



2011 Air Quality Progress Report for The Royal Borough of Kensington and Chelsea

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

May 2011



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

Report Reference number	LAQM/PR/11/final
Date	18 May 2011

Executive Summary

Under the government's Air Quality Strategy, the Council is required to assess air quality within the borough annually. The Council has been monitoring air quality since before 1995 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 was taking to work towards meeting these objectives. In September 2009, the Council published a revised Action Plan to develop new ideas, following an extensive consultation with residents and other stakeholders.

This latest progress report provides information on the review and assessment of air quality in the borough during the previous calendar year. An examination of monitoring data collected during 2010 has been undertaken for the strategy's key pollutants; nitrogen dioxide (NO₂), particulate matter (PM₁₀), carbon monoxide, benzene, 1,3-butadiene, lead, sulphur dioxide and ozone. Information on benzo(α)pyrene which is used as a marker for a complex group of hydrocarbons (PAH), ozone and PM_{2.5} is also included, though there is no requirement to do so. However these pollutants, as well as the key pollutants, are increasingly being regarded as significant threats to health. This report also provides a summary of the implementation of the actions contained in the Air Quality Action Plan 2009 -2014 in Section 9.

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

The situation for PM₁₀ and especially NO₂ remains problematic. Preliminary monitoring at the borough's five continuous monitoring sites show that exceedences of the average NO₂ annual mean objective level have occurred at all sites apart from the North Kensington background site (though even here a slight increase was experienced). Of the roadside locations, Cromwell Road and Earls Court both showed increases, whilst Knightsbridge and Chelsea showed a reduction in levels, therefore there is no clear trend overall. To meet the objectives reductions of almost 70µg/m³ are required at the worst affected road side locations, and reductions of nearly 50µg/m³ are required at some building façades locations on busy and congested roads. Exceedences of the hourly mean objective vary from site to site, from none at the North Kensington to 436 times at the Earls Court site (rather than the 18 exceedences permitted).

Monitoring of PM₁₀ at our three sites in the borough shows that these have all met the annual mean objective since 2008, though there was a slight increase in levels at North Kensington and Cromwell Road. Also, for the first time, all continuously monitored sites have met the daily mean objective level. However as the monitoring is limited to just three sites it is not possible to be certain that there are no other locations that may be close or above the objective levels in other areas of the borough. Also, as both PM₁₀ objectives have only been achieved for a relatively short time, and there are uncertainties as to whether exceedences of the daily average

objective level will continue, we are not proposing to change the approach we currently take and will not be removing this pollutant from the air quality management order. In any case the objective level is arbitrary in the strict sense that it does not reflect the fact that there is no threshold below which the presence of fine particles has no health impact.

Defra is in the process of undertaking another review of the monitoring stations it runs, which includes the Cromwell Road site. We are extremely concerned that gas monitoring (NO_x, SO₂, CO) will cease by the end of the year which will limit our understanding of public exposure to air pollution in this area.

The lack of progress towards reducing NO₂ levels is seriously worrying, given the substantial reduction needed to meet the annual mean objective and the EU time limit of 2015. We assume the government and the Mayor of London share this concern and will be bringing forward more effective measures to address the problem.

Table of contents

1	Introduction	1
1.1	Description of Local Authority Area	1
1.2	Purpose of Progress Report	2
1.3	Air Quality Objectives	2
1.4	Summary of Previous Review and Assessments	4
2	New Monitoring Data	7
2.1	Summary of Monitoring Undertaken	7
2.2	Comparison of Monitoring Results with Air Quality Objectives	14
3	New Local Developments	36
3.1	Road Traffic Sources	36
3.2	Other Transport Sources	36
3.3	Industrial Sources	36
3.4	Commercial and Domestic Sources	36
3.5	New Developments with Fugitive or Uncontrolled Sources	36
4	Local / Regional Air Quality Strategy	37
5	Planning Applications	38
6	Air Quality Planning Policies	39
7	Local Transport Plans and Strategies	40
8	Climate Change Strategies	41
9	Implementation of Action Plans	42
10	Conclusions and Proposed Actions	58
10.1	Conclusions from New Monitoring Data	58
10.2	Conclusions relating to New Local Developments	58
10.3	Other Conclusions	58
10.4	Proposed Actions	59
11	References	60

List of Figures

Figure 1:1 Map of AQMA Boundary	5
Figure 2:1 Map of Automatic Monitoring Sites	8
Figure 2:2 Map of Non-Automatic Nitrogen Dioxide Monitoring Sites	10
Figure 2:3 Map of Non-Automatic Benzene Monitoring Sites	11
Figure 2:4 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Automatic Monitoring Sites	15
Figure 2:5 Trends in the Hourly Mean Nitrogen Dioxide Concentration Measured at Automatic Monitoring Sites	16
Figure 2:6 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites (Factored)	18
Figure 2:7 Trends in Annual Mean PM ₁₀ Concentrations Measured at Automatic Monitoring Sites	22
Figure 2:8 Trends in Daily Mean PM ₁₀ Concentrations Measured at All Monitoring Sites	23
Figure 2:9 Trends in Annual Mean PM _{2.5} Concentrations Measured at all Monitoring Sites	25
Figure 2:10 Trends in Annual Mean Sulphur Dioxide Concentration Measured at Automatic Monitoring Sites	26
Figure 2:11 Trends in Annual Mean Benzo(a)pyrene Concentration Measured at Monitoring Sites in London	29
Figure 2:12 Trends in the 8-hour Ozone Exceedences Measured at Automatic Monitoring Sites	31
Figure 2:13 Trends in Annual Mean Ozone Concentrations Measured at Automatic Monitoring Sites	31
Figure 2:14 Trends in Annual Mean Lead Concentrations	32
Figure 2:15 Trends in Annual Mean Carbon Monoxide Concentrations Measured	33
Figure 2:16 Trends in the Maximum Running Annual Mean 1,3-Butadiene Measured at Automatic Monitoring Sites	34

List of Tables

Table 1.1 Air Quality Objectives included in Regulations for the purpose of Local Air Quality Management in England	3
Table 1.2 Summary of Results of First Round of Review and Assessment	4
Table 2.1 Details of Automatic Monitoring Sites	9
Table 2.2 Details of Non- Automatic Monitoring Sites	12
Table 2.3 Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with Annual Mean Objective	14
Table 2.4 Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour Mean Objective	15
Table 2.5 Results of Nitrogen Dioxide Diffusion Tubes	17
Table 2.6 Results of PM ₁₀ Automatic Monitoring: Comparison with Annual Mean Objective	21
Table 2.7 Results of PM ₁₀ Automatic Monitoring: Comparison with 24-hour Mean Objective	22
Table 2.8 Annual mean level of PM _{2.5} Automatic Monitoring	24
Table 2.9 Results of Sulphur Dioxide Automatic Monitoring: Comparison with Objectives	26
Table 2.10 Annual Mean Lead levels within the Borough	32
Table 2.11 Concentrations of CO measured in the Borough and at one central London site	33
Table 2.12 Levels of 1,3-butadiene (maximum annual running means) in London	34
Table 9.1 Action Plan Progress	44

Appendices

Appendix A	QA/QC Data
Appendix B	Monthly Mean Value Results of Nitrogen Dioxide Diffusion Tubes
Appendix C	Glossary

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.

The Royal Borough has an estimated population of 180,000, which is expected to rise to 200,000 by 2030, and the highest population density (131 people per hectare) of all local authorities in England and Wales. The 2011 census results should reveal more recent population changes. However, with the exception of the City of London it is the smallest London borough. In addition to the resident population thousands of people come into the borough each day to work and visit. About 30,000 visitors stay each night.

The borough is primarily a residential area with 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 in the borough.

There are 207 km (127.6 miles) of roads in the borough; 28 km (17 miles) (13.5 per cent) are A roads, ten km (six miles) (4.8 per cent) are B roads and the remaining 169 km (105 miles) (81.6 per cent) are C roads or unclassified. Six per cent (12.5 km (7.8 miles)) of the roads in the borough are designated as part of the Transport for London Road Network (TLRN) managed by TfL. These routes are: Westway (A40), Cromwell Road (A4), Earl's Court one-way system (A3220), Chelsea Embankment (A3212).

The restrictions on the available north/south or east/west routes also constrained by bridges mean that those routes that are available are heavily trafficked. These routes 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. The most notable changes in the past fifty years have been the construction of the Westway flyover and the decline in the use of the River Thames. However the demands placed upon it have continued to change; the movement of people, goods and services has increased, bringing more congestion to the road network.

The emission sources of pollutants from within the borough are therefore 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.

1.2 Purpose of Progress Report

Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment reports. Their purpose is to monitor trends and changes in air quality conditions as well as informing the Local Air Quality Management process.

They are not intended to be as detailed as Updating and Screening Assessment Reports, or to require as much effort. However, if the Progress Report identifies a new risk of exceedence of an Air Quality Objective, the Local Authority (LA) should undertake a Detailed Assessment immediately, and not wait until the next round of Review and Assessment.

1.3 Air Quality Objectives

The air quality objectives applicable to Local Air Quality Management (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 $\mu\text{g}/\text{m}^3$ (for carbon monoxide 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 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	5.00 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	0.25 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2005
Particles (PM₁₀) (gravimetric)	50 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
Sulphur dioxide	350 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

1.4.1 First Round of Review and Assessment

Stages One - Three

The Council completed the first round of Review and Assessment in 2000. It consisted of three stages which involved examining the sources, 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 as 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 NO_2 and PM_{10} . 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 USA was conducted in 2009. New 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 since the previous rounds of review and assessment. 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.

This 2011 progress report is the final part of the fourth round. The next report, due in 2012, will be an updating and screening 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 the continuous 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 operated by Defra, because data from these are included in the report. Although the West London site was closed by Defra in 2007, it is retained in the table as long term trends incorporate data from here. We also have 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.

Data from the Cromwell Road site was affected by significant data loss due to problems with the monitoring site's air conditioning unit. This had to be replaced with the result that the site was closed for approximately eight weeks. Sampling at the Knightsbridge site was also disrupted by stonework repairs on the Harrods façade and works to the pavement requiring the temporary re-location and re-instatement of the sampling line.

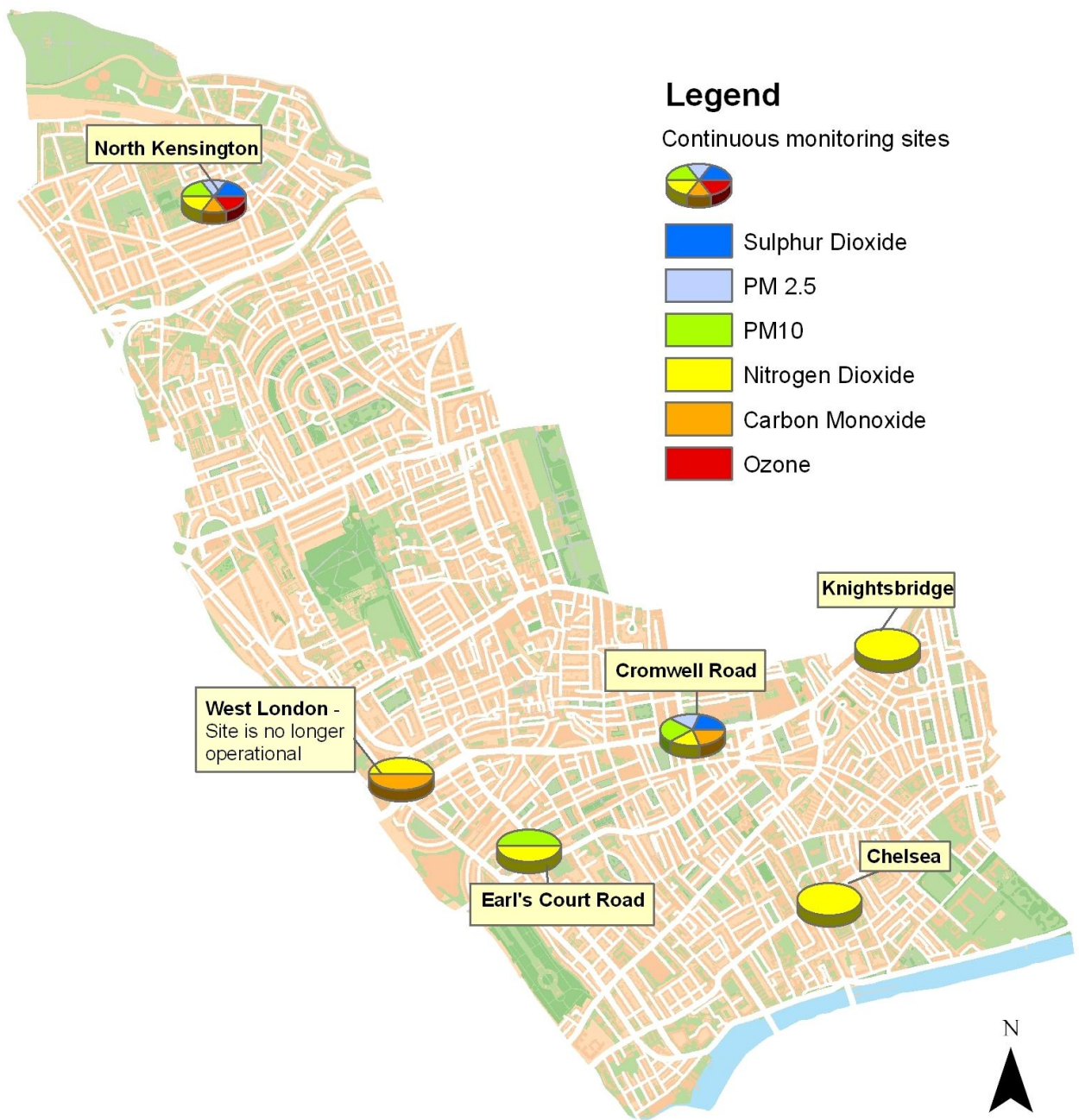
Air quality data for 2010 has been included in the report where it is available but is largely provisional. The map overleaf shows sites operating between 2006 and 2010.

We understand that Defra is nearing the end of in the process of carrying out a review of the air quality monitoring stations it operates. The Cromwell Road site is included within this review and it is possible that Defra may decide to stop monitoring nitrogen oxides from as early as October. The Royal Borough is naturally very concerned about this. Whilst the site may not conform to EU guidelines, due to its proximity to the road junction, the site does represent exposure experienced by a significant number of residents and visitors. The length of time that this site has been open is also invaluable for trend monitoring. Its significance must not be underestimated and we would urge Defra to take this into account before coming to a final decision.

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



© Crown copyright and database rights 2011
Ordnance Survey 100021668

Status: Final
Date: April 2011
Author: Environmental Quality



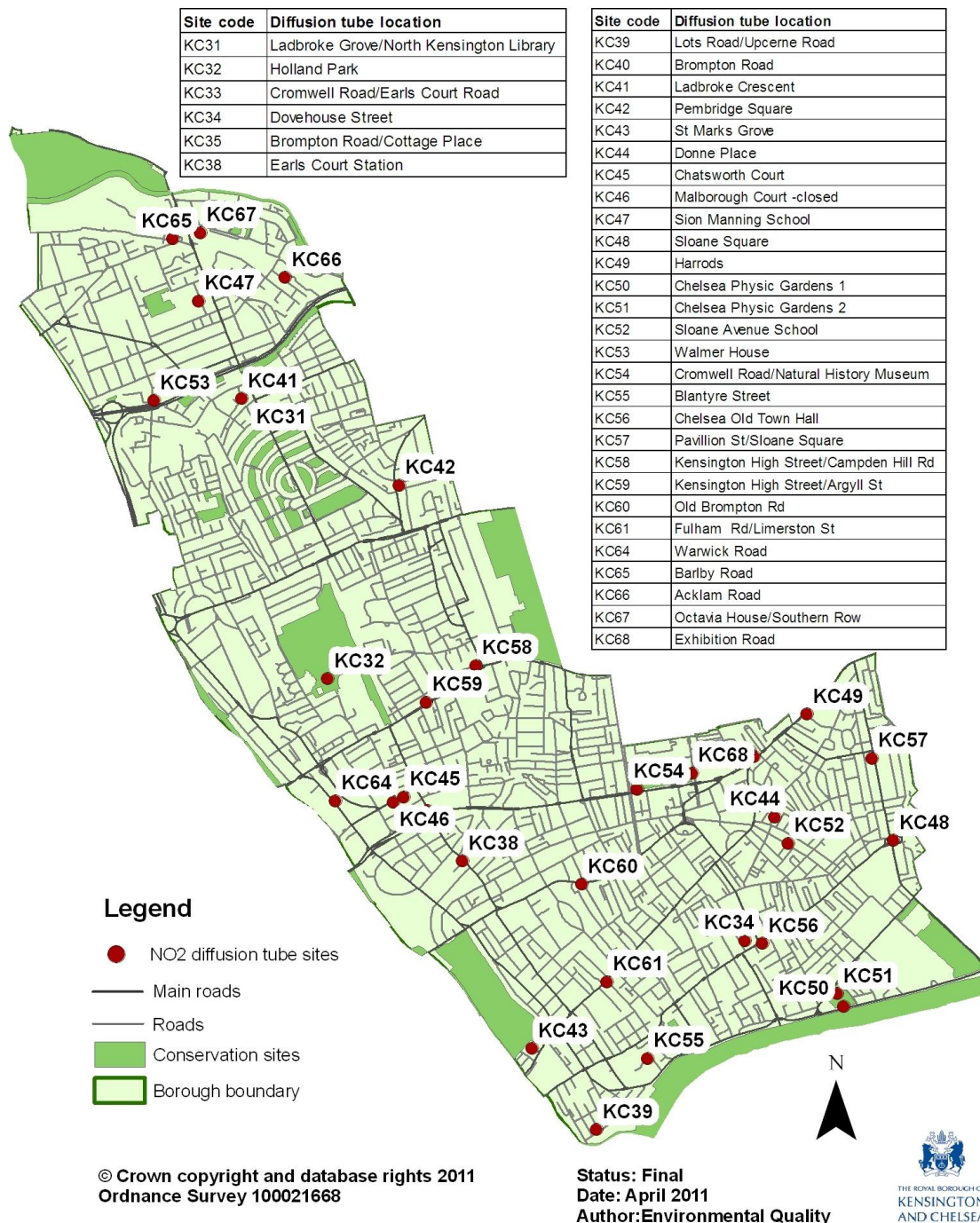
Table 2.1 Details of Automatic Monitoring Sites

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	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
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	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, also known as 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 included, as data from this site is referred to in the report.

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.

Three months of benzene data from July to September 2010 had to be eliminated from the final results due to a possible contamination/sample degradation issue that remains unidentified. This has resulted in significant data loss for the year.

Figure 2:3 Map of Non-Automatic Benzene Monitoring Sites

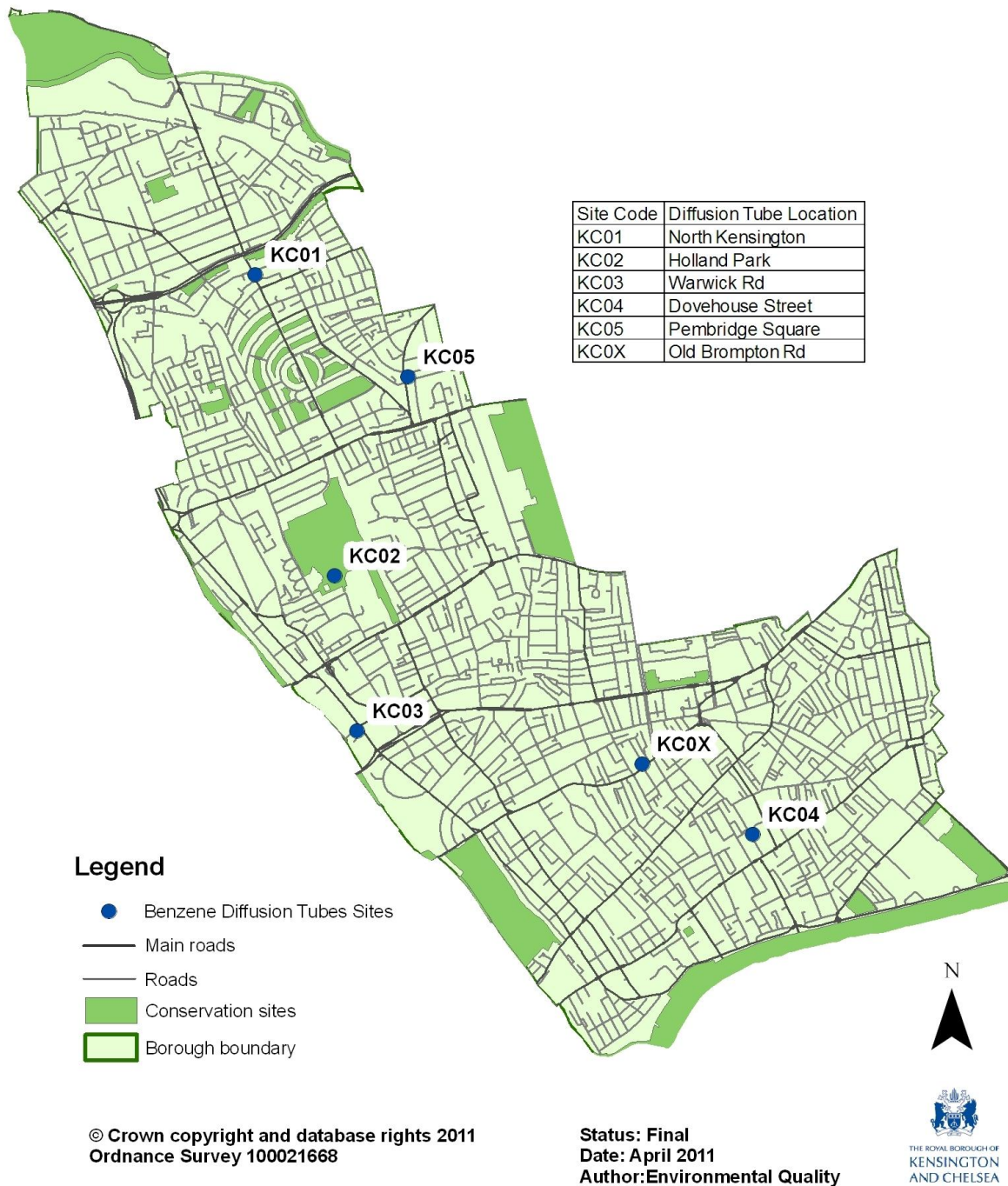


Table 2.2 overleaf provides further details of the 33 NO₂ and five benzene diffusion tube sites operating in the borough in 2010/11.

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 its 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. As mentioned previously, the West London monitoring site was closed in 2007 following a review by Defra of its monitoring network. 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.

Mean concentrations during 2010 (based on unratified data) increased slightly at three sites and decreased at two sites since last being reported.

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 2010 %	Annual mean concentrations (µg/m ³)				
				2006	2007	2008	2009	2010
KC1	North Kensington	Y	91	38	39	33	33	36
AURN	West London*	Y	closed	51	46	-	-	-
KC5	Earls Court*	Y	92	-	-	107	107	109
AURN	Cromwell Rd 2	Y	68	84	72	67	72	74
KC3	Knightsbridge	Y	85	95	94	94	89	85
KC4	Kings Road Chelsea	Y	90	96	91	93	93	87
AURN	Marylebone Rd	Y	97	112	102	115	107	97

* These sites have operated for part of a year. Data capture for West London site in 2007 was 82%; 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 monitoring results for 2010 at continuous sites show that exceedences of the average NO₂ annual mean objective level of 40 µg/m³ have occurred at all sites in the borough apart from the North Kensington background site. No clear overall trend is apparent. North Kensington, which had remained at the same level for two years, increased in 2010 though is still below the objective level. Of the roadside locations, Cromwell Road and Earls Court both showed increases, whilst Knightsbridge and Chelsea showed a reduction in levels.

The chart below shows the longer term trend since 2000; only North Kensington, Cromwell Road and West London (until it was closed) have shown an overall downward trend. However, over the same period the sites at Chelsea and Knightsbridge have shown an overall increase in the annual mean level. Over the period shown, a greater divergence in concentrations has also become apparent between background and roadside sites.

Figure 2:4 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Automatic Monitoring Sites

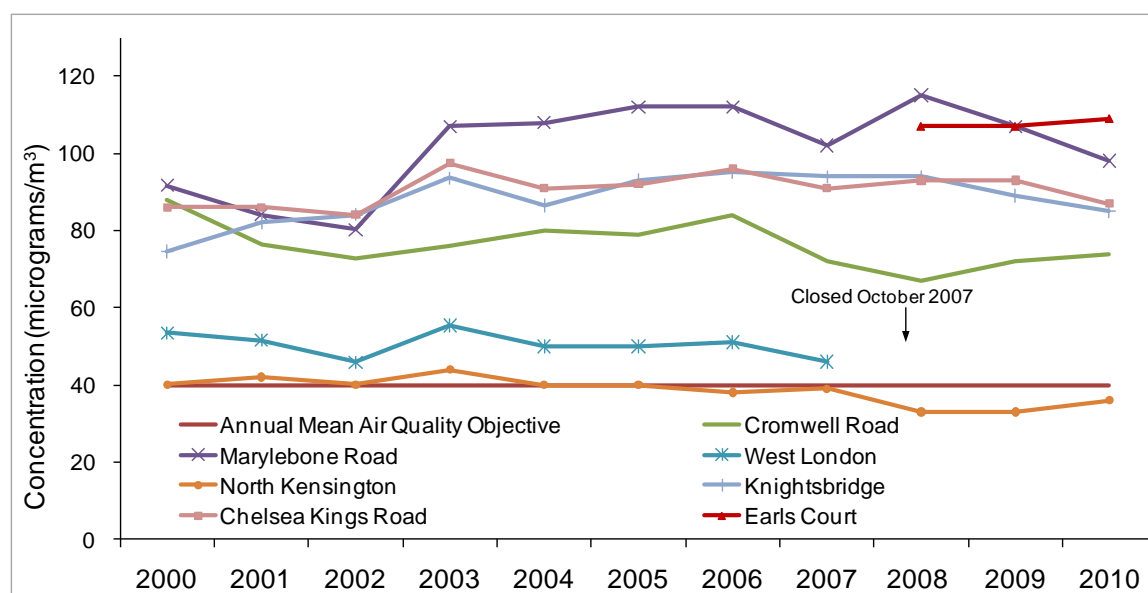


Table 2.4 Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour Mean Objective

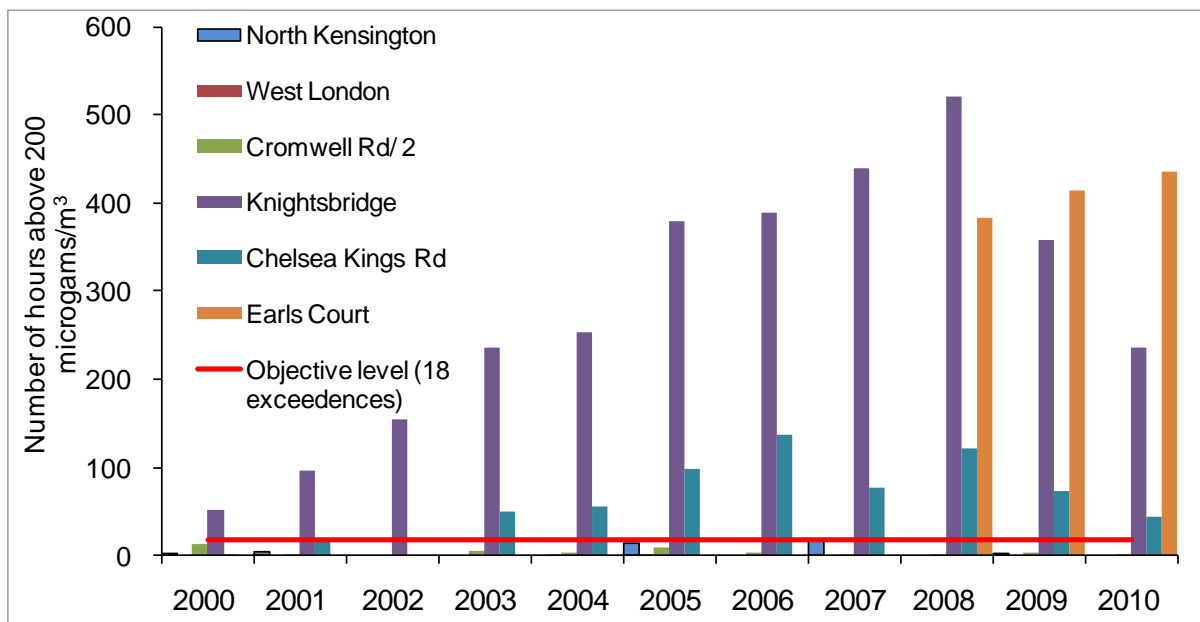
Site ID	Location	Within AQMA ?	Data Capture for full calendar year 2010 %	Number of Exceedences of hourly mean (200 µg/m ³) Where valid data is less than 90% the 99.8 th percentile of hourly means is shown in brackets				
				2006	2007	2008	2009	2010
KC1	North Kensington	Y	91	0	17 (201)	0 (122)	1	0
AURN	West London*	Y	closed	0	0	-	-	-
KC5	Earls Court*	Y	92	-	-	384 (242)	414	436
AURN	Cromwell Rd 2	Y	68	4	2	1 (147)	3	1
KC3	Knightsbridge	Y	85	389	440	520	358	236
KC4	Kings Road Chelsea	Y	90	136	77	122	72	43
AURN	Marylebone Rd	-	97	676	452	822	477	511

2010 data (in italics) is provisional and should be treated with caution. Source Londonair.org.uk.
Data in *italics* (2010) is provisional and should be treated with caution. **Bold** indicates an exceedence of the hourly mean objective (Table 1.1).

In 2010, exceedences of the hourly mean (above $200\mu\text{g}/\text{m}^3$) vary from site to site, from none at the background site to 436 at the Earls Court Site (rather than the 18 exceedences permitted). Three of the five sites (Knightsbridge, Chelsea Kings Road and Earls Court) exceeded the objective in 2010 by a very wide margin; this illustrates that meeting the objective is highly problematic.

The chart below shows the number of hourly exceedences at sites in the borough since 2000. As mentioned, the hourly objective should not be exceeded more than 18 times in a year. Overall the trend for the past 10 years shows an increase in the number of exceedences. In 2010 levels at the Earls Court site were at their highest; however at the Knightsbridge and Chelsea sites exceedences were down compared to the previous year.

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 NO_2 was collected at 33 locations in the borough in 2010. The details of all the diffusion tube sites can be found in Table 2.2.

Table 2.5 presents factored annual mean concentrations for 34 sites, 33 of which operated in 2009 (full dataset of monthly mean values is included in Appendix B). 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 2010 has been calculated as 1.06. Details of the analytical laboratory and bias adjustment methodology are described in Appendix A.

The results indicate that only two 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 thirteen are at risk of exceeding the hourly mean objective (shaded cells), that is, sites 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 2008 and 2009 show no clear overall trend; a smaller number of sites have shown small reductions in levels whilst others show an increase.

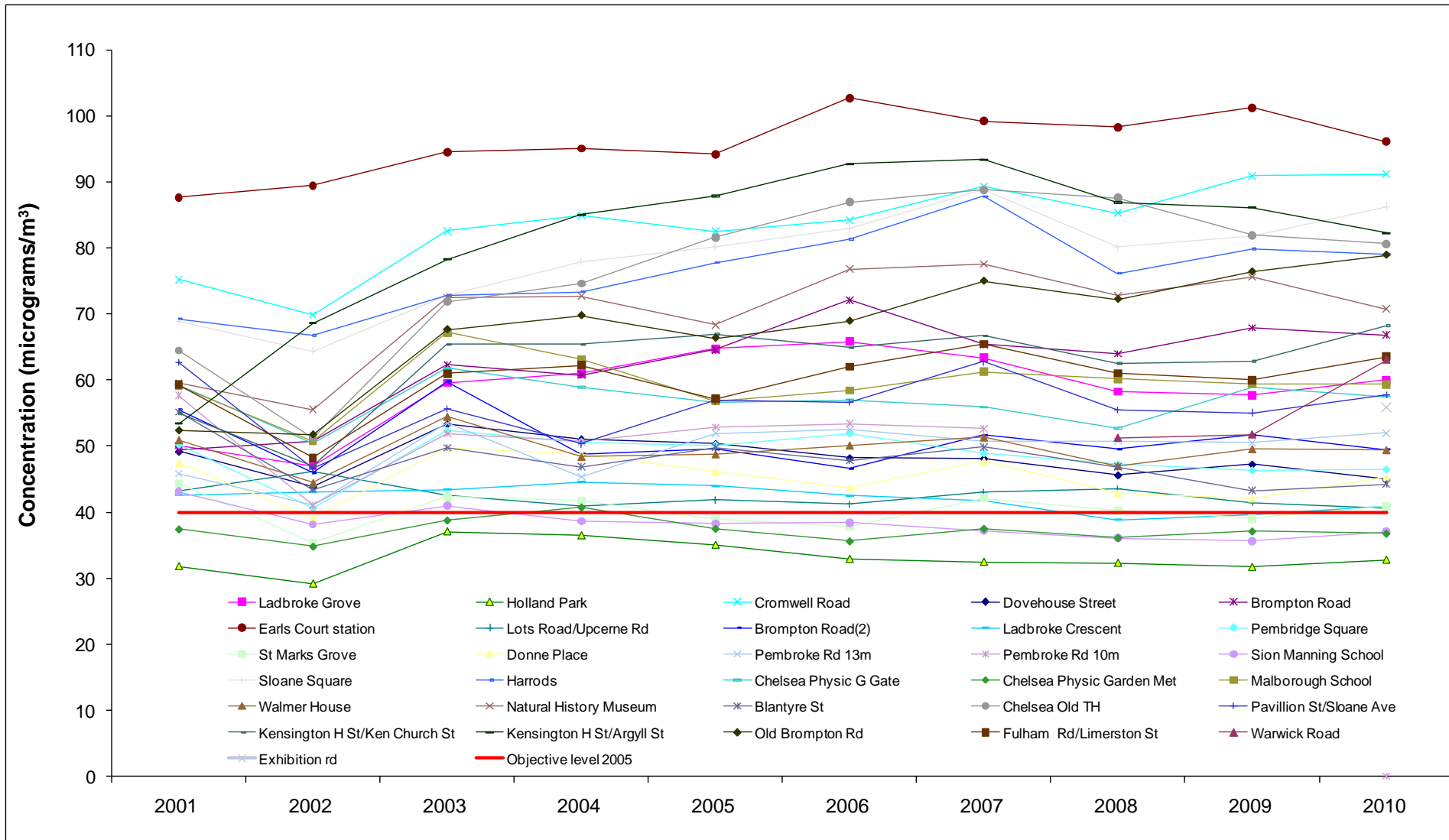
Table 2.5 Results of Nitrogen Dioxide Diffusion Tubes

Site ID	Location	Within AQMA?	Data Capture for monitoring period ^a %	Data Capture for full calendar year 2010 %	Annual mean concentrations ($\mu\text{g}/\text{m}^3$) Adjusted for bias			
					2007	2008	2009	2010 [#]
KC31	Ladbroke Grove/Nth Ken Library	Y		100	63.4	58.2	57.7	60.0
KC32	Holland Park	Y		100	32.5	32.3	31.7	32.8
KC33	Cromwell Road/Earls Court Rd	Y		92	89.3	85.3	90.9	91.2
KC34	Dovehouse Street	Y		100	48.1	45.6	47.2	44.9
KC35	Brompton Road/Cottage Place	Y		100	65.4	64.0	67.9	66.8
KC38	Earls Court Station	Y		100	99.2	98.2	101.2	96.1
KC39	Lots Road/Upcerne Road	Y		83	43.0	43.5	41.4	40.7
KC40	Brompton Road	Y		100	51.6	49.5	51.6	49.5
KC41	Ladbroke Crescent	Y		100	41.8	38.8	39.6	40.9
KC42	Pembridge Square Library	Y		100	48.9	47.2	46.3	46.4
KC43	St Marks Grove	Y		100	42.1	40.2	39.1	40.8
KC44	Donne Place	Y		92	47.7	42.8	42.1	45.3
KC45	Chatsworth Court	Y		100	50.8	50.7	50.5	52.0
KC46	Marlborough Court	Y		100	52.6	closed	closed	closed
KC47	Sion Manning School	Y		100	37.2	36.0	35.6	37.1
KC48	Sloane Square	Y		92	88.9	80.1	81.8	86.3
KC49	Harrods	Y		92	87.8	76.1	79.8	79.0
KC50	Chelsea Physic Garden (Gate)	Y		92	55.9	52.7	58.9	57.5
KC51	Chelsea Physic Garden (Met Station)	Y		92	37.5	36.1	37.1	36.8
KC52	Sloane Ave. nr Marlborough school	Y		92	61.3	60.2	59.4	59.4
KC53	Walmer House	Y		100	51.3	47.0	49.6	49.4
KC54	Cromwell Rd/Natural History Museum	Y		92	77.6	72.8	75.6	70.7
KC55	Blantyre St	Y		100	49.9	46.9	43.2	44.3
KC56	Chelsea Old Town Hall	Y		92	88.8	87.6	81.9	80.6
KC57	Pavillion St/Sloane Ave	Y		92	62.8	55.5	55.0	57.7
KC58	Kensington H St/Kensington Church St	Y		83	66.7	62.5	62.8	68.2
KC59	Kensington H St/Argyll St	Y		100	93.4	86.9	86.1	82.2
KC60	Old Brompton Rd/Draycott Ave	Y		92	75.0	72.2	76.4	78.9
KC61	Fulham Rd/Limerston St	Y		100	65.4	61.0	60.0	63.5
KC64	Warwick Rd	Y		100	-	51.2	51.7	63.0
KC56	Barlby Road*	Y		100	-	-	39.6	40.8
KC66	Acklam Road*	Y		100	-	-	43.4	45.9
KC67	Southern Row*	Y		100	-	-	41.6	43.6
KC68	Exhibition Road	Y		67	-	-	-	55.9

Bias adjustment factor 2010= 1.06; 2009 = 1.00; 2008 = 0.98; 2007 = 1.01 (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). Shaded areas indicate a risk that the 1-hour objective may also be exceeded. * period mean reported in 2009 (May 2009- March 2010)

Figure 2.6 illustrates the trend since 2001. Overall, many sites (mainly roadside locations) have recorded increased levels; a few of the urban background sites have seen reductions, whilst others have shown little overall change. Despite some recent signs of improvement there is no clear indication of a consistent downward trend.

Figure 2:6 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites (Factored)



Overall Nitrogen Dioxide Conclusions

Apart from relatively small improvements at some mainly urban background locations, the majority of the borough continues to exceed the annual mean objective by an appreciable margin. Reductions of almost $70\mu\text{g}/\text{m}^3$ are required at the worst road side positions and reductions of almost $50\mu\text{g}/\text{m}^3$ are required at building facades location 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 $10\text{-}40\mu\text{g}/\text{m}^3$ are needed, whilst at the least trafficked residential roads; the reduction needed may only be a few micrograms.

The hourly mean is also exceeded at approximately a third of monitoring locations. These are predominately the busier roadside locations such as high streets. Hourly exceedences would have to be reduced by 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 locations.

The extent of these exceedences continues to have serious health implications. At some individual sites, levels are more than twice the annual objective level. Time is running out rapidly, if this borough and other parts of inner London are to meet the objective 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. This issue has meant that a consistent long term dataset has been difficult 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). Whilst these instruments were recently identified as not being equivalent to gravimetric methods, the corrected data (factored by 1.3) from these sites was considered suitable for local air quality management purposes. However, following a successful bid for a Defra grant, the Council's two TEOMS were upgraded to FDMS units in 2009. This data can be reported without any correction applied. Further developments also mean that TEOM data from 2004 onwards has been adjusted using the Volatile Correction Method (VCM) to make it comparable to FDMS measurements. Data using TEOM*1.3 has been included so that the effect of these changes can be seen in relation to new adjustment factors and the latest monitoring methods.

Defra operate partisol instruments (gravimetric samplers equivalent to the EU reference method) at the North Kensington site. However this monitoring was interrupted between 2007 and 2008 following a review of the Defra monitoring networks and concerns over the quartz filters used¹. This data was collected by Defra for research purposes to compare different particle monitoring techniques. These instruments restarted in 2009.

The Council has also operated a partisol (gravimetric) sampler at the Earls Court Road (since May 2002) using Teflon coated glass fibre (Emfab) filters which are not affected by the same issues as the quartz filters. This site offers the longest data series in the borough which is unaffected by the various changes resulting from measurement issues that have occurred elsewhere.

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

¹ Maggs, R., Harrison, D., Carslaw, D., Stevenson, K. (2009) Analysis of Trends in Gravimetric Particulate Mass Measurements in the United Kingdom

not considered representative. However it is important to note that for the following reasons this is not a reasonable conclusion:

- The EU directive (which the air quality regulations transpose into UK legislation) state that the limit values should apply at all locations apart from where members of the public do not have access to factory premises, or on the carriage way or central reservations of roads;
- The current objectives are weaker than the provisional more stringent objectives;
- And there is no known threshold level at which no health effects are detectable

Table 2.6 shows particulate data collected in the borough and at other central London locations using various methods and adjustments between 2006 and 2010. Data capture for some sites are especially low due to changes at sites and is included for indicative purposes only. Comparisons with objective levels need to be treated with caution where concentrations are close to the objective level, especially for 2010 data which is unratified.

Table 2.6 Results of PM₁₀ Automatic Monitoring: Comparison with Annual Mean Objective

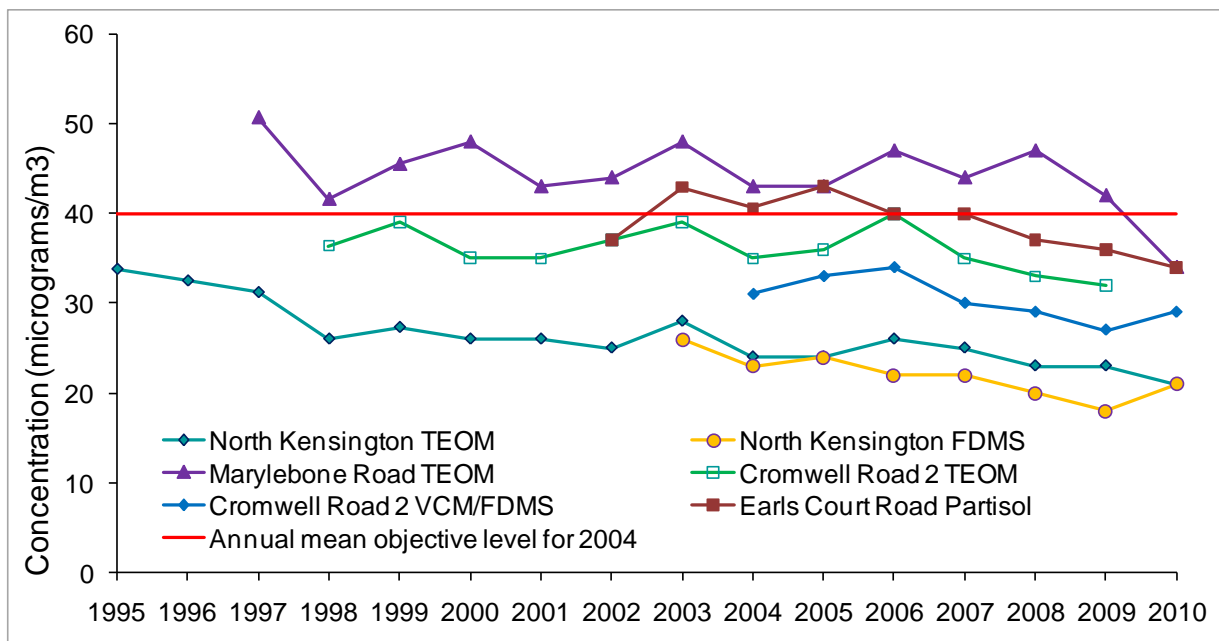
Site ID	Location	Method	Within AQMA?	Data capture for previous years %	Data capture 2010 %	Annual mean concentrations (µg/m ³)				
						2006*	2007*	2008*	2009	2010
KC1	North Kensington TEOM	1.3	Y	98,98	96	26	25	23	23	20
KC1	North Kensington FDMS		Y	98,98	64	22	22	21	18	21
AURN	N Kensington Partisol	None	Y	91, 73, 45, 81	95	32	28	19	20	16
KC2	Cromwell Rd 2 TEOM	1.3	Y	98,57	-	40	35	33	32	-
KC2	Cromwell Rd 2 VCM/FDMS	VCM	Y	98, 95	62	34	30	29	27	29
KC5	Earls Court Partisol	None	Y	86,95	90	40	40	37	36	34
AURN	Bloomsbury TEOM	1.3	-	98	89	30	29	26	23	18
AURN	Marylebone Rd TEOM	1.3	-	96,97	96	47	45	47	42	34
AURN	Marylebone Rd FDMS	none	-	96	91			35	35	32
AURN	Marylebone Rd Partisol	none	-	76, 66, 58, 97	82	46	47	39	39	30

* though means should be “annualised” as in Box 3.2 of LAQN TG(09), if monitoring was not carried out for the full year this has not been undertaken for the Marylebone Road or North Kensington partisol data. **Bold** indicates an exceedence of the annual mean objective. Data in *italics* is provisional and should be treated with caution.

The annual mean results for 2010 are within the objective level at the monitoring sites. However there has been an increase (as measured by FDMS) at North Kensington and Cromwell Road, but a small decrease at Earls Court between 2009 and 2010.

The chart below (Figure 2.7) shows that overall levels have declined over the longer term in the borough.

Figure 2:7 Trends in Annual Mean PM₁₀ Concentrations Measured at Automatic Monitoring Sites

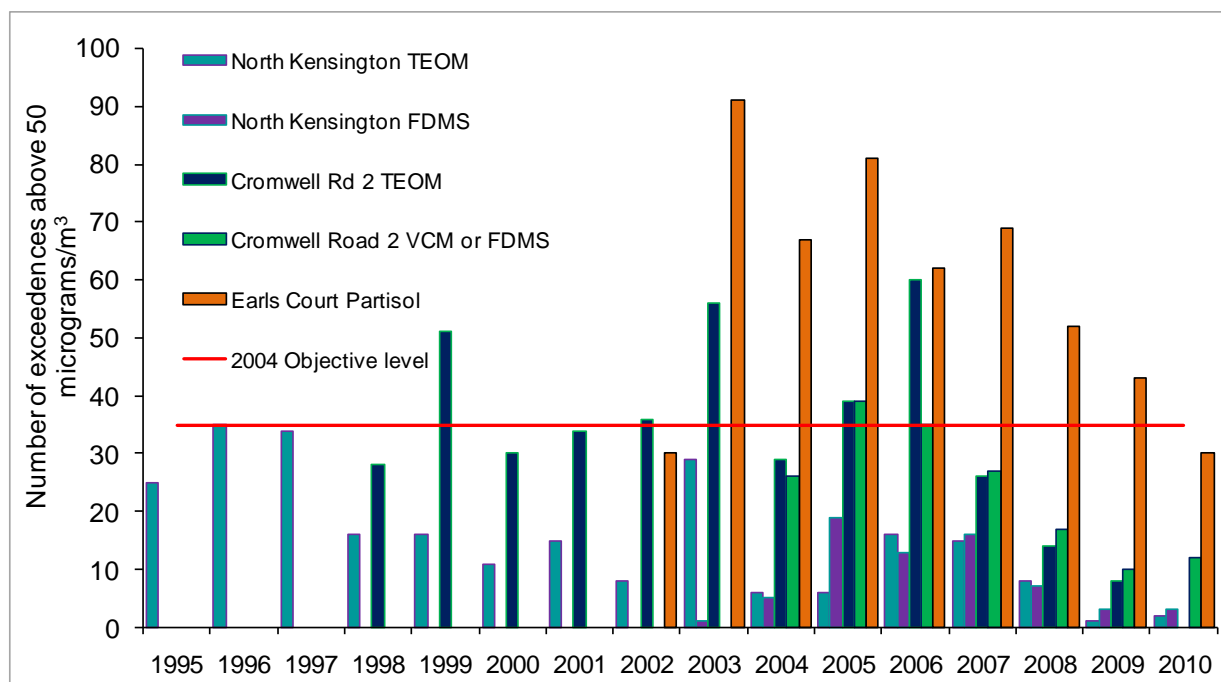


The table below shows data for exceedences of the daily mean objective for three sites in the borough and other sites (for comparative purposes). The data includes various monitoring methods. In 2010, for the first time, all sites within the borough, met the hourly objective level. However, early indications for 2011 show this is unlikely to continue as there have already been 16 exceedences in the first three months of the year.

Table 2.7 Results of PM₁₀ Automatic Monitoring: Comparison with 24-hour Mean Objective

Site ID	Location	Factor	Within AQMA ?	Data Capture 2008 %	Data Capture 2009 %	Data Capture 2010# %	Number of exceedences of 24 hourly mean (50 µg/m ³) - 35 are permitted 90 th %tile shown in brackets where data capture less than 90 %				
							2006	2007	2008	2009	2010
KC1	North Kensington TEOM	1.3	Y	98	98	96	16	15	8	7	2
KC1	North Kensington FDMS	VCM	Y	98	86	64	13	18	11	3	3
AURN	N Kensington Partisol	None	Y	45	81	95	22	19	N/A	7	2
KC2	Cromwell Rd2 TEOM	1.3	Y	98	95	-	60	26	14	8	-
KC2	Cromwell Rd2 VCM/FDMS	VCM	Y	98	95	62	35	27	15	14	12
KC5	Earls Court Partisol	None	Y	86	95	90	62	69	52 (74.4)	43	30
AURN	Bloomsbury TEOM	1.3	Y	81	<50	89	21	13	9 (48.5)	9	2
AURN	Marylebone Rd TEOM	1.3	Y	96	97	96	149	119	151	110	77
AURN	Marylebone Rd FDMS	none	-	93	96	91	-	-	-	32	25
AURN	Marylebone Rd Partisol*	none	-	58	97	82	69	62	N/A	36	15

i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.) * Partisol Data 2006 – 2007 < 90th percentile not calculated.

Figure 2:8 Trends in Daily Mean PM₁₀ Concentrations Measured at All Monitoring Sites

PM₁₀ conclusions

Monitoring trends in the borough reveal that the three monitoring sites in the borough including the Earl's Court monitor (EU reference equivalent method) have met the annual mean objective for PM₁₀ since 2008. The Earls court site has also met the daily mean objective level in 2010 for the first time. However as the monitoring of particles is limited to three sites it is not possible to be certain that there are no other locations that may be close or above the objective levels in other areas of the borough. Also the exceedence of the daily mean is subject to far greater variations than annual mean levels from year to year. Therefore it would be premature to conclude that PM₁₀ levels are no longer of concern in the borough especially as monitoring in 2011 has revealed a large number of exceedences of the daily mean already.

2.2.3 Particulate Matter (PM_{2.5})

The latest Air Quality Strategy² set a cap of 25µg/m³ for particulate matter (PM_{2.5}) and 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.

² Defra (2007) The Air Quality Strategy for England, Scotland, Wales, and Northern Ireland

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 at the North Kensington site by Defra using a gravimetric instrument since 2002. This monitoring was interrupted in October 2007 following concerns regarding the filters used in the instruments. Monitoring restarted in 2008 and is now additionally monitored with an FDMS instrument which is a continuous method.

Table 2.8 Annual mean level of PM_{2.5} Automatic Monitoring

Year	Site	Annual mean µg/m ³ (TEOM FDMS)	Annual mean µg/m ³ (GRAV)	% Data Capture	
2002	North Kensington (Partisol)	-	18	91	
	Bloomsbury TEOM	14	-	87	
	Marylebone Road (Partisol)	-	26	79	
	Marylebone Road TEOM	22	-	96	
2003	North Kensington (Partisol)	-	21	87	
	Bloomsbury TEOM	14	-	96	
	Marylebone Rd (Partisol)	-	30	83	
	Marylebone Rd TEOM	19	-	93	
2004	North Kensington (Partisol)	-	16	89	
	Bloomsbury TEOM	13	-	98	
	Marylebone Road Partisol)	-	26	88	
	Marylebone Road TEOM	19	-	96	
2005	North Kensington (Partisol)	-	18	93	
	Bloomsbury TEOM	13	-	94	
	Marylebone Rd (Partisol)	-	26	83	
	Marylebone Rd TEOM	19	-	97	
2006	North Kensington (Partisol)	-	18	94	
	Bloomsbury TEOM	14	-	98	
	Marylebone Road (Partisol)	-	27	87	
	Marylebone Road TEOM	21	-	98	
2007	North Kensington (Partisol)	-	16	76	
	Bloomsbury TEOM	14	-	88	
	Marylebone Rd (Partisol)	-	24	75	
	Marylebone Rd TEOM	20	-	96	
2008	North Kensington (Partisol)	<i>No data due to changes to network</i>			
	North Kensington TEOM FDMS	18			
	Bloomsbury TEOM	13		77	
	Marylebone Rd (Partisol)	<i>No data due to changes to network</i>			
2008	Marylebone Rd TEOM	20		94	
	2009	North Kensington (Partisol)	-	11	89
		North Kensington-TEOM FDMS	14	-	97
		Cromwell Road-TEOM FDMS*	16.0	-	33
Bloomsbury TEOM		16.3	-	91	
Marylebone Rd (Partisol)		-	18	81	
Marylebone Rd TEOM-FDMS		21	-	94	
2010	North Kensington (Partisol)	-	14	94	
	North Kensington-TEOM-FDMS	14	-	92	
	Cromwell Road-FDMS*	<i>No data</i>			
	Bloomsbury TEOM-FDMS	16	-	89	
	Marylebone Rd (Partisol)	-	16.7	30	
	Marylebone Rd TEOM-FDMS	21	-	91	

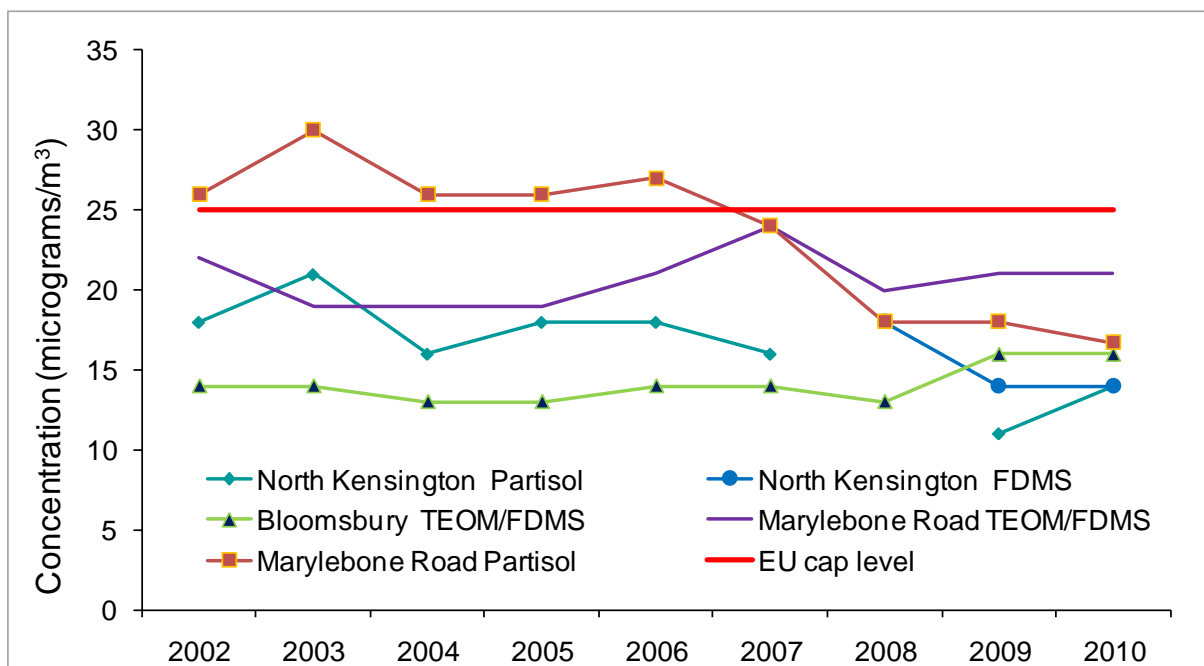
*Monitoring of PM_{2.5} at Cromwell Road began in 2009. Data in *italics* (2009) is provisional and should be treated with caution. **Bold** indicates an exceedence of the hourly mean objective (Table 1.1). *Italics* represent unratified data.

Recent data (2010) appears to suggest the cap concentration is met at the central London sites included in the table, however much of the data is not fully ratified and should be treated with some caution. In examining the longer term trends, it should be noted that the

data series has been affected (interruption to monitoring), to a certain extent, due to changes to monitoring methodology and equipment.

The figure below compares concentrations with the EU cap level. Levels appear to be stabilising in 2010 at North Kensington urban background site for both FDMS and partisol derived data. However, the change in levels at Marylebone Road, a kerbside location, is less clear, whilst the partisol indicates a continued slight drop in concentrations; the FDMS appears to show levels have stabilised. This discrepancy may be partly due to the differences between the methods of monitoring.

Figure 2:9 Trends in Annual Mean PM_{2.5} Concentrations Measured at all Monitoring Sites



The exposure reduction target is based on the three year average from 2009 to 2011 at urban background locations. The annual mean concentrations currently being measured at urban background sites would indicate that a national exposure reduction target of 15 per cent, is likely to be applied, to be achieved by 2020.

It is therefore important that measures to reduce PM_{2.5} are not deferred by an apparent meeting of PM₁₀ objectives.

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

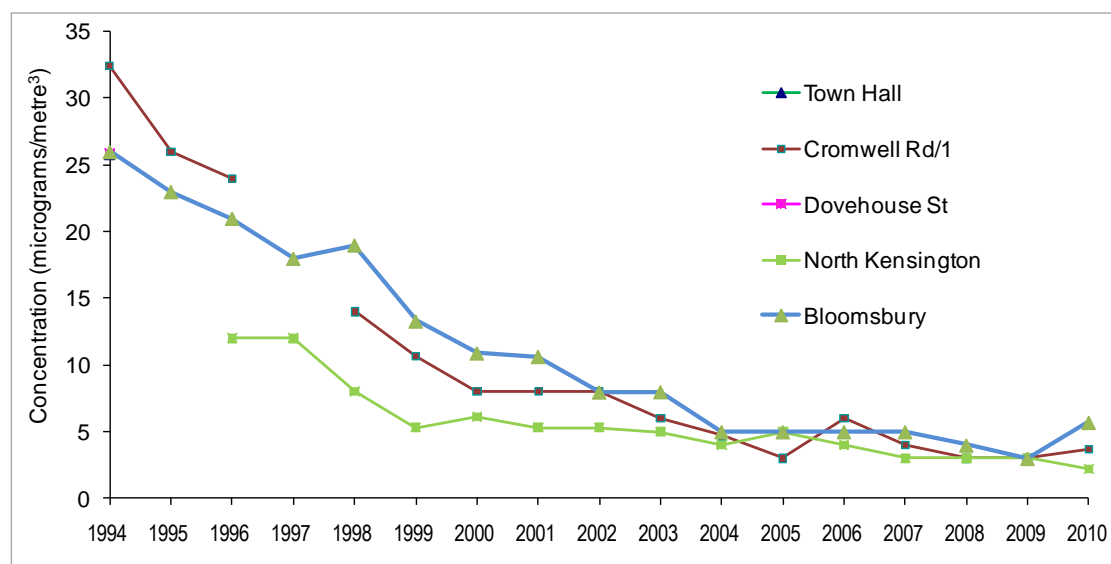
Monitoring data is currently collected at two sites in the borough and is shown in the table below. Data from Bloomsbury (outside the borough) is also included in the table below. Historical data based on non continuous ‘8 port bubbler’ method is also available from the Dovehouse Street and Town Hall sites. These monitoring sites are representative of residential areas away from busy roads and levels 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 2010 %	Annual mean	Number of Exceedences 2010		
					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	94	2.2	0	0	0
AURN	Cromwell Road	Y	67	3.7	0	0	0
AURN	Bloomsbury	N	96	5.7	0	0	0

No exceedences of any of the objectives have been observed in the past ten years at monitoring locations in the borough. There was a slight increase in the annual mean at Cromwell Road but a slight decrease at North Kensington in 2010 compared to 2009. Elevated SO₂ is most likely to be the result of plume grounding episodes arising from industrial sources in the East Thames area but none have resulted in any exceedences. 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

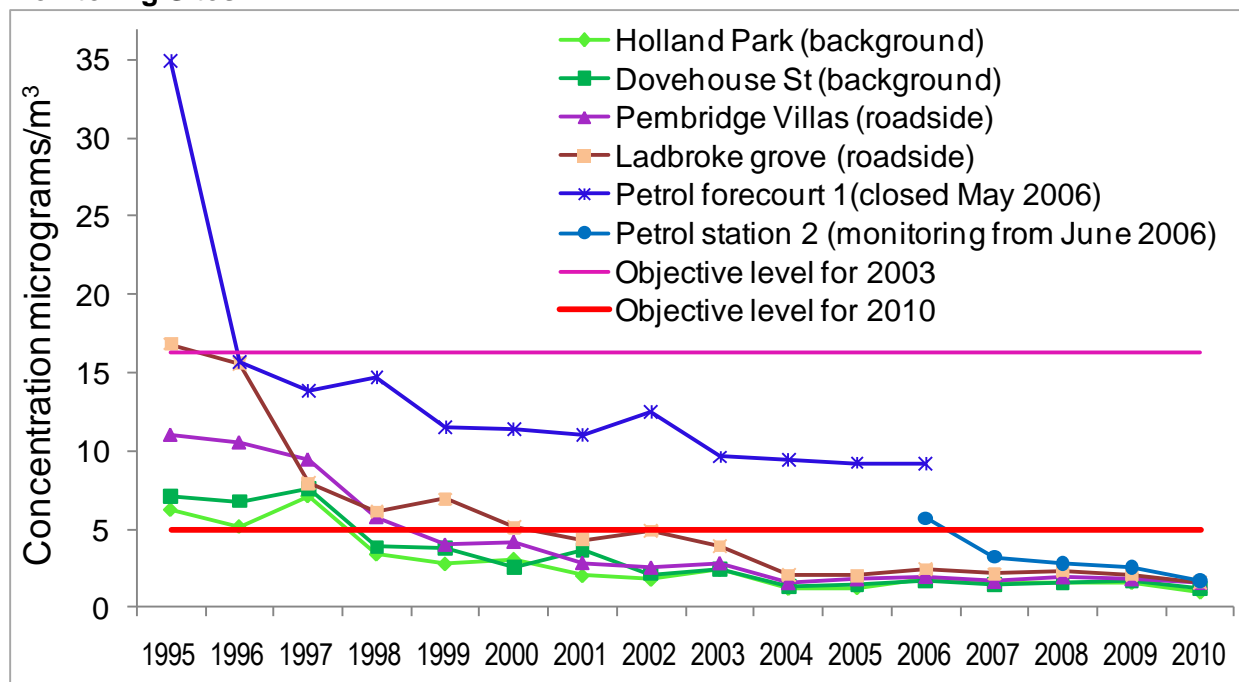
We currently undertake sampling at five locations using diffusion tubes, these include two roadside, two background, and one site in close proximity to a petrol station forecourt. The petrol station has operated stage two (in addition to stage one) vapour recovery since 2007.

The highest levels of benzene have generally been recorded at the petrol station sites. However this difference is far less noticeable in recent years. 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 since 2000 (the measured annual mean is assumed to be the equivalent of the running annual mean). Results for 2010 show a decline in levels compared to 2009 (data capture for 2010 was 75% at all sites due to a loss of data from possible contamination or sample degradation).

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

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)

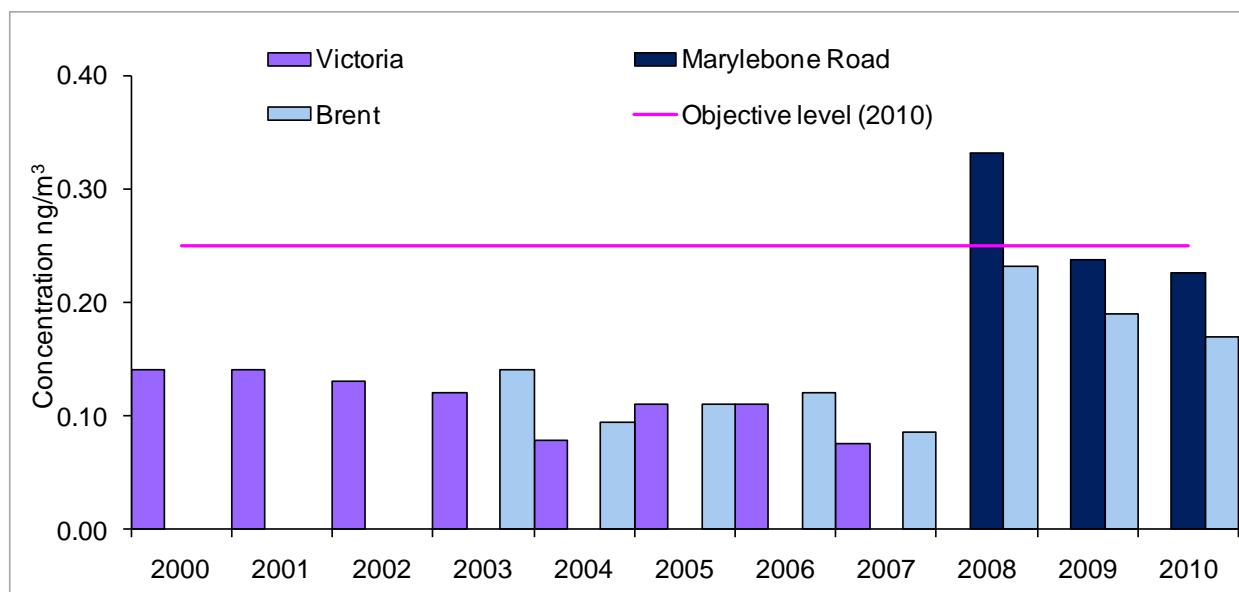
Polycyclic Aromatic Hydrocarbons (PAHs) are a complex mixture of organic compounds some of which are carcinogens. The Government has set an objective for these pollutants. It would be very difficult and expensive to monitor a selection of these pollutants, consequently, the Government has selected benzo(a)pyrene (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 has been included in this report, for information. 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 in the future if the use of biomass or biofuels becomes more widespread.

The monitoring method at Brent changed between 2007 and 2008. Marylebone Road monitoring began in 2008. The results appear to be higher after 2007, It is not clear if the levels have increased or are due to a change in the method. Of the available data it appears that the objective was exceeded only at Marylebone Rd in 2008.

The most recent data available from monitoring at sites in Marylebone Road and Brent are included in the chart below. Only data for January to September was available from the Defra data archive at the time of preparing the report. Indications are that levels of benzo(a)pyrene are below the objective level in 2010.

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

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

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 more 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 shows levels of ozone at a background location in the borough, in comparison to the objective level (as shown by the red line). There is no clear overall trend from 2000 to the present though there has been a decrease in the number of periods exceeding the objective in 2009 and 2010.

Figure 2:12 Trends in the 8-hour Ozone Exceedences Measured at Automatic Monitoring Sites

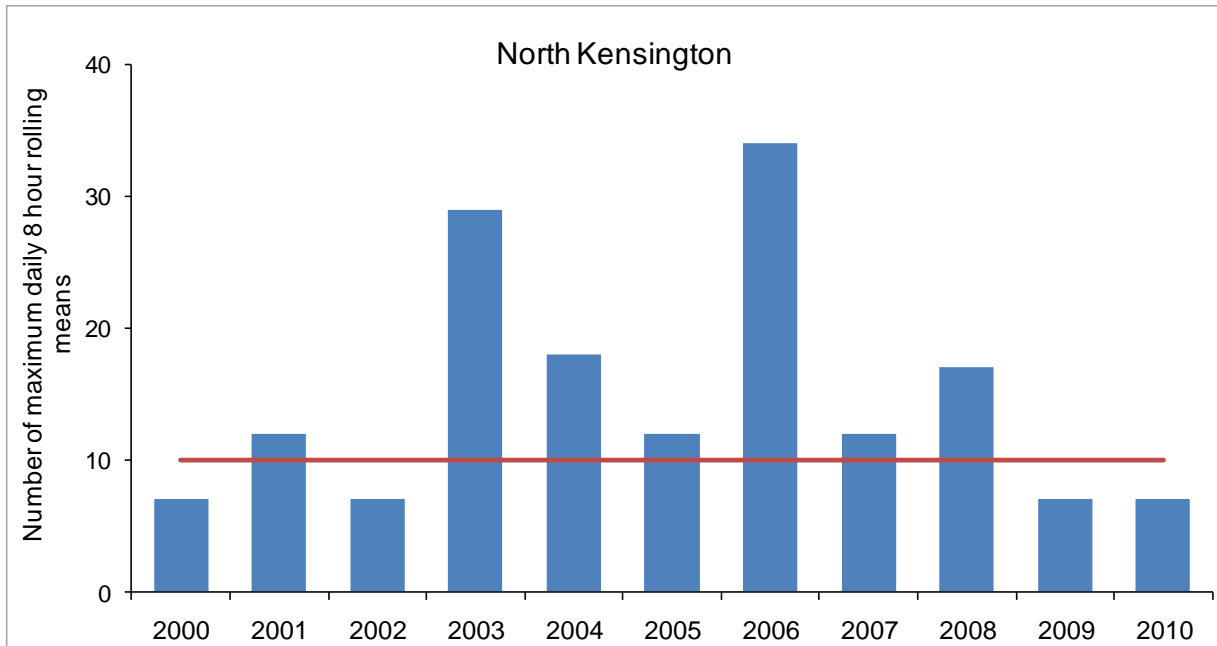
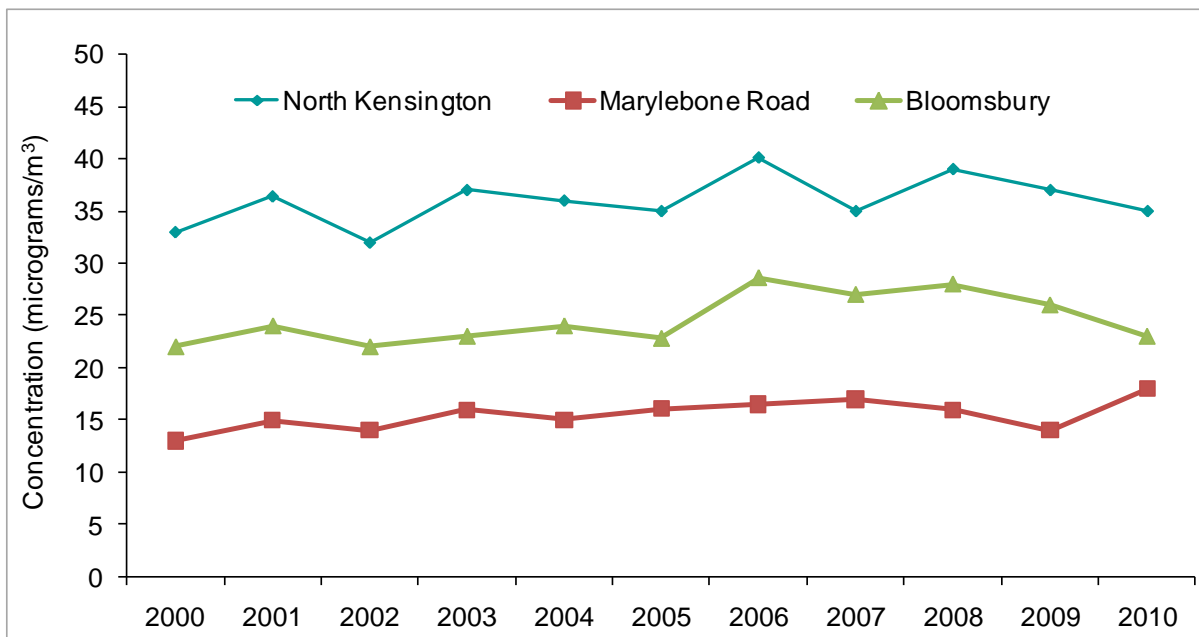


Figure 2:13 shows annual mean levels of ozone measured at the North Kensington, and Bloomsbury (background) sites, Marylebone Road- a roadside location site (the two latter sites are located outside the borough) from 2000. Concentrations of ozone at the roadside location are lower due to its oxidation by traffic pollutants. This chart also shows that, overall, annual mean levels have increased over the period shown but that during 2010 there was a fall in levels compared to 2009 at the background sites but an increase at the roadside site.

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).

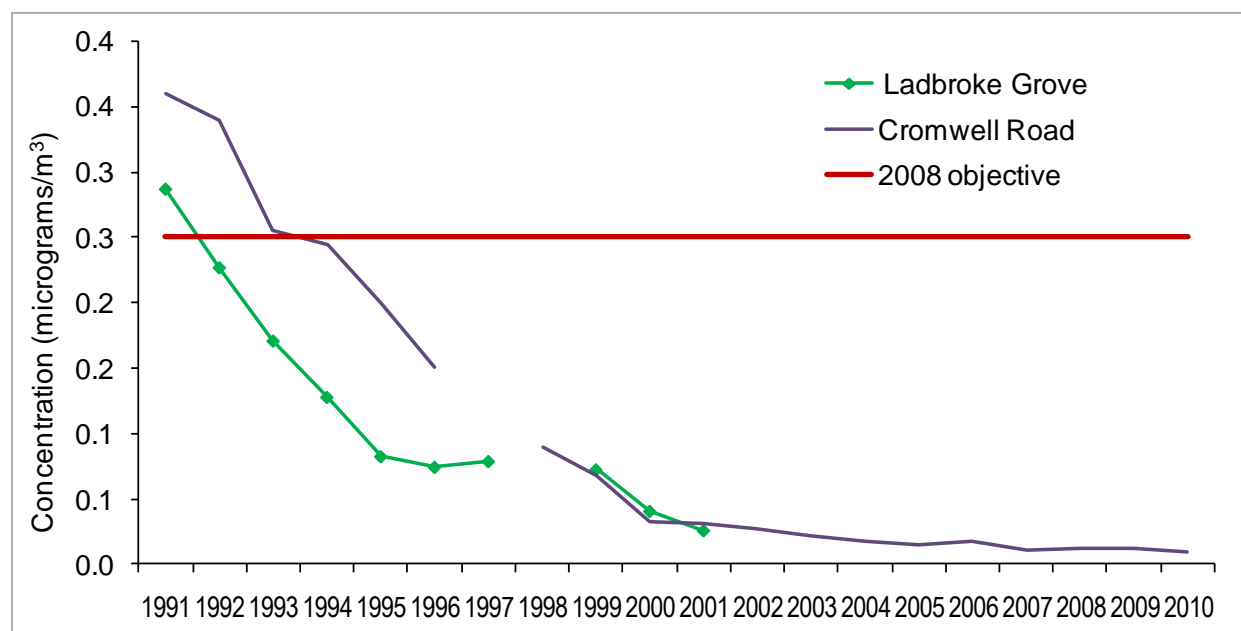
Lead monitoring in the borough is undertaken by Defra at the Cromwell Road monitoring site. Monitoring was previously undertaken by the Council at Ladbroke Grove. When leaded petrol was phased out, monitored levels dropped significantly so the decision was taken to close the site at the end of 2001.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

As demonstrated in the chart below, monitoring data shows a significant downward trend over the longer term however the level of reduction in the past few years continues but at much smaller amount. The 2004 and 2008 objectives were met at the Ladbroke Grove site by 1992 and at the Cromwell Road site by 1994.

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 collated since 2006 in the borough is shown in Table 2.11 including data from one other busy kerbside location from central London (Marylebone Road). Data from 2010 shows we continue to meet the objective.

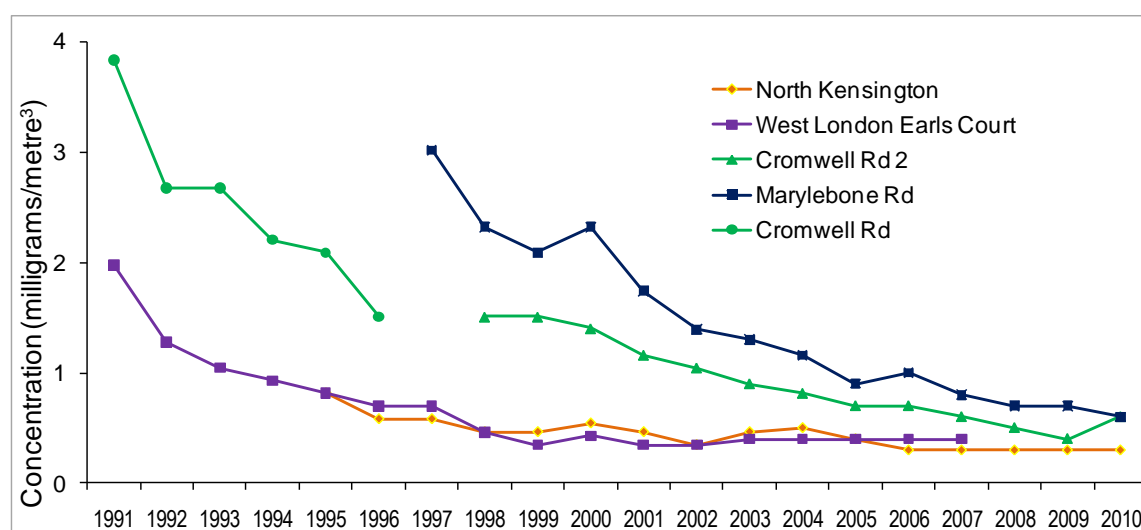
Table 2.11 Concentrations of CO in the Borough and at one central London site

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
2006	North Kensington	0.3	2.0	0	97
	West London	0.4	1.8	0	84
	Cromwell Rd 2	0.7	2.0	0	95
	Marylebone Rd	1.0	2.8	-	66
2007	North Kensington	0.3	2.6	0	98
	West London	0.4	2.0	0	82
	Cromwell Rd 2	0.6	2.3	0	96
	Marylebone Rd	0.8	2.7	0	94
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	0.6	3.4	0	68
	Marylebone Rd	0.6	2.6	0	96

* Low data capture at Marylebone Road

There were no exceedences of the objective in 2010 at any of the monitoring locations in the borough. Generally, annual mean levels at roadside locations are a little higher than concentrations at background locations. The highest maximum daily 8 hour running mean value measured at any of the sites in the borough during 2010 was 3.4mg/m³, though slightly higher than 2009 it is well within the 10 mg/m³ objective level. The figure below shows the long term trend in annual mean levels, this demonstrates a steady downward trend overall with the exception of Cromwell Road 2 between 2009 and 2010, however this may be due to the low data capture at this site.

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).

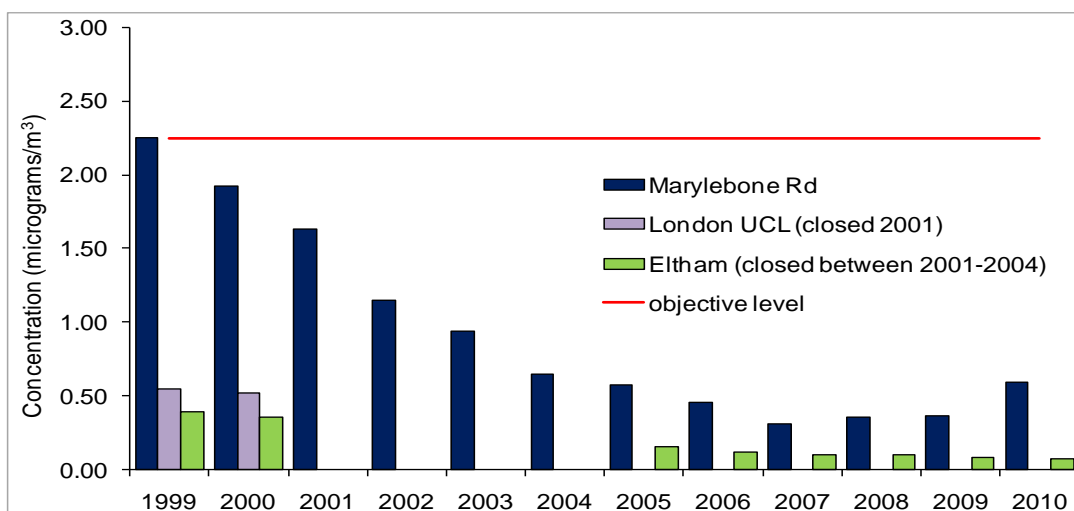
Table 2.12 Levels of 1,3-butadiene (maximum annual running means) in London

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	<75*
	Eltham	0.07	78

*Incomplete data. Data in italics is provisional

The running annual mean concentration has declined steadily at the Marylebone Road (roadside) site dropping from $2.25\mu\text{g}/\text{m}^3$ to $0.31\mu\text{g}/\text{m}^3$ between 1999 and 2007 (though there was a slight increase between 2008 and 2010). The Eltham site, which has operated intermittently, has been well within the objective since 1999 when monitoring started. 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. Concentrations of sulphur dioxide, benzene, lead, carbon monoxide and 1,3- butadiene and ozone continue to meet air quality strategy objectives.

Preliminary monitoring at the borough's five continuous monitoring sites show that exceedences of the average NO₂ annual mean 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 none at the North Kensington to 436 times at the Earls Court site (rather than the 18 exceedences permitted).

Monitoring of PM₁₀ at our three sites in the borough shows that these have all met the annual mean objective since 2008. Also, for the first time, all continuous sites have met the daily mean objective level. However as the monitoring is limited to just three sites it is not possible to be certain that there are no other locations that may be close or above the objective levels in other areas of the borough. Also, as both PM₁₀ objectives have only been achieved for a relatively short time, and there are uncertainties as to whether exceedences of the daily average objective level will continue, we are not proposing to change the approach we currently take and will not be removing this pollutant from the air quality management order.

3 New Local Developments

3.1 Road traffic sources

The redevelopment of the Wornington Green Estate will encompass a comprehensive regeneration strategy to complement the surrounding neighbourhood of North Kensington. As part of this redevelopment a new internal road network will be built to return the area to a more traditional street layout. The existing Wornington Green estate provides a significant barrier to movement for pedestrians and cyclists in the area. The new streets will dramatically improve permeability and will provide safer, more attractive routes for pedestrians due to more overlooking, improved street lighting and greater activity. It will also provide more direct routes for cyclists on lightly trafficked roads. All the new streets within the site will function as local streets and will not form part of the priority road network in the area.

Traffic emissions have been considered within the air quality assessment and low emissions strategy has been produced for the planning application.

3.2 Other transport sources

No changes to other transport sources have been identified in the borough.

3.3 Industrial sources

No new industrial sources have been identified.

3.4 Commercial and domestic sources

Biomass boilers are discouraged in the borough. There are no new/newly identified commercial or domestic sources which have not been considered as part of an air quality assessment.

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 our progress report last year, we reported that we were writing an air quality statement on the health consequences of poor air quality, to reinforce the recently renewed Air Quality Action Plan and reflect our concerns about the progress being made to improve air quality and the acceleration that is needed in order to meet the objectives. Although meeting the fine particles annual mean objective of $40\mu\text{g}/\text{m}^3$ is the immediate priority, in a relatively short time (2015) the UK will be required to meet the NO_2 annual mean objective also of $40\mu\text{g}/\text{m}^3$. The 2010 monitoring results continue to show no signs that the considerable reductions needed at four automatic monitoring sites and over 30 passive sampling sites are occurring. The Council is acutely aware that residents living close to some of these sites are experiencing almost twice the officially acceptable level of NO_2 in relation to this health based objective.

As yet, neither the government, nor the Mayor of London have proposed radical measures to make serious inroads into lowering the concentrations of NO_2 . With neither national, nor regional assistance to address this problem, the Council is unable to make the progress in this respect that it would like to achieve.

We have delayed the drafting of a policy statement until a decision is reached over whether the UK government will be taken to the European Court for its failure to meet the fine particles objective and what corrective measures may subsequently be imposed. These will need to be considered with reference to the Mayor of London's revised Air Quality strategy published in December 2010.

We now anticipate this statement will be produced and adopted in January 2012.

5 Planning Applications

The Council ensures that air quality is a consideration from the early planning stages. Developers should 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 2010 – March 2011 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. Land to the rear of 99 to 111, Freston Road, LONDON. Granted 21/09/2010
2. Charles House, 375 Kensington High Street. Granted 30/07/2010 -
3. Kensal Green Gas works (Area 2B). Granted 23/03/2011

Below is a list of major applications that we have been working on with developers to minimise air quality impacts; these applications have been submitted but not yet approved or refused:

1. Princess Louise Hospital, registered 12/11/2010,
2. Middle Row Primary School, registered 24/11/2010
3. 195 Warwick Road (Homebase), registered 03/12/2010
4. 100 West Cromwell Road, registered 20/01/2011

We also commented on 13 other applications that were either slightly smaller in scale or they have subsequently been refused (though not on air quality grounds).

In addition, to ensure air quality considerations are fully incorporated in the development proposal, including the energy component which can have a considerable impact on air quality, early discussions are essential. This includes responding to site specific Supplementary Planning Documents, scoping reports, and pre application discussions. The pre-application discussions that take place before formal applications for major and strategic redevelopment schemes can be useful in highlighting the council's position and drawing the developers attention to the Council's AQ SPD.

In the last 12 months, air quality (along with other environmental impacts), has been given considerable attention for the following schemes:

1. Earls Court and West Kensington opportunity area
2. Silchester Garages and adjoining sites.
3. Thames Tunnel
4. The Kensington Academy and Leisure Centre Site

We also have several development sites (that have been granted permission in previous years), where we are consulted or review on-going monitoring data. These include re-developments at:

- Holland Park School
- De-Vere Gardens Hotels

6 Air Quality Planning Policies

The Council's Core strategy was adopted on the 8th December 2010. The Core Strategy sets out the vision, objectives and detailed spatial strategy for future development in the borough and also considers a comprehensive range of environmental, economic and social issues. 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.'

In 2009 the Council also updated its Air Quality SPD, replacing the SPD adopted on 25th May 2002. The SPD 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. 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.

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.

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.

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.

7 Local Transport Plans and Strategies

The Council's first Local Implementation Plan (LIP) set out how we intend to implement the Mayor's Transport Strategy locally. This was approved by the then Mayor of London in August 2007 and covers the period up to April 2011. In May 2010 the Mayor published his Transport Strategy and at the same time asked all London boroughs to produce LIPs to show how they will support the Strategy locally.

Our latest consultation draft LIP sets out how we intend to implement the MTS as well as other local transport-related priorities from 2011 onwards. We have prepared our LIP in line with Transport for London (TfL) LIP Guidance - TfL are assessing all LIPs on behalf of the Mayor of London.

We undertook a consultation of on the content of our draft LIP between January and March 2011. The main objectives of the draft LIP are;

1. Improve accessibility to places and services, especially for those with special mobility needs
2. Make it easier for residents to choose walking, cycling and public transport over private car ownership and use
3. Improve the quality, accessibility and reliability of public transport
4. Reduce transport - related air pollution and related carbon dioxide emissions
5. Increase the proportion of journeys made on foot and by bicycle
6. Manage on-street parking and loading to achieve a better balance between the competing demands on kerb-side space
7. Improve journey time reliability for all road users
8. Improve the appearance, efficiency and inclusiveness of our streets and places, and make them inclusive for all
9. Reduce the number and severity of road accident casualties

An Executive Summary, the document and the associated Environmental Report, which assesses the potential environmental impacts of our proposals at - <http://www.rbkc.gov.uk/environmentandtransport/roadsandhighways/localimplementationplan.aspx>.

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 2010, we also commissioned King's Environmental Research Group to characterise pollution sources and pollutant behaviour at each of our roadside monitoring stations to try and establish whether they originated from local, London-wide or transboundary sources. We have just received the draft report and will report on the results in next year's update.

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 for 2010-11 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 a target of reducing CO₂ by 40% by March 2014 from 2007/08 level.

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.

A comprehensive review of the Council’s renewable energy options (both on and off site) was commissioned a few years ago which demonstrated limited feasibility. However since the introduction of Feed-In-Tariffs (FITs), the financial case for the generation of renewable energy has become a more realistic option. Therefore the Council is currently undertaking a new feasibility study.

The Council has been exploring the potential for district heating. In 2010, a Heat Mapping study was completed under Phase 1 of the LDA Decentralised Energy Masterplan Programme process which included high level implementation plans for each potentially viable scheme. The study determined that a number of areas are potentially suitable for initial district heating clusters and therefore warrant a full feasibility study. Most of these fall within the strategic sites identified in the Core Strategy (sites with major development opportunities). The Core Strategy, which was published in December 2010, puts forward opportunities for Decentralised Energy, more specifically Combined Cooling, Heat and Power systems or similar, through major development opportunities. Detailed feasibility studies are being conducted on the sites identified in the Heat Map.

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

9 Implementation of Action Plans

Introduction

The Council's second Air Quality Action Plan (AQAP) 2009-2014 outlines the measures that are being taken to help us work towards achieving the national air quality objectives. This section provides an update on the progress that has been made in the last twelve months in terms of the measures and targets set. Successful delivery of these measures involves the active co-ordination of several different departments within the Council.

Good progress has been made with many measures. We are particularly pleased with our work to encourage safe cycling, and have carried out 200 free adult cycle training lessons since April 2010, provided 63 free cycle maintenance sessions and delivered eight cycle mechanic training sessions, which has complemented the successful introduction of the Central London Cycle Hire Scheme, which the Council has worked with TfL to secure 52 docking stations in the borough.

In addition, we have produced an easy access, plain English web based best practice guidance tool for builders, developers and residents, which among other areas, covers air quality and dust. It includes a section on relevant legislation and best practice guidance, information for builders on how to limit emissions and it also contains advice for residents if a problem occurs. The guide was developed following requests from several Residents Associations and will continue to be updated and improved on a regular basis. <http://www.rbkc.gov.uk/environmentandtransport/adviceforbuilders.aspx>.

Unfortunately, the news is not all positive. In a recent cross-Council cost savings exercise, several posts were marked for deletion, which included the Council's Air Quality Promotion Officer. This took effect from last November and has meant that little progress on actions 2 and 3 of the plan (raising awareness and public health collaboration work) has been possible. As we re-orientate the way the team works, to accommodate this and other changes, we are looking at ways to recover some capacity for this.

Another change which has recently occurred is the abolition of many national indicators, specifically NI194 and NI185. These data are no longer being reported, which will have implications for the Council and how we will monitor changes in emissions from our own estate and operations.

In our previous Air Quality Progress Report published in May 2010 we undertook a further assessment of the impact of railway emissions. In the feedback received from the GLA we were asked to include a measure within our action plan to lobby for improvements in the electrification of the line and railway emissions. We suggested that the Great Western Mainline would be electrified through to Swansea. Since then the present government has reviewed the Department for Transport's proposals, and the Transport Secretary confirmed on 1st March 2011 that the electrification would go ahead, as far as Cardiff, because the business case for extending it to Swansea had not been made.

Network Rail are still committed to delivering the necessary overhead electrification work as far as Swindon by 2016 and overall this reflects the successful lobbying by local

authorities and others for a cleaner, more modern form of traction, which will significantly reduce pollution, especially NO₂ and PM₁₀ levels, along the inner city railway corridor, including North Kensington.

As well as looking back over the last twelve months, we wanted to highlight a new and quite exciting piece of work we have been leading on behalf of the Central London Air Quality Cluster Group and funded by Defra. We have commissioned a project that will review the air quality related actions currently being undertaken by member boroughs and develop guidance to improve the effectiveness of local air quality management. The measures will enable boroughs to focus their resources more effectively. We hope the work will be complete by the end of 2011 and we will report on this in our next update.

Table 9.1 Action Plan Progress

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 equipment was installed at the Cromwell Road (roadside) monitoring station in August 2009. In the nine months of 2010 however there were problems with the site and the instrument's operation. These difficulties have resulted in a significant loss of data and we have been unable to obtain an annual mean level. The equipment has currently been collecting data since Sep 2010.	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>Quarterly meetings were held with representatives from the local Primary Care Trust and Health Protection Agency. Unfortunately, the Air Quality Promotion Officer post (who organised these meetings) was deleted in November and we do not have the resources to continue with them for the time being.</p> <p>We continue to distribute our Indoor Air Quality leaflet where opportunities arise.</p> <p>A Smoke Free Homes Officer appointed was appointed for 12 months in December 2009. She worked closely with local health organisations and managed to secure 433 pledges to create smoke-free homes. The Smoke Free Homes officer position was fixed term and funded by the PCT and came to an end in December 2010.</p>	Ongoing, unless otherwise stated	N/a

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
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)	No. of airTEXT users to reach target of 300. Provide presentations and awareness workshops to schools and community groups. Establish links with all schools in the borough.	N/a	To date, 168 people subscribe to the airTEXT service within Kensington and Chelsea. There were 33 new subscribers within 2010/11. We have promoted airTEXT at pharmacies and GP surgeries by circulating leaflets and submitting an electronic message for waiting room information screens. We attended the Council's Environment Day, several community workshops and the AGM of our Tenant Management Association to raise awareness and promote airTEXT and Walkit.com. We also worked in collaboration with the Healthy Schools Programme to engage schools in the borough. Unfortunately, the Air Quality Promotion Officer post (who was involved in much of this work) was deleted in November and therefore progress in the last five months has not been as great as we would have liked.	Target of 300 airTEXT users to be achieved by March 2012. General promotional opportunities will be ongoing (2009-2014).	N/a
4	Council and contractors' fleet	Improve emissions from Council and contractors' fleet by requiring the latest Euro Standard, where possible, increasing the	LA	2009	2009-2014 (ongoing)	Achieve the emission reduction target from the NI194 baseline toolkit (2008/09).	8%	Progress relating to low emission vehicles: A car user review has been carried out which includes leased commercial vehicles fleet, taxi use, car user allowances and car park passes for staff. Following this review we will be putting recommendations to senior management regarding car allowances, taxis, and fleet choices. This is	2014	Between 2008/09 and 2009/10, CO ₂ emissions from business mileage were reduced by 12 percent (45.5 to 40.1 tonnes) and by 22 per cent

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
		number of alternatively fuelled "low emission" vehicles, fitting abatement equipment and providing green driver training.						<p>likely to reduce the total mileage being undertaken as well as reducing staff commuting.</p> <p>In March 2011, the Council produced a draft report "Commercial Fleet - Managers and Drivers Manual" in March 2011. This will be finalised this summer. Recommendations have been made to take CO₂ emissions into consideration when choosing a make or model to lease. As a guideline for cars we recommend aiming for emissions under 100g/km where possible. For vans, we recommended choosing the model with the lowest CO₂ emissions in its class. This will help to ensure smaller more efficient models are selected.</p> <p>In partnership with SITA UK, the Council has trialled a new refuse collection vehicle which runs on is fuelled on a mix of fuel made from landfill gas and diesel. This has now been completed and the results are being reviewed. In addition, the climate change programme has just established a new structure working more closely with SITA in particular to address their fleet. As this is at an early stage, more information will be provided in next year's update.</p> <p>The Council is keeping up to date with advances in low emission vehicle technology by attending events held by a range of manufacturers.</p>		(106.5 to 82.6 tonnes) for leased car vehicles. Calculations for NOX and PM ₁₀ are not available. However, as the reduction has arisen because of reduced mileage and a move to smaller engine sizes, a reduction will also have occurred in these pollutants.

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
								Progress relating to contractor's vehicles: A few contractors have taken the initiative and installed equipment to monitor how their vehicles are driven. This will help monitor fuel and driver behaviour.		
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 Targets within the plan include: <ul style="list-style-type: none"> To reduce the number of staff driving to work from 13.4% (2008) to 10% (2012) To increase the number of staff cycling to work for the whole or part of their journey to work from 5.1% (2008) to 8% by (2012) 	N/a	As reported last year, the Council's Travel Plan (2009-2012) has been produced which reviews current modes of staff travel and sets measures and targets for increasing sustainable transport, e.g. cycling. Between 2008 and 2010, the proportion of staff driving to work decreased from 13.4 per cent to 5 per cent . The proportion of staff cycling to work as a main mode has increased from 5.1% (2008) to 7% (2010)	The Travel Plan is in place- this measure is complete. A comprehensive staff travel survey is to be carried out in Summer 2011 (three years from the last).	A car user review has been carried out to look at ways to reduce Council CO ₂ emissions in three main areas; fleet, car user allowances and taxi use. The review is currently being finalised.

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
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>Three voltage optimisation units have been installed at Kensington Town Hall, the last of which was installed on the 6th April 2011. A unit at Chelsea Old Town Hall has also been installed in April. The last remaining installation, at Council Offices, is due to take place in June 2011.</p> <p>Double glazing and wall insulation at Kensington Town Hall will be incorporated within phased Space Programme works (implemented by 2014).</p> <p>Following the successful implementation of smart metering to 92 (80%) of the Council's electricity supplies during the 2009/10 period, it is planned to implement smart metering for the Council's gas supplies to improve reporting and monitoring across the Council's portfolio during 2011/12.</p> <p>Energy Audits on a selection of the borough's Schools have continued with 10 completed during April 2010-March 2011.</p> <p>The boilers at Chelsea Old Town Hall were replaced with more efficient models in November 2010</p> <p>The amount of energy used by each main Council worksite and school is available for staff to view on our internal intranet site.</p>	2009-2014 (ongoing)	<p>It is projected that the installation of the optimisation units will reduce our annual CO₂ emissions by 479 tonnes, annual NO_x by 1,010kg and annual PM₁₀ by 29kg.</p> <p>The planned installation of double glazing and wall insulation is projected to reduce the Town Hall's gas consumption by 1,760,000kWh.</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
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	We are currently in discussion with the TMO Energy Officer and have collected data on communal boiler stock and timetable for boiler upgrade.	December 2011	
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	In 2010/11, we requested low emission strategies or set conditions for low NOx boilers and combustion plant assessment for approximately 20 planning applications. Where conditions are set by the transportation section to limit the traffic impacts, further controls are applied to boiler and CHP plant, to avoid duplication of requirements. Four low emission strategies have been approved.	Revised SPD was adopted in June 2009. Action complete Requests for low emission strategies are ongoing.	N/a
9.	Air Quality Action Fund	Make use of S106 obligations to require large new developments to make a one-off financial contribution to an air quality action fund.	LA	2009-2010	2009-2014 (Ongoing)	Section 106 Planning Obligations SPD adopted and contributions recorded.	N/a	The Council's Section 106 Planning Obligations SPD sets out the approach, policies and procedures in respect of planning obligations. The document outlines the standard contributions for air quality and justifies the approach. To date, contributions for air quality have been sought for at least two major	The Section 106 Planning Obligations SPD was adopted in August 2010 Action complete	N/a

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
								developments within the borough.	Requests for financial contributions will be ongoing.	
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	<p>The Green Developers guide is not going to be produced and will be removed as an action from this plan.</p> <p>The Council's proposed Core Strategy has now been published, which is the key document for the Local Development Framework (LDF) and that sets out the Council's planning policies for the next eighteen years and replaces the Unitary Development Plan. Restrictive policies on energy efficiency have been set out in the Core Strategy (Policy CE1, Chapter 36), asking developers to achieve:</p> <ul style="list-style-type: none"> – Code for Sustainable Homes Level 4 for new residential developments (seeking to increase to Level 5 from 2013); – BREAAAM <i>Excellent</i> for new non-residential developments (seeking to increase to <i>Outstanding</i> from 2016 onwards), and; – EcoHomes <i>Very Good</i> (with 40% of the credits under the Energy, Water and Materials sections individually) for conversions and refurbishments defined as major developments, and for any subterranean extension to a dwelling. 	The Council's Core was published on 8 th December 2011	N/a

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
11.	Construction Emissions	Continue work to minimise emissions from construction sites by requiring all developers to follow the London Council's (2006) <i>Best Practice Guidance – The control of dust and emissions from construction and demolition as a minimum standard.</i>	LA	2009	2009-2014 (Ongoing)	Planning conditions imposed on all large developments, requesting construction risk assessments.	N/a	<p>Construction risk assessments were requested for 20 developments.</p> <p>In November 2010, the Council produced a web based best practice guidance tool for builders and developers, which covers air quality. http://www.rbkc.gov.uk/environmentandtransport/airquality/adviceforbuilders.aspx It provides links to key pieces of legislation, steps a builder should take to minimise emissions and advice for residents if a problem occurs.</p>	2009-2014 (Ongoing)	N/a
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</p>	N/a	<p>95% of Registered Providers total housing stock has achieved the Decent Homes standard which is an improvement on last year. Continuing to work towards 100%.</p> <p>The TMO continue to achieve the 100% <i>Decent Homes</i> standard. 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>Warm Front</i>- a national scheme available to those on certain benefits, providing financial assistance to upgrade heating systems and improve insulation. 2 Warm Front grants have been approved this year.</p>	Uncertain exactly when 100% of RSLs will be achieved but will continue to work towards this. TMO achieved 100% so measure is complete.	

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
						grants.		<p><u>West London- Warm Zone-</u> grants for free heating and insulation are available to homeowners and private tenants in receipt of means tested benefits. It also provides free loft insulation to those over 70 years of age and heavily subsidises loft insulation to all other residents. 15 Warm Zones grants have been awarded this year.</p> <p><u>Kensington and Chelsea 'Keep Warm Grant'</u> Financial assistance is available to homeowners and private tenants on benefits or low income to upgrade or install heating and insulation. 18 grants amounting to £117,000 have been awarded this year.</p> <p>Also In the past year, five loft insulation grants have been awarded.</p> <p>The Council has also established an Affordable Warmth and Energy Efficiency Working Group. The first formal meeting took place in September 2010.</p> <p>The council is also currently offering Smart Meters on loan from Kensington Central Library; these help people to identify how much energy is being used at home.</p>		
13.	Borough-wide Boiler Survey	Research emissions associated with existing heating plant in RBKC by	LA	2009-2011	2011	Compiling an emissions inventory	N/a	Grant money has been obtained from the Carbon Trust to undertake the 'Renew Project', a household survey which will focus on the Earl's Court area of the borough. The survey will include questions	2012	N/a

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
		carrying out a borough- wide boiler survey						about boilers and other energy sources within residential properties. The data will be compiled to form part of the emissions inventory. This project is due to start in September 2011.		
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. The collection of 2010-11 data for N185 which records variables related to N194 will start from April 2011 and data reporting will be at the end of June 2011. Identification of effective emission reduction measures are pending.	2011	N/a
15.	Controlling Emissions from Biomass	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	A detailed air quality assessment with dispersion modelling is requested for all developments proposing to use of biomass and biofuel. No biomass or biofuel boilers have been granted planning permission in the last 12 months that we are aware of.	2014	As stated in the Air Quality SPD, the Council is unlikely to accept proposals for biomass-fuelled (including biofuels) individual or CHP systems because of the concern about increasing emissions of particulate and gaseous pollutants within a borough which is an AQMA and Smoke Control Area.
16.	School Travel Plans	The focus of this measure has now	LA	2009	2010	50% of all schools have an active	N/a	98.6% of all schools and colleges in the borough now have an approved travel plan ,	Target complete,	School Travel Plans encourage

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
		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'.				travel plan (meaning that the school has submitted an updated travel plan document including mode of travel to school data)		63 out of 77 schools (82%) have active travel plans in place,		but ongoing process – each school monitors their travel plan annually. 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.
17.	Encouraging Cycling	Continue to encourage safe cycling in the borough by improving facilities and providing free cycle training to residents	LA	2009-2010	2009-2014 (ongoing)	Annual increase in cycling numbers	N/a	<p>Delivered 200 free adult cycle training lessons since April 2010.</p> <p>Provided 63 free cycle maintenance sessions (Dr Bike) to the public and workplaces.</p> <p>Delivered 8 cycle mechanic training sessions.</p> <p>Cycle Parking Facility Scheme:</p> <ul style="list-style-type: none"> – Footway cycle stands: 157 cycle hoops and 33 cycle stands – Estate cycle parking: 266 cycle hoops and stands (combination of both) – Carriageway cycle stands – installed 16 sites <p>Provided site assessments at 5 schools to assist in identifying space for cycle parking</p> <p>Cycle parking provided at 18 schools and two workplaces</p>	2014	N/a

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
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	A total of 48 docking stations were installed in the borough by the end of July 2010. There are now 52 docking stations operational, exceeding the original target. There are 5,462 cycles available for hire in the central London area.	30 th July 2010 Action completed	This scheme aims to encourage bicycle use, especially for short journeys. These can help to reduce the impact of using cars for short journeys.
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	A further ten bays have been added in the last 12 months bringing the total to 197 bays on-street 53%* of the fleet are within VED band A-B (Based on 118 vehicles with 12 month permits). There have been approximately 1700 new members during the past 12 months bringing the total to almost 8000. Virtually all residents are within a three minutes walk of a bay.	2014	New pricing structure for car club parking permits will increase number in VED band A-B. The structure also gives an incentive for vehicles in VED band C. 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 campaign to inform drivers of the idling engines regulation and continue to monitor hotspots and use the	LA	2009-2010	2009-2014 (ongoing)	Number of warnings and complaints	N/a	The Highways Enforcement Team continues to conduct regular checks at known trouble spots. These areas include Kings road, Kensington High Street, Exhibition road and Cromwell Road. Areas likely to cause nuisance are also targeted such as cab ranks, bus stops coach stops and areas around schools.	Ongoing Ad-hoc checks will continue throughout the year	When a vehicle is waiting for longer than 30 seconds then engine should be switched off to stop emissions and fuel consumption.

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
		available enforcement powers to encourage drivers to switch off their engines.						<p>Leaflets have been distributed to those car/van/bus/coach drivers who are sitting in vehicles running idle engines.</p> <p>During 2010/2011 enforcement officers responded to 12 complaints of vehicles parked with idling engines running; 11 of these were in the south of the borough and one in the north. This is the same number of complaints as last year. Complaints were mainly associated with builders/construction vans, cars and motorcyclists.</p> <p>No Fixed Penalty Notices were issued.</p>		
21.	Investigate the effects of a more robust LEZ	Assess the 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.	LA	2010	2011	Investigation completed and results submitted to TfL and GLA.	N/a	<p>The Council responded to the consultation on Clearing the air- the Mayor's Draft Air Quality Strategy in July 2010.</p> <p>The response expressed disappointment that the Mayor was proposing to defer stricter standards for HGVs and the inclusion of LGVs.</p> <ul style="list-style-type: none"> • It also pressed for a certification and testing regime to be in place in time for the new NO2 standard (2015). <p>Research into a joint borough LEZ initiative has been deferred during the Tri-borough discussions.</p>	2011	The existing London LEZ has lead to a reduction in emissions but could be further strengthened by introducing the next stages of the regulations sooner and introducing a similar system to cities such as Berlin.

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
22.	Parking Charges	Review the surcharge for diesel vehicles Review the graduated parking permits system to incorporate discounts for low emission vehicles (electric vehicles)	LA	2009	2010-2011	Changes implemented to residents parking permit charges	N/a	Residents parking charges are reviewed on a yearly basis. At the most recent review, the price of the lowest two bands of residents' remained unchanged while the rest were increased to reflect the increase in the Retail Price Index (around 4.6%). This increased the differential between high and low polluting vehicles. The diesel surcharge was increased from £5.50 to £15 but no surcharge will applied to the new Euro V standard diesel vehicles. •Electric vehicles continue to be charged at the lowest parking permit rate.	The parking charges will continue to be reviewed on an annual basis.	It is hoped that any future changes to residents parking permits will further reward residents who have chosen low emission vehicles such as electric, and place a surcharge on vehicles which are most polluting.
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	•The Council now require ECPs with all new developments. This is enforced through the use of planning conditions. • The Council is currently requesting that ECPs are installed at around 20% of on-site parking spaces in new developments. The Mayors target for charging points in new developments has been set at 20%. This will make it harder to justify a higher proportion of electric charging points. We also plan to install two charging points on-street in the 2011/12 financial period.	On target for completion (50% by 2012 and 100% by 2014)	

10 Conclusions and Proposed Actions

10.1 Conclusions from new monitoring data

Monitoring from the last twelve months at the borough's continuous monitoring sites show that exceedences of the average NO₂ annual mean 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 none at the North Kensington to 436 times at the Earls Court site (rather than the 18 exceedences permitted).

Monitoring of PM₁₀ shows that all sites met both the annual and daily mean objective level. However as the monitoring is limited to just three sites it is not possible to be certain that there are no other locations that may be close or above the objective levels in other areas of the borough. Also, as both PM₁₀ objectives have only been achieved for a relatively short time, and there are uncertainties as to whether exceedences of the daily average objective level will continue, we are not proposing to change the approach we currently take and will not be making any changes to the air quality management order.

10.2 Conclusions relating to new local developments

Air quality assessments submitted for new developments are always subject to a thorough review; however most indicate only a minor negative impact. Nonetheless mitigation measures, through low levels of parking; installation of electric charging points; the development of travel plans and so on, is negotiated to reduce the impact of pollutant and greenhouse emissions. There are no new local developments that will require a more detailed assessment.

10.3 Other conclusions

The Council will continue to make progress with the measures set out in the AQAP over the next few years. However, given the significant reductions required to meet objective levels, up to 70µg/m³ in the worst affected areas, in the case of nitrogen dioxide (Section 2.2.1) it is clear that no individual borough in London can achieve objective levels on their own. Whilst the situation for PM₁₀ appears to be less of a problem in terms of meeting objective levels; the great concern over the health impacts of particulate matter, and especially the finer PM_{2.5} fraction, means that efforts should continue to be made to tackle this pollutant.

The lack of progress towards reducing NO₂ levels is seriously worrying, given the substantial reduction needed to meet the annual mean objective and the EU time limit of 2015. We are in no doubt that the government and the Mayor of London share this concern and hope they will be work together to bring forward more effective measures to address the problem.

Difficulties in improving quality are exacerbated by the relatively small geographical area covered by each local authority (especially one such as small as ours) and the

lack of direct control over the main pollutant sources. For example the main strategic roads (and therefore the traffic) are under TfL management.

Transport measures such as the encouragement of car clubs, school and business travel plans, improving the accessibility and reliability of public transport, making it easier for residents to walk and cycle can only affect only a small proportion of the transport fleet using the boroughs roads. Other actions that we can take, for example, through planning control over new developments can only hope to reduce the impact of new additional sources. All these measures will make a contribution but significant reductions are only feasible with greater government intervention.

It is therefore important that greater effort is made to understand the unique problems faced in London and that the solutions must be agreed and co-ordinated amongst local authorities, the GLA and the government to ensure that air quality objectives can be met.

10.4 Proposed Actions

The new monitoring data has not identified the need to proceed to a Detailed Assessment for any other pollutants not already covered within the existing AQMA. The next review and assessment report that the council will prepare is the Updating and Screening Assessment due in April 2012.

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 Consultation Draft Local Implementation Plan December 2010

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

RBKC (2008) The Climate Change Strategy 2008-2015

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

Defra's Local Air Quality Management Support Pages

http://www.laqmsupport.org.uk/Summary_of_Laboratory_Performance_in_WASP_R1_03-107.pdf

Appendices

Appendix A: QA/QC Data

Appendix B: Monthly Mean Value Results of Nitrogen Dioxide Diffusion Tubes

Appendix C: 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 2010

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

Bias Adjustment 2010

	Diffusion Tube	Continuous Analyser	Correction Factor (A)	% Bias based on continuous monitor (B)
London N. Kensington	34.0	36.9	1.11	-10
London Brent Kingsbury	28.0	29.0	1.05	-4
Croydon, London Road	66.0	71.0	1.08	-8
Croydon, George Street	50.0	52.0	1.07	-6
Hounslow, Chiswick High Road	64.0	69.1	1.08	-8
Hillingdon 1, South Ruslip	48.0	47.2	0.99	1
Hillingdon 2, Hospital	38.0	36.0	0.95	5
Greenwich 4, Eltham Rd	24.0	26.0	1.05	-5
Greenwich 5, Trafalgar Road	44.0	47.1	1.07	-7
Greenwich 7, Blackheath	59.0	47.1	0.96	5
LWEP Bloomsbury	46.0	57.00	1.23	-18
		Overall % Bias		-5.00
		Mean Bias Adjustment Factor	1.06	

Calculations provided by Bureau Veritas

Choice of Factor

The LWEF 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 LWEF managed by Bureau Veritas. The tubes are analysed using desorption scanning gas chromatography/mass spectrometry (GC/MS). Comparison of the LWEF 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 AEA Technology 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 trail⁶ raised concerns over the filter media used in these instruments and showed that an over estimation in measured concentrations resulted from the 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 blank subtracted.

Uncertainty of measurement - 8.07%+/- Limit of Detection - 0.408mg/m³*
@1248.05hrs

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 for each month between October 2008 and October 2009 was rated 'good' which signifies a high level of accuracy for laboratory measurements.⁷

They also participate in the Network Field Inter-comparison Exercise operated by NETCEN, 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.

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

⁷ Defra's Local Air Quality Management Support Pages
http://www.laqmsupport.org.uk/Summary_of_Laboratory_Performance_in_WASP_R103-107.pdf

Summary of NO₂ Network Field Inter-comparison Results, 2008

Annual Mean Bias		Precision	
NETCEN Performance Target	Gradko Annual Mean Bias	NETCEN Performance Target	Gradko Precision
±25%	- 11%	10%	3%

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. Comparison of the LWEP data with the calculated mean data for the AHMN indicates that the concentrations recorded are comparable.

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. As part of quality control procedures integral to the London-Wide Benzene Survey, a selection of boroughs are sent one or two extra diffusion tubes for duplicate or triplicate exposure at a monitoring site within their borough. In 2009, duplicate exposures were successful on eleven occasions and triplicate exposures on eight. The results of these tubes indicate satisfactory agreement between duplicate and triplicate tubes. The maximum difference between duplicates is $\pm 1.0 \mu\text{g}/\text{m}^3$ and the maximum difference between triplicates is $\pm 1.2 \mu\text{g}/\text{m}^3$.

Appendix B: Monthly Mean Value Results of Nitrogen Dioxide Diffusion Tubes

Full dataset (monthly mean values) for the nitrogen dioxide diffusion tubes 2010 (unadjusted)

Site	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Mean
Ladbroke Grove	69.6	68.5	52.0	55.6	58.2	58.9	39.5	43.1	58.3	51.5	56.1	67.8	56.6
Holland Park	43.6	36.6	28.4	27.0	23.7	26.3	20.4	22.2	32.1	34.6	38.5	37.6	30.9
Cromwell Road	91.2	101.8	76.3	77.3	69.5	111.4	82.5		93.9	79.9	93.2	69.4	86.0
Dovehouse St	50.7	52.4	44.2	38.1	34.5	34.8	32.5	34.1	40.1	36.0	58.3	53.1	42.4
Brompton Road/Cottage Place	64.1	59.6	59.9	52.0	58.6	59.8	70.8	70.9	74.4	59.7	69.1	57.5	63.0
Earls Court (station)	93.0	88.6	78.7	94.2	81.9	90.8	90.8	119.6	50.8	92.4	116.7	90.3	90.6
Lots Rd/Uperne Rd		52.5	34.9	33.6	32.2			28.7	37.6	39.0	44.4	42.4	38.4
Brompton Road	53.3	52.8	44.4	36.0	38.9	42.9	43.7	41.5	56.0	45.8	55.5	48.9	46.6
Ladbroke Crescent	48.9	47.7	33.2	38.7	32.8	36.9	21.7	27.9	37.2	40.0	51.9	46.7	38.6
Pembridge Square	51.8	49.3	42.8	41.4	35.8	39.2	34.3	34.4	44.7	44.0	53.6	53.9	43.8
St Marks Gove	51.6	54.2	35.5	32.9	31.1	33.3	24.0	25.4	39.7	40.7	47.1	46.8	38.5
Donne Place	56.4	47.0	38.0	37.5	34.1	36.4	28.6	34.0	39.8	42.5	60.6	58.2	42.7
Chatsworth Court	59.9	56.6	47.8	44.8	44.7	49.8	42.8	43.2	53.7	46.3	51.0	47.8	49.0
Sion Manning	44.3	42.0	32.1	32.7	26.8	28.8	21.2	22.5	33.2	35.2	42.5	40.7	33.5
Sion Manning	43.9	49.0	31.1	32.0	29.3	28.8	22.0	22.6	36.3	37.2	42.8	40.6	34.6
Sion Manning	43.8	42.2	33.4	30.3	27.4	27.5	18.6	21.8	34.1	35.6	43.2	41.5	33.3
Sloane Square		81.6	84.1	77.1	83.2	78.8	71.1	85.5	80.8	84.8	81.3	87.2	81.4
Harrods		80.2	67.8	75.6	71.6	80.6	59.5	66.6	74.2	71.3	83.1	89.4	74.5
CPG Gate		56.5	52.4	48.2	51.4	50.3	53.3	50.2	56.6	65.7	56.4	55.2	54.2
CPG Met		40.8	37.2	31.9	27.6	30.4	24.5	26.3	32.9	37.9	45.8	46.0	34.7
Marlborough School/ Sloane avenue	65.3	64.0	50.9	55.7	51.0		42.3	41.3	61.3	52.8	69.2	62.3	56.0
Walmer House	50.6	54.2	39.8	45.2	42.6	44.0	40.9	42.9	52.5	49.2	50.9	46.3	46.6
Natural History Museum	74.3	78.7	78.0	60.4	64.4	62.1	61.5	52.3		80.1	65.5	71.0	68.0
Natural History Museum	79.1	80.3	75.0	57.3	62.5	63.2	63.3	49.2		75.3	64.0	67.1	66.9
Natural History Museum	79.4	80.4	37.4	65.0	61.6	64.4	63.0	52.5		70.7	70.1	72.7	65.2
Blantyre St		52.2	38.9	36.4	37.2		28.6	31.2	46.8		55.4	48.9	41.8
Chelsea Old TH	77.1	74.7	65.5	69.1	77.9	79.2	77.9	73.7		74.5	82.2	84.8	76.1
Pavilion St/Sloane Ave	66.6	65.8	50.2		62.3	59.2	40.5	37.7	58.8	27.9	64.2	66.0	54.5
Kensington H St/ Campden Hill Rd		61.7	54.0	57.4	60.5		96.4	63.3	67.2	58.7	66.5	57.8	64.3
Kensington H St/Argyll St	78.2	76.1	66.2	74.5	80.2	86.9	39.8	87.2	100.6	82.6	84.1	74.3	77.6
Old Brompton Rd	83.7	78.9	59.6	63.4	68.7		67.0	69.8	82.2	81.8	77.6	85.9	74.4
Fulham Rd/Limerston St	66.4	65.0	48.8	53.9	58.1	55.8	43.8	55.5	67.1	56.1	81.0	67.8	59.9
Warwick Road	60.0	51.2	46.8	45.2	49.7	53.0	39.6	41.8	51.1	55.2	161.9	58.0	59.5
Barbly road	56.6	47.1	31.5	37.9	33.2	31.0	24.8	25.5	41.7	38.9	45.0	49.0	38.5
Acklam Road	52.8	54.8	37.3	39.8	40.8	36.3	30.9	33.1	47.3	45.0	52.4	49.0	43.3
Southern Row	52.2	52.2	38.8	32.2	34.6	32.4	36.3	34.1	45.7	36.4	51.6	47.5	41.1
Exhibition Road					51.5	52.4	50.9	43.4	47.2	61.6	55.1	59.6	52.7
Mean Sion Manning	57.7	44.4	32.2	31.7	27.8	28.4	20.6	22.3	34.5	36.0	42.8	40.9	34.9
Mean Natural History Museum	77.6	79.8	63.5	60.9	62.8	63.2	62.6	51.4		75.4	66.5	70.3	66.7

Mean results from Sion Manning and the Natural History Museum (KC47 and KC54) are the mean results from multiple tube exposures (triplicate tubes).

Note: This data has not been corrected for bias.

Appendix C: 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.