WEST OXFORDSHIRE DISTRICT COUNCIL

2014 Air Quality Progress Report for WEST OXFORDSHIRE DISTRICT COUNCIL

In fulfillment of Part IV of the Environment Act 1995 - Local Air Quality Management

April 2014

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Note: In order to answer requests for data in the various sections some sets of data appear again in an alternative location however this does not detract from the presentation nor readability of the report.

Comments of a similar nature from previous reviews have been addressed.

Executive Summary

The monitoring reported within the 2014 Progress Report for West Oxfordshire District Council does not indicate any additional areas of general concern with regard to air quality.
Within the District there are no industrial developments with air pollution implications and any development proposals have been considered with regard to their potential to increase traffic pollution in the AQMAs and other areas.

Chipping Norton AQMA
The Chipping Norton Air Quality Action Plan, as accepted by Defra, proposed the introduction of a Weight Limit for HGVs and re-routing of HGV traffic (primarily targeting the Vale of Evesham / SE England two way flow).

The proposal has the objective of reducing HGV traffic density on the A44 through Chipping Norton by routing traffic further to the West on the A40 to access the Vale of Evesham from the South. This measure would involve 'de-priming' the A44 (currently a Primary Route for HGVs) and associated modification to signage.

Oxfordshire County Council (OCC) commissioned a feasibility study for the implementation of the lorry management measures. Currently, further consultation with neighbouring Counties is necessary and financial constraints within OCC budgets have delayed plans to implement this Action Plan.

The above intent remains within OCC LTP3 (2011 – 2030) (Chapter 20 - Revised Oct 2012). A schedule for implementation is still awaited and as OCC LTP4 is currently being formulated, representations have been made to incorporate the original proposal.

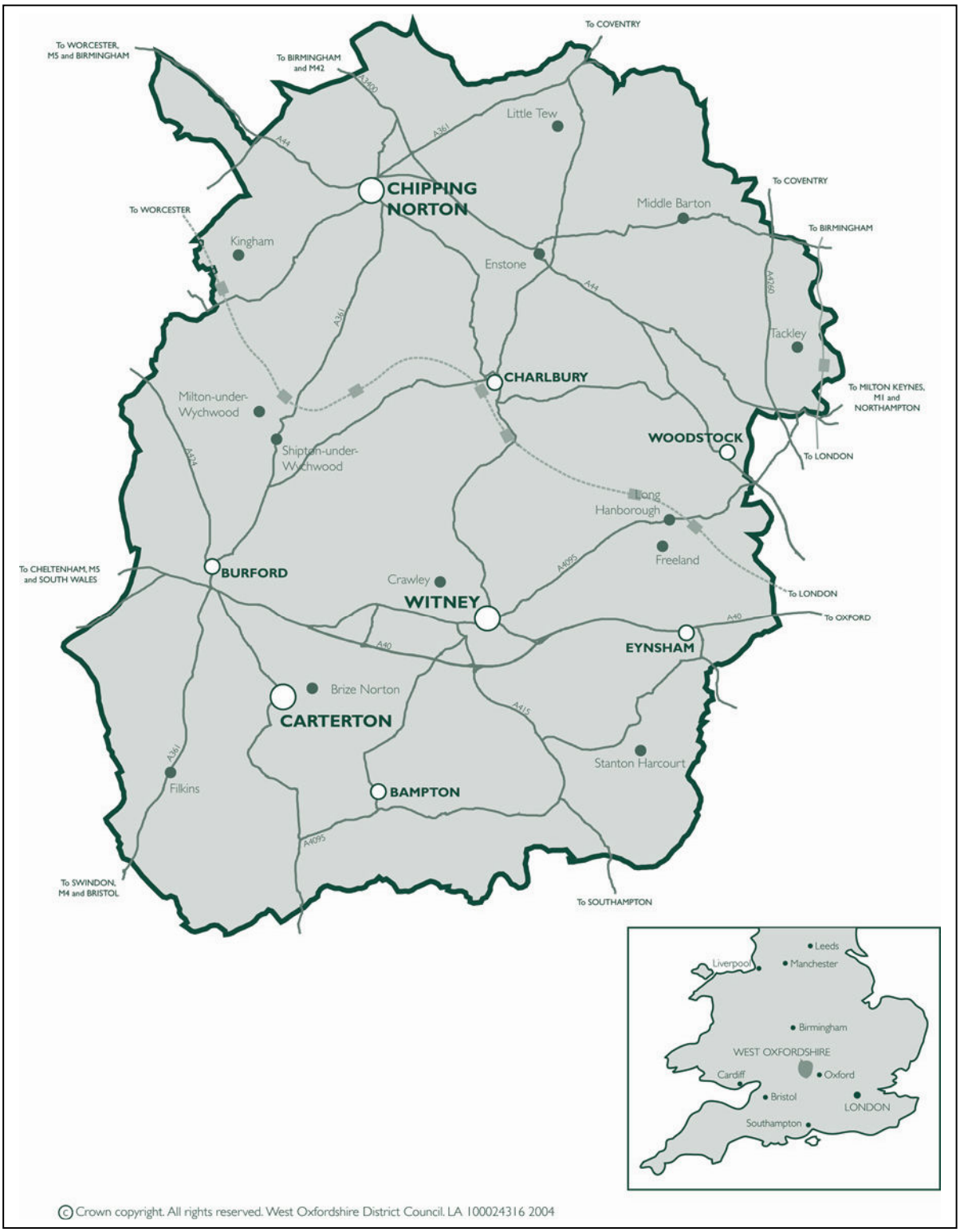
However, the WODC Low Carbon and Environment Plan (2013), addresses some of the additional air quality mitigation measures within the Air Quality Action Plan.

Witney AQMA
The Draft Action Plan for the Witney AQMA, having been deferred for a significant period pending the outcome of the Cogges Link Road (CLR) Planning Application by OCC, was approved by WODC Cabinet in December 2010. A period of public consultation was conducted throughout February 2011.

The Draft Action Plan for the Witney AQMA was written with the assumption that the CLR would proceed as per the Planning Consent. There were further procedural stages to be concluded after which the Draft Action Plan and the results of the public consultation would be reviewed to produce an Action Plan (and which would include the latest dispersion modelling) for consideration and approval by WODC Cabinet and OCC and in due course submitted to Defra.

This latter expectation failed to materialise as, in June 2012, the Department for Transport refused a compulsory purchase order for the land Oxfordshire County Council needed to build the Cogges Link Road

Accordingly, there is currently no Draft Action Plan for the Witney AQMA pending the revision of options which might address traffic flow within and around Witney.



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1 Introduction

1.1 Description of Local Authority Area

West Oxfordshire is one of the most attractive parts of Britain, lying to the north of the River Thames, to the west of the city of Oxford and including the eastern edge of the Cotswolds, part of the District is designated an Area of Outstanding Natural Beauty.

It is a rural district covering 714 km^2 (71,494 Hectares) with a population of 110,300* spread across a large number of relatively small settlements, totalling 83 parishes.

[* Updated projection for West Oxfordshire – Greater London Authority, Data Management and Analysis Group, published May 2011.
The 2011 Census figure was 104,800]

Situated in a prime central location, there are excellent communications to most parts of the country via the A40/M40 and the A34 roads. There are railway stations at Charlbury, Hanborough and Kingham with regular services to London and Birmingham.

It has a rich architectural and historic heritage ranging from Cotswold stone cottages to the splendour of Blenheim Palace, a World Heritage site.

As might be expected from the above, tourism is buoyant and is a main contributor to the District's vibrant economy. The business sector is made up of a healthy mixture of high technology, small and medium enterprises and continues to have one of the lowest unemployment rates in Britain. The area faces no major social problems and crime figures are amongst the lowest in the country.

1.2 Purpose of Progress 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 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.

Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment reports. Their purpose is to maintain continuity in the Local Air Quality Management process.

They are not intended to be as detailed as Updating and Screening Assessment Reports, or to require as much effort. However, if the Progress Report identifies the risk of exceedence of an Air Quality Objective, the Local Authority (LA) should undertake a Detailed Assessment immediately, and not wait until the next round of Review and Assessment.

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM **in England** are set out in the Air Quality (England) Regulations 2000 (SI 928), The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 1.1. This table shows the objectives in units of micrograms per cubic metre, μg/m^3 (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

Table 1.1 Air Quality Objectives included in Regulations for the purpose of LAQM in England

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 µg/m^3	Running annual mean	31.12.2003
	5.00 µg/m^3	Annual mean	31.12.2010
1,3-Butadiene	2.25 µg/m^3	Running annual mean	31.12.2003
Carbon monoxide	10 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.50 µg/m^3	Annual mean	31.12.2004
	0.25 µg/m^3	Annual mean	31.12.2008
Nitrogen dioxide	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m^3	Annual mean	31.12.2005
Particulate Matter (PM_{10}) (gravimetric)	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	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

1.4 Summary of Previous Review and Assessments

Two AQMA declarations have been made in the District because the annual nitrogen dioxide objective in the Air Quality (England) Regulations 2000 was unlikely to be met by December 2005 and the cause of this was believed to be traffic related.

The areas are detailed in Figures 1.2 and 1.3 below and were declared on 7th February 2005 (date of order). The development of the action plans began for both areas and a continuous monitoring site established in **Chipping Norton**. This site has been in operation since March 2006.

Oxfordshire County Council outlined a number of traffic management options which needed looking at in more detail to investigate their feasibility and impact on air quality so that a cost benefit analysis could be applied to each option. The County employed consultants to appraise the traffic management options and the results were used by the District Council's air quality consultants to model and predict their impact on air quality.

With regard to Chipping Norton, the Air Quality Action Plan was accepted by Defra in early 2009.

The original continuous monitoring site in **Witney** had to be decommissioned because the site was sold. However, another site in that area was established and continuous monitoring resumed in April 2009.

The Draft Action Plan for the Witney AQMA, having been deferred for a significant period pending the outcome of the Cogges Link Road (CLR) Planning Application by OCC, was approved by WODC Cabinet in December 2010. A period of public consultation was conducted throughout February 2011. In June 2012, the Department for Transport refused a compulsory purchase order for the land Oxfordshire County Council needed to build the Cogges Link Road.

Accordingly, there is currently no Draft Action Plan for the Witney AQMA pending the revision of options which might address traffic flow within and around Witney.

Figure 1.2 Map of AQMA Boundaries – Witney

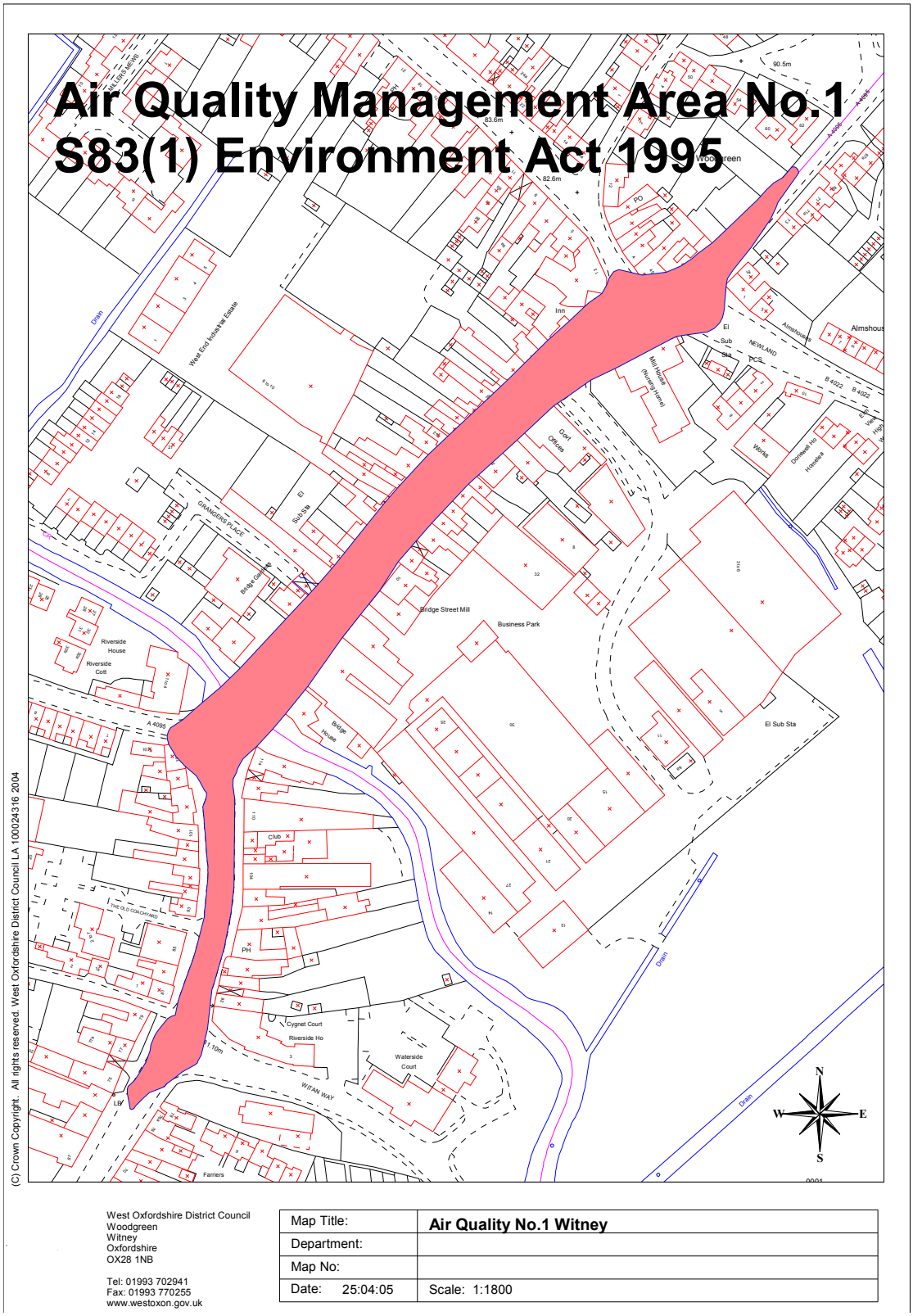
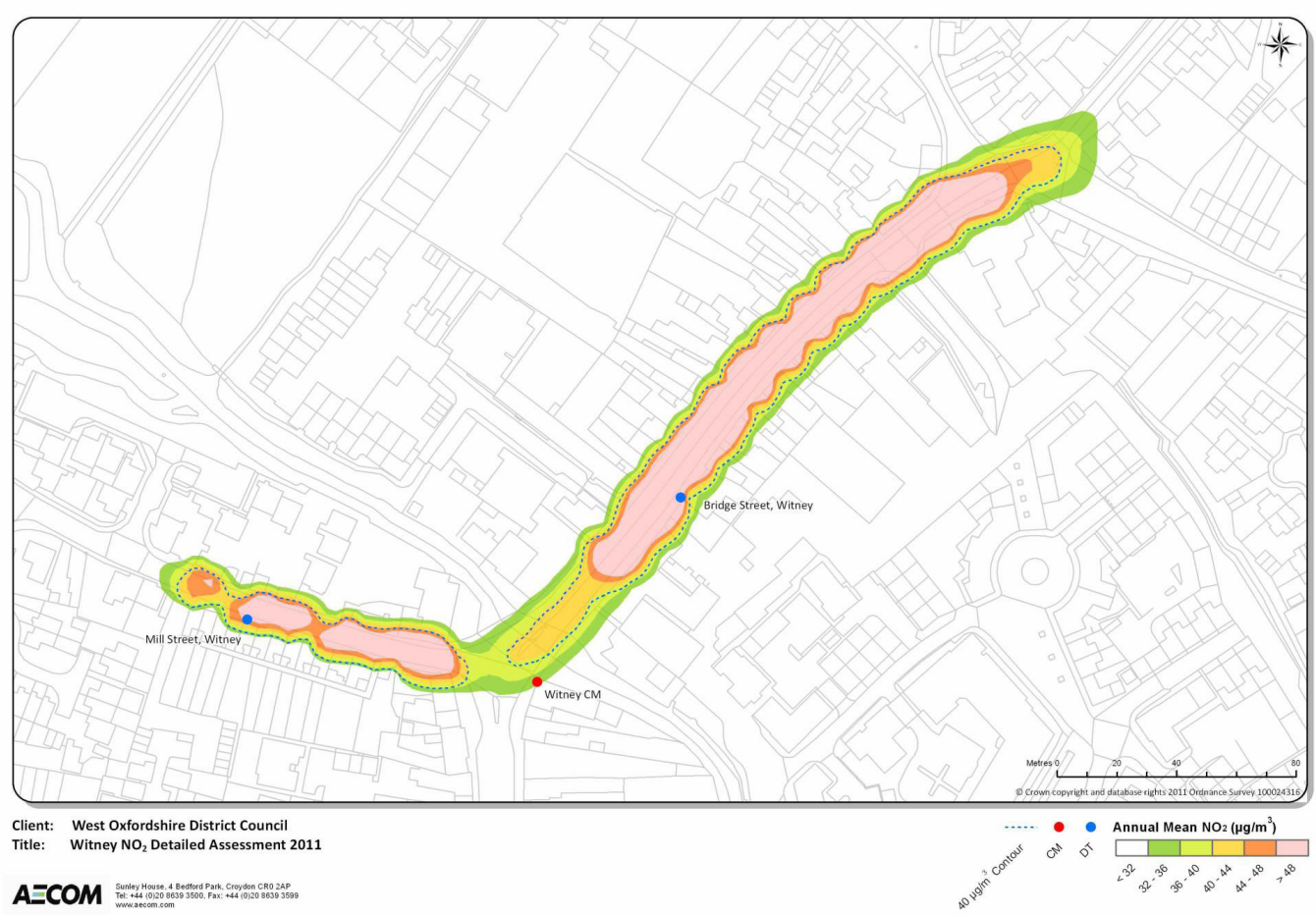
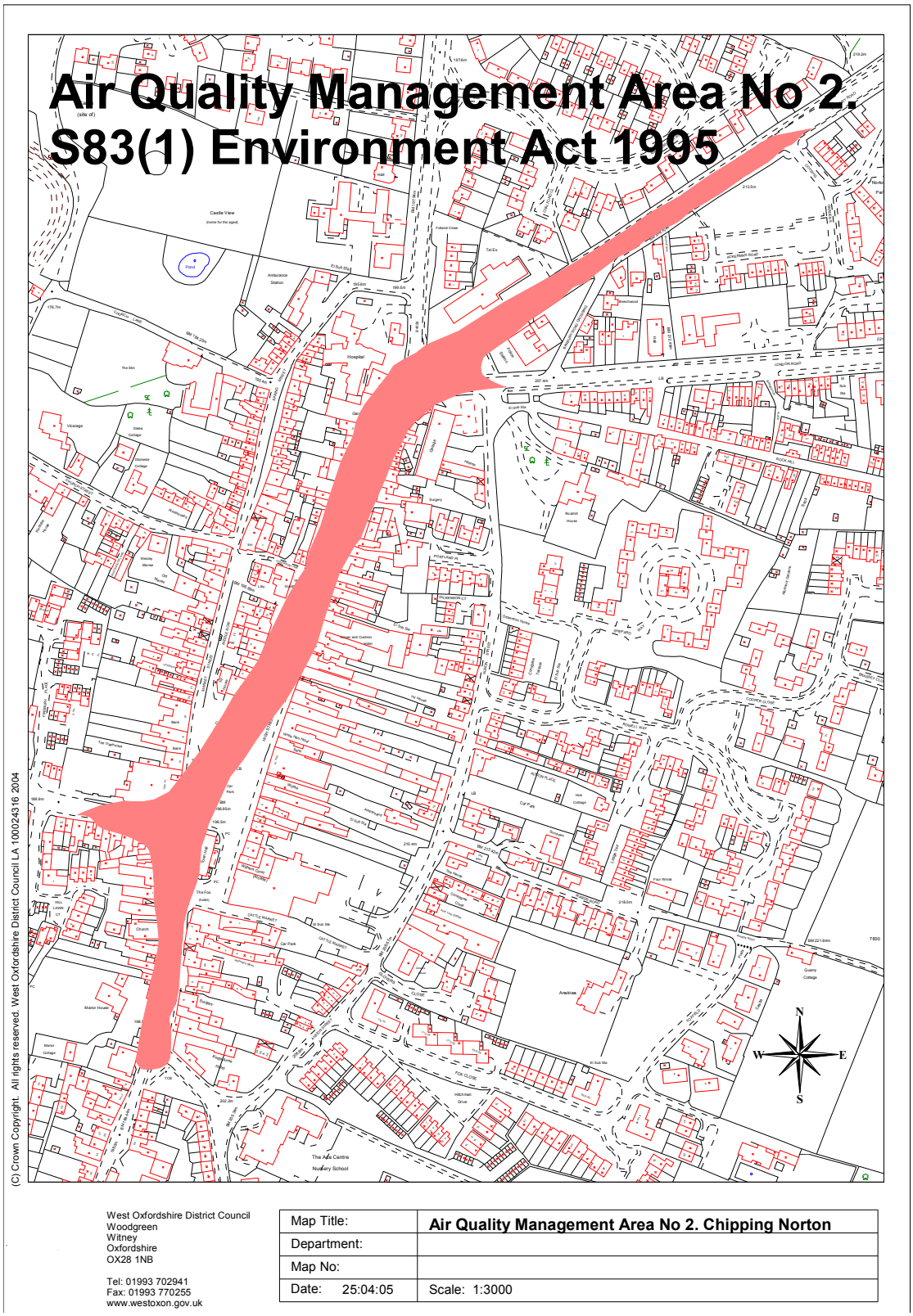


Figure 1.3 Map of AQMA Boundaries – Witney (2011 Update)



The Witney AQMA has been reassessed and the inclusion of the Mill Street diffusion tube site within its boundary has been confirmed following an update of the dispersion modelling in May 2011. Different modelling makes it difficult to reconcile the two similar but different presentations and overlaying one upon the other doesn't truly reflect the current boundary as per the later assessment. It is proposed to maintain the AQMA boundary, as originally declared, whilst noting the inclusion of the minor extension along Mill Street. [This site had always previously been considered part of the AQMA, previous mapping had placed it outside the boundary.]

Figure 1.4 Map of AQMA Boundaries – Chipping Norton



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Map Title:	**Air Quality Management Area No 2. Chipping Norton**
Department:	
Map No:	
Date: 25:04:05	Scale: 1:3000

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

AQMA No 1 - Witney

Continuous monitoring of nitrogen dioxide began in Newland, Witney in August 2001 and continued there until April 2005. When this site was sold, the original API, a chemiluminescent NOx continuous analyser, was relocated to Chipping Norton. A similar but newer model was established (May 2009) at a new location on Bridge Street within the Witney AQMA (the location is shown on the plan at Figure 2.1). Calibration checks of the instrumentation are made every two weeks by the LA and six monthly service and calibration work is carried out by SupportingU . All the data is ratified and validated annually by AECOM Limited.

Annual Mean NO_2 Concentrations - Witney

Period	Annual Mean NO_2 Concentration / µg/m^3	Hourly Exceedences
2013 Annual Mean	**29.6**	**0**

AQMA No 2 - Chipping Norton.

A monitoring station was established in Chipping Norton to monitor nitrogen dioxide using the chemiluminescent analyser relocated from Witney. This was done to carry out further assessment work in response to the declaration of AQMA No 2 (the location is shown on the plan at Figure 2.2). The analysis of previous results helped formulate the Chipping Norton AQMA Action Plan which was accepted by Defra

Continuing monitoring is an integral part of the plan as submitted. Financial constraints have delayed the necessary consultation and technical investigation required prior to installation and implementation of recommended mitigation measures.
Calibration checks of the instrumentation are made every two weeks by the LA and six monthly service and calibration work is carried out by SupportingU.

Service reports have been routine and although the 2012 data capture rate for this analyser was much improved, 2013 has not followed this trend. An A/C failure within the analyser housing occurred during the warmer parts of the summer and the analyser was isolated between 12 July and 06 September resulting in an 8 week data loss.

However, during this period, a significant section of the AQMA was subject to major utility works (05 -16 August). This occurred during the first 2 weeks of a 5 week Diffusion Tube exposure period. A reduction of up to 40% in pollution levels was anticipated and in reality a 30% reduction was evident at the Diffusion Tube sites due to greatly reduced normal traffic volumes (having been diverted) but continuing essential access for construction plant and delivery vehicles

All the data is ratified and validated annually by AECOM Limited.

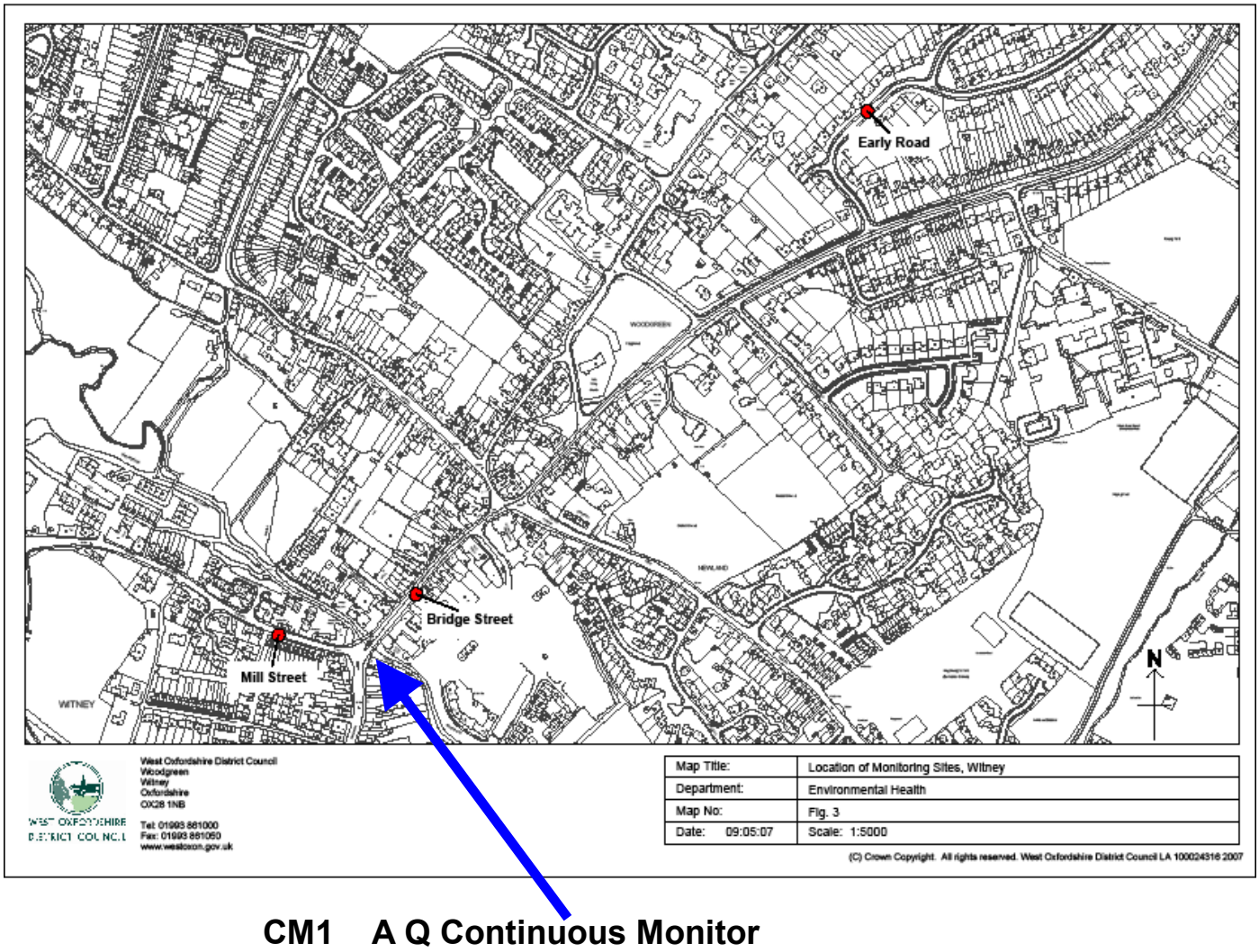
The data collected in the period January 2013 to December 2013 inclusive has been ratified and validated and is summarised in the table below.

Annual Mean NO_2 Concentrations - Chipping Norton

Period	Annual Mean NO_2 Concentration / $\mu g/m^3$	Hourly Exceedences
2013 Annual Mean	**38.0** (Annualised)	**3**

Figure 2.1 Map of Automatic Monitoring Site

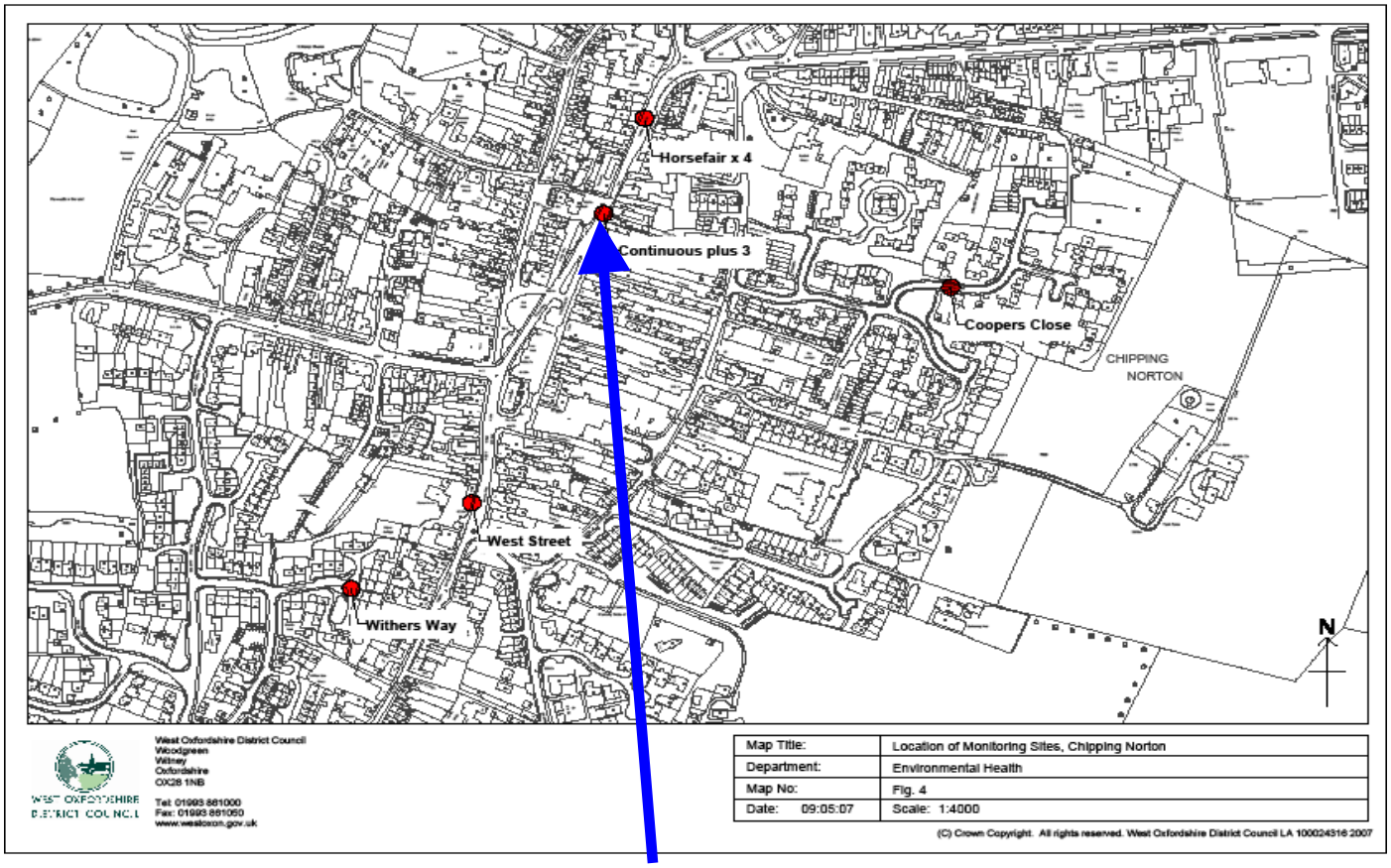
CM1 WITNEY



CM1 A Q Continuous Monitor

Figure 2.2 Map of Automatic Monitoring Site

CM2 CHIPPING NORTON



CM2 A Q Continuous Monitor

Table 2.1a Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	OS Grid Ref	Inlet Height (m)	Pollutants Monitored	In AQMA?	Relevant Exposure?	Distance to kerb of nearest road	Worst-case Location
CM2	Chipping Norton	Urban Roadside	431404 227206	2.0	NO_2	Y	Y (2.0m to facade)	0.5m	Y
CM1	Witney	Urban Roadside	435768 210177	2.0	NO_2	Y	Y (0.5m to facade)	2.0m	Y

2.1.2 Non-Automatic Monitoring Sites

Nitrogen Dioxide monitoring by Diffusion Tube.

Diffusion tubes are exposed for approximately 4 weeks before being sent for analysis to Environmental Scientifics Group (ESG) at Didcot. The Overall Bias Adjustment factor available from the AEA spreadsheet **v03.14 (28 studies)**, where a bias adjustment figure is provided for the participating laboratories for the period 2013, was **0.80**. Additionally, a Bias Adjustment Factor, **0.79**, was calculated using the AEA Spreadsheet for Calculation of Diffusion Tube Precision and Accuracy and the raw NO2 concentrations measured by the Chipping Norton Co-Location study diffusion tubes.

Table 2.4 details the results of the monitoring across the district adjusted for laboratory bias. It shows that 'Bridge Street' in Witney and 'Horsefair' in Chipping Norton currently exceed the objective concentration and these areas lie within the Air Quality Management Areas that were declared in March 2005. All other areas were within the objective limits. Furthermore, with the exception of the mean of the three co-located diffusion tubes in Chipping Norton, Mill Street in Witney and High Street (south) in Burford, all other sites (32) were more than one standard deviation (SD = 4 i.e. 36 µg/m^3 or less) below the objective limit.

The diffusion tubes are supplied by ESG and analysed in accordance with ESG's ANU/SOP/1015, issue 1. This method meets the guidelines set out in Defra's 'Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance.'

The tubes (from a specified batch) are prepared by spiking acetone : triethanolamine (50:50) on to the grids prior to the tubes being assembled.

In the WASP inter-comparison scheme for comparing spiked Nitrogen Dioxide diffusion tubes, ESG is currently ranked as a ‘Category Good’ laboratory

Ratification of the WODC data was completed by AECOM Limited in April 2014.

Table 2.1b Details of Non-Automatic Monitoring Sites - Within AQMAs

Annual Mean NO_2 / µg/m^3 (2013) in Witney (Bias Adjusted – Local v National)

Location	Annual Mean NO_2 / µg/m^3	
	Local (0.79)	National (0.80)
Bridge Street	**50.7**	**51.3**
Mill Street	37.4	37.9

Annual Mean NO_2 / µg/m^3 (2013) in Chipping Norton (Bias Adjusted – Local v National)

Location	Annual Mean NO_2 / µg/m^3	
	Local (0.79)	National (0.80)
Horsefair	**55.4**	**56.1**
17 Horsefair	31.0	31.4
Co-Location Triplicate Mean	39.1	39.6
5 Horsefair	23.0	23.3
7 Horsefair	24.5	24.8
West Street	29.0	29.6

Note: All are representative of relevant exposure – those in bold exceed 40 µg/m^3

Factor affecting DT exposure in Chipping Norton, 05 Aug – 16 Aug 2013

During this period, a significant section of the AQMA was subject to major road works. This occurred during the first 2 weeks of a 5 week Diffusion Tube exposure period. A reduction in pollution levels of 30% was evident at all AQMA sites, except 'West Street', due to greatly reduced normal traffic volumes (having been diverted after West Street) with some essential access for construction plant and delivery vehicles being retained.

The Diffusion Tube 'Horsefair'

The Appraisal Report for PR2013 made reference in the Commentary to the NO_2 concentration at the 'Horsefair' site.

Following the guidance in LAQM.TG(09) the conclusion is that does not represent an exceedence of the 1 hourly mean objective as the tube does not represent relevant exposure to this objective.

1.29 members of the public are not likely to be regularly present.

1.29 and are not likely to be exposed for a period of time appropriate to the averaging period of this objective.

1.29 relevant public exposure is not realistic – see photograph below – the close proximity of the narrow pavement to the restricted width highway with HGVs

regularly transiting this location does not encourage persons to linger in this location or loiter on the pavement.

1.31 the allowed number of exceedences of the objective, as recorded at a continuous analyser located only some 78m distant and at an equivalent kerbside location has (over 7 years) averaged less than 6 pa (where the limit is 18 pa).

1.31 does not have to be the same persons regularly present at that location – a single exposure of an individual (not the same individual) above the standard can be avoided.

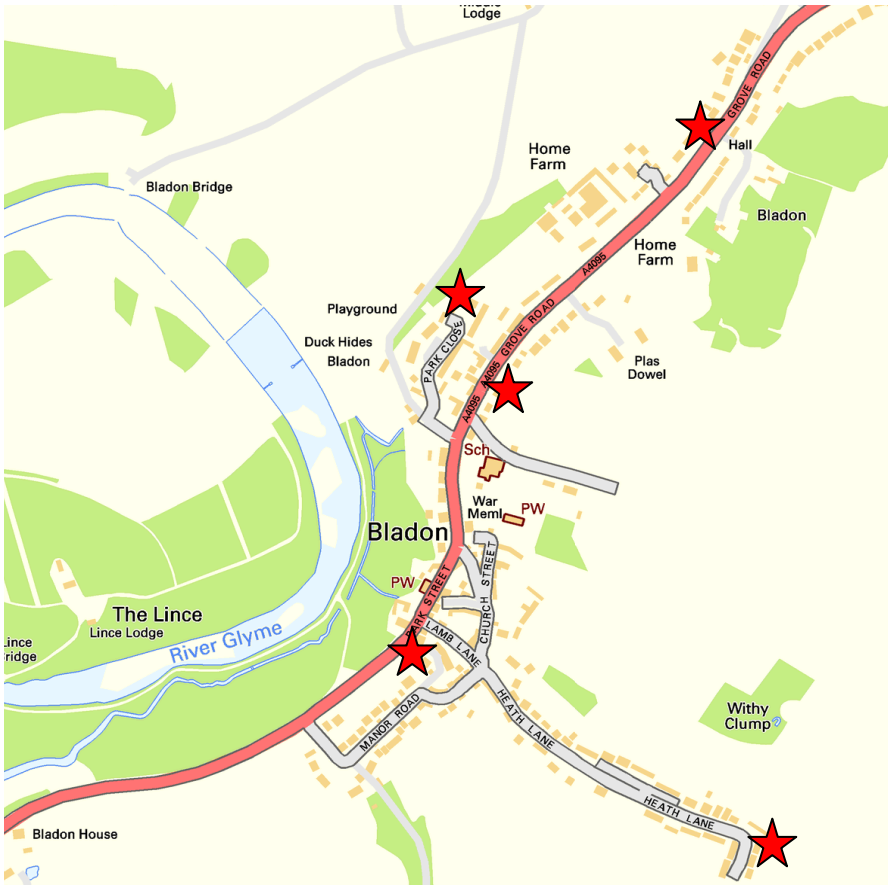
5.17 The LA chooses not to assume that the 1 hour mean objective is exceeded and the AQMA order does not require amendment.

Note: The Diffusion Tube is mounted on the 'Roundabout' road sign

Details of Non- Automatic Monitoring Sites

Maps of Non-Automatic Monitoring Sites

Figure 2.3

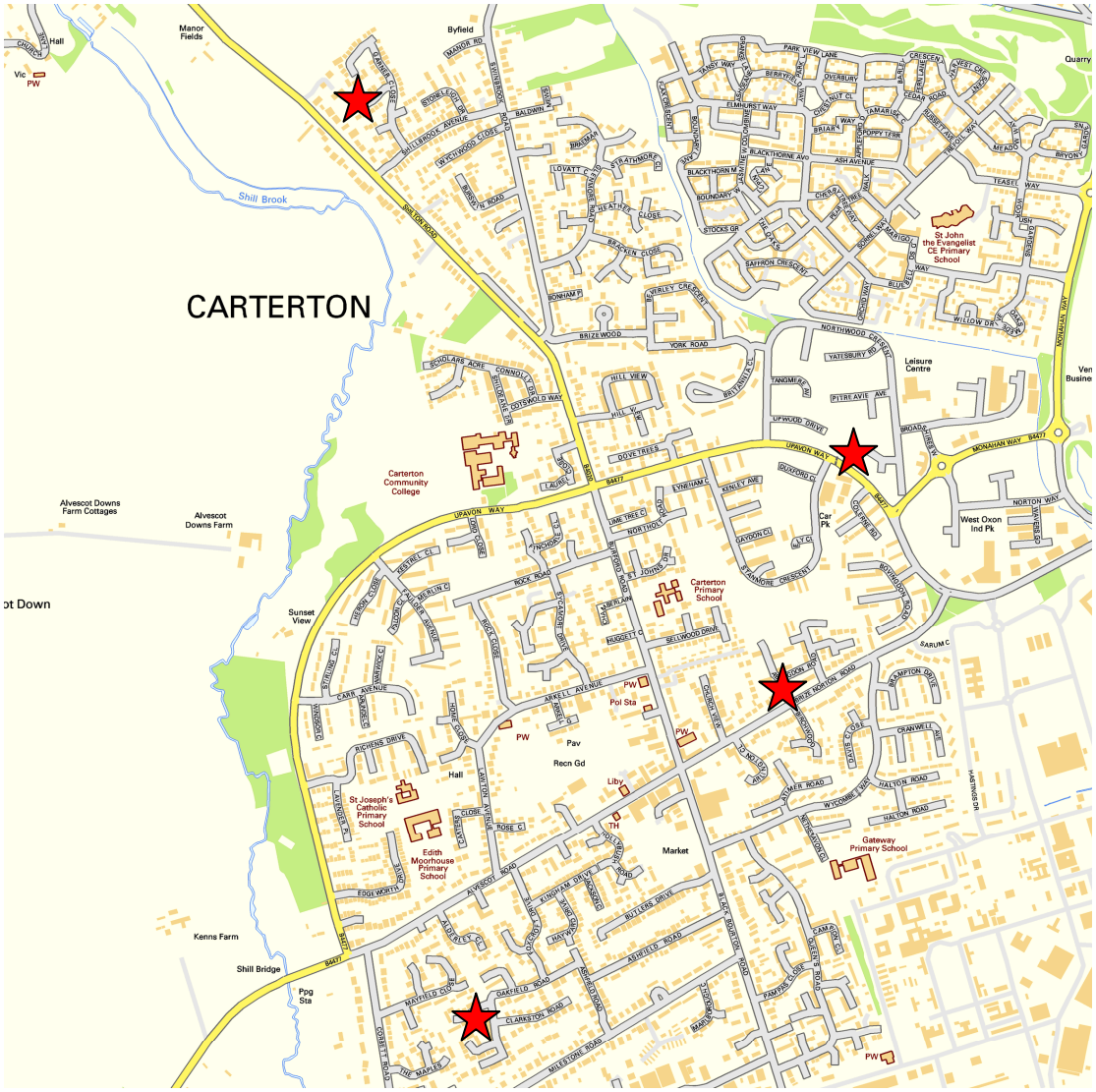


BLADON

Figure 2.4

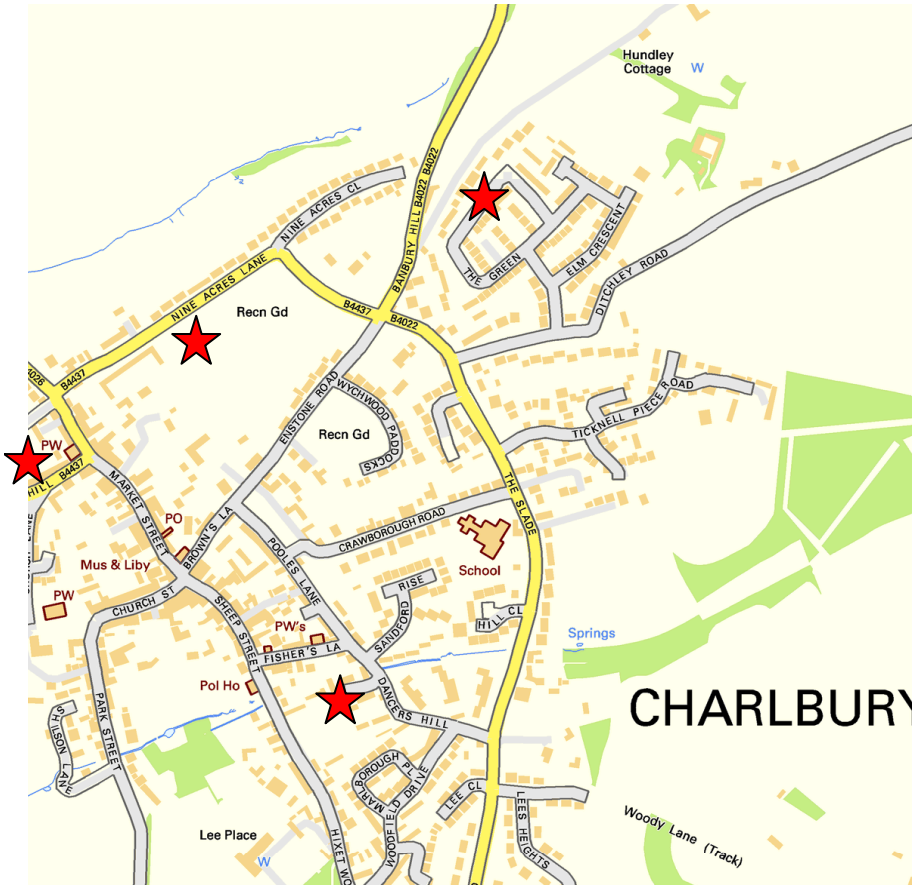
BURFORD

Figure 2.5



CARTERTON

Figure 2.6



CHARLBURY

Figure 2.7

CHIPPING NORTON

Diffusion tubes co-located with NOx Analyser

Figure 2.8

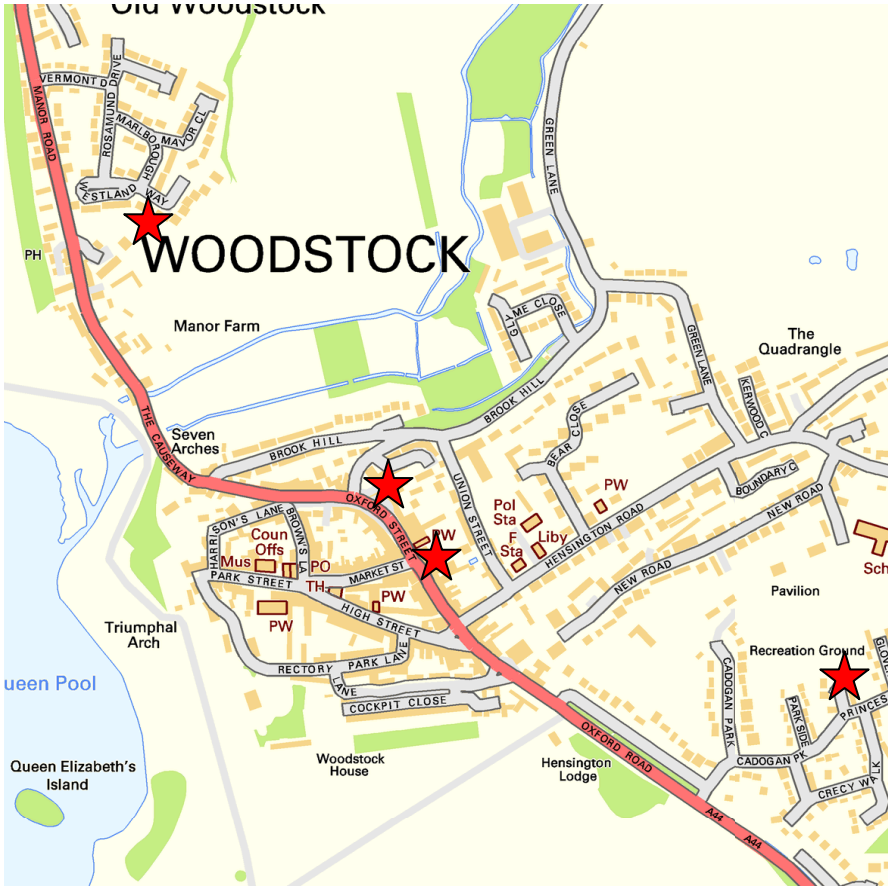
EYNSHAM

Figure 2.9

WITNEY

NOx Analyser

Figure 2.10



WOODSTOCK

Table 2.1c Details of Non- Automatic Monitoring Sites

Site ID DT#	Site Name	Site Type	OS Grid Reference	Site Height (m) 2.5 to 3m	Pollutants Monitored NO2	In AQMA	Is Monitoring Co-located with a Continuous Analyser	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
1	Bridge Street, Witney	R	435816 210239			**Y**		**Y 0.5**	**2**	**Y**
2	Mill Street, Witney	R	435671 210198			**Y**		**Y 0.5**	**1**	**Y**
3	Early Rd., Witney	B	436339 210806						**2**	
4	Abbey Rd., Witney	B	434596 209210						**2**	
5	High St, (N) Burford	R	425187 212431					**Y 0.5**	**2**	**Y**
6	93 High Street, (S) Burford	R	425156 212197					**Y 2**	**0.5**	**Y**
7	Frethern Cl, Burford	B	425406 211678						**1**	

Site ID DT#	Site Name	Site Type	OS Grid Reference	Site Height (m) 2.5 to 3m	Pollutants Monitored NO2	In AQMA	Is Monitoring Co-located with a Continuous Analyser	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
8	Orchard Rise, Burford	B	425447 211949						**1**	
9	Brize Norton Rd, Carterton	R	428329 206946					**Y**	**2**	**Y**
10	Upavon Way, Carterton	R	428467 207442					**Y**	**2**	**Y**
11	Garner Close, Carterton	B	427415 208234						**1**	
12	Oakfield Road, Carterton	B	427687 206254						**1**	
13	Dyers Hill, Charlbury	R	435585 219620					**Y**	**1**	**Y**
14	Nineacres Lane, Charlbury	R	435654 219763					**Y**	**1**	**Y**

Site ID DT#	Site Name	Site Type	OS Grid Reference	Site Height (m) 2.5 to 3m	Pollutants Monitored NO2	In AQMA	Is Monitoring Co-located with a Continuous Analyser	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
15	Tanners Close, Charlbury	B	435945 219324						**1**	
16	The Green, Charlbury	B	436138 219973						**1**	
17	Horsefair, Chipping Norton	R	431425 227275			**Y**		**Y 0.5**	**0.5**	**Y**
33	17,Horsefair Chipping Norton	R	431450 227314			**Y**		**Y 2**	**0.5**	**Y**
36 37 38	Co-location, Chipping Norton (Triplicate Mean)	R	431404 227206			**Y**	**Y**	**Y 2**	**0.5**	**Y**
34	5 Horsefair, Chipping Norton	R	431439 227268			**Y**		**Y 0.5**	**5**	**Y**

Site ID DT#	Site Name	Site Type	OS Grid Reference	Site Height (m) 2.5 to 3m	Pollutants Monitored NO2	In AQMA	Is Monitoring Co-located with a Continuous Analyser	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
35	7 Horsefair, Chipping Norton	R	431443 227282			**Y**		**Y 0.5**	**4**	**Y**
18	West Street, Chipping Norton	R	431300 226959			**Y**		**Y 0.5**	**2**	**Y**
19	Coopers Close, Chipping Norton	B	431694 227156						**1**	
20	Withers Way, Chipping Norton	B	431207 226877						**1**	
21	Acre End Street, Eynsham	R	442950 209301					**Y 2**	**1**	**Y**
22	Mill Street, Eynsham	R	443309 209573					**Y 1**	**1**	**Y**

Site ID DT#	Site Name	Site Type	OS Grid Reference	Site Height (m) 2.5 to 3m	Pollutants Monitored NO2	In AQMA	Is Monitoring Co-located with a Continuous Analyser	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
23	Orchard Close, Eynsham	B	443632 209356						**0.5**	
24	Shakespeare Rd, Eynsham	B	442856 209781						**1**	
25	Oxford Street, (E) Woodstock	R	444592 216763					**Y 2**	**1**	**Y**
26	Oxford Street, (W) Woodstock	R	444526 216851					**Y 1**	**0.5**	**Y**
27	The Ley, Woodstock	B	445131 216615						**1**	
28	Westland Way, Woodstock	B	444212 217270						**1**	
29	Grove Road, (S) Bladon	R	444871 214983					**Y 5**	**1**	**Y**

Site ID DT#	Site Name	Site Type	OS Grid Reference	Site Height (m) 2.5 to 3m	Pollutants Monitored NO2	In AQMA	Is Monitoring Co-located with a Continuous Analyser	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
30	Grove Road, (N) Bladon	R	445190 215353					**Y 5**	**1**	**Y**
31	Heath Lane, Bladon	B	445227 214402						**1**	
32	Park Close, Bladon	B	444851 215094						**1**	
39	Park Street, Bladon	R	444791 214681					**Y 0.5**	**1**	**Y**

2.2 Comparison of Monitoring Results with Air Quality Objectives

Automatic AQ Monitoring Station – CM2 Chipping Norton

The data collected in the period January 2013 to December 2013 inclusive has been ratified and validated and is summarised in the table below.

Annual Mean NO_2 Concentrations

Period	Annual Mean NO_2 Concentration / µg/m^3	Hourly Exceedences >200 µg/m^3
2013 Annual Mean	**38.0** (Annualised)	**3**

Note: Based on **83%** data capture

Due to a/c equipment failure the analyser was isolated for 8 weeks between 12 July – 06 September 2013

Automatic AQ Monitoring Station – CM1 Witney

The data collected in the period January 2013 to December 2013 inclusive has been ratified and validated and is summarised in the table below.

Annual Mean NO_2 Concentrations

Period	Annual Mean NO_2 Concentration / µg/m^3	Hourly Exceedences >200 µg/m^3
2013 Annual Mean	**29.6**	**Nil**

Note: Based on **89.9%** data capture

Diffusion Tube Site Monitoring

At Table 2.4 are details of the results of the monitoring across the district adjusted for laboratory bias. It shows that 'Bridge Street' and 'Horsefair' in Chipping Norton currently exceed the objective concentration and these areas lie within the Air Quality

Management Areas that were declared in March 2005. All other areas were within the objective limits. Furthermore, with the exception of the mean of the three co-located diffusion tubes in Chipping Norton, Mill Street in Witney and High Street (south) in Burford, all other sites (32) were more than one standard deviation (SD = 4 i.e. 36 µg/m^3 or less) below the objective limit.

Annual Mean NO_2 / µg/m^3 (2013) in Witney (Bias Adjusted – Local v National)

Location	Annual Mean NO_2 / µg/m^3	
	Local (0.79)	National (0.80)
Bridge Street	**50.7**	**51.3**
Mill Street	37.4	37.9

Annual Mean NO_2 / µg/m^3 (2013) in Chipping Norton (Bias Adjusted – Local v National)

Location	Annual Mean NO_2 / µg/m^3	
	Local (0.79)	National (0.80)
Horsefair	**55.4**	**56.1**
Co-Location Triplicate Mean	39.1	39.6

The results, overall, do not indicate any additional areas of concern requiring a detailed assessment.

2.2.1 Nitrogen Dioxide (NO_2)

The Chipping Norton data includes both automatic monitoring and diffusion tube monitoring. The automatic monitoring returned a Mean Pollution Concentration of 38.0 µg/m^3 (annualised) this was based on a 83.0% data capture. The measured annual mean concentration is greater than 40 µg/m^3 within part of the Chipping Norton AQMA (Horsefair) and within the boundary of the Witney AQMA.

The Chipping Norton AQMA (Horsefair) site has not recorded more than 18, 1-hour means above 200 µg/m^3 (actual number is 3), and the 99.8th percentile of 1-hour mean concentrations is 155.9 µg/m^3.

Data from the continuous monitoring station within the Witney AQMA achieved 89.9% capture rate. The 99.8th percentile of 1-hour mean concentrations is 90.9µg/m^3.

The monitoring site locations are representative of relevant public exposure.

Automatic Monitoring Data

Graphs showing the full year dataset (hourly mean values) of both Automatic monitoring stations are at Appendix C.

Table 2.2 Results of Automatic Monitoring for NO_2: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % [a]	Valid Data Capture 2013 % [b]	Annual Mean Concentration (µg/m^3)				
					2009 [c]	2010 [c]	2011 [c]	2012 [c]	2013 [c]
CM1	Roadside	Y		89.9	32.7*	33.0	27.9*	28.2	29.6
CM2	Roadside	Y		83.0	39.6	45.3	38.3*	36.6	38.0 [c]

In bold, exceedence of the NO_2 annual mean AQS objective of 40µg/m^3

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

[c] Means “annualised” *

Table 2.3 Results of Automatic Monitoring for NO_2: Comparison with 1-hour Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % [a]	Valid Data Capture 2013 % [b]	Number of Hourly Means > 200µg/m^3				
					2009 [c]	2010 [c]	2011 [c]	2012 [c]	2013 [c]
CM1	Roadside	Y		89.9	0* (105.0)	0 (105.9)	0* (100.2)	0 (87.5)	0 (90.9)
CM2	Roadside	Y		83.0	4 (174.8)	6 (172.8)	5* (182.9)	1 (157.9)	3 (155.9)

In bold, exceedence of the NO_2 hourly mean AQS objective (200µg/m^3 – not to be exceeded more than 18 times per year)

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

[c] If the data capture for full calendar year is less than 90%, include the 99.8th percentile of hourly means in brackets.

*Mean was “annualised” as monitoring was not carried out for the full year - the 99.8th percentile of hourly means (in brackets) are included for comparison only.

Diffusion Tube Monitoring Data

A full dataset (monthly mean values) is included at Appendix B.

This is raw data (not bias adjusted) - the more relevant (corrected) data is presented below in the various tables.

Results of Nitrogen Dioxide Diffusion Tubes - Witney

Annual Mean NO_2 / µg/m^3 (2012) in Witney (Bias Adjusted – Local v National)

Location	Annual Mean NO_2 / µg/m^3	
	Local (0.79)	National (0.80)
Bridge Street	**50.7**	**51.3**
Mill Street	37.4	37.9

Results of Nitrogen Dioxide Diffusion Tubes - Chipping Norton

Annual Mean NO_2 / µg/m^3 (2013) in Chipping Norton (Bias Adjusted – Local v National)

Location	Annual Mean NO_2 / µg/m^3	
	Local (0.79)	National (0.80)
Horsefair	**55.4**	**56.1**
Co-Location Triplicate Mean	39.1	39.6
17 Horsefair	31.0	31.4
5 Horsefair	23	23.3
7 Horsefair	24.5	24.8
West Street	29	29.6

The national bias adjustment factor applied in PR 2014 to the annual means is 0.80

All of the above are located within AQMAs.

All other areas were within the objective limits. Furthermore, with the exception of the mean of the three co-located diffusion tubes in Chipping Norton, Mill Street in Witney and High Street (south) in Burford, all other sites (32) were more than one standard deviation (SD = 4 i.e. 36 µg/m^3 or less) below the objective limit.

See Table 2.4 for % data capture of other / all Diffusion Tubes

Table 2.4 Results of NO_2 Diffusion Tubes 2013

Site ID DT#	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2013 (Number of Months or %) [a]	2013 Annual Mean Concentration (µg/m^3) - Bias Adjustment factor = (National) 0.80
1	Bridge Street, Witney	R	**Y**		100	**51.3**
2	Mill Street, Witney	R	**Y**		100	37.9
3	Early Rd., Witney	B			100	14.4
4	Abbey Rd., Witney	B			100	15.5
5	High St, (N) Burford	R			100	34.1
6	93 High Street, (S) Burford	R			83	36.5
7	Frethern Cl, Burford	B			83	10.9
8	Orchard Rise, Burford	B			100	10.3

West Oxfordshire – England **April 2014**

Site ID DT#	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2013 (Number of Months or %) [a]	2013 Annual Mean Concentration (µg/m^3) - Bias Adjustment factor = (National) 0.80
9	Brize Norton Rd, Carterton	R			100	26.1
10	Upavon Way, Carterton	R			100	19.9
11	Garner Close, Carterton	B			100	12.1
12	Oakfield Road, Carterton	B			100	14.1
13	Dyers Hill, Charlbury	R			100	17.0
14	Nineacres Lane, Charlbury	R			100	15.5
15	Tanners Close, Charlbury	B			100	10.3
16	The Green, Charlbury	B			92	11.1

West Oxfordshire – England **April 2014**

Site ID DT#	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2013 (Number of Months or %) [a]	2013 Annual Mean Concentration (µg/m^3) - Bias Adjustment factor = (National) 0.80
17	Horsefair, Chipping Norton	R	**Y**		100	**56.1**
33	17,Horsefair Chipping Norton	R	**Y**		92	31.4
36 37 38	Co-location, Chipping Norton (Triplicate Mean)	R	**Y**	**Y**	100	39.6
34	5 Horsefair, Chipping Norton	R	**Y**		100	23.3
35	7 Horsefair, Chipping Norton	R	**Y**		100	24.8
18	West Street, Chipping Norton	R	**Y**		92	27.3
19	Coopers Close, Chipping Norton	B			100	12.6

West Oxfordshire – England **April 2014**

Site ID DT#	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2013 (Number of Months or %) [a]	2013 Annual Mean Concentration (µg/m^3) - Bias Adjustment factor = (National) 0.80
20	Withers Way, Chipping Norton	B			100	12.1
21	Acre End Street, Eynsham	R			100	16.6
22	Mill Street, Eynsham	R			100	15.9
23	Orchard Close, Eynsham	B			100	12.4
24	Shakespeare Rd, Eynsham	B			100	14.9
25	Oxford Street, (E) Woodstock	R			100	33.9
26	Oxford Street, (W) Woodstock	R			100	33.6
27	The Ley, Woodstock	B			100	12.5

West Oxfordshire – England **April 2014**

Site ID DT#	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2013 (Number of Months or %) [a]	2013 Annual Mean Concentration (µg/m^3) - Bias Adjustment factor = (National) 0.80
28	Westland Way, Woodstock	B			100	12.6
29	Grove Road, (S) Bladon	R			100	21.3
30	Grove Road, (N) Bladon	R			100	25.8
31	Heath Lane, Bladon	B			100	12.0
32	Park Close, Bladon	B			100	10.9
39	Park Street, Bladon	R			100	31.1

In bold, exceedence of the NO_2 annual mean AQS objective of 40µg/m^3

Underlined, annual mean > 60µg/m^3, indicating a potential exceedence of the NO_2 hourly mean AQS objective

[a] Means have been "annualised" as full calendar year data capture was less than 75%

Table 2.5 Results of NO_2 Diffusion Tubes (2009 to 2013)

Site ID DT#	Name Location	Site Type	Within AQMA?	2013 (Bias Adjustment Factor = 0.80)	2009 (Bias Adjustment Factor = 0.81)	2010 (Bias Adjustment Factor = 0.85)	2011 (Bias Adjustment Factor = 0.84)	2012 (Bias Adjustment Factor = 0.79)
1	Bridge Street, Witney	R	Y	51.3	52.4	56.3	54.0	49.3
2	Mill Street, Witney	R	Y	37.9	45.0	44.5	45.4	41.5
3	Early Rd., Witney	B		14.4	18.7	16.9	15.4	14.0
4	Abbey Rd., Witney	B		15.5	16.2	20.0	16.5	16.2
5	High St, (N) Burford	R		34.1	39.2	38.6	37.7	33.6
6	93 High Street, (S) Burford	R		36.5	34.8	38.6	37.5	30.9
7	Frethern Cl, Burford	B		10.9	15.8	15.5	12.0	12.6
8	Orchard Rise, Burford	B		10.3	13.4	12.5	10.5	10.3

West Oxfordshire – England **April 2014**

Site ID DT#	Name Location	Site Type	Within AQMA?	2013 (Bias Adjustment Factor = 0.80)	2009 (Bias Adjustment Factor = 0.81)	2010 (Bias Adjustment Factor = 0.85)	2011 (Bias Adjustment Factor = 0.84)	2012 (Bias Adjustment Factor = 0.79)
9	Brize Norton Rd, Carterton	R		26.1	24.2	23.7	20.9	21.8[a]
10	Upavon Way, Carterton	R		19.9	26.3	24.6	21.8	20.0
11	Garner Close, Carterton	B		12.1	15.7	14.3	11.6	11.5
12	Oakfield Road, Carterton	B		14.1	15.8	15.7	13.6	13.2
13	Dyers Hill, Charlbury	R		17.0	20.6	19.8	18.5	17.9
14	Nineacres Lane, Charlbury	R		15.5	19.7	17.6	16.9	15.7
15	Tanners Close, Charlbury	B		10.3	13.0	13.1	11.2	10.2
16	The Green, Charlbury	B		11.1	13.6	12.6	10.8	10.6

West Oxfordshire – England **April 2014**

Site ID DT#	Name Location	Site Type	Within AQMA?	2013 (Bias Adjustment Factor = 0.80)	2009 (Bias Adjustment Factor = 0.81)	2010 (Bias Adjustment Factor = 0.85)	2011 (Bias Adjustment Factor = 0.84)	2012 (Bias Adjustment Factor = 0.79)
17	Horsefair, Chipping Norton	R	Y	56.1	63.8	66.4	60.0	61.6
33	17,Horsefair Chipping Norton	R	Y	31.4	0	0	37.5	31.9
36 37 38	Co-location, Chipping Norton (Triplicate Mean)	R	Y	39.6	44.6	45.4	41.5	38.4
34	5 Horsefair, Chipping Norton	R	Y	23.3	30.8	29.9	26.8	24.2
35	7 Horsefair, Chipping Norton	R	Y	24.8	31.3	29.3	26.7	24.7
18	West Street, Chipping Norton	R	Y	27.3	33.4	35.5	31.5	29.6
19	Coopers Close, Chipping Norton	B		12.6	12.4	14.8	12.6	11.5

West Oxfordshire – England **April 2014**

Site ID DT#	Name Location	Site Type	Within AQMA?	2013 (Bias Adjustment Factor = 0.80)	2009 (Bias Adjustment Factor = 0.81)	2010 (Bias Adjustment Factor = 0.85)	2011 (Bias Adjustment Factor = 0.84)	2012 (Bias Adjustment Factor = 0.79)
20	Withers Way, Chipping Norton	B		12.1	13.8	14.8	11.2	11.5
21	Acre End Street, Eynsham	R		16.6	19.5	18.6	16.4	16.2
22	Mill Street, Eynsham	R		15.9	17.6	19.1	16.9	15.3
23	Orchard Close, Eynsham	B		12.4	15.2	14.7	12.4	12.3
24	Shakespeare Rd, Eynsham	B		14.9	18.0	18.4	14.6	14.0
25	Oxford Street, (E) Woodstock	R		33.9	31.4	39.0	33.9	32.5
26	Oxford Street, (W) Woodstock	R		33.6	39.3	38.6	35.4	33.9
27	The Ley, Woodstock	B		12.5	15.0	13.6	11.7	11.5

West Oxfordshire – England **April 2014**

Site ID DT#	Name Location	Site Type	Within AQMA?	2013 (Bias Adjustment Factor = 0.80)	2009 (Bias Adjustment Factor = 0.81)	2010 (Bias Adjustment Factor = 0.85)	2011 (Bias Adjustment Factor = 0.84)	2012 (Bias Adjustment Factor = 0.79)
28	Westland Way, Woodstock	B		12.6	15.9	16.5	11.3	12.2
29	Grove Road, (S) Bladon	R		21.3	23.5	23.5	21.1	20.8
30	Grove Road, (N) Bladon	R		25.8	31.1	31.3	27.8	26.1
31	Heath Lane, Bladon	B		12.0	15.7	14.0	12.6	12.6
32	Park Close, Bladon	B		10.9	14.1	12.8	11.7	10.8
39	Park Street, Bladon	R		31.1	35.5	36.9	34.3	33.5

In bold, exceedence of the NO_2 annual mean AQS objective of 40µg/m^3

Underlined, annual mean > 60µg/m^3, indicating a potential exceedence of the NO_2 hourly mean AQS objective

Summary of Compliance with AQS Objectives

Andrew Ward has examined the results from monitoring in the district.

Concentrations within the two AQMAs still exceed the objective for NO2 and the AQMAs should remain.

Concentrations outside of the AQMAs are all below the objectives at relevant locations, therefore there is no need to proceed to a Detailed Assessment.

3 New Local Developments

WODC confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

3.1 Road Traffic Sources

WODC confirms that there are no new or newly identified road traffic sources which may have an impact on air quality within the Local Authority area.

3.2 Other Transport Sources

WODC confirms that there are no new or newly identified other transport sources which may have an impact on air quality within the Local Authority area.

3.3 Industrial Sources

WODC confirms that there are no new or newly identified industrial sources which may have an impact on air quality within the Local Authority area.

3.4 Commercial and Domestic Sources

WODC confirms that there are no new or newly identified commercial or domestic sources which may have an impact on air quality within the Local Authority area.

3.5 New Developments with Fugitive or Uncontrolled Sources

WODC confirms that there are no new developments with fugitive or uncontrolled sources or that have an impact on air quality within the Local Authority area.

WODC confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

WODC confirms that all the following have been considered:

- **Road traffic sources**
- **Other transport sources**
- **Industrial sources**
- **Commercial and domestic sources**
- **New developments with fugitive or uncontrolled sources.**

4 Local / Regional Air Quality Strategy

With two AQMAs declared, an Action Plan running for one and, pending a re-appraisal of options, a second one to be re-presented in draft form after review of matters raised during a Public Consultation and Judicial Review, the District has addressed the significant sources of pollution and monitors progress within these declared areas.

5 Planning Applications

The previously proposed 'Cogges Link Road' in Witney, intended to provide a by-pass / relief road around the Witney AQMA, has ceased to be an option. When an alternative scheme is developed, pre and post construction air quality data will be available from the continuous monitoring station sited within the AQMA. The design and positioning of any new road to be considered should not adversely affect air quality along its route.

Chipping Norton

Land at Rockhill Farm, London Road, Chipping Norton

WODC Planning App 14/0522/P/OP

80 unit x Extra Care Housing plus 16 x Dwellings

Environmental Statement has been reviewed and the ES does not predict any significant difference to the Air Quality in the locality.

6 Local Transport Plans and Strategies

Monitoring data is available from the automatic analyser in Witney a review of which will give a better 'before' scenario of the AQMA - prior to the implementation of any proposed Action Plan. Comparisons will be able to be made with post construction data.

In 2015 there will be a USA (for 2014).

7 Implementation of Action Plans

- **Chipping Norton**

Action Plan Progress [Measures are as listed in Action Plan]

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
1	HGV Routing	Reduce unit emissions in the AQMA in conjunction with County LTP	OCC	2009 - 2010	2014 - 2020 Subject to current financial constraints	2014 - 2020 Subject to current financial constraints	Annual returns	Development and implementation continues to be subject to financial constraints	Development and implementation subject to current financial constraints	2014 – 2020 Incorporated within OCC LTP3 (revised Oct 2012) LTP4 awaited	Most positive proposal
2	Funding bid for regional prioritisation		OCC					Only required if Measure 1 does not deliver results	Only required if Measure 1 does not deliver results		
3	Continuously monitor emissions within AQMA	Identify and confirm reducing emissions trend	WODC	2005 - 2008	2009 - Current	2009 - Current	Annual returns	See PR 2008, USA 2009, PR 2010, 2011 USA 2012 PR 2012, 2013	See PR 2008, USA 2009, PR 2010, 2011 USA 2012 PR 2012, 2013	Continuously monitor emissions within AQMA as per PR2014	Variable but currently marginally below annual mean
4	Steering group		WODC		2014 onwards as required upon full implementation of Measure 1	2014 onwards as required upon full implementation of Measure 1	Annual returns				Not required at present time

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
5	Development of Climate Change Policy		Government								
5a	Lobby Government	Lobbying and support of Government to create policy to increase the use of cleaner vehicles and fuels	OCC has Highway Authority Network Management Duty (for the free flow of traffic etc)		LTP3 and awaited LTP4						OCC has produced LTP3 – and LTP4 awaited

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
5b	**Engage with local public transport operators**	**Reduce unit emissions in the AQMA**	**OCC**	**Engage with local public transport operators (buses and taxis) to a) promote the procurement of vehicles with cleaner engine technologies and b) to promote the use of cleaner fuels.**	**Continuing introduction of newer, less polluting buses**	**Continuing introduction of newer, less polluting buses**	**Annual returns**	Continuing introduction of newer, less polluting buses **Refer to Oxford City PR2014 for indication of improvement achieved by using more modern public transport vehicles**	Continuing introduction of newer, less polluting buses		Improvements evident within the public utility vehicles operating within Oxford city and all connecting commuter routes including those within WODC to and from Chipping Norton

No.	Measure	Focus	Lead Authority	Planning Phase	Implemen-tation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
5c	Engage with freight transport operators	Engage with freight transport operators to a) promote the procurement of vehicles with cleaner engine technologies and b) to promote the use of cleaner fuels.	OCC		Expected changes to emission standards	Expected changes to emission standards	Techno-logical develop-ment	Current liaison between Oxford City and other Oxfordshire District Councils regarding feasibility of Freight Transport Hubs			
5d	'Leave your car at home' initiative	WODC and OCC to Promote use of public transport - awareness levels raised in all periodic Council publicity media	WODC	WODC Climate Change Action Plan - Apr 2011 – Green Travel Action 5.1	Continuous Produce maps and information on local public transport and publicise	Continuous Produce maps and information on local public transport and publicise		In progress	In progress		An aspiration but nor practical within a remote and rural area

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
5e	Promote use of cycles	Promotion of the use of the cycle. Awareness levels raised in all periodic Council publicity media Promote cycling and walking in Chipping Norton	WODC	WODC Climate Change Action Plan - Apr 2011 – Green Travel Action 3.3	Continuous Update, print and promote Maps Council campaign carried out in the town	Continuous Update, print and promote Maps Council campaign carried out in the town		In progress Planned - Sustainable Transport Group	In progress Planned - Sustainable Transport Group		Very hilly terrain around this location thus an aspiration rather than a significant contributor towards reductions
5f	School Travel Plans / Green Travel Plan	Development of School Travel Plans and promotion of WODC Green Travel Plan	OCC	WODC Climate Change Action Plan - Apr 2011 – Green Travel Actions	Continuous	Continuous		WODC Green Travel Plan revised Feb 2011	WODC Green Travel Plan revised Feb 2011		Contained also within OCC LTP3 and awaited LTP4
6	County Bus Strategy		OCC					OCC LTP3	LTP4 is awaited and continues this strategy		

No.	Measure	Focus	Lead Authority	Planning Phase	Implemen-tation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
7	Local Transport Plans	County wide improvements to route infrastructure and traffic management	OCC					OCC LTP3	LTP4 is awaited and continues these improvements		
8	Switch off idling engines	Acquisition of powers to require drivers to switch off their engines if they are left idling.			Education al approach favoured over enforcement	Education al approach favoured over enforcement		Advice / Action as required by Community Wardens	Advice / Action as required by Community Wardens		
9	Manage parking to reduce traffic congestion and improve air quality	Manage parking to reduce traffic congestion and improve air quality	WODC		New Community Wardens to enforce both on and off road parking to minimise restrictions to traffic flow.	New Community Wardens to enforce both on and off road parking to minimise restrictions to traffic flow.		Increased / high visibility patrolling within the District by Community Wardens	Increased / high visibility patrolling within the District by Community Wardens		

8. Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

No additional exceedences have been identified.

There are no significant trends to report.

8.2 Conclusions relating to New Local Developments

Any proposal for a Witney traffic alleviation scheme will be expected to beneficially affect Air Quality along its route within the Witney AQMA. Future details will form the basis of a revised Action Plan.

8.3 Proposed Actions

The Progress Report has not identified the need to proceed to a Detailed Assessment for any pollutant.

The new monitoring data has not identified any need for additional monitoring, or changes to the existing monitoring programme.

The next course of action is to submit the 2014 Air Quality Progress Report

9 References

WODC Data Ratification
'Air Quality Monitoring: Annual Report 2013'
April 2014 – AECOM Ltd

WODC Low Carbon and Environment Plan 2013

http://www.westoxon.gov.uk/media/731615/WODC-Low-Carbon-and-Environmental-Plan.pdf

Oxfordshire Local Transport Plan 2011 -2030 (April 2011)

https://www.oxfordshire.gov.uk/cms/sites/default/files/folders/documents/roadsandtransport/transportpoliciesandplans/localtransportplan/finalfinalltp3summarydocument.pdf

Appendices

Appendix A: Quality Assurance / Quality Control (QA/QC) Data

Appendix B: Diffusion Tube Monitoring Data (monthly mean values)

Appendix C: Hourly Mean NO2 Concentration: Chipping Norton and Witney

Appendix D: Local Bias Adjustment Factor for Diffusion Tube Correction. Chipping Norton Co-Location 2013

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors and Factor from Local Co-location Studies

Diffusion tubes are exposed for approximately 4 weeks before being sent for analysis to the supplier, ESG. The Overall Bias Adjustment factor available from the AEA spreadsheet v3/14, where the bias adjustment figure provided for the participating laboratories for the period 2013 is 0.80. A Bias Adjustment Factor, of 0.79, was calculated using the AEA Spreadsheet for Calculation of Diffusion Tube Precision and Accuracy and the raw NO2 concentrations measured by the Chipping Norton Co-Location study diffusion tubes.

Discussion of Choice of Factor to Use

Both local and national Bias Adjustment Factors were available. The national factor has been used because of the 'below ideal' data capture rate of the automatic analyser within the Chipping Norton AQMA and consistency with previous years' reporting.

The UK NAQS recommended capture rate is 90% and the EU Directive for NO2 specifies a 75% data capture threshold for assessing compliance with limit and guidance values. Reliability had improved during 2010 and the data captured was assessed to be reliable and representative however for 2011 the reduced capture rate was due to equipment outages. The year 2012 showed a marked improvement in reliability and hence data capture rate however the current year (2013) has been affected by air conditioning reliability requiring the analyser to be isolated during the warmer period for 8 weeks from July through to September.

QA/QC of automatic monitoring

Calibration checks of the instrumentation are made every two weeks by the LA and six monthly service and calibration work has been carried out, from November 2011 and April 2012 at the Chipping Norton and Witney sites respectively by SupportingU Ltd. All the data is ratified and validated annually by AECOM Limited.

QA/QC of Diffusion Tube Monitoring

The diffusion tubes are supplied by ESG and analysed in accordance with ESG's ANU/SOP/1015, Issue 1. This method meets the guidelines set out in Defra's 'Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance.'

The tubes (from a specified batch) are prepared by spiking acetone : triethanolamine (50:50) on to the grids prior to the tubes being assembled.

In the WASP inter-comparison scheme for comparing spiked Nitrogen Dioxide diffusion tubes, ESG is currently ranked as a ‘Category Good’ laboratory

Ratification of the WODC data was completed by AECOM Limited in April 2014.

Appendix B: Diffusion Tube Monitoring Data (monthly mean values)

Table 9: Raw Monthly Diffusion Tube Monitoring Data, 2013

Area	Location	Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean (Unadj.)	Data Capture (%)
Witney	Bridge Street	R	71.3	69.7	92.0	64.2	46.2	60.2	54.5	47.9	63.2	55.3	72.9	72.2	64.1	100%
	Mill Street	R	49.7	46.2	52.8	38.5	40.7	39.4	40.3	43.8	53.1	52.0	52.2	59.7	47.4	100%
	Early Road	B	27.0	24.4	26.5	14.0	10.4	11.2	9.2	11.1	18.6	20.4	22.5	21.4	18.1	100%
	Abbey Road	B	28.3	28.6	29.2	12.8	12.2	12.3	9.5	12.8	20.0	20.6	28.1	18.5	19.4	100%
Burford	High Street	R	37.6	39.3	42.9	31.5	43.5	40.8	39.3	46.2	45.6	46.6	55.9	41.7	42.6	100%
	93 High Street	R	44.3	49.6	66.1	48.1	33.3	44.1	42.7	ND	45.3	ND	39.3	43.2	45.6	83%
	Frethern Close	B	19.7	17.4	ND	10.2	ND	9.6	10.4	10.4	13.3	13.2	18.3	14.0	13.7	83%
	Orchard Rise	B	16.5	18.6	19.6	8.9	8.6	8.2	6.2	10.8	13.4	15.0	17.6	11.6	12.9	100%
Carterton	Brize Norton Road	R	43.3	34.1	45.9	28.4	25.6	26.2	23.8	23.2	32.1	26.6	49.0	32.8	32.6	100%
	Upavon Way	R	29.4	29.3	28.3	20.3	19.3	18.5	16.5	20.4	30.1	28.4	34.9	23.5	24.9	100%
	Garner Close	B	25.1	20.1	26.6	11.0	8.9	10.0	6.5	9.2	15.6	15.4	19.1	13.7	15.1	100%
	Oakfield Road	B	37.2	25.1	29.5	12.5	9.5	12.8	8.2	9.4	18.2	15.1	20.0	13.4	17.6	100%
Charlbury	Dyers Hill	R	29.9	25.1	30.1	15.9	17.8	18.8	17.6	19.1	22.3	18.5	21.8	17.4	21.2	100%
	Nineacres Lane	R	21.6	25.7	31.1	15.3	15.7	15.6	12.7	14.6	20.9	20.6	22.0	17.1	19.4	100%
	Tanners Close	B	20.9	12.9	22.1	9.8	7.3	9.6	8.3	8.1	13.0	13.2	17.8	11.5	12.9	100%
	The Green	B	25.2	19.0	17.4	10.2	ND	9.0	5.8	8.0	13.8	13.6	15.6	14.7	13.8	92%
Chipping Norton	Horsefair	R	57.0	74.0	71.5	65.5	66.5	66.6	72.4	58.7	77.7	70.6	94.8	66.6	70.2	100%
	17 Horsefair		44.3	38.2	59.8	41.7	33.0	39.4	32.4	28.0	36.3	39.1	39.1	ND	39.2	92%
	CN Co-Location	R	61.2	61.2	77.0	50.9	40.8	53.0	49.8	34.0	56.1	46.6	40.2	40.5	50.9	100%
	CN Co-Location	R	64.4	63.0	70.4	54.9	42.0	50.9	48.7	32.9	51.0	39.8	49.5	40.5	50.7	100%
	CN Co-Location	R	53.6	56.9	72.2	47.5	33.2	49.0	42.6	33.0	48.7	39.5	46.5	39.6	46.9	100%
	Co-Location Average	R	59.7	60.4	73.2	51.1	38.7	51.0	47.0	33.3	51.9	42.0	45.4	40.2	49.5	100%

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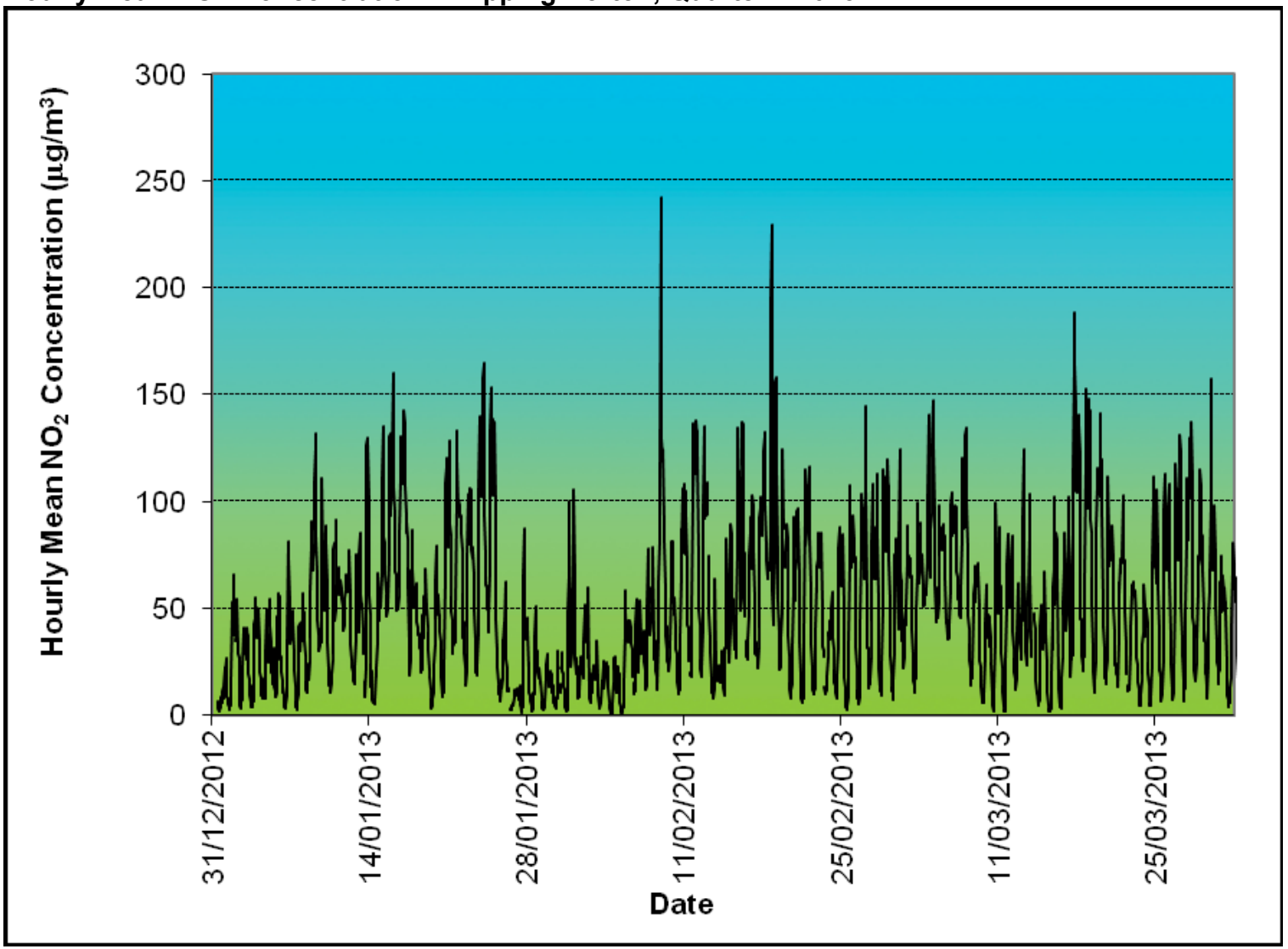
Capabilities on project:
Environment

Area	Location	Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean (Unadj.)	Data Capture (%)
	5 Horsefair	R	28.5	37.1	43.8	33.0	27.0	30.9	27.0	21.4	29.1	29.2	28.4	14.7	29.2	100%
	7 Horsefair	R	37.8	34.8	47.7	35.3	27.0	31.5	26.1	20.8	32.1	29.1	35.3	14.9	31.0	100%
	West Street	R	45.1	44.1	~~3.1~~	34.8	35.7	35.3	31.4	37.7	38.2	29.8	46.9	27.9	37.0	92%
	Coopers Close	B	19.1	21.4	22.3	10.1	11.0	19.8	7.3	9.4	16.9	16.0	21.2	14.4	15.7	100%
	Withers Way	B	23.0	22.3	27.7	12.7	11.0	11.2	7.3	8.2	14.9	12.0	18.3	12.9	15.1	100%
Eynsham	Acre End Street	R	30.6	26.0	36.2	17.2	14.6	16.1	12.8	13.9	22.6	18.1	27.3	12.9	20.7	100%
	Mill Street	R	23.8	27.5	31.2	16.3	13.9	14.3	13.6	14.6	21.4	18.6	25.3	17.8	19.9	100%
	Orchard Close	B	23.1	22.1	26.1	10.7	10.1	10.7	8.8	9.9	16.9	14.8	19.6	13.7	15.5	100%
	Shakespeare Road	B	27.9	21.8	32.1	13.3	13.9	13.6	10.2	12.5	19.7	18.8	25.3	14.1	18.6	100%
Woodstock	Oxford Street	R	42.5	58.3	76.4	41.1	33.7	36.3	36.9	29.5	42.6	39.2	45.7	26.2	42.4	100%
	Oxford Street(2)	R	46.6	41.4	38.7	29.3	30.4	30.9	33.2	37.4	47.0	40.9	94.2	34.7	42.1	100%
	The Ley	B	24.6	22.1	23.5	11.4	10.2	10.7	7.0	9.5	17.0	17.7	18.3	15.8	15.7	100%
	Westland Way	B	24.5	19.2	25.9	9.9	13.4	10.9	8.3	11.8	15.7	15.9	18.3	15.4	15.8	100%
Bladon	Grove Road	R	32.2	32.7	39.2	20.7	19.6	24.0	19.1	21.8	29.4	28.0	29.5	23.0	26.6	100%
	Grove Road(2)	R	41.0	43.1	44.2	22.5	23.5	26.7	21.8	24.7	35.2	32.2	39.0	33.1	32.3	100%
	Heath Lane	B	20.3	21.9	23.2	10.5	9.6	10.4	8.9	10.9	15.8	16.4	19.1	13.0	15.0	100%
	Park Close	B	22.4	18.5	23.6	8.8	8.1	10.2	6.9	8.9	15.5	13.1	16.3	11.7	13.7	100%
	Park Street	R	41.1	51.4	46.9	31.6	35.2	35.9	31.2	28.0	45.1	38.7	50.5	30.2	38.8	100%

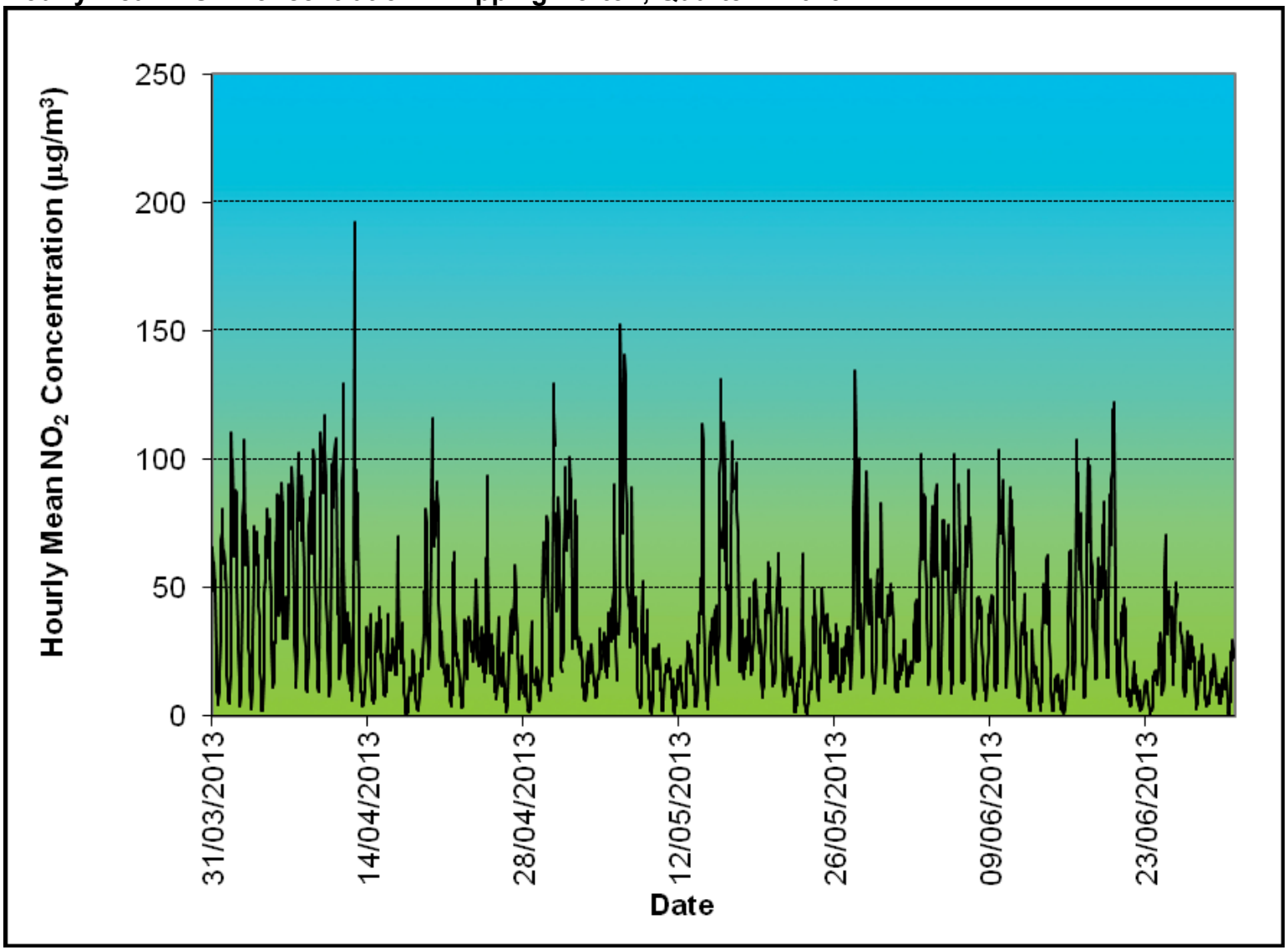
NOTES: All concentrations are in units of µg/m^3. "ND"signifies missing data. Site types: "R" = Roadside, "B" = Background. Struck-out values (~~3.1~~) considered erroneous and ignored in annual calculations.

Appendix C: Hourly Mean NO2 Concentration: Chipping Norton and Witney

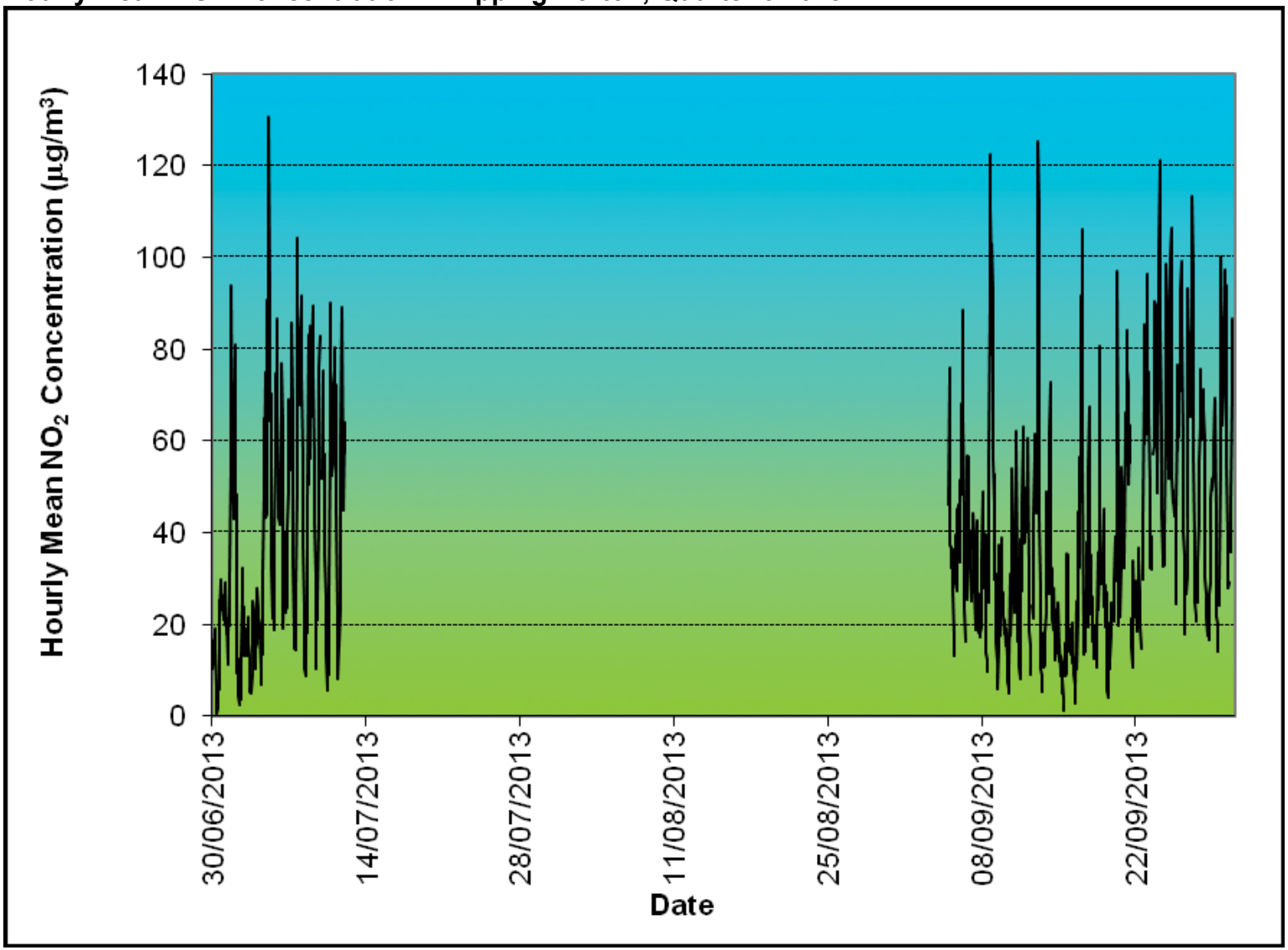
Hourly Mean NO2 Concentration: Chipping Norton, Quarter 1 2013



Hourly Mean NO2 Concentration: Chipping Norton, Quarter 2 2013



Hourly Mean NO2 Concentration: Chipping Norton, Quarter 3 2013



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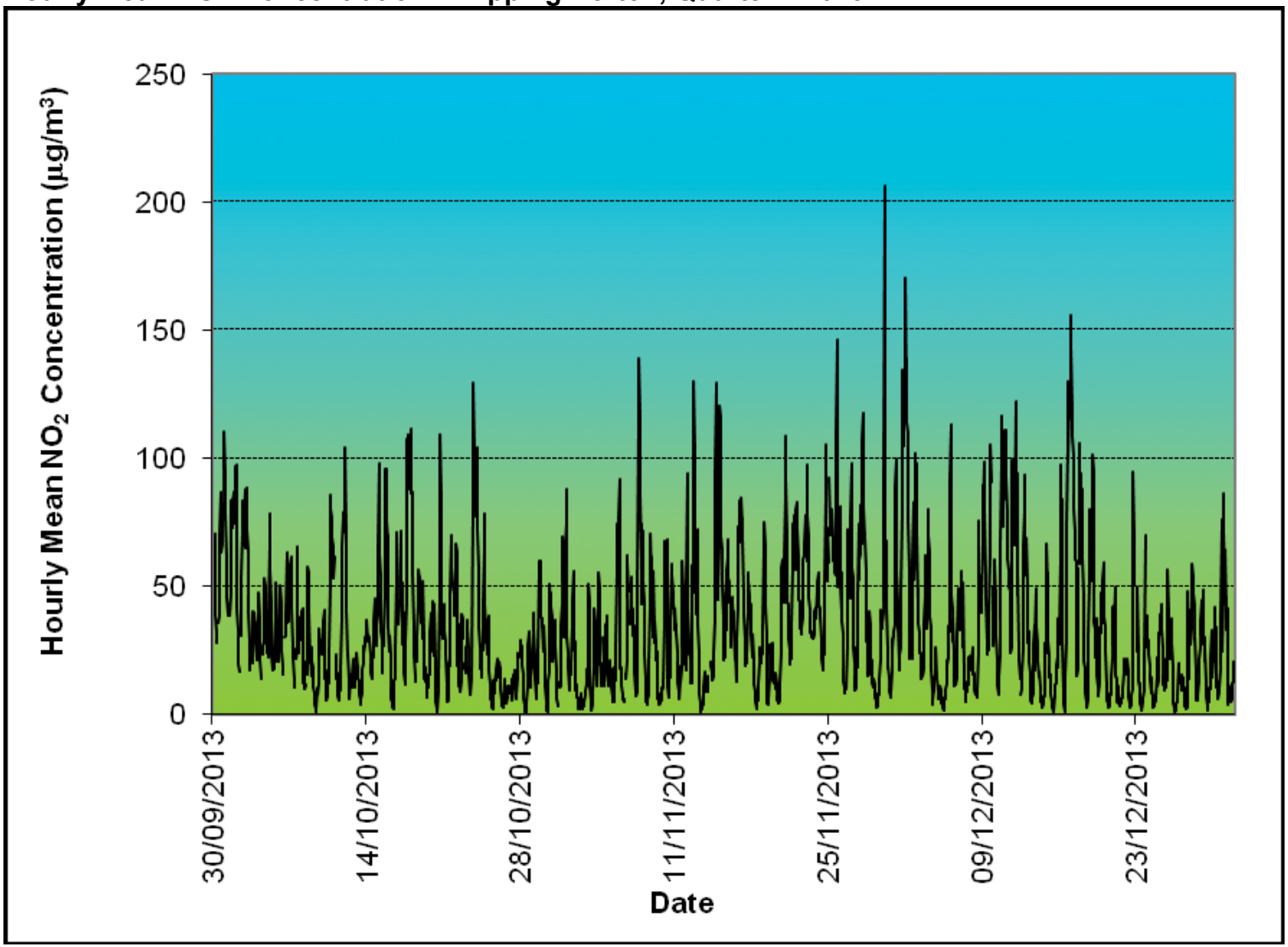
Hourly Mean NO2 Concentration: Chipping Norton, Quarter 4 2013



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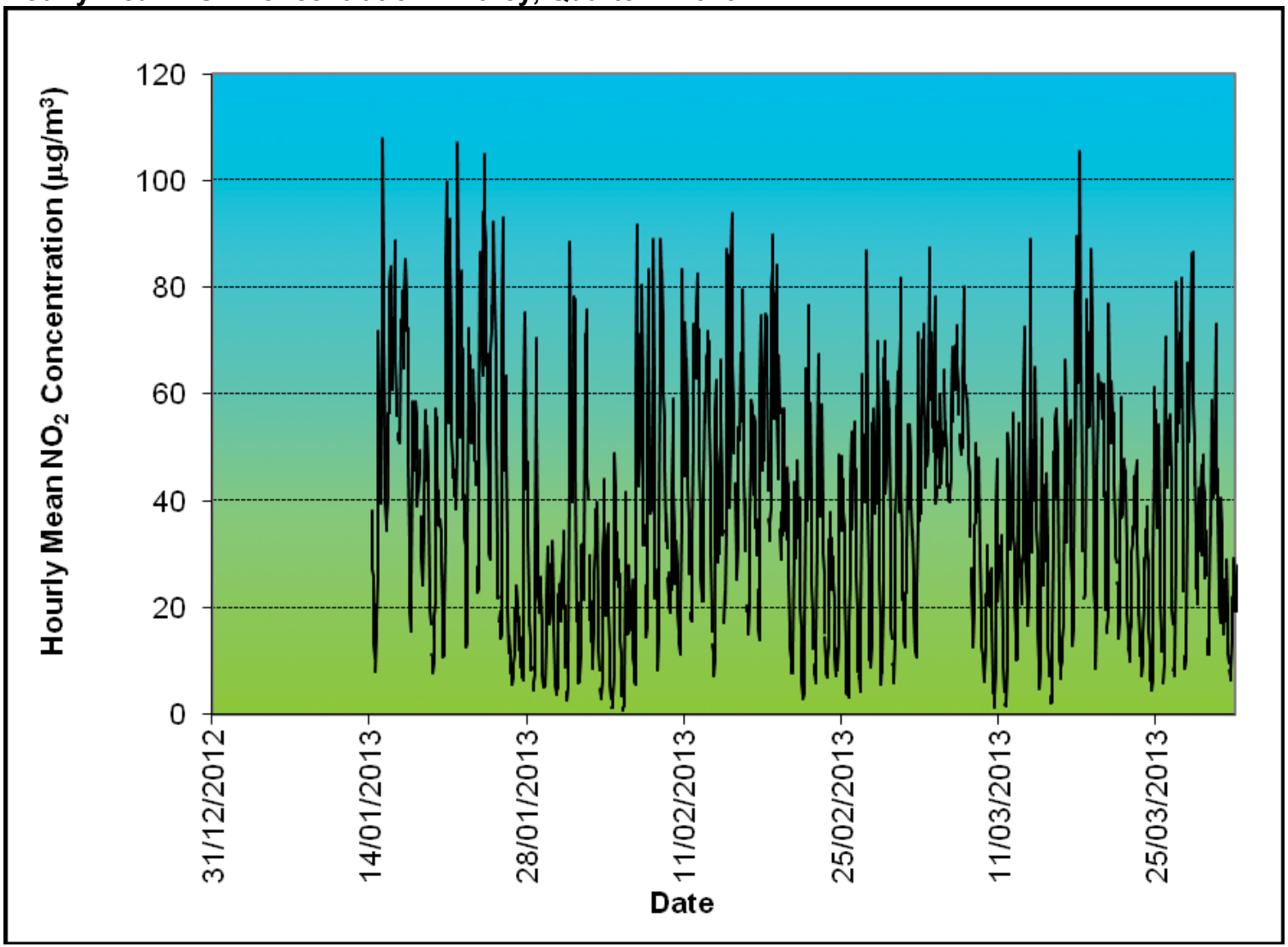
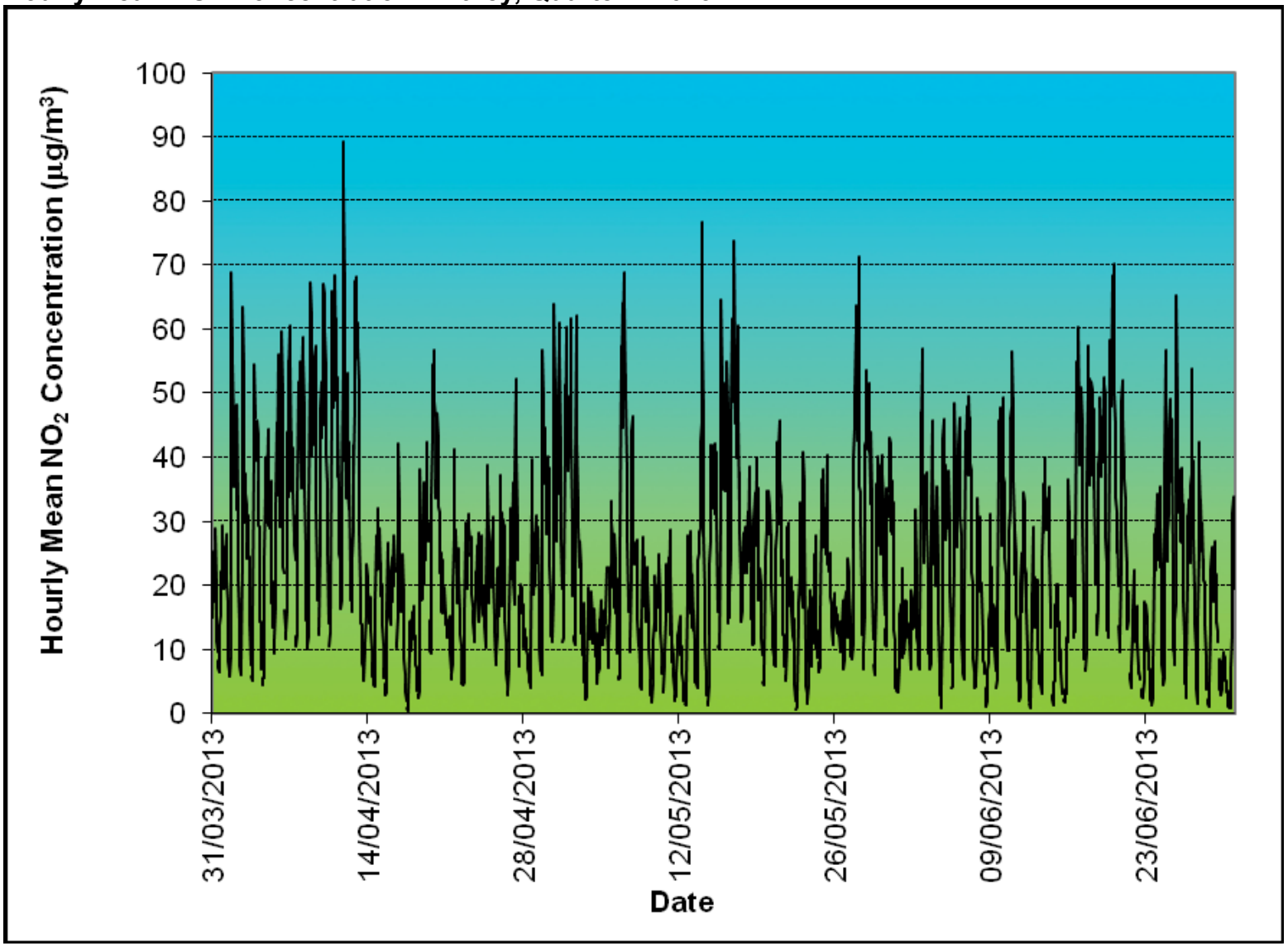
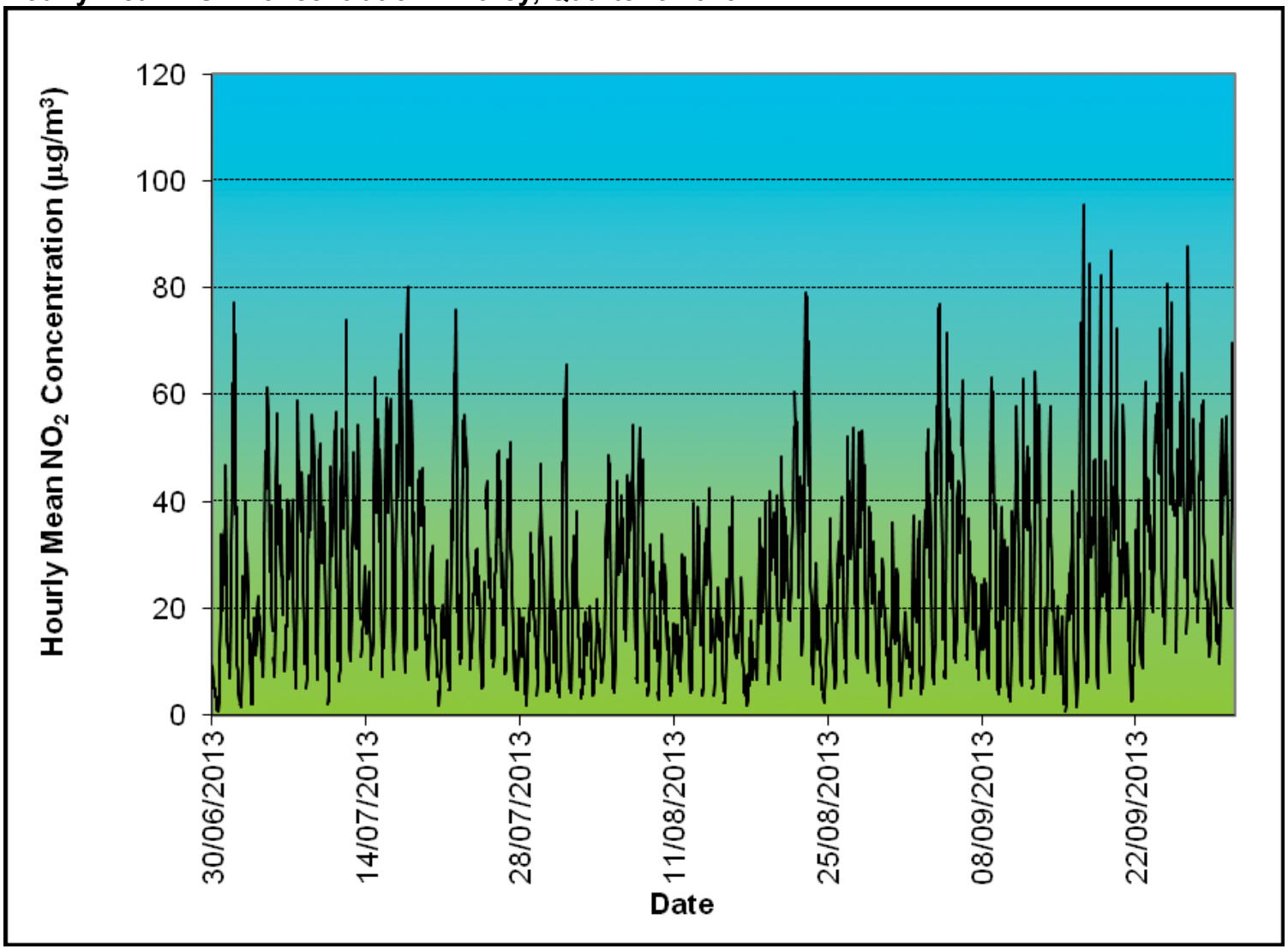
Hourly Mean NO2 Concentration: Witney, Quarter 1 2013



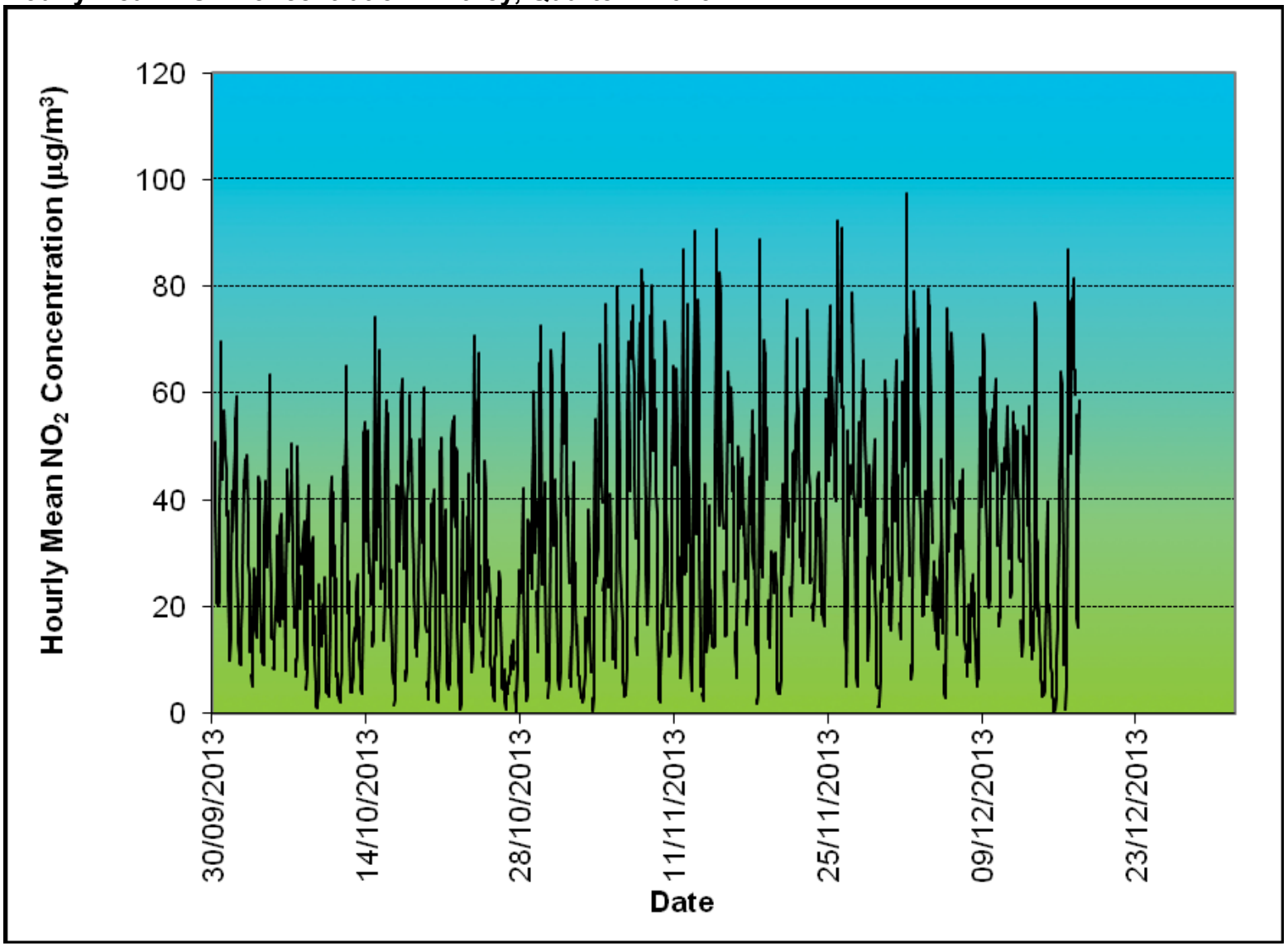
Hourly Mean NO2 Concentration: Witney, Quarter 2 2013



Hourly Mean NO2 Concentration: Witney, Quarter 3 2013



Hourly Mean NO2 Concentration: Witney, Quarter 4 2013



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Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	03/01/2013	31/01/2013	61.2	64.4	53.6	60	5.5	9	13.8	46.21	98.1	Good	Good
2	31/01/2013	26/02/2013	61.2	63.0	56.9	60	3.1	5	7.8	48.08	98.6	Good	Good
3	26/02/2013	26/03/2013	77.0	70.4	72.2	73	3.4	5	8.5	55.32	98.2	Good	Good
4	26/03/2013	24/04/2013	50.9	54.9	47.5	51	3.7	7	9.2	44.26	98.8	Good	Good
5	24/04/2013	30/05/2013	40.8	42.0	33.2	39	4.8	12	11.9	31.57	97.8	Good	Good
6	30/05/2013	25/06/2013	53.0	50.9	49.0	51	2.0	4	5.0	34.26	98.6	Good	Good
7	25/06/2013	30/07/2013	49.8	48.7	42.6	47	3.9	8	9.6	33.66	48.0	Good	or Data Capture
8	30/07/2013	04/09/2013	34.0	32.9	33.0	33	0.6	2	1.5	0.00	0.0	Good	or Data Capture
9	04/09/2013	01/10/2013	56.1	51.0	48.7	52	3.8	7	9.4	40.86	91.0	Good	Good
10	01/10/2013	29/10/2013	46.6	39.8	39.5	42	4.0	10	10.0	34.26	95.8	Good	Good
11	29/10/2013	04/12/2013	40.2	49.5	46.5	45	4.7	10	11.8	37.79	98.4	Good	Good
12	04/12/2013	07/01/2014	40.5	40.5	39.6	40	0.5	1	1.3	30.76	98.5	Good	Good
13													
											Overall survey -->	Good precision	Poor Overall DC

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

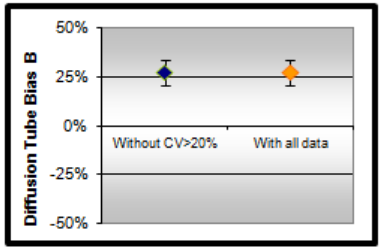
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Chipping Norton 2013

Precision 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 10 periods of data	
Bias factor A	0.79 (0.75 - 0.83)
Bias B	27% (21% - 34%)
Diffusion Tubes Mean:	51 μgm^{-3}
Mean CV (Precision):	7
Automatic Mean:	40 μgm^{-3}
Data Capture for periods used:	97%
Adjusted Tubes Mean:	41 (39 - 43) μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 10 periods of data	
Bias factor A	0.79 (0.75 - 0.83)
Bias B	27% (21% - 34%)
Diffusion Tubes Mean:	51 μgm^{-3}
Mean CV (Precision):	7
Automatic Mean:	40 μgm^{-3}
Data Capture for periods used:	97%
Adjusted Tubes Mean:	41 (39 - 43) μgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Appendix D: Local Bias Adjustment Factor for Diffusion Tube Correction, Chipping Norton Co-Location 2013