

**Air Quality Review and Assessment**

# **Air Quality Annual Progress Report for St Albans City and District Council**

A report produced by St Albans City and District Council



This document should be considered with specific reference to the Updating Screening Assessment and the Detailed Assessment.

August 2005

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## **Executive Summary**

The Environment Act 1995 requires Local Authorities to periodically review and assess local air quality against the air quality objectives contained in the Air Quality Regulations. Local Authorities are currently undertaking the second round of the review and assessment. The second round is undertaken in two stages. Initially an Updating and Screening Assessment (USA) which is used to evaluate the Local Authorities area and to establish if any areas are likely to exceed the air quality objectives. The Second stage is to conduct, if necessary, a Detailed Assessment of the areas highlighted in the USA. Following on from this a Local Authority is required to undertake Annual Progress Reports between subsequent rounds of reviews and assessments to update on changes within the district and update on actions detailed in the Action Plan.

This document forms the Air Quality Progress Report for St Albans City & District Council. In writing this report the Council has had regard to the Department for Environment Food and Rural Affairs (DEFRA) publication 'Progress Report Guidance LAQM.PRG(03)'.

The report provides the latest monitoring results from the air quality monitoring station located at Fleetville and from the nitrogen dioxide and benzene diffusion tube monitoring carried out in various locations across the district including isolated properties which required further investigation following the USA.

The results from the continuous air quality monitoring station show that the concentrations for the air quality objectives that Local Authorities are required to meet will be achieved in 2004/2005 at this location. The objectives may not be met at this location for ozone, which because of its transient nature is a National Air Quality objective. The diffusion tube data shows that the air quality objectives are unlikely to be met at various locations around the district. The locations are the same as those indicated in the first or second round of reviews and have already been subject to further detailed assessment.

Progress on St Albans City & District Councils Action Plan can be seen in Appendix B.



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## **1.0 Background to Air Quality Review and Assessment**

- 1.1 The Environment Act 1995 requires local authorities to periodically review and assess local air quality against the objects set in the Air Quality Regulations. In areas where the air quality objective is predicted not to be met by the required dates, Local Authorities are required to establish Air Quality Management Area's (AQMA's) and implement Action Plans to improve air quality.
- 1.2 The first round of the review and assessment process is complete and Local Authorities should also now have completed the second round. The second round was split into two stages initially an Updating and Screening Assessment. This required Local Authorities to review the sources of emissions to air to identify if the situation had changed since the first round, and if so, what impact this may have on the predicted exceedences of the air quality objectives. Such changes might include significant traffic growth, construction of new industry with emissions to air, or could be the result of additional monitoring in locations with no historical datasets. St Albans completed this stage in July 2003
- 1.3 Where a significant risk of exceeding one or more of the air quality objectives is identified Local Authorities are required to proceed to a Detailed Assessment. St Albans completed the Detailed Assessment in March 2004 and as a result two new AQMA's have been declared. As a result of this St Albans City & District Council will be required to produce an additional Action Plan for the declared areas detailing the measures that the Council anticipates taking to resolve the air quality issues within its District.
- 1.4 A timetable for future rounds of Review and Assessment has been set. Updating and Screening Assessments (USA's) are required every three years in 2003, 2006 and 2009. In the intervening years, Local Authorities should prepare an annual air quality Progress Reports between subsequent rounds of reviews.

## **2.0 The Role of Progress Reports.**

- 2.1 The Local Air Quality Management (LAQM) process. The objective is to provide an annual review and update on air quality issues, including developments that might be significant to air quality and the result of monitoring. Any significant changes can then be acted upon immediately by proceeding to a Detailed Assessment, rather than waiting for the next full round of review and assessment.

- 2.2 The benefits to Local Authorities of producing a Progress Report are set out in Box 1.1 of the Progress Report Guidance, which includes:

**Box 1.1: How Progress Reports can assist local authorities**

by helping retain a profile for LAQM within the authority, including the retention of staff with a knowledge of air quality issues

by providing a means for communicating air quality information to members and the public

by maximising the usefulness and interpretation of the monitoring effort being carried out by the local authority

by maximising the value of the investment in monitoring equipment

by making the next round of review and assessment that much easier, as there will be a readily available up-to-date source of information

by helping local authorities respond to requests for up-to-date information on air quality

by providing information to assist in other policy areas, such as transport and land use planning

by providing a ready source of information on air quality for developers carrying out environmental assessments for new schemes

by demonstrating progress with implementation of air quality Action Plans and/or air quality strategies

by providing a timely indication of the need for further measures to improve air quality, rather than delaying until the next full round of review and assessment

- 2.3 This document forms the Progress Report for St Albans City & District Council and has had regard to the DEFRA publication 'Progress Report Guidance LAQM.PRG(03)'.

- 2.4 The overall aims of the Progress Report should be to:

- Report on progress on the implementation of Local Air Quality Management (LAQM);
- Report on monitoring results
- Report on new developments that might affect local air quality
- Report progress on implementing measure identified in St Albans Action Plan to improve air quality in areas where concentrations of pollutants are above the air quality objectives.

### **3.0 Air Quality Objectives.**

- 3.1 The air quality objectives set by the Air Quality Regulation are shown in Table 1.1 these objectives are to be achieved between 2003 and 2010.



**Table 1.1** Objectives included in the Air Quality Regulations 2000 and (Amendment) Regulations 2002 for the purpose of Local Air Quality Management

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
<b>Benzene</b> All authorities	16.25 µg/m <sup>3</sup> (5ppb)	running annual mean	31.12.2003
Authorities in England and Wales only	5.00 µg/m <sup>3</sup> (1.5 ppb)	annual mean	31.12.2010
<i>Authorities in Scotland and Northern Ireland only<sup>a</sup></i>	<i>3.25 µg/m<sup>3</sup> (1ppb)</i>	<i>running annual mean</i>	<i>31.12.2010</i>
<b>1,3-Butadiene</b>	2.25 µg/m <sup>3</sup> (1ppb)	running annual mean	31.12.2003
<b>Carbon monoxide</b> Authorities in England, Wales and Northern Ireland only <sup>a</sup>	10.0 mg/m <sup>3</sup> (8.6ppm)	maximum daily running 8-hour mean	31.12.2003
<i>Authorities in Scotland only</i>	<i>10.0 mg/m<sup>3</sup> (8.6ppm)</i>	<i>running 8-hour mean</i>	<i>31.12.2003</i>
<b>Lead</b>	0.5 µg/m <sup>3</sup> 0.25 µg/m <sup>3</sup>	annual mean annual mean	31.12.2004 31.12.2008
<b>Nitrogen dioxide<sup>b</sup></b>	200 µg/m <sup>3</sup> (105ppb) not to be exceeded more than 18 times a year 40 µg/m <sup>3</sup> (21ppb)	1 hour mean annual mean	31.12.2005 31.12.2005
<b>Particles (PM<sub>10</sub>) (gravimetric)<sup>c</sup></b> All authorities	50 µg/m <sup>3</sup> not to be exceeded more than 35 times a year	24 hour mean annual mean	31.12.2004 31.12.2004

	40 µg/m <sup>3</sup>		
<i>Authorities in Scotland only<sup>d</sup></i>	<i>50 µg/m<sup>3</sup> not to be exceeded more than 7 times a year</i>	<i>24 hour mean</i>	<i>31.12.2010</i>
	<i>18 µg/m<sup>3</sup></i>	<i>annual mean</i>	<i>31.12.2010</i>
<b>Sulphur dioxide</b>	350 µg/m <sup>3</sup> (132ppb) not to be exceeded more than 24 times a year	1 hour mean	31.12.2004
	125 µg/m <sup>3</sup> (47ppb) not to be exceeded more than 3 times a year	24 hour mean	31.12.2004
	266 µg/m <sup>3</sup> (100ppb) not to be exceeded more than 35 times a year	15 minute mean	31.12.2005

a. In Northern Ireland none of the objectives are currently in regulation. Air Quality (Northern Ireland) Regulations

are scheduled for consultation early in 2003.

b. The objectives for nitrogen dioxide are provisional.

c. Measured using the European gravimetric transfer sampler or equivalent.

d. These 2010 Air Quality Objectives for PM10 apply in Scotland only, as set out in the Air Quality (Scotland)

Amendment Regulations 2002.

## 4.0 Conclusions of the Previous Review and Assessment.

4.1 St Albans City & District Council completed the first review and assessment of air quality in January 2003. This assessment concluded that the air quality objectives contained in the Air Quality Regulations would be achieved in the entire District except for an area in Frogmore which is adjacent to the M25. As a result the area was declared as an Air Quality Management Area (AQMA) and an Action Plan was adopted by the council in October 2003.

4.2 The Updating and Screening Assessment (USA) for St Albans was completed in July 2003. The assessment concluded that:

- St Albans City and District Council is not required to carry out a detailed Review and Assessment for carbon monoxide, benzene, 1,3

Butadiene, lead, sulphur dioxide and PM<sub>10</sub> .

- Air quality monitoring data for 2001 and 2002 indicates exceedances of the 2005 objective for nitrogen dioxide at several background sites including:

SA06 - Barnet Road, London Colney

SA22 - Lybury lane, Redbourn

In addition the Design Manual for Roads and Bridges (DMRB) screening model predicts exceedances of nitrogen dioxide objectives at two road junctions :

The A5183 and A1081 in St Albans

Isolated property within the A4147, M1 and M10

- 4.3 The USA therefore concluded that a Detailed Assessment would be required for Nitrogen Dioxide.
- 4.4 The consultation process with DEFRA following the production of the report highlighted the Council had inadequate information with regard to benzene as Dacorum District Council holds no emission data for the Buncefield Terminal. St Albans Council was therefore required to investigate further the levels of benzene at a few isolated houses located in the St Albans District near to the Depot. The results of the further investigations can be seen in paragraph 5.9 and tables 1.4a -1.4f
- 4.5 The Detailed Assessment for nitrogen dioxide showed that four areas required a detailed assessment these included:
- SA06 – Barnet Road, London Colney
  - SA22 – Lybury Lane, Redbourn.

The DMRB model predicted exceedences the road junctions:

- The A5183 and A1081 in St Albans (Holywell Hill – SA15)
- Isolated property within the A4147, M1 and M10.

Following the Detailed Assessment it was concluded that the areas at Holywell Hill and the isolated property within the A4147, M1 and M10 would be declared as Air Quality Management Areas. (see Appendix A for the declaration orders).

## **5.0 New Monitoring Results.**

5.01 This section provides a summary of the air quality monitoring results available since the USA was completed in July 2003.

## 5.1 Diffusion Tube Monitoring Sites

**Table 1.2 Showing Location of Diffusion Tubes in the St Albans District**

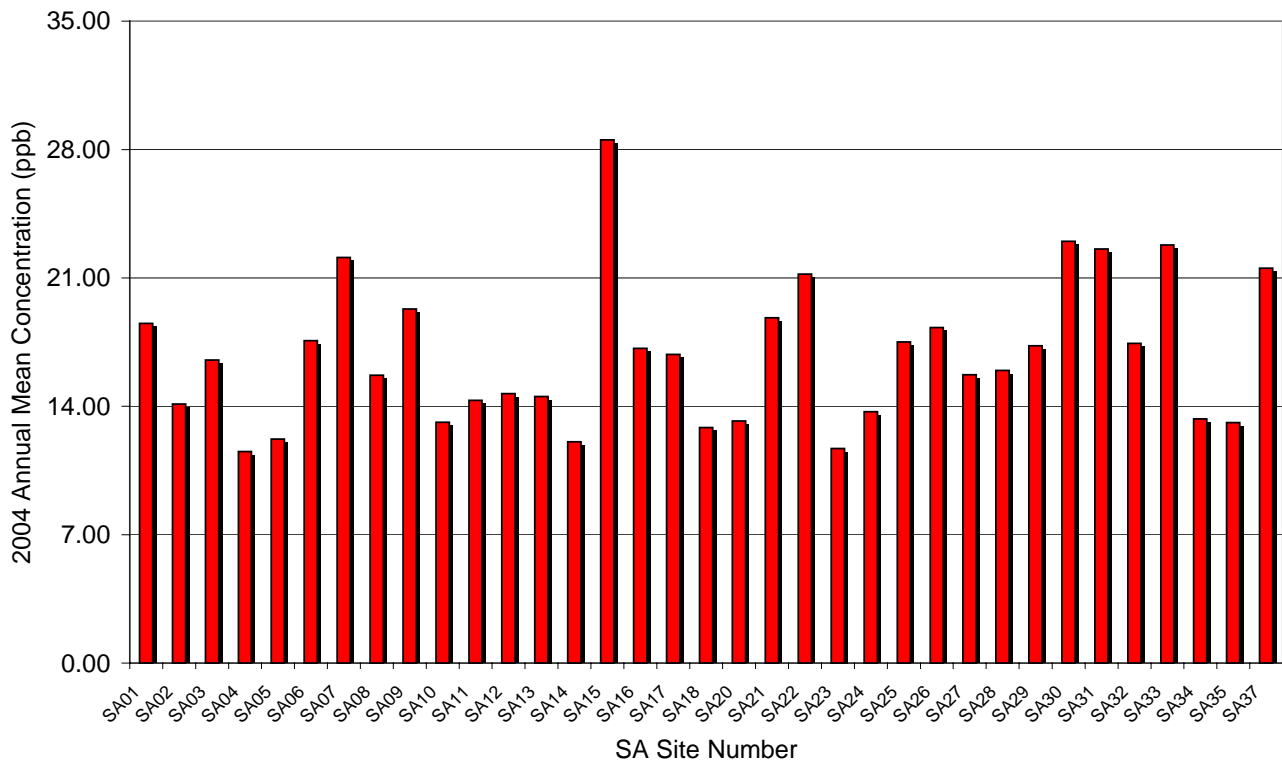
SiteCode	Address	State	X Grid Ref	Y Grid Ref	Class
SA01	Museum of St Albans, Hatfield Road	Open	515100	207700	kerbside
SA02	Holywell Hill, St Albans	Open	514100	206500	intermediate
SA03	St Peters Street, St Albans	Open	514900	207400	background
SA04	Pondfield Crescent Marshalswick St Albans	Open	516700	209200	background
SA05	Ben Austins, Redbourn	Open	510100	211800	background
SA06	Ridgeview Hostel, Barnet Road, London Colney	Open	518600	203500	intermediate
SA07	Waterdale, Bricket Wood	Open	512000	202200	intermediate
SA08	Bowmans Green JMI, Telford Rd, London Colney	Open	517400	203900	background
SA09	High Street, Harpenden	Open	513500	214300	kerbside
SA10	Crabtree Lane, Harpenden	Open	514400	214300	background
SA11	Redbourn JMI, Crouch Hall Lane, Redbourn	Open	512800	210200	background
SA12	Ashridge Drive, Bricket Wood	Open	512800	202200	intermediate
SA13	Wheathampstead High Street	Open	517700	214100	kerbside
SA14	Adult Ed. Centre, Butterfield, Wheathampstead	Open	517500	213900	background

SA15	Peahen PH, Holywell Hill, St Albans	Open	514700	207100	kerbside
SA16	Tippendell Lane, St Albans	Open	513600	204400	intermediate
SA17	London Colney Roundabout	Open	517700	204700	intermediate
SA18	Batchwood Drive, St Albans	Open	513900	208100	intermediate
SA20	Fleetville C. Centre 1, Royal Rd, St Albans (SA1)	Open	516541	209359	background
SA21	Lye Lane, Bricket Wood	Open	513317	202665	background
SA22	Lybury Lane	Open	509434	202665	background
SA23	St Agnells	Open	509024	212779	background
SA24	Redding Lane	Open	509117	214082	background
SA25	Searches Farm	Open	511353	203756	background
SA26	Oakwood Road	Open	512569	202728	background
SA27	Five Acres Avenue, Bricket Wood	Open	512690	202713	background
SA29	Meadow Close, Bricket Wood	Open	513022	202624	background
SA30	Smug Oak Lane	Open	515390	202564	background
SA31	Radlett Road	Open	515297	502774	background
SA32	Sycamore Drive, Park Street	Open	514900	203852	background
SA33	Mount Drive, Park Street	Open	514650	204549	background
SA34	Fleetville C. Centre 2, Royal Rd, St Albans (SA1)	Open	516541	207359	background
SA35	Fleetville C. Centre 3, Royal Rd, St Albans (SA1)	Open	516541	209359	background
SA37	Sleapcross Gardens	Open	520092	206676	background

5.1.1 Nitrogen dioxide monitoring is carried out at 35 locations throughout the District by diffusion tubes. The site details are shown below in Table 1.2

- 5.1.2 The result for the 35 nitrogen dioxide diffusion tube monitoring sites operated by the council during 2004 are shown in figure 1.1 and Table 1.3 (showing predicted levels 2005/2010). Various co-location studies were conducted on behalf of authorities in Hertfordshire and Bedfordshire by ERG, Kings College, London (Appendix C). The annual report suggested bias factors for application to 2003 diffusion tube results. St Albans have collocated three nitrogen dioxide diffusion tubes at the Fleetville monitoring station for the 12 month period used for this data set. Results in this report have not had bias factors applied, however, as can be seen from Appendix C the suggested bias adjustment for this data set is 1.0 so the results would be unaffected.
- 5.1.3 Technical Guidance LAQM.TG(03) (DEFRA, 2003) advises that the adjustment factor to estimate annual average concentrations in 2005 from 2004 data is 0.97 for roadside data. For background sites 0.98 has been used as the adjustment factor for 2004.
- 5.1.4 To estimate annual mean concentrations in 2010 from 2004 data, an adjustment factor of 0.80 has been used for roadside data. For background sites 0.84 has been used as the adjustment factor for the 2004 dataset. Estimated concentrations for 2005 and 2010 are shown in table 1.3.
- 5.1.5 For both the 2005 and 2010 predicted concentrations the background bias adjustment figure has been used rather than the roadside at intermediate sites. This approach has been taken to be precautionary and in possibly overestimate rather than under predict.

**Figure 1.1 Showing the Annual Mean results for Diffusion Tubes**



**Table 1.3 Showing Annual mean Nitrogen Dioxide Tube Concentrations in ppb for 2004 and Predicted Means for 2005 and 2010**

Location	Address	Mean 2004 (Raw Data)	Predicted 2005	Predicted 2010
SA01 (K)	Museum of St Albans, Hatfield Road	18.53	17.97	14.82
SA02	Holywell Hill, St Albans	14.13	13.85	11.87
SA03	St peters Street, St Albans	16.52	16.19	13.87
SA04	17 Pondfield Crescent, Marshalswick, St Albans	11.53	11.30	9.69
SA05	Ben Austins, Redbourn	12.22	11.98	10.26

SA06	Ridgeview Hostel, Barnet Rd	17.58	17.23	14.78
SA07	Waterdale, Bricket Wood	22.12	21.68	18.58
SA08	Bowmans Green JM1, Telford Rd,	15.69	15.38	13.18
SA09 (K)	High Street, harpenden	19.30	18.72	15.44
SA10	Crabtree Lane, Harpenden	13.13	12.87	11.03
SA11	Redbourn JM1, Crouch Hall Lane, Redbourn	14.32	14.03	12.03
SA12	Ashridge Drive, Bricket Wood	14.69	14.40	12.34
SA13 (K)	Wheathampstead High Street	14.54	14.10	11.63
SA14	Adult Education Centre, Wheathampstead	12.06	11.82	10.13
SA15 (K)	Peahen PH, Holywell Hill, St Albans	28.53	27.67	22.82
SA16	Tippendale Lane, St Albans	17.17	16.83	14.42
SA17	London Colney Roundabout	16.83	16.49	14.14
SA18	Batchwood Drive, St Albans	12.84	12.58	10.79
SA20	Fleetville Community Centre, Royal Rd, St Albans	13.20	12.94	11.10
SA21	Lye Lane, BricketWood	18.83	18.45	15.82
SA22	Lybury Lane	21.21	20.79	17.82
SA23	St Agnells	11.70	11.47	9.83
SA24	Redding Lane	13.70	13.43	11.51
SA25	Searches Farm	17.51	17.16	14.71
SA26	Oakwood Road	18.29	17.92	15.36
SA27	Five Acres Avenue, Bricket Wood	15.72	15.41	13.20



SA28	Garnett Drive, Bricket Wood	15.96	15.64	13.41
SA29	Meadow Close, Bricket Wood	17.31	16.96	14.54
SA30	Smug Oak Lane	23.00	22.54	19.32
SA31	Radlett Road	22.58	22.13	18.97
SA32	Sycamore Drive, Park Street	17.44	17.09	14.65
SA33	Mount Drive, Park Street	22.80	22.34	19.15
SA34	Fleetville Community Centre 2, Royal Rd, St Albans	13.32	13.05	11.19
SA35	Fleetville Community Centre 3, Royal Rd, St Albans	13.12	12.85	11.02
SA37	Sleapcross Gardens	21.53*	21.10	18.10

\* Based on Data over the period October – December 2004  
(K) Kerbside

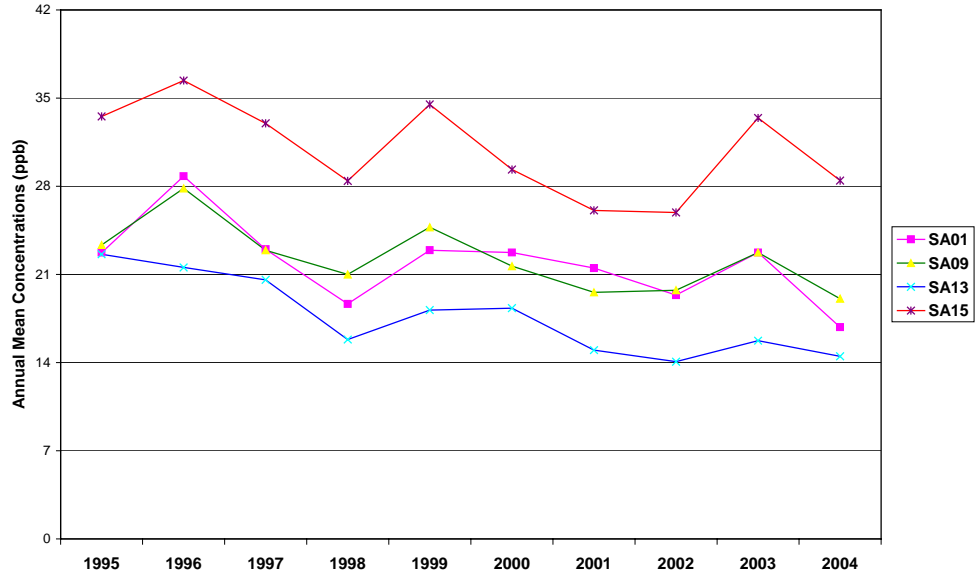
5.1.6 The tubes are supplied and analysed by Gradko International Ltd and are prepared using 20% TEA/ water . Gradko International Ltd are a UKAS accredited Laboratory.

5.1.7 The Government's Air Quality Standards Objective for the mean nitrogen dioxide levels is  $40\mu\text{g m}^{-3}$  (21ppb), to be achieved by the end of 2005. 7 of the District's 35 diffusion tube sites recorded annual means above the object levels in 2004. As with previous years, the kerbside site (SA15) at the Peahen Junction, Holywell Hill in St Albans recorded the highest mean, well above the objective of  $40\mu\text{g m}^{-3}$  (21ppb). This area was investigated in the Detailed Assessment and has since been declared an AQMA.

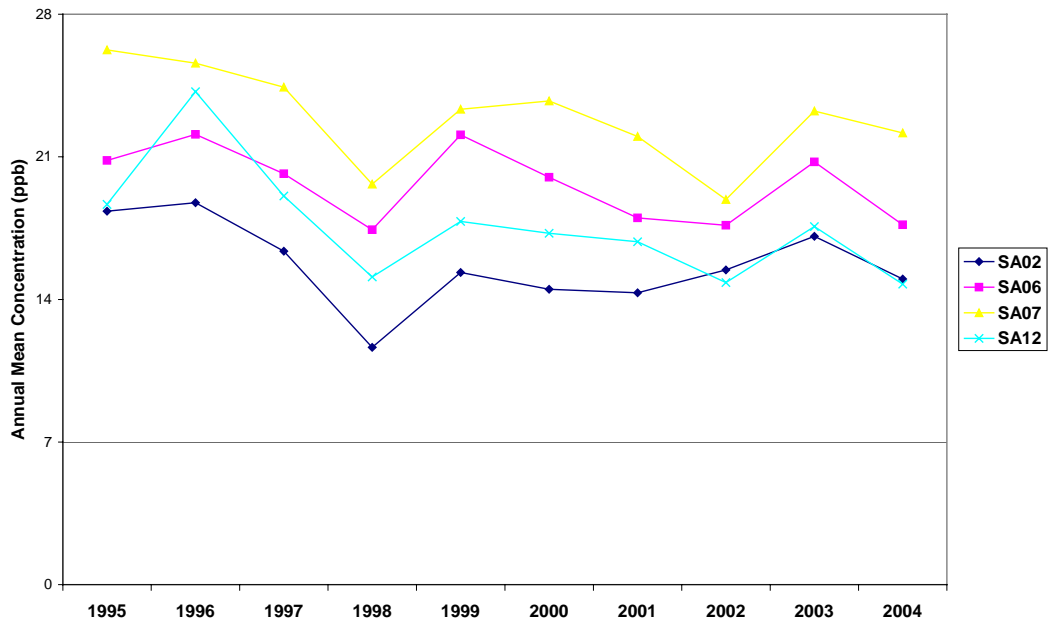
5.1.8 Care must be taken when considering trends in pollution levels as recorded by diffusion tubes, as they are prone to inaccuracies in the tube preparation and chemical analysis. Results from the Districts more accurate continuous monitoring site are included for comparison and tend analysis is discussed in more detail in chapter 6.

5.1.9 Trends in annual mean  $\text{NO}_2$  for diffusion tubes are shown in figure 1.2, 1.3 and 1.4, Annual means for 2004 at all sites were lower when compared against those for 2003. This is a trend common with many other parts of the Southeast and reflects the wetter and less settled weather conditions experienced in 2004.

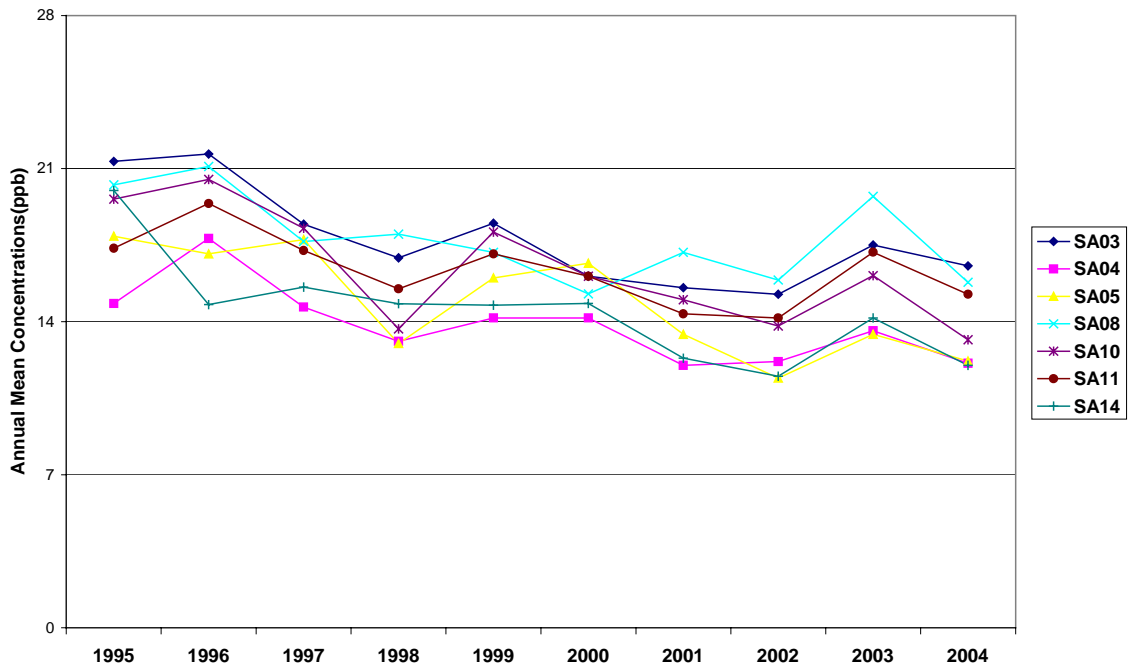
**Figure 1.2 Showing Trends in Nitrogen Dioxide Concentration 1995-2004 Kerbside sites**



**Figure 1.3 Showing Trends in Nitrogen Dioxide Concentration 1995-2004 intermediate sites.**



**Figure 1.4 Showing Trends in Nitrogen Dioxide Concentration 1995-2004 background sites.**



5.1.9.1 **Benzene**– Historically monitoring shows that annual mean concentrations for benzene have fallen steadily over the last 10 years in line with national trends. The data collected over the last 6 months shows that at none of the sites was the objective levels exceeded. Tables

1.4a,b,c,d,e,f show the benzene diffusion tube data over a six month period as agreed with DEFRA to illustrate that the exposure at the nearest residential properties would be below the objective levels. All the sites were below the  $5\mu\text{g}\text{m}^{-3}$  objective level.

**Table 1.4a Showing benzene diffusion tube data**

Aug-04				
Site Code	Date On	Date Off	Benzene	Benzene
			ppb	ug/m3
Harpenden High St	03/08/2004	31/08/2004	0.2	0.8
London Colney	03/08/2004	31/08/2004	0.2	0.6
Fleetville	03/08/2004	31/08/2004	0.3	0.9
Peahen	04/08/2004	31/08/2004	0.5	1.6
Eaton Lodge	03/08/2004	31/08/2004	0.2	0.8
Cherry Tree Lodge	03/08/2004	31/08/2004	0.4	1.2

**Table 1.4b Showing benzene diffusion tube data**

Sep-04				
Site Code	Date On	Date Off	Benzene	Benzene
			ppb	ug/m3
Harpenden High St	31/08/2004	28/09/2004	0.4	1.4
London Colney	31/08/2004	28/09/2004	0.3	0.9
Fleetville	31/08/2004	missing	-	-
Peahen	31/08/2004	28/09/2004	0.4	1.4
Eaton Lodge	31/08/2004	28/09/2004	0.3	0.9
Cherry Tree Lodge	31/08/2004	28/09/2004	0.3	1.1

**Table 1.4c Showing benzene diffusion tube data**

Oct-04				
Site Code	Date On	Date Off	Benzene	Benzene
			ppb	ug/m3
Harpenden High St	28/09/2004	02/11/2004	0.3	0.8
London Colney	28/09/2004	01/11/2004	0.2	0.7
Fleetville	28/09/2004	02/11/2004	0.2	0.6
Peahen	28/09/2004	02/11/2004	0.5	1.5
Eaton Lodge	28/09/2004	01/11/2004	0.2	0.7
Cherry Tree Lodge	28/09/2004	02/11/2004	0.1	0.4

**Table 1.4d Showing benzene diffusion tube data**

Nov-04				
Site Code	Date On	Date Off	Benzene	Benzene
			ppb	ug/m3
Harpenden High St	02/11/2004	30/11/2004	0.0	0.0
London Colney	01/11/2004	30/11/2004	0.0	0.0
Fleetville	02/11/2004	30/11/2004	0.0	0.0
Peahen	02/11/2004	01/12/2004	0.0	0.0
Eaton Lodge	01/11/2004	30/11/2004	0.0	0.0
Cherry Tree Lodge	02/11/2004	30/11/2004	0.0	0.0

**Table 1.4e Showing benzene diffusion tube data**

Dec-04				
Site Code	Date On	Date Off	Benzene	Benzene
			ppb	ug/m3
Harpden High St	30/11/2004	04/01/2005	0.5	1.6
London Colney	30/11/2004	04/01/2005	0.3	1.1
Fleetville	30/11/2004	04/01/2005	0.4	1.3
Peahen	30/11/2004	04/01/2005	0.6	2.0
Eaton Lodge	30/11/2004	04/01/2005	0.3	1.1
Cherry Tree Lodge	30/11/2004	04/01/2005	0.3	1.1

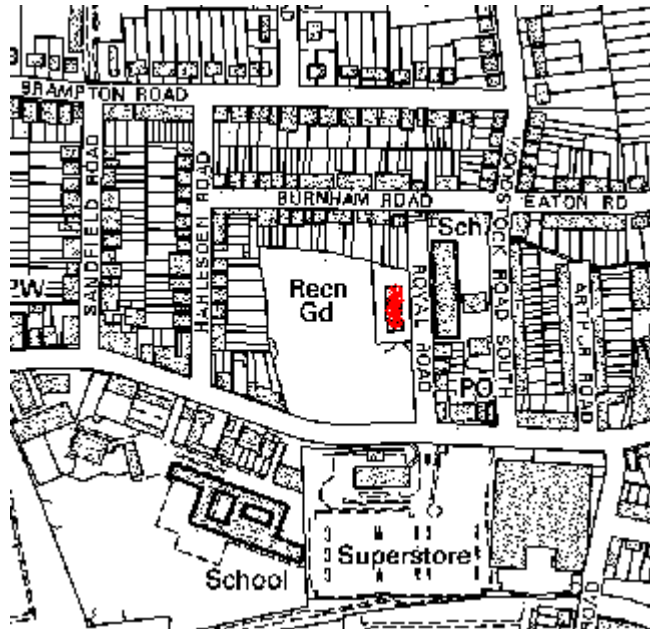
**Table 1.4f Showing benzene diffusion tube data**

Jan-05				
Site Code	Date On	Date Off	Benzene	Benzene
			ppb	ug/m3
Harpden High St	04/01/2005	01/02/2005	0.5	1.7
London Colney	04/01/2005	01/02/2005	0.3	1.0
Fleetville	04/01/2005	01/02/2005	0.3	1.0
Peahen	04/01/2005	01/02/2005	0.7	2.3
Eaton Lodge	04/01/2005	01/02/2005	0.3	1.1
Cherry Tree Lodge	04/01/2005	01/02/2005	0.4	1.2

## 5.2 Continuous Monitoring Sites

5.21 Continuous monitoring of nitrogen dioxide, nitric oxides, PM<sub>10</sub>, sulphur dioxide, carbon monoxide and ozone are carried out at the air quality monitoring station located at Fleetville Community Centre, Royal Road, St Albans. The station is classified as a urban background monitoring site and is located close to residential properties in a residential area. (Fig 1.5 Shows location of site).

**Figure 1.5 Showing the Location of the Fleetville Air Quality Monitoring Site**



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- 5.22 The analysers are serviced regularly and QA/QC audits are also conducted every six months.
- 5.23 In the Updating and Screening Assessment data for the period Jan 2002 – Jan 2003 were reported. Ratified data for the period Jan 2004 – Jan 2005 is now available and is therefore considered in this report. No adjustment of data is necessary to calculate the annual mean as 12 months of data had been captured.
- 5.24 Table 1.5 shows data capture rates for the analyser during 2004. Reduced capture rates may be caused by repeated or prolonged analyser or logger breakdowns. St Albans capture rate was approximately 94% the failures were mainly due to communication problems. The logging period is significantly improved over the previous year (85%). Temperature fluctuations were also responsible for some of the failures associated with the analysers used to monitor carbon monoxide, nitrogen dioxide and ozone. It has been decided that a more controlled temperature environment would be beneficial and an air conditioning unit has been fitted to improve the situation and hopefully improve the data capture rates.

- 5.25 **Results of monitoring-** Annual mean concentrations are shown in Table 1.6 . These statistics are based on hourly mean data. The results have been detailed below and in Tables 1.7 & 1.8 and detail if the Air Quality Strategy Objectives will be achieved.
- 5.26 **Carbon monoxide-** There were no incidences of carbon monoxide above the levels prescribed in the Air Quality Strategy Objectives.
- 5.27 **Nitrogen dioxide-** There were no incidences of nitrogen dioxide above the levels prescribed in the Air Quality Strategy Objectives.
- 5.28 **Ozone-** The 8 hour mean was exceeded on 20 occasions this is in excess of the levels prescribed in the Air Quality Strategy Objectives. The first widespread incident occurred during mid march, the last at the end of September. Ozone is a national objective rather than a regional objective due to the transient nature of the pollutant.
- 5.29 **PM<sub>10</sub> -** There were no incidences of PM<sub>10</sub> above the levels prescribed in the Air Quality Strategy Objectives.
- 5.30 **Sulphur Dioxide-** There were no incidences of sulphur dioxide above the levels prescribed in the Air Quality Strategy Objectives.

**Table 1.5 Analyser Capture Rates (%) for 2004 (ERG, London 2005)**

<b>Site</b>	<b>Carbon Monoxide</b>	<b>Nitrogen Dioxide</b>	<b>Ozone</b>	<b>PM<sub>10</sub></b>	<b>Sulphur Dioxide</b>
Broxbourne (Roadside)		91		97	
E Herts Sawbridgeworth (Background)		98		98	
Hertsmere Borehamwood (Background)	98	96	98	96	
St Albans Fleetville (Background)	95	96	94	96	91

**Table 1.6 Annual Means for 2004 (ERG, London, 2004)**

<b>Site</b>	<b>Carbon Monoxide (ppm)</b>	<b>Nitrogen Dioxide (<math>\mu\text{g}\text{m}^{-3}</math>)</b>	<b>Ozone (<math>\mu\text{g}\text{m}^{-3}</math>)</b>	<b>PM<sub>10</sub> (<math>\mu\text{g}\text{m}^{-3}</math> (1.3 Gravimetric conversion applied) )</b>	<b>Sulphur Dioxide (<math>\mu\text{g}\text{m}^{-3}</math>)</b>
Broxbourne (Roadside)		46.6		25.8	
E Herts Sawbridgeworth (Background)		21.4		17.8	
Hertsmere Borehamwood (Background)	0.1	26.5	41	20.2	
St Albans Fleetville (Background)	0.3	25.5	43.3	23.2	7



**Table 1.7 Comparison with Air Quality Strategy Objectives – Achieved ('yes') or Exceeded ('no')**

Annual Mean	CO		PM <sub>10</sub>		SO <sub>2</sub>	
	A	B	C	D	E	F
Broxbourne Roadside	-	Yes (4)	Yes (26)	-	-	-
East Herts Roadside	-	Yes (5)	Yes (24)	-	-	-
Mid Beds Roadside 2	-	-	-	-	-	-
Stevenage Roadside	-	Yes (5)	Yes (24)	-	-	-
Watford Roadside	-	Yes (7)	Yes (25)	-	-	-
East Herts Background	-	Yes (1)	Yes (24)	-	-	-
Hertsmere Background	Yes (0)	Yes (1)	Yes (20)	-	-	-
Luton Background	Yes (0)	Yes (1)	Yes (23)	n.a (0)	n.a (0)	n.a (0)
Luton Airport Background	-	n.a. (63)	n.a. (38)	-	-	-
North Herts Background	-	Yes (1)	Yes (18)	-	-	-
St Albans Background	Yes (0)	Yes (3)	Yes (23)	Yes (0)	Yes (0)	Yes (0)
South Beds Background	-	Yes (1)	Yes (18)	-	-	-
Three River Background	-	Yes (3)	Yes (19)	-	-	-
Welwyn Hatfield Background	-	-	-	-	-	-
Bedford Rural	-	-	-	Yes (8)	Yes (0)	No (133)
East Herts Rural	-	-	-	-	-	-
Mid Beds Rural	-	-	-	-	-	-
Greenwich 4	-	Yes (5)	Yes (22 $\mu\text{gm}^{-3}$ )	Yes (0)	Yes (0)	Yes (0)
Kens and Chelsea 1	Yes (0)	Yes (6)	Yes (24 $\mu\text{gm}^{-3}$ )	Yes (0)	Yes (0)	Yes (0)
Marylebone Road	Yes (0)	No (99)	No (43 $\mu\text{gm}^{-3}$ )	Yes (0)	Yes (0)	Yes (0)

A: 10 $\text{mgm}^{-3}$  measured as running 8 hour mean t.b.a. by 2004.

B: 50 $\mu\text{gm}^{-3}$  not to be exceeded more than 35 times a year measured as 24 hour mean to be achieved by 2005. TEOM to Gravimetric conversion factor of 1.3 applied.

C: 40 $\mu\text{gm}^{-3}$  measured as annual mean to be achieved by 2005. TEOM to Gravimetric conversion factor of 1.3 applied.

D: 350 $\mu\text{gm}^{-3}$  not to be exceeded more than 24 times a year measured as 1 hour mean t.b.a. by 2005.

E: 125 $\mu\text{gm}^{-3}$  not to be exceeded more than 3 times a year measured as 24 hour mean t.b.a. by 2005.

F: 267 $\mu\text{gm}^{-3}$  not to be exceeded more than 35 times a year measured as 15 min. mean t.b.a. by 2006.

n.a.: Not enough data for statistic (annual capture rate less than 75%) or analyser type not applicable.

**Table 1.8 Comparison with provisional Air Quality Strategy Objectives – Achieved ('yes') or Exceeded ('no')**

Annual Mean	O <sub>3</sub>	NO <sub>2</sub>	
	A	B	C
Broxbourne Roadside	-	Yes (0)	No (46)
East Herts Roadside	-	Yes (0)	Yes (31)
Mid Beds Roadside	-	Yes (0)	No (41)
Stevenage Roadside	-	Yes (0)	Yes (29)
Watford Roadside	No (17)	Yes (0)	No (42)
East Herts Background	-	Yes (0)	Yes (23)
Hertsmere Background	No (21)	Yes (0)	Yes (26)
Luton Background	No (14)	Yes (0)	Yes (32)
North Herts Background	-	Yes (0)	Yes (18)
St Albans Background	No (20)	Yes (0)	Yes (23)
South Beds Background	-	Yes (0)	Yes (18)
Three River Background	-	Yes (1)	Yes (37)
Welwyn Hatfield Background	No (22)	Yes (0)	Yes (22)
Bedford Rural	No (18)	-	-
East Herts Rural	No (28)	-	-
Mid Beds Rural	No (49)	-	-
Greenwich 4	No (11)	Yes (0)	Yes (30µgm <sup>-3</sup> )
Kens and Chelsea 1	No (17)	Yes (0)	No (40µgm <sup>-3</sup> )
Marylebone Road	Yes (0)	No (529)	No (110µgm <sup>-3</sup> )

A: 100µgm<sup>-3</sup> not to be exceeded more than 10 times a year measured as the daily max of running 8 hour mean (T.B.A. by 2006).

B: 200µgm<sup>-3</sup> not to be exceeded more than 18 times a year measured as 1 hour mean (to be achieved by 2006).

C: 40µgm<sup>-3</sup> measured as an annual mean (to be achieved by 2006).

n.a.: Not enough data for statistic (annual capture rate less than 75%) or analyser type not applicable.

## 6.0 Trends in Pollution Levels.

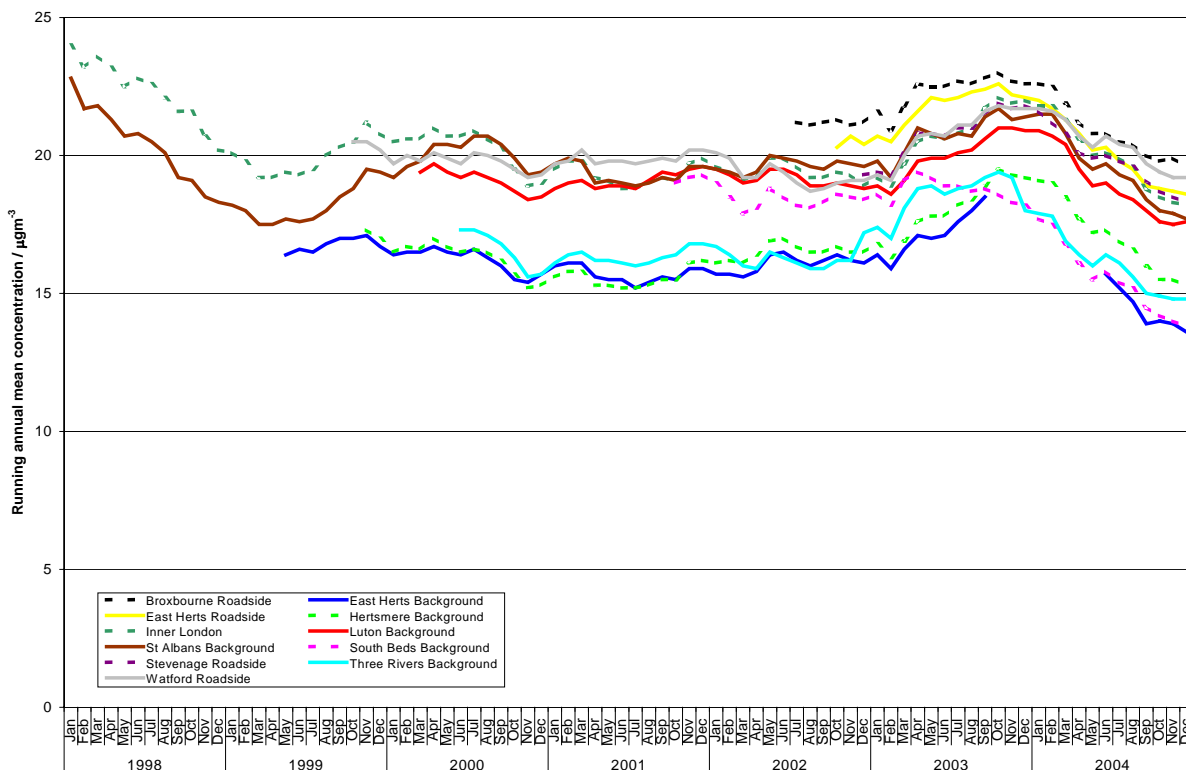
- 6.1 **PM<sub>10</sub> Particulates-** Running annual mean particulate trends are shown in Figure 1.6. A large proportion of the particulate matter experienced in St Albans is from regional sources, such as transport of pollution from the main land of Europe. 2003 saw long and frequent periods of weather ideal for such long range transportation of pollution. There has been a significant reduction in levels during 2004
- 6.2 The results of this are seen in figure 1.7 as an upward trend at all sites since during 2003 and a decline during 2004
- 6.3 **Carbon Monoxide-** A plot of running annual mean carbon monoxide (CO) concentrations is shown in fig 1.8. Concentrations at the St Albans background site continue their downward trend. Emission levels are now approaching levels that are so low that they are becoming sensitive to analyser inaccuracy.
- 6.4 Improved emission control technologies especially catalytic converters, have led to a downward trend in national CO concentrations. In some areas, this decrease is being countered by increased traffic levels. It is worth noting that annual mean carbon monoxide as recorded by the St Albans monitoring site at the beginning of 2004 was less than half that recorded at the beginning of 1998.
- 6.5 **Sulphur Dioxide-** Decreased burning of domestic coal and oil, cleaner industrial combustion processes, catalytic converters and low sulphur fuel have all contributed to a national downward trend in sulphur dioxide concentrations.
- 6.6 Concentrations in St Albans are very low in most areas and show little change over this period
- 6.7 **Nitrogen Dioxide-** Nitrogen dioxide is the most commonly monitored pollutant. Charts of running annual mean concentrations are shown in Fig 1.9, percentage change over a shorter period is shown in Fig 2.0.
- 6.8 The air quality objective for annual mean nitrogen dioxide is  $40\mu\text{g}\text{m}^{-3}$  (21ppb) Figure 1.9 show that concentrations were below this objective, however unusually stable weather conditions during 2003 caused an increase in the means across the whole of the south-east. Unless there is a repeat of these unusual conditions it is reasonable to expect that the means will continue to decrease as is evident from the 2004 results.
- 6.9 **Ozone-** A relatively small proportion of vehicle emissions are in the form of nitrogen dioxide. A much larger proportion is in the form of nitric oxide,

which then reacts in the atmosphere with ozone and other pollutants to form nitrogen dioxide. Health standards and objectives are based on NO<sub>2</sub> because NO<sub>2</sub> is considered harmful to health, while NO is not. Improvements in vehicle technology mean that modern cars generally emit less NO than in the past. Unfortunately, not all of this decrease is translated into improvements in NO<sub>2</sub> levels.

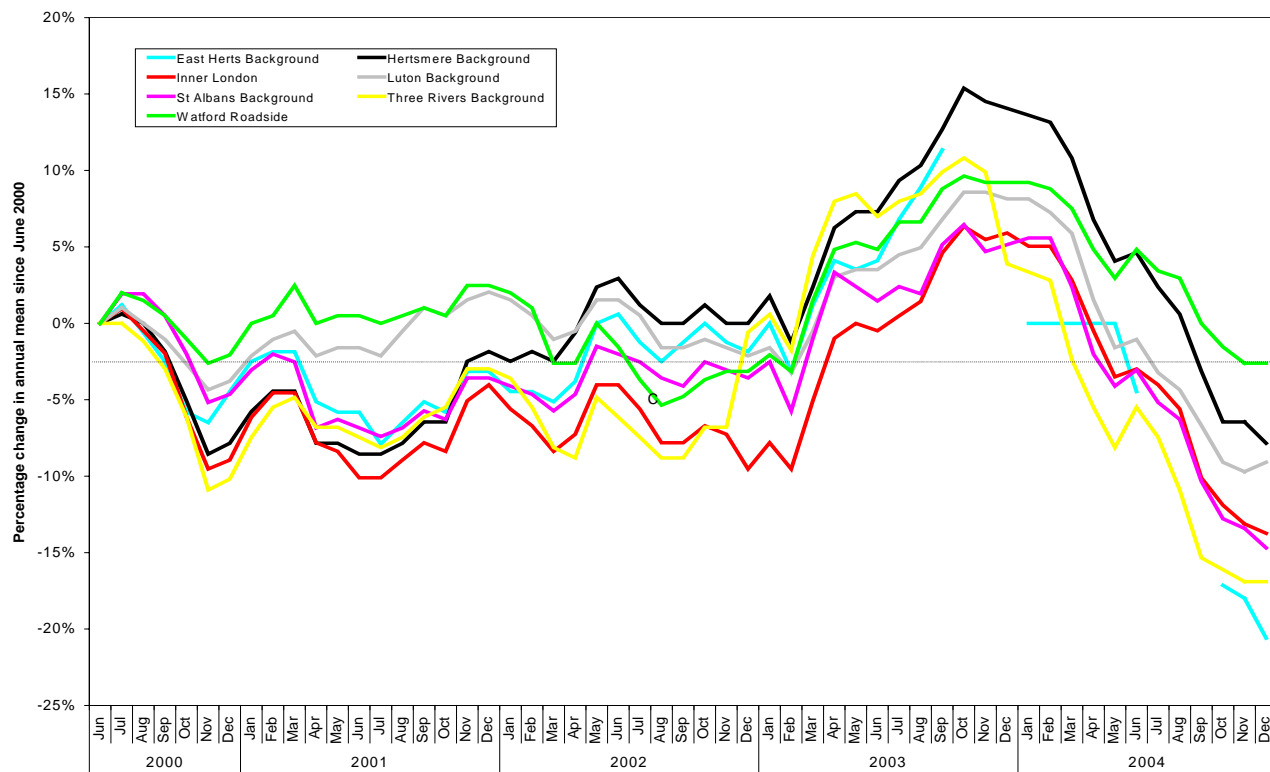
6.10 Figures 2.2 & 2.3, reveal much of the reason why the reduction in NO is not being translated into a similar reduction in NO<sub>2</sub>. Ozone levels are highly dependant on the weather and a series of warm sunny summer periods can cause a sharp increase in mean levels. As with particulates a large percentage of the ozone experienced in St Albans is from continental Europe. These two factors have caused an overall increase in ozone concentrations over the past 6 years of between 15% and 30% (Fig 2.3). The ozone reacts with local NO pollution to form NO<sub>2</sub>. Therefore, until ozone pollution levels can be decreased, improvements in NO levels will not be fully reflected in improvements in NO<sub>2</sub>.

6.11 Figure 2.3, shows the percentage change in ozone annual means since June 1998. Variations are strongly influenced by the weather, with increases during years with 'good' summers i.e. greater than average sunshine hours, and decrease during especially wet or cloudy years. 2003 was an especially sunny year and all sites monitored in the Herts & beds network recorded a large percentage increase.

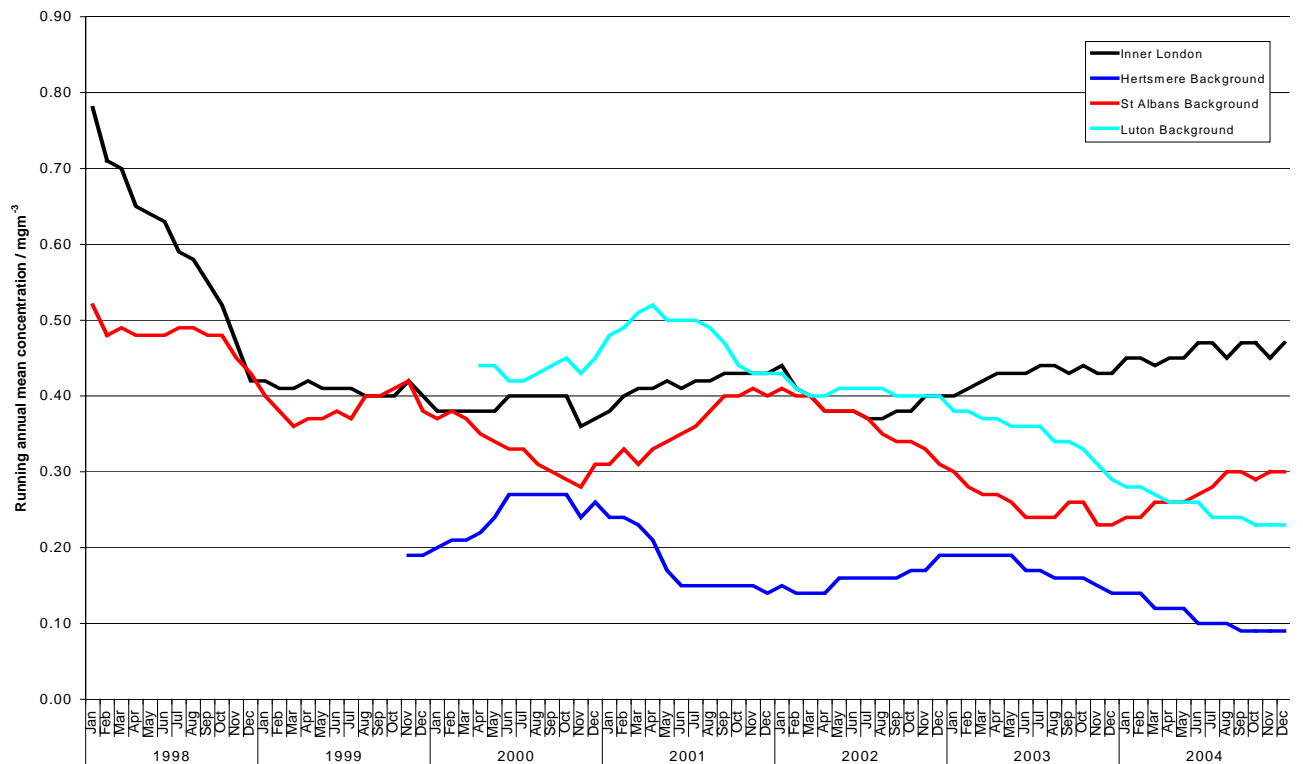
**Figure 1.6 Trends in running annual mean PM<sub>10</sub> concentrations, 1998 to 2005**



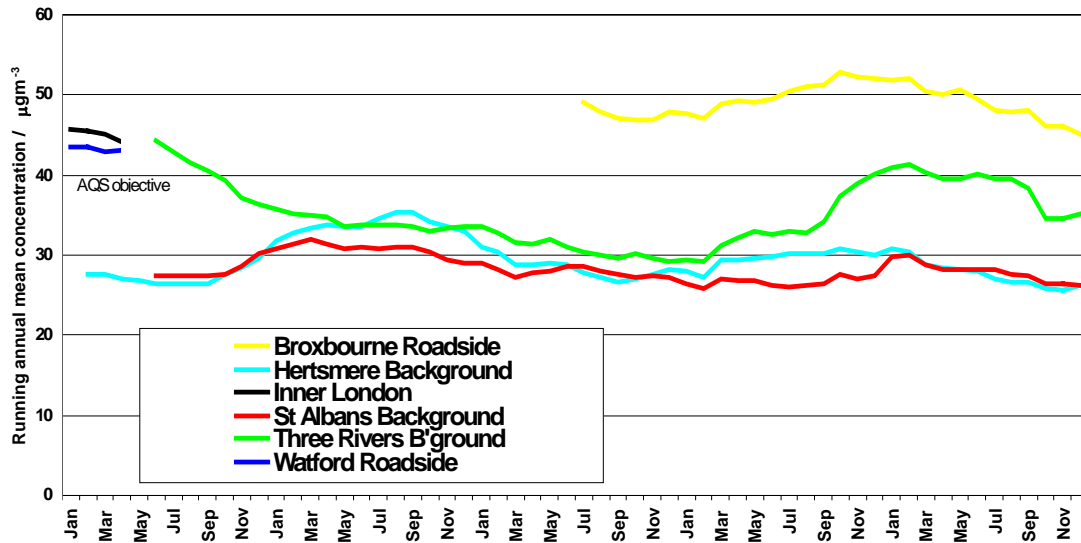
**Figure 1.7 Percentage change in running annual mean PM<sub>10</sub> since June 2000**



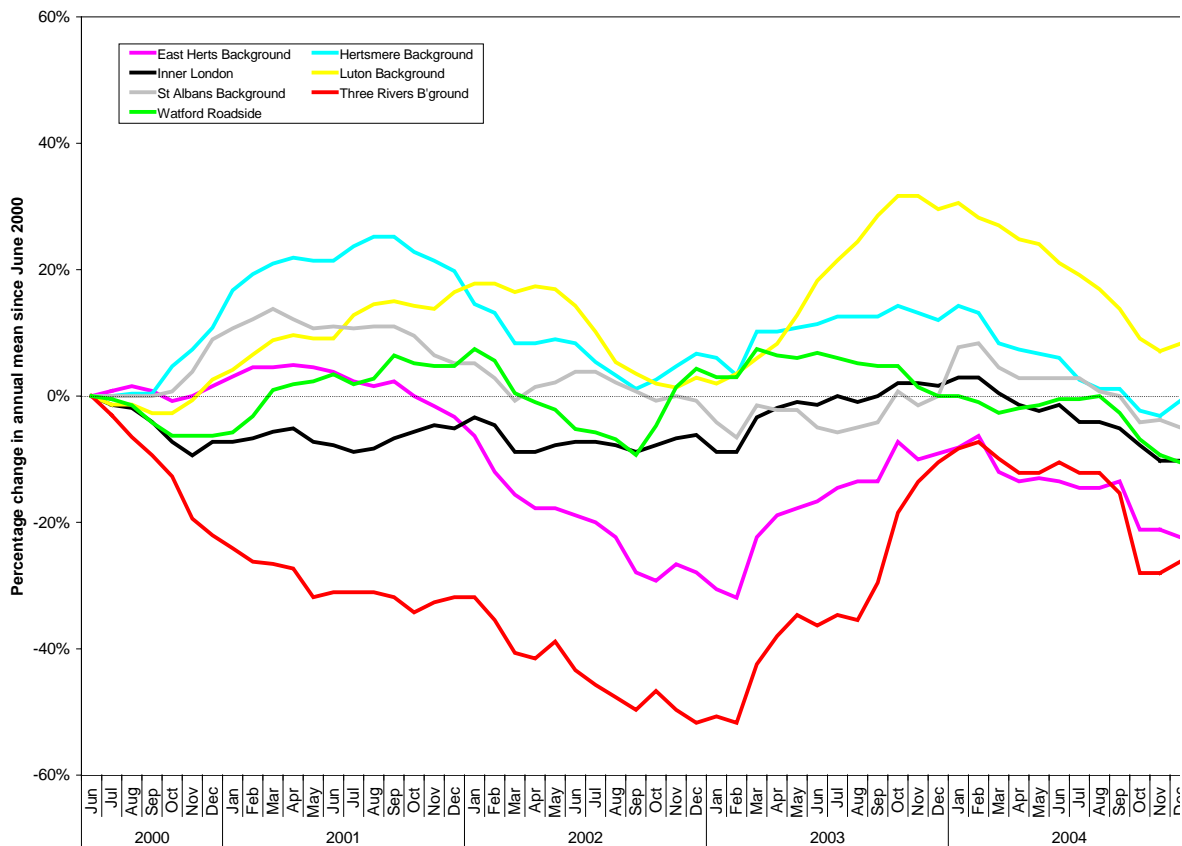
**Figure 1.8 Trends in running annual mean CO concentrations, 1998 to 2005**



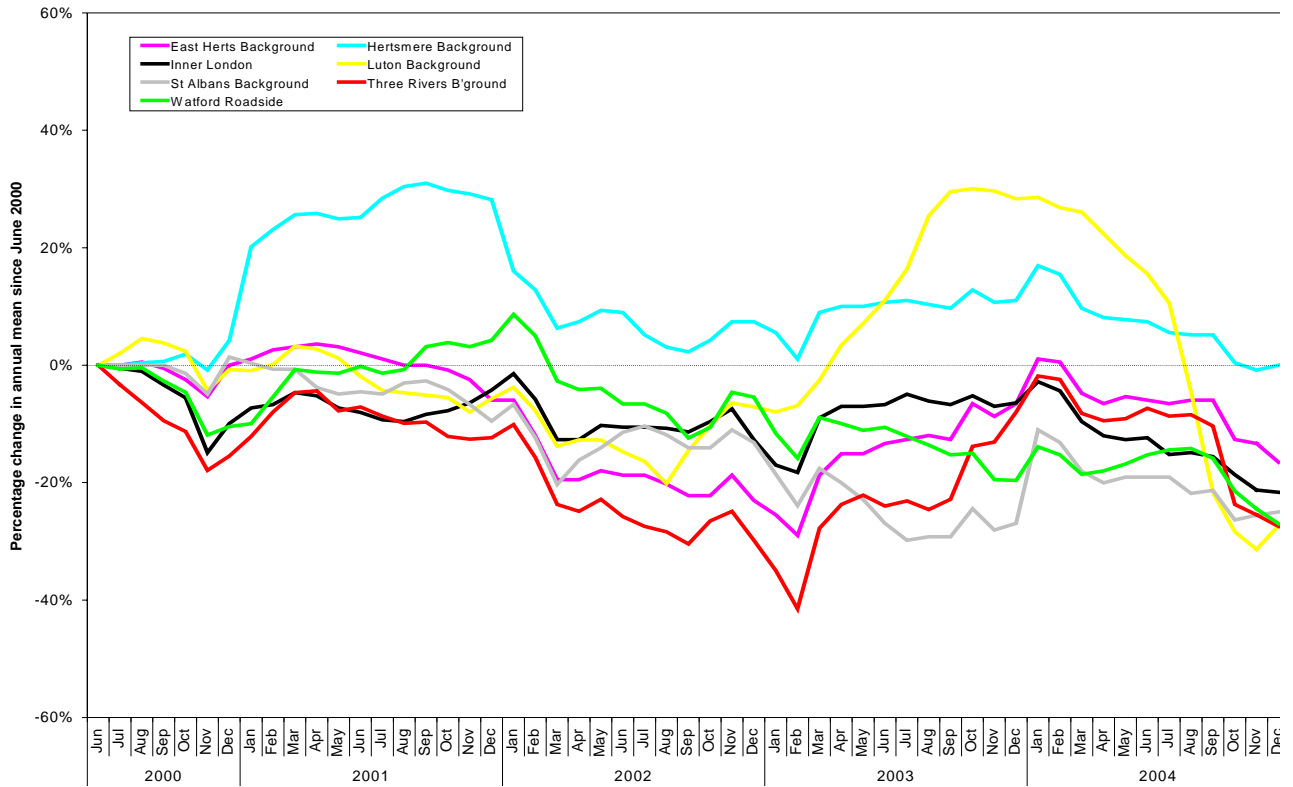
**Figure 1.9 Trends in running annual means NO<sub>2</sub> Concentration since 2000**



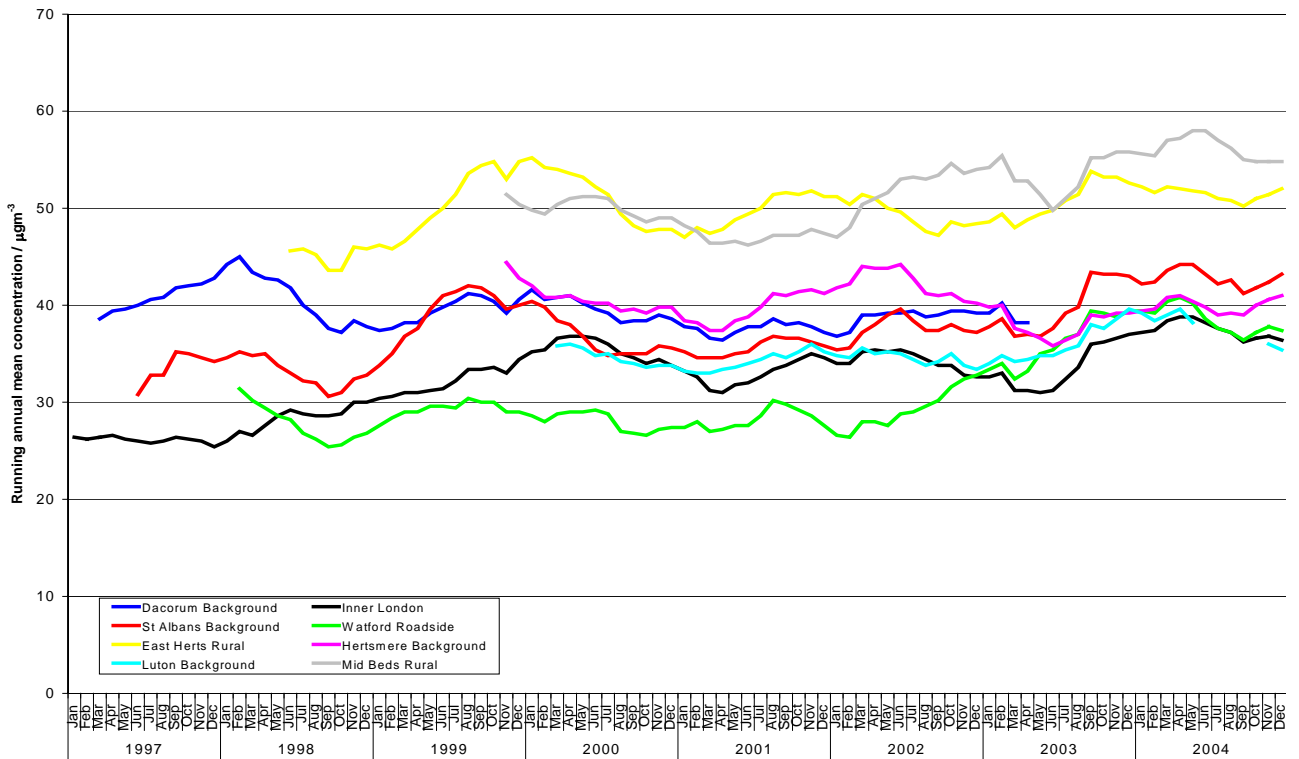
**Figure 2.0 Change (%) in annual mean NO<sub>2</sub> concentrations since June 2000**



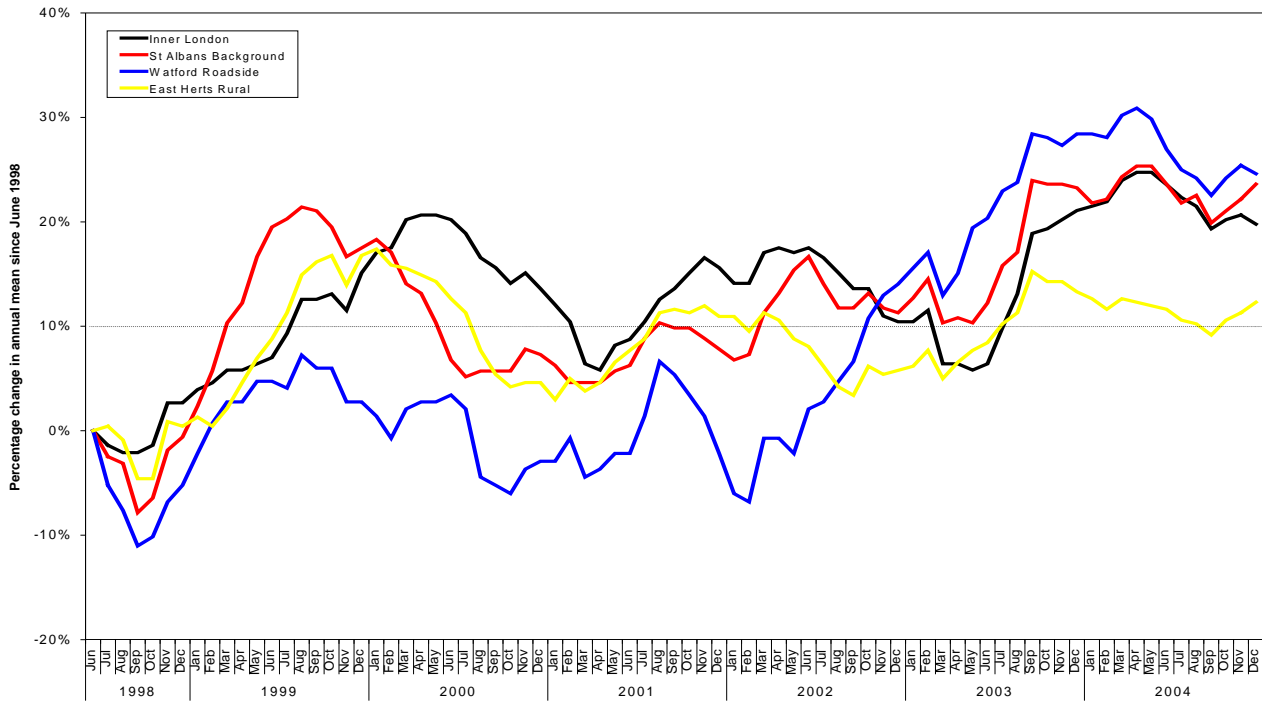
**Figure 2.1 Change (%) in annual mean NO<sub>x</sub> concentrations since June 2000**



**Figure 2.2 Running annual mean O<sub>3</sub> concentrations, 1997 to 2005**



**Figure 2.3 Change (%) in annual mean O<sub>3</sub> concentrations since June 1998**



## 7.0 New Developments- Industrial Processes.

- 7.1 **Part A1 Industrial Processes-** There have been no new Part A1 industrial processes authorised in the St Albans City & District area since the last Updating and Screening Assessment in July 2003.
- 7.2 **Part A2 Industrial Processes-** There have been no new Part A2 industrial processes authorised in the St Albans City & District area since the last Updating and Screening Assessment in July 2003.
- 7.3 **Part B Industrial Processes-** There have been two new Part B industrial processes authorised in the St Albans City & District area since the last Updating and Screening Assessment in July 2003. These include two new oil burners. The St Albans Hospital incinerator has closed since the Updating and Screening Assessment. There is therefore believed to be no new processes that would be significant to air quality.
- 7.4 **Landfill, Quarrying and Mineral Processes-** There have been no new landfill, quarrying and mineral processes in the St Albans City & District area since the last Updating and Screening Assessment in July 2003.



- 7.5 **Industrial Closures-** there have been no industrial closures in the St Albans City & District area since the last Updating and Screening Assessment in July 2003.

## 8.0 New Developments - Transport.

- 8.1 **New Road Developments-** Consultation with Hertfordshire County Council has confirmed the following:

- No new roads have been constructed or proposed since the previous Updating and Screening Assessment (USA) in July 2003.
- No roads have been identified for which updated traffic data has revealed that the Annual Average Daily Traffic Flow (AADTF) is significantly higher (25% or more) than previously thought.
- No roads have been identified which have AADTF greater than 10,000 vehicles per day, but which were omitted from the previous USA.

- 8.2 **Existing Roads-** Consultation with Hertfordshire County Council has confirmed the following:

- There are no new road layouts or road works in St Albans which are thought to give rise to a significant change in traffic levels or emissions.
- No roads have been identified with an AADTF greater than 10,000 vehicles per day, which have experienced large increases (25% or more) in traffic flow since the previous USA.

- 8.3 **Other Public Exposure to Vehicle Emissions-** Local Authorities are required to consider whether there are any of the following in their area, whether new since the last USA, or newly identified.

- 1) Narrow congested streets meeting the following criteria:

- Residential Properties within 5 metres of the kerb
- Average traffic speeds of 50Kph or less
- The carriageway is less than 10 metres wide, and
- AADTF is greater than 10,000 vehicles per day

- 2) Busy streets where people may spend 1 hour or more close to the traffic (most likely streets with shops, bars, cafés etc), meeting the following criteria:

- Public exposure for 1 hour or more, within 5 meters of the kerb.
- AADTF is greater than 10,000 vehicles per day.

There are no new, or newly identified streets meeting these criteria since the previous assessment.

- 8.4 **Other transport sources-** As well as road vehicles, public exposure to emissions from planes, buses, trains and ships must also be considered.
- 8.5 **Airports-** There are no major airports in the district. The nearest major airport is Luton airport which is about 4 km northwest of the district and consequently any relevant exposure will be outside the district.
- 8.6 **Bus Stations/ Train station -** The main bus and train station is located in St Albans City at Station interchange in Victoria Street/Station way. DMRB screening was undertaken as part of the USA which predicted concentrations of  $34\mu\text{gm}^{-3}$  which was lower than the annual objective and unlikely to exceed the hourly objective on more than 18 occasions. The bus and train movements have remained fairly constant since the USA in July 2003 and it is therefore anticipate that there would be no exceedances of the objective levels.
- 8.7 **Shipping-** St Albans is inland and therefore there are no emissions from coastal shipping in St Albans

## 9.0 **New Developments – Residential & Commercial.**

- 9.1 There have been no new housing, commercial or public developments in St Albans since July 2003 which are likely to have a significant impact on air quality due to significantly changed traffic flows.

## 10.0 **Local Transport Plans and Strategies.**

- 10.1 St Albans is currently working with Hertfordshire County Council in the production of the Local Transport Plan to ensure that measures that have a direct bearing on air quality are included and will assist Hertfordshire County Council with the implementation and reporting of these measures.

## 11.0 **Action Plan Progress.**

- 11.1 Appendix B details the Action Plans targets and the progress that has been made on progressing these actions in relation to the original target dates.

## 12.0 Conclusions and Recommendations

- 12.1 The results from the continuous monitoring station at Fleetville shows that the annual mean for all pollutants at this site except for ozone are due to be below the 2005 & 2010 objective levels. The exceedances in ozone are a national objective.
- 12.2 The latest diffusion tube monitoring results show that the Nitrogen Dioxide annual mean objectives may be exceeded for the 2010 objectives at the Peahen Junction. The Peahen Junction was investigated in the last round of reviews and as such was declared an AQMA.
- 12.3 Nitrogen Dioxide concentrations at most of the other sites in the District are predicted to be below the annual mean by 2005/2010. Some sites are predicted to be above the 2005 objective for example Waterdale, Bricket Wood this site has been subject to a previous Detailed Assessment and the modelling has indicated that the objective levels should not be exceeded. Sleafcross Gardens is also predicted to marginally exceed the 2005 objective, however this is based on only six months data and therefore further monitoring is required to establish if this preliminary data is accurate. The only other sites predicted to exceed the 2005 objectives are Smug Oak Lane and Radlet Road, both of these sites are close to the M25 and are currently in an AQMA.
- 12.4 The results from the benzene monitoring at relevant receptors adjacent to the Buncefield Oil depot have shown that the benzene levels are significantly below the objective levels. In November 2004 an analytical instrumental failure occurred so data was not available for that month. From the data gathered St Albans Council has shown that the objectives will be met and therefore do not consider it necessary to continue monitoring at these site. The Buncefield Oil depot is an authorised process inspected by Dacorum Borough Council, and therefore the emissions to air should be controlled by Permit.
- 12.5 There are no new processes with substantially changed emissions since the last review and assessment.
- 12.6 There have been no new landfill or quarrying processes in the District since July 2003.
- 12.7 There have been no new residential, public or commercial developments requiring assessment identified in St Albans District.

- 12.8 There have been no new roads or changes to existing roads or traffic flows which are likely to have an impact on air quality. There have been no changes to other transport sources identified.
- 12.9 In conclusion St Albans Council does not believe that there is currently any need to progress to a detailed assessment.

## 13.0 References.

- 1) DETR (2000). The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. Department of the Environment, Transport and Regions,
- 2) Netcen (AEA Technology plc) (2003) Air Quality Updating and Screening Assessment for St Albans
- 3) Netcen (AEA Technology plc) (2004) Air Quality Review and Assessment – Detailed
- 4) Netcen (AEA Technology plc) (2003) Air Quality Review and Assessment – Stage 4
- 5) St Albans City & District Council (2003) Air Quality Review and Assessment, Air Quality Action Plan for St Albans City and District Council
- 6) DEFRA (2003). Local Air Quality Management LAQM.TG(03). Department for Environment, Food and Rural Affairs.
- 7) DEFRA (2003). Local Air Quality Management LAQM.PRG(03). Department for Environment, Food and Rural Affairs.
- 8) ERG 2004, Herts & Beds Air Pollution Monitoring Network, Annual Report 2003. Kings College, London
- 9) ERG 2005, [www.hertsbedsair.org.uk](http://www.hertsbedsair.org.uk)

## **Appendix A**

### **Declaration of Air Quality Management Order 2004**

# **Appendix B**

## **Action Plan Progress**

# **Appendix C**

## **Co-location Studies for Diffusion Tubes**



# **Appendix D**

## **Travelwise Events Initiatives**

## Appendix E

### Acronyms and Definitions used in this Report.

AADFT	Annual Average Daily Traffic Flow
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
CO	Carbon Monoxide
DEFRA	Department for Environment Food and Rural Affairs
DMRB	Design Manual for Roads And Bridges
LAQM	Local Air Quality Management
$\mu\text{g}/\text{m}^3$	Micrograms per metre cubed
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Oxides of Nitrogen
ppb	Parts per billion
Receptor	In the context of this report, the relevant location where air quality is assessed or predicted (for example, houses, hospitals, schools).
Roadside	1-5 metres from the kerb
SO <sub>2</sub>	Sulphur Dioxide
TEA	Triethanlamine
USA	Updating Screening Assessment