



North Hertfordshire District Council

Local Air Quality Management

Detailed Assessment 2010

April 2010

DOCUMENT INFORMATION

Local Authority:

North Hertfordshire District Council
Council Offices
Gernon Road
Letchworth Garden City
Hertfordshire
SG6 3JF

Project Manager: Tracy Farrell
Telephone: 01462 474328
Email: tracy.farrell@north-herts.gov.uk

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CONTENTS

EXECUTIVE SUMMARY.....	1
1 INTRODUCTION.....	2
1.1 PROJECT BACKGROUND.....	6
1.2 LEGISLATIVE BACKGROUND.....	6
2 REVIEW AND ASSESSMENT OF AIR QUALITY UNDERTAKEN BY NORTH HERTFORDSHIRE DISTRICT COUNCIL.....	8
2.1 THE FIRST, SECOND AND THIRD ROUND OF REVIEW AND ASSESSMENT.....	8
2.2 THE FOURTH ROUND OF REVIEW AND ASSESSMENT.....	10
2.3 SCOPE AND METHODOLOGY OF THE DETAILED ASSESSMENT.....	10
2.4 MONITORING EQUIPMENT.....	10
3 RESULTS.....	13
3.1 NO ₂ DIFFUSION TUBE DATA.....	13
3.2 NO ₂ REAL TIME ANALYSER DATA.....	15
3.2.1 Whitehorse Street, Baldock.....	15
3.2.2 Hitchin Hill Roundabout, Hitchin.....	17
3.3 PM ₁₀ DATA	17
4 CONCLUSIONS.....	19
4.1 WHITEHORSE STREET, BALDOCK.....	19
4.2 HITCHIN HILL ROUNDABOUT, HITCHIN.....	19
4.3 UPPER TILEHOUSE STREET, HITCHIN.....	19
4.4 NIGHTINGALE STREET ROUNDABOUT, HITCHIN.....	19
5 REFERENCES.....	20
APPENDIX 1 Quality Assurance / Quality Control (QA/QC).....	21
1.1 Calibration.....	21
1.2 Rescaling.....	21
1.3 Data Ratification.....	21
1.4 Servicing.....	22
APPENDIX 2 Background NOx levels.....	22
APPENDIX 3 Diffusion Tube data and calculations.....	23

FIGURES

Figure 2.1 – Photograph of WhiteHorse Street Site.....	11
Figure 2.2 – Photograph of Hitchin Library Site.....	12
Figure 3.1 – Location of NOx analyser on Whitehorse Street Baldock.....	15
Figure 3.2 – ‘Screen Grab’ of statistical tool calculator at Herts & Beds Network website showing annual mean of NOx levels at Whitehorse Street.....	15
Figure 3.3 – Map showing location of Baldock Bypass.....	16
Figure 3.4 - Map showing Hitchin Hill Roundabout site.....	17
Figure 3.5 – Map showing Hitchin Library site.....	18
Figure 3.6 – ‘Screen Grab’ of statistical tool calculator at Herts & Beds Network website showing annual mean of PM10 levels at Hitchin Library.....	18

TABLES

Table 1.1 – UK Air Quality Strategy objectives (England).....	7
Table 3.1 - Diffusion Tube data results NHDC (in $\mu\text{g}/\text{m}^3$).....	13

Executive Summary

This Detailed Assessment (DA) of Air Quality has been undertaken in four areas within Hitchin and Baldock for Nitrogen Dioxide (NO₂) and particulates (PM₁₀). The DA follows from the findings of the last Updating and Screening Assessment (USA) produced in 2009, as part of the Fourth Round of the air quality Review and Assessment. The Detailed Assessment is required by DEFRA as part of the Local Air Quality Management regime. The following are the areas of concern identified in the last USA:

- Whitehorse Street, Baldock
- Hitchin Hill roundabout, Hitchin
- Park Way / Upper Tilehouse Street, Hitchin
- Nightingale Street roundabout, Hitchin

The findings of this Detailed Assessment are provided below:

Whitehorse Street, Baldock

The real time NO_x analyser showed the annual mean at this site did not exceed the objective for that pollutant, and that the hourly mean was never exceeded. However, the analyser has only been located at this site for 4 months. As the annual mean is close to the objective, it is recommended that monitoring continue for a full year and be reported on in the next Progress Report 2011. The diffusion tube data for the sites on Whitehorse Street support the results of the real time analyser, that the objective has not been exceeded. The diffusion tubes shall continue to provide further monitoring information.

The annual mean and hourly mean at this site did NOT exceed the objective

Hitchin Hill Roundabout, Hitchin

The diffusion tube data from the two sites on Hitchin Hill roundabout does not show exceedences of the objective. However, the annual mean is close to the objective therefore monitoring at this site should continue. From April 1st 2010, a continuous NO_x analyser will be added to the monitoring network at this site, and this should be reported on in the next Progress Report 2011.

The annual mean at this site did NOT exceed the objective

Park Way / Upper Tilehouse Street, Hitchin

The TEOM sited at Hitchin library has captured one month of data. This data shows that the annual mean has not been exceeded, and that the daily mean has not been exceeded. It is recommended that the TEOM remain on site for a full year, and the data be reported in the next Progress Report 2011. The diffusion tube data for the site, has annual means of 35, 37 & 41 µg/m³ at the three diffusion tube locations. It is recommended that the diffusion tubes continue to be used at this location. Further, NHDC will be submitting an application for a Air Quality Grant from DEFRA, for the purpose of purchasing a Real time NO_x analyser for this site.

The annual mean and hourly mean at this site did NOT exceed the objective

Nightingale Street Roundabout, Hitchin

The diffusion tubes sited at Nightingale Street Roundabout, showed annual averages of 28, 26 & 33 µg/m³. Therefore the annual mean has not been exceeded. However, data capture was very low for this site. Therefore it is recommended that the diffusion tubes continue at this site and be reported on in the Progress report 2011.

The annual mean at this site did NOT exceed the objective

1 Introduction

1.1 Project background

North Hertfordshire District Council (NHDC), are required to undertake air quality Detailed Assessments for three locations in Hitchin, and one in Baldock, as requested by DEFRA as part of the Local Air Quality Management regime, following the findings of the last air quality Updating and Screening Assessment (USA), 2009.

Part IV of the Environment Act, 1995 places a statutory duty on Local Authorities to periodically review and assess the air quality within their area. The Detailed Assessment is a requirement of the Fourth Round of Review and Assessment for Local Authorities that have identified areas where there is a risk of exceedence of an air quality objective within their Updating and Screening Assessment.

The USA 2009 identified the following areas in North Hertfordshire where monitoring data exceeded the Air Quality Strategy (AQS) annual mean objective for NO₂:

- Whitehorse Street, Baldock
- Hitchin Hill Roundabout, Hitchin.
- Park Way / Upper Tilehouse Street, Hitchin.
- Nightingale Road, Hitchin

1.2 Legislative background

The significance of existing and future pollutant levels can be assessed in relation to national air quality standards and objectives, established by the Government. The latest Air Quality Strategy (AQS)¹ released in July 2007 provides the over-arching strategic framework for air quality management in the UK and contains national air quality standards and objectives established by the Government to protect human health. The objectives for ten pollutants, (benzene, 1,3-butadiene, carbon monoxide, lead, nitrogen dioxide, sulphur dioxide, particulates (PM10 and PM2.5), polycyclic aromatic hydrocarbons and ozone), have been prescribed within the Air Quality Strategy based on The Air Quality Standards (England) Regulations 2007². The objectives set out in the AQS for the protection of human health are presented in Table 1.1.

The Air Quality Standards (England) Regulations 2007² came into force on 15th February 2007. This brings together in one statutory instrument the Governments requirements to fulfil separate EU Daughter Directives through a single consolidated statutory instrument, which is fully aligned with the proposed new EU Air Quality Directive (CAFÉ – Clean Air For Europe)³. The Regulations 2007 include objectives for Arsenic, Cadmium and Nickel. These are required to be assessed by member states in response to the proposed new EU Air Quality Daughter Directive (CAFÉ), however, the AQS does not contain objectives for these pollutants and local authorities are not currently required to assess against these.

Table 1.1 – UK Air Quality Strategy objectives (England)

pollutant	Objective	Concentration measured as	Date to be achieved by and maintained thereafter
Benzene	16.25 µg/m ³	running annual mean	31st December 2003
	5 µg/m ³	running annual mean	31st December 2010
1,3-Butadiene	2.25 µg/m ³	running annual mean	31st December 2003
Carbon monoxide	10 mg/m ³	maximum daily running 8 hour mean	31st December 2003
Lead	0.5 µg/m ³	annual mean	31st December 2004
	0.25 µg/m ³	annual mean	31st December 2008
Nitrogen dioxide	200 µg/m ³ , not to be exceeded more than 18 times a year	hourly mean	31st December 2005
	40 µg/m ³	annual mean	31st December 2005
Particles (PM ₁₀)	50 µg/m ³ , not to be exceeded more than 35 times a year	24 hour mean	31st December 2004
	40 µg/m ³	annual mean	31st December 2004
Particles (PM _{2.5})	25 µg/m ³	Annual mean	2020
	Target of 15% reduction in concentrations at urban background ⁱ	annual mean	In urban areas between 2010 and 2020
Sulphur dioxide	266 µg/m ³ , not to be exceeded more than 35 times a year	15 minute mean	31st December 2005
	350 µg/m ³ , not to be exceeded more than 24 times a year	hourly mean	31st December 2004
	125 µg/m ³ , not to be exceeded more than 3 times a year	24 hour mean	31st December 2004
Polycyclic aromatic hydrocarbons	0.25 ng/m ³ B(a)P ²	Annual average	31st December 2010
Ozone	100 µg/m ³ , not to be exceeded more than 10 times a year	8 hour mean	31 December 2005

2. Review and Assessment of Air Quality undertaken by North Hertfordshire District Council

The Local Air Quality Management (LAQM) regime was first set down in the 1997 National Air Quality Strategy (NAQS)⁶ 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. The guidance has since been reviewed and the latest guidance include the policy guidance LAQM.PG.(09)⁷ and Technical Guidance LAQM.TG (09),⁸. Progress Report Guidance LAQM.PRG (03),⁹ and addendum to these documents. 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.

2.1 The First, Second and Third round of Review and Assessment.

Between 1999 and 2003, NHDC undertook its First Round of Review and Assessments 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 NHDC did not have to proceed to a Detailed Assessment, annual air quality Progress Reports were required in the following years until the Third Round of Review and Assessment. Both Progress 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). There were a number of changes made to the technical guidance for the Review and Assessment process.

Having considered each pollutant, it was concluded that the air quality objectives for benzene, 1,3-butadiene, carbon monoxide, lead and sulphur dioxide 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:

- Hitchin Hill Roundabout, Hitchin
- Park Way / Upper Tilehouse Street, Hitchin
- Whitehorse Street, Baldock

Although both diffusion tubes in Hitchin are kerbside sites (therefore not relevant public exposure), the estimated concentrations at the facades of nearby properties showed that there is 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 Design Manual for Roads and Bridges screening showed that the daily mean PM₁₀ AQS objective was likely to be exceeded at Park Way / Upper Tilehouse Street junction. In 2007, three Detailed Assessments were carried out.

The Detailed Assessments presented the following conclusions:

Stevenage Road, (Hitchin Hill roundabout), Hitchin:

“Based on modelled results for year 2006, it is unlikely that the annual mean AQS objective will be breached at properties along Stevenage Road and around the Hitchin Hill roundabout. Therefore, an AQMA at this junction is not required”.

Results near properties in Dower Court in Stevenage Road were under but close to the annual mean AQS objective. Therefore, it was recommended that NHDC relocate the

diffusion tube in Stevenage Road on the façade of Dower Court facing Stevenage Road, and install further diffusion tubes along Stevenage Road as this road is heavily trafficked and there are several properties close to the kerb.

Park Way / Upper Tilehouse Street, Hitchin.

“Predicted NO₂ and PM₁₀ results showed that all AQS objectives for these pollutants were unlikely to be breached at properties around this junction, as results were well below the objectives. Therefore, an AQMA is not required at this location”.

It was recommended that NHDC relocate the diffusion tube at Hitchin Library at a location more relevant for public exposure, and install further diffusion tubes near properties along the roads with highest traffic (Park Way and Upper Tilehouse Street).

Whitehorse Street, Baldock.

Monitoring data and modelled results showed that the NO₂ annual mean AQS objective had been exceeded at a number of properties along Hitchin Street, Whitehorse Street, and at a few properties in the High Street near the junction in 2006. Projections to year 2010 showed that the annual mean AQS objective would still be breached by this date at those properties close to the junction.

However, the detailed assessment did not take into account the recent Baldock Bypass that had been opened, and the projected traffic figures did not reflect the considerable change in traffic numbers, (in particular HGV's) at this site. It was therefore considered prudent, to delay declaring an AQMA until real time data could be obtained for this site.

2.2 The Fourth Round of Review and Assessment

The USA 2009 concluded that NHDC should progress to Detailed Assessments for mean NO₂ at the following four junctions:

- Whitehorse Street, Baldock
- Upper Tilehouse Street, Hitchin
- Hitchin Hill Roundabout, Hitchin
- Nightingale Road, Hitchin.

2.3 Scope and Methodology of the Detailed Assessment.

The purpose of the Detailed Assessment is to provide the Local Authority with an opportunity to supplement the information that has been gathered in the earlier review and assessment work and more accurately assess the impact of pollution sources on local receptors. Recent diffusion tube data and real time analyser data, is used.

The Detailed Assessment will identify with reasonable certainty whether or not there is likely to be an exceedence of the AQS objectives and if so, define the extent and magnitude of the exceedence.

2.4 Monitoring Equipment

NHDC own both a continuous NO_x analyser, and a TEOM unit to measure PM₁₀. For the purpose of this detailed assessment, it was considered appropriate to move the equipment from its previous site (Breachwood Green), to the detailed assessment sites to allow for a more accurate assessment of air quality.

The NO_x analyser was moved to Whitehorse Street, Baldock in September 2009. The Environmental research Group at King's College who ratify the data for the NO_x analyser assisted with location choice, and the new site can be seen in figure 2.1 below.

The TEOM has been moved to the Hitchin Library site. The location of which can be seen below in figure 2.2. The TEOM became operational on 12th March 2010.

The cost of moving these two pieces of equipment, and associated works and additional housing was met by using the funding received by NHDC from DEFRA Air Quality Grants in 2009.

The remainder of the funding has paid for 5 months NO_x monitoring at Hitchin Hill, and the decommissioning of the old Air Quality Lab. There were no further funds to allow for more detailed monitoring at the Nightingale Road site, however NHDC has placed further passive diffusion tubes throughout the district to monitor NO₂ concentrations.

Figure 2.1 Whitehorse street monitoring equipment



Figure 2.2 Hitchin Library monitoring equipment



3 Results

3.1 NO₂ Diffusion tube data

NHDC currently measures NO₂ concentrations based on a network of passive diffusion tubes at kerbside and roadside sites across the District.

Harwell Scientific Services supplies and analyse the tubes which are prepared based on the 50% TEA (Triethanolamine) in Acetone method. Harwell Scientific Services is a UK Accreditation Service (UKAS) accredited laboratory and participates in the UK National Diffusion Tube Network and the Workplace Analysis Scheme for Efficiency (WASP).

An annual bias correction factor has been applied to the data. (See Appendix 3). Bias of diffusion tubes is thought to be largely associated with the laboratory and preparation method used. The review and assessment helpdesk provides averaged bias factors based on national surveys of co-located sites. When necessary, monitoring data has been annualised in accordance with methodology in the Technical Guidance (LAQM.TG(09)).

Table 3.1 Diffusion Tube data results NHDC (in $\mu\text{g}/\text{m}^3$)

Code	Location	X(m)	Y(m)	Class	Average $\mu\text{g}/\text{m}^3$	Annualised	Bias
HITCHIN HILL ROUNDABOUT							
NH45	Stevenage Road Hitchin	518708	228347	K	46	49	38
HN76	Dower Court Hitchin	518738	228338	K	43	46	36
NIGHTINGALE STREET							
NH66	Meadowbank Hitchin	519555	229909	K	33	36	28
NH68	40 Byron Close Hitchin	519587	229835	K	31	33	26
NH69	64 Grove Road Hitchin	518821	229993	K	39	42	33
NH83	Hitchin Station Roundabout A	519328	229752	R	X	X	X
NH84	Hitchin Station Roundabout B	519366	229806	R	X	X	X
UPPER TILEHOUSE STREET (HITCHIN LIBRARY SITE)							
NH63	Library Hitchin	518160	229092	K	45	48	37
NH77	Upper Tilehouse Street, Hitchin	518006	229032	K	50	54	41
NH82	Upper Tilehouse Street, Hitchin	518129	929065	R	42	46	35
WHITEHORSE STREET, BALDOCK							
NH61	Whitehorse Street Baldock	524428	233882	K	60	64	50
NH70	Bus Stop, Hitchin Street, Baldock	524298	233784	K	36	39	30
NH71	Puddleducks, Hitchin Street, Baldock	524375	233844	K	36	39	30
NH72	Opp Rose and Crown Whitehorse Street Baldock	524502	233948	K	43	46	36
NH73	Satchells, High St Baldock	524486	233856	K	37	40	31
NH75	Church, Whitehorse Street, Baldock	524574	234022	K	38	41	31

Bias (annual bias correction factor) **0.77**, R(a) **1.08373749** – see appendix A3

3.2. NO₂ Real time analyser data

3.2.1 Whitehorse Street, Baldock.

A detailed Assessment of this site was undertaken in 2007, which concluded that an AQMA was necessary. Implementation of the AQMA was postponed as it was anticipated that traffic counts would substantially decrease following the opening of the Baldock Bypass (See Figure 3.3). (In 2006 the Baldock Bypass was opened and traffic counts on Whitehorse Street have decreased by 41%)

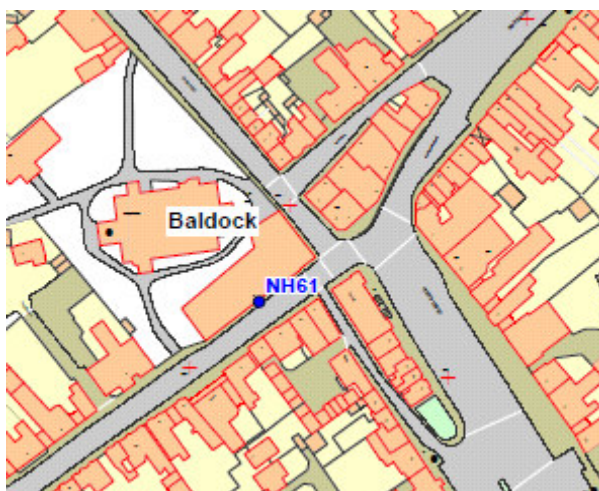


Figure 3.1 NO_x analyser at Whitehorse Street
(Crown Copy Right – All Rights Reserved North Herts DC LA 1000 18622 – 2007)

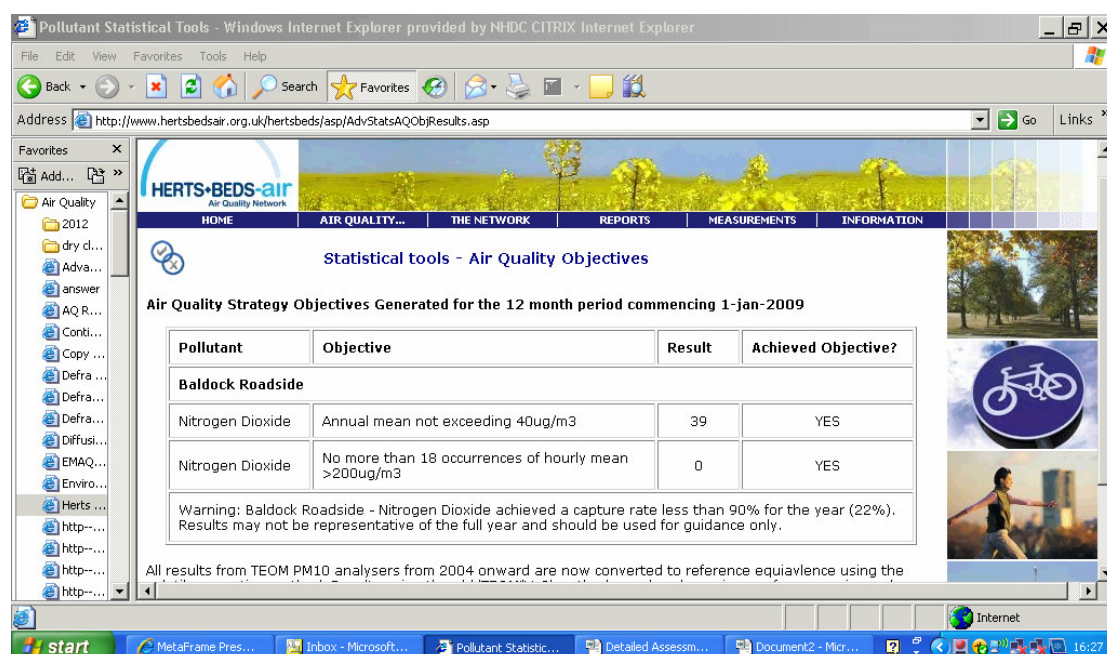


Figure 3.2 Screen grab of Statistical tool calculator at Herts and Beds website

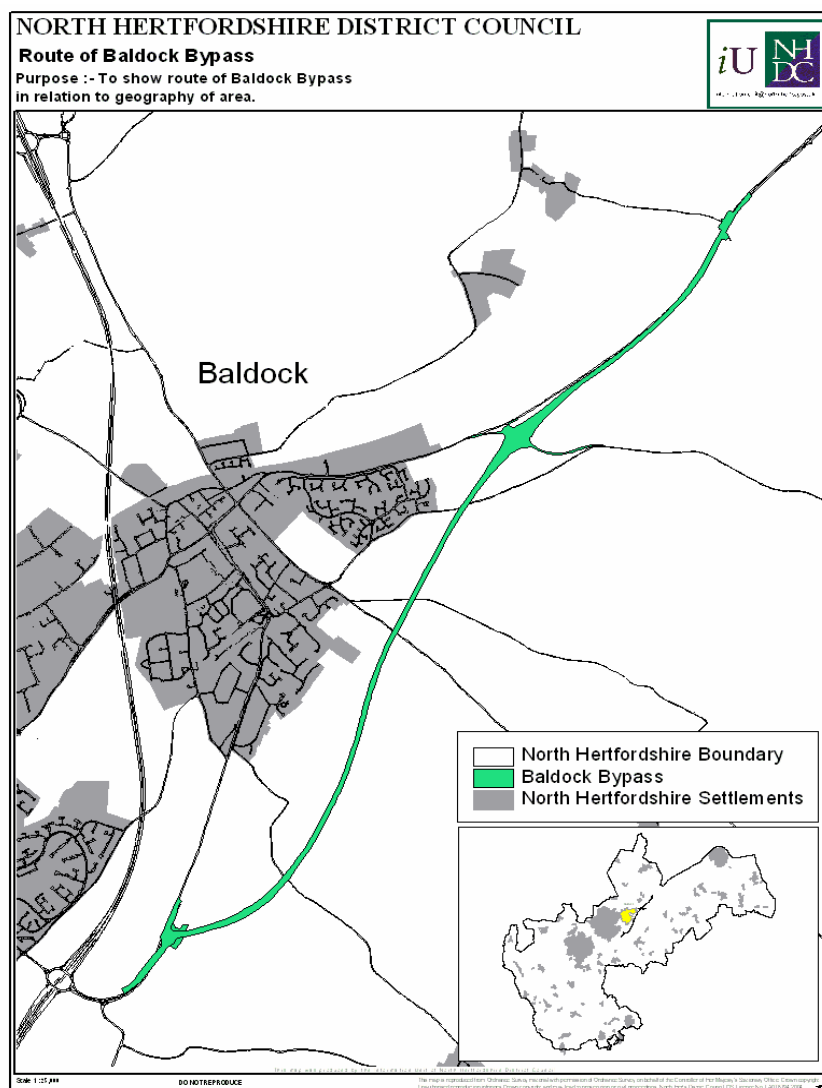


Figure 3.3 – Map showing the Baldock Bypass
(Crown Copy Right – All Rights Reserved North Herts DC LA 1000 18622 – 2007)

The NO_x analyser at Whitehorse Street has been running since the beginning of September 2009. Figure 3.2 shows the results using the statistical tool on the Herts and Beds Network website. Neither the annual or daily objective have been exceeded. However, as the site has only been running since September, data capture is very low. As data capture is below 75% it should not be used. The monitoring equipment will stay at this location for further reporting in the 2011 Progress Report.

3.2.2 Hitchin Hill roundabout, Hitchin

This 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. The USA 2009 reported that one diffusion tube (NH45) was close to the objective, and recommended that the junction proceed to a Detailed Assessment.

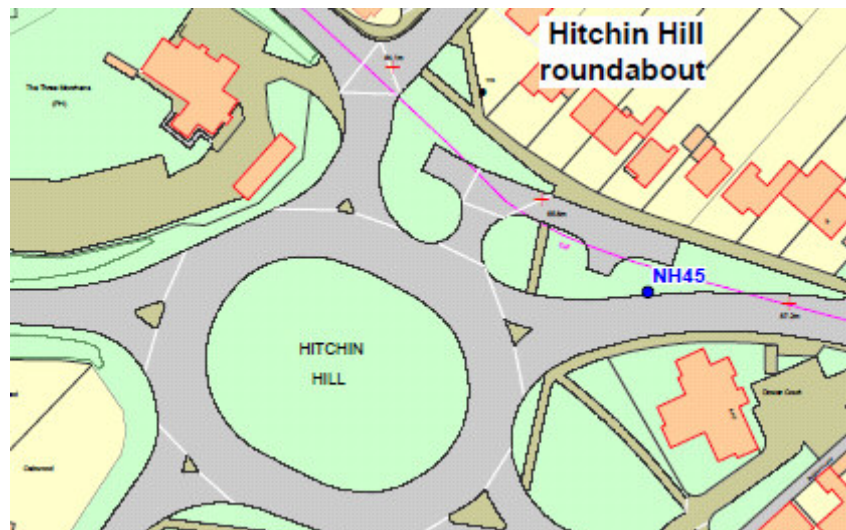


Figure 3.4 – Hitchin Hill Roundabout site.

(Crown Copy Right – All Rights Reserved North Herts DC LA 1000 18622 – 2007)

The two diffusion tubes at this site have annual averages of 36 & 38 µg/m³ for 2009. Whilst this does not exceed the objective, it is considered sufficiently close to the objective to require further monitoring.

Therefore, using funding obtained from the DEFRA grant awards, 5 months of Continuous NO_x monitoring will commence at this site from 1st April 2010. The results from this monitoring will be reported in the 2011 Progress Report. It is hoped that further funding will be obtained to allow this monitoring to continue for a further 7 months giving a complete year of continuous monitoring.

3.3 PM₁₀ Data

Upper Tilehouse Street, Hitchin.

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 this junction in the 2009 USA using DMRB indicated that exceedences of the NO₂ annual mean are likely to occur at the façade of a near by residence which is the reason for this detailed assessment.

As NHDC only has one NO_x analyser (moved to Whitehorse Street), the TEOM was relocated to this site as high PM₁₀ levels are indicative of high NO₂ levels. It has been operating since March 12th 2010, and figure 3.6 shows that in the short time that it has been running the annual mean objective has **not** been exceeded. However, the TEOM has not been running for long enough to obtain sufficient data capture. Therefore further reporting of the data is recommended in the 2011 Progress Report. Diffusion tube data at this site shows annual mean of 35, 37 & 41 µg/m³.

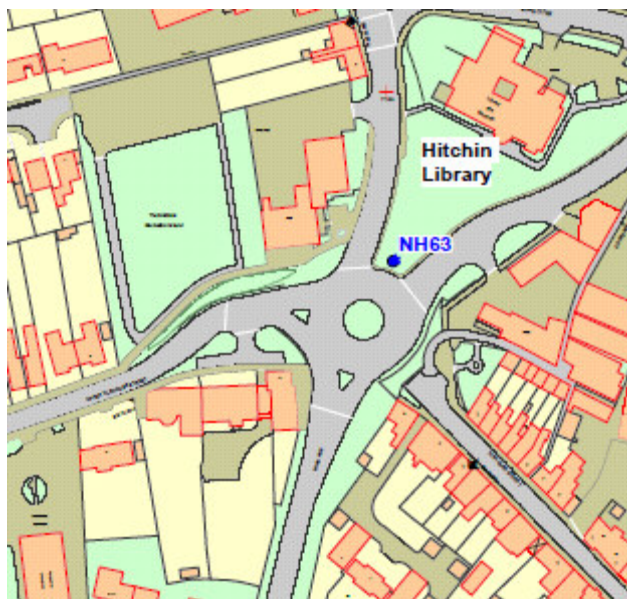


Figure 3.5 Hitchin Library site (Upper Tilehouse Street)
(Crown Copy Right – All Rights Reserved North Herts DC LA 1000 18622 – 2007)

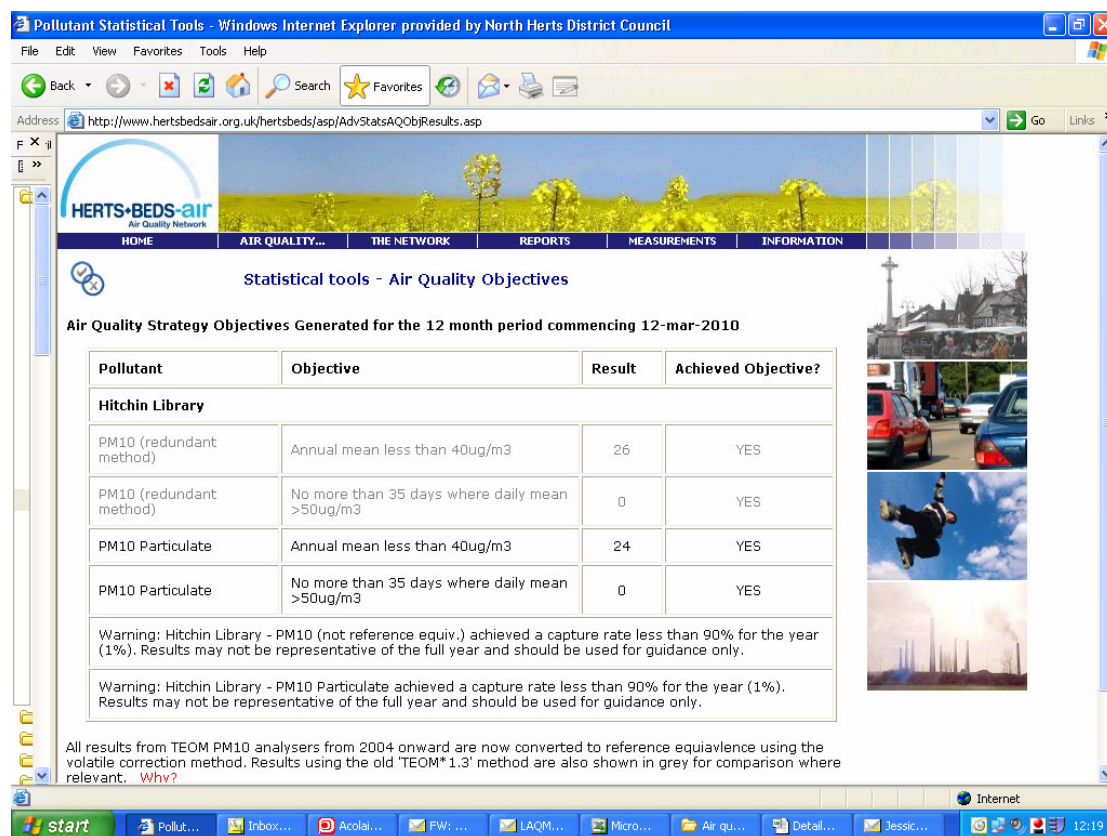


Figure 3.6 – Screen grab of Statistical Tool Calculator of Herts and Beds network for the TEOM at Hitchin Library.

4. CONCLUSIONS

4.1 Whitehorse Street, Baldock

The real time NOx analyser showed the annual mean at this site did not exceed the objective for that pollutant, and the hourly mean was never exceeded. However, the analyser has only been located at this site for 4 months. As the annual mean is close to the objective, it is recommended that monitoring continue for a full year and be reported on in the next Progress Report 2011. The diffusion tube data for the sites on Whitehorse Street support the results of the real time analyser, that the objective has not been exceeded. The diffusion tubes shall continue to provide further monitoring information.

4.2 Hitchin Hill roundabout, Hitchin

The diffusion tube data from the two sites on Hitchin Hill roundabout does not show exceedences of the objective. However, the annual mean is close to the objective therefore monitoring at this site should continue. From April 1st 2010, a continuous NOx analyser will be added to the monitoring network at this site, and the data from this shall be reported in the next Progress Report in 2011.

4.3 Park Way / Upper Tilehouse Street, Hitchin

The TEOM sited at Hitchin library has captured one month of data. This data shows that the annual mean has not been exceeded, and that the daily mean has not been exceeded. It is recommended that the TEOM remain on site for a full year, and the data be reported in the next Progress Report 2011. The diffusion tube data for the site, has annual means of 35, 37 & 41 $\mu\text{g}/\text{m}^3$ at the three locations. It is recommended that the diffusion tubes continue to be used at this site. Further NHDC will be submitting an application for a Air Quality Grant from DEFRA, for the purpose of purchasing a Real time NOx analyser for this site.

4.4 Nightingale Street Roundabout, Hitchin

The diffusion tubes sited at Nightingale Street roundabout, showed annual averages of 28, 26 & 33 $\mu\text{g}/\text{m}^3$. Therefore the annual mean has not been exceeded. However, data capture was very low for this site. Therefore it is recommended that the diffusion tubes continue at this site and be reported on in the Progress Report 2011. Further funding shall be sought to obtain a real time analyser for this site.

The main conclusion from this Detailed Assessment of four sites, is that currently no site is exceeding the annual or daily objectives for PM₁₀ or NO₂. However further monitoring is required at all four locations to achieve a year with over 90% data capture.

The network should be enhanced with continuous monitoring at Nightingale Street, (i.e. an Osiris Turn Key to monitor PM₁₀ and increased diffusion tubes). The monitoring at Hitchin Hill should be extended from 5 months to 1 year to allow for a full data set, and the current monitoring regime should be continued with regard to the Continuous NOx analyser at Whitehorse Street, the TEOM at Hitchin Library, and the Diffusion Tube network.

5 REFERENCES

1. The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007), Published by Defra in partnership with the Scottish Executive, Welsh Assembly Government and Department of the Environment Northern Ireland.
2. The Air Quality Standards Regulations 2007, Statutory Instrument No 64, The Stationary Office Limited.
3. <http://ec.europa.eu/environmental/air/cafe/index.htm>
4. $25\mu\text{g}/\text{m}^3$ is a concentration cap combined with 15% reduction.
5. Benzo(a)Pyrene
6. DoE 1997, 'The United Kingdom National Air Quality Strategy', The Stationary Office.
7. DEFRA (2009) Policy Guidance LAQM.PG(09), Part IV of the Environment Act 1995, Local Air Quality Management, The Stationary Office.
8. DEFRA (2009) Technical Guidance LAQM.TG(09), Part IV of the Environment Act 1995, Local Air Quality Management, The Stationary Office.
9. DEFRA (2003) Progress Report Guidance LAQM.PRG(03), Part IV of the Environment Act 1995, Local Air Quality Management, The Stationary Office

Appendix

Appendix 1 Quality assurance/ quality control (QA/QC)

A1.1 Calibration

As with most accurate measurement equipment, the APNA 360 must be calibrated to determine its function. Calibration is simply the testing of equipment against a known quantity to determine whether it produces expected results. In the case of the APNA 360 nitrogen dioxide analyser, calibration takes the form of two routines:

- a) The response of the analyser to high concentrations of nitric oxide is assessed by a “span calibration”. Simply, a nitric oxide (at a known high concentration) is passed into the APNA 360 analyser and the result produced by it is noted.
- b) The response of the analyser to sample containing no oxides of nitrogen (NO_x) is assessed by passing air which has been “scrubbed” clean of NO_x (“zero air”) into the APNA 360 and thus conduct a “zero calibration” and the analysed result noted.

Essentially, the analyser should produce a result, which is close to the absolute concentration at both ends of the scale - the span range.

Span and zero calibrations are conducted every third day by the NO_x analyser automatically and stored in the datalogger for periodic inspection. To ensure a consistently high quality assurance standard, the NO_x analyser is calibrated, for both zero and span, every 10 - 14 days and the result faxed to a third body for validation.

Due to the nature of particulate matter and the working of the TEOM, the instrument cannot be calibrated routinely. Quality of the output data is assured by regular servicing and diagnostic of the TEOM by its supplier.

A1.2 Rescaling

However, for a host of reasons, analysers such as the APNA 360 do not always produce calibration results that are exactly in line with the anticipated levels during both the span and zero calibration operation. This does not mean that the data produced must be discarded because it is not accurate. “Calibration drift” is common and can be compensated by the use of a scaling calculation; any under/over reading by the analyser is distributed over the span range so that the data produced routinely is altered to reflect any inaccuracy.

The result of rescaling is to ensure that data from the analyser is accurate at the concentrations encountered routinely.

Rescaling is not conducted by North Hertfordshire District Council, but is undertaken by The Environmental Research Group (ERG) under contract. ERG is an environmental research body associated with Kings College London and is a non-profit organisation, which runs a number of large monitoring networks such as The Herts and Beds Network. Rescaling takes place after every manual calibration to ensure a robust data set.

A1.3 Data ratification

Whilst calibration can identify problems with the functioning of NO_x analyser, it cannot be relied upon to indicate the responsiveness of the equipment on a day to day basis. Data ratification is basically the examination of the data produced by both the TEOM and APNA 360 on a daily basis and the comparison with other analysers locally to determine whether there is anything unusual about the data generated. Data ratification is conducted by (ERG), under contract, to ensure that any isolated fault with either analyser is identified as quickly as possible.

A1.4 Servicing

Complex equipment such as the analysers within the mobile air quality monitoring station, requires regular maintenance to ensure that they function reliably. Horiba Ltd, the supplier of the station, is contracted to service the equipment on a programmed basis. However, routine inspection and maintenance of the station is a responsibility of North Hertfordshire District Council and takes place every 10 -14 days.

Appendix 2 Background NO_x & NO₂ levels

NO_x

Units are ug.m-3

Local_Auth_Code	x	Y	geoarea	EU_zone_agglom_0 1	Total_NOx_09
Whitehorse Street	524500	233500	6	29	26.29396
Tilehouse Street	518500	229500	6	29	26.19091
Hitchin Hill	518500	228500	6	29	22.00022
Nightingale Road	519500	229500	6	29	23.98342

NO₂

Units are ug.m-3

Local_Auth_Code	x	Y	geoarea	EU_zone_agglom_01	NO2_09
Whitehorse Street	524500	233500	6	29	17.16313
Tilehouse Street	518000	229000	6	29	17.10928
Hitchin Hill	518500	228500	6	29	14.75201
Nightingale Road	519500	229500	6	29	15.86368

Appendix 3 Diffusion tube data

A3.1 Nox tube results for Baldock/Hitchin (Jan - Dec 2009)

Code	Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	Annualised	Bias
NH45	Stevenage Road Hitchin			51	53	42			12		70	45		46	49	38
NH59	NH04a Clothall Road Baldock			44	39	27	40	31	20	39	43	150	11	35	38	30
NH61	NH53a Whitehorse Street Baldock	46	64	72	65	37								60	64	50
NH63	NH02a Library Hitchin			55	53				29	42			72	45	48	37
NH66	Meadowbank, Hitchin	52	46	41	34	27	23			13	47	131	14	33	36	28
NH68	40 Byron Close, Hitchin	50	41	46	33	26		35	19	14		44	50	31	33	26
NH69	64 Grove Road, Hitchin		43	47	44	35		26					79	39	42	33
NH70	Nr Bus Stop Hitchin Street Baldock	51	41	47	49	24	30		23	34	41	134	9	36	39	30
NH71	Puddleducks Hitchin St Baldock		46	40	40			20		36		143	6	36	39	30
NH72	Opp Rose Crown Whitehorse St Baldock		57	48	46		33	38	35	42			11	43	46	36
NH73	os Satchells High St Baldock		43	42	48	26	27					129	8	37	40	31
NH75	Nr UnRef Church Whitehorse St Baldock		55	43	46	31	28	31	22	34	49	171	12	38	41	31
NH76	Dower Court Hitchin			62	52	35	42	28	26	47	50	45	67	43	46	36
NH77	Upper Tilehouse Street Hitchin traffic lights		55			44	54	42	36	54	62	64	70	50	54	41
NH82	Upper Tilehouse St Nr Roundabout								36	39	51	65	88	42	46	35
NH83	Hitchin Station Roundabout A														X	X
NH84	Hitchin Station Roundabout B										48	56	95		X	X

Bias* 0.77

R(a) 1.08373749

Nox tube results for Whitehorse Street, Baldock (Jan - Dec 2009)

Code	Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
NH59	NH04a Clothall Road Baldock			44	39	27	40	31	20	39	43	150	11
NH61	NH53a Whitehorse Street Baldock	46	64	72	65	37							
NH70	Nr Bus Stop Hitchin Street Baldock	51	41	47	49	24	30		23	34	41	134	9
NH71	Puddleducks Hitchin St Baldock		46	40	40			20		36		143	6
NH72	Opp Rose Crown Whitehorse St Baldock		57	48	46		33	38	35	42			11
NH73	os Satchells High St Baldock		43	42	48	26	27					129	8
NH75	Nr UnRef Church Whitehorse St Baldock		55	43	46	31	28	31	22	34	49	171	12

Nox tube results for Hitchin Library, Hitchin (Jan - Dec 2009)

Code	Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
NH63	NH02a Library Hitchin			55	53				29	42			72
NH77	Upper Tilehouse Street Hitchin traffic lights		55			44	54	42	36	54	62	64	70
NH82	Upper Tilehouse St Nr Roundabout								36	39	51	65	88

Nox tube results for Hitchin Hill, Hitchin (Jan - Dec 2009)

Code	Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
NH45	Stevenage Road Hitchin			51	53	42			12		70	45	
NH76	Dower Court Hitchin			62	52	35	42	28	26	47	50	45	67

Nox tube results for Nightingale Road, Hitchin (Jan - Dec 2009)

Code	Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
NH66	Meadowbank, Hitchin	52	46	41	34	27	23			13	47	131	14
NH68	40 Byron Close, Hitchin	50	41	46	33	26		35	19	14		44	50
NH69	64 Grove Road, Hitchin		43	47	44	35		26					79
NH83	Hitchin Station Roundabout A												

NH84 | Hitchin Station Roundabout B

48 56 95

Calculations for annualisation:

2009 (in ppb)

10 months - Feb - Oct

Long Term Site	Annual Mean (ppb)	Period Mean (ppb)	Ratio(ppb)
Stevenage, Lytton Way	15.2893557422969	13.9547169811321	1.09564069
St Albans, Fleetville	13.0852054794521	12.7	1.03033114
Welwyn, DCO	15.0907780979827	13.4147859922179	1.124936179
E.Herts, Sawbridgeworth	16.2969014084507	15.0334600760456	1.084041952
		R(a)	1.08373749
	29.20266947	26.65350943	1.09564069
	24.99274247	24.257	1.03033114
	28.82338617	25.62224125	1.124936179
	31.12708169	28.71390875	1.084041952
			1.08373749