



Luton Borough Council 2011 Air Quality Progress Report

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

April 2011



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Executive Summary

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

The Report concatenates 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) 2009. The monitoring in the area around LLA now covers more than a calendar year, but less than a full year at a new site in Caddington Road.

London Luton Airport has continued its automatic monitoring of 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 2010 at the automatic monitoring station operated by Luton Borough Council near to the M1 motorway Junction 11/A505 (ref: LN01).

Results show that, in the area in and around the AQMA, there have been no exceedances of the annual average objective for NO₂ in 2010. However, there were such exceedances at four monitoring locations at LLA

- LA01 – Terminal Patio at LLA
- LA02 – Airport Approach Road
- LA05 – Runway Apron at LLA
- LA06 – President Way at LLA

LA01, LA02, LA05 and LA06 are either within the LLA airfield or very close to it and are 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 100µgm⁻³ was reached or exceeded on 10 days; the maximum permissible without breaching 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 begun in 2009 on the recommendation of the USA 2009 is continuing on the recommendation of the Progress Report 2010.

Since the last USA in 2009, there have been no new Part A or Part B Processes permitted.

Construction of the M1 J10 to J13 Dynamic Hard Shoulder Running scheme continued throughout 2010 and completion is expected in 2013. Construction

April 2011

Luton Borough Council - England

continued of the Translink Guided Busway from Luton to Dunstable (extending unguided to Houghton Regis to the west, and London Luton Airport to the east).

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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
LBC	Luton Borough Council
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 the units used are milligrammes per cubic metre, mg.m^{-3}). Table 1.1 includes the number of permitted exceedances 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);
- Progress Report (2010).

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 exceedances 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 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).

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 within 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.

Progress Report (2010)

This Progress Report has identified there is no need to proceed to any Detailed Assessments. 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. Passive monitoring of NO₂ in the environs of LLA and in the area of the AQMA is to continue throughout 2010.

Figure 1.1 Maps of AQMA Boundaries

Follow link to:

[Luton Air Quality Management Area \(No 2\) Order 2005](#)

2 New Monitoring Data

2.1.1 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.

2.1.2 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 adjusted 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	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?
LN01 Challney Community College	Urban background.	505570	222754	NO _x , SO ₂ CO, PM ₁₀ , O ₃	TEOM Corrected using KCL Volatile Correction Model	N	Y(38m)	15m	N
LA08 London Luton Airport	Background	511871	221142	PM ₁₀	BAM	N	N	N/A	N

2.1.3 Non-Automatic Monitoring

In 2010, the Borough Council operated 17 NO₂ diffusion tube sites one of which was on behalf of the Highways Agency for its study of NO₂ levels in AQMAs. London 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 2010 – January 2011 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.

The bias correction for diffusion tubes deployed by Luton Council was derived from the average of the three diffusion tubes collocated at the automatic monitoring station LN01, and has been calculated as 0.91 for 2010. The bias correction for diffusion tubes deployed by LLA was derived from the national database of collocated studies, which offers a correction factor of 0.93 for 2010. (Spreadsheet Version Number: 03/11)

**Figure 2.1 Map of Non-Automatic Monitoring Sites in and around the AQMA
(Incorporating automatic monitor LN01 collocated with LN19/20/21)**

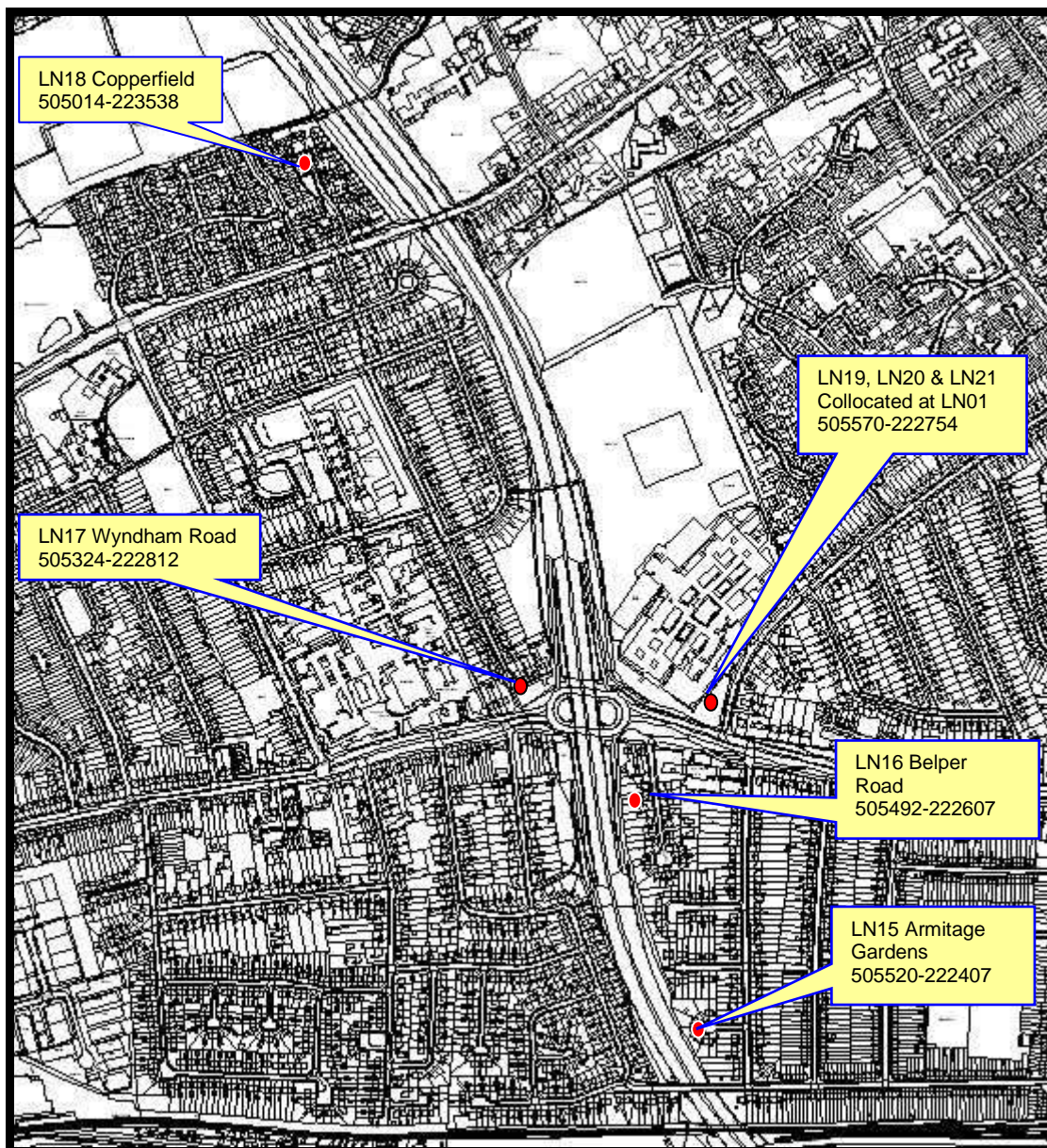


Figure 2.2 Map of Non-Automatic Monitoring Sites in and around London Luton Airport (Incorporating automatic PM₁₀ monitor at LA08)

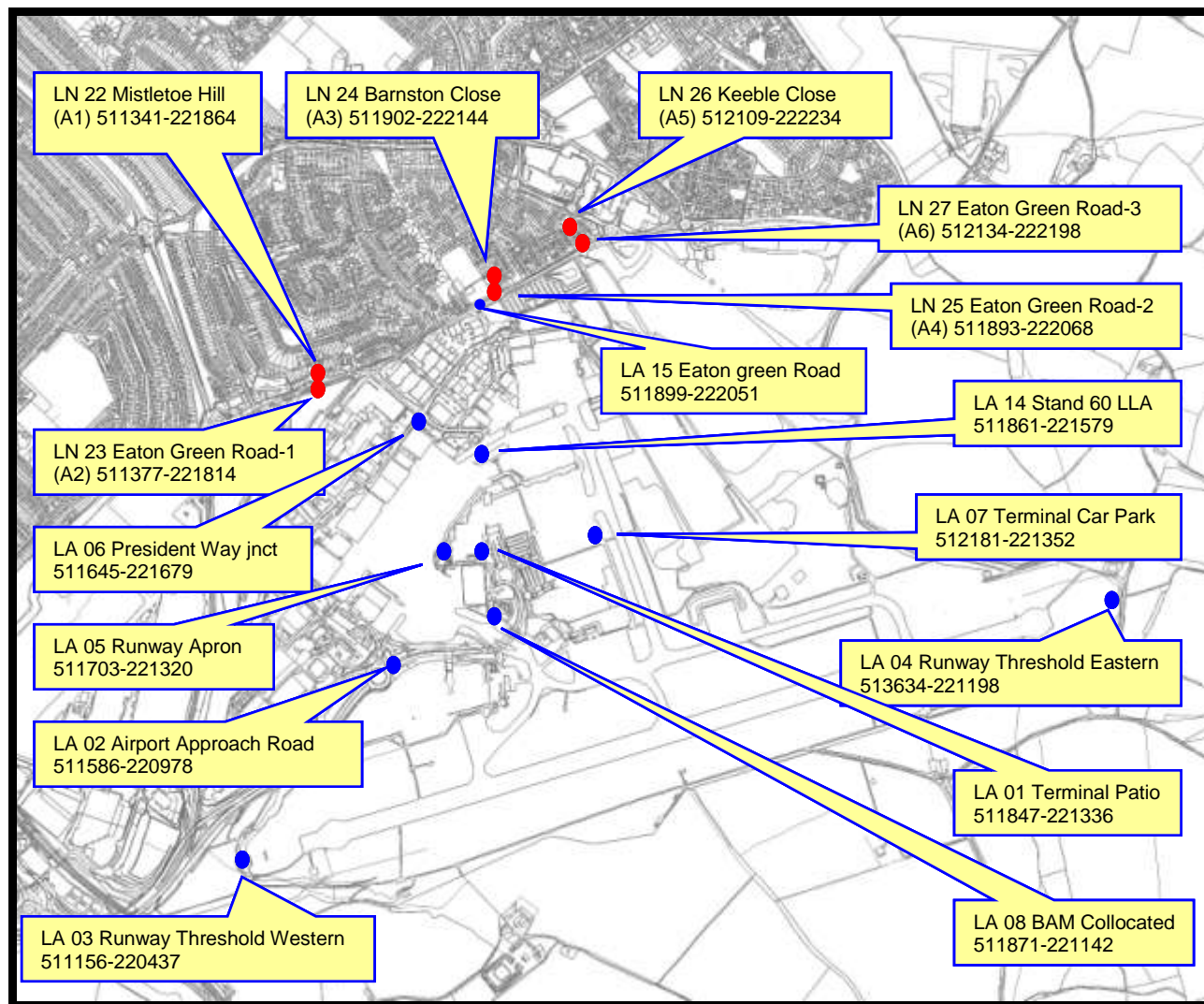


Figure 2.3 Map of Non-Automatic Monitoring Sites in Town Centre

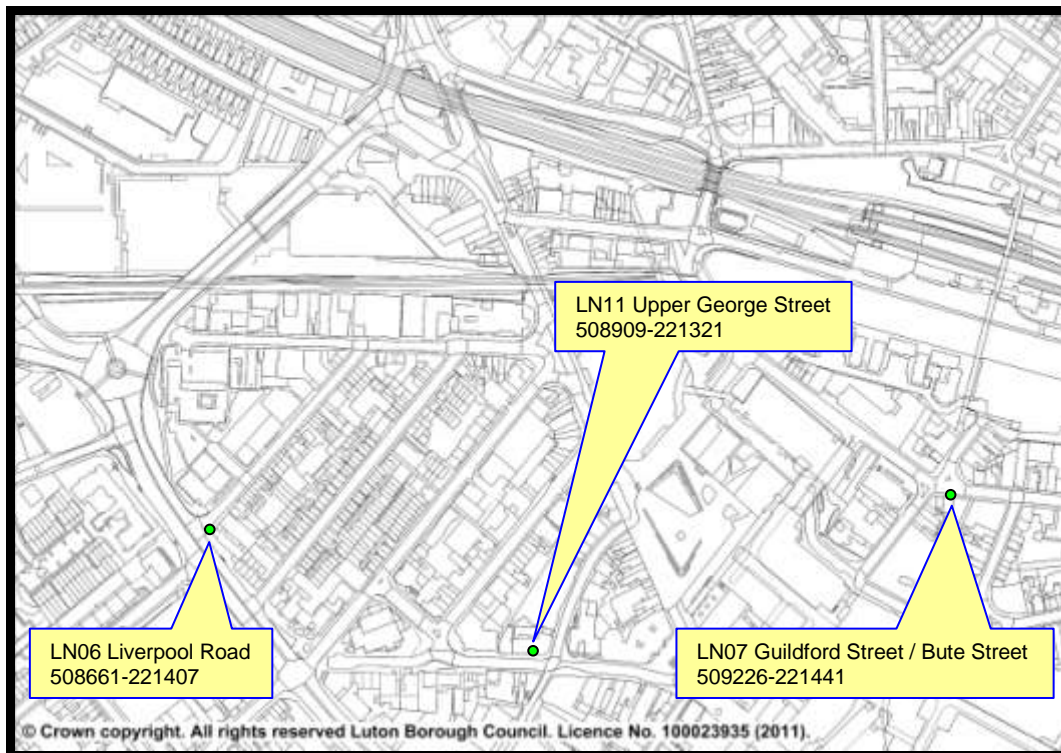


Figure 2.4 Map of Non-Automatic Monitoring Site at Caddington Road

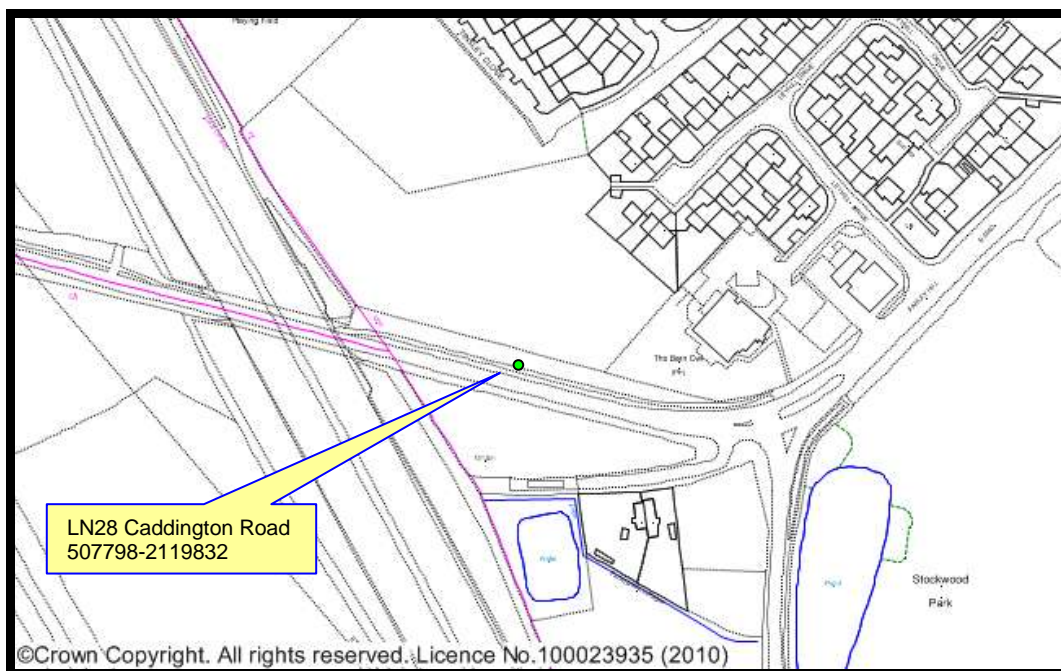


Table 2.2 Details of Non- Automatic Monitoring Sites

	Site name	Site type	OS Grid Ref eastings-northing	Pollutants monitored	In AQMA ?	Relevant exposure	Distance to kerb of nearest road	Worst case Location ?
LN06	Liverpool Road	Kerbside	508662-221407	NO ₂	No	No	<1m	
LN07	Guildford St / Bute St	Kerbside	509226-221441	NO ₂	No	No	<1m	
LN11	Upper George St	Roadside	508909-221321	NO ₂	No	No	3m	
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

Table 2.2 Details of Non- Automatic Monitoring Sites

Site ID	Site name	Site type	OS Grid Ref eastings-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 exceedances of either the 40 $\mu\text{g.m}^{-3}$ annual mean NO_2 objective or more than the permitted 18 exceedances of the 200 $\mu\text{g.m}^{-3}$ hourly mean NO_2 objective in 2010. Similarly, the 99.8th percentile of hourly concentrations did not exceed 200 $\mu\text{g.m}^{-3}$. Data capture for 2010 was 88%.

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

Site ID	Location	Within AQMA?	Relevant public exposure? Y/N	Data Capture for monitoring period %	Data Capture for full calendar year 2010 %	Annual mean concentrations ($\mu\text{g.m}^{-3}$)		
						2008	2009	2010
LN01	Challney Community College	N	N	88	88	35	36	34

Figure 2.5 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Automatic Monitoring Station LN01 near M1 Motorway J11.

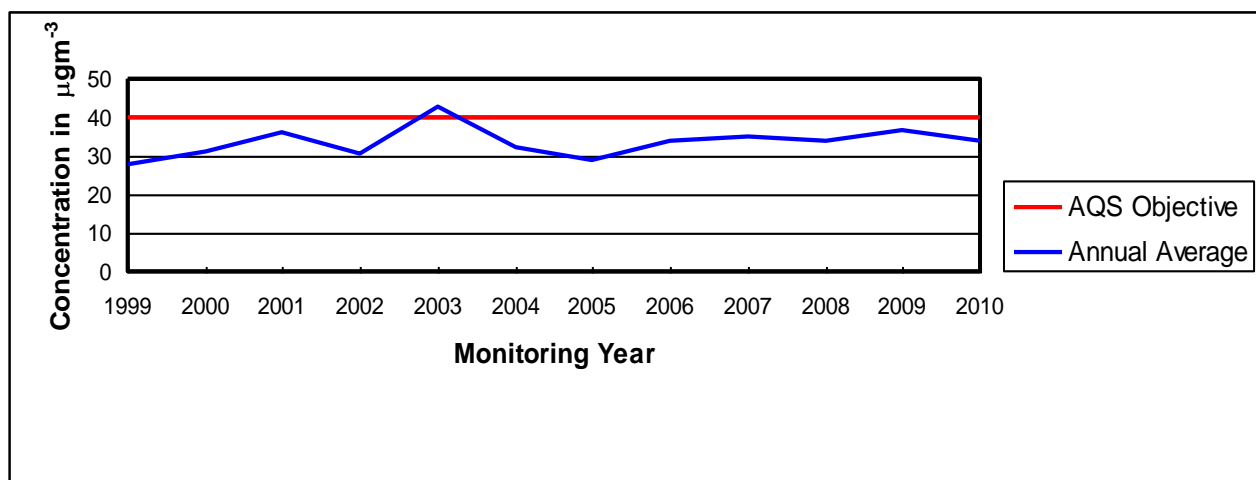


Table 2.3b Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour Mean Objective

Site ID	Location	Within AQMA?	Relevant public exposure? Y/N	Data Capture for monitoring period %	Data Capture for full calendar year 2010 %	Number of Exceedances of hourly mean ($200 \mu\text{g.m}^{-3}$) 99.8 th %ile in brackets		
						2008	2009	2010
LN01	Challney Community College	N	N	88	88	5 (153.2)	0 (140.7)	0 (133.6)

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. The 2010 bias correction for LBC tubes (0.91) was derived from the comparison of the annual average of the three diffusion tubes collocated at the automatic station with the annual average measured at the automatic station. For the diffusion tubes deployed by London Luton Airport the 2010 bias adjustment factor (0.93) was derived from the national database of co-located studies. (Spreadsheet Version Number: 03/11)

Table 2.4 Results of Nitrogen Dioxide Diffusion Tubes

	Location	Within AQMA	Relevant public exposure Y/N	Data Capture for monitoring period %	Data Capture for full calendar year 2010 %	Annual mean concentrations ($\mu\text{g.m}^{-3}$)		
						2008	2009	2010
LN15	Armitage Gardens (HA survey)	Y	Y	91.7	91.7		33.86	32.32
LN16	Belper Road (M1)	Y	Y	100	100	44.76	42.21	38.42

LN17	Wyndham Road (M9)	Y	Y	100	100	41.37	36.78	39.48
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	Location	Within AQMA	Relevant public exposure Y/N	Data Capture for monitoring period %	Data Capture for full calendar year 2010 %	Annual mean concentration ($\mu\text{g.m}^{-3}$)		
						2008	2009	2010
LN19	CR1 (collocated @ LN01)	No	No	100	100	31.93	35.66	32.94
LN20	CR2 (collocated @ LN01)	No	No	100	100	34.81	35.41	33.88
LN21	CR3 (collocated @ LN01)	No	No	91.7	91.7	37.64	33.98	33.99
LN22	Mistletoe Hill (A1)	No	Y	100	100	Commenced March 2009	22.85	24.40
LN23	Eaton Green Road-1 (A2)	No	No	100	100		33.26	35.08
LN24	Barnston Close (A3)	No	Y	91.7	91.7		26.65	25.78
LN25	Eaton Green Road-2 (A4)	No	No	91.7	91.7		29.10	30.71
LN26	Keeble Close (A5)	No	Y	100	100		21.76	23.19
LN27	Eaton Green Road-3 (A6)	No	No	91.7	91.7		28.01	29.34
LN28	Caddington Road (M16)	No	No	90	83.3		Commenced March 2010	46.31

Site ID	Location	Within AQMA	Relevant public exposure Y/N	Data Capture for monitoring period %	Data Capture for full calendar year 2010 %	Annual mean concentrations ($\mu\text{g.m}^{-3}$)		
						2008	2009	2010
LA01	Terminal Patio	No	No	100	100			46.81
LA02	Airport Approach Road	No	No	100	100	33.06	35.81	41.15
LA03	Runway Threshold Western	No	No	100	100	23.81	24.09	27.90
LA04	Runway Threshold Eastern	No	No	100	100	19.90	19.55	21.93
LA05	Runway Apron	No	No	100	100	44.81	46.61	50.22
LA06	President Way Jct	No	No	100	100	35.56	40.01	40.38
LA07	Terminal Car Park	No	No	100	100	27.73	27.56	33.87
LA08	BAM Collocated	No	No	100	100	30.79	31.02	35.65
LA09	Stagenhoe Bottom Farm	No	No	100	100	11.75	13.37	14.57
LA10	Grove Farm Slip End	No	No	100	100	13.08	14.52	16.90
LA13	Delmerend Lane Flamstead	No	No	100	100	13.32	15.68	20.23
LA14	Stand 60 Luton Airport	No	No	100	100	38.38	35.97	38.75
LA15	Eaton Green Road	No	No	100	100			33.02

2.2.2 PM₁₀

Data for 2010 from the Council's automatic site (LN01) shows there to have been no exceedances of the 40 $\mu\text{g.m}^{-3}$ annual mean PM₁₀ objective or more than the permitted 35 exceedances 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 2010 was 94%. All results from the TEOM PM₁₀ analyser since 2004 are 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 2010 from the LLA automatic site (LA08) shows there to have been no exceedances of the 40 $\mu\text{g.m}^{-3}$ annual mean PM₁₀ objective or more than the permitted 35 exceedances 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 2010 was 90%.

Table 2.5a 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 2010 %	Annual mean concentrations ($\mu\text{g.m}^{-3}$)		
					2008	2009	2010
LN01	Challney Community College	N	94	94	18	20	17.5
LA08	London Luton Airport	N	90	90	21	20	14

Figure 2.6 Chart Showing Annual Average of PM₁₀ Levels at Automatic Monitoring Station LN01 near M1 Motorway J11.

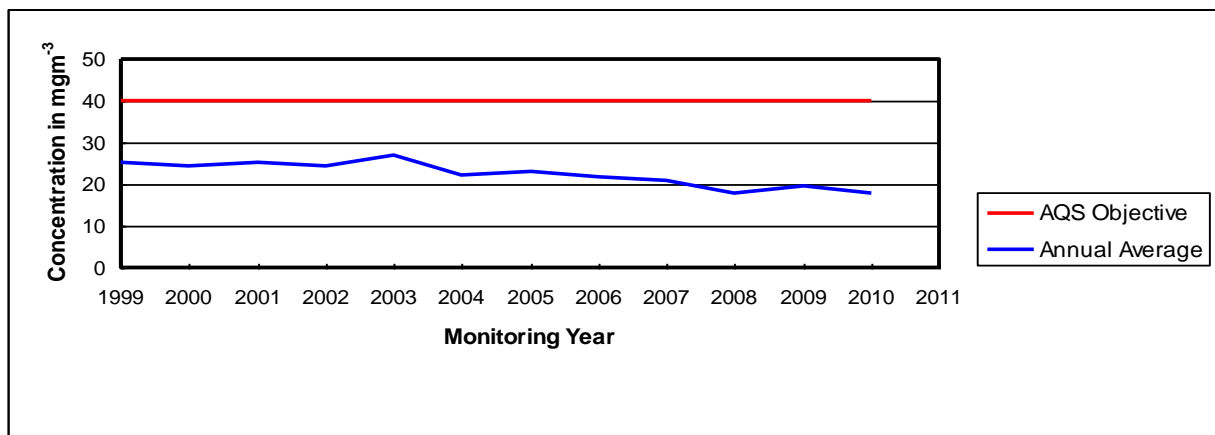


Figure 2.7 Chart Showing Annual Average of PM₁₀ Levels at Automatic Monitoring Station LA08 at London Luton Airport.

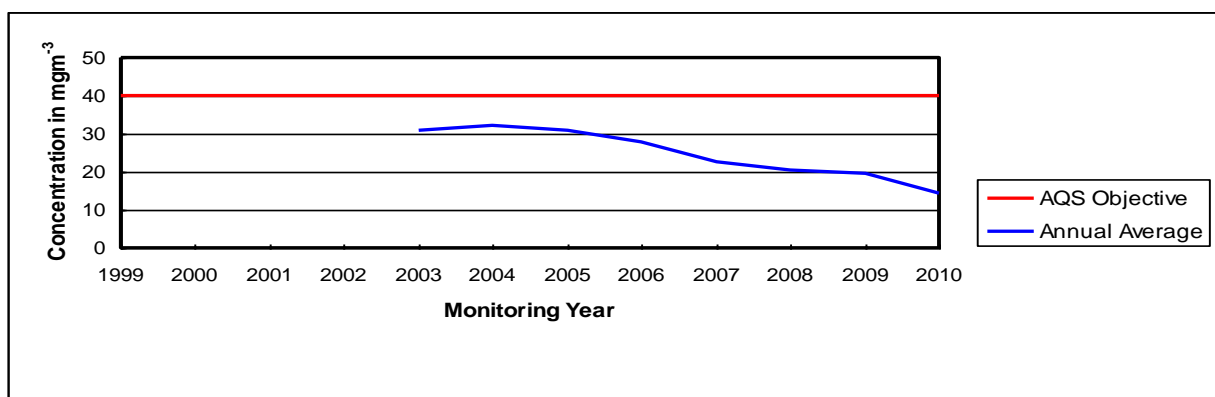


Table 2.5b Results of PM₁₀ Automatic Monitoring: Comparison with 24-hour Mean Objective

Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture 2010 %	Number of Exceedances of daily mean objective (50 µg.m ⁻³)		
					90 th %ile in brackets		
					2008	2009	2010
LN01	Challney Community College	N	94	94	3(29.1)	2(31.2)	0
LA08	London Luton Airport	N	90	90	4(32.9)	5(31.6)	0

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 88%.

Accordingly:

the 99.9th percentile of 15-minute means in 2010 was 24.1 µg.m⁻³

the 99.7th percentile of 1-hour means in 2010 was 17.2 µg.m⁻³

the 99th percentile of 24-hour means in 2010 was 8.7 µg.m⁻³

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

Table 2.6 Results of SO₂ Automatic Monitoring: Comparison with Objectives

Site	Location	Within AQMA	Data Capture for monitoring period %	Data Capture 2010 %	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	88	88	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 equalled or exceeded in nine of the last twelve years.

Table 2.7 Exceedances of the Ozone 8-hour Mean Objective.

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Exceedances of 8-hour mean objective.	18	8	11	9	30	14	16	16	9	20	11	10

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 and Southampton, 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 in 2010, shows behavioural change in the large majority of users and the service being valued by almost all.

2.2.6 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 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.

Luton Council confirms that all the following have been considered –

- **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 Local Transport Plan (LTP3) with the Air Quality Action Plan. Recently published, this shows 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, includes 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 plan's 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.

[Luton Local Transport Plan 3](#)

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](#).

The plan focusses on those 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 diffusion tube data from the Council's monitoring regime in the area of the current AQMA shows there to have been no exceedances of the $40 \mu\text{g}\cdot\text{m}^{-3}$ annual NO_2 objective in 2010. This compares with exceedances at one location in 2009 and at two locations in 2008. However, whilst the recorded levels at LN16 (Belper Road) seem to show a downward trend since 2008, those at LN17 (Wyndham Road) are not falling year on year.

Given the Works on the M1 J10/J13 Hard Shoulder Running Scheme are ongoing and not expected to be completed until some time in 2013, it would not be prudent to review the boundaries of the AQMA at this time, and probably not until at least a year after completion of those Works.

The diffusion tube data from LLA's monitoring regime in and around the airfield show there to have been exceedances of the $40 \mu\text{g}\cdot\text{m}^{-3}$ annual NO_2 objective at four locations in 2010.

- LA01 – Terminal Patio at LLA
- LA02 – Airport Approach Road
- LA05 – Runway Apron at LLA
- LA06 – President Way at LLA

None of these locations are in areas of relevant exposure therefore no Detailed Assessment of the exceedances 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 LBC 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. Monitoring at these six locations commenced in March 2009 and there is now data covering more than a calendar year. Data for all six monitoring points show levels of NO_2 to be considerably below the annual NO_2 objective of $40 \mu\text{g}\cdot\text{m}^{-3}$; the three 'urban background' sites giving lower results than the three 'roadside' sites, as would be expected. However, five of the six 2010 results show a slight increase on those of 2009.

Three new NO_2 diffusion tube sites (LN06, LN07 & LN11) have been brought into use at 'kerbside' locations where it is expected traffic flows will be affected by the opening and use of the currently under construction busway between London Luton Airport and

Houghton Regis. Monitoring began in September 2010 and initial monitoring results will be reported in the USA 2012.

A further new diffusion tube site (LN28) has been established at Caddington Road. This is close to the M1 Motorway and about 3.8km south of J11 and the AQMA. It is not in an area of relevant exposure but has been placed to provide a reference level to inform discussions over various expected proposals to develop land adjacent to the M1 in that area.

7.2 Proposed Actions

It is not necessary to proceed to any Detailed Assessments for any of the prescribed pollutants monitored. However, the LBC regimes of passive monitoring of NO₂ will continue:

- in and around the area of the AQMA;
- in the environs of LLA;
- at the new strategic locations to monitor the effect of the Luton/Dunstable Busway
- at the new site in Caddington Road.

The automatic monitoring station at LN01 will continue to operate but at reduced capacity, measuring NO_x, PM₁₀ and O₃ only.

Luton Borough Council will now proceed to an Updating and Screening Assessment which will need to be completed by the end of April 2012.

8 References

[Luton Borough Council Progress Report \(2008\)](#)

[Luton Borough Council Updating & Screening Assessment \(2009\)](#)

[Luton Borough Council Progress Report \(2010\)](#)

[Local Air Quality Management – Technical Guidance LAQM.TG\(09\)](#)

[Hertfordshire & Bedfordshire Air Quality Network](#)

[Spreadsheet of Combined Bias Adjustment Factors \(version 03/11\)](#)

[Luton Borough Council Environment Strategy Framework](#)

[Local Transport Plan LTP3](#)

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 2010 – January 2011.

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 2010 – January 2011 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.

The bias correction used for Luton Council's tubes was derived from comparison of the annual average of three collocated tubes (LN19, LN20 & LN21) at the automatic monitoring station LN01) with the annual average at that automatic monitoring station over the same period.

For the diffusion tubes deployed by LBC, the bias factor for 2010 = 0.91.

The bias correction for the diffusion tubes used by London Luton Airport was derived from the national database of collocated studies.

For the diffusion tubes deployed by LLA, the bias factor for 2010 = 0.93.

Factor from National Database of Collocated Studies for LLA tubes

National Diffusion Tube Bias Adjustment Factor Sp										Spreadsheet Version Number: 03/11	
Follow the steps below in the correct order to show the results of relevant co-location studies										This spreadsheet will be updated in late March 2011 on the LAQM Helpdesk Website	
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.											
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract					Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.						
Step 1:	Step 2:	Step 3:	Step 4:								
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	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 a laboratory is not shown, we have no data for this laboratory.	If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data ²	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 <small>To undo your selection, choose (All) from the pop-up list</small>	Year ² <small>To undo your selection, choose (All)</small>	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m ³)	Automatic Monitor Mean Conc. (Cm) (µg/m ³)	Bias (B)	Tube Precision ⁵	Bias Adjustment Factor (A) (Cm/Dm)	
Gradko	50% TEA in Acetone	2010	R	Reading BC	12	40	46	-13.2%	G	1.15	
Gradko	50% TEA in Acetone	2010	R	East Hampshire DC	11	27	25	6.5%	G	0.94	
Gradko	50% TEA in Acetone	2010	R	Wolverhampton CC	12	42	41	4.1%	G	0.96	
Gradko	50% TEA in Acetone	2010	R	Wolverhampton CC	12	38	38	0.8%	G	0.99	
Gradko	50% TEA in Acetone	2010	R	Exeter CC	12	42	40	5.6%	G	0.95	
Gradko	50% TEA in Acetone	2010	R	Lewisham Council	10	74	51	46.0%	G	0.69	
Gradko	50% TEA in Acetone	2010	Overall Factor³ (6 studies)						Use		0.93

Discussion of Choice of Factor to Use

London Luton Airport has no collocated diffusion tubes and no automatic NO₂ monitor. There is therefore no choice but to use the national database for collocated studies to determine the LLA bias factor for 2010.

Luton Borough Council has tri-located tubes at its automatic site (LN01), data from which was used to calculate a local bias factor of 0.91. The national database for the same tube preparation gives a bias factor of 0.95. LN01 is an 'urban background' site approximately 170m from the M1 Motorway and, together with tubes LN15, LN16, LN17 & LN18, in the environs of the AQMA. It is therefore, in this instance, more appropriate to use the locally derived bias factor than that from the national database.

PM Monitoring Adjustment

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