

2014 Air Quality Progress Report for Broadland District Council

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

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Executive Summary

This report fulfils the requirements of the Local Air Quality Management process as set out in part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007, and the relevant Policy and Technical Guidance documents.

This Progress Report is Broadland District Council's fifth round of Review and Assessment. Results from monitoring by the Council are presented and sources of air pollution are identified. This document determines those changes since the last assessment, which could lead to a risk of an air quality objective being exceeded.

Little has changed in terms of emissions in Broadland District since the fifth round Updating and Screening Assessment in 2012. This Progress Report therefore determines that no further Detailed Assessments are necessary in Broadland District Council at this time.

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1 Introduction

1.1 Description of Local Authority Area

Broadland District is located in Norfolk and includes the northern suburbs of Norwich and rural areas to the north and east of the city – covering an area of 55,215 hectares (552km²) with a population of about 120 000. Lying partly within the east of Broadland District is the Norfolk Broads National Park, with some 200km of navigable waterways. Broadland District Council borders Great Yarmouth, South Norfolk, North Norfolk, Norwich City and Breckland Councils.

1.2 Purpose of Progress Report

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

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

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

1.3 Air Quality Objectives

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

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

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 $\mu\text{g}/\text{m}^3$	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

1.4 Summary of Previous Review and Assessments

In the first round of Review and Assessment process, Broadland District Council carried out a Stage 3 Review and Assessment for nitrogen dioxide (related to traffic emissions) and also for sulphur dioxide (related to an industrial process). It was concluded from a detailed modelling assessment, that the nitrogen dioxide objective was unlikely to be exceeded. The sulphur dioxide objective was predicted to be exceeded, and a recommendation to declare an AQMA with associated long term monitoring was made. However, a decision was subsequently taken not to declare an AQMA as a result of confirmed measures to reduce emissions from the industrial process.

Broadland District Council carried out an Updating and Screening Assessment in 2003. It concluded that a Detailed Assessment was not required at that time, as the air quality objectives were not predicted to be exceeded; therefore a Progress Report was required in 2004. The same conclusion was reached in the Air Quality Progress Report, that air quality in the district was good, and that the air quality objectives would not be exceeded.

Broadland District Council completed their third round of Updating and Screening Assessment in April 2006. It concluded that there had been no significant changes with regard to emissions of carbon monoxide, 1,3-butadiene, lead, nitrogen dioxide, or sulphur dioxide. Therefore a Detailed Assessment for these pollutants was not required at that time. In terms of particulate matter (PM_{10}), the daily mean objective was likely to be exceeded at one busy junction, the A140/A1042 junction, comprising Cromer Road (A140), Aylsham Road, Boundary Road (A140), Mile Cross Lane (A1042) and Reepham Road. Broadland was therefore required to proceed to a Detailed Review and Assessment for PM_{10} in order to further define the extent of the risk of exceedance at this location.

As there were potential PM_{10} exceedances caused by road traffic, it was considered likely that the annual mean objective for nitrogen dioxide was also at risk, and a

Detailed Assessment was undertaken for both pollutants (nitrogen dioxide and PM₁₀) at the junction. The Detailed Assessment concluded that it was very likely that the nitrogen dioxide annual mean objective was exceeded in 2006, and exceedences were also predicted in 2010. However, no exceedence of the daily mean objective for PM₁₀ was predicted at the junction in 2006 or 2010. As a result, it was recommended that Broadland declare an AQMA for nitrogen dioxide. Following the Detailed Assessment, diffusion tubes were located at locations with predicted exceedences to confirm modelling results. The results were presented in the Progress Report in 2008. Monitoring at the existing 10 monitoring sites within the district indicated that no exceedence of the annual mean nitrogen dioxide objective was reported outside the proposed AQMA area. Seven new monitoring sites were set up in the proposed AQMA in March 2008, and in September 2008 Broadland declared an AQMA for nitrogen dioxide at the A140 / A1042 junction in Upper Hellesdon, Norwich.

The 2009 Updating and Screening Assessment concluded that there were no exceedences of the nitrogen dioxide objective and the Upper Hellesdon AQMA was revoked in April 2010. The Updating and Screening Assessment did, however, identify that the Haveringland Farm Poultry Unit met the criteria requiring a detailed assessment for PM₁₀. This Detailed Assessment is still pending, awaiting further information from the LAQM support helpdesk, it is understood that further research is being carried out with a view to reviewing this assessment parameter.

Nitrogen dioxide monitoring published in the 2011 and 2013 Progress Report did not identify any exceedences of the annual mean objective. The 2012 and Updating and Screening Assessment also did not identify any exceedences, but did review emissions from new biomass boilers.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

Broadland District Council conducted monitoring at 16 diffusion tube sites. These are spread throughout the district, including several sites in the area previously covered by the AQMA. Details of diffusion tube sites are shown in Figure 2.1 and Table 2.2. The diffusion tubes are supplied and analysed by Gradko International. Details of the QA/QC approach are given in Appendix A.

One new monitoring site was introduced at Berrington Road in Hellesdon in the summer, for which 6 months of data is available. These results have been annualised as per the advice in TG(09), the calculation is shown in Appendix A.

At one other site (BN10) there was less than 75% data capture, and these results were also annualised.

Figure 2.1 Map of Non-Automatic Monitoring Sites

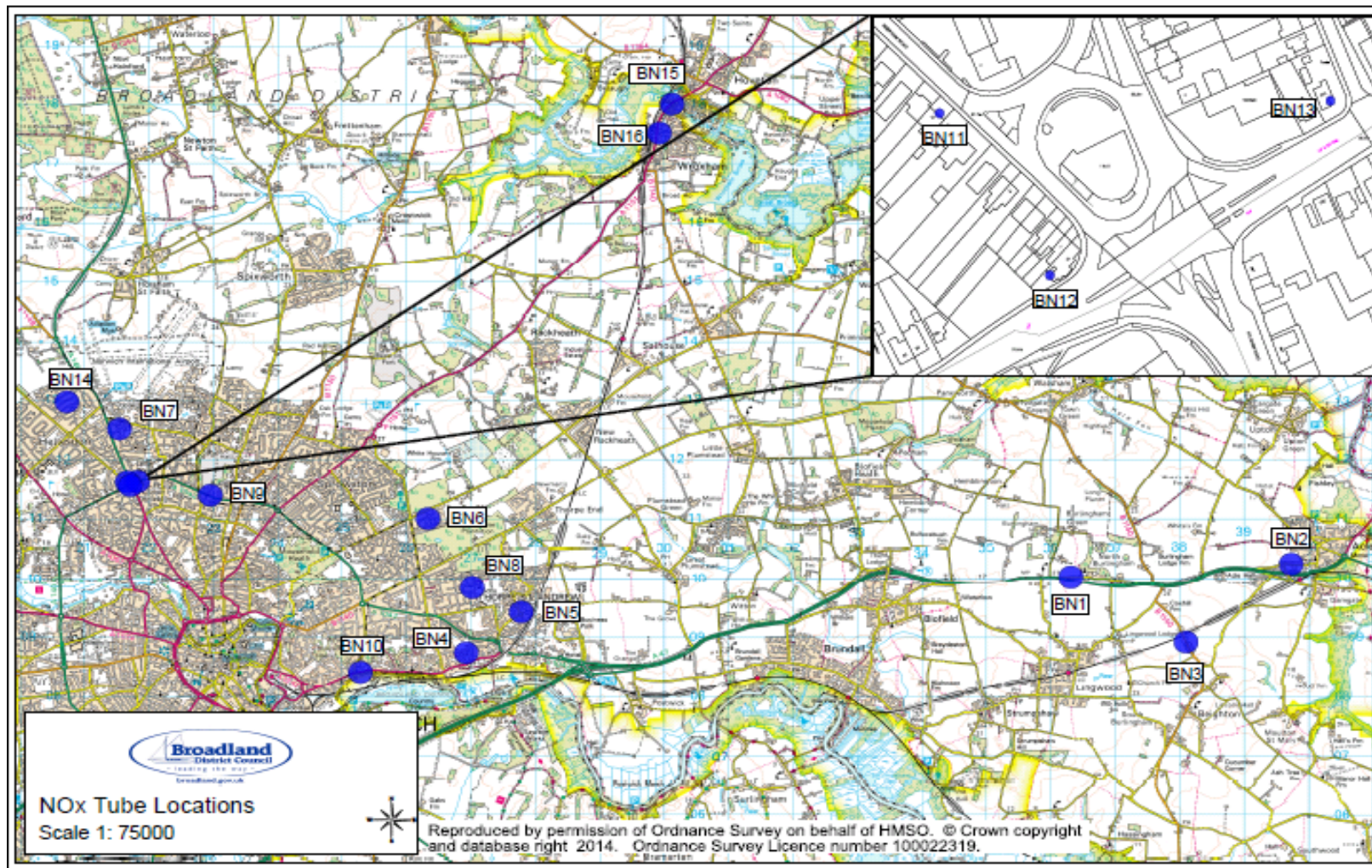


Table 2.2 Details of Non- Automatic Monitoring Sites

Site ID	Site Location	Site Type	Grid Reference	Pollutants Monitored	In AQMA?	Colocated?	Relevant Exposure?	Distance to kerb?	Worst-case exposure?
BN1	A47 N Burlingham	Roadside	636268 310000	NO2	n/a	N	N (231m)	<1 m	Y
BN2	Norwich Rd, Acle	Roadside	639713 310237	NO2	n/a	N	N (24m)	<1 m	Y
BN3	Cox Hill, Beighton	Roadside	638094 308891	NO2	n/a	N	N (417m)	<1 m	Y
BN4	Hillside, Thorpe St Andrew	Roadside	626911 308738	NO2	n/a	N	Y (0m)	2 m	Y
BN5	Dussindale, Thp St Andrew	Roadside	627755 309440	NO2	n/a	N	Y (0m)	2 m	Y
BN6	Breck Rd, Sprowston	Roadside	626313 311010	NO2	n/a	N	Y (0m)	2 m	Y
BN7	Heath Crescent, Hellesdon	Roadside	621539 312522	NO2	n/a	N	Y (0m)	2 m	Y
BN8	Hansell Road	Roadside	627003 309849	NO2	n/a	N	Y (0m)	2 m	Y
BN9	Chartwell Rd, Old Catton	Roadside	622938 311399	NO2	n/a	N	Y (0m)	2 m	Y
BN10	Yarmouth Rd, Thp St Andrew	Roadside	625264 308411	NO2	n/a	N	N (76m)	2 m	Y
BN11	21 Reepham Rd, Hellesdon	Roadside	621642 311622	NO2	n/a	N	Y (0m)	8 m	Y
BN12	10A Boundary Rd, Hellesdon	Roadside	621698 311565	NO2	n/a	N	Y (0m)	6 m	Y
BN13	214 Mile Cross Ln, Hellesdon	Roadside	621811 311636	NO2	n/a	N	Y (0m)	5 m	Y
BN14	Berrington Road, Hellesdon	Roadside	621690 311758	NO2	n/a	N	Y (0m)	4 m	Y
BN15	Library Wroxham	Roadside	630182 318042	NO2	n/a	N	N (16m)	2 m	Y
BN16	The Avenues, Wroxham	Roadside	629887 317575	NO2	n/a	N	N (35m)	2 m	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide (NO₂)

Table 2.3 below shows the results of the diffusion tube monitoring data. The results have been bias adjusted, and the details of this calculation are given Appendix A.

Table 2.3 Results of NO₂ Diffusion Tubes 2013

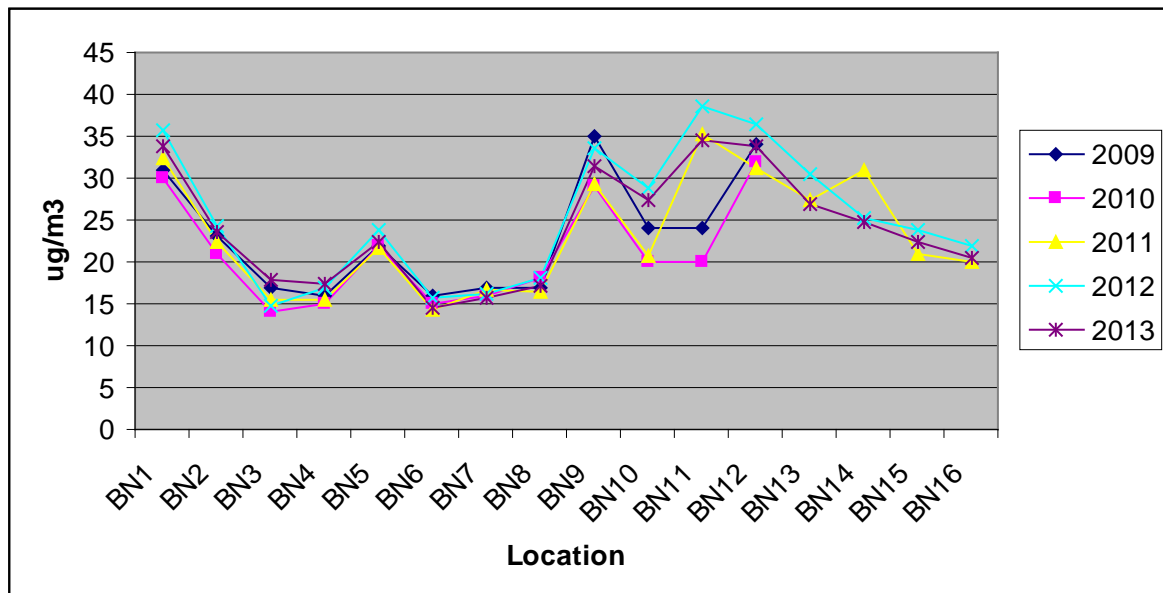
Site ID	Site Location	Site Type	In AQMA?	Colocated?	Data Capture (months)	2013 Annual mean ug/m ³ Bias adjustment factor 0.95
BN1	A47 N Burlingham	Roadside	n/a	N	10	33.7
BN2	Norwich Rd, Acle	Roadside	n/a	N	10	23.5
BN3	Cox Hill, Beighton	Roadside	n/a	N	10	17.9
BN4	Hillside, Thorpe St Andrew	Roadside	n/a	N	10	17.4
BN5	Dussindale, Thp St Andrew	Roadside	n/a	N	10	22.5
BN6	Breck Rd, Sprowston	Roadside	n/a	N	10	14.6
BN7	Heath Crescent, Hellesdon	Roadside	n/a	N	10	15.8
BN8	Hansell Raod	Roadside	n/a	N	10	17.2
BN9	Chartwell Rd, Old Catton	Roadside	n/a	N	10	31.4
BN10	Yarmouth Rd, Thp St Andrew	Roadside	n/a	N	7	27.4
BN11	21 Reephams Rd, Hellesdon	Roadside	n/a	N	10	34.5
BN12	10A Boundary Rd, Hellesdon	Roadside	n/a	N	6	33.8
BN13	214 Mile Cross Ln, Hellesdon	Roadside	n/a	N	10	27
BN14	Berrington Road, Hellesdon	Roadside	n/a	N	10	24.7
BN15	Library Wrox ham	Roadside	n/a	N	10	22.3
BN16	The Avenues, Wrox ham	Roadside	n/a	N	10	20.5

Table 2.4 and Figure 2.2 show the general trend in nitrogen dioxide levels over the last 5 years. BN11 has the highest recorded levels of nitrogen dioxide in the district, this is adjacent to a busy road with queuing traffic, and is in the site of the previous AQMA, levels have gone down slightly since 2012 here. Should the proposed Northern Distributor Road (outer ring road) be granted planning permission, this should alleviate traffic and queuing on this inner ring road.

Table 2.4 Trends of mean nitrogen dioxide levels.

Site ID	2008	2009	2010	2011	2012	2013
BN1	26	31	30	32.5	35.6	33.7
BN2	19	23	21	22.5	24.3	23.5
BN3	12	17	14	15.4	14.7	17.9
BN4	12	16	15	15.5	16.9	17.4
BN5	17	22	22	21.6	23.7	22.5
BN6	11	16	15	14.3	15.7	14.6
BN7	13	17	16	16.6	16.1	15.8
BN8	12	17	18	16.5	18.1	17.2
BN9	26	35	29	29.3	33.5	31.4
BN10	18	24	20	20.6	28.7	27.4
BN11	29	24	20	35.3	38.6	34.5
BN12	28	34	32	31.2	36.4	33.8
BN13	n/a	n/a	n/a	27.4	30.4	27
BN14	n/a	n/a	n/a	30.9	25.2	24.7
BN15	n/a	n/a	n/a	20.9	23.8	22.3
BN16	n/a	n/a	n/a	20	21.9	20.5

Figure 2.2 Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites



2.2.2 Summary of Compliance with AQS Objectives

Broadland District Council has examined the results from monitoring in the district. Concentrations are all below the objectives, therefore there is no need to proceed to a Detailed Assessment.

3 New Local Developments

3.1 Road Traffic Sources

The planning application for the Northern Distributor Road has been called in by the Planning Inspectorate and is currently (as of April 2014) being assessed by National Infrastructure Planning. The process of examination will take into account air quality matters including the balance of any improvement or detrimental affect on air quality. The final decision will be taken by the Secretary of State. The application does not identify any areas which may result in the AQS being exceeded as a result of this development.

3.2 Commercial and Domestic Sources

Two planning applications have been received for biomass boilers to be installed at poultry units. The two sites are:

Oulton Farm – 6 x 200kw

Felthorpe Farm 10 x 200kw

The Council required an air quality assessment to be included in the planning application, including modelling for both PM₁₀ and NO₂. Planning permission has not yet been determined, however for both sites the modelled impact has been predicted as a negligible impact on air quality at all sensitive locations.

Broadland District Council confirms that there are no new or newly identified local developments which have been granted planning permission which may have an impact on air quality within the Local Authority area.

Broadland 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 Air Quality Planning Policies

Broadland District Council has incorporated the following policy into the local plan to address air quality as part of the planning process:

Air Quality: Where a proposed development would result in airborne pollutants exceeding statutory objectives, it will not be permitted unless appropriate mitigation measures are agreed. Development which may give rise to airborne emissions of potentially harmful substances, including smoke, grit and dust, will be required to provide a risk assessment of the likelihood of demonstrable harm to human health or to the environment. Particular account will be taken of any sensitive uses, which would adjoin or otherwise be affected by such emissions.

5 Local Transport Plans and Strategies

Norfolk County Council has adopted a Local Transport Plan which identifies methods that can be implemented to reduce emissions. These include reducing exhaust emissions from the transport fleet and tackling traffic problems. The full document can be found here : <http://www.norfolk.gov.uk/view/NCC073526>

6 Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

The new monitoring data indicates that there has been a slight fall in nitrogen dioxide levels at the majority of sites. The site with the highest levels of nitrogen dioxide has shown a slight reduction for the last two years, and is still within the AQS, so no AQMA needs to be declared. The proposed Northern Distributor Road should further reduce levels here if it is granted planning permission.

6.2 Proposed Actions

The next course of action will be to submit the 2015 Updating and Screening assessment. If in the interim period DEFRA provide further guidance on progression to a Detailed Assessment for PM₁₀ at Haveringland Farm Poultry unit, then this will be commenced. Monitoring will continue at the site of the previous AQMA in Hellesdon.

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

Site	Site Type	Annual Mean ($\mu\text{g}/\text{m}^3$)	Period Mean ($\mu\text{g}/\text{m}^3$)	Ratio
Wicken Fen	Rural Background	9.7	8.6	1.13
St Osyth	Rural Background	12.5	11.2	1.12
Average				112
Corrected value				24.7

Broadland District Council's diffusion tubes are prepared and analysed by Gradko using 50% TEA in water. As no automatic monitoring was undertaken in Broadland's area, the bias adjustment factor used was derived from the latest version of the national database of co-location studies (version 03/13 available on the LAQM support website: <http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html>) The results from this spreadsheet provided a national bias adjustment factor of 0.95 for 2013.

Short-term to Long-term Data adjustment

Where data is available for less than 75% of the year, the values have been corrected according to the methodology in TG (09) in the table below:

Table A.1 Short-Term to Long-Term Monitoring Data Adjustment

BN11

Site	Site Type	Annual Mean ($\mu\text{g}/\text{m}^3$)	Period Mean ($\mu\text{g}/\text{m}^3$)	Ratio
Wicken Fen	Rural Background	9.7	6.8	1.4
St Osyth	Rural Background	12.5	10.62	1.2
Average				1.3
Corrected value				27.43

BN14

Appendix B : uncorrected nitrogen dioxide data

Site ID	Jan	Feb	Mar	April	May	June	July	August	Sept	Oct	Nov	Dec
BN1	47.2	48.6	n/a	24.8	30.6	n/a	34.2	32.8	34.1	36.6	39.7	26.4
BN2	38.5	24.3	n/a	17.7	17.4	n/a	18.1	18.1	25.5	26.3	32.8	29.3
BN3	34.7	25.6	n/a	12.5	11.4	n/a	13.5	11.8	18.6	16.8	27.1	16.7
BN4	27.6	10.9	n/a	11.2	9.9	n/a	30.7	10.8	23.5	14.5	25	18.7
BN5	40.2	26.6	n/a	17.2	17.1	n/a	18.1	19.3	26.6	24.2	23.9	23.8
BN6	23.9	18	n/a	9.3	9.2	n/a	9.8	11.4	16.1	15.4	22.6	18.6
BN7	27.4	23	n/a	11.5	10.7	n/a	11.1	11.5	20.5	16.6	23.9	19.6
BN8	37.1	20.7	n/a	11.5	9.9	n/a	10.1	10.5	18.1	14.6	27	21.4
BN9	41.2	37.8	n/a	27.1	24.4	n/a	25.1	29.9	32.7	34.1	41.6	36.6
BN10	32.6	27.1	n/a	15.7	n/a	n/a	n/a	18.7	7.2	n/a	28.18	n/a
BN11	49.5	38.8	n/a	29.9	34.1	n/a	38.3	33.5	37.1	35.8	33.3	32.2
BN12	48.5	46.7	n/a	31.1	31.2	n/a	33.5	24.6	30.8	34.8	40.4	34.4
BN13	42	27.7	n/a	20.8	19.7	n/a	22.1	24.6	29	31.2	34.6	32.8
BN14	n/a	n/a	n/a	n/a	30.6	n/a	30.8	n/a	7.2	19.8	24.5	26.9
BN15	39.7	25.9	n/a	20.9	16.3	n/a	24.6	17.4	20.1	17.6	26.3	26
BN16	35	22.7	n/a	15.5	16.9	n/a	15.7	16.9	21.2	19.5	28.1	24.6