BasildonCouncil

BASILDON • BILLERICAY • WICKFORD

2017 Air Quality Annual Status Report (ASR)

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

28th July 2017

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Executive Summary: Air Quality in Our Area

Air Quality in Basildon

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].

The borough of Basildon comprises the urban areas of Basildon, Billericay and Wickford as well as rural villages and settlements set among the surrounding countryside. The main source of air pollution in the borough is from traffic emissions, particularly along the A127 and A13 major routes and at the key junctions of A13/A130 Sadlers Farm junction, A127/A132 Nevendon Interchange and A127 Pipps Hill Interchange.

The Council recognises the importance of working with partnering Authorities such as with Essex County Council to make improvements to local transport infrastructure and also to fulfil its own regulatory responsibility towards industrial processes.

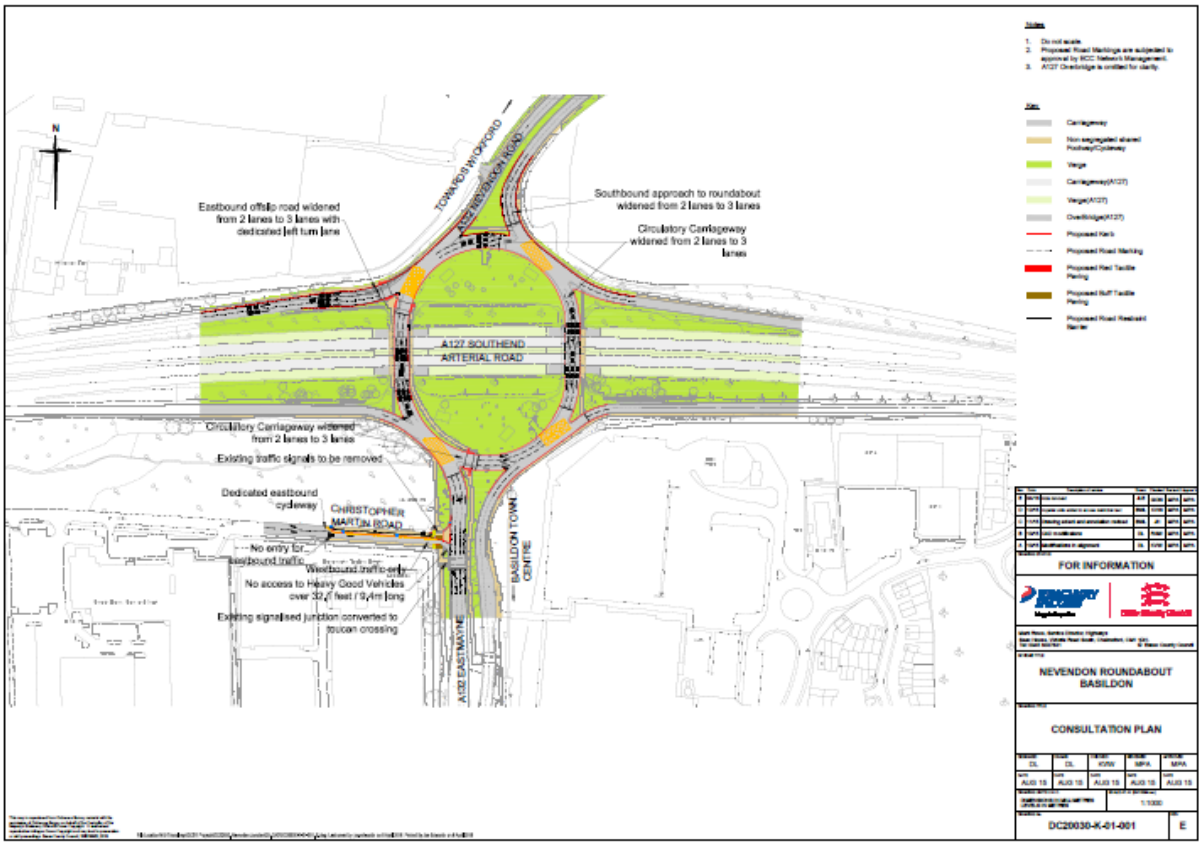
Air pollution is considered to be generally low in Basildon and monitoring of local Air Quality has measured no exceedances of air quality objective at relevant exposure. The trend of results across all monitored sites indicates that Air Quality is improving. A graph can be found in Appendix A that shows monitoring results from 2011 to 2016. Concentrations of Nitrogen Dioxide (NO_2) can be seen to have dropped over this time.

Actions to Improve Air Quality

Basildon Council is addressing these issues with Essex County Council whom are the highway authority. A number of major schemes have been proposed with the A127/A132 Nevendon Interchange Improvement scheme to manage congestion at the Nevendon roundabout and improve A127 journey times and access to Basildon and Wickford via the A132 Nevendon Interchange commenced in 2016.

[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

Figure i.1 A127/A132 Nevendon Interchange Improvement Scheme



Conclusions and Priorities

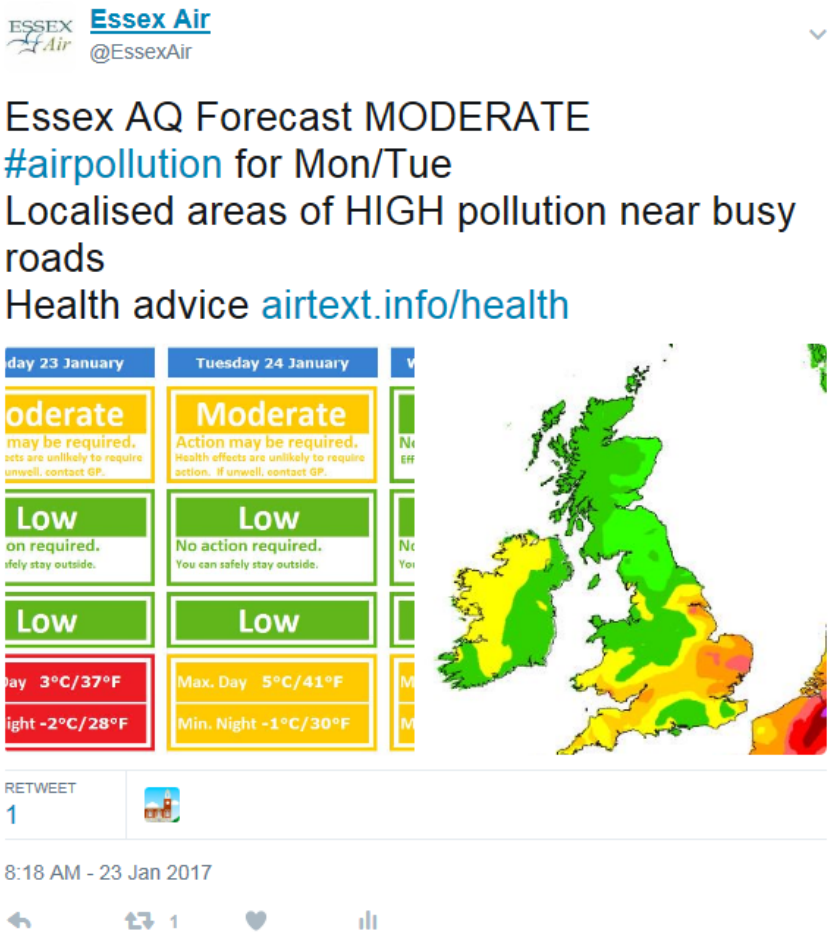
Air quality in Basildon meets the national Air Quality Objectives. As such, Basildon Council does not have an Air Quality Strategy or Action Plan. However, the road network in the Borough experiences congestion on key routes and at key junctions during peak periods. Modelling of growth proposed by the Council's Local Plan has identified junctions that could exceed their capacity, causing further significant congestion and may give rise to increased air pollution.

Basildon Council has been named in the UK plan for tackling roadside NO_2 concentrations. This relates to concerns regarding air pollution on the A127 within the vicinity of the Fortune of War roundabout. Air quality at this location is not within the remit of Local Air Quality Management (LAQM) but the Council is looking to work with Defra and neighbouring authorities to further understand the air quality at this location.

Local Engagement and How to get Involved

Basildon Council is a member of the Essex Air Quality consortium. The purpose of the Essex Air is to promote improvements in air quality related issues. The Essex Air web site provides a daily forecast of air pollution. Also the @EssexAir twitter feed provides localised weekly air pollution forecasts.

Figure i.2 Essex Air Twitter Air Quality Notifications



Links to Defra recommended actions and health advice are provided when air pollution is likely to be moderate or higher. This will enable those with heart or lung conditions, or other breathing problems to make informed judgements about their levels of activity or exposure.

Essex County Council has worked closely with Liftshare to develop the Essex Car Share scheme. This operates across Basildon and provides commuters with a car sharing service which could cut congestion and air pollution whilst saving money.

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1 Local Air Quality Management

This report provides an overview of air quality in Basildon 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 Basildon 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

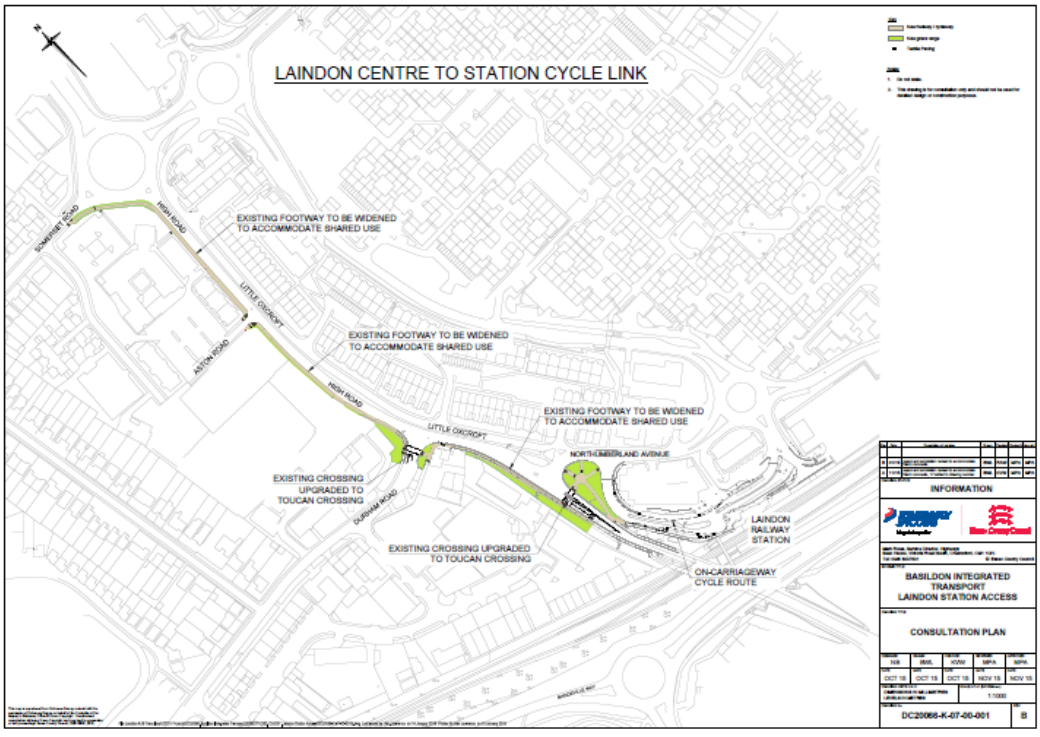
2.1 Progress and Impact of Measures to address Air Quality in Basildon Council

Basildon Council does not have an Air Quality Management Area or associated Action Plan but has taken forward a number of measures during the current reporting year of 2016 in the pursuit of improved local air quality. Details of all measures completed, in progress or planned are set out in Table 2.1.

Key completed measures are:

- A new route has been designed to provide better cycle access into the Laindon rail station. Funded by Essex County Council and the South East Local Enterprise Partnership (SELEP) Local Growth Fund. Construction of the scheme began at the end of February and was completed in October 2016.

Figure 2.1 - Laindon Cycle Link



- A127/A132 Neverdon Interchange Improvement scheme to manage congestion at the Neverdon roundabout and improve A127 journey times and access to Basildon and Wickford commenced in 2016.

- In 2017 Wickford Rail Station forecourt improvements are to be undertaken. The investment by Essex County Council provides an additional exit lane at the Station Approach junction with Station Avenue allowing easier access for buses, taxis, cyclists and pedestrians. Motorcyclists and cyclists also benefit from more parking bays provided outside the station. The scheme has formed part of the Basildon Integrated Transport package in partnership with Greater Anglia, aiming to increase sustainable travel by improving transport links and improving station accessibility.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
1	Essex Liftshare	Alternatives to private vehicle use	Car & lift sharing schemes	Essex County Council	N/A	2014	Number of Users	No AQMA	Ongoing	N/A	
2	Member of Essex Air	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	Essex Air	N/A	N/A	N/A	No AQMA	Ongoing	N/A	
3	Environmental Permit Inspection & Enforcement	Environmental Permits	Measures to reduce pollution through IPPC Permits going beyond BAT	Basildon Council	N/A	N/A	Operator compliance with Environmental Permit	No AQMA	Ongoing	N/A	
4	Smoke Controlled Zones	Policy Guidance and Development Control	Low Emissions Strategy	Basildon Council	N/A	N/A	N/A	No AQMA	Ongoing	N/A	
5	Laindon Cycle Route	Transport Planning and Infrastructure	Cycle Network	Essex County Council	2015	2016	Reduced personal car use	No AQMA	Works Completed	2016	
6	Neverdon Interchange Scheme	Traffic Management	UTC, Congestion management, traffic reduction	Essex County Council	2015	2016	Manage congestion	No AQMA	Ongoing	2017	
7	Wickford Rail Station	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	Essex County Council	2016	2017	Improve vehicle access & cycle facilities	No AQMA	Ongoing	2017	

2.2 $PM_{2.5}$ – 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.

Basildon Council does not monitor $PM_{2.5}$ concentrations however notes the Public Health Outcomes Framework indicator 3.01 – Fraction of mortality attributable to particulate ($PM_{2.5}$) air pollution which for 2015 gave a value of 5.3% which has reduced from 5.5% in 2013. These values are broadly similar to other authorities within the region.

Basildon Council is taking the following measures to address $PM_{2.5}$:

- Regular inspections of permitted industry where combustion and non-combustion processes could lead to anthropogenic emissions of $PM_{2.5}$.
- Working with Essex County Council (highway authority) to deliver Major Transport improvement Schemes to alleviate congestion. In addition to reduced exhaust emissions, these schemes will reduce non-exhaust emissions from brake and tyre wear by making traffic flows smoother.

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

Basildon Council undertook non- automatic (passive) monitoring of NO_2 at 12 sites during 2016. 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) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. “annualisation” and/or distance correction), are included in Appendix C.

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 (NO_2)

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

Table A.2 in Appendix A compares the bias adjusted monitored NO^2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

For diffusion tubes, the full 2016 dataset of monthly mean values is provided in Table B.1 in Appendix B.

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)
BAS001	Pound Lane Laindon	Roadside	568654	189997	NO_2	No	34.3	0.4	No	2.0
BAS002	High Road Laindon	Roadside	568115	190062	NO_2	No	5.6	6.2	No	2.0
BAS003	Honiley Ave	Roadside	575204	190963	NO_2	No	2.9	0.5	No	2.0
BAS005	Essex Park A132	Roadside	574833	193096	NO_2	No	85	5.6	No	2.0
BAS006	The Meads	Roadside	573194	187531	NO_2	No	7.8	0.5	No	2.0
BAS007	52 Merricks Lane	Façade	572173	186916	NO_2	No	0	9.0	No	2.0
BAS008	Panadown	Façade	569845	188709	NO_2	No	0	9.7	No	2.0
BAS009	Delimands	Façade	569754	188814	NO_2	No	0	11.3	No	2.0
BAS010	AQS	Façade	569774	188870	NO_2	No	50	6.4	No	2.0
BAS015	Harold Gardens	Roadside	575047	193941	NO_2	No	3.6	1.4	No	2.0
BAS016	Nevedon Road	Roadside	573245	190764	NO_2	No	17.0	0.9	No	2.0
BAS017	Honeypot Lane	Roadside	570844	188902	NO_2	No	16.3	0.8	No	2.0

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 NO_2 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
BAS001	Roadside	Diffusion Tube	100.00	100.00	29.77	30.49	27.72	27.43	28.91
BAS002	Roadside	Diffusion Tube	100.00	100.00	35.19	29.43	29.57	28.55	27.59
BAS003	Roadside	Diffusion Tube	100.00	100.00	**41.54**	35.44	36.51	33.74	34.97
BAS005	Roadside	Diffusion Tube	100.00	100.00	32.48	30.69	35.49	29.63	27.64
BAS006	Roadside	Diffusion Tube	100.00	100.00	33.85	31.24	32.13	27.28	29.56
BAS007	Façade	Diffusion Tube	100.00	100.00	33.11	30.39	32.35	27.54	29.76
BAS008	Façade	Diffusion Tube	100.00	91.67	29.83	29.29	26.87	25.08	27.25
BAS009	Façade	Diffusion Tube	91.67	91.67	29.63	28.84	26.46	23.25	26.36
BAS010	Façade	Diffusion Tube	100.00	100.00	35.08	31.65	29.44	30.52	31.90
BAS015	Roadside	Diffusion Tube	100.00	100.00	30.49	28.20	26.64	24.70	24.86
BAS016	Roadside	Diffusion Tube	91.67	100.00	39.57	35.10	35.73	35.33	34.03
BAS017	Roadside	Diffusion Tube	100.00	100.00	33.24	30.96	30.39	26.69	27.84

☒ **Diffusion tube data has been bias corrected**

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

Historic data has not been distance corrected for relevant exposure. 2016 data has been distance corrected and can be found in Table C.2 in Appendix C.

Notes:

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

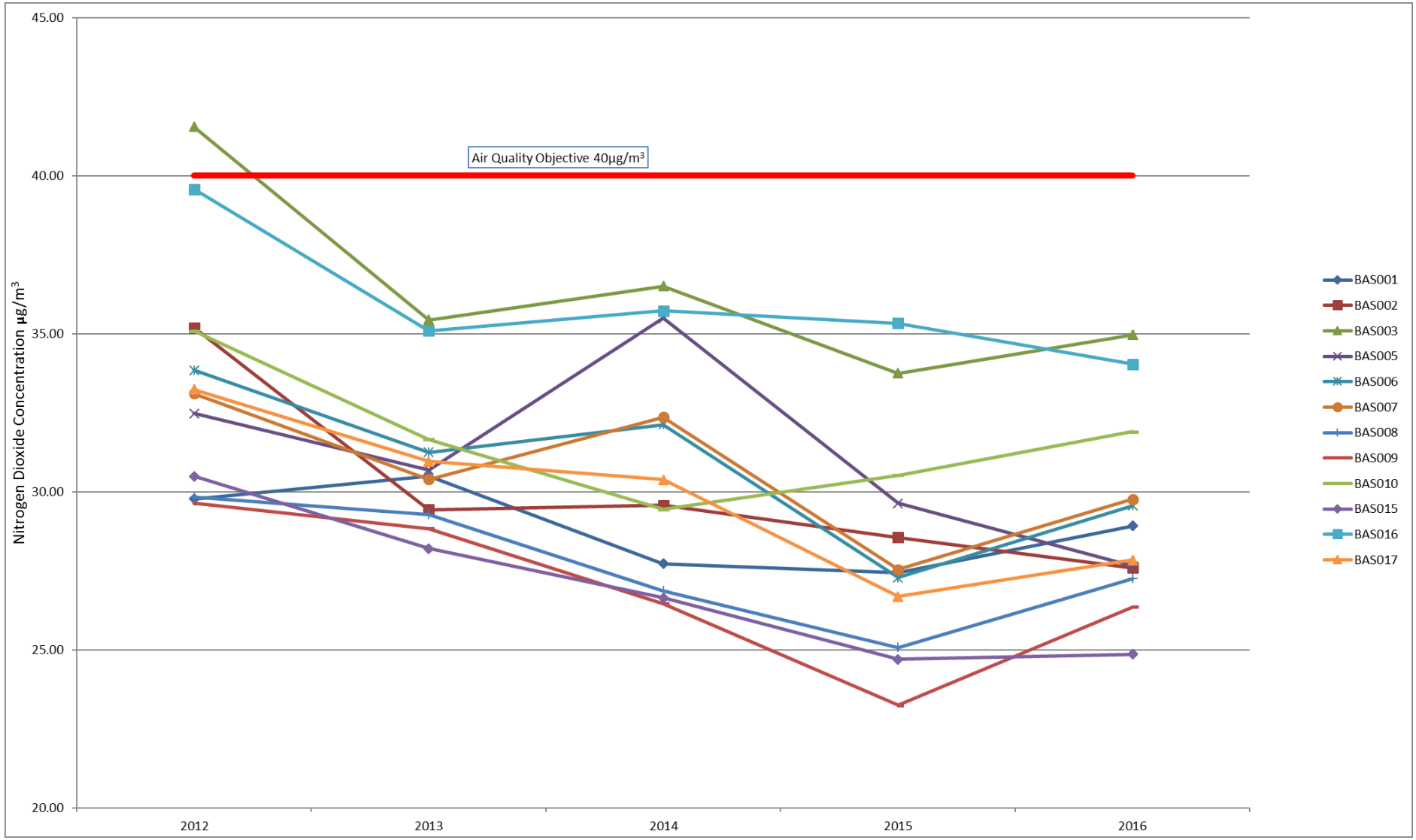
NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

(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 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 NO_2 Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2016

Table B.1 – NO_2 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 (1)	Distance Corrected to Nearest Exposure (2)
BA001	27.50	40.30	46.40	38.90	38.10	34.70	27.20	30.90	30.90	41.30	45.70	48.70	37.55	28.91	19.03
BA002	35.80	41.30	29.60	38.50	27.70	28.20	32.00	30.40	33.90	31.10	47.70	53.80	35.83	27.59	25.29
BA003	57.20	48.00	34.70	41.10	42.20	36.70	41.40	36.10	45.30	34.60	54.80	72.90	45.42	34.97	29.30
BA005	40.00	40.60	43.10	39.20	37.90	29.90	19.00	22.90	33.50	35.30	35.50	53.90	35.90	27.64	18.57
BA006	42.70	46.00	34.90	40.70	40.40	13.40	32.50	29.20	38.70	36.20	46.50	59.50	38.39	29.56	23.09
BA007	49.20	41.20	32.30	40.30	38.30	32.20	31.30	30.80	39.60	31.60	43.20	53.80	38.65	29.76	29.76
BA008	39.70	40.80	33.70	34.50	34.80	25.00	Missing	23.20	34.50	30.30	45.30	47.50	35.39	27.25	27.25
BA009	Missing	36.00	36.50	34.80	35.60	26.30	22.80	25.20	34.40	34.10	42.50	48.30	34.23	26.36	26.36
BA010	52.30	44.80	36.10	41.00	37.50	35.20	41.10	36.10	41.40	37.30	42.20	52.20	41.43	31.90	20.33
BA015	42.40	38.20	28.50	26.30	27.80	24.30	24.10	23.70	36.30	25.50	38.80	51.50	32.28	24.86	22.54
BA016	57.40	51.30	39.70	45.50	42.00	34.20	39.40	36.10	42.40	35.90	49.20	57.30	44.20	34.03	25.37
BA017	45.00	42.80	31.30	35.50	33.00	26.80	28.00	30.00	37.00	33.90	46.10	44.40	36.15	27.84	22.45

☒ **National bias adjustment factor used**

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) 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 QA/QC

Basildon Council undertook monitoring at 12 nitrogen dioxide diffusion tubes sites in 2016.

The diffusion tubes were supplied by Environmental Scientifics Group (ESG Didcot) (UKAS Testing Laboratory number 1015) with a preparation method of 50% triethanolamine (TEA) in Acetone.

The AIR NO_2 proficiency testing scheme found that the laboratory achieved the following percentage of results determined as satisfactory for 2016:

Table C.1 – AIR PT Results 2016

AIR PT Round	AIR PT AR006	AIR PT AR007	AIR PT AR009	AIR PT AR010
Round conducted in the period	January – February 2016	April – May 2016	July – August 2016	September – October 2016
ESG Didcot	100%	75%	75%	100%

Diffusion Tube Bias Adjustment Factors

Basildon Council uses the national bias adjustment figure for calculating diffusion tubes results.

The Diffusion Tube Bias Adjustment Factors Spreadsheet 03/17v2 identified that for ESG (Didcot) 50% TEA in acetone diffusion tubes in 2016, a bias adjustment factor of 0.77 should be used. This was derived from orthogonal regression analysis of 30 studies.

Nitrogen Dioxide Fall Off with Distance Calculator

Using the formula from the NO_2 fall off with distance calculator version 4.1, concentrations have been estimated at relevant exposure. Results are shown in Appendix B

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

Figure D.1 – Diffusion Tube Monitoring Locations

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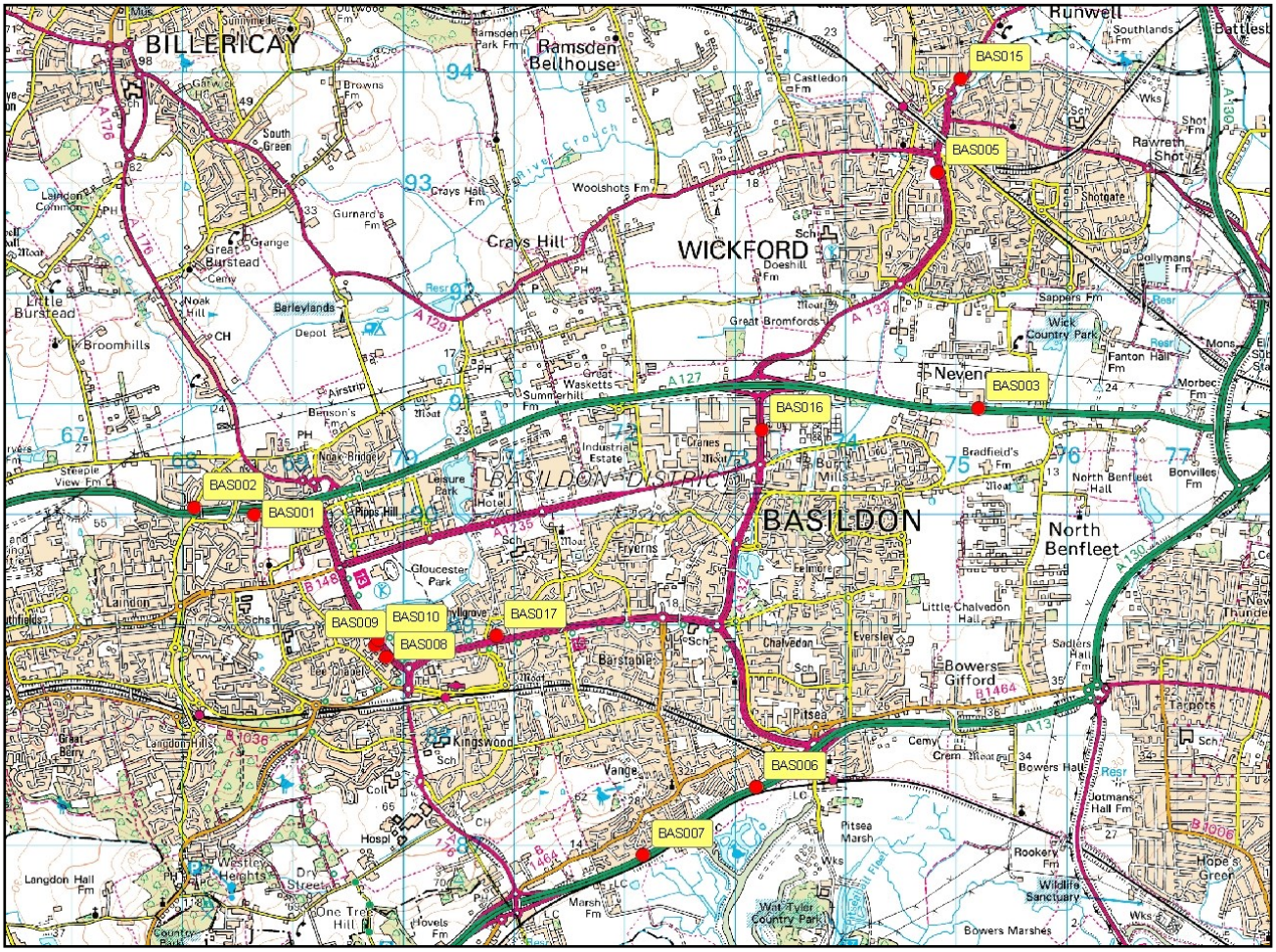

Appendix E: Summary of Air Quality Objectives in England

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/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
EU	European Union
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

References

Basildon LDF Core Strategy – Assessment of Potential Core Strategy Sites on Existing Junctions available at: http://www.basildon.gov.uk/CHttpHandler.ashx?id=3993&p=0

Basildon Council Draft Local Plan available at: http://www.basildon.gov.uk/CHttpHandler.ashx?id=6599&p=0

Defra Diffusion Tube Bias Adjustment Factors Spreadsheet available at: https://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html

Defra LAQM Summary of Laboratory Performance in AIR NO_2 PT Scheme available at: https://laqm.defra.gov.uk/assets/airptrounds7to18apr2015feb2017.pdf

Defra LAQM Policy Guidance LAQM PG16 and Technical Guidance LAQM TG16 available at: https://laqm.defra.gov.uk/supporting-guidance.html

Essex Air Quality Consortium available at: http://www.essexair.org.uk/Default.aspx

EssexCarShare.com available at: https://essex.liftshare.com/

Essex Air Twitter Feed available at: https://twitter.com/essexair

Essex County Council Major Schemes in Basildon available at: http://www.essexhighways.org/Transport-and-Roads/Highway-Schemes-and-Developments/Major-Schemes.aspx

UK Air Quality Plan for tackling roadside NO2 concentrations: https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017