

# Report

## **Air Quality Updating and Screening Assessment for Hertsmere Borough Council**

A report produced for the Hertsmere  
Borough Council

Version 1  
June 2006  
ED 42015

<b>Title</b>	Air Quality Updating and Screening Assessment for Hertsmere Borough Council
<b>Customer</b>	Hertsmere Borough Council
<b>Customer reference</b>	
<b>Confidentiality, copyright reproduction and</b>	This document has been prepared by AEA Technology plc in connection with a contract to supply goods and/or services and is submitted only on the basis of strict confidentiality. The contents must not be disclosed to third parties other than in accordance with the terms of the contract.
<b>File reference</b>	ED 42015001
<b>Report number</b>	AEAT/ENV/R/2219
<b>Report status</b>	Unrestricted

AEA Technology Environment and Energy  
 Gemini Building  
 Harwell  
 Didcot  
 Oxon.  
 OX11 0QR

Telephone 0870 190 3857  
 Facsimile 0870 190 6607

AEA Technology Environment and Energy is the trading name of AEA Technology plc  
 AEA Technology Environment and Energy is certificated to ISO9001

	<b>Name</b>	<b>Signature</b>	<b>Date</b>
<b>Authors</b>	Anne Wagner		
<b>Reviewed by</b>	Jim McGinlay		
<b>Approved by</b>	Jim McGinlay		

# Executive Summary

The UK Government published its strategic policy framework for air quality management in 1995 establishing national strategies and policies on air quality which culminated in the Environment Act, 1995. The Air Quality Strategy<sup>1</sup> provides a framework for air quality control through air quality management and air quality standards. These and other air quality standards<sup>a</sup> and their objectives<sup>b</sup> have been enacted through the Air Quality Regulations in 1997, 2000 and 2002. The Environment Act 1995 requires Local Authorities to undertake air quality reviews. In areas where an air quality objective is not anticipated to be met, Local Authorities are required to establish Air Quality Management Areas and implement action plans to improve air quality.

The first and second round of air quality review and assessments have been completed by Hertsmere Borough Council. The Local Authority are now required to proceed to the third round of review and assessment in which sources of emissions to air are reassessed to identify whether the situation has changed since the second round, and if so, what impact this may have on predicted exceedences of the air quality objectives.

The third round of review and assessment is to be undertaken in two steps. The first step is an Updating and Screening Assessment, which updates the Stage 1 and 2 review and assessments previously undertaken for all pollutants identified in the Air Quality Regulations. Where a significant risk of exceedence is identified for a pollutant it will be necessary for the local authority to proceed to a Detailed Assessment, equivalent to the previous Stage 3 assessments. Where a local authority does not need to undertake a Detailed Assessment, a progress report is required instead.

This report is equivalent to an Updating and Screening Assessment for Hertsmere Borough Council as outlined in the Government's published guidance.

This Updating and Screening Assessment has concluded that Hertsmere Borough Council is not required to carry out a Detailed Review and Assessment for carbon monoxide, benzene, 1,3-butadiene, lead, nitrogen dioxide, PM10 or sulphur dioxide.

---

<sup>a</sup> Refers to standards recommended by the Expert Panel on Air Quality Standards. Recommended standards are set purely with regard to scientific and medical evidence on the effects of the particular pollutants on health, at levels at which risks to public health, including vulnerable groups, are very small or regarded as negligible.

<sup>b</sup> Refers to objectives in the Strategy for each of the eight pollutants. The objectives provide policy targets by outlining what should be achieved in the light of the air quality standards and other relevant factors and are expressed as a given ambient concentration to be achieved within a given timescale.

The general approach taken in this Updating and Screening Assessment was to:

- Identify the conclusions of the last round of review and assessment for each of the seven pollutants included in the air quality regulations;
- Identify significant sources of emissions to air for the seven pollutants included in the air quality regulations, including major roads and industrial plant;
- Identify new sources not previously considered in the first round of review and assessment;
- Identify any sources for which emissions have changed significantly since the last round of review and assessment;
- Identify and interpret the significance of air quality monitoring data made available since the last round of review and assessment;
- Assess the risk of exceedences of the air quality objectives in locations where relative public exposure may exist using screening models and nomograms; and
- Where necessary, identify locations and pollutants for which further detailed assessment of air quality will be required.

A checklist identifying the considerations in this report is shown at the end of each chapter and Appendix 4.

**Acronyms and definitions used in this report**

AADTF	Annual Average Daily Traffic Flow
ADMS	an atmospheric dispersion model
AQDD	an EU directive (part of EU law) - Common Position on Air Quality Daughter Directives, commonly referred to as the Air Quality Daughter Directive
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
AP	Action Plan
AURN	Automatic Urban and Rural Network (Defra funded network)
base case	In the context of this report, the emissions or concentrations predicted at the date of the relevant air quality objective (2005 for nitrogen dioxide)
CO	Carbon monoxide
d.f.	Degrees of freedom (in statistical analysis of data)
DETR	Department of the Environment Transport and the Regions (now Defra)
Defra	Department of the Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges
EA	Environment Agency
EPA	Environmental Protection Act
EPAQS	Expert Panel on Air Quality Standards (UK panel)
EU	European Union
GIS	Geographical Information System
HA	Highways Agency
kerbside	0 to 1 m from the kerb
LADS	Urban background model specifically developed for Stage 3 Review and Assessment work by <b>netcen</b> . This model allowed contributions of the urban background and road traffic emissions to be calculated
Limit Value	An EU definition for an air quality standard of a pollutant listed in the air quality directives
n	number of pairs of data
NAEI	National Atmospheric Emissions Inventory
NO <sub>2</sub>	Nitrogen dioxide
NO <sub>x</sub>	Oxides of nitrogen
NRTF	National Road Traffic Forecast
ppb	parts per billion (where 1 ppb is 1 volume of the pollutant gas in 109 volumes of air)
r	the correlation coefficient (between two variables)
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
SD	standard deviation (of a range of data)
SO <sub>2</sub>	Sulphur dioxide
TEMPRO	A piece of software produced by Defra used to forecast traffic flow increases
UWE AQMRC	University of the West of England Air Quality Management Resource Centre

# Contents

<b>1</b>	<b>INTRODUCTION TO THE UPDATING AND SCREENING ASSESSMENT .....</b>	<b>1</b>
1.1	PURPOSE OF THE UPDATING AND SCREENING ASSESSMENT .....	1
1.2	OVERVIEW OF APPROACH TAKEN .....	1
1.3	RELEVANT DEFRA DOCUMENTATION USED .....	1
1.4	POLLUTANTS CONSIDERED IN THIS REPORT .....	2
1.5	STRUCTURE OF THE REPORT .....	2
1.5.1	<i>The difference between 'standards' and 'objectives' in the UK AQS .....</i>	<i>4</i>
<b>2</b>	<b>THE UK AIR QUALITY STRATEGY .....</b>	<b>5</b>
2.1	NATIONAL AIR QUALITY STANDARDS.....	5
2.2	TIMESCALES TO ACHIEVE THE OBJECTIVES FOR THE POLLUTANTS IN AIR QUALITY STRATEGY .....	5
2.3	AIR QUALITY REVIEWS – THE APPROACHES AND EXPECTED OUTCOMES.....	5
2.4	LOCATIONS THAT THE REVIEW AND ASSESSMENT MUST CONCENTRATE ON.....	7
<b>3</b>	<b>INFORMATION USED TO SUPPORT THIS ASSESSMENT .....</b>	<b>8</b>
3.1	CONCLUSIONS FROM THE SECOND ROUND OF REVIEW AND ASSESSMENT OF AIR QUALITY FOR HERTSMERE BOROUGH COUNCIL.....	8
3.2	PROPOSED DEVELOPMENTS WHICH MAY AFFECT AIR QUALITY .....	8
3.3	MAPS AND DISTANCES OF RECEPTORS FROM ROADS.....	9
3.4	ROAD TRAFFIC DATA .....	9
3.4.1	<i>Fraction of HDVs.....</i>	<i>9</i>
3.4.2	<i>Base year for traffic.....</i>	<i>9</i>
3.4.3	<i>Traffic growth.....</i>	<i>9</i>
3.4.4	<i>Distance from the centre of the road to the kerbside and to the receptors.....</i>	<i>9</i>
3.5	PART A AND B PROCESSES.....	10
3.6	AMBIENT MONITORING .....	10
3.6.1	<i>Diffusion tubes.....</i>	<i>10</i>
3.6.2	<i>Continuous monitoring.....</i>	<i>10</i>
<b>4</b>	<b>UPDATING AND SCREENING ASSESSMENT FOR CARBON MONOXIDE .....</b>	<b>12</b>
4.1	THE NATIONAL PERSPECTIVE.....	12
4.2	STANDARD AND OBJECTIVE FOR CARBON MONOXIDE .....	12
4.3	CONCLUSIONS OF THE SECOND ROUND OF REVIEW AND ASSESSMENT FOR CARBON MONOXIDE.....	12
4.4	SCREENING ASSESSMENT OF CARBON MONOXIDE .....	13
4.5	BACKGROUND CONCENTRATIONS FOR CARBON MONOXIDE .....	13
4.6	SCREENING ASSESSMENT OF MONITORING DATA .....	13
4.7	SCREENING ASSESSMENT OF VERY BUSY ROADS .....	13
4.8	CONCLUSIONS FOR CARBON MONOXIDE CONCENTRATIONS IN HERTSMERE BOROUGH COUNCIL AREA .	13
<b>5</b>	<b>UPDATING AND SCREENING ASSESSMENT FOR BENZENE</b>	<b>14</b>
5.1	THE NATIONAL PERSPECTIVE .....	14
5.2	STANDARD AND OBJECTIVE FOR BENZENE.....	14
5.3	CONCLUSIONS OF THE SECOND ROUND OF REVIEW AND ASSESSMENT FOR BENZENE .....	14
5.4	SCREENING ASSESSMENT OF BENZENE.....	15
5.5	BACKGROUND CONCENTRATIONS FOR BENZENE.....	15
5.6	SCREENING ASSESSMENT OF MONITORING DATA .....	15
5.7	SCREENING ASSESSMENT OF VERY BUSY ROADS .....	15
5.8	SCREENING ASSESSMENT OF INDUSTRIAL SOURCES .....	16
5.9	SCREENING ASSESSMENT OF PETROL STATIONS.....	16
5.10	SCREENING ASSESSMENT OF FUEL STORAGE DEPOTS .....	16

5.11	CONCLUSIONS FOR BENZENE CONCENTRATIONS IN HERTSMERE .....	16
<b>6</b>	<b>UPDATING AND SCREENING ASSESSMENT FOR 1,3-BUTADIENE.....</b>	<b>18</b>
6.1	THE NATIONAL PERSPECTIVE.....	18
6.2	STANDARD AND OBJECTIVE FOR 1,3-BUTADIENE.....	18
6.3	CONCLUSIONS OF THE SECOND ROUND OF REVIEW AND ASSESSMENT FOR 1,3-BUTADIENE.....	18
6.4	SCREENING ASSESSMENT OF 1,3-BUTADIENE.....	18
6.5	BACKGROUND CONCENTRATIONS FOR 1,3-BUTADIENE .....	19
6.6	SCREENING ASSESSMENT OF MONITORING DATA .....	19
6.7	SCREENING ASSESSMENT OF INDUSTRIAL SOURCES .....	19
6.8	CONCLUSIONS FOR 1,3-BUTADIENE CONCENTRATIONS IN THE HERTSMERE BOROUGH COUNCIL AREA..	19
<b>7</b>	<b>UPDATING AND SCREENING ASSESSMENT FOR LEAD.....</b>	<b>20</b>
7.1	THE NATIONAL PERSPECTIVE .....	20
7.2	STANDARD AND OBJECTIVE FOR LEAD.....	20
7.3	CONCLUSIONS OF THE SECOND ROUND OF REVIEW AND ASSESSMENT FOR LEAD .....	20
7.4	SCREENING ASSESSMENT OF LEAD .....	20
7.5	SCREENING ASSESSMENT OF MONITORING DATA .....	21
7.6	SCREENING ASSESSMENT OF INDUSTRIAL SOURCES .....	21
7.7	CONCLUSIONS FOR LEAD CONCENTRATIONS IN HERTSMERE COUNCIL.....	21
<b>8</b>	<b>UPDATING AND SCREENING ASSESSMENT FOR NITROGEN DIOXIDE.....</b>	<b>22</b>
8.1	INTRODUCTION .....	22
8.2	STANDARDS AND OBJECTIVES FOR NITROGEN DIOXIDE.....	22
8.3	CONCLUSIONS OF THE FIRST AND SECOND ROUND OF REVIEW AND ASSESSMENT FOR NITROGEN DIOXIDE	22
8.4	SCREENING ASSESSMENT OF NITROGEN DIOXIDE .....	23
8.5	BACKGROUND CONCENTRATIONS FOR NITROGEN DIOXIDE .....	24
8.6	SCREENING ASSESSMENT OF MONITORING DATA .....	24
8.6.1	<i>Diffusion tube monitoring</i> .....	24
8.6.2	<i>Diffusion tube analysis</i> .....	25
8.6.3	<i>Bias correction of diffusion tube data</i> .....	25
8.6.4	<i>Automatic Monitoring</i> .....	26
8.7	SCREENING ASSESSMENT OF ROAD TRAFFIC SOURCES.....	26
8.7.1	<i>Street Canyons</i> .....	27
8.7.2	<i>Busy Junctions</i> .....	27
8.8	SCREENING ASSESSMENT OF INDUSTRIAL SOURCES .....	28
8.9	SCREENING ASSESSMENT OF OTHER TRANSPORT SOURCES.....	28
8.9.1	<i>Bus Stations</i> .....	28
8.9.2	<i>Airports</i> .....	28
8.10	CONCLUSIONS FOR NITROGEN DIOXIDE CONCENTRATIONS IN HERTSMERE .....	28
<b>9</b>	<b>UPDATING AND SCREENING ASSESSMENT FOR SULPHUR DIOXIDE.....</b>	<b>30</b>
9.1	INTRODUCTION .....	30
9.2	STANDARD AND OBJECTIVE FOR SULPHUR DIOXIDE .....	30
9.3	CONCLUSIONS OF THE FIRST AND SECOND ROUND OF REVIEW AND ASSESSMENT FOR SULPHUR DIOXIDE	30
9.4	SCREENING ASSESSMENT OF SULPHUR DIOXIDE .....	31
9.5	BACKGROUND CONCENTRATIONS FOR SULPHUR DIOXIDE.....	31
9.6	SCREENING ASSESSMENT OF MONITORING DATA .....	31
9.7	SCREENING ASSESSMENT OF INDUSTRIAL SOURCES .....	31
9.7.1	<i>Small Boilers</i> .....	32
9.8	SCREENING ASSESSMENT OF DOMESTIC SOURCES.....	32
9.8.1	<i>Domestic coal burning</i> .....	32

9.9 SCREENING ASSESSMENT OF OTHER TRANSPORT SOURCES ..... 32  
 9.9.1 *Shipping* ..... 32  
 9.9.2 *Railways* ..... 32  
 9.10 CONCLUSIONS FOR SULPHUR DIOXIDE CONCENTRATIONS IN HERTSMERE COUNCIL ..... 32

**10 UPDATING AND SCREENING ASSESSMENT FOR PM10 ....33**

10.1 THE NATIONAL PERSPECTIVE ..... 33  
 10.2 STANDARD AND OBJECTIVE FOR PM<sub>10</sub> ..... 33  
 10.3 CONCLUSIONS OF THE SECOND OF REVIEW AND ASSESSMENT FOR PM<sub>10</sub> ..... 33  
 10.4 SCREENING ASSESSMENT OF PM<sub>10</sub> ..... 34  
 10.5 BACKGROUND CONCENTRATIONS FOR PM<sub>10</sub> ..... 34  
 10.6 SCREENING ASSESSMENT OF MONITORING DATA ..... 34  
 10.7 SCREENING ASSESSMENT OF ROAD TRAFFIC SOURCES ..... 35  
 10.7.1 *Busy Junctions* ..... 36  
 10.8 SCREENING ASSESSMENT OF INDUSTRIAL SOURCES ..... 36  
 10.9 SCREENING ASSESSMENT OF FUGITIVE AND UNCONTROLLED SOURCES ..... 37  
 10.9.1 *Quarries and landfill sites* ..... 37  
 10.9.2 *Domestic solid fuel burning* ..... 37  
 10.10 SCREENING ASSESSMENT OF OTHER TRANSPORT SOURCES ..... 37  
 10.10.1 *Airports* ..... 37  
 10.11 CONCLUSIONS FOR PM10 CONCENTRATIONS IN HERTSMERE ..... 37

**11 CONCLUSIONS .....39**

11.1 CARBON MONOXIDE ..... 39  
 11.2 BENZENE ..... 39  
 11.3 1,3-BUTADIENE ..... 39  
 11.4 LEAD ..... 39  
 11.5 NITROGEN DIOXIDE ..... 39  
 11.6 SULPHUR DIOXIDE ..... 39  
 11.7 PM<sub>10</sub> ..... 39  
 11.8 SUMMARY AND RECOMMENDATIONS ..... 39  
 AQMA 1 (525905, 199918) ..... 58  
 AQMA 2 (523015, 199991) ..... 59  
 AN AREA COMPRISING THE DOMESTIC PROPERTY KNOWN AS CHARLESTON PADDOCKS, ST ALBANS ROAD, SOUTH MIMMS,  
 POTTERS BAR. .... 59  
 AQMA 3 (522063, 200665) ..... 60  
 AQMA 4 (513752, 197661) ..... 61  
 AQMA 5 (517823, 195267) ..... 62  
 AQMA 6 (526241, 201410) ..... 63  
 HIGH STREET, POTTERS BAR IN FRONT OF THE BUS GARAGE ..... 63

**APPENDICES**

**Appendix 1** Monitoring Data  
**Appendix 2** List of Part A processes  
**Appendix 3** Descriptions of selected models and tools  
**Appendix 4** Report Checklist  
**Appendix 5** Maps of AQMA  
**Appendix 6** Reporting Checklist



# 1 Introduction to the Updating and Screening Assessment

This section outlines the purpose of this Updating and Screening Assessment and the scope of the assessment.

## 1.1 PURPOSE OF THE UPDATING AND SCREENING ASSESSMENT

The first and second rounds of air quality review and assessments is now complete and all local authorities should have completed all necessary stages. Where the likelihood of exceedences of air quality objectives have been identified in areas of significant public exposure, an air quality management area should have been declared, followed by a Further (formerly 'Stage 4') Assessment, and the formulation of an action plan to eliminate exceedences. Local authorities are now required to proceed to the third round of review and assessment in which sources of emissions to air are reassessed to identify whether the situation has changed since previous rounds of review and assessment, and if so, what impact this may have on predicted exceedences of the air quality objectives. Such changes might include significant traffic growth on a major road, which had not been foreseen, construction of a new industrial plant with emissions to air, or significant changes in the emissions of an existing plant.

The third round of review and assessment is to be undertaken in two steps. The first step is an Updating and Screening Assessment, which updates the Stage 1 and 2 review and assessments previously undertaken for all pollutants identified in the Air Quality Regulations. Where a significant risk of exceedence is identified for a pollutant it will be necessary for the local authority to proceed to a Detailed Assessment, equivalent to the previous Stage 3 assessments. Where a local authority does not need to undertake a Detailed Assessment, a progress report is required instead.

## 1.2 OVERVIEW OF APPROACH TAKEN

The general approach taken to this Updating and Screening Assessment was to:

- Identify the conclusions of the last round of review and assessment for each of the seven pollutants included in the air quality regulations;
- Identify significant sources of emissions to air for the seven pollutants included in the air quality regulations, including major roads and industrial plant;
- Identify new sources not previously considered in the first two rounds of review and assessment;
- Identify any sources for which emissions have changed significantly since the last round of review and assessment;
- Identify and interpret the significance of air quality monitoring data made available since the last round of review and assessment;
- Assess the risk of exceedences of the air quality objectives in locations where relative public exposure may exist using screening models and nomograms; and
- Where necessary, identify locations and pollutants for which further detailed assessment of air quality will be required.

## 1.3 RELEVANT DEFRA DOCUMENTATION USED

This report takes into account the guidance in LAQM.TG(03), published January 2003.

## 1.4 POLLUTANTS CONSIDERED IN THIS REPORT

All pollutants included in the Air Quality Regulations for the purposes of Review and Assessment have been considered in this report (Table 1.1).

## 1.5 STRUCTURE OF THE REPORT

The report is structured as follows:

- **Chapter 1** introduces the aims of the updating and screening assessment, the approach adopted for the assessment;
- **Chapter 2** summaries the UK Air Quality Strategy and the function of an updating and screening assessment;
- **Chapter 3** identifies data used in support of this assessment and highlights significant changes in emissions to air within the Local Authority since the second round of review and assessment;
- **Chapters 4-10** present the review and assessment for each of the seven pollutants included in the Air Quality Regulations;
- **Chapter 11** presents conclusions and recommendations for further work, where required, for each of the seven pollutants;
- **Chapter 12** presents the references and acknowledgements

The Objectives of the Air Quality strategy are shown in Table 1.1.

<b>Table 1.1</b> Objectives included in the Air Quality Regulations 2000 and (Amendment) Regulations 2002 for the purpose of Local Air Quality Management			
<b>Pollutant</b>	<b>Air Quality Objective</b>		<b>Date to be achieved by</b>
	<b>Concentration</b>	<b>Measured as</b>	
<b>Benzene</b>			
All authorities	16.25 µg/m <sup>3</sup>	running annual mean	31.12.2003
Authorities in England and Wales only	5.00 µg/m <sup>3</sup>	annual mean	31.12.2010
Authorities in Scotland and Northern Ireland only <sup>a</sup>	3.25 µg/m <sup>3</sup>	running annual mean	31.12.2010
<b>1,3-Butadiene</b>	2.25 µg/m <sup>3</sup>	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>	maximum daily running 8-hour mean	31.12.2003
Authorities in Scotland only	10.0 mg/m <sup>3</sup>	running 8-hour mean	31.12.2003
<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> not to be exceeded more than 18 times a year 40 µg/m <sup>3</sup>	1 hour mean annual mean	31.12.2005 31.12.2005
<b>Particles (PM<sub>10</sub>) (gravimetric)<sup>c</sup></b>	50 µg/m <sup>3</sup> not to be exceeded more than 35 times a year 40 µg/m <sup>3</sup>	24 hour mean annual mean	31.12.2004 31.12.2004
Authorities in Scotland only <sup>d</sup>	50 µg/m <sup>3</sup> not to be exceeded more than 7 times a year 18 µg/m <sup>3</sup>	24 hour mean annual mean	31.12.2010 31.12.2010
<b>Sulphur dioxide</b>	350 µg/m <sup>3</sup> not to be exceeded more than 24 times a year 125 µg/m <sup>3</sup> not to be exceeded more than 3 times a year 266 µg/m <sup>3</sup> not to be exceeded more than 35 times a year	1 hour mean 24 hour mean 15 minute mean	31.12.2004 31.12.2004 31.12.2005

a. Air Quality (Northern Ireland) Regulations 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 PM<sub>10</sub> apply in Scotland only, as set out in the Air Quality (Scotland) Amendment Regulations 2002.

### **1.5.1 The difference between 'standards' and 'objectives' in the UK AQS**

Air quality *standards* (in the UK AQS) are the concentrations of pollutants in the atmosphere that can broadly be taken to achieve a certain level of environmental quality. The standards are based on assessment of the effects of each pollutant on human health including the effects on sensitive subgroups. The standards have been set at levels to avoid significant risks to health.

The *objectives* of the UK air quality policy are framed on the basis of the recommended standards. The objectives are based on the standards, but take into account feasibility, practicality, and the costs and benefits of fully complying with the standards.

Specific objectives relate either to achieving the full standard or, where use has been made of a short averaging period, objectives are sometimes expressed in terms of percentile compliance. The use of percentiles means that a limited number of exceedences of the air quality standard over a particular timescale, usually a year, are permitted. This is to account for unusual meteorological conditions or particular events such as November 5th. For example, if an objective is to be complied with at the 99.9th percentile, then 99.9% of measurements at each location must be at or below the level specified.

## **2 The UK Air Quality Strategy**

### **2.1 NATIONAL AIR QUALITY STANDARDS**

The Government prepared the Air Quality Strategy for England, Scotland, Wales and Northern Ireland for consultation in August 1999. It was published in January 2000 (DETR, 2000) with an addendum issued in February 2003. The Air Quality Strategy uses national air quality standards to enable air quality to be measured and assessed. These also provide the means by which objectives and timescales for the achievement of objectives can be set. These standards and associated specific objectives to be achieved between 2003 and 2010 are shown in Table 1.1. The table shows the standards in mass concentrations ( $\mu\text{g m}^{-3}$  or  $\text{mg m}^{-3}$ ) with the number of exceedences that are permitted (where applicable) and the equivalent percentile.

### **2.2 TIMESCALES TO ACHIEVE THE OBJECTIVES FOR THE POLLUTANTS IN AIR QUALITY STRATEGY**

In most local authorities in the UK, objectives were (or will be) met for most of the pollutants within the timescale of the objectives shown in Table 1.1. It is important to note that the objectives for  $\text{NO}_2$  remain provisional. The Government has recognised the problems associated with achieving the standard for ozone and this will not therefore be a statutory requirement. Ozone is a secondary pollutant and transboundary in nature and it is recognised that local authorities themselves can exert little influence on concentrations when they are the result of regional primary emission patterns.

### **2.3 AIR QUALITY REVIEWS – THE APPROACHES AND EXPECTED OUTCOMES**

Technical Guidance has been issued in 'Review and Assessment: Technical Guidance' LAQM.TG (03)1 to enable air quality to be monitored, modelled, reviewed and assessed in an appropriate and consistent fashion. This updating and screening assessment has considered the procedures set out in this technical guidance.

The primary objective of undertaking a review of air quality is to identify any areas that are unlikely to meet national air quality objectives and ensure that air quality is considered in local authority decision-making processes. The complexity and detail required in a review depends on the risk of failing to achieve air quality objectives and it has been proposed therefore that reviews should be carried out in two steps. Both steps of review and assessment may be necessary and every authority is expected to undertake at least a first stage review and assessment of air quality in their authority area. The steps are briefly described in Table 2.1.

**Table 2.1** Brief details of steps in the third Round of the Air Quality Review and Assessment process

<b>Level Assessment</b>	<b>of</b>	<b>Objective</b>	<b>Approach</b>
Updating Screening	and	To identify those matters that have changed since the last review and assessment, which might lead to a risk of an air quality objective being exceeded	Use a checklist to identify significant changes that require further consideration.  Where such changes are identified, then apply simple screening tools to decide whether there is sufficient risk of an exceedance of an objective to justify a Detailed Assessment
Detailed Assessment		To provide an accurate assessment of the likelihood of an air quality objective being exceeded at locations with relevant exposure. This should be sufficiently detailed to allow the designation or amendment of any necessary AQMAs	Use quality-assured monitoring and validated modelling methods to determine current and future pollutant concentrations in areas where there is a significant risk of exceeding an air quality objective.
Annual reports	Progress	Local authorities should prepare annual air quality Progress Reports between subsequent rounds of reviews and assessments. The concept is that this will ensure continuity in the LAQM process.	The precise format of the progress report is left up to the local authority to decide, but guidance on what it should cover is available in LAQM.PRG(03) <sup>5</sup> , published in 2003. It is envisaged that these Progress Reports could be useful for the compilation of annual 'state of the environment' reports that many authorities already prepare.

The current deadline for completion of updating and screening assessments is April 2006, and for detailed assessments April 2007.

## 2.4 LOCATIONS THAT THE REVIEW AND ASSESSMENT MUST CONCENTRATE ON

For the purpose of review and assessment, the authority should focus their work on locations where members of the public are likely to be exposed over the averaging period of the objective. Table 2.2 summarises the locations where the objectives should and should not apply.

**Table 2.2** Typical locations where the objectives should and should not apply

Averaging Period	Pollutants	Objectives <i>should</i> apply at ...	Objectives <i>should not</i> generally apply at ...
<b>Annual mean</b>	<ul style="list-style-type: none"> <li>• 1,3 Butadiene</li> <li>• Benzene</li> <li>• Lead</li> <li>• Nitrogen dioxide</li> <li>• Particulate Matter (PM<sub>10</sub>)</li> </ul>	All background locations where members of the public might be regularly exposed.	Building facades of offices or other places of work where members of the public do not have regular access.
		Building facades of residential properties, schools, hospitals, libraries etc.	Gardens of residential properties.
			Kerbside sites (as opposed to locations at the building facade), or any other location where public exposure is expected to be short term
<b>24 hour mean and 8-hour mean</b>	<ul style="list-style-type: none"> <li>• Carbon monoxide</li> <li>• Particulate Matter (PM<sub>10</sub>)</li> <li>• Sulphur dioxide</li> </ul>	All locations where the annual mean objective would apply.	Kerbside sites (as opposed to locations at the building facade), or any other location where public exposure is expected to be short term.
		Gardens of residential properties.	
<b>1 hour mean</b>	<ul style="list-style-type: none"> <li>• Nitrogen dioxide</li> <li>• Sulphur dioxide</li> </ul>	All locations where the annual mean and 24 and 8-hour mean objectives apply.	Kerbside sites where the public would not be expected to have regular access.
		Kerbside sites (e.g. pavements of busy shopping streets).	
		Those parts of car parks and railway stations etc. which are not fully enclosed.	
		Any outdoor locations to which the public might reasonably be expected to have access.	
<b>15 minute mean</b>	<ul style="list-style-type: none"> <li>• Sulphur dioxide</li> </ul>	All locations where members of the public might reasonably be exposed for a period of 15 minutes or longer.	

It is unnecessary to consider exceedences of the objectives at any location where public exposure over the relevant averaging period would be unrealistic. Locations should also represent non-occupational exposure.

### 3 Information used to support this assessment

This section lists the key information used in this review and assessment.

#### 3.1 CONCLUSIONS FROM THE SECOND ROUND OF REVIEW AND ASSESSMENT OF AIR QUALITY FOR HERTSMERE BOROUGH COUNCIL

Hertsmere Borough Council has completed the following review and assessments of air quality to date:

- Combined Stage 1 and 2 Review and Assessment - identified those pollutants where there is a risk of exceeding the air quality objectives in Hertsmere Borough Council. It concluded that levels of benzene, 1,3-butadiene, carbon monoxide, nitrogen dioxide, PM<sub>10</sub> and sulphur dioxide may all potentially exceed the appropriate air quality standards within 200 m of major roads, and that more monitoring and traffic data was required for a comprehensive Stage 3 review and assessment.
- Stage 3 Review and Assessment - assessed the likelihood of the air quality objectives being exceeded. Detailed modelling of nitrogen dioxide, PM<sub>10</sub> and carbon monoxide concentrations demonstrated widespread exceedences of both the annual mean nitrogen dioxide objective and both PM<sub>10</sub> objectives along stretches of the M25 and the M1.
- Updating and Screening Assessment (June 2003)

Hertsmere Borough Council designated 4 separate Air Quality Management Areas (AQMAs) for nitrogen dioxide on the basis of the Stage 3 review and assessment, covering mainly residential properties in close proximity to the M25 and M1.

- Stage 4 involved further accurate and detailed assessment of both current and future air quality, and source apportionment in regions with exceedences. A range of Action Plan scenarios to improve air quality in Hertsmere Borough Council was assessed. Recommendations were made to declare 2 additional Air Quality Management Areas, which are not yet covered under the already existing 4 AQMAs along Elstree Cross Road and High Street, Potters Bar in front of the Bus garage.

#### 3.2 PROPOSED DEVELOPMENTS WHICH MAY AFFECT AIR QUALITY

Any new developments in the local authority area, or outside the LA that may impact on local air quality need to be considered. Key considerations should include:

- **Industry** – There are no significant industrial developments planned in Hertsmere Borough Council.
- **Housing and redevelopment** – There are no known confirmed housing and redevelopment schemes planned in Hertsmere Borough Council.
- **Road Network changes** – There are no road transport schemes proposed within Hertsmere Borough Council.



### 3.3 MAPS AND DISTANCES OF RECEPTORS FROM ROADS

Hertsmere Borough Council provided traffic data and speed limits for roads. For roads where this information has not been provided, estimates were made based on OS landline™ data.

**Maps in this document are based upon Ordnance Survey material with permission of Her Majesty's Stationery Office © Crown Copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. 100019747. 2004**

### 3.4 ROAD TRAFFIC DATA

This section summarises the information used in this report; more detailed information is given in Appendix 2. Appendix 2 lists the locations of the traffic flow and speed measurement points, flow and speed data and other relevant traffic statistics. Figure 2.6 shows the location of major roads in the Borough of Hertsmere.

Data were collated from a range of sources, including:

- Data provided by Hertfordshire County Council
- Data held in the National Atmospheric Emissions Inventory (NAEI, 2004) where no other data were available from either Hertfordshire County Council, Hertsmere Borough Council or the Highways Agency.

Speed data supplied by Hertfordshire County Council was recorded at the 85<sup>th</sup> percentile, as this was deemed more resistant to differences in local conditions. Speed was monitored at only three sites. The average speeds assigned to all other sites are based on the average values of all the speed monitoring sites, so a 30 mph speed limit was presumed to have an 'average' speed of 37 mph, a 40 mph speed limit = 45 mph, 70 mph = 74 mph. For the purpose of the Updating and Screening Assessment, estimated speeds **less than or equal to** the appropriate speed limits were used in the DMRB model, except at the speed monitoring sites where the recorded value was used. Speeds slower than the national speed limits were assigned to sections of roads in areas close to junctions.

#### 3.4.1 Fraction of HDVs

Percentages of cars, and HGVs were available for some traffic monitoring points from Hertfordshire County Council. For other road links, the percentage of HGVs was estimated from the data held in the 2004 National Atmospheric Emissions Inventory.

#### 3.4.2 Base year for traffic

The base year for traffic flows from the NAEI was 2004. The base year for the traffic flows provided by Hertfordshire County Council was 2004.

#### 3.4.3 Traffic growth

To estimate pollutant concentrations in future years, traffic flows must be projected forward to the year appropriate to each of the pollutant objectives, so traffic growth factors were calculated from the Department for Transport National Road Traffic Forecasts (Great Britain) 97. In the absence of further information on the severity of capacity limitations, a **central** estimate was considered the most likely outcome.

3.4.4 Distance from the centre of the road to the kerbside and to the receptors  
The distances of receptors from the road were assumed to be:

- Single carriageway road: 5m,
- Dual carriageway: 10m,
- Motorway: 15m as no other data were available.

### 3.5 PART A AND B PROCESSES

There are no Part A and 22 Part B Industrial processes in Hertsmere Borough Council. A full list of Part B processes is given in Appendix 4.

### 3.6 AMBIENT MONITORING

Hertsmere Borough Council have undertaken monitoring of the following pollutants in their area:

- Carbon monoxide
- Nitrogen dioxide
- Particles (PM<sub>10</sub>)

#### 3.6.1 Diffusion tubes

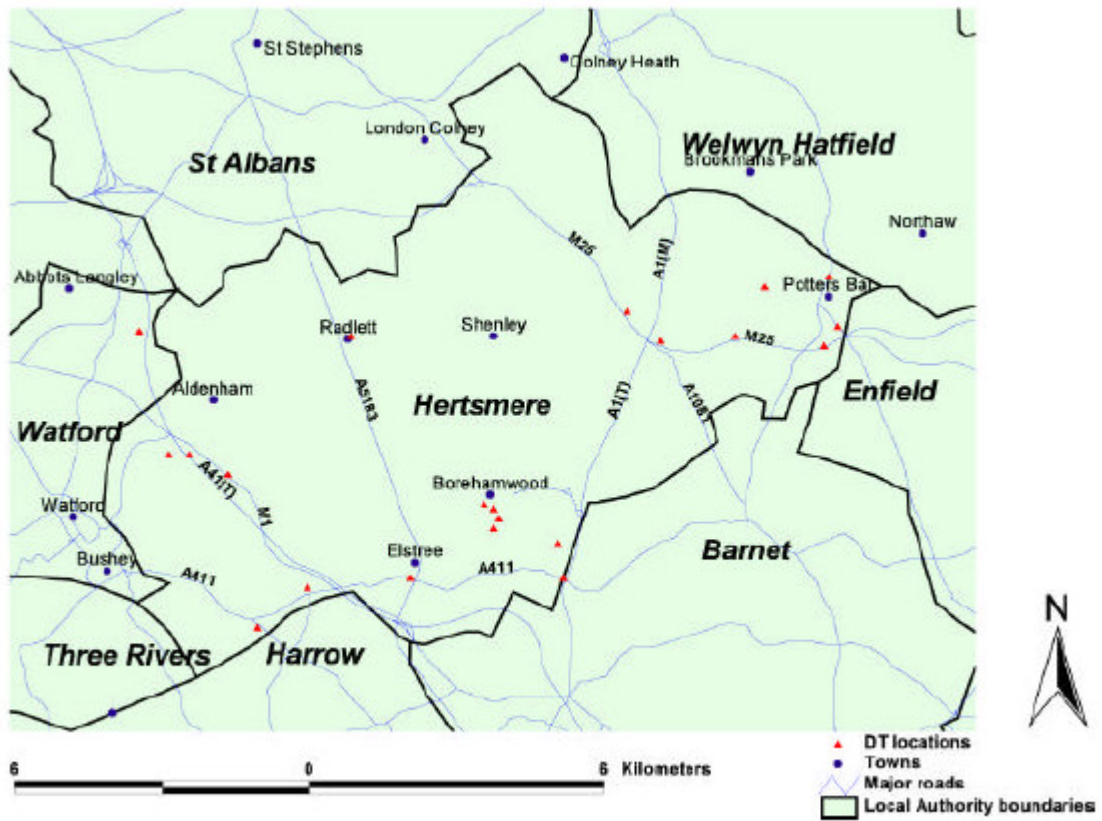
Hertsmere Borough Council currently carries out nitrogen dioxide monitoring using diffusion tubes at 25 locations. The location of diffusion tubes in relation to major roads and town centres can be seen in Figure 2.6. Each diffusion tube was exposed over the full monitoring period (12 months, 2005). The tubes were prepared using a solution of 50 % TEA in acetone and were analysed by Walsall Metropolitan Borough Council.

#### 3.6.2 Continuous monitoring

Concentrations of carbon monoxide, nitrogen oxides (NO<sub>x</sub>) and PM<sub>10</sub> are continuously monitored at the Hertsmere Background site (HM1) located at Furzehill School, Borehamwood (OS grid reference 519400E 196300N). The station is included in the Herts and Beds Air Pollution Monitoring Network, which is operated by the Environmental Research Group at Kings College, London. All data are checked and ratified by the operator prior to release.

PM<sub>10</sub> is measured using TEOM – measurements dissemination by the Herts and Beds Air Pollution Monitoring Network are **not** corrected prior to release, so it was necessary to multiply by a factor of 1.3 to convert the gravimetric equivalent concentrations. All PM<sub>10</sub> concentrations quoted in this report are gravimetrically equivalent.

**Figure 2.6** – Major road network and nitrogen dioxide diffusion tube locations in Hertsmere Borough Council



## 4 Updating and Screening Assessment for Carbon Monoxide

### 4.1 THE NATIONAL PERSPECTIVE

The main source of carbon monoxide in the United Kingdom is road transport, which accounted for 49% of total releases in 2003. Annual emissions of carbon monoxide have been falling steadily since the 1970s, and are expected to continue to do so. Current projections indicate that road transport emissions will decline by a further 53% between 2000 and 2005. Existing policies will be sufficient to reduce maximum daily 8-hour mean concentrations of carbon monoxide below 10  $\text{mgm}^{-3}$  by about 2003.

### 4.2 STANDARD AND OBJECTIVE FOR CARBON MONOXIDE

The Government and the Devolved Administrations adopted an 8-hour running mean concentration of 11.6  $\text{mgm}^{-3}$  as the air quality standard for carbon monoxide. The new objective has been set at a slightly tighter level of 10  $\text{mgm}^{-3}$  as a maximum daily running 8-hour mean concentration to have been achieved by the end of 2003, bringing it into line with the second Air Quality Daughter Directive limit value.

### 4.3 CONCLUSIONS OF THE SECOND ROUND OF REVIEW AND ASSESSMENT FOR CARBON MONOXIDE

The following conclusions were given for carbon monoxide in the 2003 Review and Assessment Report for Hertsmere Borough Council

- Carbon dioxide has been continuously monitored in Hertsmere Borough Council during the period 1999 onwards. The maximum running 8-hour concentration recorded in 2001 was 2.7  $\text{mgm}^{-3}$ , which is significantly less than the objective value of 10  $\text{mgm}^{-3}$ .
- There are no roads in Hertsmere Borough Council that are classified as 'very busy' according to the criteria in the guidance.

The following conclusions were given for carbon monoxide in the earlier stages of Review and Assessment for Hertsmere Borough Council (reviewed against 1997 Strategy Objective):

- There are no present or proposed industrial processes in Hertsmere Borough Council that have the potential, individually or cumulatively, to emit significant quantities of carbon monoxide;
- Emissions from vehicles are expected to decrease over the relevant period, and national policies are expected to ensure that exceedence of the carbon monoxide air quality objective is very unlikely;
- Predicted levels of carbon monoxide compare well with measured concentrations and are expected to be below the air quality objective in 2005.

The first round of review and assessment concluded that the 1997 objective for carbon monoxide (11.6  $\text{mgm}^{-3}$  by 2005) was unlikely to be exceeded in Hertsmere Borough Council.

Based on the guidance, a detailed assessment was not required for carbon monoxide in Hertsmere Borough Council.

#### 4.4 SCREENING ASSESSMENT OF CARBON MONOXIDE

The Technical Guidance LAQM TG (03) requires assessment of carbon monoxide to consider the following sources, data or locations:

- Monitoring Data
- Very Busy Roads

These are described in the following sections.

#### 4.5 BACKGROUND CONCENTRATIONS FOR CARBON MONOXIDE

The average background carbon monoxide concentration estimated from the UK background maps (<http://www.airquality.co.uk/archive/laqm/tools.php>) was 0.0.27mgm<sup>-3</sup> in 2005 with a maximum concentration of 0.30mgm<sup>-3</sup> in 2005. Predicted average background concentration of carbon monoxide estimated from the UK background maps is 0.0.19mgm<sup>-3</sup> in 2010 with a maximum concentration of 0.21mgm<sup>-3</sup> in 2010.

#### 4.6 SCREENING ASSESSMENT OF MONITORING DATA

Monitoring for carbon monoxide has been undertaken using hourly continuous monitoring at Hertsmere Background site, HM1. Data for monitoring periods in 2005 show the maximum 8-hour average concentration was 1.8 mgm<sup>-3</sup>.

#### 4.7 SCREENING ASSESSMENT OF VERY BUSY ROADS

The guidance document LAQM TG(03) requires assessment of carbon monoxide only at 'very busy roads' (Appendix 2). Traffic flow data were supplied by Hertfordshire County Council and from the NAEI. Based on these data, there are no roads in Hertsmere Borough Council that are classified as 'very busy' according to the criteria in the guidance.

#### 4.8 CONCLUSIONS FOR CARBON MONOXIDE CONCENTRATIONS IN HERTSMERE BOROUGH COUNCIL AREA

Carbon dioxide has been continuously monitored in Hertsmere Borough Council during the period 1999 onwards. The maximum running 8-hour concentration recorded in 2005 was 1.8 mgm<sup>-3</sup>, which is significantly less than the objective value of 10 mgm<sup>-3</sup>. There are no roads in Hertsmere Borough Council that are classified as 'very busy' according to the criteria in the guidance.

Updating and Screening Assessment Summary Checklist for Carbon Monoxide

Item	Response
• Monitoring data	Monitoring data indicates no exceedance of the objective for CO
• Very busy roads or junctions in built-up areas	No 'very busy roads,' and background concentration is below the threshold

A detailed assessment is not required for carbon monoxide in Hertsmere Borough Council.

## 5 Updating and Screening Assessment for Benzene

### 5.1 THE NATIONAL PERSPECTIVE

The main sources of benzene emissions in the UK are petrol-engined vehicles, petrol refining, and the distribution and uncontrolled emissions from petrol station forecourts without vapour recovery systems. A number of policy measures already in place, or planned for future years, will continue to reduce emissions of benzene. Since January 2000, EU legislation has reduced the maximum benzene content of petrol to 1%, from a previous upper limit of 5%. The European Auto-Oil programme will further reduce emissions for cars and light-duty vehicles, and emissions of benzene from the storage and distribution of petrol are controlled by vapour recovery systems.

Forecasts based on national mapping suggest that the policy measures currently in place will achieve the 2003 objective at all urban background and roadside/kerbside locations. Whilst the 2010 objectives are expected to be met at all urban background, and most roadside locations, there is the possibility for some remaining exceedences, which will require additional measures at a local level.

### 5.2 STANDARD AND OBJECTIVE FOR BENZENE

The Government and the Devolved Administrations adopted a running annual mean concentration of  $16.25 \mu\text{g m}^{-3}$  as the air quality standard for benzene, with an objective for the standard to have been achieved by the end of 2003. However, in light of the health advice from EPAQS and the Department of Health's Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment (COC) to reduce concentrations of benzene in air to as low a level as possible, additional tighter objectives have also been set.

The additional objective is for an annual mean of  $5 \mu\text{g m}^{-3}$  to be achieved by the end of 2010 in England and Wales. In Scotland and Northern Ireland, a running annual mean of  $3.25 \mu\text{g m}^{-3}$  has been adopted as an additional objective, to be achieved by the end of 2010.

### 5.3 CONCLUSIONS OF THE SECOND ROUND OF REVIEW AND ASSESSMENT FOR BENZENE

The 2003 Review and Assessment report concluded that:

- Hertsmere Borough Council does not host any roads that are classified as 'very busy' according to the criteria given in the guidance, therefore benzene emissions from traffic sources do not need to be assessed.
- A number of petrol stations sited on busy roads in Hertsmere Borough Council annually deliver more than 2 million litres per year, none had relevant receptors within 10 m of the pumps, i.e. there was no relevant public exposure.

The following conclusions were given for benzene in the first round of Review and Assessment for Hertsmere Borough Council (reviewed against 1997 Strategy Objective):

- There are no present or proposed industrial processes in Hertsmere Borough Council or neighbouring areas, which have the potential, individually or cumulatively, to emit significant quantities of benzene;
- Emissions from vehicles are expected to decrease over the relevant period, and national policies are expected to ensure that there will be no exceedences due to petrol stations by 2005;
- Current levels of benzene are estimated to be already below the 2005 objective of  $16.25 \mu\text{g m}^{-3}$  in Hertsmere Borough Council.

- National policy measures are expected to deliver the national air quality objective for benzene by the end of 2005.

The first round of review and assessment concluded that the 1997 objective for benzene ( $16.25 \mu\text{g m}^{-3}$  by 2005) would not be exceeded in Hertsmere Borough Council. However, it was recommended that monitoring, review and detailed assessments of benzene levels should be undertaken by Hertsmere Borough Council to more precisely assess the potential risk to public health and the environment.

Based on the guidance, a detailed assessment was not required for benzene in Hertsmere Borough Council.

## 5.4 SCREENING ASSESSMENT OF BENZENE

The Technical Guidance LAQM.TG (03) requires assessment of benzene to consider the following sources, data or locations:

- Monitoring Data
- Very Busy Roads or Junctions in Built-up Areas
- Industrial Sources
- Petrol Stations
- Major Fuel Storage Depots (Petroleum only)

These are described in the following sections.

## 5.5 BACKGROUND CONCENTRATIONS FOR BENZENE

The estimated average background benzene concentrations for Hertsmere Borough Council are ( $\mu\text{g m}^{-3}$ ):

	2005	2010
Maximum	0.52	0.53
Average	0.45	0.44

(Source: <http://www.airquality.co.uk/archive/laqm/tools.php>)

## 5.6 SCREENING ASSESSMENT OF MONITORING DATA

No monitoring of benzene has been undertaken in the Hertsmere Borough Council area.

## 5.7 SCREENING ASSESSMENT OF VERY BUSY ROADS

The guidance document LAQM TG(03) requires assessment of benzene only at 'very busy roads' (Appendix 2). Traffic flow data were supplied by Hertfordshire County Council and from the NAEI. Based on these data, there are no roads in Hertsmere Borough Council that are classified as 'very busy' according to the criteria given in the guidance. Levels of benzene from traffic sources are already well below the 2010 limit background value of  $2 \mu\text{g m}^{-3}$  and so achieving this objective in Hertsmere Borough Council is not predicted to be a problem.

## 5.8 SCREENING ASSESSMENT OF INDUSTRIAL SOURCES

The Guidance LAQM TG(03) lists the following processes as significant potential sources of benzene:

**Part A** (percentage of total emissions from all UK plant in this sector to the UK total in brackets)

- Petroleum processes (73)
- Petrochemical processes (2)
- Carbonisation processes (12)
- Cement/lime manufacture (7)
- Gasification processes (5)

**Part B**

- Processes for the storage and unloading of petrol at terminals.

None of the Part A or Part B industrial processes in Hertsmere Borough Council (Appendix 3) operate these processes or have the potential to emit benzene.

## 5.9 SCREENING ASSESSMENT OF PETROL STATIONS

There is some evidence that petrol stations may emit sufficient benzene to put the 2010 objective at risk of being exceeded, especially if combined with higher levels from nearby busy roads.

The guidance only requires petrol stations to be considered if they meet the following criteria:

- Near a busy road, i.e. more than 30,000 vehicles per day
- Annual throughput greater than 2 million litres
- Regular public exposure within 10 m of the pumps.

There are 15 petrol stations in Hertsmere Borough Council authorised as Part B processes (Appendix 3). Of these, four stations are known to have a throughput greater than 2 million litres per year. The highest throughput station at South Mimms Service Area (15 million litres per year) is fitted with a Stage 2 Vapour Recovery System, preventing petrol vapours being lost when vehicles are refuelled. As a result, this station can be ruled out as a potential source of benzene.

There are no places where members of the public might regularly be exposed within 10 m of the pumps.

Since no petrol stations meet all criteria listed above, a detailed assessment for benzene is not required based on petrol station emissions.

## 5.10 SCREENING ASSESSMENT OF FUEL STORAGE DEPOTS

There are no major fuel storage depots in Hertsmere Borough Council.

## 5.11 CONCLUSIONS FOR BENZENE CONCENTRATIONS IN HERTSMERE

Hertsmere Borough Council does not host any roads that are classified as 'very busy' according to the criteria given in the guidance, therefore benzene emissions from traffic sources do not need to be assessed.

Although a number of petrol stations sited on busy roads in Hertsmere Borough Council annually deliver more than 2 million litres per year, none were within 10 m of the pumps, i.e. there was no relevant public exposure.

Both the 2003 and 2010 objectives for benzene are predicted to be met in Hertsmere Borough Council.



## Updating and Screening Assessment Summary Checklist for Benzene

<b>Item</b>	<b>Response</b>
• Monitoring data outside an AQMA	None
• Monitoring data within an AQMA	None
• Very busy roads or junctions in built up areas	Hertsmere Borough Council does not host any roads that are classified as 'very busy' according to the criteria given in the guidance
• New industrial sources.	None present
• Industrial sources with substantially increased emissions, or new relevant exposure	None present
• Petrol stations	None meeting the criteria with relevant exposure
• Major fuel storage depots (petrol only)	None

Based on the guidance, a detailed assessment is not required for benzene in Hertsmere Borough Council.

## 6 Updating and Screening Assessment for 1,3-Butadiene

### 6.1 THE NATIONAL PERSPECTIVE

The main source of 1,3-butadiene in the United Kingdom is emissions from motor vehicle exhausts. 1,3-butadiene is also an important industrial chemical and is handled in bulk at a small number of industrial premises. Maximum running annual mean concentrations of 1,3-butadiene measured at all urban background/centre and roadside locations in the national network are already well below the 2003 objective of  $2.25 \mu\text{g m}^{-3}$ . The increasing numbers of vehicles equipped with three way catalysts will significantly reduce emissions of 1,3-butadiene in future years. Recently agreed further reductions in vehicle emissions and improvements to fuel quality are expected to further reduce emissions of 1,3-butadiene from vehicle exhausts. These measures are expected to deliver the air quality objective by the end of 2003.

### 6.2 STANDARD AND OBJECTIVE FOR 1,3-BUTADIENE

The Government and the Devolved Administrations adopted a maximum running annual mean concentration of  $2.25 \mu\text{g m}^{-3}$  as an air quality standard for 1,3-butadiene. The objective is for the standard to have been achieved by the end of 2003.

### 6.3 CONCLUSIONS OF THE SECOND ROUND OF REVIEW AND ASSESSMENT FOR 1,3-BUTADIENE

The following conclusions were given for 1,3-butadiene in the first round of Review and Assessment for Hertsmere Borough Council:

- There are no existing or proposed Part A or B processes in Hertsmere Borough Council or neighbouring areas, which have the potential to emit significant amounts of 1,3-butadiene;
- Emissions from vehicles are expected to decrease over the relevant period;
- Current levels of 1,3-butadiene in Hertsmere Borough Council are estimated to be already below the objective of  $2.25 \mu\text{g m}^{-3}$ ;
- National policy measures are expected to deliver the national air quality objective for 1,3-butadiene by the end of 2003.

The 2003 Review and Assessment report concluded that:

- Estimated background concentrations and data from national monitoring stations indicate that the objective for 1,3-butadiene is likely to be achieved by the end of 2003.
- There are no industrial processes, current or proposed, in Hertsmere Borough Council that have the potential to emit 1,3-butadiene.

The second round of review and assessment concluded that the 1997 objective for 1,3-butadiene ( $2.25 \mu\text{g m}^{-3}$  by 2005) would not be exceeded in Hertsmere Borough Council.

A detailed assessment was not required for 1,3-butadiene in Hertsmere Borough Council.

### 6.4 SCREENING ASSESSMENT OF 1,3-BUTADIENE

The Technical Guidance LAQM.TG (03) requires assessment of 1,3-butadiene to consider the following sources, data or locations:

- Monitoring Data
- New Industrial Sources
- Existing Industrial Sources with Significantly Increased Emissions

These are described in the following sections.

## 6.5 BACKGROUND CONCENTRATIONS FOR 1,3-BUTADIENE

The average background 1,3-butadiene concentration estimated from the UK background maps (<http://www.airquality.co.uk/archive/laqm/tools.php>) was  $0.19\mu\text{g}\text{m}^{-3}$  in 2005 with a maximum concentration of  $0.21\mu\text{g}\text{m}^{-3}$ . Predicted average background 1,3-butadiene concentration estimated from the UK background maps is  $0.14\mu\text{g}\text{m}^{-3}$  in 2010 with a maximum concentration of  $0.0.15\mu\text{g}\text{m}^{-3}$ .

## 6.6 SCREENING ASSESSMENT OF MONITORING DATA

No monitoring of 1,3-butadiene has been undertaken in Hertsmere Borough Council.

## 6.7 SCREENING ASSESSMENT OF INDUSTRIAL SOURCES

The Guidance LAQM TG. (03) lists the following processes as significant potential sources of 1,3-butadiene:

**Part A** (percentage of total emissions from all UK plant in this sector to the UK total in brackets)

Petroleum processes (2)

Petrochemical processes (95)

Organic chemical manufacture (3)

**Part B**

Rubber processes

None of the Part A or Part B industrial processes in Hertsmere Borough Council operate these processes or have the potential to emit 1,3-butadiene (Appendix 3). There are no known industrial processes, current or proposed, in neighbouring areas that have the potential to emit 1,3-butadiene.

## 6.8 CONCLUSIONS FOR 1,3-BUTADIENE CONCENTRATIONS IN THE HERTSMERE BOROUGH COUNCIL AREA

Estimated background concentrations and data from national monitoring stations indicate that the objective for 1,3-butadiene is likely to be achieved by the end of 2006. There are no industrial processes, current or proposed, in Hertsmere Borough Council that have the potential to emit 1,3-butadiene.

Updating and Screening Assessment Summary Checklist for 1,3-butadiene

Item	Response
• Monitoring data	None
• New industrial sources.	None present
• Industrial sources with substantially increased emissions, or new relevant exposure	None present

A detailed assessment is not required for 1,3-butadiene in Hertsmere Borough Council.

## 7 Updating and Screening Assessment for Lead

### 7.1 THE NATIONAL PERSPECTIVE

The agreement reached between the European Parliament and the Environment Council on the Directive on the Quality of Petrol and Diesel Fuels (part of the Auto-Oil Programme) has led to the ban on sales of leaded petrol in the United Kingdom with effect from 1 January 2000. Emissions of lead are now restricted to a variety of industrial activities, such as battery manufacture, pigments in paints and glazes, alloys, radiation shielding, tank lining and piping.

Detailed assessments of the potential impact of lead emissions from industrial processes have been undertaken by the Government and the Devolved Administrations, based upon both monitoring and sector analysis studies. The former has included a 12-month monitoring survey in the vicinity of 30 key industrial sites in the UK, which has been used to supplement information already provided from the non-automatic monitoring networks. These monitoring data have generally indicated no exceedences of the 2004 or 2008 objectives, although locations in proximity to non-ferrous metal production and foundry processes were deemed to be at risk.

### 7.2 STANDARD AND OBJECTIVE FOR LEAD

The Government and the Devolved Administrations adopted an annual mean concentration of  $0.5 \mu\text{g m}^{-3}$  as the air quality standard for lead, with an objective for the standard to have been achieved by the end of 2004. In addition, a lower air quality objective of  $0.25 \mu\text{g m}^{-3}$  to be achieved by the end of 2008 has also been set.

### 7.3 CONCLUSIONS OF THE SECOND ROUND OF REVIEW AND ASSESSMENT FOR LEAD

The following conclusions were given for lead in the earlier stages of Review and Assessment for Hertsmere Borough Council (reviewed against 1997 Strategy Objective):

- There are no existing or proposed Part A or B processes in Hertsmere Borough Council or neighbouring areas which have the potential to emit significant amounts of lead;
- Estimated current background lead levels in Hertsmere Borough Council are already below the UK air quality objective for 2005;
- National policy measures are expected to deliver the national air quality objective for lead by 2005.

The 2003 Update and Screening report concluded:

- Lead emissions from industrial processes in Hertsmere Borough Council are not likely to exceed the objectives for lead to be achieved in 2004 and 2008.

The second round of review and assessment concluded that the 1997 objective for lead ( $0.5 \mu\text{g m}^{-3}$  by 2005) would not be exceeded in Hertsmere Borough Council. A detailed assessment is not required for lead in Hertsmere Borough Council.

### 7.4 SCREENING ASSESSMENT OF LEAD

The Technical Guidance LAQM TG (03) requires assessment of lead to consider the following sources, data or locations:

- Monitoring Data outside an AQMA
- New Industrial Sources
- Existing Industrial Sources with Significantly Increased Emissions

These are described in the following sections.

## 7.5 SCREENING ASSESSMENT OF MONITORING DATA

No monitoring of lead has been undertaken in Hertsmere Borough Council.

## 7.6 SCREENING ASSESSMENT OF INDUSTRIAL SOURCES

The Guidance LAQM.TG (03) lists the following processes as significant potential sources of lead:

**Part A** (percentage of total emissions from all UK plant in this sector to the UK total in brackets)  
 Iron and steel (37)  
 Non-ferrous metals (23)  
 Manufacture of organic chemicals (35)

### Part B

Non-ferrous metal furnaces  
 Electrical furnaces  
 Blast cupolas  
 Aluminium processes  
 Zinc Processes  
 Copper processes  
 Lead glass manufacture

None of the Part A or Part B industrial processes in Hertsmere Borough Council operate these processes or have the potential to emit lead (Appendix 3).

There are no known industrial processes, current or proposed, in neighbouring areas that have the potential to emit lead.

## 7.7 CONCLUSIONS FOR LEAD CONCENTRATIONS IN HERTSMERE COUNCIL

Lead emissions from industrial processes in Hertsmere Borough Council are not likely to exceed the objectives for lead to be achieved in 2004 and 2008.

Updating and Screening Assessment Summary Checklist for **Lead**

Item	Response
• Monitoring data	None
• New industrial sources.	None
• Industrial sources with substantially increased emissions, or new relevant exposure	None

A detailed assessment is not required for lead in Hertsmere Borough Council.

## 8 Updating and Screening Assessment for Nitrogen Dioxide

### 8.1 INTRODUCTION

The principal source of NO<sub>x</sub> emissions is road transport, which accounted for about 40% of total UK emissions in 2003. Major roads carrying large volumes of high-speed traffic (such as motorways and other primary routes) are a predominant source, as are conurbations and city centres with congested traffic. Within most urban areas, the contribution of road transport to local emissions will be much greater than for the national picture.

Meeting the annual mean objective in 2005, and the limit value in 2010, is expected to be considerably more demanding than achieving the 1-hour objective. National studies have indicated that the annual mean objective is likely to be achieved at all urban background locations outside of London by 2005, but that the objective may be exceeded more widely at roadside sites throughout the UK in close proximity to busy road links. Projections for 2010 indicate that the EU limit value may still be exceeded at urban background sites in London, and at roadside locations in other cities.

### 8.2 STANDARDS AND OBJECTIVES FOR NITROGEN DIOXIDE

The Government and the Devolved Administrations have adopted two Air Quality Objectives for nitrogen dioxide, as an annual mean concentration of 40 µg<sup>m</sup><sup>-3</sup>, and a 1-hour mean concentration of 200 µg<sup>m</sup><sup>-3</sup> not to be exceeded more than 18 times per year. The objectives are to be achieved by the end of 2005.

### 8.3 CONCLUSIONS OF THE FIRST AND SECOND ROUND OF REVIEW AND ASSESSMENT FOR NITROGEN DIOXIDE

The following conclusions were given for nitrogen dioxide in the first round of Review and Assessment for Hertsmere Borough Council:

- Predicted mean background concentrations of nitrogen dioxide in 2005 will be less than 32 µg<sup>m</sup><sup>-3</sup>;
- Emissions from industrial processes in Hertsmere Borough Council and neighbouring areas are unlikely to cause exceedence of the objectives;
- Emissions from traffic or other transport sources in Hertsmere Borough Council and neighbouring areas **are** likely to cause exceedence of the objectives, particularly around the M25, M1 and A1(M) motorways and the A1 trunk road;
- National policy measures, however, are expected to significantly reduce emissions from road traffic by 2005.
- Hertsmere Borough Council declared 4 separate AQMAs for nitrogen dioxide on the basis of the Stage 3 review and assessment. A range of Action Plan scenarios to improve air quality in Hertsmere Borough Council was assessed at Stage 4.

The first round of review and assessment concluded that the annual mean objective for nitrogen dioxide (40 µg<sup>m</sup><sup>-3</sup> by 2005) would be exceeded four locations in Hertsmere Borough Council.

The 2003 Update and Screening Assessment concluded that:

- Predicted concentrations of nitrogen dioxide indicate that the annual average objective is likely to be exceeded in 2005; this has been confirmed from the diffusion tube measurements and continuous monitoring.
- Traffic sources will also cause exceedences of the annual mean objective in 2005.
- There are no significant industrial sources of nitrogen dioxide in Hertsmere Borough Council.

A detailed assessment was required for nitrogen dioxide in Hertsmere Borough Council.

The 2004 Detailed Assessment recommended:

- Retaining the 4 AQMAs already declared:
  - Hertsmere No. 1: An area comprising the domestic properties 23-27 Dove Lane and caravan site off A1000 Barnet Road.
  - Hertsmere No. 2: An area comprising the domestic property known as Charleston Paddocks, St Albans Road, South Mimms, Potters Bar.
  - Hertsmere No. 3: An Area comprising the domestic properties 31-39 Blanche Lane, South Mimms.
  - Hertsmere No. 4: An area comprising the domestic properties 12 Grove Place, Hartspring Lane, Aldenham and caravans numbered 1, 2, 3, 4, 7, 8, 55, 56, 57, 58, 59, 60 within Winfield Caravan site, Hartspring Lane.
- Consider increasing the size of AQMA No1 (Dove Lane/Barnet Road);
- Recommended that Hertsmere Borough Council consider designating additional small Air Quality Management Areas.

The 2005 Further Air Review and Assessment report recommended:

- Declaration of 2 new AQMA at the following sites:
  - Hertsmere AQMA No. 5: Elstree Cross Road;
  - Hertsmere AQMA No. 6: High Street, Potters Bar in form of the Bus garage.

As a result two new AQMAs have been declared (AQMA 5 and AQMA 6) in addition to the already existing four AQMAs in Hertsmere Borough Council.

## **8.4 SCREENING ASSESSMENT OF NITROGEN DIOXIDE**

The Technical Guidance LAQM TG.(03) requires assessment of nitrogen dioxide to consider the following sources, data or locations:

- Monitoring data outside an AQMA
- Monitoring data within an AQMA
- Narrow congested streets with residential properties close to the kerb
- Junctions
- Busy streets where people may spend 1-hour or more close to traffic
- Roads with high flow of buses and/or HGVs
- New roads constructed or proposed since first round of review and assessment
- Roads close to the objective during the first round of review and assessment
- Roads with significantly changed traffic flows
- Bus Stations
- New industrial sources
- Industrial sources with substantially increased emissions
- Aircraft

These are evaluated in the following sections.

## 8.5 BACKGROUND CONCENTRATIONS FOR NITROGEN DIOXIDE

The estimated background nitrogen dioxide annual mean concentrations for Hertsmere Borough Council are ( $\mu\text{gm}^3$ ):

	2005	2010
Maximum	24.7	21
Average	21.01	18.2

(Source: <http://www.airquality.co.uk/archive/laqm/tools.php>)

Nitrogen dioxide concentrations measured by the Hertsmere background continuous monitor (HM1) are slightly higher than those predicted by the UK maps. The annual mean during 2005 measured by continuous monitor was  $25.9 \mu\text{gm}^{-3}$ , with a projected decrease to  $22.2 \mu\text{gm}^{-3}$  by 2010.

The DMRB calculations are based on the background values taken from the UK maps (<http://www.airquality.co.uk/archive/laqm/tools.php>).

## 8.6 SCREENING ASSESSMENT OF MONITORING DATA

### 8.6.1 Diffusion tube monitoring

Nitrogen dioxide is currently measured at 25 sites operated by Hertsmere Borough Council. Further details of these sites are given in Appendix A.

The data from site HM37 will not be used due to insufficient data capture (data capture 33%).

From Guidance LAQM TG(03) Box 6.6, the adjustment factors to estimate annual average concentrations in 2010 from 2005 data are:

$$\text{Background} = [0.778/0.0.908] = 0.86$$

$$\text{Roadside} = [0.734/0.892] = 0.82$$

The adjustment factor used for kerbside sites was 0.82 in order to provide a slightly conservative estimate for 2010. Intermediate sites were projected using the background adjustment factor (using a factor of 0.86), which again gives a slightly conservative estimate.

Table 8.1 shows the bias-adjusted (see section 7.6.3) nitrogen dioxide concentrations for 2005, and estimated projected concentrations for 2010. The projected concentrations suggest that the objective for nitrogen dioxide may have been exceeded in 2005 at the following locations:

HM02	Stirling Corner, Borehamwood
HM03	Shenley Road, Borehamwood
HM18	Blanche Lane, South Mimms
HM19	The Broadway, Potters Bar
HM21	Dove Lane, Potters Bar
HM22	South Mimms, Services M25
HM23	Bus Garage, High Street, Potters Bar
HM28	Hartspring Lane, Aldenham.



**Table 8.1** Mean nitrogen dioxide diffusion tube concentrations (2005),  $\mu\text{g}\text{m}^{-3}$  Nitrogen dioxide concentration

Site	Location	Site Type	Nitrogen Dioxide Concentration, $\mu\text{g}\text{m}^{-3}$		
			(2005 measured)	(2005 as bias adjusted)	(2010 predicted)
HM01	Aldenham Grove Radlett	B	27.1	24.9	21.4
HM02	Stirling Corner, Borehamwood	K	53.4	<b>49.1</b>	<b>40.3</b>
HM03	Shenley Rd, Borehamwood	K	50.3	<b>46.3</b>	38.0
HM05	Essex Rd, Borehamwood	B	33.9	31.2	26.8
HM06	Mildred Ave, Borehamwood	B	25.5	23.5	20.2
HM07	Monkswood Gdns, Borehamwood	B	33.1	30.5	26.2
HM09	Watford Road, Elstree	K	41.6	38.3	31.4
HM10	High Rd, Bushey Heath	K	35.2	32.4	26.6
HM12	Garages, Highwood Ave (rear), Bushey	I	30.1	27.7	23.8
HM18	Blanche Lane, South Mimms	K	44.0	<b>40.5</b>	33.2
HM19	The Broadway, Potters Bar	K	49.8	<b>45.8</b>	37.6
HM21	Dove Lane, Potters Bar	K	48.3	<b>44.4</b>	36.4
HM22	South Mimms, Services M25	K	45.3	<b>41.7</b>	34.2
HM23	Bus Garage, High St, Potters Bar	K	68.1	<b>62.6</b>	<b>51.3</b>
HM26	Park Ave, Potters Bar	K	37.6	34.6	28.4
HM27	Pegmire Lane, Aldenham	K	33.9	31.2	25.6
HM28	Hartspring Lane, Aldenham	K	46.0	<b>42.3</b>	34.7
HM29	Caldecote Lane, Bushey Heath	K	26.9	24.7	20.3
HM31	Osprey Close Watford	K	30.1	27.7	22.7
HM32	Bell Lane, London Colney	K	31.1	28.6	23.5
HM33	AQMS 1	B	34.8	32.0	27.5
HM34	AQMS 2	B	32.6	29.9	25.7
HM35	AQMS 3	B	32.0	29.4	25.3
HM36	Boulevard	K	40.9	37.6	30.8

Notes on Site Type:

k = Kerbside, i = Intermediate, b = Background

**Bold Italics** = sites likely to exceed NO<sub>2</sub> annual mean objectives in 2005 and /or 2010

HM18 Blanche Lane, South Mimms; HM21 Dove Lane, Potters Bar; HM22 South Mimms, Services M25 and HM23 Bus Garage, High Street, Potters Bar were not identified as a potential exceedence site during the previous round of review and assessment – current projections now suggest that it will exceed the nitrogen dioxide annual mean objective in 2005.

Projected concentrations for 2010 suggest that two sites (HM02, HM23) may exceed the 2005 nitrogen dioxide annual mean objective in that year.

All sites where an exceedence is predicted are all within the 6 currently declared AQMAs.

The closest receptor for sites HM02 (Stirling Corner, Borehamwood) is located in Barnet and thus is outside Hertsmere Borough Council's area. This site has also been assessed in various modelling assessments.

### 8.6.2 Diffusion tube analysis

Diffusion tubes were analysed by Walsall Metropolitan Borough Council in 2005.

### 8.6.3 Bias correction of diffusion tube data

In this report, the bias of diffusion tube data was corrected for by taking the bias adjustment factor provided by the database of collocation studies issued by University of West of England (UWE) on behalf of DEFRA (UWE (2005)). As the bias adjustment factor for 2005 has not been released yet, the factor for 2003 was used to perform a worst-case scenario analysis (Table 8.2).

**Table 8.2** Bias Adjustment factor taken from collocation studies issued by University of West of England (UWE) on behalf of DEFRA (UWE (2005))

Analyse d By	Method	Year	Site Type	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (mg/m3)	Automatic Monitor Mean Conc. (Cm) (mg/m3)	Bias (B)	Bias Adjustment Factor (A) (Cm/Dm)
Walsall MBC	50% TEA in Acetone	2003	B	12	34	31	8.3%	<b>0.92</b>
Walsall MBC	50% TEA in Acetone	2004	B	12	31	26	20.4%	<b>0.83</b>

The concentrations recorded by the diffusion tubes collocated with the Hertsmere continuous monitoring site could not be compared due to poor data precision and capture rate of the diffusion tube data.

The diffusion tube measurements for 2005 (and for predicting concentrations in 2010) were therefore adjusted by multiplying by a bias adjustment factor of 0.92.

#### 8.6.4 Automatic Monitoring

Continuous monitoring for nitrogen dioxide has been undertaken at one location in Hertsmere Borough Council – the Hertsmere Background site (HM1) located at Furzehill School, Borehamwood. Data for monitoring periods during 2005 show that maximum hourly average concentrations were less than  $113.62 \mu\text{gm}^{-3}$ . No hourly average exceedences ( $>200 \mu\text{gm}^{-3}$ ) were recorded.

	Data Capture	2005	2010 (predicted)
Maximum (Hourly)	91%	$22.72 \mu\text{gm}^{-3}$	$19.47 \mu\text{gm}^{-3}$
Average (Hourly)	91%	$113.62 \mu\text{gm}^{-3}$	

## 8.7 SCREENING ASSESSMENT OF ROAD TRAFFIC SOURCES

Traffic flow data were taken from the NAEI 2004 roads database and from manual and automatic traffic data supplied by Hertfordshire County Council for 2004 (Appendix 2). For screening purposes, receptor distances based on the closest property where public exposure was likely and speeds at or slightly below the speed limit for each road were used.

Where available, receptor distances were measured using OS Landline™ maps. Where these were not available, conservative estimates of receptor distances were estimated by taking half the road width plus 2 m for single carriageway roads, and half the road width plus 5 m for dual carriageways and motorways.

Traffic growth factors applied for 2005 were 1.02 from 2004 and for 2010 were 1.097 from 2004 (see Appendix 2).

The background concentration of nitrogen dioxide in 2005 was taken as the worst case scenario from NAEI projections, which was considered a realistic background level around motorways and very busy junctions in Hertsmere i.e. locations where exceedences are most likely to occur. Background pollutant concentrations predicted for significant years are shown in Appendix 2.

Table 8.3 lists the A roads and motorways where significant nitrogen dioxide concentrations are predicted in 2005 using the DMRB model.

**Table 8.3** Estimated nitrogen dioxide concentrations near A roads and motorways in 2005

Link No.	Road Name	Distance to Nearest Receptor	AADT	Speed (kph)	%HGV	NO <sub>2</sub> (µgm <sup>-3</sup> )
1	M25	30	128181	113	14.5	38.97
2	A41	5	48835	30	4.2	33.83
4	A1000	5	21016	30	6.6	31.02
5	A1	5	57426	30	5.2	34.45
9	M1	30	88133	113	7.0	32.31
15	M25	50	130947	113	15.7	35.04
17	A41	5	22845	30	4.6	30.52
18	A111	5	17406	30	7.6	31.15
20	M1	5	17626	30	7.0	30.49
22	A1	5	11486	30	5.2	30.39
23	A1	5	45939	30	5.2	35.34
25	A1000	5	13988	30	5.0	30.30
26	A111	5	17578	30	7.6	33.01
27	A41	5	32086	30	3.4	31.03
28	A411	5	42422	30	2.2	30.80
29	A4008	5	51254	30	2.9	32.54
31	A1081	5	21892	30	6.7	33.18
33	M1	5	85935	30	7.0	36.28
34	A1	5	58854	30	6.5	34.05
35	A1(M)	5	70267	30	7.0	35.34

**Bold Italics** indicate locations where exceedences of the nitrogen dioxide objectives are likely to occur.

The DMRB model indicates that the 2005 objective of 40 µgm<sup>-3</sup> will be met.

The predicted values for 2010 show no exceedences for NO<sub>2</sub> within Hertsmere Borough.

### 8.7.1 Street Canyons

The DMRB model may significantly under-predict concentrations of nitrogen dioxide alongside urban city-centre roads classified as 'street canyons'. In this context a street canyon may be described as a relatively narrow street with buildings on either sides, where the height of the buildings is generally greater than the width of the road. To avoid missing potential exceedences of the objective in such locations the predicted annual mean NO<sub>2</sub> 'road traffic component' concentration, in the 'local output' sheet of DMRB, is increased by a factor of 2, to take account of the model under-prediction. This is then added to the background to give total concentration (as advised in TG. (03)). There are no street canyon locations identified in Hertsmere Borough Council.

### 8.7.2 Busy Junctions

Annual average nitrogen dioxide concentrations near busy road junctions (>10,000 vehicles per day) in Hertsmere Borough Council have been estimated for 2005 using DMRB screening model (Table 7.3).

**Table 8.4** Estimated nitrogen dioxide concentrations near busy junctions in Hertsmere Borough Council

Junction	Road Link	Average traffic speed (kph)	Nearest Receptor	NO <sub>2</sub> Concentration (µgm <sup>-3</sup> )
M25 South Mimms	M25, A1	40	200m/20m	26.25
M25 Potters Bar	M25, A111	40	160m/20m	26.94
Radlett	A5183, B462	20, 10 <sup>a</sup>	15m/10m	32.29
Caldecote Hill, Bushey	A411, A409	20	15m/40m	27.37
Aldenham/Watford	A41(T), B462	20	50m/50m	26.85

<sup>a</sup> T-junction – estimated speed slower for joining traffic than for main road.

Table 8.4 shows that the 2005 annual mean objective for NO<sub>2</sub> is not likely to be exceeded at the closest receptors to busy road junctions and no more detailed modelling is necessary.

## 8.8 SCREENING ASSESSMENT OF INDUSTRIAL SOURCES

The Guidance LAQM TG (03) lists the following processes as significant potential sources of nitrogen dioxide:

**Part A** (the number provided in brackets is the percentage of total emissions from all UK plant in this sector to the UK Part A total)

Iron and steel (19)  
 Petroleum processes (16)  
 Combustion processes (34)  
 Cement/lime manufacture (9)  
 Carbonisation (6)  
 Gasification (4)  
 Inorganic chemicals (4)

### Part B

Glass manufacture

None of the Part A or Part B industrial processes in Hertsmere Borough Council (Appendix 3) operate these processes or have the potential to emit significant quantities of NO<sub>2</sub>. There are no known industrial processes, current or proposed, in neighbouring areas that have the potential to emit significant quantities of NO<sub>2</sub>.

## 8.9 SCREENING ASSESSMENT OF OTHER TRANSPORT SOURCES

### 8.9.1 Bus Stations

The bus station in Potters Bar is situated by the railway station and sees approximately 500 bus movements per day (where a bus coming into the station then going out again is treated as two separate movements). The two bus stations in Borehamwood, which are situated at the Tesco supermarket on Shenley Road and at the railway station, each see approximately 650 bus movements. These flows are significantly less than 1000, which is given in the Guidance as the level requiring further investigation.

The main bus garage in Hertsmere Borough Council is located in High Street, Potters Bar. It is estimated to see approximately 1000 bus movements per day.

The 2005 diffusion tubes result for HM23 (Bus garage) indicate that NO<sub>2</sub> concentrations at this site are generally well above the annual mean objective for NO<sub>2</sub> and are likely to remain so in 2005. By 2010, concentrations are predicted to be lower but HM23 still may exceed the EU Limit Value.

However, the NO<sub>2</sub> Diffusion tube at this bus stop is located on a traffic island. Such sites are likely to give results higher than those which would be registered at the nearest receptor and are therefore likely to be very much worst case. Hertsmere Borough Council may wish to relocate this diffusion tube to the nearest relevant receptor.

An AQMA (Hertsmere No. 6: High Street, Potters Bar in front of the Bus Garage) is in place and hence no further assessment is necessary.

### 8.9.2 Airports

There are no airports in Hertsmere Borough Council or neighbouring authorities that have a throughput of 5 million passengers per year and/or 500,000 tonnes of freight.

## 8.10 CONCLUSIONS FOR NITROGEN DIOXIDE CONCENTRATIONS IN HERTSMERE

Predicted concentrations of nitrogen dioxide indicate that the annual average objective is likely to be exceeded in 2005; this has been confirmed from the diffusion tube measurements and

continuous monitoring. Estimated projected concentrations for 2010 suggest exceedances of the 2005 nitrogen dioxide annual mean objective.

There are no significant industrial sources of nitrogen dioxide in Hertsmere Borough Council.

#### Updating and Screening Assessment Summary Checklist for Nitrogen Dioxide

<b>Item</b>	<b>Response</b>
• Monitoring data outside an AQMA	Marginal exceedances at some kerbside locations with no relevant receptors
• Monitoring data within an AQMA	Exceedances within the AQMAs
• Narrow congested streets with residential properties close to the kerb	None present
• Junctions.	DMRB indicates no exceedances
• Busy streets where people may spend 1-hour or more close to traffic	No exceedence
• Roads with high flow of buses and/or HGVs.	M25 (15) – DMRB indicates no exceedances
• New roads constructed or proposed since the previous round of R&A	No major road changes
• Roads with significantly changed traffic flows, or new relevant exposure	DMRB indicates no exceedances
• Bus Stations	There are more than 1000 bus movements per day, located in AQMA
• New industrial sources.	None present
• Industrial sources with substantially increased emissions, or new relevant exposure	None present
• Aircraft	None present

A detailed assessment is not required for nitrogen dioxide in Hertsmere Borough Council.

## 9 Updating and Screening Assessment for Sulphur Dioxide

### 9.1 INTRODUCTION

The main source of sulphur dioxide in the United Kingdom is power stations, which accounted for more than 69% of emissions in 2003. There are also significant emissions from other industrial combustion sources. Domestic sources now only account for 3% of emissions, but can be locally much more significant. Road transport currently accounts for less than 1% of emissions.

Local exceedences of the objectives (principally the 15-minute mean objective) may occur in the vicinity of small combustion plant (less than 20 MW) which burn coal or oil, in areas where solid fuels are the predominant form of domestic heating, and in the vicinity of major ports.

### 9.2 STANDARD AND OBJECTIVE FOR SULPHUR DIOXIDE

The Government and the Devolved Administrations adopted a 15-minute mean of  $266 \mu\text{g m}^{-3}$  as an air quality standard for sulphur dioxide, with an objective for the standard not to be exceeded more than 35 times in a year by the end of 2005.

Additional objectives have also been set which are equivalent to the EU limit values specified in the First Air Quality Daughter Directive. These are for a 1-hour mean objective of  $350 \mu\text{g m}^{-3}$ , to be exceeded no more than 24 times per year, and a 24-hour objective of  $125 \mu\text{g m}^{-3}$ , to be exceeded no more than 3 times per year, to be achieved by the end of 2004.

### 9.3 CONCLUSIONS OF THE FIRST AND SECOND ROUND OF REVIEW AND ASSESSMENT FOR SULPHUR DIOXIDE

The following conclusions were given for sulphur dioxide in the first stage of Review and Assessment for Hertsmere Borough Council:

- There are no current or proposed significant industrial sources of sulphur dioxide at relevant locations in Hertsmere Borough Council;
- There are no known small combustion plant in Hertsmere Borough Council, and therefore no emissions which could have any significant effect on air quality either individually or cumulatively and in conjunction with ambient background concentrations of sulphur dioxide at relevant locations in Hertsmere Borough Council;
- Densities of coal fired burning households are unlikely to significantly prejudice air quality objectives at relevant locations in Hertsmere Borough Council.

The risk of exceeding the 15-minute mean objective for sulphur dioxide in Hertsmere Borough Council is considered negligible.

The 2003 Updating and Screening report concluded that there are no significant industrial or domestic sources of sulphur dioxide in Hertsmere Borough Council.

A detailed assessment is not required for sulphur dioxide.

## 9.4 SCREENING ASSESSMENT OF SULPHUR DIOXIDE

The Technical Guidance LAQM.TG (03) requires assessment of sulphur dioxide to consider the following sources, data or locations:

- Monitoring data within an AQMA
- Monitoring data outside an AQMA
- New industrial sources
- Industrial sources with substantially increased emissions
- Areas of domestic coal burning
- Small boilers (>5MW (thermal) burning coal or oil
- Shipping
- Railway Locomotives

These are evaluated in the following sections.

## 9.5 BACKGROUND CONCENTRATIONS FOR SULPHUR DIOXIDE

The estimated average background sulphur dioxide concentration taken from the UK background maps (<http://www.airquality.co.uk/archive/laqm/tools.php>) for 2001 was  $4.16 \mu\text{g}\text{m}^{-3}$ , the maximum concentration was  $12\mu\text{g}\text{m}^{-3}$ .

## 9.6 SCREENING ASSESSMENT OF MONITORING DATA

Sulphur dioxide monitoring has not been undertaken in Hertsmere Borough Council. However, monitoring of background sulphur dioxide in the neighbouring borough of St Albans shows a maximum 15-minute mean of  $87 \mu\text{g}\text{m}^{-3}$  in 2005, which is well below the 15-minute objective of  $266 \mu\text{g}\text{m}^{-3}$ .

## 9.7 SCREENING ASSESSMENT OF INDUSTRIAL SOURCES

The Guidance LAQM.TG (03) lists the following processes as significant potential sources of sulphur dioxide:

**Part A** (percentage of total emissions from all UK plant in this sector to the UK Part A total in brackets)

- Iron and steel (9)
- Petroleum processes (15)
- Combustion processes (45)
- Cement/lime manufacture (3)
- Carbonisation (10)
- Non-ferrous metals (7)
- Ceramic Production (9)

**Part B**

- Combustion plant 20-50 mwth
- Furnaces 20-50 mwth
- Copper processes
- Refractory goods
- Glass manufacture
- Roadstone coating

None of the Part A or Part B industrial processes in Hertsmere Borough Council (Appendix 3) operate these processes or have the potential to emit significant quantities of sulphur dioxide. There are no industrial processes, current or proposed, in neighbouring areas that have the potential to emit significant quantities of sulphur dioxide.

### 9.7.1 Small Boilers

There have been no small boiler processes greater than 5MW identified in Hertsmere Borough Council.

## 9.8 SCREENING ASSESSMENT OF DOMESTIC SOURCES

### 9.8.1 Domestic coal burning

There are no data for domestic coal burning available but solid fuel use continues to decline throughout the area. It is unlikely that there are any areas with 50 houses using these fuels in a 500 m<sup>2</sup> area.

## 9.9 SCREENING ASSESSMENT OF OTHER TRANSPORT SOURCES

### 9.9.1 Shipping

There are no shipping movements in Hertsmere Borough Council, and therefore not a source of sulphur dioxide.

### 9.9.2 Railways

There are no known areas in Hertsmere Borough Council where diesel railway engines are run for more than 15 minutes continuously and where members of the public might be exposed. Most railway lines in Hertsmere Borough Council are electrified.

## 9.10 CONCLUSIONS FOR SULPHUR DIOXIDE CONCENTRATIONS IN HERTSMERE COUNCIL

There are no significant industrial or domestic sources of sulphur dioxide in Hertsmere Borough Council.

Updating and Screening Assessment Summary Checklist for Sulphur Dioxide

Item	Response
• Monitoring data outside an AQMA	None
• Monitoring data within an AQMA	None
• New industrial sources.	None present
• Industrial sources with substantially increased emissions, or new relevant exposure	None present
• Areas of domestic coal burning	Not relevant
• Small Boilers > 5 MW (thermal).	None identified
• Shipping	Not relevant
• Railway Locomotives	Not relevant

A detailed assessment is not required for sulphur dioxide.



## 10 Updating and Screening Assessment for PM<sub>10</sub>

### 10.1 THE NATIONAL PERSPECTIVE

National UK emissions of primary PM<sub>10</sub> have been estimated as totalling 141,000 tonnes in 2003. Of this total, around 27% was derived from road transport sources. It should be noted that, in general, the emissions estimates for PM<sub>10</sub> are less accurate than those for the other pollutants with prescribed objectives, especially for sources other than road transport.

The Government established the Airborne Particles Expert Group (APEG) to advise on sources of PM<sub>10</sub> in the UK and current and future ambient concentrations. Their conclusions were published in January 1999 (APEG, 1999). APEG concluded that a significant proportion of the current annual average PM<sub>10</sub> is due to the secondary formation of particulate sulphates and nitrates, resulting from the oxidation of sulphur and nitrogen oxides. These are regional scale pollutants and the annual concentrations do not vary greatly over a scale of tens of kilometres. There are also natural or semi-natural sources such as wind-blown dust and sea salt particles. The impact of local urban sources is superimposed on this regional background. Such local sources are generally responsible for winter episodes of hourly mean concentrations of PM<sub>10</sub> above 100 µg m<sup>-3</sup> associated with poor dispersion. However, it is clear that many of the sources of PM<sub>10</sub> are outside the control of individual local authorities and the estimation of future concentrations of PM<sub>10</sub> are in part dependent on predictions of the secondary particle component.

### 10.2 STANDARD AND OBJECTIVE FOR PM<sub>10</sub>

The Government and the Devolved Administrations have adopted two Air Quality Objectives for fine particles (PM<sub>10</sub>), which are equivalent to the EU Stage 1 limit values in the first Air Quality Daughter Directive. The objectives are 40 µg m<sup>-3</sup> as the annual mean, and 50 µg m<sup>-3</sup> as the fixed 24-hour mean to be exceeded on no more than 35 days per year, to have been achieved by the end of 2004. In addition there is an objective of 50 µg m<sup>-3</sup> as the fixed 24-hour mean to be exceeded on no more than 7 days per year and 20 µg m<sup>-3</sup> as the annual mean to be achieved by the end of 2010. The objectives are based upon measurements carried out using the European gravimetric transfer reference sampler or equivalent.

It should be noted that the objectives for 2010, based on the Stage 2 EU Limit Values have not been included in the Air Quality Regulations for England, and local authorities are not currently required to assess against them. In addition, they were the subject of the European Commission's recent review of the First Daughter Directive.

The Commission is currently consulting on a new consolidated Directive on Ambient Air Quality, which is likely to see changes to the above Limit Values, though the nature of these changes cannot be confirmed at this time.

### 10.3 CONCLUSIONS OF THE SECOND OF REVIEW AND ASSESSMENT FOR PM<sub>10</sub>

The following conclusions were given for PM<sub>10</sub> in the earlier stages of Review and Assessment Hertsmere Borough Council:

- Annual mean background concentrations of PM<sub>10</sub> are measured to be 18 µg m<sup>-3</sup> during a 2-month period in 1998/1999;
- PM<sub>10</sub> emissions from domestic solid fuel burning are unlikely to cause exceedence of the objectives;
- Emissions from industrial processes in Hertsmere Borough Council and neighbouring areas are unlikely to cause exceedence of the objectives;
- Emissions from traffic or other transport sources are likely to cause exceedence of the objectives in Hertsmere Borough Council;

- Emissions from uncharacterised activities are unlikely to cause exceedence of the objectives in Hertsmere Borough Council;

Local emissions of PM<sub>10</sub> are likely to cause exceedence of the objectives in Hertsmere Borough Council, particularly at receptors situated close to traffic sources. However, future trends are likely to show a decrease in ambient PM<sub>10</sub> levels with a reduction in PM<sub>10</sub> emissions from vehicles of almost 40% by 2005 (based on 1995 figures).

The 2003 Update and Review Assessment concluded:

- The DMRB screening model indicates that both the annual mean and 24-hour objectives for PM<sub>10</sub> will be met in 2004.
- It is predicted, however, that both the proposed annual mean and the 24-hour mean objectives for 2010 may not be achieved at many roadside receptors in the Borough.
- Hertsmere Borough Council should be aware of this potential exceedence and should plan ahead should these provisional objectives become set in regulations.
- A detailed assessment was not required for PM<sub>10</sub> in Hertsmere Borough Council.

## 10.4 SCREENING ASSESSMENT OF PM<sub>10</sub>

The Technical Guidance LAQM TG(03) requires assessment of PM<sub>10</sub> to consider the following sources, data or locations:

- Monitoring data outside an AQMA
- Monitoring data within an AQMA
- Busy roads and junctions in Scotland
- Junctions
- Roads with high flow of buses and/or HGVs
- New roads constructed or proposed since first round of review and assessment
- Roads close to the objective during the first round of review and assessment
- Roads with significantly changed traffic flows
- New industrial sources
- Industrial sources with substantially increased emissions
- Areas with domestic solid fuel burning
- Quarries, landfill sites, open cast coal, handling of dusty cargoes at ports etc
- Aircraft

These are evaluated in the following sections.

## 10.5 BACKGROUND CONCENTRATIONS FOR PM<sub>10</sub>

The estimated average background and maximum PM<sub>10</sub> concentrations estimated from the UK background maps (<http://www.airquality.co.uk/archive/laqm/tools.php>) in µgm<sup>-3</sup> are:

**Table 10.1** Estimated Current and Future Background PM<sub>10</sub> Concentrations in Hertsmere Council

Background PM <sub>10</sub> (µg/m <sup>3</sup> )	2001	2005	2010
Average	22.5	22.7	20.7
Maximum	24.4	24.7	22.6

## 10.6 SCREENING ASSESSMENT OF MONITORING DATA

Monitoring for PM<sub>10</sub> has been undertaken at the Hertsmere Background (HM1) location. Data for monitoring periods in 2005 show that the annual mean was 21.71 µgm<sup>-3</sup>. 2010 projections are reduced to 19.51 µgm<sup>-3</sup> using local measurements. No exceedences of the 24-hour mean objective occurred during 2001 (Appendix 1).

## 10.7 SCREENING ASSESSMENT OF ROAD TRAFFIC SOURCES

Traffic flow data were taken from the NAEI 2004 roads database and from manual and automatic traffic data supplied by Hertsmere Borough Council for 2004 (Appendix 2). For screening purposes, appropriate receptor distances where public exposure was likely were estimated and speeds at or just below the maximum for the road were used.

Where available, receptor distances were measured using OS Landline™ maps. Where these were not available, conservative estimates of receptor distances were estimated by taking half the road width plus 2 m for single carriageway roads, and half the road width plus 5 m for dual carriageways and motorways. From 2004 data, growth factors of 1.017 to 2005 and 1.097 to 2010 were applied.

Tables 10.2 and 10.2 show PM<sub>10</sub> concentrations in 2005 and 2010 calculated using the DMRB model for A roads and motorways in Hertsmere Borough Council. Roads with the highest PM<sub>10</sub> values have been selected for display in both tables.

**Table 10.2 Predicted PM<sub>10</sub> concentrations in 2005 calculated using DMRB for roads in Hertsmere Borough Council (µgm<sup>-3</sup>).**

Link No.	Road Name	Distance to Nearest Receptor	AADT	Speed (kph)	%HGV	PM <sub>10</sub> Annual Mean (µgm <sup>-3</sup> ) 2005	Number of Exceedences 2005
1	M25	30	128181	113	14.5	31.60	34
2	A41	5	48835	30	4.2	30.60	30
5	A1	5	57426	30	5.2	30.01	28
15	M25	50	130947	113	15.7	28.63	23
23	A1	5	45939	30	5.2	30.00	28
33	M1	30	85935	113	7.0	32.38	21
34	A1	5	58854	30	6.5	30.74	30
35	A1(M)	5	70267	30	7.0	31.64	34

Exact receptor distance unknown. Conservative estimate of distance to nearest receptor based on 0.5 x road width plus a nominal value (see section 10.7 Screening Assessment of Road Traffic Sources). This will be the maximum possible PM<sub>10</sub> concentration.

**Table 10.3 Predicted PM<sub>10</sub> concentrations in 2010 calculated using DMRB for roads in Hertsmere Borough Council (µgm<sup>-3</sup>).**

Link No.	Road Name	Distance to Nearest Receptor	AADT	Speed (kph)	%HGV	PM <sub>10</sub> Annual Mean (µgm <sup>-3</sup> ) 2010	Number of Exceedences 2010
1	M25	30	138260	113	14.52	26.29	16
2	A41	5	52675	30	4.23	26.11	15
5	A1	5	61941	30	5.23	25.06	13
15	M25	30	141244	30	15.67	26.69	17
23	A1	5	49552	30	5.23	25.20	13
33	M1	5	92692	30	7	26.53	16
34	A1	5	63482	30	6.50	25.59	14
35	A1(M)	5	75792	30	7	26.09	15

The DMRB model indicates that no exceedances of the 2004 objectives for PM<sub>10</sub> in 2005 and 2010. The table shows

### 10.7.1 Busy Junctions

Annual average PM<sub>10</sub> concentrations near busy road junctions in Hertsmere Borough Council have been estimated for 2005 and 2010 using DMRB (Table 10.4).

**Table 10.4** Estimated annual mean PM<sub>10</sub> concentrations and exceedences of the 24-hour mean in 2005 near busy junctions in Hertsmere Borough Council.

Junction	Road Link	Average traffic speed (kph)	Annual mean PM <sub>10</sub> Concentration (µgm <sup>-3</sup> )	
			Number of exceedences in brackets	
			2005	2010
M25 South Mimms	M25, A1	40	25 (14)	22.5 (7)
M25 Potters Bar	M25, A111	40	26 (26)	22.7 (8)
Radlett	A5183, B462	20, 10 <sup>a</sup>	31 (32)	26 (15)
Caldecote Hill, Bushey	A411, A409	20	27 (17)	23.4 (9)
Aldenham/Watford	A41(T), B462	20	26 (16)	23 (8)

<sup>a</sup> Exact receptor distance unknown. Conservative estimate of distance to nearest receptor was 6 m. This is indicative of the maximum possible PM<sub>10</sub> concentration.

<sup>b</sup> T-junction – estimated speed slower on joining traffic than on main road.

The DMRB screening model indicates that the annual mean objective for PM<sub>10</sub> to be met by 2004 will be met in 2005 and 2010 at relevant locations close to A roads and busy junctions in Hertsmere Borough Council. The annual mean at all locations is below the objective of 40 µgm<sup>-3</sup>. The number of exceedences of the 24-hour mean is below the upper limit of 35 exceedences.

The Guidance LAQM TG(03) states that only busy junctions with relevant exposure within 10 m of the junction are considered significant for the Updating and Screening Assessment.

This is not an issue for the 2004 objective as PM<sub>10</sub> levels are already predicted to be less than the objective values, but more detailed information may be needed for assessment against future objectives.

The DMRB model predicts that neither the proposed PM<sub>10</sub> annual mean nor the 24-hour mean objectives will be achieved in Hertsmere Borough Council by 2010 (Tables 10.3 and 10.4). The NAEI predicts 2010 background levels to be in the region of 20.7 µgm<sup>-3</sup>, which exceeds the annual mean objective of 20 µgm<sup>-3</sup>. Hertsmere Borough Council should be aware of the possibility of further exceedences for planning purposes and when developing future monitoring stations.

Local monitoring data, however, suggests that 2010 background levels of PM<sub>10</sub> will be lower – around 19.5 µgm<sup>-3</sup>. In this instance, PM<sub>10</sub> concentrations at all receptors will be lower than those calculated in tables 10.3 and 10.4 and many locations could quite likely meet the proposed annual mean objective of 20 µgm<sup>-3</sup>. It is unlikely that PM<sub>10</sub> concentrations at receptors close to the M25 will meet the proposed annual mean objective. Hertsmere Borough Council should be aware of the possibility of potential exceedences for planning purposes and when developing future monitoring strategies.

## 10.8 SCREENING ASSESSMENT OF INDUSTRIAL SOURCES

The Guidance LAQM TG (03) lists the following processes as significant potential sources of PM<sub>10</sub>:

**Part A** (percentage of total emissions from all UK plant in this sector to the UK total in brackets)

Iron and steel (61)

Petroleum processes (4)

Combustion processes (13)

Cement/lime manufacture (7)

Carbonisation (2)

Gasification (4)

Non-ferrous metals (4)

Fertilizer production

**Part B**

- Combustion plant 20-50 mwth
- Furnaces 20-50 mwth
- Coal and coke processes
- Quarry Process
- Roadstone coating
- Rubber processes
- China and clay processes
- Coating powder
- Coil coating

None of the Part A or Part B industrial processes in Hertsmere Borough Council (Appendix 3) operate these processes or have the potential to emit significant quantities of PM<sub>10</sub>. There are no industrial processes, current or proposed, in neighbouring areas that have the potential to emit significant quantities of PM<sub>10</sub>.

**10.9 SCREENING ASSESSMENT OF FUGITIVE AND UNCONTROLLED SOURCES**

**10.9.1 Quarries and landfill sites**

There are no recorded quarries or landfill sites with relevant locations for public exposure within 200m.

**10.9.2 Domestic solid fuel burning**

There are no data for domestic coal burning available but solid fuel use continues to decline throughout the area. It is believed that there are no areas with 50 or more houses using these fuels in a 500m square.

**10.10 SCREENING ASSESSMENT OF OTHER TRANSPORT SOURCES**

**10.10.1 Airports**

There are no airports in Hertsmere Borough Council or neighbouring authorities that have a throughput of 5 million passengers per year and/or 500,000 tonnes of freight.

**10.11 CONCLUSIONS FOR PM10 CONCENTRATIONS IN HERTSMERE**

The DMRB screening model indicates that the objective to be met by 2004 will be achieved for PM<sub>10</sub> in 2005.

It is predicted, that both the proposed annual mean and the 24-hour mean objectives for 2010 may not be achieved at many roadside receptors in the Borough. Hertsmere Borough Council should be aware of this potential exceedence and should plan ahead should these provisional objectives become set in regulations.

Updating and Screening Assessment Summary Checklist for PM<sub>10</sub>

Item	Response
<ul style="list-style-type: none"> <li>• Monitoring data outside an AQMA</li> </ul>	Monitoring data indicates no exceedances
<ul style="list-style-type: none"> <li>• Monitoring data within an AQMA</li> </ul>	No AQMAs declared for PM <sub>10</sub>
<ul style="list-style-type: none"> <li>• Busy roads and junctions in Scotland</li> </ul>	Not in Scotland
<ul style="list-style-type: none"> <li>• Junctions.</li> </ul>	Junctions assessed using DMRB – no exceedances of the 24-hour mean objective
<ul style="list-style-type: none"> <li>• Roads with high flow of buses and/or</li> </ul>	M25 assessed – no exceedances of the 24 hour mean objective are indicated

flow of buses and/or HGVs.	
<ul style="list-style-type: none"> <li>New roads constructed or proposed since last round of R&amp;A</li> </ul>	No major road changes
<ul style="list-style-type: none"> <li>Roads with significantly changed traffic flows, or new relevant exposure.</li> </ul>	All roads assessed using DMRB
<ul style="list-style-type: none"> <li>Roads close to the objective during the second round of Review and Assessment</li> </ul>	All roads assessed using DMRB with up to date traffic data. There were no roads close to the objective in the last updating and screening assessment
<ul style="list-style-type: none"> <li>New industrial sources.</li> </ul>	None present
<ul style="list-style-type: none"> <li>Industrial sources with substantially increased emissions, or new relevant exposure</li> </ul>	None present
<ul style="list-style-type: none"> <li>Areas of domestic solid fuel burning</li> </ul>	None present
<ul style="list-style-type: none"> <li>Quarries / landfill sites / opencast coal / handling of dusty cargoes at ports etc.</li> </ul>	None present
<ul style="list-style-type: none"> <li>Aircraft</li> </ul>	None present

A detailed assessment is not required for PM<sub>10</sub> in Hertsmere Borough Council.

## 11 Conclusions

### 11.1 CARBON MONOXIDE

Carbon dioxide has been continuously monitored in Hertsmere Borough Council during the period 1999 onwards. The maximum running 8-hour concentration recorded in 2005 was 1.8 mgm<sup>-3</sup>, which is significantly less than the objective value of 10 mgm<sup>-3</sup>. There are no roads in Hertsmere Borough Council that are classified as 'very busy' according to the criteria in the guidance. A detailed assessment is not required for carbon monoxide in Hertsmere Borough Council.

### 11.2 BENZENE

Although a number of petrol stations sited on busy roads in Hertsmere Borough Council annually deliver more than 2 million litres per year, none were within 10m of the pumps, i.e. there was no relevant public exposure. Based on the guidance, a detailed assessment against the 2003 objectives is not required for benzene in Hertsmere Borough Council. Current trends indicate that the tighter benzene objective for 2010 will not be exceeded either.

### 11.3 1,3-BUTADIENE

Estimated background concentrations and data from national monitoring stations indicate that the objective for 1,3-butadiene was achieved by the end of 2003. There are no industrial processes, current or proposed, in Hertsmere Borough Council that have the potential to emit 1,3-butadiene. A detailed assessment is not required for 1,3-butadiene in Hertsmere Borough Council.

### 11.4 LEAD

Lead emissions from industrial processes in Hertsmere Borough Council are not likely to exceed the objectives for lead to be achieved in 2004 and 2008. A detailed assessment is not required for lead in Hertsmere Borough Council.

### 11.5 NITROGEN DIOXIDE

Predicted concentrations of nitrogen dioxide indicate that the annual average objective is likely to be exceeded in 2005; this has been confirmed from the diffusion tube measurements and continuous monitoring. Estimated projected concentrations for 2010 suggest exceedences of the 2005 nitrogen dioxide annual mean objective.

There are no significant industrial sources of nitrogen dioxide Hertsmere Borough Council.

All sites where an exceedence is predicted have been assessed in detail during the first and second round of Update and Screening Assessment and are all within the currently declared 6 AQMAs.

A detailed assessment is not required for NO<sub>2</sub> in Hertsmere Borough Council.

### 11.6 SULPHUR DIOXIDE

There are no significant industrial or domestic sources of sulphur dioxide in Hertsmere Borough Council. A detailed assessment is not required for sulphur dioxide.

### 11.7 PM<sub>10</sub>

The DMRB screening model indicates that the objective to be met by 2004 will be met for PM<sub>10</sub> in 2005.

It is predicted, that both the proposed annual mean and the 24-hour mean objectives for 2010 may not be achieved at many roadside receptors in the Borough. Hertsmere Borough Council should be aware of this potential exceedence and should plan ahead should these provisional objectives become set in regulations.

### 11.8 SUMMARY AND RECOMMENDATIONS

A Detailed Assessment is not required for benzene, 1,3-butadiene, carbon monoxide, lead, nitrogen dioxide, PM<sub>10</sub> or sulphur dioxide.

## References

Consultants in Environmental Science Ltd, *Hertsmere Borough Council Stage 1 and 2 Air Quality Review and Assessment*, August 1998

Consultants in Environmental Science Ltd, *Hertsmere Borough Council Stage 3 Air Quality Review and Assessment*, March 2001

AEA Technology Environment, *Hertsmere Borough Council Air Quality Review and Assessment – Stage 4*, October 2002

AEA Technology Environment, *Hertsmere Borough Council Air Quality Update and Screening Assessment – 2003*

AEA Technology Environment, *Hertsmere Borough Council Air Quality Detailed Assessment – 2004*

AEA Technology Environment, *Hertsmere Borough Council Further Assessment Report - 2005*

Department for Transport, *National Road Traffic Forecasts (Great Britain) 1997*,  
<http://www.roads.dft.gov.uk/roadnetwork/nrpd/heta2/nrtf97/nrtf05.htm>

Data provided by **netcen** on behalf of Defra and the Devolved Administrations:

*National Air Quality Archive, Local Air Quality Management*  
<http://www.airquality.co.uk/archive/laqm/laqm.php>

*National Atmospheric Emissions Inventory (NAEI 2000)*  
<http://www.naei.co.uk/>

Highways Agency, *Interim Advice Note 46/02 - Revised Air Quality Assessment Procedure for the Design Manual for Roads and Bridges, Volume 11, section 3, part 1*

Part IV of the Environment Act 1995, *Local Air Quality Management: Technical Guidance LAQM.TG(03)*, published January 2003

*2LAQM.TG(03) – Update. January 2006*

*The Air Quality Regulations (2000) and The Air Quality (England) Amendment Regulations 2002.*

*DETR (2000) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. Department of the Environment, Transport and the Regions. Cm 4548, SE 2000/3, NIA 7*

*Part IV of the Environment Act 1995. Local Air Quality Management. Progress Report Guidance. LAQM.PRG(03). 2003*

*Design Manual For Roads and Bridges, Highways Agency, 2003*

*EA (1998b) Guidance for estimating the air quality impact of stationary sources. Guidance Note 24. Environment Agency*



# Appendices

## CONTENTS

Appendix 1	Monitoring Data
Appendix 2	Traffic Flow Data
Appendix 3	Descriptions of selected models and tools
Appendix 4	Emissions Data
Appendix 5	Maps of AQMAs
Appendix 6	Reporting Checklist



# **Appendix 1**

## Monitoring data

### **CONTENTS**

**Table A1.1** Nitrogen dioxide diffusion tube site details

**Table A1.2** Nitrogen dioxide diffusion tube data 2005

**Table A1.3** Continuous monitoring data

**Table A1.1** Current Diffusion tube site details

Site	Site Location	Site Type	Grid Reference	
HM01	Aldenham Grove Radlett	Background	516500	200200
HM02	Stirling Corner, Borehamwood	Kerbside	520800	195300
HM03	Shenley Rd, Borehamwood	Kerbside	519400	196700
HM05	Essex Rd, Borehamwood	Background	519200	196800
HM06	Mildred Ave, Borehamwood	Background	519500	196500
HM07	Monkwood Gdns, Borehamwood	Background	520700	196000
HM09	Watford Road, Elstree	Kerbside	517700	195300
HM10	High Rd, Bushey Heath	Kerbside	514600	194300
HM12	Garages, Highwood Ave (rear), Bushey	Intermediate	512800	197800
HM18	Blanche Lane, South Mimms	Kerbside	522100	200700
HM19	The Broadway, Potters Bar	Kerbside	524900	201200
HM21	Dove Lane, Potters Bar	Kerbside	526100	200000
HM22	South Mimms, Services M25	Kerbside	522800	200100
HM23	Bus Garage, High St, Potters Bar	Kerbside	526200	201400
HM26	Park Ave, Potters Bar	Kerbside	526400	200400
HM27	Pegmire Lane, Aldenham	Kerbside	514000	197400
HM28	Hartspring Lane, Aldenham	Kerbside	513200	197800
HM29	Caldecote Lane, Bushey Heath	Kerbside	515600	195100
HM31	Osprey Close Watford	Kerbside	212313	200175
HM32	Bell Lane, London Colney	Kerbside	518400	202800
HM33	AQMS 1	Background	519400	196300
HM34	AQMS 2	Background	519400	196300
HM35	AQMS 3	Background	519400	196300
HM36	Boulevard	Kerbside	519021	196619
HM37	P Bar Bus Garage shops	Kerbside	526201	201402

**Table A1.2** Nitrogen dioxide diffusion tube data, 2005 ( $\mu\text{g m}^{-3}$ ) (unadjusted)

Site	J	F	M	A	M	J	J	A	S	O	N	D	2005 Annual Mean
HM01	14	22	27	12	9		10	11	12	17	8	15	14
HM02	31	38	35	38	21	33	26	9	34	29	17	26	28
HM03	14	28	38	37	13	28	27	21	36	31	18		26
HM05	31	19	21	15	11	12	15	13	18	19	25	15	18
HM06	25	1	19	15	10	11	10	13	15	13	14	15	13
HM07	30	20	26	17	12	14	16	10	13	21	12	18	17
HM09	30	20	31	25	21	20	16	13	18	31	17	21	22
HM10	18	36	24	14	15	13	16	23	18	12	13	20	19
HM12	21	23	20	17	12	18	14	12	15	10	6	22	16
HM18	14	16	25	23	27	15	30	29	22	35	19	23	23
HM19	17	20	34	28	25	22	27	27			23	39	26
HM21	18	27	45	30	24	23	21	24	24	31	16	22	25
HM22	18	33	33	23	28	25	25	27	15	21	15	23	24
HM23	40	32		41	38	26	44	36	35	44	27	31	36
HM26		33		20	17	19	19	10	21	19	20	20	20
HM27	28	16	25	19	12	15	11	14	25	20	11	18	18
HM28			26	25	22	26	22	25	23	25	18	30	24
HM29	31	18	15	13	9	10	12	12	13	13	9	15	14
HM31	20	14	18	17	12	18	20	15	17	19	6	14	16
HM32	14	21		18	14	23	21	22	3	14	8	22	16
HM33	19	41	23	14	14	15	14	9	18	18	14	21	18
HM34	18	34	24	17	15	13	12	13	18	18	7	17	17
HM35	29	17	21	14	12	11	14	14	18	18	14	20	17
HM36	19	18	27	28	17	24	22	17		27	14	24	22

**Table A1.3** Continuous Monitoring data

Pollutant	2004 Mean Measured	Gravimetric conversion
CO	0.01 ppm	0.01 mgm <sup>-3</sup>
CO (max running 8 hr mean)	1.7 ppm	1.96 mgm <sup>-3</sup>
NO2	13.9 ppb	26.4 µgm <sup>-3</sup>
PM10	15.6 µg/m <sup>3</sup> (non-Grav)	20.3 µgm <sup>-3</sup>
PM10 (max 24 hour mean)	43 µg/m <sup>3</sup> (non-Grav)	55.9 µgm <sup>-3</sup>

Pollutant	2005 Mean Measured	Gravimetric conversion
CO	< 75% data capture	n/a µgm <sup>-3</sup>
NO2	12 ppb	22.72 µgm <sup>-3</sup>
PM10	16.7 µg/m <sup>3</sup> (non-Grav)	21.7 µgm <sup>-3</sup>
PM10 (max 24 hour mean)	41.8 µg/m <sup>3</sup> (non-Grav)	54.3 µgm <sup>-3</sup>

# Appendix 2

## Traffic Flow Data

### CONTENTS

<b>Table A2.1</b>	Road classifications in LAQM TG(03) <sub>1</sub> – Definitions
<b>Table A2.2</b>	Growth Factors applied to Annual Average Daily Traffic Flow
<b>Table A2.3</b>	Predicted background concentrations
<b>Table A2.4</b>	Traffic Data for Hertsmere Borough Council, supplied by Hertsmere Borough Council
<b>Table A2.5</b>	Traffic Data and Pollutant Concentrations for Hertsmere Borough Council 2005, supplied by NAEI 2005 – DMRB model output
<b>Table A2.6</b>	Traffic Data and Pollutant Concentrations for Hertsmere Borough Council 2005, supplied by Hertsmere Borough Council – DMRB model output

**Table A2.1** Road Classifications in LAQM TG(03) - Definitions

Very busy roads	Single carriageway roads with average daily traffic flows exceeding 80,000 vehicles
	Dual carriageway (2- or 3-lane) roads with average daily traffic flows exceeding 120,000 vehicles
	Motorways with average daily flows exceeding 140,000 vehicles.
Busy Roads	Roads with more than 30,000 vehicles per day.

**Table A2.2** National Road Traffic Forecasts (NRTF) Growth factors applied to annual Average daily Traffic Flow (2004 base year)

Traffic Growth Factors	Growth factor
2004	1
2004 - 2005	1.017
2004 - 2006	1.035
2004 - 2007	1.050
2004 - 2008	1.066
2004 - 2009	1.082
2004 - 2010	1.097

**Table A2.3** Predicted background concentrations

Year	Predicted Background Concentrations					
	CO (mgm <sup>-3</sup> )	Benzene (µgm <sup>-3</sup> )	1,3 butadiene (µgm <sup>-3</sup> )	NOx (µgm <sup>-3</sup> )	NO <sub>2</sub> (µgm <sup>-3</sup> )	PM <sub>10</sub> (µgm <sup>-3</sup> )
2004	0.34	0.60	0.25	33.50	21.30	23.10
2005	0.34	0.57	0.25	32.10	20.70	22.80
2010	0.34	0.48	0.25	25.70	18.20	20.90





**Table A2.4** Traffic Data for Hertsmere Borough Council, supplied by Hertsmere Borough Council, 2004

Site	Road Name	Location	AAWD in 2004	% LDV	%HDV	Speed Limit	85th Percentile Speed	
100	M1	Junction 4-5, Bushey	84466	13.71%	7.00%			
111	A1	Barnet Bypass, Dyrham Park	57848	14.74%	6.54%			
112	A1(M)	Junction 1-2, South Mimms	69066					
120	A5183	Elstree Hill North, Elstree	13746					
121	A5183	Watling Street, Radlett	10004	7.45%	2.71%			
151	A41	Tylers Way, Aldenham	22934					
152	A41	Otterspool Way, Bushey	45996					
200	A111	Southgate Road, Potters Bar	21462					
209	A411	London Road, Bushey	16855	9.78%	2.25%	30	36	38
210	A411	Elstree Road, Bushey	10528					
211	A411	Elstree Road, Bushey	14972					
212	A411	Barnet Lane, Borehamwood	20856					
245	A1000	Barnet Road, Kitts End	7868					
251	A1081	St Albans Road, Potters Bar	11222					
268	A409	Heathbourne Road, Bushey	15567					
314	B462	Aldenham Road, Bushey	17556					
315	B462	Hartspring Lane, Bushey	15173					
325	B556	Bell Lane, London Colney	13352					
327	B556	Cecil Road, Potters Bar	10714	12.21%	4.27%			
359	A5135	Elstree Way, Borehamwood	15435					
379	B5378	Allum Lane, Borehamwood	11024					
465	C85	Theobald Street, Borehamwood	9112					
517	A4140	High Road, Bushey	15290					
544	A411	Barnet Lane, Borehamwood	15687					
547	C85	Furzehill Road, Borehamwood	12710					
710	B5378	Black Lion Hill, Shenley	9982			40	44	45
757	C84	Radlett Lane, Shenley	6255			30	45	45
10001	B5378	Shenley Road, Borehamwood	17162	9.49%	2.86%			

LDV = Light Duty Vehicle  
 HDV = Heavy Duty Vehicle

**Table A2.5** Traffic Data and Pollutant Concentration for Hertsmere Borough Council 2005, supplied by NAEI 2004 – DMRB model output

Link No	Road Name	Grid Reference		Distance to nearest receptor (m)	AADT (during 2005)	Speed (kph)	% HDV	2005 Total Concentration						Number of PM <sub>10</sub> exceedences
								CO (mgm <sup>-3</sup> )	Benzene (µgm <sup>-3</sup> )	1,3 butadiene (µgm <sup>-3</sup> )	NOx (µgm <sup>-3</sup> )	NO <sub>2</sub> (µgm <sup>-3</sup> )	PM <sub>10</sub> (µgm <sup>-3</sup> )	
1	M25	522500	201500	30	128181	113	14.5	0.44	0.81	0.91	113.60	38.97	31.60	33.79
2	A41	512500	197500	5	48835	30	4.2	0.60	1.10	0.72	83.51	33.83	30.60	29.77
3	A411	515500	195500	5	9755	30	3.7	0.43	0.65	0.33	55.14	27.60	26.17	15.35
4	A1000	526500	201500	5	21016	30	6.6	0.48	0.71	0.47	74.36	31.02	27.89	20.35
5	A1	522500	199500	5	57426	30	5.2	0.56	1.09	0.83	89.51	34.45	30.01	27.54
6	A411	520500	195500	5	15110	30	2.3	0.49	0.77	0.37	55.48	27.03	25.86	14.53
7	A5183	518500	195500	5	18243	30	3.0	0.50	0.79	0.41	58.12	27.38	26.15	15.31
8	A411	516500	195500	5	22939	30	3.2	0.51	0.80	0.44	64.11	29.22	27.29	18.52
9	M1	515500	196500	30	88133	113	7.0	0.44	0.78	0.53	78.97	32.31	28.87	23.53
10	A5183	516500	200500	5	16392	30	3.6	0.46	0.65	0.38	53.55	25.34	26.04	15.01
11	A1000	526500	200500	5	12603	30	5.0	0.43	0.64	0.36	63.99	29.71	26.43	16.05
12	A5135	520500	197500	5	22482	30	4.5	0.50	0.80	0.46	65.41	28.77	27.19	18.24
13	A41	517500	193500	5	14863	30	3.8	0.49	0.72	0.38	58.03	27.24	26.43	16.07
14	A411	517500	195500	5	12292	30	3.5	0.46	0.71	0.36	54.32	26.67	25.71	14.15
15	M25	525500	200500	50	130947	113	15.7	0.40	0.71	0.68	88.9	35.04	28.63	23
16	A41	516500	195500	5	19221	30	3.3	0.50	0.76	0.41	62.44	28.86	27.04	17.79
17	A41	515500	196500	5	22845	30	4.6	0.50	0.77	0.46	70.02	30.52	28.04	20.83
18	A111	526500	201500	5	17406	30	7.6	0.47	0.67	0.44	75.06	31.15	27.89	20.34
19	A411	513500	195500	5	15366	30	4.5	0.50	0.73	0.40	63.46	28.88	27.25	18.39
20	M1	518500	194500	5	17626	30	7.0	0.51	0.80	0.47	72.52	30.49	27.69	19.73
21	A5135	521500	197500	5	18568	30	3.2	0.49	0.76	0.40	56.27	26.43	25.88	14.59
22	A1	522500	200500	5	11486	30	5.2	0.43	0.61	0.35	65.12	30.39	26.69	16.79
23	A1	522500	200500	5	45939	30	5.2	0.54	0.96	0.71	89.71	35.34	30.00	27.52
24	A41	518500	194500	5	14863	30	3.8	0.50	0.77	0.39	59.23	27.70	26.23	15.53
25	A1000	526500	200500	5	13988	30	5.0	0.45	0.65	0.37	66.75	30.30	26.80	17.10
26	A111	526500	200500	5	17578	30	7.6	0.47	0.68	0.45	80.01	33.01	28.31	21.67
27	A41	513500	197500	5	32086	30	3.4	0.54	0.89	0.53	71.20	31.03	28.78	23.23
28	A411	512500	196500	5	42422	30	2.2	0.58	1.05	0.60	69.49	30.80	28.98	23.89
29	A4008	512500	197500	5	51254	30	2.9	0.60	1.13	0.69	76.91	32.54	29.94	27.29
30	A5183	518500	196500	5	8780	30	4.3	0.43	0.67	0.33	46.74	24.33	24.44	11.10
31	A1081	519500	203500	5	21892	30	6.7	0.47	0.68	0.48	80.71	33.18	28.64	22.76
32	A5183	518500	195500	5	16055	30	3.9	0.50	0.77	0.40	59.99	27.79	26.30	15.70

**Table A2.6** Traffic Data and Pollutant Concentration for Hertsmere Borough Council 2005, supplied by Hertsmere Borough Council – DMRB model output

Link No	Site Code	Road Name	Distance to nearest receptor (m)	AADT (during 2005)	Speed (kph)	% HDV	2005 Total Concentration						Number of PM <sub>10</sub> exceedences
							CO (mgm <sup>-3</sup> )	Benzene (µgm <sup>-3</sup> )	1,3 butadiene (µgm <sup>-3</sup> )	NOx (µgm <sup>-3</sup> )	NO <sub>2</sub> (µgm <sup>-3</sup> )	PM <sub>10</sub> (µgm <sup>-3</sup> )	
33	100	Junction 4-5, Bushey	30	85935	113	7.0	0.45	0.80	0.53	74.6	30.7	28.2	21.4
34	111	Barnet Bypass, Dyrham Park	5	58854	30	6.5	0.60	1.16	0.91	92.74	34.05	30.74	30.32
35	112	Junction 1-2, South Mimms	5	70267	30	7.0	0.61	1.27	1.07	100.26	35.34	31.64	33.95
36	120	Elstree Hill North, Elstree	5	13985	30	3.1	0.48	0.71	0.37	54.30	26.40	25.99	14.88
37	121	Watling Street, Radlett	5	10178	30	2.7	0.44	0.67	0.33	47.35	24.76	25.03	12.46
38	151	Tylers Way, Aldenham	5	23333	30	5.0	0.52	0.81	0.48	68.07	29.38	27.67	19.66
39	152	Otterspool Way, Bushey	5	46796	30	3.0	0.57	1.05	0.64	69.02	29.57	28.12	21.07
40	200	Southgate Road, Potters Bar	5	21835	30	4.4	0.51	0.79	0.46	64.81	28.70	27.30	18.54
41	209	London Road, Bushey	5	17148	30	2.3	0.50	0.75	0.38	54.39	26.42	26.11	15.20
42	210	Elstree Road, Bushey	5	10711	30	3.0	0.45	0.68	0.34	48.86	25.12	25.22	12.92
43	211	Elstree Road, Bushey	5	15232	30	3.6	0.49	0.73	0.38	57.75	27.17	26.42	16.03
44	212	Barnet Lane, Borehamwood	5	21219	30	2.7	0.51	0.79	0.42	57.90	27.21	26.56	16.44
45	245	Barnet Road, Kitts End	5	8005	30	3.0	0.42	0.65	0.31	44.63	24.08	24.61	11.47
46	251	St Albans Road, Potters Bar	5	11417	30	3.3	0.45	0.69	0.35	50.73	25.57	25.46	13.51
47	268	Heathbourne Road, Bushey	5	15838	30	3.2	0.49	0.73	0.38	56.78	26.96	26.33	15.79
48	314	Aldenham Road, Bushey	5	17861	30	2.5	0.50	0.75	0.39	55.48	26.67	26.24	15.55
49	315	Hartspring Lane, Bushey	5	15437	30	2.5	0.49	0.73	0.37	54.16	26.37	26.05	15.03
50	325	Bell Lane, London Colney	5	13584	30	2.5	0.47	0.71	0.36	51.84	25.83	25.71	14.15
51	327	Cecil Road, Potters Bar	5	10900	30	4.3	0.45	0.68	0.35	52.32	25.94	25.59	13.85
52	359	Elstree Way, Borehamwood	5	15703	30	3.3	0.49	0.73	0.38	57.03	27.02	26.35	15.86
53	379	Allum Lane, Borehamwood	5	11216	30	3.1	0.45	0.68	0.34	49.98	25.39	25.36	13.28
54	465	Theobald Street, Borehamwood	5	9270	30	2.5	0.43	0.66	0.32	45.57	24.32	24.78	11.89
55	517	High Road, Bushey	5	15556	30	2.8	0.49	0.73	0.38	55.24	26.61	26.16	15.34
56	544	Barnet Lane, Borehamwood	5	15960	30	2.7	0.49	0.73	0.38	55.14	26.59	26.16	15.34
57	547	Furzehill Road, Borehamwood	5	12931	30	2.5	0.47	0.70	0.35	50.89	25.61	25.57	13.79
58	710	Black Lion Hill, Shenley	5	10156	30	3.1	0.44	0.67	0.33	48.29	24.98	25.12	12.69
59	757	Radlett Lane, Shenley	5	6364	30	3.0	0.41	0.63	0.30	42.06	23.43	24.24	10.64
60	10001	Shenley Road, Borehamwood	5	17460	30	2.9	0.50	0.75	0.39	56.55	26.91	26.34	15.83

# **Appendix 3**

## **Descriptions of screening models and tools**

### **CONTENTS**

#### **Simple screening models**

Design Manual for Roads and Bridges (DMRB)

Guidance for Estimating the Air Quality Impact of Stationary Sources (GSS)

**1. Design Manual for Roads and Bridges (DMRB)** - This screening method was formulated by the former Department of Transport. The method gives a preliminary indication of air quality near roads. The DMRB method requires information on vehicle flow, HDV mix, vehicle speed and receptor-road distances. It contains a useful database of vehicular emission factors for future years.

The method adopts the annual mean concentration as the base statistic. Background pollutant levels are included explicitly in the calculations by adding an amount to the annual mean traffic contribution using the Air Quality Archive (paragraph 6.09) or default values. The model also estimates, from the annual mean PM<sub>10</sub> prediction, the number of days where the PM<sub>10</sub> concentration exceeds the 50µg m<sup>-3</sup> daily mean objective. The latest version of the DMRB nomogram (1.02, dated February 2003) has been used for this assessment. Details of the road layout cannot be specified.

**2. Guidance for Estimating the Air Quality Impact of Stationary Sources (GSS);** this guide provides precalculated dispersion results for stack emissions expressed as nomograms, was published by the Environment Agency (EA) in 1998. The nomograms are based on a large number of computations using ADMS. They cover 10 stack heights, 4 categories of surface roughness, 3 averaging times and 3 climate types. The predicted pollutant concentrations are comparable with the prescribed air quality objectives. The model is limited to a range of stack heights and exit velocities, and cannot treat building wake effects or non-buoyant source releases.

Where such point sources needed to be assessed, the **netcen** point source spreadsheet, based on this methodology has been used. This is available from <http://www.airquality.co.uk/archive/laqm/tools.php>.

# Appendix 4

## Emissions Data

### CONTENTS

**Table A4.1** Authorised Part B processes in Hertsmere Borough Council (excluding petrol stations)

**Table A4.2** Authorised Part B processes in Hertsmere Borough Council – petrol stations

**Table A4.1** Authorised Part B Processes in Hertsmere Borough Council (excluding petrol stations)

Name	Grid Reference	Type of Process	PG Note	Pollutant
Bushey Hall Garage Bushey Hall Drive, Bushey	TQ 123964	Respraying of Road vehicles	PG 6/34	None
Harkness Hall Ltd Station Road, Borehamwood	TQ 192964	Spraying of Cinematographic Screens	PG 6/23	None
National Institute for Biological Standards and Control Blanche Lane, South Mimms	TL 217007	Animal Remains Incineration	PG 5/3	NSR
Spur Shelving Otterspool Way, Watford	TG128978	Powder Coating Process	PG 6/31	NSR
Brent Timer London Road, Bushey	TQ 127954	Chemical Treatment of Timber	PG 6/3	None
Milcars Chester Road, Borehamwood	TQ204969	Respraying of Road vehicles	PG 6/34	None
Jack Rob Motors Ltd Warwick Road, Borehamwood	TQ204969	Respraying of Road vehicles	PG 6/34	None

**Note:** NSR = No Significant Release

**Table A4.2** Authorised Part B Processes in Hertsmere Borough Council - petrol stations

Process = Unloading of Petrol into Storage at Service Stations

PG note = PG 1/14

Name	Grid Reference	Throughput > 2 Million litres per year?	Stage 2 Vapour Recovery fitted?
Esso Petroleum Co Ltd Watford By-Pass, Elstree	TQ174946	Yes	No
Esso Petroleum Co Ltd High Road Bushey	TQ150940	Yes	No
Clarendon Filling Stations Elstree Way, Borehamwood	TQ208971	Unknown	Unknown
BP Express Shopping Ltd High Street, Potters Bar	TL261011	Unknown	Unknown
Elf Oil UK Ltd Elton Way	TQ137972	Unknown	Unknown
Tesco Stores Ltd Shenley Road, Borehamwood	TQ197969	Unknown	Unknown
Total Convenience Store Allum Lane, Elstree	TQ190963	Unknown	Unknown
Malhurst Ltd Theobald Street, Borehamwood	TQ190967	Unknown	Unknown
Falcon Garage (Bushey) Bushey Hall Road	TG119963	Unknown	Unknown
Shell UK Ltd Elstree Way, Borehamwood	TQ201970	Yes	No
Total Convenience Store Walting Street, Radlett	TQ163999	Unknown	Unknown
Murco Service Stations Barnet Road, Potters Bar	TL260006	Unknown	Unknown
Murco Service Stations St Albans Road, South Mimms	TL223012	Unknown	Unknown
Welcome Break Service Area South Mimms Service area, M25	TL227002	Yes	Yes
Tesco Petrol Filling Stations Mutton Lane, Potters Bar	TL258009	Unknown	Unknown

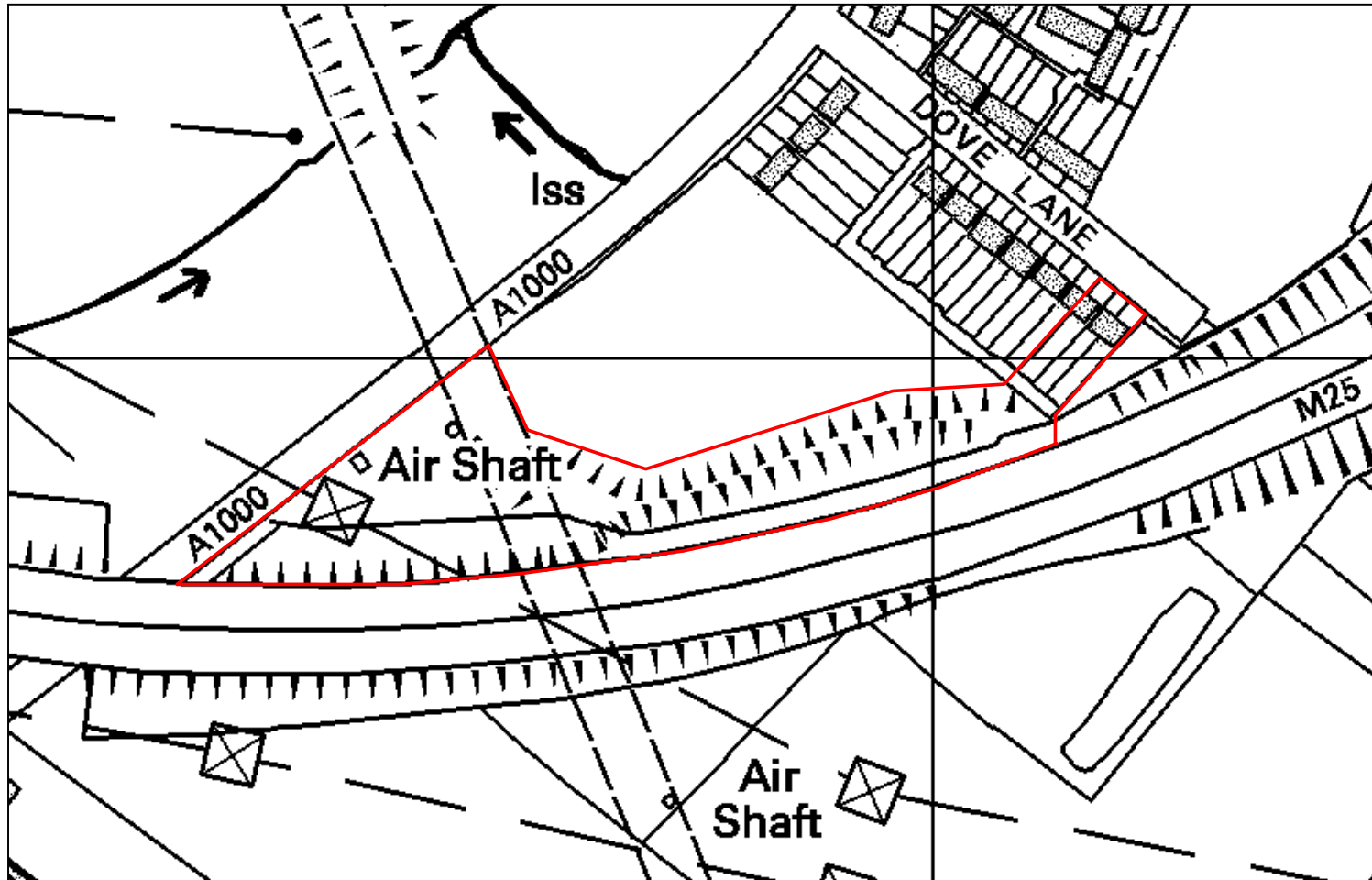


# **Appendix 5**

## AQMAs

**AQMA 1 (525905, 199918)**

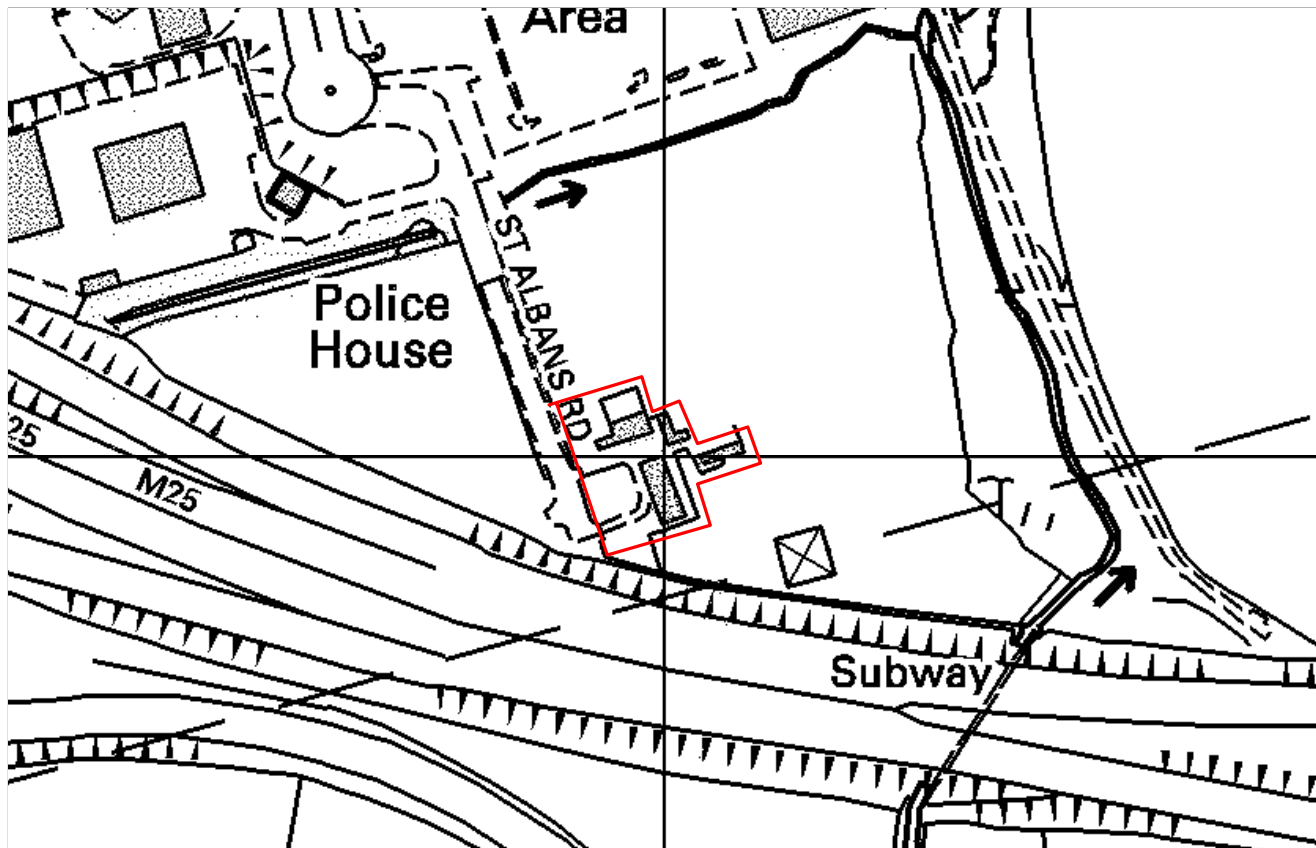
An area comprising the domestic properties 23-27 Dove Lane and caravan site off A1000 Barnet Road.



©Crown copyright. All rights reserved. Hertsmere Borough Council LA077852 2004

**AQMA 2 (523015, 199991)**

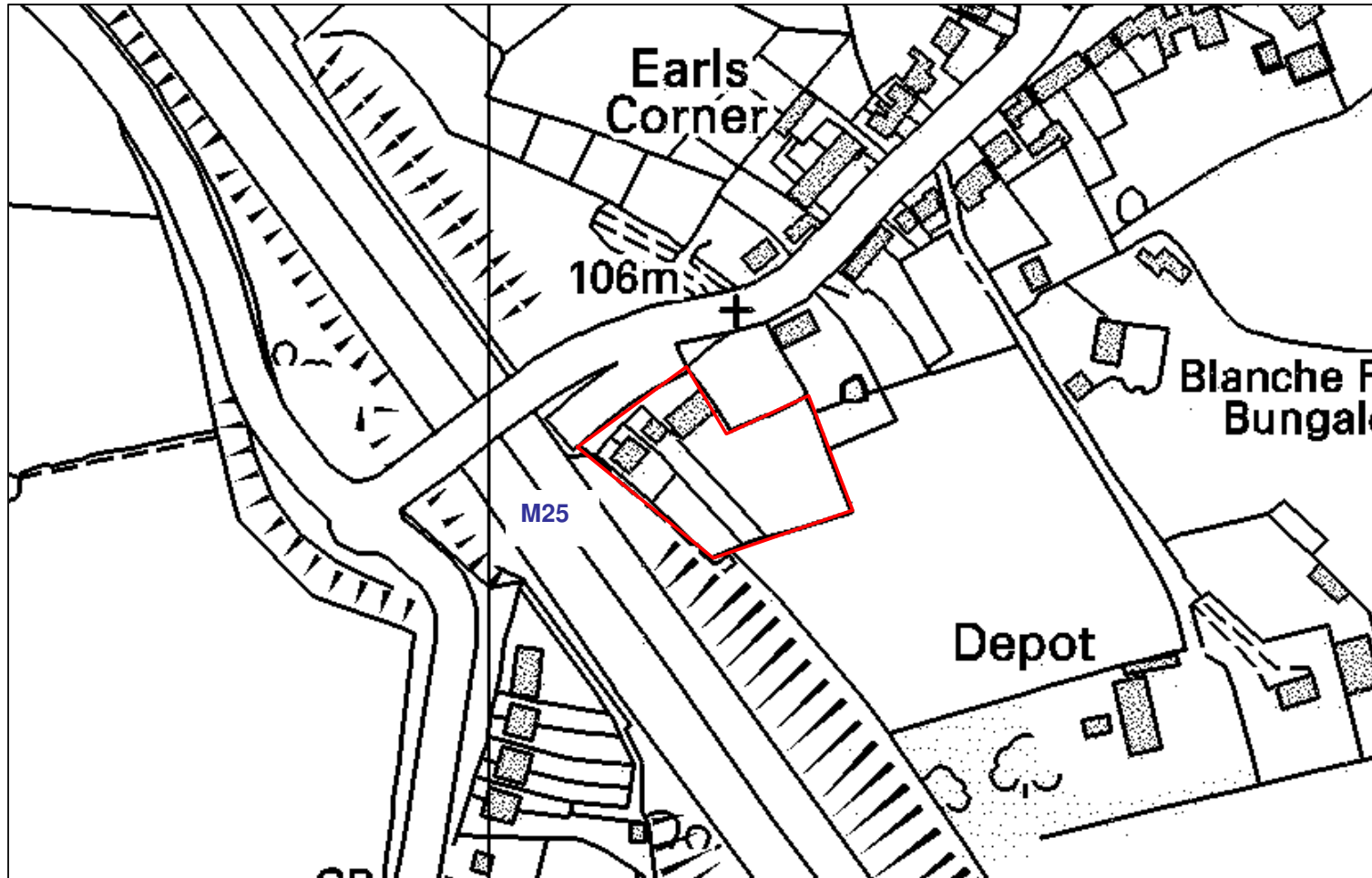
AN AREA COMPRISING THE DOMESTIC PROPERTY KNOWN AS CHARLESTON PADDOCKS, ST ALBANS ROAD, SOUTH MIMMS, POTTERS BAR.



©Crown copyright. All rights reserved. Hertsmere Borough Council LA077852 2004

**AQMA 3 (522063, 200665)**

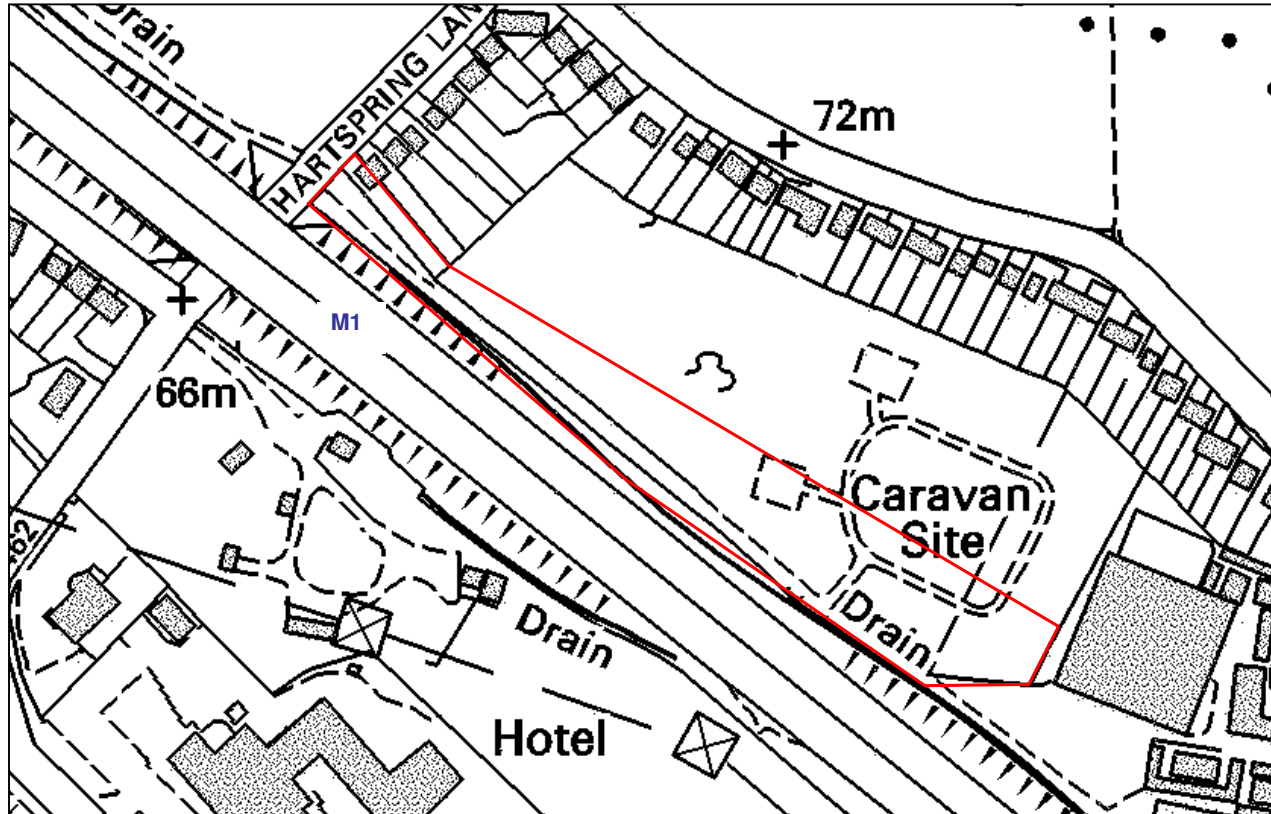
An Area comprising the domestic properties 31-39 Blanche Lane, South Mimms.



©Crown copyright. All rights reserved. Hertsmere Borough Council LA077852 2004

### AQMA 4 (513752, 197661)

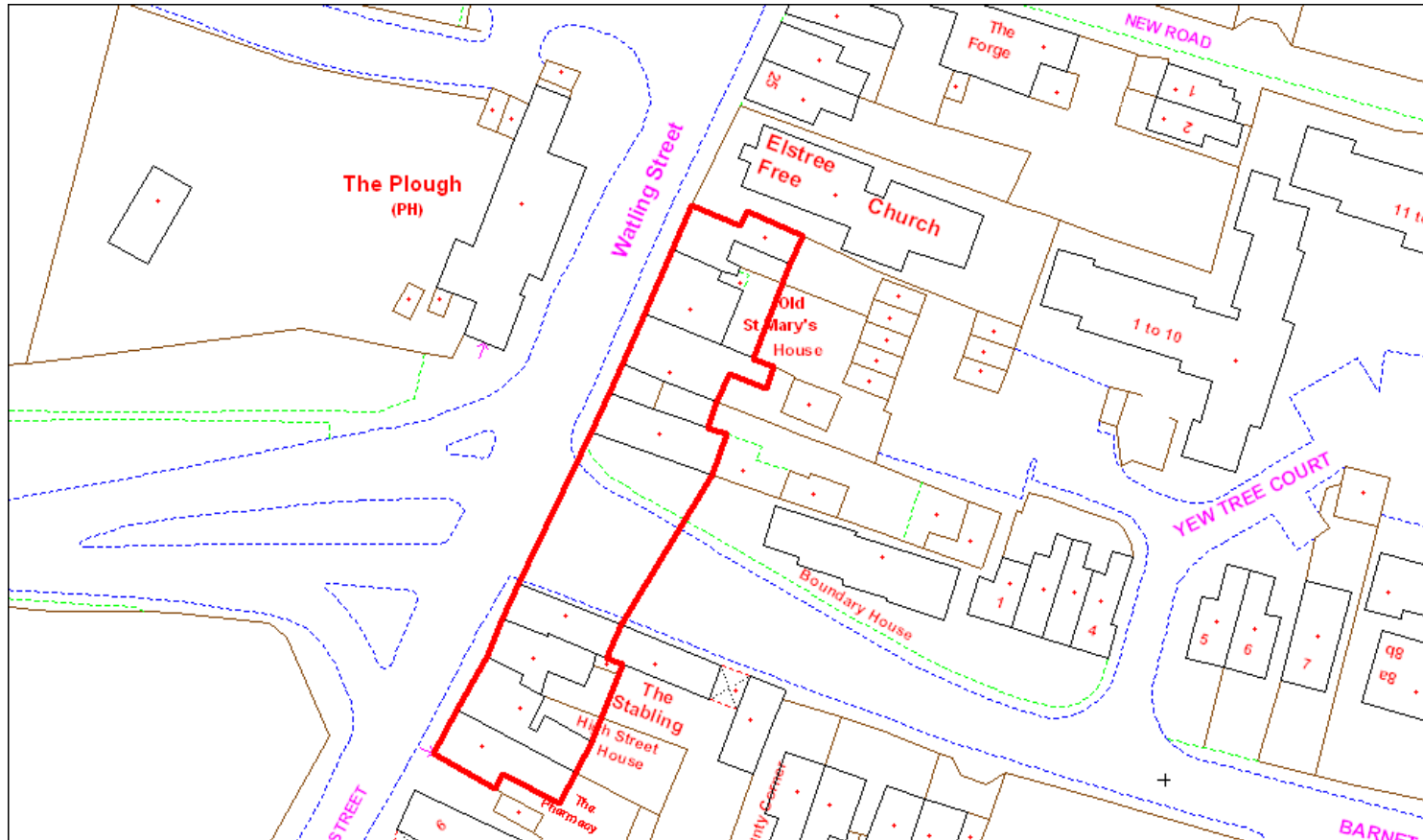
An area comprising the domestic properties 12 Grove Place, Hartspring Lane, Aldenham and caravans numbered 1, 2, 3, 4, 7, 8, 55, 56, 57, 58, 59, 60 within Winfield Caravan site, Hartspring Lane.



©Crown copyright. All rights reserved. Hertsmere Borough Council LA077852 2004

# AQMA 5 (517823, 195267)

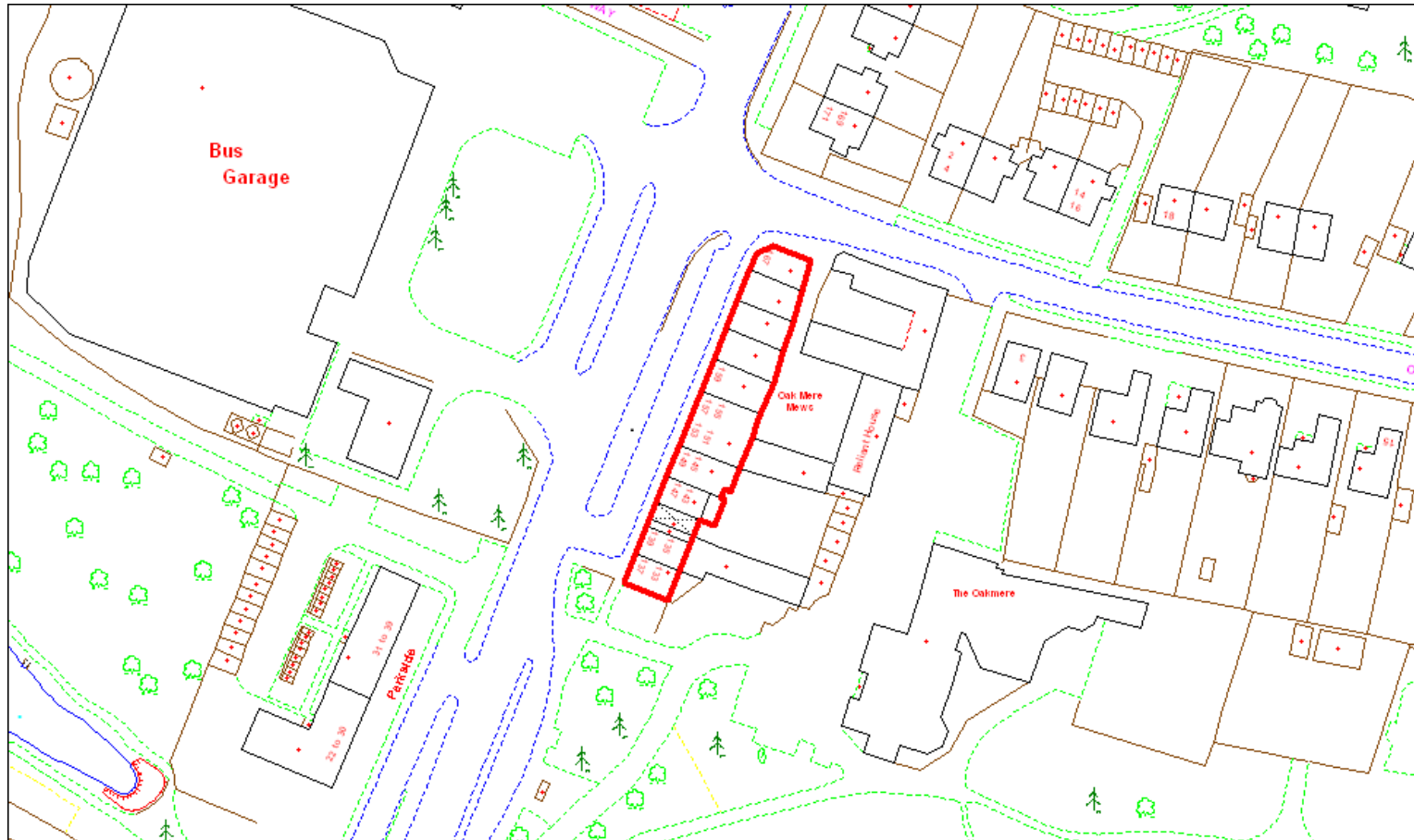
Elstree Cross Road



©Crown copyright. All rights reserved. Hertsmere Borough Council LA077852 2004

## AQMA 6 (526241, 201410)

HIGH STREET, POTTERS BAR IN FRONT OF THE BUS GARAGE



©Crown copyright. All rights reserved. Hertsmere Borough Council LA077852 2004

# **Appendix 6**

## **Report Checklist**

USA Checklist from <http://www.uwe.ac.uk/aqm/review/checklists/usalist.doc>



Updating and Screening Assessment Summary Checklist for **Carbon Monoxide**

<b>Item</b>	<b>Response</b>
• Monitoring data	Monitoring data indicates no exceedance of the objective for CO
• Very busy roads or junctions in built-up areas	No 'very busy roads,' and background concentration is below the threshold

Updating and Screening Assessment Summary Checklist for **Benzene**

<b>Item</b>	<b>Response</b>
Monitoring data outside an AQMA	None
• Monitoring data within an AQMA	None
• Very busy roads or junctions in built up areas	Hertsmere Borough Council does not host any roads that are classified as 'very busy' according to the criteria given in the guidance
• New industrial sources.	None present
• Industrial sources with substantially increased emissions, or new relevant exposure	None present
• Petrol stations	None meeting the criteria with relevant exposure
• Major fuel storage depots (petrol only)	None

Updating and Screening Assessment Summary Checklist for **1,3-butadiene**

<b>Item</b>	<b>Response</b>
• Monitoring data	None
• New industrial sources.	None present
• Industrial sources with substantially increased emissions, or new relevant exposure	None present

Updating and Screening Assessment Summary Checklist for **Lead**

<b>Item</b>	<b>Response</b>
• Monitoring data	None
• New industrial sources.	None
• Industrial sources with substantially increased emissions, or new relevant exposure	None

Updating and Screening Assessment Summary Checklist for **Nitrogen Dioxide**

<b>Item</b>	<b>Response</b>
• Monitoring data outside an AQMA	Marginal exceedances at some kerbside locations with no relevant receptors
• Monitoring data within an AQMA	Exceedances within the AQMAs
• Narrow congested streets with residential properties close to the kerb	None present
• Junctions.	DMRB indicates no exceedances
• Busy streets where people may spend 1-hour or more close to traffic	DMRB indicates no exceedances
• Roads with high flow of buses and/or HGVs.	M25 (15) – DMRB indicates no exceedances
• New roads constructed or proposed since the previous round of R&A	No major road changes
• Roads with significantly changed traffic flows, or new relevant exposure	DMRB indicates no exceedances
• Bus Stations	There are more than 1000 bus movements per day, located in AQMA 6
• New industrial sources.	None present
• Industrial sources with substantially increased emissions, or new relevant exposure	None present
• Aircraft	None present

Updating and Screening Assessment Summary Checklist for **Sulphur Dioxide**

<b>Item</b>	<b>Response</b>
• Monitoring data outside an AQMA	None
• Monitoring data within an AQMA	None
• New industrial sources.	None present
• Industrial sources with substantially increased emissions, or new relevant exposure	None present
• Areas of domestic coal burning	Not relevant
• Small Boilers > 5 MW (thermal).	None identified
• Shipping	Not relevant
• Railway Locomotives	Not relevant

Updating and Screening Assessment Summary Checklist for **PM<sub>10</sub>**

<b>Item</b>	<b>Response</b>
• Monitoring data outside an AQMA	Monitoring data indicates no exceedances
• Monitoring data within an AQMA	No AQMAs declared for PM <sub>10</sub>
• Busy roads and junctions in Scotland	Not in Scotland
• Junctions.	Junctions assessed using DMRB – no exceedances of the 24-hour mean objective
• Roads with high flow of buses and/or HGVs.	M25 assessed – no exceedances of the 24 hour mean objective are indicated
• New roads constructed or proposed since last round of R&A	No major road changes
• Roads with significantly changed traffic flows, or new relevant exposure.	All roads assessed using DMRB
• Roads close to the objective during the second round of Review and Assessment	All roads assessed using DMRB with up to date traffic data. There were no roads close to the objective in the last updating and screening assessment
• New industrial sources.	None present

• Industrial sources with substantially increased emissions, or new relevant exposure	None present
• Areas of domestic solid fuel burning	None present
• Quarries / landfill sites / opencast coal / handling of dusty cargoes at ports etc.	None present
• Aircraft	None present