2012 Air Quality Updating and Screening Assessment for The London Borough of Hillingdon

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

June 2012

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Executive Summary

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

A review of new monitoring data has identified the following:

- Annual mean NO_2 concentrations have increased slightly at London Heathrow LHR2 when compared to 2010 but have remained fairly constant over the last five years. The measured annual mean concentration was in excess of the 40 $\mu g.m^{-3}$ objective again at this site during 2011. This site is however not at a location of relevant human exposure.

- Annual mean NO_2 concentrations at the London Hillingdon automatic monitoring site were in excess of the annual mean objective during 2011 and have increased consistently over the last five years. This site is representative of relevant human exposure as it is a similar distance from the M4 Motorway as the nearby housing.

- At Hillingdon Hayes, the measured NO_2 annual mean has remained fairly constant over the last three years averaging around 55 $\mu g.m^{-3}$, which is significantly in excess of the 40 $\mu g.m^{-3}$ objective. This site is approximately 15m from locations of relevant exposure.

- The measured NO_2 annual mean has increased steadily over recent years at Heathrow Oaks Road; the 2011 annual mean of 39 $\mu g.m^{-3}$ is just less than the 40 $\mu g.m^{-3}$ objective; this is the highest measured annual mean in recent years. This site is however classed as a roadside site and is not therefore considered representative of relevant exposure.

- At all of the other automatic monitoring sites the measured annual mean in 2011 was below the 40 $\mu g.m^{-3}$ objective and has either decreased slightly or stayed fairly constant over recent years.

- Annual mean NO_2 concentrations in excess of the 40 $\mu g.m^{-3}$ objective were also measured at the following diffusion tube sites:

    - HD31: AURN, Sipson
    - HD43: Uxbridge Day Nursery, Park Road
    - HD46: South Ruislip Auto-monitor, West End Road
    - HD53: Warren Road, Ickenham

- The measured NO_2 annual mean at all of these sites has consistently been in excess of the objective over recent years; all of the sites are within the existing AQMA. Examination of the trend in NO_2 annual means measured across the network of diffusion tubes indicates that NO_2 concentrations have in general decreased slightly at all sites.

- No annual mean PM_{10} concentration in excess of the 40 $\mu g.m^{-3}$ objective was measured at the automatic monitoring sites during 2011. There is no clear trend over recent years in annual mean

PM_{10} concentrations at the monitoring sites. None of the monitoring sites had more than the 35 permitted daily average PM_{10} concentration greater than 50 $\mu g.m^{-3}$ during 2011.

The assessment of new sources has not identified any new sources that require detailed assessment.

The Updating and Screening assessment has not identified any locations where a Detailed Assessment for any source or pollutant should be conducted. The London Borough of Hillingdon will continue monitoring at all existing sites within the District and will continue to implement the measures outlined in their Air Quality Action Plan for the existing AQMA.

The next air quality review and assessment report will be the 2013 Progress Report.

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Appendices

1 Introduction

1.1 Description of Local Authority Area

Hillingdon is, geographically, the second largest local authority in London and has approximately 250,000 residents. Parts of the Borough to the north of the A40 are semi-rural, with Ruislip as the district centre. The south of the Borough is more densely populated, urban in character, and contains the metropolitan centre of Uxbridge and the towns of Hayes and West Drayton. It also contains numerous important transport links. As well as being home to Heathrow Airport the Borough is crossed by the M4 and the A40 and bordered to the west by the M25 and to the east by the A312, attracting traffic into the Borough and encouraging traffic to pass through it. They therefore generate a significant air pollution burden for residents.

1.2 Purpose of Report

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

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

1.3 Air Quality Objectives

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

Table 1.1: Air Quality Objectives for the purpose of Local Air Quality Management in England.

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

1.4 Summary of Previous Review and Assessments

Detailed assessment of air quality in Hillingdon has been undertaken for over 10 years following guidance from National Government.

In summary, an Air Quality Management Area (AQMA) was declared because of concern over annual mean concentrations of NO_2. The AQMA covers the A40 corridor and Chiltern-Marylebone railway line and all parts of the Borough south of them. Problems are most severe around Heathrow Airport and the major road network that goes through the Borough, reflecting the largest sources of NOx emissions within the AQMA. An Action Plan, showing how the Council intended to tackle these problems, was issued in 2004. This contains a series of 8 packages of measures that address emissions from traffic, Heathrow Airport, industry, existing housing, new developments, and so on.

Annual reviews of air quality have shown that levels of NO_2 are little changed over recent years. There is however a good record of implementation of the Action Plan in areas for which the Council has control. An obvious problem arises because the most important sources in the Borough (the airport and the major road network) are not under the Council's control.

The London Borough of Hillingdon has completed the following assessments, plans and reports on air quality to date:

1.4.1 Round 1

Stage 1: The report recommended that further examination was required for NO_2, PM_{10}, CO and SO_2.

Stage 2: Further assessment of NO_2, PM_{10}, CO and SO_2 were carried out as recommended in the Stage 1 Review and Assessment. The report concluded that the air quality objectives for all four pollutants might or would not be met in Hillingdon and that a stage 3 assessment was required.

Stage 3: Detailed modelling of NO_2, PM_{10}, CO and SO_2 was carried out. The report concluded that the annual mean NO_2 and 24 hour mean PM_{10} objectives would not be met in the Borough and that an air quality management area should be declared.

Stage 4: Further modelling and source apportionment were undertaken in the form of a stage 4 assessment.

As a result, the London Borough of Hillingdon declared an air quality management area (AQMA) and developed an air quality action plan. The AQMA order was made and came into force on the 1st May 2001.

Following the publication of Hillingdon's Stage 4 Assessment it was concluded that the original AQMA Order could be revoked and replaced by a new version for NO_2 only, expanded to cover all of the A40 corridor. It was also extended up to the Chiltern-Marylebone railway line. It was, however, no longer expected that the PM_{10} objectives were likely to be exceeded. The new AQMA order came into force on the 1st September 2003.

1.4.2 Round 2

2003 Updating and Screening Assessment

The 2003 USA report predicted that for all pollutants apart from NO_2 and PM_{10} the air quality objectives would be met and therefore there was no need to proceed to a detailed assessment. There was no need to progress to a Detailed Assessment for NO_2 as an AQMA had already been declared for this area during the previous round of Review and Assessment. Modelling of PM_{10} concentrations indicated that exceedances were confined to major road corridors and that there were no relevant public exposures. As a result a Detailed Assessment for PM_{10} was not required.

2004 Air Quality Action Plan

The Action Plan for Hillingdon was approved by the Council's Cabinet in June 2004. During the development of the plan account was taken of various other plans developed by the Borough, the Mayor of London, BAA for Heathrow, national government and other bodies. Consideration was given to alternative strategies for bringing local air quality into compliance with the national objectives.

2005 Progress Report

During 2004, the annual mean standard for NO_2 was exceeded at both roadside and background sites within the Borough. This supported the earlier decision to declare an AQMA across the southern half of the Borough, and to adopt the AQAP based on the exposure of parts of the Hillingdon population to these levels of NO_2. By the end of the first year of the action plan more than 80% of measures were recorded as being underway, either in a 'planning phase' or 'in progress'.

1.4.3 Round 3

2006 Updating and Screening Assessment and Action Plan Progress Reports

The report concluded that for all pollutants, apart from NO_2, the air quality objectives would be met within the London Borough of Hillingdon. All locations exceeding the NO_2 objective are within the already existing AQMA, thus there was no need to progress to Detailed Assessment for this pollutant. The Action Plan Progress Report noted that good progress was again made, with more than 85% of measures underway.

2007 Progress Report

The 2007 Progress Report concluded that during 2006 the annual mean NO_2 objective was still exceeded at both roadside and background sites within the Borough and its neighbouring local authorities. The report also concluded that there was no evidence of progress towards achieving the standard from the 2006 data when taken with other data showing results and trends over several years. Monitoring results also indicated that objectives for other air quality strategy pollutants were achieved during 2004, and support the decision not to declare an AQMA on the basis of exposure to these other pollutants. These results support the earlier decision to declare an AQMA (Air Quality Management Area) across the southern half of the Borough, and to adopt the AQAP based on exposure of people in some parts of Hillingdon to these levels of NO_2.

The report also noted that over 30% of the measures in the Action Plan were either 'complete' or 'ongoing'.

2008 Progress Report

The progress report concluded that during 2007, the annual mean standard for NO_2 was exceeded at roadside, suburban and background sites within the Borough and its neighbouring local authorities. These include sites monitored continuously in the national and London networks as well as those within the Hillingdon diffusion tube survey. There was also no progress towards achieving the NO_2 standard discernible in the 2007 data when taken as a whole with other data showing the results and trends over several years. These results once again supported the decision to declare and continue with the AQMA and to implement the AQAP based on exposure of the Hillingdon population to NO_2. Other monitoring results indicated that objectives for all other pollutants were achieved during 2007, though continued monitoring, especially of fine particles, remained desirable.

More than half of the measures included in the Action Plan were considered complete/ongoing. However, a significant number (14%) were recorded as 'not started'. A number of these concerned areas where the Local Authority has little or no control, for example actions to reduce emissions at Heathrow.

1.4.4 Round 4

2009 Updating and Screening Assessment and Action Plan Progress Reports

Analysis of NO_2 monitoring data from 2008 confirmed the findings of the previous Review and Assessment report that there is a requirement for the existing AQMA and that no further action was required in areas outside this boundary. It was recommended that monitoring be undertaken along the Great Western Mainline due to the large number of movements of diesel locomotives. If increased monitoring indicated that emissions from the Mainline resulted in exceedances of the NO_2 objectives the London Borough of Hillingdon would be required to perform a Detailed Assessment.

The progress report noted that nearly two thirds of measures were complete/ongoing. Again, a significant number of measures (12%) were recorded as 'not started'. As before, most of these were outside direct Council control.

Forecasting future concentrations in the Borough was noted to be particularly uncertain. A major source of this uncertainty related to developments at Heathrow Airport, in particular the proposed Third Runway.

2010 Progress Report

Analysis of NO_2 data for 2009 shows that within the existing AQMA there continued to be exceedances of the AQS objectives but there are no new exceedances outside of the AQMA. Therefore, the Borough was not required to proceed to a Detailed Assessment. Diffusion tube monitoring on both north and south of the Great Western Mainline indicated that emissions from diesel locomotives, both at the boundary and relative receptors, did not result in concentrations that exceed NO_2 air quality objectives.

The report also concluded that there continued to be no exceedances of the AQS objective for PM_{10} and benzene.

2011 Progress Report

From the 2010 monitoring data it was concluded that within the existing AQMA there continued to be exceedances of the NO_2 annual mean objective but no new exceedances were measured outside the AQMA.

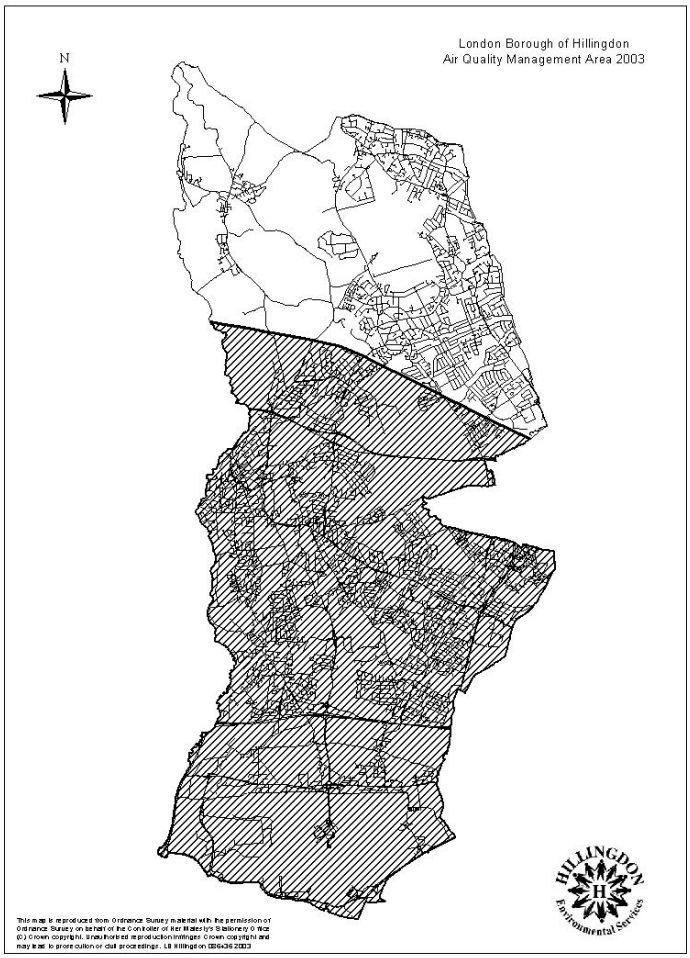
Data from a one-year NO_2 diffusion tube monitoring study around Heathrow involving three local authorities confirmed the requirement of the existing AQMA. Assessment of the trend of NO_2 measurements from both automatic and non-automatic monitoring indicates that annual mean NO_2 concentrations have remained relatively unchanged since 2003. There continues to be no trend towards improvement of NO_2 concentrations, despite some decrease in road traffic in the Borough. The report noted that this raises serious questions about the modelling undertaken for the third runway, which forecast that there would be improvements sufficient for the limit values to be met within a few years; and that this needs to be considered in any future modelling undertaken in relation to airport operations.

For all other pollutants, no exceedances of the AQS objectives were measured.

1.4.5 Existing AQMA

The extent of the existing AQMA boundary is presented in Figure 1.1.

Figure 1.1. Hillingdon AQMA boundary



2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

There are 11 automatic continuous monitoring sites in the London Borough of Hillingdon.

Hillingdon 1, Hillingdon 2 and Hillingdon 3 are part of the London Network; London Heathrow, Heathrow Oaks Road and Heathrow Green Gates are part of the Heathrow airport monitoring; London Sipson, Hillingdon Hayes and London Harmondsworth are part of the local network. Details of QA/QC of the monitoring stations can be found in Appendix A.

Automatic monitoring ceased at Hillingdon 2 – Hillingdon Hospital in September/October 2011

Figure 2.1a: Automatic Monitoring sites – Heathrow, Hillingdon, Harmondsworth and Hayes

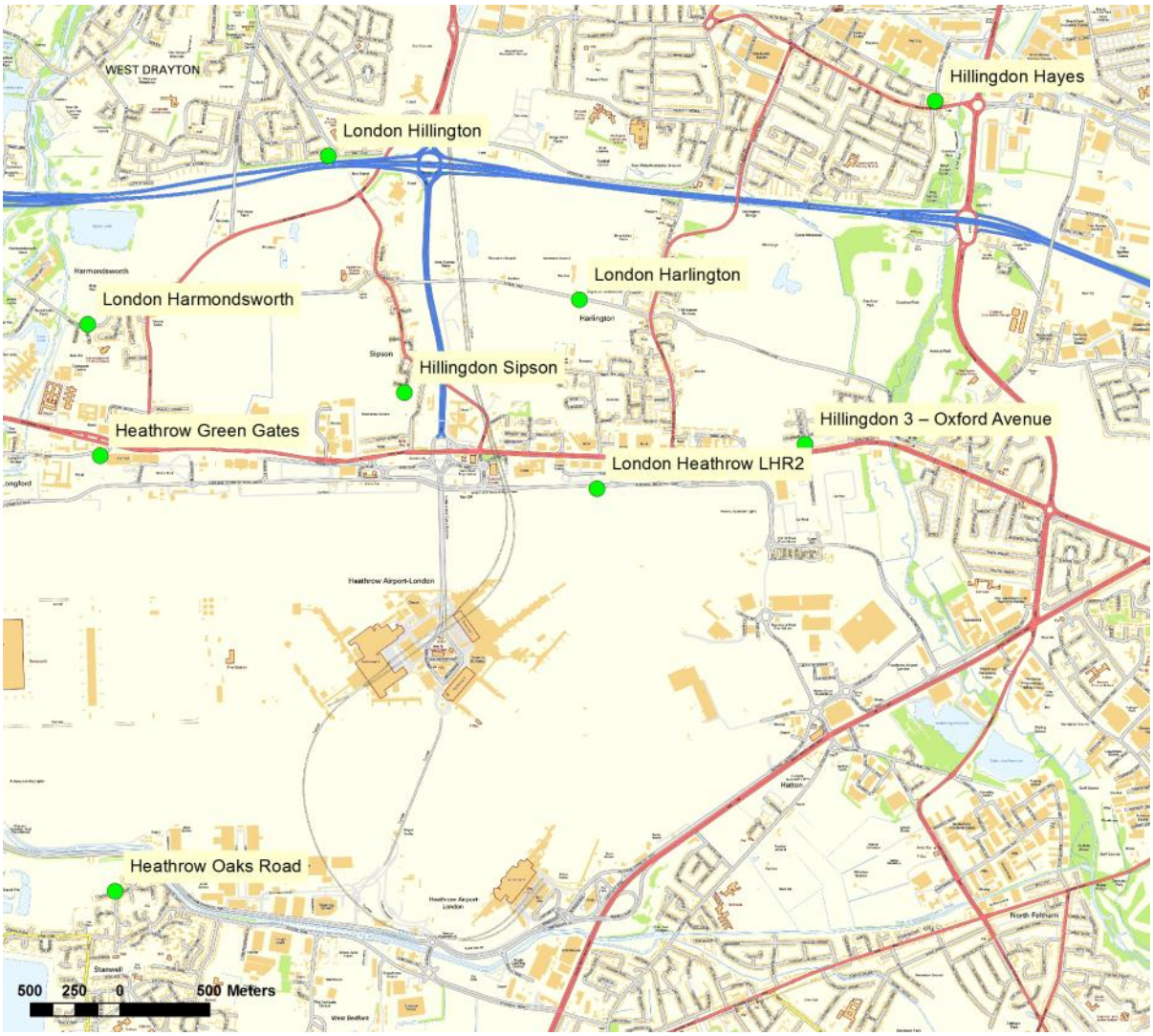


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Figure 2.1b: Automatic Monitoring sites – South Ruislip

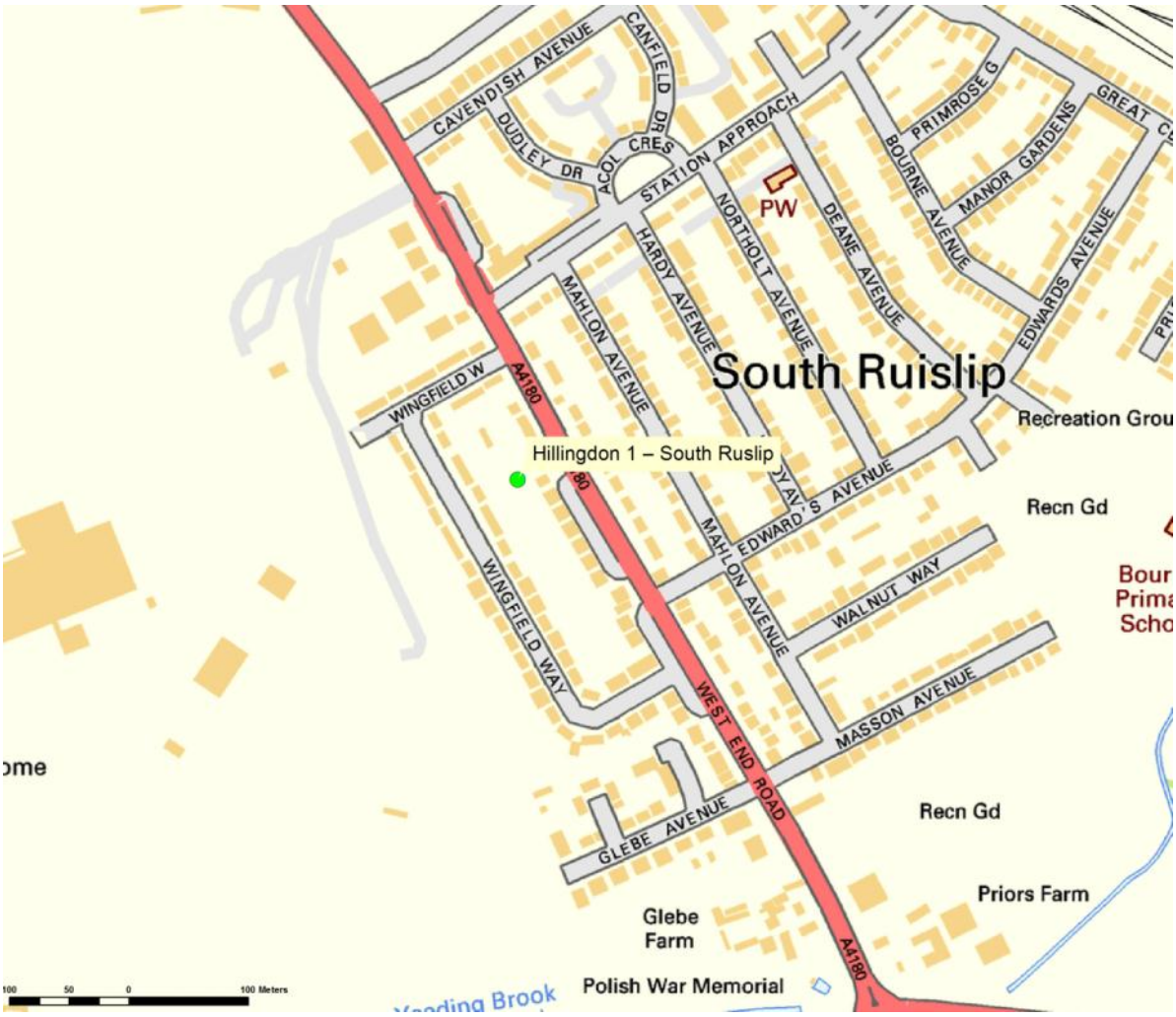

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Figure 2.1c: Automatic Monitoring sites – Hillingdon Hospital

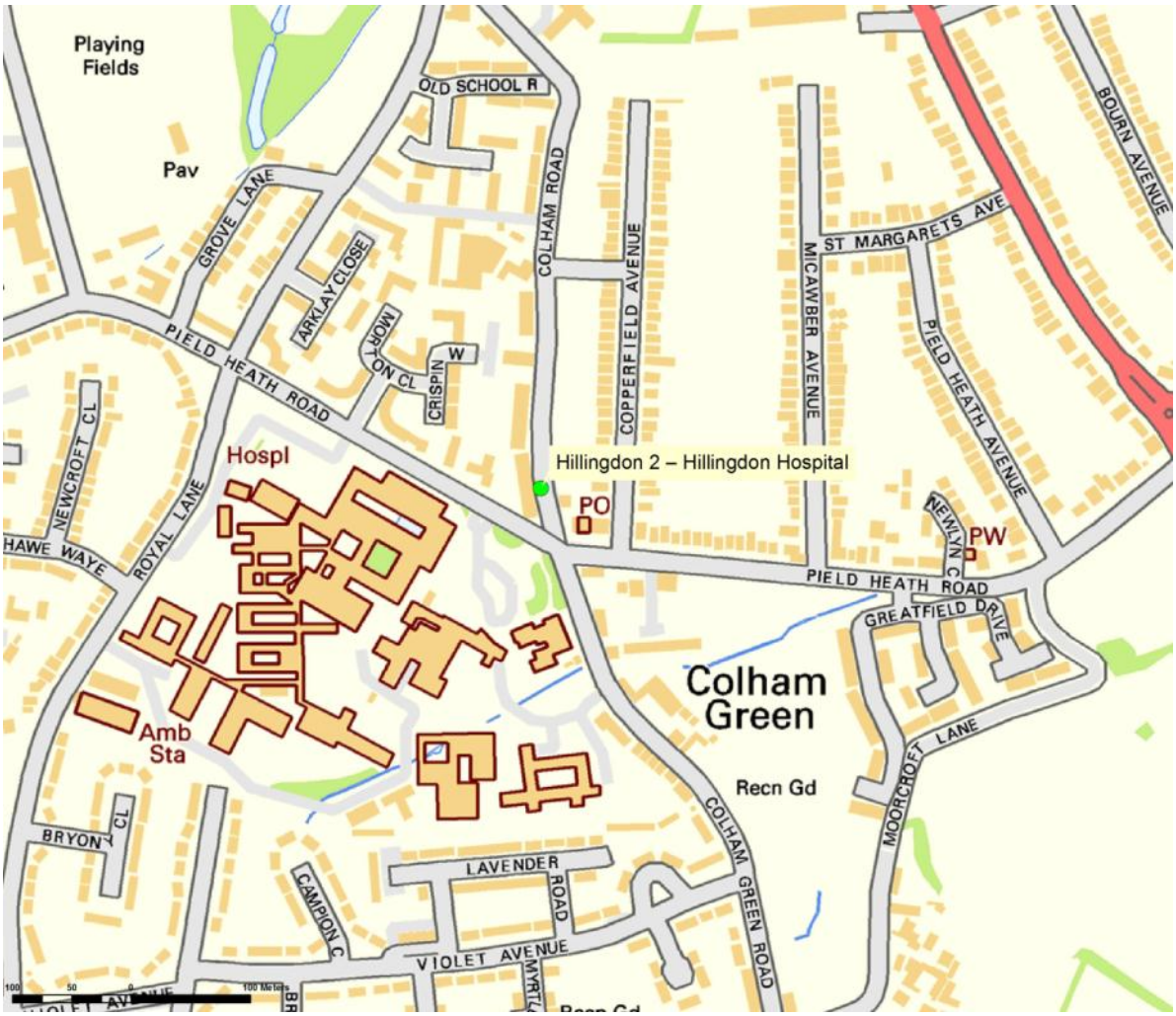

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Table 2.1 Details of Automatic Monitoring Sites

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?
London Heathrow LHR2	Airport	508399	176746	NO_2, $PM_{10}PM_{2.5}$	Chemiluminescence TEOM	Yes	N	N/A (inside the airport)	No
London Hillingdon	Suburban	506900	178600	NO_2, O_3	Chemiluminescence	Yes	Y	3m (30m from M4)	Yes
Hillingdon 1 – South Ruslip	Roadside	510770	184960	NO_2, PM_{10}	Chemiluminescence TEOM	Yes	Yes (14m)	2.5m	Representative of exposure on this road
Hillingdon 2 – Hillingdon Hospital	Roadside	506991	181951	NO_2, PM_{10}	Chemiluminescence TEOM	Yes	Yes (7m)	2m	By residential and also opposite hospital
Hillingdon 3 – Oxford Avenue	Roadside	509557	176994	NO_2, PM_{10}	Chemiluminescence TEOM	Yes	Yes (8m)	18m to A4 Bath Road (5m to Oxford Avenue)	Yes (for emissions from Bath Rd and Airport)
London Harlington	Airport	508300	177800	CO, NO_2, O_3, PM_{10} $PM_{2.5}$	Chemiluminescence TEOM FDMS	Yes	No	8m	Background
Hillingdon Sipson	Urban background	507325	177282	NO_2	Chemiluminescence	Yes	Yes	9m from nearest residential facade	Yes
London Harmondsworth	Roadside	505561	177661	NO_2, PM_{10}	Chemiluminescence BAM	Yes	Y(20m)	1m	Yes
Heathrow Green Gates	Airport	505630	176930	NO_2, PM_{10}, $PM_{2.5}$	Chemiluminescence TEOM	Yes	N	N/A (background for the airport) 62m from airport boundary)	No (Background location)
Heathrow Oaks Road	Airport	505714	174503	NO_2, PM_{10}, $PM_{2.5}$	Chemiluminescence TEOM	Yes	N	5m	No
Hillingdon Hayes	Roadside	510283	178905	NO_2, PM_{10}	Chemiluminescence BAM	Yes	Y(15m)	5m	Yes

2.1.2 Non-Automatic Monitoring

Diffusion tube monitoring of NO_2 is carried out at a number of locations in the London Borough of Hillingdon. During 2011 NO_2monitoring was undertaken using passive diffusion tubes at 33 sites across the borough during 2011.

The 2010 Progress Report included a review of the existing diffusion tube network and made a number of recommendations for removal of certain sites where low annual mean NO_2 concentrations were consistently being measured. Diffusion tubes measurements were discontinued after 2010 at the following sites:

- HD41 - Church Walk, Hayes
- HD50 - Hillingdon Hospital – Triplicate tube co-located with automatic analyser
- HD62 - 1 North Hyde Gardens, Hayes
- HD63 - 370 Sipson Road, Sipson, Middlesex
- HD71 - Oxford Avenue, Cranford
- Measurements from sites HD80 to HD100 were reported in the 2011 Progress report; these sites were part of a one-off large study over 4 of the Boroughs surrounding Heathrow Airport which was funded for one year only; the study has now been discontinued.

A further review of the existing diffusion tube sites is planned for this year where consideration will be given to re-locating tubes to relevant locations where NO_2 concentrations hotspots may be occurring.

Details of the diffusion tube monitoring locations at which measurement were conducted in 2011 are presented in Table 2.1. The locations include kerbside, intermediate and urban background sites.

Maps showing the locations of the diffusion tube monitoring sites are presented in Figures 2.2a to 2.2j.

A bias adjustment factor of 0.93 reported in the most recent version of the national database of co-location studies[1] conducted for tubes prepared (50% TEA in acetone) and analysed by Gradko during 2011 has been used to adjust the diffusion tube results.

Full details of the diffusion tube QA/QC including justification for the choice of bias adjustment factor are presented in Appendix A.

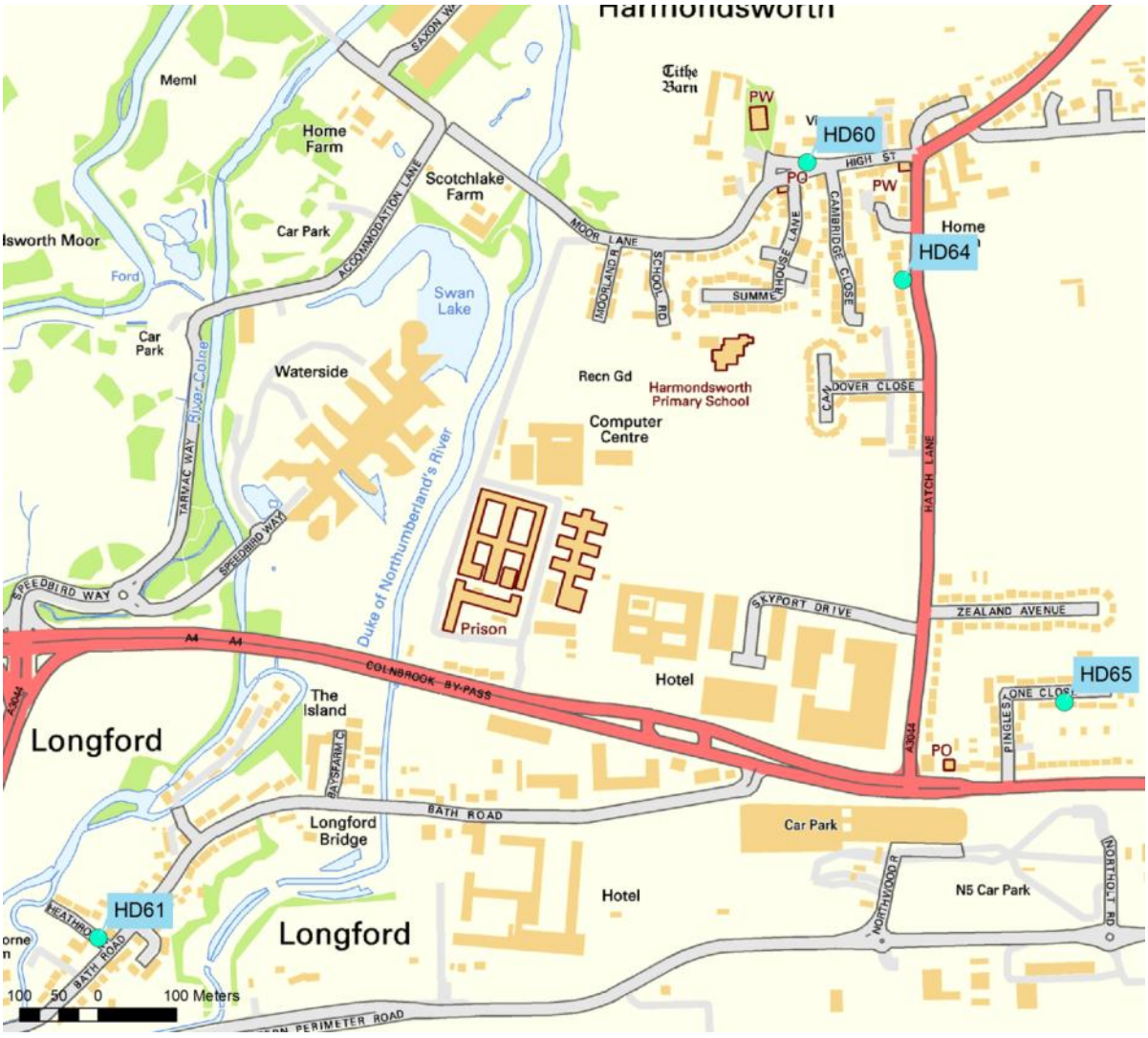
[1] National Physical Laboratory (2012) Diffusion_Tube_Bias_ Factors v03_12.xls; accessible at http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html (accessed April 2012)

Table 2.2: Details of Non- Automatic Monitoring Sites

ID	Location	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?
HD31	AURN, Sipson	Roadside*†	506951	178605	NO_2	Yes	Y(0m)	30m from M4	Co-location site
HD42	Uxbridge Technical College	Roadside	510417	180752	NO_2	Yes	Y(4m)	2m	Representative of a road
HD43	Uxbridge Day Nursery, Park Road	Roadside	505995	184057	NO_2	Yes	Y(0m)	4m	Yes
HD46	South Ruislip Auto-monitor, West End Road	Suburban†	510837	184917	NO_2	Yes	Y(14m)	2.5m	Representative of a road
HD47	Hillingdon Primary School, Uxbridge Road	Roadside	507582	182534	NO_2	Yes	Y(0m)	5m	Representative of a road
HD48	Citizens Advice Bureau, Eastcote Road, Ruislip	Background*†	509117	187665	NO_2	No	N	7m	No
HD49	83 Hayes End Drive, Hayes End,	Background	508650	182274	NO_2	Yes	Y(7m)	7m	No - background
HD51	4 Colham Avenue Yiewsley	Background*	506334	180266	NO_2	Yes	Y(0m)	4m	Yes- Nearest residential to busy road
HD52	101 Cowley Mill Rd, Uxbridge	Background	505157	183231	NO_2	Yes	Y95m)	1m	Representative of a road
HD53	Warren Road, Ickenham,	Background	506241	185652	NO_2	Yes	Y(1m)	23m	Yes -nearest residential to busy road
HD55	Harold Avenue	Roadside*	509917	179015	NO_2	Yes	Y(4m)	30m	Yes - nearest residential to busy road
HD56	15 Phelps Way, Hayes	Background	509796	178633	NO_2	Yes	Y(7m)	1.5m	Representative of a road
HD57	25 Cranford Lane, Harlington)	Background	508756	177717	NO_2	Yes	Y(7m)	1m	Yes -nearest residential to busy road
HD58	Brendan Close, Harlington	Background †	508412	177124	NO_2	Yes	Y(0m)	1m	Representative of a road
HD59	7 Bomber Close, Sipson	Background	507294	177322	NO_2	Yes	Y(8m)	1m	Representative of a road
HD60	Harmonsworth Green, Harmondsworth	Background	505753	177760	NO_2	Yes	Y(0m)	1m	Representative of a street
HD61	Heathrow Close, Longford	Background	504848	176770	NO_2	Yes	Y(0m)	2m	Representative of a street
HD64	34 Hatch Lane, Sipson	Roadside	505875	177610	NO_2	Yes	Y(0m)	17m	Representative of a street
HD65	28 Pinglestone Close, Sipson,	Background*	506081	177071	NO_2	Yes	Y(0m)	4m	Representative of a street
HD66	486 Sipson Road, Sipson,	Background*	507305	177518	NO_2	Yes	Y (0m)	12m	Representative of a street
HD67	31 Tavistock Road	Background*	505729	180290	NO_2	Yes	Y(3m)	1m	Representative of a street
HD68	Ratcliffe Close, Uxbridge	Background*	505775	182565	NO_2	Yes	Y(0m)	1m	Yes - nearest residential to road

ID	Location	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?
HD69	Hillingdon Health Centre	Roadside	507699	184786	NO_2	Yes	Y(0m)	2m	Yes
HD70	Harefield Hospital, Hill End Road	Background*	505291	190935	NO_2	No	Y(0m)	5m	Representative of a street
HD72	2 Vineries Close	Background*	507236	177927	NO_2	Yes	Y(0m)	9m	Representative of a street
HD73	Queensmead School, South Ruislip.	Background*	511825	185655	NO_2	No	Y(0m)	1m	Representative of a street
HD74	Field End Road/Field End School, S.Ruislip.	Roadside	511887	186565	NO_2	No	Y(8m)	1m	Yes
HD75	Sidmouth Drive, South Ruislip	Background*	510103	186133	NO_2	No	Y(4m)	2m	Yes - nearest receptor to busy road
HD76	Kaduna Close, Eastcote	Roadside	510536	188787	NO_2	No	Y(4m)	1m	Yes - nearest residential to busy road
HD77	Chamberlain Way, Eastcote	Background*	511108	189742	NO_2	No	Y(12m)	1m	Representative of a street
HD78	Gateway Close, Northwood	Roadside	508212	191833	NO_2	No	Y(24m)	1m	Representative of a street
HD79	Swallowfield Way/Kestrel Way (Railside)	Background	508537	179606	NO_2	Yes	Y(24m)	12m(from railway)	South of railway so not worse-case
HD80	Swallowfield Way/Kestrel Way (Roadside)	Background	508542	179650	NO_2	Yes	N	4m	60m North of railway

Figure 2.2a: Diffusion tube locations – Harmondsworth, Sipson & Longford



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Diffusion Tube

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Figure 2.2b: Diffusion tube locations – Sipson & Harlington

Figure 2.2c: Diffusion tube locations – Hayes

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Diffusion Tube

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Figure 2.2d: diffusion tube locations – Yiewsley

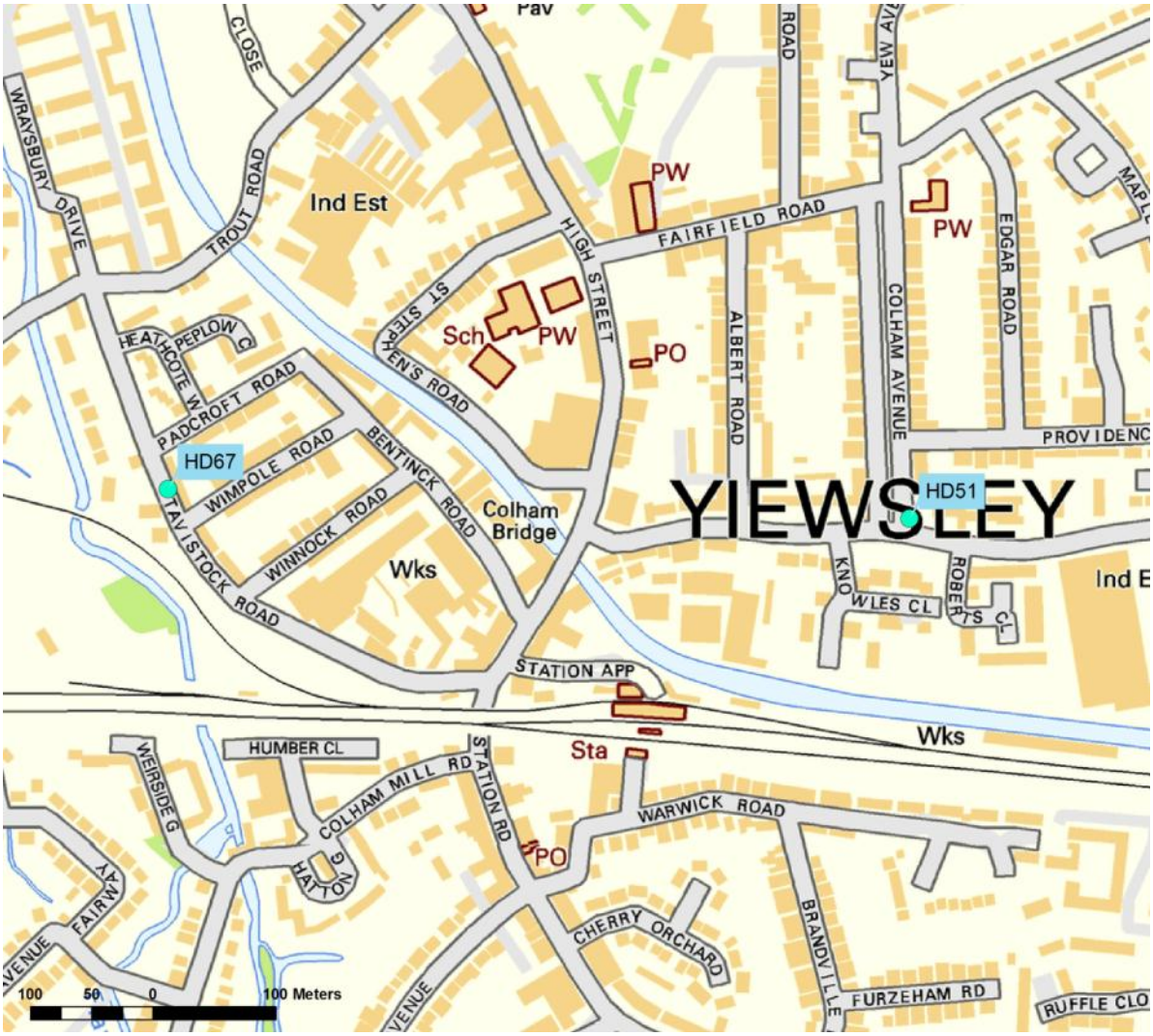

Figure 2.2e: Diffusion tube locations – Hillingdon & Hayes End

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Diffusion Tube

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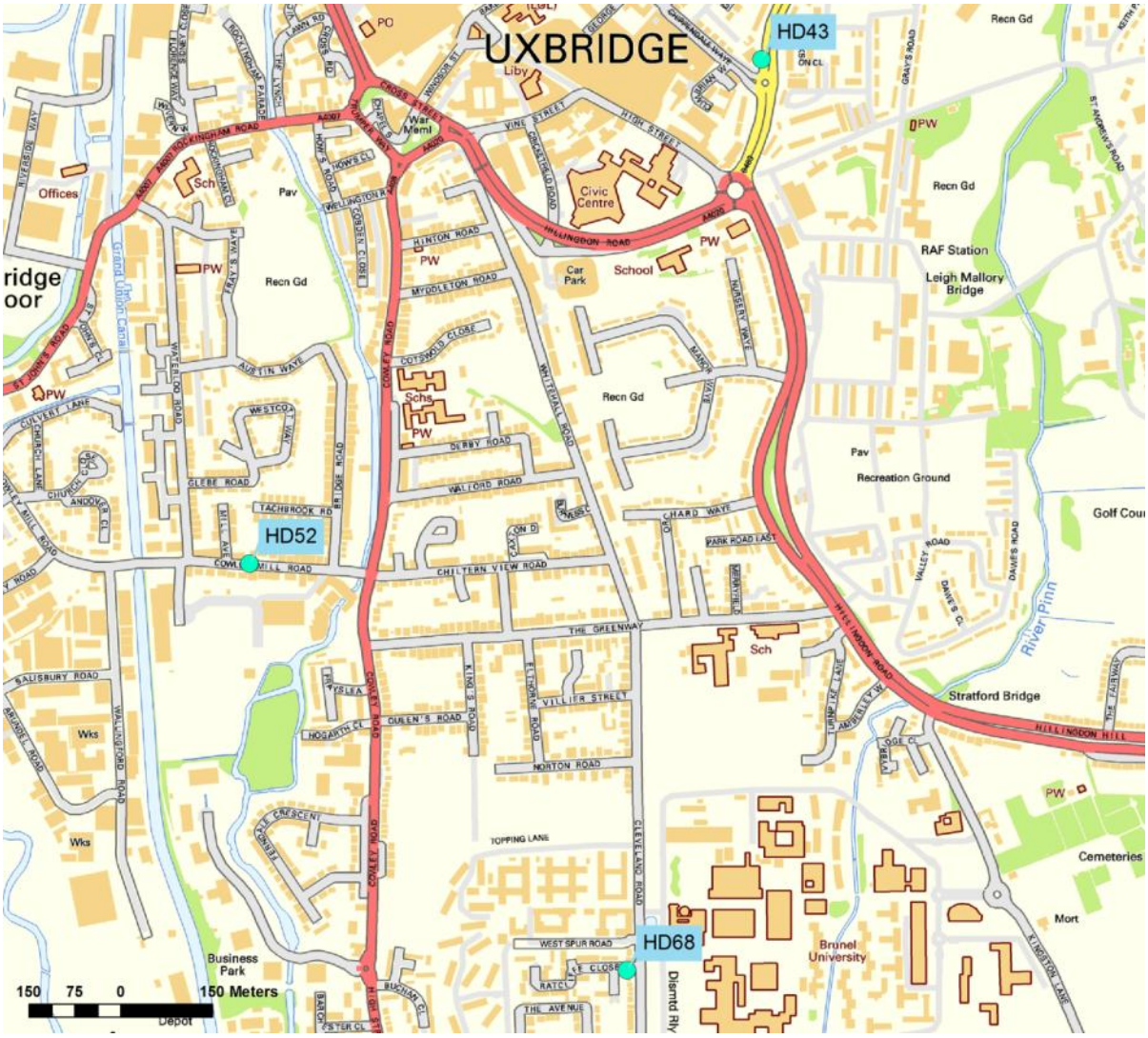
Figure 2.2f: Diffusion tube locations – Uxbridge



N

Legend

Diffusion Tube

AEA

Figure 2.2g: diffusion tube locations – Uxbridge & Hillingdon

N

Legend

Diffusion Tube

AEA

Figure 2.2h: Diffusion tube locations – South Ruislip

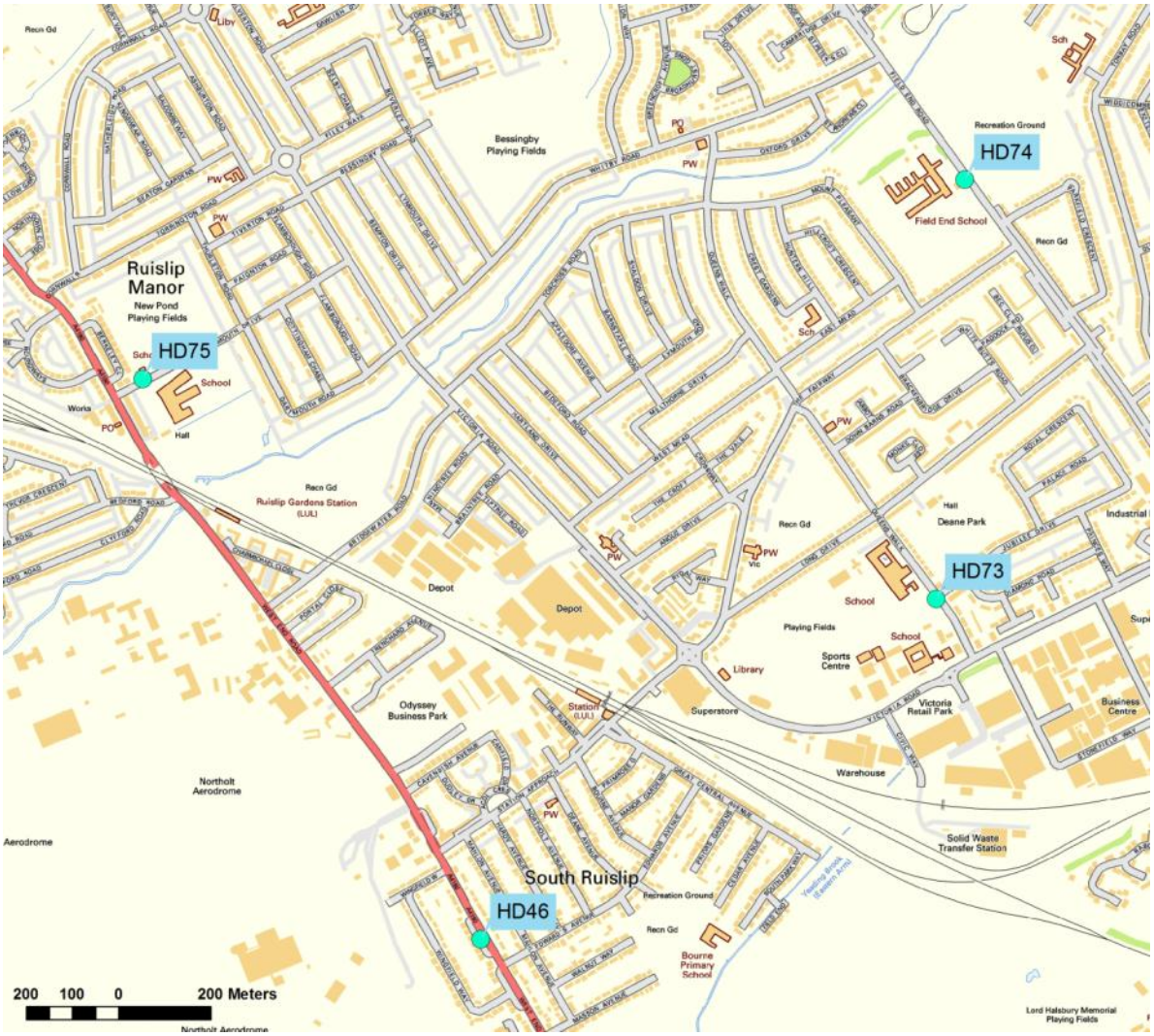


Figure 2.2i: Diffusion tube locations – Eastcote & Ruislip

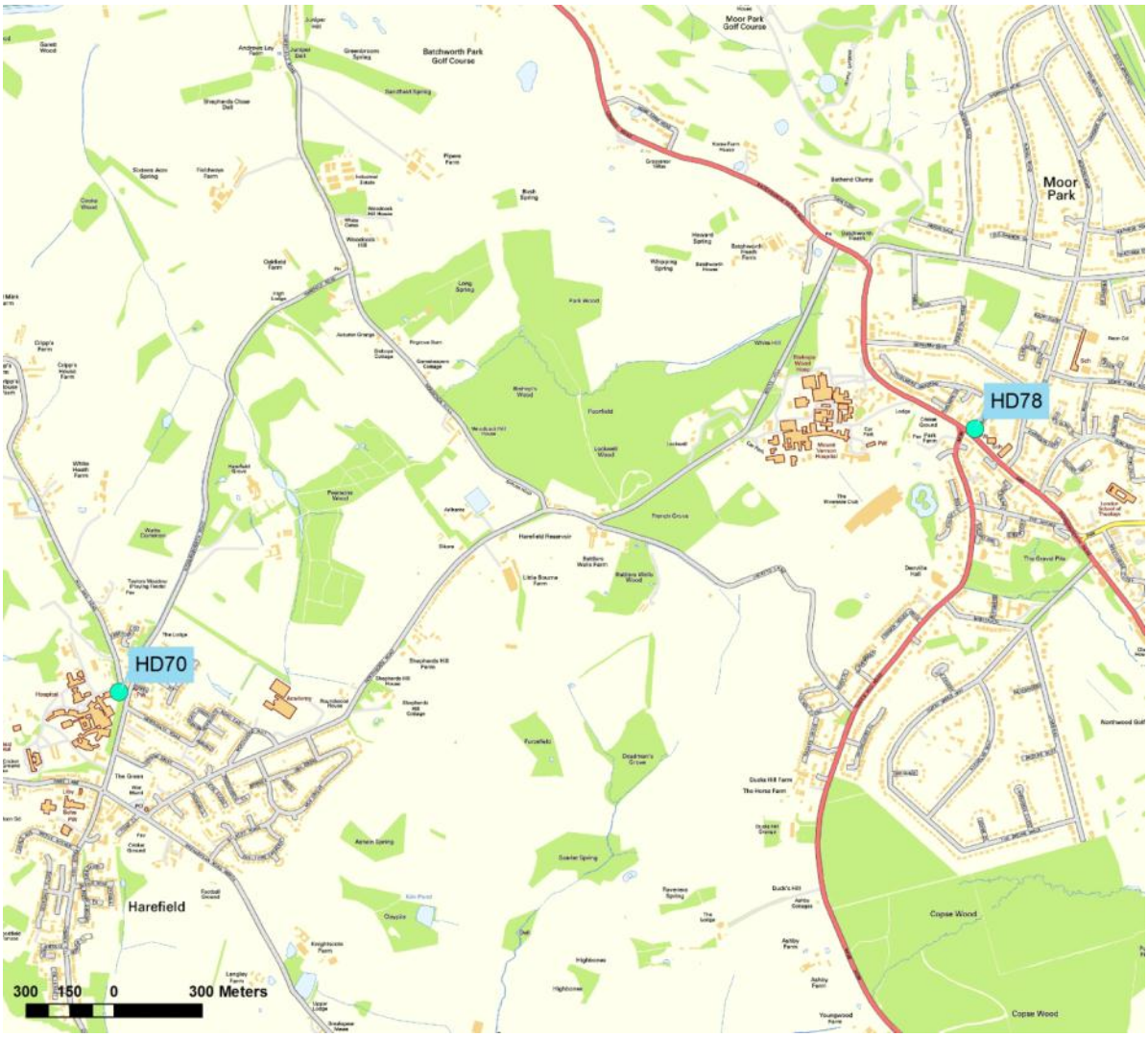
N

Legend

Diffusion Tube

AEA

Figure 2.2j: Diffusion tube locations – Harefield and Northwood



N

Legend

Diffusion Tube

AEA

2.2 Comparison of Monitoring Results with AQ Objectives

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

The annual mean NO_2 concentrations measured at the automatic monitoring locations in the London Borough of Hillingdon from 2007 to 2011 are presented in Table 2.3. Concentrations in excess of the 40 $\mu g.m^{-3}$ objective are highlighted in bold.

Table 2.3 NO_2 Automatic monitoring results: Comparison with annual mean objective

Site name	Within AQMA?	Data Capture 2011 (%)	Annual mean concentrations ($\mu g/m^3$)				
			2007	2008	2009	2010	2011
London Heathrow LHR2	Yes	98.4%	**54**	**53**	**49.8**	**49.6**	**52**
London Hillingdon	Yes	97.6%	**45**	**51**	**54.0**	**53.6**	**55**
Hillingdon 1 – South Ruslip	Yes	99.8%	**48.7**	**46**	**49.3**	**46.9**	**42**
Hillingdon 2 – Hillingdon Hospital	Yes	70.3%	**43.4**	35	37.4	36	36.6*
Hillingdon 3 – Oxford Avenue	Yes	94.8%	**43.4**	**42**	**43.4**	**41.0**	**44**
London Harlington	Yes	96.2%	37.0	35	36.3	34.5	34
Hillingdon Sipson	Yes	99.7%	**40.3**	38	39.0	38.3	37
London Harmondsworth	Yes	91.4%	35.0	32	33.4	30.5	31
Heathrow Green Gates	Yes	99.5%	38.0	38	37.5	**41.2**	35
Heathrow Oaks Road	Yes	88.2%	-	35	33.4	37.2	39
Hillingdon Hayes	Yes	89.2%	-	**50**	**55.6**	**54.3**	**55**

*** Annualised mean due to data capture < 75%**

A bar chart showing the trends in annual mean NO_2 concentrations over the last five years is presented in Figure 2.3. From the available monitoring data and trends the following observations have been made:

- Annual mean NO_2 concentrations have increased slightly at London Heathrow LHR2 when compared to 2010 but have remained fairly constant over the last five years. Although the measured annual mean concentration is in excess of the 40 $\mu g.m^{-3}$ objective; this site is located on the north east edge of the airfield apron, approximately 180m from the centre line of the north runway and 15m from the kerb of the Northern Perimeter Road. It is not therefore representative of relevant exposure.

- Annual mean NO_2 concentrations have increased consistently over the last five years at London Hillingdon; this site is representative of relevant human exposure as it is a similar distance from the M4 Motorway as the nearby housing. This site is already within the Hillingdon AQMA.

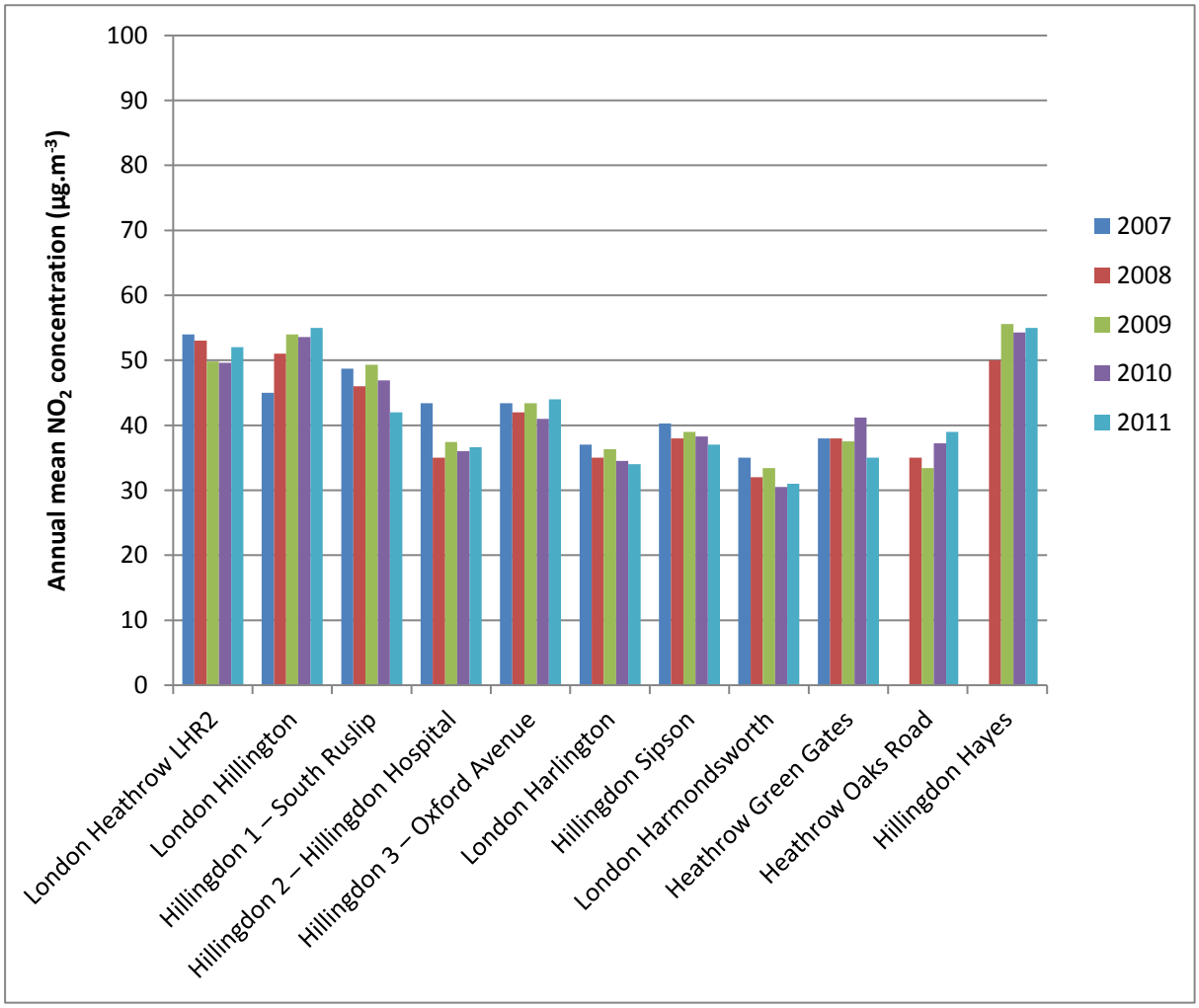
- At Hillingdon Hayes, the measured NO_2 annual mean has remained fairly constant over the last three years averaging around 55 $\mu g.m^{-3}$, which is significantly in excess of the 40 $\mu g.m^{-3}$ objective. This site is approximately 15m from locations of relevant exposure.

- The measured NO_2 annual mean has increased steadily over recent years at Heathrow Oaks Road; the 2011 annual mean of 39 $\mu g.m^{-3}$ is just less than the 40 $\mu g.m^{-3}$ objective; this is the highest measured annual mean in recent years. This site is classed as a roadside site and is not therefore considered representative of relevant exposure.

- At all of the other sites the measured annual mean is below the 40 µg.m^{-3} objective and has either decreased slightly or stayed fairly constant over recent years.

All of the sites at which annual mean concentrations in excess of the objective have been measured are within the existing Hillingdon AQMA.

Figure 2.3: Trends in annual mean NO_2 concentration measured at automatic monitoring sites



The number of measured 1-hour mean concentrations in excess of the 200 µg.m^{-3} short-term objective at each of the automatic monitoring sites are presented in Table 2.4. None of the sites measured more than the permitted 18 exceedances of the short-term objective during 2011.

Table 2.4: NO_2 automatic monitoring results: Comparison with 1-hour mean objective

Site name	Within AQMA?	Data Capture 2011 (%)	Number of exceedences of hourly mean objective (200 µg.m^{-3}) For data capture < 90%, the 99.79th %ile of 1-hr means is shown in brackets (µg.m^{-3})				
			2007	2008	2009	2010	2011
London Heathrow LHR2	Yes	98.4%	12	0	**0**	2 (154)	0
London Hillington	Yes	97.6%	8	1 (159)	0	0	0
Hillingdon 1 – South Ruslip	Yes	99.8%	**21**	5	2	7	0
Hillingdon 2 – Hillingdon Hospital	Yes	70.3%	0	0	0 (89.3)	0	0 (115)
Hillingdon 3 – Oxford Avenue	Yes	94.8%	5	1	0 (97.9)	1 (142)	0
London Harlington	Yes	96.2%	4	0	0 (82.5)	0	0
Hillingdon Sipson	Yes	99.7%	0	2	7	0	0
London Harmondsworth	Yes	91.4%	0	0	0	0 (101)	0
Heathrow Green Gates	Yes	99.5%	1	0 (141)	0	0	0
Heathrow Oaks Road	Yes	88.2%	-	2 (168)	4	0	0
Hillingdon Hayes	Yes	89.2%	1	0	7	15	15

Diffusion Tube Monitoring Data

Details of the annual mean NO_2 concentrations measured using diffusion tube sites during 2011 are presented in Table 2.5 and the series of results measured from 2008 to 2011 are presented in Table 2.6. Bar charts showing the trends in measured NO_2 annual mean concentrations measured with diffusion tubes are presented in Figures 2.4 and 2.5.

Annual mean NO_2 concentrations in excess of the 40 µg.m^{-3} objective were measured at the following diffusion tube sites:

- HD31: AURN, Sipson
- HD43: Uxbridge Day Nursery, Park Road
- HD46: South Ruislip Auto-monitor, West End Road
- HD53: Warren Road, Ickenham

The measured NO_2 annual mean at all of these sites has consistently been in excess of the objective over recent years; all of the sites are within the existing AQMA. Examination of the trend in NO_2 annual means measured across the network of diffusion tubes indicates that NO_2 concentrations have in general decreased slightly at all sites. This is a similar trend to that seen in the NO_2 concentrations measured at some of the automatic monitoring stations in the Borough. This slight decrease may however, in some part, also be attributable to the slight decrease in the national bias adjustment factor applied to the results (0.93 this year compared to 0.99 last year). There was no obvious downward trend in the automatic data which appears to support this.

Table 2.5: Results of NO_2 Diffusion Tubes

ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2011 (%)	Data with less than 9 months has been annualised (Y/N)	Has data been distance corrected? (Y/N)	Annual mean concentration 2011 ($\mu g.m^{-3}$) (Bias Adj. factor = 0.93)
HD31	AURN, Sipson	Roadside	Yes	Yes	97.3%	n/a	N	**44.7***
HD42	Uxbridge Technical College	Roadside	Yes	No	83%	n/a	N	36.9
HD43	Uxbridge Day Nursery, Park Road	Roadside	Yes	No	92%	n/a	N	**43.4**
HD46	South Ruislip Auto-monitor, West End Road	Suburban	Yes	Yes	94.7%	n/a	N	**42.4***
HD47	Hillingdon Primary School, Uxbridge Road	Roadside	Yes	No	100%	n/a	N	30.0
HD48	Citizens Advice Bureau, Eastcote Road, Ruislip	Background	No	No	100%	n/a	N	27.7
HD49	83 Hayes End Drive, Hayes End,	Background	Yes	No	100%	n/a	N	25.6
HD51	4 Colham Avenue Yiewsley	Background	Yes	No	100%	n/a	N	33.2
HD52	101 Cowley Mill Rd, Uxbridge	Background	Yes	No	100%	n/a	N	33.3
HD53	Warren Road, Ickenham,	Background	Yes	No	100%	n/a	N	**40.5**
HD55	Harold Avenue	Roadside	Yes	No	92%	n/a	N	37.8
HD56	15 Phelps Way, Hayes	Background	Yes	No	100%	n/a	N	35.2
HD57	25 Cranford Lane, Harlington)	Background	Yes	No	83%	n/a	N	36.5
HD58	Brendan Close, Harlington	Background	Yes	No	100%	n/a	N	39.4
HD59	7 Bomber Close, Sipson	Background	Yes	No	92%	n/a	N	34.4
HD60	Harmonsworth Green, Harmondsworth	Background	Yes	No	92%	n/a	N	29.4
HD61	Heathrow Close, Longford	Background	Yes	No	92%	n/a	N	34.9
HD64	34 Hatch Lane, Sipson	Roadside	Yes	No	92%	n/a	N	31.7
HD65	28 Pinglestone Close, Sipson,	Background	Yes	No	100%	n/a	N	32.4
HD66	486 Sipson Road, Sipson,	Background	Yes	No	100%	n/a	N	30.7
HD67	31 Tavistock Road	Background	Yes	No	92%	n/a	N	30.1
HD68	Ratcliffe Close, Uxbridge	Background	Yes	No	100%	n/a	N	27.3
HD69	Hillingdon Health Centre	Roadside	Yes	No	83%	n/a	N	33.5
HD70	Harefield Hospital, Hill End Road	Background	No	No	92%	n/a	N	23.9

ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2011 (%)	Data with less than 9 months has been annualised (Y/N)	Has data been distance corrected? (Y/N)	Annual mean concentration 2011 ($\mu g.m^{-3}$) (Bias Adj. factor = 0.93)
HD72	2 Vineries Close	Background	Yes	No	100%	n/a	N	31.9
HD73	Queensmead School, South Ruislip.	Background	No	No	92%	n/a	N	26.3
HD74	Field End Road/Field End School, S.Ruislip.	Roadside	No	No	100%	n/a	N	28.4
HD75	Sidmouth Drive, South Ruislip	Background	No	No	100%	n/a	N	27.7
HD76	Kaduna Close, Eastcote	Roadside	No	No	100%	n/a	N	25.0
HD77	Chamberlain Way, Eastcote	Background	No	No	92%	n/a	N	25.0
HD78	Gateway Close, Northwood	Roadside	No	No	92%	n/a	N	31.4
HD79	Swallowfield Way/Kestrel Way (Railside)	Background	Yes	No	92%	n/a	N	32.8
HD80	Swallowfield Way/Kestrel Way (Roadside)	Background	Yes	No	83%	n/a	N	33.0

*** Triplicate average at colocation study site.**

Table 2.6 Results of NO_2 Diffusion Tubes (2007 to 2011)

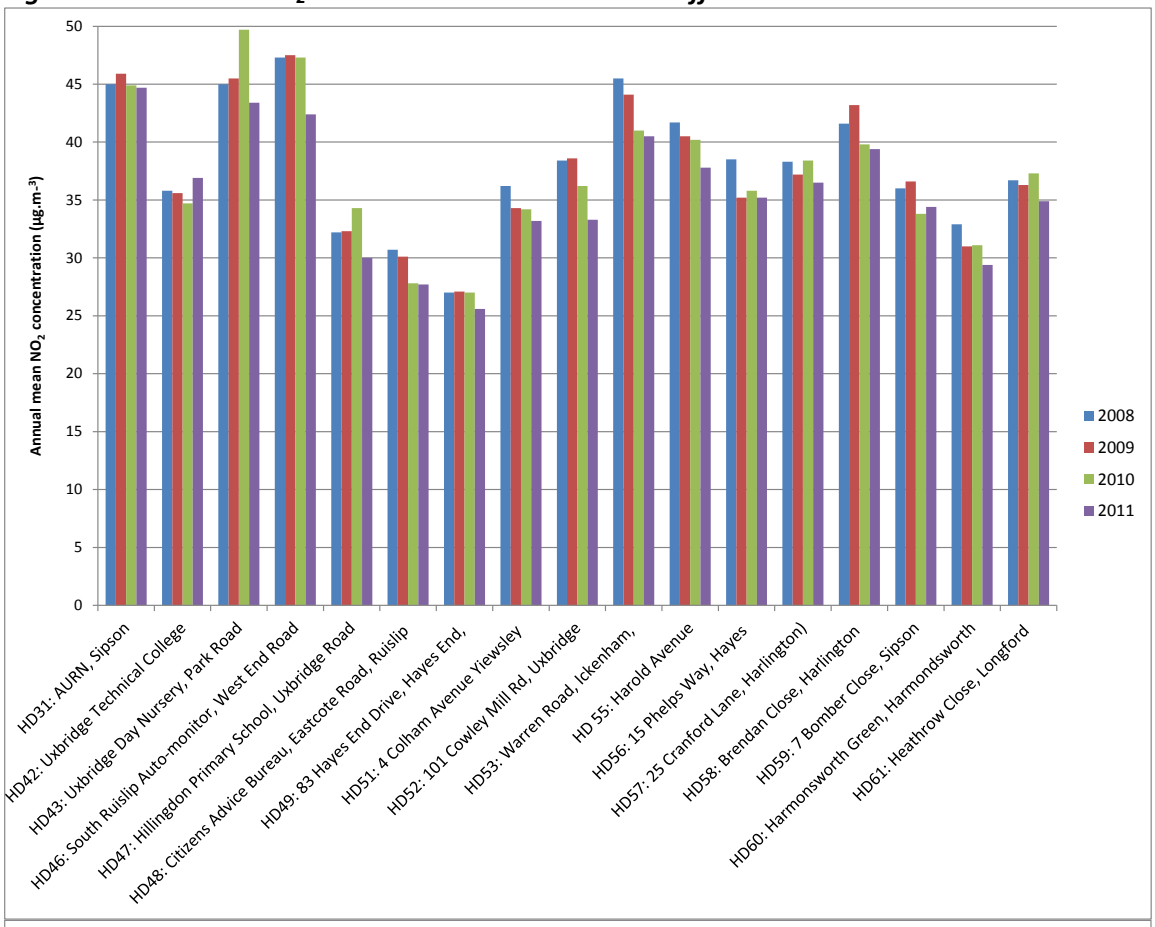
ID	Location	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) µg.m^{-3}			
				2008 (Bias Adj. Factor = 0.93)	2009 (Bias Adj. Factor = 0.96)	2010 (Bias Adj. Factor = 0.99)	2011 (Bias Adj. Factor = 0.93)
HD31	AURN, Sipson	Roadside	Yes	**45.0**	**45.9**	**44.9**	**44.7***
HD42	Uxbridge Technical College	Roadside	Yes	35.8	35.6	34.7	36.9
HD43	Uxbridge Day Nursery, Park Road	Roadside	Yes	**45.0**	**45.5**	**49.7**	**43.4**
HD46	South Ruislip Auto-monitor, West End Road	Suburban	Yes	**47.3**	**47.5**	**47.3**	**42.4***
HD47	Hillingdon Primary School, Uxbridge Road	Roadside	Yes	32.2	32.3	34.3	30.0
HD48	Citizens Advice Bureau, Eastcote Road, Ruislip	Background	No	30.7	30.1	27.8	27.7
HD49	83 Hayes End Drive, Hayes End,	Background	Yes	27.0	27.1	27.0	25.6
HD51	4 Colham Avenue Yiewsley	Background	Yes	36.2	34.3	34.2	33.2
HD52	101 Cowley Mill Rd, Uxbridge	Background	Yes	38.4	38.6	36.2	33.3
HD53	Warren Road, Ickenham,	Background	Yes	**45.5**	**44.1**	**41.0**	**40.5**
HD55	Harold Avenue	Roadside	Yes	**41.7**	**40.5**	**40.2**	37.8
HD56	15 Phelps Way, Hayes	Background	Yes	38.5	35.2	35.8	35.2
HD57	25 Cranford Lane, Harlington)	Background	Yes	38.3	37.2	38.4	36.5
HD58	Brendan Close, Harlington	Background	Yes	**41.6**	**43.2**	39.8	39.4
HD59	7 Bomber Close, Sipson	Background	Yes	36.0	36.6	33.8	34.4
HD60	Harmonsworth Green, Harmondsworth	Background	Yes	32.9	31.0	31.1	29.4
HD61	Heathrow Close, Longford	Background	Yes	36.7	36.3	37.3	34.9
HD64	34 Hatch Lane, Sipson	Roadside	Yes	NA	32.8	32.6	31.7
HD65	28 Pinglestone Close, Sipson,	Background	Yes	31.8	33.0	32.4	32.4
HD66	486 Sipson Road, Sipson,	Background	Yes	34.1	32.9	33.7	30.7
HD67	31 Tavistock Road	Background	Yes	31.8	29.8	31.6	30.1
HD68	Ratcliffe Close, Uxbridge	Background	Yes	29.0	28.5	29.4	27.3
HD69	Hillingdon Health Centre	Roadside	Yes	35.4	36.2	35.6	33.5
HD70	Harefield Hospital, Hill End Road	Background	No	26.0	25.9	25.5	23.9

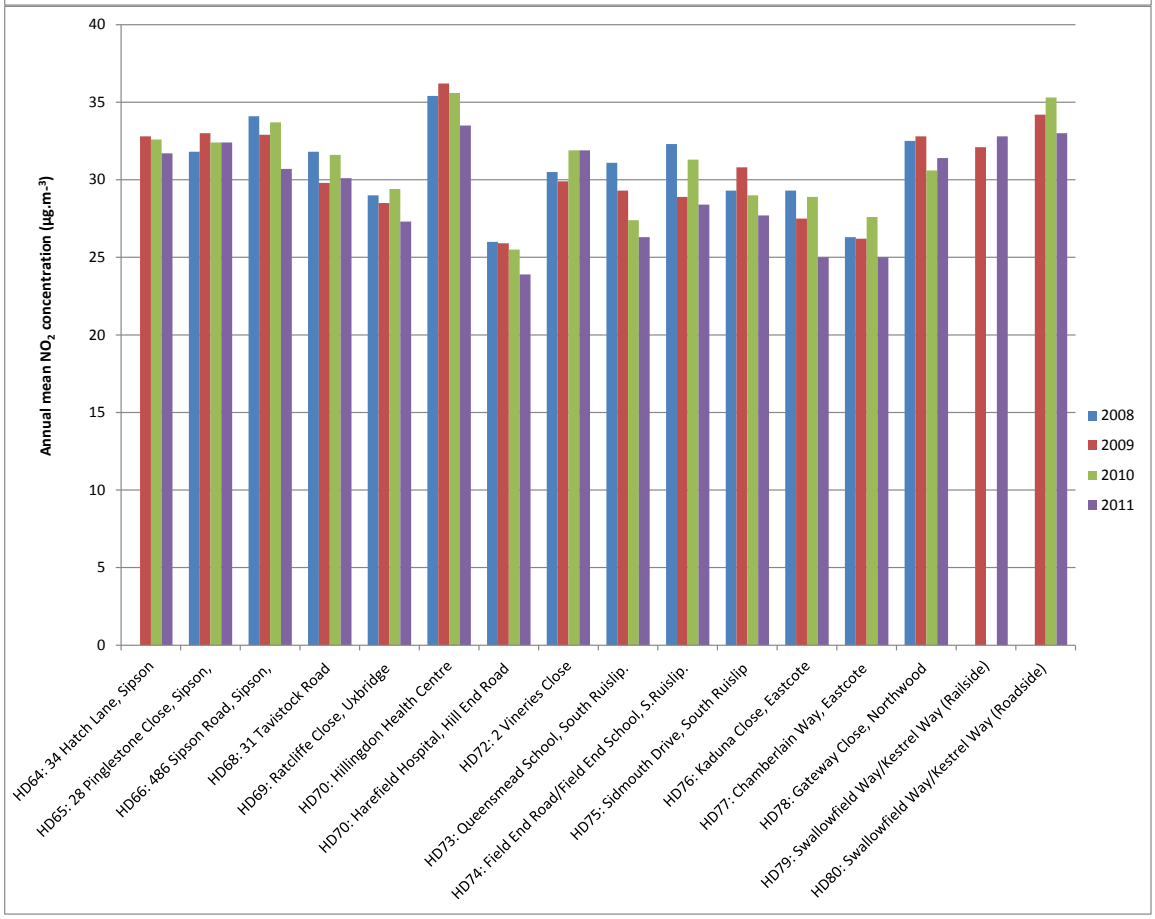
ID	Location	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) µg.m^{-3}			
				2008 (Bias Adj. Factor = 0.93)	2009 (Bias Adj. Factor = 0.96)	2010 (Bias Adj. Factor = 0.99)	2011 (Bias Adj. Factor = 0.93)
HD72	2 Vineries Close	Background	Yes	30.5	29.9	31.9	31.9
HD73	Queensmead School, South Ruislip.	Background	No	31.1	29.3	27.4	26.3
HD74	Field End Road/Field End School, S.Ruislip.	Roadside	No	32.3	28.9	31.3	28.4
HD75	Sidmouth Drive, South Ruislip	Background	No	29.3	30.8	29.0	27.7
HD76	Kaduna Close, Eastcote	Roadside	No	29.3	27.5	28.9	25.0
HD77	Chamberlain Way, Eastcote	Background	No	26.3	26.2	27.6	25.0
HD78	Gateway Close, Northwood	Roadside	No	32.5	32.8	30.6	31.4
HD79	Swallowfield Way/Kestrel Way (Railside)	Background	Yes	-	32.1	-	32.8
HD80	Swallowfield Way/Kestrel Way (Roadside)	Background	Yes	-	34.2**	35.3	33.0

*** Triplicate average at colocation study site.**

**** Annualised result due to low data capture**

Figure 2.4: Trends in NO_2 annual mean measured with diffusion tubes 2007 – 2011





2.2.2 PM_{10}

The annual mean PM_{10} concentrations measured from 2007 to 2011 are presented in Table 2.7 and Figure 2.5. A bar chart showing recent trends in annual mean PM_{10} concentrations is presented in Figure 2.5

Short to long term data adjustment has been applied to derive annual mean PM_{10} concentrations at both of the following sites where the data capture was less than 75%:

- Data capture was 58.1% at the London Harlington AURN site. This low data capture was attributable to measurement data from 1st January to 23rd May being removed during the data ratification process. This was due to air conditioning problems in the analyser cabin.
- The data capture at Hillingdon Hospital was 68.9% as monitoring at the site was discontinued on 27th September 2011.

No annual mean PM_{10} concentration in excess of the 40 $\mu g.m^{-3}$ objective was measured at the automatic monitoring sites during 2011. There is no clear trend in annual mean PM_{10} concentrations across the monitoring sites.

The number of 24-hour mean PM_{10} concentrations in excess of the 50 $\mu g.m^{-3}$ short-term objective; measured from 2007 to 2011 are presented in Table 2.8. None of the monitoring sites had more than the 35 permitted daily means greater than 50 $\mu g.m^{-3}$ during 2011.

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

Site name	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %[a]	Valid Data Capture 2011 %[b]	Confirm Gravimetric Equivalent	Annual Mean Concentration (µg.m^{-3})				
						2007*	2008*	2009*	2010*	2011*
London Heathrow LHR2	Airport	Y	98.7%	98.7%	Y	25	23	25	24	25
Hillingdon 1 – South Ruslip	Roadside	Y	99.3%	99.3%	Y	25	23	35	22	24
Hillingdon 2 – Hillingdon Hospital#	Roadside	Y	92%	68.9%	Y	29	21	22	26	23**
Hillingdon 3 – Oxford Avenue	Roadside	Y	94.9%	94.9%	Y	22	21	21	20	23
London Harlington	Airport	Y	58.1%	58.1%	Y	22	21	16	20	22**
London Harmondsworth	Roadside	Y	87.7%	87.7%	Y	22	30	28	18	21
Heathrow Green Gates	Airport	Y	98.4%	98.4%	Y	22	17	18	20	21
Heathrow Oaks Road	Airport	Y	86.6%	86.6%	Y	22	20	21	22	24
Hillingdon Hayes	Roadside	Y	92.4%	92.4%	Y	-	22	16	24	25

* TEOM results VCM corrected

** Short to long term adjustment applied as data capture < 75%

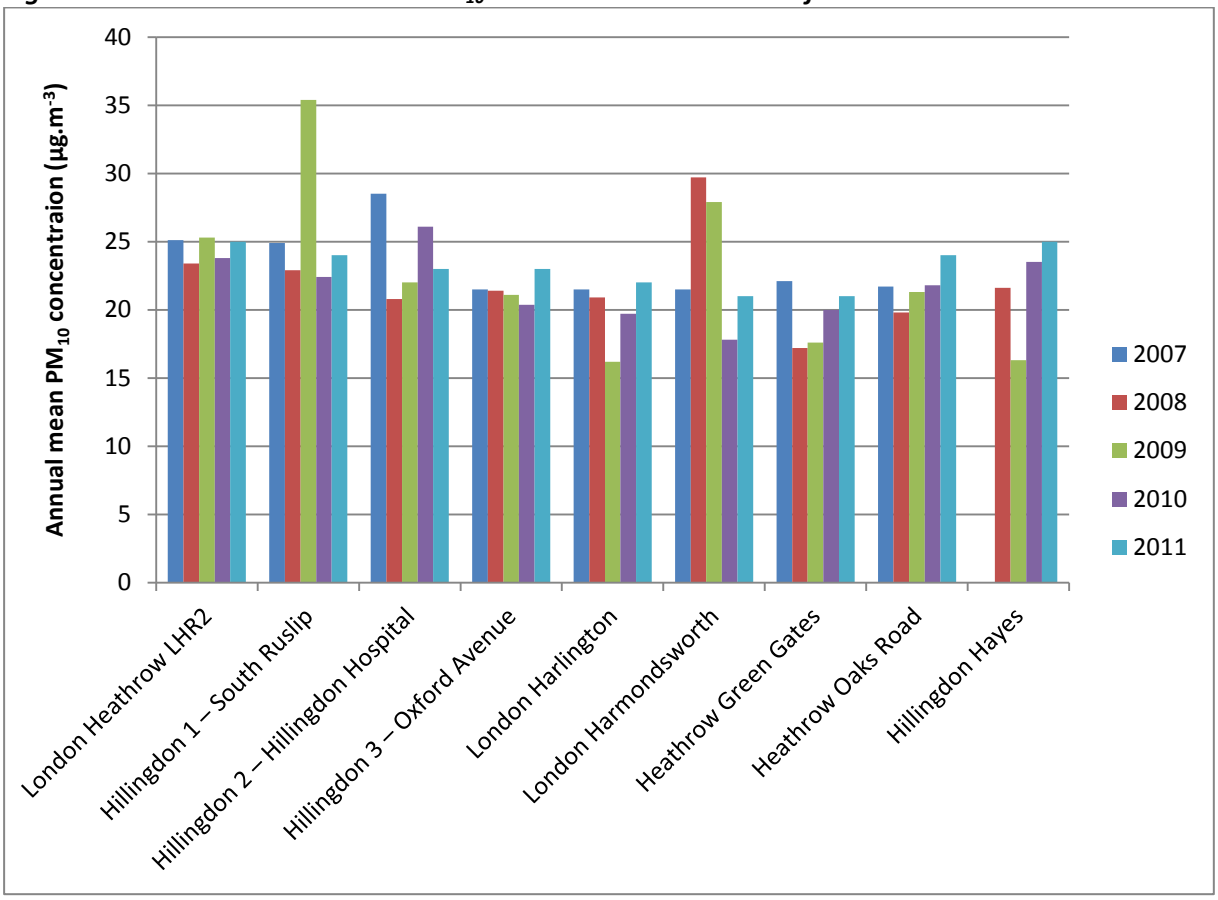
Hillingdon Hospital site discontinued September 27th 2011

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

Site name	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %[a]	Valid Data Capture 2011 %[b]	Confirm Gravimetric Equivalent	Number of Exceedences of 24-Hour Mean (50 µg.m^{-3})				
						2007*	2008*	2009*	2010*	2011
London Heathrow LHR2	Airport	Y	98.7%	98.7%	Y	20	15	7	4	19
Hillingdon 1 – South Ruslip	Roadside	Y	99.3%	99.3%	Y	22	12	7	5	21
Hillingdon 2 – Hillingdon Hospital	Roadside	Y	92%	68.9%	Y	11	6	0	15	13
Hillingdon 3 – Oxford Avenue	Roadside	Y	94.9%	94.9%	Y	30	10	2	2	16
London Harlington	Airport	Y	58.1%	58.1%	Y	16	10	5	12	1
London Harmondsworth	Roadside	Y	87.7%	87.7%	Y	2	33	25	2 (31.6)	10
Heathrow Green Gates	Airport	Y	98.4%	98.4%	Y	16	2	0	0	16
Heathrow Oaks Road	Airport	Y	86.6%	86.6%	Y	21	9	1	1	16
Hillingdon Hayes	Roadside	Y	92.4%	92.4%	Y	-	2	6	6	18

* TEOM results VCM corrected

Figure 2.5: Trends in annual mean PM_{10} concentrations measured from 2007 – 2011



2.2.3 Summary of Compliance with AQS Objectives

London Borough of Hillingdon has examined the results from monitoring in the Borough. Concentrations outside of the AQMA are all below the objectives at relevant locations, therefore there is no need to proceed to a Detailed Assessment.

3 Road Traffic Sources

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

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

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

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

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

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

3.4 Junctions

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

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

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

3.6 Roads with Significantly Changed Traffic Flows

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

3.7 Bus and Coach Stations

Two bus stations located within the London Borough of Hillingdon area may have a flow of buses greater than 2,500 buses per day; Uxbridge bus station and the Heathrow bus and coach station. Both of these are however already within the Hillingdon AQMA hence there is no need to proceed to a Detailed Assessment.

London Borough of Hillingdon has assessed new/newly identified bus stations, and concluded that it will not be necessary to proceed to a Detailed Assessment.

4 Other Transport Sources

4.1 Airports

Heathrow airport is located within the London Borough of Hillingdon and meets the criteria for which a detailed assessment of air quality is required i.e. an equivalent passenger throughput more than 10 mppa and relevant exposure within 1000m. A detailed assessment has already been conducted for Heathrow airport and action plan measures are currently in place that aim to reduce NOx emissions from the airport.

London Borough of Hillingdon confirms that there are no newly identified airports in the Local Authority area.

4.2 Railways (Diesel and Steam Trains)

4.2.1 Stationary Trains

The Great Western mainline runs through the London Borough of Hillingdon and stops at Hayes and Harlington and West Drayton stations.

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

4.2.2 Moving Trains

The Great Western mainline runs through the London Borough of Hillingdon. There is nearby residential housing alongside the railway. The 2009 Updating and Screening assessment concluded that there were locations with a large number of movements of diesel locomotives, with potential long-term relevant exposure within 30m, and recommended that the council proceed to a Detailed Assessment for NO_2.

Subsequent diffusion tube measurements of annual mean NO_2 concentrations at locations close to the railway have been below the 40 $\mu g.m^{-3}$ annual mean objective. The 2010 Progress Report concluded that diffusion tube monitoring on both north and south of the Great Western Mainline indicated that emissions from diesel locomotives, both at the boundary and relative receptors, did not result in concentrations that exceed NO_2 air quality objectives. Based on this monitoring data it is not currently considered necessary to complete a detailed assessment.

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

4.3 Ports (Shipping)

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

5 Industrial Sources

5.1 Industrial Installations

A number of industrial processes are operational within the London Borough of Hillingdon. A full list of all permitted processes including dry cleaners and petrol stations is presented in Appendix B.

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

Drayton Garden Village: Energy Centre

A planning application has been submitted for an Energy Centre which will be included within the development proposals for the Drayton Garden Village mixed-use development at the former national air traffic services (NATS) headquarters, Porters Way, West Drayton, UB7 9AX. The energy centre will include 3 x 1400kW gas boilers which, when occupancy of the site reaches 60%, will revert to back up boilers to a new 600kW gas CHP.

An atmospheric dispersion modelling assessment was submitted to quantify the potential impact of the energy centre on local air quality. The air quality assessment concluded that, based on worst case emissions i.e. the energy plant running at maximum capacity assuming 100 % of NOx emissions as NO_2; the greatest impact as a result of emissions from the proposed Energy Centre will be to the north-east of the proposed Energy Centre. The report advised that annual mean NO_2 concentrations in excess of the 40 $\mu g.m^{-3}$ objective are considered unlikely; on the basis that the increases in NO_2 concentrations as a result of emissions from the proposed Energy Centre are predicted to be less than 2 $\mu g.m^{-3}$ in the majority of locations, with increases of up to 5 $\mu g.m^{-3}$ in the vicinity of Mulberry Crescent. These conclusions are based on the background concentrations to the north east of the Energy Centre being approximately 35 $\mu g.m^{-3}$.

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

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

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

5.2 New or Significantly Changed Installations with No Previous Air Quality Assessment

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

5.3 Major Fuel (Petrol) Storage Depots

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

5.4 Petrol Stations

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

5.5 Poultry Farms

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

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

One new biomass combustion installation has been identified that requires screening. A new biomass boiler has recently become operational at Heathrow Airport; a HERZ BioFire 500 - 1000 Bio Control 400 – 1000kW rated biomass boiler, designed to operate with EU standard wood pellets. A screening assessment of the boiler was conducted using the nomograms for biomass combustion in TG(09); the screening indicated that a Detailed Assessment is required for assessment against the 1-hour mean NO_2 objective only. This is mainly due to the height of a close by building (15m) which is less than 1 m below the height of the stack (15.4 m), which reduces the effective stack height of the emission to 0.06m.

Having considered the location of the new biomass boiler stack within Heathrow airport; where there are a number of sources of quite significant NOx emissions e.g. aircraft; it is not reasonable to conduct a Detailed Assessment of such a small point source in the context of many much larger sources of NOx emissions; it would also be all but impossible to effectively model short-term concentrations of $_{NO2}$ without characterising the other sources in some detail.

When considering the application from BAA, the London Borough of Hillingdon recognised that biomass combustion, unless properly abated, is not ideal within an existing AQMA but did consider its contribution to reducing greenhouse gas emission from energy production. To address the air quality impact London Borough of Hillingdon therefore specified that the plant should have full abatement technology fitted to reduce particulate and NOx emissions.

The airport is within an existing AQMA and has a current air quality action plan, therefore no detailed assessment is required.

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

6.2 Biomass Combustion – Combined Impacts

London Borough of Hillingdon confirms that there are no biomass combustion plants in the Local Authority area.

6.3 Domestic Solid-Fuel Burning

No new sources of domestic solid-fuel burning have been identified since the previous round of Review and Assessment.

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

7 Fugitive or Uncontrolled Sources

Two new bulk cement plants have recently become operational within the London Borough of Hillingdon. Details of dust suppression techniques were submitted with applications for each site and have been included as part of the authorisations. No complaints regarding dust or visual indications of dust have been reported to date.

One site has been identified where there is potential for a detailed assessment to be required due to fugitive emissions of dust/particulates. This is described below.

Tarmac Roadstone Coating, Hayes

The Tarmac Roadstone site is located just north of the railway line beside the A312 in Hayes. This site operates a roadstone coating process which is regulated as a Part B Process under the Environmental Permitting Regulations by the London Borough of Hillingdon. Complaints regarding dust nuisance have been received in the past from commercial premises opposite the site. There has also been indication of dust tracking from the site on the roads accessing the site, and dust covering nearby bike shelters etc. It is likely that the main source of fugitive dust/particulate emissions will be the loose stock piles of aggregate etc. that are located at the north east of the site.

No complaints have however been received from residential properties; and there have been no obvious visual signs of the dust being tracked as far as the nearest residential area at Silverdale Gardens, which is approximately 300m northwest of the active area of the site. Lorries to and from the site can only access Tarmac from Bilton Way or Pump Lane where they come off the A312.

Using the screening criteria for fugitive and uncontrolled sources of PM_{10} in the TG(09) guidance; based on an annual mean PM_{10} background of 21 $\mu g.m^{-3}$ (from the 2010 base year background maps), a detailed assessment of PM_{10} would be required if there is any relevant exposure within 200m of the source of emissions. The residential properties are over 200m from the source therefore a Detailed Assessment is not required in this case.

London Borough of Hillingdon confirms that there are no potential sources of fugitive particulate matter emissions that require a Detailed Assessment in the Local Authority area.

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

Annual mean NO_2 concentrations have increased slightly at London Heathrow LHR2 when compared to 2010 but have remained fairly constant over the last five years. The measured annual mean concentration was in excess of the 40 $\mu g.m^{-3}$ objective again at this site during 2011; this site is located on the north east edge of the airfield apron, approximately 180m from the centre line of the north runway and 15m from the kerb of the Northern Perimeter Road. It is not therefore representative of relevant exposure.

Annual mean NO_2 concentrations at the London Hillingdon automatic monitoring site were in excess of the annual mean objective during 2011 and have increased consistently over the last five years. This site is representative of relevant human exposure as it is a similar distance from the M4 Motorway as the nearby housing. This site is already within the Hillingdon AQMA.

At Hillingdon Hayes, the measured NO_2 annual mean has remained fairly constant over the last three years averaging around 55 $\mu g.m^{-3}$, which is significantly in excess of the 40 $\mu g.m^{-3}$ objective. This site is approximately 15m from locations of relevant exposure. This site is also already within the Hillingdon AQMA.

The measured NO_2 annual mean has increased steadily over recent years at Heathrow Oaks Road; the 2011 annual mean of 39 $\mu g.m^{-3}$ is just less than the 40 $\mu g.m^{-3}$ objective; this is the highest measured annual mean in recent years. This site is however classed as a roadside site and is not therefore considered representative of relevant exposure.

At all of the other automatic monitoring sites the measured annual mean in 2011 was below the 40 $\mu g.m^{-3}$ objective and has either decreased slightly or stayed fairly constant over recent years.

Annual mean NO_2 concentrations in excess of the 40 $\mu g.m^{-3}$ objective were also measured at the following diffusion tube sites:

- HD31: AURN, Sipson
- HD43: Uxbridge Day Nursery, Park Road
- HD46: South Ruislip Auto-monitor, West End Road
- HD53: Warren Road, Ickenham

The measured NO_2 annual mean at all of these sites has consistently been in excess of the objective over recent years; all of the sites are within the existing AQMA. Examination of the trend in NO_2 annual means measured across the network of diffusion tubes indicates that NO_2 concentrations have in general decreased slightly at all sites.

No annual mean PM_{10} concentration in excess of the 40 $\mu g.m^{-3}$ objective was measured at the automatic monitoring sites during 2011. There is no clear trend over recent years in annual mean PM_{10} concentrations at the monitoring sites. None of the monitoring sites had more than the 35 permitted daily average PM_{10} concentration greater than 50 $\mu g.m^{-3}$ during 2011.

8.2 Conclusions from Assessment of Sources

The assessment of new sources has not identified any new sources that have not been considered previously. A detailed assessment is not therefore required for any new sources.

8.3 Proposed Actions

The Updating and Screening assessment has not identified any locations where a Detailed Assessment for any source or pollutant should be conducted. The London Borough of Hillingdon will continue monitoring at all existing sites within the District and will continue to implement the measures outlined in their Air Quality Action Plan for the existing AQMA.

9 Acknowledgements

AEA gratefully acknowledge the support received from Val Beale and Nayani Chandran of the London Borough of Hillingdon when completing this assessment.

10 References

Department for Environment, Food and Rural Affairs, (2009) Local Air Quality Management Technical Guidance LAQM.TG (09).

Department for Environment, Food and Rural Affairs, Air Quality Strategy for England, Scotland Wales and Northern Ireland, 2007.

Spreadsheet of Diffusion Tube Bias Adjustment Factors accessed at http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html

Appendices

Appendix A: QA/QC Data

Appendix B: Regulated Processes

Appendix A: QA:QC Data

Factor from Local Co-location Studies (if available)

There were two local co-location studies conducted within the borough during 2011 at the Hillingdon:Ruislip and Hillingdon:Sipson automatic monitoring sites. Bias factors have been calculated for each site. Table A.2 shows details of the calculation of the combined bias adjustment factor, details of how the the co-location factors were calculated are presented in Figures A.1 to A.3

Table A.2: Calculation of the average diffusion tube bias adjustment factor 2011

Co-location site	Bias adjustment factor 2011
Hillingdon - Ruislip	0.92
Hillingdon – Sipson	0.78
Average bias	**0.85**

Figure A.1: Co-location study Hillingdon – Ruislip

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	05/01/2011	02/02/2011		54.2	47.6	51	4.7	9	42.1
2	02/02/2011	02/03/2011	51.5	59.5	51.5	54	4.6	9	11.5
3	02/03/2011	30/03/2011	71.3	55.2	56.8	61	8.9	14	22.0
4	30/03/2011	27/04/2011	44.1	37.8	43.1	42	3.4	8	8.3
5	27/04/2011	01/06/2011	35.3	36.4	37.7	36	1.2	3	3.0
6	01/06/2011	29/06/2011	43.4	43.1		43	0.2	0	1.8
7	29/06/2011	03/08/2011	42.8	41.7	42.1	42	0.6	1	1.4
8	03/08/2011	31/08/2011	39.2	40.6	43.5	41	2.2	5	5.5
9	31/08/2011	28/09/2011	44.3	49.8	45.5	47	2.9	6	7.2
10	28/09/2011	02/11/2011	37.0	44.0	33.2	38	5.5	14	13.6
11	02/11/2011	30/11/2011	53.8	59.0	55.7	56	2.6	5	6.5
12	30/11/2011	31/12/2011	36.4	37.4	37.5	37	0.6	2	1.6
13									

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

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
47.0	100	Good	Good
45.6	100	Good	Good
54.9	99.7	Good	Good
45.0	99.9	Good	Good
30.0	100	Good	Good
32.2	100	Good	Good
35.1	99.9	Good	Good
30.5	100	Good	Good
35.9	99.9	Good	Good
46.4	99.1	Good	Good
58.7	100	Good	Good
42.4	99.9	Good	Good
	Overall survey -->	Good precision	Good Overall DC

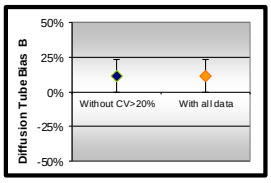
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Hillingdon - Ruislip

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

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 12 periods of data	
Bias factor A	0.92 (0.83 - 1.03)
Bias B	9% (-3% - 21%)
Diffusion Tubes Mean:	46 µgm^{-3}
Mean CV (Precision):	6
Automatic Mean:	42 µgm^{-3}
Data Capture for periods used:	100%
Adjusted Tubes Mean:	42 (38 - 47) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 12 periods of data	
Bias factor A	0.92 (0.83 - 1.03)
Bias B	9% (-3% - 21%)
Diffusion Tubes Mean:	46 µgm^{-3}
Mean CV (Precision):	6
Automatic Mean:	42 µgm^{-3}
Data Capture for periods used:	100%
Adjusted Tubes Mean:	42 (38 - 47) µgm^{-3}



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Version 04 - February 2011

Figure A.2: Co-location study Hillingdon Sipson

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	05/01/2011	02/02/2011	46.4	49.9	43.0	46	3.5	7	8.6
2	02/02/2011	02/03/2011	49.5	53.1	49.4	51	2.1	4	5.2
3	02/03/2011	30/03/2011	56.9	57.8	55.0	57	1.4	2	3.5
4	30/03/2011	27/04/2011	32.1	37.2	34.2	34	2.5	7	6.3
5	27/04/2011	01/06/2011	37.9	34.2	42.9	38	4.4	11	10.9
6	01/06/2011	29/06/2011	51.8	49.3	53.6	52	2.2	4	5.4
7	29/06/2011	03/08/2011	43.6		42.8	43	0.5	1	4.9
8	03/08/2011	31/08/2011	41.5	43.7	43.1	43	1.1	3	2.8
9	31/08/2011	28/09/2011	56.6	57.7	59.7	58	1.6	3	3.9
10	28/09/2011	02/11/2011	53.8	50.3	53.2	52	1.8	4	4.6
11	02/11/2011	30/11/2011	56.9	56.1	58.8	57	1.4	2	3.4
12	30/11/2011	31/12/2011	43.4	43.6	43.0	43	0.3	1	0.8
13									

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

Automatic Method

Period Mean	Data Capture (% DC)
44.6	99.4
44.5	100
49.6	99.7
38.9	99.7
22.5	99.6
19.4	99.9
30.6	99.8
30.9	99.9
35.2	99.7
47.6	100
49.5	99.3
32.7	100

Data Quality Check

Tubes Precision Check	Automatic Monitor Data
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good precision	Good Overall DC

Overall survey -->

(Check average CV & DC from Accuracy calculations)

Site Name/ ID: AURN, Sipson

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

Accuracy (with 95% confidence interval) without periods with CV larger than 20%

Bias calculated using 12 periods of data

Bias factor A: 0.78 (0.63 - 1.01)

Bias B: 29% (-1% - 59%)

Diffusion Tubes Mean: 48 µgm^{-3}

Mean CV (Precision): 4

Automatic Mean: 37 µgm^{-3}

Data Capture for periods used: 100%

Adjusted Tubes Mean: 37 (30 - 48) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA

Bias calculated using 12 periods of data

Bias factor A: 0.78 (0.63 - 1.01)

Bias B: 29% (-1% - 59%)

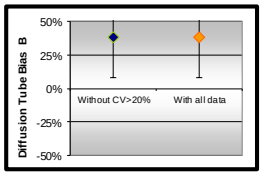
Diffusion Tubes Mean: 48 µgm^{-3}

Mean CV (Precision): 4

Automatic Mean: 37 µgm^{-3}

Data Capture for periods used: 100%

Adjusted Tubes Mean: 37 (30 - 48) µgm^{-3}



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Version 04 - February 2011

Diffusion Tube Bias Adjustment Factors

The diffusion tubes deployed by the London Borough of Hillingdon are supplied and analysed by Gradko using a preparation mixture of 50% triethanolamine (TEA) in acetone.

This year's average factor from the national database of Gradko results is 0.93 as presented in Figure A.3 below.

Figure A.3: Gradko 2011 – National average bias adjustment factor

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 03/12

Follow the steps below in the correct order to show the results of relevant co-location studies
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet
This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of September 2012
LAQM Helpdesk Website

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List

If a laboratory is not shown, we have no data for this laboratory.

Step 2: Select a Preparation Method from the Drop-Down List

If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down List

If a year is not shown, we have no data[2]

Step 4:

Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.

If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953

Analysed By[1]	Method (To apply your selection, choose [All] from the pop-up list)	Year[2] (To apply your selection, choose [All])	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision[4]	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	50% TEA in acetone	2011	R	London Borough of Richmond up	12	38	35	8.3%	P	**0.92**
Gradko	50% TEA in acetone	2011	B	London Borough of Richmond up	12	28	24	16.7%	G	**0.86**
Gradko	50% TEA in acetone	2011	UB	Reading Borough Council	12	22	24	-5.4%	G	**1.06**
Gradko	50% TEA in Acetone	2011	R	Worthing Borough Council	11	43	38	13.1%	G	**0.88**
Gradko	50% TEA in acetone	2011	R	Reading Borough Council	10	38	43	-10.8%	P	**1.12**
Gradko	50% TEA in acetone	2011	R	West Berkshire Council	11	41	44	-6.7%	G	**1.07**
Gradko	50% TEA in acetone	2011	K	Marylebone Road Intercomparisc	12	98	100	-2.0%	G	**1.02**
Gradko	50% TEA in acetone	2011	R	Lewisham Council	12	80	48	66.4%	G	**0.60**
Gradko	50% TEA in acetone	2011	R	Wolverhampton City	12	38	36	6.4%	G	**0.94**
Gradko	50% TEA in acetone	2011	R	Wolverhampton City	12	39	33	17.8%	G	**0.85**
Gradko	50% TEA in acetone	2011	R	Wolverhampton City	9	34	39	-12.1%	P	**1.14**
Gradko	50% TEA in acetone	2011	R	East Hampshire District Council	11	24	22	9.1%	G	**0.92**
Gradko	50% TEA in Acetone	2011	R	Stevenage Borough Council	13	35	30	16.7%	P	**0.86**
Gradko	50% TEA in Acetone	2011	UB	London Borough of Bexley	11	26	23	11.7%	G	**0.90**
Gradko	50% TEA in Acetone	2011	SU	London Borough of Bexley	10	28	29	-3.5%	G	**1.04**
Gradko	50% TEA in Acetone	2011	SU	London Borough of Bexley	9	27	26	3.6%	G	**0.96**
Gradko	50% TEA in Acetone	2011	R	London Borough of Bexley	11	53	44	21.6%	G	**0.82**
Gradko	50% TEA in acetone	2011	UB	Norwich City Council	10	14	13	9.2%	G	**0.92**
Gradko	50% TEA in acetone	2011	UB	Sandwell Metropolitan Borough C	12	24	23	3.1%	G	**0.97**
Gradko	50% TEA in acetone	2011	R	Sandwell Metropolitan Borough C	10	42	41	1.0%	G	**0.99**
Gradko	50% TEA in acetone	2011		**Overall Factor[3] (20 studies)**					**Use**	**0.93**

Discussion of Choice of Factor to Use

In recent years, three separate diffusion tubes co-location studies have been conducted within the London Borough of Hillingdon; in 2011 this was reduced to two co-location studies as the automatic monitor at Hillingdon Hospital was discontinued in September 2011.

To summarise the bias adjustment factors that have been applied in recent years; the average local co-location factor from three sites was applied to the 2008 (0.93) and 2009 data (0.96). The following year, the national factor for Gradko (0.99) was applied to the 2010 data. This year's average co-location factor of 0.85 is significantly lower than the factors applied in recent years. This year's average factor from the national database of Gradko results is 0.93 which is more consistent with the factors that have been applied to the Hillingdon diffusion tubes data in recent years.

The adjustment factor of 0.93 from the national database of co-location studies has therefore been used to bias adjust the 2011 diffusion tube results.

PM Monitoring Adjustment

Daily mean TEOM measurements were adjusted to account for the volatile fraction of particulate matter using data downloaded from the Kings College VCM Portal Website.

All BAM data was corrected for slope using a gravimetric factor of 0.83 for Indicative Gravimetric Equivalent from 1 January 2011. Particulate matter concentrations are reported at ambient temperature and pressure.

Short-term to Long-term Data adjustment

NO_2 adjustment

A short to long term data adjustment was applied to the 9 months of available NO_2 measurements at the Hillingdon Hospital automatic monitoring location to derive an annual mean NO_2 concentration; as the data capture was less than 75% (68.9% data capture from 1st January to 27th September). The details of the AURN sites used and the ratio calculations are presented in Table A.1.

Table A.1: Short to long term data adjustment derivation (January to September 2011)

Site	Site Type	Annual Mean (Am)	Period Mean (Pm)	Ratio (Am/Pm)
London Teddington	Urban Background	21.4	20.8	1.03
London N. Kensington	Urban Background	36.1	34.3	1.054
London Hillingdon	Urban Background	55.2	52.6	1.050
			Average ratio (Am/Pm)	**1.045**

PM_{10} adjustment

A short to long term data adjustment was applied to the 9 months of available PM_{10} measurements at the Hillingdon Hospital automatic monitoring location (68.9% data capture from 1st January to 27th September) to derive an annual mean PM_{10} concentration. The details of the AURN sites used and the ratio calculations are presented in Table A.2.

Table A.2: Short to long term data adjustment derivation (January to September 2011)

Site	Site Type	Annual Mean (Am)	Period Mean (Pm)	Ratio (Am/Pm)
London Bloomsbury	Urban background	22.5	23.3	0.965
London N. Kensington	Urban background	23.7	23.3	1.020
Reading New Town	Urban Background	19.2	19.5	0.983
			Average ratio (Am/Pm)	**0.989**

A short to long term data adjustment was also applied to the 7 months of available PM_{10} measurements at the London Harlington automatic monitoring location (58% data capture from 1st January to 27th September) to derive an annual mean PM_{10} concentration. The details of the AURN sites used and the ratio calculations are presented in Table A.3.

Table A.3: Short to long term data adjustment derivation (January to September 2011)

Site	Site Type	Annual Mean (Am)	Period Mean (Pm)	Ratio (Am/Pm)
London Bloomsbury	Urban background	22.5	18.1	1.248
London N. Kensington	Urban background	23.7	21.2	1.119
Reading New Town	Urban Background	19.2	16.4	1.170
			Average ratio (Am/Pm)	**1.179**

QA/QC of automatic monitoring

The London Borough of Hillingdon automatic sites are part of the National Automatic Monitoring Calibration Club, whereby monitoring data are managed to the same procedures and standards as AURN sites by AEA Technology.

QA/QC of diffusion tube monitoring

Gradko have participated in recent HSL WASP NO2 PT rounds and the percentage (%) of results submitted which were subsequently determined to be satisfactory during 2011 based upon a z-score of < ± 2 were as follows:

- Jan – Mar 2011: 100%
- Apr – Jun 2011: 100%
- Jul – Sep 2011: 100%
- Oct - Dec 2011: 37.5%

Table A.2: NO_2 monthly mean concentrations measured at diffusion tubes sites 2011

ID	Site name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual mean ($\mu g.m^{-3}$)	Data capture	Requires annualised?	Bias adjusted annual mean ($\mu g.m^{-3}$) (0.93 adj factor)
HD31	AURN, Sipson	46.4	49.5	56.9	32.1	37.9	51.8	43.6	41.5	56.6	53.8	56.9	43.4	47.5	100%	N	44.2
HD31	AURN, Sipson	49.9	53.1	57.8	37.2	34.2	49.3	-	43.7	57.7	50.3	56.1	43.6	48.4	92%	N	45.1
HD31	AURN, Sipson	43.0	49.4	55.0	34.2	42.9	53.6	42.8	43.1	59.7	53.2	58.8	43.0	48.2	100%	N	44.8
HD42	Uxbridge Technical College	48.4	43.5	46.3	33.3	-	-	36.0	34.4	40.8	39.1	43.3	31.4	39.6	83%	N	36.9
HD43	Uxbridge Day Nursery, Park Road	-	48.3	52.4	50.3	37.4	44.9	51.9	44.6	48.2	43.9	50.6	41.1	46.7	92%	N	43.4
HD46	South Ruislip Auto-monitor, West End Road	-	51.5	71.3	44.1	35.3	43.4	42.8	39.2	44.3	37.0	53.8	36.4	45.4	92%	N	42.2
HD46	South Ruislip Auto-monitor, West End Road	54.2	59.5	55.2	37.8	36.4	43.1	41.7	40.6	49.8	44.0	59.0	37.4	46.6	100%	N	43.3
HD46	South Ruislip Auto-monitor, West End Road	47.6	51.5	56.8	43.1	37.7		42.1	43.5	45.5	33.2	55.7	37.5	44.9	92%	N	41.8
HD47	Hillingdon Primary School, Uxbridge Road	38.4	39.9	40.8	33.2	21.4	26.3	30.4	27.7	31.7	32.6	41.9	22.7	32.3	100%	N	30.0
HD48	CAB, Eastcote Road, Ruislip	29.5	32.0	35.6	28.7	24.8	28.3	23.1	26.9	33.3	29.5	38.3	27.1	29.8	100%	N	27.7
HD49	83 Hayes End Drive, Hayes End,	31.2	32.0	38.7	27.8	18.7	22.3	19.6	22.2	28.4	28.3	36.3	24.6	27.5	100%	N	25.6
HD51	4 Colham Avenue Yiewsley	41.0	37.6	41.8	39.3	26.6	32.8	26.9	29.7	38.1	36.8	43.1	34.4	35.7	100%	N	33.2
HD52	101 Cowley Mill Rd, Uxbridge	43.9	39.9	42.5	27.5	27.5	34.6	30.3	29.0	36.6	35.1	48.7	34.0	35.8	100%	N	33.3
HD53	Warren Road, Ickenham,	46.4	43.2	44.4	40.5	35.6	29.5	40.9	43.1	53.5	46.9	49.8	48.8	43.5	100%	N	40.5
HD55	Harold Avenue	47.4	45.9	51.6	-	28.8	33.2	34.9	38.7	45.2	40.5	43.1	37.7	40.6	92%	N	37.8
HD56	15 Phelps Way, Hayes	52.4	35.6	45.9	42.8	25.3	37.0	28.6	31.8	36.3	36.1	45.2	37.3	37.9	100%	N	35.2
HD57	25 Cranford Lane, Harlington)	45.7	41.9	46.1	-	28.9	37.0	34.7	34.5	40.4	36.5	46.4	-	39.2	83%	N	36.5
HD58	Brendan Close, Harlington	44.9	46.1	45.6	35.5	32.3	43.9	29.1	37.7	49.7	45.3	52.3	45.3	42.3	100%	N	39.4
HD59	7 Bomber Close, Sipson	43.8	40.5	46.9	-	28.3	29.2	27.6	33.8	37.2	39.3	48.0	31.8	37.0	92%	N	34.4
HD60	Harmonsworth Green, Harmondsworth	36.6	35.9	41.5	-	23.3	27.1	25.6	25.1	30.7	32.4	41.5	28.2	31.6	92%	N	29.4
HD61	Heathrow Close, Longford	42.8	40.6	54.4	-	27.3	30.1	30.7	32.2	35.5	38.7	46.6	33.9	37.5	92%	N	34.9
HD64	34 Hatch Lane, Sipson	36.6	37.4	43.3	39.5	23.8	-	28.7	30.1	34.7	32.7	40.5	28.0	34.1	92%	N	31.7
HD65	28 Pinglestone Close, Sipson,	38.9	38.7	44.7	27.5	24.0	36.4	28.3	29.0	41.2	36.7	43.0	29.4	34.8	100%	N	32.4
HD66	486 Sipson Road, Sipson,	36.9	36.6	42.8	27.0	26.2	31.7	28.8	25.5	37.7	34.4	41.6	27.5	33.1	100%	N	30.7

ID	Site name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual mean ($\mu g.m^{-3}$)	Data capture	Requires annualised?	Bias adjusted annual mean ($\mu g.m^{-3}$) (0.93 adj factor)
HD67	31 Tavistock Road	34.5	43.6	41.9	31.3	21.0	26.4	-	23.8	33.4	33.3	41.5	25.1	32.3	92%	N	30.1
HD68	Ratcliffe Close, Uxbridge	34.1	29.0	40.9	43.4	21.1	21.9	21.5	23.6	26.1	30.9	38.5	21.7	29.4	100%	N	27.3
HD69	Hillingdon Health Centre	36.2	37.9	45.6	37.7	-	34.2	30.1	31.0	-	35.8	41.6	30.0	36.0	83%	N	33.5
HD70	Harefield Hospital, Hill End Road	27.5	28.5	30.0	26.0	13.3	-	19.4	19.7	27.7	29.4	39.7	21.5	25.7	92%	N	23.9
HD72	2 Vineries Close	37.7	35.2	40.6	42.9	21.4	29.3	26.4	27.6	53.8	33.0	37.0	27.3	34.3	100%	N	31.9
HD73	Queensmead School, South Ruislip.	32.0	33.8	36.7	25.5	18.0	23.8	20.9	23.2	28.5	30.0	38.9	-	28.3	92%	N	26.3
HD74	Field End Road/Field End School, S.Ruislip.	32.5	33.5	37.5	34.5	19.2	39.0	27.6	23.6	28.4	31.1	38.5	21.4	30.6	100%	N	28.4
HD75	Sidmouth Drive, South Ruislip	33.6	31.7	36.6	26.9	20.9	25.4	23.8	27.4	32.3	33.3	39.8	26.4	29.8	100%	N	27.7
HD76	Kaduna Close, Eastcote	31.8	33.0	36.9	26.6	16.7	28.3	16.5	20.9	26.4	28.2	36.9	19.8	26.8	100%	N	25.0
HD77	Chamberlain Way, Eastcote	30.6	31.4	37.8	26.4	16.2	22.3	-	19.2	25.1	27.0	37.4	22.5	26.9	92%	N	25.0
HD78	Gateway Close, Northwood	35.6	35.1	36.7	27.0	32.7	-	25.9	29.2	38.6	35.5	40.8	34.0	33.7	92%	N	31.4
HD79	Swallowfield Way/Kestrel Way (Railside)	38.7	38.5	39.9	38.1	29.0	30.0	27.2	30.0	42.2	-	41.6	33.3	35.3	92%	N	32.8
HD80	Swallowfield Way/Kestrel Way (Roadside)	42.5	-	-	34.1	31.0	33.5	26.5	30.9	38.6	38.0	45.4	34.2	35.5	83%	N	33.0

Appendix B: Regulated Processes

Table B.1: London Borough of Hillingdon Part B - Industrial Processes

Company (standard Part B)	OS grid reference		Address	Process
	Easting	Northing		
British Airways Engineering Base	509618	176107	Technical Block K (S486), PO Box 10, Heathrow Airport TW6 2JA	Coating and Recoating of Aircraft - PG6/40 (04)
Harven Form Foundry	508299	179723	Harven Form Foundaries, Rigby Lane, Hayes Middlesex UB3 1ET	Iron, Steel, Non-Ferrous metals - PG2/ 4 (04)
Hanson Premix Denham	505558	187353	Hanson, Skip Lane Harvil Road Ickenham UB9 6JW	Use of Bulk Cement - PG3/01 (04)
Hanson Premix West Drayton	507846	179854	Old Stockley Road, West Drayton UB7 8NF	Use of Bulk Cement - PG3/01 (04)
Tarmac Heathrow 3	507297	174496	Grass Area 17, near Control Post 24, Heathrow Airport, TW6	Use of Bulk Cement - PG3/01 (04)
London Concrete Sibson	507609	178130	Sipson Lane, Harlington, Hayes, Middlesex UB7 0JG	Use of Bulk Cement - PG3/01 (04)
Tarmac Hatton Cross	509819	175709	Cranford Lane South, TW6 (near Hatton Cross)	Use of Bulk Cement - PG3/01 (04)
Hanson Aggregates West Drayton	507928	179824	Old Stockley Road, West Drayton UB7 8NF	Roadstone - PG3/15a (04))
Tarmac Roadstone Hayes	510518	179504	Hayes Works, Pump Lane, Hayes Middlesex UB3 3LZ.	Roadstone / Cement - PG3/15a (04) PG3/01 (04)
Thames Materials	505622	187439	Skip Lane, off Harvil Road, Harefield UB9 6JW	Mobile Crushing and Screening - PG3/16 (04)
Breakspear Crematorium	508181	188873	Breakspear Road, Ruislip, Middlesex HA4 7SL	Crematoria - PG5/ 2
Trimite Ltd	504832	183117	Arundel Road, Uxbridge, Middlesex UB8 2SD	Manufacture of coatings - PG6/44 (04)
APR Cars Ltd	508454	189035	Reservoir Road, Ruislip, Middlesex HA4 7TT	Vehicle Refinisher - PG6/34 (04)
Vee Tec Ltd	505206	182393	Bridge Works, Iver Lane, Uxbridge UB8 2JF	Vehicle Refinisher - PG6/34 (04)
Solus (Hayes) Ltd	511443	180228	Beaconsfield Road, Hayes UB4 0SL	Vehicle Refinisher - PG6/34 (04)
Sipson Group	506948	180330	Stone Close, Horton Road, West Drayton UB7 8JU	Vehicle Refinisher - PG6/34 (04)
Baldwins	507126	179990	Berrite Works, Ironbridge Road, West Drayton UB7 8HY	Vehicle Refinisher - PG6/34 (04)
Impact Bodyshop	504548	183163	Eskdale Road, Uxbridge UB8 2SL	Vehicle Refinisher - PG6/34 (04)
Eastglade Autos Limited	507882	186175	11a Swakeleys Road, Ickenham, Middlesex UB10 8DF	Waste Oil Burner - PG1/1 (04)
Citygate Ruislip	511682	185328	664 Victoria Road, South Ruislip, Middlesex HA4 0LN	Waste Oil Burner - PG1/1 (04)
Hillingdon Autos	505585	180371	The Walnuts, Trout Road, Yiewsley UB7 7RS	Waste Oil Burner - PG1/1 (04)
BACE (Bullsbridge) pending permit	510426	179321	Unit 2, Bullsbridge, North Hyde Gardens, Hayes UB3 4QR	Degreasing of Aircraft Parts - PG 6/45 (11)

Table B.2: London Borough of Hillingdon – Dry Cleaners

Company name	Street Address	Town	Postcode	Process
Ariana Quality Dry Cleaners	229 High Street	Uxbridge	UB8 1LD	Dry Cleaning
Professional Dry Cleaners	1044 Uxbridge Road	Hayes	UB4 0RJ	Dry Cleaning
Hurricane	201 Field End Road	Eastcote	HA5 1QZ	Dry Cleaning
Whitby Dry Cleaners	3 Whitby Parade, Whitby Road	South Ruislip	HA4 9EA	Dry Cleaning
Swift Dry Cleaners	98 High Street	Ruislip	HA4 8LS	Dry Cleaning
First Choice Drycleaners	321 Long Lane	Hillingdon	UB10 9JU	Dry Cleaning
Bromptons of Windsor Street	47 Windsor Street	Uxbridge	UB8 1AB	Dry Cleaning
Express Drycleaners	8 Station Approach	Northwood	HA6 2XN	Dry Cleaning
Blue Dragon Drycleaners Ltd	53 Swakeleys Road	Ickenham	UB10 8DG	Dry Cleaning
Manor Dry Cleaners	116 Victoria Road	Ruislip Manor	HA4 0AL	Dry Cleaning
Star Dry Cleaners - Bowe 525	250 Kingshill Avenue	Hayes	UB4 8BZ	Dry Cleaning
Duvals Dry Cleaners	1 Crescent Parade, Uxbridge Road	Hillingdon	UB10 0LG	Dry Cleaning
Dry Clean 2 Door	42 School Parade, High Street	Harefield	UB9 6BU	Dry Cleaning
Appletons Dry Cleaners	260 Yeading Lane	Hayes	UB4 9AX	Dry Cleaning
Hurricane Dry Cleaners	131 High Street	Ruislip	HA4 8JY	Dry Cleaning
R & J Dry Cleaners	148 High Street	West Drayton	UB7 7BD	Dry Cleaning
Impressive Dry Cleaners	30 Green Lane	Northwood	HA6 2QB	Dry Cleaning
S Dry Cleaners	980 Uxbridge Road	Hayes	UB4 0RL	Dry Cleaning
Gem Dry Cleaners	12 The Broadway, Joel Street	Northwood Hill	HA6 1PF	Dry Cleaning
XL Cleaners	522 Victoria Road	Ruislip	HA4 0HD	Dry Cleaning
Rosies Dry Cleaners	38 Station Road	West Drayton	UB7 7DD	Dry Cleaning
Annies Dry Cleaners	11 New Pond Parade, West End Road	Ruislip	HA4 6LR	Dry Cleaning
Kenclean Dry Cleaners	210 High Street	Hayes	UB3 5DS	Dry Cleaning
First Choice Dry Cleaners	119 Field End Road	Eastcote	HA5 1QH	Dry Cleaning

Table B.3: London Borough of Hillingdon – Petrol Stations

Company	Location/ address
BP Oil UK ltd	Malthurst Victoria Road Victoria Road Ruislip HA4 0SA (BP OIL UK LTD)
BP Oil UK ltd	BP Eastcote F/Stn 726 Field End Road Ruislip HA4 0QP (BP OIL UK LTD)
BP Oil UK ltd	BP F/Stn Bury Street Ruislip Middx HA4 7TW (BP OIL UK LTD)
Safeway stores & BP Oil UK ltd	BP Long Lane S/Stn Uxbridge Road Hillingdon UB10 0LQ (SAFEWAY STORES PLC & BP OIL UK LTD)
Shell UK Ltd	Shell Swakeleys Long Lane Ickenham UB10 8TB (SHELL UK LTD)
Rajarnatnam Mayooranathan T/A Colham self serve Ltd	148 Colham Green Road Hillingdon UB8 3LJ (RAJARATNAM MAYOORANATHAN T/A COLHAM SELF SERVE LTD)
Shell UK Ltd	Shell Yiewsley 209 High Street Yiewsley UB7 7QP (SHELL UK LTD)
Tesco Stores Ltd	Tesco F/Stn Willow Tree Lane Glencoe Road Yeading Hayes UB4 9SQ (TESCO STORES LIMITED)
J Sainsburys PLC	Sainsburys F/Stn Lombardy Retail Park Coldharbour Lane Hayes UB3 3HN (J SAINSBURYS PLC)
Total UK Ltd	TCS Ruislip 300 West End Road Ruislip HA4 6QQ (TOTAL UK LIMITED)
Total UK Ltd	TCS West Drayton Holloway Lane West Drayton UB7 9JS (TOTAL UK LIMITED)
Tesco Stores Ltd	Tesco Express High Road Cowley UB8 2HS (C36)
ROC UK Ltd	Esso Heathrow North S/Stn Shepiston Lane Hayes UB3 1LL (ROC UK LTD)
Pace petroleum Ltd	Q8 Eastcote High Road Eastcote HA5 2ET (PACE PETROLEUM LIMITED)
Murco Petroleum Ltd	Mill Road F/Stn Mill Road West Drayton UB7 7EQ (MURCO PETROLEUM LTD)
Avis Rent a car Ltd	Valet Building Avis Rent A Car Northrop Road HAL TW6 2QA (AVIS RENT A CAR LTD)
State Oil Ltd	127-133 Station Road West Drayton UB7 7ND (STATE OIL LTD)
Total UK Ltd	TotalFinaElf Peggy Bedford 400 Bath Road Longford UB7 0BA (TOTAL UK LIMITED)
Total UK Ltd	TotalFinaElf Hayes Coldharbour Lane Hayes UB3 3HG (TOTAL UK LIMITED)
Europcar UK Ltd	Europcar Interrent Reception Northern Perimeter Road HAL TW6 2QE (EUROPCAR UK LIMITED)
Total UK Ltd	TCS Ickenham High Road Ickenham UB10 8LF (TOTAL UK LIMITED)
Texaco Ltd	Texaco Lees Corner Hillingdon UB4 0JN (TEXACO LIMITED)
Iqbal Singh Deooray	Midcroft Garage Midcroft Road Ruislip HA4 7BH (IQBAL SINGH DEOORAY)
Hertz UK Ltd	Hertz Turnaround Facility Northern Perimeter Road HAL TW6 2QD (HERTZ UK LIMITED)
BP Oil UK Ltd	BP Heathrow Airside B Central Area Heathrow Airport HAL UB3 5AP (BP OIL UK LTD)
J Sainsburys PLC	Sainsburys F/Stn 11 Long Drive South Rusilip HA4 0HQ (J SAINSBURY PLC)

Company	Location/ address
Somerfield Stores Ltd	Texaco Sipsons Corner Harlington UB3 5AZ (SOMERFIELD STORES LTD)
Heathrow Airport Ltd	Building 471 Fleet House Northern Perimeter Rd Heathrow UB3 5AP (HEATHROW AIRPORT LTD)
Certek Ltd	141 Ickenham Road Ruislip HA4 7DH (CERTEK LTD)
Akber Ali Manji	Esso 38-42 North Hyde Road Hayes UB3 4NE (AKBER ALI MANJI)
Tesco Stores Ltd	Esso Tolcarne S/Stn Joel street Northwood Hills HA5 2PA (TESCO STORES LTD)
Enterpise Car Rental.	Enterprise Car Rental Northern Perimeter Road Heathrow TW6 2RY