2016 Air Quality Annual Status Report (ASR)

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

June 2016

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Report Reference number	
Date	June 2016

Executive Summary: Air Quality in Our Area

Air Quality in Basingstoke and Deane Borough

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 billion[3]. Improving air quality can benefit those who may find their conditions are made worse through exposure to air pollution, for example people with heart or lung conditions.

Air quality has been monitored in Basingstoke and Deane Borough Council as part of the local authority review and assessment process since the mid 1990s.

The 2014 Progress Report identified an area around Winton Square in Basingstoke where there were exceedances of the NO_2 annual mean objective at locations relevant for human exposure. The 2015 Updating and Screening Report also reported exceedances of the annual mean objective but advised that a detailed assessment was underway to determine if were exceedances were occurring at areas of relevant exposure.

The detailed modelling assessment of air quality in Winton Square was carried out in the latter part of 2015 using the most recent traffic, monitoring and meteorology data. It showed exceedance may be occurring but recognised the uncertainty in modelled concentrations and recommended further monitoring at residential properties located on the 1st floor on the south side of Winton Square. Basingstoke and Deane Borough Council will monitor at this location for a full year and report on the outcome in the 2017 Annual Summary Report.

[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

Although there is currently no Air Quality Action Plan or Air Quality Strategy in place within the council area, Basingstoke and Deane Borough Council has taken forward a number of initiatives during the current reporting year of 2015 in pursuit of improving local air quality.

Local Priorities and Challenges

In order to fulfil its goal in producing quantifiable outcomes to timescale all delivery partners, such as Hampshire County Council, need to take responsibility and engage constructively in the process.

How to Get Involved

Road vehicles are a major source of many pollutants in urban areas. They produce over 50 per cent of the emissions of nitrogen oxides in the UK.

Before using your car, ask yourself:

• do I really need to make this journey?

• could I walk or cycle instead of taking the car?

• could I take a bus, tram or train?

• are the levels of air pollution already too high today?

If you must drive:

• drive smoothly. You'll save fuel, and your engine will also pollute less;

• don't rev your engine unnecessarily;

• maintain your car. Keep the engine properly tuned and the tyres at the right pressure; and

• turn off the engine when your car is stationary.

At home

• Buy water-based or low-solvent paints, varnishes, glues and wood preservatives.

• Avoid burning solid fuels if possible. If you live in a smoke control area, burn only authorised smokeless fuels (your local authority can advise you).

• Avoid lighting bonfires, but if you must, don't light them when pollution levels are high or while the weather is still and cold. Only burn dry material and never burn household waste, especially plastic, rubber, foam or paint. Levels of pollution can be quite high on bonfire night and other events/festivals with bonfires, and sensitive people, including people with respiratory conditions, may notice some effects. However exposure can be considerably reduced by remaining indoors and keeping windows closed.

For further information please see https://www.basingstoke.gov.uk/air-quality

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1 Local Air Quality Management

This report provides an overview of air quality in Basingstoke and Deane Borough Council during 2015. 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 Basingstoke and Deane Borough 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 the objectives.

Basingstoke and Deane Borough Council have agreed with Defra to undertake monitoring for a full year at residential properties located at a first floor height at 45 Winton Square to further ascertain there is exceedance of the annual mean air quality objective. The outcome of this monitoring will inform whether an Air Quality Management Area is required.

2.2 Progress and Impact of Measures to address Air Quality in Basingstoke and Deane Borough Council

Although there is currently no Air Quality Action Plan or Air Quality Strategy in place[4][5] within the council area, Basingstoke and Deane Borough Council has taken forward a number of initiatives during the current reporting year of 2015 in pursuit of improving local air quality. These initiatives are described in Table 2.1.

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.

[4] https://www.basingstoke.gov.uk/content/page/44223/Air%20quality%20progress%20report%202014.pdf

[5] https://www.basingstoke.gov.uk/air-quality#elem_26729

Basingstoke and Deane Borough Council is currently developing its approach to address $PM_{2.5}$ in partnership with public health local authority officers. The approach to address $PM_{2.5}$ will be reported on in the 2017 Annual Status Report.

Table 2.1 –Measures to Improve Air Quality

Strategy	Link to report or press release	Comment
Climate change strategy	http://www.basingstoke.gov.uk/rte.aspx?id=164	Aims to reduce carbon emissions and work with to reduce the impacts of climate change and manage the associated risks. Reduced our carbon emissions by 21% between 2007 and 2012
Cycling Strategy	https://www.basingstoke.gov.uk/cyclestrategy	Aims to encourage more people to use their bikes for commuting and leisure
	https://www.basingstoke.gov.uk/cycle	This is a listing of cycle route maps
Transport Strategy	https://www.basingstoke.gov.uk/rte.aspx?id=372	The council, in partnership with Hampshire County Council (HCC), the Highway and Passenger Transport Authority has developed a number of polices and proposals
Climate change strategy and carbon management	https://www.basingstoke.gov.uk/rte.aspx?id=676	In addition to carbon reductions a range of actions to tackle climate change in the borough

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

This section sets out what monitoring has taken place and how it compares with objectives. Basingstoke and Deane Borough Council did not undertake automatic (continuous) monitoring at any sites during 2015. Table A.1 in Appendix A shows the details of the sites.

As noted in TG(16) local authorities do not have to report annually on the following pollutants: 1,3-butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem.

3.1.2 Non-Automatic Monitoring Sites

Basingstoke and Deane Borough Council undertook non-automatic (passive) monitoring of NO_2 at 26 sites during 2015. Table A.1 in Appendix A 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) and bias adjustment for the diffusion tubes are included in Appendix C.

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO_2)

Table A.2 in Appendix A compares both the raw and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40 µg m^{-3}. The full 2015 dataset of monthly mean values is provided in Appendix B.

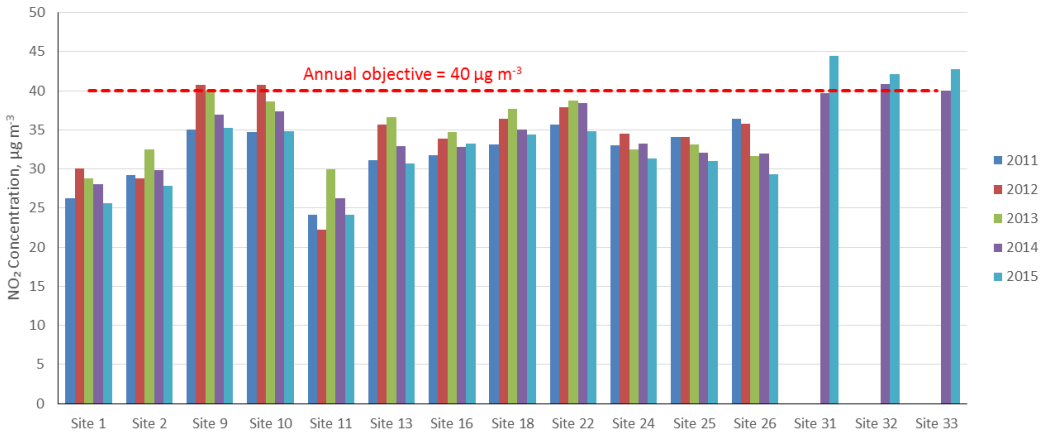
Figures 3-1 to 3-4 presents these data in a graphical format for the roadside, kerbside, urban background sites and locations aimed to assess the concentrations downwind of a biomass facility. Annual mean concentration tended to decrease at most locations since 2013.

Exceedance of the annual objective concentration occurred at 45 Winchester Road (Site 20) and at 45 Winton Square (triplicate diffusion tubes listed individually as Sites 31 to 33). However, both these locations are not considered relevant for exposure. Nevertheless, a distance correction was applied. This reduced the concentration below the objective at 45 Winchester Road but values remained the same at 45 Winton Square because the tubes are located in the façade of the building. The raw data, bias corrected and distance corrected nitrogen dioxide concentrations are presented in Table 3-1.

Table 3-1 Distances corrected concentrations at sites where the NO_2 concentration exceeded the annual objective

Site code	Tube location	Site type	Nitrogen dioxide concentration, µg m^{-3}		
			Raw Data	Bias adjusted	Distance corrected
Site 20	45 Winchester Rd.	Kerbside	**44.1**	**40.2**	35.8
Site 31	Façade of 45 Winton Square	Roadside	**48.8**	**44.4**	**44.4**
Site 32	Façade of 45 Winton Square	Roadside	**46.3**	**42.1**	**42.1**
Site 33	Façade of 45 Winton Square	Roadside	**47.0**	**42.8**	**42.8**

Figure 3-1 Trends in annual NO_2 concentration at roadside sites (2011 to 2015)



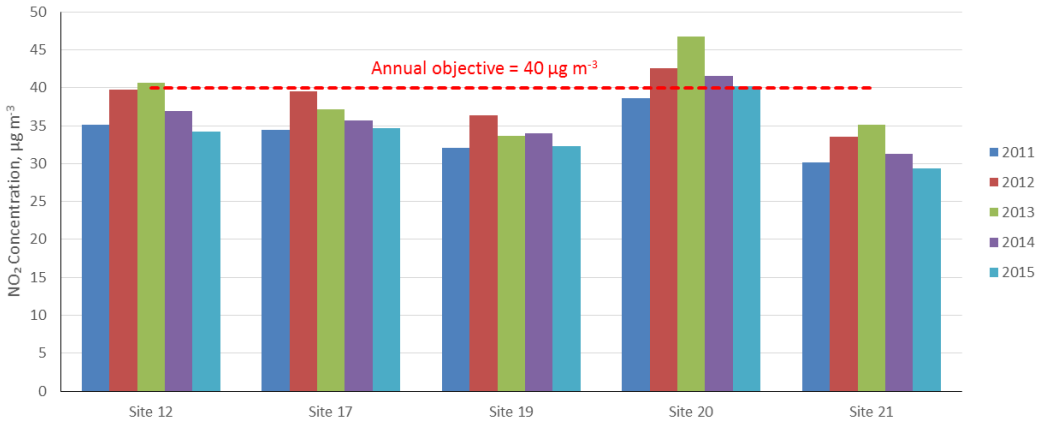


Figure 3-2 Trends in annual NO_2 concentration at kerbside sites (2011 to 2015)

Figure 3-3 Trends in annual NO_2 concentration at urban background locations (2011 to 2015)

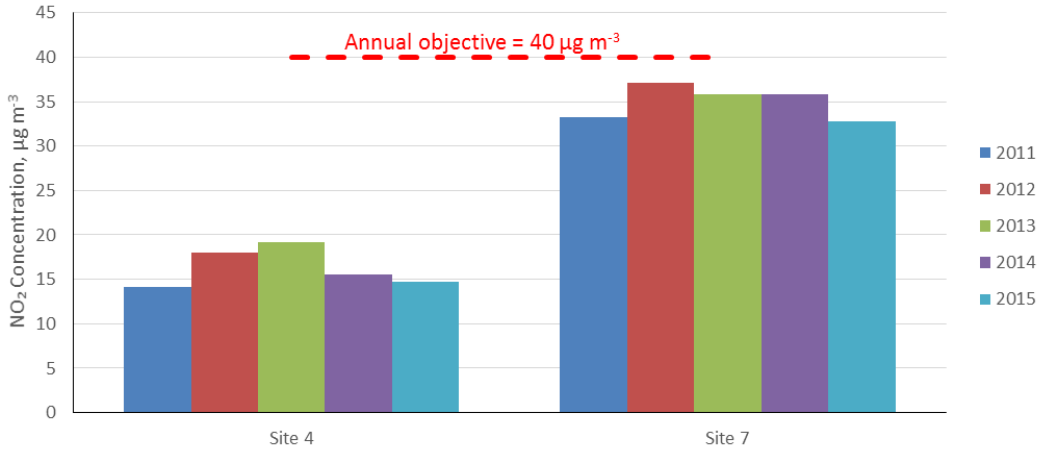
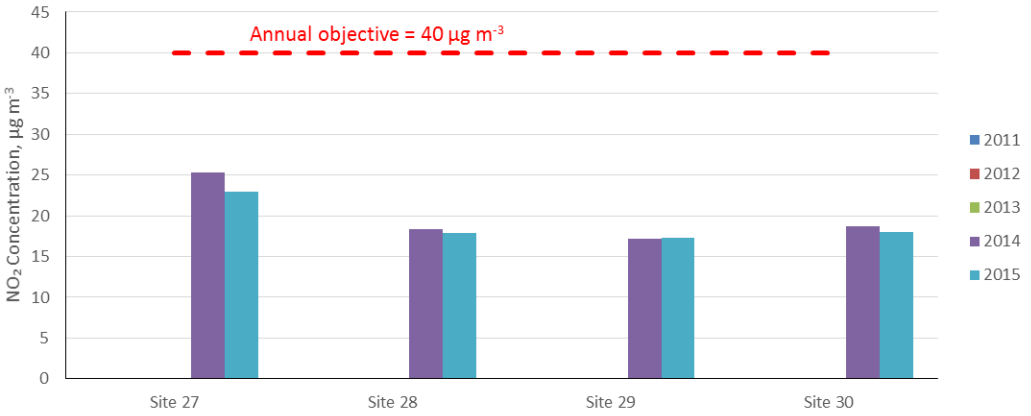


Figure 3-4 Trends in annual NO_2 concentration at "special" sites (2011 to 2015)



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)
Site 1	Winton Sq, Basingstoke	Roadside	463600	151800	NO_2	N	1	1.7	N	4
Site 2	Front façade, 279 Winchester Rd, Basingstoke	Roadside	462300	150700	NO_2	N	0	2.3	N	4
Site 4	Stocker Close, Basingstoke	Urban Background	463500	150700	NO_2	N	11	1.6	N	4
Site 7	Bus stop by “The Guru” Newbury Rd	Urban Background	451783	151234	NO_2	N	5	1.2	N	4
Site 9	Traffic lights at Winton Sq.	Roadside	463640	151857	NO_2	N	4	1.4	N	4
Site 10	Corner of New St./Winton Square jnctn.	Roadside	463586	151862	NO_2	N	5	1.1	N	4
Site 11	Corner of Winton Square/Saru	Roadside	463586	151862	NO_2	N	12	1.6	N	4

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)
	m Hill jnctn									
Site 12	4 Winton Square	Kerbside	463607	151840	NO_2	N	6	0.9	N	4
Site 13	Adjacent 52 New Road, B'Stoke	Roadside	463982	152014	NO_2	N	0	4.8	N	4
Site 16	Junct. Winton Square/Winchester R'd.	Roadside	463587	151845	NO_2	N	5	1.1	N	4
Site 17	37 Winchester St.	Kerbside	463662	151852	NO_2	N	1	0.4	N	4
Site 18	Adjacent 37 Winchester St.	Roadside	463664	151836	NO_2	N	1	1.7	N	4
Site 19	Adjacent Copenhagen Hse, New St.	Kerbside	463658	151912	NO_2	N	0	3	N	4
Site 20	45 Winchester Rd.	Kerbside	463625	151846	NO_2	N	1	0.5	N	3
Site 21	Winchester R'd/Winton Square junct.	Kerbside	463586	151830	NO_2	N	10	0.6	N	4
Site 22	Façade of Agra Balti, 34 Winchester Rd	Roadside	463636	151856	NO_2	N	0	1.3	N	4

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)
Site 24	IT services, front façade, the Old Plough, Newbury Rd	Roadside	451367	162731	NO_2	N	0	5.5	N	4
Site 25	IT services, front façade, the Old Plough, Newbury	Roadside	451367	162731	NO_2	N	0	5.5	N	4
Site 26	IT services, front façade, the Old Plough, Newbury Road	Roadside	451367	162731	NO_2	N	0	5.5	N	4
Site 27	Armstrong Road opposite from Biomass Plant	Special *	465358	153015	NO_2	N	270	59	N	4
Site 28	Footpath between Swing Swang Road & Lambs Row	Special*	465568	153183	NO_2	N	14	29	N	4
Site 29	Footpath between	Special*	465646	153223	NO_2	N	13	13	N	4

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)
	Swing Swang Road & Lambs Row									
Site 30	Public space at end of Blackberry Walk	Special*	465486	153287	NO_2	N	20	100	N	4
Site 31	Façade of 45 Winton Square	Roadside	463629	151846	NO_2	N	0	2.5	N	3
Site 32	Façade of 45 Winton Square	Roadside	463629	151846	NO_2	N	0	2.5	N	3
Site 33	Façade of 45 Winton Square	Roadside	463629	151846	NO_2	N	0	2.5	N	3

(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.

(3) Site referred to as “Special” were established to assess the impact of a biomass facility

Table A.2 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2011	2012	2013	2014	2015
Site 1	Roadside	DT	100	100	26.3	30.1	28.8	28.1	25.6
Site 2	Roadside	DT	100	100	29.2	28.8	32.5	29.9	27.9
Site 4	Urban Background	DT	100	100	14.1	18	19.2	15.6	14.7
Site 7	Urban Background	DT	100	100	33.3	37.1	35.8	35.8	32.7
Site 9	Roadside	DT	100	100	35	**40.7***	39.9	36.9	35.2
Site 10	Roadside	DT	100	100	34.7	**40.7***	38.6	37.4	34.8
Site 11	Roadside	DT	100	100	24.1	22.2	30	26.3	24.2
Site 12	Kerbside	DT	92	92	35.1	39.8	**40.7***	36.9	34.3
Site 13	Roadside	DT	100	100	31.1	35.7	36.6	32.9	30.7
Site 16	Roadside	DT	75	75	31.8	33.9	34.7	32.8	33.2
Site 17	Kerbside	DT	100	100	34.4	39.5	37.1	35.7	34.6
Site 18	Roadside	DT	100	100	33.1	36.4	37.7	35	34.4
Site 19	Kerbside	DT	100	100	32.1	36.4	33.7	34	32.3
Site 20	Kerbside	DT	100	100	38.6	**42.6***	**46.7***	**41.5**	**40.2**
Site 21	Kerbside	DT	100	100	30.1	33.5	35.1	31.3	29.3
Site 22	Roadside	DT	100	100	35.7	37.9	38.7	38.4	34.8
Site 24	Roadside	DT	100	100	33	34.5	32.5	33.2	31.3
Site 25	Roadside	DT	100	100	34.1	34.1	33.1	32.1	31.0
Site 26	Roadside	DT	100	100	36.4	35.8	31.7	32	29.3
Site 27	Special *	DT	100	100	-	-	**	25.3*	23.0
Site 28	Special*	DT	100	100	-	-	**	18.4*	17.9
Site 29	Special*	DT	92	92	-	-	**	17.2*	17.3
Site 30	Special*	DT	100	100	-	-	-	18.7*	18.1

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2011	2012	2013	2014	2015
Site 31	Roadside	DT	100	100	-	-	-	39.7*	**44.4**
Site 32	Roadside	DT	100	100	-	-	-	**40.9***	**42.1**
Site 33	Roadside	DT	100	100	-	-	-	**40***	**42.8**

Notes: Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 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 Technical Guidance LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Appendix B: Full Monthly Diffusion Tube Results for 2015

Table B.1 – NO_2 Monthly Diffusion Tube Results - 2015

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
Site 1	33.4	26.1	31.3	28.9	22.4	21.9	22.1	30.3	32.2	35.3	24.9	29.0	28.1	25.6
Site 2	35.1	36.5	36.3	29.8	26.2	22.8	31.5	30.5	32.0	34.4	24.7	27.5	30.6	27.9
Site 4	22.1	16.5	19.5	19.3	11.7	11.6	11.1	15.2	18.4	23.3	14.6	11.1	16.2	14.7
Site 7	35.3	**40.9**	39.6	37.2	25.8	34.5	34.9	38.4	**40.9**	39.6	31.6	33.1	36.0	32.7
Site 9	34.8	**48.9**	**46.8**	39.7	30.2	29.4	35.6	39.9	**42.2**	**42.1**	39.8	35.3	38.7	35.2
Site 10	37.6	**51.6**	**50.9**	**42.7**	31.5	32.9	36.4	37.3	38.5	29.7	31.8	37.9	38.2	34.8
Site 11	29.7	28.4	32.6	30.9	21.9	20.1	22.5	25.9	30.2	34.9	23.1	18.6	26.6	24.2
Site 12	37.5	39.4	**44.6**		32.6	32.1	27.7	36.3	**42.6**	**49.7**	33.9	37.8	37.6	34.3
Site 13	34.1	**41.3**	34.1	35.9	30.1	26.3	27.9	37.0	31.5	**41.4**	33.2	31.8	33.7	30.7
Site 16	33.1	**43.6**		38.0		29.4	**46.5**	34.3	38.6		33.7	31.4	36.5	33.2
Site 17	**52.5**	**47.2**	**41.7**	38.7	33.0	29.7	35.8	34.1	39.8	**42.9**	26.5	35.0	38.1	34.6
Site 18	**44.4**	**44.2**	**42.1**	35.0	34.4	30.1	33.1	37.1	39.6	**44.2**	35.7	33.4	37.8	34.4
Site 19	39.9	**41.3**	**42.1**	33.4	30.4	29.5	31.6	35.7	36.2	35.8	34.2	36.1	35.5	32.3
Site 20	**44.2**	**46.4**	**48.2**	**47.1**	39.4	39.6	39.5	**45.6**	**43.4**	**48.6**	**41.3**	**46.2**	**44.1**	**40.2**
Site 21	28.6	33.5	36.1	35.0	27.9	24.4	27.1	32.4	38.7	**43.3**	33.5	26.1	32.2	29.3
Site 22	**41.0**	**42.9**	**43.2**	**40.8**	31.6	28.2	34.9	**40.8**	39.5	**46.2**	34.2	35.3	38.2	34.8
Site 24	35.3	39.8	35.9	32.8	33.7	27.7	32.5	35.6	37.4	33.9	34.4	33.4	34.4	31.3
Site 25	34.3	34.9	36.5	32.3	33.3	28.7	33.7	36.5	38.2	36.6	32.4	32.0	34.1	31.0
Site 26	35.6	33.1	34.3	30.2	29.6	31.4	33.6	35.2	33.2	32.3	26.3	31.6	32.2	29.3
Site 27	33.5	32.4	29.1	26.6	18.0	17.4	20.6	23.7	27.0	30.0	21.3	23.4	25.3	23.0

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 (1)
Site 28	24.4	26.2	22.1	17.4	13.6	15.0	19.2	18.1	18.2	23.0	21.3	17.1	19.6	17.9
Site 29	23.8	24.5	22.4		14.4	12.9	16.7	16.8	18.7	22.9	19.4	16.0	19.0	17.3
Site 30	25.4	27.3	19.1	21.6	15.3	12.8	16.9	18.1	18.9	22.7	22.6	17.5	19.9	18.1
Site 31	**58.5**	**60.6**	**46.8**	**47.9**	**42.8**	37.4	**40.2**	**51.5**	**53.6**	**56.1**	**45.4**	**44.8**	**48.8**	**44.4**
Site 32	**50.9**	**51.0**	**50.1**	**50.6**	32.5	36.5	**41.3**	**47.2**	**52.8**	**52.9**	**43.9**	**45.7**	**46.3**	**42.1**
Site 33	**49.3**	**52.5**	**56.8**	**49.2**	39.8	**41.8**	38.0	**49.6**	**49.0**	**55.2**	**41.6**	**41.0**	**47.0**	**42.8**

(1) See Appendix C for details on bias adjustment

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

Diffusion Tube Bias Adjustment Factors

Diffusion tubes may systematically under or over-read NO_2 concentrations when compared to the reference chemiluminescence analyser. This is described as bias and can be corrected to improve the accuracy of the diffusion tube results, using a suitable bias adjustment factor. Basingstoke and Deane Borough Council's diffusion tubes are prepared and analysed by Gradko using the 20% TEA in water method. This laboratory takes part in the QA/QC Field Intercomparison, operated on behalf of DEFRA

No automatic monitoring is carried out within the borough therefore the bias adjustment factor used within the Annual Progress Report is derived from the national database[6]. The diffusion tube national adjustment factor spreadsheet is shown in figure A1. The national adjustment factor derived from the spreadsheet was 0.91. The adjustment of 0.91 has been used to adjust all diffusion tubes results in 2015.

[6] http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html

National Diffusion Tube Bias Adjustment Factor Spreadsheet

Spreadsheet Version Number: 03/16

Follow the steps below **in the correct order** to show the results of **relevant** co-location studies
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet
This spreadhseet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of June 2016
LAQM Helpdesk Website

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1:	Step 2:	Step 3:	Step 4:
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	**Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.**
If a laboratory is not shown, we have no data for this laboratory.	If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data[2]	If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953

Analysed By[1]	Method (To undo your selection, choose (All) from the pop-up list)	Year[5] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) ($\mu g/m^3$)	Automatic Monitor Mean Conc. (Cm) ($\mu g/m^3$)	Bias (B)	Tube Precision[6]	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in water	2015	R	Ards and North Down Borough Council	12	38	26	48.6%	G	**0.67**
Gradko	20% TEA in water	2015	UC	Breckland Council	12	30	29	1.5%	G	**0.99**
Gradko	20% TEA in water	2015	R	Cheltenham Borough Council	12	35	35	2.7%	G	**0.97**
Gradko	20% TEA in water	2015	R	Lisburn & Castlereagh City Council	10	36	29	24.8%	G	**0.80**
Gradko	20% TEA in water	2015	R	Luton Borough Council	12	46	44	6.0%	G	**0.94**
Gradko	20% TEA in water	2015	R	Monmouthshire County Council	12	41	37	11.0%	G	**0.90**
Gradko	20% TEA in water	2015	B	Pembrokeshire Council	10	4	3	36.7%	G	**0.73**
Gradko	20% TEA in water	2015	R	City of Lincoln Council	12	39	33	17.9%	G	**0.85**
Gradko	20% TEA in water	2015	R	Borough Council of King's Lynn and West No	12	29	22	32.5%	G	**0.75**
Gradko	20% TEA in water	2015	R	Cheshire West and Chester	10	38	40	-5.2%	G	**1.06**
Gradko	20% TEA in water	2015	R	Dudley MBC	12	47	50	-5.9%	G	**1.06**
Gradko	20% TEA in water	2015	R	Dudley MBC	12	40	35	14.0%	G	**0.88**
Gradko	20% TEA in water	2015	R	Dudley MBC	12	34	31	10.0%	G	**0.91**
Gradko	20% TEA in water	2015	UB	Dudley MBC	11	23	19	20.9%	G	**0.83**
Gradko	20% TEA in water	2015	KS	Glasgow City Council	12	60	61	-0.9%	P	**1.01**
Gradko	20% TEA in water	2015	UB	Glasgow City Council	10	25	25	3.3%	P	**0.97**
Gradko	20% TEA in water	2015	R	Glasgow City Council	9	30	31	-2.8%	P	**1.03**
Gradko	20% TEA in water	2015	R	Glasgow City Council	12	43	38	14.0%	P	**0.88**
Gradko	20% TEA in water	2015	KS	Marylebone Road Intercomparison	12	102	81	26.2%	G	**0.79**
Gradko	20% TEA in water	2015	UB	Liverpool	12	20	22	-9.0%	G	**1.10**
Gradko	20% TEA in water	2015	R	Preston City Council	12	29	27	8.9%	G	**0.92**
Gradko	20% TEA in water	2015	R	Thurrock Borough Council	12	28	45	-37.1%	G	**1.59**
Gradko	20% TEA in water	2015	R	Gateshead Council	11	33	33	-0.8%	G	**1.01**
Gradko	20% TEA in water	2015	R	Gateshead Council	10	36	33	11.2%	G	**0.90**
Gradko	20% TEA in water	2015	R	Gateshead Council	12	28	25	9.2%	G	**0.92**
Gradko	20% TEA in water	2015	KS	New Forest DC	11	47	36	31.1%	P	**0.76**
Gradko	20% TEA in water	2015	R	New Forest DC	11	33	25	31.7%	G	**0.76**
Gradko	20% TEA in water	2015	R	Wokingham Borough Council	11	36	33	-69.0%	G	**0.93**
Gradko	20% TEA in water	2015	UC	Southampton City Council	12	28	29	-3.5%	G	**1.04**
Gradko	20% TEA in water	2015		**Overall Factor[3] (29 studies)**				Use		**0.91**

Distance correction for Site 20 (45 Winchester Road)

This calculator allows you to predict the annual mean NO_2 concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.

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Enter data into the yellow cells

Step 1	**How far from the KERB was your measurement made (in metres)?**	(Note 1)	**0.5**	metres
Step 2	**How far from the KERB is your receptor (in metres)?**	(Note 1)	**1.5**	metres
Step 3	**What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?**	(Note 2)	**17.86**	$\mu g/m^3$
Step 4	**What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?**	(Note 2)	**40.15**	$\mu g/m^3$
Result	**The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor**	(Note 3)	**35.8**	$\mu g/m^3$

Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road - see the FAQ at http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

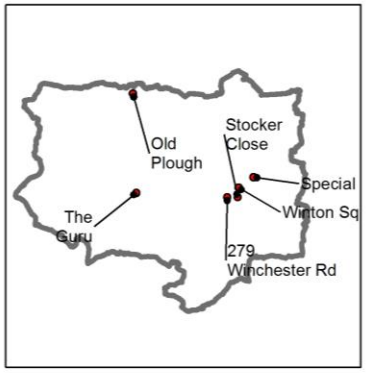
Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at www.airquality.co.uk, or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

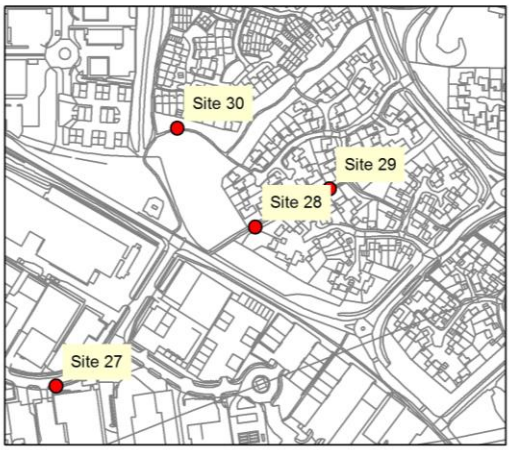
Issue 4: 25/01/11. Created by Dr Ben Marner; Approved by Prof Duncan Laxen. Contact: benmarner@aqconsultants.co.uk

Appendix D: Map(s) of Monitoring Locations

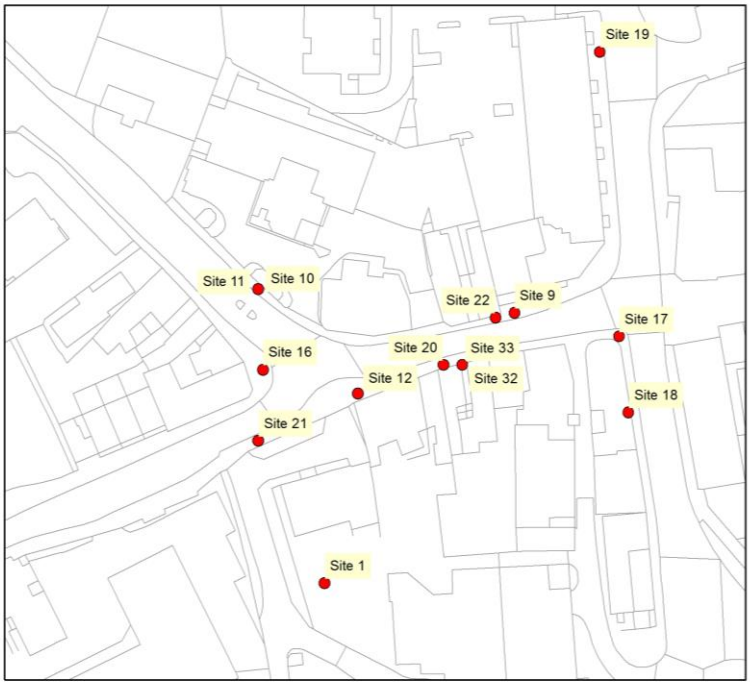
Basingstoke and Deane BC outline



"Special" Biomass plant



Winton Square/Winchester Road



Site ID	Site Name	Site Type
Site 1	Winton Sq, Basingstoke	Roadside
Site 2	Front façade, 279 Winchester Rd, Basingstoke	Roadside
Site 4	Stocker Close, Basingstoke	Urban Ba
Site 7	Bus stop by "The Guru" Newbury Rd	Urban Ba
Site 9	Traffic lights at Winton Sq.	Roadside
Site 10	Corner of New St./Winton Square jnctn.	Roadside
Site 11	Corner of Winton Square/Sarum Hill jnctn	Roadside
Site 12	4 Winton Square	Kerbside
Site 13	Adjacent 52 New Road, B'Stoke	Roadside
Site 16	Junct. Winton Square/Winchester R'd.	Roadside
Site 17	37 Winchester St.	Kerbside
Site 18	Adjacent 37 Winchester St.	Roadside
Site 19	Adjacent Copenhagen Hse, New St.	Kerbside
Site 20	45 Winchester Rd.	Kerbside
Site 21	Winchester R'd/Winton Square junct.	Kerbside
Site 22	Façade of Agra Balti, 34 Winchester Rd	Roadside
Site 24	IT services, front façade, the Old Plough, Newbury Rd	Roadside
Site 25	IT services, front façade, the Old Plough, Newbury	Roadside
Site 26	IT services, front façade, the Old Plough, Newbury Road	Roadside
Site 27	Armstrong Road opposite from Biomass Plant	Special *
Site 28	Footpath between Swing Swang Road & Lambs Row	Special*
Site 29	Footpath between Swing Swang Road & Lambs Row	Special*
Site 30	Public space at end of Blackberry Walk	Special*
Site 31	Façade of 45 Winton Square	Roadside
Site 32	Façade of 45 Winton Square	Roadside
Site 33	Façade of 45 Winton Square	Roadside

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[7]	
	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

[7] The units are in microgrammes of pollutant per cubic metre of air (µg/m^3).

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

2014 Air Quality Progress Report for Basingstoke and Deane Borough Council. Downloaded from website 23rd June 2016

https://www.basingstoke.gov.uk/content/page/44223/Air%20quality%20progress%20report%202014.pdf

2015 Updating and Screening Assessment for Basingstoke and Deane Borough Council. Downloaded from website 23rd June 2016

https://www.basingstoke.gov.uk/content/page/44220/Updating%20and%20Screening%20Assessment%20-%202015.pdf

Technical Guidance (2016) http://laqm.defra.gov.uk/documents/LAQM-TG16-April-16-v1.pdf

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https://www.basingstoke.gov.uk/content/page/44222/Air%20quality%20assessment%20-%20Winton%20Square.pdf

http://www.basingstoke.gov.uk/browse/environment-and-planning/pollution/air-quality/Air+Quality+Reports.html