



2017 Air Quality Annual Status Report (ASR)

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

June 2017

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Executive Summary: Air Quality in Our Area

Air Quality in Broadland

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas^{1,2}.

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion³.

Air quality in Broadland is generally good, mainly because it is not an intensively built up or industrialised location and includes large rural areas. The majority of air pollution in the Broadland District Council area is associated with road traffic and in particular associated with queuing traffic on busy roads, mostly in the suburbs of Norwich. There are no Air Quality Management Areas (AQMA's) in the Broadland area. The monitoring undertaken has shown the concentrations observed are remaining below the air quality standard threshold.

Work on constructing the Norwich Northern Distributor Road is continuing with the road due to open in Winter 2017/18. The road should help ease queuing traffic on the radial routes out of Norwich into the Broadland area which should in-turn reduce air-pollution.

Actions to Improve Air Quality

Broadland District Council works closely with Norfolk County Council on initiatives to reduce pollution from road traffic. In addition improvements undertaken to improve air quality in the Norwich City area can also have a positive impact on air quality in Broadland. For example improving emissions from buses and improving existing or introducing new cycle routes into Norwich City.

¹ Environmental equity, air quality, socioeconomic status and respiratory health, 2010

² Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

³ Defra. Abatement cost guidance for valuing changes in air quality, May 2013

As stated above the Norwich Northern Distributor Road is due to open in Winter 2017/18 and should help ease queuing traffic on the radial routes around Norwich part of which are within the Broadland District Council area.

Conclusions and Priorities

Broadland District Council will continue to monitor nitrogen dioxide across the district over the coming year. Additional monitoring locations will be introduced during 2017 to consider air quality in areas that have previously not been monitored. As part of ensuring the monitoring carried out is relevant Broadland District Council will review the locations of the existing monitoring tubes to ensure the locations are appropriate. Broadland District Council also listens to concerns from residents and where appropriate tubes can be installed to monitor air quality where concerns have been raised.

Local Engagement and how to get Involved

For further information on air quality please contact us at: Environ.protection@broadland.gov.uk

If people would like to find out more about air quality in general there are a number of resources available on line. These include:

- The UK Government air website: <https://uk-air.defra.gov.uk/>
- The UK Governments air quality data archive: <https://uk-air.defra.gov.uk/data/>
- Air Quality England. A quick reference to air quality information for a variety of local authority areas across England: www.airqualityengland.co.uk
- Met Office Air Pollution web page: <http://www.metoffice.gov.uk/guide/weather/air-quality>

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1 Local Air Quality Management

This report provides an overview of air quality in Broadland District Council during 2016. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) 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 an exceedance is considered likely the local authority must 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. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Broadland District Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England can be found in Table E.1 in Appendix E.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMA's) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of the objectives.

Broadland District Council has no Air Quality Management Areas (AQMA's).

2.2 Progress and Impact of Measures to address Air Quality in Broadland

Defra's appraisal of last year's ASR was that the content of the report was fully acceptable. Defra has suggested Broadland District Council should consider reviewing the current location of tubes where the concentration recorded is very low to determine if there are issues elsewhere. The council could also outline how they plan to work with Public Health to consider PM_{2.5} concentrations.

Broadland District Council is currently reviewing its sampling locations for the NO₂ monitoring taking into consideration concerns raised by residents and traffic data provided by Norfolk County Council. As a first step in this process three new monitoring sites have been established in 2017 which will be considered as part of the 2018 ASR. In addition some tubes will be relocated at the end of the current sampling period in order to consider air quality in other currently unmonitored locations.

Broadland District Council is collating information on whether there is a need to carry out monitoring for PM_{2.5} and if so where the appropriate locations will be. A decision on the appropriate course of action will be reached in due course.

A number of projects have been undertaken within the Norwich and Broadland areas to improve traffic flow and as a consequence reduce concentrations of air pollutants. Projects to encourage using public transport and improve facilities for cycling and walking have also been undertaken. In addition action to improve air quality has seen retro-fitting improved emissions control systems carried out on some buses.

Work to increase the number of cycling and walking routes for residents and visitors to further improve sustainable transport facilities for people to use is also in progress.

Construction is also progressing of the Norwich North Distributor Road (NNDR). The NNDR is due to open in Winter 2017/18 and should help ease queuing traffic on the radial routes around Norwich a number of which are within the Broadland District area. Further examples of action that is being or has been undertaken that impacts air quality in the Broadland District Council area are given in Table 2.1.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Construction of Northern Distributor Road	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	Norfolk CC and DoT	Under construction	Completion due Winter 2017/2018	Individual take up	N/A	Construction in progress	Winter 2017/2018	re-routing through traffic around Norwich avoiding Ring road
2	Energy Efficiency of New Build Properties	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Property Developers	Completed	Completed	Reduction in energy bills and energy use	N/A	Implemented	On going	Reduction in energy bills and energy use
3	Replacement of old street light bulbs with energy efficient units	Policy Guidance and Development Control	Low Emissions Strategy	Broadland District Council	Completed	Completed	Reduction in energy bills and energy use	N/A	Implemented	On going	Reduction in energy bills and energy use
4	Promotion of cycling as a travel alternative	Promoting Low Emission Transport	Other	Norfolk County Council	Completed	On-going	Reduction in congestion and emissions	Aid in the overall reduction in emissions to air. Exact value not known	Implemented	On going	Improvements to existing cycle routes and establishment of new routes.

Broadland District Council

5	School Travel Plans	Promoting Travel Alternatives	School Travel Plans	Local Schools, Academies and Norfolk County Council	Completed	Completed	Reduction in congestion and emissions	Aid in the overall reduction in emissions to air. Exact value not known	Reports produced at several/all schools	Reviewed as required	Plans advocate the use of sustainable alternatives to the car for the 'school run'
6	Educating and Informing people on responsible driving and alternative transport modes	Promoting Travel Alternatives	Other	Norfolk County Council, Transport Providers and Local Authorities	Completed	Completed	Reduction in congestion and emissions	Aid in the overall reduction in emissions to air. Exact value not known	Ongoing	Ongoing	Norwich Area Transport Strategy
7	Promotion of local footpaths	Public Information	Via leaflets	Broadland District Council	Completed	Completed	Promoting local walks rather than travelling to walks in other locations	N/A	Completed	Completed	Reduction in recreational vehicle use
8	Energy Efficiency information available to residents	Public Information	Other	Broadland District Council	Completed	Completed	Reduction in energy bills and energy use	N/A	Completed	Completed	Updating information to keep it accurate
9	Cycle to Work scheme	Promoting Travel Alternatives	Promotion of cycling	Broadland District Council	Completed	Completed	Reduction in congestion and emissions	N/A	Ongoing	Ongoing	Providing means of supporting staff purchase sustainable alternative to car for journey to work.
10	Payment of mileage allowance for using bicycle for work travel	Promoting Travel Alternatives	Promotion of cycling	Broadland District Council	Completed	Completed	Reduction in congestion and emissions	N/A	Ongoing	Ongoing	Endorsing alternative to car use for work journeys

2.3 PM_{2.5} – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of PM_{2.5} (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM_{2.5} has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Levels of PM_{2.5} are in general lower in rural areas of the district and potentially higher in more urban areas. The dominant source of particulate matter in Broadland is from road traffic, particularly along the radial routes out of Norwich into Broadland towns and villages.

The measures taken by Norfolk County Council to address pollution from buses in and around Norwich should also have an impact on reducing PM_{2.5} levels in Broadland. Norfolk County Council has been working with bus operators to retrofit selected buses with improved emission control systems including particulate traps. Drivers are also been encouraged to adopt 'eco driving' styles and training and in-cab systems have been installed to assist with this. In addition the introduction of newer buses with better exhaust treatment systems will also bring an improvement in air quality.

The opening of the NNDR in winter 2017/18 is also likely to ease queuing on the radial routes around Norwich, including those in the Broadland area.

Broadland District Council is collating information on whether there is a need to carry out monitoring for PM_{2.5} within its area and if a need is identified where the appropriate monitoring locations would be. A decision on the appropriate course of action to take will be reached in due course.

Broadland District Council along with the other Norfolk Local Authorities is a member of the Norfolk Environmental Protection Group's Air Quality Sub-Group. The group undertakes regular 2-way engagement with representatives of Public Health England and the Director of Public Health at Norfolk County Council. The meetings also include representatives from Norfolk County Council's Planning and Transportation department. The purpose of these regular meetings is to share knowledge on local air quality concerns, discuss future projects and plans and

ensure that all parties are aware of the actions being taken by other organisations to improve air quality.

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

There are no automatic monitoring sites within the Broadland District Council area and as a consequence no automatic monitoring is carried out by Broadland District Council within the Broadland area.

3.1.2 Non-Automatic Monitoring Sites

Broadland District Council undertook non-automatic (passive) monitoring of NO₂ at 16 sites during 2016. Table A.1 in Appendix A gives details of the monitoring locations. Table A.2 provides details of the percentage data capture for each location as well as the raw and bias adjusted annual mean for each location. The full data for each location is provided in Appendix B. Further Details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

A map showing the location of the monitoring sites is provided in Appendix D. No changes were made to the monitoring locations during the 12 months covered by this report. No changes have been made in how Broadland District Council undertakes the installation and collection of the tubes. The laboratory used to carry out analysis of the monitoring tubes has not made any changes to the method used to analyse the tubes.

3.2 Individual Pollutants

Broadland District Council carries out monthly analysis of NO₂ concentrations at a number of locations across the Broadland District. This has been carried out for several years and the data collated. The data is reviewed annually to determine if the concentration recorded at any location is above the threshold of 40µg/m³. In addition the data for 2016 is compared with previous year's data to assess whether any patterns or trends are shown.

3.2.1 Nitrogen Dioxide (NO₂)

Table A.2 in Appendix A compares the bias adjusted and annualised (where this has been required) monitoring results for NO₂ for the past 5 years with the air quality objective of 40µg/m³. The full 2016 data set including the raw data as well as the raw and bias adjusted annual means is given in Appendix B.

The results for 2016 show no exceedances of the air quality objective value of 40µg/m³ at any of the monitoring locations.

The results for 2016 show a marginal increase over the 2015 results. Table A.2 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³.

In all locations except one all of the monitoring data was collected. At BN8 (Hansell Road) the sample for February 2016 was not collected due to the NO₂ tube being removed. As a consequence the percentage of samples collected at BN8 was 92%. As the level of data was above the 75% minimum at all locations no annualisation of the data was required.

The results for 2016 show a slight increase in the concentration of NO₂ recorded compared with 2015 at a number of monitoring points. Appendix F provides a table and graph of the monitoring results for all locations monitored from 2010 – 2016. In addition further graphs are included to demonstrate the changes in NO₂ concentration recorded in 2010, 2012, 2014 and 2016.

When the 2016 results are compared to the results for 2010 the latest results are noticeably lower than those from 2010 at most monitoring locations. Similarly, the results for 2012 can be considered the highest recorded in the Broadland area throughout the monitoring carried out so far. Therefore comparing the overall results for 2016 with those for 2012 there is an improvement in air quality in 2016.

Research to try and identify a possible source of the increased NO₂ has found there was an increase in traffic in the district in 2016 compared to 2015.

Congestion due to road works may also have made a contribution. An increase in NO₂ for 2016 is not enough evidence to indicate a sustained reduction in air quality. While there has been a slight increase in NO₂ concentrations in some locations during 2016 monitoring period the overall concentration of NO₂ continues to show a decline since 2012. The results of the monitoring undertaken during

Broadland District Council

2016 shows the level of NO₂ at all locations was below the threshold of 40µg/M³ set by DEFRA. Therefore no areas need to be considered in more detail at this time and Broadland District Council has not identified anywhere that an AQMA is required. Broadland District Council will continue to monitor NO₂ concentrations in order to assess the air quality in the district.

Appendix A: Monitoring Results

Table A.1 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
BN1	A47 North Burlingham	Kerbside	636268	310000	NO2	NO	231	1	NO	2.09
BN2	Norwich Rd. Acle	Kerbside	639713	310237	NO2	NO	24	1	NO	2.17
BN3	Cox Hill Beighton	Kerbside	638094	308891	NO2	NO	417	1	NO	2.2
BN4	Hillside Avenue Thorpe St. Andrew	Roadside	626911	308738	NO2	NO	0	2	NO	2.57
BN5	Dussingdale Drive Thorpe St. Andrew	Kerbside	627755	309440	NO2	NO	0	2	NO	2.48
BN6	Breck Rd. Sprowston	Roadside	626313	311010	NO2	NO	0	2	NO	2.34
BN7	Heath Cres. Hellesdon	Roadside	621539	312522	NO2	NO	0	2	NO	1.4
BN8	Hansell Rd. Thorpe St. Andrew	Kerbside	627003	309849	NO2	NO	0	2	NO	2.32
BN9	Chartwell Rd. Old Catton	Roadside	622938	311399	NO2	NO	0	2	NO	2.09
BN10	Yarmouth Rd. Thorpe St. Andrew	Roadside	625264	308411	NO2	NO	76	2	NO	2.82
BN11	Reepham	Kerbside	621642	311622	NO2	NO	0	8	NO	2.32

	Rd. Hellesdon									
BN12	10A Boundary Rd. Hellesdon	Kerbside	621698	311565	NO2	NO	0	6	NO	2.03
BN13	213 Milecross Ln. Hellesdon	Roadside	321811	311636	NO2	NO	0	5	NO	1.97
BN14	Berrington Rd. Hellesdon	Kerbside	621690	311758	NO2	NO	0	1	NO	2.21
BN15	Wroxham Library Norwich Rd.	Roadside	630182	318042	NO2	NO	16	2	NO	2.1
BN16	The Avenue Wroxham	Kerbside	329887	317575	NO2	NO	35	2	NO	2.1

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property).

(2) N/A if not applicable.

Table A.2 – Annual Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2012	2013	2014	2015	2016
BN1	Kerbside	Diffusion Tube	100	100	35.6	33.7	30.8	28.4	30.6
BN2	Kerbside	Diffusion Tube	100	100	24.3	23.5	21.6	18.3	19.3
BN3	Kerbside	Diffusion Tube	100	100	14.7	17.9	16.5	13.3	14.4
BN4	Roadside	Diffusion Tube	100	100	16.9	17.4	14.6	12.7	14.9
BN5	Kerbside	Diffusion Tube	100	100	23.7	22.5	22	20.2	20.5
BN6	Roadside	Diffusion Tube	100	100	15.7	14.6	13.8	12.7	12.5
BN7	Roadside	Diffusion Tube	100	100	16.1	15.8	15.5	13.6	14
BN8	Kerbside	Diffusion Tube	92	92	18.1	17.2	15.4	11.8	12.8
BN9	Roadside	Diffusion Tube	100	100	33.5	31.4	23.4	28.3	29.4
BN10	Roadside	Diffusion Tube	100	100	28.7	27.4	22.7	20.6	20
BN11	Kerbside	Diffusion Tube	100	100	38.6	34.5	34.3	30.1	31.9
BN12	Kerbside	Diffusion Tube	100	100	36.4	33.8	33.5	29.2	30.5
BN13	Roadside	Diffusion Tube	100	100	30.4	27	25.8	24.4	24.8
BN14	Kerbside	Diffusion Tube	100	100	25.2	24.7	17.6	16	16.2
BN15	Roadside	Diffusion Tube	100	100	23.8	22.3	21.7	16.3	17.4
BN16	Kerbside	Diffusion Tube	100	100	21.9	20.5	19.2	17	18.2

☒ Diffusion tube data has been bias corrected

☒ Annualisation has been conducted where data capture is <75%

☐ If applicable, all data has been distance corrected for relevant exposure

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

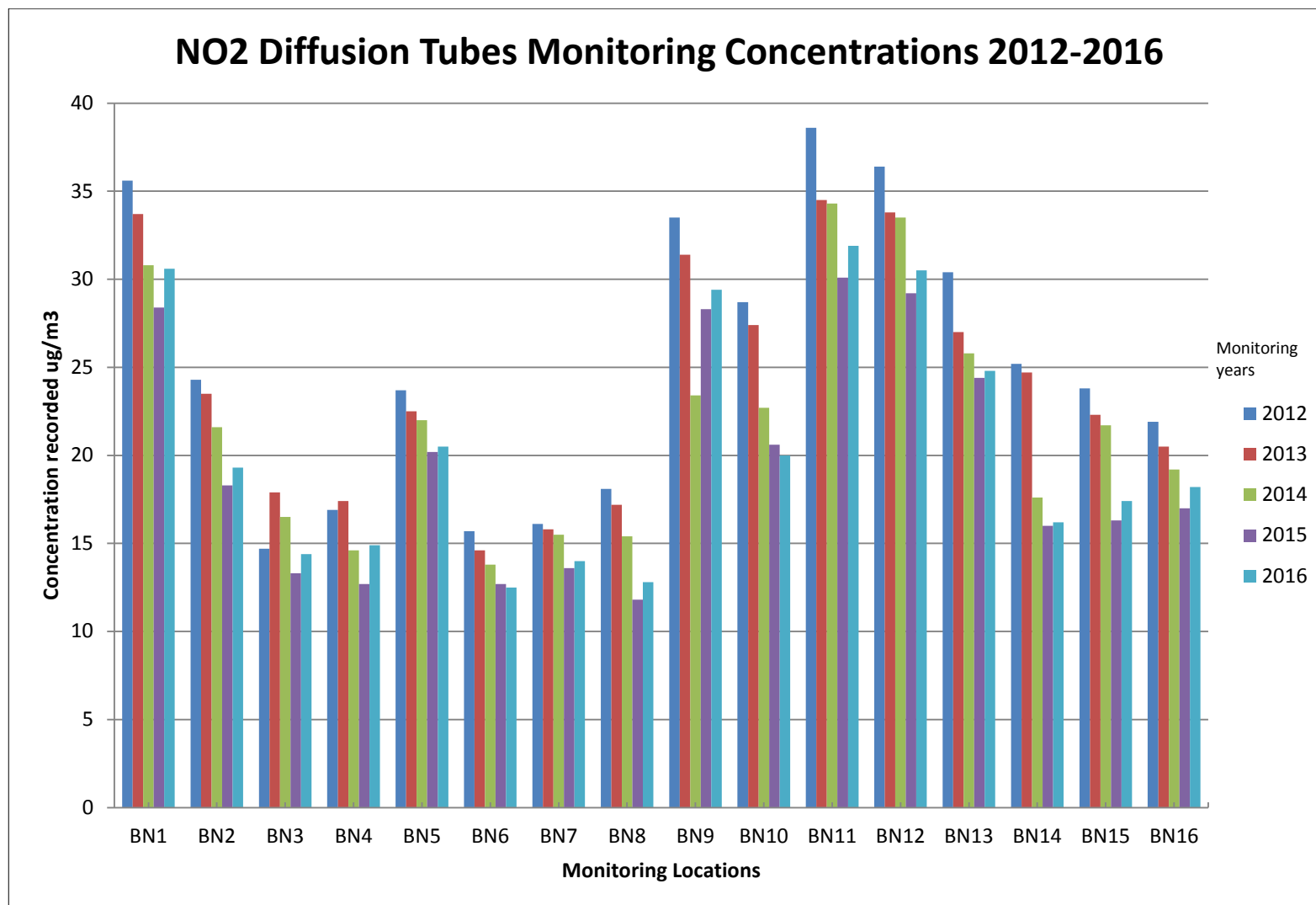
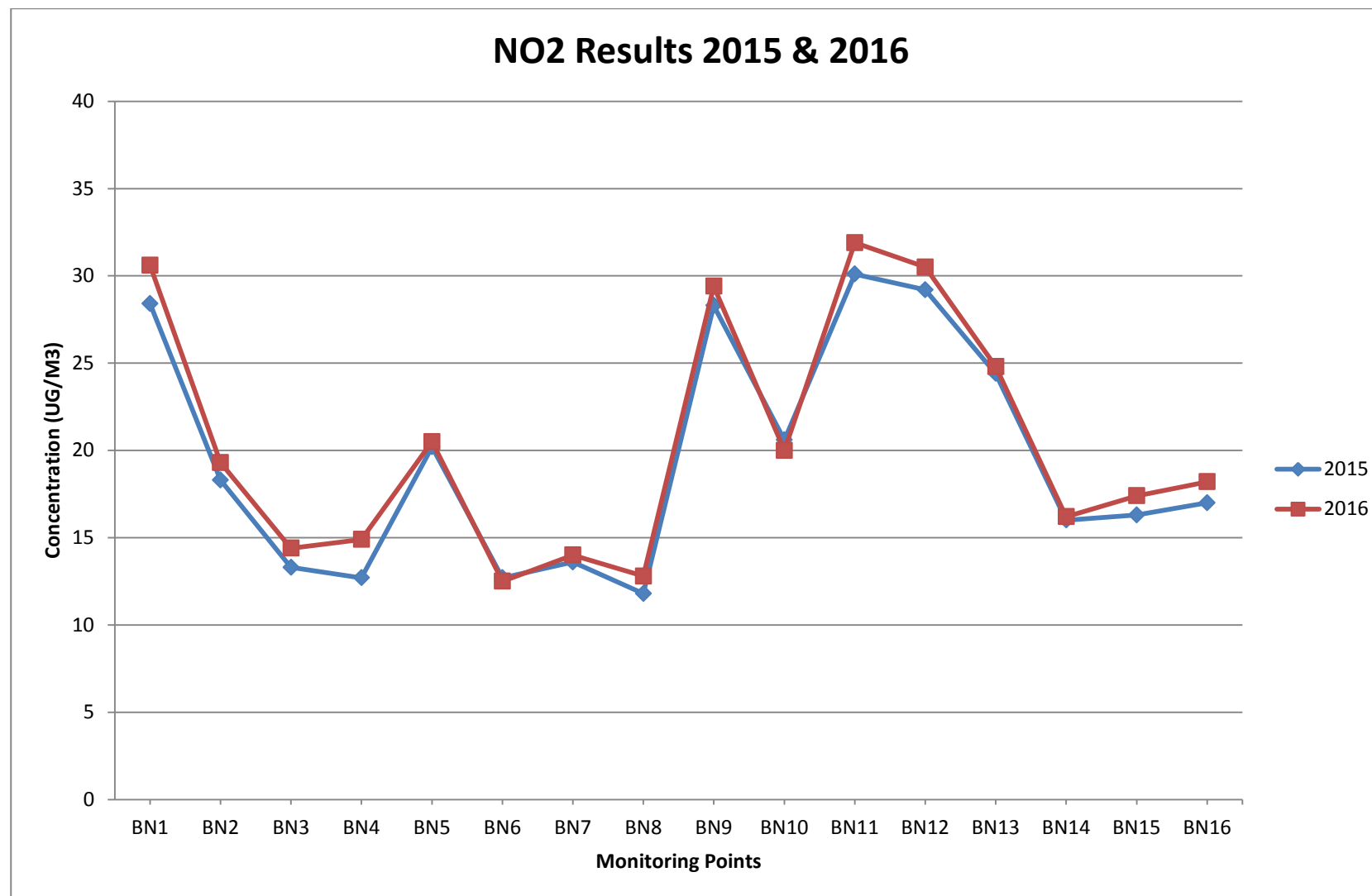
Figure A.1 – Trends in Annual Mean NO₂ Concentrations

Figure A.2 Comparison of NO₂ results for 2015 and 2016.

Appendix B: Full Monthly Diffusion Tube Results for 2016

Table B.1 – NO₂ Monthly Diffusion Tube Results - 2016

Site ID	NO ₂ Mean Concentrations (µg/m ³)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (factor) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
BN1	33.5	27.9	24.1	32.5	27.0	33.2	37.5	35.1	17.5	40.1	48.1	38.1	32.9	30.6	231.00
BN2	24.2	19.7	16.3	18.9	12.9	17.0	17.6	20.5	9.0	27.5	35.6	29.0	20.7	19.3	24.00
BN3	13.6	15.82	11.3	14.88	11.73	10.19	9.79	14.91	7.57	20.18	31.45	23.34	15.4	14.4	417.00
BN4	18.1	18.74	12.1	10.19	7.55	26.55	5.81	12.24	7.12	21.28	28.85	23.76	16.0	14.9	0.00
BN5	21.5	25.3	19.15	20.05	16.52	17.82	17.73	21.95	10.66	27.78	36.87	28.86	22.0	20.5	0.00
BN6	17.5	14.92	9.12	10.58	6.4	8.01	8.79	10.56	5.54	20.61	25.46	23.46	13.4	12.5	0.00
BN7	17.0	19.56	10.81	11.93	8.26	10.08	9.54	13.73	7.84	18.23	29.42	23.74	15.0	14.0	0.00
BN8	15.2		11.3	12.09	7.07	8.34	8.95	11.95	6.33	19.89	27.15	23.57	13.8	12.8	0.00
BN9	36.9	36.12	25.97	31.91	27.08	30.67	28.4	27.35	14.39	38.42	43.34	38.85	31.6	29.4	0.00
BN10	26.4	24.96	17.8	18.43	0.42	26.55	18.09	17.17	11.91	27.96	36.24	31.89	21.5	20.0	0.00
BN11	38.5	37.65	28.39	36.32	29.98	29.76	24.8	31.04	18.63	41.76	53	41.39	34.3	31.9	0.00
BN12	30.2	42.01	34.43	34.69	29.6	24.65	22.5	30.8	16.76	40.12	49.61	37.76	32.8	30.5	0.00
BN13	33.8	28.72	22.49	23.94	17.39	24.81	20.67	27.54	13.71	32.49	42.23	31.83	26.6	24.8	0.00
BN14	24.6	16.5	14.06	12.62	7.25	11.85	9.83	14.65	7.66	25.41	34.43	29.66	17.4	16.2	0.00
BN15	17.8	20.3	14.15	17.89	19.14	13.81	14.05	18.14	9.21	23.21	34.03	23.16	18.7	17.4	16.00
BN16	23.7	21.98	15.29	16.18	14.99	16.21	13.34	17.75	9.56	25.13	31.72	28.11	19.5	18.2	35.00

- ☐ Local bias adjustment factor used
- ☒ National bias adjustment factor used
- ☐ Annualisation has been conducted where data capture is <75%

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

(1) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure.

Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

Diffusion Tubes Bias Adjustment Factors

Broadland District Council's diffusion tubes are prepared and analysed by Gradko International using 20% TEA in water. No automatic monitoring was undertaken in Broadland. The Bias adjustment factor used in this document was derived from the latest version of the national database co-location studies available on the LAQM website at: <https://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html>.

The above website gave an adjustment factor of 0.97 for 2016.

Short-term to Long-term Data Adjustment.

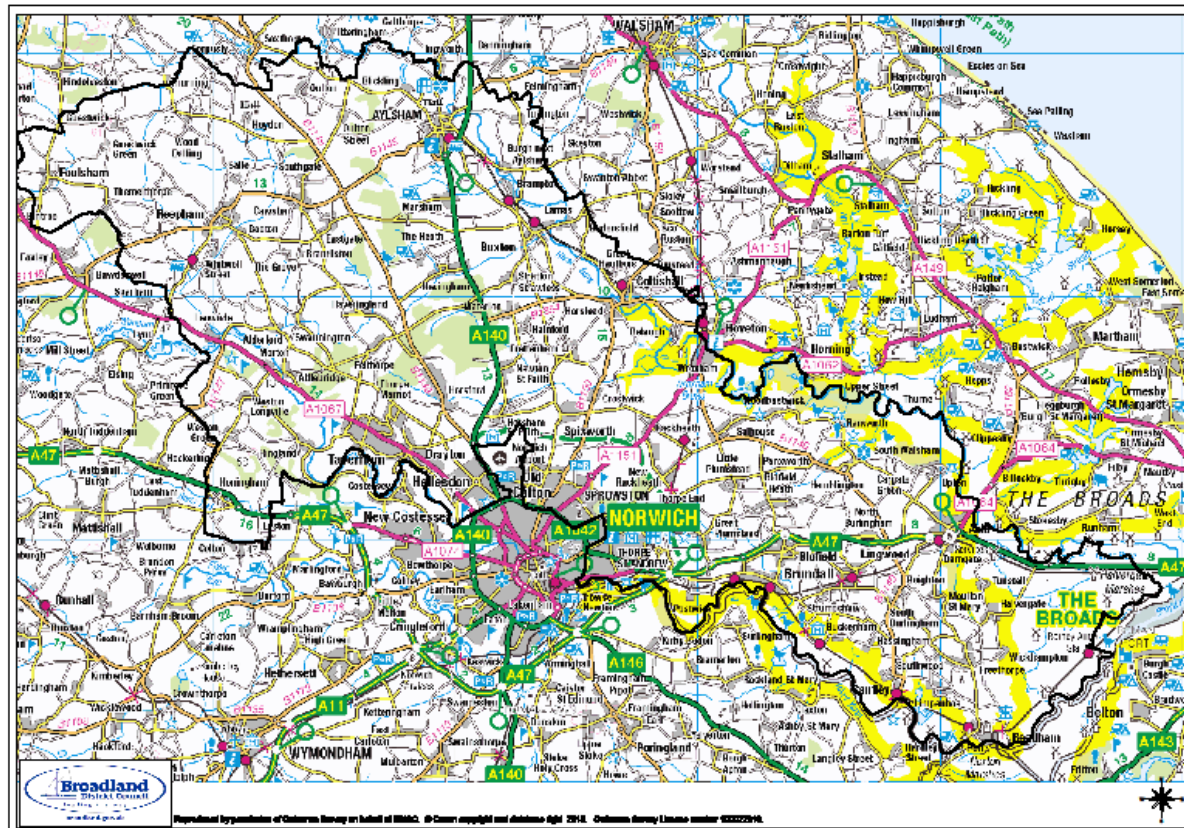
No location produced less than 75% site data. Therefore no data adjustment was required for any locations for the 2016 monitoring period.

QA/QC of Diffusion Tubes Monitoring

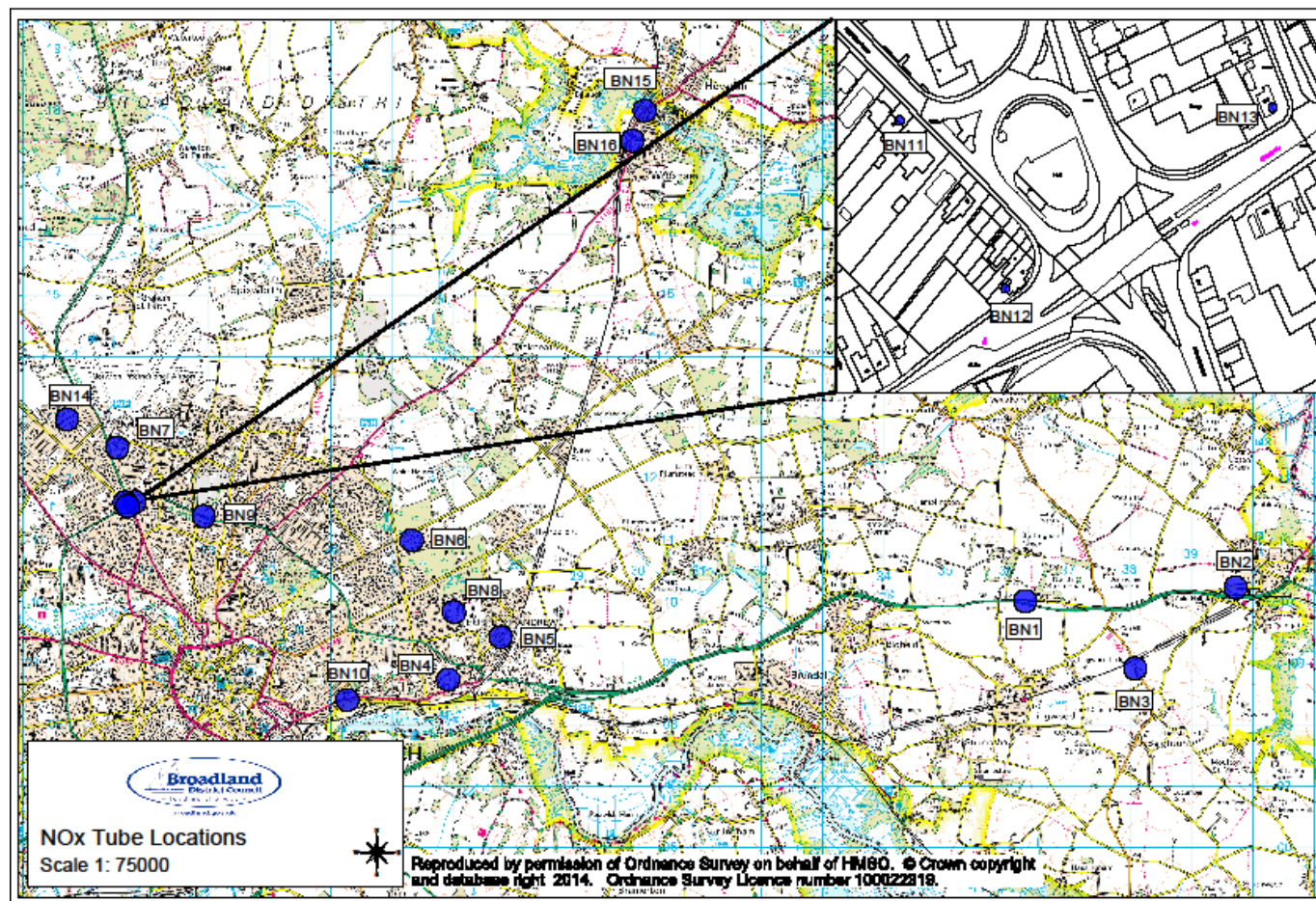
The diffusion tubes used by Broadland District Council are prepared and analysed by Gradko International using the 20%TEA in water method. The laboratory has demonstrated good data precision during 2016 and their analysis performance has been deemed 100% by the AIR-PT assessment scheme (formerly the WASP assessment scheme).

Appendix D: Map(s) of Monitoring Locations and AQMAs

Map 1 Location of Broadland District in Norfolk



Map 2 Location of NO₂ monitoring points in the Broadland area



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

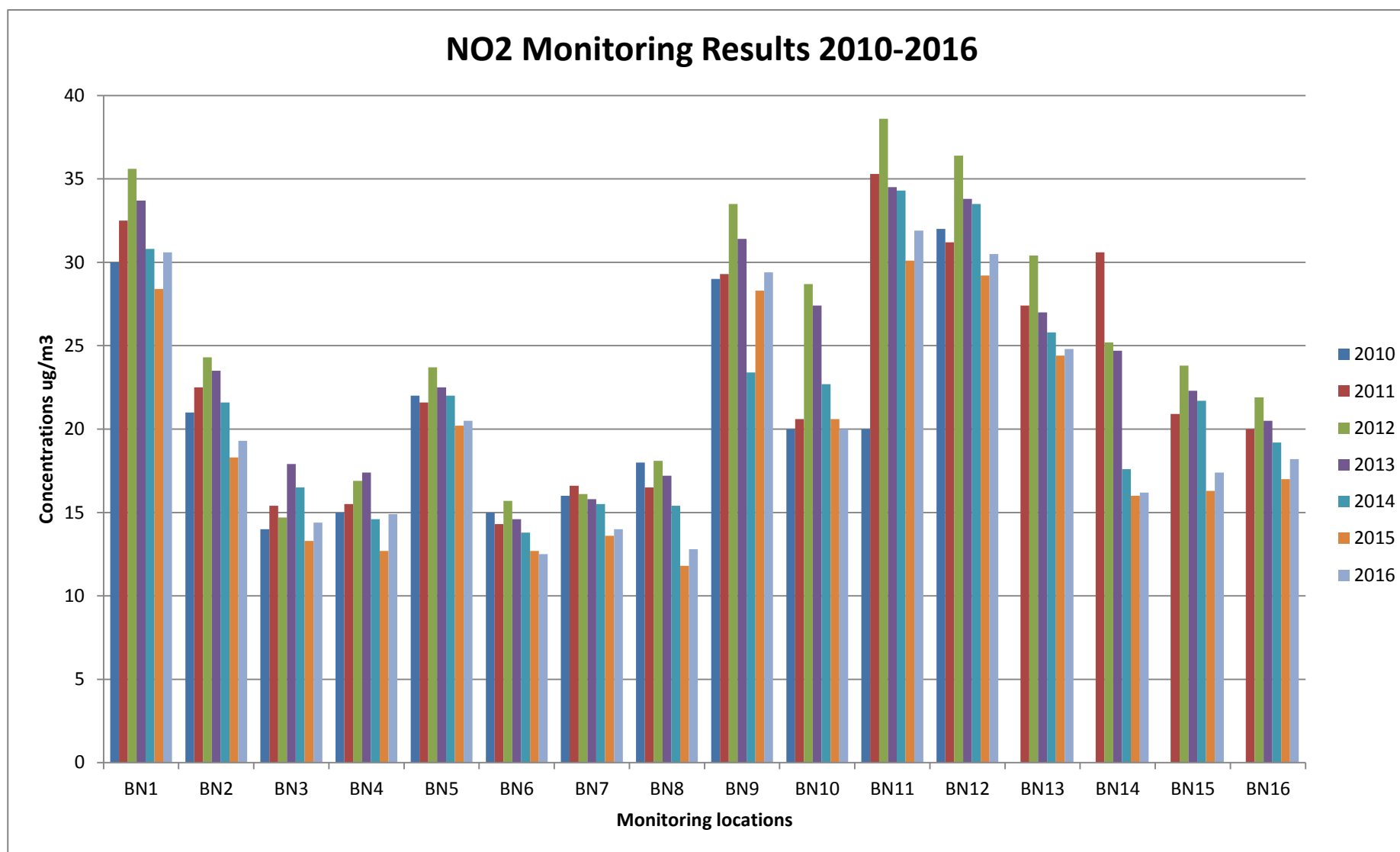
Pollutant	Air Quality Objective ⁴	
	Concentration	Measured as
Nitrogen Dioxide (NO ₂)	200 µg/m ³ not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m ³	Annual mean
Particulate Matter (PM ₁₀)	50 µg/m ³ , not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m ³	Annual mean
Sulphur Dioxide (SO ₂)	350 µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m ³ , not to be exceeded more than 35 times a year	15-minute mean

⁴ The units are in micrograms of pollutant per cubic metre of air (µg/m³).

Appendix F: Results of Monitoring 2010- 2016

Table F.1 – Results of NO₂ monitoring at all sampling points 2010- 2016 (all results in µg/m³)

Site ID	Site Type	Within AQMA?	2010 Bias Adj. *0.75	2011 Bias Adj. *0.84	2012 Bias Adj. *0.87	2013 Bias Adj. *0.95	2014 Bias Adj. *0.91	2015 Bias Adj. *0.91	2016 Bias Adj. *0.97
BN1	Kerbside	N/A	30	32.5	35.6	33.7	30.8	28.4	30.6
BN2	Kerbside	N/A	21	22.5	24.3	23.5	21.6	18.3	19.3
BN3	Kerbside	N/A	14	15.4	14.7	17.9	16.5	13.3	14.4
BN4	Roadside	N/A	15	15.5	16.9	17.4	14.6	12.7	14.9
BN5	Roadside	N/A	22	21.6	23.7	22.5	22	20.2	20.5
BN6	Roadside	N/A	15	14.3	15.7	14.6	13.8	12.7	12.5
BN7	Roadside	N/A	16	16.6	16.1	15.8	15.5	13.6	14
BN8	Roadside	N/A	18	16.5	18.1	17.2	15.4	11.8	12.8
BN9	Roadside	N/A	29	29.3	33.5	31.4	23.4	28.3	29.4
BN10	Roadside	N/A	20	20.6	28.7	27.4	22.7	20.6	20
BN11	Roadside	N/A	20	35.3	38.6	34.5	34.3	30.1	31.9
BN12	Roadside	N/A	32	31.2	36.4	33.8	33.5	29.2	30.5
BN13	Roadside	N/A		27.4	30.4	27	25.8	24.4	24.8
BN14	Roadside	N/A		30.9	25.2	24.7	17.6	16	16.2
BN15	Roadside	N/A		20.9	23.8	22.3	21.7	16.3	17.4
BN16	Roadside	N/A		20	21.9	20.5	19.2	17	18.2
Air Quality Threshold			40	40	40	40	40	40	40

Graph F.1 – Results of NO₂ monitoring at all sampling points 2010 - 2016 (all results in µg/m³)

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO ₂	Sulphur Dioxide
...	...

References

National Bias Adjustment factor: <https://lagm.defra.gov.uk/bias-adjustment-factors/national-bias.html>

National Traffic Data: <https://www.dft.gov.uk/traffic-counts/area.php?regions=East+of+England&la=Norfolk>

Norwich Area Transport Strategy and associated reports