RUSHMOOR BOROUGH COUNCIL

2021 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

Date: August 2021

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Executive Summary: Air Quality in Our Area

Air Quality in Rushmoor Borough Council

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

The mortality burden of air pollution within the UK is equivalent to 28,000 to 36,000 deaths at typical ages[3], with a total estimated healthcare cost to the NHS and social care of £157 million in 2017[4].

Rushmoor Borough Council has been investigating air quality in the borough since 1999, following the guidance provided in the Local Air Quality Management process, as part of the requirements of the Environment Act 1995. Every Local Authority is required to review and assess air quality within its area annually, and if it is found that air quality objectives are not being achieved or are not likely to be achieved, then they are required to designate an Air Quality Management Area (AQMA). For each AQMA designated, local authorities have to produce an Air Quality Action Plan that details the measures to be taken to improve air quality in that area.

This review and assessment process over the years has identified that the most significant air quality objective, in terms of the one most likely to be breeched in the borough, is the annual mean objective for nitrogen dioxide. Monitoring of nitrogen dioxide levels in Rushmoor has continued and the results for 2020 show that air quality in the area is

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

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

[3] Defra. Air quality appraisal: damage cost guidance, July 2020

[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

generally good. Air quality objectives are being achieved and the designation of an Air Quality Management Area within the Borough is not required.

Emissions from road traffic using the M3 motorway have proved a problem in the past, and an AQMA was in place along the M3 corridor due to likely exceedances of the air quality objective for nitrogen dioxide. However, this AQMA was revoked in 2011 due to monitoring showing continual on-going improvements in nitrogen dioxide levels in the area. Levels now are well within the objective level and the overall trend continues to be one of improvement.

Whilst monitoring across the borough shows that the relevant air quality objectives are being met, further improvements in air quality is always desirable, particularly close to main roads that experience a high volume of traffic. Rushmoor Borough Council will continue to work closely with Hampshire County Council and Highways England, who ultimately have direct responsibility for these roads, to seek continuing improvements to air quality in these areas.

Rushmoor Borough Council, along with Surrey Heath Borough Council, was directed by the Secretary of State to develop a plan to achieve air quality improvements along the A331, and to bring about compliance with legal limits in the shortest possible time. The Local Plan was finalised in April 2019 and a speed restriction of 50mph along a 1.8 km section of the A331, between Coleford Bridge and Frimley was implemented in June 2019. This is predicted to deliver compliance with the NO2 EU limit value in 2021. Funding has been secured for Hampshire County Council to implement the speed reduction and for Rushmoor Borough Council to monitor and evaluate its effectiveness in delivering compliance. Further details of the Full Business Case can be found on the Blackwater Valley Group's website at https://www.a331airquality.co.uk/

Actions to Improve Air Quality

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

The 2019 Clean Air Strategy[5] sets out the case for action, with goals even more ambitious than EU requirements to reduce exposure to harmful pollutants. The Road to Zero[6] sets out the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

Rushmoor Borough Council have undertaken a number of measures to improve air quality across our region:

- The Rushmoor Local Plan adopted in 21 February 2019, will guide the location, scale and type of future development in Rushmoor up to 2032 and contains detailed policies to protect air quality. These are designed to prevent future developments from impacting local air quality negatively, ensuring continued compliance with national air quality objectives.
- A Local Air Quality Plan has been produced and a speed restriction implemented along the A331 to reduce concentrations of NO_2. Rushmoor Borough Council has received funding to monitor and evaluate the effectiveness of this measure in delivering compliance with the NO_2 EU limit value.
- Rushmoor Borough Council declared a Climate Emergency in 2019, and our Climate Change Action Plan was approved in November 2020. This provides a set of actions aimed at making the council carbon neutral and Aldershot and Farnborough more sustainable by 2030.

Conclusions and Priorities

No exceedances of the nitrogen dioxide (NO_2) annual mean air quality objective of 40µg/m^3 were recorded at any monitoring site within the Rushmoor Borough Council. The overall trend in annual mean NO_2 concentrations is one of gradual improvement since 2002.

[5] Defra. Clean Air Strategy, 2019

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

Rushmoor Borough Council will continue to monitor NO_2 using passive diffusion tubes and will periodically review this monitoring regime to identify potential new hotspot locations and to ensure monitoring is representative of the whole borough.

Monitoring will continue along the A331 to assess the effectiveness of reducing the speed limit from 70mph to 50mph in delivering compliance with the NO_2 EU limit value in 2021.

Local Engagement and How to get Involved

Road traffic emissions are the main source of pollution in the borough, so there are several ways in which residents and businesses locally can help to improve air quality in the area. Reducing energy use in the home, at work and whilst travelling all can have a beneficial impact on local air quality, whilst saving money and reducing carbon emissions.

Reducing fuel use is easy and individual minor changes can collectively make a significant contribution to improving local air quality:

- A quarter of car journeys are under two miles and more than half are less than five miles. Walking, cycling or using public transport will significantly reduce emissions
- Car sharing is an easy way to reduce emission and fuel costs
- Improving your driving style can save lots of fuel
- Avoid aggressive acceleration and braking
- Driving at 50mph uses 30 per cent less fuel than driving at 70mph
- Driving in fifth gear uses 25 per cent less fuel than third gear
- Opening the windows increases 'drag' and fuel consumption
- Reduce excess weight if not needed (such as roof racks)
- Keep tyres inflated to the right pressure and balanced

Further details of air quality in the Borough can be found on the Council's webpages at https://www.rushmoor.gov.uk/article/3927/Air-quality

The Clean Air Strategy 2019 sets out the Government's plans for dealing with all sources of air pollution and the action required to reduce emissions. Further information can be found at https://www.gov.uk/government/publications/clean-air-strategy-2019

Daily forecasts of air pollution across the UK can be found at https://uk-air.defra.gov.uk/forecasting/

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1 Local Air Quality Management

This report provides an overview of air quality in Rushmoor during 2020. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Rushmoor 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 12 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

Rushmoor Borough Council currently does not have any declared AQMAs.

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

Defra's appraisal of last year's ASR concluded that Rushmoor Borough enjoys generally good air quality, with no exceedances of the air quality objectives. It was further noted that Rushmoor Borough Council had made notable progress on measures to improve air quality during 2019:

- Introduction of a speed restriction of 50mph along a 1.8 km section of the A331, between Coleford Bridge and Frimley, which was implemented in June 2019. Six new triplicate NO2 monitoring sites have been located along a section of the A331 to assess the effectiveness of reducing the speed limit from 70mph to 50mph.
- Adoption of the Rushmoor Local Plan on 21 February 2019. The Local Plan will guide the location, scale and type of future development in Rushmoor up to 2032 and contains detailed policies to protect air quality.

Rushmoor Borough Council and Hampshire County Council have taken forward a number of direct measures during the current reporting year of 2020 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.. 15 measures are included within Table 2., with the type of measure and the progress Rushmoor Borough Council have made during the reporting year of 2020 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2..

More detail on these measures can be found in their respective Action Plans

- Hampshire Local Transport Plan 2011-2031
- Rushmoor Borough Transport Statement December 2013
- Hampshire County Council Cycling Strategy September 2015
- Hampshire County Council's Electric Vehicle Charging Framework
- Farnborough and Aldershot Town Access Plans
- Climate Change Action Plan 2020-2030

Key completed measures are:

- Climate Change Action Plan 2020-2030, approved in November 2020

Rushmoor Borough Council's priorities for the coming year are:

- To continue passive monitoring throughout the borough, to ensure compliance with air quality objectives
- To implement the Climate Change Action Plan 2020-2030

The Climate Change Action Plan 2020-2030, approved in November 2020, sets out an ambitious series of activities and projects, with one year, three year and longer-term timeframes to be progressed over the next ten years. This includes a number of measures to improve air quality and reduce pollution in the borough, with the synergies between carbon emission reduction measures and improving local air quality considered so that priority areas can be identified for maximum benefit.

The principal challenges and barriers to implementation that Rushmoor Borough Council anticipates facing are delays due to the COVID-19 pandemic

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	**Funding Source**	**Defra AQ Grant Funding**	Funding Status	**Estimated Cost of Measure**	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	Detailed policies included within new Rushmoor Local Plan	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Adopted 21 February 2019		RBC		NO				Ongoing improvement in NO2 levels measured		Adopted 21 February 2019	Local Plan will guide the location, scale and type of future development in Rushmoor up to 2032
2	Bus service improvement	Transport Planning and Infrastructure	Bus route improvements	2013		RBC	Local Authority, LTP, Funding: Gov Grant, S106	NO					% increase in in patronage on Route 1 bus service	Route 1 Gold service has continued to increase patronage such that Stagecoach have now invested in a replacement of the 43 seater single deck to 73 seater double deck buses on the route from November 2016	Target is to achieve an annual increase in patronage of at least 1%
3	Increase public transport usage	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2013		Hampshire County Council	Local Authority, LTP, Funding: Gov Grant, S106	NO					The total number of journeys by bus, rail and coastal ferry services in Hampshire.	journeys increased by over 11% between 2003/4 and 2009/10, meeting the corresponding LTP2 target by a comfortable margin	
4	Travel Planning	Promoting Travel Alternatives	Workplace Travel Planning			RBC	Local Authority, LTP, Funding: Gov Grant, S106	NO					Percentage of qualifying developments supported by a Travel Plan		All qualifying developments(9) are required to provide a Transport Assessment and Travel Plan.
5	Access Improvement	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	2013		RBC/HCC	Local Authority, LTP, Funding: Gov Grant, S106	NO						Hampshire County Council has adopted the Farnborough Town Access Plan (TAP). This identifies improvements and other access initiatives	TAP to be reviewed every five years
6	Installation of Electric Vehicle (EV) charge points across the County	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2015		HCC/SSE	Private/grant funding/public sector investment	NO				Reduced vehicle emissions		Two sites located in Farnborough:. rapid charge point in Esso Petrol Station, Bridge Road & fast charge point in Queensmead Car Park	network of EEV charge points installed by Hampshire County Council in collaboration with Scottish and Southern Energy using government grant

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	**Funding Source**	**Defra AQ Grant Funding**	Funding Status	**Estimated Cost of Measure**	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
7	Cycling Strategy	Promoting Travel Alternatives	Promotion of cycling	2015		HCC	Local Authority, LTP, LEP, Funding: Gov Grant, CIL	NO	Not Funded			Reduced vehicle emissions	Participation rates and public satisfaction indices.	New Cycling Strategy adopted Sept 2015	Funding
8	Walking Strategy	Promoting Travel Alternatives	Promotion of walking			HCC	Local Authority, LTP, LEP, Funding: Gov Grant, CIL	NO	Not Funded			Reduced vehicle emissions	* Journey to work data * Proportion of school children walking to school * Monitoring of walking interventions will be done on a scheme specific basis * Monitor the impact of Development Travel Plans		Funding
9	Council Staff Travel Plan	Promoting Travel Alternatives	Workplace Travel Planning			RBC		NO				Reduced vehicle emissions		Adopted	To be revised and updated
11	Home working scheme for council staff	Promoting Travel Alternatives	Encourage / Facilitate home-working			RBC		NO			Completed	Reduced vehicle emissions		information available to staff on Council Intranet	
12	Local Air Quality Plan	Policy Guidance and Development Control	Other policy	Final Plan submitted May 2019		RBC SHBC HCC SCC JAQU	2019 - 2023	NO	Funded	£100k - £500k	Implementation		* Reduction in NO2 *Behaviour change - average speed	Full Business Case submitted May 2019. Funding received - RBC for monitoring & Evaluation / HCC for implementation of speed reduction measure along A331	Speed reduction measure to be removed once air quality improvements achieved and compliance with EU limit value secured.
13	Bradford's Roundabout improvements	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high	2019		HCC	43800	NO	Funded	£100k - £500k	Completed	Calculated 4.4t of NO_X emissions over 10 years	before and after queue length surveys	Funding secured and detailed design complete	

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	**Funding Source**	**Defra AQ Grant Funding**	Funding Status	**Estimated Cost of Measure**	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
			vehicle occupancy lane												
14	Speed reduction on A331	Traffic Management	Reduction of speed limits, 20mph zones	2019	2023	HCC	Summer 2019	NO	Funded	£100k - £500k	Implementation	Reduction in NO2	Reduction in average speed	Funding granted under Implementation Fund and detailed designs complete	On-going
15	Climate Change Action Plan	Other	Other	2020	2030	RBC	Local Authority	NO				Reduction in CO2, NO2, PM10	Development of Action Plan. Carbon neutral by 2030.	Action Plan approved Nov 2020	Action Plan contains measures to reduce the impact of the Borough's activities on the environment.

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

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

The Public Health Outcomes Framework (PHOF) for England recognises the burden of ill health resulting from poor air quality. PHOF Indicator D01 reports that 4.6% of deaths in Hampshire and 5.3% in Rushmoor during 2019 were attributable to fine particulates (PM2.5), the figure for England being 5.1%.

Rushmoor Borough Council do not currently monitor for PM2.5 or PM10. In the absence of PM2.5 monitoring and where a local authority does not undertake PM10 monitoring, the current Defra background mapping resource should be used to provide maximum background annual mean PM2.5 concentrations within the Local Authority. This resource is available through https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018 The current Defra background maps for Rushmoor Borough Council (2018 reference year) show that all background concentrations of $PM_{2.5}$ are below the annual mean Air Quality objective for $PM_{2.5}$ (25 µg/m^3), with the highest concentration predicted to be 12 µg/m^3.

Rushmoor Borough Council is taking the following measures to address $PM_{2.5}$: All significant developments are now required to produce Construction Method Statements prior to demolition or construction works commencing, that detail the measures to be employed to minimise fugitive dust emissions and minimise the deposition of dust on the public highway.

Environmental Health continues to regulate Part B industrial installations and these include such processes as Concrete Crushers, Roadstone Coating and Concrete Batching processes that all have the potential emit significant levels of particulates into the air. Environmental Health will continue to work with operators to ensure that measures are in place to reduce fugitive dust from these industrial sites.

Policy IN2 of the Local Plan requires development to minimise the need for travel, promote opportunities for sustainable transport, and improved accessibility for pedestrian and cycle networks.

Policy DE10 of the Local Plan deals specifically with Pollution. Proposals for development that risks non-compliance of EU Limit Values or National Air Quality Objectives will be refused.

Rushmoor Borough Council has also recently approved its Climate Change Strategy and complementary Action Plan. This includes measures to improve air quality and reduce pollution in the borough and will consider the synergies between carbon emission reduction measures and improving local air quality to identify priority areas for maximum benefit.

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

This section sets out the monitoring undertaken within 2020 by Rushmoor Borough Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2016 and 2020 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Rushmoor Borough Council does not currently operate any automatic monitoring sites. An automatic monitoring station was located in Medway Drive, Farnborough, next to the M3 motorway, up until April 2011. The measurements from this site are presented in previous reports.

National monitoring results are available at https://uk-air.defra.gov.uk/.

3.1.2 Non-Automatic Monitoring Sites

Rushmoor Borough Council undertook non- automatic (i.e. passive) monitoring of NO_2 at 26 sites during 2020. Table A.1 in Appendix A presents the details of the non-automatic sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. annualisation and/or distance correction), are included in Appendix C.

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO_2)

Error! Reference source not found. and Table A.2 in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2020 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.

Rushmoor Borough Council has examined the results from monitoring in the borough and can confirm that there were no exceedances of the NO_2 annual mean objectives. All air quality objectives are being achieved.

Examination of the trend in the annual mean NO_2 concentrations over the last five years (Figure A.1) indicates a general improvement in NO_2 concentrations at sites across the borough over this time.

The Blackwater Valley Group have produced a Local Plan to reduce concentrations of NO_2 along the A331. A speed restriction measure has been implemented along a 1.8 km section of the A331, and monitoring of this is ongoing to evaluate its effectiveness in achieving compliance of the EU Limit value in the shortest possible time.

6 NO_2 diffusion tube triplicate sites (RBC1 – SH6) were established during 2019 along the A331 and Blackwater Valley path. These monitoring sites are not representative of public exposure as defined under the LAQM regime and no results are above 40µg/m^3. There were no exceedances of the NO_2 annual mean objective and all results are included in this report.

The Blackwater Valley Group routinely submit quarterly monitoring reports to the Government's Joint Air Quality Unit to update them on progress. We are currently on track to achieve compliance in 2021 and will continue to monitor air quality levels until at least 2023, when we propose to decommission the speed reduction measure.

All annual mean results were less than 60µg/m^3, indicating that an exceedance of the 1-hour mean objective is unlikely at all locations.

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)
C1	Medway Drive - Lamppost 17, opp Tees Close	Roadside	485047	156934	NO2	No	20.0	37.0	No	2.5
H1	North Close	Roadside	486435	157943	NO2	No	0.0	35.0	No	2.5
J1	2 Tees Close	Roadside	485058	156912	NO2	No	0.0	8.0	No	2.5
K1	201 Ash Road, Aldershot	Roadside	487932	149942	NO2	No	0.0	9.0	No	2.5
L1	Alpine Ski Centre	Urban Background	487380	151558	NO2	No	125.0	300.0	No	2.5
N1	270 Fernhill Road, Farnborough	Urban Background	485444	157373	NO2	No	0.0	26.0	No	2.5
O1	One-Stop, Cove Road, Farnborough	Roadside	485864	155502	NO2	No	3.0	2.0	No	2.5
Q1	Prospect Avenue	Roadside	487121	156898	NO2	No	5.0	1.0	No	2.5
R1	86 Rectory Road, Farnborough	Roadside	487844	155922	NO2	No	0.0	4.0	No	2.5
S1	64a Park Road, Farnborough	Roadside	488109	153924	NO2	No	5.0	3.0	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube Co-located with a Continuous Analyser?	Tube Height (m)
Y1	38 Union Street	Roadside	486853	155913	NO2	No	6.0	2.0	No	2.5
Z1	Queens Avenue, A. -opposite churches	Roadside	486588	151976	NO2	No	80.0	13.0	No	2.5
Z2	Badajos Road	Roadside	486112	151152	NO2	No	28.0	10.0	No	2.5
AA	Mayfield Road - Lamppost 7 - Cherrywood Primary School	Roadside	486434	156806	NO2	No	15.0	3.0	No	2.0
BB	Church Lane East - St Michaels Primary School	Roadside	487111	149777	NO2	No	10.0	2.0	No	2.5
DD	Lynchford Road Lamp post 2 (by Wavell playground	Roadside	486887	153409	NO2	No	10.0	3.0	No	2.0
EE	Penine Way	Roadside	485123	157138	NO2	No	1.0	48.0	No	2.0
GG	Farnborough Road	Roadside	487086	154946	NO2	No	3.0	2.0	No	2.0
FF	97-99 North Lane, Aldershot	Roadside	487940	150466	NO2	No	6.0	2.0	No	2.0
HH	Windmill Rd/High Street, Aldershot	Roadside	486993	150445	NO2	No	-2.0	5.0	No	2.0
BVR 1a, BVR 1b, BVR 1c	On Tree at bend north of bridge	Roadside	487963	156329	NO2	No	>200	12.0	No	1.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
BVR 2a, BVR 2b, BVR 2c	North of railway bridge	Roadside	487962	156302	NO2	No	>200	6.5	No	2.0
BVR 3a, BVR3b, BVR3c	Fence post 25m south of footbridge	Roadside	487882	156633	NO2	No	>200	7.5	No	1.1
BVR4a, BVR 4b, BVR 4c	Fence post beside traffic count box	Roadside	487873	156660	NO2	No	>200	8.1	No	1.1
BVR 5a, BVR 5b, BVR 5c	Tree 1m south of traffic count box	Roadside	487874	156656	NO2	No	>200	8.0	No	1.5
SH 6a, SH 6b, SH 6c	Fence - north of railway bridge	Roadside	487952	156395	NO2	No	>200	11.9	No	1.1

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 NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^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 2020 (%) [2]	2016	2017	2018	2019	2020
C1	485047	156934	Roadside	75.0	75.0	29.9	24.0	24.8	24.3	19.5
H1	486435	157943	Roadside	67.3	67.3	27.9	24.1	23.7	21.2	16.4
J1	485058	156912	Roadside	67.3	67.3	23.8	20.9	20.8	21.6	14.8
K1	487932	149942	Roadside	75.0	75.0	30.3	25.5	26.1	25.6	21.1
L1	487380	151558	Urban Background	75.0	75.0	13.7	11.7	12.8	12.2	8.7
N1	485444	157373	Urban Background	75.0	75.0	22.7	17.8	19.4	20.1	15.7
O1	485864	155502	Roadside	75.0	75.0	30.4	25.5	22.8	21.8	18.5
Q1	487121	156898	Roadside	75.0	75.0	36.3	38.5	35.6	36.2	30.7
R1	487844	155922	Roadside	65.4	65.4	27.5	27.3	32.6	30.0	22.5
S1	488109	153924	Roadside	75.0	75.0	26.5	21.0	22.2	23.6	17.1
Y1	486853	155913	Roadside	67.3	67.3	27.4	23.1	23.0	22.4	15.8
Z1	486588	151976	Roadside	75.0	75.0	20.5	17.7	18.0	18.2	12.5

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 2020 (%) [2]	2016	2017	2018	2019	2020
Z2	486112	151152	Roadside	75.0	75.0	23.0	17.5	18.5	16.6	12.6
AA	486434	156806	Roadside	65.4	65.4	22.1	19.0	19.2	20.6	14.2
BB	487111	149777	Roadside	65.4	65.4	24.2	15.9	16.9	18.0	11.3
DD	486887	153409	Roadside	75.0	75.0		25.7	22.7	22.1	16.6
EE	485123	157138	Roadside	75.0	75.0				21.8	16.9
GG	487086	154946	Roadside	67.3	67.3				27.8	21.8
FF	487940	150466	Roadside	75.0	75.0				23.5	19.6
HH	486993	150445	Roadside	75.0	75.0				20.5	17.6
BVR 1a, BVR 1b, BVR 1c	487963	156329	Roadside	100.0	100.0				25.9	19.4
BVR 2a, BVR 2b, BVR 2c	487962	156302	Roadside	100.0	100.0				26.4	22.0
BVR 3a, BVR3b, BVR3c	487882	156633	Roadside	100.0	100.0				26.3	22.3
BVR4a, BVR 4b, BVR 4c	487873	156660	Roadside	100.0	100.0				27.7	25.5
BVR 5a, BVR 5b, BVR 5c	487874	156656	Roadside	100.0	100.0				32.5	26.5

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 2020 (%) (2)	2016	2017	2018	2019	2020
SH 6a, SH 6b, SH 6c	487952	156395	Roadside	100.0	100.0				22.7	21.9

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

☒ **Diffusion tube data has been bias adjusted.**

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

Notes:

The annual mean concentrations are presented as µg/m^3.

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

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined**.

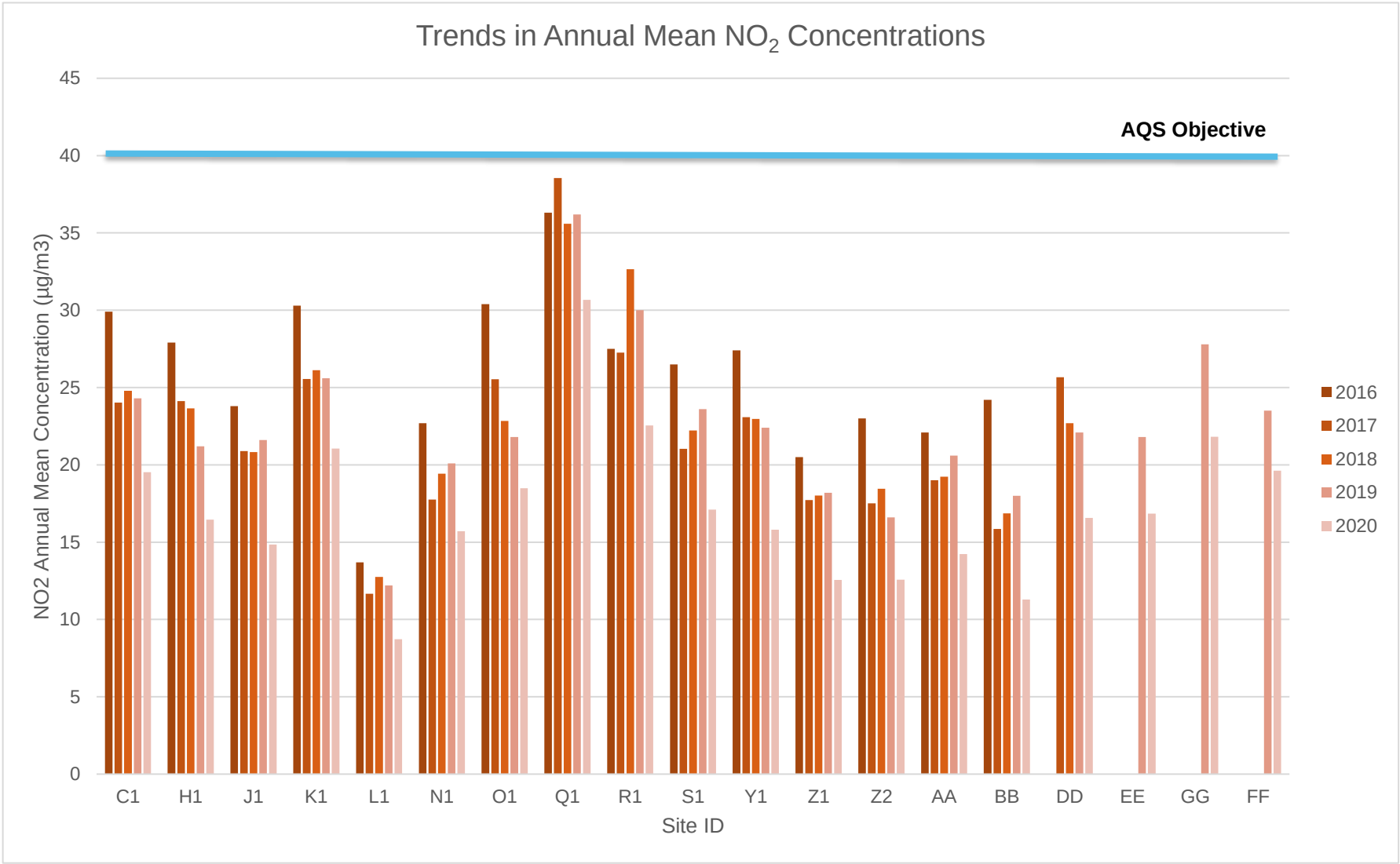
Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Figure A.1 – Trends in Annual Mean NO_2 Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2020

Table B.1 – NO_2 2020 Diffusion Tube Results ($\mu g/m^3$)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.81)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
C1	485047	156934	30.5	26.7				15.1	18.3	21.7	26.2	24.3	28.8	25.4	24.1	19.5		
H1	486435	157943	25.1	21.4					15.2	19.2	24.3	22.7	26.9	23.6	22.3	16.4		
J1	485058	156912	26.3	20.6				11.9	14.3	16.3	21.6	21.3		18.8	18.9	14.8		
K1	487932	149942	32.8	26.9				20.4	18.7	25.5	28.6	26.5	28.0	26.5	26.0	21.1		
L1	487380	151558	15.2	8.8				6.9	6.4	8.1	10.2	11.8	16.2	13.3	10.8	8.7		
N1	485444	157373	26.8	20.6				15.9	9.3	17.0	18.0	19.9	24.9	22.1	19.4	15.7		
O1	485864	155502	31.7	21.9				16.9	14.2	20.1	24.8	20.5	29.0	26.3	22.8	18.5		
Q1	487121	156898	47.5	42.7				33.6	27.5	38.2	38.0	32.6	42.5	38.3	37.9	30.7		
R1	487844	155922	35.0	36.3				23.7	19.8	27.2	30.1	28.8	31.5		29.1	22.5		
S1	488109	153924	27.2	22.8				13.8	12.4	16.7	20.5	23.8	27.8	25.0	21.1	17.1		
Y1	486853	155913	31.5	22.7				13.6	10.7	17.0	19.7	23.5		22.2	20.1	15.8		
Z1	486588	151976	19.2	15.2				11.1	8.4	13.6	15.1	15.4	21.8	19.7	15.5	12.5		
Z2	486112	151152	18.5	13.6				10.9	8.0	13.7	16.2	16.7	22.4	19.8	15.5	12.6		
AA	486434	156806	25.8	19.9				11.9	11.4	14.7	18.0	20.0	25.0		18.3	14.2		
BB	487111	149777	18.5	13.5				10.0	8.8	12.5	15.4	17.2	20.5		14.5	11.3		
DD	486887	153409	27.5	20.2				12.3	14.8	15.8	22.6	21.7	26.3	22.8	20.5	16.6		
EE	485123	157138	26.8	22.8				15.7	10.8	17.5	19.1	22.1	27.7	24.7	20.8	16.9		
GG	487086	154946	36.1	29.4					20.2	26.1	27.7	31.0	36.4	29.6	29.6	21.8		

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.81)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
FF	487940	150466	30.6	22.3				18.5	14.6	22.4	23.7	26.4	32.0	27.6	24.2	19.6		
HH	486993	150445	27.8	21.5				14.9	13.9	19.0	22.2	23.2	26.7	26.1	21.7	17.6	18.4	
BVR 1a	487963	156329	20.5	37.7	24.6	17.7	16.5	18.3	17.9	22.5	23.2	27.5	32.9	28.1	-	-		Triplicate Site with BVR 1a, BVR 1b and BVR 1c - Annual data provided for BVR 1c only
BVR 1b	487963	156329	28.4	34.5	25.9	10.7	15.2	19.4	14.8	22.4	22.4	27.4	32.9	28.5	-	-		Triplicate Site with BVR 1a, BVR 1b and BVR 1c - Annual data provided for BVR 1c only
BVR 1c	487963	156329	33.2	33.9	25.8	18.8	16.0	18.2	18.7	22.7	21.0	26.2	31.9	27.7	24.0	19.4		Triplicate Site with BVR 1a, BVR 1b and BVR 1c - Annual data provided for BVR 1c only
BVR 2a	487962	156302	31.9		25.9	20.0	20.2	22.2	21.5	27.2	28.1	29.8	31.3	30.9	-	-		Triplicate Site with BVR 2a, BVR 2b and BVR 2c - Annual data provided for BVR 2c only
BVR 2b	487962	156302	30.4	36.7	25.4	21.4	20.3	23.7	21.9	27.4	26.9	28.9	34.6		-	-		Triplicate Site with BVR 2a, BVR 2b and BVR 2c - Annual data provided for BVR 2c only
BVR 2c	487962	156302	27.6	36.1	27.0	20.5	19.2	20.4	20.8	28.8	26.9	30.8			27.1	22.0		Triplicate Site with BVR 2a, BVR 2b and BVR 2c - Annual data provided for BVR 2c only
BVR 3a	487882	156633	36.1	40.7	31.5	18.2	18.1	17.9	20.9	22.5	27.3	25.6	34.5	32.4	-	-		Triplicate Site with BVR 3a, BVR3b and BVR3c - Annual data provided for BVR3c only
BVR3b	487882	156633	36.2	43.3	31.4	18.5	17.9	18.1	19.6	23.4	26.9	28.0		31.7	-	-		Triplicate Site with BVR 3a, BVR3b and BVR3c - Annual data provided for BVR3c only
BVR3c	487882	156633	39.1	39.1	30.4	19.0	20.0	17.5	20.4	22.9	27.0	28.6	38.5	33.8	27.6	22.3		Triplicate Site with BVR 3a, BVR3b and BVR3c - Annual data provided for BVR3c only
BVR4a	487873	156660	38.1	41.5	34.0	22.1	23.1	21.8	22.8	26.4	30.8	33.2	38.3	37.4	-	-		Triplicate Site with BVR4a, BVR 4b and BVR 4c - Annual data provided for BVR 4c only
BVR 4b	487873	156660	44.6	43.2	32.0	22.2	22.2	23.0	24.8	28.2	31.6	33.3	40.0	36.0	-	-		Triplicate Site with BVR4a, BVR 4b and BVR 4c - Annual data provided for BVR 4c only
BVR 4c	487873	156660	42.5	44.0	32.9	21.7	23.4	23.2	23.4	27.5	31.3	33.6	42.1	38.1	31.5	25.5		Triplicate Site with BVR4a, BVR 4b and BVR 4c - Annual data provided for BVR 4c only
BVR 5a	487874	156656	40.4	42.2	34.4	22.2	25.1	26.7	26.4	33.2	33.2	37.0	42.5	38.7	-	-		Triplicate Site with BVR 5a, BVR 5b and BVR 5c - Annual data provided for BVR 5c only
BVR 5b	487874	156656	43.6	40.9	32.8	22.4	24.4	24.4	27.1	31.8	34.6	34.8	45.1	36.4	-	-		Triplicate Site with BVR 5a, BVR 5b and BVR 5c - Annual data provided for BVR 5c only
BVR 5c	487874	156656	36.1	43.6	31.4	22.0	25.1	26.1	26.3	31.6	29.8	35.0	44.0	25.9	32.7	26.5		Triplicate Site with BVR 5a, BVR 5b and BVR 5c - Annual data provided for BVR 5c only

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.81)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
SH 6a	487952	156395	39.0	42.5	29.7	19.8	18.4	16.8	17.9	21.3	24.6	27.2	36.2	28.8	-	-		Triplicate Site with SH 6a, SH 6b and SH 6c - Annual data provided for SH 6c only
SH 6b	487952	156395	36.3	42.5	32.4	19.5	18.1	17.6	17.3	21.8	24.6	28.4	33.1	31.4	-	-		Triplicate Site with SH 6a, SH 6b and SH 6c - Annual data provided for SH 6c only
SH 6c	487952	156395	40.8	40.1	31.8			17.3	18.5	21.1	24.0	30.1	37.1	30.9	27.1	21.9		Triplicate Site with SH 6a, SH 6b and SH 6c - Annual data provided for SH 6c only

☒ **All erroneous data has been removed from the NO_2 diffusion tube dataset presented in Table B.1.**

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

☐ **Local bias adjustment factor used.**

☒ **National bias adjustment factor used.**

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

☒ **Rushmoor Borough Council confirm that all 2020 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.**

Notes:

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

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined**.

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 Rushmoor Borough Council During 2020

Rushmoor Borough Council has not identified any new sources relating to air quality within the reporting year of 2020.

Additional Air Quality Works Undertaken by Rushmoor During 2020

Rushmoor Borough Council has not completed any additional works within the reporting year of 2020.

QA/QC of Diffusion Tube Monitoring

The diffusion tubes deployed by Rushmoor Borough Council are supplied and analysed by Gradko using a preparation mixture of 20% triethanolamine (TEA) in water. Gradko comply with the AIR PT scheme, 75% of results between January 2018 and November 2019 were determined to be satisfactory based upon a z-zcore of < ± 2. Table 1 from the latest summary of the Laboratory Performance in AIR NO2 Proficiency Testing Scheme (AIR-PT Rounds AR0030, 31, 33, 34, 36, 37, 39, 40 and 42 (Jan 2019 – Mar 2021) is reproduced here. The actual reports can be accessed at http://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html

All monitoring has been completed in adherence with the 2020 Diffusion Tube Monitoring Calendar.

Table 1: Laboratory summary performance for AIR NO_2 PT rounds AR0030, 31, 33, 34, 36. 37, 39, 40 and 42

The following table lists those UK laboratories undertaking LAQM activities that have participated in recent AIR NO_2 PT rounds and the percentage (%) of results submitted which were subsequently determined to be **satisfactory** based upon a z-score of ≤ ± 2 as defined above.

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

[1] Participant subscribed to two sets of test results (2 x 4 test samples) in each AIR PT round.
[2] NR, No results reported.
[3] Round was cancelled due to pandemic.
Cardiff Scientific Services, Exova (formerly Clyde Analytical), Kent Scientific Services, Kirklees MBC and Northampton Borough Council; these labs are not detailed as they no longer carry out NO2 diffusion tube monitoring and therefore did not submit results for any of the AIR NO_2 PT rounds listed.

Diffusion Tube Annualisation

A number of sites had a valid data capture for the full calendar year of less than 75% (70%). %). It was necessary to annualise the mean as per Box 7.8 of Technical Guidance LAQM.TG16. UK-AIR was used to identify the three nearest locally-managed automatic monitoring sites, with sufficient annual data capture: Godalming Ockford Road 2, Reading Caversham Road and Surrey Heath Camberley. Details of the calculation method undertaken is provided in Table C.2

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2021 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG16 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Rushmoor have applied a national bias adjustment factor of 0.81 to the 2020 monitoring data. A summary of bias adjustment factors used by Rushmoor Borough Council over the past five years is presented in Table C.1.

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2020	National	08/21	0.81
2019	National	09/20	0.91
2018	National	03/19	0.93
2017	National	09/18	0.87
2016	National	03/17	0.97

NO_2 Fall-off with Distance from the Road

Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure should be estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

A fall-off-with-distance calculation was required for one site (Site HH). Output data from the LAQM NO_2 fall-off with distance calculator for this site is presented in Table C.3.

Table C.2 – Annualisation Summary (concentrations presented in µg/m^3)

Site ID	Annualisation Factor Godalming Ockford Road 2	Annualisation Factor Reading Caversham Road	Annualisation Factor Surrey Heath Camberley	Annualisation Factor Site 4 Name	**Average Annualisation Factor**	**Raw Data Annual Mean**	**Annualised Annual Mean**	Comments
H1	0.8814	0.9336	0.9178		0.9109	22.3	20.3	
J1	0.9758	0.9649	0.9688		0.9698	18.9	18.3	
R1	0.9728	0.9557	0.9452		0.9579	29.1	27.8	
Y1	0.9758	0.9649	0.9688		0.9698	20.1	19.5	
AA	0.9728	0.9557	0.9452		0.9579	18.3	17.6	
BB	0.9728	0.9557	0.9452		0.9579	14.5	13.9	
GG	0.8814	0.9336	0.9178		0.9109	29.6	26.9	

Table C.3 – NO_2 Fall off With Distance Calculations (concentrations presented in µg/m^3)

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	**Monitored Concentration (Annualised and Bias Adjusted**	**Background Concentration**	**Concentration Predicted at Receptor**	Comments
HH	5.0	3.0	17.6	12.3	18.4	

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

Figure D.1 – Map showing location of non-automatic monitoring sites C1, J1 and EE

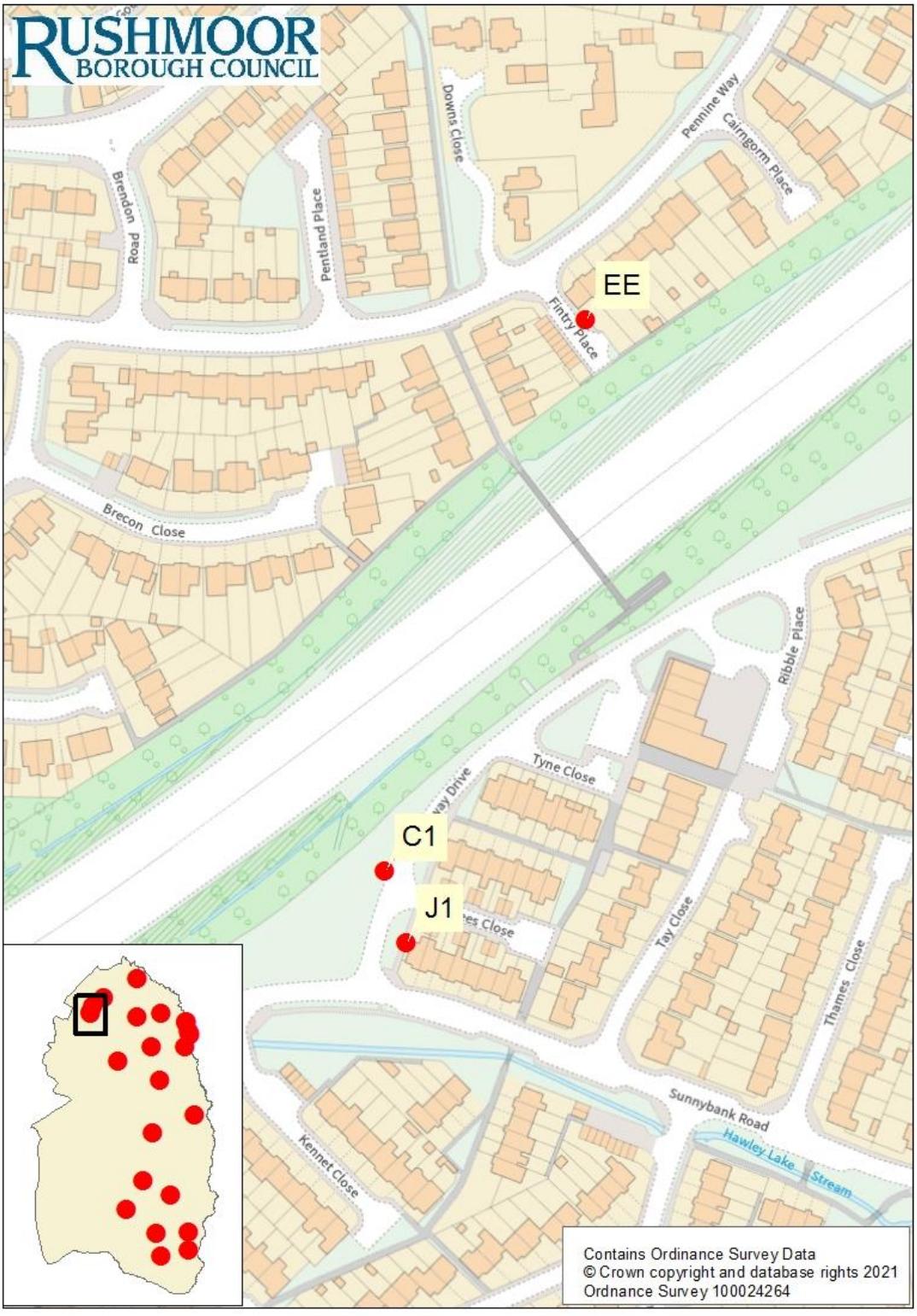


Figure D.2 – Map showing location of non-automatic monitoring sites H1, N1, Q1, and AA

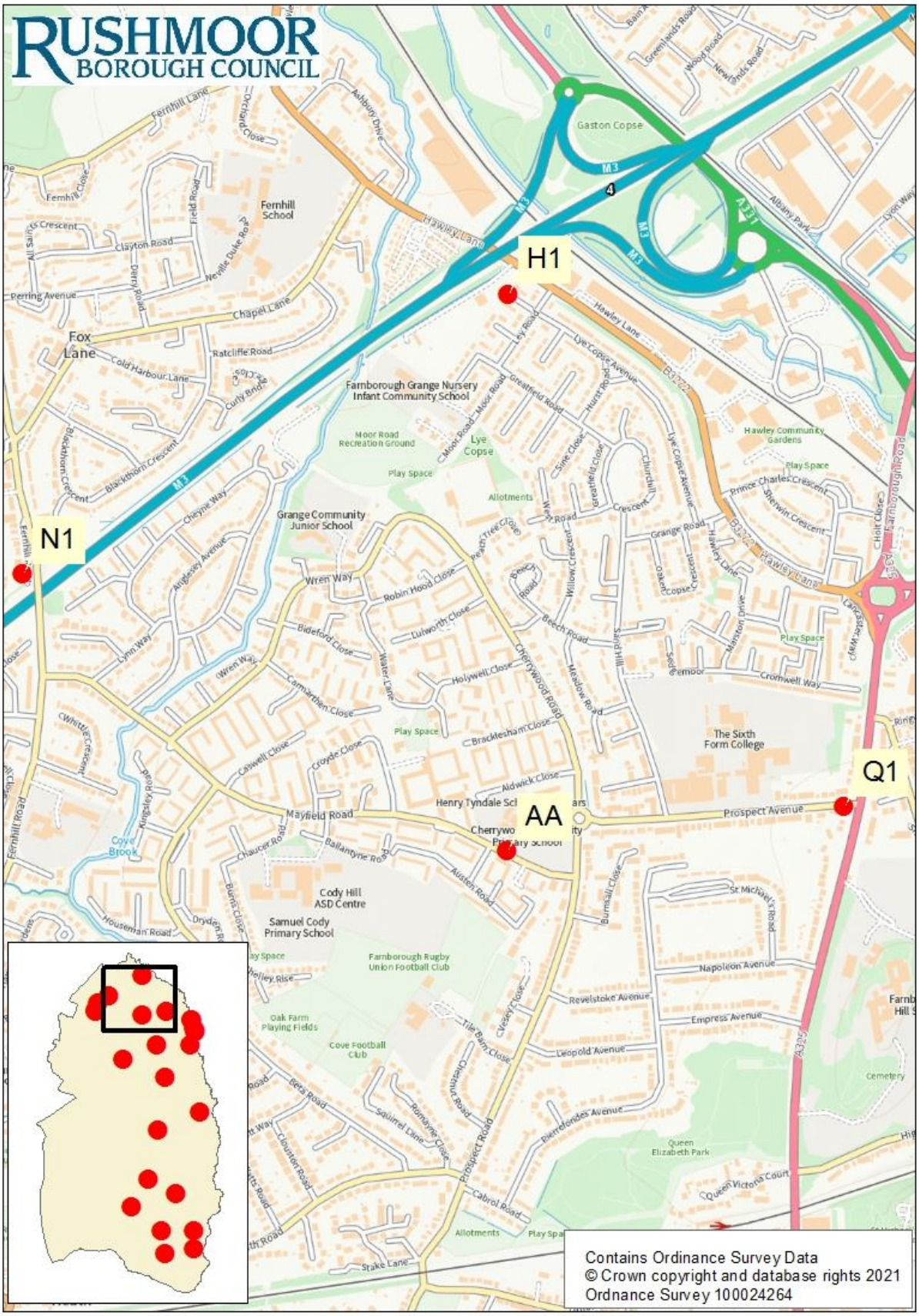


Figure D.3 - Map showing location of non-automatic monitoring sites O1, R1, S1, W1, Y1, DD and GG

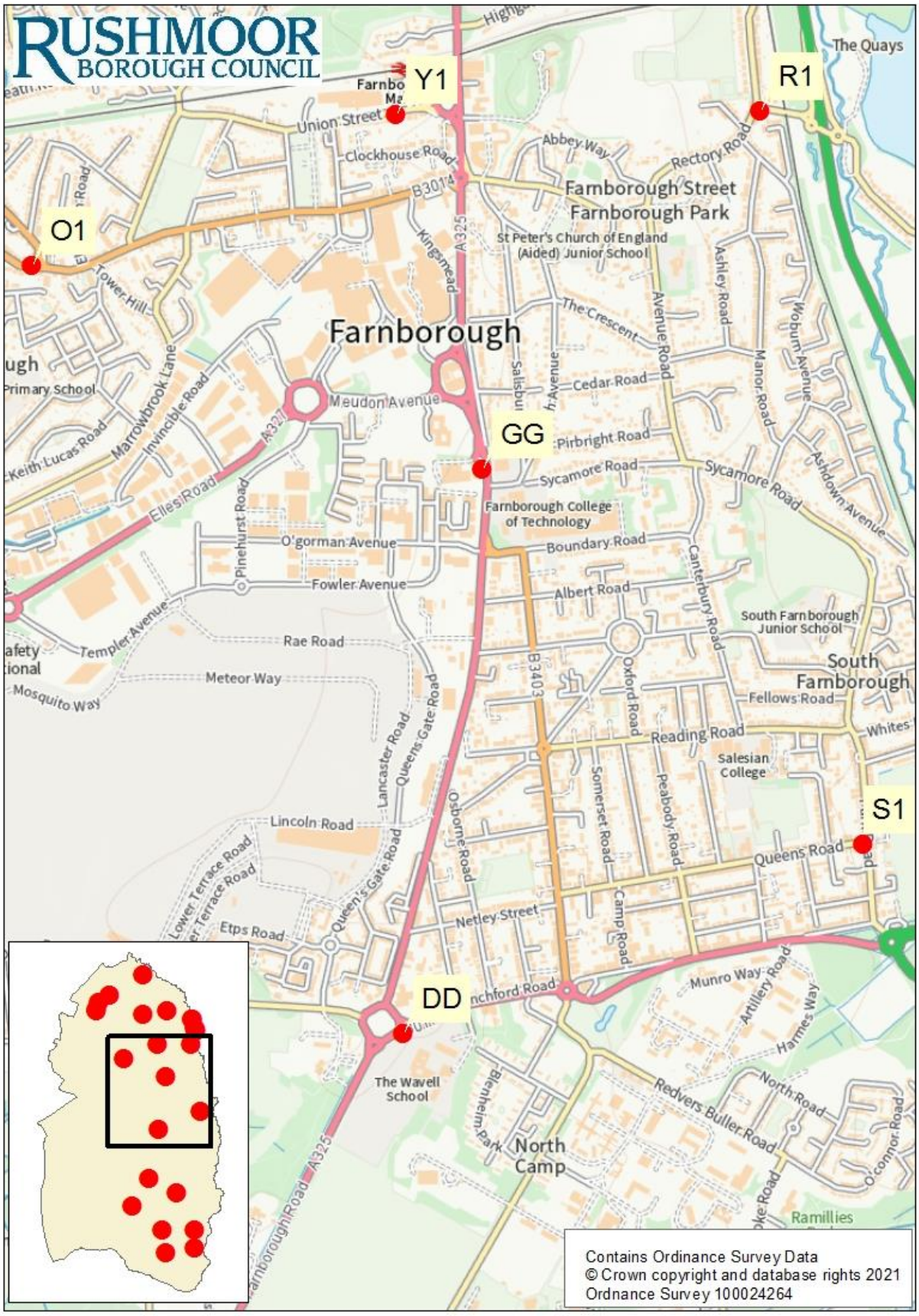


Figure D.4 - Map showing location of non-automatic monitoring sites L1, Z1 and Z2

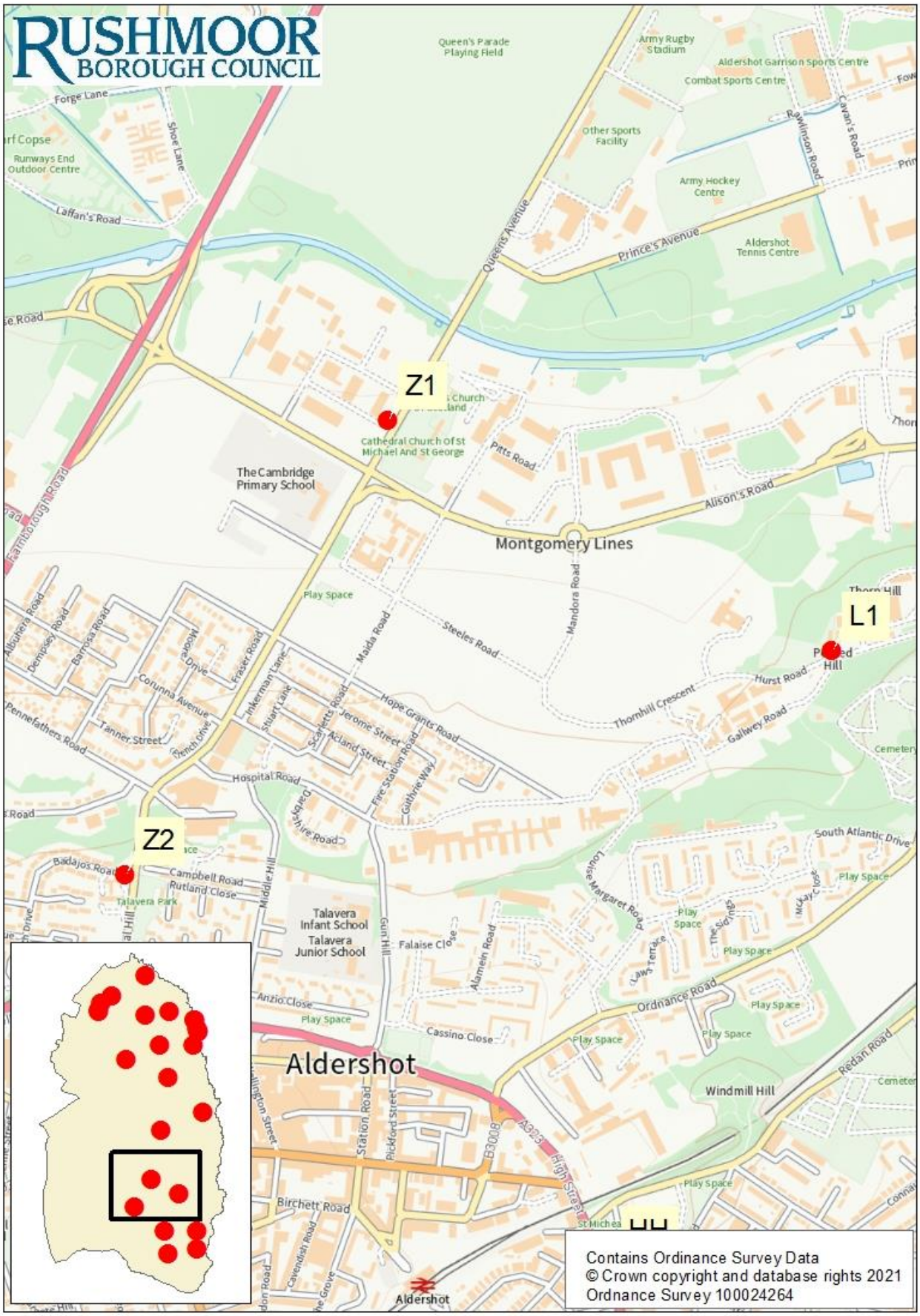


Figure D.5 - Map showing location of non-automatic monitoring sites K1, BB HH and FF

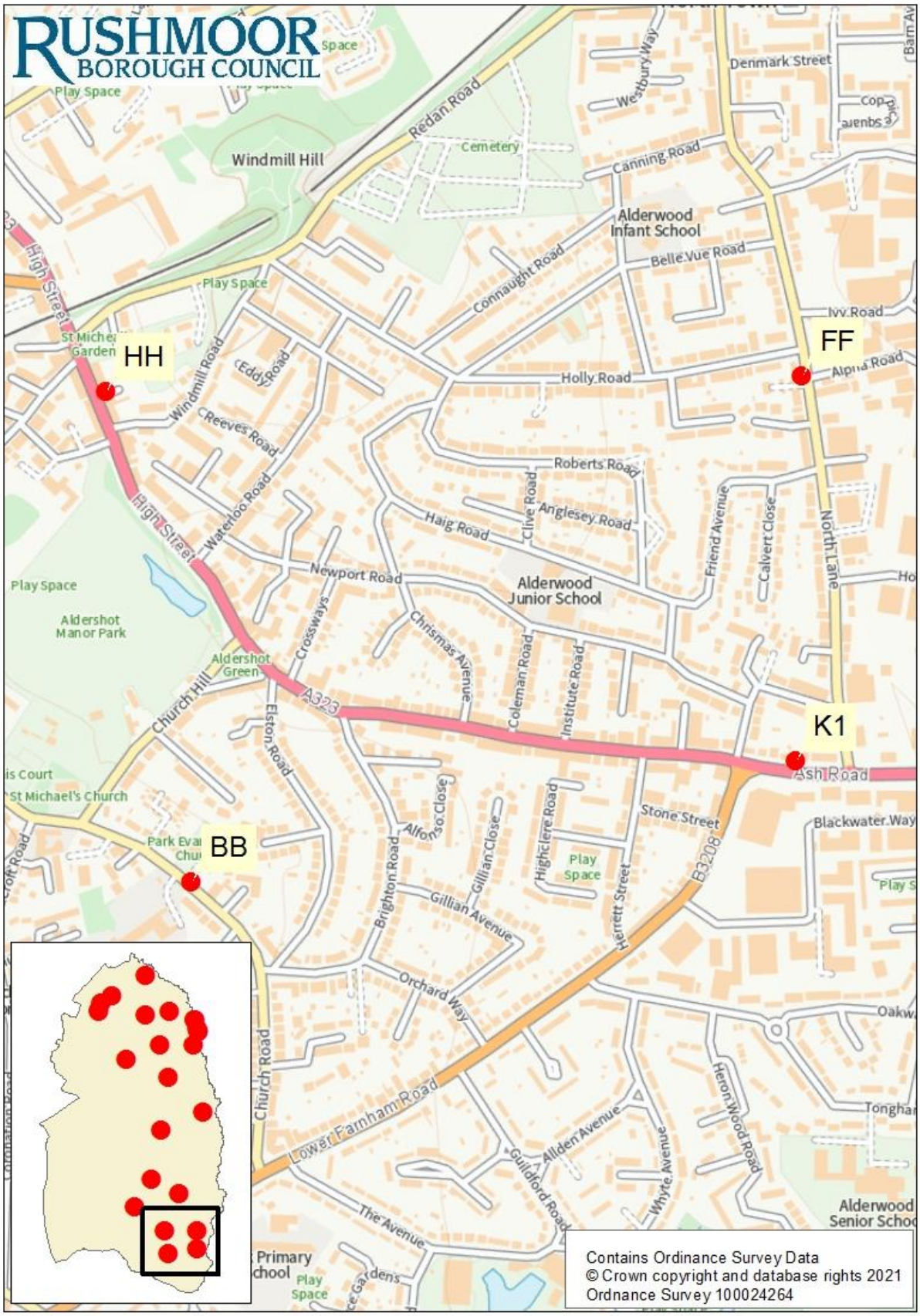
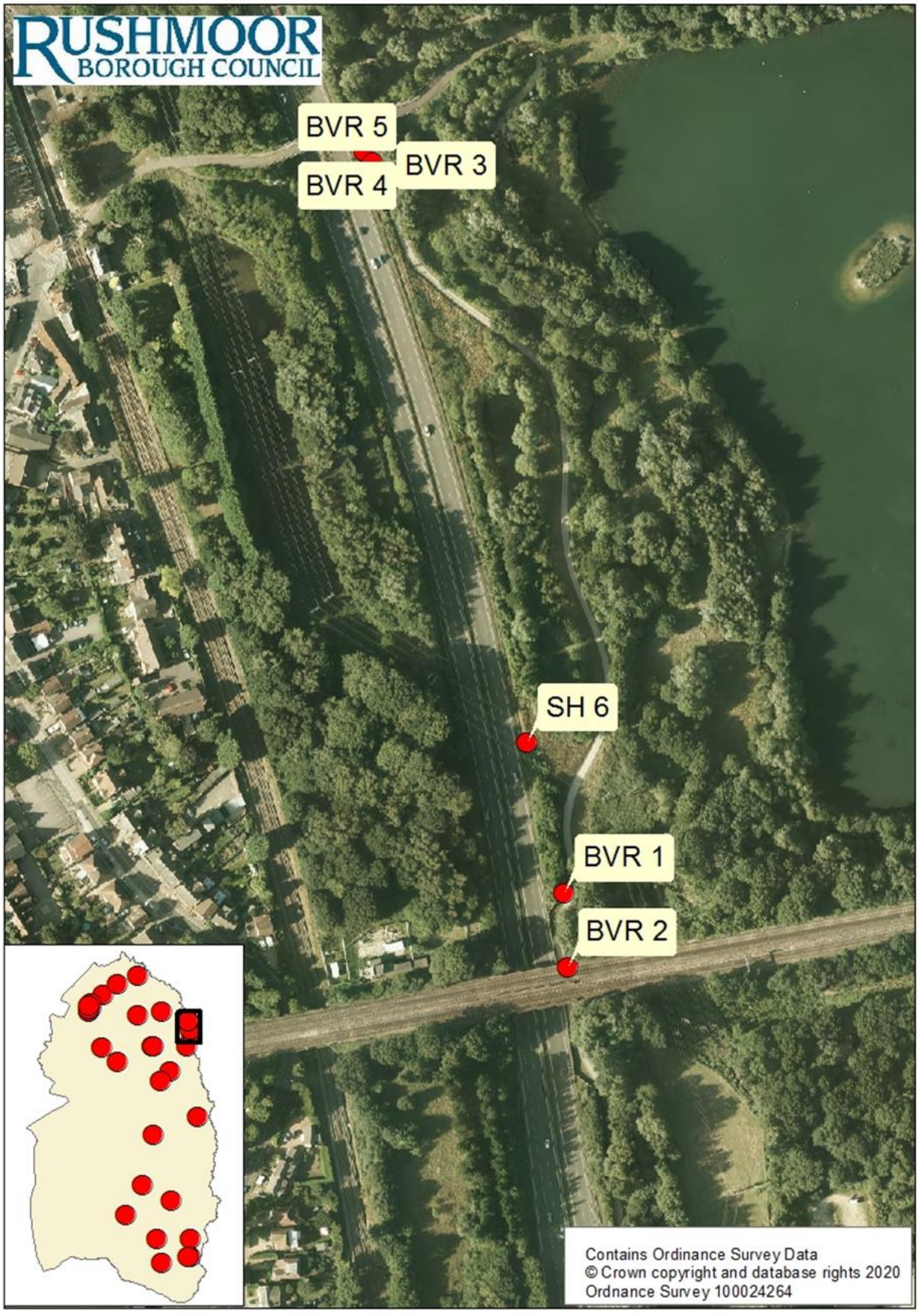


Figure D.6 - Map showing location of non-automatic monitoring sites along the A331



Appendix E: Summary of Air Quality Objectives in England

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

Pollutant	Air Quality Objective: Concentration	Air Quality Objective: Measured as
Nitrogen Dioxide (NO_2)	200µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
Nitrogen Dioxide (NO_2)	40µg/m^3	Annual mean
Particulate Matter (PM_{10})	50µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
Particulate Matter (PM_{10})	40µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
Sulphur Dioxide (SO_2)	125µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
Sulphur Dioxide (SO_2)	266µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

[7] The units are in microgrammes of pollutant per cubic metre of air (µg/m^3).

Appendix F: Impact of COVID-19 upon LAQM

COVID-19 has had a significant impact on society. Inevitably, COVID-19 has also had an impact on the environment, with implications to air quality at local, regional and national scales.

COVID-19 has presented various challenges for Local Authorities with respect to undertaking their statutory LAQM duties in the 2021 reporting year. Recognising this, Defra provided various advice updates throughout 2020 to English authorities, particularly concerning the potential disruption to air quality monitoring programmes, implementation of Air Quality Action Plans (AQAPs) and LAQM statutory reporting requirements. Defra has also issued supplementary guidance for LAQM reporting in 2021 to assist local authorities in preparing their 2021 ASR. Where applicable, this advice has been followed.

Despite the challenges that the pandemic has given rise to, the events of 2020 have also provided Local Authorities with an opportunity to quantify the air quality impacts associated with wide-scale and extreme intervention, most notably in relation to emissions of air pollutants arising from road traffic. The vast majority (>95%) of AQMAs declared within the UK are related to road traffic emissions, where attainment of the annual mean objective for nitrogen dioxide (NO_2) is considered unlikely. On 23rd March 2020, the UK Government released official guidance advising all members of public to stay at home, with work-related travel only permitted when absolutely necessary. During this initial national lockdown (and to a lesser extent other national and regional lockdowns that followed), marked reductions in vehicle traffic were observed; Department for Transport (DfT) data[8] suggests reductions in vehicle traffic of up to 70% were experienced across the UK by mid-April, relative to pre COVID-19 levels.

This reduction in travel in turn gave rise to a change of air pollutant emissions associated with road traffic, i.e. nitrous oxides (NO_x), and exhaust and non-exhaust particulates (PM). The Air Quality Expert Group (AQEG)[9] has estimated that during the initial lockdown period in 2020, within urbanised areas of the UK reductions in NO_2 annual mean concentrations were between 20 and 30% relative to pre-pandemic levels, which

[8] Prime Minister's Office, COVID-19 briefing on the 31st of May 2020

[9] Air Quality Expert Group, Estimation of changes in air pollution emissions, concentrations and exposure during the COVID-19 outbreak in the UK, June 2020

represents an absolute reduction of between 10 to 20µg/m^3 if expressed relative to annual mean averages. During this period, changes in $PM_{2.5}$ concentrations were less marked than those of NO_2. $PM_{2.5}$ concentrations are affected by both local sources and the transport of pollution from wider regions, often from well beyond the UK. Through analysis of AURN monitoring data for 2018-2020, AQEG have detailed that $PM_{2.5}$ concentrations during the initial lockdown period are of the order 2 to 5µg/m^3 lower relative to those that would be expected under business-as-usual conditions.

As restrictions are gradually lifted, the challenge is to understand how these air quality improvements can benefit the long-term health of the population.

Impacts of COVID-19 on Air Quality within Rushmoor

Rushmoor Borough Council does not have any declared AQMAs. However, the following impacts have been recorded:

- Reductions of NO_2 concentrations of between 14 and 31% were experienced at roadside diffusion tube monitoring sites in 2020 compared with 2019 within. This equates to an average 24% reduction in roadside annual mean concentrations relative to 2019.

Opportunities Presented by COVID-19 upon LAQM within Rushmoor

No LAQM related opportunities have arisen as a consequence of COVID-19 within Rushmoor.

Challenges and Constraints Imposed by COVID-19 upon LAQM within Rushmoor

During 2020, Gradko, the laboratory that supply and analyse diffusion tubes for Rushmoor were temporarily closed in April and May. Therefore, it was not possible to maintain diffusion tube exposure periods for March to May in line with the national monitoring calendar for a number of sites. This has affected data capture within 2020, resulting in monitoring sites having to be annualised. **Small Impact**

The impacts as presented above are aligned with the criteria as defined in Table F 1, with professional judgement considered as part of their application.

Table F 1 – Impact Matrix

Category	Impact Rating: None	Impact Rating: Small	Impact Rating: Medium	Impact Rating: Large
Automatic Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Automatic Monitoring – QA/QC Regime	Adherence to requirements as defined in LAQM.TG16	Routine calibrations taken place frequently but not to normal regime. Audits undertaken alongside service and maintenance programmes	Routine calibrations taken place infrequently and service and maintenance regimes adhered to. No audit achieved	Routine calibrations not undertaken within extended period (e.g. 3 to 4 months). Interruption to service and maintenance regime and no audit achieved
Passive Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Passive Monitoring – Bias Adjustment Factor	Bias adjustment undertaken as normal	<25% impact on normal number of available bias adjustment colocation studies (2020 vs 2019)	25-50% impact on normal number of available bias adjustment studies (2020 vs 2019)	>50% impact on normal number of available bias adjustment studies (2020 vs 2019) and/or applied bias adjustment factor studies not considered representative of local regime
Passive Monitoring – Adherence to Changeover Dates	Defra diffusion tube exposure calendar adhered to	Tubes left out for two exposure periods	Tubes left out for three exposure periods	Tubes left out for more than three exposure periods
Passive Monitoring – Storage of Tubes	Tubes stored in accordance with laboratory guidance and analysed promptly.	Tubes stored for longer than normal but adhering to laboratory guidance	Tubes unable to be stored according to be laboratory guidance but analysed prior to expiry date	Tubes stored for so long that they were unable to be analysed prior to expiry date. Data unable to be used
AQAP – Measure Implementation	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP
AQAP – New AQAP Development	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP

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 Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

References

- Local Air Quality Management Technical Guidance LAQM.TG16. April 2021. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG16. May 2016. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.