



2014 Air Quality Progress Report for Forest of Dean District Council

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

October 2014

Forest of Dean District Council

Local Authority Officer	Chris J Ball Environmental Protection & Licensing Officer
Department	Environmental Protection & Licensing
Address	Forest of Dean District Council Council Offices High Street Coleford Gloucestershire GL16 8HG
Telephone	01594 812429
E-mail	chris.ball@fdean.gov.uk
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Executive Summary

The 2014 Progress Report provides an update on the air quality issues affecting the Forest of Dean district, including results of pollutant monitoring and information on new residential, industrial and transport developments that might affect air quality in the district.

In 1995, the Environment Act provided for a National Air Quality Strategy requiring local authorities to carry out Reviews and Assessments of the air quality in their area for seven specific pollutants. These are; carbon monoxide (CO), benzene, 1, 3-butadiene, nitrogen dioxide (NO₂), lead, sulphur dioxide (SO₂) and PM₁₀ (Particles under 10µm in diameter).

This Air quality Progress Report concludes the following:

- Two locations were identified where the annual mean objective of 40µg/m³ for NO₂ was exceeded in 2013. These locations are all within the Lydney Air Quality Management Area which was declared in July 2010. All other monitoring locations were below the annual mean objectives. None of the sites outside Lydney Air Quality Management Area are close to an annual mean of 60µg/m³ suggesting that there are no concerns for the 1-hour objective. Forest of Dean District Council will not be undertaking a Detailed Assessment for nitrogen dioxide in 2014.
- The Forest of Dean District Council confirms that there are no new or newly identified local developments, which may have an impact on air quality within the Local Authority area.
- Apart from within the Lydney AQMA, there are no sources of concern within Forest of Dean District Council's administrative area from the following:-
 - Road traffic sources,
 - Other transport sources,
 - Industrial sources,
 - Commercial and domestic sources,
 - New developments with fugitive or uncontrolled sources.
- 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.

Table of Contents

Executive Summary	2
1 Introduction	6
1.1 Description of Local Authority Area	6
1.2 Purpose of Progress Report	7
1.3 Air Quality Objectives	8
1.4 Summary of Previous Review and Assessments	9
2 New Monitoring Data	13
2.1 Summary of Monitoring Undertaken	13
2.1.1 Automatic Monitoring Sites	13
2.1.2 Non-Automatic Monitoring Sites	13
2.2 Comparison of Monitoring Results with Air Quality Objectives	16
2.2.1 Nitrogen Dioxide (NO ₂)	16
2.2.2 Particulate Matter (PM ₁₀)	20
2.2.3 Sulphur Dioxide (SO ₂)	20
2.2.4 Benzene	20
2.2.4.1 Other Pollutants Monitored	20
2.2.5 Summary of Compliance with AQS Objectives	20
3 New Local Developments	21
4 Local / Regional Air Quality Strategy	22
5 Planning Applications	24
6 Air Quality Planning Policies	26
7 Local Transport Plans and Strategies	27
8 Climate Change Strategies	28
9 Conclusions and Proposed Actions	29
9.1 Conclusions from New Monitoring Data	29
9.2 Conclusions relating to New Local Developments	29
9.3 Proposed Actions	29
10 Bibliography	31
11 Appendix A: QA:QC Data	33
12 Appendix B: List of Part A1 Permitted Processes	42
13 Appendix C: List of Part A2 Permitted Processes	44
14 Appendix D: List of Part B Permitted Processes	45
15 Appendix E: Diffusion tube locations	48

List of Figures

FIGURE 1 - FOREST OF DEAN DISTRICT BOUNDARY MAP	6
FIGURE 2 – MAP OF LYDNEY AQMA BOUNDARY	11
FIGURE 3 - NITROGEN DIOXIDE DIFFUSION TUBE SITES	14
FIGURE 4 - TRENDS IN ANNUAL MEAN NITROGEN DIOXIDE CONCENTRATIONS MEASURED AT DIFFUSION TUBE MONITORING SITES	19

List of Tables

TABLE 1 - AIR QUALITY OBJECTIVES INCLUDED IN REGULATIONS FOR THE PURPOSE OF LAQM IN ENGLAND	8
TABLE 2 - CONCLUSIONS OF PREVIOUS ROUNDS OF REVIEW AND ASSESSMENT	10
TABLE 3 - DETAILS OF NON- AUTOMATIC MONITORING SITES	15
TABLE 4 - RESULTS OF NO ₂ DIFFUSION TUBES 2013	17
TABLE 5 - RESULTS OF NO ₂ DIFFUSION TUBES (2009 TO 2013)	18
TABLE 6 – ALL LARGE PLANNING APPLICATIONS DEEMED RELEVANT TO NOTE IN REFERENCE TO AIR QUALITY.	24
TABLE 7 - 2013 BIAS CORRECTION FACTOR FOR NO ₂ DIFFUSION TUBE DATA CO- LOCATION STUDIES (LAQM REVIEW AND ASSESSMENT SUPPORT WEBSITE) – VERSION 06/14	34
TABLE 8 - 2012 BIAS CORRECTION FACTOR FOR NO ₂ DIFFUSION TUBE DATA CO- LOCATION STUDIES (LAQM REVIEW AND ASSESSMENT SUPPORT WEBSITE) - VERSION 07/13	35
TABLE 9 - 2011 BIAS CORRECTION FACTOR FOR NO ₂ DIFFUSION TUBE DATA CO- LOCATION STUDIES (LAQM REVIEW AND ASSESSMENT SUPPORT WEBSITE) - VERSION 03/12	35
TABLE 10 - 2010 BIAS CORRECTION FACTOR FOR NO ₂ DIFFUSION TUBE DATA CO- LOCATION STUDIES (LAQM REVIEW AND ASSESSMENT SUPPORT WEBSITE) - VERSION 03/11	36
TABLE 11 - LABORATORIES THAT HAVE DEMONSTRATED SATISFACTORY PERFORMANCE IN THE WASP SCHEME FOR ANALYSIS OF NO ₂ DIFFUSION TUBES, APRIL 2012 – MARCH 2014.	41
TABLE 12 - LIST OF PART A1 PERMITTED PROCESSES	42
TABLE 13 - LIST OF POULTRY FARMS	43
TABLE 14 - LIST OF PART A2 PERMITTED PROCESSES	44
TABLE 15 - LIST OF PART B PERMITTED PROCESSES	45
TABLE 16 - LIST OF PETROL STATIONS	47
TABLE 17 - CHANGE OF DIFFUSION TUBE LOCATIONS FROM 2011-2013 (NO CHANGES IN 2013)	48

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1 Introduction

1.1 Description of Local Authority Area

The Forest of Dean is a rural community situated in Gloucestershire, covering 585 square kilometres. It is made up of four major towns (Lydney, Coleford, Cinderford and Newent) surrounded by numerous villages, with the remainder of the District comprising wooded areas and open space.

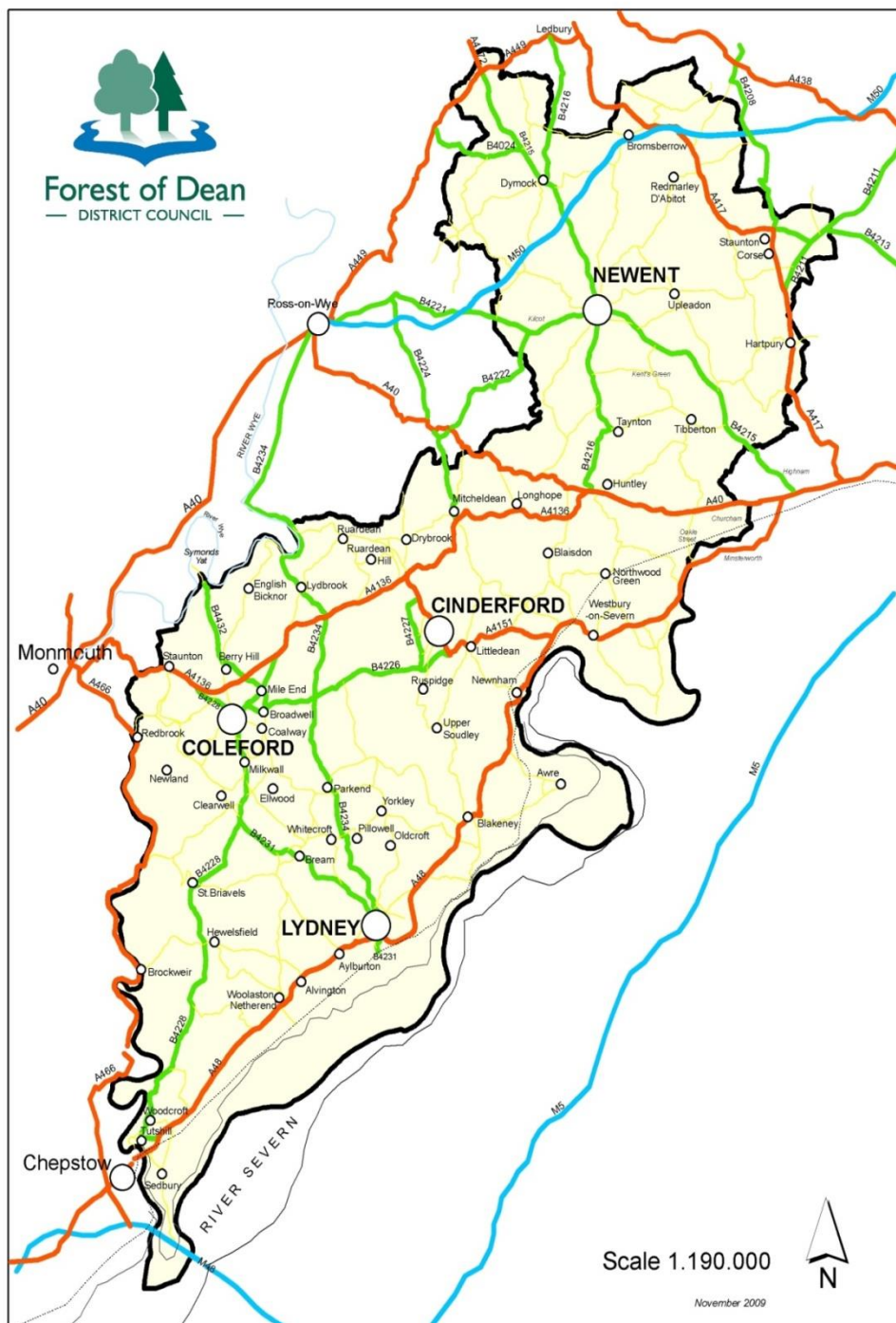


Figure 1 - Forest of Dean District Boundary map

The main industry is still manufacturing, having moved from iron and steel to advanced electronics and IT with light engineering, tourism and local ceramics also providing much of the employment in the District. The population is just around 82,000. The main routes through the District include the M50 in the north of the District and numerous A-roads (e.g. A48 and the A40).

There are no major industrial areas within the district or close-by that significantly impact on air quality. The industries within the District that emit any of the prescribed pollutants are not located close to relevant public exposure. The scale on which they operate does not produce emissions that significantly affect local air quality.

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)¹, the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007² and the relevant Policy and Technical Guidance documents³. 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 exceedances 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 an exceedance 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 Part IV of the Environment Act (1995)

² Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007

³ Local Air quality Management, 2009 Technical Guidance LAQM.TG(09)

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)⁴, The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 1. This table shows the objectives in units of micrograms per cubic metre $\mu\text{g}/\text{m}^3$ (milligrams per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedances in each year that are permitted (where applicable).

Table 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 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	5.00 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
Carbon monoxide	10 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.50 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	0.25 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2005
Particulate Matter (PM ₁₀) (gravimetric)	50 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
Sulphur dioxide	350 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

⁴ Air Quality (England) (Amendment) Regulations 2002 (SI3043)

1.4 Summary of Previous Review and Assessments

Last year, The Forest of Dean District Council undertook the 2013 Progress Report⁵ which was submitted in September 2013.

This report confirmed that five sites in the town of Lydney exceeded the nitrogen dioxide annual mean objective of 40µg/m³. These sites are within the Lydney AQMQ, which was declared in July 2010.

The Forest of Dean District Council has previously undertaken the Updating and Screening Assessment 2012⁶, submitted in May 2012, which concluded the following:

- Three sites in the town of Lydney exceeded the nitrogen dioxide annual mean objective of 40µg/m³, all within Lydney AQMA.
- Apart from the AQMA, there are no road traffic sources, other transport sources, industrial sources, commercial or domestic sources, fugitive or uncontrolled sources.
- No detailed assessment is required for any pollutants within Forest of Dean District Council's administrative area.

These two reports show a large increase in NO₂ levels across the district in 2012 at an average increase of 11% compared to 2011.

⁵ Air Quality Progress Report 2013, submitted to Defra September 2013

⁶ Updating and Screening Assessment 2012, submitted to Defra May 2012

Table 2 - Conclusions of previous rounds of review and assessment

Report	Exceedences Identified	AQMA declared	Additional Comments
Progress Report 2013⁷ (Report submitted September 2013)	Five locations were identified where the annual mean objective of 40µg/m ³ for NO ₂ was exceeded in 2012. These locations are all within the Lydney AQMA which was declared in July 2010. All other monitoring locations were below the annual mean objectives.	Yes	This shows an increase of NO ₂ levels of 11% on the previous year across the district.
Updating & Screening Assessment 2012⁸ (Report Submitted May 2012)	Three locations were identified where the annual mean objective of 40µg/m ³ for NO ₂ was exceeded in 2012. These locations are all within the Lydney AQMA which was declared in July 2010. All other monitoring locations were below the annual mean objectives.	Yes	This was a decrease on the results of the previous year.
Progress Report 2011⁹ (Report Submitted May 2011)	Five sites in the town of Lydney exceeded the nitrogen dioxide annual mean objective of 40µg/m ³ . These sites are within the Lydney AQMA, which was declared in July 2010. No other pollutants exceeded their respective annual mean concentrations.	Yes	In July 2011, the Lydney AQMA Further assessment was produced
Progress Report 2010¹⁰ (Report Submitted Aug 2010)	<p>Four sites in the town of Lydney exceeded the nitrogen dioxide annual mean objective of 40µg/m³. These sites are within the Lydney AQMA, which was declared in July 2010. No other pollutants exceeded their respective annual mean concentrations.</p> <p>Measured NO₂ levels were within 10% of the air quality objective at one location in Newnham-on-Severn. If the trends in this area indicate that the NO₂ levels are increasing, the Forest of Dean District Council will undertake a Detailed Assessment when required.</p> <p>There were no concerns from the following sources - other road traffic; other transport; industrial; commercial or domestic; fugitive or uncontrolled.</p>	Yes	Lydney AQMA was declared in July 2010. See – Figure 2
Updating & Screening Assessment 2009¹¹	NO ₂ annual mean objective exceeded at three sites in Lydney in 2008.(Report submitted November 2009)	Yes	Lydney AQMA to be declared at beginning of 2010.

⁷ Progress Report 2013, submitted to Defra Sep 2011

⁸ Updating & Screening Assessment, submitted to Defra May 2012

⁹ Progress Report 2011, submitted to Defra May 2011

¹⁰ Progress Report 2010, submitted to Defra Aug 2011

¹¹ Updating & Screening Assessment, submitted to Defra Nov 2009

Report	Exceedences Identified	AQMA declared	Additional Comments
Detailed Assessment 2008¹²	Detailed Assessment: Exceedences of annual mean NO ₂ objective for Lydney Town Centre. (Report submitted February 2009)	No	Need for an AQMA for Lydney identified.
Progress Report 2007	Potential exceedance of annual mean objective for NO ₂ in Lydney	No	A Detailed Assessment for Lydney to be submitted.
Updating & Screening Assessment 2006	(Submitted Aug 2006) None	No	Pemery Pressroom Products Ltd (new A1 industrial development in the District).

Lydney Air Quality Management Area

In July 2010, an AQMA was designated in Lydney town centre due to the exceedance of nitrogen dioxide levels from traffic emissions sources.

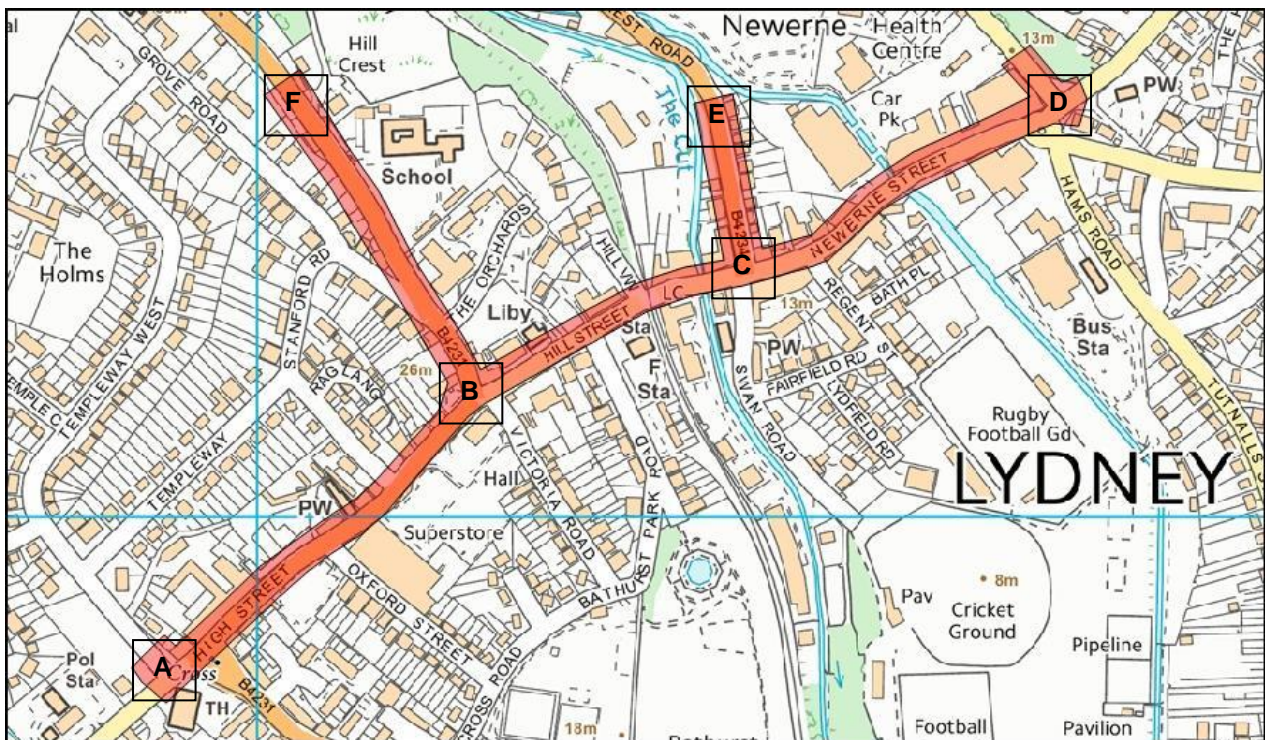


Figure 2 – Map of Lydney AQMA Boundary

Figure 2 shows the designated area which incorporates roads affronting residential properties in High Street, Hill Street and Newerne Street from Temple Way junction (A) to Albert Street Junction (D); and Bream Road from

¹² Detailed Assessment – Lydney Town Centre, submitted to Defra Feb 2009

High Street junction (B) to approximately 75m past the entrance to Lydney C of E Primary School (F); and Forest Road from Hill Street (C) to just past 17 Forest Road (E).

Continued monitoring has been undertaken in order to progress in the production of the Lydney Air Quality Action Plan, which is currently being produced.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Forest of Dean District Council does not undertake any continuous monitoring within its administrative area.

2.1.2 Non-Automatic Monitoring Sites

The Forest of Dean District Council has undertaken NO₂ monitoring with diffusion tubes at 30 sites during 2013 (Appendix E - Map of monitoring locations). The diffusion tubes were supplied and analysed by Gradko Environmental Services (QA/QC data can be found in Appendix A). Tubes were prepared using 50µl of 20% Triethanolamine in Water. The tube preparation and subsequent analysis follow the procedures in the harmonised "Practical Guidance" document. All diffusion tubes are stored, handled and exposed in accordance with the relevant guidance. All diffusion tubes have a monthly exposure period.

Where necessary, diffusion tubes with less than 75% (nine months) data have been annulled using the methodology outlined in Box 3.2 of the Technical Guidance (LAQM.TG(09))¹³ There have been no sites with less than 9 months of data capture during 2013; therefore no sites have been annulled.

The Forest of Dean District Council does not undertake any co-location studies; so bias adjustment factors were obtained from the National Bias Adjustment Factor Spreadsheet (Version 06/14) (Appendix D)

- 2013 – 0.95 for 35 studies¹⁴
- 2012 – 0.97 for 34 studies¹⁵
- 2011 – 0.89 for 26 studies¹⁶
- 2010 – 0.85 for 7 studies¹⁷
- 2009 – 0.79 for 4 studies

¹³ Local Air quality Management, 2009 Technical Guidance LAQM.TG(09)

¹⁴ Table **Error! Main Document Only.**, p. 35 - 2013 Bias correction factor for NO₂ diffusion tube data co-location studies – ver.06/14

¹⁵ Table 8, p. 36 - 2012 Bias correction factor for NO₂ diffusion tube data co-location studies – ver.07/13

¹⁶ Table 9, p. 36 - 2011 Bias correction factor for NO₂ diffusion tube data co-location studies – ver.03/12

¹⁷ Table 10, p. 37 - 2010 Bias correction factor for NO₂ diffusion tube data co-location studies – ver.03/11

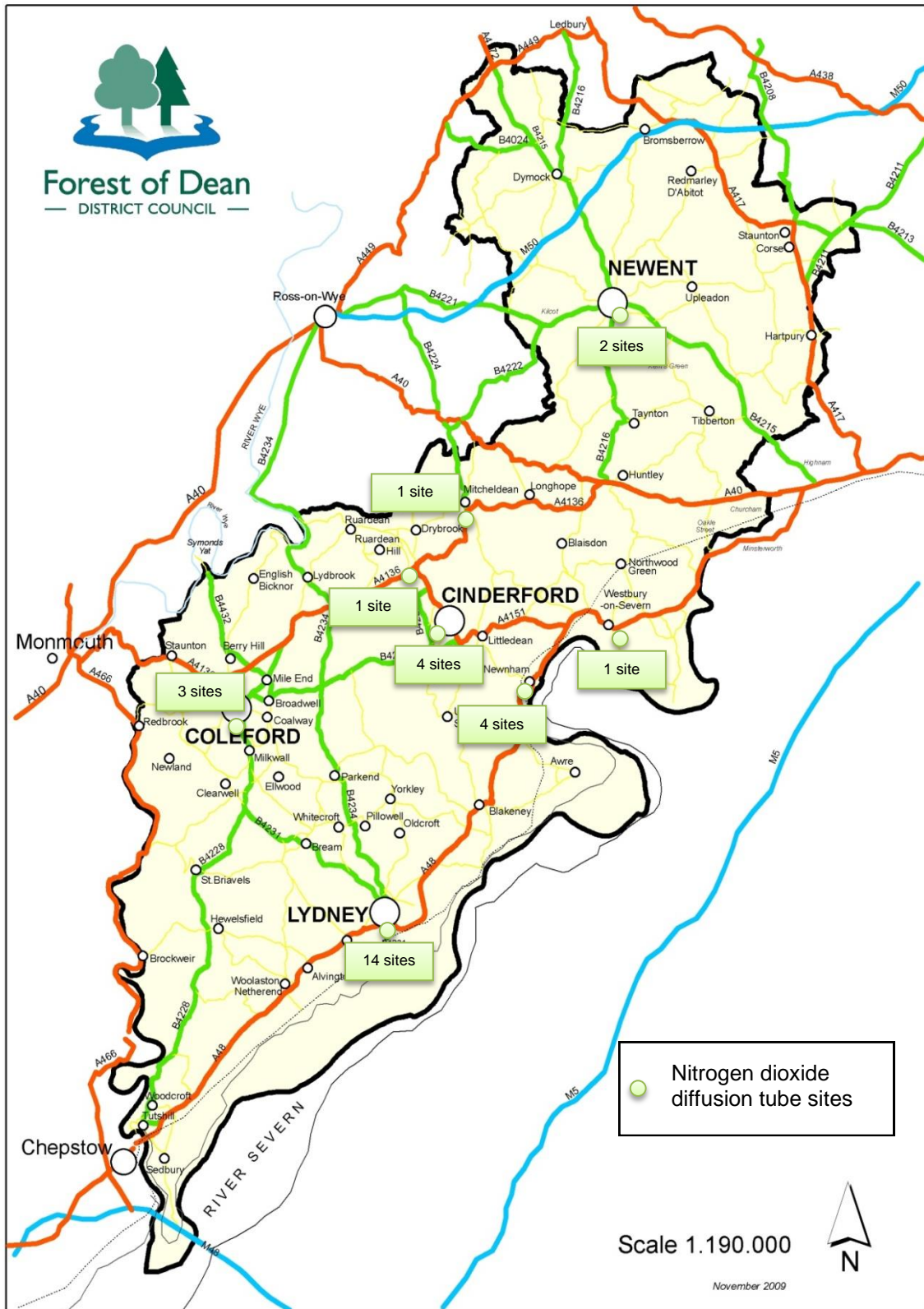


Figure 3 - Nitrogen dioxide diffusion tube sites

Table 3 - Details of Non- Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Pollutants Monitored	In AQMA?	Relevant Exposure?	Distance to Kerb of Nearest Road (m)	Worst-Case Exposure?
CIN01	Cinderford – St Whites Terrace	Roadside	365458	212855	NO ₂	No	Y (<1m)	4m	Yes
CIN02	Cinderford – Berisford Court	Urban Centre	365814	214014	NO ₂	No	Y (2m)	1m	Yes
CIN03	Cinderford – Bottom High St	Roadside	365291	214732	NO ₂	No	Y (2<1m)	1m	Yes
COL01	Coleford –Gloucester Road	Suburban	357629	210787	NO ₂	No	Y (<1m)	2m	Yes
COL02	Coleford – Market Place	Suburban	357553	210757	NO ₂	No	Y (<1m)	7m	Yes
COL03	Coleford – Old Vicarage Court	Suburban	357742	210580	NO ₂	No	Y (<1m)	7m	Yes
HUN02	Huntley - The Red Lion junction	Roadside	372198	219359	NO ₂	No	N (<1m)	1m	Yes
LYD01	Lydney – Top High St	Roadside	363142	203074	NO ₂	Yes	Y (<1m)	2m	Yes
LYD02	Lydney – Newerne Street	Urban Centre	363523	203261	NO ₂	Yes	Y (<1m)	4m	Yes
LYD03	Lydney – Mid High St	Suburban	363025	202964	NO ₂	Yes	Y (<1m)	1m	Yes
LYD04	Lydney – Bottom High St	Suburban	362964	202909	NO ₂	Yes	Y (<1m)	1m	Yes
LYD05	Lydney - Regents Arcade	Urban Centre	363443	203206	NO ₂	Yes	Y (1m)	1m	Yes
LYD06	Lydney – Bream Junction (Triplicate 1of3)	Suburban	363189	203110	NO ₂	Yes	N (1m)	1m	Yes
LYD08	Lydney – Mid Bream Road	Roadside	363107	203217	NO ₂	Yes	Y (<1m)	2m	Yes
LYD09	Lydney – Top Bream Road	Kerbside	363046	203322	NO ₂	Yes	Y (<1m)	<1m	Yes
LYD10	Lydney – Old Chip Shop, Forest Road	Roadside	363405	203237	NO ₂	Yes	Y (<1m)	2m	Yes
LYD11	Lydney – Forest Road	Kerbside	363391	203337	NO ₂	Yes	Y (<1m)	<1m	Yes
LYD12	Lydney –Newerne Street	Urban Centre	363607	203322	NO ₂	Yes	Y (<1m)	2m	Yes
LYD13	Lydney – Bream Junction (Triplicate 2of3)	Suburban	363189	203110	NO ₂	Yes	N (1m)	1m	Yes
LYD14	Lydney – Bream Junction (Triplicate 3of3)	Suburban	363189	203110	NO ₂	Yes	N (1m)	1m	Yes
LYD15	Lydney – Highfield Lane	Suburban	364087	204137	NO ₂	Yes	N (1m)	1m	Yes
MIT01	Mitcheldean –The Merrin	Roadside	366483	218277	NO ₂	No	Y (2m)	1m	Yes
NAI01	Nailbridge – Crossroads	Roadside	364555	216226	NO ₂	No	N (<1m)	1m	Yes
NEW01	Newent – opposite Clifton House, High Street	Suburban	372058	226159	NO ₂	No	N (1m)	1m	Yes
NEW02	Newent – Church Street	Urban Centre	372288	225852	NO ₂	No	Y (<1m)	2m	Yes
NOS02	Newnham-on-Severn - High St	Roadside	369038	211590	NO ₂	No	Y (<1m)	2m	Yes
NOS03	Newnham-on-Severn - High St	Roadside	369135	211870	NO ₂	No	Y (<1m)	3m	Yes
NOS04	Newnham-on-Severn - High St	Roadside	369200	211929	NO ₂	No	Y (<1m)	3m	Yes
NOS05	Newnham-on-Severn - High St	Roadside	369040	211679	NO ₂	No	Y (<1m)	12m	Yes
WOS01	Westbury-on-Severn - High St - bus stop	Roadside	371649	214054	NO ₂	No	N (5m)	2m	Yes

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide (NO₂)

Table 4 indicates two locations where the annual mean objective of 40µg/m³ for NO₂ was exceeded in 2013 (highlighted) - High Street, Lydney (LYD01) and Art/Picture Gallery, Hill Street, Lydney (Triplicates - LYD06, LYD13, LYD14). These locations are all within the Lydney AQMA which was declared in July 2010. All other monitoring locations were below the annual mean objectives.

Three sites, Mid High Street, Lydney (LYD03); Bottom High Street, Lydney (LYD04); Mid Bream Road, Lydney (LYD08) are within 10% of the annual mean of 40µg/m³. These sites are all within the Lydney AQMA and will continue to be monitored closely during 2014/15.

None of the sites outside Lydney AQMA are close to an annual mean of 60µg/m³ suggesting that there are no concerns for the 1-hour objective. Forest of Dean District Council will not be undertaking a Detailed Assessment for Nitrogen Dioxide in 2013.

Diffusion Tube Monitoring Data

Table 4 - Results of NO₂ Diffusion Tubes 2013

Site ID	Location	Within AQMA?	Data Capture 2013	2013 Annual Mean Concentration (µg/m ³) Bias Adjusted
CIN01	Cinderford – St Whites Terrace	No	100	23.5
CIN02	Cinderford – Berisford Court	No	100	23.8
CIN03	Cinderford – Bottom High St	No	100	23.5
COL01	Coleford – Gloucester Road	No	100	34.0
COL02	Coleford – Market Place	No	92	23.6
COL03	Coleford – Old Vicarage Court	No	100	24.0
HUN02	Huntley - The Red Lion junction	No	100	22.1
LYD01	Lydney – Top High St	Yes	100	41.4 [†]
LYD02	Lydney – Newerne Street	Yes	100	21.0
LYD03	Lydney – Mid High St	Yes	100	37.1 ^{††}
LYD04	Lydney – Bottom High St	Yes	92	38.2 ^{††}
LYD05	Lydney - Regents Arcade	Yes	92	34.3
LYD06	Lydney – Bream Junction (Triplicate 1 of 3)	Yes	100	40.8 [†]
LYD08	Lydney – Mid Bream Road	Yes	100	37.3 ^{††}
LYD09	Lydney – Top Bream Road	Yes	100	34.8
LYD10	Lydney – Old Chip Shop, Forest Road	Yes	92	26.9
LYD11	Lydney – Forest Road	Yes	100	17.8
LYD12	Lydney – Newerne Street	Yes	92	31.7
LYD13	Lydney – Bream Junction (Triplicate 2 of 3)	Yes	100	40.5 [†]
LYD14	Lydney – Bream Junction (Triplicate 3 of 3)	Yes	100	40.3 [†]
LYD15	Lydney – Highfield Lane	No	92	11.1
MIT01	Mitcheldean – The Merrin	No	100	28.1
NAI01	Nailbridge - Crossroads	No	100	30.6
NEW01	Newent – opp. Clifton House, High Street	No	100	24.0
NEW02	Newent – Church Street	No	83	24.9
NOS02	Newnham-on-Severn - High St	No	100	30.1
NOS03	Newnham-on-Severn - High St	No	100	27.1
NOS04	Newnham-on-Severn - High St	No	100	28.2
NOS05	Newnham-on-Severn - High St	No	100	25.6
WOS01	Westbury-on-Severn - High St - bus stop	No	75	21.4

[†]Concentrations exceeding Air Quality Objectives (>40µg/m³)

^{††}Concentrations within 10% of Air Quality Objectives (40µg/m³)

Table 5 - Results of NO₂ Diffusion Tubes (2009 to 2013)

Site ID	Site Name	Within AQMA?	Annual Mean Concentration (µg/m ³) - Adjusted for Bias					
			2009	2010	2011	2012	2013	2013-2012 ±
CIN01	Cinderford – St Whites Terrace	No	21.3	27.8	22.8	25.1	23.5	-(1.6)
CIN02	Cinderford – Berisford Court	No	20.8	24.4	22.5	26.0	23.8	-(2.2)
CIN03	Cinderford – Bottom High St	No	20.7	26.5	21.7	25.0	23.5	-(1.5)
COL01	Coleford –Gloucester Road	No	28.5	36.5	35.4	37.8	34.0	-(3.8)
COL02	Coleford – Market Place	No	-	-	-	25.8	23.6	-(2.2)
COL03	Coleford – Old Vicarage Court	No	-	-	-	29.0	24.0	-(5.0)
HUN02	Huntley - The Red Lion junction	No	23.0	25.6	20.2	26.0	22.1	-(3.9)
LYD01	Lydney – Top High St	Yes	44.3	46.4	40.8	49.7	41.4	-(8.3)
LYD02	Lydney – Newerne Street	Yes	20.6	23.9	22.8	24.7	21.0	-(3.7)
LYD03	Lydney – Mid High St	Yes	39.9	46.9	39.2	45.1	37.1	-(8.0)
LYD04	Lydney – Bottom High St	Yes	-	40.7	34.6	44.1	38.2	-(5.9)
LYD05	Lydney - Regents Arcade	Yes	35.7	39.8	38.2	42.5	34.3	-(8.2)
LYD06	Lydney – Bream Junction (Triplicate 1of3)	Yes	40.7	46.6	41.5	45.7	40.8	-(4.9)
LYD08	Lydney – Mid Bream Road	Yes	-	39.7	39.6	44.5	37.3	-(4.9)
LYD09	Lydney – Top Bream Road	Yes	41.8	46.0	44.6	47.5	34.8	-(12.7)
LYD10	Lydney – Old Chip Shop, Forest Road	Yes	-	31.9	26.3	30.0	26.9	-(3.1)
LYD11	Lydney – Forest Road	Yes	-	24.8	16.5	20.3	17.8	-(2.5)
LYD12	Lydney –Newerne Street	Yes	-	-	32.0	36.0	31.7	-(4.3)
LYD13	Lydney – Bream Junction (Triplicate 2of3)	Yes	-	-	40.1	46.4	40.5	-(5.9)
LYD14	Lydney – Bream Junction (Triplicate 3of3)	Yes	-	-	39.0	44.3	40.3	-(4.0)
LYD15	Lydney – Highfield Lane	No	-	-	-	15.5	11.1	-(4.4)
MIT01	Mitcheldean –The Merrin	No	26.8	31.5	26.2	31.7	28.1	-(3.6)
NAI01	Nailbridge - Crossroads	No	-	35.0	35.4	37.1	30.6	-(6.5)
NEW01	Newent – opposite Clifton House, High St	No	23.2	27.4	22.3	24.3	24.0	-(0.3)
NEW02	Newent – Church Street	No	25.0	28.4	26.2	27.9	24.9	-(3.0)
NOS02	Newnham-on-Severn - High St	No	-	35.7	32.2	33.8	30.1	-(3.7)
NOS03	Newnham-on-Severn - High St	No	-	30.0	32.1	31.1	27.1	-(4.0)
NOS04	Newnham-on-Severn - High St	No	-	37.3	30.4	35.5	28.2	-(7.3)
NOS05	Newnham-on-Severn - High St	No	-	35.4	26.1	27.9	25.6	-(2.3)
WOS01	Westbury-on-Severn - High St - bus stop	No	24.3	27	23.6	24.3	21.4	-(2.9)

Table 5 shows there has been an average of a 13.7% decrease between the 2012 and 2013 annual mean NO₂ concentration.

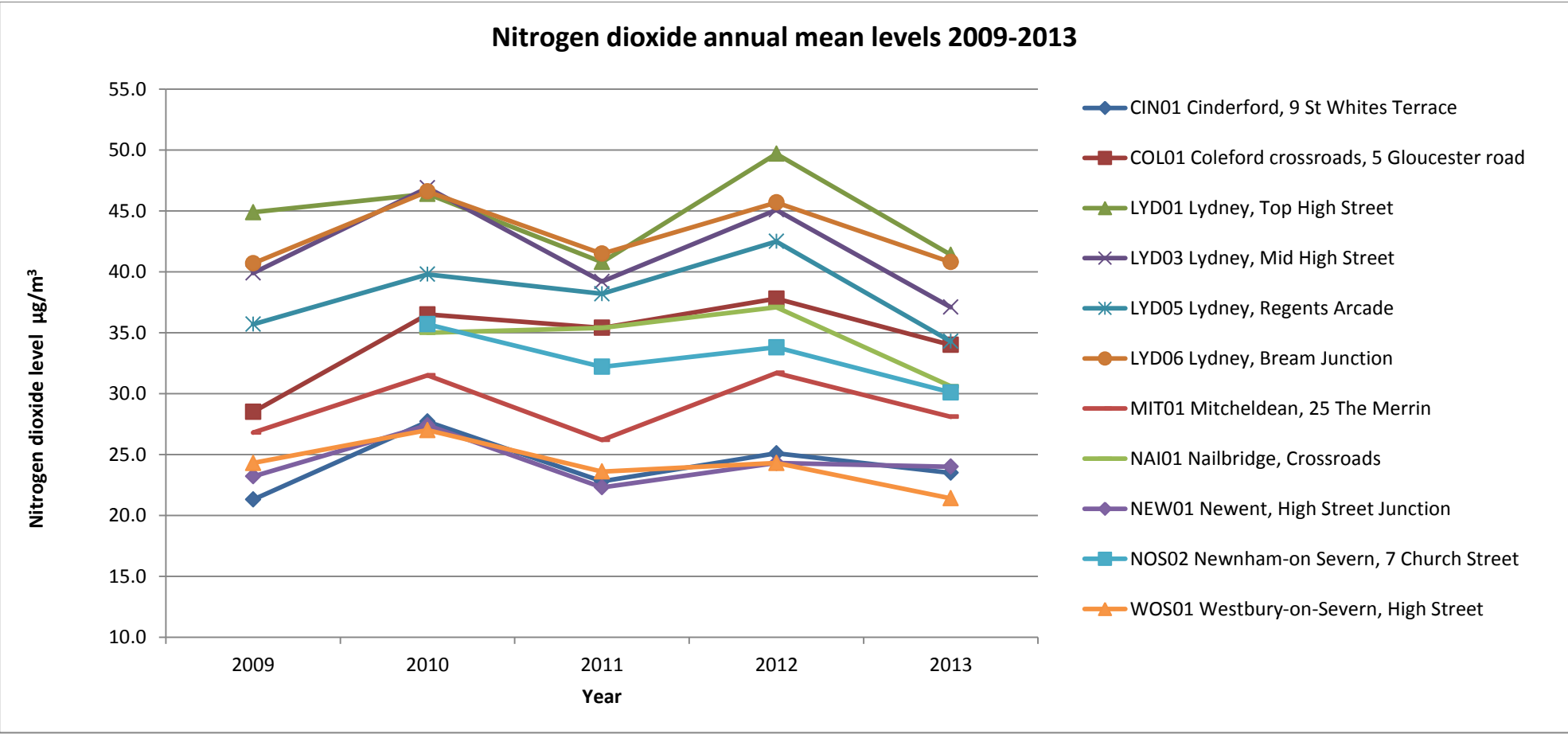


Figure 4 - Trends in annual mean Nitrogen dioxide concentrations measured at diffusion tube monitoring sites

Figure 4 shows a trend chart providing NO₂ annual mean results over the past 4-5 years. From the dataset there is no significant trend. A larger dataset would be required in order to make an accurate assessment of any trend significance. However, it is clear from the graph that the highest values are within the Lydney AQMA.

2.2.2 Particulate Matter (PM₁₀)

The Forest of Dean District Council has not undertaken any PM₁₀ monitoring within their administrative area since the Updating and Screening Assessment in 2006.

2.2.3 Sulphur Dioxide (SO₂)

The Forest of Dean District Council has not undertaken any sulphur dioxide monitoring within their administrative area since Progress Report 2010. The usefulness of the data obtained is negligible as the results are in no way comparable to the sulphur dioxide air quality objective.

2.2.4 Benzene

The Forest of Dean District Council has not undertaken any benzene monitoring within their administrative area since the Updating and Screening Assessment in 2006.

2.2.4.1 Other Pollutants Monitored

Forest of Dean District Council has not undertaken any carbon monoxide, lead and 1,3-Butadiene monitoring within their administrative area since the Updating and Screening Assessment in 2006.

2.2.5 Summary of Compliance with AQS Objectives

Forest of Dean District Council has examined the concentrations from all monitoring locations. Concentrations of NO₂ outside of the Lydney AQMA are all below the objective at relevant locations; therefore, there is no need to proceed to a Detailed Assessment at this stage.

Concentrations within the AQMA still exceed the objective for NO₂ at two locations within Lydney town centre and the AQMA should remain.

3 New Local Developments

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

Forest of Dean District Council 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

The National Air Quality Strategy recognises that every local authority can make a contribution to continued improvements in air quality by the development of their own strategies. By developing and implementing local air quality strategies, an integrated approach to air quality can be obtained.

The Forest of Dean District Council does not have a Local Air Quality Strategy at present, but is, however, part of a partnership that has developed a County-wide Strategy for Gloucestershire. All six local authorities in Gloucestershire (operating as the Gloucestershire Pollution Group) together with the County and the University of the West of England's Air Quality Management Resource Centre (AQMRC, UWE) published a county-wide strategy in 2005. The county-wide strategy was adopted by the Forest of Dean District Council in 2005. In 2011, Gloucestershire Pollution Group revised this publication.

Key objectives of County-wide strategy Gloucestershire 2011:

- To work towards meeting the national air quality objectives, as regulated by the current Air Quality Regulations. This is a statutory requirement for all six local authorities in Gloucestershire, for carbon monoxide, lead, 1,3-butadiene, benzene, sulphur dioxide, particulates (PM_{10, 2.5}) and nitrogen dioxide.
- To continue to work towards reducing ozone concentrations through the reduction of other pollutant concentrations (as precursors to the formation of ozone), even though ozone is not yet regulated by local authorities in the UK;
- To comply with the local air quality management timetable, in the submitting of Updating and Screening Assessments, Detailed Assessments (where appropriate); Progress Reports (submitted annually) and any further reviews, actions plans and action plan progress reports as necessary;
- To provide the framework for designating, revoking and amending air quality management areas within Gloucestershire (as and when

appropriate) and for developing air quality action plans (as appropriate);

- To review the key mechanisms and structures in place regionally to deliver air quality improvements and to seek to improve upon such mechanisms and structures;
- To ensure that improving upon local air quality remains a key objective of all future submissions of Local Transport Plans to central government by the County Council;
- To review the main constraints and barriers to improving air quality locally and to seek to reduce them;
- To reduce air pollution to the lowest levels that can be reasonably achieved, in line with the underlying principles of the European Ambient Air Quality Framework Directive (96/62/EC), and to aim to achieve a minimum of 10% improvement on the basic objectives;
- To maintain good air quality and prevent the deterioration of air quality where already satisfactory;
- To reduce emissions of CO₂ emitted by road transport, through local air quality management initiatives and policies to reduce overall traffic volumes and congestion across Gloucestershire, and,
- To consider subsequent reviews of this County-wide Air Quality Strategy, in conjunction with the regular reviews of Gloucestershire's Local Transport Plan. The Strategy proposed fulfils the local authority obligations to improve air quality locally and will assist with fostering shared and best practice between local authorities across Gloucestershire and with Gloucestershire County Council.

5 Planning Applications

Table 6 – All large planning applications deemed relevant to note in reference to air quality.

Planning Reference	Area	Development Details	Application accepted Date	AQA Undertaken	AQA Comments
Under Construction					
P0627/13/FUL	Land South Of Cambourne Place Lydney	Erection of retail store, petrol filling station, car parking, service areas	May 2013	Yes	Assessment concluded that the impact of the proposed development in air quality is considered to be negligible for NO2.
P0322/13/OUT	Former Lydney Car Centre Newerne Street Lydney	Erection of a new retail unit (Class A1) with ancillary warehouse space and associated development	May 2013	No	No assessment deemed necessary by developer due to less than 5% increase in traffic. Conditions requested by Environmental Protection Team.
P0663/14/OUT	Northern Quarter	Hybrid application for new spine road, college, 195 dwellings, hotel, employment usage, car parking	April 2014	Yes	

Planning Reference	Area	Development Details	Application accepted Date	AQA Undertaken	AQA Comments
Large Applications/those that could cause an impact with Decisions pending					
P1111/14/OUT	Land off Driffield road, Allaston Road and Court Road	100 Houses	Decision Pending	Yes	The AQA at this site was done for previous planning application of a much larger development (250 homes) which was refused permission. The results of the AQA showed that at this large-scale; the development would have a imperceptible to small impact on NO ₂ emissions. Therefore, after construction, the site is unlikely to have any real effect on Air Quality or the Lydney AQMA
P0969/14/OUT	Land North of Ross Road, Newent, Gloucestershire	85 Houses	Decision Pending	Yes	AQA found that area has poor air quality but is still within acceptable limits for living. Currently in contention with Council over this issue.

6 Air Quality Planning Policies

Core Strategy Policy 1¹⁸ (CSP.1)

Design, environmental protection and enhancement (strategic objective: providing quality environments)

The design and construction of new development must take into account important characteristics of the environment and conserve, preserve or otherwise respect them in a manner that maintains or enhances their contribution to the environment, including their wider context. New development should demonstrate an efficient use of resources. It should respect wider natural corridors and other natural areas, providing green infrastructure where necessary.

In achieving the above, the following will be considered regarding air quality:

- The potential for the development to cause pollution and any mitigation measures to avoid pollution or make environmental improvements where existing problems occur.
- Development that is not able to be satisfactorily accommodated in respect of the above will not be permitted.

In assessing the impact of a development the considerations listed in the policy will be taken into account along with any necessary mitigation or remediation. Where a satisfactory environment cannot be achieved, proposals will not be acceptable. They should prevent pollution.

¹⁸ Forest of Dean District Council Core Strategy – February 2012, pp. 38-41

7 Local Transport Plans and Strategies

The Gloucestershire Local Transport Plan 2011-2026¹⁹ (LTP3), was published in April 2011. The Plan addresses national transport priorities at the local level and have aligned these to four main themes, which are:-

- A greener, healthier Gloucestershire;
- Sustainable Economic Growth;
- A safer, securer transport system;
- Good access to services.

Issues such as noise and air quality will be mitigated where possible by engaging in the noise action planning process and air quality action planning. The LTP3 document includes a Health Impact Assessment (HIA), which indicates that programmes to encourage walking and cycling will have to be sustained in order to ensure that LTP3 policies and actions maintain a positive impact on health.

In reference to the Forest of Dean, the Gloucestershire Local Transport Plan 2011-2026¹³ promises to aid the creation of cycle links between the Forest market Towns as a method of reducing Air Quality Issues. It also aims to reduce traffic in the District by improving rail services from Lydney to Gloucester and also Cardiff. It also wants to discourage car-use by enforcing higher parking charges.

¹⁹ The Gloucestershire Local Transport Plan 2011-2026

8 Climate Change Strategies

The Forest of Dean District Council developed a carbon management plan in 2008 to reduce the amount of carbon emitted as a direct result of the Council's operations. Since 2010, the council has published an annual report on the direct emissions by the Forest of Dean District Council.

The Forest of Dean District Council also has a policy within their Core Strategy:

Core Policy Strategy CSP.2)²⁰ - Climate Change Adaptation (strategic objective: thriving sustainable communities)

Proposals for development will be required to demonstrate that their design and layout will reduce the impacts of climatic change as identified in national, regional and local predictions over the lifetime of the development concerned. The following should be addressed in an integrated way, demonstrating that one element benefits another:

- Water management
- Heating and cooling
- Biodiversity

²⁰ Forest of Dean District Council Core Strategy – February 2012, pp. 41-43

9 Conclusions and Proposed Actions

9.1 Conclusions from New Monitoring Data

There are two locations where the annual mean objective of 40µg/m³ for NO₂ was exceeded in 2013 - High Street (LYD01), and Hill Street (Triplicates - LYD06/13/14). These locations are all within the Lydney AQMA, which was declared in July 2010, however, the annual mean for these two sites were all lower than the 2012 results.

The annual levels of NO₂ at all other locations within the District in 2013 are generally comparable with levels from the previous four years, however there was a decrease at every site from the levels in 2012. Overall, there was a decrease of 13.7% between the 2013 and 2012 results.

Forest of Dean District Council has examined the concentrations from all monitoring locations. Concentrations of NO₂ outside of the Lydney AQMA are all below the objective at relevant locations; therefore, there is no need to proceed to a Detailed Assessment at this stage.

It is considered that no other pollutants are at levels which will exceed the air quality objectives.

9.2 Conclusions relating to New Local Developments

There are a number of planning developments that have been approved within the District at various stages in their development. Multiple of these developments have had Air Quality assessments undertaken but have been judged to have a negligible effect on Air Quality in their respective areas.

9.3 Proposed Actions

The Forest of Dean District Council will continue to closely monitor the districts NO₂ diffusion tube concentrations, and if deemed necessary, will undertake a Detailed Assessment for NO₂.

Lydney AQMA was declared in July 2010, and a Further Assessment was undertaken July 2011. An Action Plan for Lydney AQMA is currently being developed and the draft should be submitted by the end of 2014.

The Forest of Dean District Council has reviewed and updated certain monitoring locations by making them more representative of the impact of traffic in those areas. In 2015, an 'Air Quality Updating and Screening Assessment' will be undertaken which will review Air Quality results from the years 2012-2014 and take note of all potential sources that could have detrimental effect on Air Quality in the District.

10 Bibliography

Title	Author	Year
Part IV of the Environment Act (1995), link	Legislation.gov.uk	1995
Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007, link	DEFRA	2007
Local Air quality Management, 2009 Technical Guidance LAQM.TG(09) link	Forest of Dean District Council	2009
Air Quality (England) (Amendment) Regulations 2002 (SI3043), link	Legislation.gov.uk	2002
Progress Report 2013, PR2013	Forest of Dean District Council	2013
Updating and Screening Assessment 2012, USA2012	Forest of Dean District Council	2012
Progress Report 2011, PR2011	Forest of Dean District Council	2011
Progress Report 2010, PR2010	Forest of Dean District Council	2010
Updating & Screening Assessment 2009, USA2009	Forest of Dean District Council	2009
Detailed Assesment – Lydney Town Centre, DA2009	Forest of Dean District Council	2009
Lydney AQMA – Further assessment, FA2011	Forest of Dean District Council	2011
Diffusion Tubes for Ambient NO ₂ Monitoring: Practical Guidance for Laboratories & Users link	AEA for DEFRA	2008
Summary of Laboratory Performance in WASP NO ₂ Proficiency Testing Scheme for Rounds 117-124. link	DEFRA	2014
The Gloucestershire Local Transport Plan 2011-2026, link	Gloucestershire County Council	2011
A County-Wide Air Quality Strategy for Gloucestershire link	Air Quality Research Group Faculty of Applied Sciences University of the West of England, Bristol	2004
Forest of Dean District Council Core Strategy – February 2012, pp. 38-41 link	Forest of Dean District Council	2012

Appendices

Appendix A: QA/QC Data

Appendix B: List of Part A1 Permitted Processes

Appendix C: List of Part A2 Permitted Processes

Appendix D: List of Part B Permitted Processes

Appendix E: Diffusion tube locations

11 Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

Diffusion tube monitoring has inherent errors. In order to minimise these, a bias-adjustment factor is applied to the results. This factor is obtained by collocating three diffusion tubes at a continuous monitoring site. The average values from the monthly exposed tubes for a given year are then compared directly to the corresponding continuously monitored values.

Forest of Dean District Council does not undertake any co-location studies; so bias adjustment factors were obtained from the National Bias Adjustment Factor Spreadsheet (Version v06/14) by DEFRA.

- 2013 – 0.95 for 35 studies v.06/14
- 2012 – 0.97 for 34 studies v.07/13
Change in factor– 0.00 (v.09/12, total 41 studies)
- 2011 – 0.89 for 26 studies v.03/12
Change in factor: -0.07 (v.09/11, total 42 studies)
- 2010 – 0.85 for 4 studies v.03/11
Change in factor: 0.00 (v.09/10, total 7 studies)

Gradko International (diffusion tube supplier and analyst) is UKAS accredited; is assessed annually for compliance to ISO 17025 and participates in other proficiency schemes.

Gradko have confirmed that:

- their procedures have been amended to follow the guidance issued on behalf of Defra (AEA Energy & Environment, Feb 2008) relating to the preparation, extraction, analysis and calculation procedures for passive NO₂ diffusion tubes.
- that most of these procedures were in force before the guidance was introduced and any amendments necessary in achieving compliance were minimal.
- Gradko also participate in a number of QA/QC monitoring systems to demonstrate satisfactory performance such as:

- The Workplace Analysis Scheme for Proficiency (WASP) programme to ensure uniformity in data throughout the year. Only laboratories that are in the WASP scheme are used for analysing tubes from the National Nitrogen Dioxide Diffusion Tube Network.
- The monthly field inter-comparison exercise with other laboratories to enable assessment of bias and precision undertaken by AEA Energy & Environment.
- An external QC scheme to check solutions run by AEA Energy & Environment.

Table 7 - 2013 Bias correction factor for NO₂ diffusion tube data co-location studies (LAQM Review and Assessment support website) – version 06/14

Analysed By ¹	Method	Year ⁵	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m ³)	Automatic Monitor Mean Conc. (Cm) (µg/m ³)	Bias (B)	Tube Precision ⁶	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in water	2013	R	Cheshire West and Chester	12	39	41	-4.40%	G	1.05
Gradko	20% TEA in Water	2013	R	Dudley MBC	12	38	31	23.10%	G	0.81
Gradko	20% TEA in Water	2013	UB	Dudley MBC	10	25	25	-1.70%	G	1.02
Gradko	20% TEA in Water	2013	R	Dudley MBC	11	41	39	5.40%	G	0.95
Gradko	20% TEA in water	2013	R	East Herts Council	10	35	30	19.40%	G	0.84
Gradko	20% TEA in water	2013	R	Fareham Borough Council	9	34	34	2.00%	G	0.98
Gradko	20% TEA in water	2013	R	Fareham Borough Council	12	42	45	-6.20%	G	1.07
Gradko	20% TEA in water	2013	R	Gateshead Council	11	34	37	-8.70%	G	1.1
Gradko	20% TEA in water	2013	R	Gateshead Council	11	35	33	6.30%	G	0.94
Gradko	20% TEA in water	2013	R	Gateshead Council	10	33	32	2.10%	G	0.98
Gradko	20% TEA in water	2013	R	Borough Council of King's Lynn & West Norfolk	12	29	26	12.50%	G	0.89
Gradko	20% TEA in water	2013	R	Gedling Borough Council	10	37	35	7.20%	G	0.93
Gradko	20% TEA in water	2013	R	The Highland Council	12	24	21	14.10%	G	0.88
Gradko	20% TEA in Water	2013	R	Dudley MBC	12	52	59	-12.00%	P	1.14
Gradko	20% TEA in water	2013	R	NOTTINGHAM CITY COUNCIL	12	43	44	-2.20%	G	1.02
Gradko	20% TEA in water	2013	R	NOTTINGHAM CITY COUNCIL	10	41	39	6.40%	G	0.94
Gradko	20% TEA in water	2013	R	NOTTINGHAM CITY COUNCIL	11	43	42	1.90%	G	0.98
Gradko	20% TEA in water	2013	R	Brighton & Hove City Council	11	62	60	1.90%	G	0.98
Gradko	20% TEA in water	2013	R	Brighton & Hove City Council	11	41	30	37.50%	G	0.73
Gradko	20% TEA in water	2013	KS	Marylebone Road Intercomparison	12	101	81	25.80%	G	0.8
Gradko	20% TEA in Water	2013	R	Brighton & Hove City Council	9	54	45	19.60%	G	0.84
Gradko	20% TEA in water	2013	R	Wiltshire Council	12	40	36	10.10%	G	0.91
Gradko	20% TEA in water	2013	R	Wiltshire Council	11	41	37	11.60%	G	0.9
Gradko	20% TEA in water	2013	R	Wiltshire Council	12	39	49	-20.00%	G	1.25
Gradko	20% TEA in water	2013	R	Breckland Council	12	32	33	-3.30%	G	1.03
Gradko	20% TEA in water	2013	R	City of Lincoln Council	12	43	43	0.50%	G	0.99
Gradko	20% TEA in water	2013	R	Monmouthshire County Council	12	41	34	19.00%	G	0.84
Gradko	20% TEA in water	2013	R	Lancaster City Council	12	44	40	9.90%	G	0.91
Gradko	20% TEA in water	2013	R	Lancaster City Council	12	36	34	6.10%	G	0.94
Gradko	20% TEA in water	2013	UB	Luton Borough Council	12	36	33	7.10%	G	0.93
Gradko	20% TEA in water	2013	R	Pendle	12	35	38	-8.70%	P	1.1
Gradko	20% TEA in water	2013	R	North Ayrshire Council	12	32	32	-0.10%	G	1
Gradko	20% TEA in water	2013	KS	New Forest DC	11	46	40	13.40%	G	0.88
Gradko	20% TEA in water	2013	R	New Forest District Council	11	34	28	19.40%	G	0.84
Gradko	20% TEA in water	2013	UB	southampton city council	12	30	30	-0.50%	G	1
Gradko	20% TEA in water	2013		Overall Factor³ (35 studies)					Use	0.95

Table 8 - 2012 bias correction factor for NO₂ diffusion tube data co-location studies (LAQM Review and Assessment support website) - version 07/13

Analysed By	Method <small>To undo your selection, choose (All) from the pop-up list</small>	Year <small>To undo your selection, choose (All)</small>	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m ³)	Automatic Monitor Mean Conc. (Cm) (µg/m ³)	Bias (B)	Tube Precision ^a	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in w ater	2012	R	Wiltshire Council	11	38	40	-4.0%	G	1.04
Gradko	20% TEA in Water	2012	UB	Dudley MBC	11	39	33	16.0%	G	0.86
Gradko	20% TEA in Water	2012	UB	Dudley MBC	10	27	26	3.1%	G	0.97
Gradko	20% TEA in Water	2012	R	Dudley MBC	11	43	42	2.0%	G	0.98
Gradko	20% TEA in w ater	2012	R	Monmouthshire County Council	9	47	42	12.7%	G	0.89
Gradko	20% TEA in w ater	2012	R	Cheshire West & Chester	11	40	45	-10.1%	G	1.11
Gradko	20% TEA in Water	2012	UB	East Herts Council	11	21	12	71.9%	G	0.58
Gradko	20% TEA in Water	2012	R	Gateshead Council	11	34	34	-1.4%	G	1.01
Gradko	20% TEA in Water	2012	R	Gateshead Council	11	36	37	-3.2%	G	1.03
Gradko	20% TEA in Water	2012	R	Gateshead Council	11	32	33	-2.6%	G	1.03
Gradko	20% TEA in Water	2012	R	Dudley MBC	9	55	60	-7.5%	G	1.08
Gradko	20% TEA in Water	2012	UB	Luton Borough Council	11	38	30	29.4%	G	0.77
gradko	20% TEA in w ater	2012	UC	Southampton City Council	11	30	33	-8.3%	G	1.09
Gradko	20% TEA in w ater	2012	R	Exeter City Council	11	34	34	-0.3%	G	1.00
Gradko	20% TEA in w ater	2012	R	Scarborough B C	11	32	37	-11.3%	G	1.13
Gradko	20% TEA in Water	2012	KS	Marylebone Road Intercomparison	11	106	94	12.1%	G	0.89
Gradko	20% TEA in w ater	2012	KS	New Forest DC	10	46	40	13.4%	G	0.88
Gradko	20% TEA in w ater	2012	R	New Forest DC	10	33	29	11.8%	G	0.89
Gradko	20% TEA in w ater	2012	R	Brighton & Hove City Council	11	41	37	10.5%	G	0.91
Gradko	20% TEA in w ater	2012	R	City of Lincoln Council	11	53	44	18.4%	G	0.84
Gradko	20% TEA in w ater	2012	R	Fareham Borough Council	9	38	39	-4.1%	G	1.04
Gradko	20% TEA in w ater	2012	R	NOTTINGHAM CITY COUNCIL	10	44	44	-0.2%	G	1.00
Gradko	20% TEA in w ater	2012	R	NOTTINGHAM CITY COUNCIL	11	43	41	4.9%	G	0.95
Gradko	20% TEA in w ater	2012	R	NOTTINGHAM CITY COUNCIL	10	46	47	-0.3%	G	1.00
Gradko	20% TEA in w ater	2012	R	The Highland Council	9	24	32	-24.1%	G	1.32
Gradko	20% TEA in w ater	2012	R	Wiltshire Council	10	36	35	3.9%	G	0.96
Gradko	20% TEA in Water	2012	UB	LB Waltham Forest	11	33	38	-11.8%	S	1.13
Gradko	20% TEA in w ater	2012	R	Pendle	10	39	32	20.6%	G	0.83
Gradko	20% TEA in w ater	2012	R	Lancaster City Council	10	46	42	11.3%	G	0.90
Gradko	20% TEA in w ater	2012	R	Lancaster City Council	11	37	36	2.1%	G	0.98
Gradko	20% TEA in w ater	2012	R	Wokingham Borough Council	9	32	34	-7.4%	G	1.08
Gradko	20% TEA in w ater	2012	R	London Borough of Ealing	10	55	54	1.8%	P	0.98
Gradko	20% TEA in w ater	2012	R	London Borough of Ealing	10	83	84	-0.3%	P	1.00
Gradko	20% TEA in w ater	2012	UB	London Borough of Ealing	9	32	36	-10.8%	G	1.12
Gradko	20% TEA in w ater	2012		Overall Factor^a (34 studies)				Use	0.97	

Table 9 - 2011 Bias correction factor for NO₂ diffusion tube data co-location studies (LAQM Review and Assessment support website) - version 03/12

Analysed By	Method <small>To undo your selection, choose (All) from the pop-up list</small>	Year <small>To undo your selection, choose (All)</small>	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m ³)	Automatic Monitor Mean Conc. (Cm) (µg/m ³)	Bias (B)	Tube Precision ^a	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in w ater	2011	R	Scarborough Borough Council	12	35	37	-4.7%	G	1.05
Gradko	20% TEA in Water	2011	R	Dudley MBC	12	35	28	23.3%	G	0.81
Gradko	20% TEA in Water	2011	UB	Dudley MBC	12	28	25	10.0%	G	0.91
Gradko	20% TEA in Water	2011	R	Dudley MBC	11	45	40	11.8%	G	0.89
Gradko	20% TEA in w ater	2011	K	South Lakeland District Council	10	41	38	8.3%	G	0.92
Gradko	20% TEA in w ater	2011	R	Gedling Borough Council	11	43	35	24.5%	G	0.80
Gradko	20% TEA in w ater	2011	R	Gateshead	12	39	37	4.9%	P	0.95
Gradko	20% TEA in w ater	2011	R	Gateshead	12	37	36	1.8%	G	0.98
Gradko	20% TEA in w ater	2011	R	Gateshead	10	33	31	5.1%	G	0.95
Gradko	20% TEA in w ater	2011	R	Gosport Borough Council	10	28	25	11.1%	G	0.90
Gradko	20% TEA in w ater	2011	UC	Southampton City Council	12	31	35	-10.8%	G	1.12
Gradko	20% TEA in Water	2011	R	Dudley MBC	9	50	51	-1.5%	G	1.02
Gradko	20% TEA in w ater	2011	K	Marylebone Road Intercomparison	12	111	100	11.4%	G	0.90
Gradko	20% TEA in w ater	2011	R	Boston Borough Council	11	57	36	59.6%	P	0.63
Gradko	20% TEA in w ater	2011	UB	Luton Borough Council	11	39	35	11.1%	G	0.90
Gradko	20% TEA in w ater	2011	R	Exeter City Council	11	37	33	15.1%	S	0.87
Gradko	20% TEA in w ater	2011	UB	Belfast City Council	12	36	29	23.5%	G	0.81
Gradko	20% TEA in w ater	2011	R	Bromsgrove District Council (Worce	10	56	53	6.0%	G	0.94
Gradko	20% TEA in w ater	2011	R	Monmouthshire County Council	11	47	40	17.9%	S	0.85
Gradko	20% TEA in w ater	2011	K	New Forest District Council	10	49	42	16.7%	G	0.86
Gradko	20% TEA in w ater	2011	R	New Forest District Council	12	34	26	29.9%	G	0.77
Gradko	20% TEA in w ater	2011	R	Fareham Borough Council	12	39	33	17.4%	G	0.85
Gradko	20% TEA in w ater	2011	R	Rushcliffe BC	11	35	39	-9.5%	G	1.10
Gradko	20% TEA in Water	2011	R	Carlisle City Council	12	35	28	24.8%	G	0.80
Gradko	20% TEA in Water	2011	O	North Warwickshire Borough Council	12	48	39	23.0%	G	0.81
Gradko	20% TEA in w ater	2011	R	Wokingham Borough Council	11	41	38	8.6%	G	0.92
Gradko	20% TEA in w ater	2011		Overall Factor^a (26 studies)				Use	0.89	

Table 10 - 2010 Bias correction factor for NO₂ diffusion tube data co-location studies (LAQM Review and Assessment support website) - version 03/11

Analysed By ¹	Method <small>To undo your selection, choose (All) from the pop-up list</small>	Year ⁵ <small>To undo your selection, choose (All)</small>	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m ³)	Automatic Monitor Mean Conc. (Cm) (µg/m ³)	Bias (B)	Tube Precision ⁶	Bias Adjustment Factor (A) (Cm/Dm)
Bristol Scientific Services	20% TEA in Water	2010	R	Wiltshire Council	12	40	35	16.5%	G	0.86
Bristol Scientific Services	20% TEA in Water	2010	R	Wiltshire Council	9	50	40	24.9%	G	0.80
Bristol Scientific Services	20% TEA in Water	2010	R	Wiltshire Council	9	48	42	15.1%	G	0.87
Bristol Scientific Services	20% TEA in Water	2010	R	Wiltshire Council	11	45	36	25.7%	G	0.80
Bristol Scientific Services	20% TEA in Water	2010	B	LB Waltham Forest	12	40	38	6.7%	S	0.94
Bristol Scientific Services	20% TEA in Water	2010	K	Marylebone Road Intercomparison	12	119	93	27.2%	G	0.79
Bristol Scientific Services	20% TEA in Water	2010	R	South Gloucestershire	11	34	31	9.1%	G	0.92
Bristol Scientific Services	20% TEA in Water	2010		Overall Factor ⁷ (7 studies)					Use	0.85

QA/QC of Diffusion Tube Monitoring

As part of their provision of support to Local Authorities for air quality management, Defra and the Devolved Administrations provide a set of centralised QA/QC services, to assist Local Authorities using diffusive samplers for monitoring of ambient nitrogen dioxide (NO₂) concentration, as part of their Local Air Quality Management process.

This is aimed at the analytical laboratories that supply and analyse the diffusion tubes, and currently comprises:

- Promotion of the independent Workplace Analysis Scheme for Proficiency (WASP, operated by the Health and Safety Laboratory, with yearly assessment against agreed performance criteria.
- Operation of a field inter-comparison exercise, in which diffusion tubes are co-located with an automatic analyser: from January 2006 this is at a roadside site.
- Provision of quality control standard solutions, free of charge to laboratories that prepare and analyse NO₂ diffusion tubes used by Local Authorities for LAQM purposes.

Summary of Laboratory Performance in WASP NO₂ Proficiency Testing Scheme for Rounds 117-124.

The Workplace Analysis Scheme for Proficiency (WASP) is an independent analytical proficiency-testing (PT) scheme, operated by the Health and Safety Laboratory (HSL). WASP offers a number of test samples designed to test the proficiency of laboratories undertaking analysis of chemical pollutants in

workplace and ambient air. One such sample is the WASP NO₂ test sample type that is distributed to participants in a quarterly basis.

WASP NO₂ PT forms an integral part of the UK NO₂ Network's QA/QC, and is a useful tool in assessing the analytical performance of laboratories supplying diffusion tubes to Local Authorities for use in the context of Local Air Quality Management (LAQM). With consent from the participating laboratories, HSL provides summary proficiency testing data to the LAQM Helpdesk for hosting on the web-pages at <http://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html>

The WASP scheme is operated independently by HSL. The cost of operating the WASP is borne by the laboratories, which pay an annual fee to HSL. Defra and the Devolved Administrations advise that diffusion tubes used for Local Air Quality Management should be obtained from laboratories that have demonstrated satisfactory performance in the WASP scheme.

For this reason, although WASP remains an independent proficiency-testing scheme, laboratory performance in WASP is also assessed by NPL in conjunction with separate data from the Field Intercomparison Exercise carried out at Marylebone Road, central London. The information is used to help the laboratories to identify if they have problems and may assist devising measures to improve their performance. This forms part of work for Defra and the Devolved Administrations under the Local Air Quality Management Services Contract. This information will be updated on a quarterly basis following completion of each WASP PT round. The posting of reports to schedule is dependent on the laboratories sending their results promptly to HSL.

WASP NO₂ PT scheme overview

Purpose of scheme

The WASP performance testing scheme uses artificially spiked Palmes type diffusion tubes to test each participating laboratory's analytical performance on a quarterly basis. Such tubes are not designed to test other parts of the measurement system e.g. sampling. Every quarter, roughly January, April, July and October each year, each laboratory receives four diffusion tubes doped with an amount of nitrite, known to HSL, but not the participants. At least two of the tubes are usually duplicates, which enables precision, as well as accuracy,

to be assessed. The masses of nitrite on the spiked tubes are different each quarter, and reflect the typical analytical range encountered in actual NO₂ ambient monitoring in the UK when using such diffusion tubes.

Preparation of test samples

Diffusion tubes are spiked using a working nitrite solution prepared from a stock solution. The concentration of this stock solution is initially assayed using a titrimetric procedure. All steps in the subsequent test sample production process, involving gravimetric and volumetric considerations, are undertaken using calibrated instruments employing traceable standards. As an additional cross check, 12 spiked Palmes tubes are picked at random from each spike loading level and submitted to a third party laboratory which is accredited to ISO 17025 to undertake this analysis using an ion chromatographic procedure.

In summary, the tube spiking precision is calculated to be better than 0.5 %, expressed as a standard deviation, and this is derived from repeat gravimetric checking of the pipette device used to spike the test samples. The calculated spike values, derived from titrimetric, gravimetric and volumetric considerations, are found to be typically within ± 3 % of results obtained by the third party laboratory using an ion chromatographic analytical procedure.

Scheme operation

The participants analyse the test samples and report the results to HSL. HSL assign a performance score to each laboratory's result, based on how far their results deviate from the reference values for each test samples. The reference values are best estimates of the levels of nitrite doped onto the test sample tubes. At the completion of the round, laboratories receive a report detailing how they have performed and how their results relate to those of their peers.

Performance scoring

Changes to Scoring System as reported on the LAQM website.

The z-score system is used by HSL to assess the performance of laboratories participating in the WASP NO₂ scheme. Information on the interpretation of the z score is provided below.

It was proposed however that HSL would migrate to an alternative scoring scheme, which is commonly used elsewhere in their WASP scheme for other PT services. In anticipation of this proposed migration, laboratory summary performance, previously reported on the LAQM website, has been based upon this WASP scoring system.

HSL has decided, upon review, to maintain the z-score system, primarily due to the fact that it is a more readily understandable scoring system when viewed by a wider audience. Hence, going forward, laboratory summary performance, to be reported on the LAQM website, will be based upon this z-score system.

Key changes to the scoring system include:

- All monthly performance scores are reported and the previous WASP scoring system, which allowed the lowest performing round result (best 4 out of 5) to be dropped, is no longer used.
- The use of the z-score allows new entrants or those leaving the WASP scheme to be assessed as the score is not based on a rolling performance indicator.
- All results from UK laboratories participating in the WASP scheme are now reported (previously laboratories that did not demonstrate satisfactory performance were not included).

Assessing the performance of a laboratory

End users that avail of analytical services from laboratories should satisfy themselves that such laboratories meet their requirements. A number of factors ideally need to be considered including:-

- Expertise and skills of staff within the laboratory?
- Does the laboratory follow accepted measurement standards, guidance?
- Does the laboratory operate a robust internal quality control system?
- Is the laboratory third party accredited to relevant standards such as ISO 17025?
- Does the laboratory successfully participation in relevant external proficiency testing schemes?

- How good is their customer care (communication, turnaround times, pricing etc)?

Participation therefore in an external proficiency-testing scheme such as WASP represents but one factor in such considerations.

Participation in a single round of an external proficiency-testing scheme represents but a “snap-shot” in time of the analytical quality that a laboratory can produce. It is more intuitive therefore to consider performance over a number of rounds.

Following on from above, therefore over a rolling five round WASP window, one would expect that 95% of laboratory results should be $\geq \pm 2$. If this percentage is substantially lower than 95 % for a particular laboratory, within this five round window, then one can conclude that the laboratory in question may have significant systematic sources of bias in their assay.

A summary of the WASP performance for each laboratory participating in the scheme is provided in Table 1. This table provides the percentage of results where the z-score was between -2 and +2 which is deemed to be a satisfactory z-score.

Table 11 - Laboratories that have demonstrated satisfactory performance in the WASP scheme for analysis of NO₂ diffusion tubes, April 2012 – March 2014.

WASP Round	WASP R117	WASP R118	WASP R119	WASP R120	WASP R121	WASP R122	WASP R123	WASP R124
Round conducted in the period	April – June 2012	July – September 2012	October – December 2012	January – March 2013	April – June 2013	July – September 2013	October – December 2013	January – March 2014
Aberdeen Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	NR [2]	75 %
Cardiff Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Edinburgh Scientific Services	100 %	100 %	100 %	100 %	100 %	75 %	100 %	100 %
Environmental Services Group, Didcot [1]	100 %	100 %	100 %	100 %	100 %	100 %	100 %	
Exova (formerly Clyde Analytical)	0 %	100 %	25 %	75 %	NR [2]	NR [2]	NR [2]	50 %
Glasgow Scientific Services	50 %	100 %	100 %	50 %	25 %	100 %	100 %	100 %
Gradko International [1]	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Kent Scientific Services	100 %	75 %	100 %	50 %	75 %	100 %	100 %	100 %
Kirklees MBC	100 %	75 %	100 %	100 %	100 %	100 %	100 %	100 %
Lambeth Scientific Services	100 %	0 %	100 %	100 %	0 %	50 %	75 %	25 %
Milton Keynes Council	100 %	75 %	100 %	50 %	100 %	75 %	75 %	75 %
Northampton Borough Council	100 %	100 %	100 %	0 %	100 %	100 %	100 %	100 %
Somerset Scientific Services	100 %	100 %	100 %	100 %	100 %	75 %	100 %	100 %
South Yorkshire Air Quality Samplers	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Staffordshire County Council	100 %	75 %	100 %	50 %	100 %	100 %	100 %	100 %
Tayside Scientific Services (formerly Dundee CC)	100 %	100 %	100 %	75 %	100 %	100 %	100 %	100 %
West Yorkshire Analytical Services	75 %	50 %	100 %	100 %	100 %	50 %	100 %	75 %

[1] Participant subscribes to two sets of test samples (2 x 4 test samples) in each WASP PT round.

[2] NR Not reported

12 Appendix B: List of Part A1 Permitted Processes

Environmental Agency permitted installations involving Part A1 prescribed activities regulated under Environmental Permitting (England & Wales) Regulations 2010

Table 12 - List of Part A1 Permitted Processes

Permit	Company Name/Address	Description
XP3039GG	BASF Metals and Recycling Ltd Valley Road Cinderford Gloucestershire GL14 2PB	S4.2(A)(1)(b) Unless falling within another Section of this Schedule, any manufacturing activity which is likely to result in the release into the air of any hydrogen halide (other than the manufacture of glass or the coating, plating or surface treatment of metal) or which is likely to result in the release into the air or water of any halogen or any of the compounds mentioned in paragraph (a)(vi) (other than the treatment of water). S2.2A(1)(e) Recovering any of the following elements if the activity may result in their release into the air: gallium; indium; palladium; tellurium; thallium and S5.1(A)(1)(e) Unless carried out as part of any other activity in this Part, the incineration of non-hazardous waste in a plant which is not an incineration plant or a co-incineration plant but which has a capacity of 1 tonne or more per hour.
ZP3036LK	Cargill PLC Town Farm Gloucester Road Newent Gloucestershire GL18 1HP	S6.8 A (1) (b) Slaughtering animals at plant with a carcass production capacity of more than 50 tonnes per day and S5.3 A(1) (c) (ii) Disposal of non-hazardous waste in a facility with a capacity of more than 50 tonnes per day by - physico-chemical treatment, not being treatment specified in any paragraph other than paragraph D9 in Annex IIA to Council Directive 75/442/EEC, which results in final compounds or mixtures which are discarded by means of any of the operations numbered D1 to D12 in that Annex (for example, evaporation, drying, calcination, etc) (D9).
BV1305IV	Surotech International Ltd Hafner House 11 Newent Business Park Gloucester Road Newent Gloucestershire GL18 1DZ	S4.1 A(1) (a) (iii) Producing organic chemicals such as organic compounds containing sulphur, such as sulphides, mercaptans, sulphonic acids, sulphonates, sulphates and sulphones and sulphur heterocyclics and (viii) plastic material, such as polymers, synthetic fibres and cellulose based fibres. S4.2 A(1) (a) (iv) Producing inorganic chemicals such as (iv) salts, such as ammonia chloride, potassium chlorate, potassium carbonate, sodium carbonate, perborate, silver nitrate, cupric acetate, ammonia phosphomolybdate and (c) Unless falling within any other Section of the Schedule any manufacturing activity involving the use of hydrogen cyanide or hydrogen sulphide.
BP3236LC	Glatfelter Lydney Ltd, Lydney Paper Mill, Church Road, Lydney, Gloucestershire GL15 5EJ	6.1 A(1) (a) Producing industrial plant pulp from timber or other fibrous materials and S6.1 A(1)(b) producing industrial plant paper and board where the plant has a production capacity of more than 20 tonnes per day.

Permit	Company Name/Address	Description
AP3731SA	Pressroom Products Limited Crucible Close Mushet Industrial Park Coleford Gloucestershire GL16 8RE	Section 5.4 Part A(1)(a) Recovery of waste; by distillation of oil/organic solvent.
BK9326IX	Suntory Beverage & Food Ltd Royal Forest Factory Coleford Gloucestershire GL16 8JB	Section 6.8 A(1)(d)(ii) – Treating and processing materials intended for the production of food products from vegetable raw materials at plant with a finished production capacity of more than 300 tonnes per day. Section 5.3 A(1)(c)(ii) - Disposal of non-hazardous waste in a facility with a capacity of more than 50 tonnes per day by - physico-chemical treatment, not being treatment specified in any paragraph other than paragraph D9 in Annex IIA to Council Directive 75/442/EEC, which results in final compounds or mixtures which are discarded by means of any of the operations numbered D1 to D12 in that Annex (for example, evaporation, drying, calcination, etc.) (D9).

Table 13 - List of Poultry Farms

Premises	Type of Farm	No. of Birds	Type of ventilation
Ploddy House Poultry Unit, Newent	Turkey broilers	52,000	Side vents
Cherry Rock Poultry Unit, Hartpury	Chicken broilers	270,000	Side vents
Woolaston Court Poultry Unit, Woolaston	Layers	80,000	Roof vents
Cottrells Barn Poultry Unit, Mitcheldean	Pullets	64,000	Half roof & half side vents
Treetops Poultry Unit, Bream	Chicken broilers	318,000	Side vents
St Briavels & Severn View, St Briavels	Pullets	210,000	Side vents Side vents
Roads Farm, St Briavels variation currently in (not yet issued) for 220,000 pullets	Pullets	220,000	Roof vents
Hill Farm, Lydney	Chicken broilers	110,000	Side vents
Stone End Farm, Churcham	Chicken broilers	900,000	Side vents
Stone House Farm, Kempsey. Chicken broilers, 100,000,	Chicken broilers	100,000	Side vents & gable end fans.

13 Appendix C: List of Part A2 Permitted Processes

Local Authority Integrated Pollution Prevention and Control (LAIPPC) permitted installations involving Part A2 prescribed activities regulated under the Environmental Permitting (England & Wales) Regulations 2010.

Table 14 - List of Part A2 Permitted Processes

Permit	Company Name/Address	Description
PPC A2/3	Broadmoor Brickworks Whimsey Industrial Estate Steam Mills Cinderford	Manufacture of Heavy Clay Goods (Bricks)
PPC A2/4	Coleford Brick & Tile, Hawkwell Works Cinderford	Manufacture of Heavy Clay Goods (Bricks)
PPC(A2)19/92	JD Norman Lydney Ltd, Tutnalls, Lydney	Ferrous Metal Foundry

14 Appendix D: List of Part B Permitted Processes

Local Authority Pollution Prevention and Control (LAPPC) permitted installations involving Part B prescribed activities regulated under the Environmental Permitting (England & Wales) Regulations 2010.

Table 15 - List of Part B Permitted Processes

Permit	Company Name/Address	Description
PPC/5/01	Severn Valley Woodworks, Northwood Green, Westbury	Timber and Wood Based Products
PPC/10/92	Forest Auto Salvage, Valley Road, Cinderford	Waste Oil Burner
PPC/14/92	Lafarge Tarmac (Stowfield), Stowfield Quarry, Scowles Pitch, Coleford	Quarry Processes/Roadstone Coating
PPC/16/93	Breeden Aggregates Ltd Clearwell Quarries, Stowe, St. Briavels , Lydney,	Stone Crushing
PPC/20/92	(1) Bitchem Ltd., Birchwood Close, Forest Vale Industrial Estate, Cinderford	Roadstone Coating & Bitumen/Tar Processes
PPC/62/07	Cannop Foundry, Crabtree Rd, Cinderford	Ferrous & Non Ferrous Metal Foundry
PPC/25/92	P & J Loveridge, 157 High Street, Cinderford	Waste Oil Burner
PPC/32/92	Berwin Industrial Polymers, Church Road, Lydney	Rubber Processes
PPC/38/95	Rothdean Haulage, Station Street, Cinderford	Respraying of Road Vehicles
PPC/39/95	Newspace Containers Ltd., Unit 30, Lydney Industrial Estate, Lydney	Rubber Processes
PPC/40/95	Hanson Formpave Ltd., Tufthorn Avenue, Coleford	Bulk use of Cement
PPC/42/95	Hanson Aggregates, Drybrook Quarry, Drybrook	Quarry Processes
PPC/43/95	(2) Bitchem Ltd., Birchwood Close, Forest Vale Industrial Estate, Cinderford	Roadstone Coating & Bitumen/Tar Processes
PPC/48/96	Crematoria Management Ltd., Yew Tree Brake, Cinderford	Cremation of human remains
PPC/50/98	Rackham Housefloors Ltd., Forest Vale I.E. Cinderford	Bulk Use of Cement

Permit	Company Name/Address	Description
PPC/54/02	Breeden Aggregates Ltd Clearwell Concrete Plant, Clearwell Quarries, Stowe, St. Briavels, Lydney	Bulk Use of Cement
PPC/55/03	Milbury Precast, Lydney Industrial Estate, Harbour Road, Lydney	Bulk Use of Cement
PPC/57/03	Paul Jones Motors, Spout Garage, Bank Street, Coleford	Waste Oil Burner
PPC/58/04	Dean Mowers Ltd., Central Garage, Blakeney	Waste Oil Burner
PPC/DC/1/06	Cavendish Dry Cleaners, 4 Cavendish Buildings, Hill St, Lydney	Dry Cleaning
PPC/31/93	Nobel Foods Ltd., Clearwell Mill, Clearwell	Vegetable Feed
PPC/63/07	Mitcheldean MOT Centre, Mitcheldean,	Waste Oil Burner
PPG/66/11	FAB Recycling Ltd, Broadmoor Road, Cinderford,	Waste Oil Burner
PPC/67/11	Beeches Garage, Edge End Road, Mile End, Coleford,	Waste Oil Burner
PPC/70/14	Severn Valley Woodworks, Units 1-3, Ward Industrial Estate, Station Road, Lydney	Timber Products
PPC/69/12	Coleford Concrete Plant, Stowfield Quarry, Scowles Pitch, Coleford	Cement

Table 16 - List of Petrol Stations

Permit	Company Name/Address	Description
PPC/PVR/6/98	Newent Self-Serve, Gloucester Road, Newent	Petrol Vapour Recovery
PPC/PVR/7/98	Cross Hands Garage, Corse, Hartpury	Petrol Vapour Recovery
PPC/PVR/8/98	Abbotswood Garage, Lower High Street, Cinderford	Petrol Vapour Recovery
PPC/PVR/9/98	Elton Service Station, Elton Corner, Westbury-on-Severn	Petrol Vapour Recovery
PPC/PVR/10/98	General Garage, Ross Road, Huntley	Petrol Vapour Recovery
PPC/PVR/11/99	Highleadon Filling Station, Newent	Petrol Vapour Recovery
PPC/PVR/12/99	Motor house Service Station, Old Station Way, Coleford	Petrol Vapour Recovery
PPC/PVR/14/00	Steam Mills Garage, Steam Mills, Cinderford	Petrol Vapour Recovery
PPC/PVR/15/00	Tesco Filling Station, High Street, Lydney	Petrol Vapour Recovery
PPC/PVR/16/02	Mitcheldean Garage, New Road, Mitcheldean	Petrol Vapour Recovery
PPC/PVR/17/02	Chaxhill Service Station, Chaxhill, Westbury-on-Severn	Petrol Vapour Recovery
PPC/PVR/18/04	Cinderford MOT & Service Centre, Cinderford	Petrol Vapour Recovery
PPC/PVR/1/98	Thompson & Thompson, Cross Hands Garage, Lydney	Petrol Vapour Recovery
PPC/PVR/2/98	Lower Lane Superstop, Berry Hill, Coleford	Petrol Vapour Recovery
PPC/PVR/4/98	Alvington Service Station, Gloucester Road, Alvington	Petrol Vapour Recovery
PPC/PVR/5/98	Brierley Service Station, Brierley, Drybrook	Petrol Vapour Recovery

15 Appendix E: Diffusion tube locations

Table 17 - Change of diffusion tube locations from 2011-2013 (no changes in 2013)

Ref	Diffusion Tube Location	2011	2012	2013	Comments
CIN01	Cinderford – St Whites Terrace	✓	✓	✓	
CIN02	Cinderford – Berisford Court	✓	✓	✓	
CIN03	Cinderford – Bottom High St	✓	✓	✓	
COL01	Coleford – Gloucester Road	✓	✓	✓	
COL02	Coleford – Market Place (NEW)	-	✓	✓	Added Jan 2012 to assess locality further
COL03	Coleford – Old Vicarage Court (NEW)	-	✓	✓	Added Jan 2012 to assess locality further
HUN02	Huntley - The Red Lion junction	✓	✓	✓	
LYD01	Lydney – Top High St	✓	✓	✓	
LYD02	Lydney – Newerne Street	✓	✓	✓	
LYD03	Lydney – Mid High St	✓	✓	✓	
LYD04	Lydney – Bottom High St	✓	✓	✓	
LYD05	Lydney - Regents Arcade	✓	✓	✓	
LYD06	Lydney – Bream Junction (Triplicate 1of3)	✓	✓	✓	
LYD08	Lydney – Mid Bream Road	✓	✓	✓	
LYD09	Lydney – Top Bream Road	✓	✓	✓	
LYD10	Lydney – Old Chip Shop, Forest Road	✓	✓	✓	
LYD11	Lydney – Forest Road	✓	✓	✓	
LYD12	Lydney –Newerne Street	✓	✓	✓	
LYD13	Lydney – Bream Junction (Triplicate 2of3)	✓	✓	✓	
LYD14	Lydney – Bream Junction (Triplicate 3of3)	✓	✓	✓	
LYD15	Lydney – Highfield Lane (NEW)	-	✓	✓	Added Jan 2012 - monitor background levels
MIT01	Mitcheldean –The Merrin	✓	✓	✓	
NAI01	Nailbridge - Crossroads	✓	✓	✓	
NEW01	Newent – opposite Clifton House, High St	✓	✓	✓	
NEW02	Newent – Church Street	✓	✓	✓	
NOS02	Newnham-on-Severn - High St	✓	✓	✓	
NOS03	Newnham-on-Severn - High St	✓	✓	✓	
NOS04	Newnham-on-Severn - High St	✓	✓	✓	
NOS05	Newnham-on-Severn - High St	✓	✓	✓	
WOS01	Westbury-on-Severn - High St - bus stop	✓	✓	✓	

CIN01 - St Whites Terrace, Cinderford



Site	Annual mean concentrations ($\mu\text{g}/\text{m}^3$) Bias Adjusted			
	2010	2011	2012	2013
CIN01	27.8	22.8	25.1	23.5

CIN02 - Berisford Court, Cinderford



Site	Annual mean concentrations ($\mu\text{g}/\text{m}^3$) Bias Adjusted			
	2010	2011	2012	2013
CIN02	24.4	22.5	26.0	23.8

CIN03 - Bottom High Street, Cinderford



Site	Annual mean concentrations ($\mu\text{g}/\text{m}^3$) Bias Adjusted			
	2010	2011	2012	2013
CIN03	26.5	21.7	25.0	23.5

COL01 - Gloucester Road, Coleford, COL02 – Market Place, Coleford



Site	Annual mean concentrations ($\mu\text{g}/\text{m}^3$) Bias Adjusted			
	2010	2011	2012	2013
COL01	36.5	35.4	37.8	34
COL02	-	-	25.8	23.6

COL03 – Old Vicarage Court, Coleford



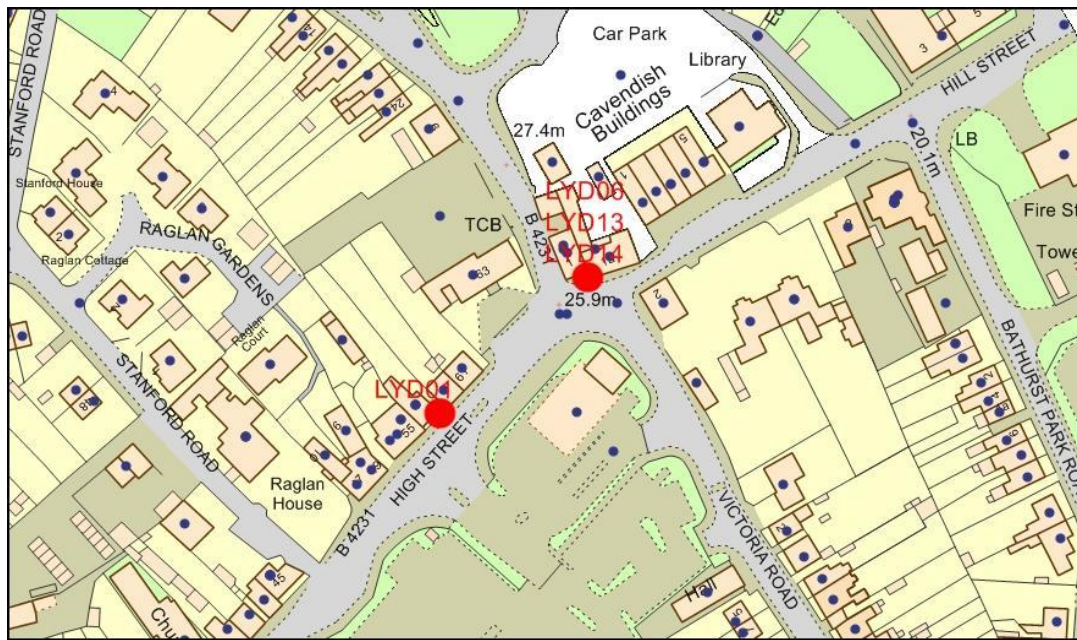
Site	Annual mean concentrations ($\mu\text{g}/\text{m}^3$) Bias Adjusted			
	2010	2011	2012	2013
COL03	-	-	29.0	24.0

HUN02 - A40 Red Lion Junction, Huntley



Site	Annual mean concentrations ($\mu\text{g}/\text{m}^3$) Bias Adjusted			
	2010	2011	2012	2013
HUN02	-	24.1	23.2	22.1

LYD01 – Top Hill Street, Lydney, LYD06/13/14 – Bottom Hill Street, Lydney

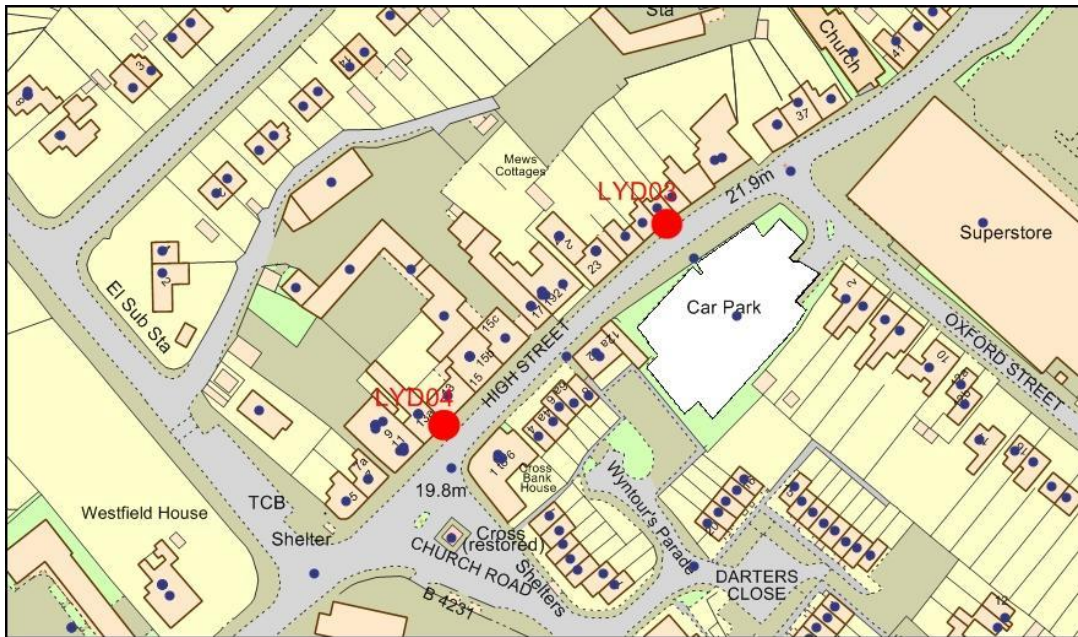


Site

Site	Annual mean concentrations ($\mu\text{g}/\text{m}^3$) Bias Adjusted			
	2010	2011	2012	2013
LYD01	46.4	40.8	49.7	41.4
LYD06	46.6	41.5	45.7	40.8

Site	Annual mean concentrations ($\mu\text{g}/\text{m}^3$) Bias Adjusted			
	2010	2011	2012	2013
LYD13	-	40.1	46.4	40.5
LYD14	-	39.0	44.5	40.3

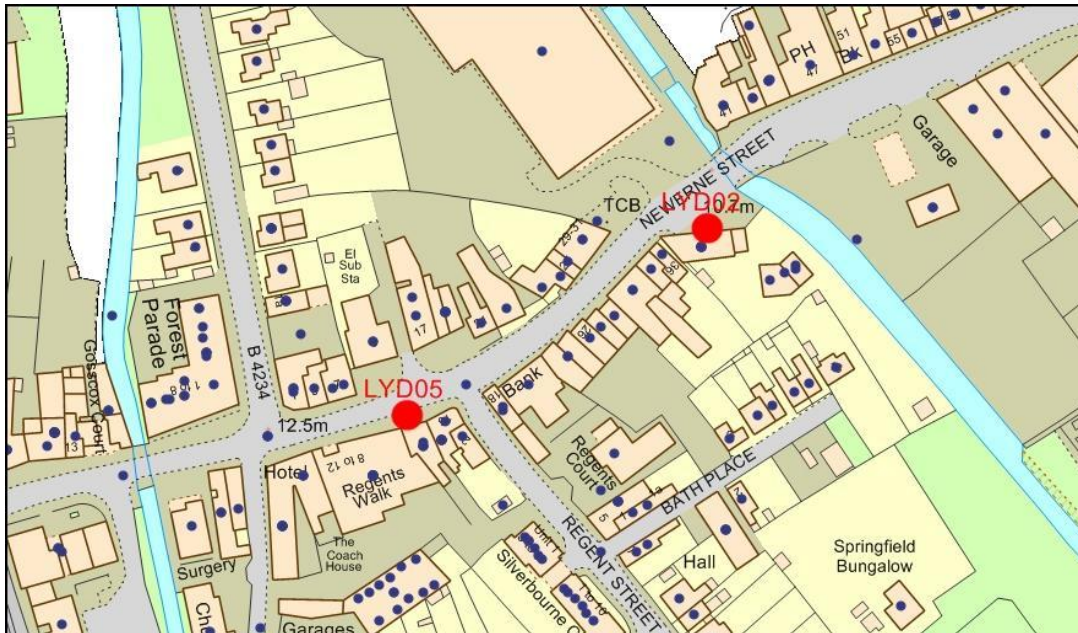
LYD03 - 29 High Street Lydney, LYD04 - 13 High Street, Lydney



Site	Annual mean concentrations ($\mu\text{g}/\text{m}^3$) Bias Adjusted			
	2010	2011	2012	2013
LYD03	46.9	39.2	45.1	37.1
LYD04	40.7	34.6	44.1	38.2

LYD01

LYD02 - Bridge House, Newerne Street Lydney, LYD05 – Regents Arcade, Lydney



Site	Annual mean concentrations ($\mu\text{g}/\text{m}^3$) Bias Adjusted			
	2010	2011	2012	2013
LYD02	23.9	22.8	24.7	21
LYD05	39.8	38.2	42.5	34.3

LYD08 13 Bream Road, Lydney, LYD09 17 Bream Road, Lydney

LYD06



Site	Annual mean concentrations ($\mu\text{g}/\text{m}^3$) Bias Adjusted			
	2010	2011	2012	2013
LYD08	39.7	39.6	44.5	37.3
LYD09	46.0	44.6	47.5	34.8

MIT01 The Merrin, Mitcheldean



Site	Annual mean concentrations ($\mu\text{g}/\text{m}^3$) Bias Adjusted			
	2010	2011	2012	2013
MIT01	31.5	26.2	31.7	28.1

NAI01 Crossroads, Nailbridge



Site	Annual mean concentrations ($\mu\text{g}/\text{m}^3$) Bias Adjusted			
	2010	2011	2012	2013
NAI01	35.0	35.4	37.1	30.6

NEW01 High Street, Newent



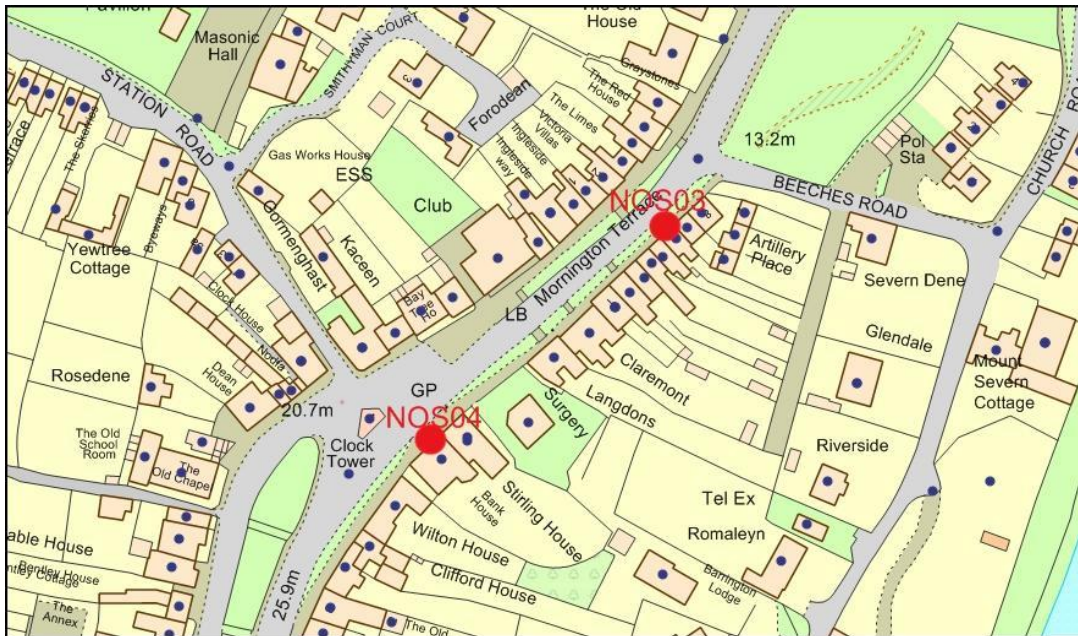
Site	Annual mean concentrations ($\mu\text{g}/\text{m}^3$) Bias Adjusted			
	2010	2011	2012	2013
NEW01	27.4	22.3	24.3	24.0

NEW02 Church Street, Newent



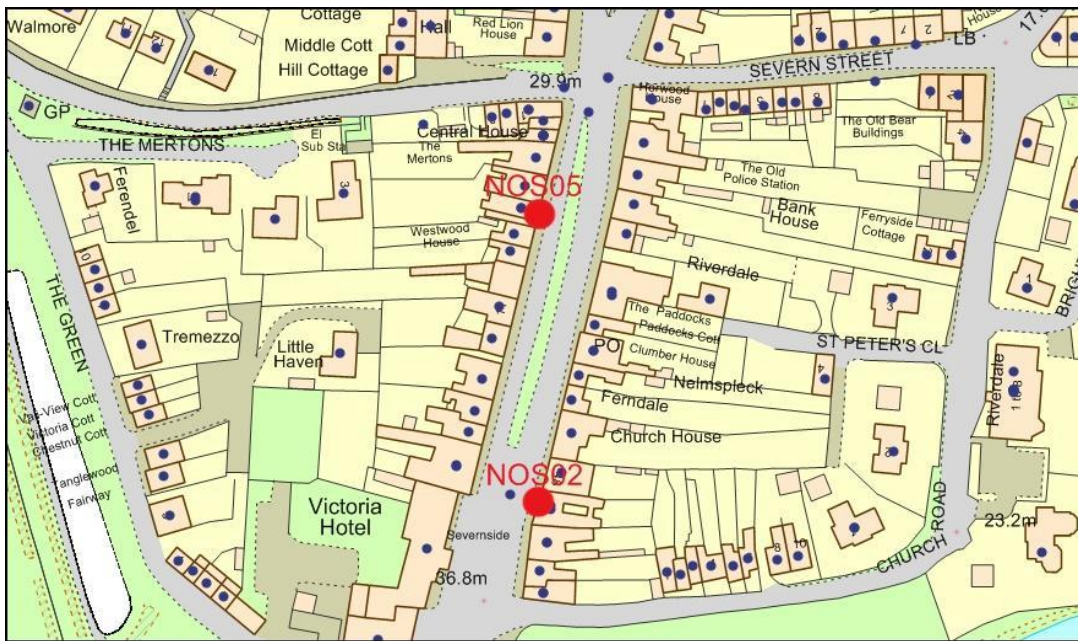
Site	Annual mean concentrations ($\mu\text{g}/\text{m}^3$) Bias Adjusted			
	2010	2011	2012	2013
NEW02	28.4	26.2	27.9	24.9

NOS04 opposite Clock Tower, Newnham, NOS03 Mornington Terrace



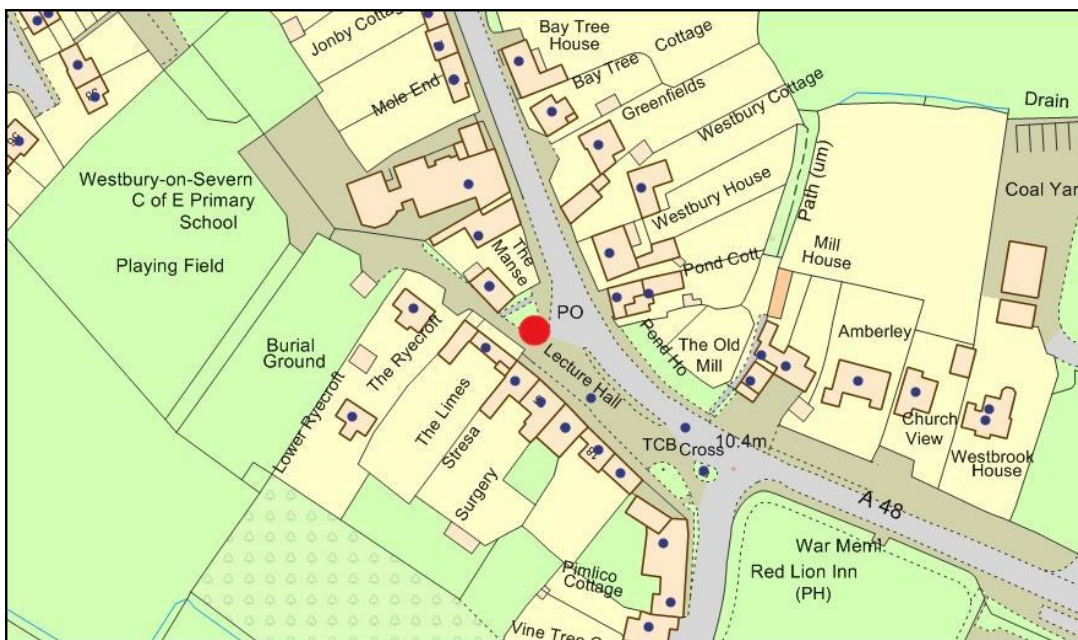
Site	Annual mean concentrations ($\mu\text{g}/\text{m}^3$) Bias Adjusted			
	2010	2011	2012	2013
NOS03	30.0	32.1	31.1	27.1
NOS04	37.3	30.4	35.5	28.2

NOS02 High Street, Newnham, NOS05 High Street, Newnham



Site	Annual mean concentrations ($\mu\text{g}/\text{m}^3$) Bias Adjusted			
	2010	2011	2012	2013
NOS02	35.7	32.2	33.8	30.1
NOS05	35.4	26.1	27.9	25.6

WOS01 Bus Stop A48, Westbury-on-Severn



Site	Annual mean concentrations ($\mu\text{g}/\text{m}^3$) Bias Adjusted			
	2010	2011	2012	2013
WOS01	17.0	23.6	24.3	21.4

