



Luton Borough Council 2010 Air Quality Progress Report

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

September 2010



Local Authority Officer	Brian Page
--------------------------------	----------------------------

Department	Environmental & Consumer Services
Address	Luton Borough Council Town Hall LUTON LU1 2BQ
Telephone	01582 54 65 14
e-mail	Brian.page@luton.gov.uk

Report Reference number	AQPR/2010/BRP
Date	September 2010

Executive Summary

This Progress Report has identified there is no need to proceed to any Detailed Assessments.

The Report identifies new nitrogen dioxide (NO₂) data available in the area of the Air Quality Management Area (AQMA) and in the environs of London Luton Airport (LLA), from passive monitoring recommended in the Updating and Screening Assessment (USA) completed in 2009; although in the case of the area around LLA, a complete calendar year of data is not yet available.

LLA has continued its automatic monitoring of particulates (PM₁₀) and its diffusion tube monitoring of NO₂ at locations on and around the airfield.

Monitoring of nitrogen dioxide (NO₂), sulphur dioxide (SO₂), particulates (PM₁₀), ozone (O₃) and carbon monoxide (CO) continued throughout 2009 at the automatic monitoring station operated by Luton Borough Council near to the M1 motorway Junction 11/A505 (ref: LN01).

Results show exceedances of the annual average objective as specified in the national Air Quality Strategy (AQS) for NO₂ at four monitoring points in 2009;

- LN16 – Belper Road – east of M1 near J11
- LA01 – Terminal Patio at LLA
- LA05 – Runway Apron at LLA
- LA06 – President Way at LLA

The first location, LN16 is within the existing AQMA, and LA01, LA05 and LA06 are within the LLA airfield and not near relevant receptors.

Results from the automatic monitoring station LN01 show no exceedances of the AQS Objectives in both the short and long term for any of the prescribed pollutants measured. However, for O₃ the rolling 8 hour mean objective of 100µg.m⁻³ was exceeded on 11 occasions, once more than the non-regulatory objective.

At LLA the annual mean and 24 hour mean AQS Objectives for PM₁₀ were not exceeded.

Passive monitoring of NO₂ in the environs of LLA began in 2009 and is continuing on the recommendation of the USA 2009. Although not covering a complete calendar year, data indicates the annual mean NO₂ objective of 40 µg.m⁻³ is unlikely to be exceeded in areas of relevant exposure. This monitoring will continue throughout 2010 and the results considered further in the Progress Report 2011.

Table of contents

1	Introduction	7
1.1	Description of Local Authority Area	7
1.2	Purpose of Progress Report	7
1.3	Air Quality Objectives	7
1.4	Summary of Previous Review and Assessments	9
2	New Monitoring Data	12
2.1	Summary of Monitoring Undertaken	12
2.2	Comparison of Monitoring Results with Air Quality Objectives	19
3	New Local Developments	26
4	Planning Applications	27
5	Local Transport Plans and Strategies	28
6	Climate Change Strategies	29
7	Conclusions and Proposed Actions	30
7.1	Conclusions from New Monitoring Data	30
7.2	Proposed Actions	31
8	References	32
9	Appendices	33

Appendices

- Appendix A** **QA/QC of automatic monitoring**
- Appendix B** **Diffusion Tube Bias Adjustment Factors**
- Appendix C** **Annualisation of Data.**

List of Tables

- Table 1.1** **Air Quality Objectives included in Regulations for the purpose of Local Air Quality Management in England.**
- Table 2.1** **Details of Automatic Monitoring Sites**
- Table 2.2** **Details of Non- Automatic Monitoring Sites**
- Table 2.3** **Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with Annual Mean Objective**
- Table 2.4** **Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour Mean Objective**
- Table 2.5** **Results of Nitrogen Dioxide Diffusion Tubes**
- Table 2.6** **Results of PM₁₀ Automatic Monitoring: Comparison with Annual Mean Objective**
- Table 2.7** **Results of PM₁₀ Automatic Monitoring: Comparison with 24-hour Mean Objective**
- Table 2.8** **Results of SO₂ Automatic Monitoring: Comparison with Objectives**
- Table 2.9** **Exceedances of the Ozone 8-hour Mean Objective.**

List of Figures

- Figure 2.2** **Maps of Non-Automatic Monitoring Sites**
- a. Monitoring Locations in and around the AQMA
(Incorporating automatic monitor LN01 collocated with LN19/20/21)**
- b. Monitoring Locations in and around London Luton Airport
(Incorporating automatic PM₁₀ monitor at LA08)**

Figure 2.3 Chart showing Trends in Annual Average NO₂ Levels at Automatic Monitoring Station LN01 near M1 Motorway J11.

Figure 2.4 Chart Showing Annual Average of PM₁₀ Levels at Automatic Monitoring Station LN01 near M1 Motorway J11.

Figure 2.5 Chart Showing Annual Average of PM₁₀ Levels at Automatic Monitoring Station LA08 at London Luton Airport.

Acronyms and Definitions Used in this Report

AQMA	Air Quality Management Area
APU	Auxiliary Power Units
AQS	Air Quality Strategy
BAM	Beta Attenuation Monitor
CO	Carbon monoxide
Defra	Department of the Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges
EIA	Environmental Impact Assessment
ERG	Environmental Research Group of King's College London
kerbside	0 to 1 m from the kerb
km	kilometre
LAQM	Local Air Quality Management
LAQM.PRG	Local Air Quality Management – Progress Report Guidance
LAQM.TG	Local Air Quality Management – Technical Guidance
LLA	London Luton Airport
LTP	Local Transport Plan
m	Metre
NO ₂	Nitrogen dioxide
NO _x	Oxides of nitrogen
Mppa	million passengers per annum
O ₃	Ozone
PM _{2.5}	Particulate Matter smaller than 2.5 microns
PM ₁₀	Particulate Matter smaller than 10 microns
ppb	parts per billion (1 ppb is 1 volume of pollutant in 10 ⁹ volumes of air)
receptor	In the context of this study, the relevant location where air quality is assessed or predicted (for example, houses, hospitals and schools)
roadside	1 to 5 m from the kerb
SO ₂	Sulphur dioxide
TEA	Triethanolamine
TEOM	Tapered Element Oscillating Microbalance
USA	Updating and Screening Assessment
µg.m ⁻³	Microgrammes per cubic metre

1 Introduction

1.1 Description of Local Authority Area

Luton is a unitary authority in Bedfordshire in the South East of England. It has an estimated population of over 185,000 in an area of 4336 hectares (10,657 acres). The Borough is dominated by the population centre of Luton and also contains London Luton Airport to the south east.

The main sources of air pollution are traffic using the M1 Motorway, that runs North – South at the Western side of the Borough, and London Luton Airport (LLA) that is situated in the southeast corner of the Borough. There is only the one Part A1 IPPC process (regulated by the Environment Agency) in the area, being the IBC vehicle-plant Boiler house. There are no A2 processes and 49 Part B processes (regulated by Luton BC) in the area.

The Borough has declared an Air Quality Management Area (AQMA) that covers 431 dwellings situated near the M1 motorway.

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

1.4 Summary of Previous Review and Assessments

Luton Borough Council has completed the following rounds of Review and Assessment to date:

- Stages 1 and 2 (1999);
- Stage 3 (2001);
- Stage 4 (2003);
- Updating and Screening Assessment (2003);
- Further and Detailed Assessment (2004);
- Progress Report (2005);
- Updating and Screening Assessment (2006);
- Progress Report (2007);
- Progress Report (2008);
- Updating and Screening Assessment (2009).

Stages 1 to 4 (1999 to 2002)

Luton Borough Council published its Stage 1 Review and Assessment in March 1999. It concluded that further investigation was required for carbon monoxide (CO), nitrogen dioxide (NO₂), particulate matter (PM₁₀) and sulphur dioxide (SO₂). The Stage 2 Review and Assessment published in October 1999 considered these pollutants in more detail and concluded that further investigation needed to be made regarding NO₂ and PM₁₀.

Stage 3 Review and Assessment (2001) looked in greater detail at NO₂ and PM₁₀ and found that the AQS objectives predicted to be exceeded were the annual mean NO₂ objective (40µg.m⁻³ by end of 2005) and the 24 hourly mean PM₁₀ objective (50µg.m⁻³ by end of 2004). However, after considering whether there was any relevant exposure, and following consultation, it was decided not to declare an AQMA.

In 2003, the Stage 4 Review & Assessment report (AEAT, 2003) was used to inform an Action Plan and to provide more up to date information on air quality in Luton. The assessment looked in detail at NO₂ and PM₁₀ and concluded that:

- a) the PM10 annual average objective would not be exceeded anywhere in Luton,
- b) that the 24-hour mean objective for PM₁₀ would only be exceeded on the M1 Motorway itself (where relevant exposure does not occur) and
- c) that the provisional annual average objective for PM₁₀ of 20 µg.m⁻³ by 2010 would not be exceeded, except perhaps within approximately 5m of the boundary of the M1.

The assessment also concluded that there was likely to be exceedences of the NO₂ annual mean objective at locations of relevant exposure. These locations were at 24 specified dwellings that are within a 50 m band along the M1.

Updating & Screening Assessment (2003)

The Updating and Screening Assessment (Luton Borough Council, 2003) concluded that the following pollutants would meet relevant AQS objectives for Benzene, 1-3 Butadiene, CO, Lead, PM₁₀ and SO₂. However, it was concluded that there was likely to be exceedance of the NO₂ annual mean objective at locations inside and outside of the AQMA declared in November 2003 (which contained the 24 dwellings determined to have relevant exposure in the Stage 4 Review and Assessment). Therefore a Detailed Assessment and Further Assessment were required to quantify and spatially redefine the exceedance area.

Further and Detailed Assessment (2004)

The Further Assessment and Detailed Assessment (AEAT, 2004) concluded that the NO₂ annual mean objective of 40 µg.m⁻³ for 2005 was likely to be exceeded over a much greater area than had been concluded by the Stage 3 and 4 Review and Assessments. The area of likely exceedance comprised 431 dwellings. An Air Quality Management Area (AQMA) was subsequently declared in March 2005, which contained these 431 dwellings (see Appendix 1 The Luton Air Quality Management Areas (NO₂) Order 2005). The Order and maps of the AQMA are available on Luton Council's website, www.luton.gov.uk/airquality

Progress Report (2005)

The 2005 Progress Report indicated a downward trend in NO₂ concentrations in Luton at the monitoring locations. During 2004 the measured average annual concentration of NO₂ in Luton reduced at all locations compared to 2003. There was only one site exceeding the annual mean objective for NO₂; by Junction 11 of the M1. All other AQS pollutant concentrations fell consistently below the objective concentrations.

Updating and Screening Assessment (2006)

The Updating and Screening Assessment (2006) concluded that Further Assessments or Detailed Assessments were not required for any of the AQS pollutants.

Progress Report (2007)

The 2007 Progress Report indicated that the measured annual average NO₂ concentration in Luton reduced at virtually all locations compared with the 2003 concentrations. As in previous assessments, a downward trend in NO₂ concentrations at the measurement sites was indicated. All other AQS pollutant concentrations fell consistently below the objective concentrations.

Progress Report (2008)

The 2008 Progress Report showed that there has been no exceedance of the annual or short-term objectives for NO₂, PM₁₀, CO and SO₂. It was reported that diffusion tubes had been re-deployed with the AQMA in 2008 but there was no data available to assess if there were likely to be an exceedance in NO₂ objectives in the borough. Two exceedances were identified at London Luton Airport, although no monitoring at locations of relevant exposure is currently undertaken.

Updating & Screening Assessment (2009)

Monitoring of NO₂ began in areas of relevant exposure outside the northern boundary of London Luton Airport. There is not yet a calendar year of data but results to date suggest exceedances of the Annual Objective will be unlikely, as will be the need for a Detailed Assessment. There is also no requirement to proceed to a Detailed Assessment for any other sources assessed.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

Luton Borough Council undertakes automatic monitoring of the following pollutants covered by the AQS:

- Carbon Monoxide (CO);
- Nitrogen Dioxide (NO₂);
- Sulphur Dioxide (SO₂);
- Particulate Matter (PM₁₀) (TEOM)
- Ozone (O₃)

Luton Borough Council also maintains a regime of NO₂ diffusion tubes throughout the Borough.

London Luton Airport monitors PM₁₀ at an automatic monitor (BAM), and also maintains a regime of NO₂ diffusion tubes on and around the airfield.

2.1.1 Automatic Monitoring Sites

Currently, there are two automatic monitoring sites in the area of Luton Borough. One (LN01), near the M1 Motorway J11, is operated by the Borough Council, and monitors Carbon monoxide (CO), Nitrogen dioxide (NO₂), Nitrogen oxides (NO_x) Sulphur dioxide (SO₂), Ozone (O₃) and particulate matter (PM₁₀) using a Tapered Element Oscillating Microbalance (TEOM). The results from the TEOM are corrected using the Kings College Volatile Correction Model. The other (LA08), records PM₁₀ only, using a Beta Attenuation Monitor (BAM) and is operated by London Luton Airport. Results from both sites are ratified and corrected by ERG and placed on the website: <http://www.hertsbedsair.org.uk>

Table 2.1 Details of Automatic Monitoring Sites

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)	Does this location represent worst-case exposure?
LN01	Urban background.	505570	222755	CO, NO ₂ , NO _x , SO ₂ , PM ₁₀ (TEOM)	N	Y (38m)	14m	N
LA08 (Luton Airport)	Urban Background	511866	221145	PM ₁₀ (BAM)	N	N	N/A	N

2.1.2 Non-Automatic Monitoring

In 2009, the Borough Council operated 13 NO₂ diffusion tube sites one of which was on behalf of the Highways Agency for its study of NO₂ levels in AQMAs. Luton Airport operates a further 13 NO₂ diffusion tube sites, one of which (LA15), is a new site operating since November 2009.

Luton Borough Council uses the 'Grey Cap' diffusion tubes supplied and analysed by Gradko, using a preparation mixture of 20% triethanolamine (TEA) in deionised water. Gradko complies with WASP scheme and achieved 'good' performance based on old and new criteria for the January 2009 – January 2010 period.

London Luton Airport uses diffusion tubes prepared and analysed by Gradko International Ltd. The laboratory takes part in the NO₂ Network QA/QC Field Intercomparison using the preparation method of 50% triethanolamine (TEA) in acetone.

Bias corrections for all diffusion tubes were derived from the national database of collocated studies: i.e.

for the diffusion tubes deployed by Luton Council:	2009 = 0.9
for the diffusion tubes deployed by LLA:	2009 = 0.99.

Figure 2.2 Maps of Non-Automatic Monitoring Sites

**a. Monitoring Locations in and around the AQMA
(Incorporating automatic monitor LN01 collocated with LN19/20/21)**

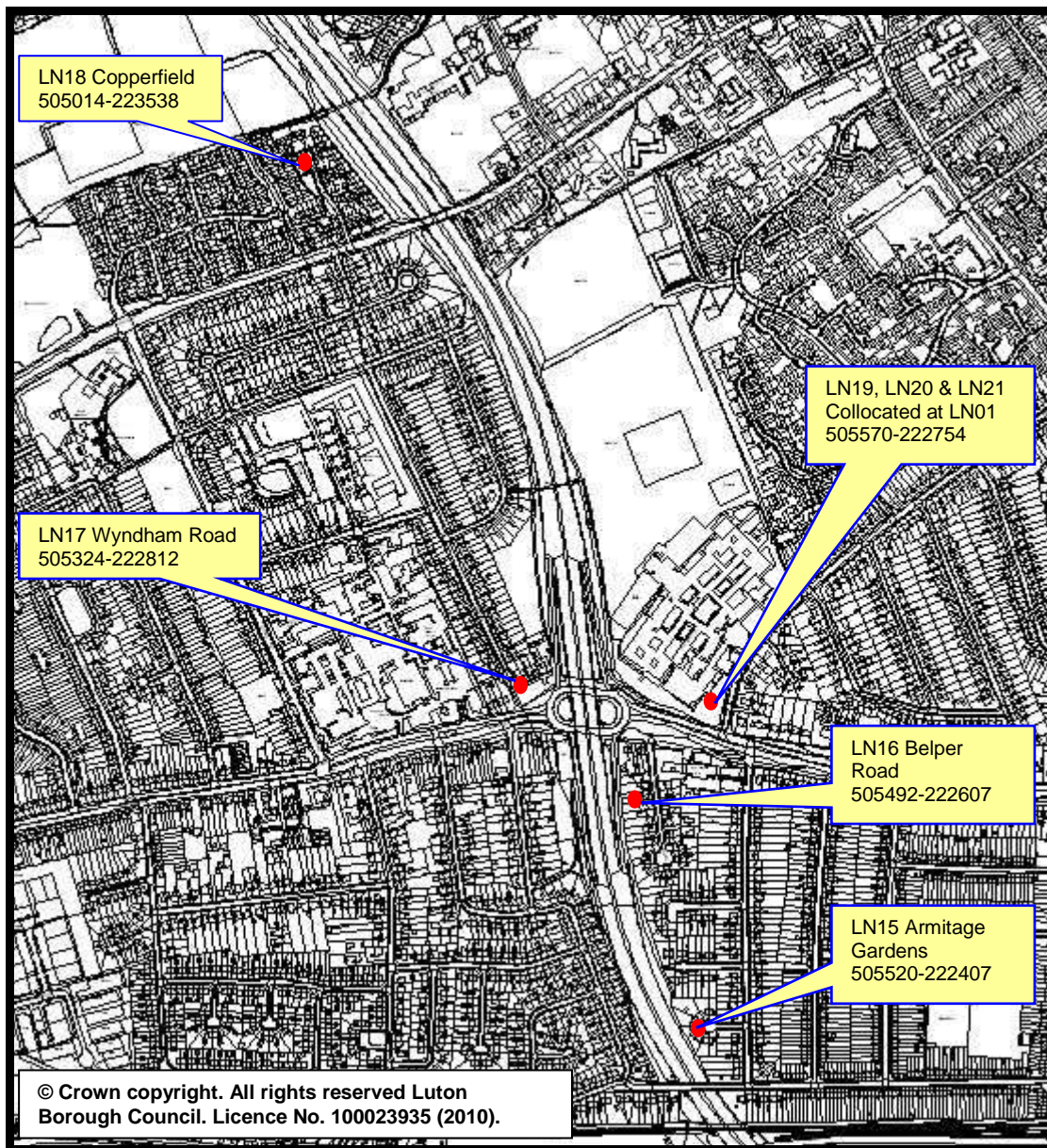


Figure 2.2 Maps of Non-Automatic Monitoring Sites

b. Monitoring Locations in and around London Luton Airport (Incorporating automatic PM₁₀ monitor at LA08)

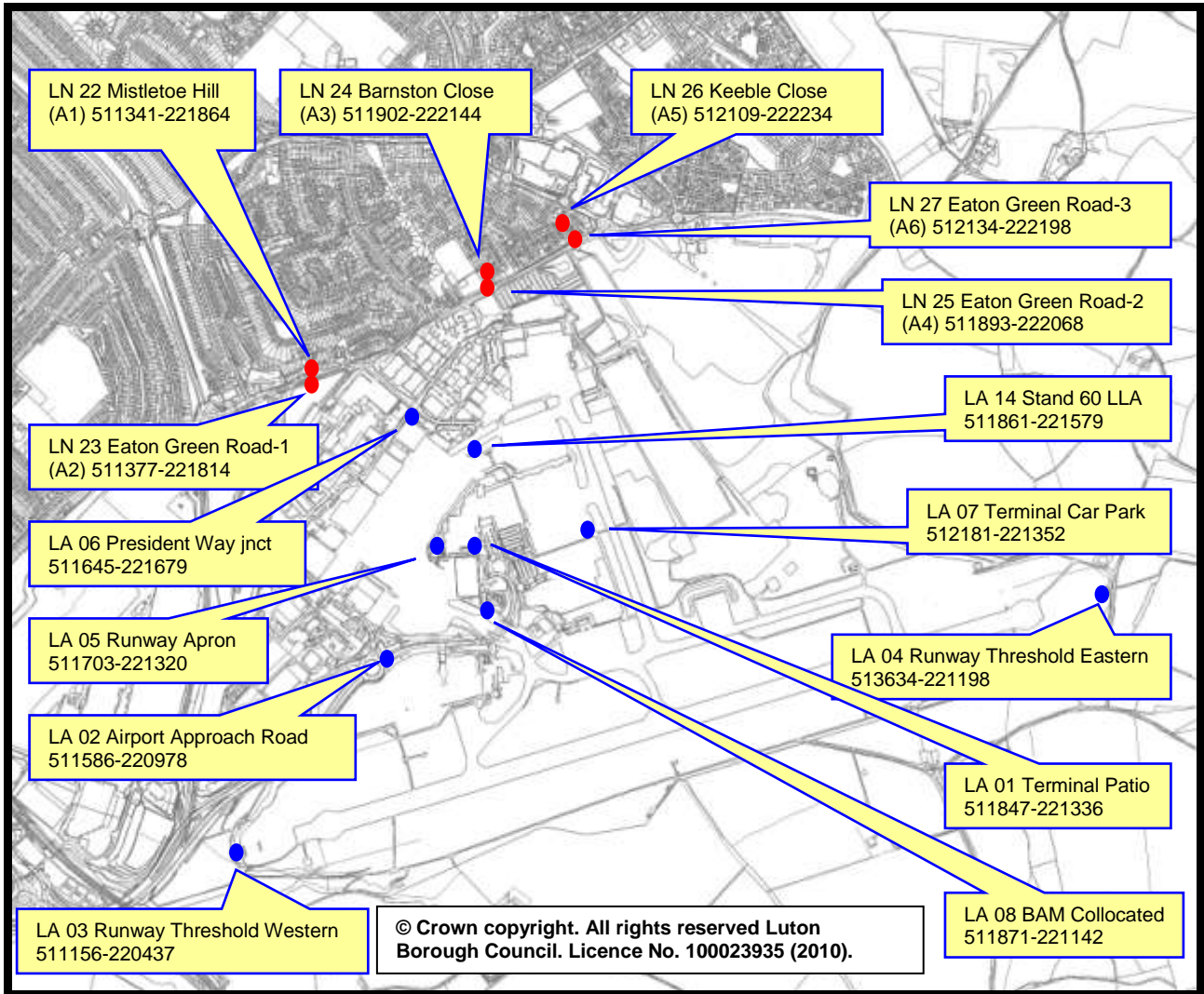


Table 2.2 Details of Non- Automatic Monitoring Sites

Site ID	Site name	Site type	OS Grid Ref easting-northing	Pollutants monitored	In AQMA?	Relevant exposure	Distance to kerb of nearest road	Worst case location?
LN15	Armitage Gardens (HA survey)	Roadside	505520-222407	NO ₂	Y	Yes (5m)	2m	Yes
LN16	Belper Road (M1)	Roadside	505492-222607	NO ₂	Y	Yes (5m)	3m	Yes
LN17	Wyndham Road (M9)	Roadside	505324-222812	NO ₂	Y	Yes (5m)	1m	Yes
LN18	Copperfield (M14)	Roadside	505014-223538	NO ₂	Y	Yes (3m)	2m	Yes
LN19	CR1 (collocated @ LN01)	Urban background	505570-222754	NO ₂	NO	Yes (38m)	13m	
LN20	CR2 (collocated @ LN01)	Urban background	505570-222754	NO ₂	NO	Yes (38m)	13m	
LN21	CR3 (collocated @ LN01)	Urban background	505570-222754	NO ₂	NO	Yes (38m)	13m	
LN22	Mistletoe Hill (A1)	Urban background	511341-221864	NO ₂	NO	Yes (0m)	9m	
LN23	Eaton Green Road-1 (A2)	Roadside	511377-221814	NO ₂	NO	Yes (18m)	2m	
LN24	Barnston Close (A3)	Urban background	511902-222144	NO ₂	NO	Yes (0m)	5m	
LN25	Eaton Green Road-2 (A4)	Roadside	511893-222068	NO ₂	NO	Yes (17m)	2m	
LN26	Keeble Close (A5)	Urban background	512109-222234	NO ₂	NO	Yes (0m)	12m	
LN27	Eaton Green Road-3 (A6)	Roadside	512134-222198	NO ₂	NO	Yes (6m)	2m	
LN28	Caddington Road (M16)	Kerbside	507798-219832	NO ₂	NO	No	<1m	Yes

Site ID	Site name	Site type	OS Grid Ref easting-northing	Pollutants monitored	In AQMA?	Relevant exposure	Distance to kerb of nearest road	Worst case location?
LA01	Terminal Patio	Background	511847-221336	NO ₂	NO	No	n/a	n/a
LA02	Airport Approach Road	Kerbside	511586-220978	NO ₂	NO	No	3m	n/a
LA03	Runway Threshold Western	Background	511156-220437	NO ₂	NO	No	n/a	n/a
LA04	Runway Threshold Eastern	Background	513634-221198	NO ₂	NO	No	n/a	n/a
LA05	Runway Apron	Background	511703-221320	NO ₂	NO	No	n/a	n/a
LA06	President Way Jct	Kerbside	511645-221679	NO ₂	NO	No	3m	n/a
LA07	Terminal Car Park	Intermediate	512181-221352	NO ₂	NO	No	n/a	n/a
LA08	BAM Collocated	Background	511871-221142	NO ₂	NO	No	n/a	n/a
LA09	Stagenhoe Bottom Farm	Background	517637-222554	NO ₂	NO	No	n/a	n/a
LA10	Grove Farm Slip End	Background	507623-217724	NO ₂	NO	No	n/a	n/a
LA13	Delmerend Lane Flamstead	Rural	508426-214366	NO ₂	NO	No	n/a	n/a
LA14	Stand 60 Luton Airport	Kerbside	511861-221579	NO ₂	NO	No	n/a	n/a
LA15	Eaton Green Road	Kerbside	511899-222051	NO ₂	NO	No	8m	n/a

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

Data from the Council’s automatic site (LN01) shows there to have been no exceedences of either the 40 $\mu\text{g.m}^{-3}$ annual mean NO_2 objective or more than the permitted 18 exceedences of the 200 $\mu\text{g.m}^{-3}$ hourly mean NO_2 objective in 2009. Similarly, the 99.8th percentile of hourly concentrations has not exceeded 200 $\mu\text{g.m}^{-3}$. Data capture for 2009 was 85%.

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

Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture for full calendar year 2009 %	Annual mean concentrations ($\mu\text{g.m}^{-3}$)		
					2007	2008	2009
LN01	Challney Community College	N	85	85	35	35	36

Figure 2.3 Chart showing Trends in Annual Average NO_2 Levels at Automatic Monitoring Station LN01 near M1 Motorway J11.

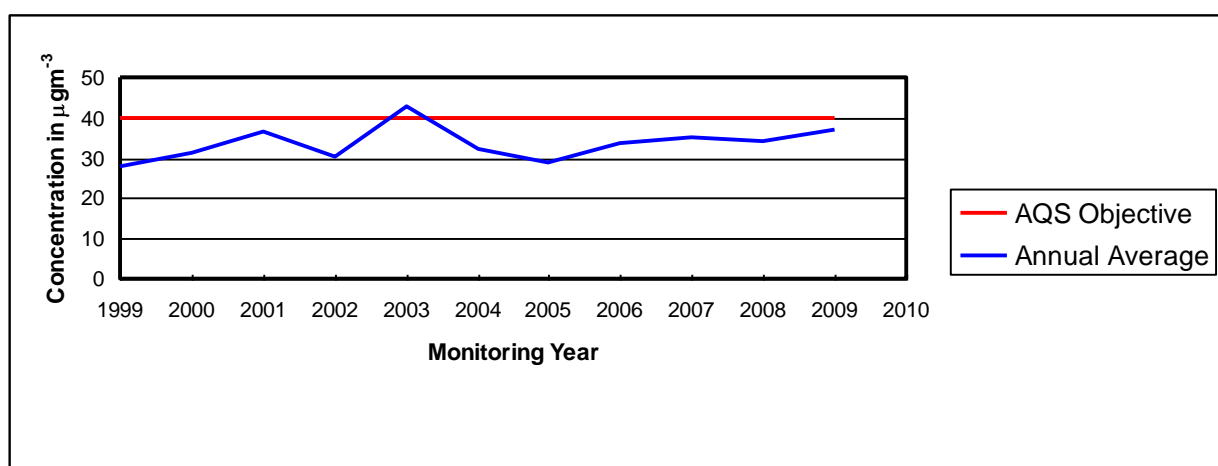


Table 2.4 Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour Mean Objective

Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture for full calendar year 2009 %	Number of Exceedences of hourly mean ($200 \mu\text{g.m}^{-3}$) 99.8 th percentile of hourly means in brackets.		
					2007	2008	2009
LN01	Challney Community College.	N	85	85	14 (197.1)	5 (153.2)	0 (140.7)

Diffusion Tube Monitoring Data

Although used continuously by the Council from the late 1990s through to 2005, diffusion tubes were not deployed during 2006 and 2007. Passive monitoring resumed in 2008 in the area of the AQMA and in 2009 in areas near London Luton Airport. The results are shown below and if future monitoring reveals trends, they will be reported in future progress Reports. Bias corrections were derived from the national database of collocated studies: i.e. 2008 = 0.92 and 2009 = 0.9. For the diffusion tubes deployed by London Luton Airport the bias adjustment factors were also derived from the national database of co-located studies: i.e. 2008 = 0.94 and 2009 = 0.99.

Table 2.5 Results of Nitrogen Dioxide Diffusion Tubes

Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture for full calendar year 2009 %	Annual mean concentrations ($\mu\text{g.m}^{-3}$)		
					2007	2008	2009
LN15	Armitage Gardens (HA survey)	Y	50	50			33.86 annualised
LN16	Belper Road (M1)	Y	100	83.3		44.76	42.21
LN17	Wyndham Road (M9)	Y	91.67	91.67		41.37	36.78
LN18	Copperfield (M14)	Y	90	75		25.58	29.90
LN19	CR1 (collocated @ LN01)	NO	91.67	91.67		31.93	35.66

LN20	CR2 (collocated @ LN01)	NO	100	100		34.81	35.41
LN21	CR3 (collocated @ LN01)	NO	83.3	83.3		37.64	33.98
LN22	Mistletoe Hill (A1)	NO	90	75	Commenced March 2009		22.85
LN23	Eaton Green Road-1 (A2)	NO	100	83.3	Commenced March 2009		33.26
LN24	Barnston Close (A3)	NO	100	83.3	Commenced March 2009		26.65
LN25	Eaton Green Road-2 (A4)	NO	100	83.3	Commenced March 2009		29.10
LN26	Keeble Close (A5)	NO	100	83.3	Commenced March 2009		21.76
LN27	Eaton Green Road-3 (A6)	NO	90	75	Commenced March 2009		28.01

Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture for full calendar year 2009 %	Annual mean concentration ($\mu\text{g.m}^{-3}$)		
					2007	2008	2009
LA02	Airport Approach Road	NO	100	100	33.25	33.06	35.81
LA03	Runway Threshold Western	NO	100	100	28.05	23.81	24.09
LA04	Runway Threshold Eastern	NO	100	100	19.80	19.90	19.55
LA05	Runway Apron	NO	100	100	45.62	44.81	46.61
LA06	President Way Jct	NO	100	100	36.47	35.56	40.01
LA07	Terminal Car Park	NO	100	100	29.12	27.73	27.56
LA08	BAM Collocated	NO	100	100	34.16	30.79	31.02
LA09	Stagenhoe Bottom Farm	NO	100	100	11.72	11.75	13.37
LA10	Grove Farm Slip End	NO	100	100	13.04	13.08	14.52

LA13	Delmerend Lane Flamstead	NO	100	100	14.77	13.32	15.68
LA14	Stand 60 Luton Airport	NO	100	100	43.40	38.38	35.97

2.2.2 PM₁₀

Data for 2009 from the Council's automatic site (LN01) shows there to have been no exceedences of the 40 $\mu\text{g.m}^{-3}$ annual mean PM₁₀ objective or more than the permitted 35 exceedences of the 50 $\mu\text{g.m}^{-3}$ 24-hour mean PM₁₀ objective. Similarly, the 90th percentile of 24-hour concentrations has not exceeded 50 $\mu\text{g.m}^{-3}$. Data capture for 2009 was 75%. All results from the TEOM PM₁₀ analyser from 2004 onward are now converted to reference equivalence by Kings College using their Volatile Correction Model and posted on the website <http://www.hertsbedsair.org.uk>

PM₁₀ at LLA

Data for 2009 from the LLA automatic site (LA08) shows there to have been no exceedences of the 40 $\mu\text{g.m}^{-3}$ annual mean PM₁₀ objective or more than the permitted 35 exceedences of the 50 $\mu\text{g.m}^{-3}$ 24-hour mean PM₁₀ objective. Similarly, the 90th percentile of 24-hour concentrations has not exceeded 50 $\mu\text{g.m}^{-3}$. Data capture for 2009 was 85%.

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

Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture for full calendar year 2009 %	Annual mean concentrations ($\mu\text{g.m}^{-3}$)		
					2007	2008	2009
LN01	Challney Community College	N	75	75	21	18	20
LA08	London Luton Airport	N	85	85	23	21	20

Figure 2.4 Chart Showing Annual Average of PM₁₀ Levels at Automatic Monitoring Station LN01 near M1 Motorway J11.

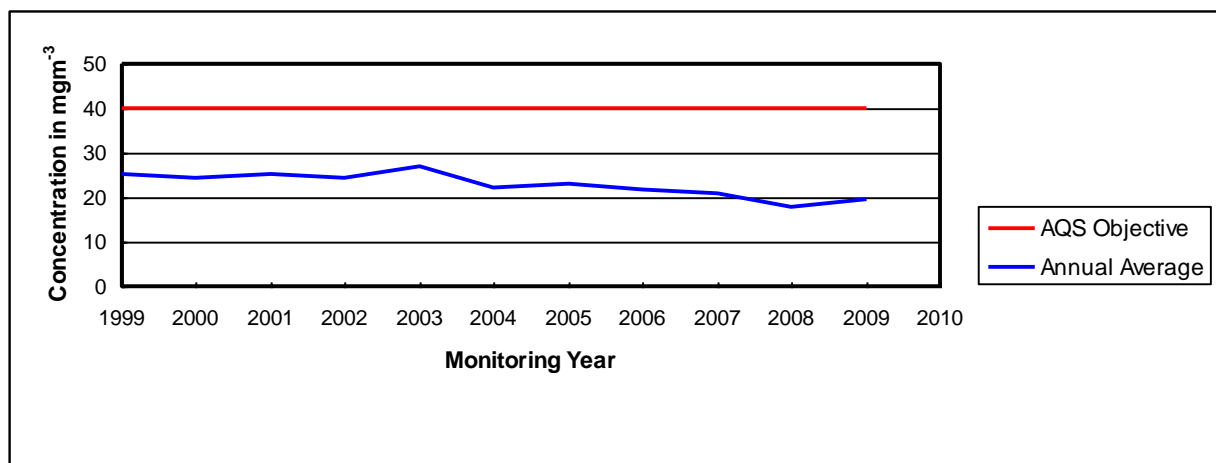


Figure 2.5 Chart Showing Annual Average of PM₁₀ Levels at Automatic Monitoring Station LA08 at London Luton Airport.

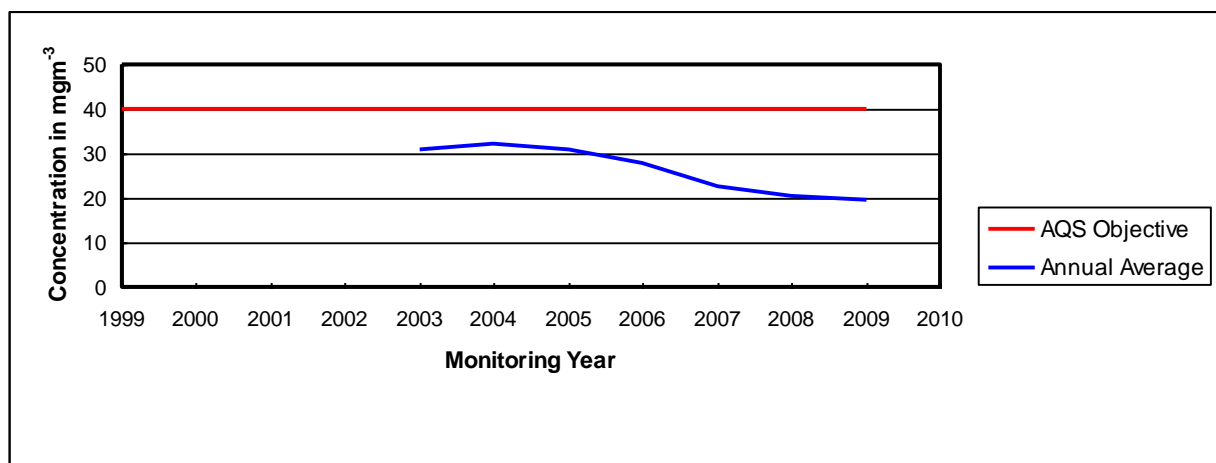


Table 2.7 Results of PM₁₀ Automatic Monitoring: Comparison with 24-hour Mean Objective

Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture 2009 %	Number of Exceedences of daily mean objective (50 µg/m ³) 90 th percentile of daily means in brackets.		
					2007	2008	2009
LN01	Challney Community College	N	75	75	10(37.4)	3(29.1)	2(31.2)
LA08	London Luton Airport	N	85	85	10(36.9)	4(32.9)	5(31.6)

2.2.3 Sulphur Dioxide

Data from the Council's automatic monitoring site LN01 shows there were no exceedances of any of the objectives for SO₂ in 2009, although the data capture rate was less than 90% at 85%.

Accordingly:

the 99.9th percentile of 15-minute means in 2009 was 23.1 µg.m⁻³

the 99.7th percentile of 1-hour means in 2009 was 17.7 µg.m⁻³

the 99th percentile of 24-hour means in 2009 was 12.7 µg.m⁻³

There have been no exceedances of the SO₂ objectives at this site since monitoring began in 1997.

Table 2.8 Results of SO₂ Automatic Monitoring: Comparison with Objectives

Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture 2009 %	Number of Exceedances of: (µg/m ³)		
					15-minute Objective (266 µg/m ³)	1-hour Objective (350 µg/m ³)	24-hour Objective (125 µg/m ³)
LN01	Challney Community College	N	85	85	0	0	0

2.2.4 Benzene

Benzene is no longer monitored in Luton. A study in 1995/6 at a roadside site and a background site gave average levels of 11.05 µg.m⁻³ and 5.85 µg.m⁻³ respectively; well below the air quality objective of 16 µg.m⁻³ annual running mean.

2.2.5 Other pollutants monitored

Ozone

Ozone has been monitored at the automatic site LN01 since 1999. The non-regulatory UK objective for ozone is for the 8-hour mean level of 100 µg.m⁻³ to be not exceeded more than 10 times in any year. The table below shows this objective has been exceeded in eight of the last eleven years.

Table 2.9 Exceedances of the Ozone 8-hour Mean Objective.

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Exceedances of 8-hour mean objective.	18	8	11	9	30	14	16	16	9	20	11

A decrease in ozone pollution cannot be achieved by Local Authorities alone and is only possible with international effort. It is for this reason the National Air Quality Strategy objective for ozone is for guidance only and not supported by regulations.

As there is now a confirmed link between air pollution and asthma and the pollutant most likely to exceed the objective – ozone - is not amenable to local control, **airAlert** has been devised to warn sufferers from asthma and other respiratory diseases of the likely occurrence of episodes of elevated air pollution. Originating in the Sussex authorities and now taken up by the Bedfordshire and Hertfordshire authorities, airAlert uses air quality and meteorological data to forecast the likely occurrence of air pollutants rising into the 'moderate' 'high' or 'very high' bandings, one, two or three days in advance. Appropriate messages are sent free of charge to subscribers via their mobile phone, e-mail or voice mail. This enables recipients of the messages to take greater control over their respiratory condition by:

- ensuring their medication is to hand
- taking preventative doses of medication
- restricting vigorous exercise
- avoiding polluted areas

The service began in November 2008 and uptake in Luton has been encouraging. The first evaluation, published earlier this year, shows behavioural change in the large majority of users and the service being valued by almost all.

Summary of Compliance with AQS Objectives

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

3 New Local Developments

Luton Borough 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. This includes:

Road traffic sources

Other transport sources

Industrial sources

Commercial and domestic sources

New developments with fugitive or uncontrolled sources

4 Planning Applications

The Council has approved no new planning applications which might impact on air quality.

5 Local Transport Plans and Strategies

As Luton's AQMA is directly related to traffic on the M1, and the Council has no direct control over traffic emissions contributing to it, Luton Council has decided to integrate the emerging Local Transport Plan (LTP3) with the Air Quality Action Plan. This will show how the synergy of many transport related initiatives will contribute to the overall improvement of air quality in the Borough. The LTP3, which covers long term strategy to 2026 and implementation to 2016, will include a section on Quality of Life, which has the main objective of minimising the impact of transport on the environment. The primary focus is to improve air quality and secure the revocation of declared AQMAs in the plans area. The LTP3 has the target of no new AQMAs to be declared during the LTP3 period, and the Council will continue to work with the Highways Agency to implement potential mitigation measures leading to the revocation of the existing AQMA.

6 Climate Change Strategies

Luton Borough Council is responding to the threat of and the inevitable effects of climate change by working towards developing an [adaptation action plan](#). This will address the services within the organisation which have assessed themselves as being most at risk to the effects of climate change and aims to identify actions to minimise these risks.

7 Conclusions and Proposed Actions

7.1 Conclusions from New Monitoring Data

The 2009 diffusion tube data from the Council's monitoring regime in the area of the AQMA shows exceedances of the annual NO₂ objective of 40 µg.m⁻³ at one location only. This compares with at two locations in 2008. This location, LN16 in Belper Road – a quiet residential cul-de-sac close to the M1 Motorway - lies within the existing AQMA and therefore the exceedance does not trigger any need for a Detailed Assessment. Although new data shows annual average NO₂ levels to be below the objective level at all but one location within the AQMA, it is not considered appropriate at this stage to review the boundaries of the AQMA.

The 2009 diffusion tube data from the LLA monitoring regime on and around the airfield shows exceedances of the annual NO₂ objective of 40 µg.m⁻³ at three locations. These locations are at:

- LA05 Runway Apron
- LA01 Terminal Patio
- LA06 President Way Junction

None of these locations are in areas of relevant exposure for annual mean therefore no Detailed Assessment of the exceedences is required. However, there is relevant exposure within 1000m of the airport boundary along Eaton Green Road, comprising residential housing. Although these receptors are over 400m from the terminal buildings and over 1000m from the runway and the airport has been assessed in previous rounds of review and assessment, it was recommended in the USA 2009 that monitoring in the environs of LLA should continue. Of the six diffusion tubes located in the Eaton Green Road area, three of the locations are 'roadside' along Eaton Green Road and three are 'urban background' in the adjacent housing complex and attached to relevant receptors. The 2009 diffusion tube data from these six locations shows that, although monitoring commenced in March 2009, and there is not yet data covering a full calendar year, it is extremely unlikely there will be any exceedances of the annual NO₂ objective of 40 µg.m⁻³. Monitoring at these locations will continue throughout 2010 and, as LLA is likely to expand in the future, probably beyond. This data will be reported in the Progress Report 2011.

7.2 Proposed Actions

This Progress Report has identified there is no need to proceed to any Detailed Assessments. The exceedances of the NO₂ AQS objectives measured in 2009 are either within the current AQMA or not at locations of relevant exposure.

Due to the proximity of London Luton Airport to relevant receptors along its northern boundary there is the remote possibility of exceedances at those locations. Monitoring will continue throughout 2010 and the results reported in the Progress Report 2011.

Diffusion tube data from the Belper Road (LN16) site and the Copperfield (LN18) site, which are both within the current AQMA, indicate there may no longer be exceedances of the annual NO₂ objective in those areas. However, as there is currently no trend data it would be ill-advised to consider any adjustments to the AQMA boundaries at this stage. Monitoring will continue throughout 2010 and the results reported in the Progress Report 2011.

Luton Borough Council will now proceed to a Progress Report, which will need to be completed by the end of April 2011.

8 References

Luton Borough Council Progress Report (2008)

Luton Borough Council Updating & Screening Assessment (2009)

Stevenage Borough Council Progress Report 2010

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

Hertfordshire & Bedfordshire Air Quality Network [Herts & Beds Air](#)

[Spreadsheet of Combined Bias Adjustment Factors](#)

[Luton Borough Council Environment Strategy Framework](#)

9 Appendices

Appendix A: QA:QC Data

QA/QC of automatic monitoring

In order to satisfy the requirement outlined in the Technical Guidance (09), the following QA/QC procedures were implemented:

- 2-weekly calibrations of the NO_x analyser and TEOM.
- 6-monthly audits and servicing of the monitoring site.
- Data ratification.

Calibrations of the NO_x analyser were carried out using certified compressed gas standards (ISO17025). This ensured that the calibration gas was traceable to national and international standards. In addition to the calibration sample filters were changed for both NO_x and TEOM analysers and any faults were identified thus minimising data loss.

Audits of the monitoring site consisted of a number of performance checks to identify any faults with the equipment. The calibration cylinder was also checked against another gas standard in order to confirm the gas concentration. Any identified faults were forwarded on to the service unit for repair.

The final stage of the QA/QC process was to ratify the data. During ratification, all calibration, audit and service data are collated and the data is appropriately scaled. Any suspect data identified are deleted therefore ensuring that the data are of a high quality.

QA/QC of diffusion tube monitoring

The Workplace Analysis Scheme for Proficiency (WASP) is an independent analytical performance testing scheme, operated by the Health and Safety Laboratory (HSL). WASP formed a key part of the former UK NO₂ Network's QA/QC, and remains an important QA/QC exercise for laboratories supplying diffusion tubes to Local Authorities for use in the context of Local Air Quality Management (LAQM). The laboratory participants analyse four spiked tubes, and report the results to HSL. HSL assign a performance score to each laboratory's result, based on their deviation from the known mass of nitrite in the analyte.

The outcomes of these QA/QC schemes are evaluated on a regular basis against a set of pre-defined performance criteria. The Performance criteria are based upon the Rolling Performance Index (RPI) statistic.

Gradko Laboratories takes part in the independent Workplace Analysis Scheme for Proficiency and demonstrated good performance in the WASP scheme for analysis of NO₂ diffusion tubes, January 2008 – January 2009.

Bureau Veritas (Gradko International Ltd) also take part in the independent Workplace Analysis Scheme for Proficiency and demonstrated good performance in the WASP scheme for analysis of NO₂ diffusion tubes, January 2008 – January 2009.

Appendix B: Diffusion Tube Bias Adjustment Factors

Luton Borough Council uses the 'Grey Cap' diffusion tubes supplied and analysed by Gradko, using a preparation mixture of 20% triethanolamine (TEA) in deionised water. Gradko complies with WASP scheme and achieved 'good' performance based on old and new criteria for the January 2009 – January 2010 period.

London Luton Airport uses diffusion tubes prepared and analysed by Gradko International Ltd. The laboratory takes part in the NO₂ Network QA/QC Field Intercomparison using the preparation method of 50% Triethanolamine (TEA) in Acetone.

Bias corrections for all diffusion tubes were derived from the national database of collocated studies: i.e.

for the diffusion tubes deployed by Luton Council: 2009 = 0.9
for the diffusion tubes deployed by LLA: 2009 = 0.99.

Factor from Local Co-location Studies (if available)

Although Luton Council has triplicate collocated diffusion tubes at its automatic site LN01, the data capture for 2009 was not 100% so rather than annualise the available data it was considered more prudent to use the bias corrections obtained from the national comparison site.

PM Monitoring Adjustment

All PM₁₀ data from both the Council's TEOM instrument and LLA's BAM instrument had the required corrections applied by ERG before being posted on the website: <http://www.hertsbedsair.org.uk>

Appendix C: Annualisation of Data.

Short-term to Long-term Data adjustment

One diffusion tube monitoring location, LN15, suffered disproportionately from vandalism and theft. Although this site is operated on behalf of the Highways Agency for their National AQMA Study, the data is of use to The Council. The six months of collected data was therefore annualised as below.

Site	Site Type	Annual Mean	Period Mean	Ratio
Market Harborough	AURN	12.12	12.6	0.96
Harwell	AURN	9.96	9.68	1.03
Wicken Fen	AURN	11.8	12.1	0.98
			Average	0.99
Armitage Gardens LN15	Diffusion tube		34.25	

The annualised mean for the Armitage Gardens LN15 monitoring point is **0.99** x **34.24**.