



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: December 2023

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1 Executive Summary: Air Quality in Our Area

Air Quality in Shropshire

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.

The Shropshire Council Unitary Authority area is a predominantly rural area, consisting of both pastoral and arable agriculture, and interspersed pockets of industry surrounding larger county towns. There are localised pockets of poor air quality at key highway junctions – the area contains several key HGV transport routes, on the north/south A49 route, the cross-county M54 and A5 route to/from North Wales and Merseyside, and the A41 route to/from Chester and Birmingham. There are several large quarries, and other industrial sites that are permitted for emissions to air.

Shropshire Council has two Air Quality Management Areas (AQMAs) in force; Bridgnorth Pound Street AQMA and Shrewsbury No 3 AQMA. Both AQMA's are declared for exceedances of the annual objective level (<40ug m³) for Nitrogen Dioxide, NO₂.

Whilst the overall 5-year trends within both Shrewsbury and Bridgnorth AQMA's appear to indicate an overall reduction in levels, 2022 concentrations appear to have stabilised or only slightly-reduced upon 2021 levels. Whilst the overall reductions align with national trends – reductions driven by gradual-transition to 'cleaner' and lower-emission vehicles. The indication of a 'slowing' rate of reduction, i.e. stabilisation of concentrations, is to be

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

reviewed with caution. Whilst it is difficult to test such long-term conclusions from annual concentrations further, Shropshire Council are ensuring that comprehensive source apportionment and technical assessment based on post-pandemic traffic data where possible, is being undertaken for both Air Quality Action Plan Reviews.

Monitoring has established that Bridgnorth Pound Street AQMA is still required as nitrogen dioxide levels exceed the annual average national objective level. 2 exceedances of the annual average air quality standard (AQS) of $40\mu\text{g m}^3 \text{NO}_2$ were recorded in 2022, and 18 residential properties were found to be likely to be exposed to levels of NO_2 above the National Objective Level in previous years. Whilst the overall 5-year trend within the AQMA appears to indicate an overall reduction in levels, 2022 concentrations appear to have stabilised or only slightly reduced upon 2021 levels.

Monitoring data presented in Figure 3 and Figure 4 for Shrewsbury No 3 AQMA, covering Shrewsbury Town Centre, is still required although there remains only one exceedance of the national objective level at a location where there is relevant exposure – DF438 on Castle Foregate. It is anticipated that there are only a few relevant receptors in the AQMA which are exposed to levels of nitrogen dioxide above the national objective level however the objective level has previously breached by a considerable amount, around 30%.

The highest NO_2 level to be recorded at a residential receptor was $52\mu\text{g m}^3$ in 2019 on Castle Foregate (DF438) opposite the train station, in 2022 this was calculated as $42.8\mu\text{g m}^3$ demonstrating the dramatic changes that have occurred during and post-pandemic and the fluctuations in traffic volumes. The previous lowest recorded result was $53.6\mu\text{g/m}^3$ in 2014. The 2022 concentration at this location is promising and indicates an ongoing downward trend. Despite the welcome reduction in pollutant the exceedance at DF438 demonstrates that an AQMA is still required. As assessed previously - In 2020 despite significant vehicle reductions in due to local and national Covid restrictions and lockdown measures the National Objective Level was only met by 0.1 unit showing the scale of the challenge in “normal” times, and with increased volumes of vehicle traffic.

DF458 (Located away from receptors, and within the enclosed railway bridge junction) shows further exceedances of the annual objective level, but indicates levels remain below the threshold of concern for predicted breaches of the 24-hr mean. Ongoing monitoring and assessment is clearly required.

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, due to be published in 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 (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

Shropshire Council continues to consider air pollution throughout a number of services and departments with air quality measures found in many policies across the Council. Ongoing attention is being paid to the potential Shrewsbury North West Relief Road (Shrewsbury NWRR). Detailed design and assessment has been undertaken during the current planning application 21/00924/EIA. An air quality impact assessment has been submitted and audited in respect of human health impact. It has been found that the NWRR will promote better air quality in the hotspot pollution area in Shrewsbury while creating some increases in areas with headroom below the national objective levels. This balance is considered to be positive in respect of the LAQM regime and will be subject to further assessment within the AQAP review project.

Shropshire Council commissioned Bureau Veritas to undertake AQAP reviews for both Shrewsbury and Bridgnorth AQMA's. It is envisaged that will AQAPs will be ready for consultation in early 2024, prior to being adopted formally by the Council. Work on the AQAP reviews has been complicated, and subject to delays, by a culmination of aligned policy and projects in 2022. As is detailed within the ASR, Shropshire Council has the 'Shrewsbury Movement and Public Realm Strategy in the late stages of development; is in

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

the course of developing a new Local Travel Plan (LTP4); and has recently published Local Cycling Walking and Infrastructure Plans (LCWIP) for the county.

Additionally, the successful bids for Levelling Up (Round 2) funds has also brought a number of development plans into commencement, which have the potential to generate substantial improvements and pollutant reductions within Shrewsbury AQMA. As such the number of relevant measures to be assessed, quantified, and considered has impacted upon the initial timescales for the revised AQAP. This work is on-going and Shropshire Council are working with both internal colleagues and external partners such as Town Councils, Network Rail and Business Groups to develop the action plans fully.

Conclusions and Priorities

Overall Shropshire Council monitoring data indicates downward trends within both AQMAs, further interrogation of other Shropshire locations (including Tern Hill, Coton Hill, Bayston Hill, and Oswestry) is provided in Section 4.1.3 - Nitrogen Dioxide (NO₂). Whilst very slight increases have been noted in Oswestry these are not considered likely to exceed objective levels at the current time.

As detailed within the 2023 ASR report, Shropshire Council priorities for 2023 are to complete and publish the AQAP reviews and implement the recommended measures and interventions. Shropshire Council will continue to prioritise its statutory obligations with regard to air quality and will continue to proactively monitor and assess its area.

Local Engagement and How to get Involved

To reduce air pollution and contribute to clean air everyone living, working and visiting the area can contribute. Every individual and business can promote clean air and help make a difference by considering the following actions:

Avoid driving into congested areas: it is good for your health and your wealth.

By planning your journey to avoid congested areas you can make a positive difference. Parking on the edge of town is often cheaper than parking in town centres saving you money. Walking into town from edge of town carparks keeps you active and is good for your family's health. By not driving into congested, polluted areas you reduce your family's exposure to harmful air pollutants and stop your own vehicle emissions contributing to the

problem. An alternative to walking and cycling is to use a Park and Ride or a bus service to get you the final mile.

- To help plan your journey find Shropshire Council car parks:

<https://www.shropshire.gov.uk/parking/find-my-nearest-car-park/>

- For Park and Ride information in Shropshire:

<https://www.shropshire.gov.uk/public-transport/park-and-ride/>

Consider your commute

If you regularly drive to work you may be able to save money by adopting the steps above. You could also reduce the amount of money you spend on fuel and parking by:

- using the Park and Ride service
- cycling or walking to work. By cycling or walking into work once a week you would reduce your emissions by 20%.
- Car share: this can be a very effective way of reducing numbers of vehicles on the road and saving money, the further your journey the more you stand to save. The more you share, the more you save.

Doing the school run - not the school sit

Travel to take children to school contributes to the congestion on our roads at a time of day when there are increased vehicle numbers due to people travelling to work. Where the school is within walking/cycling distance we would encourage this method of transport. Not only would this save money in fuel costs and improve air quality by reducing congestion it would also add active travel to your regular journeys helping to improve your family's health by introducing regular exercise. Getting children into the habit of walking can provide lifelong benefits to them and their families in turn.

Consider your fuel

Electric vehicles are on the rise in the UK. In July 2021, more electric powered new vehicle registrations were made than registrations for diesel vehicles showing a shift toward cleaner more sustainable fuel.

With prices falling in line with vehicles powered by other fuels and ranges ever increasing electric powered vehicles could be the way for you and your family or business to make a difference and reduce air pollution and your individual carbon footprint.

Local Responsibilities and Commitment

This ASR was prepared by the Environmental Protection team of Shropshire Council with the support and agreement of the following officers and departments:

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This ASR has been approved and signed off by:

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2 Local Air Quality Management

This report provides an overview of air quality in Shropshire Council 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 Shropshire 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.

3 Actions to Improve Air Quality

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.

A summary of AQMAs declared by Shropshire Council can be found in Table 3.1. The table presents a description of the two AQMAs that are currently designated within Shropshire Council's jurisdiction. Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of AQMAs and also the air quality monitoring locations in relation to the AQMAs. The air quality objectives pertinent to the current AQMA designation(s) are as follows:

- NO₂ annual mean

It is likely that the boundary of Shrewsbury No 3 AQMA will be amended following the latest AQAP review to focus on the limited area with ongoing exceedances.

Table 3.1 – 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
Shrewsbury No 3 AQMA	Declared 1/5/2003, Amended 1/3/2006	NO ₂ Annual Mean	The area comprising Frankwell, part of Bridge Street and Smithfield Road Castle Gates and adjacent land, extending to encompass most of the Town Centre including High Street, Wyle Cop, English Bridge and Coleham Head gyratory.	NO	86µg/m ³	43.4ug/m ³	Not Compliant	Shrewsbury Air Quality Action Plan: 2008	https://www.shropshire.gov.uk/media/5218/shrewsbury-aqap-2008.pdf
Bridgnorth Pound Street AQMA	Declared 1/4/2005	NO ₂ Annual Mean	An area encompassing Pound Street and the junction of Whitburn Street and Salop Street.	NO	54.1µg/m ³ (in 2010)	47.8ug/m ³	Not Compliant	Bridgnorth Air Quality Action Plan: 2008	https://www.shropshire.gov.uk/media/5215/bridgnorth-dc-action-plan-pdf.pdf

Shropshire Council confirm the information on UK-Air regarding their AQMA(s) is up to date.

Shropshire Council confirm that all current AQAPs have been submitted to Defra.

Shropshire commissioned Bureau Veritas to undertake action plan reviews of both Shrewsbury and Bridgnorth AQMAs in 2021. Both reviewed action plans are in development with the core technical assessment work having been completed. Successful applications by Shropshire Council to the Levelling Up (Round 2) Fund have brought several projects with potential to significantly reduce emissions within Shrewsbury AQMA into fruition. This has delayed the Action Plan reviews as the Council have sought to align both projects and utilise updated baseline (2022) traffic data to refine modelling and clarify the impact of highway alterations and adjust the designs accordingly.

Likewise in Bridgnorth, the Council has allocated funding to rejuvenate Bridgnorth High Street, this work is anticipated to impact upon traffic flows through the Pound Street AQMA with potential to smooth flows. Given the complexities of Pound Street AQMA - narrow historic streets; and the primary vehicle throughfare between High Town and Low Town; then it has been deemed necessary to assess and incorporate the wider town-level improvements into the reviewed Action Plan. There have therefore been some delays introduced from the timescales of aligned projects.

Shropshire Council are committed to ensuring both AQAPs detail funded and quantifiable reductions. Both Shropshire Council and Bureau Veritas anticipate that the finalised AQAPs shall be published in early 2024. Additional detail on the progress of Shropshire's AQAP reviews is provided in Section 3.1.1.

Progress and Impact of Measures to address Air Quality in Shropshire Council

Defra's appraisal of last year's ASR concluded the following (*Italicised*), responses are provided below each point where required:

'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. *Trends are presented and discussed in the report, with a robust comparison to air quality objectives provided.*
2. *The Council state that all six exceedances of the annual mean air quality objective for NO₂ lie within the AQMAs. However, according to Table A.2, one of these sites, DF223 is located outside of either AQMA. The Council should ensure this information is correct in future reports, and closely monitor concentrations at locations with exceedance outside of any AQMAs.*

DF223 (Tern Hill) has been reported separately in the 2023 ASR.

3. *The Council include maps of non-automatic monitoring sites and AQMA boundaries. However, some of these maps are crowded, making monitoring site labels difficult to distinguish from each other. The Council is encouraged to make sure these maps are clearer in future reports, to ensure that it is possible to see the names and locations of these sites clearly.*

This feedback has been considered within the 2023 ASR, all maps have been updated accordingly.

4. *The Council provide a detailed list of action plan measures, with detailed comments included in the tables and text of the report. This is to be commended, demonstrating the Council's pro-active and dedicated approach to addressing air quality in their jurisdiction.*
5. *There are some instances of formatting errors in the report, such as missing subscripts in "NO₂" and "PM_{2.5}". Although this doesn't affect the readability of the report, the Council is encouraged to thorough check for and rectify such errors, prior to future report submissions.*

This feedback has been considered within the 2023 ASR.

6. *The Council have included comments from last year's ASR appraisal in the report, with responses to these comments included. This is welcome and is encouraged to continue in future reports.*
7. *The Council's AQAP for both AQMAs was last published in 2008. The Council are recommended to review and update their AQAP every five years. They state that they will be an AQAP review in 2022 and are encouraged to review and publish an updated AQAP as soon as possible.*

An update on the progress of both AQAP reviews is provided in this years ASR below.

8. *Overall, the report is detailed, concise and satisfies the criteria of relevant standards. The Council should continue their good and thorough work.*

3.1.1 Shropshire Air Quality Action Plan Reviews Update

The Shropshire Council commissioned external consultants Bureau Veritas in 2021 to undertake a review of Shropshire's Air Quality Action Plans (AQAP's). Work to progress both Shrewsbury and Bridgnorth AQAP's continued through 2022 and both AQAP reviews are in the development stages and have gone through initial technical assessments and source apportionment in each AQMA. The work has been complicated by recent developments in relevant measures, particularly in Shrewsbury and these are outlined further below.

In Shrewsbury No.3 AQMA, interlinked projects are entering a key scoping and design phases, as they have been brought forward following the successful grant of Levelling Up Funding these include highway alterations in the key pollutant hotspot within the AQMA on the Castle Foregate/Chester Street ('Railway Bridge') Gyratory and the 'Smithfield Riverside' redevelopment. These projects are rapidly evolving alongside the development of a Shrewsbury Movement and Public Realm Strategy by the Shrewsbury Big Town Plan Partnership of which Shropshire Council is a key partner and there are therefore a substantial number of interventions which are currently in development which have potential to reduce pollutant concentrations across the designated AQMA and further afield.

In Bridgnorth, work is ongoing to secure reductions in NO₂ as part of the High Street regeneration project which has received funding from Shropshire Council. Likewise further works are being considered in line with the Local Cycling and Walking Infrastructure Plan. The Environmental Protection team are continuing to work at a strategic level to ensure air quality interventions can also be funded and enacted using alternative funding sources such as Community Infrastructure Levy (CIL) funding.

It should be stressed that the AQAP review project, will likely revise and identify prioritise further measures and interventions, and therefore further detail/updates will be provided in 2024's ASR.

3.1.2 2022 Measures

Shropshire Council has taken forward several direct measures during the current reporting year of 2022 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 3.2. 13 measures are included within Table 3.2, with the type of measure and the progress Shropshire Council have made during the reporting year of 2022 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 3.2.

More detail on these measures can be found in the current Action Plans, Shrewsbury: <https://www.shropshire.gov.uk/media/5218/shrewsbury-aqap-2008.pdf> and Bridgnorth: <https://www.shropshire.gov.uk/media/5215/bridgnorth-dc-action-plan-pdf.pdf>.

Key completed measures are:

Measure 4 - EV charging capacity is no longer specified by planning condition on new development, as they are required through building regulations.

Measure 5 – The low-cost sensor project funded by DEFRA AQ grant in 2018, ceased its active-phase in 2020, the project continued under sole Shropshire Council funding until 2021, when the number of Earthsense Zephyrs was reduced from 7 to 2. The project will be fully-completed upon final reporting, though this is currently delayed pending available resource for this work.

Measure 7- 75 Electric Vehicle chargers have been installed in Shropshire Council Car Parks to provide charging infrastructure to those without private parking/charging infrastructure. The project was match-funded by Shropshire Council to funding provided by the Office for Low Emission Vehicle (OLEV). More Information can be found at <https://connectedkerb.com/charge-your-car/community-pages/shropshire/>

Measure 9 – The Council published its Local Cycling and Walking Infrastructure Plan's (LCWIP) in 2022 with a number of interventions proposed across Shropshire's towns and villages. The full LCWIP can be seen at <https://next.shropshire.gov.uk/roads-travel-and-parking/active-travel/local-cycling-and-walking-infrastructure-plan-lcwip/> . A range of interventions are now being planned and implemented, and assessed with the AQAP review project.

Shropshire Council's priorities for the coming year are completion of the Air Quality Action Plan (AQAP) reviews, support interventions in Shrewsbury and Bridgnorth AQMA's to ensure optimum reductions in NO₂ concentrations. All current measures will be reviewed as part of this project.

The principal challenges and barriers to implementation that Shropshire Council anticipates facing are:

1. Funding: funding streams to carry out required modelling work and intervention development have been difficult to attain, particularly with the current economic climate. Potential internal funding streams have been considered in Bridgnorth through CIL funding and work to attain this is continuing alongside the AQAP review workstream.
2. Resource: Prolonged levels of high-service demand across all function areas has meant slower progress than anticipated, a backlog of project work has been carried forward since previous staff changeover in 2021.

Progress on the following measures has been slower than expected due to:

Measure 10 – Local Transport Plan has been delayed by the introduction of new guidance. The scope of the project has been reviewed to account for new changes, including carbon accounting for proposals.

Whilst the measures stated above and in Table 3.2 will help to contribute towards compliance, Shropshire Council anticipates that further additional measures not yet prescribed will be required, especially in Bridgnorth Pound Street, in subsequent years to achieve compliance and enable the revocation of both AQMAs. There is potential for the 'hotspot' of non-compliance in Shrewsbury AQMA to be reduced to compliant levels at receptors by highway alterations (Measure 13), Shropshire Council are currently awaiting further detailed modelling to assess this further and will be pursuing all other relevant measures to ensure necessary reductions.

Table 3.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	Hackney Carriage and Private Hire Vehicle Policy	Promoting Low Emission Transport	Taxi Licensing conditions	2019	2027	Shropshire Council	Shropshire Council	NO	Funded	< £10k	Implementation	Reduced vehicle emissions	Progressive cleaner fleet in respect of tailpipe emissions	Shropshire Council has sought to encourage a gradual transition to 'cleaner' vehicles through the vehicle age/emission specifications for licenced vehicles within the policy. The current policy has effect until 2024.	Covid disruption to policy implementation
2	Shrewsbury North West Relief Road (NWRR)	Transport Planning and Infrastructure	Other	2017	2026	Shropshire Council, DfT Large Local Majors Fund	Shropshire Council, DfT Large Local Majors Fund	NO	Partially Funded	> £10 million	Planning	6.6µg/m3 at hotspot	A reduction in air pollution in Shrewsbury No 3 AQMA.	The NWRR planning application is anticipated to be brought to committee in October 2023. A business case will be prepared for full Council, pending which main construction works are anticipated to commence in 2025. More detail can be found at: https://www.shropshire.gov.uk/roads-and-highways/shrewsbury-north-west-relief-road/key-dates/	Funding and regulatory consents and approvals.
3	Shropshire Council Pool Car Scheme	Alternatives to private vehicle use	Car Clubs	2019	2024	Shropshire Council and Enterprise	Shropshire Council	NO	Funded	£50k - £100k	Implementation	Reduced vehicle emissions	Increased mileage year on year in carpool vehicles	<ul style="list-style-type: none"> 2022 Fleet remained unchanged with 5 small unleaded petrol vehicles (3 x Corsa / 1 x Fiesta / 1 x Astra) and 2 small Toyota Yaris hybrids. Cars averaged 5100 miles per month in total between them. 	Funding constraints, secure locations for vehicle storage overnight.
4	Inclusion of electric vehicle charging points in new developments	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2018	2025	Shropshire Council	Shropshire Council	NO	Not Funded	< £10k	Completed	Reduction in emissions, uptake of cleaner technologies	Planning conditions on planning application decisions which include provisions for electric vehicle charging points in new developments	Electric vehicle chargers are now a set requirement in building regulations and therefore the active component for requesting EV Charging capability is not required through the planning process.	

Measure No.	Measure	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
5	Local Air Quality Grant project	Public Information	Via the Internet	2016	2022	Shropshire Council and DEFRA	Shropshire Council and DEFRA	YES	Funded	£100k - £500k	Completed	Awareness raising to reduce emissions through behavioural change	Completion of Key Milestones of the project reported back to DEFRA through grant requirements in quarterly reporting. Currently behind on some Key Milestones however moving forwards and resolving this going forward. DEFRA made aware through quarterly reports.	Awaiting final reporting.	Resource constraints to complete final reporting.
6	Car Parking Strategy	Policy Guidance and Development Control	Other policy	2018	2024	Shropshire Council	Shropshire Council	NO	Partially Funded	£10k - 50k	Implementation	Reduce vehicle emissions	Stage 1 - implementation of linear car parking scheme County wide including procurement and installation of new payment meters. Implementation of Stage 2 - to bring residential parking schemes into place.	Linear Parking Strategy was implemented in 2019. With 'outer band' parking cheaper than central areas and incentivising out of town parking. A review of the strategy was commissioned in 2022, for implementation in 23/24.	
7	Electric Vehicle Charging Infrastructure Delivery	Promoting Low Emission Transport	Procurring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2018	2021	Shropshire Council, OLEV, BEIS	Shropshire Council, OLEV, BEIS	NO	Funded	£100k - £500k	Completed	Reduce vehicle emissions	Provision of EV charging across the county	As of 2022, Shropshire Council have 75 EV Charging Points active across Shropshire Council Car Parks through its partner - Connected Kerb. More Information can be found at https://connectedkerb.com/charge-your-car/community-pages/shropshire/	

Measure No.	Measure	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
8	Strategic Highway Network Electric Vehicle charging	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2020	2021	Shropshire Council, Highways England	Shropshire Council, Highways England	NO	Funded	£10k - 50k	Completed	Reduce vehicle emissions	Provision of two rapid EV charging points serving the A49 route at Church Stretton and Ludlow		
9	Active Transport Manager appointment and creation of LCWIPS	Promoting Travel Alternatives	Promotion of cycling	2020	2022	Shropshire Council	Shropshire Council	NO	Funded	£50k - £100k	Completed	Reduce vehicle emissions	Active Transport Manager position created for 2 years to create LCWIPS	Expert consultants City Science, were commissioned to develop Shropshire's LCWIP. The LCWIP was finalised and published in 2022. See https://next.shropshire.gov.uk/roads-travel-and-parking/active-travel/local-cycling-and-walking-infrastructure-plan-lcwip/ . A range of interventions are now being planned and implemented.	
10	LTP4 production	Policy Guidance and Development Control	Other policy	2021	2024	Shropshire Council	Shropshire Council	NO	Funded	£50k - £100k	Planning	Reduce vehicle emissions	Creation of LTP4 with inclusion of air quality focus adopted by Council		Delays of implementation as updated Travel Plan guidance issued centrally with new scope. Project scope being updated accordingly,
11	Shrewsbury Programme Board support (Place Making)	Policy Guidance and Development Control	Other	2020	2024	Shropshire Council	Shropshire Council	NO	Not Funded	< £10k	Implementation	Reduce vehicle emissions	Joint-working with partners to align development, infrastructure and highway projects in strategic direction. Facilitate reduction in emissions.	2022 saw the formation of Shrewsbury Movement Officers Group, bringing relevant officers and partners (Highways, Economic Growth, Shrewsbury BID etc) to a bimonthly meeting to ensure projects and aims align - sharing of data, and resource.	

Measure No.	Measure	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
12	Shrewsbury Big Town Plan (SBTP) (Place Making)	Policy Guidance and Development Control	Other policy	2021	2025	Shropshire Council	Shropshire Council	NO	Not Funded	> £10 million	Implementation	Reduce vehicle emissions	SBTP is a vision document for the future look and feel of Shrewsbury including movement plans. Air quality has been highlighted as a theme requiring attention by any work carried out to fulfil this vision.	The Big Town Plan is being used as a shaping document to steer Shrewsbury town centre development. This is being implemented in projects facilitated by Levelling Up (LUF2) funding, including Gyratory Scheme and the Riverside development.	
13	Highway Alterations and introduction of cycle lane. Shrewsbury Castle Street/Chester Street Gyratory	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2022	2025	Shropshire Council	Shropshire Council, Levelling Up (Round 2) Fund	NO	Funded	£1 million - £10 million	Planning	Reduce vehicle emissions and exposure concentrations in key AQMA hotspot	Reduce vehicle emissions and exposure concentrations in key AQMA hotspot	Development and Planning stage with AQ modelling to inform final design and ensure reductions. Funding must be implemented by 2025.	Co-ordinating work with other relevant projects (Network Rail, Utilities works, Highway and Public realm improvements) resulting in timescale delays.

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.

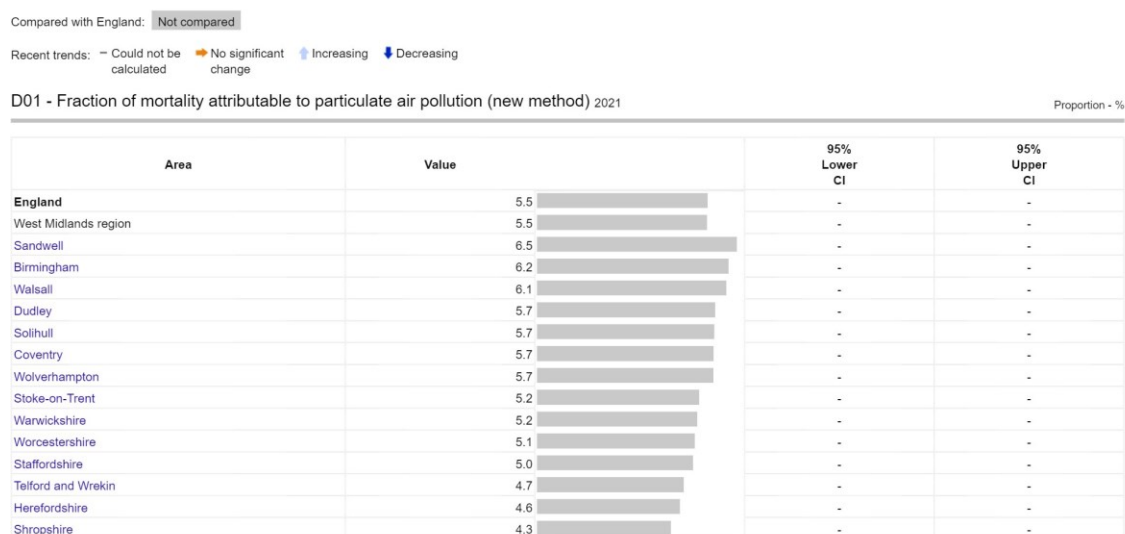
Shropshire Council has undertaken, and is continuing, the following measures which seek to address PM_{2.5}:

- Monitoring: two PM_{2.5} monitors were previously found in Shrewsbury. These allowed Shropshire Council to monitor the pollutant concentrations over time and consider if there is a need for further actions. Monitoring showed that PM_{2.5} levels are less than 10 µg/m³ as an annual mean. Three years of continuous data concluded levels of PM_{2.5} were under 10 µg/m³ with results in 2017 finding levels of 7.7 µg/m³. Monitors were discontinued to save resource in January 2018. DEFRA comments on previous ASRs endorsed the removal of monitors.
- No specific measures are being taken solely for the purpose of addressing PM_{2.5}s. However, actions are being carried out to reduce air pollutants overall and reduce traffic volumes in congested areas. These measures will assist in reducing PM_{2.5}. For example, measures noted in Table 2.2 that seek to reduce congestion will in turn reduce excessive brake pad and tyre wear - reducing PM_{2.5} emissions in the area. Any initiatives that look to moderate and reduce traffic are likely to have a similar impact.
- Shropshire Council are reviewing their obligations under The Air Quality (Domestic Solid Fuels Standards) (England) Regulations 2020 (From <https://www.legislation.gov.uk/uksi/2020/1095/contents/made>) and are running a project with the Trading Standards team to ensure that vendors within Shropshire are compliant with the new requirements and to enforce the regulations where necessary, and in accordance with our enforcement policy.
- There is further ongoing work to review Shropshire's Smoke Control Area's and introduce new areas where identified as necessary. It is anticipated that the authority shall use grant-funding for these new responsibilities to employ an existing officer for an additional day a week to undertake and resource this work.

- Shropshire Council continue to remain vigilant for new and existing sources of PM_{2.5} in our area through both its obligations under the Environmental Permitting Regulations 2016, and via consultation and review of development applications within the Planning regime.

In reviewing the need for additional actions relating to PM_{2.5} Shropshire Council have noted that the latest Public Health Outcomes Framework (PHOF) Indicator number D01 - Fraction of mortality attributable to particulate air pollution (New Method) for Shropshire was noted to be 4.3% in 2021, 4.1% in 2020, and down from 5.8% in 2019. (For more information visit: https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/3/gid/1000043/pat/15/par/E92000001/ati/502/are/E06000051/iid/93861/age/230/sex/4/cat/-1/ctp/-1/yr/1/cid/4/tbm/1/page-options/car-do-0_car-ao-0)

Figure 1 - Comparison tables of Public Health Outcome Framework (PHOF) indication D01 - Fraction of mortality attributable to particulate air pollution (new method) 2021.



Source: https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/3/gid/1000043/pat/6/par/E12000005/ati/502/are/E06000051/iid/93861/age/230/sex/4/cat/-1/ctp/-1/yr/1/cid/4/tbm/1/page-options/car-do-0_car-ao-0 (Accessed Nov 23)

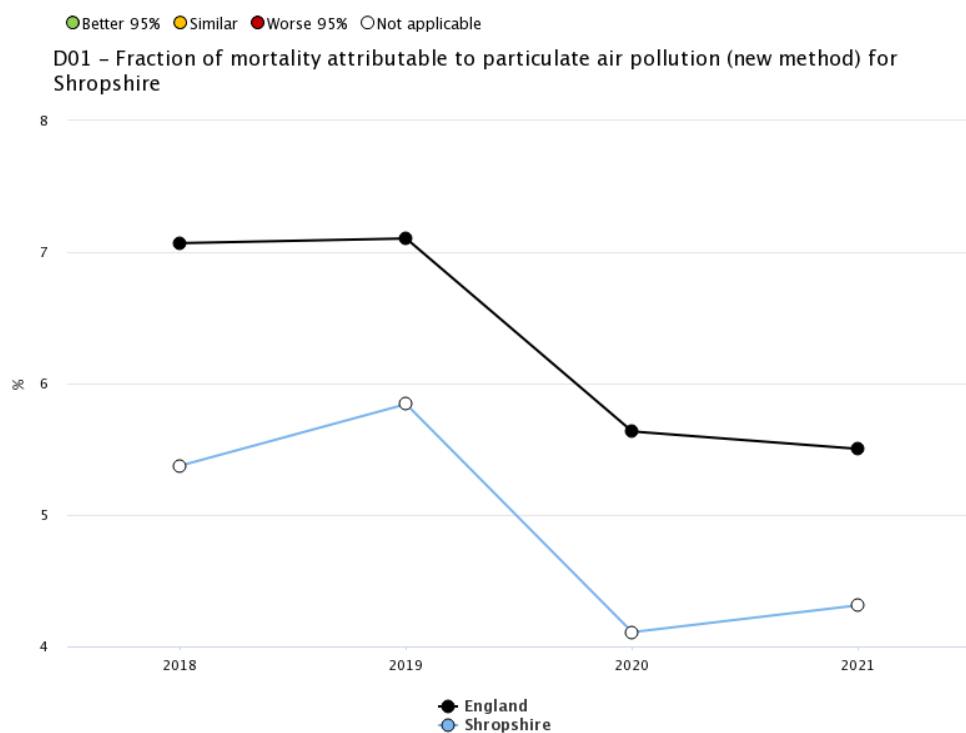
As the Shropshire Council PHOF indicator concerned with PM_{2.5} shows that mortality due to PM_{2.5} remains significantly below the national and regional average it is not considered

necessary for any specific actions to be carried out whilst there are other interventions taking place which will contribute to reducing anthropogenic PM_{2.5}.

In addition to the measures above a review of relevant information has been carried out.

Estimated Background Air Pollution Maps (Base Year 2018) for 2022 indicate maximum average concentrations of 8.38ug m³ (n=3192, Local Authority Code: 442) in the Shropshire Council area.

Figure 2 Chart of D01 Fraction of mortality attributable to particulate air pollution (new method) for Shropshire 2018 to 2021



This data sources show the likelihood that PM_{2.5} are found at levels that meet the World Health Organisation target of below 10 µg/m³. No specific measures are required however as previously explained measures being carried out to reduce NO₂ in areas of concern and reduce emissions in general will help in reducing PM_{2.5} over time.

* It should be noted that the projections in the 2018 LAQM background maps are based on assumptions which were current before the Covid-19 outbreak in the UK. In consequence these maps do not reflect short or longer term impacts on emissions in 2020 and beyond resulting from behavioural change during the national or local lockdowns.

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

This section sets out the monitoring undertaken within 2022 by Shropshire 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.

Summary of Monitoring Undertaken

4.1.1 Automatic Monitoring Sites

Shropshire Council did not undertake automatic (continuous) monitoring during 2022. NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem.

For detail of past automatic (Continuous) monitoring locations please see previous annual reports available at: <https://www.shropshire.gov.uk/environmental-health/environmental-protection-and-prevention/air-quality/shropshire-council-air-quality-reports/> .

4.1.2 Non-Automatic Monitoring Sites

Shropshire Council undertook non- automatic (i.e. passive) monitoring of NO₂ at 57 sites during 2022. Table A.2 in Appendix A presents the details of the non-automatic sites.

Maps showing the location of the monitoring sites are provided in Appendix D: Map(s) of Monitoring Locations and AQMAs. 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.

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.

4.1.3 Nitrogen Dioxide (NO₂)

Table A.3 and Table A.4 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 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.

Table A.5 in Appendix A compares the ratified continuous monitored NO₂ hourly mean concentrations for the past five years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year.

Figure 3 shows the 2022 Annual NO₂ Concentrations (ug m³) from all diffusion tubes located within Shrewsbury No.3 AQMA. The chart shows 2 exceedances of the annual NO₂ mean AQA of 40ug m³ at DF438 outside the Station Hotel on Castle Street, and at DF458 located beneath the railway bridge crossing Castle Street which currently forms part of a gyratory consisting of Chester Street, Cross Street (Enclosed) and Castle Street (partially enclosed), these exceedances are shown in greater detail in Figure 4 and in context of the previous 5 years. Precise locations can be seen within Map 1 -Map of Shrewsbury No.3 AQMA and diffusion tube sites within the north extent of the AQMA including 'hotspot' on Chester St /Castle Foregate Gyratory. Figure 3 and Figure 4 shows that key exceedances remain within Shrewsbury No.3 AQMA, overall 5 year trends suggest that concentrations continue to reduce in the area. It could be interpreted that the reducing differences between annual concentrations at DF438, i.e., -5 ug m³ difference between 2018 and 2019 concentrations, to -0.5ug m³ difference between 2021 and 2022 concentrations suggest that the rate of these reductions appears to have slowed. Whilst a similar change in differences is shown other nearby locations: DF458 and DF 458, this is only indicative, in light of the impact of the CV19 pandemic on these trends. Figure 3 shows concentrations in comparison to both the 40ug m³ Annual Objective Concentration level and to concentrations within 10% of this AQS (36ug m³). This shows no concentration values are close to reaching 10% of the annual objective level other than those that exceed the full AQS level already. This supports the conclusion that

exceedances within the Shrewsbury No.3 AQMA remain in a localised 'hotspot' in the area adjacent to the Shrewsbury Railway Station Carpark.

Previous ASRs have highlighted concentrations of NO₂ in the Coton Hill/Berwick Road area of Shrewsbury of being of potential concern, this is further relevant when considered by the potential traffic impact in this area from the operation of the potential new 'North West Relief Road' for which assessments predict minor increases in this area. Figure-5 shows recent concentrations at sites within this area, which all remain comfortably below 10% of the annual objective level. It is worth noting that the farthest location, DF490 along Berwick Road has seen a minor increase upon its 2021 concentration from 13.3ug m³ to 14.5ug m³, whilst this is a minimal increase and significantly below levels of concern it is deemed necessary to continue monitoring in this area.

A similar location of previous concern has been Bayston Hill, south of Shrewsbury and on the key A49 arterial traffic route to the North and South of the county. Figure 6 shows annual trends at both diffusion tube sites in the Bayston Hill area and are mapped in Map 4 - Map of Bayston Hill Diffusion Tube Locations. Overall trends show a decline in the past 5 years with expected drops in concentrations in 2020/21 with the impact of the pandemic. 2022 concentrations remain below annual objective levels. However DF474 on the northbound carriageway remains at 33ug m³, and close attention shall be required at this location to monitor impacts from potential traffic increases – such as Sharpstones Lane Quarry, which generates substantial HGV movements.

Annual NO₂ concentrations within Bridgnorth Pound Street AQMA are displayed in Figure 7. The highest exceedance 47.8ug m³ (DF83) is located on Pound Street. Technical assessment work within the AQAP reviews have identified this location as a key hotspot given the incline of the road to the mini-roundabout in close proximity to residential properties (<1m), this is compounded by a pedestrian 'Pelican' crossing which further slows traffic on the incline. These issues are being considered within the AQAP review, with highway interventions being amongst options considered.

Concentrations across the wider Bridgnorth area are displayed in Figure 8. Whilst significantly below objective levels, it can be seen that annual concentrations on Bridgnorth High Street have increased on 2020 and 2021 concentrations. Whilst this is in accordance with national trends – post-pandemic, these levels remain below 2018 and objective values and indicate an overall longer-term trend of declining concentrations. This will continue to be monitored, and will be further considered within the Pound Street AQMA action plan review. Bridgnorth Low Town concentrations (DF58, DF59, DF62 and

DF65) indicate concentrations typically trending below objective levels and reducing. It is worth noting again minor increase upon 2020 and 21 concentrations at DF59, and attention shall be required to assess impact of recovering/projected traffic volumes in this area.

Figure 9 presents annual concentrations in the Oswestry area. It can be seen that 2022 concentrations at both locations show minor increases on 2021 concentrations. DF314, remains at 2020 concentrations at approximately 27ug m³, and DF304 slightly exceeds both 2020 and 2021 concentrations but remains below 18/19 concentrations and significantly below objective levels. Monitoring will continue at this location to review ongoing annual trends.

Figure 10 shows the 5-year annual average comparison at DF223, Tern Hill, Market Drayton shows relatively stable concentrations since 2019 (approximately 43 to 45 ug m³) and as such the situation is not deemed to have changed from previous assessment. Likewise, as the annual concentration is <60ug m³, it is not considered that the 24-hr objective is likely being exceeded and the site therefore remains as assessed in previous ASRs. Close attention will be retained in coming years to review any growth trends whereby the assessment of this site may require review.

4.1.4 Particulate Matter (PM₁₀)

Shropshire Council does not monitor for PM₁₀.

4.1.5 Particulate Matter (PM_{2.5})

Shropshire Council does not monitor for PM_{2.5}.

4.1.6 Sulphur Dioxide (SO₂)

Shropshire Council does not monitor for SO₂.

5 Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Shropshire Council does not undertake reference-level automatic continuous monitoring.

Table A.2 – 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)
DF13	Pound Street	Roadside	371345	293081	NO2	Bridgnorth AQMA	0.1	0.8	No	2.0
DF20	Bryan & Knott Bridgnorth	Roadside	371580	293257	NO2		0.0	3.8	No	2.0
DF27	Smithfield	Roadside	371397	293179	NO2		0.1	3.3	No	2.0
DF28	50 Whitburn Street	Roadside	371321	293131	NO2	Bridgnorth AQMA	0.2	1.7	No	2.0
DF29	Adj Rutters	Roadside	371297	293108	NO2	Bridgnorth AQMA	1.0	3.3	No	2.0
DF58	8 Underhill Street	Roadside	371795	292947	NO2		0.0	1.9	No	2.0
DF59	2A Underhill Street	Roadside	371799	293011	NO2		0.0	1.6	No	2.0
DF62	2 Mill Street	Roadside	372031	292993	NO2		0.0	1.0	No	2.0
DF65	49 Mill Street	Roadside	372026	293058	NO2		0.0	2.1	No	2.0
DF71	6 Pound Street, (On Pelican Crossing)	Roadside	371346	293086	NO2	Bridgnorth AQMA	0.3	1.1	No	2.0
DF72	Mini Roundabout – Listley Street (lamp column)	Roadside	371375	293066	NO2	Bridgnorth AQMA	4.4	1.6	No	2.0
DF73	18 Pound Street (Downspout)	Roadside	371354	293089	NO2	Bridgnorth AQMA	0.1	1.2	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)
DF74	Lamp Column 48 - New Build	Roadside	371340	293125	NO2	Bridgnorth AQMA	1.9	2.0	No	2.0
DF75	Lamp Column 9 – Steps of new build	Roadside	371345	293106	NO2	Bridgnorth AQMA	1.1	3.0	No	2.0
DF76	Higgs/Stanton Ralph (Opp 45 Whitburn Street)	Roadside	371366	293146	NO2	Bridgnorth AQMA	0.1	1.5	No	2.0
DF77	39/40 Whitburn Street Lamp Column	Roadside	371375	293161	NO2	Bridgnorth AQMA	0.5	2.2	No	2.0
DF78	Pedestrian Crossing outside 42 Whitburn Street	Roadside	371360	293152	NO2	Bridgnorth AQMA	0.2	1.7	No	2.0
DF79	Chill Salon Downspout between green and black door	Roadside	371346	293143	NO2	Bridgnorth AQMA	0.1	1.5	No	2.0
DF80	48 Whitburn Street Downspout	Roadside	371334	293139	NO2	Bridgnorth AQMA	0.1	1.8	No	2.0
DF81	Stretton House 3 Salop Street Downspout	Roadside	371288	293119	NO2		0.1	1.2	No	2.0
DF82	Pedestrian Crossing outside 8 Salop Street	Roadside	371264	293120	NO2		2.5	0.7	No	2.0
DF83	Downspout Of 2 Pound Street Bridgnorth	Roadside	371341	293096	NO2	Bridgnorth AQMA	0.0	0.5	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)
DF223	Tern Hill Barn	Roadside	363640	332232	NO2		2.2	1.3	No	2.0
DF305	74 Castle Street	Roadside	328978	329879	NO2		0.1	1.9	No	2.0
DF314	Downspout on 10 Upper Church Street (Bookbinders)	Roadside	328866	329269	NO2		0.1	1.3	No	2.0
DF400	A49 Bayston Hill opp 3 Fishes	Roadside	348726	308959	NO2		0.0	1.4	No	2.0
DF403	Smithfield Road Corner of Victoria Avenue	Roadside	348891	312721	NO2	Shrewsbury No.3 AQMA	0.0	2.4	No	2.0
DF404	Town Walls, opp Murivance	Roadside	348889	312326	NO2		0.4	1.8	No	2.0
DF407	Dogpole (Car Entrance)	Roadside	349330	312503	NO2	Shrewsbury No.3 AQMA	0.2	2.1	No	2.0
DF413	Ravens Meadow, outside 23 Meadow Terrace	Roadside	349283	312851	NO2	Shrewsbury No.3 AQMA	1.7	0.7	No	2.0
DF420	Outside 25 Castle Street	Roadside	349396	312742	NO2	Shrewsbury No.3 AQMA	1.0	3.0	No	2.0
DF428A	Brittania Inn (Post office 23nnualiz)	Roadside	349445	313090	NO2	Shrewsbury No.3 AQMA		2.0	No	2.0
DF429	6a Severn Steps adj Lamp Post	Roadside	349237	312900	NO2	Shrewsbury No.3 AQMA	0.1	1.5	No	2.0
DF436, DF437	The Albert (duplicate)	Roadside	349283	312889	NO2	Shrewsbury No.3 AQMA	14.0	2.8	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)
DF438	Station Hotel 4 Castle Foregate (I)	Roadside	349400	312954	NO2	Shrewsbury No.3 AQMA	0.1	1.2	No	2.0
DF448	Dalton Drive (Lamp Post)	Roadside	345769	313223	NO2		0.1	2.8	No	2.0
DF449	2 Vaughan's Cottages (downpipe)	Roadside	346796	313509	NO2		5.5	0.2	No	2.0
DF457	Ellesmere Road / Berwick Road between Nos. 37/38	Roadside	349243	313457	NO2		0.1	1.4	No	2.0
DF457B	Ellesmere Road / Berwick Road (Traffic Signal)	Roadside	349235	313441	NO2		-0.4	0.9	No	2.0
DF458	Under Railway Bridge Over Castle Foregate	Roadside	349426	313028	NO2	Shrewsbury No.3 AQMA		2.0	No	2.0
DF459	Post in car park outside railway station	Roadside	349424	312936	NO2	Shrewsbury No.3 AQMA		18.0	No	2.0
DF461	Junction of Dogpole with High St/Wyle Cop	Roadside	349327	312389	NO2	Shrewsbury No.3 AQMA	2.0	2.0	No	2.0
DF468	Downpipe on Front of Number 3 Witchurch Road	Roadside	350376	314599	NO2		0.0	7.3	No	2.0
DF474	Lamp Column, 2 Whiterock Cottages	Roadside	348647	308771	NO2		0.9	1.7	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)
DF476	Chester Street on street parking bay height sensor post	Roadside	349360	312962	NO2	Shrewsbury No.3 AQMA	0.3	1.4	No	2.0
DF477	Bus stop opp Community Church, Chester Street	Roadside	349299	313108	NO2	Shrewsbury No.3 AQMA	1.0	2.1	No	2.0
DF480	lamp post by takeaway near Britaninia Inn	Roadside	349466	313151	NO2	Shrewsbury No.3 AQMA	0.5	2.6	No	2.0
DF482	Royal Mail lampcolumn by traffic lights	Roadside	349436	313064	NO2	Shrewsbury No.3 AQMA		1.0	No	2.0
DF485	Frankwell Terrace	Roadside	348815	312854	NO2	Shrewsbury No.3 AQMA	1.4	2.6	No	2.0
DF487	English Bridge by St Julian Friars (No Entry Sign)	Roadside	349529	312328	NO2	Shrewsbury No.3 AQMA	7.7	3.0	No	2.0
DF488	Lamppost Infront Of Hobbit House Berwick Road Shrewsbury Corner Of Ellsemere Rd And Berwick Rd	Roadside	349223	313449	NO2		1.0	1.0	No	2.0
DF489	Bus Stop Outside 9 Berwick Road Shrewsbury	Roadside	349148	313444	NO2		0.2	0.6	No	2.0
DF490	Lamppost Outside 41	Roadside	348964	313466	NO2		10.0	0.2	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)
	Berwick Road Shrewsbury									
DF501	Corner of 25 Chester Street / Cross Street	Roadside	349349	313071	NO2	Shrewsbury No.3 AQMA	1.8	1.6	No	2.0
DF502	Post outside Cambrian House	Roadside	349364	312998	NO2	Shrewsbury No.3 AQMA	0.5	2.5	No	2.0
DF503	Downspout 68 – 69 Frankwell	Roadside	348611	312969	NO2		0.1	0.7	No	2.0
DF504	Lamp Column 9 – 11 St Georges Court	Roadside	348669	312885	NO2	Shrewsbury No.3 AQMA	1.0	2.4	No	2.0

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.3 – Annual Mean NO₂ Monitoring Results: Automatic Monitoring (µg/m³)

Shropshire Council do not undertake continuous automatic monitoring of NO₂.

Table A.4 – 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
DF13	371345	293081	Roadside	1	50.0	40.5	35.6	30.3	33.1	30.1
DF20	371580	293257	Roadside	1	100.0	22.7	20.8	15.0	17.8	19.8
DF27	371397	293179	Roadside	1	100.0	26.0	25.8	19.7	23.6	15.8
DF28	371321	293131	Roadside	1	100.0				36.7	35.8
DF29	371297	293108	Roadside	1	100.0	28.9	28.5	21.6	23.9	23.3
DF58	371795	292947	Roadside	1	100.0	33.1	28.5	26.2	29.1	27.6
DF59	371799	293011	Roadside	1	100.0	29.6	28.5	23.4	24.0	24.5
DF62	372031	292993	Roadside	1	100.0	40.2		25.2	29.1	28.1
DF65	372026	293058	Roadside	1	100.0	33.4		24.6	28.3	25.5
DF71	371346	293086	Roadside	1	100.0	50.9	49.1	40.8	43.2	41.5
DF72	371375	293066	Roadside	1	100.0	30.0	28.2	22.4	23.8	22.6
DF73	371354	293089	Roadside	1	100.0	34.1	34.2	26.5	28.7	27.3

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
DF74	371340	293125	Roadside	1	100.0	30.9	29.4	22.7	25.2	24.4
DF75	371345	293106	Roadside	1	100.0	30.9	27.6	22.4	24.1	23.9
DF76	371366	293146	Roadside	0.916666667	90.4	33.8	31.8	28.4	28.8	29.5
DF77	371375	293161	Roadside	0.916666667	90.4	40.3	38.7	30.4	29.9	29.2
DF78	371360	293152	Roadside	1	100.0	39.9	38.5	32.2	35.9	32.9
DF79	371346	293143	Roadside	1	100.0	48.8	42.3	35.3	36.9	35.6
DF80	371334	293139	Roadside	1	100.0	50.3	43.6	37.2	40.3	37.5
DF81	371288	293119	Roadside	0.916666667	90.4	28.8	26.7	20.1	23.3	21.3
DF82	371264	293120	Roadside	1	100.0	27.4	22.7	17.0	20.4	19.1
DF83	371341	293096	Roadside	0.916666667	92.3				49.4	47.8
DF223	363640	332232	Roadside	1	100.0	53.6	42.8	43.1	45.9	43.9
DF305	328978	329879	Roadside	1	100.0	29.0	27.2	19.9	20.0	21.6
DF314	328866	329269	Roadside	1	100.0	38.1	33.9	27.2	25.9	27.2
DF400	348726	308959	Roadside	1	100.0	33.2	29.3	22.5	22.3	21.3

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
DF403	348891	312721	Roadside	0.916666667	90.4	30.5	30.8	23.0	23.0	25.0
DF404	348889	312326	Roadside	0.916666667	92.3	16.9	18.2	12.0	12.0	11.8
DF407	349330	312503	Roadside	1	100.0	24.1	23.4	18.1	19.6	19.8
DF413	349283	312851	Roadside	0.916666667	92.3	29.5	26.3	21.2	22.7	23.1
DF420	349396	312742	Roadside	1	100.0	27.8	26.3	21.2	21.9	23.3
DF428A	349445	313090	Roadside	1	100.0	#N/A	#N/A	#N/A	#N/A	32.4
DF429	349237	312900	Roadside	0.833333333	82.7		28.8	21.8	22.7	24.1
DF436, DF437	349283	312889	Roadside	1	100.0	#N/A	#N/A	#N/A	#N/A	28.7
DF438	349400	312954	Roadside	1	100.0	58.8	53.0	40.2	43.9	43.4
DF448	345769	313223	Roadside	1	100.0	9.6	9.1	7.2	7.0	7.1
DF449	346796	313509	Roadside	1	100.0	20.1	17.2	13.5	14.7	15.0
DF457	349243	313457	Roadside	1	100.0	#N/A	#N/A	#N/A	#N/A	28.3
DF457B	349235	313441	Roadside	1	100.0	#N/A	#N/A	#N/A	#N/A	25.5
DF458	349426	313028	Roadside	1	100.0	55.0	48.6	38.5	42.2	42.6

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 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
DF459	349424	312936	Roadside	1	100.0	42.1	35.6	26.6	29.2	29.8
DF461	349327	312389	Roadside	1	100.0	30.9	26.2	18.7	20.1	21.3
DF468	350376	314599	Roadside	0.8333333333	84.6	21.8	20.9	27.5	17.7	18.0
DF474	348647	308771	Roadside	1	100.0	46.4	42.1	36.3	35.2	33.0
DF476	349360	312962	Roadside	1	100.0	33.1	29.1	22.5	24.4	25.0
DF477	349299	313108	Roadside	1	100.0	31.3	29.8	23.1	23.9	24.8
DF480	349466	313151	Roadside	1	100.0	31.8	31.6	24.8	27.9	28.3
DF482	349436	313064	Roadside	0.916666667	92.3	45.7	38.2	32.3	32.9	31.7
DF485	348815	312854	Roadside	1	100.0	30.9	26.1	20.3	22.4	22.9
DF487	349529	312328	Roadside	1	100.0	22.7	21.9	17.5	17.5	17.9
DF488	349223	313449	Roadside	1	100.0				22.9	22.5
DF489	349148	313444	Roadside	1	100.0				18.6	18.4
DF490	348964	313466	Roadside	0.916666667	92.3				13.3	14.5
DF501	349349	313071	Roadside	1	100.0	38.2	33.5	24.6	27.8	28.5

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
DF502	349364	312998	Roadside	1	100.0	#N/A	#N/A	#N/A	#N/A	22.0
DF503	348611	312969	Roadside	0.916666667	92.3				26.1	23.6
DF504	348669	312885	Roadside	1	100.0	#N/A	#N/A	#N/A	#N/A	23.0

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 3 – Chart of Annual NO₂ Concentrations of diffusion tubes located within Shrewsbury No.3 AQMA.

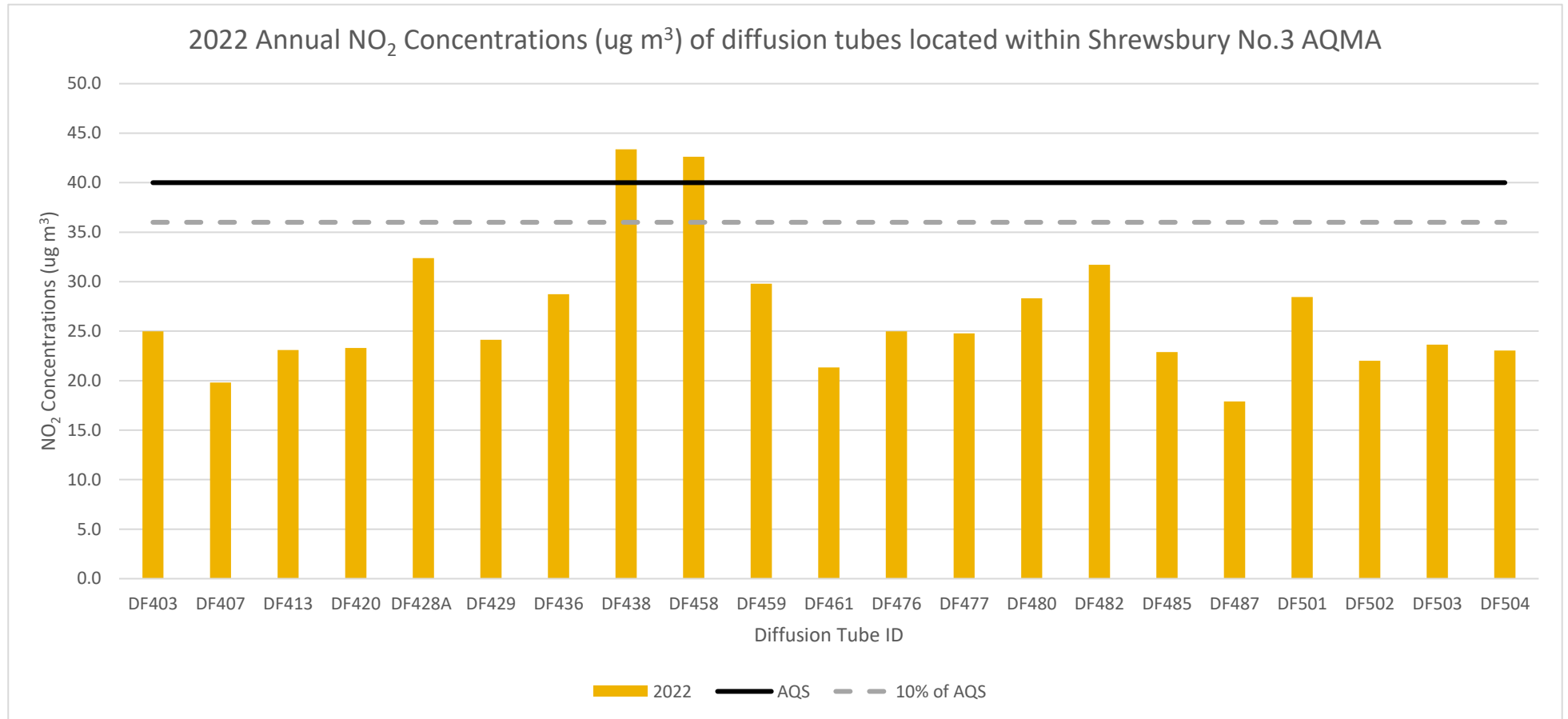


Figure 4 – Chart of Highest annual exceedances of Shrewsbury AQMA No.3 – Castle Street adjacent Shrewsbury Railway Station

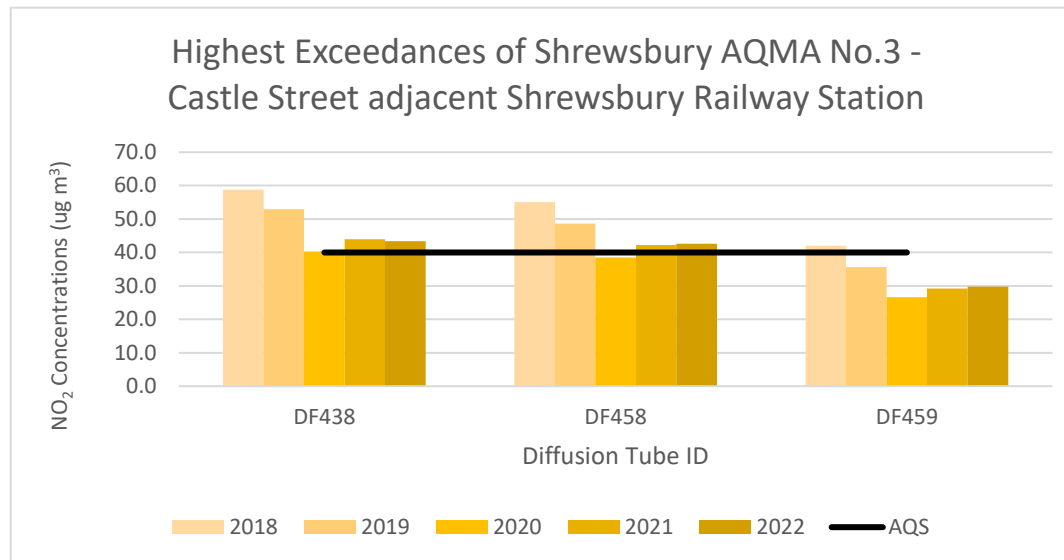


Figure-5 – Nitrogen Dioxide concentrations at diffusion tube sites in Coton Hill/Berwick Road, Shrewsbury

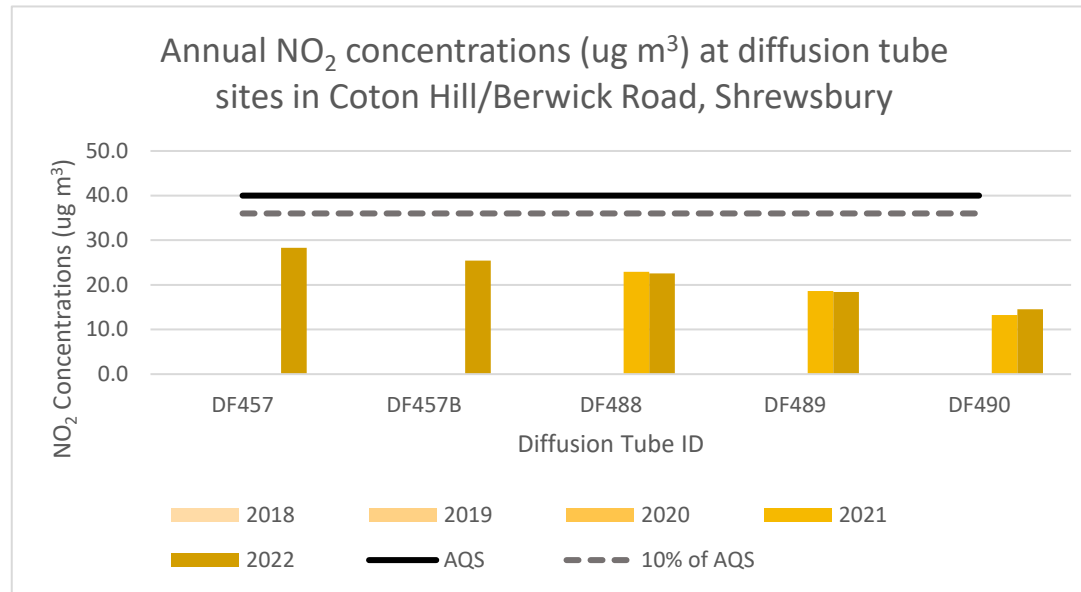


Figure 6 – Annual NO₂ concentrations (ug m³) at diffusion tube sites in Bayston Hill, Shrewsbury

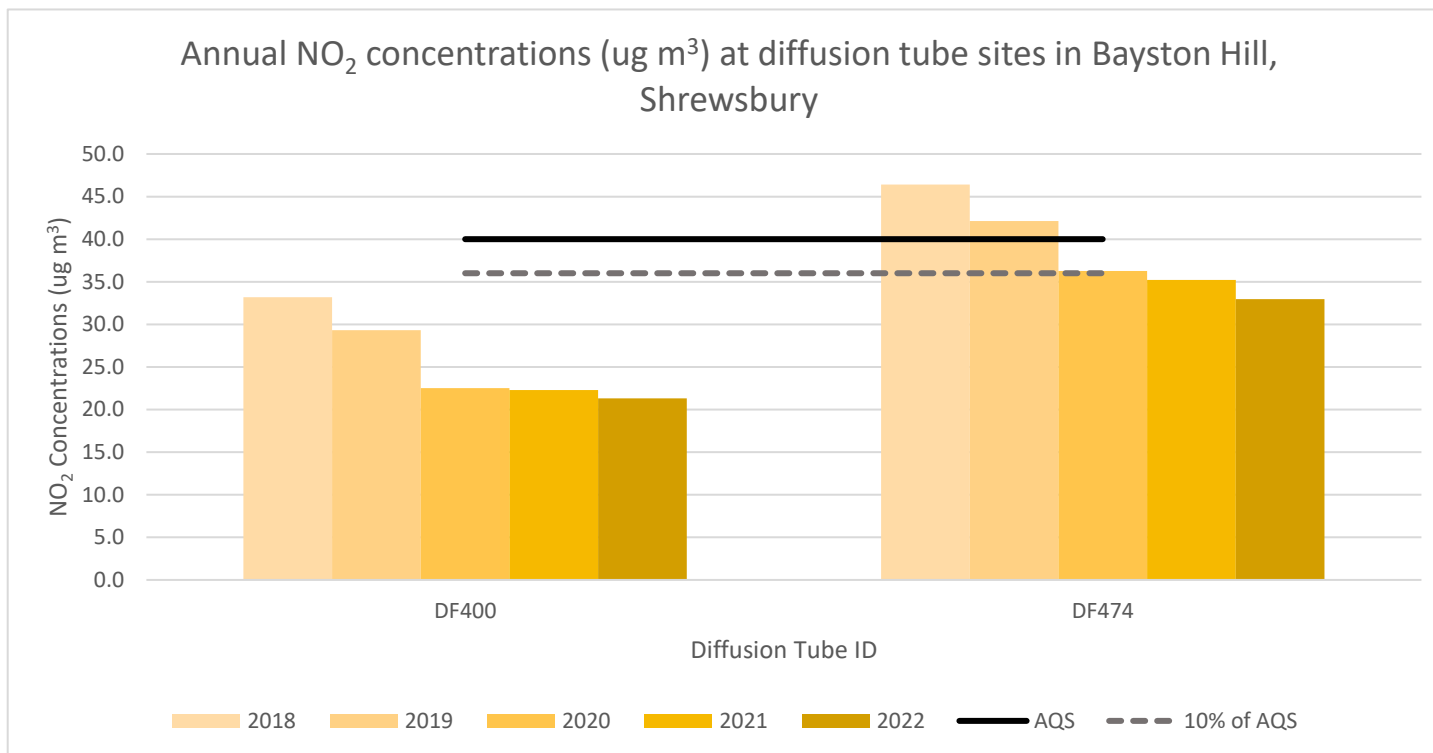


Figure 7 – Annual NO₂ concentrations in and surrounding Bridgnorth Pound Street AQMA

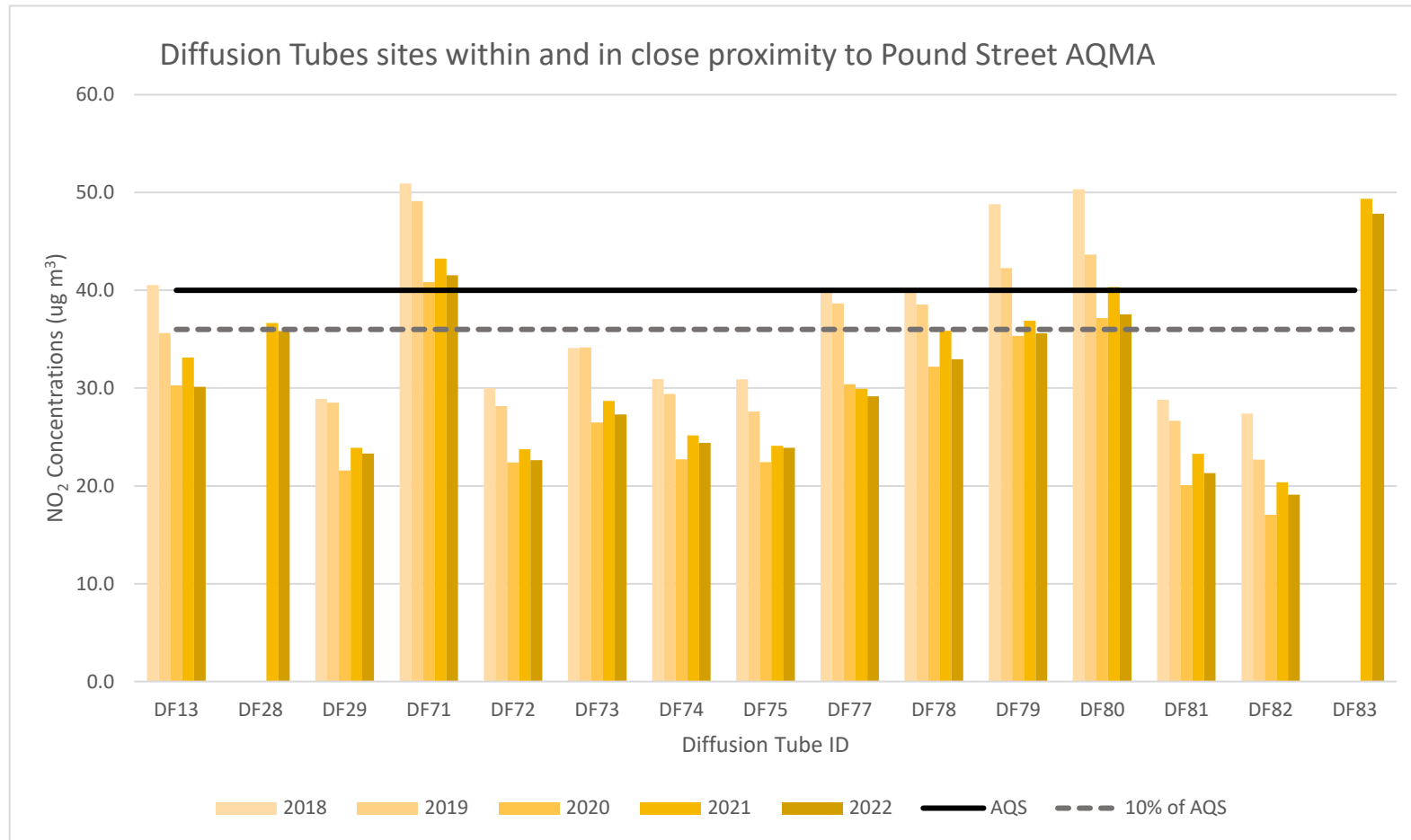


Figure 8 – Annual NO₂ concentrations in wider Bridgnorth area - High Street, Low Town

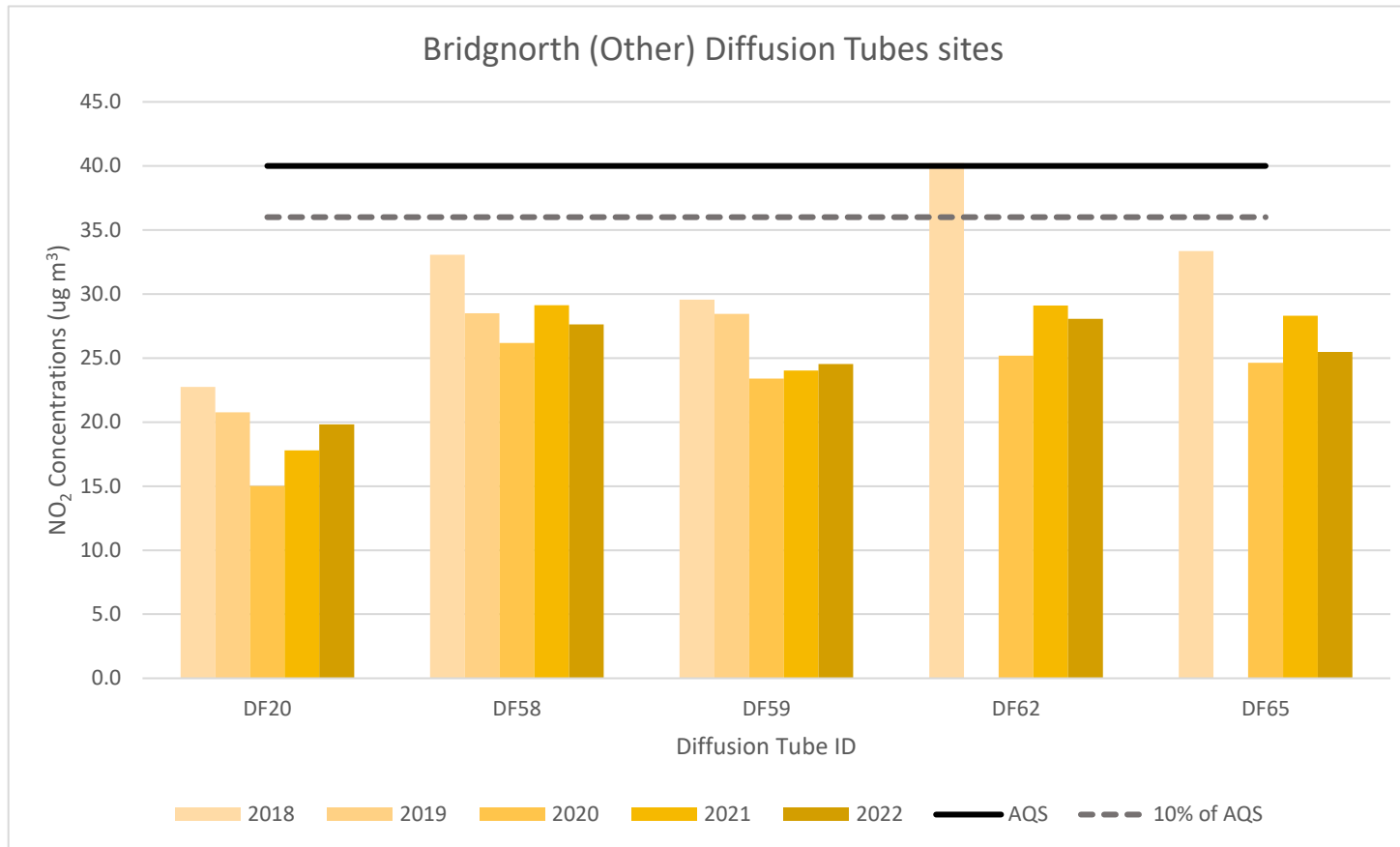


Figure 9 - Annual NO₂ concentrations at diffusion tube locations in Oswestry, Shropshire

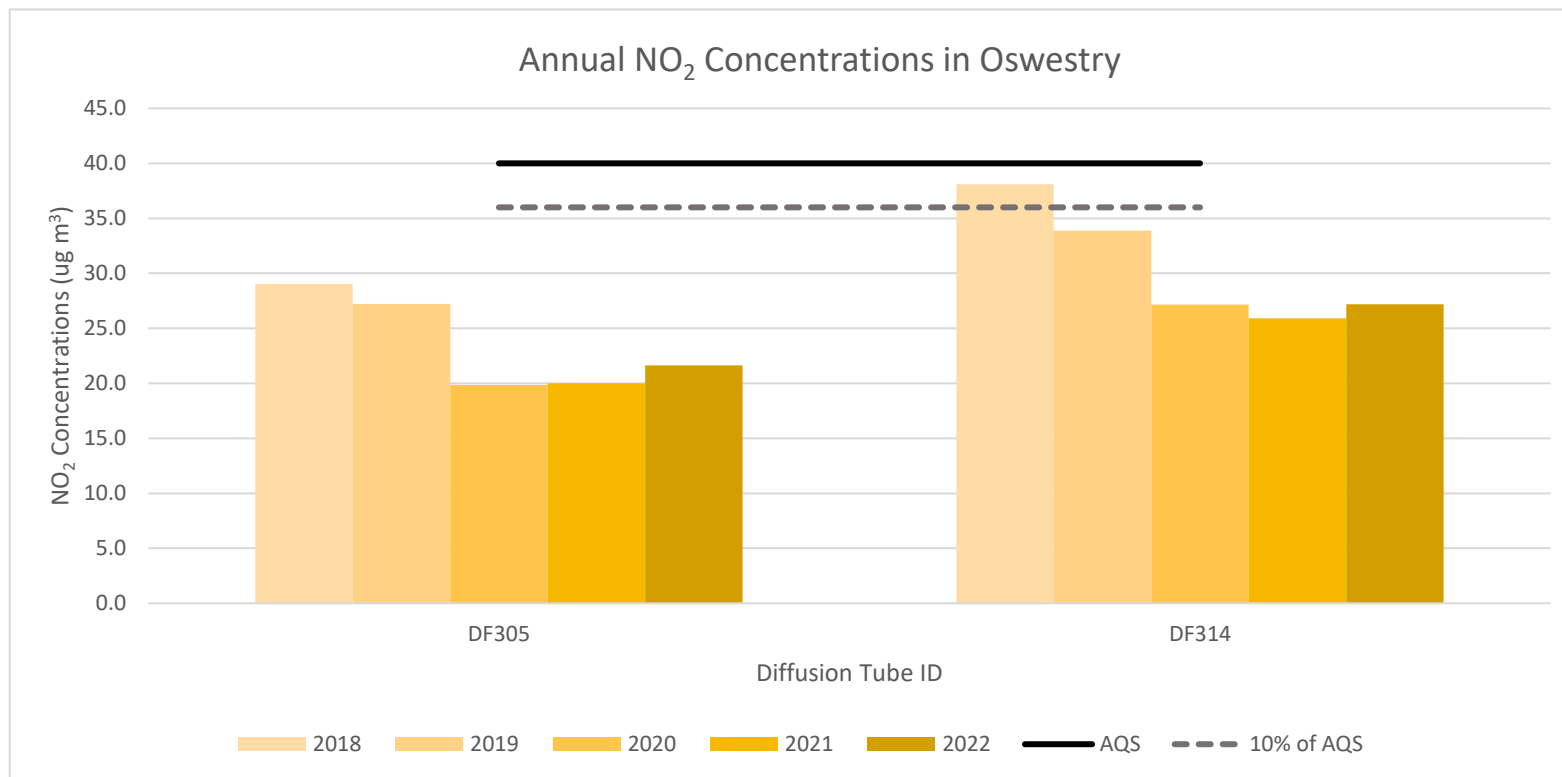


Figure 10 - Annual NO₂ concentration at DF223 Tern Hill, Market Drayton

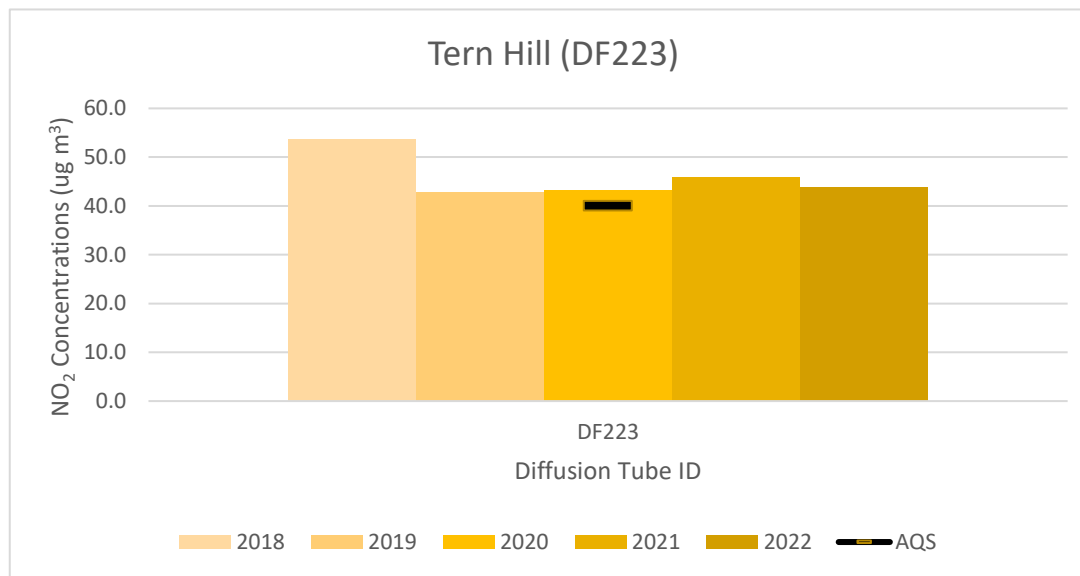


Table A.5 – 1-Hour Mean NO₂ Monitoring Results, Number of 1-Hour Means > 200µg/m³

Shropshire Council do not undertake 1-hour monitoring of NO₂.

Table A.6 – Annual Mean PM₁₀ Monitoring Results (µg/m³)

Shropshire Council do not undertake PM₁₀ monitoring.

Table A.7 – 24-Hour Mean PM₁₀ Monitoring Results, Number of PM₁₀ 24-Hour Means > 50µg/m³

Shropshire do not undertake PM₁₀ monitoring.

Table A.8 – Annual Mean PM_{2.5} Monitoring Results (µg/m³)

Shropshire do not undertake PM_{2.5} monitoring

Table A.9 – SO₂ 2022 Monitoring Results, Number of Relevant Instances

Shropshire do not undertake SO₂ monitoring.

6 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 <(0.84)>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DF13	371345	293081	42.1	36.9	38.7	34.2	31.5	29.8							35.5	30.1	-	
DF20	371580	293257	32.2	21.9	30.9	22.3	19.7	10.7	14.5	22.3	21.3	24.3	30.7	32.3	23.6	19.8	-	
DF27	371397	293179	26.3	13.3	22.4	16.4	14.2	15.3	19.9	15.9	15.6	16.4	23.9	25.8	18.8	15.8	-	
DF28	371321	293131	59.0	37.0	48.9	41.0	34.9	28.2	35.0	47.9	42.6	42.0	46.4	49.0	42.7	35.8	-	
DF29	371297	293108	36.5	22.8	39.6	28.6	22.0	17.3	23.2	28.3	27.2	24.8	32.1	30.7	27.8	23.3	-	
DF58	371795	292947	44.5	29.5	34.7	30.4	28.8	20.9	29.1	34.7	35.2	34.5	37.5	35.1	32.9	27.6	-	
DF59	371799	293011	40.2	30.7	33.0	25.1	26.8	23.8	24.0	25.7	24.6	28.8	34.4	33.3	29.2	24.5	-	
DF62	372031	292993	43.4	26.5	42.4	32.2	29.0	23.2	28.8	36.5	33.3	31.4	33.9	40.5	33.4	28.1	-	
DF65	372026	293058	41.2	30.2	33.9	31.0	29.6	23.8	29.1	18.8	31.6	28.4	31.2	35.3	30.3	25.5	-	
DF71	371346	293086	60.0	49.4	49.3	43.1	47.2	36.4	46.3	48.4	49.9	53.2	57.1	53.0	49.4	41.5	39.8	
DF72	371375	293066	36.4	20.1	35.1	25.3	21.7	16.1	25.0	30.2	29.9	25.4	30.4	27.8	26.9	22.6	-	
DF73	371354	293089	41.5	25.6	39.4	33.6	26.5	21.2	25.7	37.6	34.9	30.8	34.3	39.0	32.5	27.3	-	
DF74	371340	293125	38.2	21.7	35.9	30.4	23.9	17.7	24.8	32.0	30.1	27.6	31.0	35.3	29.0	24.4	-	
DF75	371345	293106	37.5	24.1	34.9	30.1	22.5	17.5	23.0	32.1	29.1	27.0	31.3	32.1	28.4	23.9	-	
DF76	371366	293146	43.3	31.4	42.1	30.7		23.4	31.3	34.4	34.8	37.1	38.9	39.1	35.1	29.5	-	
DF77	371375	293161	51.8	36.6	36.3	33.7	30.2	24.3	31.8	36.2	33.6	30.0	37.3		34.7	29.2	-	
DF78	371360	293152	50.0	39.6	40.8	38.6	36.4	27.9	37.9	46.6	41.1	31.6	38.7	41.4	39.2	32.9	-	
DF79	371346	293143	58.6	38.0	45.5	38.5	38.6	30.5	41.3	52.7	42.5	33.9	41.6	46.7	42.4	35.6	-	

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 <(0.84)>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DF80	371334	293139	60.3	41.2	47.7	46.5	40.7	31.4	41.1	50.1	44.7	38.6	44.8	49.4	44.7	37.5	37.2	
DF81	371288	293119	34.5	17.2	33.6	29.4	23.4	15.5	23.0	31.4	29.4	19.2	22.6		25.4	21.3	-	
DF82	371264	293120	32.5	16.5	30.5	26.5	18.6	13.9	19.6	26.4	24.6	17.5	20.7	25.7	22.8	19.1	-	
DF83	371341	293096	77.4	50.3	63.9	50.1	53.5	40.1	51.4		53.8	56.7	63.6	65.4	56.9	47.8	-	
DF223	363640	332232	65.6	41.8	56.2	45.0	45.3	35.3	53.5	53.6	50.7	50.1	62.2	67.8	52.2	43.9	35.7	
DF305	328978	329879	32.4	23.2	28.2	24.6	19.7	16.9	22.4	24.4	24.2	24.8	32.7	35.2	25.7	21.6	-	
DF314	328866	329269	41.1	30.8	31.1	28.0	27.5	23.7	30.0	27.3	31.5	33.5	40.4	43.3	32.4	27.2	-	
DF400	348726	308959	35.0	21.2	30.8	26.5	22.1	4.9	25.9	29.7	27.0	24.5	25.5	31.4	25.4	21.3	-	
DF403	348891	312721	38.8	26.1	35.1	28.3		19.4	27.4	29.7	30.3	30.0	29.3	32.9	29.8	25.0	-	
DF404	348889	312326	19.5	10.2	21.9	15.1	9.1	7.1	11.7		13.0	12.3	15.3	19.4	14.0	11.8	-	
DF407	349330	312503	32.2	17.2	32.6	25.6	18.1	13.1	20.7	23.6	25.1	21.6	25.2	27.9	23.6	19.8	-	
DF413	349283	312851	33.2	23.6	37.1	27.2	20.8	17.7	24.3		27.4	29.0	32.9	29.4	27.5	23.1	-	
DF420	349396	312742	38.1	21.6	33.4	28.2	22.9	17.2	26.7	29.8	28.4	25.0	29.6	31.9	27.7	23.3	-	
DF428 A	349445	313090	37.2	31.6	55.1	39.1	32.9	23.6	34.2	34.9	39.2	41.4	49.5	44.0	38.5	32.4	-	
DF429	349237	312900	35.1	27.3	34.8	26.9	22.5	14.5		26.1	26.4		37.7	36.1	28.7	24.1	-	
DF436	349283	312889	40.8	25.0	44.3	33.3	26.1	21.8	29.7	35.9	33.8	34.6	41.2	40.3	-	-	-	Duplicate Site with DF436 and DF437 - Annual data provided for DF437 only
DF437	349283	312889	37.9	30.1	43.5	34.4	29.5	21.8	32.2	36.6	36.3	35.4	39.0	37.6	34.2	28.7	-	Duplicate Site with DF436 and DF437 - Annual data provided for DF437 only
DF438	349400	312954	63.2	41.6	56.3	53.7	44.3	36.5	54.1	56.0	60.1	46.4	51.6	55.7	51.6	43.4	42.8	
DF448	345769	313223	13.7	6.5	12.0	7.0	5.2	4.9	5.8	5.9	6.8	9.2	11.4	13.7	8.5	7.1	-	
DF449	346796	313509	24.2	12.0	24.6	18.6	14.6	10.4	15.5	19.3	17.3	15.5	18.8	23.4	17.9	15.0	-	
DF457	349243	313457	45.2	29.0	36.3	34.4	24.1	25.9	34.6	37.1	38.5	29.3	33.6	36.4	33.7	28.3	-	

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 <(0.84)>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DF457 B	349235	313441	34.1	22.8	34.0	28.6	29.0	22.2	30.8	32.9	32.9	29.8	32.6	34.1	30.3	25.5	27.5	
DF458	349426	313028	49.9	45.0	66.6	52.5	44.7	35.1	50.0	54.0	54.9	49.4	59.2	47.4	50.7	42.6	-	
DF459	349424	312936	39.5	34.6	48.1	37.1	27.7	21.6	31.2	33.2	38.0	34.3	42.5	37.7	35.5	29.8	-	
DF461	349327	312389	31.6	19.0	33.1	28.1	20.6	14.6	25.1	26.6	27.9	23.2	26.1	29.1	25.4	21.3	-	
DF468	350376	314599	27.1			20.0	15.4	12.8	18.0	19.7	20.7	23.6	26.3	30.4	21.4	18.0	-	
DF474	348647	308771	47.2	36.9	41.0	34.6	33.4	30.7	36.5	40.0	38.9	41.1	42.9	47.9	39.3	33.0	-	
DF476	349360	312962	38.6	27.5	37.5	29.2	25.2	20.0	26.2	27.8	29.9	30.5	33.4	31.2	29.7	25.0	-	
DF477	349299	313108	37.0	25.6	36.3	24.6	25.4	22.5	25.1	25.8	29.9	32.0	36.9	33.0	29.5	24.8	-	
DF480	349466	313151	36.3	27.2	48.4	34.6	27.4	22.6	28.7	28.8	32.5	37.6	43.2	37.3	33.7	28.3	-	
DF482	349436	313064	40.3	33.8	51.0	39.5	32.2	23.8	30.7	37.7	38.1	43.3		44.9	37.8	31.7	-	
DF485	348815	312854	33.7	21.1	36.2	31.5	21.8	16.3	28.7	31.4	29.7	22.3	25.0	29.2	27.2	22.9	-	
DF487	349529	312328	28.8	17.5	29.5	22.9	15.6	11.6	20.0	21.6	22.4	18.1	21.0	26.5	21.3	17.9	-	
DF488	349223	313449	32.5	20.7	38.2	25.1	20.9	16.4	23.1	24.8	26.0	29.7	33.7	30.8	26.8	22.5	-	
DF489	349148	313444	29.5	17.7	32.4	20.6	17.6	15.0	18.5	19.1	20.2	23.6	27.4	21.0	21.9	18.4	-	
DF490	348964	313466	22.2		22.4	16.1	13.6	10.4	12.9	15.4	15.8	15.7	18.7	27.1	17.3	14.5	-	
DF501	349349	313071	38.1	24.6	48.0	32.2	28.5	22.1	31.2	34.0	35.9	36.1	35.9	39.9	33.9	28.5	-	
DF502	349364	312998	27.7	17.8	37.5	30.9	22.4	13.4	21.6	27.4	27.9	25.9	31.6	30.3	26.2	22.0	-	
DF503	348611	312969	29.9	21.3		31.6	24.9	18.9	29.2	31.2	32.9	27.0	29.6	33.1	28.1	23.6	-	
DF504	348669	312885	37.5	26.2	36.4	26.2	23.1	17.7	25.6	24.2	28.0	24.5	28.5	31.3	27.4	23.0	-	

All erroneous data has been removed from the NO₂ diffusion tube dataset presented in Table B.1 (confirm by selecting in box).

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22 (confirm by selecting in box).

Local bias adjustment factor used (confirm by selecting in box).

- National bias adjustment factor used (confirm by selecting in box).**
- Where applicable, data has been distance corrected for relevant exposure in the final column (confirm by selecting in box).**
- Shropshire Council confirm that all 2022 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System (confirm by selecting in box).**

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.

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

New or Changed Sources Identified Within Shropshire Council During 2022

Shropshire Council continues to review the situation in Coton Hill, with regard to the aggregate holding and transfer to rail station. The Council understands that no further intensification of the site has occurred within the reporting year.

Shropshire Council Environmental Protect continue to respond to planning consultations for potential development. 2022 applications have included further detail to the proposed Shrewsbury North West Relief Road, though no major impacts have been concluded that would impact on previous assessments for Air Quality.

Additional Air Quality Works Undertaken by Shropshire Council During 2022

The Councils appointed contractor Bureau Veritas has undertaken initial technical assessment for both AQMA's as part of the Air Quality Action Plan review process. More detail is provided in Section 3.1.1. 2022 Traffic Survey Data has become available for Shrewsbury as part of LUF2 works in Shrewsbury Town Centre (Gyratory and Smithfield Riverside Development). This data is being incorporated into a revised 2022 baseline, to improve the validity of the upcoming modelling. Shropshire Council anticipate that the AQAP's shall be prepared for wider consultation in early 2024.

QA/QC of Diffusion Tube Monitoring

The supplier used for NO₂ diffusion tubes in 2022 remained the same, from Gradko International Ltd. Tubes were prepared using the 20% TEA in water method. The diffusion tube monitoring was conducted in line with the DEFRA 2022 Diffusion Tube Monitoring Calendar. Gradko conduct analysis using Ultraviolet/visible spectroscopy under a UKAS accredited method.

Gradko, 20% in TEA was as assessed for precision in 2022 and with 33 'Good' Results and 0 'Bad' results. See: <https://laqm.defra.gov.uk/air-quality/air-quality-assessment/precision-and-accuracy/> . This is a remarkably high proportion of good results. Given this the diffusion tubes are considered to be reasonably precise.

As a result, it is considered that the QA/QC element for these monitors is satisfied.

7.1.1 Diffusion Tube Annualisation

Only 1 diffusion tube location captured less than 75% data but more than 33% data over the 2022 period, DF13. Annualisation was undertaken using AURN monitor information from monitors within reasonable distance from Shropshire Council as no monitors exist within the county. For this reason, the Telford and Walsall AURN monitors were used. They were chosen due to proximity and a knowledge of their setting. Annualisation was carried out within the Diffusion Tube Data Processing Tool in line with guidance.

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

Site ID	Annualisation Factor <Site 1 Name>	Annualisation Factor <Site 2 Name>	Annualisation Factor <Site 3 Name>	Annualisation Factor <Site 4 Name>	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
DF13	1.0396	0.9799			1.0098	35.5	35.9

7.1.2 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 regarding the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Shropshire Council have applied a national bias adjustment factor of 0.84 to the 2022 monitoring data. A summary of bias adjustment factors used by Shropshire Council over the past five years is presented in Table C.2.

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	National	06/23	0.84
2021	National	03/22	0.84
2020	National	06/21	0.81
2019	National	03/20	0.93
2018	National	06/19	0.92

7.1.3 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.

Six monitoring locations were noted in the Diffusion Tube Data Processing Tool as necessary for fall-off-with-distance calculation. Details are provided below:

- DF71 and DF80– these locations are within the Bridgnorth AQMA and are found on street furniture close to receptors where location directly on the façade of receptors is not possible.
- DF223 is located on the only piece of street furniture available to place a monitor. No locations on the receptor façade are available. This location has been highlighted historically given its location on a busy road junction A41/A53, and rural location with low background concentrations. It has previously been agreed that the site does not require an AQMA declaration, given the lack of direct feasible pathway to the residential receptors – (no windows on façade adjacent the highway). The past 2 years results show after fall-off with distance calculations the result was more than 10% below the national objective level and no further action is therefore proposed at this stage.

- DF438 is within the Shrewsbury No 3 AQMA. It is the current hotspot for localised pollution in the area. The diffusion tube is located on a down spout that stands proud of the receptor façade hence the need for calculations.
- DF457B is located in Coton Hill, the diffusion tube is mounted to traffic light posts which whilst close, are closer to the kerbside than the receptor façade. Distance correction is therefore required.
- DF458 is situated underneath the railway bridges at Shrewsbury train station. There is no relevant receptor for the annual mean objective. The monitoring location is there to consider short term exposure which needs no further consideration given the results obtained

**Table C.3 – NO₂ Fall off With Distance Calculations
(concentrations presented in µg/m³)**

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted)	Background Concentration	Concentration Predicted at Receptor	Comments
DF71	1.1	1.4	41.5	6.0	39.8	<i>Predicted concentration at Receptor within 10% the AQS objective.</i>
DF80	1.8	1.9	37.5	6.0	37.2	<i>Predicted concentration at Receptor within 10% the AQS objective.</i>
DF223	1.3	3.4	43.9	4.9	35.7	<i>Warning: Background NO₂ concentrations <5µg/m³ or >50µg/m³ are rare in the UK - this calculation will still work, but please check your data.</i>
DF438	1.2	1.3	43.4	8.726992	42.8	<i>Predicted concentration at Receptor above AQS objective.</i>
DF457B	0.9	0.5	25.5	7.603063	27.5	

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted)	Background Concentration	Concentration Predicted at Receptor	Comments
DF458	2.0		42.6	7.6	-	<i>Warning: Receptor to kerb must be between 0.1m and 50m to calculate concentration. Please check distances and update STEP 2 - Diffusion Tube Inputs tab Columns Distance to Relevant Exposure and Distance to Kerb of Nearest Road</i>

QA/QC of Automatic Monitoring

7.1.4 PM10 and PM2.5 Monitoring Adjustment

7.1.5 Automatic Monitoring Annualisation

Shropshire Council does not carry out any automatic particulate matter monitoring.

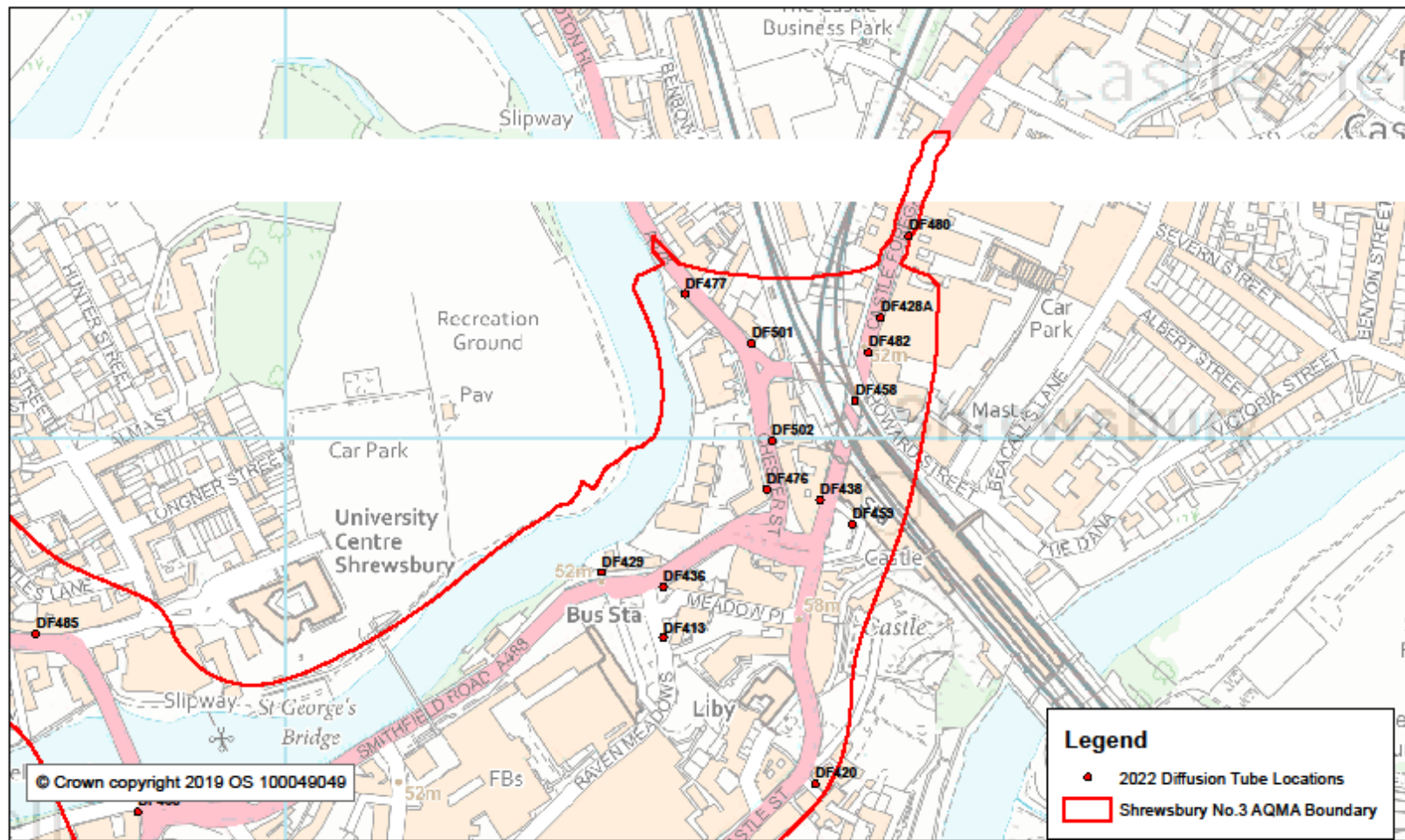
7.1.6 NO₂ Fall-off with Distance from the Road

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 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.

Shropshire Council do not have automatic monitors for NO₂.

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

Map 1 -Map of Shrewsbury No.3 AQMA and diffusion tube sites within the north extent of the AQMA including 'hotspot' on Chester St /Castle Foregate Gyratory

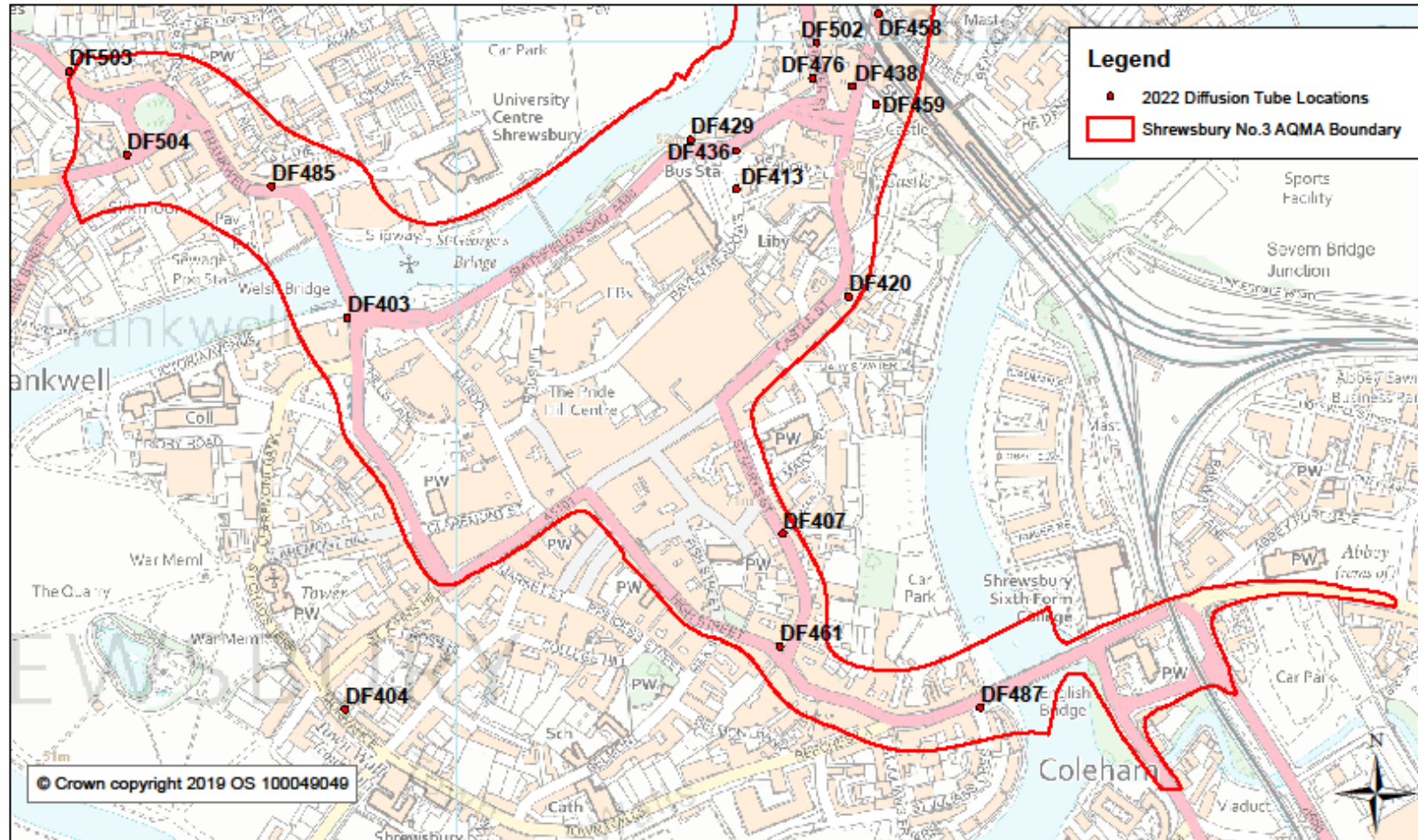


Shrewsbury No.3 AQMA - North extent including 'hotspot' on Chester St / Castle Foregate Gyratory

The Shirehall, Abbey Foregate,
Shrewsbury, Shropshire, SY2 8ND

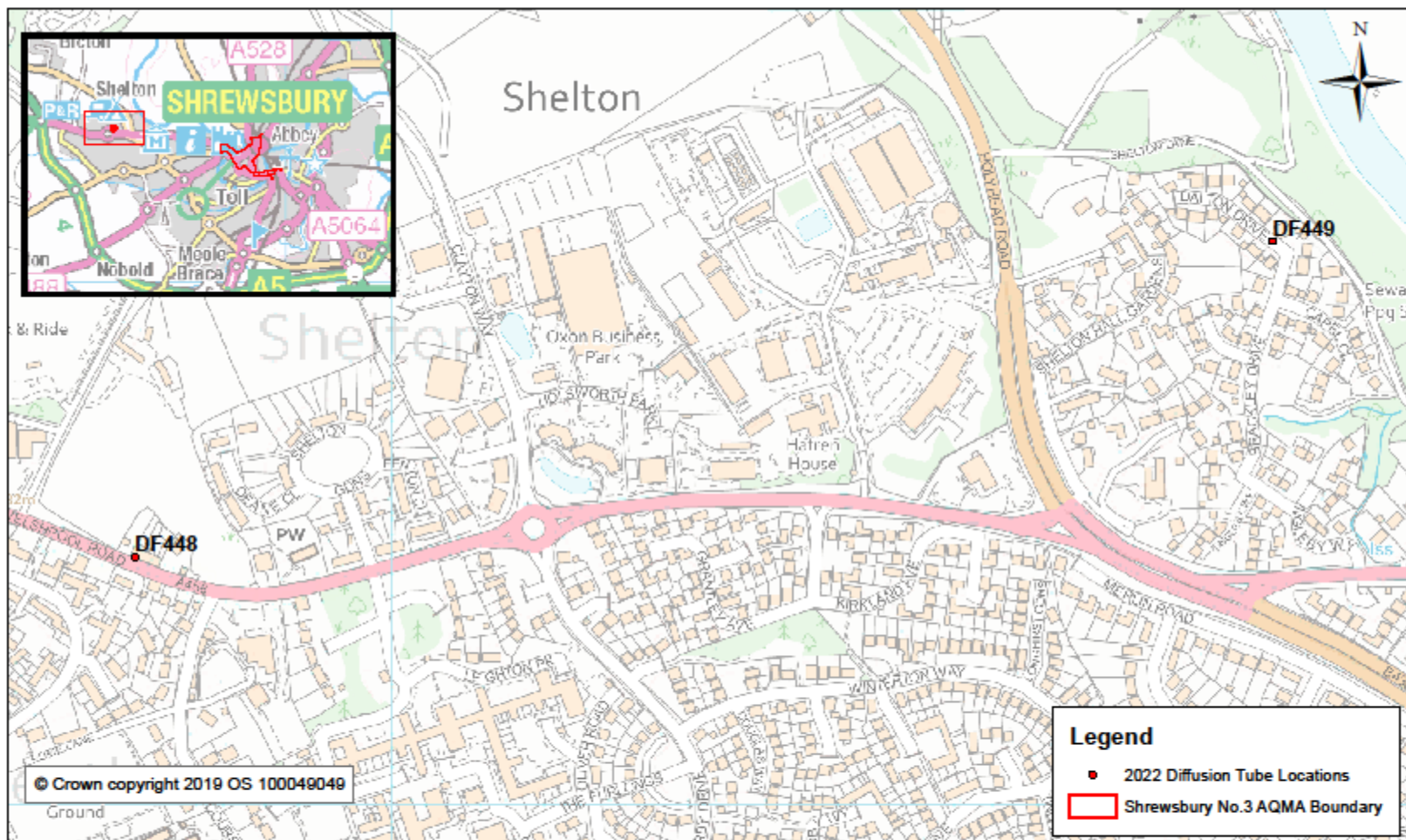
Scale : 1:3,884

Map 2 - Map of Shrewsbury No.3 AQMA and diffusion tube sites within the south extent of AQMA



Shrewsbury No.3 AQMA Diffusion Tube locations - South Extent
 The Shirehall, Abbey Foregate,
 Shrewsbury, Shropshire, SY2 8ND
 Scale : 1:5,000

Map 3 - Map of West Shrewsbury Diffusion Tube Locations



**West Shrewsbury Diffusion Tube locations in context
of Shrewsbury Centre and Shrewsbury No.3 AQMA**

The Shirehall, Abbey Foregate,
Shrewsbury, Shropshire, SY2 6ND

Scale : 1:4,465

Map 4 - Map of Bayston Hill Diffusion Tube Locations

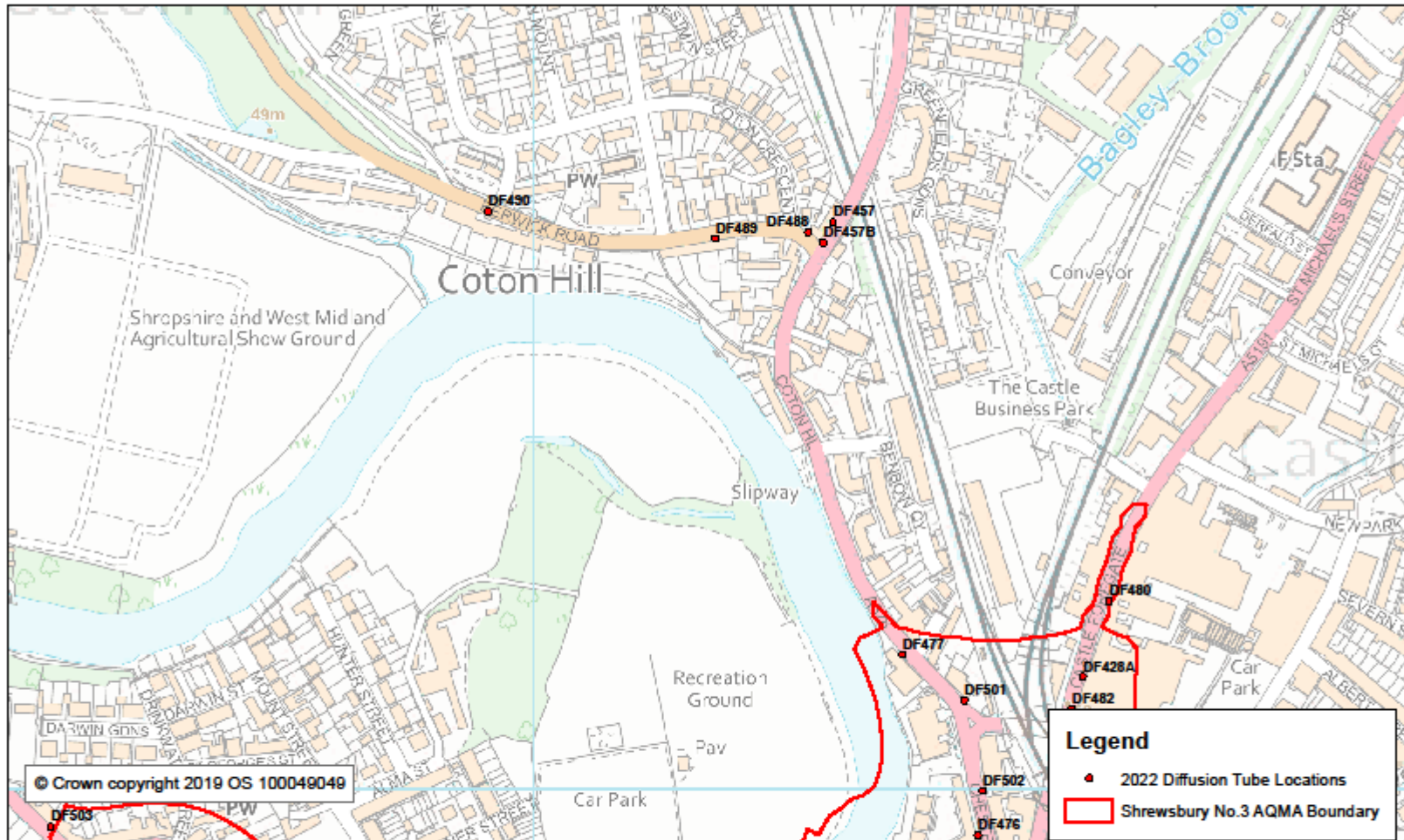


Bayston Hill Diffusion Tube locations in context of Shrewsbury

The Shirehall, Abbey Foregate,
Shrewsbury, Shropshire, SY2 6ND

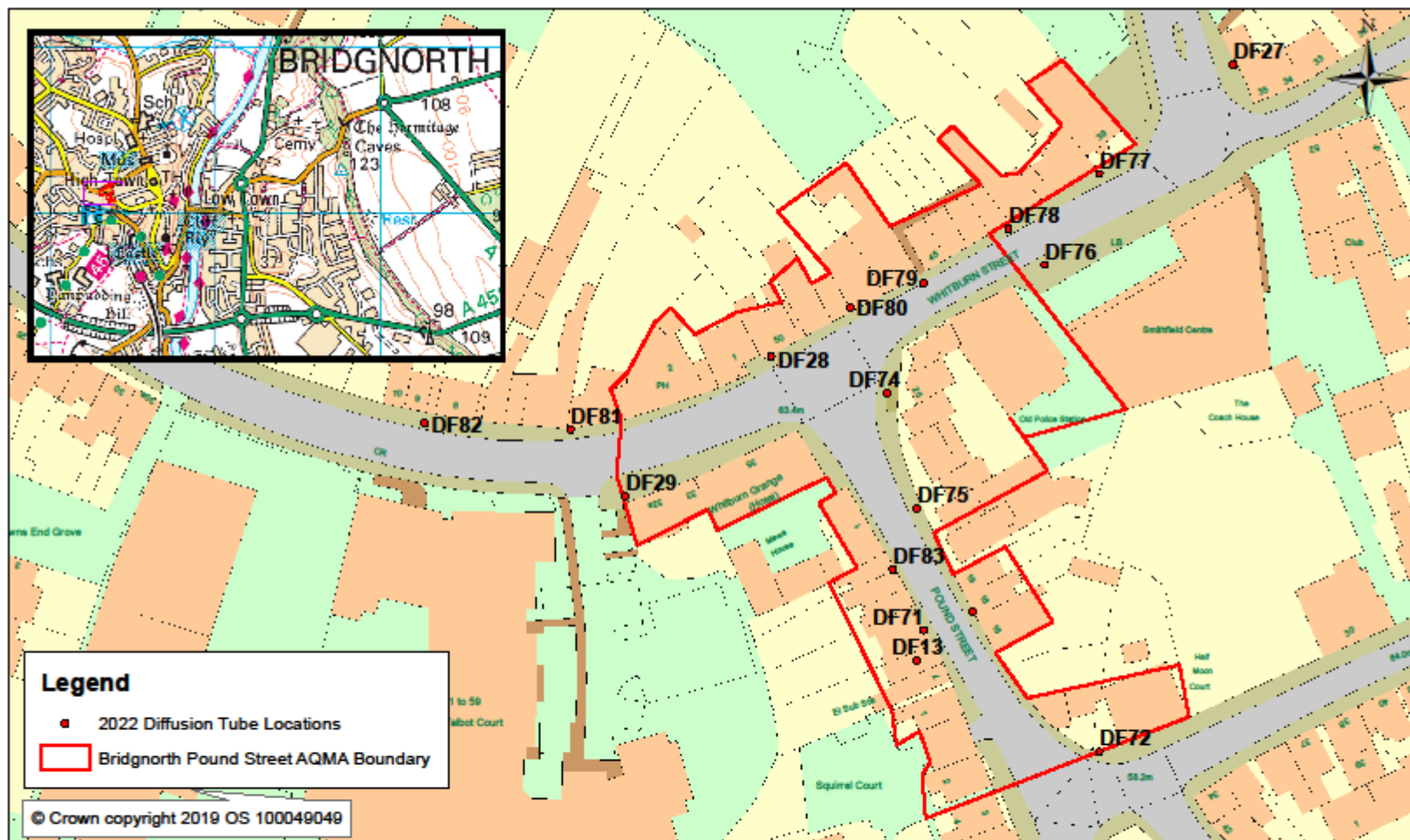
Scale : 1:4,465

Map 5 - Map of Coton Hill and Berwick Road Diffusion Tube Locations in Context of Shrewsbury No.3 AQMA



Coton Hill/Berwick Road Diffusion Tube locations in context to Shrewsbury No.3 AQMA Boundary
 The Shirehall, Abbey Foregate, Shrewsbury, Shropshire, SY2 6ND
 Scale : 1:4,000

Map 6 - Map of Bridgnorth Pound Street AQMA and surrounding Diffusion Tube Locations

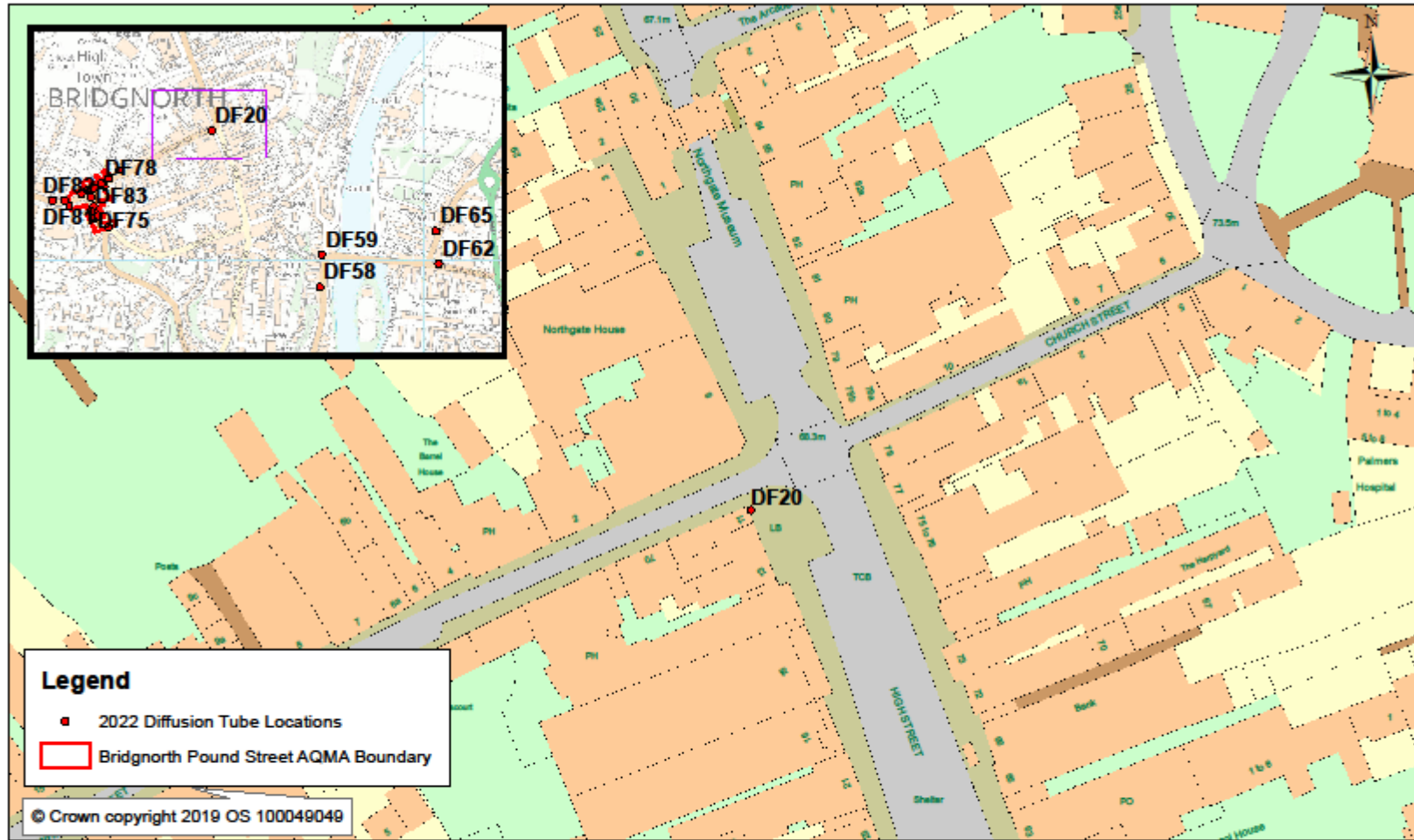


**Bridgnorth Pound Street AQMA and surrounding
Diffusion Tube Locations**

The Shirehall, Abbey Foregate,
Shrewsbury, Shropshire, SY2 6ND

Scale : 1:814

Map 7 - Map of Bridgnorth High Street Diffusion Tube Location in context of wider Bridgnorth area

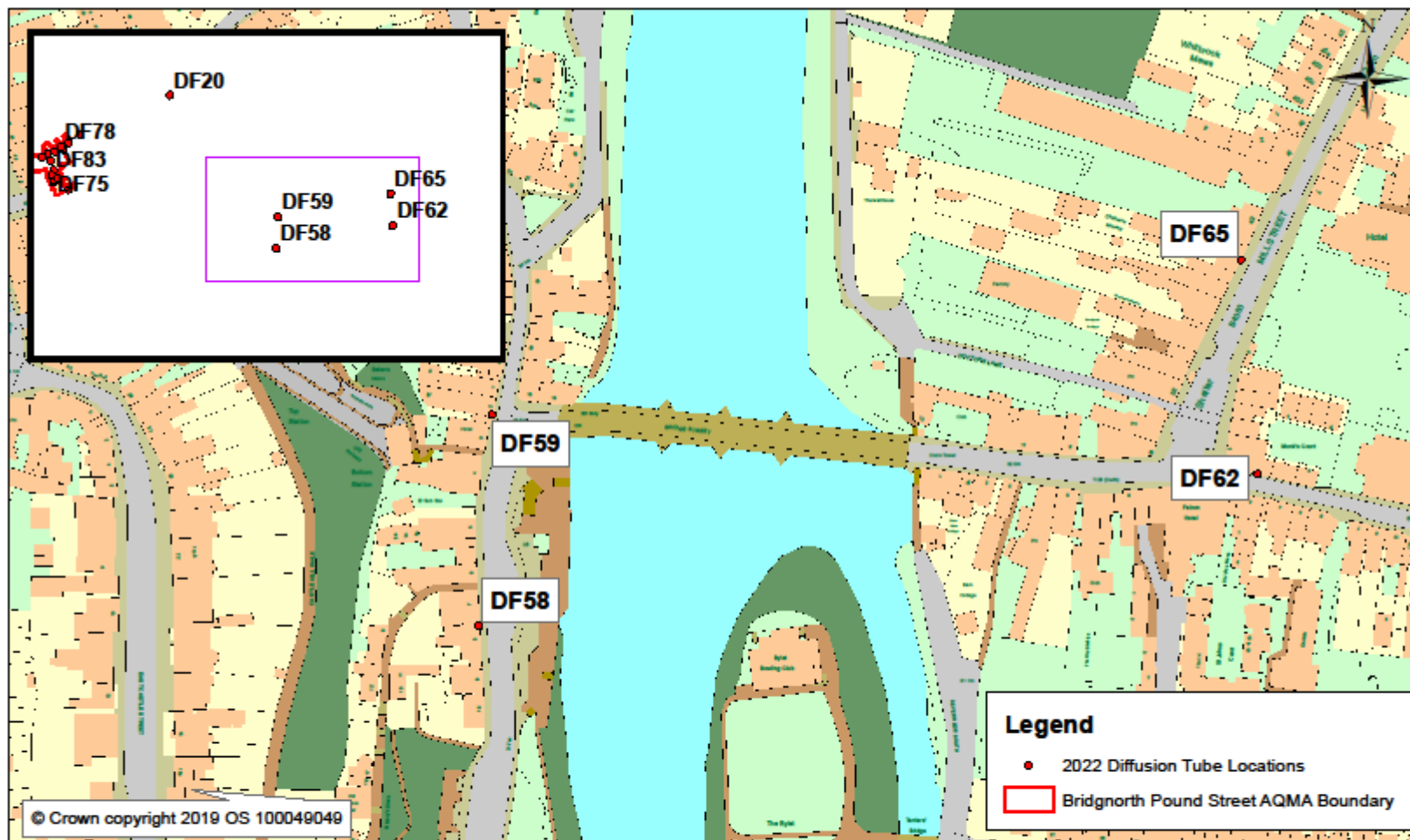


DF20 Bridgnorth High Street in context of wider Bridgnorth Area

The Shirehall, Abbey Foregate,
Shrewsbury, Shropshire, SY2 6ND

Scale : 1:800

Map 8 - Map of Bridgnorth Low Town Diffusion Tube Locations



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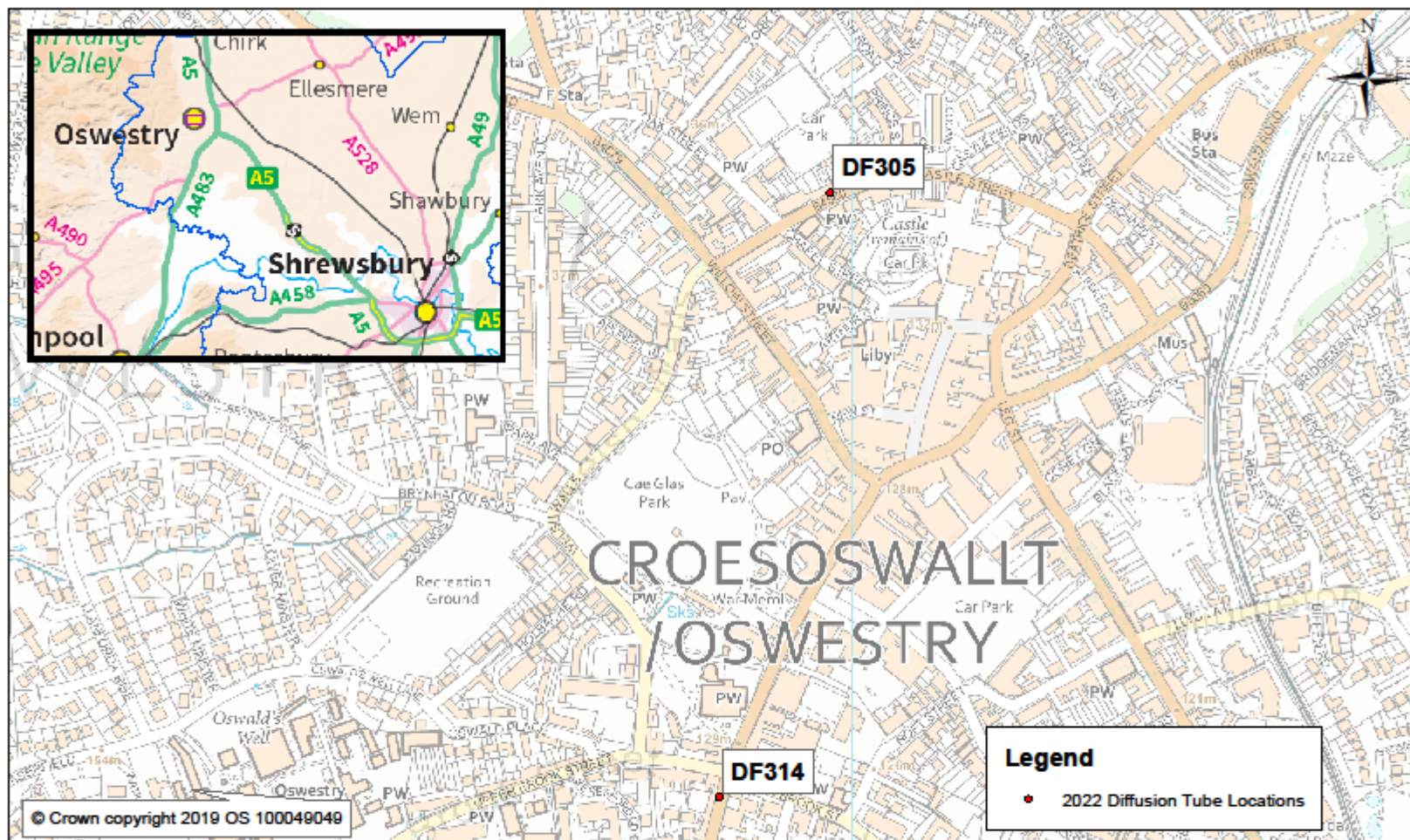


Bridgnorth Low Town Diffusion Tube Locations

The Shirehall, Abbey Foregate,
Shrewsbury, Shropshire, SY2 6ND

Scale : 1:1,500

Map 9 - Map of Oswestry Diffusion Tube locations

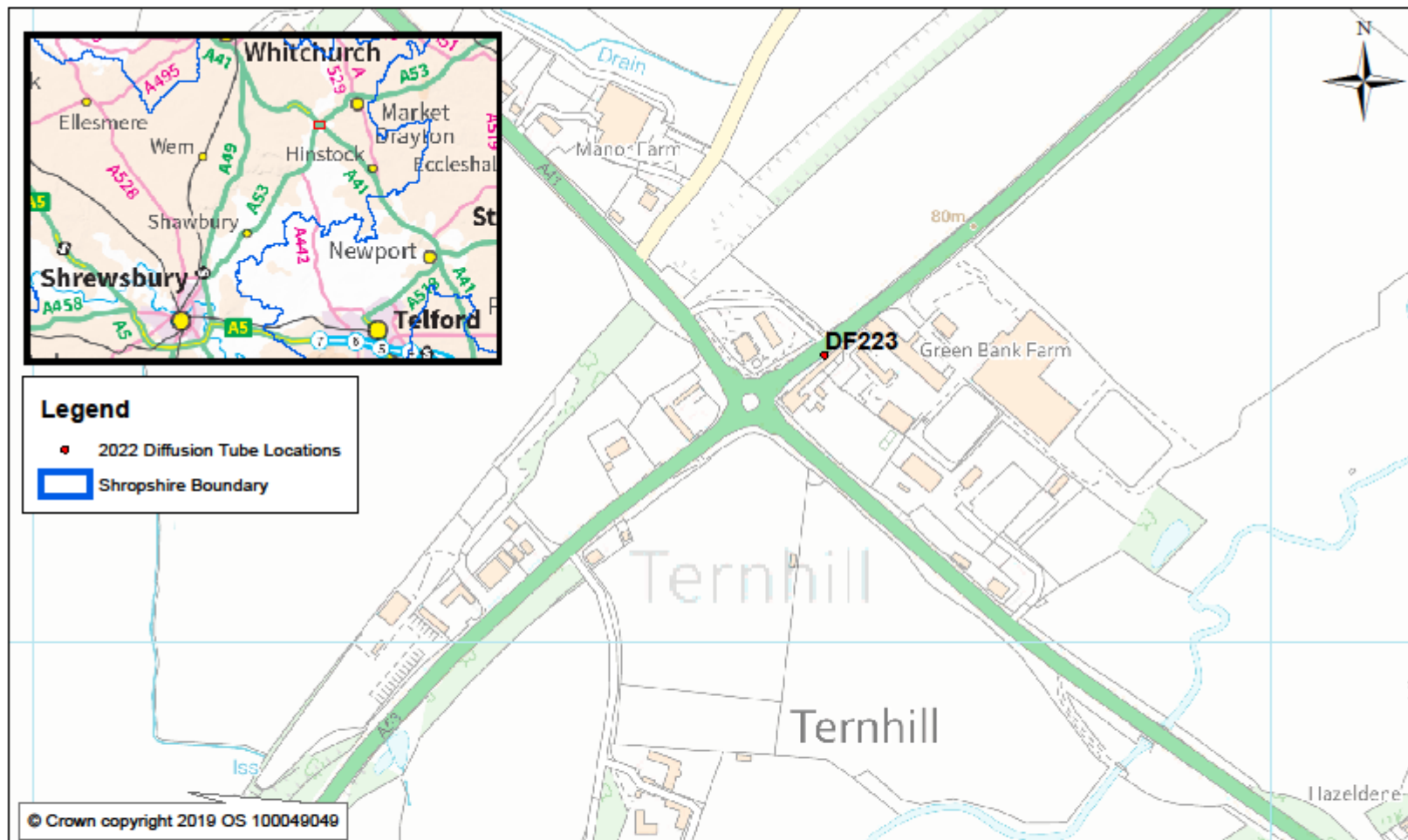


Oswestry Diffusion Tube Locations

The Shirehall, Abbey Foregate,
Shrewsbury, Shropshire, SY2 6ND

Scale : 1:5,000

Map 10 - Map of DF223 Tern Hill, Market Drayton Diffusion Tube Location



DF223 Tern Hill, Market Drayton Diffusion Tube Location

The Shirehall, Abbey Foregate,
Shrewsbury, Shropshire, SY2 6ND

Scale : 1:4,000

8 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).

9 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

10 References

- Local Air Quality Management Technical Guidance LAQM.TG22. August 2022.
Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG22. August 2022.
Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.