

Local Air Quality Management
Environment Act 1995

AIR QUALITY PROGRESS REPORT FOR 2010



North Devon Council
Environmental Health and Housing Services
Prepared March 2011



2010 Air Quality Progress Report for North Devon Council

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

March 2011

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Executive Summary

This report concludes that:-

1. The findings in the Progress Report prepared in 2009 in relation to Carbon Monoxide, Benzene, 1, 3-Butadiene, Lead, Sulphur Dioxide and PM₁₀ remain valid.
2. The Environmental Health and Housing Services department of North Devon Council have recently received confirmation that the twin towns of Lynmouth and Lynton have no mains gas supply. The implications of domestic solid fuel burning in relation to compliance with the relevant Air Quality Objectives shall therefore be assessed, and reported in the Updating and Screening Assessment 2012.
3. The measured bias adjusted annual mean concentration of Nitrogen Dioxide for 2010 is below the threshold limit value, except for site 12.
3. North Devon Council are in the process of declaring an Air Quality Management Area (AQMA) in Braunton (site 12). The diffusion tube monitoring network in Braunton has therefore recently been expanded. The results from this additional monitoring will be reported in 2012, and shall be used to inform the Further Assessment.

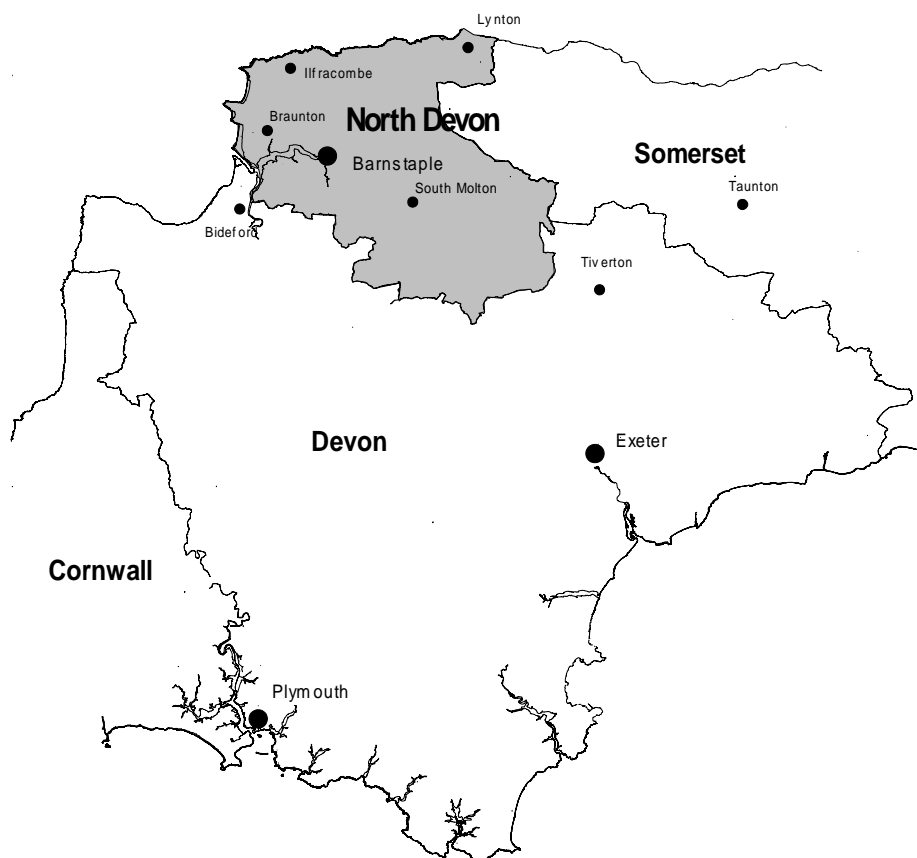
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1. INTRODUCTION

1.1 Description of Local Authority Area

The North Devon district occupies the northern most part of the county of Devon and borders the western borders of Somerset and the Bristol Channel, covering an area approximately 1,085 square kilometres (419 sq miles). The area is characterised by a rugged northern Bristol Channel coast, the sandy beaches of the West Coast, the estuarine and valley landscapes of the River Taw and the open moorland and farmland of the Exmoor fringes. The district includes approximately one-third of the area of Exmoor National Park. The character of the North Devon district is inextricably linked to its natural landscape, which is its most prized asset. The landscape is highly valued by residents and tourists alike, and incorporates numerous Sites of Special Scientific Interest, Areas of Outstanding Natural Beauty and Heritage Coastline.



The population of the area in 2000 was approximately 91,800, with approximately half the residents living in the four main settlements of Ilfracombe, Branton, South Molton and Barnstaple, which is also the regional centre for northern Devon. The remainder of the population lives in the open countryside or in one of the numerous villages and hamlets of the area.

The area has an extensive rural road network and is connected to the rest of the region by the A39, A361 and A377 roads. There is also a regional rail connection between Barnstaple and Exeter, which runs along the valley of the River Taw.

Employment in the district is concentrated in the main settlements. There is a strong dependence on the service industry, especially tourism related in the summer and also in the public administration, health and finance sectors, reflecting Barnstaple's role as a regional centre. There is also a healthy industrial base in the area and this is reflected in the 48 prescribed processes regulated under the Pollution Prevention and Control Regulations 2000, which are currently in operation within the administrative area of North Devon Council.

1.2 Purpose of Progress Report

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 Local Air Quality Management (LAQM) in England are set out in the Air Quality (England) Regulations 2000 (SI 928) and the Air Quality (England) (Amendment) Regulations 2002 (SI 3043). They are shown in Table 1. This table shows the objectives in units of microgrammes per cubic meter $\mu\text{g}/\text{m}^3$ (for carbon monoxide the units used are milligrammes per cubic metre, mg/m^3). Table 1 includes the number of permitted exceedences in any given year (where applicable).

Table 1 Air Quality Objectives included in Regulations for the purpose of Local Air Quality Management in England

			Date to be Achieved by
Benzene	16.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	5.00 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2010
1, 3-Butadiene	2.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 $\mu\text{g}/\text{m}^3$	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu\text{g}/\text{m}^3$	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
Particles (PM₁₀) (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

1.4 Summary of Previous Review and Assessments

1.4.1 First Round of Review and Assessment

The first round of review and assessment (carried out in 2000) concluded that:-

1. The risk of exceeding the air quality objectives for Carbon Monoxide, Benzene, 1, 3-Butadiene, Lead, Sulphur Dioxide, PM10 and Nitrogen Dioxide was negligible.
2. On this occasion, these conclusions were dependent on a proposed gas fired power station in Yelland not being constructed. If constructed, a

third stage review would have been required to consider localised exceedences of *Sulphur Dioxide* and *Nitrogen Dioxide*.

1.4.2 Updating and Screening Assessment (USA)

The Updating and Screening Assessment (produced in 2002/03) concluded that:-

1. The risk of exceeding the air quality objectives for Carbon Monoxide, Benzene, 1, 3-Butadiene, Lead, Sulphur Dioxide, PM10 and Nitrogen Dioxide was negligible.
2. A detailed assessment was required for the 15 minute Sulphur Dioxide only arising from public exposure to idling trains at Barnstaple Railway Station.
3. Monitoring results for Nitrogen Dioxide identified potential exceedences of the annual mean objective at several locations in Barnstaple, however these locations were likely to see significant reductions in road traffic numbers should the proposed Western Bypass and downstream bridge be constructed. As this was scheduled for completion by early 2006, it was considered that a detailed assessment for Nitrogen Dioxide was not necessary.

1.4.3 Progress Report

The Progress Report (produced in 2005) concluded that:-

1. The findings of the 2003 Updating and Screening Assessment remain valid for Carbon Monoxide, Benzene, 1, 3-Butadiene, Lead and PM₁₀.
2. A detailed Assessment is not required for the 15-minute Sulphur Dioxide objective, due to changes in the timetable for trains operating from Barnstaple Station.
3. Construction of the Barnstaple Western Bypass has now commenced. The predicted reductions in road traffic in central Barnstaple are still expected to be achieved, however compliance with the annual mean objective for Nitrogen Dioxide at Rolle Street is expected to be approximately 12 months later than started in the 2003 USA.
4. There are no new industrial processes or planned developments in the North Devon District with the potential to significantly impact upon achievement of the National Air Quality Standards.

1.4.4 Updating and Screening Assessment

The Updating and Screening Assessment (produced in 2006) concluded that:-

1. Monitoring results for Nitrogen Dioxide identified potential exceedences of the annual mean objective at several locations in Barnstaple, however these locations were likely to see significant reductions in road traffic

numbers should the proposed Western Bypass and downstream bridge be constructed. As this was scheduled for completion by May 2007, it was considered that a detailed assessment for Nitrogen Dioxide was not necessary.

1.4.5 Progress Report

The Progress Report (concluded in 2007) concluded that:-

1. The findings in the Progress Report prepared in 2007 in relation to Carbon Monoxide, Benzene, 1, 3-Butadiene, Lead, Sulphur Dioxide and PM₁₀ remain valid.
2. It was determined that whilst 2 of the 16 sites monitored in 2006 were equal to the threshold limit for Nitrogen Dioxide and one site exceeded the limit, a detailed assessment of Nitrogen Dioxide at these locations was not necessary at that time. The Western Bypass and downstream bridge project was completed in May 2007 and was forecast to have a significant effect on traffic flows in and around Barnstaple. It was stated that the effects of the completion of this project on the Nitrogen Dioxide levels at these sites would be able to be assessed during this year's LAQM Progress Report.

1.4.6 Progress Report

The Progress Report (produced in 2008) concluded that:-

1. The findings in the Progress Report prepared in 2007 in relation to Carbon Monoxide, Benzene, 1, 3-Butadiene, Lead, Sulphur Dioxide and PM₁₀ remain valid.
2. It was determined that 3 of the 16 sites monitored in 2007 exceeded the threshold limit for Nitrogen Dioxide. It was therefore determined that a detailed assessment of Nitrogen Dioxide should be undertaken at the following sites:-

Site 3	Rolle Street 2, Barnstaple
Site 12	The Square, Braunton
Site 13	The London Inn, Braunton

1.4.7 Updating and Screening Assessment

The Updating and Screening Assessment (produced in 2009) concluded that:-

1. The findings in the Progress Report prepared in 2008 in relation to Carbon Monoxide, Benzene, 1, 3-Butadiene, Lead, Sulphur Dioxide and PM₁₀ remain valid.
2. The measured bias adjusted annual mean concentration of Nitrogen Dioxide for 2008 is greater than the threshold of 40 µg/m³ at sites 12 and 13. The results of previous monitoring undertaken resulted in a detailed

assessment being commenced at these sites in March 2009, the results of which shall be reported in April 2010.

Whilst sites 12 and 13 are the only sites to exceed $40 \mu\text{g}/\text{m}^3$ for 2008, it is interesting to note that as a result of previous monitoring undertaken, a detailed assessment was also commenced in March 2009 for site 3. The results for monitoring undertaken in 2008 does not suggest an exceedence of the threshold at this site, however the detailed assessment shall be completed and the subsequent results reported in April 2010.

1.4.8 Progress Report

The Progress Report (produced in April 2010) concluded that:

- 1 The findings in the Progress Report prepared in 2009 in relation to Carbon Monoxide, Benzene, 1, 3-Butadiene, Lead, Sulphur Dioxide and PM_{10} remain valid.
- 2 The measured bias adjusted annual mean concentration of Nitrogen Dioxide for 2009 below the threshold limit value, except for sites 12 and 13.

The results of previous monitoring led to a detailed assessment being undertaken for Nitrogen Dioxide at sites 2, 3, 12 and 13. The results of this detailed assessment are summarised below.

1.4.9 Detailed Assessment of Nitrogen Dioxide at Rolle Street, Barnstaple and Braunton

The Detailed Assessment (produced in April 2010) concluded that:

- 1 North Devon Council do not intend to declare an AQMA for Rolle Street (sites 2 and 3),
- 2 North Devon Council do intend to declare an AQMA in Braunton (sites 12 and 13).

2. NEW MONITORING DATA

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

There are no automatic monitoring sites in North Devon.

2.1.2 Non-Automatic Monitoring

Nitrogen Dioxide is measured by diffusion tube at 16 locations in the North Devon District. The monitoring programme has been in place since 2000, and the monitoring sites are identified in Table 2.

Table 2: Details of Non-Automatic Monitoring Sites

							Worst Case Location?
1	Kerbside	SS 55756 BNG 33720	NO ₂	N	Y (1m)	0.5m	Y
2	Kerbside	SS 55533 BNG 33615	NO ₂	N	Y (1m)	0.5m	Y
3	Kerbside	SS 5421 BNG 33652	NO ₂	N	Y (1m)	0.5m	Y
4	Kerbside	SS 55658 BNG 32828	NO ₂	N	Y (1m)	0.5m	Y
5	Urban Background	SS 54230 BNG 32526	NO ₂	N	N (100m)	N/A	Y
6	Kerbside	SS 53936 BNG 32409	NO ₂	N	Y (1m)	0.5m	Y
7	Kerbside	SS 56717 BNG 32203	NO ₂	N	Y (1m)	0.5m	Y
8	Kerbside	SS 56671 BNG 32088	NO ₂	N	Y (1m)	0.5m	Y
9	Kerbside	SS 55559 BNG 33298	NO ₂	N	Y (1m)	0.5m	Y
10	Kerbside	SS 56130 BNG 33181	NO ₂	N	Y (1m)	0.5m	Y
11	Kerbside	SS 55764 BNG 33702	NO ₂	N	Y (1m)	0.5m	Y
12	Kerbside	SS 48896 BNG 36714	NO ₂	being declared	Y (1m)	0.5m	Y
13	Kerbside	SS 48731 BNG 36642	NO ₂	being declared	Y (1m)	0.5m	Y
14	Kerbside	SS 51544 BNG 47330	NO ₂	N	Y (1m)	0.5m	Y
15	Kerbside	SS 55704 BNG 33169	NO ₂	N	Y (1m)	0.5m	Y
16	Kerbside	SS 71426 BNG 25877	NO ₂	N	Y (1m)	0.5m	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

Air quality monitoring is currently undertaken for Nitrogen Dioxide only, using diffusion tubes – there is no monitoring programme for PM₁₀, Sulphur Dioxide or Benzene. As such, Nitrogen Dioxide is the only pollutant to be considered for the purpose of this section of the report.

2.2.1 Nitrogen Dioxide Diffusion Tube Monitoring Data

The results of the diffusion tube monitoring undertaken in 2010, are shown in Table 3.

The bias adjustment factor applied to the annual mean concentration was 0.95, as calculated from the spreadsheet available at <https://laqm.defra.gov.uk/>, inputting “Gradko” as the analysing laboratory, “20% TEA in water” for the preparation, and 2010 for the year. The spreadsheet was accessed on 14th March 2011.

In accordance with advice issued by the air quality helpdesk, all sites with a collection efficiency of >75% have been bias adjusted only. Sites with a collection efficiency of <75% have had a short-term adjustment factor applied

prior to the bias adjustment factor. A short term adjustment factor has also been applied to all sites which have a collection efficiency of <100% and an annual mean concentration of >36 µg/m³. The calculations associated with determining the appropriate short-term correction factor are included as Appendix C to this report.

The measured bias adjusted annual mean concentration of Nitrogen Dioxide for 2010 is below the threshold limit for all sites, except for site 12 – as can be seen in Table 3.

North Devon Council are in the process of declaring an AQMA in Braunton (site 12). The diffusion tube monitoring network in Braunton has therefore recently been expanded. The results from this additional monitoring will be reported in 2012, and shall be used to inform the Further Assessment.

Table 3: Results of Nitrogen Dioxide Diffusion Tubes – 2010

				Annual Mean Concentrations 2010 (µg/m ³) Adjusted for Bias
1	Pilton Causeway, Barnstaple	N	83	35.07
2	Rolle Street 1, Barnstaple	N	83	36.94
3	Rolle Street 2, Barnstaple	N	83	35.99
4	Lower Sticklepath Roundabout, Barnstaple	N	75	23.52
5	Sticklepath School, Barnstaple	N	100	9.89
6	Cedars Roundabout, Barnstaple	N	83	20.28
7	Newport Road, Barnstaple	N	92	35.39
8	South Street, Newport, Barnstaple	N	83	29.53
9	Castle Street, Barnstaple	N	92	19.66
10	Alexandra Road, Barnstaple	N	92	32.11
11	Belle Meadow Road, Barnstaple	N	83	29.12
12	The Square, Braunton	Being declared	92	46.48
13	The London Inn, Braunton	Being declared	67	36.20
14	Church Street, Ilfracombe	N	75	22.30
15	High Street, Ilfracombe	N	92	21.04
16	Broad Street, South Molton	N	75	25.84

Table 4: Results of Nitrogen Dioxide Diffusion Tubes 2007 – 2009

			Annual Mean Concentrations ($\mu\text{g}/\text{m}^3$) Adjusted for Bias		
					2009*
1	Pilton Causeway, Barnstaple	N	30.47	30.49	30.51
2	Rolle Street 1, Barnstaple	N	37.03	30.89	30.60
3	Rolle Street 2, Barnstaple	N	41.45	35.67	35.08
4	Lower Sticklepath Roundabout, Barnstaple	N	25.36	22.95	21.15
5	Sticklepath School, Barnstaple	N	10.42	5.29	8.40
6	Cedars Restaurant, Barnstaple	N	19.11	19.56	20.54
7	Newport Road, Barnstaple	N	34.03	32.34	31.16
8	South Street, Newport, Barnstaple	N	27.79	23.92	22.95
9	Castle Street, Barnstaple	N	24.34	15.63	15.37
10	Alexandra Road, Barnstaple	N	34.39	32.92	29.80
11	Belle Meadow Road, Barnstaple	N	33.43	29.38	25.17
12	The Square, Braunton	N	41.72	44.08	39.68
13	The London Inn, Braunton	N	42.87	45.44	40.81
14	Church Street, Ilfracombe	N	23.76	23.19	20.43
15	High Street, Ilfracombe	N	29.30	21.15	20.29
16	Broad Street, South Molton	N	23.98	21.91	21.54

2.2.2 Summary of Compliance with AQS Objectives

As mentioned in Section 2.2.1, North Devon Council has examined the results from monitoring in the district. With the exception of site 12, concentrations are all below the objectives, therefore there is no need to proceed to a Detailed Assessment.

North Devon Council are in the process of declaring an AQMA in Braunton (site 12). The diffusion tube monitoring network in Braunton has therefore recently been expanded. The results from this additional monitoring will be reported in 2012, and shall be used to inform the Further Assessment.

3. NEW LOCAL DEVELOPMENTS

North Devon 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.

The Environmental Health and Housing Services department have recently received confirmation however that the twin towns of Lynmouth and Lynton have no mains gas supply. The implications of domestic solid fuel burning in relation to compliance with the relevant Air Quality Objectives shall therefore be assessed, and reported in the Updating and Screening Assessment 2012.

4. CONCLUSIONS AND PROPOSED ACTIONS

4.1 Conclusions from New Monitoring Data

The measured bias adjusted annual mean concentration of Nitrogen Dioxide for 2010 is below the threshold limit for all sites, except for site 12.

North Devon Council are in the process of declaring an AQMA in Braunton (site 12). The diffusion tube monitoring network in Braunton has therefore

recently been expanded. The results from this additional monitoring will be reported in 2012, and shall be used to inform the Further Assessment.

4.2 Conclusions relating to New Local Developments

North Devon 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 – as identified in Section 3 of this report.

The Environmental Health and Housing Services department have recently received confirmation however that the twin towns of Lynmouth and Lynton have no mains gas supply. The implications of domestic solid fuel burning in relation to compliance with the relevant Air Quality Objectives shall therefore be assessed, and reported in the Updating and Screening Assessment 2012.

4.3 Other Conclusions

There are no further conclusions to be drawn from the review of this data.

4.4 Proposed Actions

North Devon Council are in the process of declaring an AQMA in Braunton (site 12). The diffusion tube monitoring network in Braunton has therefore recently been expanded. The results from this additional monitoring will be reported in 2012, and shall be used to inform the Further Assessment.

The Council has commenced a 4 month consultation period - the AQMA is expected to be formally declared by the end of June 2011.

The Environmental Health and Housing Services department have recently received confirmation that the twin towns of Lynmouth and Lynton have no mains gas supply. The implications of domestic solid fuel burning in relation to compliance with the relevant Air Quality Objectives shall therefore be assessed, and reported in the Updating and Screening Assessment 2012.

If North Devon Council has any reason to believe that the threshold limit value will be exceeded at any of the other monitoring sites in future, it will consider a further detailed assessment of the appropriate sites at that time.

References

“Local Air Quality Management – Technical Guidance LAQM.TG(09)”,
Department for Environment, Food and Rural Affairs, London, 2009.

Appendices

Appendix A: QA/QC Data

Appendix B: Map showing Diffusion Tube Locations

Appendix C: Short-term Adjustment Factor Calculations

Appendix A

QA/QC Data

Diffusion Tubes are supplied and analysed by Gradko Laboratories using a 20% TEA in water preparation.

The bias adjustment factor applied to the annual mean concentration was 0.95, as calculated from the spreadsheet available at <https://laqm.defra.gov.uk/>, inputting "Gradko" as the analysing laboratory, "20% TEA in water" for the preparation, and 2010 for the year. The spreadsheet was accessed on 14th March 2011.

Calculation of the short-term adjustment factors is included separately as Appendix C to this report.

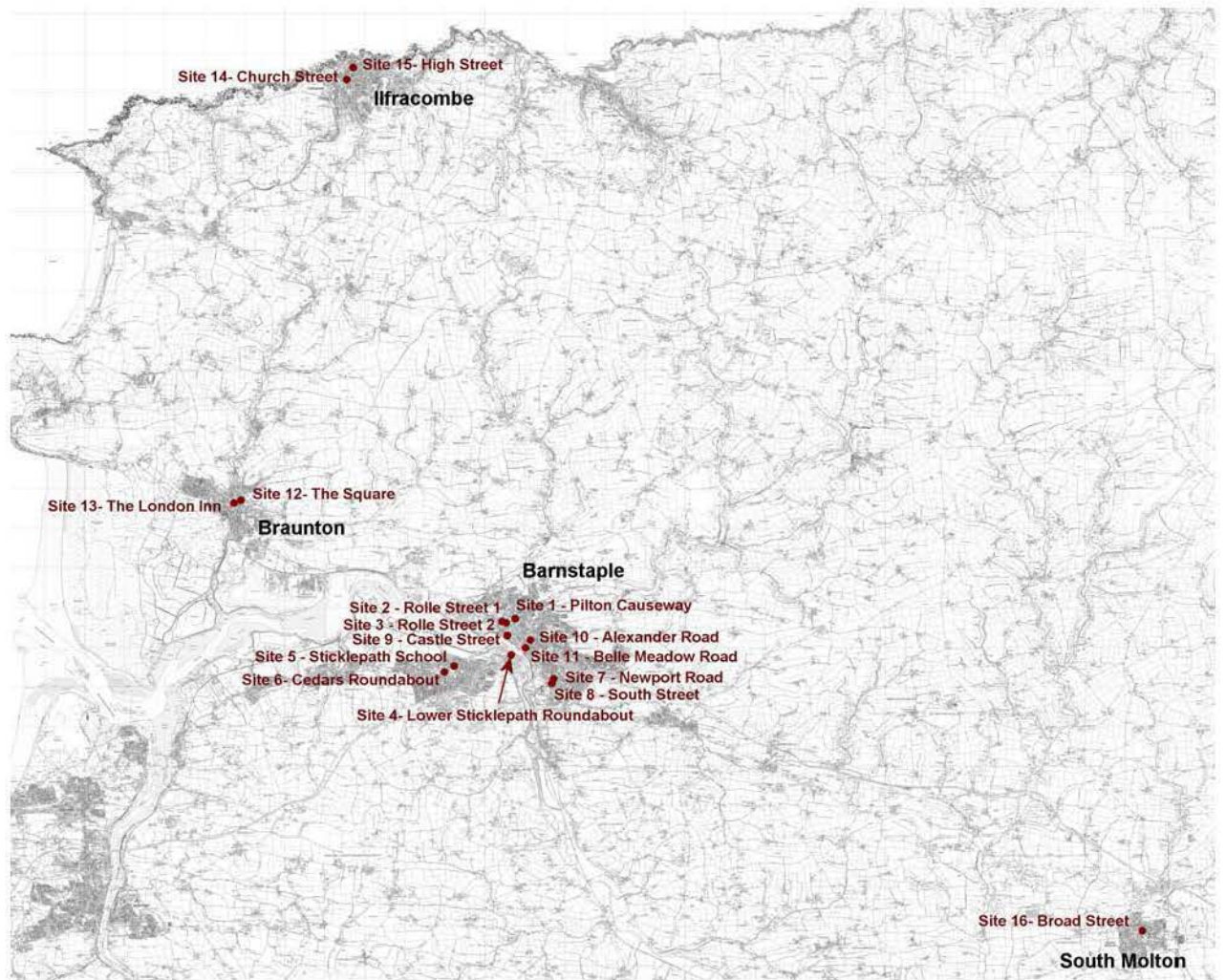
QA/QC of diffusion tube monitoring

Gradko Laboratories' internal analysis procedures are assessed annually by UKAS to confirm compliance with ISO 17025.

Furthermore, Gradko's NO₂ diffusion tube procedures have been amended to follow the guidelines of the DEFRA Harmonisation document related to the preparation, extraction, analysis and calculation procedures for NO₂ passive diffusion tubes.

Appendix B

Map Showing Approximate Diffusion Tube Locations



Appendix C

Short Term Adjustment Factor Calculations

Site 1																
Monthly Mean NO ₂ 2010																
Site Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Units	Annual Average	Period Mean	Correction Factor
Bournemouth	27	20	19	20	14	13	9	9	13	17	23	29	µgm ⁻³	17.76	18.05	0.98
Bristol St Paul's	44	41	40	29	20	22	17	19	26	34	33	53	µgm ⁻³	31.54	31.32	1.01
														Average correction factor		1.00
Site 2																
Monthly Mean NO ₂ 2010																
Site Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Units	Annual Average	Period Mean	Correction Factor
Bournemouth	27	20	19	20	14	13	9	9	13	17	23	29	µgm ⁻³	17.76	16.13	1.10
Bristol St Paul's	44	41	40	29	20	22	17	19	26	34	33	53	µgm ⁻³	31.54	29.18	1.08
														Average correction factor		1.09
Site 3																
Monthly Mean NO ₂ 2010																
Site Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Units	Annual Average	Period Mean	Correction Factor
Bournemouth	27	20	19	20	14	13	9	9	13	17	23	29	µgm ⁻³	17.76	17.33	1.02
Bristol St Paul's	44	41	40	29	20	22	17	19	26	34	33	53	µgm ⁻³	31.54	31.16	1.01
														Average correction factor		1.02
Site 7																
Monthly Mean NO ₂ 2010																
Site Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Units	Annual Average	Period Mean	Correction Factor
Bournemouth	27	20	19	20	14	13	9	9	13	17	23	29	µgm ⁻³	17.76	16.89	1.05
Bristol St Paul's	44	41	40	29	20	22	17	19	26	34	33	53	µgm ⁻³	31.54	30.37	1.04
														Average correction factor		1.04
Site 12																
Monthly Mean NO ₂ 2010																
Site Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Units	Annual Average	Period Mean	Correction Factor
Bournemouth	27	20	19	20	14	13	9	9	13	17	23	29	µgm ⁻³	17.76	16.89	1.05
Bristol St Paul's	44	41	40	29	20	22	17	19	26	34	33	53	µgm ⁻³	31.54	30.37	1.04
														Average correction factor		1.04
Site 13																
Monthly Mean NO ₂ 2010																
Site Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Units	Annual Average	Period Mean	Correction Factor
Bournemouth	27	20	19	20	14	13	9	9	13	17	23	29	µgm ⁻³	17.76	19.11	0.93
Bristol St Paul's	44	41	40	29	20	22	17	19	26	34	33	53	µgm ⁻³	31.54	33.50	0.94
														Average correction factor		0.94