2024 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995 Local Air Quality Management, as amended by the Environment Act 2021

Date: June 2024

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Executive Summary: Air Quality in Our Area

Air Quality in Bassetlaw

Breathing in polluted air affects our health and costs the NHS and our society billions of pounds each year. Air pollution is recognised as a contributing factor in the onset of heart disease and cancer and can cause a range of health impacts, including effects on lung function, exacerbation of asthma, increases in hospital admissions and mortality. In the UK, it is estimated that the reduction in healthy life expectancy caused by air pollution is equivalent to 29,000 to 43,000 deaths a year[1].

Air pollution particularly affects the most vulnerable in society, children, the elderly, and those with existing heart and lung conditions. Additionally, people living in less affluent areas are most exposed to dangerous levels of air pollution[2].

Table ES 1 provides a brief explanation of the key pollutants relevant to Local Air Quality Management and the kind of activities they might arise from.

Table ES 1 - Description of Key Pollutants

Pollutant	Description
Nitrogen Dioxide (NO_2)	Nitrogen dioxide is a gas which is generally emitted from high-temperature combustion processes such as road transport or energy generation.
Sulphur Dioxide (SO_2)	Sulphur dioxide (SO_2) is a corrosive gas which is predominantly produced from the combustion of coal or crude oil.
Particulate Matter (PM_{10} and $PM_{2.5}$)	Particulate matter is everything in the air that is not a gas. Particles can come from natural sources such as pollen, as well as human made sources such as smoke from fires, emissions from industry and dust from tyres and brakes. PM_{10} refers to particles under 10 micrometres. Fine particulate matter or $PM_{2.5}$ are particles under 2.5 micrometres.

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[1] UK Health Security Agency. Chemical Hazards and Poisons Report, Issue 28, 2022.

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

There was a general improvement in Air Quality in Bassetlaw during the reporting year 2023. Bassetlaw district council monitors the Air Quality in our area using Nitrogen Dioxide Diffusion Tubes and where we have data both 2022 and 2023 19 out of 20 monitoring locations measured a decrease in levels of Nitrogen Dioxide. Indeed where data is available the majority of sites recorded lower levels of Nitrogen Dioxide in 2023 than were found during the pandemic of 2020.

In Bassetlaw, the Office for Health Improvement & Disparities have calculated that 4.8% of mortality is attributable to particulate air pollution (Indicator D01), which is lower than the East Midlands average (6.1%) and lower than the English (5.8%) percentage figures (2022 period, using new method). This is positive but it is worth highlighting that Bassetlaw still has a lower healthy life expectancy for both men and woman when compared to the English average. Suggesting that even though Air Quality is good these gains are being offset by wider health determinants elsewhere. These wider determinants of health could include the level of children under 16 who live in absolute low income homes; 23.6% in comparison to an English Average of 15.6%

In Bassetlaw, the primary sources of air pollution include vehicle emissions, industrial processes, and agricultural activities. The main pollutants of concern are nitrogen dioxide (NO2) and particulate matter (PM), both emitted from vehicle exhausts. Additionally, ambient background levels are influenced by domestic heating emissions, with nitrogen oxides (NOx) originating from gas boilers and particulate matter from wood, coal, and oil-fired burners and boilers.

The only site where we recorded an increase in Nitrogen Dioxide was Hospital Road in Retford, opposite the Lime Grove Junction, with a 2022 level of 25.1 µg/m3 and a 2023 level 26.2 µg/m3. We will continue to monitor this site closely.

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades, there are some areas where local action is needed to protect people and the environment from the effects of air pollution.

The Environmental Improvement Plan[3] sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term targets for fine particulate matter ($PM_{2.5}$), the pollutant of most harmful to human health. The Air Quality Strategy[4] provides more information on local authorities' responsibilities to work towards these new targets and reduce fine particulate matter in their areas.

The Road to Zero[5] details the Government's approach to reduce exhaust emissions from road transport through a number of mechanisms, in balance with the needs of the local community. This is extremely important given that cars are the most popular mode of personal travel and the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

Bassetlaw District Council Environmental Health Department review and assess air quality in the district against national health-based standards, producing annual reports on our findings and monitoring activities (Strategic Objective 1 of NAQS2020). Collaborating with the Planning Department, we ensure air quality is a key consideration in the forward planning process and during consultations for new developments (Strategic Objective 1 of NAQS2020).

In partnership with the UK Health Security Agency and other health professionals, we raise awareness and promote measures to improve air quality while reducing emissions from our activities (Strategic Objective 4 of NAQS2020). An example is our promotion of the Burn Better Campaign in Winter 2023.

We rigorously enforce legislation to control industrial emissions through risk-based enforcement and charging. Additionally, we assist and advise businesses on mitigating environmental risks where possible (Strategic Objective 3 of NAQS2020).

Smoke Control Areas are enforced across all major population centres (Strategic Objective 3 of NAQS2020).

[3] Defra. Environmental Improvement Plan 2023, January 2023

[4] Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

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

We actively promote and support the use of electric vehicle charging points throughout the district and have seen an increase in the number of electric vehicles in our area including the purchasing of council electric vehicles in 2023 (Strategic Objective 1 of NAQS2020).

Conclusions and Priorities

The air quality in Bassetlaw remains good, with the majority of Nitrogen Dioxide (NO2) diffusion tubes recording reductions in 2023 compared to 2022 levels. No measured or modelled breaches of the National Air Quality Objectives have been identified in Bassetlaw. Most diffusion tube locations recorded NO2 levels below those in 2020, a year when the pandemic significantly reduced traffic-related NO2 concentrations.

Our primary focus is on facilitating the ongoing improvement of air quality in our district, particularly aligning with Objective 1 of the Nottinghamshire Air Quality Strategy, which pertains to place-making and development to promote favourable Air Quality conditions. This is especially crucial given the significant housing development in the district, with the number of domestic properties rising by approximately 1100 in the reporting year.

We will continue to monitor NO2 levels within our district. To ensure comprehensive monitoring, changes have been made to the monitoring locations in 2024 to measure air quality in areas where development is expected.

Local Engagement and How to get Involved

For any inquiries, feedback, or suggestions regarding the content presented in this report, please reach out to us using the contact information provided at the beginning of this document. To expand your knowledge about air quality and our monitoring practices, please visit our website: Bassetlaw Air Quality Information.

For valuable insights on reducing air pollution, we recommend visiting the National Clean Air Day website at Clean Air Day. Free toolkits are available for schools, workplaces, communities, and healthcare organizations at Clean Air Day Toolkits.

For comprehensive national strategies and technical information on air quality, the following Central Government resources are highly recommended:

- UK Air Quality Information

- Clean Air Strategy 2019

- [Air Quality Strategy for England](#)

It is important to note that a significant portion of road vehicles consists of private cars. By embracing alternatives such as walking, cycling, using public transportation, or car sharing, you can contribute to the improvement of local air quality.

Local Responsibilities and Commitment

This ASR was prepared by the Environmental Health Department of Bassetlaw District Council.

This ASR has been signed off by a Director of Public Health.

If you have any comments on this ASR please send them to: environmental.health@bassetlaw.gov.uk

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1 Local Air Quality Management

This report provides an overview of air quality in Bassetlaw District Council during 2023. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), 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 order to achieve and maintain the objectives and the dates by which each measure will be carried out. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Bassetlaw 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 18 months. The AQAP should specify how air quality targets will be achieved and maintained, and provide dates by which measures will be carried out.

Bassetlaw District Council currently does not have any declared AQMAs. A local Air Quality Strategy is in place to prevent and reduce polluting activities. The Air Quality Strategy for Nottingham and Nottinghamshire here

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

Defra's appraisal of last year's ASR concluded:

'Defra recommends that Directors of Public Health approve draft ASRs. Sign off is not a requirement, however collaboration and consultation with those who have responsibility for Public Health is expected to increase support for measures to improve air quality, with co-benefits for all. Please bear this in mind for the next annual reporting process.

From 2023 those authorities who have not had to designate AQMAs and produce AQAPs will be required to draw up a local Air Quality Strategy. The objective of a local Air Quality Strategy is to encourage prevention and reduction of polluting activities in preference to only taking steps to reduce air pollution once exceedances have been identified.'

This year approval for the report has been obtained and additionally Bassetlaw District Council believes that the Air Quality Strategy for Nottingham and Nottinghamshire meets the requirement of a local air quality strategy.

Bassetlaw District Council has taken forward a number of direct measures during the current reporting year of 2023 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.1. 7 measures are included within Table 2.1, with the type of measure and the progress Bassetlaw District Council have made during the reporting year of 2023 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.1.

Bassetlaw District Council worked to implement these measures in partnership with the following stakeholders during 2023:

Nottinghamshire County Council

National Highways

UKHSA

Other District Councils within Nottinghamshire.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	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	Maintain a High quality Environmental Permitting Regime	Environmental Permits	Other measure through permit systems and economic instruments	2012	2032	Local Authority	Permitted Processes				Implementation	Varies with Process	Extractive Sampling	Excellent	Resistance of Businesses to spend Capital to achieve results beyond what is legally required.
2	Attendance at regional working group	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	2012	2032	Sister Council's	LA				Implementation	Longterm downward Trends in NO2	NO2	Good	Meetings have generally been online since Covid
3	Local Education and Awareness Campaigns	Public Information	Via the Internet	2012	2032	Local Authority	LA				Implementation	Long-term downward Trends in NO2	NO2	Good	
4	Establishing Air Quality as a factor when planning local development	Policy Guidance and Development Control	Policy Guidance and Development Control	2019	2032	Local Authority, County Council and Developers	LA and Developers				Implementation	Long-term downward Trends in NO2	NO2	Good	
5	Promotion Of Cycling	Alternatives to private vehicle use	Other	2020	2031	Local Authority	LA				Implementation	Long-term downward Trends in NO2	NO2	Good	Council Events offering Free Cycle Services remain very popular
6	Promotion of Walking Groups	Alternatives to private vehicle use	Other	2020		Local Authority	LA				Implementation	Long-term downward Trends in NO2	NO2	Good	
7	Introduction of Electric vehicles in Bassetlaw District Council Fleet	Council Vehicle Fleet efficiency	Fleet efficiency and recognition schemes	2023	2023	Local Authority	LA				Completed	Reduce the impact of Council vehicles on Local Air Quality	NO2	Good	

2.3 PM$_{2.5}$ – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG22 (Chapter 8) and the Air Quality Strategy[6], local authorities are expected to work towards reducing emissions and/or concentrations of fine particulate matter (PM$_{2.5}$)). There is clear evidence that PM$_{2.5}$ (particulate matter smaller 2.5 micrometres) has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

As detailed in Policy Guidance LAQM.PG22 (Chapter 8), local authorities are expected to work towards reducing emissions and/or concentrations of PM2.5 (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM2.5 significantly impacts human health, contributing to premature mortality, allergic reactions, and cardiovascular diseases.

To assess the impact of particulate air pollution on public health, Public Health England uses the Public Health Outcomes Framework indicator D01. This indicator estimates the local mortality burdens associated with particulate air pollution for each local authority. These estimates are based on research evidence on mortality risks and modelled levels of background air pollution experienced by local populations. In Bassetlaw, the attributable fraction, representing the proportion of deaths estimated to be caused by long-term exposure to anthropogenic PM2.5 air pollution, was 4.9% in 2022, lower than the national level of 5.6%.

Bassetlaw District Council is taking several measures to address PM2.5 pollution:

- **Urban Traffic Emissions**: Recognising that road traffic significantly contributes to PM2.5 emissions, leading to higher concentrations near roads compared to background locations.

- **Other Sources**: Addressing emissions from domestic wood burning, industrial activities, and agriculture.

While Bassetlaw District Council does not currently monitor PM2.5 specifically, the Defra 2023 background mapping provides estimated PM2.5 levels ranging from 10.1µg in

[6] Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

Tuxford to 6.8μg in the rural areas south of Worksop. The relatively higher PM2.5 levels in Tuxford are attributed to its proximity to the A1 Road and the impact of secondary sources.

To reduce PM2.5 levels, the council has implemented several smoke control areas encompassing major population centres such as Worksop, Retford, Harworth and Bircotes, Carlton in Lindrick, Blyth, and Tuxford. These smoke control areas regulate permissible fuels, thus reducing PM2.5 emissions in these regions.

Bassetlaw District Council also an unsuccessful bid to the Air quality grant scheme for an Education Campaign and the purchase of PM2.5 monitors. Should staffing requirements allow another bid will be made in 2024 using the experience gained in the 2023 bid.

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

This section sets out the monitoring undertaken within 2023 by Bassetlaw District Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2019 and 2023 to allow monitoring trends to be identified and discussed.

Summary of Monitoring Undertaken

3.1.1 Non-Automatic Monitoring Sites

Bassetlaw District Council undertook non- automatic (i.e. passive) monitoring of NO₂ at sites during 2023. Appendix A Monitoring Results

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.

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 ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of $40\mu g/m^3$. 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 2023 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.

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)
2	Mansfield Road, Cuckney 2	Roadside	456489	371248	NO2	N	1.0	1.0	N	2.5
3	7A Kings Head, Carlton Road, Worksop 3	Urban Centre	458558	379288	NO2	N	1.0	1.0	N	2.5
5	Newcastle Avenue, Worksop (lamppost) 5	Roadside	458246	378911	NO2	N	1.0	1.0	N	2.5
12	Watson Road (1) Near undertakers 12	Roadside	458587	379136	NO2	N	1.0	1.0	N	2.5
22	Dunham (1), Little Styrrup 22	Roadside	481341	374505	NO2	N	1.0	1.0	N	2.5
25	London Road Junction, Retford 25	Roadside	470744	380706	NO2	N	1.0	1.0	N	2.5
26	Hospital Road, Retford 26	Roadside	470090	381296	NO2	N	1.0	1.0	N	2.5
27	Arlington Way / Grove Street, Retford 27	Roadside	470784	381115	NO2	N	1.0	1.0	N	2.5
28	Elkesley A1 (lamp 93) 28	Roadside	469150	375542	NO2	N	1.0	1.0	N	2.5

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)
29	Tuxford, Lincoln Road A1 overpass 29	Roadside	473811	371146	NO2	N	5.0	1.0	N	2.5
31	Claylands Avenue, Worksop 31	Industrial	457873	380581	NO2	N	3.0	1.0	N	2.5
34	Watson Road (2) Near Newcastle Ave 34	Roadside	458639	379002	NO2	N	1.0	1.0	N	2.5
35	Styrrup, Serlby Road / A1 35	Roadside	461089	390658	NO2	N	1.0	1.0	N	2.5
36	Blyth, Retford Road / A1 36	Roadside	463021	386942	NO2	N	2.0	2.0	N	2.5
37	Scrooby Road Roundabout	Roadside	461635	391533	NO2	N	5.0	1.0	N	2.5
39	Carlton Road - New Tesco	Roadside	458726	379923	NO2	N	10.0	1.0	N	2.5
40	Scrooby Road - New Asda	Roadside	462683	391523	NO2	N	15.0	1.0	N	2.5
41	Kilton Road - (New morrisons)	Roadside	459382	379464	NO2	N	3.0	1.0	N	2.5
43	Mansfield Road, Worksop	Roadside	457552	378744	NO2	N	1.0	1.0	N	2.5
45	Tuxford Eldon Street	Urban Centre	473600	371013	NO2	N	1.0	1.0	N	2.5
46	Tuxford School	Roadside	473900	370735	NO2	N	1.0	10.0	N	2.5

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)
47	Worksop Background	Rural	459992	380955	NO2	N	95.0	795.0	N	2.5
48	The Cannon	Roadside	458627	381271	NO2	N	1.0	5.0	N	2.5
49	Sandy Lane Gateford Road	Roadside	458280	379827	NO2	N	1.0	1.0	N	2.5
50	Ordsall Primary	Roadside	469865	379798	NO2	N	1.0	4.0	N	2.5

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 2023 (%) [2]	2019	2020	2021	2022	2023
2	456489	371248	Roadside	100	100.0	20.8		17.6	17.9	16.6
3	458558	379288	Urban Centre	100	100.0	30.2		25.4	23.8	22.8
5	458246	378911	Roadside	100	100.0	25.7	20.8	21.1	20.8	19.6
12	458587	379136	Roadside	100	100.0	34.6		30.0	28.8	27.3
22	481341	374505	Roadside	100	100.0	23.5	17.6	18.1	17.2	15.1
25	470744	380706	Roadside	100	100.0	24.7	21.7	21.3	20.8	18.8
26	470090	381296	Roadside	100	100.0	30.1	23.8	26.1	25.2	26.2
27	470784	381115	Roadside	100	100.0	28.7	22.6	23.2	22.8	21.4
28	469150	375542	Roadside	100	100.0	18.9	15.2	16.3	14.4	12.8
29	473811	371146	Roadside	100	100.0	33.2		25.9	24.1	21.9
31	457873	380581	Industrial	100	100.0	25.4	21.9	22.7	20.8	19.2
34	458639	379002	Roadside	91.7	91.6	30.5		25.4	24.0	22.8

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 2023 (%) [2]	2019	2020	2021	2022	2023
35	461089	390658	Roadside	91.7	90.0	24.1		17.5	16.8	13.8
36	463021	386942	Roadside	91.7	92.1	26.1	21.3	22.1	21.4	19.9
37	461635	391533	Roadside	91.7	91.6	28.8	24.0	24.3	22.7	20.6
39	458726	379923	Roadside	91.7	90.8	25.0		22.4	19.5	18.6
40	462683	391523	Roadside	83.3	83.2	28.9		22.6	23.8	21.7
41	459382	379464	Roadside	100	100.0	30.6	24.3	25.0	25.7	23.8
43	457552	378744	Roadside	100	100.0	23.9	18.8	19.0	18.6	17.7
45	473600	371013	Urban Centre	83.3	82.1	21.2		25.8	26.8	24.4
46	473900	370735	Roadside	58.3	58.3				12.1	11.8
47	459992	380955	Rural	91.7	90.0				8.2	7.4
48	458627	381271	Roadside	91.7	93.5					21.0
49	458280	379827	Roadside	100	100.0					22.8
50	469865	379798	Roadside	50	51.5					12.7

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22**

☒ **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 μg/m^3.

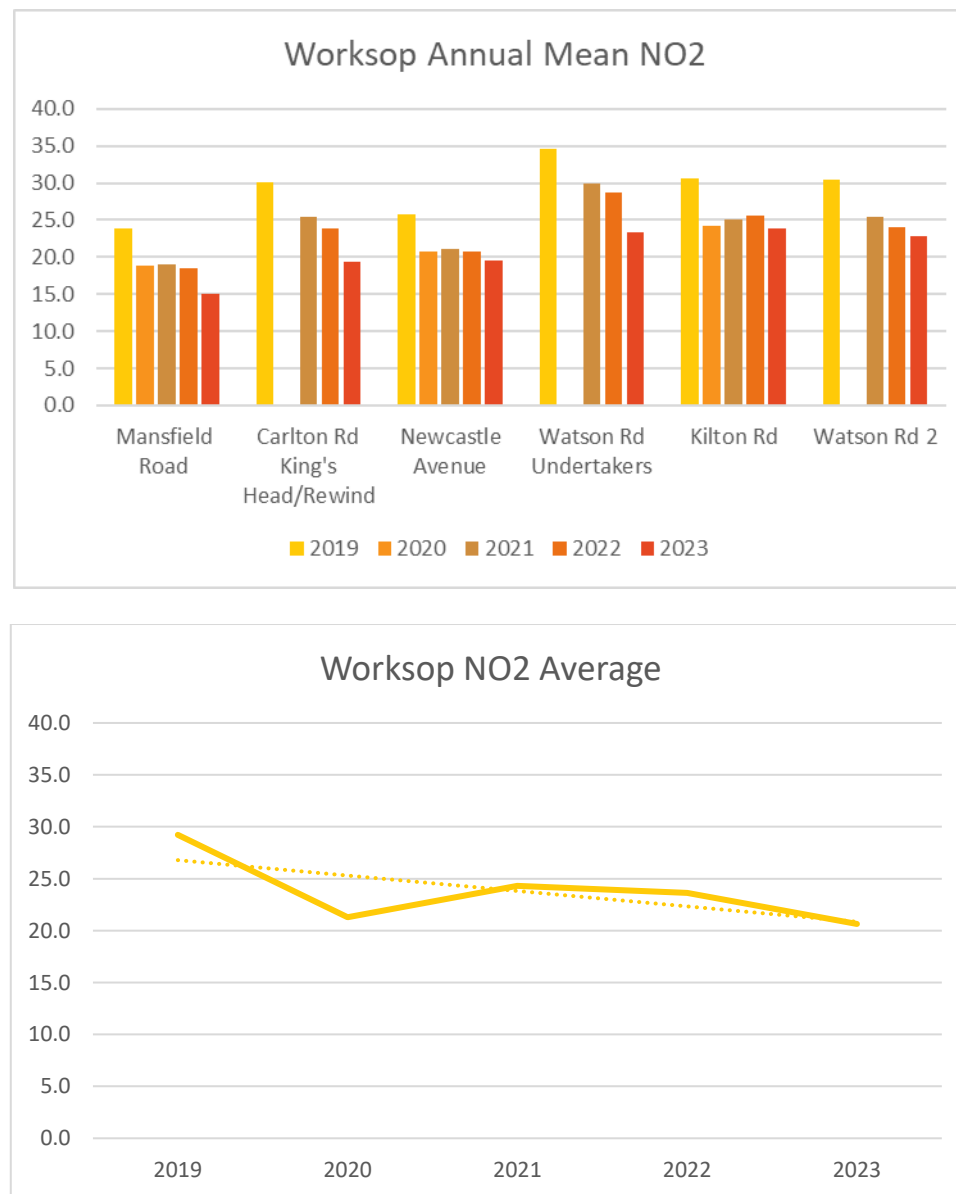Exceedances of the NO_2 annual mean objective of 40μg/m^3 are shown in **bold**.

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**.
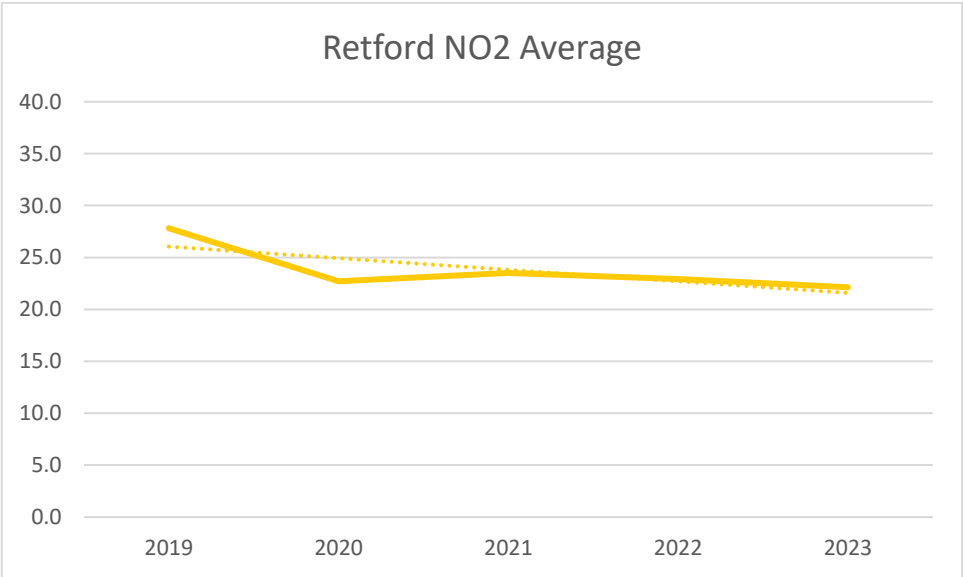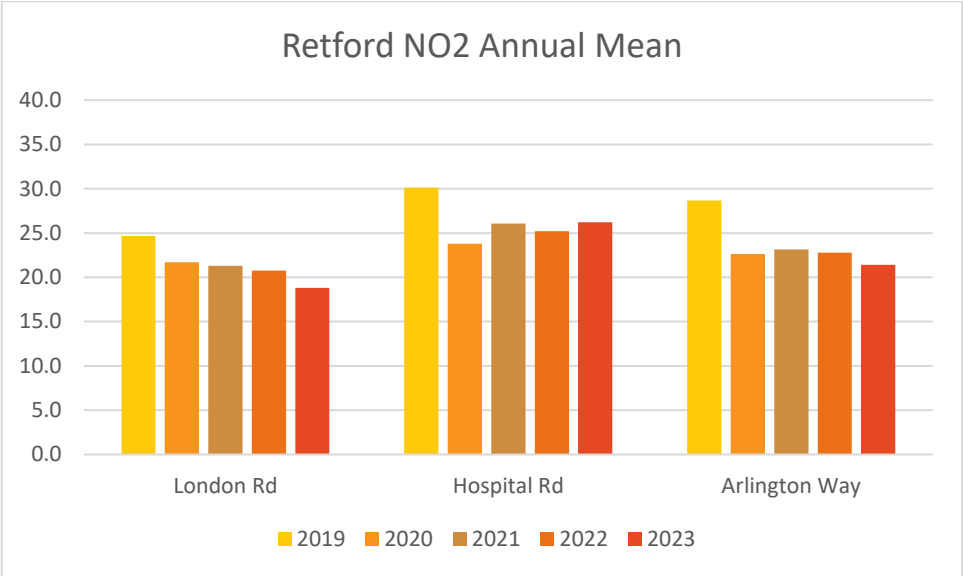
Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

Retford NO2 Annual Mean

Retford NO2 Average

Harworth Annual NO2 Mean

Harworth and Bircotes Average

Tuxford Annual NO2 Mean
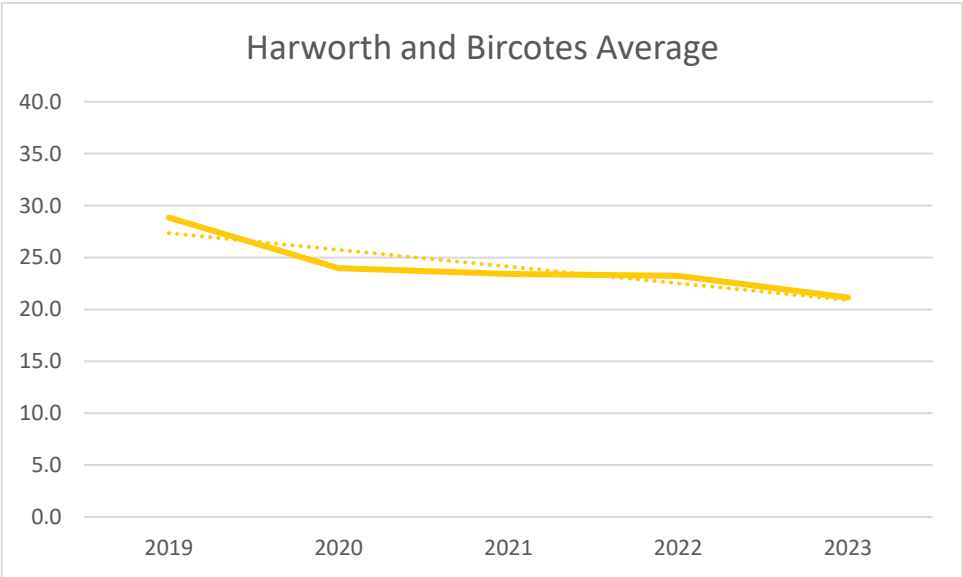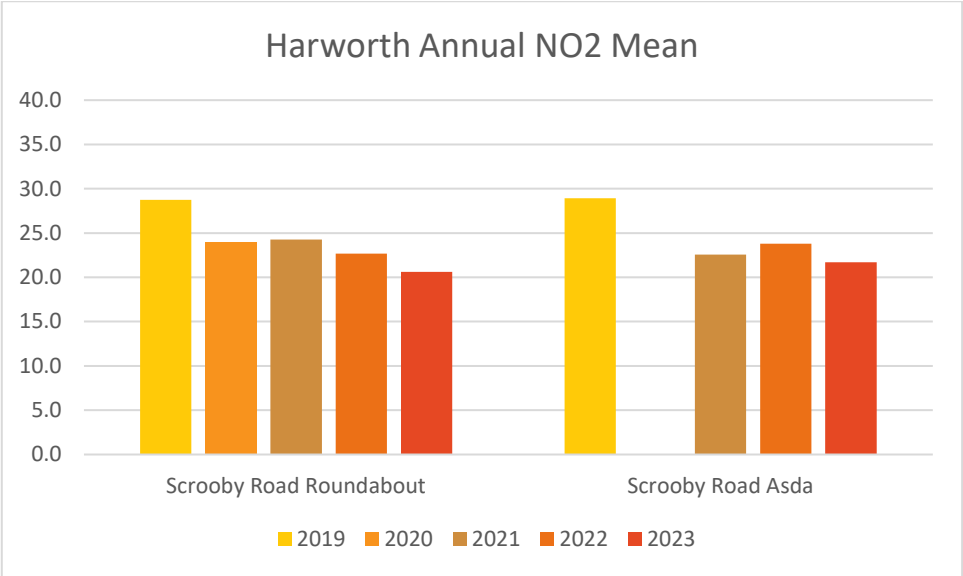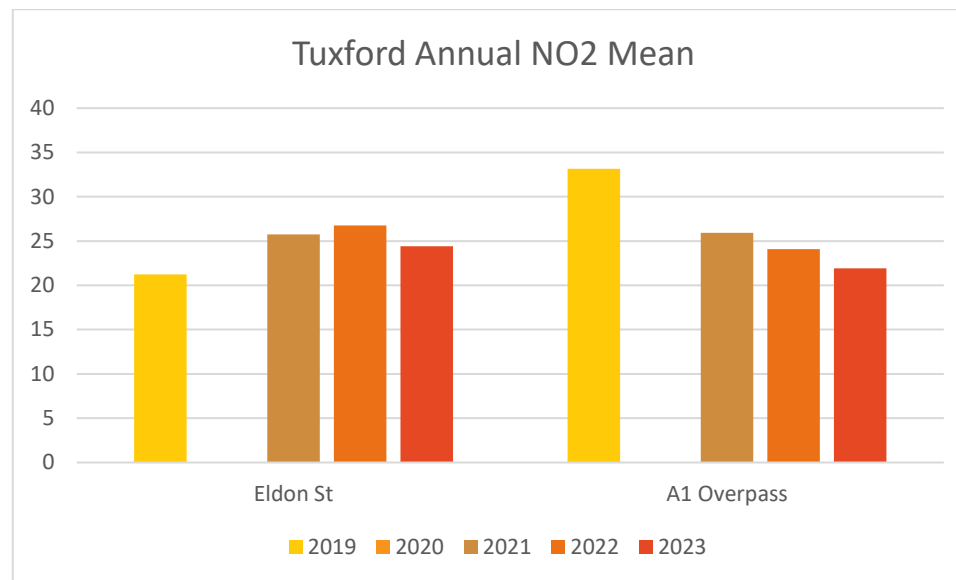
Nitrogen Dioxide levels have continued to steadily fall across Bassetlaw during the previous 5 years and we are confident this trend will continue despite additional economic growth in the District.

Appendix B: Full Monthly Diffusion Tube Results for 2023

Table B.1 – NO₂ 2023 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 <(x.x)>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
2	456489	371248	24.4	23.2	21.8	19.6	15.5	17.3	17.2	19.2	18.6	23.7	25.6	19.3	20.5	16.6	-	
3	458558	379288	35.0	38.6	30.9	26.1	21.0	22.2	21.1	22.7	24.9	32.9	35.6	26.6	28.1	22.8	-	
5	458246	378911	33.4	29.1	23.8	21.6	19.4	22.3	18.8	22.7	16.5	31.7	28.1	23.6	24.2	19.6	-	
12	458587	379136	37.5	41.9	34.7	36.8	33.5	30.2	23.3	26.9	29.5	41.1	38.3	31.4	33.8	27.3	-	
22	481341	374505	24.7	20.9	18.3	17.4	15.2	16.3	15.0	18.6	13.4	22.1	24.3	17.5	18.6	15.1	-	
25	470744	380706	33.5	27.9	24.7	19.5	15.1	17.0	19.6	18.4	19.5	28.4	31.1	24.3	23.3	18.8	-	
26	470090	381296	36.0	37.5	34.7	30.5	29.9	28.8	27.9	28.9	31.9	38.2	34.5	29.5	32.4	26.2	-	
27	470784	381115	32.0	33.8	29.2	27.2	23.4	22.4	18.6	20.8	22.5	29.7	31.1	26.5	26.4	21.4	-	
28	469150	375542	18.6	18.8	14.7	17.0	19.0	17.1	9.2	13.5	10.5	19.1	19.0	13.5	15.8	12.8	-	
29	473811	371146	35.0	31.0	26.5	22.1	17.8	23.3	26.3	26.0	27.5	32.0	32.2	25.5	27.1	21.9	-	
31	457873	380581	28.8	29.0	25.7	18.9	17.3	20.3	20.2	20.6	21.5	30.2	29.8	21.7	23.7	19.2	-	
34	458639	379002	30.2	33.7	28.5	29.6	24.0	25.7		23.0	26.1	32.8	31.8	24.2	28.2	22.8	-	
35	461089	390658	20.6	20.4	17.4	17.4	14.9	10.3	11.6	15.8	15.7	22.5	20.7		17.0	13.8	-	
36	463021	386942	28.5	28.8	23.6		24.5	24.4	16.8	21.0	21.5	30.6	27.6	22.3	24.5	19.9	-	
37	461635	391533	30.7	27.5	26.2	20.2	18.6	21.5	23.3	23.5		31.1	32.7	24.2	25.4	20.6	-	
39	458726	379923	29.5	27.2		20.4	18.1	19.9	15.9	19.2	20.5	29.2	29.6	23.6	23.0	18.6	-	
40	462683	391523	38.5	31.5	29.7	21.3	18.5	23.0		23.6	26.3	31.3		24.3	26.8	21.7	-	

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 <(x.x)>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
41	459382	379464	40.6	34.2	29.5	24.5	23.3	27.5	28.0	26.2	25.6	32.7	33.8	27.5	29.4	23.8	-	
43	457552	378744	25.9	27.6	23.0	22.6	19.7	18.9	15.2	23.9	12.6	26.2	26.0	20.1	21.8	17.7	-	
45	473600	371013	35.9	34.2	30.8	28.0	23.1	26.3	25.5			35.4	34.4	28.0	30.1	24.4	-	
46	473900	370735	20.6	20.1	15.7	15.1		11.5	8.0					14.9	15.1	11.8	-	
47	459992	380955	16.9	13.1	10.5	7.4	5.2	6.4	5.8	5.3	6.4	9.4	13.6		9.1	7.4	-	
48	458627	381271	30.1		21.9	26.0	26.2	25.2	19.4	22.7	23.8	32.4	32.2	24.8	25.9	21.0	-	
49	458280	379827	34.8	34.2	25.8	24.7	29.7	28.2	23.8	28.2	14.2	31.7	36.0	26.9	28.2	22.8	-	
50	469865	379798	23.4	19.3	16.4		9.3					21.4	16.5		17.7	12.7	-	

☒ **All erroneous data has been removed from the NO₂ diffusion tube dataset presented in Table B.1**

☒ **Annualization has been conducted where data capture is <75% and >25% in line with LAQM.TG22**

☒ **National bias adjustment factor used**

☒ **Where applicable, data has been distance corrected for relevant exposure in the final column**

☒ **Bassetlaw District Council confirm that all 2023 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 Bassetlaw District Council During 2023

Bassetlaw District Council has not identified any new sources relating to air quality within the reporting year of 2023.

Additional Air Quality Works Undertaken by Bassetlaw District Council During 2023

Bassetlaw District Council has not completed any additional works within the reporting year of 2023.

QA/QC of Diffusion Tube Monitoring

Bassetlaw District Council uses 20% TEA in water Diffusion Tubes provided by Gradko.

Diffusion Tube Annualisation

Tubes 46 and 50 required annualisation. This was carried out using the Diffusion Tube Tool.

Table C.1 – Annualisation Summary (concentrations presented in µg/m³)

Annualisation Summary - Information Only

Diffusion Tube ID	Annualisation Factor Worksop Background	Annualisation Factor Mansfield Road, Cuckney 2	Annualisation Factor 7A Kings Head, Carlton Road, Worksop 3	Annualisation Factor Newcastle Avenue, Worksop (lamppost) 5	Average Annualisation Factor	Raw Data Simple Annual Mean (µg/m3)	Annualised Data Simple Annual Mean (µg/m3)	
46	0.8986	0.9992	0.9798	0.9788	0.9641	15.1	14.6	
50	0.7657	0.9473	0.9040	0.9248	0.8854	17.7	15.7	

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2023 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.TG22 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/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Bassetlaw District Council have applied a national bias adjustment factor of 0.81 to the 2023 monitoring data. A summary of bias adjustment factors used by Bassetlaw District Council over the past five years is presented in Table C.2.

Table C.2 – Bias Adjustment Factor

| Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2023	National	03/24	0.81
2022	National	03/23	0.83
2021	National	09/22-	0.84
2020	National	09/21	0.81
2019	National	09/20	0.92

## NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support website.
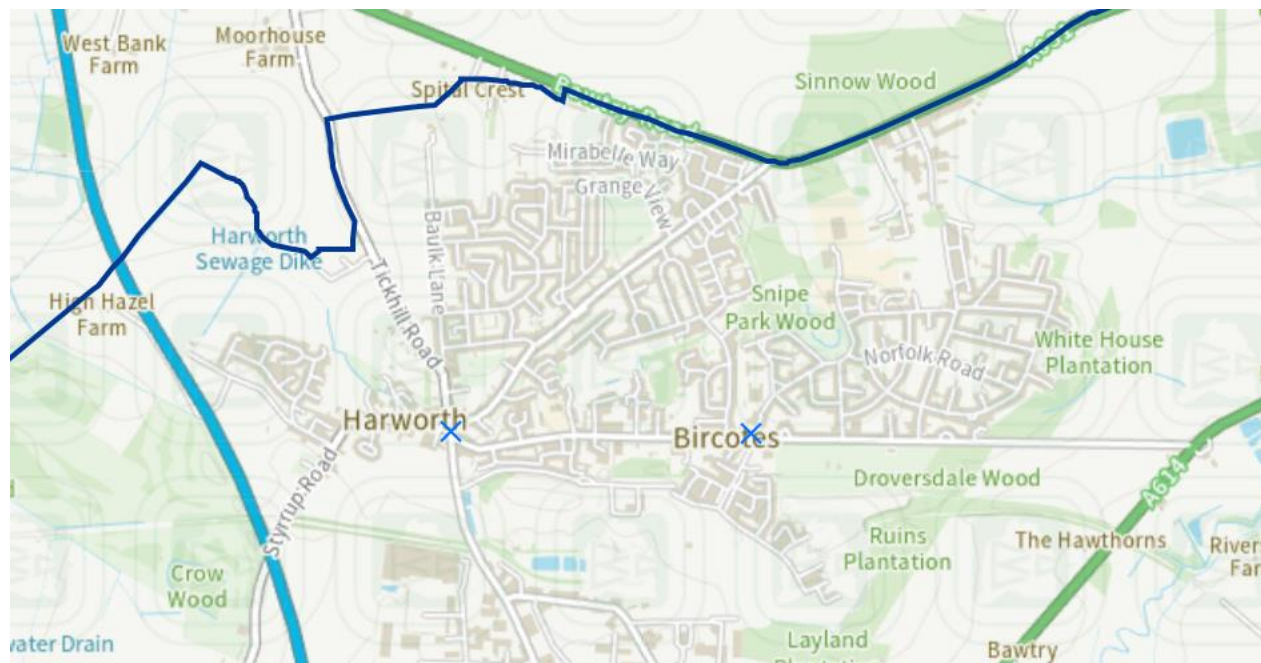
During 2023 no diffusion tubes recorded levels of Nitrogen Dioxide at levels at which distance correction is required.
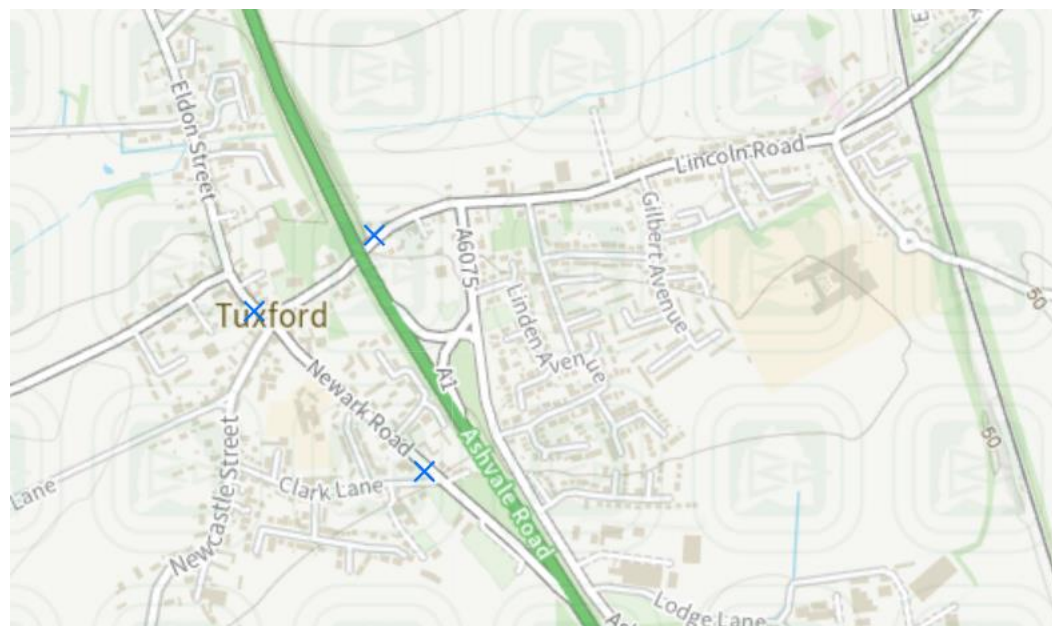
Appendix D: Map(s) of Monitoring Locations and AQMAs

Figure D.1 – Map of Non-Automatic Monitoring Site
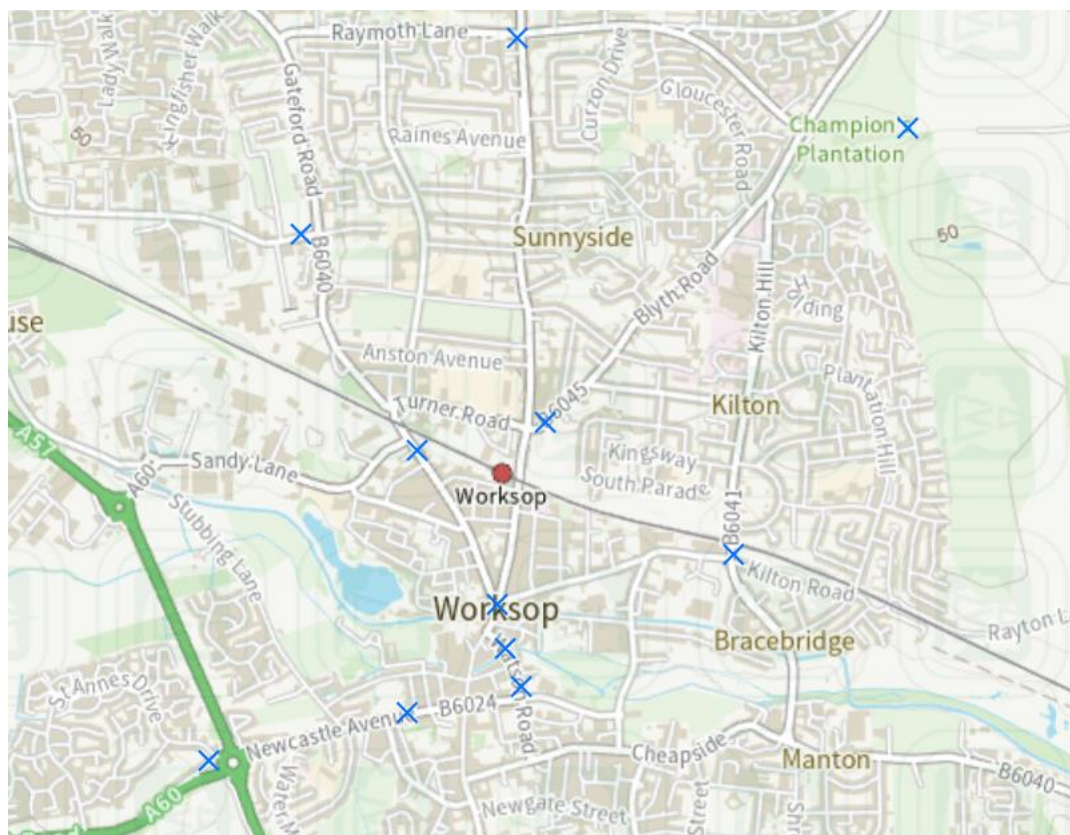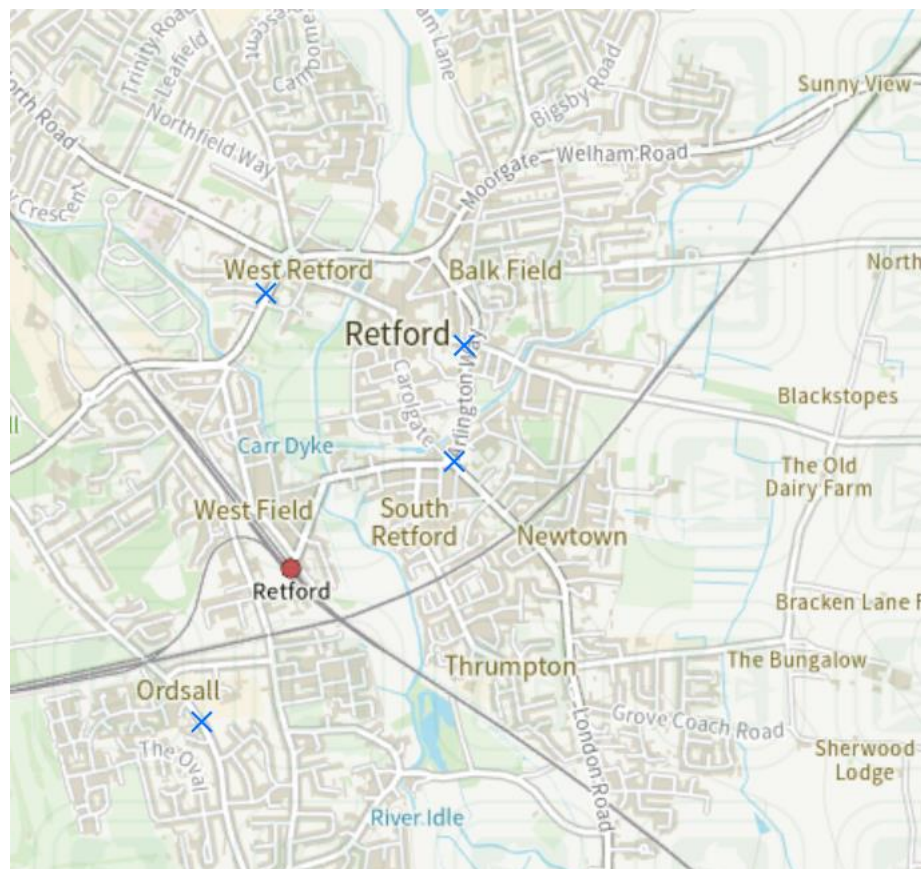
Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[7]

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

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[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	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.TG22. August 2022. 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.PG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Chemical hazards and poisons report: Issue 28. June 2022. Published by UK Health Security Agency
- Air Quality Strategy – Framework for Local Authority Delivery. August 2023. Published by Defra.