



2018 Air Quality Annual Status Report (ASR)

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

June 2018

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Executive Summary: Air Quality in Our Area

Air Quality in Broadland District Council

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 area but it is a district that includes large rural areas. Air pollution in the Broadland District Council area is mainly associated with road traffic and in particular with queuing traffic on busy roads mostly in the suburbs of Norwich. There are no Air Quality Management Areas (AQMA's) in Broadland. The monitoring undertaken has been for NO₂ and the concentrations recorded remain below the air quality standard in the Regulations.

The primary work on the construction of the Norwich Northern Distributor Road (NDR) also known as the Broadland Northway together with the associated cycle paths is now complete and the road is being used as an alternative to the Norwich Outer Ring Road. Plans are being developed to extend the Broadland Northway from its current western limit to join with the A47. If the extension is constructed it will offer a range of new routes to and from the Broadland area, north Norwich and North Norfolk and reduce the traffic demand on the outer Ring Road. The extension is at the preliminary stages and a consultation on the need for this new road is expected soon.

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

Actions to Improve Air Quality

While Broadland District Council does not have any AQMA's the authority continues to seek to improve air quality through a number of schemes. Broadland is working with the other authorities within the Greater Norwich Growth Area (Norwich City Council, South Norfolk Council and Norfolk County Council) to look at methods of reducing the impact of traffic emissions on air quality. Projects such as replacing engines on older buses with more efficient less polluting ones will see improvements in air quality. Further details of work to reduce emission to air within the Broadland District Council area are given in section 2.

Conclusions and Priorities

Broadland District Council will continue to monitor nitrogen dioxide across the district. Additional monitoring sites have been introduced in 2017. Further alterations to monitoring locations will be made in 2018 and beyond as required to ensure monitoring considers air quality where the potential for it to be poor is greatest.

Broadland District Council will also determine whether there is a need to carryout monitoring for PM_{2.5} and if there are any locations where monitoring should be carried out.

The ASR for 2017 was accepted by DEFRA with recommendations to relocate NOx tubes to more appropriate locations where necessary. This has been done and a number of tubes have been moved to areas where the risk of exposure to poor air quality may be high. In addition three new tubes have been installed at locations where either residents have raised concerns about air quality or where the Norfolk County Council traffic queuing data suggests potential poor air quality from stationary vehicles.

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 like. These include:

<https://uk-air.defra.gov.uk/> (the UK government air website)

<https://air-uk.defra.gov.uk/data/> (the UK Government air quality archive)

www.airqualityengland.co.uk (air quality England. A quick reference to A.Q. information for a variety of local authority areas across England)

www.metoffice.gov.uk/guide/weather/air-quality (Met Office air pollution web page)

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1 Local Air Quality Management

This report provides an overview of air quality in Broadland District Council during 2017. 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 (AQMAs) 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 compliance with the objectives.

Broadland District Council currently does not have any AQMAs. For reference, a map of Broadland District Council's monitoring locations is available in Appendix D.

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

Defra's appraisal of last year's ASR concluded that the report accurately reflected the air quality at the monitoring points. The changes proposed by Broadland District Council last year to the monitoring locations was welcomed by DEFRA who recommended changes to locations BN1 and BN3 to be closer to receptors. BN3 has been relocated from 2018 and it is planned to relocate BN1 from 2019 onwards.

Broadland District Council has taken forward a number of measures during 2017 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.1.

More detail on these measures can be found in their respective Action Plans. Key completed measures are:

- Completion of the Norwich Northern Distributor Road (Broadland Northway) from A47 Postwick to A1067 Fakenham Road in Attlebridge.
- Review of current NOX tube locations and relocate as appropriate.
- Introduction of new NOX tube locations at key traffic queueing junctions (based on Norfolk County Council traffic flow data) and where concern about air quality has been raised by residents.

Broadland District Council's priorities for the coming year are:

- Promoting sustainable travel alternatives to the car. Broadland District Council is working in conjunction with the other authorities within the Greater

Norwich Project area to develop walking and cycling routes for journeys to work.

- Development of the Greater Norwich Air Quality Working Group. Increasing collaborative working with the Greater Norwich Area authorities to investigate ways of reducing the impact of vehicle emissions on air quality.

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 Norwich Northern Distributor Road (A47 to A1067)	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 County Council and D.o.T.	Completed	Completed	Individual uptake	N/A	Constructed and in operation	April 2018	Re-routing traffic from Norwich Outer ring-road and join Norwich Southern by-pass to key routes north of Norwich
2	Energy Efficiency of New Build Properties	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Property Developers	Completed	Completed	Reduction of energy bills and energy use	N/A	Implemented	On going	Reduction of energy bills and energy use
3	Replacement of old street lights and associated light bulbs with energy efficient units	Policy Guidance and Development Control	Low Emissions Strategy	Broadland District Council, Parish and Town Councils and Norfolk County Highways	Completed	On going	Reduction of energy bills and energy use	N/A	On going	On going	Reduction of energy bills and energy use

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4	Promoting cycling as an alternative to the car	Promoting Low Emission Transport	Other	Norfolk County Council	Completed	On going	Reducing congestion and vehicle emissions	N/A	On going	On going	Improvements to cycle routes, establishing new routes, highlighting benefits of cycling to work
5	School Travel Plans	Promoting Travel Alternatives	School Travel Plans	Norfolk County Council, MAT's and individual schools	On going	On going	Reducing emissions and congestion	N/A	On going	On going	Reducing emissions and congestion
6	Alternative transport methods	Alternatives to private vehicle use	Other	Norfolk County Council, Local Authorities, Transport Providers	Completed	On going	Reducing congestion and vehicle emissions	N/A	On going	On going	Reducing emissions and congestion
7	Educating drivers on responsible driving techniques	Other	Other	Norfolk County Council	Completed	On going	Reducing Vehicle emissions and energy use and promoting safe driving techniques	N/A	On going	On going	Reducing emission and energy use and promoting safe driving techniques
8	Energy efficiency information for residents	Public Information	Via leaflets	Broadland District Council	Completed	Completed	Reducing emissions and energy use	N/A	Providing information when requested	On going	Reducing emissions and energy use
9	Link authority for the E.C.O (Energy Company Obligation) scheme	Public Information	Other	Broadland District Council and All L.A's	Completed	Completed	Reducing emissions and energy use	N/A	Providing information when requested	On going	Reducing emissions and energy use
10	Health Improvement Grants	Other	Other	Broadland District Council	Completed	Completed	Reducing emissions and energy use and improving residents health and well being	N/A	On going	On going	Reducing emissions and energy use and improving residents health and well being
11	Warm Homes Fund	Other	Other	Broadland District Council and some housing associations	On going	Planning	Reducing emissions and energy use and improving residents health and well being	N/A	Planning	On going	Reducing emissions and energy use and improving residents health and well being

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12	Greater Norwich Air Quality Working Group	Other	Other	Broadland District Council, South Norfolk Council, Norwich City Council, Norfolk County Council	On going	Planning	Collaborative working to improve air quality within the Greater Norwich Area through various projects and initiatives	T.B.C	Planning	On going	Collaborative working to improve air quality within the Greater Norwich Area through various projects and initiatives
13	Construction of the remaining section of the Norwich Northern Distributor Road from A1067 to A47 west of Norwich	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 County Council	Planning Phase	Planning	Individual uptake	N/A	Planning	On going	Re-routing traffic from Norwich Outer ring-road and join Norwich Southern by-pass to key routes north of Norwich
14	National Cycle Scheme	Alternatives to private vehicle use	Other	Broadland District Council	On going	On going	Individual uptake	N/A	On going	On going	Reducing emissions and congestion
15	Community Rail Partnerships	Promoting Travel Alternatives	Promote use of rail and inland waterways	Norfolk Community Rail Partnership	On going	On going	Individual uptake	N/A	On going	On going	Reducing emissions and congestion

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.

Broadland District Council is taking the following measures to address PM_{2.5}:

Using DEFRA background concentration data to consider PM_{2.5} levels across the district and identify areas of elevated concentrations. The 2010, 2011, 2013 and 2015 data have been used to assess if the background concentrations are above the EU threshold. The next step will be to determine whether there is a need to carry out monitoring for PM_{2.5} and if so where.

There is currently no threshold value for PM_{2.5} in England. The EU directive from which the English Air Quality Regulations are derived gives a threshold of 25ug/m³ Annual mean. The background review has not identified any locations where the background concentrations exceed the EU threshold. The result for 2015 shows improvements in PM_{2.5} across the district when compared to the results for 2010, 2011 and 2013. The variation in the background concentrations suggests that there may be areas where the background level of PM_{2.5} combined with other anthropogenic sources may increase the concentration. Therefore further investigation of this parameter is required to ascertain if monitoring is required and where the monitoring locations would be best located.

The opening of the Broadland Northway is likely to see significant changes in traffic movements in North Norwich and the urban fringe which forms part of the Broadland District Council area. Further assessment and traffic studies will be undertaken in association with Norfolk County Council. Broadland District Council will also be investigating the need to carry out specific PM_{2.5}.

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

3.1 Summary of Monitoring Undertaken

3.1.1 Non-Automatic Monitoring Sites

Broadland District Council undertook non- automatic (passive) monitoring of NO₂ at 19 sites during 2017. Table A. in Appendix A.1 shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. “annualisation” and/or distance correction), are included in Appendix C. Broadland District Council has undertaken a review of the monitoring locations. Initially the review has considered whether the monitoring points are likely to be obstructed, for example by foliage. This has resulted in some tubes being moved away from obstructions. In addition three new monitoring points have been installed. 2 are locations where traffic queuing data provided by Norfolk County Council showed long periods of standing traffic (Middletons Lane and the Yarmouth Road, Pound Lane junction). The third location was installed at the request of local residents concerned about the amount of slow moving traffic close to a primary school (School Road Dayton). Further reviews of sampling points will be undertaken to make sure the locations remain relevant. Where it is felt that the monitoring points are no longer relevant the tube will be relocated.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, “annualisation” and distance correction. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO₂)

Table A.1 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.

For diffusion tubes, the full 2017 dataset of monthly mean values is provided in Appendix B.

No exceedances of the air quality threshold for NO₂ have been identified in the 2017 monitoring data. In general there has been an overall decline in NO₂ concentrations since monitoring began in 2010. However, there has been an increase in the concentrations noted at 6 of the monitoring locations. The increases range from 0.2ug/m³/yr at BN16 (The Avenues, Wroxham) to 2.4ug/m³/yr at BN8 (Hansell Road, Thorpe St. Andrew). At all of these locations (except BN9 Chartwell Road, Old Catton) there has been an increase in concentration recorded from 2015. At BN9 the increase is from 2014. Despite these increases in the concentration the results from all of the monitoring points are below the 40ug/m³ threshold. The highest recorded concentration was at BN11 (Reepham Road, Hellesdon) at 33.9mg/m³. The Broadland Northway is expected to see changes in traffic flow to the north and east of Norwich as commuters and other road users find alternative routes to their destinations which avoids use of the ringroad and routes through the urban Broadland area.

The overall recorded levels of NO₂ have reduced in 2017 compared to 2016 at all other monitoring points other than those stated above and BN3 (Cox's Hill Beighton) which remained unchanged.

3.2.2 Particulate Matter (PM_{2.5})

Broadland District Council does not currently undertake monitoring for PM_{2.5} but has undertaken an initial review of the DEFRA background concentration data. The review has looked at the background concentration data from the DEFRA website for 2010, 2011, 2013 and 2015. There is currently no UK air quality threshold for PM_{2.5} so this review has used the EU threshold of 25ug/m³. The initial assessment against the EU threshold has not identified any locations within Broadland where the background concentrations exceed the threshold. However, there may be locations where the introduction of anthropogenic sources of PM_{2.5} to the background concentrations could require further assessment. Broadland District Council will therefore review this parameter further in order to determine whether there are locations that may benefit from monitoring.

Appendix A:

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	11	3	NO	1.8
BN2	Norwich Rd Acle	Kerbside	639713	310237	NO2	NO	25	2	NO	2.5
BN3	Cox's Hill Beighton	Rural	638094	308891	NO2	NO	2	2	NO	2
BN4	Hillside Avenue Thorpe St. Andrew	Suburban	626911	308738	NO2	NO	10	1	NO	3
BN5	Dussingdale Drive	Suburban	627755	309440	NO2	NO	19	2	NO	2.5
BN6	Breck Road Sprowston	Suburban	626313	311010	NO2	NO	13	2	NO	2.5
BN7	17 Heath Crescent Hellesdon	Suburban	621539	312522	NO2	NO	0	7	NO	1.5
BN8	Hansell Road Thorpe St. Andrew	Kerbside	627003	309849	NO2	NO	9	1	NO	2
BN9	Chartwell Road Old Catton	Roadside	622938	311399	NO2	NO	10	9	NO	2
BN10	Yarmouth Road Thorpe St. Andrew	Roadside	625264	308411	NO2	NO	2	10	NO	3

BN11	21 Reepham road Hellesdon	Suburban	621642	311622	NO2	NO	0	8	NO	2
BN12	10A Boundary Road Hellesdon	Suburban	621698	311565	NO2	NO	0	8	NO	2
BN13	213 Milecross Lane Hellesdon	Suburban	321811	311636	NO2	NO	0	10	NO	2
BN14	Berrington road Hellesdon	Suburban	621690	311758	NO2	NO	9	1	NO	2
BN15	Wroxham Library Norwich Rd Wroxham	Roadside	630182	318042	NO2	NO	19	2	NO	3
BN16	The Avenue Norwich Road Wroxham	Roadside	329887	317575	NO2	NO	13	7	NO	2
BN17	School Road Drayton	Suburban	617794	314204	NO2	NO	10	2	NO	3
BN18	Middletons Lane Hellesdon	Roadside	620175	311832	NO2	NO	6	1	NO	3
BN19	189 Yarmouth Road Thorpe St. Andrew	Suburban	627494	308773	NO2	NO	0	9	NO	2

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 2017 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2013	2014	2015	2016	2017
BN1	Kerbside	Diffusion Tube	100	100	33.7	30.8	28.4	30.6	23.94
BN2	Kerbside	Diffusion Tube	100	100	23.5	21.6	18.3	19.3	16.64
BN3	Roadside	Diffusion Tube	100	100	17.9	16.5	13.3	14.4	14.41
BN4	Suburban	Diffusion Tube	100	100	17.4	14.6	12.7	14.9	13.62
BN5	Suburban	Diffusion Tube	100	100	22.5	22	20.2	20.5	16.73
BN6	Suburban	Diffusion Tube	100	100	14.6	13.8	12.7	12.5	13.53
BN7	Suburban	Diffusion Tube	100	100	15.8	15.5	13.6	14	15.49
BN8	Kerbside	Diffusion Tube	100	100	17.2	15.4	11.8	12.8	14.42
BN9	Roadside	Diffusion Tube	100	100	31.4	23.4	28.3	29.4	30.97
BN10	Roadside	Diffusion Tube	100	100	27.4	22.7	20.6	20	19.76
BN11	Suburban	Diffusion Tube	100	100	34.5	34.3	30.1	31.9	33.91
BN12	Suburban	Diffusion Tube	100	100	33.8	33.5	29.2	30.5	29.9
BN13	Suburban	Diffusion Tube	100	100	27	25.8	24.4	24.8	23.41
BN14	Suburban	Diffusion Tube	100	100	24.7	17.6	16	16.2	15.04
BN15	Roadside	Diffusion	100	100	22.3	21.7	16.6	17.4	15.58

		Tube							
BN16	Roadside	Diffusion Tube	100	100	20.5	19.2	17	18.2	18.42
BN17	Suburban	Diffusion Tube	100	75					19.49
BN18	Roadside	Diffusion Tube	100	75					18.07
BN19	Suburban	Diffusion Tube	100	58					31.77

Diffusion tube data has been bias corrected

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) 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 (2014-2017)

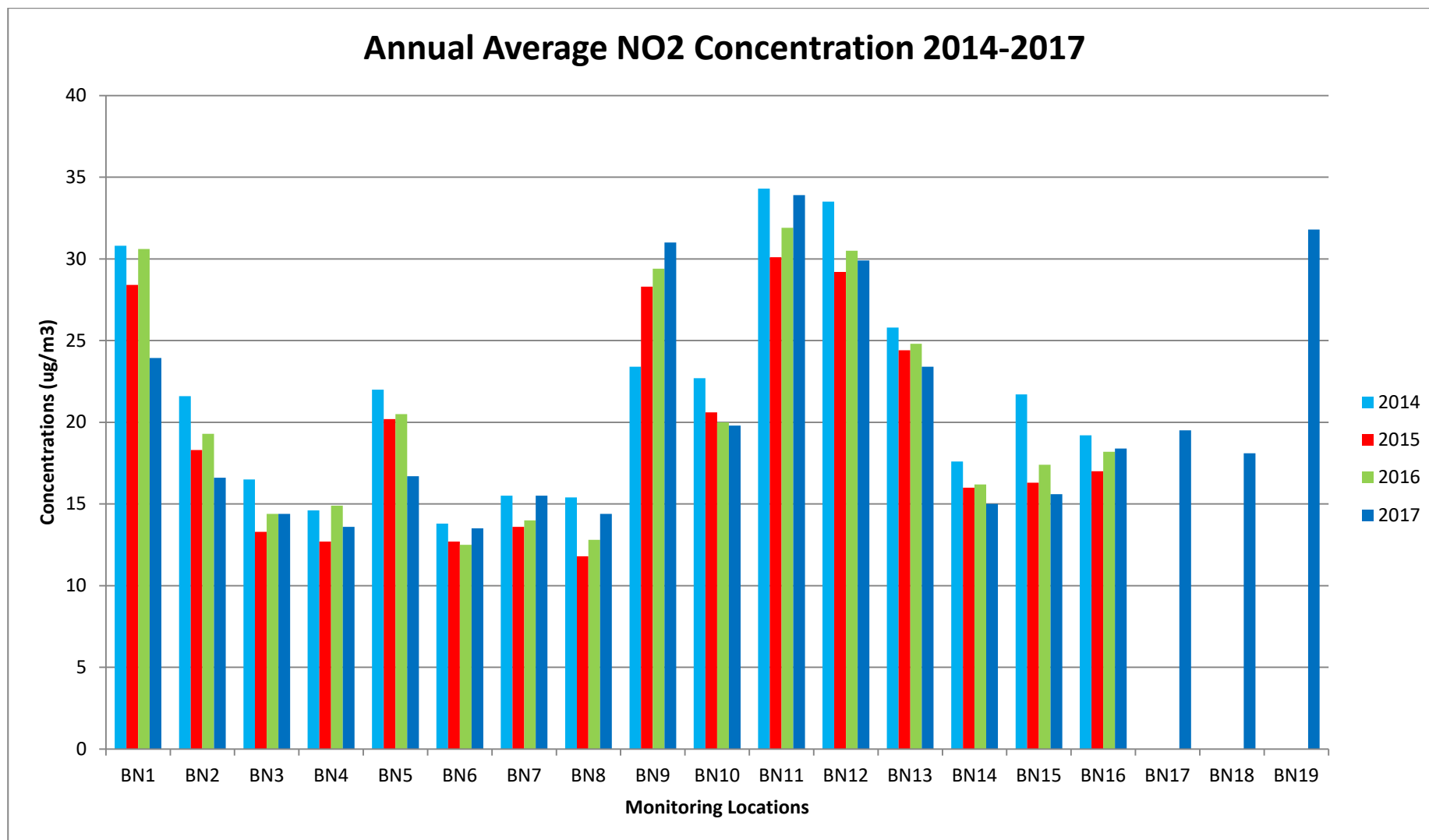
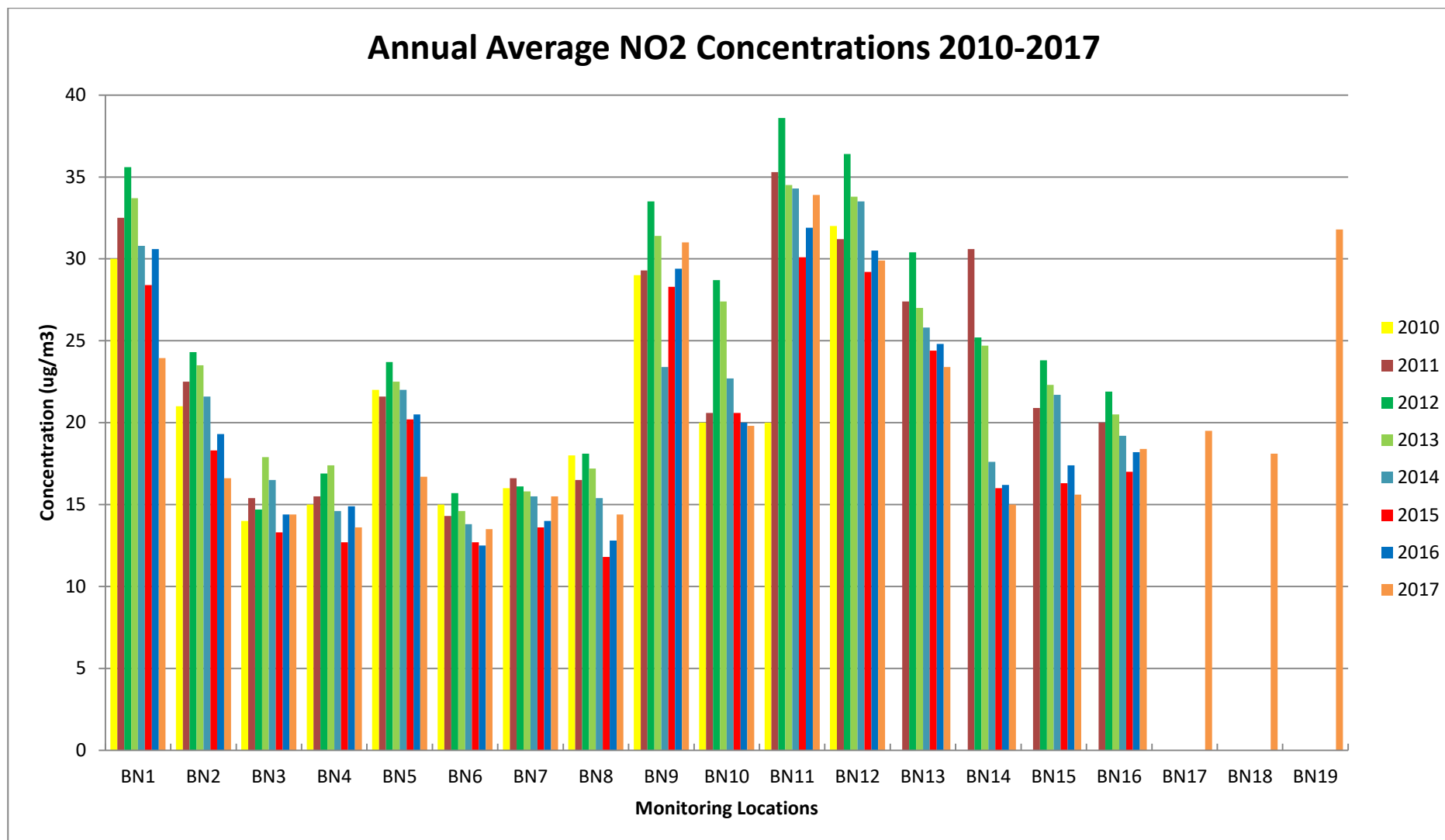


Figure A.2 – Trends in Annual Mean NO₂ Concentrations (2010-2017)



Appendix B: Full Monthly Diffusion Tube Results for 2017

Table B.1 – NO₂ Monthly Diffusion Tube Results - 2017

Site ID	NO ₂ Mean Concentrations (µg/m ³)												Annual Mean		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (factor) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
BN1	27.4	34.2	27.7	0.0	37.3	15.2		82.6	35.2	26.0	42.9	34.0	33.0	23.94	26.9
BN2	22.7	23.1	17.3	16.7	20.9	16.5		45.9	25.0	41.9	33.6	25.9	26.3	16.64	18.7
BN3	19.4	15.3	12.3	13.9	13.1	10.8		25.4	13.6	34.4	21.8	20.1	18.2	14.41	16.2
BN4	21.3	17.4	10.2	9.8	10.2	9.8		22.7	12.8	18.8	22.6	17.6	15.8	13.62	-
BN5	31.6	26.0	18.5	18.7	18.7	19.1		45.6	23.9	20.8		24.1	24.7	16.73	18.8
BN6	16.4	18.5	11.2	9.9	9.9	9.1		22.1	14.5	19.2	25.5	18.3	15.9	13.53	15.2
BN7	17.3	19.1	12.3	11.4	10.5	10.0		25.0	13.5	34.9	20.1	17.2	17.4	15.49	17.4
BN8	20.8	18.5	11.3	5.3	10.8	9.5		23.3	14.8	44.0	22.3	19.4	18.2	14.42	16.2
BN9	33.0	41.0	28.9	32.2	31.4	31.8		71.0	30.5	21.1	41.7	29.7	35.6	30.97	34.8
BN10	21.7	26.6	20.1	19.6	17.5	16.0		43.2	25.1	41.1	31.5	25.7	26.2	19.76	22.2
BN11	38.8	37.2	32.8	27.9	29.5	29.5		79.6	40.3	29.1	37.4	37.3	38.1	33.91	-
BN12	40.9	35.8	29.4	26.9	28.9	25.6		56.3	28.9	32.3	34.4	29.9	33.6	29.90	-
BN13	33.2	28.8	24.6	20.3	23.6	21.1		34.9	29.0	23.6	25.5	25.2	26.3	23.41	-
BN14	24.2	18.7	14.6	12.0	13.2	11.4		29.7	22.2	23.6	28.7	23.2	20.1	15.04	16.9
BN15	24.0	18.8	16.2	17.9	18.0	18.2		45.2	20.2	31.8	25.2	23.7	23.6	15.58	17.5

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BN16	25.8	22.6	19.5	16.3	15.4	15.2		41.0	18.9	24.5	30.9	21.4	22.9	18.42	20.7
BN17	-	-	-	24.01	24.72	21.4		59.8	32.5	18.4	20.2	17.11	27.3	19.49	21.9
BN18	-	-	-	10.74	27.26	10.5		22.8	13.4	32.7	37.8	31.29	23.3	18.07	20.3
BN19	-	-	-	-	-	25.1		64.5	29.1	28.4	36.9	30.15	35.7	31.77	-

National bias adjustment factor used

Annualisation has been conducted where data capture is <75%

Where applicable, 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) 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 20TEA 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/assets/Database_Diffusion_Tube_Bias_Factors_v03_18%20FINAL.xls

The results from the above spreadsheet gave an adjustment factor of 0.89 for 2017.

One location produced results for less than 75% of the monitoring period. Therefore data adjustment was required for BN19 the 2017 monitoring period. Adjustment was carried out based on LAQM TG16 paragraph 7.78.

Distance correction has also been undertaken for locations where the tube is not located at the façade of a building. Future diffusion tube location assessments will see the tubes will be located in a façade where possible. For the period under review distance correction was not undertaken for BN7, BN11-BN13 and BN19 which are all located on building façades. Distance correction was carried out in line with paragraph's 7.77-7.79 of LAQM TG16.

Short-term to Long-term Data Adjustment.

Monitoring location BN19 produced less than 75% site data and therefore data adjustment was required for this point. Data adjustment was undertaken using the .

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 2017 and their analysis performance has been deemed 100% by the AIR-PT assessment scheme (formerly the WASP assessment scheme).

Appendix D: Maps of Monitoring Locations

Figure D.1 Location of all NOx tubes for the 2017 monitoring period

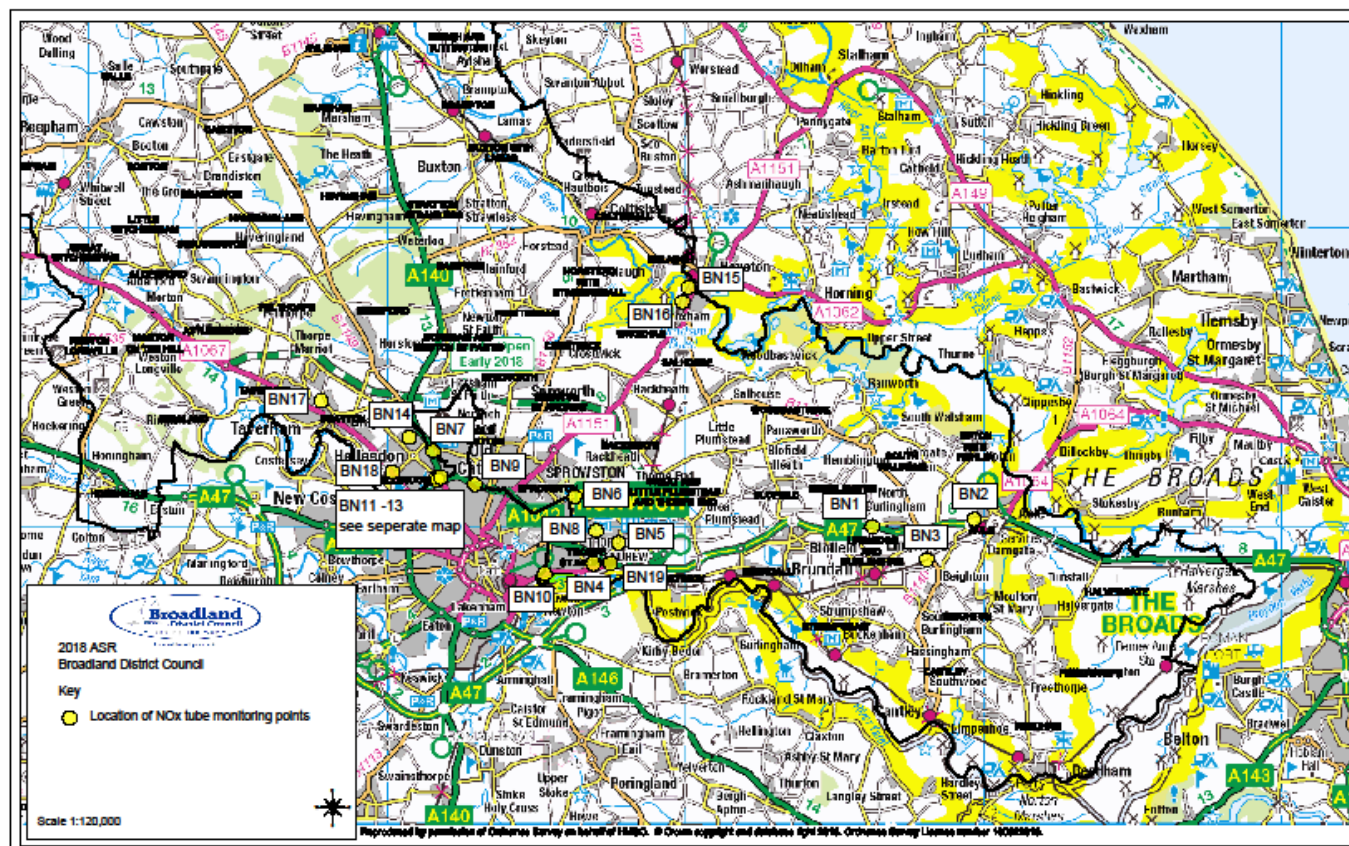
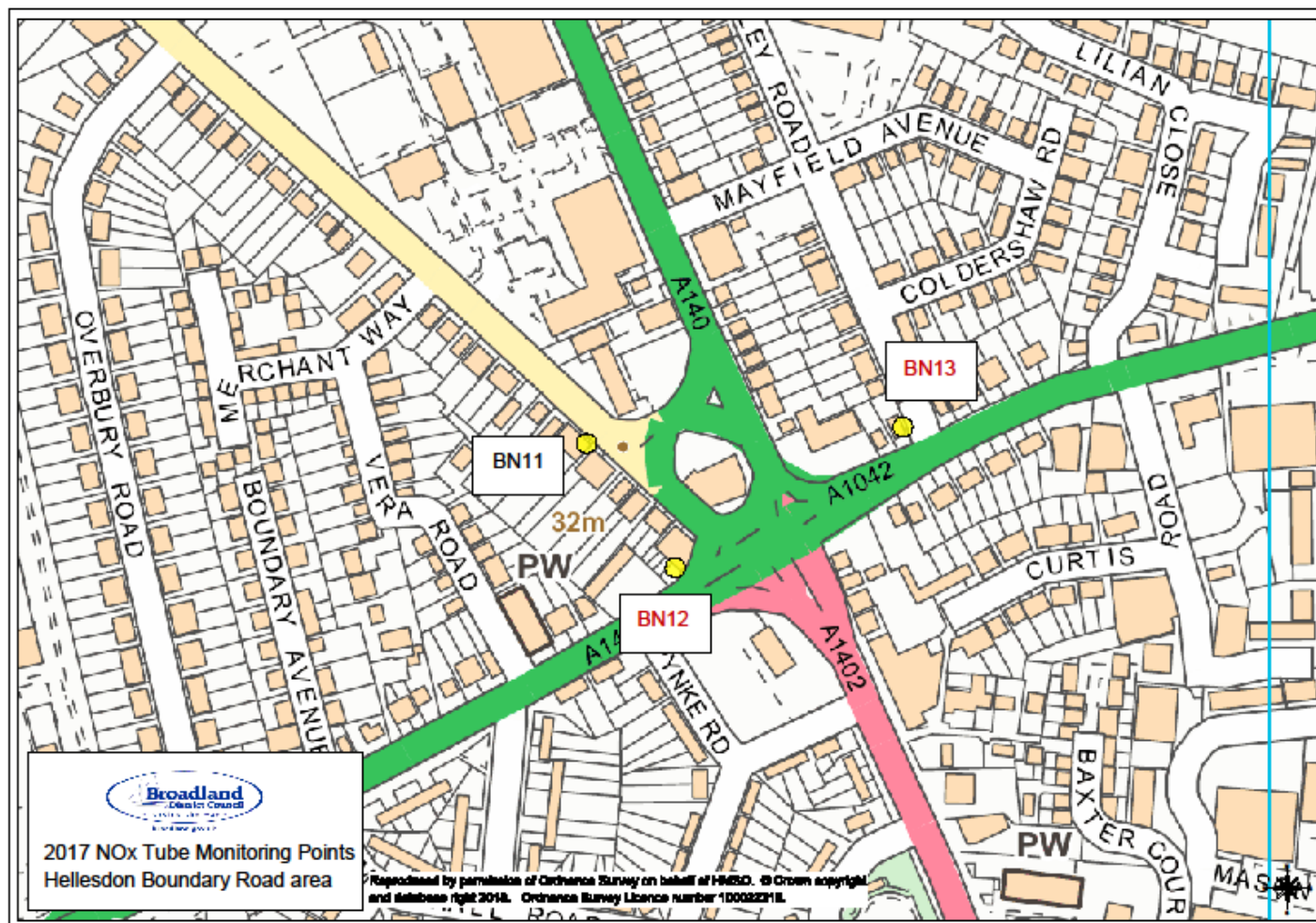


Figure D.2 Location of NOx tubes for the 2017 monitoring period – Boundary Road Area



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 microgrammes of pollutant per cubic metre of air (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

Local Air Quality Management Policy Guidance (PG16)

Local Air Quality Management Technical Guidance (TG16)

Air Pollution Background Concentration Maps (2010, 2011, 2013, 2015)

Greater Norwich Growth Area Air Quality Pledge (2017)