

Worcestershire
Regulatory Services
Supporting and protecting you



2023 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 2023

Information	Worcestershire Regulatory Services Details
Local Authority Officer	Stephen Williams
Department	Technical Services
Address	Worcestershire Regulatory Services, Wyre Forest House, Fine Point Way, Kidderminster, DY11 7WF
Telephone	01905 822799
E-mail	wrsenquiries@worcsregservices.gov.uk
Report Reference Number	RBC/ASR/01
Date	June 2023

Executive Summary: Air Quality in Our Area

Air Quality in Redditch Borough

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children, the elderly, and those with existing heart and lung conditions. There is also often a strong correlation with equalities issues because areas with poor air quality are also often less affluent areas^{1,2}.

The mortality burden of air pollution within the UK is equivalent to 29,000 to 43,000 deaths at typical ages³, with a total estimated healthcare cost to the NHS and social care of £157 million in 2017⁴.

Worcestershire Regulatory Services (WRS) have been responsible for managing (monitoring and reporting of) local air quality in the six Worcestershire District Councils since April 2011.

The Redditch area generally experiences good levels of air quality. There are currently no Air Quality Management Areas (AQMAs) in the Redditch Borough Council area, and none have been declared historically. Concentrations continue to fall well below the annual mean objective for nitrogen dioxide at measured locations.

Monitoring across the Redditch Borough area focuses on nitrogen dioxide (NO₂) via a network of passive diffusion tubes. The tubes are located in the main urban centre of Redditch. No changes were made to monitoring locations for the 2022 monitoring year.

Monitoring results within the Redditch Borough area demonstrate that there were no exceedances of the NO₂ air quality objective of 40µg/m³ in 2022. Results show there were increases in NO₂ concentrations at all monitoring locations between 2021 and 2022. This is not surprising given the restrictions that were in place during that year due to Covid-19. The largest increase of 4.6µg/m³ occurred at location SS and represents an increase of 36.36%. There is an average increase of approximately 13.4% at all locations. Concentrations from 2022 appear similar to the pre-pandemic

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

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

³ Defra. Air quality appraisal: damage cost guidance, January 2023

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

levels recorded in 2019 but are lower than 2018 results. Long term trend analysis over the 5-year period, 2018 to 2022, generally shows a decrease at all locations from 2018 to 2020 and then an increase from 2020 to 2022.

The highest concentration of NO₂ recorded in 2022 was 33.1µg/m³ recorded at OR2, 14 Other Road, with the next highest being 30.4µg/m³ at OR5 (also at Other Road). The lowest concentration was 11.6µg/m³ recorded at STOR, 18 Washford Lane. All concentrations are therefore 17% or more below the annual mean objective of 40µg/m³.

It should be noted that diffusion tubes OR4, OR5 and OR6 are a triplicate location (Misty Florist, Other Road); when averaged and bias adjusted the NO₂ concentration for this location is 30.2µg/m³.

No annual means greater than 60ug/m³ have been recorded indicating that it is extremely unlikely that there have been any exceedances of the 1-hour mean objective for NO₂ at any monitoring sites. The 60ug/m³ value is a surrogate figure to indicate exceedances of the 1-hour objective based on annual average concentrations. The concentrations recorded across the district in 2022 are generally around 50% or more below that value.

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 Plan⁵ sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term PM_{2.5} targets. The National Air Quality Strategy, published in April 2023, will provide more information on local authorities' responsibilities to work towards these new targets and reduce PM_{2.5} in their areas. The Road to Zero⁶ details the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMA) are designated due to elevated concentrations heavily influenced by transport emissions.

No AQMA have been declared within the Redditch Borough area and therefore no specific action plan has been developed. However, the general actions to improve air quality detailed in the current Worcestershire AQAP apply across Worcestershire as a whole, including the Redditch area. The following actions have also taken place.

⁵ Defra. Environmental Improvement Plan 2023, January 2023

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

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. This will be a mixture of workplace and destination charging. The scheme will be extended after the initial 12-month period to provide charging within the Council’s housing estates working with their Housing Services. The project is currently at the background / pre-construction phase.

Redditch Borough Council has published a strategy for ultra-low emission vehicles to help inform the development of appropriate infrastructure in the area to enable more people to use ultra-low emission vehicles (ULEVs). The document is available at:

<https://www.redditchbc.gov.uk/living/getting-around/electric-vehicles.aspx#strategy>

Redditch Borough Council has also been working with partners across the region including the LEPs and Waste Partnership to explore possibilities of modern technologies in respect of the vehicle fleet and how innovative technology can deliver greener and more efficient systems internally.

The Council have worked with Nottingham City Council to help create the basis of the fleet replacement programme. One of the areas looked at has been the possibility of using vegetable derived diesel in fleet vehicles to reduce emissions. However severe increases in costs associated with this product due to global pressures has put this on hold for the time being.

In 2013, WRS produced a countywide Air Quality Action Plan (AQAP) for Worcestershire. WRS have produced two updates to the AQAP, the last in 2016. For details of the progress of those measures at that time, please refer to the ‘Air Quality Action Plan Progress Report for Worcestershire April 2015-2016’. A copy of this, the previous update, and the AQAP, is available to view or download at: [Redditch Borough Council | Worcestershire Regulatory Services \(worsregservices.gov.uk\)](http://redditchboroughcouncil.gov.uk/worcestershire-regulatory-services)

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 group membership has expanded considerably at the beginning of 2023 and is currently progressing a programme of works, outlined below, which will be reported on in the next ASR (2024). The group currently comprises officers from the County and District authorities from public

health, air quality, strategic planning, sustainability, highways and transport disciplines, and also representatives from the NHS.

The Action Plan will incorporate an improving Air Quality Strategy applicable across the County including the Redditch Borough Council area and other districts that currently have no AQMAs in place, in accordance with the updated legislation and guidance.

Whilst Redditch has no AQMAs in place further work is necessary across the county to help inform the Air Quality Strategy and Action Plan process. The first step in action planning is to determine the contribution of sources of air pollution (source apportionment) to inform future actions. Some source apportionment has been undertaken across the county, but further work is required. The initial Steering Group work is focussed on actions informed by the latest source apportionment work in addition to countywide actions applicable to all districts. Traffic surveys have been undertaken in 2023 to enable source apportionment work to be completed in Spring 2024 when the relevant years' worth of monitoring data will be available in line with technical guidance.

The timeline for the various stages and delivery of the Air Quality Strategy and Action Plan is set out below.

Timeline	Phase
Feb – Dec 2023	Identification of potential overarching Worcestershire County Council actions and Worcester City Council Specific actions, feasibility filter of measures, cost benefit analysis, determination of impact, timelines and funding sources, drafting of countywide action plan
Jan – Mar 2024	Submission of Draft for review by Senior Management Team and approval by Political Committees at Worcester City Council and Worcestershire County Council and revisions
March 2024	Submission of Draft countywide AQAP inc. local AQ strategy and Worcester City Council specific actions to DEFRA
April- June 2024	3-month Public Consultation on Draft countywide AQAP following revisions
July - Sept 2024	Revisions and finalisation of countywide AQAP inc. local AQ strategy and Worcester City Council specific actions Consideration for revocation of AQMAs and source apportionment work for other AQMAs in 1) Bromsgrove DC 2) Wyre Forest DC 3) Wychavon DC
Sept – Oct 2024	Submission of Finalised AQAP for review by Senior Management Team and approval by Political Committees at Worcester City Council and Worcestershire County Council and revisions
Sept 2024 - Mar 2025	AQAPSG work on Bromsgrove DC and Wyre Forest DC specific actions (if required), refresh SG membership with relevant stakeholders. Identification of district specific actions, feasibility filter of measures, cost benefit analysis, determination of impact, timelines and funding sources, and draft update to AQAP. Consultation on additional chapters/amendments
Nov 2024	Publication of Finalised countywide AQAP inc. local AQ strategy & Worcester City chapter and submission to DEFRA
Mar - May 2025	Annual review for any amendments requiring further work.

Real-time Air Quality Monitoring Project

In September 2022 officers from WRS submitted an application to Defra's Air Quality Grant Scheme 2022/23. The scope of the bid was to establish an enhanced real-time air quality monitoring network across the main areas of air quality concern in Worcestershire for purposes of informing the public and vulnerable groups of the status of air pollution. The scheme would see the installation of approximately 24 low-cost 'Air Quality Monitors' across the county which measure NO₂, PM₁₀, and PM_{2.5} (with EA MCERTS standard accreditation as indicative ambient particulate matter device). The results of monitoring would then be used to inform decision making and requirements for further action as necessary.

In February 2023 Defra announced that the WRS bid had been successful and the requested £248,400 was awarded. An additional 10% of funds will also be 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.

At the time of writing the project is at the procurement stage, with the tender specification close to completion. Once a successful supplier has been appointed, exact monitoring locations will be agreed, and equipment installed. This is anticipated to be in the latter stages of 2023.

Two of the monitors are to be deployed within the Redditch Borough Council area. Locations are currently to be confirmed but are expected to represent worst case conditions in relation to road traffic and impacts from agriculture and solid fuel burning.

In addition, WRS have assisted the Defra AURN expansion project team with potential locations for two PM_{2.5} monitors in Worcestershire, and it is hoped these will be in place within the next 6 to 12 months. The location of the monitor is indicated to be in the area of Chadwick Mews, Redditch.

Worcestershire County Council Highways Department have also progressed the following schemes within the Redditch Borough during 2022:-

The **Redditch Station Masterplan** is currently under development

The **Redditch Local Cycling and Walking Infrastructure Plan** is currently in development and due for public consultation during Summer 2023.

Conclusions and Priorities

There are currently no AQMAs declared in the Redditch Borough. Concentrations at identified worst-case scenario locations have been recorded well below the objectives for nitrogen dioxide.

Redditch Borough Council has not identified any significant new sources of air pollution within the area for the reporting year of 2022. A number of planning applications for large developments have been made within the district during 2022. 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.

The priorities for Redditch Borough Council are to continue to monitor nitrogen dioxide at key points across the area. A full rationalisation of all monitoring locations is programmed for November 2023. 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 will be set up in the latter part of 2023. 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 and help quantify the impacts from road traffic and other sources, such as solid fuel burning, agriculture and industry. The system will also provide an alert in the event of poor air quality so that vulnerable groups can be informed and limit exposure.

Work will continue with development of a countywide Air Quality Strategy and Action Plan. Publication of the draft document is anticipated in Spring 2024 with a finalised version later that year following the necessary consultation process. This is to remain a 'live' document that can be added to and revised on a regular basis as things evolve.

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 will reduce individual's pollution emissions.
- **Turn off your engine when stationary or parked,** don't 'idle', particularly outside sensitive receptors such as schools, hospitals, care homes and residential properties.
- **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 \(www.gov.uk\)](https://www.gov.uk/government/collections/smarter-choices-changing-the-way-we-travel)
- **Hold meetings by Conference Call** by phone or video conference via Teams, Zoom, Skype or Facetime rather than driving to meetings. This reduces fuel and other travel costs, vehicle maintenance and hire cost, 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:** The government is currently providing grants for up to 75% of Electric Vehicle (EV) charging points, up to 40 charge points. Eligible businesses, charities and public sector organisations with off street parking for staff or vehicles fleets can apply for vouchers to redeem costs of electric vehicle charge-points. There is a limit of 1 voucher per applicant; however, applicants with a 'franchise' may apply for up to 20 franchisees. There is an approved charge points list and a list of authorised installers

[Workplace Charging Scheme: guidance for applicants - GOV.UK \(www.gov.uk\)](https://www.gov.uk/workplace-charging-scheme)

- 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](https://www.energy-saving-trust.org/eco-driving)
 - [How to drive economically - Eco-driving tips | AA \(theaa.com\)](https://www.theaa.com/eco-driving-tips)
 - [Fuel Consumption & CO2 Databases | Vehicle Certification Agency \(vehiclecertification-agency.gov.uk\)](https://www.vehiclecertification-agency.gov.uk/fuel-consumption-co2-databases)
- **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)^{7,8}. 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.

⁷ <http://www.breathelondon.org/>

⁸ <https://www.londonair.org.uk/LondonAir/guide/MyActionsForMe.aspx>

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/daq>
- 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

Prior to the pandemic WRS had enjoyed a good working relationship with the County Council’s Strategic Transport Team and developed closer working ties with Public Health, Planning and Sustainability colleagues within the County Council. Unfortunately, the COVID-19 pandemic, led to the suspension of existing action groups in 2020 and delayed air quality improvement projects. Additionally, there have been significant personnel turnover within the WRS and County Council teams in the interim period.

As we have emerged from the pandemic during 2022-23, WRS are seeking to re-engage with those teams and new colleagues from the different disciplines that have a role in improving air quality.

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

Worcestershire Regulatory Services

Redditch Borough Council

Worcestershire County Council

This ASR has been signed off by the Director of Public Health with the following comments:

“We welcome the submission of these reports, continued focus on improving air quality, and installation of new real time air quality monitors which will provide ‘information for action’ across the system. We recommend inclusion in future reports to recognise ageing population and increasing long term conditions sensitive to poor air quality”.

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

Technical Pollution Team
Worcestershire Regulatory Services
Wyre Forest House
Finepoint Way
Kidderminster
Worcestershire
DY11 7WF

telephone - 01905 822799

email - wrsenquiries@worcsregservices.gov.uk

Table of Contents

Executive Summary: Air Quality in Our Area **ii**

Air Quality in Redditch Borough..... ii

Actions to Improve Air Qualityiii

Conclusions and Priorities vi

Local Engagement and How to get Involved.....vii

Local Responsibilities and Commitment ix

1 Local Air Quality Management **1**

2 Actions to Improve Air Quality **2**

2.1 Air Quality Management Areas 2

2.2 Progress and Impact of Measures to address Air Quality in Redditch Borough Council..... 3

2.3 PM_{2.5} – Local Authority Approach to Reducing Emissions and/or Concentrations 7

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance **9**

3.1 Summary of Monitoring Undertaken 9

3.1.1 Automatic Monitoring Sites 9

3.1.2 Non-Automatic Monitoring Sites 9

3.2 Individual Pollutants..... 9

3.2.1 Nitrogen Dioxide (NO₂) 9

3.2.2 Particulate Matter (PM₁₀) 10

3.2.3 Particulate Matter (PM_{2.5})..... 10

3.2.4 Sulphur Dioxide (SO₂)..... 10

Appendix A: Monitoring Results **11**

Appendix B: Full Monthly Diffusion Tube Results for 2022 **14**

Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC **15**

New or Changed Sources Identified Within Redditch Borough Council During 2022 15

Additional Air Quality Works Undertaken by Redditch Borough Council During 2022 16

QA/QC of Diffusion Tube Monitoring 17

Diffusion Tube Annualisation 17

Diffusion Tube Bias Adjustment Factors 17

NO₂ Fall-off with Distance from the Road..... 19

QA/QC of Automatic Monitoring 19

Appendix D: Map(s) of Monitoring Locations and AQMAs **20**

Appendix E: Summary of Air Quality Objectives in England..... **21**

Glossary of Terms **22**

References **23**

Figures

Figure A.1 – Trends in Annual Mean NO₂ Concentrations 13
 Figure D.1 – Map of Non-Automatic Monitoring Site 20

Tables

Table A.1 – Details of Non-Automatic Monitoring Sites..... 13
 Table A.2 – Annual Mean NO₂ Monitoring Results: Non-Automatic Monitoring (µg/m³)..... 14
 Table B.1 – NO₂ 2022 Diffusion Tube Results (µg/m³) 14

 Table C.1 – Annualisation Summary (concentrations presented in µg/m³) 17
 Table C.2 – Bias Adjustment Factor..... 18
 Table C.3 – Local Bias Adjustment Calculation..... 18
 Table E.1 – Air Quality Objectives in England..... 21

1 Local Air Quality Management

This report provides an overview of air quality in Redditch Borough Council area during 2022. 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 Redditch Borough 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.

Redditch Borough Council currently does not have any declared AQMAs. A local Air Quality Strategy is currently under development as part of the countywide action plan work. A draft version of this document is anticipated to be released in Spring 2024 with a finalised version following later that year after the consultation process is completed.

Climate emergency, electric vehicle, and Redditch e-scooter trial information is available on the Council's website via the following links: -

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

[Electric vehicles - redditchbc.gov.uk](https://redditchbc.gov.uk/electric-vehicles)

[e-scooters - redditchbc.gov.uk](https://redditchbc.gov.uk/e-scooters)

2.2 Progress and Impact of Measures to address Air Quality in Redditch Borough 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. *The monitoring network remains limited at five sites. Whilst it is encouraging to see that the Council intend to prioritise for the coming year increased monitoring in congested areas, the Council is urged to expand their monitoring network in 2022, and a full update on this is expected in next year's ASR.*
2. *The QA/QC presented is sufficient, with appropriate discussion for all procedures applied. Although not mandatory, a screengrab of the national bias adjustment factor spreadsheet depicting the applied factor would be a useful addition.*
3. *Trend graphs have been provided, and detailed discussion of recent monitoring data has been included. This is commended.*
4. *Detailed discussion on PM_{2.5} is noted, including reference to the Public Health Outcomes Framework. This is encouraged in all future reports.*
5. *The ASR notes that the business of the new Air Quality Partnership set up in 2019 has been postponed indefinitely due to Covid-19. Should this change, the Council are encouraged to report on discussions held with regard to potential actions to improve air quality across the county.*
6. *The ASR included information in developments where construction should begin in 2022. There is, however, limited reference to the impacts that these developments will have on air quality within the local authority. The Council should discuss this further in future reports".*

The above points are noted. In relation to point 1, the monitoring network was not expanded in 2022. A full rationalisation of the monitoring network is programmed for Autumn 2023. The network will be expanded as necessary. It should be noted that historically monitoring has been undertaken within at least 34 locations across the borough. No exceedance of the annual objective has been identified at relevant exposure and therefore no declaration of any AQMAs have been required. In addition, two low-cost real time air quality sensors measuring NO₂, PM₁₀, and PM_{2.5} are to be introduced in the district in the latter part of 2023 as part of the Defra funded project. An automatic monitor for PM_{2.5} is also to be established in the district as part of expansion of the AURN network.

No AQMAs have been declared with within the Redditch Borough and therefore no specific action plan has been developed. However, the general actions to improve air quality detailed in the current Worcestershire AQAP apply across Worcestershire as a whole, including the Redditch area. The following actions have also taken place.

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. This will be a mixture of workplace and destination charging. The scheme will be extended after the initial 12-month period to provide charging within the Council's housing estates via working with their Housing Services. The project is currently at the background / pre-construction phase.

Redditch Borough Council has published a strategy for ultra-low emission vehicles to help inform the development of appropriate infrastructure in the area to enable more people to use ultra-low emission vehicles (ULEVs). The document is available at:

<https://www.redditchbc.gov.uk/living/getting-around/electric-vehicles.aspx#strategy>

Redditch Borough Council has also been working with partners across the region including the LEPs and Waste Partnership to explore possibilities of modern technologies in respect of the vehicle fleet and how innovative technology can deliver greener and more efficient systems internally.

The Council have worked with Nottingham City Council to help create the basis of the fleet replacement programme. One of the areas looked at has been possibility of using vegetable derived diesel in fleet vehicles to reduce emissions. However severe increases in costs associated with this product due to global pressures has put this on hold for the time being.

In 2013, WRS produced a countywide Air Quality Action Plan (AQAP) for Worcestershire. WRS have produced two updates to the AQAP, the latest in September 2016. For details of all measures completed, in progress or planned, please refer to the 'Air Quality Action Plan Progress Report for Worcestershire April 2015-2016'. A copy of this, the previous update, and the AQAP, is available to view or download at:

[Redditch Borough Council | Worcestershire Regulatory Services \(worcsregservices.gov.uk\)](http://www.redditchbc.gov.uk/Redditch-Borough-Council-Worcestershire-Regulatory-Services-worcsregservices.gov.uk)

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 group membership has expanded considerably at the beginning of 2023 and is currently progressing a programme of works, outlined below, which will be reported on in the next ASR

(2024). The group currently comprises officers from the County and District authorities from public health, air quality, strategic planning, sustainability, highways and transport disciplines, and also representatives from the NHS and the University of Worcester.

The Action Plan will incorporate an improving Air Quality Strategy applicable across the County including the Redditch Borough Council area and other districts that currently have no AQMAs in place, in accordance with the updated legislation and guidance.

Whilst Redditch has no AQMAs in place further work is necessary across the county to help inform the Air Quality Strategy and Action Plan process. The first step in action planning is to determine the contribution of sources of air pollution (source apportionment) to inform future actions. Some source apportionment has been undertaken across the county, but further work is required. 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. Traffic surveys have been undertaken in 2023 to enable source apportionment work to be completed in Spring 2024 when the relevant years' worth of monitoring data will be available in line with technical guidance.

The timeline for the various stages and delivery of the Air Quality Strategy and Action Plan is set out below.

Timeline	Phase
Feb – Dec 2023	Identification of potential overarching Worcestershire County Council actions and Worcester City Council Specific actions, feasibility filter of measures, cost benefit analysis, determination of impact, timelines and funding sources, drafting of countywide action plan
Jan – Mar 2024	Submission of Draft for review by Senior Management Team and approval by Political Committees at Worcester City Council and Worcestershire County Council and revisions
March 2024	Submission of Draft countywide AQAP inc. local AQ strategy and Worcester City Council specific actions to DEFRA
April- June 2024	3-month Public Consultation on Draft countywide AQAP following revisions
July - Sept 2024	Revisions and finalisation of countywide AQAP inc. local AQ strategy and Worcester City Council specific actions Consideration for revocation of AQMAs and source apportionment work for other AQMAs in 1) Bromsgrove DC 2) Wyre Forest DC 3) Wychavon DC
Sept – Oct 2024	Submission of Finalised AQAP for review by Senior Management Team and approval by Political Committees at Worcester City Council and Worcestershire County Council and revisions
Sept 2024 - Mar 2025	AQAPSG work on Bromsgrove DC and Wyre Forest DC specific actions (if required), refresh SG membership with relevant stakeholders. Identification of district specific actions, feasibility filter of measures, cost benefit analysis, determination of impact, timelines and funding sources, and draft update to AQAP. Consultation on additional chapters/amendments
Nov 2024	Publication of Finalised countywide AQAP inc. local AQ strategy & Worcester City chapter and submission to DEFRA
Mar - May 2025	Annual review for any amendments requiring further work.

Real-time Air Quality Monitoring Project

In September 2022 officers from WRS submitted an application to Defra's Air Quality Grant Scheme 2022/23. The scope of the bid was to establish an enhanced real-time air quality monitoring network across the main areas of air quality concern in Worcestershire for purposes of informing the public and vulnerable groups of the status of air pollution. The scheme would see the installation of approximately 24 low-cost 'Air Quality Monitors' across the county which measure NO₂, PM₁₀, and PM_{2.5} (with EA MCERTS standard accreditation as indicative ambient particulate matter device). The results of monitoring would then be used to inform decision making and requirements for further action as necessary.

In February 2023 Defra announced that the WRS bid had been successful and the requested £248,400 was awarded. An additional 10% of funds will also be 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.

At the time of writing the project is at the procurement stage, with the tender specification close to completion. Once a successful supplier has been appointed, exact monitoring locations will be agreed, and equipment installed. This is anticipated to be in the latter stages of 2023.

Two of the monitors are to be deployed within the Redditch Borough Council area. Locations are currently to be confirmed but are expected to represent worst case conditions in relation to impacts from road traffic, industry, agriculture, and solid fuel burning.

In addition, WRS have assisted the Defra AURN expansion project team with potential locations for two PM_{2.5} monitors in Worcestershire, and it is hoped these will be in place within the next 6 to 12 months. The location of the monitor is indicated to be in the area of Chadwick Mews, Redditch.

2.3 PM_{2.5} – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG22 (Chapter 8), local authorities are expected to work towards reducing emissions and/or concentrations of PM_{2.5} (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM_{2.5} has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

There 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 28km to the north of the Redditch Borough. However, WRS have assisted the Defra AURN expansion project team with potential locations for two PM_{2.5} monitors in Worcestershire, and it is hoped these will be in place within the next 6 to 12 months. One of these monitors is to be installed in Redditch in the vicinity of Chadwick Mews, Redditch.

WRS has reviewed the DEFRA national background maps to determine projected PM_{2.5} concentrations within the Redditch Borough area for the 2022 calendar year. The average total PM_{2.5} at 54 locations (centre points of 1km x 1km grids) across Redditch Borough Council is 7.73µg/m³, with a minimum concentration of 7.11µg/m³ and a maximum concentration of 8.61µg/m³. This indicates that PM_{2.5} concentrations within Redditch Borough are well below the annual average EU limit value for PM_{2.5} of 25µg/m³ and is below the proposed annual average limit value for PM_{2.5} target of 10µg/m³ to be met across England by 2040.

The Air Quality Partnership led by the Director of Public Health at Worcestershire County council, and supported by WRS, was set up in May 2019 to discuss potential actions to improve air quality across the County and determine an action plan for implementation. The group comprised officers from the County and District authorities from public health, air quality, strategic planning, sustainability, highways and transport disciplines, and also representatives from the NHS and Highways England. The work of the group, however, was postponed indefinitely due to the Covid-19 pandemic. Work recommenced in summer 2022 when 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) as published by Public Health England as part of the Public Health Outcomes Framework⁹. The fraction of mortality attributable to particulate emissions in Redditch Borough in 2021 (the most recent year available) was 5.3%. This falls below the national figure for England (5.5% in 2021) and below the figure for the West Midlands region (5.5% in 2021). Recent trend data is not available for the district due to a lack of data points with valid values.

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

The successful bid for funding from the Defra Air Quality Grant 2022/23 to establish a real time monitoring network across Worcestershire will allow for particulate monitoring in the district for the first time. It is anticipated that approximately 2 low-cost real time air quality monitors will be installed within the Redditch Borough area at worst case locations representative of heavy traffic, industry, agriculture, solid fuel burning and other sources. The project is ongoing, and it is anticipated that the monitors will be fully operational within the next 12 months.

There are currently no declared smoke control areas operating within the Redditch Borough area.

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)

WRS hold no record of complaints of nuisance from smoke, dust or fumes in the Redditch Borough in 2022.

In light of the above no additional actions are currently planned by Redditch Borough 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 (28 April 2023) published at the time of producing this report.

⁹ [Public Health Outcomes Framework - OHID \(phe.org.uk\)](https://phe.org.uk)

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

This section sets out the monitoring undertaken within 2022 by Redditch Borough Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2018 and 2022 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 Redditch Borough Council area during 2022.

3.1.2 Non-Automatic Monitoring Sites

Redditch Borough Council undertook non-automatic (i.e. passive) monitoring of NO₂ at 5 sites during 2022. 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.2 in Appendix A compares 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 2022 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.

Monitoring results within the Redditch Borough area demonstrate that there were no exceedances of the NO₂ air quality objective of 40µg/m³ in 2022. Results show there were increases in NO₂ concentrations at all monitoring locations between 2021 and 2022. This is not surprising given the restrictions that were in place during that year due to Covid-19. The largest increase of 4.6µg/m³ occurred at location SS and represents an increase of 34.8%. There is an average increase of approximately 12.2% at all locations. Concentrations from 2022 appear similar to the pre-pandemic levels recorded in 2019 but are lower than 2018 results. Long term trend analysis over the 5-year period, 2018 to 2022, generally shows a decrease at all locations from 2018 to 2020 and then an increase from 2020 to 2022.

The highest concentration of NO₂ recorded in 2022 was 32.8µg/m³ recorded at OR2, 14 Other Road, with the next highest being 30.1µg/m³ at OR5 (also Other Road). The lowest concentration was 11.4µg/m³ recorded at STOR, 18 Washford Lane. All concentrations are therefore 18% or more below the annual mean objective of 40µg/m³.

It should be noted that diffusion tubes OR4, OR5 and OR6 are a triplicate location (Misty Florist, Other Road); when averaged and bias adjusted the NO₂ concentration for this location is 29.8µg/m³. Overall, there is no discernible trend in NO₂ concentrations.

No annual means greater than 60ug/m³ have been recorded indicating that it is extremely unlikely that there have been any exceedances of the 1-hour mean objective for NO₂ at any monitoring sites. The 60ug/m³ value is a surrogate figure to indicate exceedances of the 1-hour objective based on annual average concentrations. The concentrations recorded across the district in 2022 are generally around 50% or more below that value.

3.2.2 Particulate Matter (PM₁₀)

PM₁₀ has not been monitored within the Redditch Borough Council area during 2022.

3.2.3 Particulate Matter (PM_{2.5})

PM_{2.5} has not been monitored within the Redditch Borough Council area during 2022.

3.2.4 Sulphur Dioxide (SO₂)

SO₂ is not monitored within the Redditch Borough Council area.

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)
OR1	Other Road, Street Light	Roadside	404599	267542	NO2	No	3.0	1.5	No	2.4
OR2 (26N)	14 Other Road	Roadside	404620	267495	NO2	No	0.0	3.0	No	2.1
OR4 (28N)	Misty Flowers (Other Road Side)	Roadside	404629	267467	NO2	No	0.0	4.0	No	2.0
OR5 (29N)	Misty Flowers (Other Road Side)	Roadside	404629	267467	NO2	No	0.0	4.0	No	2.0
OR6	Misty Florist, Other Road	Roadside	404629	267467	NO2	No	0.0	4.0	No	2.0
SS	7 Summer Street	Suburban	404376	267242	NO2	No	0.0	2.6	No	2.0
STOR	L/p 18 Washford Lane	Urban Background	406603	265783	NO2	No	14.6	0.8	No	2.2

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 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
OR1	404599	267542	Roadside	75	75.0	35.1	29.4	26.1	26.3	28.6
OR2 (26N)	404620	267495	Roadside	82.7	82.7	38.2	31.8	24.4	28.8	33.1
OR4 (28N)	404629	267467	Roadside	75	75.0	36.1	28.5		27.1	29.7
OR5 (29N)	404629	267467	Roadside	75	75.0	35.7	28.7		27.5	30.4
OR6	404629	267467	Roadside	82.7	82.7	36.9	28.5	23.0	28.0	30.3
SS	404376	267242	Suburban	82.7	82.7	19.2	15.8	14.2	13.2	18.0
STOR	406603	265783	Urban Background	75	75.0	12.7	10.6	8.9	9.3	11.6

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 µg/m³.

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**.

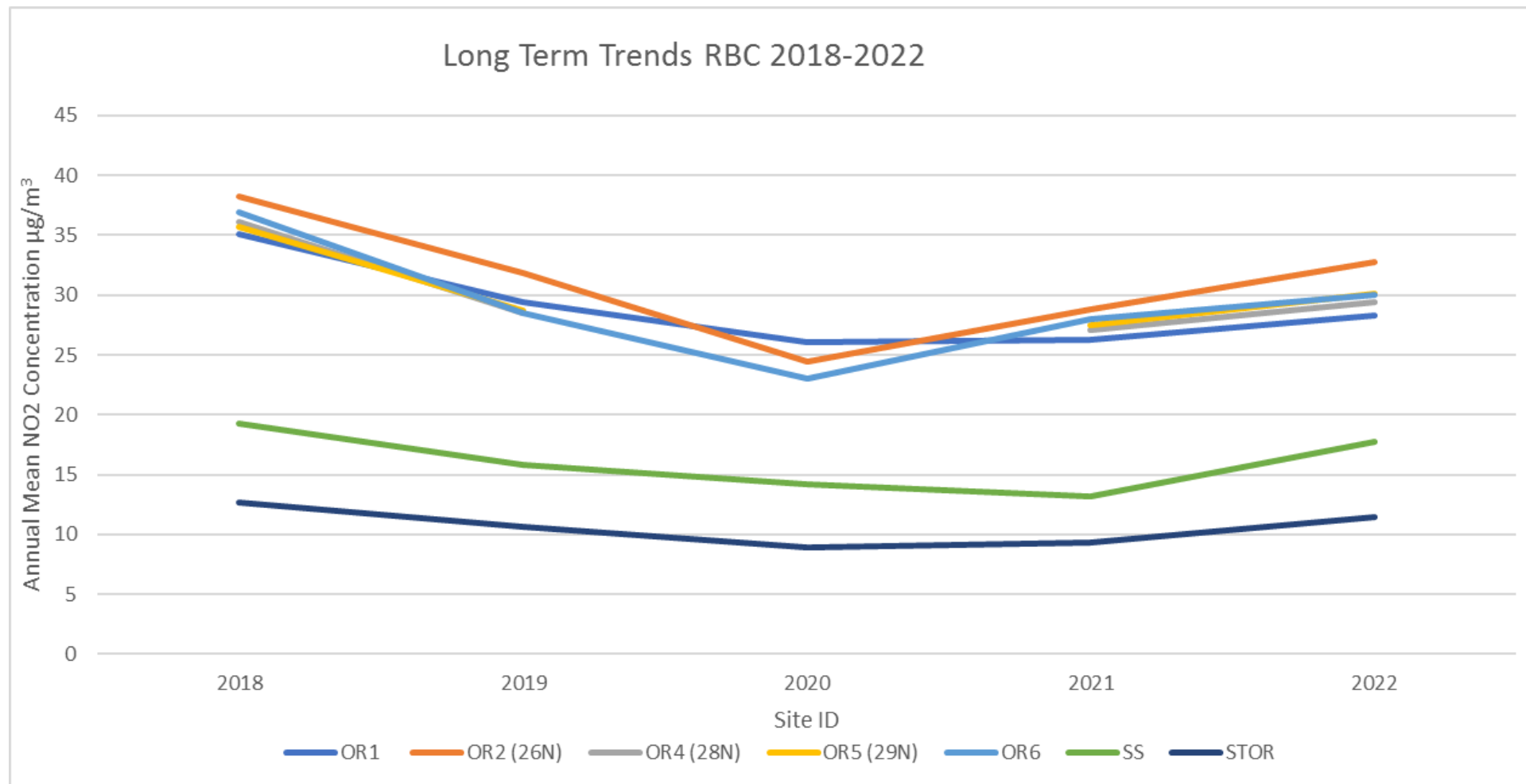
Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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 2022

Table B.1 – NO₂ 2022 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
OR1	404599	267542		24.8	40.5	27.9	11.9	29.3	29.0	27.8			34.7	39.1	29.4	28.6	-	
OR2 (26N)	404620	267495	39.8	24.9	46.7	33.0	29.6	28.7	34.2	35.0			33.9	35.9	34.2	33.1	-	
OR4 (28N)	404629	267467	34.7	20.7	39.2	37.4	27.7	24.7	30.6				26.8	33.8	30.6	29.7	-	
OR5 (29N)	404629	267467	39.2	21.9	40.9	35.7	26.1	26.4	29.3				26.9	35.9	31.4	30.4	-	
OR6	404629	267467	34.8	20.2	41.7	35.9	28.0	26.8	30.4	34.2			26.5	34.4	31.3	30.3	-	
SS	404376	267242	22.6	12.1	23.9	16.4	28.7	11.9	13.7	14.7			17.6	23.6	18.5	18.0	-	
STOR	406603	265783	17.3	12.5	13.6	10.0	7.3	6.9	8.5				12.4	18.8	11.9	11.6	-	

- 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.
- Redditch Borough Council confirm that all 2022 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 Redditch Borough Council During 2022

Redditch Borough Council has not identified any new significant sources impacting air quality within the reporting year of 2022.

Applications for a number of new developments have been identified within the Redditch Borough 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 Redditch Borough Council in 2022 are as follows:-

Planning Ref	Address	Proposal
22/00003/FUL	Units 58 To 69 And 82 To 90 Heming Road Redditch Worcestershire B98 0EA	Alterations to roof parapets to accommodate the repair / replacement of existing flat roofs
22/00027/FUL	Thorlux Lighting Moons Moat North Industrial Estate Merse Road Redditch Worcestershire B98 9HL	Installation of solar PV panels on the existing roof
22/00070/FUL	Alto House Ravens Bank Drive Redditch Worcestershire B98 9NA	Proposed demolition of existing buildings, erection of new commercial unit delivering up to 5,575 sq.m GIA of development falling within Use Classes B2, B8, E(g)(iii) including ancillary offices, access improvements, drainage, landscaping, vehicular parking, boundary treatments and associated works.

Planning Ref	Address	Proposal
22/00071/FUL	Breden View Farm Love Lyne Redditch Worcestershire B97 5QD	Change of use of agricultural buildings to mixed use of Business, General Industrial, Storage and use of land for storage of plant hire equipment and associated materials (retrospective)
22/00329/S73	Lidl Store Battens Drive Redditch Worcestershire B98 0LJ	Planning application 18/01049/FUL Date of decision - 21.12.20 Variation of condition 20 to revise opening hours for bank and public holidays from 08:00-20:00hrs to 08:00-22:00hrs. All other hours of opening to remain the same.
22/00506/FUL	Land At Shawbank Road Redditch Worcestershire B98 8YN	Warehouse Storage Building.
22/00915/FUL	Old Yarr Blaze Lane Astwood Bank Redditch Worcestershire B96 6QA	Retrospective application for the change of use from agricultural land to Equine (Sui Generis)
22/00965/FUL	The Alexandra Hospital Woodrow Drive Redditch Worcestershire B98 7UB	New two-storey extension with rooftop plantroom to provide 7 new surgical theatres and support accommodation to existing two-storey hospital building.
22/01237/S73	Accident And Emergency Department The Alexandra Hospital Woodrow Drive Redditch Worcestershire B98 7UB	Variation of condition 2 of application 21/00444/FUL - reconfiguration of north and west car parks and minor alterations to Quinneys Lane to bring it up to adoptable standards

Additional Air Quality Works Undertaken by Redditch Borough Council During 2022

Redditch Borough Council has not completed any additional works within the reporting year of 2022.

QA/QC of Diffusion Tube Monitoring

The following UKAS accredited company provided Redditch Borough Council with nitrogen dioxide diffusion tubes and analysis in 2022:

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 2022 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 $\mu\text{g}/\text{m}^3$)

All diffusion tube monitoring locations within Redditch Borough Council recorded data capture in excess of 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2022 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.

Redditch Borough Council have applied a local bias adjustment factor of 0.97 to the 2022 monitoring data. A summary of bias adjustment factors used by Redditch 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 Data Processing Tool v3.0. The site used was 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 (0.83, Defra published National Diffusion Tube Bias Adjustment Spreadsheet Version 03/23), 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
2022	Local	-	0.97
2021	National	03/22	0.84
2020	National	03/21	0.81
2019	National	03/20	0.78
2018	National	03/19	0.89

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	11				
Bias Factor A	0.97 (0.92 - 1.04)				
Bias Factor B	3% (-4% - 9%)				
Diffusion Tube Mean ($\mu\text{g}/\text{m}^3$)	13.0				
Mean CV (Precision)	2.7%				
Automatic Mean ($\mu\text{g}/\text{m}^3$)	12.7				
Data Capture	100%				
Adjusted Tube Mean ($\mu\text{g}/\text{m}^3$)	13 (12 - 14)				

Notes:

A single local bias adjustment factor has been used to bias adjust the 2022 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.

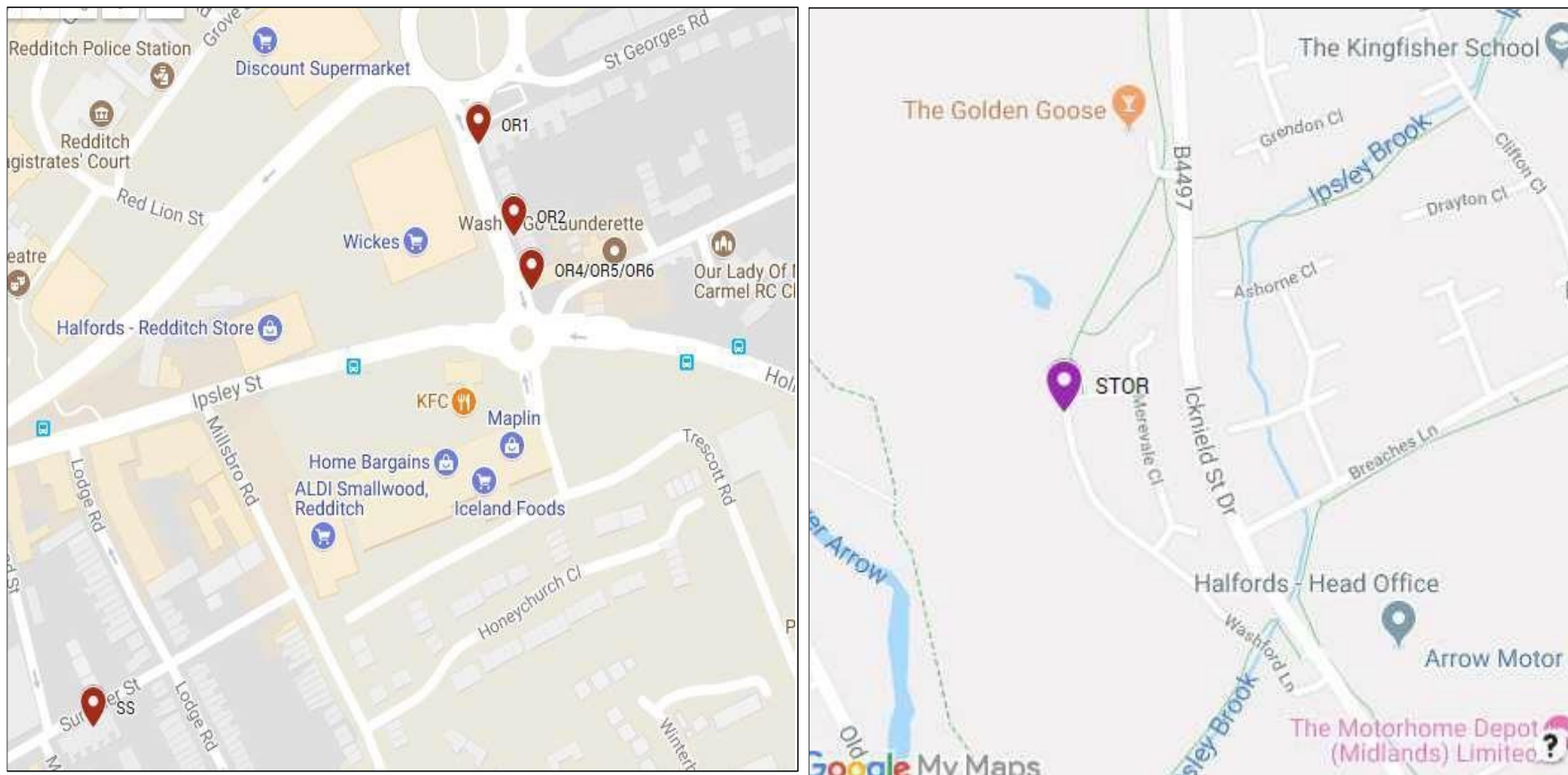
No diffusion tube NO₂ monitoring locations within Redditch Borough Council area required distance correction during 2022.

QA/QC of Automatic Monitoring

No automatic monitoring has been undertaken.

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

Figure D.1 – Maps of Non-Automatic Monitoring Sites



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England¹⁰

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

¹⁰ 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'
AQAPSG	Air Quality Action Plan Steering Group
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
AURN	Automatic Urban and Rural Network (Defra) - UK's largest automatic monitoring network and is the main network used for compliance reporting against the Ambient Air Quality Directives (by Gov't)
Defra	Department for Environment, Food and Rural Affairs
LAQM	Local Air Quality Management
MCERTS	Monitoring Certification Scheme (Environment Agency) - certification of equipment that monitors pollution in the ambient air.
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
WRS	Worcestershire Regulatory Services

References

- DEFRA (2023) National Diffusion Tube Bias Adjustment Factor Spreadsheet v.03/23
- DEFRA (2018) Background Mapping for Local Authorities
- 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.
- Worcestershire Regulatory Services (2013) 'Air Quality Action Plan for Worcestershire'
- Worcestershire Regulatory Services (2015) 'Air Quality Action Plan Progress Report for Worcestershire April 2013-April 2015'
- Worcestershire Regulatory Services (2016) 'Air Quality Action Plan Progress Report for Worcestershire April 2015 – April 2016'
- Worcestershire Regulatory Services (2022) Air Quality Annual Status Report for Redditch Borough Council