

NORTH HERTFORDSHIRE DISTRICT COUNCIL

**LOCAL AIR QUALITY MANAGEMENT UPDATING AND SCREENING
ASSESSMENT 2009**

AGGX1971215/BV/AQ/DRAFT

JUNE 2009



**BUREAU
VERITAS**

Move Forward with Confidence

This page is left blank intentionally

DOCUMENT CONTROL SHEET

Issue/Revision	Issue 1	Issue 2		
Remarks	Final Draft	Final Draft 2		
Date	18/05/09	12/06/09		
Submitted to	Tracy Farrell	Tracy Farrell		
Prepared by	Lauren Jones	Lauren Jones		
Signature				
Approved by	Lakhu Luhana	Lakhu Luhana		
Signature				
Project number	AGGX1971215	AGGX1971215		
File reference	Final Draft 1	Final Draft 2		

CONTACT INFORMATION

Contact Name: Tracey Farrell
 Job Title: Environmental Protection Officer
 Address: North Hertfordshire District Council
 Council Offices
 Gernon Road
 Letchworth Garden City
 Hertfordshire
 SG6 3JF

Disclaimer

This Report was completed by Bureau Veritas on the basis of a defined programme of work and terms and conditions agreed with the Client. Bureau Veritas' confirms that in preparing this Report it has exercised all reasonable skill and care taking into account the project objectives, the agreed scope of works, prevailing site conditions and the degree of manpower and resources allocated to the project.

Bureau Veritas accepts no responsibility to any parties whatsoever, following the issue of the Report, for any matters arising outside the agreed scope of the works.

This Report is issued in confidence to the Client and Bureau Veritas has no responsibility to any third parties to whom this Report may be circulated, in part or in full, and any such parties rely on the contents of the report solely at their own risk.

Unless specifically assigned or transferred within the terms of the agreement, the consultant asserts and retains all Copyright, and other Intellectual Property Rights, in and over the Report and its contents.

Any questions or matters arising from this Report should be addressed in the first instance to the Project Manager.

This page is left blank intentionally

TABLE OF CONTENTS

TABLE OF CONTENTS	i
LIST OF TABLES.....	iii
LIST OF FIGURES.....	iii
Executive Summary	4
1 Introduction	5
1.1 Description of Local Authority Area	5
1.2 Purpose of Report.....	5
1.3 Air Quality Objectives	6
1.4 Local Air Quality Management (LAQM).....	8
1.5 Summary of Review and Assessment Undertaken by North Hertfordshire District Council	8
2 Updating and Screening Assessment Methodology	10
2.1 Input Data	12
2.1.1 Traffic Data	12
2.1.2 Background Concentrations	12
3 New Monitoring Data	14
3.1 Summary of Monitoring Undertaken.....	14
3.1.1 Automatic Monitoring Sites.....	16
3.1.2 Non-Automatic Monitoring Data	16
3.2 Comparison of Monitoring Results with AQ Objectives.....	21
3.2.1 Nitrogen Dioxide.....	21
3.2.2 Particles (PM ₁₀)	24
4 Road Traffic Sources.....	26
4.1 Narrow Congested Streets with Residential Properties Close to the Kerb	26
4.2 Busy Streets Where People May Spend 1-hour or More Close to Traffic.....	26
4.3 Roads with a High Flow of Buses and/or Heavy Goods Vehicles	27
4.4 Junctions.....	27
4.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment	28
4.6 Roads with Significantly Changed Traffic.....	28
4.7 Bus and Coach Stations	28
5 Other Transport Sources.....	30
5.1 Airports.....	30
5.2 Railways (Diesel and Steam Trains)	30
5.2.1 Stationary Trains	30
5.2.2 Moving Trains	30
5.3 Ports (Shipping)	30
6 Industrial Sources.....	31
6.1 Industrial Installations	31

6.1.1	New or Proposed Installations for which an Air Quality Assessment Has Been Carried Out	31
6.1.2	Existing Installations Where Emissions Have Increased Substantially or New Relevant Exposure Has Been Introduced	31
6.1.3	New or Significantly Changed Installations with No Previous Air Quality Assessment ..	31
6.2	Major Fuel (petrol) Storage Depots	32
6.3	Petrol Stations	32
6.4	Poultry Farms	32
7	Commercial and Domestic Sources	33
7.1	Biomass Combustion	33
7.1.1	Biomass Combustion - Individual Installations	33
7.1.2	Biomass Combustion – Combined Impacts (PM ₁₀ Emissions)	33
7.2	Domestic Solid-Fuel Burning (Sulphur Dioxide Emissions).....	33
8	Fugitive or Uncontrolled Sources	34
9	Conclusions and Proposed Actions.....	35
9.1	Conclusions from New Monitoring Data	35
9.2	Conclusions from Assessment of Sources	35
9.2.1	Road Sources.....	35
9.2.2	Other Sources	36
9.3	Proposed Actions.....	36
10	References	37
	APPENDICES	38
Appendix 1	- Traffic Data	38
Appendix 2	- Bias Adjustment Factor Calculations.....	42
Appendix 3	- Nitrogen Dioxide Diffusion Tube Results 2008	43
Appendix 4	- NO ₂ Diffusion Tube Annualisation and Bias Corrections	46
Appendix 5	- Facade Projection Calculations	49
Appendix 6	- DMRB Air Quality Assessment Inputs	50
Appendix 7	- DMRB Air Quality Assessment Results.....	51
Appendix 8	- Maps of Locations Where Results Indicate Risk of Exceedance of Air Quality Objectives	52
Appendix 9	- List of Industrial Processes	56

LIST OF TABLES

Table 1– Air Quality Objectives Included in the Air Quality Regulations for the Purpose of Local Air Quality Management	7
Table 2– Summary of Emission Sources and Relevant Pollutants to be Considered as Part of the Updating and Screening Assessment.....	11
Table 3– Details of Automatic Monitoring Sites	16
Table 4– Details of Non- Automatic Monitoring Sites	17
Table 5– Results of Automatic Monitoring for Nitrogen dioxide: Comparison with Annual Mean Objective	21
Table 6– Results of Nitrogen Dioxide Diffusion Tubes ($\mu\text{g}/\text{m}^3$)	23
Table 7– Results of PM_{10} Automatic Monitoring: Comparison with Annual Mean Objective.....	24
Table 8– Results of PM_{10} Automatic Monitoring: Comparison with 24-hour Mean Objective	24
Table 9– Summary Sheet from Volatile Correction Model.....	25

LIST OF FIGURES

Figure 1 – Map of Traffic Count Locations.....	12
Figure 2 – Map of Monitoring Sites in Hitchin, Letchworth and Baldock	14
Figure 3 – Map of Monitoring Sites in Royston	15
Figure 4 – Map of Monitoring Sites in Breachwood Green, Knebworth and Danesbury	15

Executive Summary

Part IV of the Environment Act 1995 places a statutory duty on local authorities to review and assess the air quality within their area and take account of Government Guidance when undertaking such work.

The Updating and Screening Assessment (USA) provides an update with respect to air quality issues within the District. There have been a number of changes since the last (third) round of Review and Assessment which have been taken into account in this assessment; including revised Local Air Quality Management (LAQM) Guidance, modelled background concentration maps, updated NO_x:NO₂ conversion calculator, updated future year calculation tools and updates on specific sources (rail, poultry farms, biomass). The USA has included consideration of new monitoring data and emissions sources, in addition to any significant changes to existing emission sources identified in the previous rounds. The USA considers the seven priority health based air quality objectives as laid down in Regulations and assesses the likelihood that the air quality objectives will be met by their target dates. If the air quality objectives are unlikely to be met, a Detailed Assessment will be required.

Having considered each emission source and presented evidence to support the assessment of each, it is concluded that the air quality objectives for benzene, 1, 3-butadiene, carbon monoxide, lead, PM₁₀ and SO₂ will be met. There is no requirement to undertake a Detailed Assessment for these pollutants. However, there are exceedences of the annual mean nitrogen dioxide objective identified through monitoring data and screening of road traffic sources. Two locations are newly identified, Whitehorse Street/Station Road junction and Nightingale Road. Three other identified locations have been assessed previously in a Detailed Assessment conducted in 2007, which concluded that one location, Whitehorse Street/Hitchin Street, be declared as an AQMA while exceedences at the remaining two locations, Hitchin Hill roundabout and Upper Tilehouse Street/Park Way were deemed unlikely. In light of new road developments (Baldock By-pass) and new TG09 screening methodology, these three locations were revisited in this round of assessment. Monitoring data (though with poor data capture in most cases) and screening of road traffic sources indicated that exceedences of the objectives are likely to occur. It is therefore recommended that these five locations be reassessed at Detailed Assessment stage.

Summary Table

Pollutant	Detailed Assessment Required?	Sources/Location
Benzene	No	
1, 3 - Butadiene	No	
Carbon Monoxide	No	
Lead	No	
Nitrogen Dioxide	Yes	Road traffic sources of nitrogen dioxide. Whitehorse Street/Hitchin Street junction Baldock, Whitehorse Street/Station Road junction Baldock, Hitchin Hill roundabout Hitchin, Upper Tilehouse Street/Parkway junction Hitchin. Nightingale Road Hitchin
PM₁₀	No	
Sulphur Dioxide	No	

1 Introduction

1.1 Description of Local Authority Area

The district of North Hertfordshire is predominantly rural with the bulk of its population located in the four main centres, Hitchin, Letchworth, Baldock and Royston.

The main source of air pollution in the district is road traffic emissions from major roads, notably the A1, A505 and A507. North Hertfordshire suffers from significant congestion, particularly in Baldock. A Detailed Assessment conducted in 2007 predicted that nitrogen dioxide concentrations would exceed the annual mean objective along Whitehorse Street, Baldock and recommended the declaration of an AQMA on this street. The opening of the Baldock By-pass, has gone some way to reducing traffic volumes on busy Baldock roads such as Whitehorse Street and Station Road and reassessment of these areas is necessary to determine what impact this has had on pollution concentrations. Other pollution sources, including commercial, industrial and domestic sources, also make a contribution to background pollution concentrations.

1.2 Purpose of Report

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. The Local Air Quality Management (LAQM) process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedences are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

Bureau Veritas has been commissioned by North Hertfordshire District Council to undertake the Updating and Screening Assessment (USA) 2009, as part of the fourth round of LAQM Review and Assessment.

The following information has been considered within this assessment:

- Relevant legislative background
- Previous Review and Assessment outcomes on air quality under the LAQM regime
- Traffic data provided by North Hertfordshire District Council; For the purposes of the updating and screening assessment, the Highways Agency's DMRB¹ model has been used to assess traffic data
- Industrial, domestic and other non-traffic related source data provided by North Hertfordshire District Council
- Monitoring data for 2008 provided by North Hertfordshire District Council
- Background pollutant concentrations from modelled maps
- Technical guidance and tools provided by Defra²

¹ Highways Agency's Design Manual for Roads and Bridges (DMRB), Volume 11, Section 3, Part 1 Air Quality, May 2007, and accompanying spreadsheet DMRB Screening Method V1.03.xls. July 2007

This report sets out the relevant air quality legislation for air quality, provides a review of local air quality management within the administrative area, assesses the air quality for all relevant sources and then summarises the findings of the assessment and potential need for further Detailed Assessment work.

1.3 Air Quality Objectives

The significance of existing and future pollutant levels are assessed in relation to the national air quality standards and objectives, established by Government. The revised Air Quality Strategy (AQS)³ for the UK (released in July 2007) provides the over-arching strategic framework for air quality in the UK and contains national air quality standards and objectives established by the UK Government and devolved administrations to protect human health. The air quality objectives incorporated in the AQS and the UK Legislation are derived from the Limit Values prescribed in the EU Directives transposed into national legislation by member states.

The Clean Air for Europe (CAFE) programme was initiated in the late 1990s to draw together previous directives into a single EU Directive on air quality. The Directive 2008/50/EC⁴ introduces new obligatory standards for PM_{2.5} for Government but places no statutory duty on local Government to work towards achievement of these new standards.

The Air Quality Standards (England) Regulations 2007⁵ came into force on 15th February 2007 in order to align and bring together in one statutory instrument the Governments obligations to fulfil the requirements of the CAFE Directive.

The objectives for ten pollutants (benzene, 1,3-butadiene, carbon monoxide, lead, nitrogen dioxide (NO₂), sulphur dioxide (SO₂), particulates - PM₁₀ and PM_{2.5}, ozone and Polycyclic Aromatic Hydrocarbons (PAHs)) have been prescribed within the Air Quality Strategy³ based on The Air Quality Standards (England) Regulations 2007.

Part IV of the Environment Act 1995 places a statutory duty on local authorities to periodically review and assess the current and the future air quality within their area – a process known as a Local Air Quality Management (LAQM). The air quality objectives that apply to LAQM are defined in Air Quality Regulations 2000⁶ and Air Quality (England) (Amendment) Regulations 2002⁷ for seven pollutants benzene, 1,3-butadiene, carbon monoxide, lead, NO₂, SO₂, particulates - PM₁₀.

This assessment focuses on those pollutants included in Air Quality (England) (Amendment) Regulations 2002 for the purpose of Local Air Quality Management, in respect of pollutant sources affecting air quality within the Council's administrative area. The objectives set out in the AQS for these pollutants are presented in Table 1.

² Local Air Quality Management Technical Guidance LAQM.TG(09). February 2009. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland

³ The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007), Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland

⁴ Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe

⁵ The Air Quality Standards Regulations 2007, Statutory Instrument No 64, The Stationary Office Limited

⁶ The Air Quality (England) Regulations 2000 (Statutory Instrument 928)

⁷ The Air Quality (England) (Amendments) Regulations 2000 (Statutory Instrument 3043)

The UK Government and the Devolved Administrations have also set new national air quality objectives for PM_{2.5}. These objectives have not been incorporated into LAQM Regulations, and authorities have no statutory obligation to review and assess air quality against them.

The locations where the AQS objectives apply are defined in the AQS as locations outside buildings or other natural or man-made structures above or below ground where members of the public are regularly present and might reasonably be expected to be exposed to pollutant concentrations over the relevant averaging period of the AQS objective. Typically these include residential properties and schools/care homes for longer period (i.e. annual mean) pollutant objectives and high streets for short-term (i.e. 1-hour) pollutant objectives.

Table 1– Air Quality Objectives Included in the Air Quality Regulations for the Purpose of Local Air Quality Management

Pollutant	Objective	Concentration measured as	Date to be achieved by and maintained thereafter
Benzene All authorities	16.25 µg/m ³	running annual mean	31.12.2003
Authorities in England and Wales only	5.00 µg/m ³	annual mean	31.12.2010
1,3 Butadiene All authorities	2.25 µg/m ³	running annual mean	31.12.2003
Carbon monoxide Authorities in England, Wales and Northern Ireland only	10.0 µg/m ³	maximum daily running 8-hour mean	31.12.2003
Lead All authorities	0.5 µg/m ³	annual mean	31.12.2004
	0.25 µg/m ³	annual mean	31.12.2008
Nitrogen dioxide^a All authorities	200 µg/m ³ , not to be exceeded more than 18 times a year	hourly mean	31.12.2005
	40 µg/m ³	annual mean	31.12.2005
Particles (PM₁₀)^b (gravimetric) All authorities	50 µg/m ³ , not to be exceeded more than 35 times a year	24 hour mean	31.12.2004
	40 µg/m ³	annual mean	31.12.2004
Sulphur dioxide All authorities	350 µg/m ³ not to be exceeded more than 24 times a year	1 hour mean	31.12.2004
	125 µg/m ³ not to be exceeded more than 3 times a year	24 hour mean	31.12.2004
	266 µg/m ³ not to be exceeded more than 35 times a year	15 minute mean	31.12.2005

^a EU Limit values in respect of nitrogen dioxide to be achieved by 1st January 2010. There are, in addition, separate EU limit values for carbon monoxide, sulphur dioxide, lead and PM₁₀, to be achieved by 2005, and benzene by 2010.

^b Measured using the European gravimetric transfer sampler or equivalent.

1.4 Local Air Quality Management (LAQM)

As established by the Environment Act 1995 Part IV, all local authorities in the UK are under a statutory duty to undertake an air quality assessment within their area and determine whether they are likely to meet the air quality objectives set down by Government for a number of pollutants. The process of Review and Assessment of air quality undertaken by local authorities is set out under the Local Air Quality Management (LAQM) regime and involves a phased three yearly assessment of local air quality. Where the results of the Review and Assessment process highlight that problems in the attainment of health-based objectives for air quality will arise, the authority is required to declare an Air Quality Management Area (AQMA) – a geographic area defined by high levels of pollution and exceedences of health-based standards.

The LAQM regime was first set down in the 1997 National Air Quality Strategy (NAQS)⁸ and introduced the idea of local authority 'Review and Assessment'. The Government subsequently published policy and technical guidance related to the Review and Assessment processes in 1998. This guidance has since been reviewed and the latest documents include Policy Guidance (LAQM.PG (09))⁹ and Technical Guidance (LAQM.TG (09))¹⁰. The guidance lays down a progressive, but continuous, framework for the local authorities to carry out their statutory duties to monitor, assess and review air quality in their area and produce action plans to meet the air quality objectives.

Defra and the Devolved Administrations released the latest Policy and Technical Guidance in February 2009, in anticipation of the fourth round of Review and Assessment. The fourth round begins with this USA, required to be completed by local authorities by the end of April 2009, and builds upon the Council's previous work in the first three rounds.

1.5 Summary of Review and Assessment Undertaken by North Hertfordshire District Council

Between 1999 and 2003, North Hertfordshire District Council undertook its First Round of Review and Assessment of air quality. The First Round assessments concluded that all pollutant levels complied with the AQS objectives and no further assessment was required.

The Second Round of Review and Assessment began with a USA in 2003. The report concluded that there was still no risk of exceeding the AQS objectives. As North Hertfordshire District Council did not have to proceed to a Detailed Assessment, an annual air quality Progress Report was required in the following years until the Third Round of Review and Assessment.

North Hertfordshire District Council completed its annual air quality Progress Report in 2004 and 2005. Both reports concluded that the AQS objectives were still being met and no further action was required.

The Third Round of Review and Assessment began with a USA in 2006 (published in April 2007), which provided an update with respect to air quality issues within the District since the previous round. There were a number of changes made to the technical guidance for the Review and Assessment process since the Second Round, which were taken into account for this assessment.

⁸ DoE, 1997, 'The United Kingdom National Air Quality Strategy', The Stationary Office

⁹ Policy Guidance LAQM.PG(09) (2009), Part IV of the Environment Act 1995, Local Air Quality Management, Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland, The Stationery Office

¹⁰ Technical Guidance LAQM.TG (09) (2009), Part IV of the Environment Act 1995, Local Air Quality Management, Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland, The Stationery Office

Having considered each pollutant, it was concluded that the air quality objectives for benzene, 1, 3-butadiene, carbon monoxide, lead, and SO₂ were still being met. There continues to be no requirement to undertake a Detailed Assessment for these pollutants or to consider any AQMA.

However, updated monitoring data for year 2005 showed that three diffusion tubes exceeded the NO₂ annual mean AQS objective; two in Hitchin (one on Stevenage Road, near the Hitchin Hill roundabout, and one near the Park Way/Upper Tilehouse Street junction), and one at Hitchin Street/Whitehorse Street/High Street junction in Baldock. Although both diffusion tubes in Hitchin are kerbside sites, therefore not relevant of public exposure, the estimated concentrations at the façades of nearby properties showed that there was still a risk of exceeding the NO₂ annual mean AQS objective at these properties.

Although no monitoring data was available for PM₁₀, the predicted concentrations based on the DMRB screening tool showed that the daily mean PM₁₀ AQS objective was likely to be exceeded at the Park Way/Upper Tilehouse Street junction.

Therefore, it was recommended that a Detailed Assessment be carried out for these areas. The Detailed Assessment concluded that an AQMA should be declared at the Hitchin Street/Whitehorse junction in Baldock, encompassing all properties along Whitehorse Street (up to the junction with Clothall Road) and properties along Hitchin Street (up to the junction with 'The Gardens'). It was also recommended that properties along High Street (up to number 8) should also be included in the AQMA.

The Detailed Assessment concluded that it was not necessary to declare an AQMA at the Hitchin Hill roundabout, or Park Way/Upper Tilehouse Street junction in Hitchin. However, it was recommended that additional diffusion tubes be installed at these locations to confirm the findings of the dispersion modelling.

At the time of writing this report, the Hitchin Street/Whitehorse junction AQMA has not been formally declared as it was anticipated that a reduction in traffic volumes resulting from the redirection of traffic over the Baldock By-pass (opened in 2006) would reduce pollution in this area. As such, no Air Quality Action Plan or Air Quality Strategy has been produced at this stage.

2 Updating and Screening Assessment Methodology

The USA is intended to identify any significant changes that may have occurred since the previous rounds of Review and Assessment were completed. This includes new monitoring data, new or changed emissions sources (either locally or in neighbouring authorities), or any other local changes that might affect air quality e.g. new relevant exposure. The assessment builds on the previous Review and Assessment work undertaken by local authorities.

The USA involves a checklist approach that considers all significant emissions sources relevant to the Air Quality Objectives. The checklists are broadly the same as in the previous rounds, but have been re-ordered so that they follow a source-by-source rather than pollutant-by-pollutant approach. This is to reduce repetition within the screening process for those local authorities that do not have all the listed sources within their area. These can more easily be discounted at an early stage.

A summary of the emission source categories for the Updating and Screening checklists is provided below. The detailed checklists for each source type are then set out in the following sections, as per the methodology provided in Chapter 5 of the Technical Guidance LAQM.TG (09).

The air quality assessment for road traffic emissions sources has been undertaken using the Highways Agency's DMRB¹ model. NO₂ concentrations have been calculated based on the updated NO_x:NO₂ conversion method provided on behalf of Defra as part of the LAQM.TG(09) tools.

For other sources, the checklist approach to screening and relevant LAQM.TG(09) nomograms have been utilised.

Table 2– Summary of Emission Sources and Relevant Pollutants to be Considered as Part of the Updating and Screening Assessment

Reference No.	Emission Sources to be Assessed	Relevant Pollutants
A. Road Transport Sources		
A.1	Narrow congested streets with residential properties close to the kerb	Nitrogen dioxide
A.2	Busy streets where people may spend 1-hour or more close to traffic	Nitrogen dioxide
A.3	Roads with a high flow of buses and/or HGVs.	Nitrogen dioxide, PM ₁₀
A.4	Junctions (including busy roads and junctions in Scotland and Northern Ireland)	Nitrogen dioxide, PM ₁₀
A.5	New roads constructed since the last round of review and assessment	Nitrogen dioxide, PM ₁₀
A.6	Roads/junctions identified as being close to the objective during the previous round of review and assessment	Nitrogen dioxide, PM ₁₀
A.7	Roads with significantly changed traffic flows	Nitrogen dioxide, PM ₁₀
A.8	Bus and coach stations	Nitrogen dioxide
B: Other Transport Sources		
B.1	Airports	Nitrogen dioxide
B.2	Railway (diesel and steam trains)	Sulphur dioxide, nitrogen dioxide
B.3	Ports (shipping)	Sulphur dioxide
C: Industrial Sources		
C.1	Industrial processes (new processes and those with significantly increased emissions)	Benzene, 1,3-butadiene, lead, nitrogen dioxide, sulphur dioxide, PM ₁₀
C.2	Major petrol storage depots	Benzene
C.3	Petrol Stations	Benzene
C.4	Poultry farms	PM ₁₀
D: Commercial and Domestic Sources		
D.1	Biomass combustion	Nitrogen dioxide, PM ₁₀
D.2	Domestic solid-fuel burning	Sulphur dioxide
E: Fugitive or Uncontrolled Sources		
E.1	Quarries, landfill sites, opencast coal mining, waste transfer sites, materials handling (i.e. ports, major construction sites)	PM ₁₀

2.1 Input Data

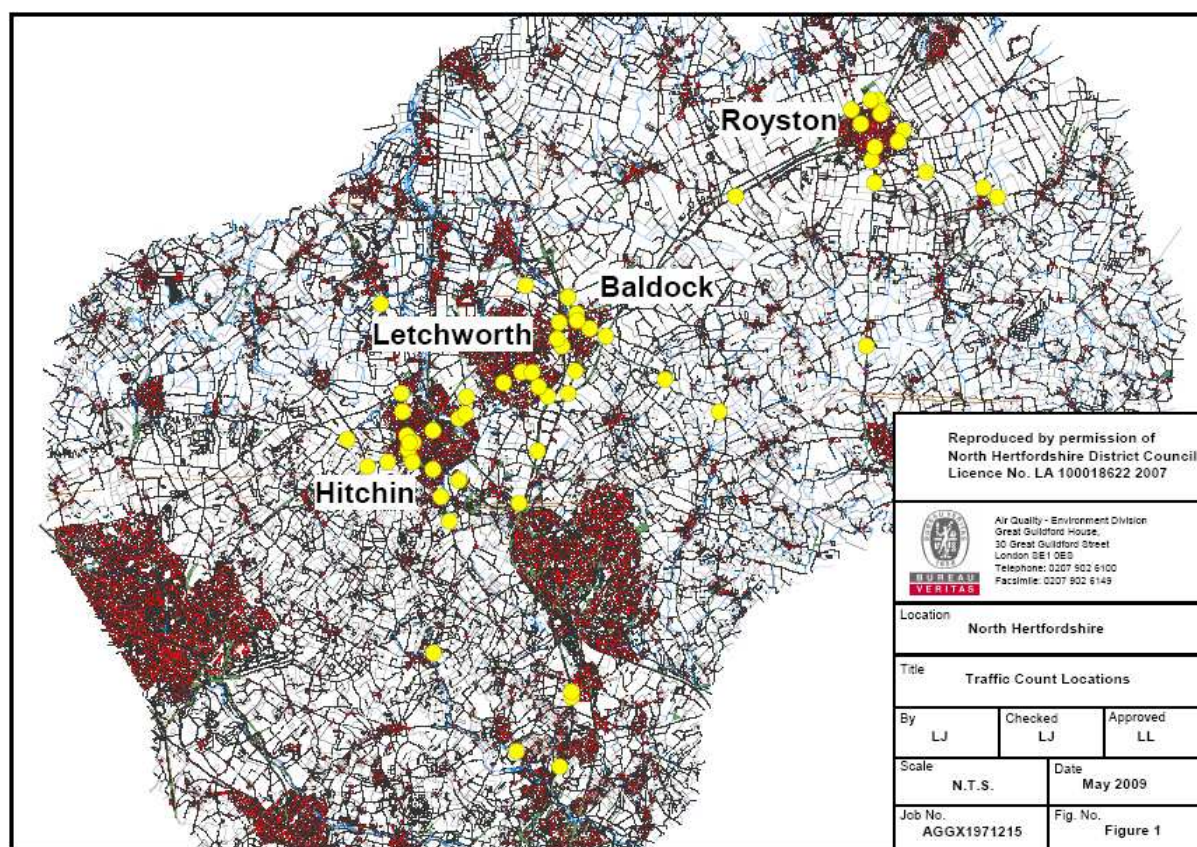
2.1.1 Traffic Data

North Hertfordshire District Council provided the annual average daily traffic flows (AADT) and speed data used in this assessment, including relevant projection factors to the baseline year 2008.

Where speed data has not been available, speeds have been based on speed limits, modified according to local conditions to take account of congestion and stop/start vehicle movements at junctions. Speeds were reduced at busy junctions to 20kph to reflect the higher emissions of queuing traffic.

Appendix 1 contains the tabular summary of traffic data provided for the USA for use in the DMRB model.

Figure 1 – Map of Traffic Count Locations



2.1.2 Background Concentrations

The DMRB model calculates the pollutant concentrations due to road traffic emissions only. The user must then add the background concentrations (arising from sources other than traffic) to derive the total pollutant concentrations at the relevant receptors modelled.

The background concentrations can be obtained either from appropriate monitoring stations or from Defra maps of modelled background pollutant concentrations. These maps are available at a resolution of 1x1 km for the entire UK. Maps are provided for future years' background pollutant concentrations. The maps can be obtained from the UK Air Quality Information Archive⁹. The maps have been updated from the previous round of Review and

Assessment as part of the LAQM.TG (09) tools released in February 2009. Background concentrations used in the DMRB model runs are shown in Appendix 6.

Section 3 reviews and assesses all new monitoring data in order to determine whether the air quality objectives are at risk of exceedance.

Figure 2 – Map of Monitoring Sites in Hitchin, Letchworth and Baldock

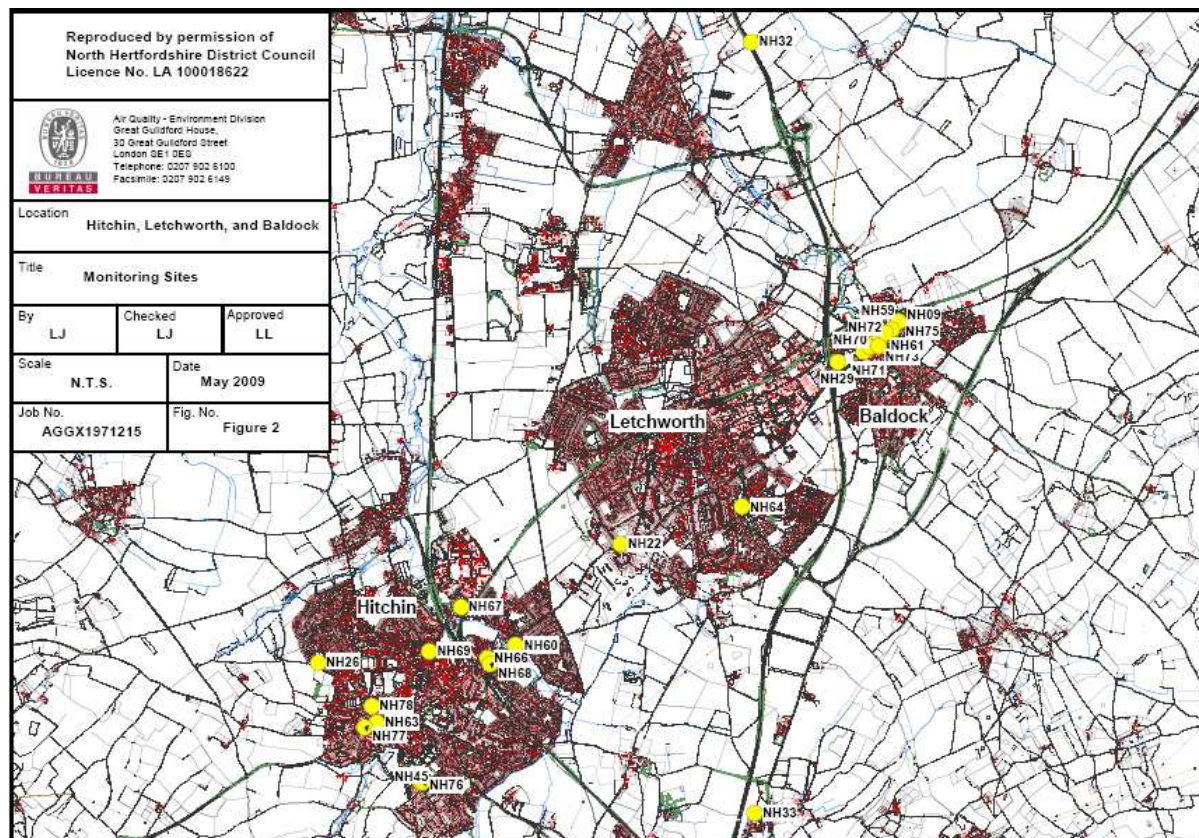


Figure 3 – Map of Monitoring Sites in Royston

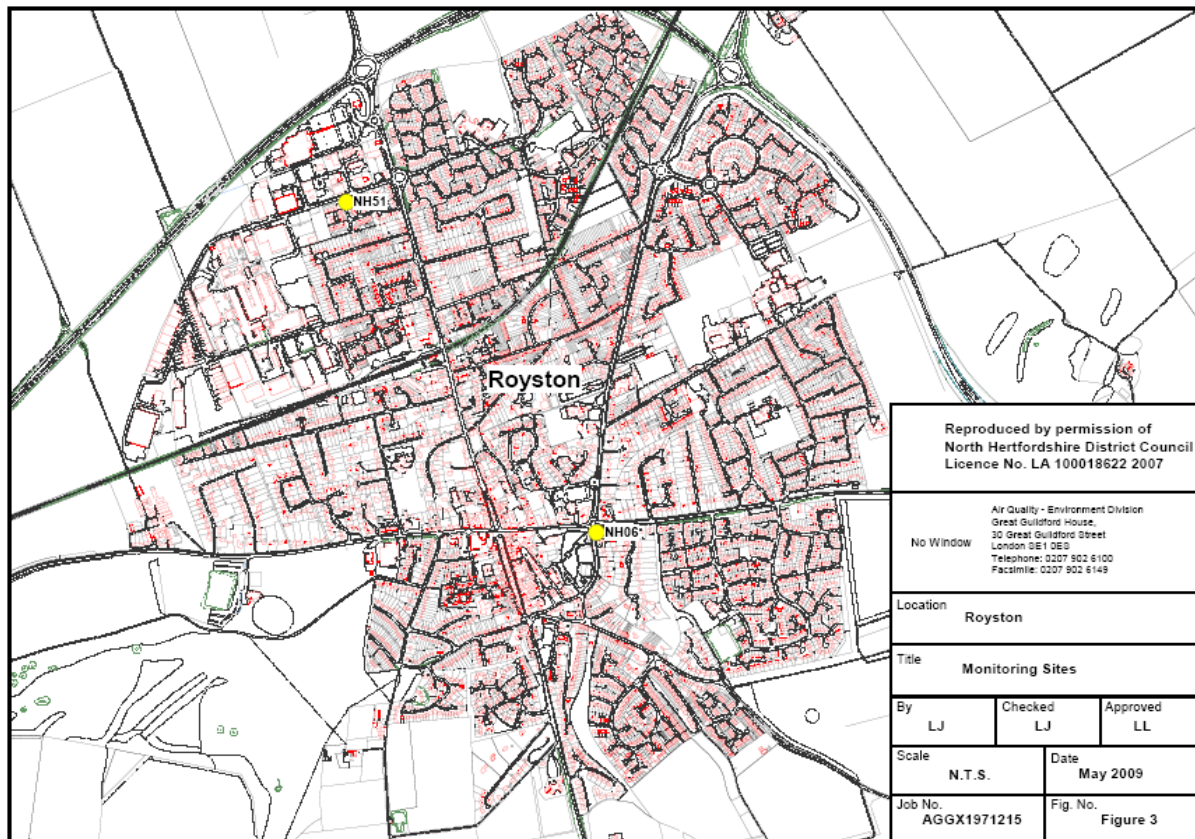
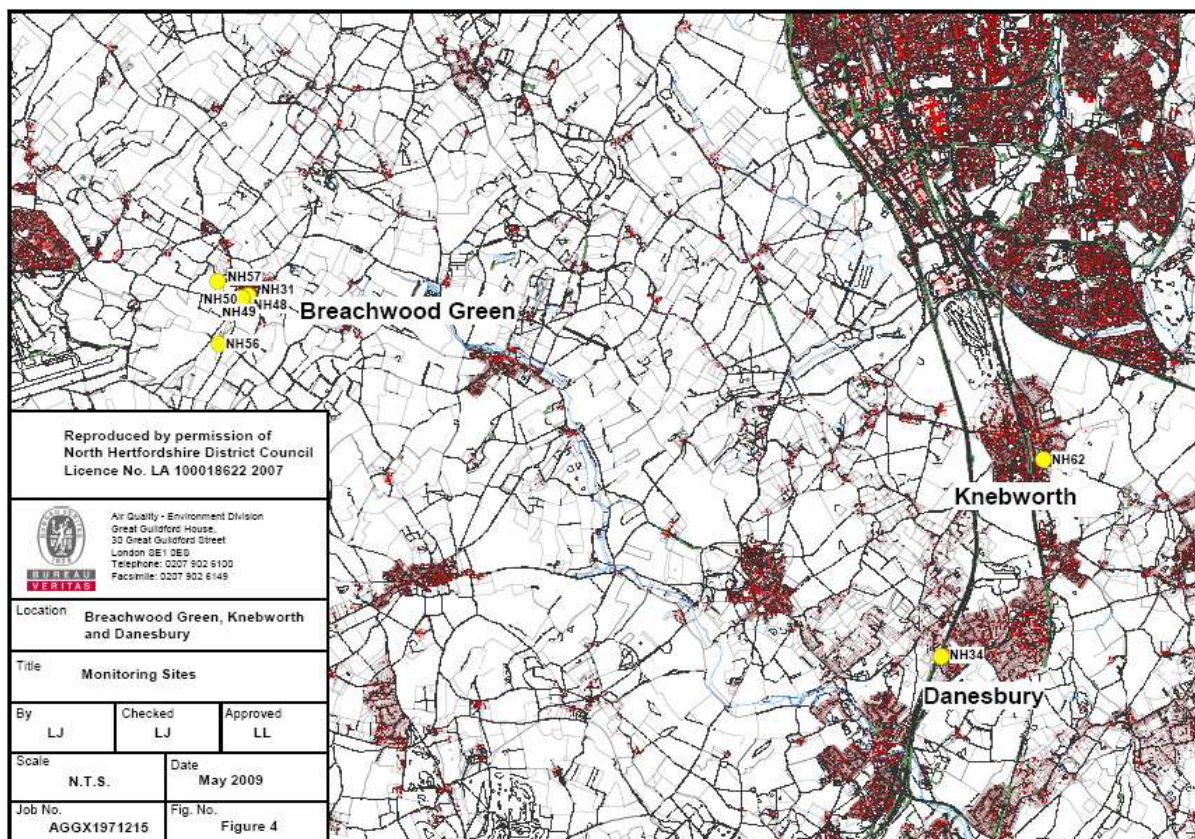


Figure 4 – Map of Monitoring Sites in Breachwood Green, Knebworth and Danesbury



3.1.1 Automatic Monitoring Sites

This section provides details of automatic monitoring carried out in 2008, the year covered by this report.

Table 3– Details of Automatic Monitoring Sites

Site Name	Site Type	OS Grid Ref (x,y)	Pollutants Monitored	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to Kerb of Nearest Road (N/A if not applicable)	Worst-case Location?
Breachwood Green	Urban background	515400, 222100	NO ₂ , PM ₁₀	No	N (38m)	N/A	No

There is currently automatic monitoring of NO₂ undertaken by North Hertfordshire District Council at one location in the area, Breachwood Green urban background site. The Quality Assurance/Quality Control (QA/QC) procedures for the HBAQMN are equivalent to the UK Automatic Urban and Rural Network (AURN) procedures. The data from this site for 2006, 2007 and 2008 is presented in Table 5. The data for 2008 is not fully ratified.

There are triplicate NO₂ diffusion tubes co-located at the Breachwood Green site, however, data capture was low for 2008 and therefore the co-location data was not used for calculation of the bias adjustment factor. The monitoring results for 2006, 2007 and 2008 for these sites are shown in Table 6.

There is currently continuous monitoring of particles (PM₁₀) undertaken by North Hertfordshire District Council at one location in the area, the Breachwood Green urban background site using a Tapered Element Oscillating Microbalance (TEOM). The Quality Assurance/Quality Control (QA/QC) procedures for the site are equivalent to the UK Automatic Urban and Rural Network (AURN) procedures.

3.1.2 Non-Automatic Monitoring Data

Details of the non-automatic monitoring undertaken in the district are shown below.

Table 4– Details of Non- Automatic Monitoring Sites

Site No.	Location	Site Type	X	Y	Pollutant Monitored	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to Kerb of Nearest Road (N/A if not applicable)	Worst-case Location ?
NH06	Town Hall Royston	Kerbside	535900	240700	NO ₂	No	N-47m	8m	No
NH09	Grosvenor Rd Baldock	Intermediate	524740	234164	NO ₂	No	N-9.4m	2.7m	No
NH22	Baldock Road Letchworth	Kerbside	521233	231349	NO ₂	No	N-22.5m	3.2m	No
NH26	Redhill Road Hitchin	Intermediate	517422	229848	NO ₂	No	Y-7.5m*	1.1m	No
NH29	Gardens to Hopewell Road Baldock	Intermediate	523972	233652	NO ₂	No	Y-25.6m	40m	No
NH31	Playing Fields Breachwood Green	Background	515171	221930	NO ₂	No	N-85m	113m	No
NH32	Stotfold Road Hinxworth	Kerbside	522878	237694	NO ₂	No	N	6.8m	No
NH33	Turf Lane Graveley	Background	522921	227950	NO ₂	No	N-15.1m	0.1m	Yes
NH34	Gwynfa Close Danesbury	Intermediate	523910	217364	NO ₂	No	N-34.3m	0.1m	Yes
NH45	Stevenage Road Hitchin	Kerbside	518708	228347	NO ₂	No	Y-3.5m*	0.1m	Yes
NH48	Breachwood Green	Background	515092	221903	NO ₂	No	N-57m	37m	No
NH49	Colocated with NH48	Background	515092	221903	NO ₂	No	N-57m	37m	No
NH50	Colocated with NH48	Background	515092	221903	NO ₂	No	N-57m	37m	No
NH51	Minster Road Royston	Kerbside	535111	241744	NO ₂	No	Y-4.9m	4.5m	No
NH56	Lye Hill Breachwood Green	Kerbside	514805	221320	NO ₂	No	N-19m	0.7m	Yes

* The measurement was taken from the receptor to the kerb rather than to the monitoring site. The Monitor is on the opposite side and is considered representative of both sides of the road.

Table 4– Details of Non- Automatic Monitoring Sites (Continued)

Site No.	Location	Site Type	X	Y	Pollutant Monitored	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to Kerb of Nearest Road (N/A if not applicable)	Worst-case Location ?
NH57	Medlow House Breachwood Green	Kerbside	514786	222112	NO ₂	No	N-9.6m	27.5m	No
NH59	NH04a Clothall Road Baldock	Kerbside	524649	234061	NO ₂	No	Y-1.7m*	2.4m	No
NH60	NH13a Willian Road Hitchin	Kerbside	519910	230076	NO ₂	No	Y-5.7m	3.1m	No
NH61	NH53a Whitehorse Street Baldock	Kerbside	524428	233882	NO ₂	No	Y-0.5m	0.9m	Yes
NH62	NH54a London Road Knebworth	Kerbside	525200	219859	NO ₂	No	N-14.1m	0.6m	Yes
NH63	NH02a Library Hitchin	Kerbside	518160	229092	NO ₂	No	Y-44.7m	6.6m	No
NH64	NH03a Letchworth Gate	Kerbside	522764	231825	NO ₂	No	Y-72m	10.5m	No
NH66	Meadowbank Hitchin	Kerbside	519555	229909	NO ₂	No	N-12.7m	1.4m	No
NH67	Cadwell Court Hitchin	Kerbside	519225	230553	NO ₂	No	N-10m	2.8m	No
NH68	40 Byron Close Hitchin	Kerbside	519587	229835	NO ₂	No	N-9m	4.7m	No
NH69	64 Grove Road Hitchin	Kerbside	518821	229993	NO ₂	No	Y-0.6m	5m	Yes
NH70	Nr Bus Stop Hitchin Street Baldock	Kerbside	524298	233784	NO ₂	No	Y-2.2m	0.1m	Yes
NH71	Puddleducks Hitchin St Baldock	Kerbside	524375	233844	NO ₂	No	Y-1.7m	1.3m	No
NH72	Rose Crown Whitehorse St Baldock	Kerbside	524502	233948	NO ₂	No	Y-2.7m	2.5m	No
NH73	os Satchells High St Baldock	Kerbside	524486	233856	NO ₂	No	Y-2.2m	1.0m	Yes

* The measurement was taken from the receptor to the kerb rather than to the monitoring site. The Monitor is on the opposite side and is considered representative of both sides of the road.

Table 4– Details of Non- Automatic Monitoring Sites (Continued)

Site No.	Location	Site Type	X	Y	Pollutant Monitored	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to Kerb of Nearest Road (N/A if not applicable)	Worst-case Location ?
NH75	Nr UnRef Church Whitehorse St Baldock	Kerbside	524574	234022	NO ₂	No	Y-3.6m	1.8m	No
NH76	Dower Court Hitchin	Kerbside	518738	228338	NO ₂	No	Y-13.7m	0.1m	Yes
NH77	Upper Tilehouse Street Hitchin	Kerbside	518006	229032	NO ₂	No	Y-7.3m	0.1m	Yes
NH78	West Hill Hitchin	Kerbside	518099	229299	NO ₂	No	Y-3.7m	1.9m	No

3.1.2.1 Nitrogen Dioxide Diffusion Tube Data

In addition to continuous monitoring, North Hertfordshire District Council undertook monitoring at 34 NO₂ diffusion tubes sites in 2008. The diffusion tubes are supplied and analysed by Harwell Scientifics utilising the 50% Triethanolamine (TEA) in acetone preparation method. Harwell Scientifics participate in the Workplace Analysis Scheme for Proficiency (WASP) for NO₂ diffusion tube analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO₂ concentrations reported are of a high calibre. The lab follows the procedures set out in the Harmonisation Practical Guidance.

With regard to the application of a bias adjustment factor for the diffusion tubes, the technical guidance LAQM.TG (09) and Review and Assessment Helpdesk recommends use of a local bias adjustment factor where available and relevant to diffusion tube sites. North Hertfordshire District Council has one (triplicate) diffusion tube co-location study at the Breachwood Green background site. For 2006 and 2007 data, the bias adjustment factors 0.78 and 0.80 respectively, have been taken from the Council's previous LAQM reports. For 2008, the bias adjustment factor, 0.84, was obtained from the bias adjustment spreadsheet version 05/09 downloaded from the Review and Assessment Helpdesk website¹¹ as the local co-location study had insufficient data capture (NH48=42%, NH49=33%, NH50=25%). The full calculations of bias adjustment for 2008 are shown in Appendix 2.

Diffusion tube data capture for 2008 was poor for most sites. In some instances this can be explained by new site installations such as those installed in July 2008 (NH76, NH77, NH78) and those installed in September 2008 (NH71, NH72, NH73, NH75). Sites NH59 and NH61 suffered losses due to vandalism and removal of street lamps, to which they had been fixed, during a four month period of road works. Data available at these two sites during December 2008 should be treated with caution as road works near by may have affected results.

As mentioned above for many tubes data capture was low. Hence, annualisation has been carried out for the sites having less than 9 months data capture. The annualisation has been undertaken using data from seven automatic monitoring background sites. The details of the automatic sites used and the annualisation results are presented in appendix 4.

¹¹ <http://www.uwe.ac.uk/aqm/review/>

3.2 Comparison of Monitoring Results with AQ Objectives

3.2.1 Nitrogen Dioxide

3.2.1.1 Automatic Monitoring Data

The 2008 data shows that there have been no exceedences of the annual mean NO₂ objective at the Breachwood Green urban background site.

Table 5– Results of Automatic Monitoring for Nitrogen dioxide: Comparison with Annual Mean Objective

Site ID	Location	Within AQMA?	Description	Annual mean concentrations (µg/m ³)		
				2006	2007	2008*
N/A	Breachwood Green Urban Background	No	Annual Mean NO ₂ > 40 µgm ³	16	18	19
			NO ₂ Hourly Mean > 200 µgm ³ for more than 18 times per year	0	0	0
			% Data Capture	91	96	98

*Data for 2008 is provisional only.

3.2.1.2 Diffusion Tube Monitoring Data

The NO₂ diffusion tube data are summarised in the table below. The full dataset (monthly mean values) are included in Appendix 3.

The 2008 diffusion tube results show seventeen sites, near to or exceeding the annual mean NO₂ objective. Of these, two are near the junction of Whitehorse Street and Hitchin Street, a junction that was recommended in 2007 DA for inclusion in an AQMA. A further five are within areas that underwent a Detailed Assessment in 2007 which concluded that these areas did not require AQMA designation. Of the remaining ten, only four roadside sites have relevant exposure. These sites are in Hitchin on Woolgrove Road (NH67), Byron Close (NH68), Grove Road (NH69) and Old Park Road (NH78). These sites have been considered with respect to relevant exposure and projection from roadside to façade using the LAQM.TG(09) NO₂ with distance from roads calculator (Appendix 5) to assess the risk of exceedance of the annual mean objective.

- NH67 Cadwell Court on Woolgrove Road, NH68 Byron Close, NH69 Grove Road and NH78 West Hill on Old Park Road are either close to or marginally above the objective, but are at kerbside locations with residential properties more than 5m from the kerb (façade projection brings the annual mean well below 40µg/m³).
- Of five sites that were included in the Detailed Assessment 2007, three sites recorded very low data capture (42% or less) and as such have not been used for the purpose of façade projection. The other two sites, Hitchin Library site (NH63) and the Stevenage Road site (NH45) achieved 75% and 67% respectively. Details of the façade projection are as follows:
 - NH63 Library, Hitchin is clearly in exceedance of the objective (47.6µg/m³) at its kerbside location and façade projection shows that NO₂ concentrations are likely to exceed (44.7µg/m³) at the nearest receptor location, 41 Upper Tilehouse Street.
 - NH45 Stevenage Road is also in exceedance of the objective (52.5µg/m³) at its kerbside location and façade projection estimates a NO₂ concentration of 41.3µg/m³ at the near by residence 1-9 Dower Court, Stevenage Road.

Based on the risk of exceedance of the annual mean NO₂ objective at relevant receptor locations, it is recommended that the Council should proceed to a Detailed Assessment at the Upper Tilehouse Street/Park Way Roundabout junction (NH63) and the Hitchin Hill Roundabout junction (NH45).

With respect to the hourly NO₂ objective, it is not expected that this will be exceeded at any site.

Table 6– Results of Nitrogen Dioxide Diffusion Tubes ($\mu\text{g}/\text{m}^3$)

Site ID	Location	Within AQMA ?	Data Capture 2008 %	Annual Mean Concentrations ($\mu\text{g}/\text{m}^3$) Adjusted for Bias		
				2006 ^(b) (Bias Factor: 0.78)	2007 (Bias Factor: 0.80)	2008 (Bias Factor: 0.84)
NH06	Town Hall Royston	No	67 ^(a)	-	-	47
NH09	Grosvenor Rd Baldock	No	58 ^(a)	26	23	26
NH22	Baldock Road Letchworth	No	33 ^(a)	29	21	27
NH26	Redhill Road Hitchin	No	25 ^(a)	19	-	25
NH29	Gardens to Hopewell Road Baldock	No	67 ^(a)	22	30	36
NH31	Playing Fields Breachwood Green	No	50 ^(a)	20	15	20
NH32	Stotfold Road Hinxworth	No	83	30	38	47
NH33	Turf Lane Graveley	No	58 ^(a)	23	25	27
NH34	Gwynfa Close Danesbury	No	83	31	34	41
NH45	Stevenage Road Hitchin	No	67 ^(a)	45	47	53
NH48	Breachwood Green	No	42 ^(a)	19	17	17
NH49	Colocated with NH48	No	33 ^(a)	-	11	18
NH50	Colocated with NH48	No	25 ^(a)	-	-	19
NH51	Minster Road Royston	No	75	28	24	29
NH56	Lye Hill Breachwood Green	No	67 ^(a)	18	18	16
NH57	Medlow House Breachwood Green	No	58 ^(a)	18	18	24
NH59	NH04a Clothall Road Baldock	No	33 ^(a)	28	24	44
NH60	NH13a Willian Road Hitchin	No	67 ^(a)	30	28	35
NH61	NH53a Whitehorse Street Baldock	No	42 ^(a)	51	59	39
NH62	NH54a London Road Knebworth	No	67 ^(a)	40	27	28
NH63	NH02a Library Hitchin	No	75	35	54	48
NH64	NH03a Letchworth Gate	No	58 ^(a)	38	37	41
NH66	Meadowbank Hitchin	No	8 ^(a)	-	-	43
NH67	Cadwell Court Hitchin	No	58 ^(a)	-	-	40
NH68	40 Byron Close Hitchin	No	67 ^(a)	-	-	37
NH69	64 Grove Road Hitchin	No	67 ^(a)	-	-	40
NH70	Nr Bus Stop Hitchin Street Baldock	No	25 ^(a)	-	-	32
NH71	Puddleducks Hitchin St Baldock	No	17 ^(a)	-	-	36
NH72	Rose Crown Whitehorse St Baldock	No	17 ^(a)	-	-	37
NH73	os Satchells High St Baldock	No	8 ^(a)	-	-	59
NH75	Nr UnRef Church Whitehorse St Baldock	No	8 ^(a)	-	-	10
NH76	Dower Court Hitchin	No	42 ^(a)	-	-	43
NH77	Upper Tilehouse Street Hitchin	No	42 ^(a)	-	-	54
NH78	West Hill Hitchin	No	42 ^(a)	-	-	40

(a) Sites for which annualisation was carried out

(b) Results were based on January to June 2006 data only.

3.2.2 Particles (PM₁₀)

There is currently continuous monitoring of particles (PM₁₀) undertaken by North Hertfordshire District Council at one location in the area, Breachwood Green urban background site using a Tapered Element Oscillating Microbalance (TEOM). The Quality Assurance/Quality Control (QA/QC) procedures for the site are equivalent to the UK Automatic Urban and Rural Network (AURN) procedures.

LAQM.TG (09) sets out the calculation required for TEOM results using the Volatile Correction Model (VCM) to estimate gravimetric equivalent. This replaces use of the previous 1.3 factor. Data for 2008 has been corrected using the VCM model. The summary sheet from VCM is presented in Table 9. Data for previous years has been taken from previous LAQM reports and uses the 1.3 factor.

The 2008 results show that the PM₁₀ objectives are continuing to be met at this site.

Table 7– Results of PM₁₀ Automatic Monitoring: Comparison with Annual Mean Objective

Site ID	Location	Within AQMA?	Data Capture 2008 %	Annual Mean Concentrations (µg/m ³)		
				2006	2007	2008*
N/A	Breachwood Green Urban Background	N	96.2	20	19	15 (17)

*Data for 2008 is provisional only. Data in brackets shows the annual mean corrected by 1.3, as per previous methodology.

Table 8– Results of PM₁₀ Automatic Monitoring: Comparison with 24-hour Mean Objective

Site ID	Location	Within AQMA?	Data Capture 2008 %	Number of Exceedences of Hourly Mean (50 µg/m ³) <i>If data capture < 90%, include the 90th %ile of hourly means in brackets.</i>		
				2006	2007	2008 *
N/A	Breachwood Green Urban Background	N	96.2	4	5	1

*Data for 2008 is provisional only.

Table 9– Summary Sheet from Volatile Correction Model

Summary	Text	Value
Site Name	North Herts Breachwood Green (Background)	
Organisation	Herts. & Beds	
Start Date	01/01/2008	
End Date	01/01/2009	
TEOM Data Already Corrected with 1.3 Factor	No	
EPA Constant A		3
EPA Constant B		1.03
Instrument Temperature		25
Instrument Pressure		1013
Instrument Reports to Local Ambient Readings	No	
Timescale	Daily	
Pressure Site	Broxbourne (Roadside) (BB1)	
Pressure Site Warning		
Temperature Site	Broxbourne (Roadside) (BB1)	
Temperature Site Warning		
FDMS Site 1	Tower Hamlets 4 - Blackwall (TH4)	
FDMS Site 1 Warning	Correction includes unratified data.	
FDMS Site 2	Bexley 7 (F) - Thames Road North (BX6)	
FDMS Site 2 Warning	Correction includes unratified data.	
FDMS Site 3	Leicester Centre (LC0)	
FDMS Site 3 Warning	Correction includes unratified data.	

4 Road Traffic Sources

The air quality assessment for road traffic emissions sources has been undertaken using the Highways Agency's DMRB¹ model. The DMRB inputs and results are shown in Appendices 6 and 7. Locations of receptors and their respective areas to be assessed at Detailed Assessment stage can be found in Appendix 8.

4.1 Narrow Congested Streets with Residential Properties Close to the Kerb

There is one newly identified congested street with a flow above 5,000 vehicles per day and residential properties close to the kerb identified by North Hertfordshire District Council. The criteria for assessment has changed since the previous round of Review and Assessment, and therefore this source has been reassessed. The criteria are listed below:

- Daily traffic flow (AADT) should be around 5,000 vehicles/day or more.
- A congested street will be one with slow moving traffic that is frequently stopping and starting due to pedestrian crossings, parked vehicles etc throughout much of the day (not just during rush hours). The average speed is likely to be less than about 25 kph (15 mph).
- A narrow street will be one with residential properties within 2 m of the kerb, and buildings on both sides of the road (the buildings on the other side of the road can be further from the road than 2 m).

The assessment need only consider NO₂.

One road was identified as a potential street canyon where the traffic flows are >5000 vehicles/day.

- A505 Nightingale Road

The assessment of A505 Nightingale Road, Hitchin using DMRB found that exceedences of the annual NO₂ objective are likely. The DMRB assessment results are shown in Appendix 7. It is therefore recommended that this road be taken to the Detailed Assessment stage. Appendix 8 Figure 4 presents the assessment area.

North Hertfordshire District Council has identified a congested street, Nightingale Road Hitchin, with a flow above 5,000 vehicles per day and residential properties close to the kerb that was not identified in previous rounds of Review and Assessment. It is recommended that a Detailed Assessment be undertaken at this location.

4.2 Busy Streets Where People May Spend 1-hour or More Close to Traffic

North Hertfordshire District Council confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

4.3 Roads with a High Flow of Buses and/or Heavy Goods Vehicles

Traffic data assessed for the USA show no roads with high flows of buses and heavy goods vehicles >20%.

North Hertfordshire District Council confirms that there are no new/newly identified roads with high flows of buses and/or heavy goods vehicles.

4.4 Junctions

North Hertfordshire District Council has identified two junctions that were not identified in previous rounds. A further three junctions previously subject to Detailed Assessment have also been reassessed to determine if 1) a reduction in traffic flows due to the redirection of traffic over the Baldock Bypass, has reduced NO₂ concentrations sufficiently to comply with the annual average NO₂ objective, and 2) to determine what effect new assessment methodology may have on pollution concentrations. These junctions are as follows:

- A505 Whitehorse Street/Hitchin Street, Baldock
- Park Way/Upper Tilehouse Street junction, Hitchin
- Hitchin Hill roundabout, Hitchin
- A505 Whitehorse Street/A507 Station Road, Baldock (new)
- A505 Nightingale Road/A505 Cambridge Road, Hitchin (new)

A Detailed Assessment undertaken in 2007 for the junction of Whitehorse Street and Hitchin Street concluded that an AQMA was necessary. Implementation of the AQMA was postponed as it was anticipated that traffic counts would substantially decrease due to the opening of the Baldock Bypass. Traffic counts have decreased as expected with a reduction of approximately 41% on Whitehorse Street. However, DMRB assessment indicates that concentrations of NO₂ are still likely to exceed 40µg/m³ at kerbside residential properties. Monitoring is being undertaken in the vicinity of the junction at kerbside sites on Whitehorse Street (NH72), Hitchin Street (NH61) and High Street (NH73), however, data capture is less than 42% in all the cases and therefore not conclusive. It is recommended that monitoring continue and that steps be taken to improve data capture. It is also recommended that this Junction proceed to the Detailed Assessment stage. The DMRB assessment results are shown in Appendix 7. Appendix 8 Figure 1 presents the assessment area.

The Upper Tilehouse Street/Park Way junction was previously assessed in the 2007 Detailed Assessment, which concluded that the NO₂ objective was not likely to be exceeded at properties in the vicinity of this junction. Reassessment of the Upper Tilehouse Street/Park Way junction using DMRB indicates that exceedences of the NO₂ annual mean are likely to occur at the façade of a near by residence. Façade projection of near by kerbside monitoring results also confirms the likelihood of NO₂ exceedences at this receptor. It is recommended that this junction proceed to Detailed Assessment. The DMRB assessment results are shown in Appendix 7. Appendix 8 Figure 2 presents the assessment area.

Hitchin Hill roundabout was subject to a Detailed Assessment in 2007, which concluded that the NO₂ objective was not likely to be exceeded at properties along Stevenage Road. This junction has been revisited in this round of assessment as NO₂ monitoring sites on Stevenage Road have been found to exceed the objective. Kerbside projection of the Stevenage Road (NH45) annual mean NO₂ confirms that exceedences are likely at one

property on Stevenage Road. It is recommended that this Junction proceed to the Detailed Assessment stage. The DMRB assessment results are shown in Appendix 7. Appendix 8 Figure 3 presents the assessment area.

The predicted NO₂ concentrations at the junction of Whitehorse Street and Station Road for kerbside residences exceed 40µg/m³. Monitoring of NO₂ is conducted at one site near this junction, though data capture is low (33%) and is therefore inconclusive. It is recommended that monitoring continue and that steps are taken to improve data capture. It is also recommended that this Junction proceed to the Detailed Assessment stage. The DMRB assessment results are shown in Appendix 7. Appendix 8 Figure 1 presents the assessment area.

The junction of Nightingale Road and Cambridge Road in Hitchin was assessed for both NO₂ and PM₁₀ due to potentially high numbers of Heavy Duty Vehicles in the area associated with near by warehouses. The DMRB assessment found that the objectives for NO₂ and PM₁₀ were unlikely to be exceeded. Therefore, no further action is required at this junction. The DMRB assessment results are shown in Appendix 7

North Hertfordshire District Council confirms that there is one newly identified busy junction where exceedences of the NO₂ annual mean are likely, and three previously assessed junctions where exceedences of the NO₂ annual mean objective are likely to occur. It is recommended that Detailed Assessment be undertaken for these four junctions.

4.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment

North Hertfordshire District Council confirms that there are no new/proposed roads that meet assessment criteria.

4.6 Roads with Significantly Changed Traffic

Traffic data assessed for the USA show no roads with significantly changed traffic flows of more than 25%.

North Hertfordshire District Council confirms that there are no new/newly identified roads with significantly changed traffic flows.

4.7 Bus and Coach Stations

The assessment considers both NO₂ and PM₁₀ emissions at bus stations that are not enclosed with >2500 movements per day.

North Hertfordshire District Council confirms that there are no relevant bus stations in the Local Authority area.

5 Other Transport Sources

5.1 Airports

The assessment for airports considers NO₂. If there are no airports in the Local Authority area, there is no need to proceed further with this part.

North Hertfordshire District Council confirms that there are no airports in the Local Authority area.

5.2 Railways (Diesel and Steam Trains)

The assessment for stationary trains considers SO₂ emissions, while the assessment for moving diesel trains considers NO₂ emissions. If there are no railways carrying diesel or steam trains in the Local Authority area, there is no need to proceed further with this part.

5.2.1 Stationary Trains

North Hertfordshire District Council confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

5.2.2 Moving Trains

North Hertfordshire District Council confirms that there are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

5.3 Ports (Shipping)

The assessment for shipping considers SO₂ emissions at busy ports with 5,000 and 15,000 movements per year and relevant exposure within 250 metres. If there are no ports or shipping, there is no need to proceed further with this part.

North Hertfordshire District Council confirms that there are no ports or shipping that meet the specified criteria within the Local Authority area.

6 Industrial Sources

6.1 Industrial Installations

The assessment of industrial installations considers all of the regulated pollutants, although those most at risk of requiring further work are SO₂, NO₂, PM₁₀ and benzene. A list of industrial processes in the district is provided in Appendix 9.

6.1.1 New or Proposed Installations for which an Air Quality Assessment Has Been Carried Out

There is one newly permitted Environment Agency process, a wheat milling process at Jas Bowman and Sons Limited. This is an existing process, but a new permit was issued in December 2005 for the processing of raw materials for the production of food. This process has been considered with regard to emissions and likely breach of air quality objectives and it is concluded that there are no significant releases to warrant a Detailed Assessment.

North Hertfordshire District Council has assessed new/proposed industrial installations, and concluded that it will not be necessary to proceed to a Detailed Assessment.

6.1.2 Existing Installations Where Emissions Have Increased Substantially or New Relevant Exposure Has Been Introduced

North Hertfordshire District Council confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

6.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment

There are ten new Part B processes permitted by North Hertfordshire District Council since the last round of Review and Assessment. These include three waste oil burners, a cement batching process, two natural gas odourising processes, two petrol stations, dry cleaners and a vehicle respraying process. There are no significant emission releases from these processes relevant to the AQS objectives.

North Hertfordshire District Council has assessed new/proposed industrial installations, and concluded that it will not be necessary to proceed to a Detailed Assessment.

6.2 Major Fuel (petrol) Storage Depots

The assessment considers benzene, with respect to the 2010 objective.

There are no major fuel (petrol) storage depots within the Local Authority area.

6.3 Petrol Stations

The assessment considers benzene, with respect to the 2010 objective. Large petrol stations, where annual throughput is more than 2000 m³ of petrol (2 million litres per annum), and with a busy road nearby of >30000 annual average daily traffic flows, require consideration with respect to relevant exposure.

North Hertfordshire District Council confirms that there are no petrol stations meeting the specified criteria.

6.4 Poultry Farms

Farms housing in excess of: 400,000 birds if mechanically ventilated, 200,000 birds if naturally ventilated, and 100,000 birds for any turkey unit, require consideration in this assessment, to establish whether there is relevant exposure within 100m of the poultry units. The assessment needs to consider only PM₁₀.

North Hertfordshire District Council confirms that there are no poultry farms in the local authority area meeting the specified criteria.

7 Commercial and Domestic Sources

7.1 Biomass Combustion

7.1.1 Biomass Combustion - Individual Installations

The assessment considers both PM₁₀ and NO₂ objectives.

North Hertfordshire District Council has confirmed that there are no biomass combustion plants in the Local Authority area which meet this criteria.

7.1.2 Biomass Combustion – Combined Impacts (PM₁₀ Emissions)

North Hertfordshire District Council confirms that there are no biomass combustion plants in the Local Authority area which meet this criteria.

7.2 Domestic Solid-Fuel Burning (Sulphur Dioxide Emissions)

The assessment considers SO₂ emissions (only) from significant areas of residential properties that use solid fuel to heat their houses. 'Significant' areas are those of about 500 x 500 m with more than 50 houses burning coal/smokeless fuel as their primary source of heating. PM₁₀ from domestic solid fuel burning is covered under the Biomass combustion – combined impacts section above.

North Hertfordshire District Council confirms that there are no areas of significant domestic fuel use in the Local Authority area.

8 Fugitive or Uncontrolled Sources

The assessment of fugitive and uncontrolled sources considers the PM₁₀ objectives. This included consideration to quarries, landfill sites, opencast coal mining, waste transfer sites, and materials handling (i.e. ports, major construction sites). Only locations not covered by previous rounds of Review and Assessment, or where there is new relevant exposure, require consideration. In the case of proposed new sources, these are only required to be considered if planning approval has been granted.

An existing landfill site is located on Bedford Road, Hitchin. There have been no substantial changes, new exposure or any dust complaints.

North Hertfordshire District Council confirms that there are no potential sources of fugitive particulate matter emissions in the Local Authority area.

9 Conclusions and Proposed Actions

9.1 Conclusions from New Monitoring Data

The USA review of new monitoring data has shown that exceedences continue to occur in two previous Detailed Assessment areas, Upper Tilehouse Street/Park Way and Hitchin Hill roundabout in Hitchin. Data capture for the previous Detailed Assessment area, Whitehorse Street/Hitchin Street, Baldock is not sufficient for the determination of likely exceedences. Data capture was poor for most other sites during 2008, it therefore is recommended that steps be taken to improve data capture.

On the basis of the new monitoring data (2008), Detailed Assessments are recommended for the NO₂ annual mean objective at the junctions of Upper Tilehouse Street/Parkway and Hitchin Hill roundabout in Hitchin.

9.2 Conclusions from Assessment of Sources

The USA has reviewed new and significantly changed sources in the district.

9.2.1 Road Sources

One road was identified as a potential street canyon where the traffic flows are >5000 vehicles/day.

- A505 Nightingale Road, Hitchin

Assessment of A505 Nightingale Road, Hitchin using DMRB found that exceedences of the annual NO₂ objective are likely. It is therefore recommended that this road be taken to the detailed assessment stage.

North Hertfordshire District Council has identified two junctions that were not previously identified as an issue, and reassessed two junctions previously assessed in a Detailed Assessment in 2007. These junctions are as follows:

- A505 Nightingale Road/A505 Cambridge Road, Hitchin
- A505 Whitehorse Street/A507 Station Road. Baldock
- A505 Whitehorse Street/Hitchin Street, Baldock (reassessed)
- A505 Upper Tilehouse Street/A602 Park Way, Hitchin (reassessed)

Assessment of the junction of Nightingale Road and Cambridge Road found that exceedences of both the NO₂ and PM₁₀ objectives were unlikely. Therefore no further action is required at this junction.

The junction of Whitehorse Street and Station Road, Baldock has been assessed and predicted NO₂ concentrations at relevant receptors have been found to exceed 40µg/m³. Monitoring of NO₂ is conducted at one site near this junction, however, data capture is only 33% and is therefore not conclusive. It is recommended that this Junction proceed to Detailed Assessment.

A Detailed Assessment undertaken in 2007 for the junction of Whitehorse Street and Hitchin Street, Baldock concluded that an AQMA was necessary. Implementation of the AQMA was postponed as it was anticipated that traffic counts would substantially decrease due to the opening of the Baldock Bypass in 2006. Traffic counts have decreased as expected with a reduction of approximately 41% on Whitehorse Street. However, concentrations of NO₂ are still predicted to exceed 40µg/m³ at nearby residential properties. Monitoring is being undertaken in the vicinity of the junction at kerbside sites on Whitehorse Street (NH72),

Hitchin Street (NH61) and High Street (NH73), however data capture is less than 42% in all cases and therefore not conclusive. It is recommended that this Junction proceed to Detailed Assessment.

Reassessment of the Upper Tilehouse Street/Park Way junction, Hitchin has concluded that exceedences of the NO₂ annual mean are likely to occur at the façade of a near by residence. Façade projection of near by kerbside monitoring results also confirms the likelihood of NO₂ exceedences at this receptor. Exceedences of the PM₁₀ objective were found be unlikely. It is recommended that this junction proceed to Detailed Assessment.

9.2.2 Other Sources

There are ten new Part B processes permitted by North Hertfordshire District Council since the last round of Review and Assessment. These include three waste oil burners, a cement batching process, two natural gas odourising processes, two petrol stations, dry cleaners and a vehicle respraying process. There are two newly permitted Environment Agency processes, a wheat milling process at Jas Bowman and Sons Limited and a pre-existing landfill site on Bedford Road, Hitchin. These processes have been considered with regard to their emissions and likely breach of air quality objectives and it is concluded that there are no significant releases to warrant a Detailed Assessment.

9.3 Proposed Actions

Proposed actions arising from the USA are as follows:

- Progress to a 2010 Detailed Assessment (for annual mean NO₂ at four junction locations in addition to the 2010 Annual Progress Report):
 - Whitehorse Street/Hitchin Street, Baldock
 - Whitehorse Street/Station Road, Baldock
 - Upper Tilehouse Street/Park Way, Hitchin
 - Hitchin Hill roundabout , Hitchin
 - Nightingale Road, Hitchin

10 References

- Highways Agency's Design Manual for Roads and Bridges (DMRB), Volume 11, Section 3, Part 1 Air Quality, May 2007, and accompanying spreadsheet DMRB Screening Method V1,03.xls. July 2007
- Local Air Quality Management Technical Guidance LAQM.TG(09). February 2009. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland
- Local Air Quality Management Policy Guidance LAQM.PG(09). February 2009. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland
- North Hertfordshire District 2008 Local Air Quality Management Annual Progress Report
- North Hertfordshire District Council 2007 Local Air Quality Management Annual Progress Report
- North Hertfordshire District Council 2006 Local Air Quality Management USA

APPENDICES

Appendix 1 - Traffic Data

Site Ref	Data Source	Location	X	Y	%HDV *	AADT 2008	Speed (mph)	Previously Assessed?	Substantial Change Since USA 2006 (25%)?	Assessed in USA 2009 Using DMRB?	Reason for Assessment
-	DFT	A507	529944	230500	14.4	6744	-	Y	N	N	n/a
-	DFT	A505 Letchworth Gate	523400	231090	9.7	30019	-	N	N	N	n/a
-	DFT	A10 London Road	535770	240100	18.9	8695	-	Y	N	N	n/a
-	DFT	A602	520000	227870	10.3	33295	-	Y	N	N	n/a
-	DFT	A1	523000	229000	16.5	72838	-	Y	N	N	n/a
-	DFT	A505 Cambridge Road	520000	230233	7.1	21493	-	Y	N	Y	Relevant exposure
-	DFT	A505 Nightingale Road	519000	229780	6.6	13435	-	N	N	Y	Street canyon
-	DFT	A505 Royston By-pass	536000	242400	11.7	31840	-	Y	N	N	n/a
-	DFT	A602 Park Way	518175	228665	7.9	28835	-	Y	N	Y	Relevant exposure
-	DFT	A1 Park Lane	524300	219600	16.3	86833	-	N	N	N	n/a
-	DFT	A10	535900	240600	10.0	16934	-	Y	N	N	n/a
-	DFT	A505 Upper Tilehouse Street	518055	229050	9.7	22437	-	Y	N	Y	Relevant exposure
-	DFT	A507 North Road	524155	234892	11.7	10956	-	N	N	N	n/a
-	DFT	A505 Baldock Road	522393	232015	6.9	12875	-	Y	N	N	n/a
-	DFT	A1	523935	233000	18.6	49376	-	Y	N	N	n/a
-	DFT	A600 Bedford Road	517009	234617	9.8	11928	-	Y	N	N	n/a
-	DFT	A505 Minsbury Hill	516500	228400	10.0	21398	-	N	N	N	n/a
-	DFT	A505	535000	242035	17.4	19722	-	Y	N	N	n/a
-	DFT	A505 Bedford Road	518000	229580	7.5	18869	-	Y	N	N	n/a
-	DFT	A505 Bedford Road	518250	229330	7.8	14101	-	Y	N	N	n/a

*Heavy duty vehicles (HDV) >20% is considered as an unusually high proportion, which would warrant assessment if not previously considered.

Appendix 1 (Continued) - Traffic data

Site Ref	Data Source	Location	X	Y	%HDV *	AADT 2008	Speed (mph)	Previously Assessed?	Substantial Change Since USA 2006 (25%)?	Assessed in USA 2009 Using DMRB?	Reason for Assessment
-	DFT	A505 Old Park Road	518100	229310	6.5	15730	-	Y	N	Y	Relevant exposure
-	DFT	A505	537000	241240	21.6	13111	-	Y	N	N	n/a
-	DFT	A602 Stevenage Road	519000	228290	10.3	35328	-	Y	N	Y	Relevant exposure
-	DFT	A600 Bedford Road	517840	230500	6.2	13274	-	Y	N	N	n/a
-	DFT	A505 Letchworth Gate	522800	232000	9.7	33354	-	N	N	N	n/a
-	DFT	A507 Clothall Road	525000	233670	14.5	7495	-	Y	N	Y	Relevant exposure
-	DFT	A507 Station Road	524500	234240	11.7	11623	-	N	N	Y	Relevant exposure
-	DFT	A10	535580	233000	12.8	10049	-	Y	N	N	n/a
-	DFT	A10 Fieldfare Way	536180	242000	10.0	15393	-	N	N	N	n/a
-	DFT	A505 Baldock Bypass	524180	231200	14.5	21571	-	N	N	N	n/a
107	HCC	A1(M) Junction 6-7	-	-	-	81405	-	Y	N	N	n/a
110	HCC	A1(M) Junction 9-10	-	-	-	47875	-	Y	N	N	n/a
145	HCC	A10 London Road	-	-	22.5	8368	-	Y	N	N	n/a
146	HCC	A10 Melbourn Road	-	-	-	13913	-	Y	N	N	n/a
167	HCC	C167 Old North Road	-	-	11.9	13714	28.9	N	N	Y	Relevant exposure
232	HCC	A505 Moormead Hill	-	-	-	21521	-	N	N	N	n/a
233	HCC	A505 Cambridge Road	-	-	-	19817	29.9	Y	N	Y	Relevant exposure
235	HCC	A505 Baldock Road	-	-	21.8	25983	62.8	Y	N	N	n/a
236	HCC	C165 Newmarket Road	-	-	16.4	2591	33.1	Y	N	N	n/a
237	HCC	A507 Clothall Road	-	-	-	6019	50.2	Y	N	Y	Relevant exposure
239	HCC	B656 Codicote Road	-	-	-	9177	-	Y	N	N	n/a
240	HCC	B656 London Road	-	-	16.5	8420	-	Y	N	N	n/a

*Heavy duty vehicles (HDV) >20% is considered as an unusually high proportion, which would warrant assessment if not previously considered.

Appendix 1 (Continued) - Traffic data

Site Ref	Data Source	Location	X	Y	%HDV *	AADT 2008	Speed (mph)	Previously Assessed?	Substantial Change Since USA 2006 (25%)?	Assessed in USA 2009 Using DMRB?	Reason for Assessment
A600	HCC	A600 Bedford Road	-	-	-	14174	33.2	Y	N	N	n/a
A505	HCC	A505 Letchworth Gate	-	-	18.3	26988	33.3	N	N	N	n/a
B197	HCC	B197 London Road	-	-	-	9750	32	N	N	N	n/a
A505	HCC	A505 Bypass	-	-	-	19848	64	Y	N	N	n/a
A507	HCC	A507 North Road	-	-	-	10799	-	N	N	N	n/a
A602	HCC	A602 Bypass	-	-	-	31387	62	Y	N	N	n/a
B197	HCC	B197 Great North Road	-	-	-	16533	-	N	N	N	n/a
B651	HCC	B651 Whitwell	-	-	19.4	1802	-	Y	N	N	n/a
B655	HCC	B655 Hexton Road	-	-	21.1	5933	-	Y	N	N	n/a
B1039	HCC	B1039 Royston Road	-	-	-	1642	-	N	N	N	n/a
B1039	HCC	B1039 Chishill Road	-	-	-	1282	-	Y	N	N	n/a
B1368	HCC	B1368 Cambridge Road	-	-	-	1854	37.5	Y	N	N	n/a
C109	HCC	C109 Stotfold Road	-	-	-	7127	28.1	Y	N	N	n/a
C89	HCC	C89 Norton Road	-	-	-	9292	-	Y	N	N	n/a
A505	HCC	A505 Baldock Road	-	-	16.1	13598	-	Y	N	N	n/a
A602	HCC	A602 Park Way	-	-	17.8	28129	-	Y	N	Y	Relevant exposure
A505	HCC	A505 Bypass Central	-	-	-	30678	-	Y	N	N	n/a
B656	HCC	B656 Whitehorse Street	-	-	-	11507	-	Y	N	Y	Street Canyon/ Junction
B656	HCC	B656 London Road	-	-	-	9555	36.8	Y	N	N	n/a
B656	HCC	B656 Letchworth Road	-	-	-	15260	36.9	N	N	N	n/a

*Heavy duty vehicles (HDV) >20% is considered as an unusually high proportion, which would warrant assessment if not previously considered.

Appendix 1 (Continued) - Traffic data

Site Ref	Data Source	Location	X	Y	%HDV *	AADT 2008	Speed (mph)	Previously Assessed?	Substantial Change Since USA 2006 (25%)?	Assessed in USA 2009 Using DMRB?	Reason for Assessment
34313002	Count On Us	High Street	-	-	-	14983	23	Y	N	Y	Street Canyon/Junction
34313004	Count On Us	Church Street	-	-	-	2348	14.2	Y	N	Y	Street Canyon/Junction
34313001	Count On Us	Hitchin Street	-	-	-	12831	21.2	Y	N	Y	Street Canyon/Junction
34313006	Count On Us	A505 Payne's Park	-	-	-	15211	25.8	Y	N	Y	Relevant exposure
20	HCC	B656 Walsworth Road	-	-	3.8	9101	-	N	N	Y	Relevant exposure

*Heavy duty vehicles (HDV) >20% is considered as an unusually high proportion, which would warrant assessment if not previously considered.

Appendix 2 - Bias Adjustment Factor Calculations

Calculation of Diffusion Tube Bias Adjustment 2008 ¹²	Bias Value as Factor:	Average Bias Value:	Add 1:	Inverse Calculation (Bias Adjustment Factor):
Using Local Studies and Review and Assessment Helpdesk Bias Adjustment spreadsheet data (version 05/09):				
AEA Tech Intercomparison= 0.84 (19.3%)	0.193	0.193	1.193	<u>0.84</u>
Using Local Co-location Study Results (only):				
Breachwood Green Bias Factor = *				

* Insufficient data capture for co-located tubes (NH48=42%, NH49=33%, NH50=25%)

¹² <http://www.uwe.ac.uk/agm/review/no2dtmethodology.pdf>

Appendix 3 - Nitrogen Dioxide Diffusion Tube Results 2008

Site Ref	Location	X	Y	Site Type	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Average	Bias Corrected Annual Mean 2008
NH06	Town Hall Royston	535900	240700	R	-	-	-	-	49	37	43	46	46	68	57	66	52	47
NH09	Grosvenor Rd Baldock	524740	234164	I	36	41	-	-	22	23	-	-	68	1	-	43	33	26
NH22	Baldock Road Letchworth	521233	231349	R	-	-	-	-	17	17	22	33	-	-	-	-	22	27
NH26	Redhill Road Hitchin	517422	229848	I	-	-	-	-	-	-	-	-	22		39	44	35	25
NH29	Gardens to Hopewell Road Baldock	523972	233652	I	49	54	-	-	40	32	34	37	-	-	53	48	43	36
NH31	Playing Fields Breachwood Green	515171	221930	B	26	37	-	-	-	12	14	-	-	-	37	28	26	20
NH32	Stotfold Road Hinxworth	522878	237694	R	53	68	-	-	34	47	47	55	42	83	71	62	56	47
NH33	Turf Lane Graveley	522921	227950	B	46	-	-	-	16	22	23	26	18	-	-	52	29	27
NH34	Gwynfa Close Danesbury	523910	217364	I	56	61	-	-	35	39	39	39	45	49	65	64	49	41
NH45	Stevenage Road Hitchin	518708	228347	R	69	78	-	-	60	42	57	38	62	59	-	-	58	53
NH48	Breachwood Green	515092	221903	B	21	31	-	-	17	15	14	-	-	-	-	-	20	17
NH49	Colocated with NH48	515092	221903	B	-	33	-	-	19	13	13	-	-	-	-	-	20	18

R= Roadside, B=Background, I=Intermediate. Exceedences of the annual mean objective are highlighted in bold.

Appendix 3 (Continued) - Nitrogen Dioxide Diffusion Tube Results 2008

Site Ref	Location	X	Y	Site Type	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Average	Corrected Annual Mean 2008
NH50	Colocated with NH48	515092	221903	B	-	-	-	-	20	14	14	-	-	-	-	-	16	19
NH51	Minster Road Royston	535111	241744	R	42	48	-	-	24	19	22	25	31	-	49	52	35	29
NH56	Lye Hill Breachwood Green	514805	221320	R	21	34	-	-	14	8	11	-	-	1	32	38	20	16
NH57	Medlow House Breachwood Green	514786	222112	R	28	39	-	-	-	23	15	-	-	32	38	38	30	24
NH59	NH04a Clothall Road Baldock	524649	234061	R	-	-	-	-	-	54	41	-	-	37	51	-	46	44
NH60	NH13a Willian Road Hitchin	519910	230076	R	45	-	-	-	45	34	23	38	37	6	67	-	37	35
NH61	NH53a Whitehorse Street Baldock	524428	233882	R	60	77	-	-	-	-	-	-	-	69	71	13	58	39
NH62	NH54a London Road Knebworth	525200	219859	R	-	44	-	-	20	24	24	30	24	45	-	49	33	28
NH63	NH02a Library Hitchin	518160	229092	R	-	72	-	-	47	38	46	53	54	68	67	66	57	48
NH64	NH03a Letchworth Gate	522764	231825	R	50	64	-	-	59	25	-	-	-	49	65	69	54	41
NH66	Meadowbank Hitchin	519555	229909	R	-	-	-	-	-	-	32	-	-	-	-	-	32	43
NH67	Cadwell Court Hitchin	519225	230553	R	-	-	-	-	45	36	39	-	43	52	57	53	46	40

R= Roadside, B=Background, K=Kerbside. Exceedences of the annual mean objective are highlighted in **bold**.

Appendix 3 (Continued) - Nitrogen Dioxide Diffusion Tube Results 2008

Site Ref	Location	X	Y	Site Type	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Average	Corrected Annual Mean 2008
NH68	40 Byron Close Hitchin	519587	229835	R	-	-	-	-	39	37	31	34	35	47	51	52	41	37
NH69	64 Grove Road Hitchin	518821	229993	R	-	-	-	-	53	28	32	38	44	49	58	53	44	40
NH70	Nr Bus Stop Hitchin Street Baldock	524298	233784	R	-	-	-	-	-	-	-	-	-	48	53	32	44	32
NH71	Puddleducks Hitchin St Baldock	524375	233844	R	-	-	-	-	-	-	-	-	27	59	-	-	43	36
NH72	Rose Crown Whitehorse St Baldock	524502	233948	R	-	-	-	-	-	-	-	-	24	65	-	-	45	37
NH73	os Satchells High St Baldock	524486	233856	R	-	-	-	-	-	-	-	-		70	-	-	70	59
NH75	Nr UnRef Church Whitehorse St Baldock	524574	234022	R	-	-	-	-	-	-	-	-	12	-	-	-	12	10
NH76	Dower Court Hitchin	518738	228338	R	-	-	-	-	-	-	41	37	-	51	56	63	50	43
NH77	Upper Tilehouse Street Hitchin	518006	229032	R	-	-	-	-	-	-	37	52	-	67	76	78	62	54
NH78	West Hill Hitchin	518099	229299	R	-	-	-	-	-	-	32	37	-	49	60	51	46	40

R= Roadside, B=Background, K=Kerbside. Exceedences of the annual mean objective are highlighted in **bold**.

Appendix 4 - NO₂ Diffusion Tube Annualisation and Bias Corrections

Site Ref	Location	Data Capture (%)	Annualisation Required?	Period Mean, $\mu\text{g}/\text{m}^3$	Annualisation Factor	Annualised Mean, $\mu\text{g}/\text{m}^3$	Bias Adjustment Factor	Annualised and Bias Corrected Mean, $\mu\text{g}/\text{m}^3$
NH06	Town Hall Royston	67	Yes	52	1.086	55.9	0.84	47
NH09	Grosvenor Rd Baldock	58	Yes	33	0.926	30.9	0.84	26
NH22	Baldock Road Letchworth	33	Yes	22	1.449	32.2	0.84	27
NH26	Redhill Road Hitchin	25	Yes	35	0.858	30.0	0.84	25
NH29	Gardens to Hopewell Road Baldock	67	Yes	43	1.002	43.5	0.84	36
NH31	Playing Fields Breachwood Green	50	Yes	26	0.926	23.8	0.84	20
NH32	Stotfold Road Hinxworth	83	No	56	-	-	0.84	47
NH33	Turf Lane Graveley	58	Yes	29	1.129	32.7	0.84	27
NH34	Gwynfa Close Danesbury	83	No	49	-	-	0.84	41
NH45	Stevenage Road Hitchin	67	Yes	58	1.078	62.7	0.84	53
NH48	Breachwood Green	42	Yes	20	1.045	20.5	0.84	17
NH49	Colocated with NH48	33	Yes	20	1.074	20.9	0.84	18
NH50	Colocated with NH48	25	Yes	16	1.427	22.8	0.84	19

Annualisation factor obtained using seven background sites in the Hertfordshire, Bedfordshire, Northamptonshire and Cambridgeshire air quality monitoring networks (N.Hertfordshire Breachwood, St Albans Fleetville, E. Hertfordshire Sawbridgeworth, S. Bedfordshire Dunstable, Northampton, East Cambridgeshire Wicken Fen).

Appendix 4 (Continued) - NO₂ Diffusion Tube Annualisation and Bias Corrections

Site Ref	Location	Data Capture (%)	Annualisation Required?	Period Mean, $\mu\text{g}/\text{m}^3$	Annualisation Factor	Annualised Mean, $\mu\text{g}/\text{m}^3$	Bias Adjustment Factor	Annualised and Bias Corrected Mean, $\mu\text{g}/\text{m}^3$
NH51	Minster Road Royston	75	No	35	-	-	0.84	29
NH56	Lye Hill Breachwood Green	67	Yes	20	0.953	18.9	0.84	16
NH57	Medlow House Breachwood Green	58	Yes	30	0.932	28.4	0.84	24
NH59	NH04a Clothall Road Baldock	33	Yes	46	1.142	52.2	0.84	44
NH60	NH13a Willian Road Hitchin	67	Yes	37	1.138	42.0	0.84	35
NH61	NH53a Whitehorse Street Baldock	42	Yes	58	0.806	46.7	0.84	39
NH62	NH54a London Road Knebworth	67	Yes	33	1.029	33.5	0.84	28
NH63	NH02a Library Hitchin	75	No	57	-	-	0.84	48
NH64	NH03a Letchworth Gate	58	Yes	54	0.906	49.3	0.84	41
NH66	Meadowbank Hitchin	8	Yes	32	1.598	51.1	0.84	43
NH67	Cadwell Court Hitchin	58	Yes	46	1.040	48.3	0.84	40
NH68	40 Byron Close Hitchin	67	Yes	41	1.086	44.3	0.84	37
NH69	64 Grove Road Hitchin	67	Yes	44	1.086	48.2	0.84	40

Annualisation factor obtained using seven background sites in the Hertfordshire, Bedfordshire, Northamptonshire and Cambridgeshire air quality monitoring networks (N.Hertfordshire Breachwood, St Albans Fleetville, E. Hertfordshire Sawbridgeworth, S. Bedfordshire Dunstable, Northampton, East Cambridgeshire Wicken Fen).

Appendix 4 (Continued) - NO₂ Diffusion Tube Annualisation and Bias Corrections

Site Ref	Location	Data Capture (%)	Annualisation Required?	Period Mean, $\mu\text{g}/\text{m}^3$	Annualisation Factor	Annualised Mean, $\mu\text{g}/\text{m}^3$	Bias Adjustment Factor	Annualised and Bias Corrected Mean, $\mu\text{g}/\text{m}^3$
NH70	Nr Bus Stop Hitchin Street Baldock	25	Yes	44	0.852	37.8	0.84	32
NH71	Puddleducks Hitchin St Baldock	17	Yes	43	0.997	42.9	0.84	36
NH72	Rose Crown Whitehorse St Baldock	17	Yes	45	0.997	44.4	0.84	37
NH73	os Satchells High St Baldock	8	Yes	70	1.004	70.2	0.84	59
NH75	Nr UnRef Church Whitehorse St Baldock	8	Yes	12	1.035	12.4	0.84	10
NH76	Dower Court Hitchin	42	Yes	50	1.031	51.2	0.84	43
NH77	Upper Tilehouse Street Hitchin	42	Yes	62	1.031	63.9	0.84	54
NH78	West Hill Hitchin	42	Yes	46	1.031	47.2	0.84	40

Annualisation factor obtained using seven background sites in the Hertfordshire, Bedfordshire, Northamptonshire and Cambridgeshire air quality monitoring networks (N.Hertfordshire Breachwood, St Albans Fleetville, E. Hertfordshire Sawbridgeworth, S. Bedfordshire Dunstable, Northampton, East Cambridgeshire Wicken Fen).

Appendix 5 - Facade Projection Calculations

Site Ref	Diffusion Tube Location	Distance from Kerb to Monitor (m)	Distance from Kerb to Receptor (m)	Background NO ₂ Concentrations (µg/m ³)	Measured NO ₂ Concentrations (µg/m ³) (Annualised and Bias Corrected)	Projected Concentration at Receptor (µg/m ³)	Detailed Assessment Required?
NH78	West Hill	2.0	5.6	20.2	39.6	35.0	No
NH69	Grove Road	0.8	5.1	17.6	40.4	32.1	No
NH67	Cadwell Court	2.9	9.2	21.5	40.5	34.9	No
NH63	NH02a Library Hitchin	3.8	5.6	20.2	47.6	44.7	Yes
NH68	Byron Close	4.7	6.1	18	37.1	35.6	No
NH76	Dower Court Hitchin	0.1	3.7	16.6	42.9	29.8	No
NH45	Stevenage Road Hitchin	0.7	3.7	16.6	52.5	41.3	Yes

Appendix 6 - DMRB Air Quality Assessment Inputs

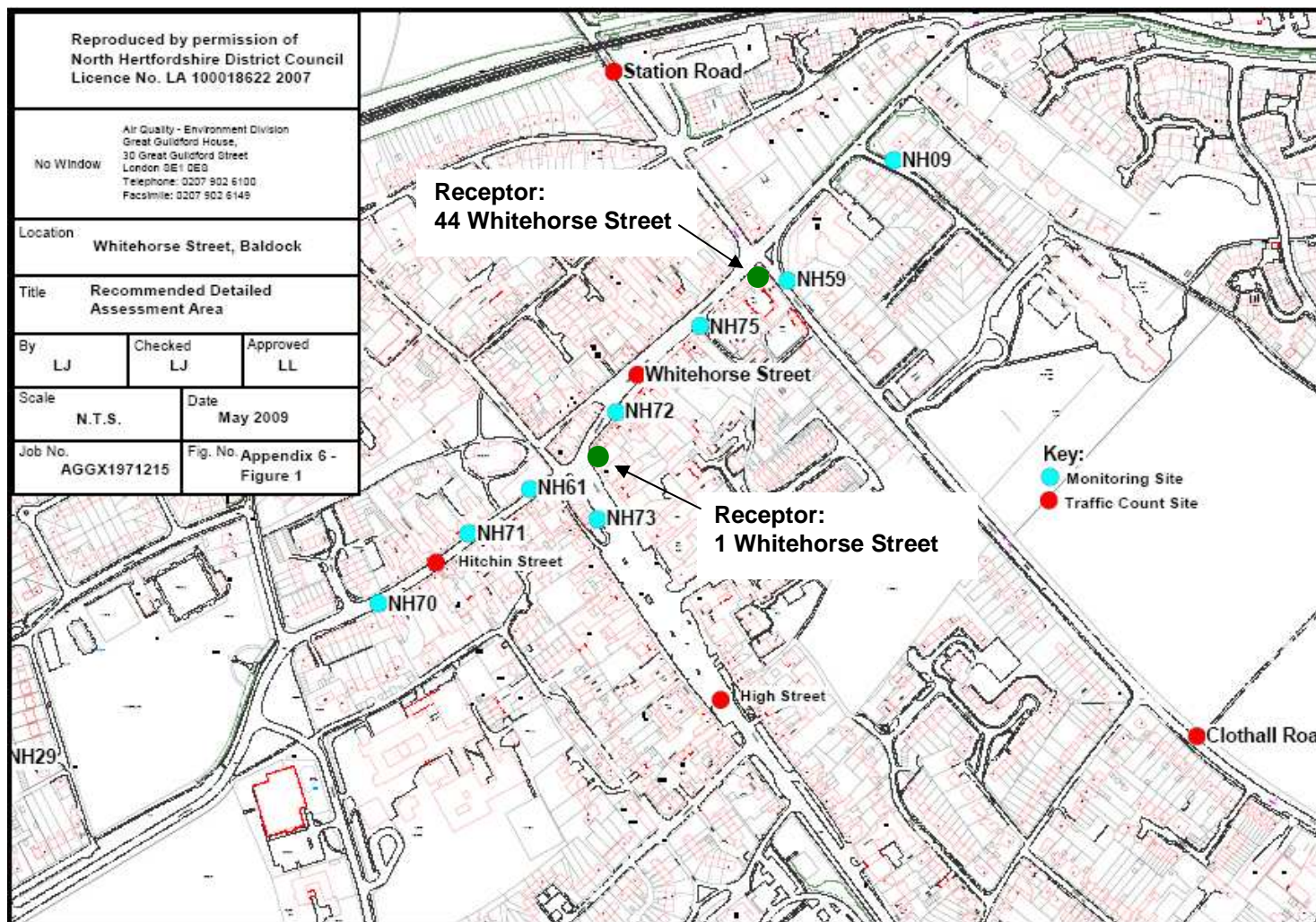
Site Ref	Road Name	Receptor	Distance to receptor (m)	AADT (2008)	% HDV	Speed (kph)	Street canyon?	Background Concentrations		
								2008 NO _x Annual Mean (µg/m ³)	2008 NO ₂ Annual Mean (µg/m ³)	2008 PM ₁₀ Annual Mean (µg/m ³)
1	A505 Nightingale Road	143 Nightingale Road	5.9	13435	6.6	20.0	Yes	28.6	20.2	19.2
2	A507 Station Road/ Whitehorse Street	44 Whitehorse Street, Baldock	8.7	11565	11.7	20.0	No	27	19.3	19.5
2	A507 Station Road/ Whitehorse Street	44 Whitehorse Street, Baldock	5.8	4569	14.5	20.0	No	27	19.3	19.5
3	A505 Moormead Hill	1 Offley Road	6.6	21521	10.0	20.0	No	20	15	17.6
4	C167 Old North Road	24 Old North Road	11.4	13714	11.9	46.5	No	22.8	16.8	18.2
5	A505 Whitehorse Street/ Hitchin Street	1 Whitehorse Street, Hitchin	6	12169	4.0	20.0	Yes	27	19.3	19.5
5	A505 Whitehorse Street/ Hitchin Street	1 Whitehorse Street, Hitchin	11.7	8647	4.0	20.0	Yes	27	19.3	19.5
6	A505 Upper Tilehouse/ A602 Park Way	41 Upper Tilehouse Street	9.5	25636	8.8	20.0	No	28.6	20	19.2
6	A505 Upper Tilehouse/ A602 Park Way	41 Upper Tilehouse Street	16.8	15471	6.5	20.0	No	28.6	20	19.2
7	A505 Nightingale Road/ Cambridge Road	Cnr Walsworth Road & Station Approach, Hitchin	26.4	17464	6.9	20.0	No	24.7	18	18.7
7	A505 Nightingale Road/ Cambridge Road	Cnr Walsworth Road & Station Approach, Hitchin	15.8	9101	3.8	20.0	No	24.7	18	18.7

Appendix 7 - DMRB Air Quality Assessment Results

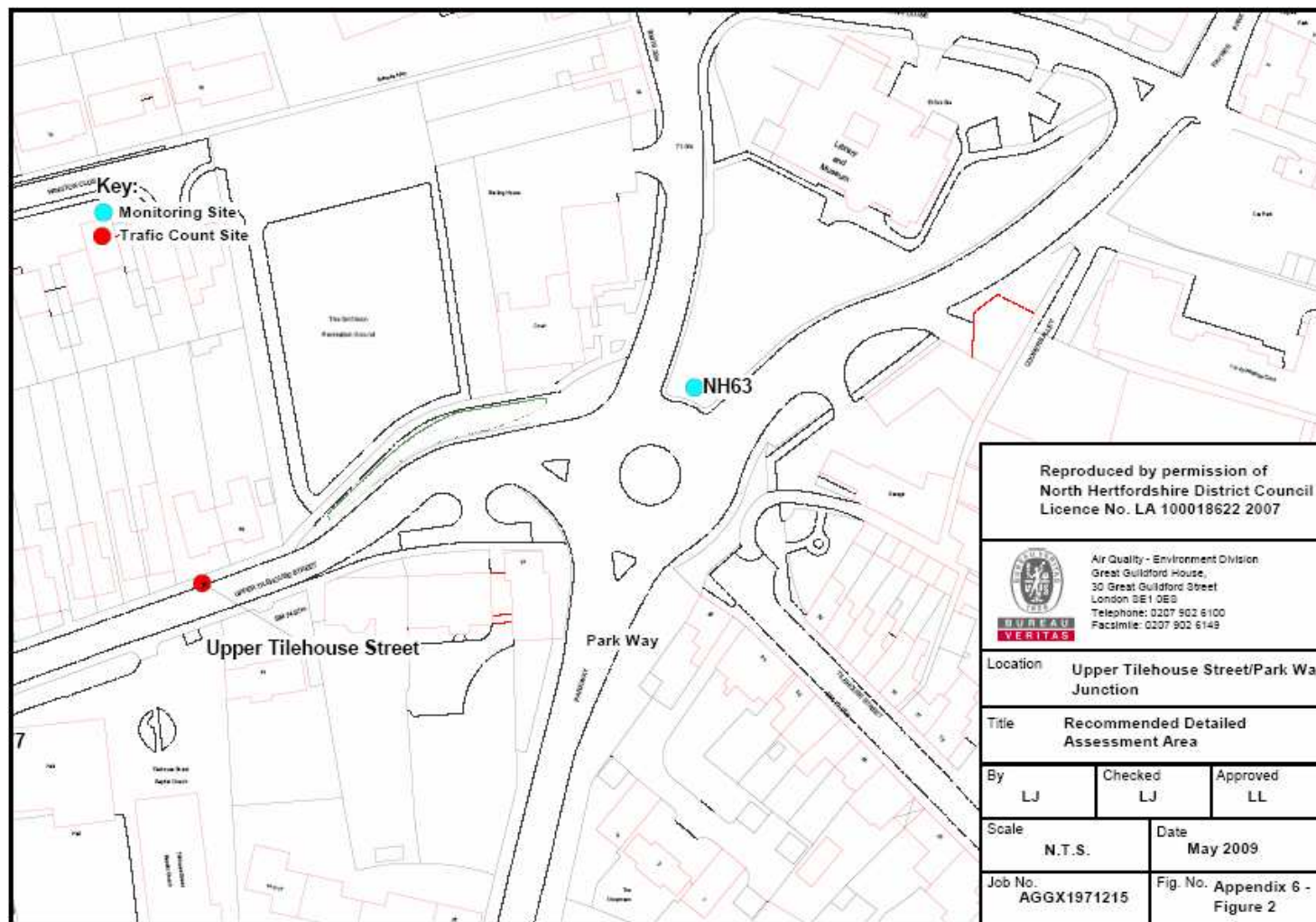
Site Ref	Road Name	Receptor	DMRB Assessment Results				Detailed Assessment Required?
			2008 NO _x Annual Mean (µg/m ³)	2008 NO ₂ * Annual Mean (µg/m ³)	2008 PM ₁₀ Annual Mean (µg/m ³)	2008 Number of Exceedences of 24 hour PM ₁₀	
1	A505 Nightingale Road	143 Nightingale Road	58.3	44.6	22.9	8	Yes
2	A507 Station Road/Whitehorse Street	44 Whitehorse Street, Baldock	115.4	40.1	25.7	14	Yes
3	A505 Moormead Hill	1 Offley Road	71.8	35.3	23.5	9	No
4	C167 Old North Road	24 Old North Road	51.7	28.3	20.7	4	No
5	A505 Whitehorse Street/Hitchin Street	1 Whitehorse Street, Hitchin	58.8	45.6	23.8	10	Yes
6	A505 Upper Tilehouse/A602 ParkWay	41 Upper Tilehouse Street	99.7	45.4	27.8	20	Yes
7	A505 Nightingale Road/Cambridge Road	Cnr Walsworth Road & Station Approach, Hitchin	54.9	30.7	22.54	7	No

* NO₂ concentrations calculated from NO_x using the LAQM.TG (09) NO_x:NO₂ conversion calculator.

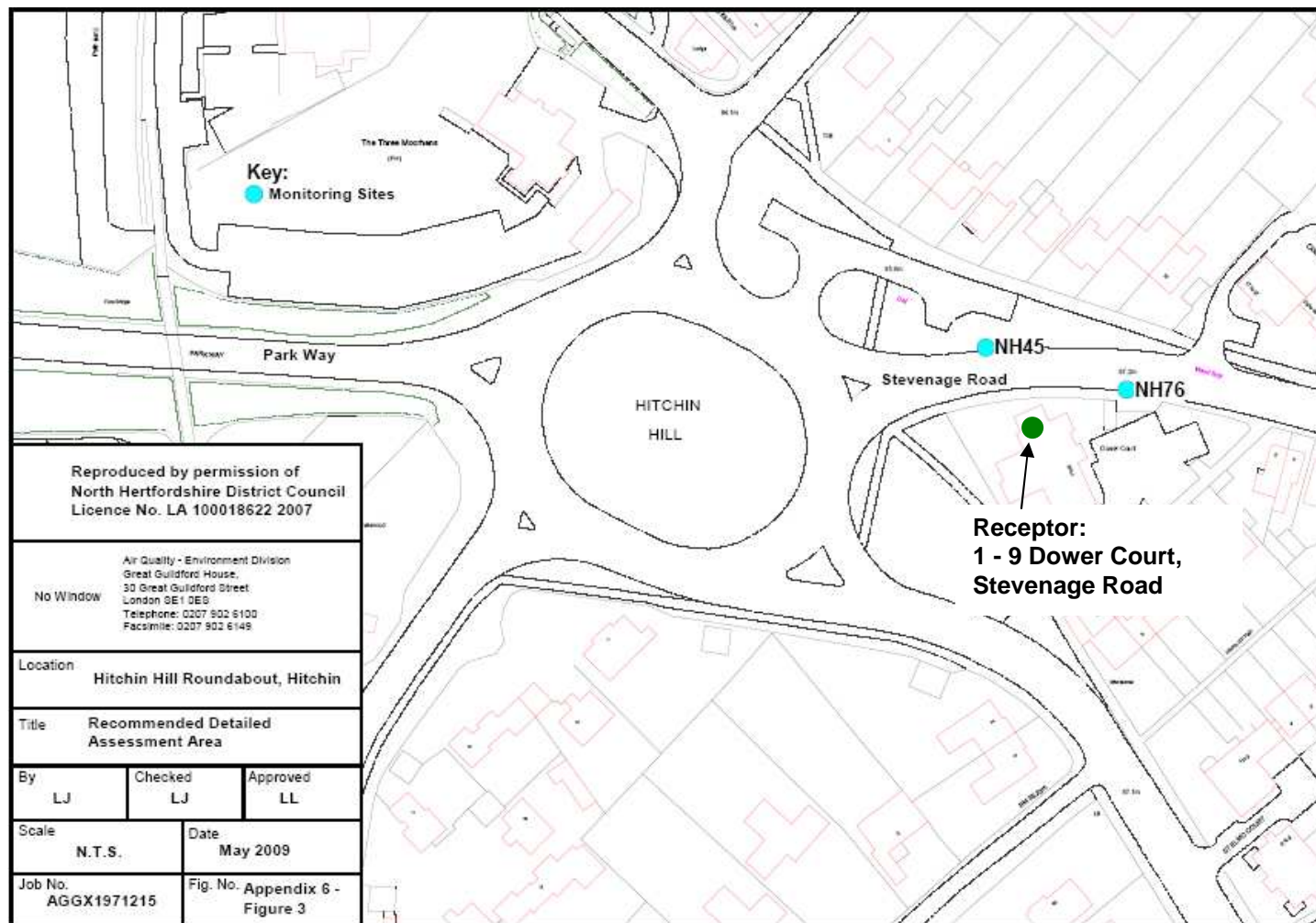
Appendix 8 - Figure 1 - Maps of Locations Where Results Indicate Risk of Exceedance of Air Quality Objectives



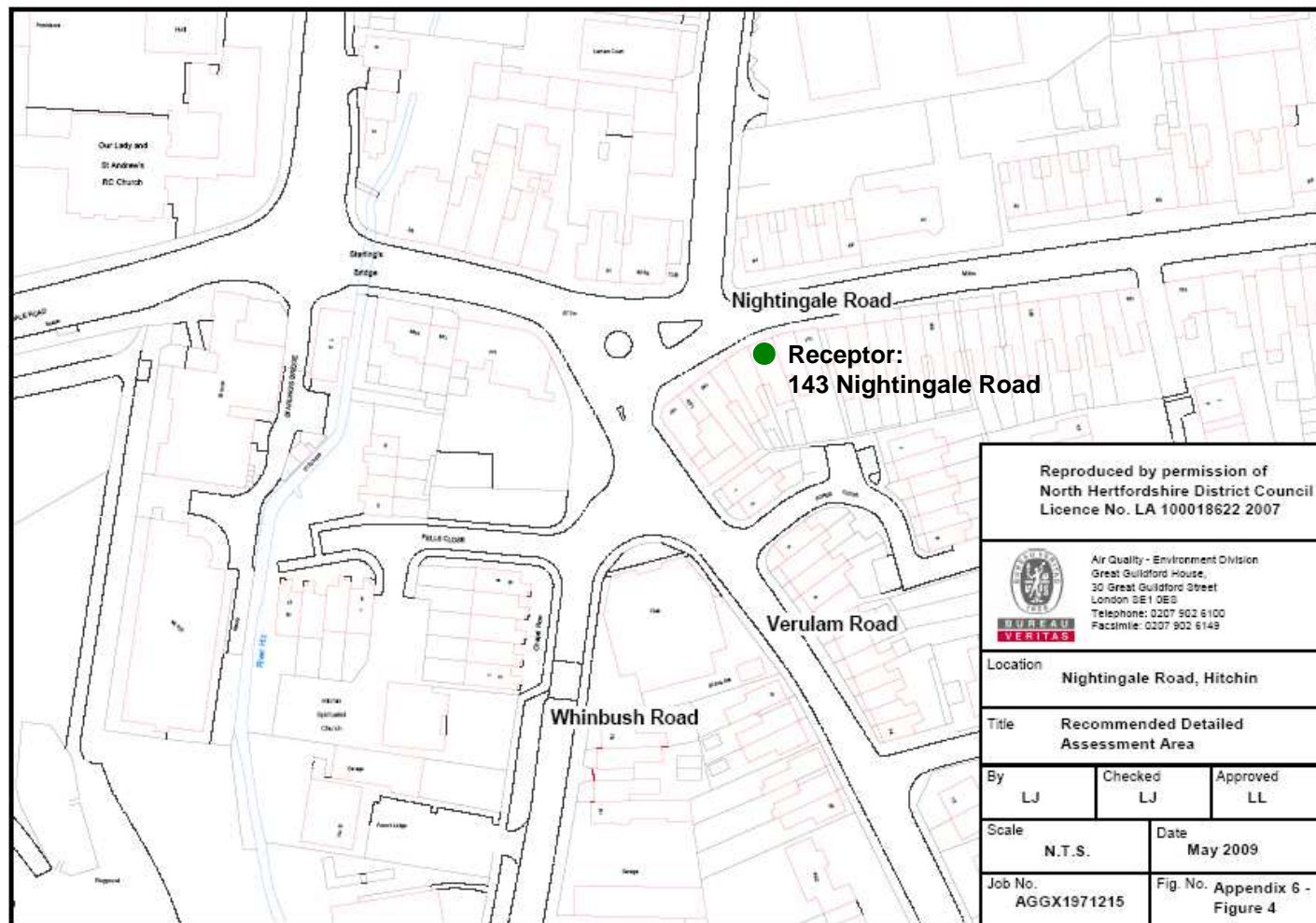
Appendix 8 (Continued) Figure 2 - Maps of Locations Where Results Indicate Risk of Exceedance of Air Quality Objectives



Appendix 8 (Continued) Figure 3 - Maps of Locations Where Results Indicate Risk of Exceedance of Air Quality Objectives



Appendix 8 (Continued) Figure 4- Maps of Locations Where Results Indicate Risk of Exceedance of Air Quality Objectives



Appendix 9 - List of Industrial Processes

Process Name	Process Type	PG Note	New Source Since USA 2006?	Existing Process with New Exposure?	Substantial Change >30%?	Potentially Significant Release with Respect to AQOs?	Complaints?	Nomogram Screening Assessment Required?	Detailed Assessment Required?
Biffa Waste Services Ltd	Disposal of Waste by Landfill	BW1807IK	Yes	No	No	No	No	No	No
Johnson Matthey	Refining non-Ferrous Metals or Alloys	BT7086	No	No	No	No	No	No	No
Jas Bowman & Sons Ltd,	Treating/Processing Raw Materials for the Production of Food.	EP3433BL	Yes	No	No	No	No	No	No
Cemex UK Materials Ltd	Cement Batching	EPA/00860/03	Yes	No	No	No	No	No	No
Autoglym	Coating Process	EPA/00675/03/p1	No	No	No	No	No	No	No
Chilfen Joinery Ltd	Combustion Process	EPA/00863/03	No	No	No	No	No	No	No
William Ransom & Sons Plc	Formulation/Finishing of Pharmaceutical Products	EPA/00655/03	No	No	No	No	No	No	No
National Grid Site	Odourising of Natural Gas	EPA/11039/05	Yes	No	No	No	No	No	No
National Grid Site	Odourising of Natural Gas	EPA/11036/05	Yes	No	No	No	No	No	No
Conqueror Industries Ltd	Powder/Wet Coating	EPA/00712/03/p2	No	No	No	No	No	No	No
Hanmere Polythene Ltd	Printing of Flexible Packaging	EPA/00881/03/p1	No	No	No	No	No	No	No
Royde and Tucker Ltd	Surface Cleaning	EPA/23600/07	Yes	No	No	No	No	No	No
TTI Group Limited	Surface Cleaning	EPA/01764/04	No	No	No	No	No	No	No

Appendix 9 (Continued) - List of Industrial Processes

Process Name	Process Type	PG Note	New Source Since USA 2006?	Existing Process with New Exposure?	Substantial Change >30%?	Potentially Significant Release with Respect to AQOs?	Complaints?	Nomogram Screening Assessment Required?	Detailed Assessment Required?
Tesco Stores Ltd	Unloading of Petrol into Storage	EPA/10937/05/p1	No	No	No	No	No	No	No
Murketts of Royston	Unloading of Petrol into Storage	EPA/10956/05/p1	No	No	No	No	No	No	No
Greenfield Service Station	Unloading of Petrol into Storage	EPA/10957/05/p1	No	No	No	No	No	No	No
Shell Petrol Station	Unloading of Petrol into Storage	EPA/10940/05/p1	No	No	No	No	No	No	No
BP Westmill	Unloading of Petrol into Storage	EPA/10945/05/p1	No	No	No	No	No	No	No
Nightingale Service Station	Unloading of Petrol into Storage	EPA/10948/05/p1	No	No	No	No	No	No	No
Marshall of Hitchin	Unloading of Petrol into Storage	EPA/10960/05/p1	Yes	No	No	No	No	No	No
BP Oakfield	Unloading of Petrol into Storage	EPA/10963/05/p1	No	No	No	No	No	No	No
Tesco Stores Ltd	Unloading of Petrol into Storage	EPA/10931/05/p1	No	No	No	No	No	No	No
Northway Filling Station (BP)	Unloading of Petrol into Storage	EPA/10952/05/p1	No	No	No	No	No	No	No
Shell Baldock	Unloading of Petrol into Storage	EPA/10962/05/p2	Yes	No	No	No	No	No	No
BP Connect	Unloading of Petrol into Storage	EPA/00152/04/p1	No	No	No	No	No	No	No
Letchworth Gate Service Station (Shell)	Unloading of Petrol into Storage	EPA/10943/05/p1	No	No	No	No	No	No	No

Appendix 9 (Continued) - List of Industrial Processes

Process Name	Process Type	PG Note	New Source Since USA 2006?	Existing Process with New Exposure?	Substantial Change >30%?	Potentially Significant Release with Respect to AQOs?	Complaints?	Nomogram Screening Assessment Required?	Detailed Assessment Required?
J Sainsbury Plc	Unloading of Petrol into Storage	EPA/10953/05/p1	No	No	No	No	No	No	No
Icknield Way Service Station (ROC UK Ltd)	Unloading of Petrol into Storage	EPA/10955/05/p1	No	No	No	No	No	No	No
Specialist Cars	Vehicle Respraying.	EPA/00714/03/p1	No	No	No	No	No	No	No
Solus (London) Ltd	Vehicle Respraying.	EPA/16609/06	No	No	No	No	No	No	No
Ensign Engineering	Vehicle Respraying.	EPA/00642/03/p1	Yes	No	No	No	No	No	No
Accident Repair Centre	Vehicle Respraying.	EPA/00882/03/p1	No	No	No	No	No	No	No
Collins Motor Engineers	Waste Oil Burner	EPA/24287/07	Yes	No	No	No	No	No	No
Top Marques Repair Garage Ltd	Waste Oil Burner	EPA/25126/07	Yes	No	No	No	No	No	No
JWJ Car and Commercial	Waste Oil Burner	EPA/00713/03	No	No	No	No	No	No	No
Top Gear Auto Centre Ltd	Waste Oil Burner	EPA/24305/07	Yes	No	No	No	No	No	No