

Luton Borough Council

Local Air Quality Management

Progress Report

2005

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Executive Summary

The main source of air pollution in Luton and the surrounding area is from road transport. There are proposals for new and altered road schemes in and around Luton that may have a beneficial effect on air quality.

During 2004 the measured average annual concentration of Nitrogen Dioxide in Luton reduced at all locations compared to 2003.

There is only 1 Site exceeding the $40\mu\text{g m}^{-3}$ Annual Mean objective for NO_2 , by Junction 11 of the M1

There are normal variations year on year in Nitrogen Dioxide (and other analytes) but the trend in Luton for NO_2 concentrations at the measurement sites is downwards, as evinced by the chart at the rear of this report.

Previous reports have identified that the concentrations of other pollutants for which there are Air Quality Objectives are not an issue in Luton as they fall consistently below the objective concentrations

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Background to Air Quality Review & Assessment

All Local Authorities are required to produce a Progress Report (PR) in 2005. DEFRA *Progress Report Guidance LAQM.PRG(03)* states this is in order to “develop a longer-term vision for both LAQM and the review & assessment process” [para 1.02 of LAQM.PRG(03)].

To place the Progress Report into context a brief summary of Local Air Quality Management (LAQM) and the situation in Luton follows.

History of Local Air Quality Management in Luton

LAQM started with Round 1 of Local Air Quality Management where Local Authorities were required to carry out up to four Reviews & Assessments (R&A).

The philosophy behind Local Air Quality Management is that future air quality is predicted and the predictions compared against “Objectives” which have been set by the Government. If the R&As indicated that the Objectives would not be met in areas where people would be regularly exposed to the exceedences the LA is required to designate an Air Quality Management Area (AQMA) and devise a plan (Air Quality Action Plan – AQAP) indicating how it will try and reduce levels of air pollution to prevent exceedences in areas of relevant exposure.

Stage 1 R&A

Luton Borough Council published its Stage 1 R&A in March 1999. It concluded that so far as Benzene, 1,3-Butadiene and Lead were concerned there was no need to take further action. It stated though that further investigation was required for Carbon Monoxide, Nitrogen Dioxide, PM₁₀ (Particulate Matter, the 50th %^{ile} aerodynamic diameter of which is less than 10µ (microns) [a micron is 1 millionth of a metre or 1 thousandth of a millimetre]) and Sulphur Dioxide.

Stage 2 R&A

The Stage 2 R&A published in October 1999 considered in more detail the 4 pollutants indicated by the Stage 1 and in regard to Carbon Monoxide and Sulphur Dioxide concluded that no further action need be taken. It found though that further investigation needed to be made regarding Nitrogen Dioxide and PM₁₀.

Stage 3 R&A

The Stage 3 R&A looked in greater detail at Nitrogen Dioxide and PM₁₀ and found that the Air Quality Standards objectives predicted to be exceeded were the annual mean nitrogen dioxide objective (21ppb/40µgm⁻³ by end of 2005) and the 24 hourly mean PM₁₀ objective (50µgm⁻³ by end of 2004). The report concluded that it should be established if relevant exposure occurred in the areas of exceedence. The area of exceedence was in a corridor 65m from the centre line of the M1 Motorway.

Investigations showed that the occupiers of 170 dwellings would be subjected to relevant exposure as they were within the area of exceedence.

In addition to seeking the views of Statutory Consultees, letters were sent to occupiers of the 170 properties in the predicted area of exceedence explaining the fact that an AQMA would have to be declared. They were asked in the letter if they wanted to receive a summary of the Stage 3 R&A and 28 (16.5%) indicated that they did. (Discussions with colleagues in other LAs in Bedfordshire & Hertfordshire who consulted the public on LAQM revealed they had a much lower response rate). Further replies were received from occupiers of 3 dwellings, the nub of their responses being that they wanted action regarding noise from vehicles on the Motorway, they were less concerned in practice about air pollution from the Motorway because they realised that little could be done about it.

Luton Borough Council is committed to consultation, as is Central Government. There is clearly little point in consultation, **if it is have any meaning**, if the responses of Consultees are not to be acted upon where action is possible. At the time of consultation on Stage 3 in December 2001 the Highways Agency (HA) were in the process of developing proposals for arranging for noise barriers to be installed alongside the Motorway in Luton as part of the Government's national discretionary scheme. Extensive discussions had taken place with the HA in early 2001 regarding a scheme which should have commenced by the end of 2001/2. However, shortages of Central Funding meant that the noise barrier works did not commence then. During discussions between the HA and Luton Borough Council it became apparent that some of the proposals for the barriers were unacceptable to Luton, not offering an optimum solution to those affected by noise from vehicles on the M1 Motorway.

These issues were never resolved in the discussions in 2001 as the discussions petered out due to the above-mentioned lack of Central Funding. However, when discussions were resumed again in 2002 between the HA and Luton Borough Council and it became apparent that the HA were still not prepared to accede to the requests being made by the Council, it became necessary for Officer-time in the area responsible for LAQM to be devoted to securing a better deal for people affected by the M1 noise. The Highways Agency agreed to the installation of a scheme as requested by Luton Borough Council, with more extensive use of absorbent barriers and protection the to school. Phase 1 of barriers, along the lengths of the M1 closer to Junction 11, were installed in 2003 and Phase 2 commenced in February 2005 and is due for completion by July 2005. Thus an AQMA was not designated wrt the 170 dwellings identified as being subject to likely exceedences and therefore relevant exposure.

Stage 4 R&A

In 2002 a Stage 4 Review & Assessment was commissioned. This was done to provide information to feed into an Action Plan and also to obtain more up-to-date information on future Air Quality in Luton. Vehicle Emission Factors had been revised by the Department for Environment, Food and Rural affairs (DEFRA) since the Stage 3 R&A was carried out and so the Stage 4 R&A used these new factors. New vehicles are becoming ever cleaner in terms of their permitted regulated emissions as required by EU legislation (see www.vca.gov.uk or phone 0117 9524235 for information from the Vehicle Certification Agency on vehicle emissions) and therefore the new Vehicle Emission Factors take lower tailpipe emissions into account.

The Stage 4 R&A looked in detail at Nitrogen Dioxide and PM₁₀. In regard to PM₁₀ it concluded that the annual average objective of 40 µgm⁻³ in 2004 will not be exceeded anywhere in Luton. It also concluded that the 24-hour mean objective for PM₁₀ of 50µgm⁻³ in 2004 would not be exceeded except on the M1 Motorway itself (where relevant exceedence does not occur). The Stage 4 R&A also concluded that the provisional annual average objective for PM₁₀ of 50 µgm⁻³ in 2010 of 20 µgm⁻³ would not be exceeded, except perhaps within approximately 5m of the **boundary** of the M1.

So far as **Nitrogen Dioxide** is concerned, the Stage 4 R&A predicted that there would be exceedences leading to relevant exposure as the 2005 Annual mean objective of 40 µgm⁻³ would not be met. These locations of relevant exposure were at 24 specified dwellings that were stated to be within a 50 m band surrounding the M1. As a result of these findings an additional set of 15 diffusion tubes were set up in the vicinity of the M1 Motorway.

Updating & Screening Assessment 2003

In 2003 new DEFRA Guidance came into force which meant that an Updating & Screening Assessment needed to be produced. This was done in accordance with Technical Guidance LAQM.TG (03). All 7 pollutants (Benzene, 1-3 Butadiene, Carbon Monoxide, Lead, Nitrogen dioxide, PM₁₀ & Sulphur Dioxide) were considered and it was found that only the 2005 annual mean objective for 2005 of 40 µgm⁻³ was likely to be exceeded at locations where relevant exceedence would occur, both inside and outside the AQMA that was to be declared. This meant that Further Assessment and a Detailed Assessment were required to be done in 2004.

Air Quality Management Area 2003

An Air Quality Management Area (AQMA) was declared in November 2003 which contained 24 dwellings.

Further & Detailed Assessment 2004

A Further Assessment & Detailed Assessment (FADA) was carried out and published in 2004. The FADA used more recent meteorological data than had been used in previous reports and it concluded that the 2005 annual mean objective for 2005 of 40 µgm⁻³ was likely to be exceeded over a much greater area than had been concluded by the Stage 3 and 4 R&As, that area comprising of 431 dwellings.

Air Quality Management Area 2005

An Air Quality Management Area (AQMA) was declared in March 2005, which contained 431 dwellings. It may be found on the Luton Borough council website, <http://www.luton.gov.uk/>

New Developments - Industrial Processes

The main source of emissions in Luton and the surrounding area is from road transport. There are no well-established or new industrial processes that are significant sources of emissions in the context of LAQM.

New Developments - Residential, Commercial, Public

There have been no major Residential, Commercial or Public developments in the area in the last year.

The Vauxhall site is to be redeveloped and infrastructure is in place for the Butterfield Green Development off the A505 to the NW of Luton. There are talks from time to time about relocating the Ground of Luton Football Club from its current location to the NW of the Town Centre, possibly to by Junction 10a of the M1. All of these developments may affect local air quality, in some cases in a beneficial manner.

New Developments - Transport

There are no new major transport developments that have been implemented in the last year.

There are proposals for various road schemes which should have a beneficial effect on air quality in Luton by diverting traffic away from the centre of Luton or by improving traffic flow on existing routes

These include: -

Luton North Bypass - from A6 North of Luton westerly to M1 at a new Junction

Luton East Circular North from A505 westerly to A6 North of Luton

Improvement to East Luton Corridor - route from Junction 10a of M1 Motorway to London Luton Airport

Translink Guided Bus Way

It may be that some of the above schemes will direct traffic away from the sections of the M1 within/close to Luton, thereby giving a reduction in M1 emissions. Traffic to the North of Luton could access the M1 for going Northbound *via* the proposed new junction in the vicinity of Chalton, in between Junction 11 (Luton & Dunstable Hospital) and Junction 12 (Toddington).

Traffic from the North of Luton could access the M1 going Southbound *via* the Luton East Circular North and the improved East Luton Corridor, joining the M1 at Junction 10, *via* Junction 10a.

There are also proposals to widen the M1 motorway in 2 schemes, the first chronologically being the M1 to the South of Junction 10 and later the M1 to the North of Junction 10.

NB. Nothing in the foregoing should be taken as an indication that any scheme has any formal approval, it is included purely to briefly layout the current state of road proposals in the area.

Useful Information about Luton

The population of Luton is 185,200 (2001 census Mid-Year Population Estimates [Revised 2003]) and its area is 4336 ha (c. 10,657 acres)

The main sources of air pollution are the M1 Motorway that runs North – South along 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 A IPPC process (regulated by the Environment Agency) in the area, being the IBC vehicle-plant Boiler house. There are no **large** Part B IPPC processes (regulated by Luton BC) in the area.

A Real-Time continuous Air Quality Monitoring Station is Situated 183m from the Centreline of the M1 Motorway, just to the North of Junction 11 (Dunstable Road.

It is considered to be a background site, although it is in the vicinity of the M1 and the Dunstable Road. Paragraphs 1.19 – 1.21 of *LAQM TG(03)* have been checked to ensure that the Monitoring Station location represents relevant exposure.

Data from the Station is collected hourly and ratified by ERG (formerly SEIPH). Carbon Monoxide, Nitrogen Dioxide, NO_x, Sulphur Dioxide, PM₁₀ (TEOM Method) and Ozone are measured at the station. 2 NO_x tubes are also collocated at the station.

ERG place the data on the <http://www.hertsbedsair.org.uk> web site on which daily and longer term data can be viewed.

Nitrogen Dioxide concentrations are also measured at 27 locations around the Borough using Diffusion tubes. The tubes are 50% “TEA” (**NOT** the beverage!) in water supplied and analysed by GRADKO.

The first table shows where, in the main, long term monitoring has taken place since 1992. The second table shows the 15 locations where monitoring has taken place since 2002 in the vicinity of the M1 Motorway.

Air quality data quoted are for 2004 unless specified otherwise.

Air Quality Objectives in the Air Quality Regulations (2000) and (Amendment) Regulations 2002 for the purpose of Local Air Quality Management.

Pollutant	Concentration limits		Averaging period	Objective	
	(μgm^{-3})	(ppb)		(μgm^{-3})	date for objective
Benzene	16.25	5	Running annual mean	16.25	by 31.12.2003
	5	1.5	Annual mean	5.0	by 31.12.2010
1,3-butadiene	2.25	1	Running annual mean	2.25	by 31.12.2003
CO	10,000	8,600	Running 8-hour mean	10000	by 31.12.2003
Pb	0.5	-	Annual mean	0.5	by 31.12.2004
	0.25	-	Annual mean	0.25	by 31.12.2008
NO₂ (see note)	200	105	1 hour mean	200	by 31.12.2005 [Maximum of 18 exceedances a year or equivalent to the 99.8 th percentile]
	40	21	Annual mean	40	by 31.12.2005
PM₁₀ gravimetric (see note)	50	-	24-hour mean	50	by 31.12.2004 [Maximum of 35 exceedances a year or ~ equivalent to the 90 th percentile]
	40	-	Annual mean	40	by 31.12.2004
SO₂	266	100	15 minute mean	266	by 31.12.2005 [Maximum of 35 exceedances a year or equivalent to the 99.9 th percentile]
	350	132	1 hour mean	350	by 31.12.2004 [Maximum of 24 exceedances a year or equivalent to the 99.7 th percentile]
	125	47	24 hour mean	125	by 31.12.2004 [Maximum of 3 exceedances a year or equivalent to the 99 th percentile]

Notes

1. Conversions of ppb and ppm to (μgm^{-3}) correct at 20°C and 1013 mb.
2. The objectives for nitrogen dioxide are provisional.
3. PM₁₀ measured using the European gravimetric transfer standard or equivalent.

Monitoring of NO₂ - data used in this Report

Data from a continuous monitor located near J11 of the M1 (OS Grid Reference 505571, 222755) as well as diffusion tubes have been used in this assessment.

Further details of the locations of the monitoring, the concentrations recorded by the diffusion tubes, the inter-comparison of the diffusion tube and continuous monitors, the QA/QC ratification procedure and the diffusion tube preparation and analysis methods are given in Appendix 1 of the *Detailed & Further Assessment of Air Quality in Luton, April 2004*, which is available on the Luton Borough Council Web site www.luton.gov.uk at: -

<http://www.luton.gov.uk/Media Library/Pdf/Environment & regeneration/Environmental & Consumer Services/Pollution/AEAT-ENVR-1693-Issue1-22-04-04.pdf>.

Diffusion tube bias

The diffusion tubes for Luton are prepared by Gradco details in Appendix 1 of *Detailed & Further Assessment of Air Quality in Luton, April 2004*. The bias has been calculated from comparison of the automatic and diffusion tube data from the collocated continuous monitor near J11 of the M1 and was undertaken by Luton Borough Council.

Comparison of the measured concentrations with NO₂ objectives

Continuous monitoring

Annual mean concentrations measured by continuous NO_x monitoring in Luton (µgm⁻³)

Year	Location	NO ₂	NO	NO _x
1999	250 m from J11 of the M1	28.1 (14.7ppb)	71.0 (37.1ppb)	99.6 (52.1 ppb)
2000	250 m from J11 of the M1	32.0 (16.7ppb)	75.1 (39.3 ppb)	107.6 (56.3 ppb)
2001	250 m from J11 of the M1	36.8 (19.3 ppb)	66.9 (35.0 ppb)	103.8 (54.3 ppb)
2002	250 m from J11 of the M1	30.5 (16.0 ppb)	68.4 (35.8 ppb)	98.9 (51.8 ppb)
2003	250 m from J11 of the M1	43.1 (22.6 ppb)	107.1(56.0 ppb)	150.2(78.6 ppb)
2004	250 m from J11 of the M1	32.1 (16.8 ppb)	51.3 (26.9 ppb)	83.4 (43.7 ppb)

There was a reported exceedance of the annual mean objective in 2003, however there were no reported exceedances of the annual mean NO₂ objective in the previous 4 years (1999-2002), nor in 2004.

There were no exceedances of the hourly mean objective of 200 µgm⁻³.

Diffusion tubes

The bias corrected diffusion tube data suggest exceedances of the annual mean objective in 2002 and 2003 and 2004 at a number of sites.

<u>i.d.</u>	<u>Location</u>	<u>Easting</u>	<u>Northing</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>
A	M1/J11	505378	222735	<u>58.0</u>	<u>75.7</u>	<u>56.3</u>
B	Marsh Road	506099	224228	<u>40.6</u>	<u>47.5</u>	36.9
C	A6-Barton Road	508304	225369	34.5	<u>41.7</u>	32.9
D	Museum	508926	222958	22.2	X	X
E	Round Green	510094	222717	<u>41.6</u>	<u>50.0</u>	37.5
F	Liverpool Road	508668	221415	39.6	<u>57.4</u>	37.9
G	Bute Street	509227	221456	<u>42.5</u>	<u>49.1</u>	38.3
H	Windsor Street	509047	220707	<u>40.1</u>	<u>45.6</u>	34.9
J	Colwell Rise	512430	222253	26.9	34.5	27.4
K	Newlands Road	507898	219704	33.5	<u>44.6</u>	31.0
CR1	CRAQM	505571	222755	34.0	<u>41.8</u>	32.9
CR2	CRAQM	505571	222755	38.4	<u>46.1</u>	31.6
SPR	Sundon Park Road	505130	225625	27.2	31.8	24.5

Note: Diffusion tube annual mean objective exceedances [>40] are shown in bold and underlined

It can be seen from the tables above that both in terms of Continuous Monitoring and Diffusion Tube Monitoring there has been substantial improvement in NO₂ levels in 2004 *cf* 2003.

There are normal variations year on year in Nitrogen Dioxide (and other analytes) but the trend in Luton for NO₂ concentrations at the measurement sites is downwards, as evinced by the charts at the rear of this report.

AQMA tubes

<u>i.d.</u>	<u>Location</u>	<u>Easting</u>	<u>Northing</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>
M1	Belper	505492	222607	39.3	<u>50.1</u>	<u>42.4</u>
M2	Longfield	505512	222469	35.2	<u>46.7</u>	34.0
M3	Raleigh	505526	222401	27.1	<u>47.3</u>	36.6
M4	Armitage	505623	222323	32.7	39.0	33.6
M5	Bradley	505617	222234	34.4	<u>44.4</u>	33.4
M6	Bradley W	505484	222232	29.1	38.0	26.3
M7	Eldon	505379	222459	29.6	38.0	32.2
M8	Dunstable	505320	222739	36.6	<u>44.2</u>	38.6
M9	Wyndham	505324	222812	<u>40.1</u>	<u>56.0</u>	<u>40.9</u>
M10	Abingdon	505283	223065	30.3	39.6	32.3
M11	Lime	505195	223295	31.9	<u>44.9</u>	30.1
M12	Seabrook	505147	223383	28.3	36.2	30.3
M13	HSL	505245	223474	<u>45.9</u>	<u>53.4</u>	<u>46.7</u>
M14	Copperfield	505014	223538	31.7	39.8	31.7
M15	Bank	505072	223709	45.1	55.2	43.7

Other Objective Pollutants - Screen shot from Web SiteSource of Screen shot: - <http://www.hertsbedsair.org.uk>Luton (Background): Statistics for

The table below shows whether pollution levels recorded at the site you have selected achieved the Government's Air Quality Strategy Objectives in 2004.

Pollutant	Objective	Was it achieved?
Carbon Monoxide	No hours rolling 8hr mean >10mg/m3	YES
PM10 Particulate	Annual Mean (gravimetric)	YES
PM10 Particulate	No days 24hr mean >50ug/m3 (gravimetric)	YES
Nitrogen Dioxide	Annual Mean	YES
Nitrogen Dioxide	No hours hourly mean >200ug/m3	YES

Results are excluded where analysers have not returned valid data for at least 75% of the year. This is why SO₂ results are not shown. During the year there were distribution grid electricity supply problems to the monitoring station due problems in the distribution network, there were also times when the SO₂ was malfunctioning, leading to >25% down time for it

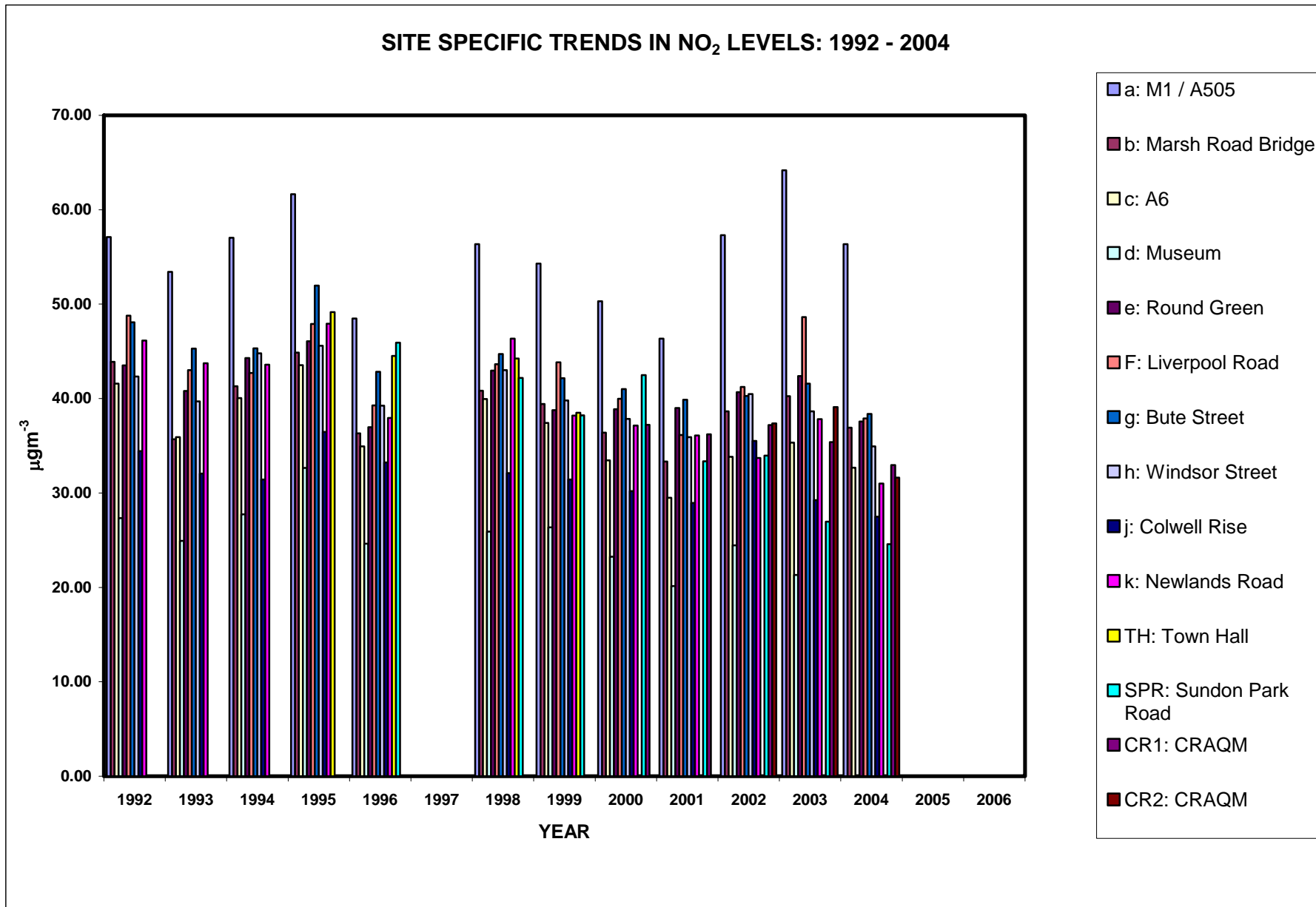
Figures for 2003 are shown to demonstrate the improvement in NO₂ in 2004 cf 2003 and also to show the achievement of SO₂ objectives.

Luton (Background): Statistics for

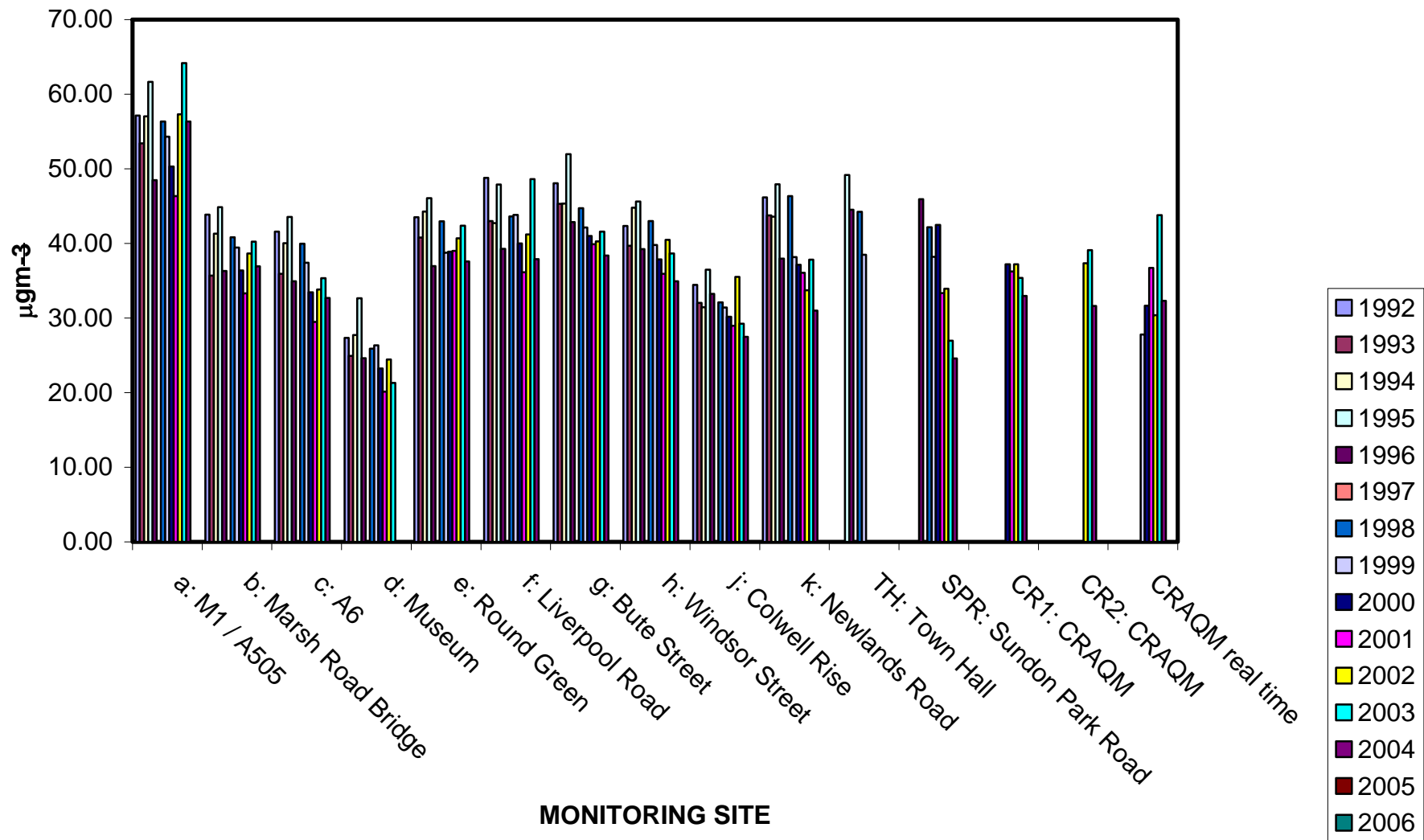
The table below shows whether pollution levels recorded at the site you have selected achieved the Government's Air Quality Strategy Objectives in 2003.

Pollutant	Objective	Was it achieved?
Carbon Monoxide	No hours rolling 8hr mean >10mg/m3	YES
PM10 Particulate	Annual Mean (gravimetric)	YES
PM10 Particulate	No days 24hr mean >50ug/m3 (gravimetric)	YES
Nitrogen Dioxide	Annual Mean	NO
Nitrogen Dioxide	No hours hourly mean >200ug/m3	YES
Sulphur Dioxide	No. days 24hr mean >125ug/m3	YES
Sulphur Dioxide	No hours hourly mean >267ug/m3	YES
Sulphur Dioxide	No periods 15min mean >267ug/m3	YES

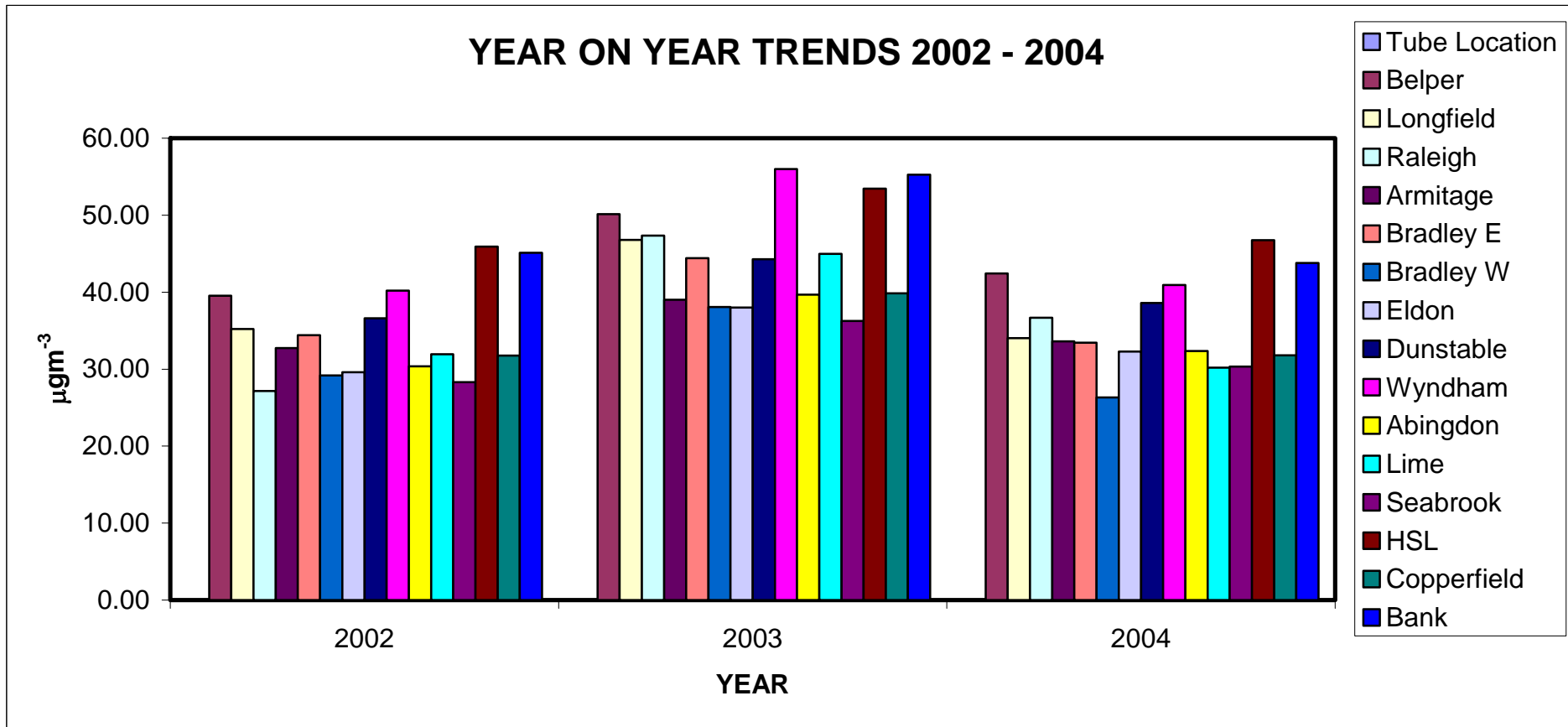
Note that as these calculations are based on a full year of measurements, the current year is not available. Results are excluded where analysers have not returned valid data for at least 75% of the year.



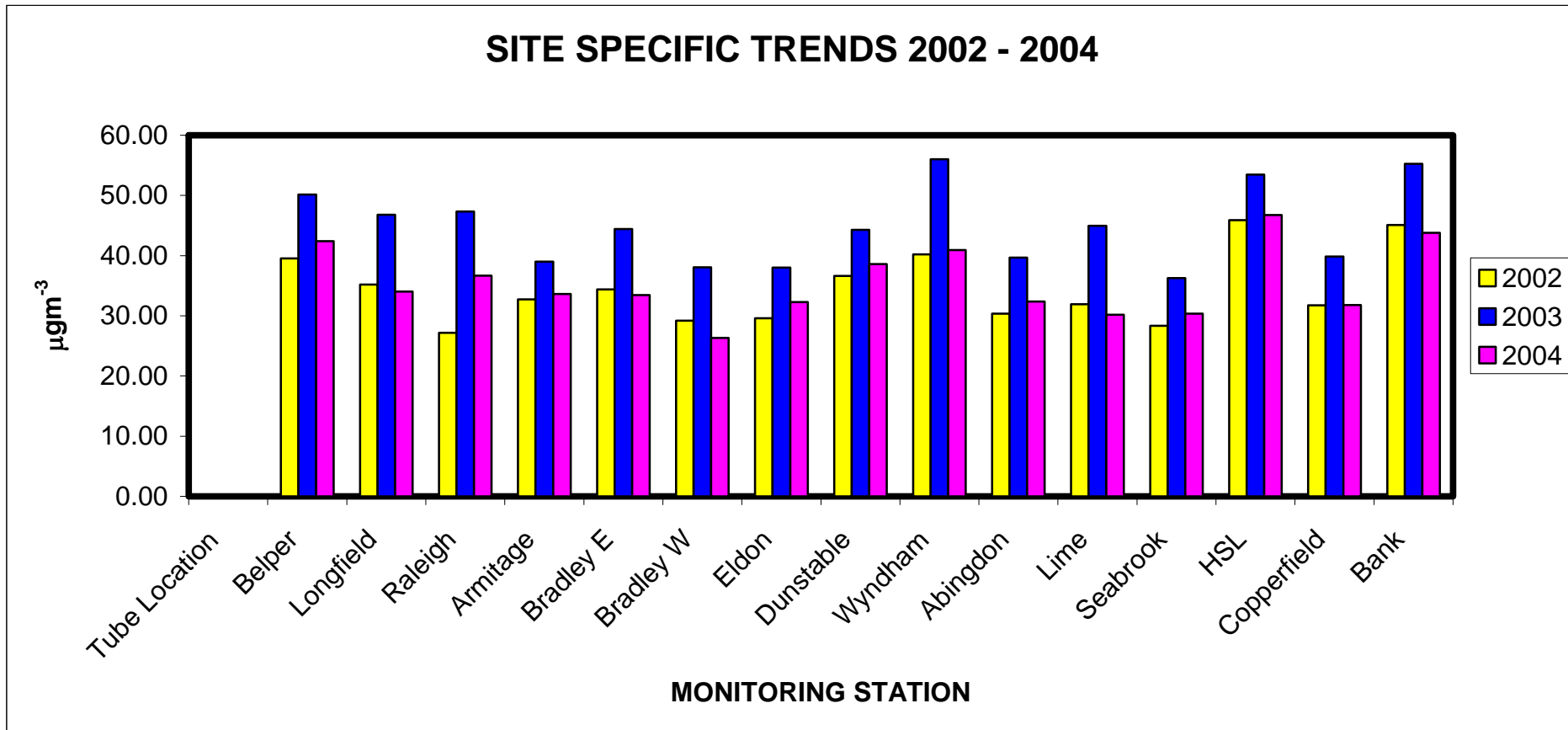
SITE SPECIFIC TRENDS IN NO₂ LEVELS: 1992 - 2006



Tubes Located in vicinity of the AQMA



Tubes Located in vicinity of the AQMA



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For more information on this report, contact

Donald Bowler, 01582 546176, donald.bowler@luton.gov.uk