



2022 Air Quality Annual Status Report (ASR)

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



Date: June 2022

Information	Details
Local Authority Officer	Pam Sharp
Department	Environmental Services
Address	Causeway House, Braintree, Essex CM7 9HB
Telephone	01376 552525
E-mail	PublicHealthandHousing@braintree.gov.uk
Report Reference Number	BRA/2022/001
Date	June 2022

Executive Summary: Air Quality in Our Area

Air Quality in Braintree 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, the elderly, and those with existing heart and lung conditions. There is also often a strong correlation with equalities issues because areas with poor air quality are also often less affluent areas^{1,2}.

The mortality burden of air pollution within the UK is equivalent to 28,000 to 36,000 deaths at typical ages³, with a total estimated healthcare cost to the NHS and social care of £157 million in 2017⁴.

Braintree District Council monitors nitrogen dioxide (NO₂) at roadside sites using diffusion tubes within the district in the three main towns of Halstead, Braintree and Witham and within the parishes of Bradwell, Rivenhall, Kelvedon and Hatfield Peverel. There are no exceedances of the air quality objective level of 40µg/m³ at any points of relevant exposure that being at facades of residential property. Following a reduction of air pollutants levels during the pandemic for the year 2020 levels have increased during 2021 although not to pre-pandemic levels. Braintree District Council has no AQMAs.

Braintree District Council is undertaking an independent review by external air quality consultants of air pollutant monitoring which will be reported in 2022.

Braintree District Council continues to be a member of the Essex Air Quality Consortium working with partners at other Essex local authorities including Essex County Council and Environment Agency.

¹ Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

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

³ Defra. Air quality appraisal: damage cost guidance, July 2021

⁴ Public Health England. Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report, May 2018

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades, and will continue to improve due to national policy decisions, there are some areas where local action is needed to improve air quality further.

The 2019 Clean Air Strategy⁵ sets out the case for action, with goals to reduce exposure to harmful pollutants. The Road to Zero⁶ sets out the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

Braintree District Council continues to maintain good air quality through control of development to prevent exposure of high air pollutant concentrations at sensitive receptor locations, promoting cycling and walking routes, promoting lifestyle change and encouraging cleaner transport. Collaboration between internal departments (e.g Planning, Health Education, Climate Change, Environmental Services) and external partners (Essex County Council, Environment Agency) has been key to maintaining good air quality and promoting the uptake of low emission vehicles and activities.

Braintree District Council will continue to adopt ambitious targets to support good air quality. This is demonstrated by the climate change strategy action plan to achieve net zero carbon by 2030. This may be viewed at [Climate Change Initial Plan](#) on the Braintree District Council website.

Conclusions and Priorities

As all monitoring locations are indicating NO₂ levels below the air quality objective level of 40µg/m³ (annual mean) at relevant receptors then there is no requirement to declare an AQMA. Braintree District Council will continue to monitor at the same location points in

⁵ Defra. Clean Air Strategy, 2019

⁶ DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

2022 and will adjust and augment monitoring where the independent air monitoring review recommends.

Braintree District Council will continue to liaise with external and internal departments and members of the public to maintain and promote good air quality and to fulfil the requirements of its ambitious Climate Change, Cycling and Livewell strategies and to continue to maintain and progress other projects and controls as shown in Table 2.2 of this report. Strategies may be viewed at Braintree District Council website and Essex Air Quality information may be viewed at www.essexair.org.uk

Local Engagement and How to get Involved

Braintree District Council would encourage members of the public to liaise with the local authority where there are concerns about air quality. For new development this can be via the Planning section of the District Council and for any air quality related queries or suggestions to improve or promote good air quality and stakeholder engagement of the topic then please make contact at publichealthandhousing@braintree.gov.uk

Local Responsibilities and Commitment

This ASR was prepared by the Environmental Services Department of Braintree District Council with the support and agreement of the following officers and departments:

Colin Batchelor – Environmental Health Manager

Mark Wilson – Climate Change Manager

Josie Falco – Head of Environment

Planning Policy section

Licensing section

This ASR has been approved by: Colin Batchelor, Environmental Health Manager

This ASR has not been signed off by a Director of Public Health.

If you have any comments on this ASR please send them to Pam Sharp or Colin Batchelor at: Braintree District Council, Causeway House, Braintree, Essex CM7 9HB

Publichealthandhousing@braintree.gov.uk

Tel 01376 552525

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1 Local Air Quality Management

This report provides an overview of air quality in Braintree District Council during 2021. 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 Braintree District Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England are presented in Table E.1.

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 should prepare an Air Quality Action Plan (AQAP) within 12 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

Braintree District Council currently has no declared AQMAs.

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

Defra's appraisal of last year's ASR concluded in Appraisal Report File reference ASR21-1136

On the basis of the evidence provided by the local authority the conclusions reached are acceptable for all sources. Following the completion of this report, Braintree District Council should submit an Annual Status Report in 2022.

Generally, the report is very good, provides a great deal of information and acts as a good first point of reference for members of the Public. The Council should continue their hard work in developing partnerships and improving local air quality.

Braintree District Council has taken forward a number of direct measures during the current reporting year of 2021 in pursuit of maintaining good local air quality. Details of all measures completed, in progress or planned are set out in Table 2.1. Twenty one measures are included within Table 2.1, with the type of measure and the progress Braintree District Council have made during the reporting year of 2021 presented.

The Council's Climate Change Strategy contains a number of actions that have direct or indirect positive actions on improving air quality. These are listed in Table 2.2.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated/Actual Completion year	Organisations involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant/Emission from Measure	Key Performance Indicator	Progress to Date	Comments/Barriers to Implementation
1	Planning considerations specific to AQ impact assessment and mitigation (e.g. provision of EV charging points and measures/site design to offset adverse impact)	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2021	ongoing	Local Authority Planning.	Local Authority	NO	n/a	n/a	Implementation	No AQMA – not quantified	n/a	Implemented through local planning and transport cooperation. Climate Change action plan to reinforce this	None
2	Provision of air impact assessment and mitigation for construction and demolition stage by developers	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	ongoing	ongoing	Local Authority Planning/Environmental Health.	Local Authority	NO	Funded	n/a	Implementation	No AQMA – not quantified	n/a	Climate Annual action plan to reinforce this	none
3	Provision of travel plans through planning process	Alternatives to private vehicle use	Other	ongoing	ongoing	Local Authority Environmental Health, Local Authority Transport Dept.	Local Authority	NO	Funded	n/a	Implementation	No AQMA – not quantified	n/a	Implemented through local planning and transport cooperation	none
4	Enforcement and inspection of polluting industry and emissions to air through environmental permitting and statutory nuisance legislation	Environmental Permits	Other measure through permit systems and economic instruments	Historical legislation	ongoing	Local Authority Environmental Health	Local Authority	NO	Funded	Statutory function	Implementation	No AQMA – not quantified	n/a	Actively enforced	none

5	Biomass/combustion chimney height assessments	Environmental Permits	Other measure through permit systems and economic instruments	Historical legislation	ongoing	Local Authority Environmental Health	Local Authority	NO	Funded	statutory function	Implementation	No AQMA – not quantified	n/a	Actively enforced	none
6	Implementation of climate change strategy	Policy Guidance and Development Control	Low Emissions Strategy	2021	2030	local authority	Local Authority	NO	Partially Funded	n/a	Implementation	No AQMA – not quantified	n/a	Climate Change Strategy adopted in 2021 and Action plan released	
7	Live well campaign	Alternatives to private vehicle use	Other	2017	ongoing	Local authority	Local Authority	NO	Funded	n/a	Implementation	No AQMA – not quantified	n/a	Actively promoted since 2017 now being supported through BDC Climate Change strategy	Public hesitancy to adopt different lifestyle
8	"Routine attendance of Essex Air Quality Consortium of Essex wide policy	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	1999	ongoing	Local Authority Environmental Health	Local Authority	NO	Funded	n/a	Implementation	No AQMA – not quantified	n/a	Held every three months	Have continued as virtual meetings
9	Adopted road traffic act powers to require switching off of engines	Traffic Management	Anti-idling enforcement	Historical legislation	ongoing	Local authority Environmental Health	Local Authority	NO	Funded	n/a	Implementation	No AQMA – not quantified	n/a	Legislation useful as an education tool	supported by Climate Change Action plan
10	Review of Licensing Policies to create greener fleet of taxis in The District	Promoting Low Emission Transport	Taxi Licensing conditions	2021	ongoing	Local Authority Licensing	Local Authority	NO	Funded	n/a	Implementation	No AQMA – not quantified	n/a	Implementation on-going	supported by Climate Change Action plan
11	Encouraging staff to use lower emission vehicles through leased car and cycle schemes	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	2012	ongoing	Local Authority	Local Authority	NO	Funded	n/a	Implementation	No AQMA – not quantified	n/a	Option existed for a number of years, 87 bicycles supplied	Lower take up by travelling officers as cheaper/more flexible alternatives to the scheme Climate Change action Plan – continue to research and evaluate ultra-low emission alternatives for the Council's fleet of vehicles - ££££ implementation costs
12	The Council will continue to promote alternatives to domestic bonfires and responsible waste management.	Public Information	Other		ongoing	Local Authority	Local Authority	NO	Funded	n/a	Implementation	No AQMA – not quantified	n/a	Implementation on-going as opportunities arise	
13	Climate change Strategy	Other	Other	2019	ongoing	Local Authority	Local Authority	NO	Funded		Completed	No AQMA – not quantified	n/a	linked to climate change strategy process	Climate change strategy and action plan for produced

14	School travel plans	Promoting Travel Alternatives	Other		ongoing	Local Authority both Tiers	Local Authority	NO	Funded	n/a	Implementation	No AQMA – not quantified	n/a	Implementation with cooperation from ECC	
15	Cycling strategy	Promoting Travel Alternatives	Promotion of cycling	2020	ongoing	Local Authority	Local Authority	NO	Funded	n/a	Planning	No AQMA – not quantified	n/a	Strategy adopted	
16	Public electric charging points in all BDC owned car parks and ECC to increase electric charging infrastructure on streets	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2016	ongoing	Local Authority	OLEV	NO	Funded	£100k - £500k	Implementation	No AQMA – not quantified	n/a	additional 16 charging points at 4 locations in 2021 in addition to 7 existing sites owned by BDC	UK's first electric forecourt in full operation after opening in December 2020
17	Independent review of current Air Quality Monitoring	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2021	2022	Local Authority	Local Authority	NO	Funded	£10k - 50k	Implementation	No AQMA - not quantified	n/a	Air Quality monitoring review in progress by reputable air quality consultants and will be reported on in on 2022	
18	Climate change Action - installing solar panels on its existing estate and any new buildings	Promoting Low Emission Plant	Shift to installations using low emission fuels for stationary and mobile sources	2021	ongoing	Local Authority	Local Authority	NO	Funded	Info not available	Implementation	No AQMA - not quantified	n/a	current total of 0.5MW	
19	Climate Change Action - boiler replacements including from solid fuel boilers to A rated boilers	Promoting Low Emission Plant	Shift to installations using low emission fuels for stationary and mobile sources	2021	ongoing	Local Authority	Eco/Green Homes Grants	NO	Funded	Info not available	Implementation	No AQMA - not quantified	n/a	Implementation ongoing	none
20	Climate Change Action - facilitating schemes for reduced gas/oil use such as Air source heat pumps	Promoting Low Emission Plant	Shift to installations using low emission fuels for stationary and mobile sources	2021	ongoing	Local Authority	Grant schemes	NO	Funded	Info not available	Implementation	No AQMA - not quantified	n/a	Implementation ongoing	
21	Climate Change Action - developed its I-Construct flagship building to provide an exemplar of sustainable development and encourage developers to build to high sustainable standards.	Promoting Low Emission Plant	Shift to installations using low emission fuels for stationary and mobile sources	2021	ongoing	Local Authority		NO	Funded	Info not available	Completed	No AQMA - not quantified	n/a	Complete	Provides an example of sustainable development and encourages developers to build to high sustainable standards

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.

There is no current regulatory standard applied to PM_{2.5} (for local authorities in England) to require action to reduce emissions or concentrations of fine particulate air pollution, although action to tackle PM10/NOx would usually contribute to this. The National Local Air Quality Technical guidance (TG 16 paragraph 2.57) states that it is estimated that as much as 40% to 50% of the PM_{2.5} levels found in any given area can be from sources outside a local authority’s direct boundary.

The Public Health Outcomes Framework introduced a PM_{2.5} indicator ‘fraction of adult mortality attributed to particulate air pollution’. In the last reported period (2020) the information for Braintree as shown below indicates that the level is 5.7%. This is comparable to the East of England region average of 5.8% and England at 5.6% as found at [Public Health Outcomes Framework](#) at the gov.uk website and as shown in graphical form below in Fig 2.1a against the England data.

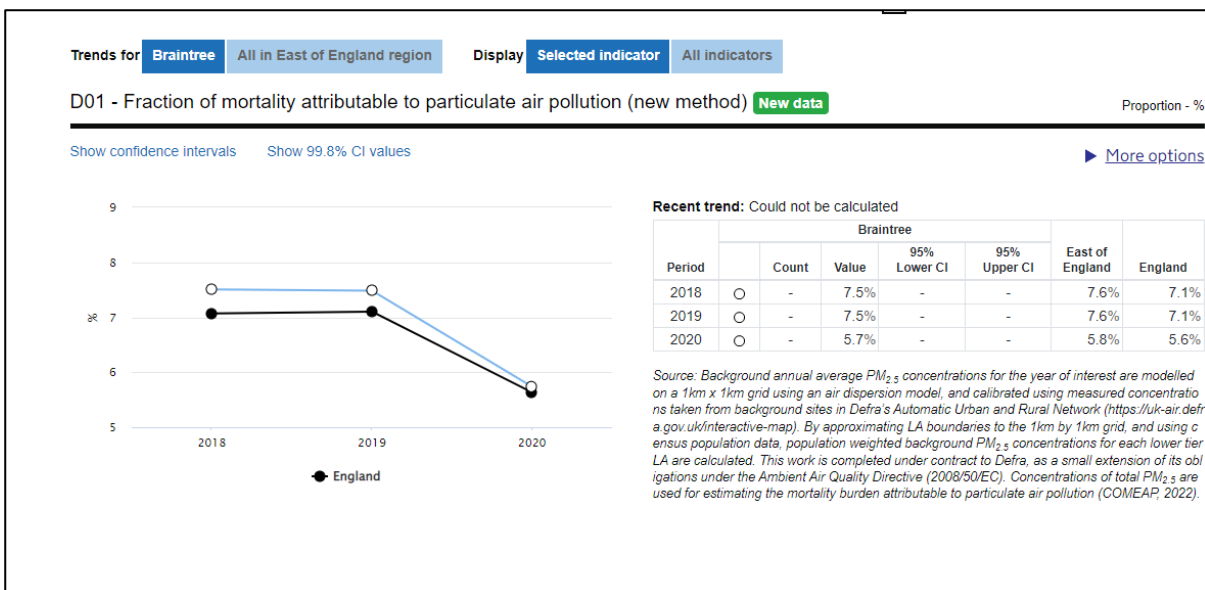
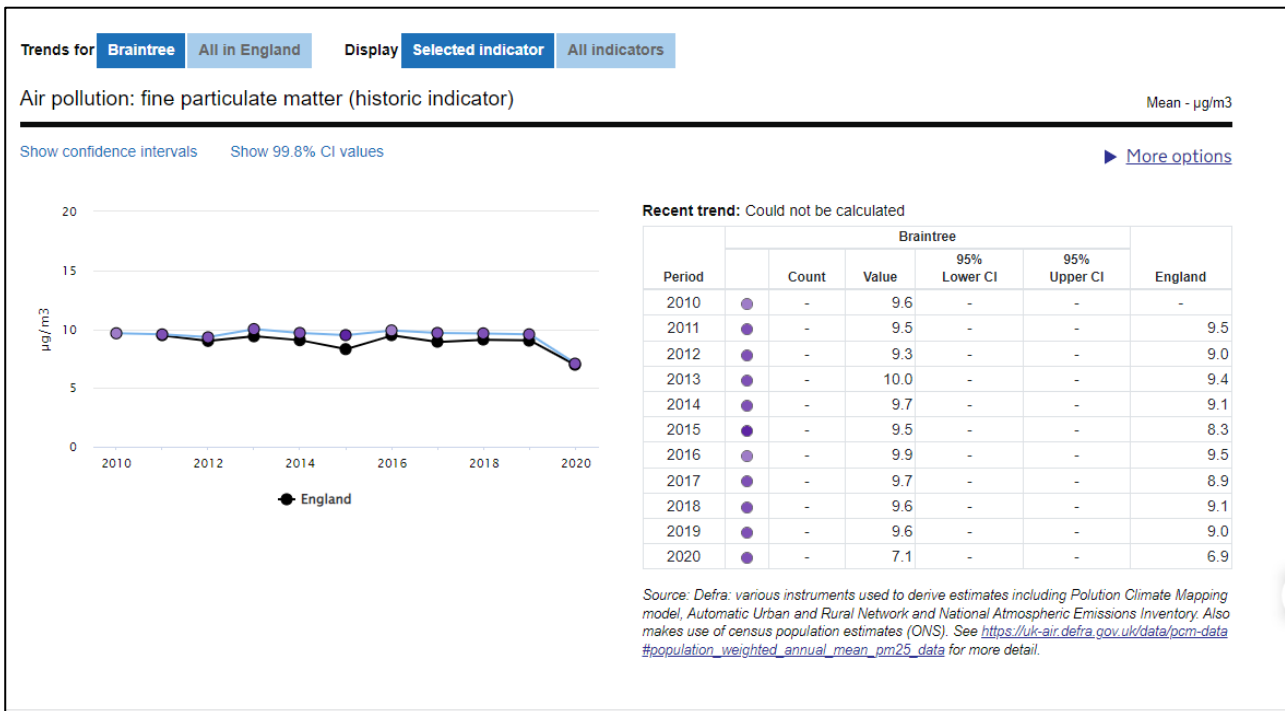


Fig 2.1 The Public Health Outcomes Framework – PM_{2.5} indicator “fraction of adult mortality attributed to particulate air pollution.

The Public Health outcomes site also reports historic indicators for Air Pollution (fine particulate matter as shown in Fig 2.2 below



.Fig2.2 The Public Health Outcomes Framework – Air Pollution: fine particulate matter (historic indicator)

The figure shown in Fig 2.2 indicates a reduction in levels of PM2.5 due to the pandemic. From the [Defra Background Mapping Resource](#) the maximum background annual mean PM2.5 concentration is 11.6 $\mu\text{g}/\text{m}^3$. Of the 617 grid square (1km) provided three are greater than 11 $\mu\text{g}/\text{m}^3$, eleven are greater than 10 $\mu\text{g}/\text{m}^3$ and the rest range from 8.7 to 10 $\mu\text{g}/\text{m}^3$.

Braintree District Council does not have any smoke control areas within its district and as in previous years will continue to limit particulate emissions through industrial process regulation, waste enforcement, prevention of burning through education and waste enforcement and statutory nuisance investigations and restrictions on planning consents during site clearance and construction processes.

Sustainable travel and reduction of congestion is promoted through the planning process and local Highways Panels which can reduce emissions from brakes and tyres.

Braintree District Council will continue to review air quality and focus on reducing and preventing air pollution (including PM2.5) through the planning regime, air pollution and regulatory control, traffic management with Highways assistance and various local initiatives shown in Table 2.1

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

Through action taken to address NO₂ this will lead to a reduction in particulate matter also for transport sources.

For other sources such as burning, construction sites and industrial processes then localised enforcement by Braintree District Council through statutory nuisance, environmental permitting, smoke and waste control regimes seeks to prevent emissions at source.

The air quality monitoring review to be produced in 2022 will inform Braintree District Council's PM_{2.5} monitoring strategy.

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

This section sets out the monitoring undertaken within 2021 by Braintree District Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2017 and 2021 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Braintree District Council has no automatic monitoring sites so does not monitor particulate matter.

NB. 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

Braintree District Council undertook non- automatic (i.e. passive) monitoring of NO₂ at 20 sites during 2021. Table A.1 in Appendix A presents the details of the non-automatic 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.

Site BR23 at Mill View, alongside A120 was removed at the end of 2020 as data does not indicate a risk of exceedance in 2020. Triplicate monitoring added at Halstead site BR14 (pavement alongside 11 Head Street (commercial property)) and at site BR16 (Corner of Head Street/Colchester Road) and two new sites NC5 and NC6 added at the East and West end of The Street at Hatfield Peverel. Site locations are shown in Appendix D.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, annualisation (where the annual mean data capture is below 75% and greater than 25%), and distance correction. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO₂)

Table A.2 in Appendix A compares the adjusted monitored NO₂ annual mean concentrations for the past five years with the air quality objective of 40µg/m³. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2021 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

No exceedances of the air quality objective for NO₂ has been determined for both annual mean (40µg/m³) and 1-hour (200µg/m³) objectives. For the pavement/kerbside site at BR14 (11 Head street) there are commercial premises immediate to the site so the annual mean objective does not apply as there is no relevant residential receptor. As the monitored concentration on the pavement is not greater than 60µg/m³, which would indicate an exceedance of the 1-hour mean then there is also no predicted exceedance of the 1 hour (200µg/m³) objective .

Figures A1a to A1d show trend charts of concentrations over five years where the data is available for various site in the Braintree District area. All sites show a downward trend with depressed readings in 2020 due to the pandemic travel restrictions.

Appendix A: Monitoring Results

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

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
BR1	Blandford House Braintree	Roadside	575600	222900	NO ₂	N/A	6.0	1.2	No	2.0
BR3	A12 Foxden Rivenhall	Roadside	583859	216497	NO ₂	N/A	19.0	2.0	No	1.8
BR4	Beckers Green Road Braintree	Urban Background	577800	222500	NO ₂	N/A	12.2	8.3	No	2.0
BR5	Chipping Hill Witham	Roadside	582002	215111	NO ₂	N/A	7.0	2.0	No	1.9
BR6	Victoria Street Braintree	Roadside	576204	222958	NO ₂	N/A	4.0	2.0	No	2.0
BR7	Stilemans Wood Braintree	Roadside	577680	221964	NO ₂	N/A	20.0	9.0	No	1.8
BR9	A12 Rivenhall Hotel	Roadside	583891	216467	NO ₂	N/A	10.0	1.5	No	1.8
BR11	High St Kelvedon	Roadside	586386	219106	NO ₂	N/A	0.0	3.5	No	1.9

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
BR12	A120 The Swan Bradwell	Roadside	580625	223115	NO ₂	N/A	11.7	2.9	No	1.8
BR13	Bridge Street Witham	Roadside	581851	214151	NO ₂	N/A	0.0	1.0	No	1.9
BR14, NC1, NC2	Head Street Halstead	Kerbside	581542	230738	NO ₂	N/A	n/a	0.7	No	1.9
BR16, NC3, NC4	Corner of Head St/ColchesterRoad Halstead	Roadside	581564	230742	NO ₂	N/A	1.4	1.0	No	1.9
BR17	Oswicks Head St Halstead	Kerbside	581530	230731	NO ₂	N/A	N/A	1.0	No	1.9
BR18	Hedingham Road Halstead	Kerbside	581471	230711	NO ₂	N/A	N/A	0.5	No	1.9
BR20	33 Head Street Halstead	Roadside	581586	230775	NO ₂	N/A	0.0	2.3	No	1.9
BR21	Collingwood Road Witham	Roadside	582143	214630	NO ₂	N/A	1.0	2.6	No	1.9
BR22	60 Avenue Road Witham	Roadside	582033	215081	NO ₂	N/A	0.0	8.7	No	1.8
BR24	14 St Michaels Road Braintree	Roadside	575611	222892	NO ₂	N/A	0.0	5.0	No	1.9
NC5	Corner Maldon Road/The St Hat Pev	Roadside	579402	211916	NO ₂	N/A	6.0	3.0	No	1.9
NC6	The Street Hat Pev	Roadside	578823	211654	NO ₂	N/A	0.0	3.0	No	1.8

Notes:

- (1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).
- (2) N/A if not applicable.

Table A.2 – Annual Mean NO₂ Monitoring Results: Non-Automatic Monitoring (µg/m³)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
BR1	575600	222900	Roadside	100	100.0	31.0	28.2	29.4	23.6	23
BR3	583859	216497	Roadside	100	100.0	51.9	46.1	45.8	37.2	33.8
BR4	577800	222500	Urban Background	100	100.0	18.3	16.2	16.6	12.7	13.3
BR5	582002	215111	Roadside	100	100.0	45.3	40.4	39.1	32.3	30.9
BR6	576204	222958	Roadside	100	100.0	24.6	22.9	21.4	16.9	18.5
BR7	577680	221964	Roadside	100	100.0	31.6	29.2	27.8	21.5	19.5
BR9	583891	216467	Roadside	84.6	84.6	46.1	40.7	35.5	26.6	27.9
BR11	586386	219106	Roadside	100	100.0	27.1	23.1	22.1	17.2	18.0
BR12	580625	223115	Roadside	100	100.0	31.5	25.9	27.3	20.9	22.0
BR13	581851	214151	Roadside	100	100.0		33.0	32.9	28.1	26.3
BR14, NC1, NC2	581542	230738	Kerbside	90.4	90.4		59.9	56.8	47.6	45.0

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
BR16, NC3, NC4	581564	230742	Roadside	100	100.0				44.1	36.3
BR17	581530	230731	Kerbside	100	100.0				42.3	33.6
BR18	581471	230711	Kerbside	100	100.0				33.0	27.3
BR20	581586	230775	Roadside	100	100.0				37.5	31.7
BR21	582143	214630	Roadside	100	100.0				28.2	24.1
BR22	582033	215081	Roadside	100	100.0				44.1	18.9
BR24	575611	222892	Roadside	100	100.0					25.0
NC5	579402	211916	Roadside	100	59.6					28.0
NC6	578823	211654	Roadside	100	59.6					27.84

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16

Diffusion tube data has been bias adjusted

Reported concentrations are those at the location of the monitoring site (bias adjusted and annualised, as required), i.e. prior to any fall-off with distance correction.

Notes:

The annual mean concentrations are presented as $\mu\text{g}/\text{m}^3$.

Exceedances of the NO₂ annual mean objective of $40\mu\text{g}/\text{m}^3$ 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**.

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

Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

- (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%).

Figure A.1 – Trends in Annual Mean NO₂ Concentrations

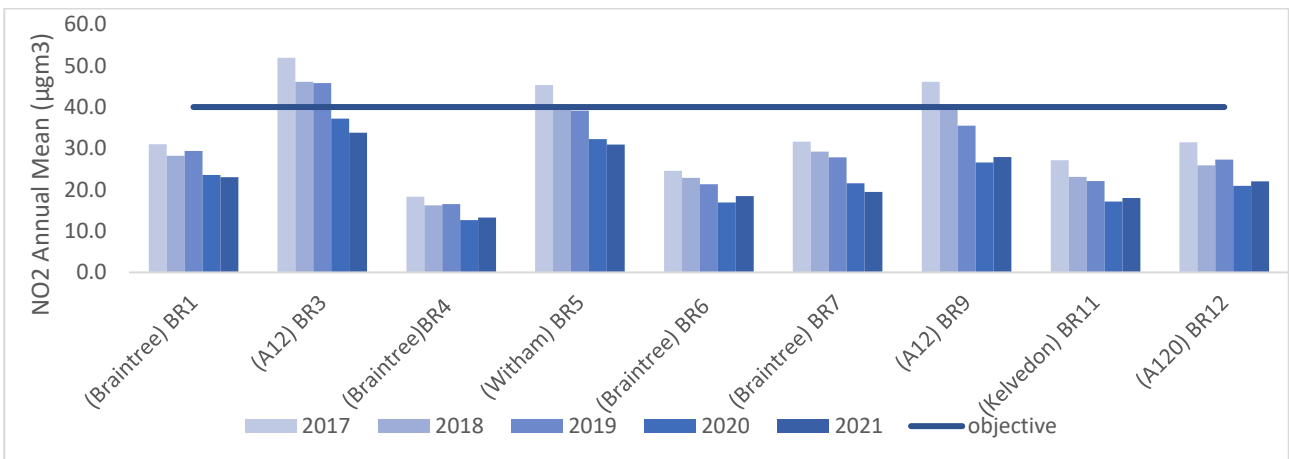


Fig A.1a NO₂ annual mean concentrations for sites in Braintree District

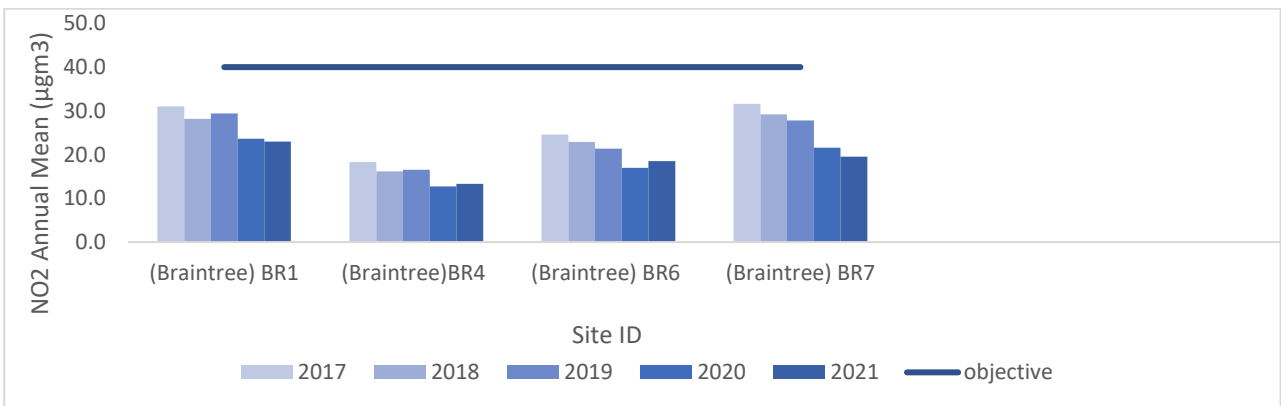


Figure A.1b NO₂ annual mean concentrations for sites in Braintree town area

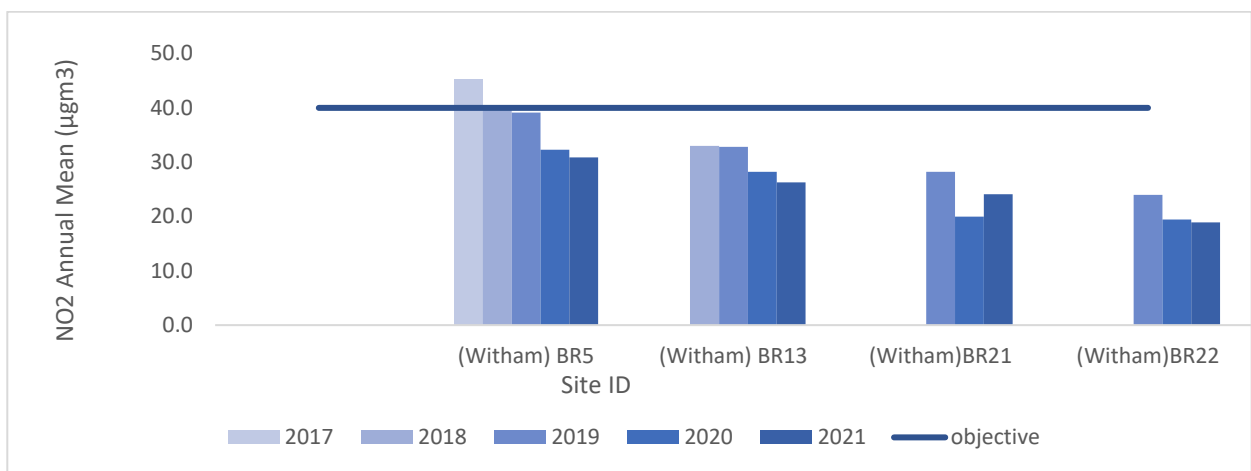


Figure A.1c NO₂ annual mean concentrations for sites in Witham

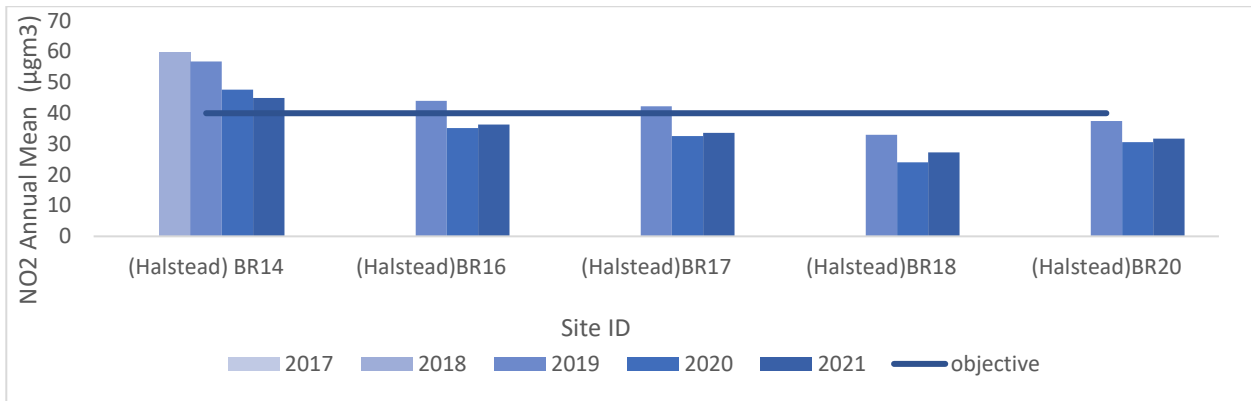


Figure A.1d NO₂ annual mean concentrations for sites in Halstead

Appendix B: Full Monthly Diffusion Tube Results for 2021

Table B.1 – NO₂ 2021 Diffusion Tube Results (µg/m³)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted 0.78	Annual Mean: Distance Corrected to Nearest Exposure
BR1	575600	222900	34.8	32.5	35.0	24.0	22.1	26.1	21.9	26.9	34.8	31.0	32.3	32.2	29.5	23.0	-
BR3	583859	216497	51.3	45.5	44.5	33.2	40.6	31.8	44.6	34.9	47.9	57.8	38.0	50.3	43.4	33.8	-
BR4	577800	222500	23.6	20.9	19.1	12.2	12.7	10.5	13.1	10.7	21.2	21.9	16.8	21.3	17.0	13.3	-
BR5	582002	215111	53.3	38.5	47.2	33.3	38.2	33.5	34.0	34.2	23.1	51.5	45.2	42.8	39.6	30.9	-
BR6	576204	222958	28.5	25.8	25.1	18.4	31.7	16.6	16.6	15.6	31.3	26.1	23.5	25.3	23.7	18.5	-
BR7	577680	221964	30.5	31.1	28.2	20.3	11.9	21.5	28.4	20.8	19.9	35.4	23.9	28.8	25.1	19.5	-
BR9	583891	216467	missing	missing	46.5	38.6	30.8	33.1	27.3	30.9	35.3	36.4	38.1	40.1	35.7	27.9	-
BR11	586386	219106	31.7	20.4	23.8	23.1	16.4	18.3	18.3	16.5	26.5	25.5	27.3	29.3	23.1	18.0	-

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted 0.78	Annual Mean: Distance Corrected to Nearest Exposure
BR12	580625	223115	38.0	28.2	32.1	26.3	29.0	28.7	23.7	25.3	21.7	31.3	23.0	31.8	28.3	22.0	-
BR13	581851	214151	30.7	36.9	36.6	34.7	39.6	34.2	39.4	33.1	13.9	39.9	29.5	36.3	33.7	26.3	-
BR14	581542	230738	62.0	58.2	67.2	65.1	57.1	67.1	62.5	28.5	22.6	missing	58.7	64.9	-	-	-
NC1	581542	230738						70.6	62.1	54.8	27.4	missing	60.2	64.2	-	-	-
NC2	581542	230738						64.9	59.7	51.2	29.6	missing	65.2	61.7	57.7	45.0	n/a
BR16	581564	230742	51.6	48.5	46.7	41.4	55.3	46.4	48.5	31.8	39.5	52.8	40.7	47.7	-	-	-
NC3	581564	230742						45.8	46.0	41.7	50.0	54.3	43.8	49.6	-	-	-
NC4	581564	230742						42.9	45.8	41.5	34.9	54.8	41.9	46.3	46.6	36.3	31.7
BR17	581530	230731	46.2	46.1	46.6	45.2	49.1	45.0	49.7	34.0	22.8	47.7	38.3	46.8	43.1	33.6	-
BR18	581471	230711	39.9	41.5	39.1	42.7	30.8	38.8	33.8	33.1	19.1	33.6	32.2	35.1	35.0	27.3	-
BR20	581586	230775	46.7	40.1	48.9	47.5	41.3	41.2	20.3	41.0	31.5	44.9	44.1	40.8	40.7	31.7	-
BR21	582143	214630	34.4	32.6	32.5	26.3	27.0	23.6	22.8	22.0	58.1	32.8	26.5	32.0	30.9	24.1	-
BR22	582033	215081	31.0	26.4	27.4	18.8	22.9	20.6	21.4	19.3	19.3	31.6	26.0	25.5	24.2	18.9	-

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted 0.78	Annual Mean: Distance Corrected to Nearest Exposure
BR24	575611	222892	32.6	30.6	31.3	29.0	27.3	19.8	34.9	20.9	76.1	26.9	25.3	29.4	32.0	25.0	-
NC5	579402	211916						30.7	29.0	25.8	64.4	34.9	32.3	33.6	35.8	28.0	-
NC6	578823	211654						26.4	28.3	28.3	60.2	37.3	31.9	36.3	35.5	27	-

- All erroneous data has been removed from the NO₂ diffusion tube dataset presented in Table B.1
- Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16
- Local bias adjustment factor used.
- National bias adjustment factor used.
- Where applicable, data has been distance corrected for relevant exposure in the final column.
- Braintree District confirm that all 2021 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

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**.

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within Braintree District During 2021

There is continual growth in homes being built in the district area – with large residential developments on the edge of all main towns being permitted and at various sites including the parishes of Kelvedon, Silver End, Cressing, Earls Colne, Coggeshall and Hattfield Peverel. The Horizon 120 site, a sustainable business park alongside the A131 at Great Notley nr Braintree has commenced construction. All large developments are required to submit air quality assessments and construction management plans to prevent, control and offset air pollution but the development will increase road traffic.

Additional Air Quality Works Undertaken by Braintree District Council During 2021

Braintree District Council has not completed any additional works within the reporting year of 2021

QA/QC of Diffusion Tube Monitoring

The supplier used for diffusion tubes within 2021 is Socotec Didcot and the method of preparation is 50% TEA in water.

As part of their provision of support to local authorities for air quality management, Defra and the Devolved Administrations provide a set of centralised QA/QC services, to assist local authorities using diffusive samplers for monitoring of ambient nitrogen dioxide (NO₂) as part of their Local Air Quality Management process.

Socotec participates in the analysis scheme AIR-PT, the most recent results on the LAQM website are given in Table B1 below where Socotec demonstrates 100% satisfactory results.

Table B1 Laboratory summary performance for AIR NO₂ PT rounds

Table 1: Laboratory summary performance for AIR NO₂ PT rounds AR0030, 31, 33, 34, 36, 37, 39, 40 and 42

The following table lists those UK laboratories undertaking LAQM activities that have participated in recent AIR NO₂ PT rounds and the percentage (%) of results submitted which were subsequently determined to be **satisfactory** based upon a z-score of $\leq \pm 2$ as defined above.

AIR PT Round	AIR PT AR030	AIR PT AR031	AIR PT AR033	AIR PT AR034	AIR PT AR036	AIR PT AR037	AIR PT AR039	AIR PT AR040	AIR PT AR042
Round conducted in the period	January – February 2019	April – May 2019	July – August 2019	September – November 2019	January – February 2020	May – June 2020	July – August 2020	September – October 2020	January – March 2021
Aberdeen Scientific Services	75 %	100 %	100 %	100 %	100 %	NR [3]	NR [3]	100 %	100 %
Edinburgh Scientific Services	100 %	NR [2]	100 %	25 %	50 %	NR [3]	NR [3]	100 %	25 %
SOCOTEC	87.5 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	NR [3]	NR [3]	100 % [1]	100 % [1]
Glasgow Scientific Services	100 %	100 %	100 %	50 %	100 %	NR [3]	NR [3]	100 %	50 %
Gradko International	75 %	100 %	100 %	100 %	75 %	NR [3]	NR [3]	75 %	25 %
Lambeth Scientific Services	50 %	100 %	50 %	100 %	100 %	NR [3]	NR [3]	100 %	100 %
Milton Keynes Council	100 %	100 %	50 %	100 %	100 %	NR [3]	NR [3]	25 %	0 %
Somerset Scientific Services	100 %	100 %	100 %	100 %	100 %	NR [3]	NR [3]	100 %	100 %
South Yorkshire Air Quality Samplers	100 %	100 %	100 %	75 %	100 %	NR [3]	NR [3]	100 %	100 %
Staffordshire County Council	100 %	75 %	75 %	75 %	100 %	NR [3]	NR [3]	50 %	100 %
Tayside Scientific Services (formerly Dundee CC)	100 %	NR [2]	100 %	NR [2]	100 %	NR [3]	NR [3]	100 %	NR [2]
West Yorkshire Analytical Services	100 %	100 %	100 %	50 %	100 %	NR [3]	NR [3]	NR [2]	NR [2]

[1] Participant subscribed to two sets of test results (2 x 4 test samples) in each AIR PT round.

[2] NR, No results reported.

[3] Round was cancelled due to pandemic.

Cardiff Scientific Services, Exova (formerly Clyde Analytical), Kent Scientific Services, Kirklees MBC and Northampton Borough Council; these labs are not detailed as they no longer carry out NO₂ diffusion tube monitoring and therefore did not submit results for any of the AIR NO₂ PT rounds listed.

Monitoring was in accordance with the diffusion tube monitoring calendar.

Diffusion Tube Annualisation

Annualisation was required for two new sites in The Street Hatfield Peverel at NC5 and NC6 with less than 12 month data. These sites were introduced in response to local concerns about the busy roads in the locality, close proximity to the A12 and increased residential development within the village. The tubes were placed midway through the year from June and therefore data capture is less than 75%. Annualisation is required for any site with data capture less than 75% but greater than 25%. Annualisation information is given in Table C2

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2021 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG16 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO₂

continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Braintree District Council have applied a national bias adjustment factor of 0.78 to the 2021 monitoring data as shown below from <https://laqm.defra.gov.uk/air-quality/air-quality-assessment/national-bias/> .

Table B.2 - National Diffusion Tube Bias Adjustment Factor Spreadsheet

National Diffusion Tube Bias Adjustment Factor Spreadsheet										Spreadsheet Version Number: 03/22			
Follow the steps below in the correct order to show the results of relevant co-location studies										This spreadsheet will be updated at the end of June 2022			
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods										LAQM Helpdesk Website			
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet													
This spreadsheet will be updated every few months, the factors may therefore be subject to change. This should not discourage their immediate use.													
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 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.		If you have your own co-location study then see footnote ¹ . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953							
Analysed By¹		Method		Year²		Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision³	Bias Adjustment Factor (A) (Cm/Dm)
3354 SOCOTEC Didcot		50% TEA in acetone		2021			Overall Factor ² (23 studies)				Use	0.78	

A summary of bias adjustment factors used by Braintree District Council over the past five years is presented in Table C.1.

No local factor was available as no automatic monitoring is carried out within or in close proximity to the District .

Table C.1 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2021	National	03/22	0.78
2020	National	03/21	0.77
2019	National	03/20	0.75
2018	National	03/19	0.76
2017	National	03/18	0.77

NO₂ Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO₂ fall-off with

distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO₂ concentrations corrected for distance are presented in Table B.1.

Defra directs that fall-off-with-distance calculations are required for any non-automatic monitoring sites where the annual mean concentration is greater than 36µg/m³ and the monitoring site is not located at a point of relevant exposure (taking the limitations of the calculator into account). The only sites with readings above 36µg/m³ are BR14 and BR16 which are close to the junction at Colchester Road/Head Street in Halstead. BR14 is a kerbside site and on a pavement adjacent to commercial premises. In previous years when pollutant levels were higher then exceedance of the short term objective indicated by a value greater than 60µg/m³ was being assessed at the BR14 site. As there is no relevant exposure for the annual mean objective no distance correction is appropriate for BR14. The site BR16 has been distance corrected from 36.3 µg/m³ corrected to 31.7 µg/m

Table C.2 – Annualisation Summary (concentrations presented in $\mu\text{g}/\text{m}^3$)

Site ID	Annualisation Factor Standford Le Hope Roadside	Annualisation Factor Cambridge Roadside	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
NC5	1.0626	0.9415	1.0021	35.8	35.9	
NC6	1.0626	0.9415	1.0021	35.5	35.6	

Table C.4 NO₂ Fall off With Distance Calculations (concentrations presented in $\mu\text{g}/\text{m}^3$)

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted)	Background Concentration	Concentration Predicted at Receptor	Comments
BR16	1.4	1	26.3	10.8	31.7	

Appendix D: Map(s) of Monitoring Locations

Figure D1.1 – Map of Non-Automatic Monitoring Sites Areas (detailed maps below)



● Denotes area of diffusion tubes with more detail in Figs D.1.2 to D.1.7

Fig D.1.2 - NO₂ Diffusion Tube Locations for Braintree Town (central)



Fig D.1.3 - NO₂ Diffusion Tube Locations for Braintree Town (south east)

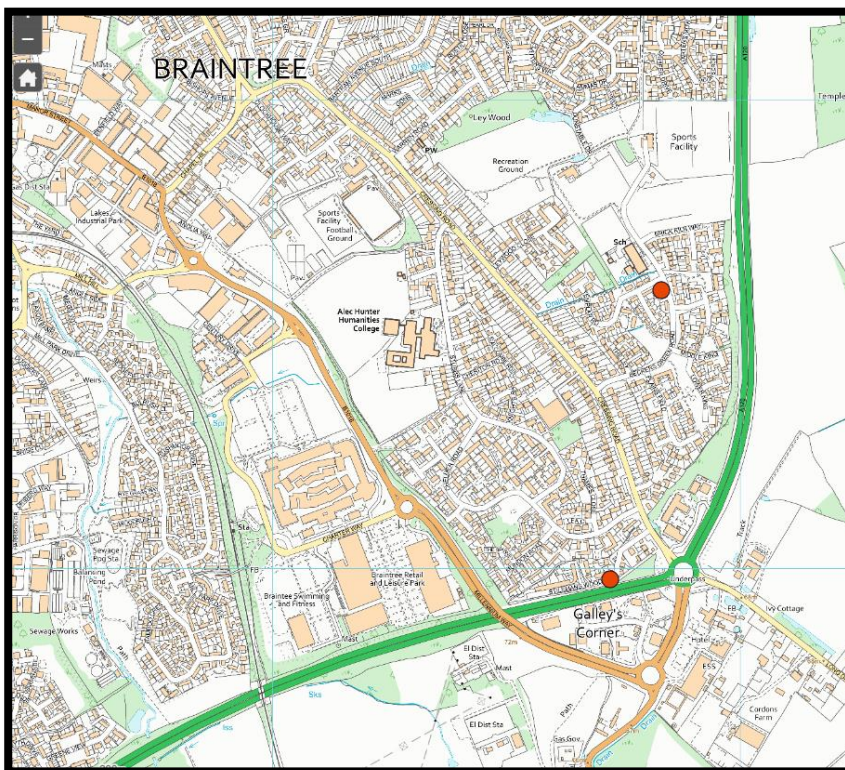


Fig D.1.4 - NO2 Diffusion Tube Locations for Witham

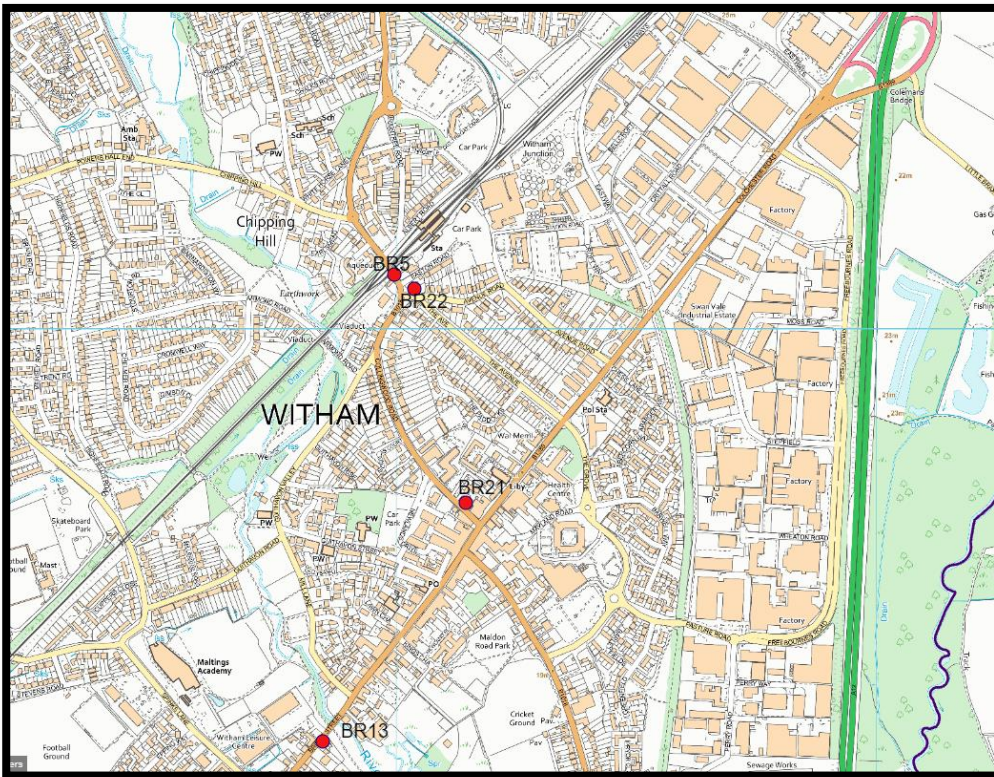


Fig D.1.5 - NO2 Diffusion Tube Locations for Halstead (overview)

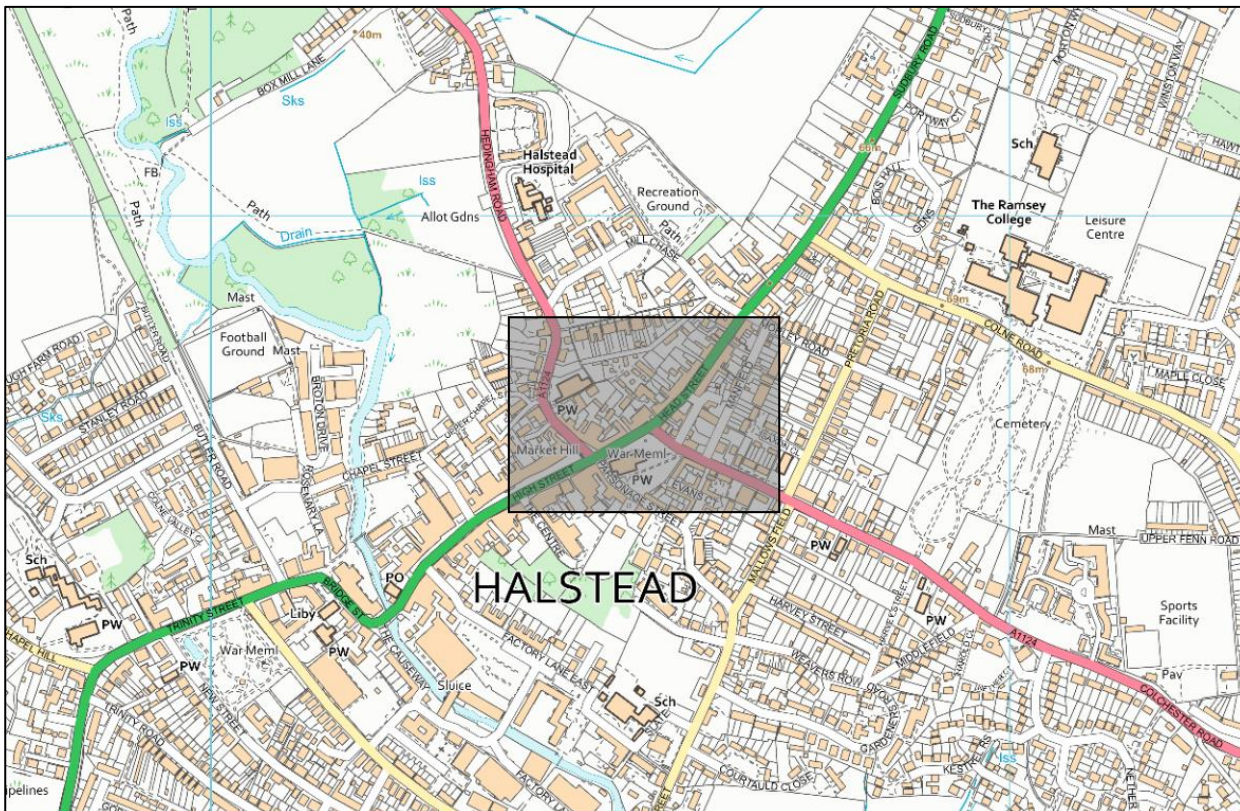


Fig D.1.6 - NO2 Diffusion Tube Locations for Halstead



Fig D.1.7 - NO2 Diffusion Tube Locations for Hatfield Peverel



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England⁷

Pollutant	Air Quality Objective: Concentration	Air Quality Objective: Measured as
Nitrogen Dioxide (NO ₂)	200µg/m ³ not to be exceeded more than 18 times a year	1-hour mean
Nitrogen Dioxide (NO ₂)	40µg/m ³	Annual mean
Particulate Matter (PM ₁₀)	50µg/m ³ , not to be exceeded more than 35 times a year	24-hour mean
Particulate Matter (PM ₁₀)	40µg/m ³	Annual mean
Sulphur Dioxide (SO ₂)	350µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean
Sulphur Dioxide (SO ₂)	125µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean
Sulphur Dioxide (SO ₂)	266µg/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/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	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
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 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 Technical Guidance LAQM.TG16. April 2021. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG16. May 2016. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland