



Bromsgrove
District Council
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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 Bromsgrove District Council

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 year¹.

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 pollution².

Worcestershire Regulatory Services (WRS) is a shared service formed from the Environmental Health and Licensing departments of the six Worcestershire District Councils. Responsibility of managing (monitoring and reporting of) local air quality transferred from the partnership councils to WRS in April 2011.

Currently, there are three Air Quality Management Areas (AQMAs) declared within the Bromsgrove District, due to exceeding the annual objective for nitrogen dioxide (NO₂). The AQMAs are:

- Worcester Road, AQMA declared 24th October 2011
- Redditch Road, AQMA declared 17th February 2010
- Lickey End, AQMA declared 26th July 2001

Worcester Road AQMA last exceedance of NO₂ was recorded in 2018 but in 2023 it was within 10% of the annual objective. Source apportionment work is ongoing which will lead to the creation of an Air Quality Action Plan (AQAP) to further reduce NO₂ levels and potentially revoke the AQMA in the future.

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

Within the Redditch Road AQMA the last exceedance of NO₂ was recorded in 2016. The Lickey End AQMA last exceedance of NO₂ at relevant exposure, was recorded in 2014. Plans are in place to revoke both of these AQMAs due to the number of years they have not exceeded the annual objective. Within the last five years neither of them has been within 10% of the annual objective. This is in accordance with LAQM. TG22 and PG22 guidance.

No exceedances of the annual mean objective for nitrogen dioxide have been recorded in the Bromsgrove District during the 2023 monitoring year. It is possible that the effects of the Covid 19 pandemic were impacting the data from the last three years as some restrictions were still in place up until the early part of 2022. However, traffic levels have largely returned to pre pandemic levels and therefore we can assume that concentrations have generally stabilised.

On average there has been a decrease of 3.8% across all the monitoring sites from 2022 to 2023. The largest decrease of 4.5µg/m³ was recorded at LE6 within the Lickey End AQMA which represents a decrease of 17.3% from 26.1µg/m³ to 21.6µg/m³.

The highest concentration of NO₂ recorded across the monitoring network in 2023 was 36.6µg/m³ at locations WR, 14 Hanover Street, Bromsgrove. This concentration is 8.5% below the annual mean objective for NO₂. This site is located within the Worcester Road, AQMA. Although no exceedances have been recorded within the AQMA for the last 5 years concentrations are within the 10% objective. It is, therefore, important to continue monitoring the situation within the AQMA with a view to potentially revoking it in the future should no further exceedances be recorded.

The highest concentration recorded within the Redditch Road AQMA was 25.6µg/m³ at locations 18 and 19. This is 36% below the annual objective. Furthermore, it has consistently been below the objective for a significant period of time with the last exceedance occurring in 2016 when two sites marginally exceeded with concentrations of 40.5µg/m³ at locations 18 and 19.

The Lickey End AQMA highest concentration of NO₂ was 33.3 µg/m³ at diffusion tube F1 in 2023. This is 16% below the objective. The results at the specific monitoring locations have been below the objective since 2019, although no exceedance at relevant exposure has been recorded since 2014 following distance correction calculations. Results continue to be below the objective in 2023 even though no Covid-19 restrictions were in place. The majority of the 2023 results were lower than those recorded in 2022.

No exceedances were recorded within the revoked Kidderminster Road, Hagley AQMA with a highest concentration of $23.6\mu\text{g}/\text{m}^3$ recorded at RES2 and RES4 within the former AQMA boundary area. This is 41.11% below the objective. Concentrations have been below the objective since the AQMA was revoked with the last exceedance of $40.2\mu\text{g}/\text{m}^3$ being recorded in 2013.

The monitoring network had one new monitoring site being added in 2023, known as PR1, 1 Perry Fields Road, Bromsgrove and none of the sites were removed.

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 $\text{PM}_{2.5}$)	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 $\text{PM}_{2.5}$ are particles under 2.5 micrometres.

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 Plan³ 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 Strategy⁴ provides more information on local authorities' responsibilities to work towards these new targets and reduce fine particulate matter in their areas.

The Road to Zero⁵ 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.

Conversations are ongoing with Bromsgrove District Council to create an Air Quality Action Plan (AQAP) for Worcester Road AQMA in Bromsgrove with a draft aiming to be published in 2025.

In addition, the following actions below have been taken forward to improve air quality within the Bromsgrove area.

Air Quality Actions Plan and Air Quality Strategy

A new Air Quality Action Plan is required for Worcestershire in accordance with the Environment Act 2021 and revised guidance published in August 2022 (LAQM.TG22 and PG22). In 2020 the COVID19 pandemic, unfortunately, led to the suspension of previous district air quality working groups and public health action groups programmes. In September 2022, WRS began discussions with Worcestershire County Council colleagues

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

with a view to form a new Steering Group and produce a new plan of actions to improve air quality across the County, to comply with recent legislative changes.

The Action Plan will incorporate an improving Air Quality Strategy, applicable across the whole County including areas outside of AQMAs, in accordance with the updated legislation and guidance.

The first step in action planning is to determine the contribution of sources of air pollution (source apportionment) to inform future actions. The AQMAs within Bromsgrove were declared between 2001 and 2011 and therefore the source apportionment needs to be renewed based on current data to enable development of appropriate actions within the action plan. The initial Steering Group work is focussed on actions informed by the most up to date source apportionment work in addition to countywide actions applicable to all districts.

The timeline for the various stages and delivery of a revised countywide AQAP, and establishment of a new countywide Air Quality Strategy, were set out in the [ASR 2023](#). However, following the introduction of a new enforcement policy by Defra in June 2023, it has been necessary to amend the previously published framework to prioritise production of a standalone AQAP for each district with an existing AQMA. The AQAP for the Worcester Road AQMA located in Bromsgrove is currently in production at the time of writing. WRS has completed the source apportionment stage and the initial identification, filtration, and shortlisting of potential AQAP measures is currently in progress.

It is anticipated the countywide Air Quality Strategy will be developed further in 2025 following the completion of these priority works (AQAPs).

The table below provides a summary revised table.

Time	Phase
1st July 2024	Submission of Draft Worcester City AQAP to DEFRA
1st Nov 2024	Submission of Draft Bromsgrove and Wyre Forest District AQAPs to DEFRA
12th Dec 2024	Publication of Final Worcester City AQAP and submission to DEFRA
Jan – Feb 2025	Progress revocation of Lickey End and Redditch Road, Bromsgrove AQMAs
1st April 2025	Publication of Final Bromsgrove and Wyre Forest District AQAPs and submission to DEFRA
April – May 2025	Review of Wychbold, Wychavon AQMA - consideration of revocation or progress to AQAP if appropriate.
30th June 2025	Publication of Annual Status Report 2025 and submission to DEFRA
2025	Develop and publish draft of Worcestershire Air Quality Strategy

Real-time Air Quality Monitoring Project

In February 2023, WRS were successful in a bid to the Defra Air Quality Grant Scheme 2022/20223 to establish an enhanced real-time air quality monitoring network across Worcestershire. The scope of the bid was to establish a real-time air quality monitoring network across the main areas of air quality concern in Worcestershire for purposes of providing enhanced monitoring data on a range of pollutants. Additionally, the proposal included informing the public and vulnerable groups of the status of air pollution in real time to encourage behaviour change.

£248,400 was awarded to WRS from the AQ Grant Scheme. An additional 10% of funds has been provided by each district council in Worcestershire, as per the match-funding requirement of the scheme, which equates to £27,600. Giving a grand total of £276,000 for the project.

The scheme has involved the installation and operation of 26 'low-cost Air Quality Monitors' which measure NO₂, PM₁₀, and PM_{2.5} across the county for a period of 3 years

(with EA MCERTS standard accreditation as indicative ambient particulate matter devices). The results of monitoring will be used to inform decision making and requirements for further action as necessary.

In 2023 the experienced sensor provider [Earthsense](#) were appointed as successful suppliers following a rigorous procurement process. The sensors, known as '[Zephyrs](#)' are provided, operated and serviced by [Earthsense](#) who provide data access.

Appropriate monitoring locations were determined by WRS in collaboration with Public Health, Worcestershire County Council Street Lighting team and Earthsense taking into consideration requirements of Bromsgrove District Council.

The locations have been chosen to maximise data capture within locations proximal to vulnerable communities and/or from a range of sources of air pollution including transport, solid fuel burning, industry and agriculture.

Two of the monitors have been deployed within the Bromsgrove District Council area in January 2024, following completion of required structural assessments. These are located at:

- Hanover Street
- Gunner Lane, Rubery

An additional monitor was installed on Station Road, Hagley in May 2024.

Earthsense and WRS have designed a publicly accessible portal to the real time monitoring data which is set to launch in 2024.

Ultra- Low Emission Taxi Infrastructure Scheme

In 2019 Bromsgrove District Council successfully won funding for electric vehicle chargers from the Governments' Ultra Low Emission Taxi Infrastructure Scheme. The scheme aims to provide a number of electric vehicle charging points for taxis and private hire vehicles.

The Council are working with the nationwide providers GeniePoint Network to deliver a robust and reliable network of rapid chargers for drivers in the Bromsgrove District. In total thirteen 50Kw rapid chargers are being funded through this scheme across the district. There are currently 9 live operational chargers and work is currently on going to deliver an additional 4 chargers across the district.

[Electric Vehicles – bromsgrove.gov.uk](https://www.bromsgrove.gov.uk/electric-vehicles)

Bromsgrove District Council and Redditch Borough Council Provision of Electric Vehicle Charging Infrastructure

The partnership councils are progressing a scheme to create a comprehensive network of EV Chargers across both Local Authority areas. About 120 new chargers are set to be placed at 33 locations in the area, after Redditch Borough Council teamed up with Bromsgrove District Council to agree a long-term contract with EV infrastructure provider Zest.

Zest is backed by the government-sponsored Charging Infrastructure Investment Fund (CIIF) and will invest about £2.1m to provide the new infrastructure for the next 15 to 20 years after winning the contract. Zest will provide, operate, and maintain the chargers.

A rollout plan is now being developed, and the first of the new chargers are expected to be installed by August 2024. In this initial phase the contract will mostly add more chargers to more council-owned car parks, while also bringing chargers to the councils' main workplaces.

Officers from Bromsgrove District Council are also working with Worcestershire County Council to establish a full pipeline of sustainable schemes. To better inform the list of schemes funding has been secured by WCC for a Local Cycling and Walking infrastructure Plan (LCWIP). Planning officers have also requested to be involved in the brief for this work. The Worcestershire Strategic Transport Model is now complete and is being checked for use across Bromsgrove.

Information relating to climate change is also available on Bromsgrove District Council's website via the links below.

[Climate emergency - bromsgrove.gov.uk](https://www.bromsgrove.gov.uk/climate-emergency)

Worcestershire County Council Highways Department have also developed a number of major infrastructure improvement schemes within the district that are at various stages of delivery. These are briefly set out below.

A38 Bromsgrove Route Enhancement Programme (BREP) Major Scheme

The A38 Bromsgrove Route Enhancement Programme (BREP) aims to provide additional highway capacity and promote walking and cycling as an alternative, through a range of improvements along the whole corridor. Phases 1 and 2 of the scheme have been

completed. Phase 3 has moved into the construction stage with a future Phase 4 being planned.

Full details of the scheme can be found on the County Council's website below:

[A38 Bromsgrove Route Enhancement Programme \(BREP\) | Worcestershire County Council](#)

Bromsgrove Transport Strategy

This scheme is part of the Strategic Transport Assessment (STA) work which will identify infrastructure and services to support planned development growth. This is part of a collaborative process between Worcestershire County Council and Bromsgrove District Council. The scheme aims to provide a package of Public Realm Enhancements in Bromsgrove Town Centre (see above) and would be integrated with other schemes in the area (such as BREP/A38 and the Strategic Active Travel Investment Programme). The scheme is to provide a comprehensive multimodal review of network efficiency and infrastructure to identify where to focus investment to improve the operation of the local transport network. This would also include a review of Bromsgrove's highway network to explore options to improve and disperse traffic flow to increase efficiency and help AQMA remediation at Worcester Road.

[Bromsgrove Strategic Transport Assessment \(Spring 2021\) | Worcestershire County Council](#)

The Bromsgrove Local Cycling and Walking Infrastructure Plan (LCWIP)

Secured funding from Active Travel England and are due to completed in 2025.

[Local cycling and walking infrastructure plans \(LCWIPs\) | Worcestershire County Council](#)

Conclusions and Priorities

Currently there are three AQMAs within the Bromsgrove District area, Lickey End AQMA, Redditch Road AQMA and Worcester Road AQMA. WRS aim to revoke the Lickey End and Redditch Road AQMAs, as neither of these have exceeded the annual mean objective of $40\mu\text{g}/\text{m}^3$ for over 5 years and neither have been within 10% of the objective.

Worcester Road AQMA was within 10% of the objective in the reporting year of 2023, therefore, following advice from Defra, it will continue to be monitored with the view to revocation in the future dependant on the results.

All three of the AQMAs were originally declared due to exceedances of the annual mean objective for nitrogen dioxide. The monitoring results from 2023 show there were no exceedances of the annual mean objective at any of the locations across the district. The highest concentration value of NO_2 was $36.6\mu\text{g}/\text{m}^3$ at WR this is within the Worcester Road AQMA.

In general monitoring results indicated a decrease when comparing 2023 to 2022 data.

Bromsgrove District Council has not identified any significant sources of air pollution within the area for the reporting year of 2023. A number of planning applications for large developments have been made within the district during 2023. The proposals have been assessed as part of the planning process and are not expected to have a significant impact on local air quality when they are operational. Details of these applications are listed in Appendix C.

Monitoring, review, and assessment of air quality will continue within the Bromsgrove District area at all existing and former AQMAs and other relevant areas. As previously discussed at this stage there is a view to revoke two of the existing three AQMAs (Lickey End and Redditch Road AQMAs) and to potentially revoke the Worcester Road AQMA in the future. The standalone AQAP for the Worcester Road AQMA, WRS has completed the source apportionment stage and the initial identification, filtration and shortlisting of potential AQAP measures is currently in place. The countywide Air Quality Strategy is anticipated to be developed in 2025 following the completion of these priority works (AQAPs).

A full rationalisation of all monitoring locations is programmed for Autumn 2024. Locations will be added and removed as deemed appropriate. WRS, on behalf of the Council will continue to review and comment on planning applications where air quality is a relevant concern.

As referred to in the previous section a real-time air quality monitoring network has been set up. This includes the installation and operation of 26 Zephyr Air Quality monitors' that measure NO₂, PM₁₀ and PM_{2.5}, as well as other parameters, across the county. Two of the monitors have been deployed within the Bromsgrove District Council area in January 2024 and an additional monitor was installed in Hagley in May 2024. This will provide important data in respect of PM₁₀ and PM_{2.5} for which monitoring across the county has been very limited previously, as well as NO₂. Real time information will enable a better understanding of air quality in the borough to help inform decision making and requirements for further action as necessary.

Local Engagement and How to get Involved

There are a number of ways members of the public can help to improve local air quality:

- **Walk or cycle instead of driving:** Leaving your car at home and walking or cycling instead will benefit in three ways - increased exercise, reduced pollution exposure, and reducing your pollution emissions.
- **Turn off your engine when stationary or parked,** don't 'idle', particularly when parked outside sensitive receptors such as schools, hospitals, care homes and residential properties. This both reduces emissions and saves fuel.
- General travel planning advice is available on Worcestershire County Council's website (including walking, cycling and bus maps and timetables) and Government website:
 - [Travel and Roads | Worcestershire County Council](#)
 - [Smarter choices: changing the way we travel - GOV.UK \(www.gov.uk\)](#)
- **Hold meetings by Conference Call** by phone or video conference via Teams, Zoom, Skype, Facetime, or other service, rather than driving to meetings. This reduces fuel and other travel costs, vehicle maintenance and hire cost, and increases productivity through reduction in hours lost through unnecessary travel.
- **Facilitate Flexible Working Arrangements** for non-front-line staff to work remotely from home or nearer home facilities for one or more days a week thus removing or reducing any journey to work. This reduces congestion which has beneficial impacts for delivery times, reduced business costs and thus economic benefits. Additionally, provides social benefits through improved work life balance for employees, reduces local air quality and reduced emergency vehicle response times.

- **Switch Fleet to Low Emission Vehicles**
- If you must drive, follow fuel efficient driving advice, often known as ‘**Smarter Driving Tips**’, to save on fuel and reduce your emissions. Several websites promote such advice including:
 - [Save money and emissions through ecodriving - Energy Saving Trust](#)
 - [How to drive economically - Eco-driving tips | AA \(theaa.com\)](#)
 - [Fuel Consumption & CO2 Databases | Vehicle Certification Agency \(vehiclecertification-agency.gov.uk\)](#)
- Reduce air pollution from open fires and wood-burning stoves: Advice is available from Defra on choosing the right stove, using the right fuels and maintenance, enabling householders to reduce their impact on their health and air quality from open fires and wood burning stoves. Further information is available on the [Smokeless Zones](#) and [Public Advice](#) pages on WRS website.

Air pollution can affect all of us over our lifetime however certain groups will be more sensitive to the effects of air pollution. Vulnerable groups include adults and children with lung or heart conditions such as asthma, chronic bronchitis, emphysema, and chronic obstructive lung disease (COPD). Senior citizens are more likely to be affected by respiratory diseases and children are more likely to be affected by air pollution due to relatively higher breathing and metabolic rates as well as a developing lung and immune system.

Vulnerable individuals and groups can keep informed of:

- Current levels and forecasts of air pollution from Defra at: <https://uk-air.defra.gov.uk/>.
- If you are sensitive to the effects of air pollution, it may be appropriate to limit the length of time spent in areas of local poor air quality – see advice from Defra at <https://uk-air.defra.gov.uk/air-pollution/daqi>
- If you are on social media, sign up to the WRS Twitter feed. WRS tweet when pollution is forecast by Defra to be moderate to very high.

Further information for the general public on reducing your family's exposure to poor air quality in Worcestershire and how individuals, business and schools can assist with reducing their impact on local air quality is available at

[Protecting Me and Others from Air Pollution | Worcestershire Regulatory Services](#)

[\(worcsregservices.gov.uk\)](#)

Local Responsibilities and Commitment

Following the pandemic good working relations have recommenced with the County Council's Strategic Transport team and developed closer working ties with Public Health, Planning and Sustainability colleagues within the County Council.

This ASR was prepared by the Worcestershire Regulatory Services Technical Services Department on behalf of Bromsgrove District Council with the support and agreement of officers from the following organisations:

Worcestershire Regulatory Services

Bromsgrove District Council

Worcestershire County Council

This ASR has been submitted to the Director of Public Health for a comment. No comments have been received for inclusion in this report prior to the deadline for submission.

If you have any comments on this ASR please send them to:

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1 Local Air Quality Management

This report provides an overview of air quality in Bromsgrove 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 Bromsgrove 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 (AQMA) 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.

A summary of AQMA declared by Bromsgrove District Council can be found in Table 2.1. The table presents a description of the three AQMA that are currently designated within Bromsgrove District Council. Appendix D: Map(s) of Monitoring Locations and AQMA provides maps of AQMA and the air quality monitoring locations in relation to the AQMA. The air quality objectives pertinent to the current AQMA designations are as follows:

- NO₂ annual mean objective

We propose to revoke the following AQMA in Bromsgrove:

- Redditch Road
- Lickey End

The Worcester Road AQMA will continue to be monitored and consideration will be made to revoke this in the future dependant on the data.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
Lickey End, Bromsgrove AQMA	26 th July 2001	NO ₂ Annual Mean	Residential properties along four roads emanating from the Junction 1 M42	YES	45.7µg/m ³	33.3µg/m ³	9 years		
Redditch Road, Bromsgrove AQMA	17 th February 2010	NO ₂ Annual Mean	Long stretch of the A38 including a number of residential properties	YES	45.6µg/m ³	25.6µg/m ³	7 years		
Worcester Road, Bromsgrove AQMA	24 th October 2011	NO ₂ Annual Mean	Compromises mainly the B4091 Worcester Road single carriageway of the southwest of the town centre	NO	56µg/m ³	36µg/m ³	5 years		

- ☒ Bromsgrove District Council confirm the information on UK-Air regarding their AQMA(s) is up to date.
- ☒ Bromsgrove District Council confirm that all current AQAPs have been submitted to Defra.

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

Defra's appraisal of last year's ASR concluded *"the report is well structured, detailed and provides the information specified in the Guidance. The following comments are designed to help inform future reports:*

- 1. Bromsgrove District Council have provided a detailed timeline for the stages and delivery of the Air Quality Strategy and AQAP.*
- 2. However, the AQAP is out of date, it was published in 2013 and updated in 2016. AQAPs are required to be updated every five years therefore this should be a priority of the Council.*
- 3. It is encouraging to see the BDC setting up a real-time AQ monitoring network for NO₂, PM₁₀ and PM_{2.5} in 2023 in addition to the current monitoring network.*
- 4. The Council used a local bias adjustment factor calculated from a co-location study outside of this District. Greater details and explanation should have been provided surrounding this choice as well as the monitoring site from which this adjustment factor was calculated from. Additionally, the consultation with the Defra LAQM helpdesk could have been included within an appendix.*
- 5. The figures in Appendix D are detailed overall. However, some monitoring sites and the first AQMA are missing labels. Additionally, all of the figures appear to have different formatting. The Council could update all the figures in future reports to maintain consistency.*
- 6. Most of the figures showing trends in monitoring data are clear and easy to read. The include the AQO and are broken down into multiple areas. The figure showing long term trends for the whole District is difficult to read given the size of the bars.*

The above points are noted. In relation to point 2 work is ongoing to complete the AQAP with a suggested completion of 2025. At the time of writing WRS has completed the source apportionment stage and the initial identification, filtering and shortlisting of potential AQAP measures is currently in progress.

In relation to point 4, a local bias adjustment factor has been calculated using the 'Diffusion Tube Data Processing Tool spreadsheet' which has been uploaded to the Defra

LAQM portal. All calculations and data are presented within the relevant sections of the spreadsheet. The calculation details have also been provided in 'Table C.3 – Local Bias Adjustment Calculation' within the 2023 ASR. The factor has been derived from the automatic monitoring station installed at Wyre Forest House, Finepoint Way, Kidderminster which is the head office for WRS. The installation is collocated with three diffusion tubes and is largely run and managed for the purpose of undertaking a local bias adjustment factor for the county. WRS are responsible for maintaining the monitoring network across the six-district councils within Worcestershire and therefore the handling and processing of the diffusion tubes is the same for each area. A decision was made during the preparation of the 2023 ASR to utilise the bias adjustment factor of 0.97 compared to the national bias adjustment factor of 0.83 as this represented a much more conservative value and therefore is more protective of public health. The same decision has been made in relation to the 2024 ASR as again the local bias adjustment factor is more conservative than the national factor.

In relation to point 5, this has been noted. Labels have been added to figures in Appendix D.

In relation to point 6, due to the number of data points a figure has not been added to show long term trends for the whole district, as the figure would be difficult to read.

A countywide Air Quality Strategy for improving air quality and public health and reducing impacts across Worcestershire is currently at an early stage of development. It is anticipated the strategy will be progressed following the finalisation of new action plans for the Worcestershire districts with AQMAs (see timeline below) and a draft will be published in 2025.

Bromsgrove 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 2.2. Measures reported in previous years relating to earlier action plans have been removed from Table 2.2 in the ASR as are superseded by the developing Draft Bromsgrove AQAP 2025 – 2030, see below for further information.

Air Quality Actions Plan and Air Quality Strategy

A new Air Quality Action Plan is required for Worcestershire in accordance with the Environment Act 2021 and revised guidance published in August 2022 (LAQM.TG22 and PG22). In 2020 the COVID19 pandemic, unfortunately, led to the suspension of previous district air quality working groups and public health action groups programmes. In September 2022, WRS began discussions with Worcestershire County Council colleagues with a view to forming a new Steering Group and producing a new plan of actions to improve air quality across the County, to comply with recent legislative changes.

The first step in action planning is to determine the contribution of sources of air pollution (source apportionment) to inform future actions. The AQMAs within Bromsgrove were declared between 2001 and 2011 and therefore the source apportionment needs to be renewed based on current data to enable development of appropriate actions within the action plan. The initial Steering Group work is focussed on actions informed by the most up to date source apportionment work in addition to countywide actions applicable to all districts.

The timeline for the various stages and delivery of a revised countywide AQAP, and establishment of a new countywide Air Quality Strategy, were set out in the [ASR 2023](#). However, following the introduction of a new enforcement policy by Defra in June 2023, it has been necessary to amend the previously published framework to prioritise production of a standalone AQAP for each district with an existing AQMA. The AQAP for the Worcester Road AQMA located in Bromsgrove is currently in development at the time of writing. WRS has completed the source apportionment stage and the initial identification, filtration and shortlisting of potential AQAP measures is currently in progress.

It is anticipated the countywide Air Quality Strategy will be developed further in 2025 following the completion of these priority works (AQAPs).

The table below provides a summary revised table.

Time	Phase
1st July 2024	Submission of Draft Worcester City AQAP to DEFRA
1st Nov 2024	Submission of Draft Bromsgrove and Wyre Forest District AQAPs to DEFRA
12th Dec 2024	Publication of Final Worcester City AQAP and submission to DEFRA
Jan – Feb 2025	Progress revocation of Lickey End and Redditch Road, Bromsgrove AQMAs
1st April 2025	Publication of Final Bromsgrove and Wyre Forest District AQAPs and submission to DEFRA
April – May 2025	Review of Wychbold, Wychavon AQMA - consideration of revocation or progress to AQAP if appropriate.
30th June 2025	Publication of Annual Status Report 2025 and submission to DEFRA
2025	Develop and publish draft of Worcestershire Air Quality Strategy

Real-time Air Quality Monitoring Project

In February 2023, WRS were successful in a bid to the Defra Air Quality Grant Scheme 2022/2023 to establish an enhanced real-time air quality monitoring network across Worcestershire. The scope of the bid was to establish a real-time air quality monitoring network across the main areas of air quality concern in Worcestershire for purposes of providing enhanced monitoring data on a range of pollutants. Additionally, the proposal included informing the public and vulnerable groups of the status of air pollution in real time to encourage behaviour change.

£248,400 was awarded to WRS from the AQ Grant Scheme. An additional 10% of funds has been provided by each district council in Worcestershire, as per the match-funding requirement of the scheme, which equates to £27,600. Giving a grand total of £276,000 for the project.

The scheme has involved the installation and operation of 26 'low-cost Air Quality Monitors' which measure NO₂, PM₁₀, and PM_{2.5} across the county for a period of 3 years

(with EA MCERTS standard accreditation as indicative ambient particulate matter devices). The results of monitoring will be used to inform decision making and requirements for further action as necessary.

In 2023 the experienced sensor provider [Earthsense](#) were appointed as successful suppliers following a rigorous procurement process. The sensors, known as '[Zephyrs](#)' are provided, operated and serviced by [Earthsense](#) who also provide data access.

Appropriate monitoring locations were determined by WRS in collaboration with Public Health, Worcestershire County Council Street Lighting team and Earthsense taking into consideration requirements of Bromsgrove District Council.

The locations have been chosen to maximise data capture within locations proximal to vulnerable communities and/or from a range of sources of air pollution including transport, solid fuel burning, industry and agriculture.

Two of the monitors have been deployed within the Bromsgrove District Council area in January 2024, following completion of required structural assessments. These are located on:

- Hanover Street
- Gunner Lane, Rubery

An additional monitor was installed on Station Road, Hagley in May 2024.

Earthsense and WRS have designed a publicly accessible portal to the real time monitoring data which is set to launch later in 2024.

Ultra-Low Emission Taxi Infrastructure Scheme

In 2019 Bromsgrove District Council successfully won funding for electric vehicle chargers from the Governments' Ultra Low Emission Taxi Infrastructure Scheme. The scheme aims to provide a number of electric vehicle charging points for taxis and private hire vehicles.

The Council are working with the nationwide providers GeniePoint Network to deliver a robust and reliable network of rapid chargers for drivers in the Bromsgrove District. In total thirteen 50Kw rapid chargers are being funded through this scheme across the district. There are currently 9 live operational chargers and work is currently on going to deliver an additional 4 chargers across the district.

[Electric Vehicles – bromsgrove.gov.uk](https://bromsgrove.gov.uk/electric-vehicles)

Bromsgrove District Council and Redditch Borough Council Provision of Electric Vehicle Charging Infrastructure

The partnership councils are progressing a scheme to create a comprehensive network of EV Chargers across both Local Authority areas. About 120 new chargers are set to be placed at 33 locations in the area, after Redditch Borough Council teamed up with Bromsgrove District Council to agree a long-term contract with EV infrastructure provider Zest.

Zest is backed by the government-sponsored Charging Infrastructure Investment Fund (CIIF) and will invest about £2.1m to provide the new infrastructure for the next 15 to 20 years after winning the contract. Zest will provide, operate, and maintain the chargers.

A rollout plan is now being developed, and the first of the new chargers are expected to be installed by August 2024. In this initial phase the contract will mostly add more chargers to more council-owned car parks, while also bringing chargers to the councils' main workplaces.

Officers from Bromsgrove District Council are also working with Worcestershire County Council to establish a full pipeline of sustainable schemes. To better inform the list of schemes funding has been secured by WCC for a Local Cycling and Walking infrastructure Plan (LCWIP). Planning officers have also requested to be involved in the brief for this work. The Worcestershire Strategic Transport Model is now complete and is being checked for use across Bromsgrove.

Information relating to climate change is also available on Bromsgrove District Council's website via the links below.

[Climate emergency - bromsgrove.gov.uk](https://www.bromsgrove.gov.uk/climate-emergency)

Worcestershire County Council Highways Department have developed a number of major infrastructure improvement schemes within the district that are at various stages of delivery. These are briefly set out below.

A38 Bromsgrove Route Enhancement Programme (BREP) Major Scheme

The A38 Bromsgrove Route Enhancement Programme (BREP) aims to provide additional highway capacity and promote walking and cycling as an alternative, through a range of

improvements along the whole corridor. Phases 1 and 2 of the scheme have been completed. Phase 3 has moved into construction with a future Phase 4 being planned.

Full details of the scheme can be found on the County Council's website below:

[A38 Bromsgrove Route Enhancement Programme \(BREP\) | Worcestershire County Council](#)

Bromsgrove Transport Strategy

This scheme is part of the Strategic Transport Assessment (STA) work which will identify infrastructure and services to support planned development growth. This is part of a Bromsgrove District Council collaborative process between Worcestershire County Council and Bromsgrove District Council. The scheme aims to provide a package of Public Realm Enhancements in Bromsgrove Town Centre (see above) and would be integrated with other schemes in the area (such as BREP/A38 and the Strategic Active Travel Investment Programme). The scheme is to provide a comprehensive multimodal review of network efficiency and infrastructure to identify where to focus investment to improve the operation of the local transport network. This would also include a review of Bromsgrove's highway network to explore options to improve and disperse traffic flow to increase efficiency and help AQMA remediation at Worcester Road.

[Bromsgrove Strategic Transport Assessment \(Spring 2021\) | Worcestershire County Council](#)

The Bromsgrove Local Cycling and Walking Infrastructure Plan (LCWIP)

Secured funding from Active Travel England and are due to completed in 2025.

[Local cycling and walking infrastructure plans \(LCWIPs\) | Worcestershire County Council](#)

Technical Planning Document

WRS officers drafted the guidance document in 2017. This is a live document that is continuously updated where changes are required.

The document includes guidance on requirements for air quality assessments, standard recommendations expected for air quality mitigation measures, and advice relating to good practice for new development.

Consultants / agents are signposted to the information so that they are aware of the requirements in relation to development and submitting suitable assessments.

Challenges and Barriers

Whilst concentrations of NO₂ have seen large decreases in recent years due to the Covid Pandemic it is possible that exceedances of the objectives may continue in the coming years. The principal challenges and barriers to implementation that Bromsgrove District Council face are numerous. Some of these challenges relate to the specific site conditions at each AQMA, as well as cost implications and difficulties associated with improving existing infrastructure.

The area of the Worcester Road AQMA, where regular exceedances of the objectives have been recorded historically, is best described as a 'street canyon'. It comprises narrow streets with continuous buildings on either side and is a major route for traffic in and out of Bromsgrove. The street canyon restricts the dispersal of NO₂ and therefore represents a more significant issue than would be the case in a more open scenario.

Although the Kidderminster Road, Hagley AQMA has been revoked the area remains a major arterial route where congestion is still a significant issue. A large diffusion tube network is in place here to ensure a good coverage of monitoring. The monitoring network will also remain within the Lickey End and Redditch Road AQMAs following revocation, although may be reduced over time.

Securing funding for improvement schemes is a key factor. Ensuring uptake of greener methods of transport and changes in behaviour are also difficult to achieve without incentives or a lack of alternative options being in place. The current cost of electrical vehicles or hybrids means this alternative is out of the reach for many people.

Large scale residential development is also proposed within the Bromsgrove District and the wider area in future years. Consequently, solving the problem of poor air quality at problem locations within the district may be difficult. Even without further development, and increasing numbers of vehicles, the current road network is already stretched with significant congestion.

The coronavirus pandemic and subsequent lockdowns had a positive impact on air quality concentrations with fewer journeys being undertaken and more people working from home. This is clearly identifiable within the monitoring results from 2020 to 2022 when compared with data from 2023 and historical data from before the coronavirus pandemic.

The pandemic did previously delay some of the schemes reported on in this document such as installation of the EV taxi charge point project and the various highways works. However, it is understood that these schemes have now all resumed and largely caught up with progress.

The pandemic also impacted on WRS work in relation to the update of the AQAP and has delayed activities such as source apportionment. It also makes decision making harder as previous monitoring data has not been reflective of normal circumstances.

Measures stated above and in Table 2.2 will help contribute towards compliance within the Bromsgrove District Council area and help enable the revocation of the existing AQMA Worcester Road in the future.

Table 2.2 – 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
RTAQMIN	Real-time air quality monitoring network	Public Information	Via the internet	2022	2025	WRS BDC MHDC RBC WDC WC WFDC	Defra	Yes	Funded	£100k - £500k	Planning	Zero	Increase in website hits and raising profile of AQ	Successful funding of Defra AQ grant for real time monitoring network via low cost sensors for NO2 PM10 & PM25. Earthsense appointed as successful supplier. Two of the sensors were installed in Bromsgrove January 2024 (Hanover Street and Gunner Lane Rubery) and an additional sensor installed in Hagley Station Road, May 2024. Publicly accessible portal monitoring real time data in May 2024.	
ULEVTIS	Ultra-Low Emission Taxi Infrastructure Scheme	Promoting Low Emission Transport	Procuring alternative refuelling infrastructure to promote low emission vehicles, EV recharging, Gas fuel recharging	2019	2029	BDC	ULEV	No	Funded	£100k - £500k	Implementation	Decrease in emission	Increase in EV taxi numbers	Following the successful funding from the Governments Ultra Low Emission Taxi Infrastructure Scheme. There are currently 9 live operational chargers work is ongoing to deliver an additional 4 chargers across the district.	
PEVCIS	Bromsgrove District Council and Redditch Borough Council Provision of Electric Vehicle Charging Infrastructure	Promoting Low Emission Transport	Procuring alternative refuelling infrastructure to promote low emission vehicles, EV charging, gas refuel charging	2022	2027	BDC RBC	ULEV	No	Funded	£100k - £500k	Planning	Increase in EV numbers	Decrease in emissions	RBC teamed up with BDC to agree a contract with Zest. A roll out plan is being developed with the first new chargers to be installed in August 2024.	Currently in initial phase.
BREP	A38 Bromsgrove Route Enhancement Package	Traffic Management	UTC, Congestion management traffic reduction	2017	2025	WCC DFT	WLEP	No	Not funded	> £10 million	Implementation	Reduction in Pollutant/ Emission from Measure	Improved traffic flow and less queuing	Phase 1 and 2 complete. Phase 3 moved into construction with a future phase 4 being planned.	
BSTA	Bromsgrove Transport Strategy (Strategic Transport Assessment)	Local Transport Network				BDC WCC							Improved traffic flow and less queuing	Scheme to provide a multimodal review of network efficiency and infrastructure. To improve the local transport network.	
LCWIP	Local Cycling and Walking Infrastructure Plan	Local Transport Network		2017	2025			No	Funded					Secured funding from Active Travel, with plan expected to be completed by 2025.	

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 Strategy⁶, 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.

There are currently no automatic PM_{2.5} monitoring stations in Worcestershire that are recognised by Defra for measuring against ambient air quality directives. The nearest AURN PM_{2.5} monitoring station is the Birmingham Ladywood site approximately 20km to the north of the Bromsgrove District.

WRS has reviewed the DEFRA national background maps to determine projected PM_{2.5} concentrations within the Bromsgrove District for the 2023 calendar year. The average total PM_{2.5} at the 218 locations (centre points 1km x 1km grids) across the Bromsgrove District Council is 7.93µg/m³ with the lowest concentration of 7.21µg/m³ and the highest concentration being 9.23µg/m³. This indicates that PM_{2.5} concentrations within the Bromsgrove District are well below the annual average EU limit value for PM_{2.5} of 25µg/m³ and are below the proposed annual average limit value for PM_{2.5} target of 10µg/m³ across England by 2040.

The Air Quality Partnership led by the Director of Public Health at Worcestershire County Council and supported by WRS recommenced in 2022 following a hiatus due to the Covid-19 pandemic. WRS met with colleagues from Public Health numerous times to discuss the ongoing situation with air quality, relevant changes and workstreams going forward. The DoPH represents a key partner in the ongoing development of the Air Quality Strategy and Action Plan work and has several representatives sitting on the steering group.

WRS has reviewed the fraction of mortality attributable to particulate air pollution (indicator D01) published by Public Health England as part of the Public Health Outcomes Framework. The fraction of mortality attributable to particulate emissions in the Bromsgrove District in 2022 (the most recent year available) was 5.5%. This is below the

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

national figure for England (5.8% in 2022) and the Bromsgrove figure is lower than the West Midlands regional figure (5.7% for 2022).

More information on the Public Health Outcomes Frameworks that examines indicators that help to understand the trends in public health can be found at [Public Health Outcomes Framework - OHID \(phe.org.uk\)](https://publichealthoutcomesframework.org.uk)

The successful bid for funding from the Defra Air Quality Grant Scheme 2022/23 to establish a real time monitoring network across Worcestershire will allow for particulate monitoring in the district for the first time. 2 low-cost real time air quality monitors have been deployed within the Bromsgrove District in January 2024, and an additional monitor was installed on Station Road, Hagley in May 2024.

There are currently no declared smoke control areas operating within the Bromsgrove District.

More information, maps, and guides on the type of fuels that can be used can be found at: [Smoke Control Areas | Worcestershire Regulatory Services \(worcsregservices.gov.uk\)](https://www.worcsregservices.gov.uk/smoke-control-areas)

WRS hold 24 records of complaints of nuisance from smoke, dust or fumes in the Bromsgrove District in 2023, with a warning letter and advice given.

In light of the above no additional actions are currently planned by Bromsgrove District Council in relation to the reduction of PM_{2.5} levels. However, it is anticipated that any actions taken to improve NO₂ levels across the region as part of the revised future countywide AQAP will likely result in a linked improvement in PM_{2.5} levels. Additionally, the new countywide AQAP will include the local air quality strategy for all Worcestershire districts and have due regard for the new responsibilities on local authority for PM_{2.5} outlined within the revised national Air Quality Strategy which is to be published in 2025.

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

This section sets out the monitoring undertaken within 2023 by Bromsgrove 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.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

No automatic (continuous) monitoring was undertaken within the Bromsgrove District Council area during 2023.

3.1.2 Non-Automatic Monitoring Sites

Bromsgrove District Council undertook non- automatic (i.e. passive) monitoring of NO₂ at 45 sites during 2023. Table A. 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.1 and Table A.2 in Appendix A compare the ratified and 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 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.

No exceedances of the annual mean objective for nitrogen dioxide have been recorded in the Bromsgrove District during the 2023 monitoring year. No exceedances of the objectives were recorded in the previous year's 2020 – 2022. The last exceedances were recorded in the Worcester Road AQMA in 2018 and in 2019 within the Lickey End AQMA. In respect of the Lickey End AQMA it should be noted that although exceedances were recorded at LE4 and F1 in 2019 neither of these locations are representative of relevant exposure. When distance corrected concentrations are much lower falling well below the objective with the last relevant exceedance occurring in 2014. Concentrations have not been within 10% of the objective at either of these locations since 2015 when calculated back.

It is possible that the effects of the Covid 19 pandemic were impacting the data from the last three years as some restrictions were still in place up until the early part of 2022. However, traffic levels have largely returned to pre pandemic levels and therefore can assume that concentrations have generally stabilised and are a representative of normality in 2023.

On average there has been a decrease of 3.8% across all the monitoring sites from 2022 to 2023. The largest decrease of $4.5\mu\text{g}/\text{m}^3$ was recorded at LE6 within the Lickey End AQMA which represents a decrease of 17.3% from $26.1\mu\text{g}/\text{m}^3$ to $21.6\mu\text{g}/\text{m}^3$.

However, some monitoring sites have seen an increase. The largest increase was $3.9\mu\text{g}/\text{m}^3$ which was recorded at F1 within the Lickey End AQMA this saw a rise from $29.4\mu\text{g}/\text{m}^3$ to $33.3\mu\text{g}/\text{m}^3$ which represents a 13.2% increase.

The highest concentration of NO_2 recorded across the monitoring network in 2023 was $36.6\mu\text{g}/\text{m}^3$ at locations WR, 14 Hanover Street, Bromsgrove. This concentration is 8.5% below the annual mean objective for NO_2 . This site is located within the Worcester Road, AQMA. Although no exceedances have been recorded within the AQMA for the last 5 years concentrations are within the 10% objective. It is, therefore, important to continue

monitoring the situation within the AQMA with a view to potentially revoking it in the future should no further exceedances be recorded.

Concentrations within the other two AQMAs were well below the objective in 2023. The highest concentration recorded within the Redditch Road AQMA was $25.6\mu\text{g}/\text{m}^3$ at locations 18 and 19. This is 36% below the annual objective. Furthermore, it has consistently been below the objective for a significant period of time with the last exceedance occurring in 2016 when two sites marginally exceeded with concentrations of $40.5\mu\text{g}/\text{m}^3$ at locations 18 and 19.

The Lickey End AQMA highest concentration of NO_2 was $33.3\mu\text{g}/\text{m}^3$ at diffusion tube F1 in 2023. This is 16% below the objective. The results have stayed below the objective since 2019 at monitoring locations, and since 2014 when calculated back to relevant exposure. Results continue to be below the objective in 2023 even though no Covid-19 restrictions were in place. The majority of the 2023 results were lower than those recorded in 2022.

No exceedances were recorded within the revoked Kidderminster Road, Hagley AQMA with a highest concentration of $23.6\mu\text{g}/\text{m}^3$ recorded at RES2 and RES4 within the former AQMA boundary area. This is 41.11% below the objective. Concentrations have been below the objective since the AQMA was revoked with the last exceedance of $40.2\mu\text{g}/\text{m}^3$ being recorded in 2013.

Following the revocation of the AQMA new monitoring locations were established in the wider area to the south along the Worcester Road, West Hagley, which had been highlighted as a potential concern. In 2023 a highest concentration of $34.5\mu\text{g}/\text{m}^3$ was recorded at HAG5. It should be noted that HAG5 is located close to the highway approximately 7.3m from residential exposure. Therefore, concentrations remain well below the objective in this area when considering relevant exposure.

The monitoring network had one new monitoring site being added in 2023, known as PR1, 1 Perry Fields Road, Bromsgrove and none of the sites were removed.

No annual means greater than $60\mu\text{g}/\text{m}^3$ have been recorded indicating that it is extremely unlikely that there have been any exceedances of the 1-hour mean objective for NO_2 at any monitoring sites. The $60\mu\text{g}/\text{m}^3$ is a surrogate figure to indicate exceedances of the 1-hour objective based on annual average concentrations. The vast majority of the concentrations recorded across the district in 2023 are more than 40% below that value.

In summary the last exceedance of NO₂ at Worcester Road was recorded in 2018. The last exceedance of NO₂ in Lickey End AQMA at relevant exposure was recorded in 2014 and the last exceedance of NO₂ in Redditch Road was 2016.

3.2.2 Particulate Matter (PM₁₀)

PM₁₀ has not been monitored in 2023.

3.2.3 Particulate Matter (PM_{2.5})

PM_{2.5} has not been monitored in 2023.

3.2.4 Sulphur Dioxide (SO₂)

SO₂ has not been monitored in 2023.

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)
FL1	2C Fox Lane	Roadside	395079	269797	NO2	No	0.0	7.0	No	2.1
FL2	New houses close to Road on Fox Lane	Roadside	395118	269721	NO2	No	0.0	1.6	No	2.1
RH1	8 Rockhill	Roadside	395243	269844	NO2	No	0.0	6.3	No	2.2
WR4	188 Worcester Road	Roadside	395312	269938	NO2	Yes - Worcester Road AQMA	0.0	7.5	No	2.2
WR2	159 Worcester Road	Roadside	395511	270180	NO2	Yes - Worcester Road AQMA	0.0	2.2	No	2.2
WR3	138 Worcester Road	Roadside	395501	270190	NO2	Yes - Worcester Road AQMA	0.0	4.4	No	2.5
BC	Ye Olde Black Cross	Roadside	395685	270424	NO2	Yes - Worcester Road AQMA	0.0	2.1	No	2.3
BCX	16 Worcester Road	Roadside	395807	270549	NO2	Yes - Worcester Road AQMA	0.0	2.7	No	5.3
WR	14 Hanover Street	Roadside	395702	270423	NO2	Yes - Worcester Road AQMA	0.0	6.4	No	1.4
BG1	Davenhall House	Roadside	396238	271108	NO2	No		2.6	No	2.6

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)
BR	35 Birmingham Road	Roadside	396292	271210	NO2	No	0.0	3.4	No	2.2
LE7	371 Birmingham Road	Urban Background	396916	273014	NO2	Yes - Lickey End AQMA	0.0	15.9	No	2.1
1	3A Alcester Road	Roadside	396999	272979	NO2	Yes - Lickey End AQMA	0.0	11.7	No	1.8
LE4	Harvester, Birmingham Road, Lickey End	Roadside	396935	272949	NO2	Yes - Lickey End AQMA	11.0	1.4	No	2.1
LK1	288 Birmingham Road (next to Harvester)	Roadside	396939	272934	NO2	Yes - Lickey End AQMA	0.0	10.0	No	1.5
LK2	1 Old Birmingham Road, Lickey End	Roadside	396995	273129	NO2	Yes - Lickey End AQMA	0.0	5.5	No	1.5
LE5	5 Old Birmingham Road	Roadside	396999	273143	NO2	Yes - Lickey End AQMA	0.0	6.5	No	1.9
LE6	308 Birmingham Road	Urban Background	396958	273157	NO2	Yes - Lickey End AQMA	0.0	18.3	No	2.1
F1	J1 M42 roundabout street light at junction with Old Birmingham Road	Roadside	397010	273112	NO2	Yes - Lickey End AQMA	20.0	2.3	No	2.0
TS	Smallholdings, Wildmoor Lane	Rural	396613	275085	NO2	No	0.0	51.0	No	1.8
RUB1	Library Way, off New Road	Roadside	398555	277200	NO2	No	12.0	2.0	No	1.6
RES1	26 Stourbridge Road, Hagley	Roadside	391445	281179	NO2	No	0.0	15.0	No	2.1
RES2	21 Birmingham Road	Roadside	391556	281042	NO2	No	0.0	15.0	No	2.2

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)
9	78 Kidderminster Road	Roadside	391210	280668	NO2	No	0.0	8.3	No	2.0
KR62	62 Kidderminster Road	Roadside	391182	280631	NO2	No	0.0	7.0	No	2.0
RES3	104 Kidderminster Road South	Roadside	389827	279590	NO2	No	0.0	14.3	No	2.0
HAG4	Lampost opp Shell Garage Worcester Road	Roadside	389850	279588	NO2	No	1.0	5.5	No	2.0
HAG3	1 Cross Keys Mews, Worcester Road	Roadside	389909	279629	NO2	No	0.0	3.0	No	1.6
RES4	23 Worcester Road, Hagley	Roadside	390025	279765	NO2	No	0.0	14.5	No	2.1
HAG2	69 Worcester Road, Hagley	Roadside	390203	279945	NO2	No	0.0	13.0	No	1.8
HAG1	79 Worcester Road, Hagley	Roadside	390247	279996	NO2	No	0.0	12.0	No	1.9
11	74 Worcester Road, Hagley	Roadside	390295	280043	NO2	No		2.8	No	1.9
HAG5	On low sign near 4 Cross Keys Mews	Roadside	389929	279650	NO2	No	7.3	4.5	No	1.6
HAG6	1 SpoutSomething Cottage	Roadside	389939	279664	NO2	No	0.0	5.0	No	1.8
SBR1	Lampost o/s 61 Stourbridge Road, Bromsgrove	Roadside	396127	271516	NO2	No	4.8	2.2	No	1.9
SBR2	Lampost o/s Sainsburys Local	Roadside	395996	272063	NO2	No		3.5	No	2.0

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)
	189 Stourbridge Road									
SBR3	Lampost o/s 285 Stourbridge Road	Roadside	395825	272841	NO2	No	12.0	1.0	No	1.9
KEN	Lampost o/s 12 & 14 Kendal Close, Bromsgrove	Roadside	396683	270354	NO2	No	0.0	1.7	No	2.4
SR	2 Stoke Road, Aston Fields, Bromsgrove	Roadside	396780	269450	NO2	No	0.0	4.9	No	1.9
18	84 Redditch Road	Roadside	395180	268549	NO2	Yes - Redditch Road AQMA	0.0	1.6	No	2.0
19	93 Redditch Road	Roadside	395188	268564	NO2	Yes - Redditch Road AQMA	0.0	2.7	No	1.9
HR	52 Hanbury Road, Stoke Heath	Roadside	394772	268441	NO2	Yes - Redditch Road AQMA	0.0	5.0	No	2.2
16	58 Redditch Road, Bromsgrove	Roadside	394701	268444	NO2	Yes - Redditch Road AQMA	0.0	2.3	No	2.2
255	255 Worcester Road	Roadside	394408	268417	NO2	No	0.0	12.0	No	2.3
PR1	1 Perry Fields Road, Bromsgrove	Suburban	395795	272309	NO2	No	0.0	0.6	No	1.5

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
FL1	395079	269797	Roadside	91.75824176	91.8	16.4	13.9	13.0	18.7	16.4
FL2	395118	269721	Roadside	83.79120879	83.8	29.1	24.8	27.2	29.7	29.2
RH1	395243	269844	Roadside	99.72527473	99.7	23.7	20.4	22.0	25.1	22.8
WR4	395312	269938	Roadside	99.72527473	99.7	24.4	19.3	21.4	23.9	23.4
WR2	395511	270180	Roadside	99.72527473	99.7	31.0	22.4	25.6	27.8	28.4
WR3	395501	270190	Roadside	99.72527473	99.7	24.6	20.0	21.5	27.4	24.7
BC	395685	270424	Roadside	99.72527473	99.7	38.0	27.7	31.5	37.4	35.4
BCX	395807	270549	Roadside	99.72527473	99.7	36.5	26.3	29.6	32.4	31.5
WR	395702	270423	Roadside	99.72527473	99.7	31.5	29.4	32.3	36.2	36.6
BG1	396238	271108	Roadside	99.72527473	99.7	26.3	19.6	23.1	27.0	26.7
BR	396292	271210	Roadside	99.72527473	99.7	23.5	18.9	21.1	23.1	22.6
LE7	396916	273014	Urban Background	99.72527473	99.7	23.6	17.7	20.0	22.0	21.4
1	396999	272979	Roadside	90.38461538	90.4	19.4	15.4	22.0	22.7	17.1
LE4	396935	272949	Roadside	99.72527473	99.7	40.1	29.1	31.5	32.4	33.7
LK1	396939	272934	Roadside	99.72527473	99.7	26.9	23.7	22.3	28.8	26.7
LK2	396995	273129	Roadside	99.72527473	99.7	26.2	22.0	21.5	24.7	23.2
LE5	396999	273143	Roadside	99.72527473	99.7	26.9	20.2	21.0	23.8	23.1
LE6	396958	273157	Urban Background	99.72527473	99.7	23.0	17.5	23.6	26.1	21.6
F1	397010	273112	Roadside	99.72527473	99.7	43.4	27.8	28.5	29.4	33.3
TS	396613	275085	Rural	82.41758242	82.4	18.2	15.2	16.3	19.0	17.7
RUB1	398555	277200	Roadside	92.03296703	92.0	23.6	18.5	21.0	21.7	22.6
RES1	391445	281179	Roadside	99.72527473	99.7	17.1	13.9	14.2	16.5	15.0
RES2	391556	281042	Roadside	82.41758242	82.4	24.6	19.5	21.4	23.9	23.6
9	391210	280668	Roadside	99.72527473	99.7	23.7	19.5	21.5	22.8	21.9
KR62	391182	280631	Roadside	99.72527473	99.7	24.0	17.8	20.0	20.7	20.2
RES3	389827	279590	Roadside	99.72527473	99.7	15.7	12.1	15.8	18.4	15.5
HAG4	389850	279588	Roadside	92.30769231	92.3	25.1	18.8	22.9	25.1	23.3
HAG3	389909	279629	Roadside	99.72527473	99.7	33.7	27.2	26.7	31.8	30.7
RES4	390025	279765	Roadside	99.72527473	99.7	24.7	20.3	22.6	23.7	23.6

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
HAG2	390203	279945	Roadside	99.72527473	99.7	21.4	17.3	17.9	19.8	19.3
HAG1	390247	279996	Roadside	92.03296703	92.0	21.3	17.1	17.0	18.4	18.5
11	390295	280043	Roadside	99.72527473	99.7	22.0	18.0	18.4	18.0	19.6
HAG5	389929	279650	Roadside	99.72527473	99.7		29.5	32.7	35.8	34.5
HAG6	389939	279664	Roadside	99.72527473	99.7		16.6	20.6	21.4	20.9
SBR1	396127	271516	Roadside	99.72527473	99.7		24.9	26.6	28.6	28.4
SBR2	395996	272063	Roadside	99.72527473	99.7		18.4	20.5	22.8	22.1
SBR3	395825	272841	Roadside	92.30769231	92.3		25.9	27.8	31.7	30.2
KEN	396683	270354	Roadside	99.72527473	99.7	17.6	15.3	16.5	17.8	17.0
SR	396780	269450	Roadside	99.72527473	99.7	21.7	17.2	19.0	21.7	21.0
18	395180	268549	Roadside	99.72527473	99.7	26.5	22.4	25.1	25.9	25.6
19	395188	268564	Roadside	92.03296703	92.0	27.6	23.1	25.5	26.4	25.6
HR	394772	268441	Roadside	99.72527473	99.7	25.5	20.4	23.5	26.4	24.3
16	394701	268444	Roadside	91.48351648	91.5	25.0	20.4	21.8	21.7	22.9
255	394408	268417	Roadside	99.72527473	99.7	16.8	15.9	17.3	19.8	17.5
PR1	395795	272309	Suburban	74.72527473	74.7					17.6

☒ 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 $\mu\text{g}/\text{m}^3$.

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

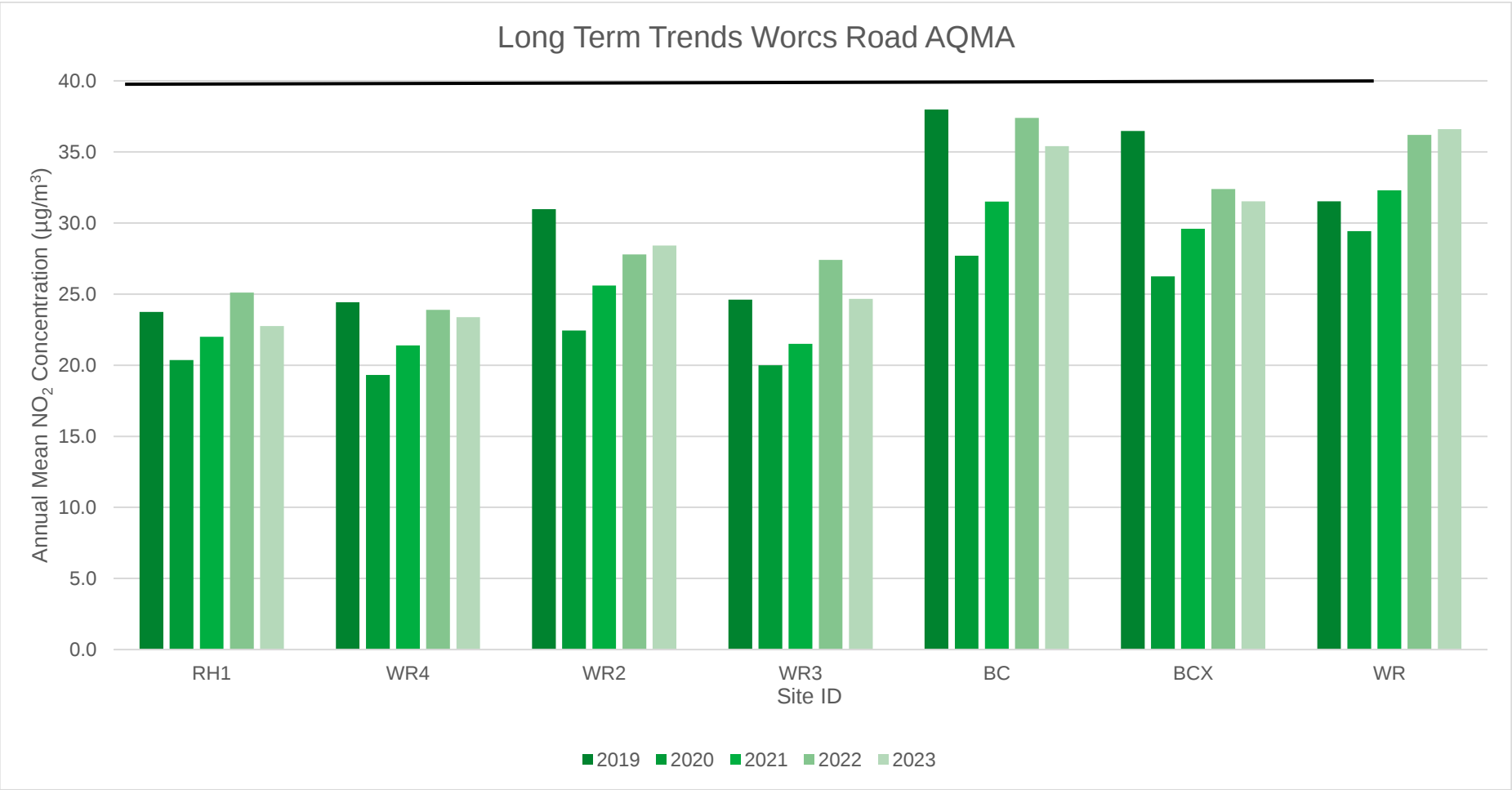
NO₂ annual means exceeding 60 $\mu\text{g}/\text{m}^3$, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

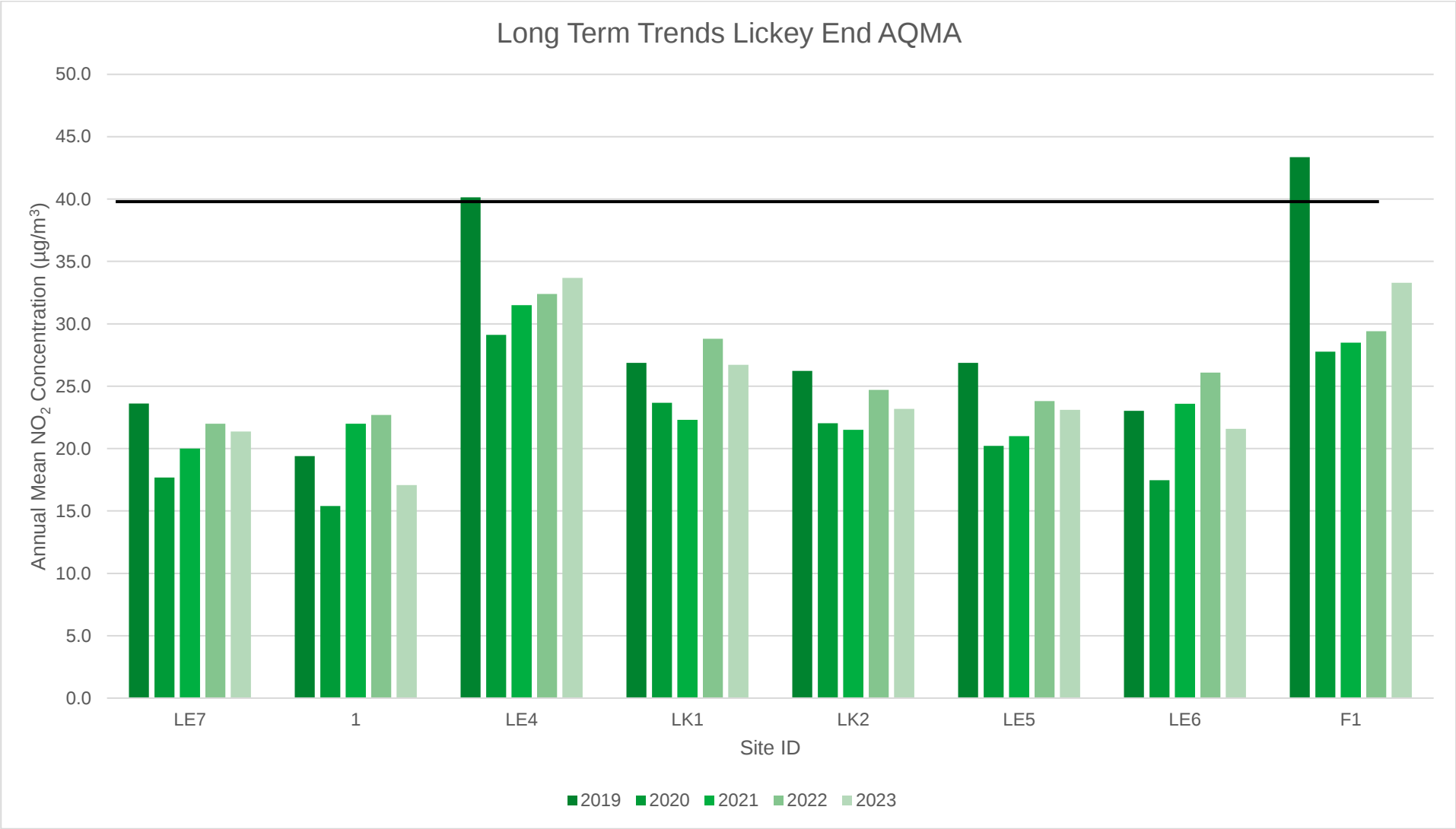
Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

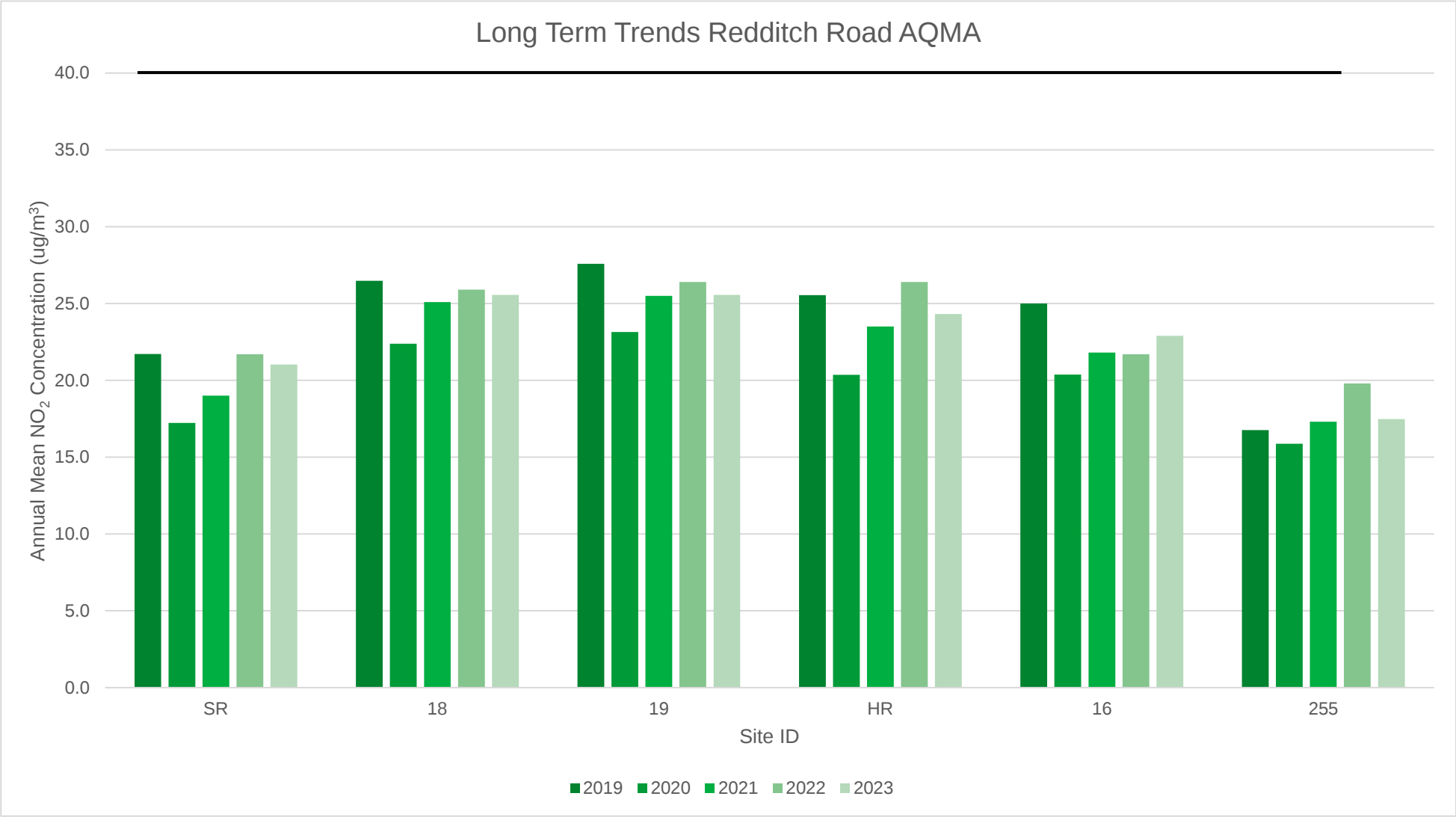
Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

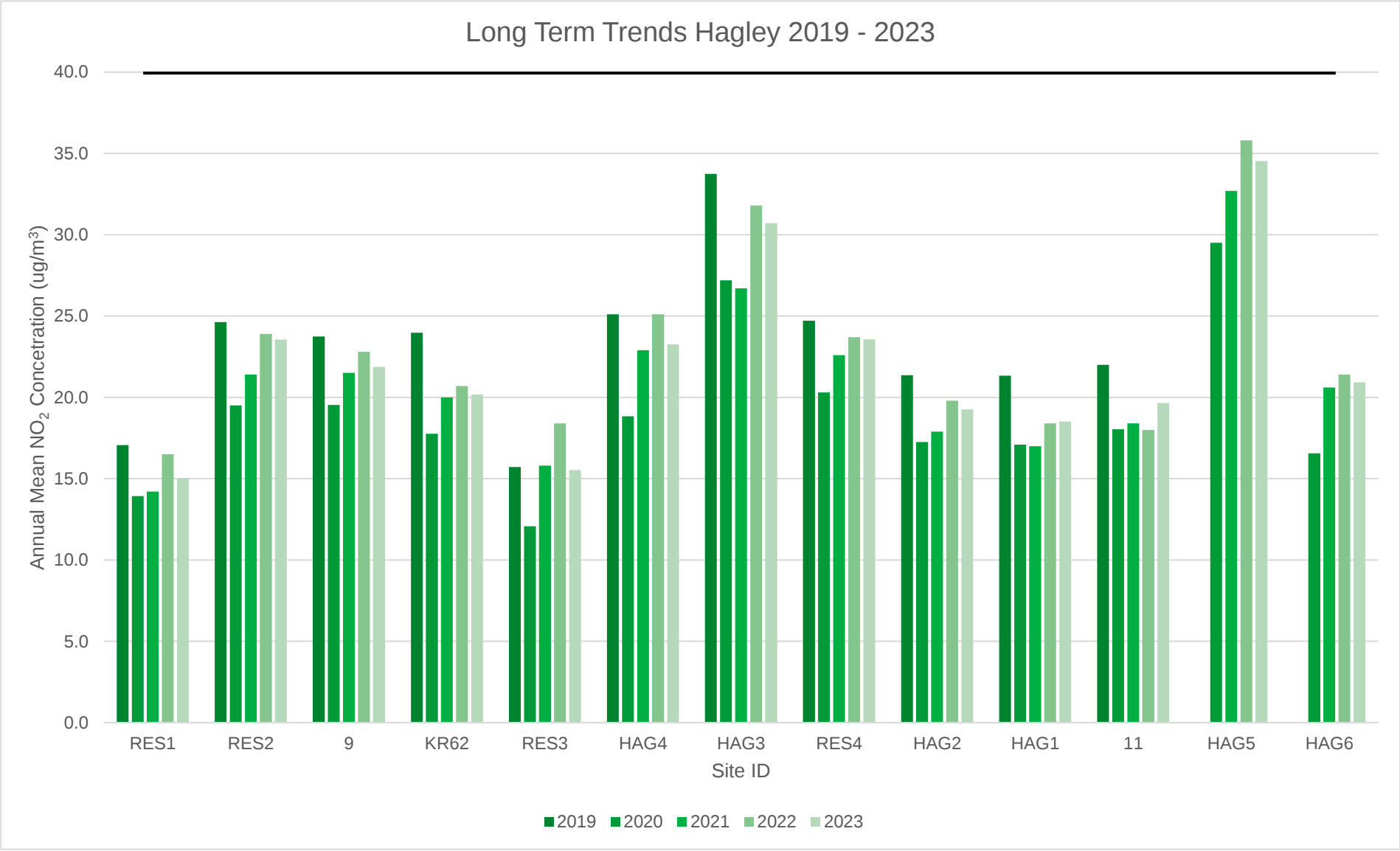
- (1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
- (2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

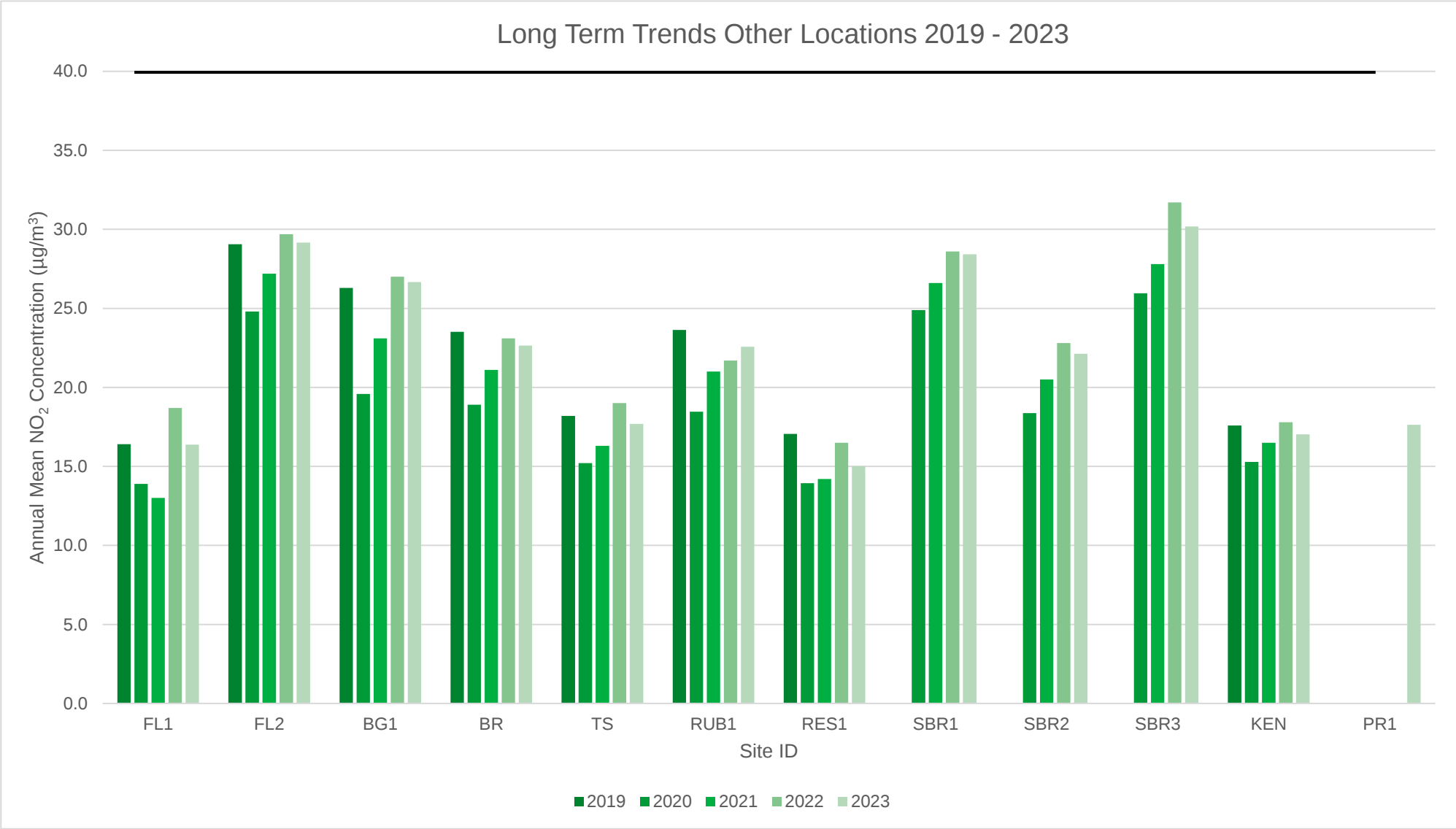
Figure A.1 – Trends in Annual Mean NO₂ Concentrations











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 (0.97)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
FL1	395079	269797	20.0	19.9	15.7	16.4	14.5	13.8	8.8	11.9	25.5	18.8	20.5		16.9	16.4	-	
FL2	395118	269721	37.0	37.2	31.6	30.9	26.6	25.3		18.6		30.2	33.3	30.0	30.1	29.2	-	
RH1	395243	269844	29.7	28.3	22.4	22.9	20.7	20.6	19.3	21.0	26.3	22.6	26.5	21.2	23.5	22.8	-	
WR4	395312	269938	30.5	29.1	23.0	24.3	19.6	20.8	17.8	20.6	27.5	25.8	26.8	23.4	24.1	23.4	-	
WR2	395511	270180	36.5	31.8	33.0	31.6	25.9	26.9	21.2	22.8	36.3	32.5	30.6	22.4	29.3	28.4	-	
WR3	395501	270190	33.0	33.3	24.3	22.8	22.0	19.3	18.5	25.0	27.0	24.0	28.9	27.1	25.4	24.7	-	
BC	395685	270424	42.8	34.6	38.0	35.4	33.9	30.8	32.5	33.7	42.6	36.5	42.1	35.3	36.5	35.4	-	
BCX	395807	270549	37.6	44.8	34.2	34.1	29.1	28.5	24.8	27.5	35.7	32.8	31.2	29.9	32.5	31.5	-	
WR	395702	270423	49.8	42.3	38.1	41.6	34.5	34.2	26.7	32.2	41.8	37.6	38.7	35.4	37.7	36.6	-	
BG1	396238	271108	33.3	32.7	26.5	28.9	23.9	24.3	20.8	22.5	30.8	30.2	31.1	24.9	27.5	26.7	-	
BR	396292	271210	29.6	28.3	22.7	23.6	21.7	19.1	15.9	18.4	24.9	25.6	28.0	22.2	23.3	22.6	-	
LE7	396916	273014	26.1	22.5	23.6	25.0	23.2	23.2	11.7	18.9	24.1	24.9	24.6	16.5	22.0	21.4	-	
1	396999	272979	24.0	22.4	18.3	17.0	18.1	14.9	11.8	16.4	16.8	18.6		15.5	17.6	17.1	-	
LE4	396935	272949	47.4	32.1	38.4	25.5	38.4	30.4	30.7	31.5	37.0	36.7	43.0	25.5	34.7	33.7	-	
LK1	396939	272934	32.2	43.4	26.5	25.3	24.1	20.3	20.8	21.4	25.0	26.9	30.0	34.7	27.5	26.7	-	
LK2	396995	273129	32.4	30.3	24.4	23.0	19.5	17.6	20.5	19.1	23.3	25.0	27.8	23.9	23.9	23.2	-	
LE5	396999	273143	31.2	29.0	24.2	22.9	20.6	18.9	20.6	19.8	22.9	24.4	28.6	23.0	23.8	23.1	-	
LE6	396958	273157	30.3	27.7	21.2	19.9	13.8	14.2	18.7	16.8	21.0	23.2	36.8	23.3	22.2	21.6	-	
F1	397010	273112	40.2	39.0	36.7	37.6	29.8	33.0	31.9	29.7	35.3	37.9	26.0	34.6	34.3	33.3	-	
TS	396613	275085	19.2	20.0	19.2	19.4	15.0	16.8	10.3			23.8	23.0	15.9	18.2	17.7	-	
RUB1	398555	277200	26.1	26.2	22.4	21.6	23.3	22.9		20.3	21.2	23.2	28.2	20.6	23.3	22.6	-	
RES1	391445	281179	19.9	18.0	15.8	15.5	11.9	11.4	11.8	12.9	15.9	17.8	18.7	16.1	15.5	15.0	-	
RES2	391556	281042	29.1	29.3	24.4	24.7	24.5	21.2	18.4	22.7	23.4	25.4			24.3	23.6	-	
9	391210	280668	27.0	26.8	22.7	23.9	22.1	21.8	16.8	20.4	20.4	22.5	26.1	20.1	22.5	21.9	-	
KR62	391182	280631	25.7	26.9	20.6	20.6	20.2	18.3	18.0	19.0	19.4	17.2	24.5	19.2	20.8	20.2	-	
RES3	389827	279590	18.8	18.4	15.4	16.8	12.6	14.3	16.4	12.8	16.5	17.5	18.7	13.8	16.0	15.5	-	
HAG4	389850	279588	28.6	28.6	23.9	26.6		23.5	9.9	20.9	23.7	32.4	26.4	19.4	24.0	23.3	-	

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 (0.97)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
HAG3	389909	279629	36.9	37.5	33.9	32.7	33.0	31.9	27.9	29.8	31.0	25.7	32.9	26.6	31.7	30.7	-	
RES4	390025	279765	30.1	31.3	24.8	26.5	25.6	21.5	17.5	19.8	21.4	24.2	27.6	21.2	24.3	23.6	-	
HAG2	390203	279945	25.3	25.1	20.4	20.6	18.5	17.1	13.1	17.0	18.4	20.7	24.3	17.8	19.8	19.3	-	
HAG1	390247	279996	24.0	22.8	18.7	18.9	16.2	16.7		15.6	18.5	20.7	21.2	16.7	19.1	18.5	-	
11	390295	280043	25.7	26.1	22.0	21.9	18.6	20.1	14.5	17.6	21.8	23.9	13.9	17.2	20.3	19.6	-	
HAG5	389929	279650	41.2	43.7	22.1	41.3	41.4	40.9	31.9	29.7	33.5	36.3	35.4	29.7	35.6	34.5	-	
HAG6	389939	279664	25.3	25.1	22.5	24.1	19.6	21.1	15.9	18.5	23.2	23.6	21.9	18.2	21.6	20.9	-	
SBR1	396127	271516	38.1	35.8	28.8	28.7	26.9	22.3	23.8	28.5	29.5	29.5	32.4	27.3	29.3	28.4	-	
SBR2	395996	272063	30.4	28.0	23.1	22.2	18.7	17.5	15.9	18.8	23.1	24.2	28.9	22.8	22.8	22.1	-	
SBR3	395825	272841	36.7	36.3	33.7	33.8		27.6	22.5	27.9	31.6	32.4	34.1	25.8	31.1	30.2	-	
KEN	396683	270354	27.0	21.7	17.0	15.9	15.1	12.4	11.0	14.1	16.8	18.9	25.5	15.1	17.6	17.0	-	
SR	396780	269450	27.4	28.2	21.9	21.8	22.2	18.6	13.4	17.4	20.4	22.9	28.1	17.9	21.7	21.0	-	
18	395180	268549	33.8	34.4	26.5	27.0	22.1	22.8	17.6	22.4	25.4	28.9	31.6	23.7	26.4	25.6	-	
19	395188	268564	31.6	32.1	25.4		19.5	21.4	20.6	23.1	28.7	30.7	33.4	23.2	26.3	25.6	-	
HR	394772	268441	30.1	32.2	26.5	24.6	25.3	21.7	17.8	20.7	24.0	26.1	31.2	20.6	25.1	24.3	-	
16	394701	268444	27.9	29.2	24.2	24.2	19.6	21.5	17.3	20.5		26.6	28.4	20.3	23.6	22.9	-	
255	394408	268417	25.6	25.1	19.0	17.4	14.5	14.0	10.9	14.0	16.4	20.4	24.2	14.7	18.0	17.5	-	
PR1	395795	272309				18.1	17.0	17.3	11.4	15.2	20.2	23.3	23.9	17.3	18.2	17.6	-	

☒ 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.TG22.

☒ Local bias adjustment factor used.

☐ National bias adjustment factor used.

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

☒ Bromsgrove 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 Bromsgrove District Council During 2023

Bromsgrove District Council has not identified any new significant sources impacting air quality within the reporting year of 2023.

Applications for a number of new developments have been identified within the Bromsgrove District area. The proposals have been assessed as part of the planning process and are not expected to have a significant impact on local air quality should they become operational.

Details of applications for significant developments received by Bromsgrove District Council in 2023 are as follows:

Planning Ref	Address	Proposal
23/000003/SCR	A38 Bromsgrove, Worcestershire	New screening opinion for the A38 Bromsgrove Route Enhancement Programme (BREP)
23/00616/FUL	Waseley Hills High School School Road Rubery Worcestershire	Phased demolition and construction of replacement school, including new Multi Use Games Area (MUGA), landscaping and associated works.

Additional Air Quality Works Undertaken by Bromsgrove District Council During 2023

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

QA/QC of Diffusion Tube Monitoring

The following UKAS accredited company provided Redditch Borough Council with nitrogen dioxide tubes and analysis in 2023:

Gradko International Limited

St. Martins House

77 Wales Street

Winchester

SO23 0RH

diffusion@gradko.com

The 20% Triethanolamine (TEA) / De-ionised Water preparation method is used.

Gradko International Limited participate in the AIR NO₂ Proficiency Testing Scheme (AIR-PT).

All monitoring undertaken has been completed in accordance with the 2023 Diffusion Tube Monitoring Calendar, i.e. on or within ± 2 days of the specified date.

Diffusion Tube Annualisation

Table C.1 – Annualisation Summary (concentrations presented in $\mu\text{g}/\text{m}^3$)

Site ID	Annualisation Factor Birmingham Ladywood	Annualisation Factor Leamington Spa	Annualisation Factor Leominster	Annualisation Factor West Bromwich Kenrick Park	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
PR1	1.0649	1.1343	1.1416	1.0582	1.0997	18.2	-

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/NO₂.

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

Bromsgrove District Council have applied a local bias adjustment factor of 0.97 to the 2023 monitoring data. A summary of bias adjustment factors used by Bromsgrove Borough Council over the past five years is presented in Table C.2.

WRS has determined the appropriate local bias adjustment factor utilising the Diffusion Tube Processing Tool v4.0. The site used the colocation study at Wyre Forest House, Kidderminster. The local bias adjustment factor has been used as it is more conservative compared with the national bias adjustment factor (0.82, Defra published National Diffusion Tube Bias Adjustment Version 03/24), following consultation with Defra LAQM helpdesk and technical guidance.

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2023	Local	-	0.97
2022	Local	-	0.97
2021	National	03/22	0.84
2020	National	03/21	0.81
2019	National	03/20	0.78

Table C.3 – Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4	Local Bias Adjustment Input 5
Periods used to calculate bias	12				
Bias Factor A	0.97 (0.93 – 1.01)				
Bias Factor B	3% (-1% - 8%)				
Diffusion Tube Mean ($\mu\text{g}/\text{m}^3$)	12.4				
Mean CV (Precision)	1.9%				
Automatic Mean ($\mu\text{g}/\text{m}^3$)	12.0				
Data Capture	99%				
Adjusted Tube Mean ($\mu\text{g}/\text{m}^3$)	12 (11 – 12)				

Notes: A single local bias adjustment factor has been used to bias adjust the 2023 diffusion tube results.

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.

No diffusion tube NO₂ monitoring locations within Bromsgrove District Council area required distance correcting during 2023.

QA/QC of Automatic Monitoring

No automatic monitoring has been undertaken.

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

Figure D.1 – Map of Non-Automatic Monitoring Site

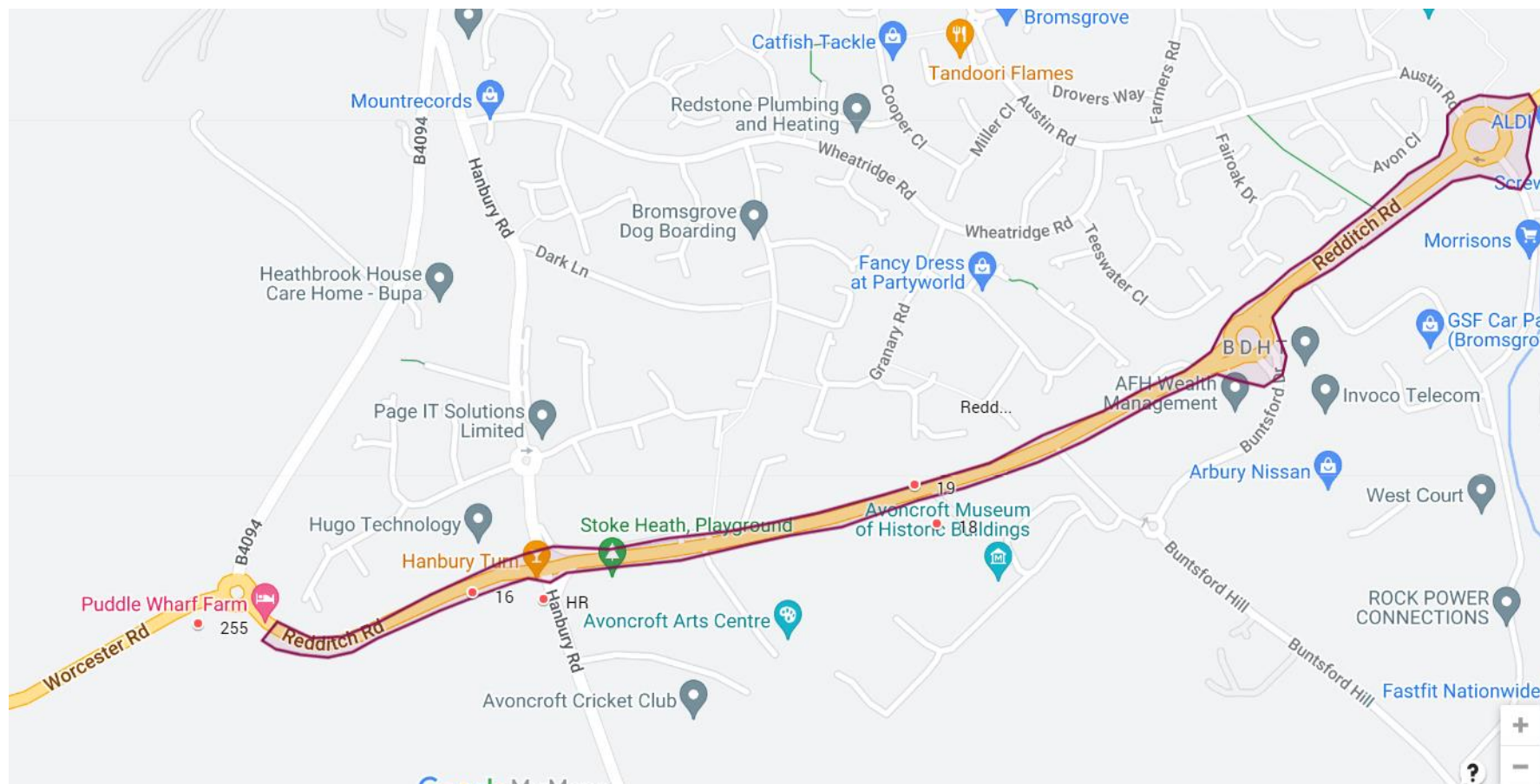


Figure D.1a: Redditch Road AQMA and monitoring locations: 255, 16, HR, 18, 19

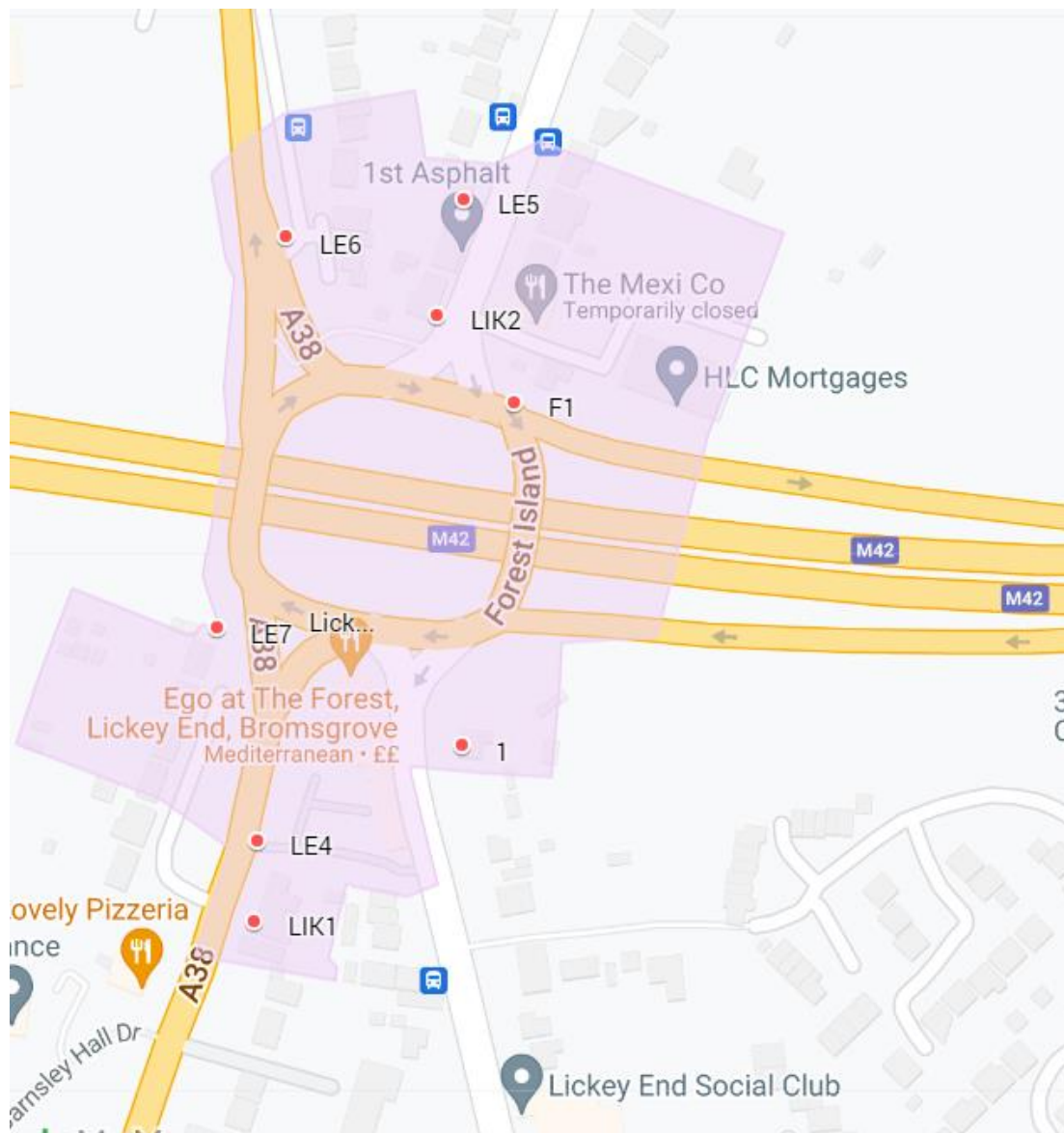


Figure D.1b: Lickey End AQMA and monitoring locations: LK1, LE4, LE7, 1, F1, LK2, LE5, LE6

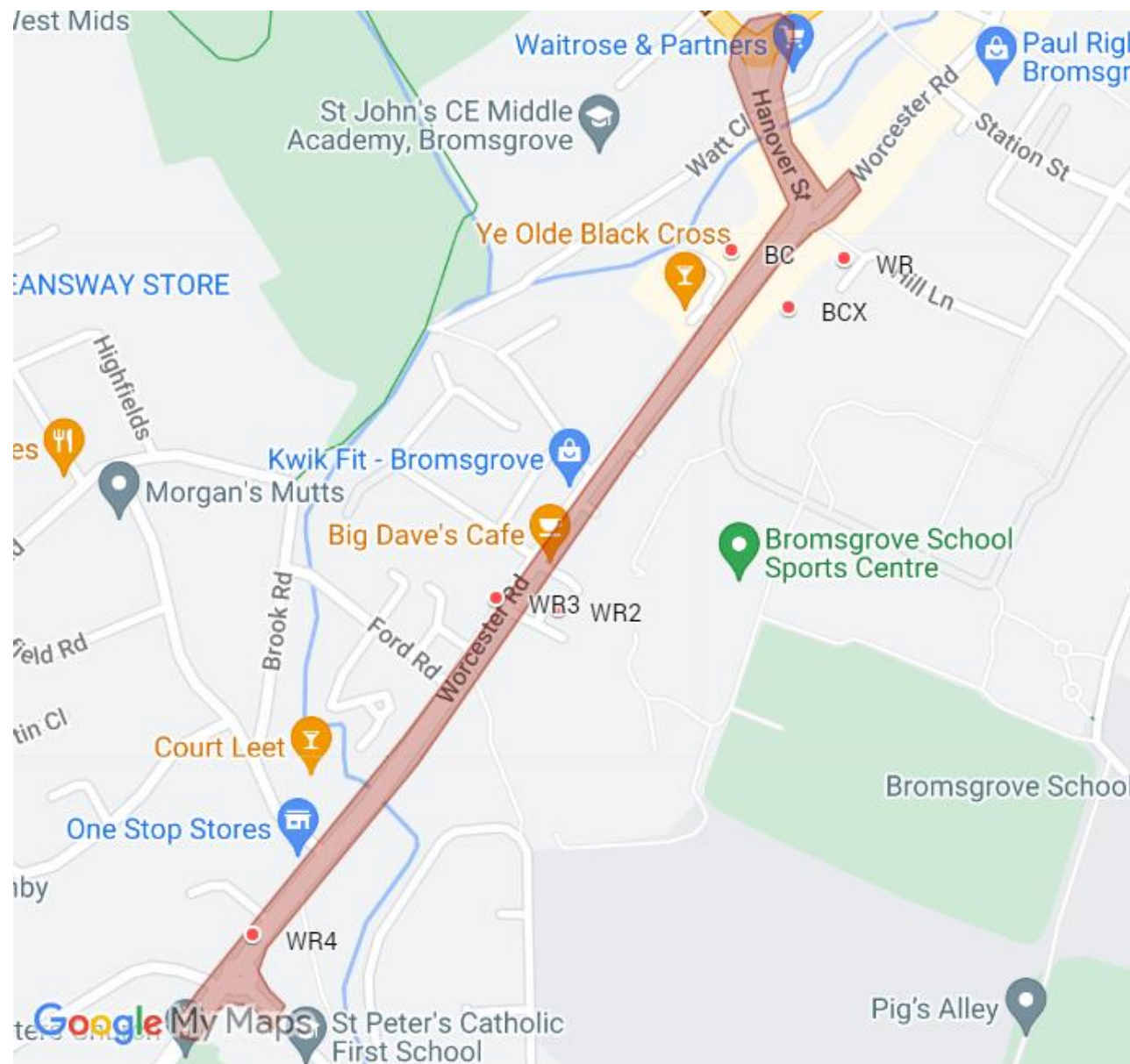


Figure D.1c: Worcester Road AQMA and monitoring locations: WR, BC, BCX, WR3, WR2, WR4



Figure D.1d: Bromsgrove Monitoring Locations: FL1, FL2, RH1

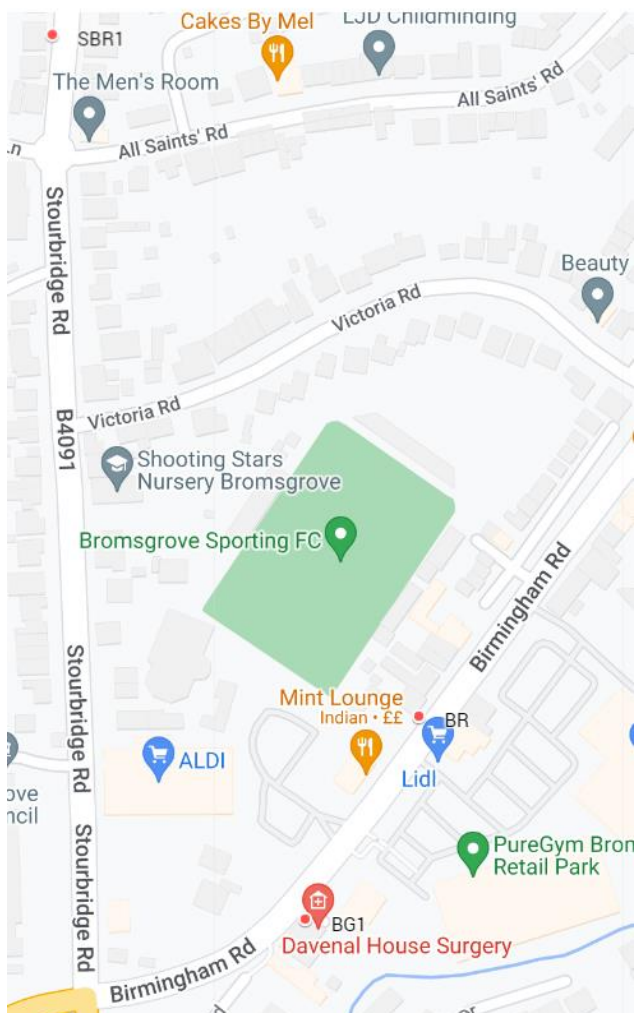


Figure D.1e: Bromsgrove Monitoring
Locations: BG1, BR2, SBR1

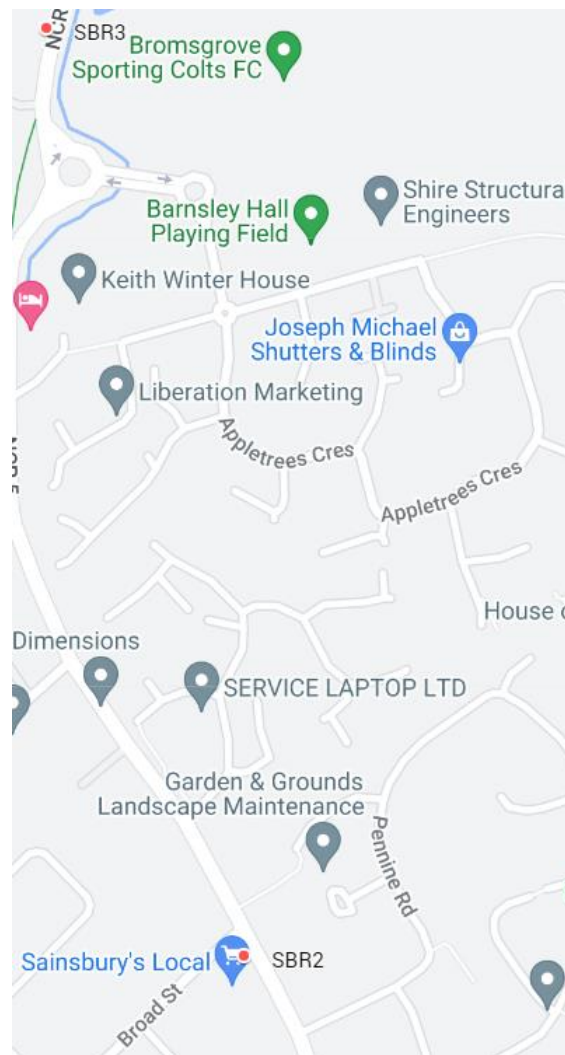


Figure D.1f: Bromsgrove Monitoring
Locations: SBR3, SBR2

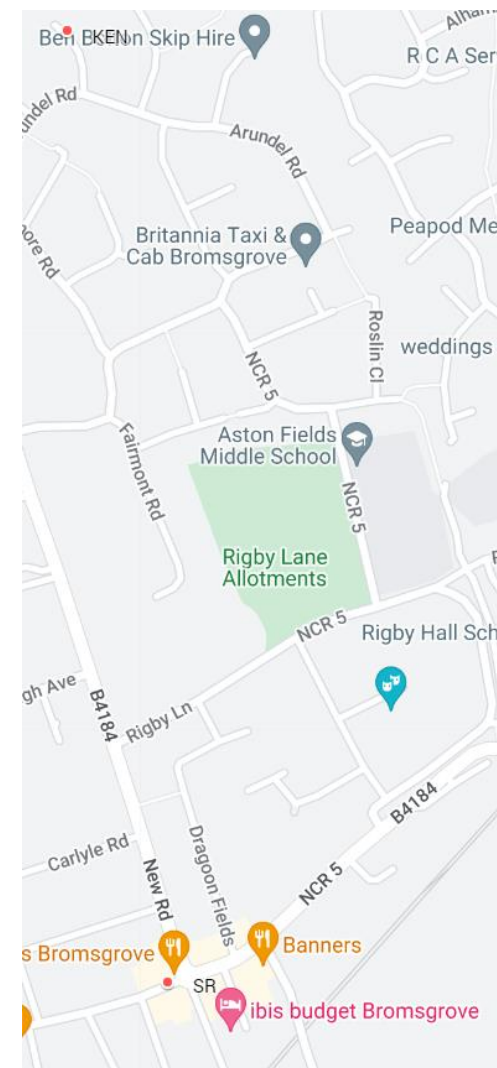


Figure D.1g: Bromsgrove Monitoring
Locations: KEN and SR



Figure D.1h: Bromsgrove Monitoring Location: TS

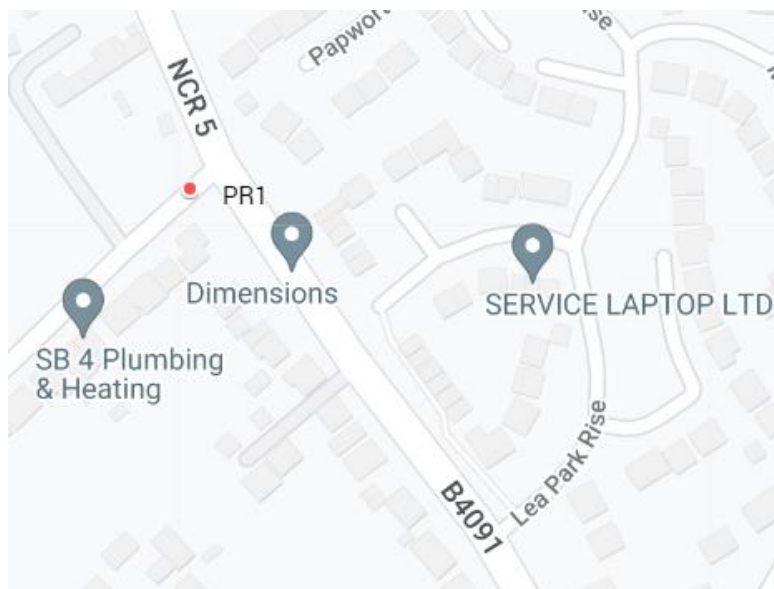


Figure D.1i: Monitoring Location: PR1



Figure D.1j: Rubery Monitoring Location: RUB1

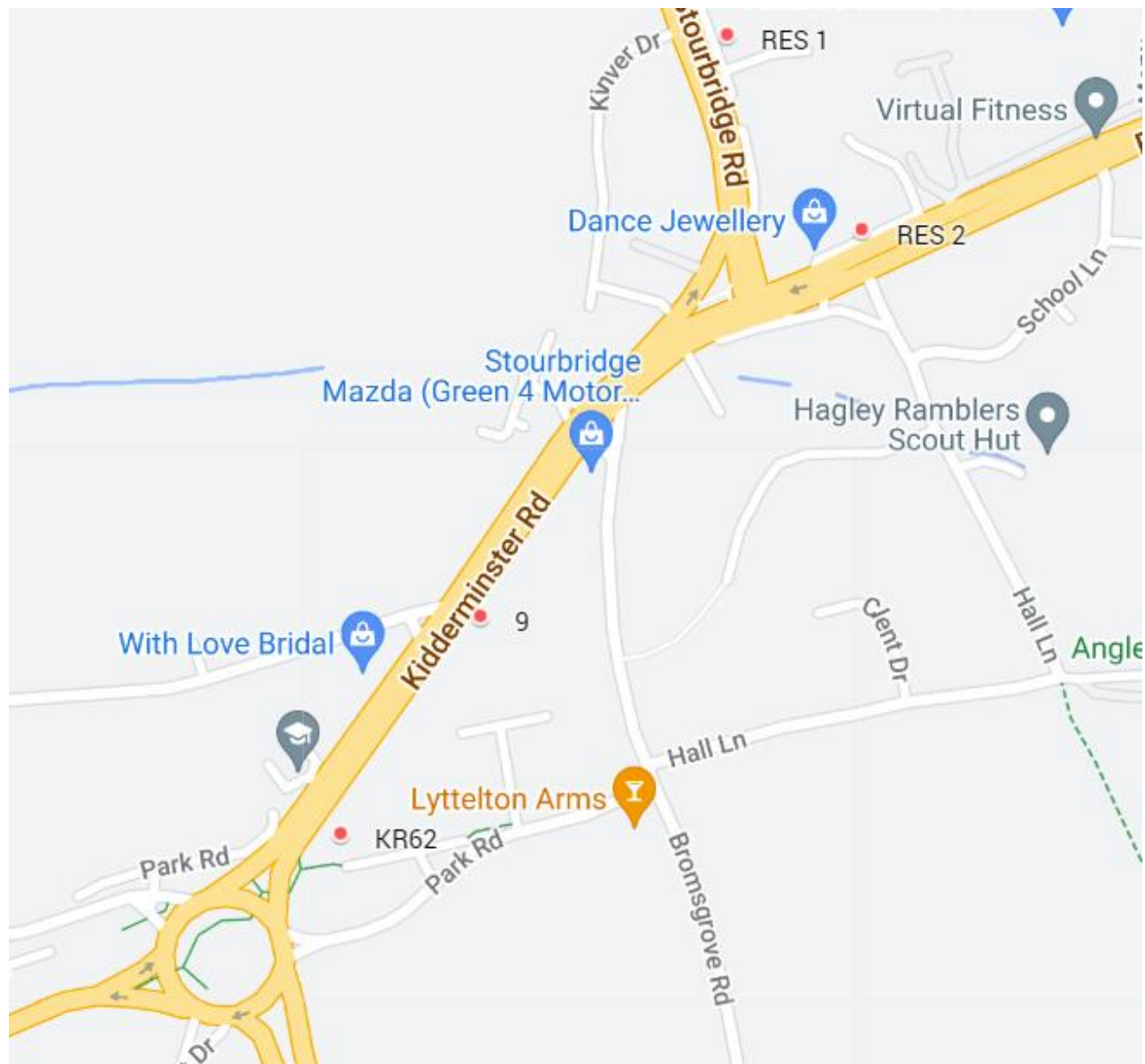


Figure D.1k: Hagley Monitoring Locations: RES1, RES2, 9, KR62

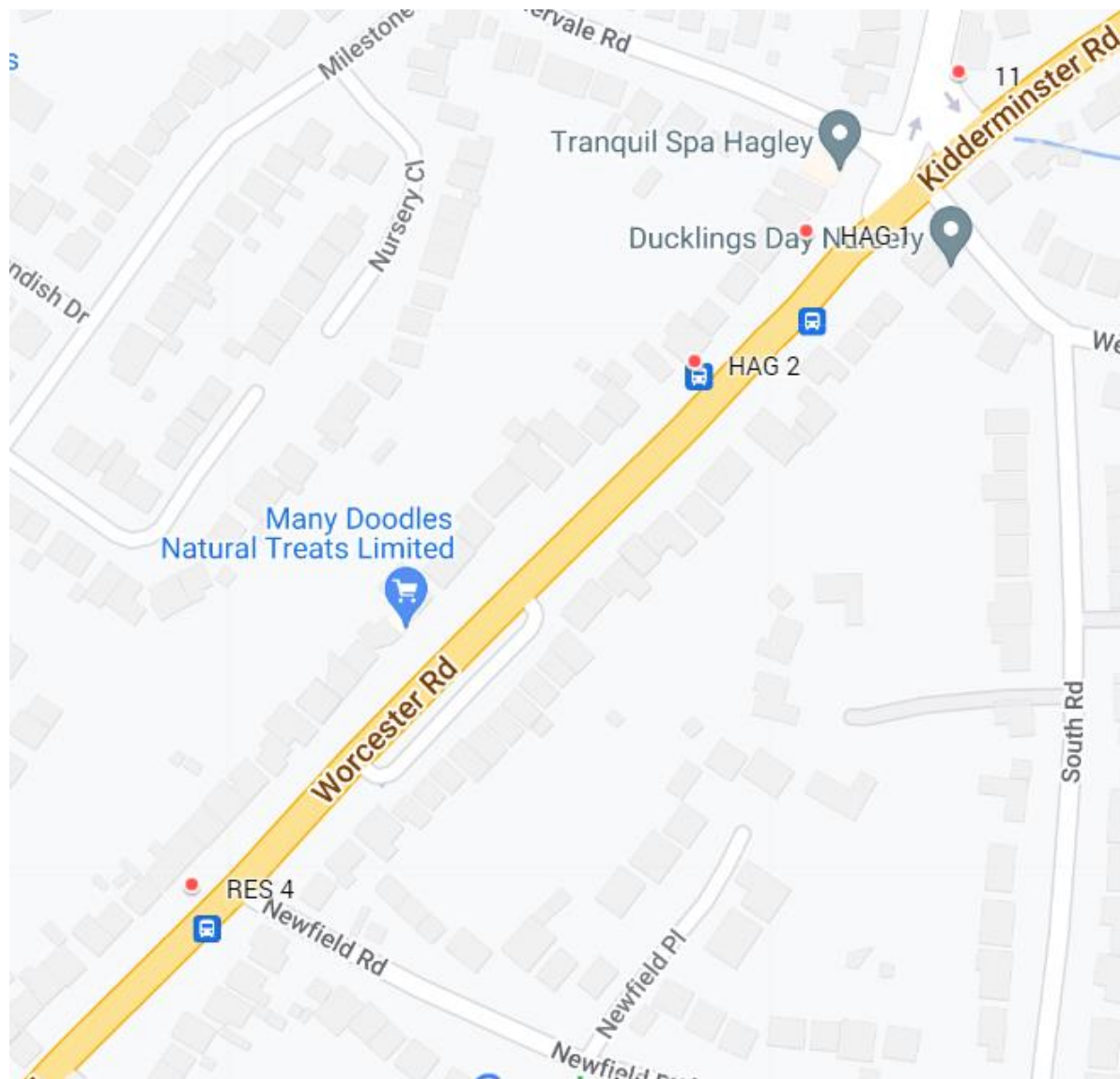


Figure D.11: Hagley Monitoring Locations: 11, HAG1, HAG2 and RES4



Figure D.1m: Hagley Monitoring Locations: RES3, HAG4, HAG3, HAG5, HAG6

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.TG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
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- Chemical hazards and poisons report: Issue 28. June 2022. Published by UK Health Security Agency
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- Worcestershire Regulatory Services (2023) Air Quality Annual Status Report for Bromsgrove District Council.
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