



2019 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the
Environment Act 1995
Local Air Quality Management

August 2019

Rugby Borough Council

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Executive Summary: Air Quality in Our Area

Air Quality in Rugby 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 and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas^{1,2}.

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion³.

The main pollutants of concern in Rugby, as in most areas of the UK, are associated with road traffic, in particular NO₂ and particulate matter (PM) at locations close to busy, congested roads where people may live, work or shop. Previous Review and Assessment reports and local knowledge have identified areas where UK air quality objectives may be exceeded. Rugby Borough Council declared an Air Quality Management Area (AQMA) in 2004 for exceedances of the annual mean NO₂ objective. This area covers the whole urban area of Rugby bounded by the southern boundary with Daventry District Council, A5, M6, minor roads to the west of Long Lawford, A45 and M45 (https://uk-air.defra.gov.uk/aqma/details?aqma_ref=267#109).

Monitoring data for 2018 showed an overall increasing trend in annual mean NO₂ concentrations compared to 2017, with increases in annual mean concentration at 38 of the 56 monitoring sites in Rugby Borough Council's monitoring network. The greatest increase was monitored outside of the declared AQMA and resulted in an exceedance of the air quality objective at this location (S24). There was one exceedance of the annual mean objective for NO₂ within Rugby Borough Council's AQMA in 2018 (S54a).

Actions to Improve Air Quality

Rugby Borough Council has continued its work alongside Coventry and Warwickshire Air Quality Alliance, a partnership comprising Environmental Health, Public Health,

¹ Wheeler and Ben-Shlomo, Environmental equity, air quality, socioeconomic status and respiratory health, 2005

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

³ Defra. Abatement cost guidance for valuing changes in air quality, May 2013

Planning and Transport officers from the Coventry and Warwickshire local authorities to implement the Air Quality objectives of the Health Protection Strategy 2017-2021. The Strategy provides:

- Practical solutions to promote behaviour shifts and initiatives that reduce car journeys and promote physical activity, including in school and workplace environments;
- More ‘active’ travel infrastructure solutions with increased cycle ways, and improved public transport infrastructure;
- Evidence of designing in health through planning processes; and
- Exploration of wider opportunities for improving fleet vehicles, and green procurement opportunities.

Rugby Borough Council’s Local Plan 2011 – 2031 has been updated and was adopted by the elected members on 4 June 2019. This sets out specific planning policies in relation to air quality, and states:

Policy HS5: Traffic Generation and Air Quality

“Any development that results in significant negative impacts on health and wellbeing of people in the area as a result of pollution, noise or vibration caused by traffic generation will not be permitted unless effective mitigation can be achieved.

Any development that results in significant negative impacts on air quality within identified Air Quality Management Areas or on the health and wellbeing of people in the area as a result of pollution should be supported by an air quality assessment and, where necessary, a mitigation plan to demonstrate practical and effective measures to be taken to avoid the adverse impacts.”

Several other policies also address air quality:

- ED2 (Employment development within Rugby urban area), requiring applicants to demonstrate that any potential impacts on neighbouring land uses, particularly those sensitive to noise, visual amenity or air quality impacts arising from industrial uses are avoided, or mitigated to an acceptable level;
- SDC1 (Sustainable Design), outlining that developers are to consider the impact of environmental factors such as poor air quality to ensure such sensitive sites

achieve relevant statutory compliance and/or are adhering to current best practice; and

- D1 (Transport), detailing the importance of reducing the impact of vehicular movements to mitigate the significant adverse impact road traffic can have on environmental factors such as air quality.

In conjunction with the Air Quality Alliance, Consultants and Planning Policy Officers, Rugby Borough Council has developed a new Air Quality Supplementary Planning Document to provide guidance to planners. This document outlines the criteria against which developments are assessed in order to determine whether or not an Air Quality Assessment is required. Furthermore, the Document outlines suitable mitigation measures for minimising negative impacts on air quality within AQMAs and ensuring that future development remains air quality neutral.

Following adoption of the Local Plan, Rugby Borough Council seeks to implement the Air Quality Supplementary Planning Document in due course.

Conclusions and Priorities

The main priorities for addressing air quality set out by Rugby Borough Council are:

- Complete the review of the Rugby Transport Strategy in conjunction with Warwickshire County Council in order to consider possible measures to address congestion at key locations in Rugby, including the Warwick Street Gyratory. This will help to improve safety and air quality in these areas.
- Identify strategies for the reducing levels of PM_{2.5}. This will include the launch of a social media campaign targeting residents of the Borough in relation to the use of open fires and wood-burning stoves.
- Behaviour Change Intervention Project – developed by Coventry and Warwickshire Public Health and the Air Quality Alliance, this project aims to develop a shift in public behaviour that will ultimately reduce exposure to air pollution whilst simultaneously increasing levels of physical activity. A key objective of the project is to highlight the opportunities available to members of the public to allow them to adopt more sustainable forms of transport, in addition to understanding the barriers faced by members of the public to walking, cycling or travelling via public transport to their place of work. This understanding will

be used to develop, implement and evaluate a behaviour change intervention that promotes active/sustainable travel while reducing exposure and contribution to air pollution. This project will also explore the role personal air pollution monitors can play in both educating people on the impacts of air pollution and in changing their travel behaviour. It will pilot the use of personal air pollution monitors across a study group and include a series of quantitative questionnaires to identify if an intervention can be developed that can be replicated in multiple settings (such as schools, other work locations, etc.) to increase active travel and reduce exposure to air pollution.

- Rugby Borough Council are currently part of a bid by Warwickshire County Council for funding for electric charging points. Rugby Borough Council are planning up to 9 charging points, however exact numbers and locations are yet to be finalised. Provisional locations include Newbold Road long-stay car park, Evreux Way car park and the John Barford long-stay multi-storey car park.
- Rugby Borough Council are currently investigating the possibility of joining the Coventry and Warwickshire car share scheme. This would enable Council workers to have better access to shared journeys and in doing so reduce the number of vehicle trips in and out of the town centre. This will be promoted to staff internally through the internet communication platforms. The Car Share scheme will also be promoted to the public via a social media campaign and website links.
- During 2019 Rugby Borough Council will conduct an extensive review of non-automatic (diffusion tube) monitoring sites. With the exception of site S54a, at which exceedances of the annual mean NO₂ objective have occurred, annual mean NO₂ concentrations at all but one non-automatic monitoring sites outside of the AQMA, have been below 25µg/m³ for the past 5 years, with the remaining site, S51, measuring concentrations below 35µg/m³. In 2016 and 2018, S54a has monitored concentrations of above 45µg/m³. Rugby Borough Council will consider refocussing the non-automatic monitoring locations outside of the AQMA and closer to S54a to fully investigate the exceedances seen at this site.
- Within the AQMA itself, many non-automatic monitoring sites have been measuring concentrations below 30 µg/m³. These monitoring locations around Hillmorton Paddock, Long Lawford, Newbold-on-Avon and Brownsover.

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Exceedances of the AQO continue to be experienced at S24, near to Dunchurch. Rugby Borough Council will continue to monitor the area around S24. Additionally, the Council will seek to consider relocating monitoring locations where there have been consistently low concentrations to locations with extensive new housing developments, all of which are within the existing AQMA. This will be implemented at the end of 2019 and will be reflected in monitoring data for 2020.

One of the key challenges to improving air quality in Rugby is predominantly in the form of planning applications for developments that may impact negatively on existing air quality, as is the case for most local authorities. There have been several recently completed major developments in Rugby, along with a considerable number of large-scale developments in the pipeline and numerous smaller developments.

1. A replacement primary school, new secondary school, and new Special Education Needs school at Rokeby Estate, Rugby. Please note that this is currently subject to a legal challenge.
2. Coton Park East – An allocation in the Local Plan for around 800 dwellings.
3. Land to the north of Ashlawn Road – allowed on appeal decision for development of up to 860 dwellings and associated school. Planning Appeal Reference: APP/E3715/W/16/3147448.
4. Urban Expansion South West of Rugby – an allocation in the Local Plan for around 5,000 residential dwellings with associated infrastructure comprising of link road, health/community facility, and employment uses, including a local centre, together with primary and secondary schools. This site also covers the development proposal for Ashlawn Road.
5. Oakdale Nursery, Rugby Road, Coventry, CV8 3GJ - Outline planning permission for the redevelopment of the former Garden Centre / Nursery site to provide a 'Care Village' residential retirement development of 124 independent living units and a 36-bed care centre.
6. Brandon Stadium (Coventry Stadium) Rugby Road Demolition of existing buildings and outline planning application for residential development of up to 137 dwellings.

The following developments are either under construction or are completed / occupied:

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1. Rugby Radio Station (SUE) – Urban extension to Rugby providing up to 6,200 dwellings and up to 130,000 square metres of space for various land uses (including mixed use district centre, 3 primary schools and 1 secondary school). Phase 2 is currently under construction. Phase 3 is due to start construction in Autumn 2018.
2. Rugby Gateway (Eden Park) – Outline application for up to 1,300 residential units and employment zone. Phase I and the employment zone has been completed. Phase II (230 dwellings), and Phase 4 (147 dwellings) is under construction.
3. Leicester Road/Technology Drive – permission granted for 620 dwellings. The first three phases comprised of 87 dwellings for phase 1, 40 apartments for phase 2, and 75 dwellings for phase 3 and have been completed. On the south side of the development site, three further sites were granted planning permission for Leicester Road West for 87 dwellings, Butterfield Gardens for 101 dwellings (both of which were completed) and Land South of Technology Drive was granted planning permission for 230 dwellings which represents the final phase and is under construction.
4. Elliot's Retail Park (Phase I) – 27,000 m² retail development now fully constructed and occupied.
5. Elliot's Retail Park (Phase II) – bulky goods retail park is now fully constructed and occupied.
6. Junction 1 Retail Park – 5,670 m² retail park is now completed and occupied.
7. Coton House – 82 residential properties completed and substantially occupied.
8. Cawston Extension – Outline planning permission granted for up to 600 homes under reference R11/0114. However, the site has been divided into four sections with four different developers. Each of the four sections have been substantially completed and partly occupied. The northern most section has been constructed by William Davis for 184 dwellings under reference R16/1721. The southern site has been constructed by Linden Homes for a total of 246 dwellings (from combined planning permissions of R16/1780 and R17/1885). To the east of these two sites, Redrow Homes constructed 113 dwellings (from planning permission R15/0540), whilst the furthest site to the east has been

constructed by Triosquare and comprises 10 dwellings granted under combined references of R12/1947 and R16/2295 (it should be noted that these last two permissions were not part of the original outline under R11/0114). In total, these four sections comprise 553 dwellings, substantially completed, and partly occupied.

Local Engagement and How to get Involved

The general public can take simple measures to help improve air quality, the main ones being, where possible, making short trips and journeys on foot or by bike instead of by car, or using public transport. Car sharing with colleagues, or with other parents on the school run, are some other examples of ways to reduce traffic congestion, for example. Other measures are listed below:

- Purchasing low-emission electric and/or hybrid vehicles, with government funding and grants available.
- Upgrading boilers to newest and most efficient gas condensing boilers with lowest NO_x (and carbon) emissions.
- Renewable energy generation via solar photovoltaics or wind turbine installation (although individual effect on air quality is minor and non-local)
- Reducing the use of open fires and wood-burning stoves;
- Ensuring only permitted appliances and fuels are burnt in the 'Smoke Free Zone' across the urban area; and
- Following good practices.

Further information can be found on the Council's website⁴, and Defra's Local Air Quality Management (LAQM) website⁵.

⁴ Rugby Borough Council Air Pollution website: https://www.rugby.gov.uk/info/20021/pollution/217/air_pollution

⁵ Defra LAQM website: <http://laqm.defra.gov.uk/>

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1 Local Air Quality Management

This report provides an overview of air quality in Rugby Borough Council during 2018. 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 Rugby Borough Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England can be found in Table E.1 in Appendix E.

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 must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

A summary of AQMAs declared by Rugby Borough Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=214. Alternatively, see Appendix D: Map(s) of Monitoring Locations and AQMAs, which provides a map of air quality monitoring locations in relation to Rugby Borough Council's AQMA.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)				Action Plan		
						At Declaration		Now		Name	Date of Publication	Link
Rugby AQMA (NO ₂)	16/12/2004	NO ₂ Annual Mean 40 µg/m ³	Rugby	The area covers the whole urban area of Rugby bounded by the southern boundary with Daventry District Council, A5, M6, minor roads to the west of Long Lawford, A45 and M45.	YES	> 40	µg/m ³	43.3	µg/m ³	Rugby Borough Council AQAP	2010	Currently being updated; available from the Council on request.

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

2.2 Progress and Impact of Measures to address Air Quality in Rugby Borough Council

Defra's appraisal of last year's ASR concluded that although there have been significant improvements in local air quality in recent years, progress on action plan measures was limited since the previous reporting year. It was however noted that several of the traffic management schemes implemented by Rugby Borough Council have resulted in improved air quality.

Rugby Borough Council has taken forward a number of direct measures during the current reporting year of 2018 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

More detail on these measures can be found in Rugby Borough Council's Air Quality Action Plan. All actions from 2018 are ongoing; there are no additional completed measures to report.

Rugby Borough Council expects the following measures to be completed over the course of the next reporting year:

- Adoption of the Air Quality Planning Policy Guidance;
- Complete the review of the Rugby Transport Strategy in conjunction with Warwickshire County Council;
- Implement the Behaviour Change Intervention Project;
- Install up to 9 charging points at the provisional locations: Newbold Road long-stay car park, Evreux Way car park and the John Barford long-stay multi-storey car park; and
- Conduct an extensive review of non-automatic (diffusion tube) monitoring sites and identify areas for new monitoring or relocation.

Additionally, Warwickshire County Council is currently reviewing the Rugby Transport Strategy in partnership with Rugby Borough Council as part of a wider review of Warwickshire's Local Transport Plan (LTP3). This will consider possible measures for addressing congestion and improving safety and air quality at key locations in Rugby, including the Warwick Street Gyrotory.

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Rugby Borough Council anticipates that the measures stated above and in Table 2.2 will achieve compliance in the Rugby AQMA. It is however noted that Rugby Borough Council will monitor the recorded exceedance outside of the AQMA and consider declaring an additional AQMA upon receipt of 2019 monitoring data, should exceedances continue. This will be addressed in the next reporting year.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
A	Rugby Western Relief Road (RWRR)	Transport Planning and Infrastructure	Other	WCC	1996-2007	2007-2011	Implementation of the scheme in full	12%	The road was fully opened to traffic in September 2010.	Completed September 2010	N/A
B	Warwick Street Gyratory Improvements	Transport Planning and Infrastructure	Other	WCC	2007-2014	2014/15	Implementation of the scheme in full	N/A	The major improvement to the Gyratory was completed in May 2015.	Completed May 2015	N/A
C	Improvements to Church Street/ North Street	Transport Planning and Infrastructure	Other	WCC	2018	Post 2016/17	Implementation of the scheme in full	N/A	A scheme to extend the pedestrianised area of the town centre on Church Street/North Street was previously developed and consulted upon, however it was jointly agreed by Warwickshire County Council and Rugby Borough Council not to implement the scheme at that time. The Borough Council is now considering a number of public realm improvements as part of a wider strategy for the town centre, which for this area would supersede the previously developed proposals for Church Street/North Street	TBC	The timescales for implementation of the scheme have changed as a result of the further consultation, which has been carried out on the revised proposal.

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D	Decriminalisation of Parking Enforcement within Rugby Borough	Traffic Management	Other	WCC	2000-2005	2005-2006	Implementation of the scheme in full	N/A	Scheme fully implemented in 2006	2006	Since the commencement of Decriminalisation of Parking (now referred to as Civil Parking Enforcement CPE) on 02/10/06 in Rugby, the introduction of parking charges on some town centre streets together with a high level of enforcement has resulted in less vehicles being parked on the streets and less congestion, and therefore emissions, due to inconsiderate parking.
E	Re-routing traffic - Lorry Route Maps and agreements	Traffic Management	UTC, Congestion management, traffic reduction	WCC	Ongoing	N/A	Reduction in complaints regarding inappropriate lorry movements	N/A	An initial Advisory Lorry Route Map for the County was produced in 2005. This was subsequently revised and reissued in 2009. HGV routing agreements are stipulated through the planning process with WCC	N/A	
F	Variable Message Signing	Traffic Management	UTC, Congestion management, traffic reduction	WCC	2006-2008	2009	Implementation of the scheme in full	N/A	Scheme fully implemented in 2009	Completed in 2009	Evidence from other towns in Warwickshire that Variable Message Signing reduces the unnecessary distance travelled by vehicles looking for parking spaces. In Rugby town centre the impact of Variable Message Signing may have been masked by overall reductions in road traffic brought about by the opening of RWRR and road infrastructure

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											improvements to the Warwick Street Gyratory.
G	Improve the Borough Council Fleet (interims of emissions)	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	RBC	Ongoing	Ongoing	N/A	N/A	Euro 6 is now the latest technology with no further advancement on the horizon. Currently the Euro 6 vehicles we have consists of 13 x refuse freighters', 1 x road sweeper 1 x highways tipper and 7 x housing vans/tippers 3.5t. All replacement vehicles will be Euro 6.	Ongoing	Euro 6 is the most advanced technology available and is anticipated to deliver NOx emissions reductions
H	Improve Bus Emissions	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	RBC/WCC	Ongoing	Ongoing	N/A	N/A	Urban Quality Bus Corridor improvements have been made on routes between the Town Centre and Lower Hillmorton/Long Lawford, between Woodlands and the Town Centre, and on the Inter-Urban route between Rugby and Coventry. Finance has been provided through developers of committed planning developments	Ongoing	A lack of resources by the bus operators. However the update older public service vehicles with those of the latest technologies should result in measureable emissions reductions of NOx and PM10
I	Cycling	Promoting Travel Alternatives	Promotion of cycling	WCC	Ongoing	Ongoing	Increase in cycling as a result of individual scheme implementation	N/A	The basis of a cycle network has been delivered in phases over the last 15 years, using a combination of on and off-carriageway routes. Additional routes will come forward as resources permit and in	Ongoing	

									<p>conjunction with new development.</p> <p>WCC and RBC provide cycle training for young people and adults who are keen to improve their cycle skills.</p> <p>Cycle facilities have been provided as part of RWRR.</p> <p>The Leicester Road viaduct Connect2 scheme opened in 2014.</p> <p>The A428 Lawford Road cycleway between Long Lawford and the RWRR was completed in 2014. A bid to the DfT's Cycle Safety fund was successful for a scheme to extend this cycleway from the RWRR to the Town Centre. The extension was completed in 2015.</p>		
J	Walking	Promoting Travel Alternatives	Promotion of walking	WCC	Ongoing	Ongoing	Increase in walking (footfall) as a result of individual scheme implementation	N/A	<p>The LTP Walking Strategy sets out a series of improvements for pedestrians, including new or upgraded pedestrian crossings, new/widened footways, improved street lighting, provision of new dropped kerbs, and footway resurfacing/reconstruction.</p>	Ongoing	

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K	Workplace Travel Plans	Promoting Travel Alternatives	Workplace Travel Planning	WCC	Ongoing	Ongoing	Number of Travel Plans agreed with existing employers and as part of new development	N/A	Workplace Travel Plans are secured through a S106 agreement as part of new development.	N/A	
L	School Travel Plans and Safer Routes to School	Promoting Travel Alternatives	School Travel Plans	WCC	Ongoing	Ongoing	Reduction in the number of car-based journeys to school	N/A	The majority of Local Authority run schools within the Borough now have a School Travel Plan in place.	N/A	
M	Public Transport Strategy, including the Bus Strategy	Promoting Travel Alternatives	Other	WCC	Ongoing	Ongoing	Increase in bus patronage	N/A	Ongoing implementation of the various strategies which make up the Public Transport Strategy, including the Bus Strategy, Passenger Rail Strategy, Community Transport Strategy, Public Transport Information Strategy and Public Transport Interchange Strategy.	N/A	
N	Travel Awareness Campaigns	Promoting Travel Alternatives	Personalised Travel Planning	WCC	Ongoing	Ongoing	Reduction in the number of car-based journeys being made within the Borough	N/A	Ongoing implementation of the Changing Travel Behaviour Strategy and other relevant LTP strategies.	N/A	
O	Energy efficiency improvements to Rugby housing & the reduction of fuel poverty.	Policy Guidance and Development Control	Low Emissions Strategy	RBC	Ongoing	Ongoing	HECA report published March 2017, and will be updated at two yearly intervals	N/A	Across the borough we have provided the following services: * Worked with our partner, Act on Energy, to provide an energy advice phone line * Organised advice sessions held at the Town Hall & library, flu clinics, Children's Centres and Older People's Drop-in session * Held training	N/A	DECC statistics show that CO ₂ emissions by domestic use (Units kt CO ₂) have reduced from 215.7 in 2009 to 213.3 in 2013, a per capita reduction from 21.8 to 19.8 We aim to reduce CO ₂ emissions in the housing sector to 172.6kt CO ₂ of 2009 (215.7kt CO ₂) levels by 2020. This will be

									<p>sessions for front-line staff and community and voluntary workers</p> <ul style="list-style-type: none"> * Provided media coverage with Press Releases; articles in Tenant Times; twitter posts on coping with cold weather, energy savings tips, etc.; cold weather alerts issued to front-line staff and 100 community organisations * Sent mail out to 1970 households in the Benn area with information about ECO funding for energy improvements, plus support available from Act on Energy * Held presentation for local landlords about the Minimum Energy Efficiency Standards and provided information about new Carbon Monoxide legislation * Carried out initial feasibility assessment for District Heating <p>Council tenants have benefitted from these improvements and services:</p> <ul style="list-style-type: none"> * electric to gas conversions for 262 properties * new windows and doors to 3420 properties with windows and doors * central heating 	equivalent to a 20% reduction.
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									renewals – 49 gas to gas upgrades * energy advice session held for tenants at Woodside Travellers Site * mail out to Sheltered Tenants and High Rise Residents about Warm Home Discount		
P	Control Of Industrial Emissions	Environmental Permits	Measures to reduce pollution through IPPC Permits going beyond BAT	RBC	Ongoing	Ongoing	97.5% compliance improvements	N/A	37 Permitted Industrial Pollution Process (100% inspections completed) achieved 97.3% compliance improvements.	N/A	One site was not compliant making 97.3% compliance improvements achieved
Q	Emissions from Domestic and Commercial Sources	Environmental Permits	Other	RBC	Ongoing	Ongoing	Reduction in complaints	N/A	Low priority. Low number of complaints.	N/a	Designated smoke Control Area (chimneys) and section 79 of the EPA 1990 actively implemented where problems are identified.
R	Control of Bonfires	Policy Guidance and Development Control	Other policy	RBC	Ongoing	Ongoing	Reduction in complaints	N/A	Low priority. Low number of complaints.	N/A	Section 79 of the EPA 1990 actively implemented where problems are identified
S	Planning Development and Planning Applications	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	RBC	Ongoing	Ongoing	N/A	N/A	Rugby Borough Council's Local Plan 2011 – 2031 has been updated and this was adopted by the elected members on 4 June 2019. This sets out specific planning policies in relation to air which states: Policy HS5: Traffic Generation and Air Quality	N/A	Work on new Air Quality Supplementary Planning Guidance continues alongside the Local Plan.

									<p>Any development that results in significant negative impacts on health and wellbeing of people in the area as a result of pollution, noise or vibration caused by traffic generation will not be permitted unless effective mitigation can be achieved.</p> <p>Any development that results in significant negative impacts on air quality within identified Air Quality Management Areas or on the health and wellbeing of people in the area as a result of pollution should be supported by an air quality assessment and, where necessary, a mitigation plan to demonstrate practical and effective measures to be taken to avoid the adverse impacts.</p>		
T	Installing EV Charging Points in RBC Car Parks	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emissions Vehicles, EV recharging, Gas fuel recharging	WCC	2019-20	2020	N/A	N/A	<p>RBC are currently part of a bid by Warwickshire County Council for funding for electric charging points. The bid is on behalf of WCC and all the districts and boroughs.</p> <p>The application for grant funding is to the</p>	2020	

									<p>Energy Saving Trust and if granted we intend to find a commercial company to provide the remainder of the funding.</p> <p>RBC are planning up to 9 charging points. Numbers and locations to be agreed, but provisional locations are Newbold Road car park (long stay), Evreux Way car park (in front of the Town Hall) and the John Barford car park (our long stay multi-storey car park).</p>		
U	Promotion of Practical Guidance for use of open fires and wood burning stoves in domestic settings	Public Information	Via Internet	RBC	2019	2019	N/A	N/A	RBC are planning a promotion campaign using promotional guidance provided by DEFRA in relation to open fires and wood burning stoves. This will be done via the web page and social media communication platforms	Ongoing	
V	Promotion of Car Share Scheme	Promoting Travel Alternatives	Personalised Travel Planning	RBC/WCC	2019	2019	Reduction in the number of car-based journeys being made within the Borough	N/A	<p>There is car share scheme operating across Coventry and Warwickshire.</p> <p>RBC looking at options for staff to join the scheme as an organisation with internal promotion though emails and updates</p> <p>Promotion of the scheme externally via</p>	Ongoing	

									the website and Social Media platforms		
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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.

Between 2011-15, Rugby has been below the national average for the Public Health Framework Indicator, 'Fraction of mortality attributable to particulate air pollution'. However in 2016, the fraction value increased markedly from 4.6% to 5.5% and was higher than the national average (5.3%) for that time⁶. In 2017, the fraction value decreased to 5.0% and was below the national average of 5.1%. This trend is not dissimilar to the neighbouring councils; Coventry, Warwick and Stratford-on-Avon, with all councils experiencing the peak in 2016. Since 2011, Rugby remains to have higher fraction values than Stratford-on-Avon but below that of Warwick and Coventry. With the latter council having fraction values higher than the national average.

Public Health Coventry (Coventry City Council) and Public Health Warwickshire (Warwickshire County Council) have established the joint Arden Health Protection Committee. Included in the members are the Environmental Health managers in Warwickshire and Coventry comprising representatives from Public Health England, NHS, Public Health Coventry, Public Health Warwickshire and local authority Environmental Health officers.

Rugby Borough Council have worked alongside Coventry and Warwickshire Air Quality Alliance to implement the Air Quality objectives of the Health Protection Strategy 2017-2021. The success of this strategy and the measures it proposes will be demonstrated by reductions in ambient concentrations of NO₂ and PM_{2.5}, reductions in the use of private cars for short journeys and increased development and use of cycle ways.

Rugby Borough Council are currently identifying strategies for reducing levels of PM_{2.5}. This will include a launch of a campaign using social media and website links educating residents in the Borough in relation to use of open fires and wood burning stoves.

⁶ Public Health Outcome Framework (2019), 'Health Protection'. Available at: <https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/0/gid/1000043/pat/6/par/E12000008/ati/101/are/E07000094>

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how it compares with objectives.

Rugby Borough Council no longer undertakes automatic (continuous) monitoring, as the continuous particulate monitor at Parkfield Road was taken out of use in December 2017.

3.1.2 Non-Automatic Monitoring Sites

Rugby Borough Council undertook non-automatic (passive) monitoring of NO₂ at 56 sites during 2018; with one triplicate site (S54) being relocated midway through the reporting year. Table A.1 in Appendix A shows the details of the 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” and distance correction. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO₂)

Table A.2 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³.

For diffusion tubes, the full 2018 dataset of monthly mean values is provided in Appendix B. Rugby Borough Council does not undertake continuous monitoring of NO₂.

During 2018, the annual mean NO₂ objective was exceeded at two diffusion tube locations (S24 and S54a). Site S24 in Dunchurch Square is the only diffusion tube site

to have consistently exceeded the air quality objective, year on year, since 2014. S24 is positioned within the existing AQMA and is considered a location of relevant exposure. NO₂ concentrations at S24 did display a downward trend between 2014 and 2017 but have now increased from 40.7 µg/m³ (2017) to 43.3 µg/m³ (2018) (Figure A.2).

Site 54a, located on the junction of Church Road and Bulkington Road in Shilton, north of Coventry, exceeded the air quality objective for the second time since monitoring started in 2016. NO₂ concentrations at the site fell from 47.1 µg/m³ (2016) to 37.6 µg/m³ in 2017 but have now increased again to 46.1 µg/m³ in this reporting year. The site is considered a location of relevant exposure. However, due to limited data periods this data should be considered with some caution and monitoring is continuing in 2019 to further investigate the exceedance.

Two sites in 2018 have fallen below the air quality objective, these were S49 and S54b. Site S49 is located on the roundabout joining Hilmorton Road and Whitehall Road and exceeded the air quality objective for the first time in 2017 since monitoring began in 2012. In the 2017 ASR, the increase in concentration in 2017 was suggested to be a result of major road works on Hilmorton Road either side of the Whitehall Road roundabout. Concentrations of NO₂ have now dropped from 43.7 µg/m³ to 34 µg/m³, this is similar to concentrations seen in years prior to 2017, confirming that the exceedance in 2017 was due to the road works occurring at the time.

Site S54b, formally known as W2, is located at the roadside of the Warwick Street gyratory system near the centre of town within the existing AQMA. In 2017 NO₂ concentrations were 43.3 µg/m³ but have now dropped to 38.7 µg/m³, below the air quality objective. Major improvement works occurred to the gyratory system, part of the AQAP and were completed in May 2015. 2018 is the third year where it was possible to assess whether changes to the road layout has had the intended impact of decreasing the impact of traffic on the town centre, in particular the annual mean NO₂ concentration. In Figure A.4 it can be seen that NO₂ concentrations at S54b have been declining since 2016, indicating that the improvement works carried out on the gyratory appear to be successful. Due to limited data periods this data should be considered with some caution and that full year results will be reported in the next ASR.

3.2.2 Particulate Matter (PM₁₀)

Rugby Borough Council ceased PM₁₀ monitoring in December 2017. Monitoring at the Parkfield Road location was originally commenced to investigate particulate matter concentrations at sensitive receptors near to the Cemex Climafuel facility, but there were no monitored exceedances of the PM₁₀ annual mean or short-term mean objectives after several years of monitoring.

3.2.3 Particulate Matter (PM_{2.5})

Rugby Borough Council ceased PM_{2.5} monitoring at the Parkfield Road location in December 2017, as there were no monitored exceedances of the PM_{2.5} annual mean target value after several years of monitoring.

Appendix A: Monitoring Results

Table A.1 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
S1	10 Newbold Road	Kerbside	449000	277178	NO2	YES	0	0.5	NO	2.5
S2	Marton A423	Kerbside	440830	269008	NO2	NO	5	1	NO	2.5
S3	69 School Street	Urban Background	447316	276162	NO2	YES	0	15	NO	2.5
S4	St Margaret's School, Wolston	Urban Background	441131	275648	NO2	NO	0	90	NO	2.5
S5	Ryton Village Hall, High Street	Kerbside	438642	274418	NO2	NO	25	0.5	NO	2.5
S6	2 West Field Road	Urban Background	449671	274795	NO2	YES	0	10	NO	2.5
S7	68 Cymbeline Way	Urban Background	448863	272786	NO2	YES	0	10	NO	2.5
S8	EHO Treatment, Newbold Road	Kerbside	450138	275557	NO2	YES	10	1	NO	2.5
S9	(Argyle Street) Cambridge Street	Roadside	451187	275334	NO2	YES	0	5	NO	2.5

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S10	Webb Ellis Pub, Corporation Street	Roadside	450069	275040	NO2	YES	0	5	NO	2.5
S11	15 Oliver Street	Roadside	449787	275224	NO2	YES	0	5	NO	2.5
S12	Boughton Leigh School, Hollowell Way	Urban Background	451445	277245	NO2	YES	0	56	NO	2.5
S13	Avon Mill Pub, Newbold Road	Roadside	450088	276229	NO2	YES	15	3	NO	2.5
S14	Binley Woods, Village Hall	Urban Background	439450	277523	NO2	NO	0	20	NO	2.5
S15	Lawford Road / Jubilee Street, Arnie's Batch	Kerbside	449168	275411	NO2	NO	0	0.5	NO	2.5
S16	Hotel, London Road A45, Ryton	Roadside	436867	275275	NO2	NO	0	19	NO	2.5
S17, S18, S19	Stamford Gardens Rugby Road	Roadside	431271	266404	NO2	NO	N/A	6	YES	2.5
S20	Newbold Road	Roadside	450137	275849	NO2	YES	25	3	NO	2.5
S21	Corner of Percival Road and	Roadside	451698	273273	NO2	YES	15	2	NO	2.5

	Ashlawn Road									
S22	Corner of Fisher Avenue and Ashlawn Road	Roadside	452403	273567	NO2	YES	18	5	NO	2.5
S23	Paddox Pub Corner	Roadside	452672	273633	NO2	YES	13	3	NO	2.5
S24	Dun Cow, Dunchurch Square	Kerbside	448496	271244	NO2	YES	0	0.5	NO	2.5
S25	Southam Road, 'Crystal', Dunchurch	Roadside	448414	271175	NO2	YES	0	2	NO	2.5
S26	Lawford Road, (former Simms Scrap Yard)	Roadside	448999	275505	NO2	YES	0	12	NO	2.5
S27	Leamington Road, Ryton on Dunsmore	Roadside	449435	275543	NO2	NO	7	2.5	NO	2.5
S28	256 Parkfield Road	Roadside	449011	276329	NO2	YES	0	2	NO	2.5
S29	Avon Valley School	Urban Background	449575	276540	NO2	YES	0	35	NO	2.5
S30	Murray Road (Bus Stop Nr Rail Station)	Kerbside	451107	275838	NO2	YES	0	0.5	NO	2.5
S31	Wood Street / Park Road	Roadside	450848	275849	NO2	YES	0	3	NO	2.5

S32	Railway Terrace, Station Bar	Roadside	450750	275547	NO2	YES	0	3	NO	2.5
S33	Albert Street, Alma Lodge Hotel	Roadside	450510	275355	NO2	YES	0	3	NO	2.5
S34	Regent Street, near Oxfam	Roadside	450405	275329	NO2	YES	0	3	NO	2.5
S35	Church Street, Town Fryer	Roadside	450444	275236	NO2	YES	0	3	NO	2.5
S36	Whitehall Road junction with Clifton Road Roundabout	Roadside	450870	275043	NO2	YES	12	3	NO	2.5
S37	Lower Hillmorton Road junction with Clifton Road. Roundabout	Roadside	450897	275059	NO2	YES	5	2	NO	2.5
S38	Clifton Road before railway bridge	Kerbside	451868	275501	NO2	YES	9	0.5	NO	2.5
S39	Clifton Road Roundabout Murray Road	Roadside	450852	275116	NO2	YES	0	5	NO	2.5

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S40	Lawrence Sherriff Street, Drury Lane	Roadside	450181	275029	NO2	YES	0	5	NO	2.5
S41	Bilton Road, Big Yellow House	Roadside	450010	274998	NO2	YES	0	15	NO	2.5
S42	Bilton Road, near Crow Pie Pub	Roadside	448855	274352	NO2	YES	10	5	NO	2.5
S43	Dunchurch Gyratory Residential	Roadside	450162	274898	NO2	YES	4	3	NO	2.5
S44	Barby Lane/ Ashlawn Road	Roadside	453394	273633	NO2	YES	15	2	NO	2.5
S45	Bretford-electricity pole near 3 Avon Cottages	Roadside	442963	277071	NO2	YES	11	3	NO	2.5
S46	Oxford Road, Ryton Belvedere	Kerbside	437555	274561	NO2	NO	30	1	NO	2.5
S47	Regent Place	Kerbside	450445	275495	NO2	YES	5	0.5	NO	2.5
S48	North Street, Nat. West. Bank	Roadside	450304	275314	NO2	YES	0	2	NO	2.5
S49	Lesley Suiter House, Whitehall Road, Hillmorton	Roadside	450864	274896	NO2	YES	13	3	NO	2.5

S50	Bilton Church	Roadside	448169	273625	NO2	YES	18	3	NO	2.5
S51	Brinklow, Brays Close	Roadside	443433	279208	NO2	NO	6	3	NO	2.5
S52	Daventry Road East, Dunchurch	Roadside	448537	271195	NO2	YES	1	3	NO	2.5
S53	Conventry Road West, Dunchurch	Roadside	448361	271334	NO2	YES	0	1.5	NO	2.5
S54a	3 Church Rd Shilton	Roadside	440416	284401	NO2	NO	0	1.5	NO	2.5
S54b	Rugby School Lampost 6	Roadside	450269	274998	NO2	YES	0	1.5	NO	2.5
S55	Main St Stretton	Roadside	445004	281330	NO2	NO	5	2	NO	2.5

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property).

(2) N/A if not applicable.

Table A.2 – Annual Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2018 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2014	2015	2016	2017	2018
S1	Kerbside	Diffusion Tube	83.3	83.3	19.5	20.4	18.8	17.8	17.6
S2	Kerbside	Diffusion Tube	100	100	18.4	16.3	16.5	13.4	14.6
S3	Urban Background	Diffusion Tube	100	100	15.5	15.6	15.5	12.2	14.2
S4	Urban Background	Diffusion Tube	100	100	13.5	13.7	14.0	12.3	12.1
S5	Kerbside	Diffusion Tube	100	100	29.6	27.9	28.5	25.0	24.0
S6	Urban Background	Diffusion Tube	100	100	15.7	17.3	16.3	14.1	14.9
S7	Urban Background	Diffusion Tube	100	100	13.1	12.7	13.2	10.4	11.6
S8	Kerbside	Diffusion Tube	91.6	91.6	33.5	38.2	33.6	29.3	30.0
S9	Roadside	Diffusion Tube	91.6	91.6	18.9	18.8	23.3	15.9	15.8
S10	Roadside	Diffusion Tube	100	100	40.9	41.6	41.0	34.8	30.8
S11	Roadside	Diffusion Tube	100	100	25.2	25.6	24.3	21.8	21.8
S12	Urban Background	Diffusion Tube	91.6	91.6	21.7	23.9	25.8	21.3	19.6
S13	Roadside	Diffusion Tube	91.6	91.6	33.4	38.3	39.5	36.5	34.8
S14	Urban Background	Diffusion Tube	100	100	17.9	19.0	18.2	14.7	15.1

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2018 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2014	2015	2016	2017	2018
S15	Kerbside	Diffusion Tube	100	100	28.9	30.9	28.3	25.6	26.9
S16	Roadside	Diffusion Tube	100	100	22.1	21.3	22.8	18.2	19.6
S17	Roadside	Diffusion Tube	100	100	20.5	20.2	21.4	17.1	18.9
S18	Roadside	Diffusion Tube	100	100	21.3	20.2	20.7	17.1	18.6
S19	Roadside	Diffusion Tube	100	100	20.7	20.5	20.4	16.7	17.7
S20	Roadside	Diffusion Tube	91.6	91.6	32.6	30.9	32.4	26.7	27.8
S21	Roadside	Diffusion Tube	100	100	24.7	24.2	24.2	22.2	22.5
S22	Kerbside	Diffusion Tube	100	100	22.9	23.2	24.4	20.8	21.3
S23	Roadside	Diffusion Tube	100	100	24.2	23.1	25.1	21.7	21.0
S24	Roadside	Diffusion Tube	100	100	46.4	48.9	47.1	40.7	43.3
S25	Roadside	Diffusion Tube	100	100	31.5	33.8	34.5	28.0	29.3
S26	Roadside	Diffusion Tube	100	100	21.0	20.3	22.4	18.3	19.1
S27	Urban Background	Diffusion Tube	100	100			27.5	21.3	18.2
S28	Kerbside	Diffusion Tube	100	100	19.7	20.9	19.7	16.1	17.2
S29	Roadside	Diffusion Tube	100	100	23.0	24.9	21.7	18.7	19.8

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2018 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2014	2015	2016	2017	2018
S30	Roadside	Diffusion Tube	100	100	36.1	36.6	36.4	32.3	34.5
S31	Roadside	Diffusion Tube	100	100	31.6	32.1	29.7	26.1	27.3
S32	Roadside	Diffusion Tube	100	100	29.7	32.6	30.4	28.2	29.3
S33	Roadside	Diffusion Tube	100	100	25.4	25.6	25.4	21.6	22.4
S34	Roadside	Diffusion Tube	100	100	26.9	33.9	27.8	25.5	24.8
S35	Roadside	Diffusion Tube	100	100	34.0	34.8	32.3	28.4	31.7
S36	Kerbside	Diffusion Tube	100	100	34.0	34.7	35.3	29.5	28.9
S37	Roadside	Diffusion Tube	100	100	29.9	31.6	30.1	24.1	23.9
S38	Roadside	Diffusion Tube	100	100	27.9	27.8	29.9	25.7	26.5
S39	Roadside	Diffusion Tube	100	100	30.0	31.9	30.0	25.9	27.9
S40	Roadside	Diffusion Tube	100	100	30.1	32.8	34.7	30.5	26.5
S41	Roadside	Diffusion Tube	100	100	25.4	27.0	27.4	23.0	25.7
S42	Roadside	Diffusion Tube	100	100	26.4	23.7	24.2	20.7	22.8
S43	Roadside	Diffusion Tube	83.3	83.3	27.7	28.7	31.1	25.2	25.9
S44	Kerbside	Diffusion Tube	100	100			29.8	23.8	27.4

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2018 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2014	2015	2016	2017	2018
S45	Kerbside	Diffusion Tube	91.6	91.6	28.3	27.7	26.7	22.5	22.5
S46	Roadside	Diffusion Tube	100	100	39.5	38.1	39.3	36.5	36.7
S47	Roadside	Diffusion Tube	83.3	83.3	33.0	33.9	35.2	30.8	32.6
S48	Roadside	Diffusion Tube	100	100	36.6	34.5	37.5	34.3	31.0
S49	Roadside	Diffusion Tube	91.6	91.6	39.9	39.1	36.6	43.7	34.0
S50	Roadside	Diffusion Tube	100	100	24.8	25.1	25.3	21.5	22.9
S51	Roadside	Diffusion Tube	91.6	91.6	32.3	33.6	32.4	28.3	29.4
S52	Roadside	Diffusion Tube	100	100	23.0	24.9	24.0	20.9	20.8
S53	Roadside	Diffusion Tube	100	100			24.6	20.1	21.8
S54a*	Roadside	Diffusion Tube	100	66.7			47.1	37.6	46.1
S54b*	Roadside	Diffusion Tube	100	33.3		46.5	45.5	43.3	38.7
S55	Roadside	Diffusion Tube	83.3	83.3			25.3	20.6	20.8

Diffusion tube data has been bias corrected

Annualisation has been conducted where data capture is <75%

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**.

(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%).

(3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

* Due to limited data capture at these sites, data should be viewed with caution. A full year of results will be reported on in next year’s ASR.

Figure A.1 – Trends in Kerbside Annual Mean NO₂ Concentrations

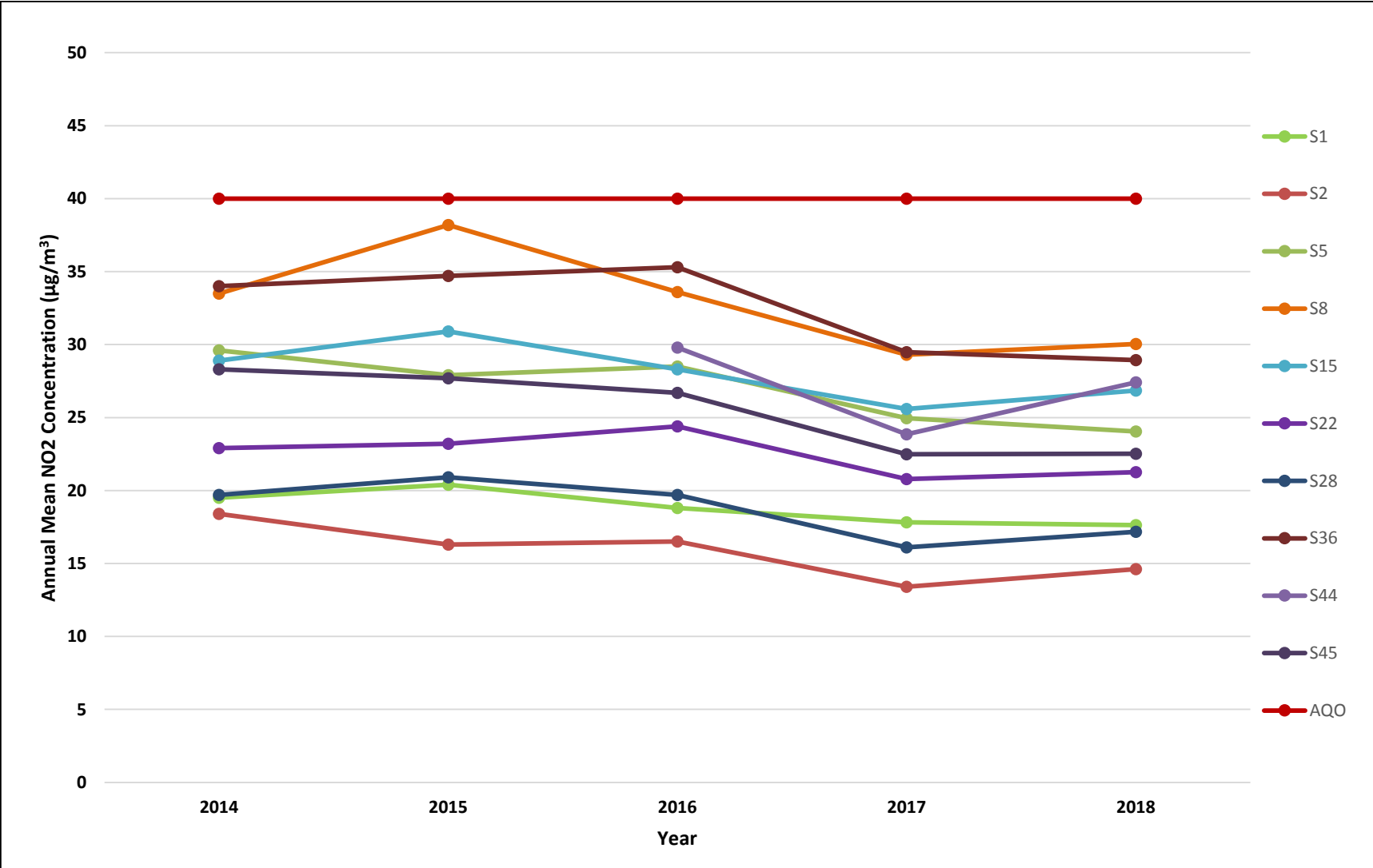


Figure A.2 – Trends in Roadside Annual Mean NO₂ Concentrations (1)

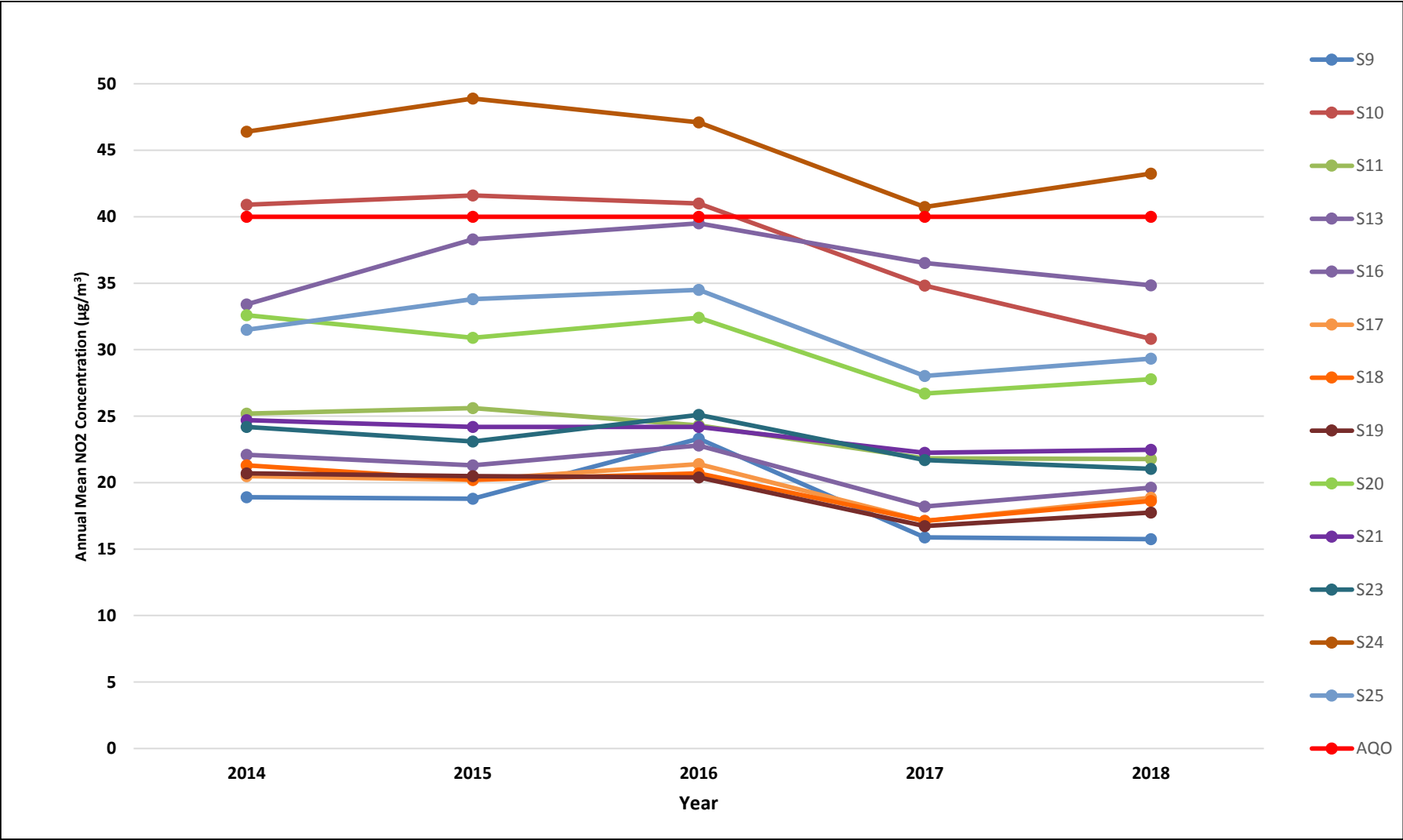


Figure A.3 – Trends in Roadside Annual Mean NO₂ Concentrations (2)

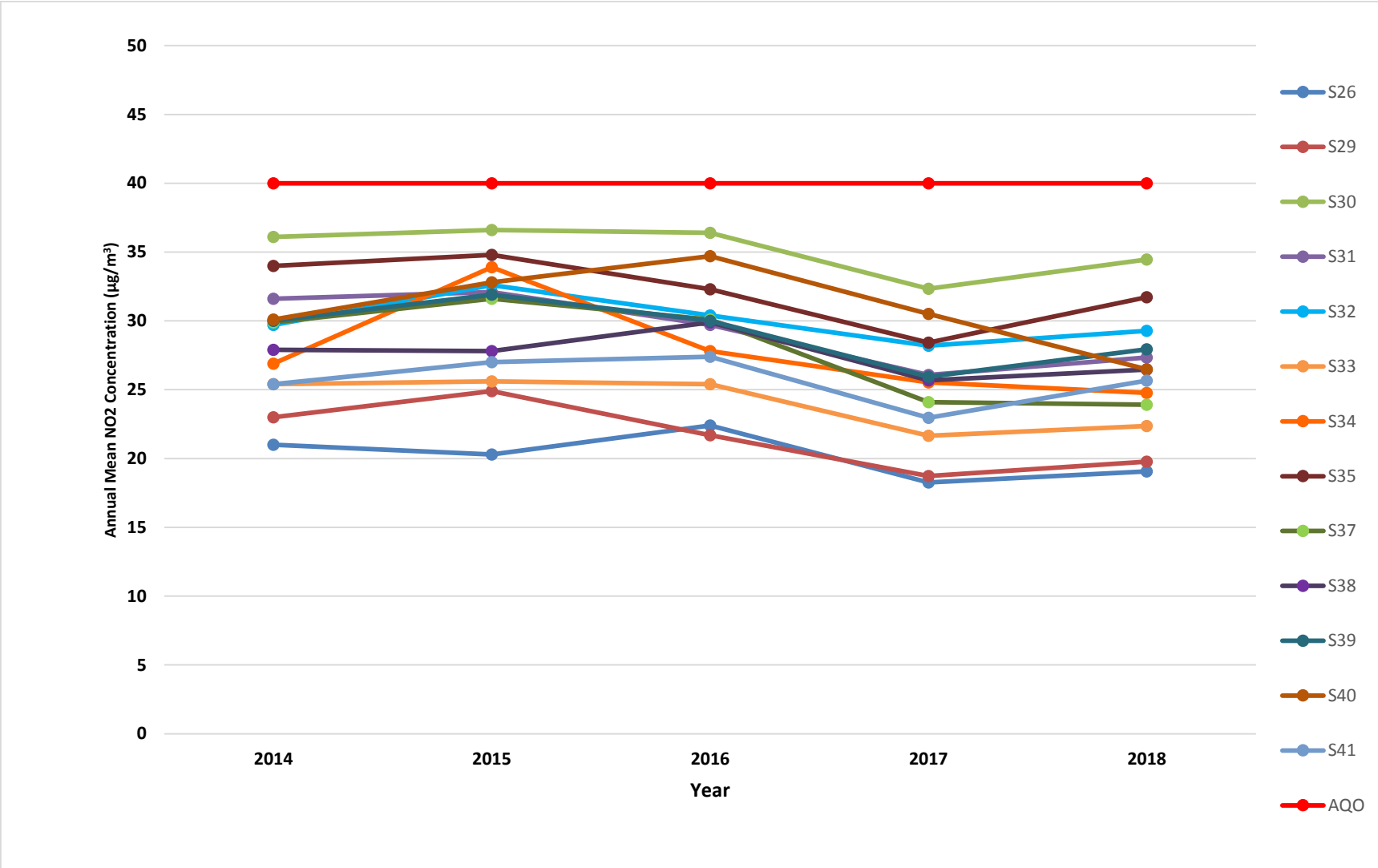
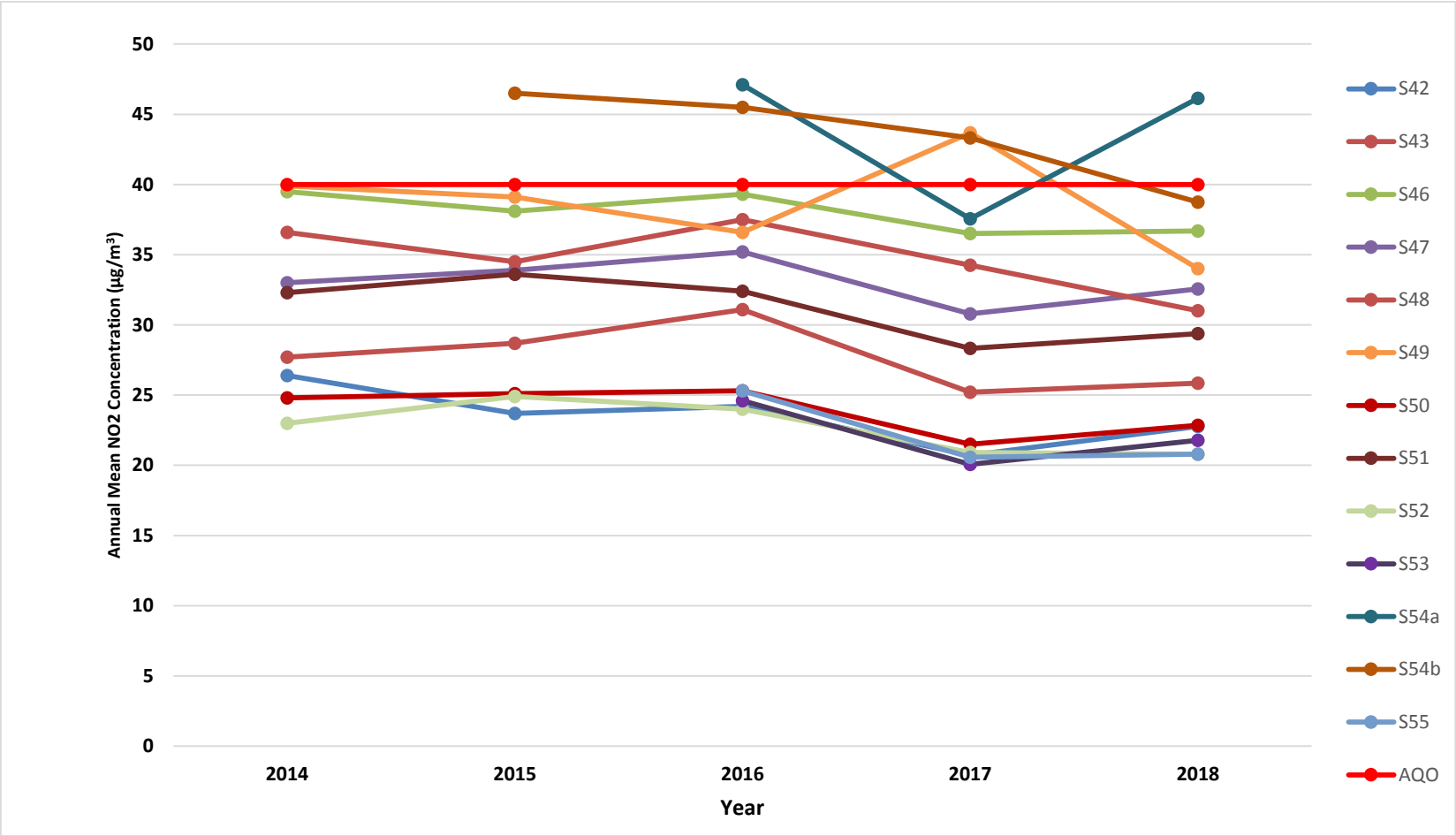


Figure A.4 – Trends in Roadside Annual Mean NO₂ Concentrations (3)



Appendix B: Full Monthly Diffusion Tube Results for 2018

Table B.1 – NO₂ Monthly Diffusion Tube Results - 2018

Site ID	NO ₂ Mean Concentrations (µg/m ³)												Annual Mean		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (factor) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
S1	25.8			21.6	18.4	14.0	19.7	17.5	16.3	26.3	27.4	25.4	21.2	17.6	17.6
S2	21.2	19.3	22.2	15.1	15.7	14.7	11.7	13.4	12.2	20.3	22.7	22.8	17.6	14.6	13.1
S3	22.2	18.6	20.9	14.7	11.6	10	14.7	12.2	10.5	18.8	25.9	25	17.1	14.2	14.2
S4	18.5	16.5	17.9	13.2	10.7	9.2	11.4	12.5	10.6	18.5	19	17.1	14.6	12.1	12.1
S5	35	31.9	27.8	29.8	32.8	26.9	26.8	26.6	25.2	24.8	26.7	33.3	29.0	24.0	16.7
S6	22.3	21.7	19.4	16.1	14.4	12.9	13.7	12.4	13.8	21	24.8	22.4	17.9	14.9	14.9
S7	19.2	17	16.2	10.9	9.2	9	10	10.3	10.1	17.4	22.2	15.9	14.0	11.6	11.6
S8	51.1	33.2		9	39	32.3	39.4	34.6	30.2	43.1	38	48.3	36.2	30.0	24.7
S9	23	22.4		19.8	13.2	10.4	15.7	14.6	13.9	24.2	24	27.6	19.0	15.8	15.8
S10	47.2	42.4	47.6	35.4	41.9	31.2	37.9	40.4	35.1	2.2	49.4	35	37.1	30.8	30.8
S11	28.9	22.9	28.3	25.4	24.3	18	23.8	22.2	21.3	31.9	31.8	36.1	26.2	21.8	21.8
S12	35.1	26.3	29.2		15	14.6	15.3	18.2	19.9	26.5	29	30	23.6	19.6	19.6
S13	51.5	35.9	46.1	44.5	35.2	25.4	45.7	44.1		44.6	41.1	47.6	42.0	34.8	27.1
S14	20.6	22.9	22.8	17	14.4	11.6	14.8	14.2	15.1	22.8	21.8	20.8	18.2	15.1	15.1
S15	36.3	35.3	36.2	30.8	23.6	21.9	29.6	29	28.1	35.9	37.4	44.1	32.4	26.9	26.9

Site ID	NO ₂ Mean Concentrations (µg/m ³)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (factor) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
S16	26.1	28.7	24.8	22	23.8	23.3	23.4	20.2	19.4	28.8	24.1	19	23.6	19.6	19.6
S17	27.6	26.4	26.3	21.1	19.3	14.9	15.9	16	13.6	38.2	26.8	26.8	22.7	18.9	18.9
S18	27.6	26.4	26.3	21.1	19.3	14.9	15.9	16	13.6	38.2	26.8	26.8	22.7	18.6	18.6
S19	27.6	26.4	26.3	21.1	19.3	14.9	15.9	16	13.6	38.2	26.8	26.8	22.7	17.7	17.7
S20		40.1	40.7	34.8	33.2	23.9	28.3	23.4	21.9	36.1	47.5	38.2	33.5	27.8	22.7
S21	34.5	24	31.2	25.7	23.4	16.3	21.1	25	24.1	30.9	32	36.6	27.1	22.5	16.8
S22	31.1	28.1	30.9	25.4	22.4	21.5	22.6	19.9	17.1	25.6	27.5	35.3	25.6	21.3	17.3
S23	30.8	32.1	34.5	25.6	26.2	19.5	1.9	20.9	20.9	31.3	28.5	31.9	25.3	21.0	17.2
S24	57.6	58.8	53.1	53.5	57.1	50.3	49.8	48.4	44	54.8	44.2	53.8	52.1	43.3	43.3
S25	39.1	36.1	37.3	34.5	35.8	29.9	33.3	30.4	30.7	40.9	37.4	38.6	35.3	29.3	29.3
S26	29.9	23	27.1	21.7	19	15.5	18.5	21.5	18.4	27.2	24.5	29.2	23.0	19.1	19.1
S27	36.2	29.8	23.1	12.3	3.3	14.8	15.9	7	25.5	31.4	28.2	36	22.0	18.2	17.1
S28	25.8	23.9	21.4	20.2	15.9	12.1	14.8	15.1	15.4	24.8	29.4	29.4	20.7	17.2	17.2
S29	25.5	25.9	31.2	23.7	21	16.5	19.3	17.5	19.2	24.6	31.3	30.2	23.8	19.8	19.8
S30	36.6	41.5	47.9	42.7	48.6	34.9	40	34.2	30.5	46.1	49.9	45.2	41.5	34.5	34.5
S31	41.2	38.2	36	31.2	30.5	21.7	27.7	27.3	26.9	39.2	39.7	35.6	32.9	27.3	27.3
S32	37.9	39.6	42.7	32.4	35.1	28.7	32.8	29.7	27.3	40.9	35.8	40.5	35.3	29.3	29.3
S33	34.9	24.8	30.1	24.4	24.3	15.5	23.9	22.7	21.6	33.4	32.8	35	27.0	22.4	22.4
S34	39.1	35	34.7	29.6	25.2	17.6	27.1	28	24.9	29.9	32.3	34.8	29.9	24.8	24.8
S35	40.2	37.1	39	32.1	33.2	28.5	40.3	37	37.6	41.9	46.5	45.2	38.2	31.7	31.7

Rugby Borough Council

Site ID	NO ₂ Mean Concentrations (µg/m ³)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (factor) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
S36	38.6	38.7	46.4	40	35.1	27.9	33.5	32.3	29.9	7.3	41.2	47.5	34.9	28.9	25.2
S37	30.7	37	35	29	26	20.2	26.8	28.9	29.6	6.3	35.5	40.8	28.8	23.9	22.8
S38	37.7	38.9	34.1	29.3	31.4	25.4	25.7	27.3	25.7	34.7	33	39.3	31.9	26.5	20.3
S39	39.3	41.2	36	31.7	29.7	24.4	28.5	28.7	26.9	35.8	39.8	41.9	33.7	27.9	27.9
S40	37.2	39.5	38.3	30.6	32.1	27.5	32.5	29.7	30.4	5.3	36	43.7	31.9	26.5	26.5
S41	30.1	39.2	36.3	31.4	28.7	24.8	30	24.2	22.2	37.5	33.3	33.3	30.9	25.7	25.7
S42	31.2	30.8	31.3	26.8	26	28.1	22.1	20	17.1	30.8	32.6	32.3	27.4	22.8	20.6
S43	18.4	33.7	31.8	33.1			31	25.2	26.1	40.2	34.7	37.3	31.2	25.9	24.9
S44	34.3	39.7	41	29.1	34.6	31.4	28	24.5	26.5	35.6	30.7	40.9	33.0	27.4	19.5
S45	37.2	24.3	31.2	16.9	19.3	14.7	31.5	28.1	28.7	33.3	33.2		27.1	22.5	18.7
S46	41.4	49.8	40.4	51.1	50.1	39.2	43.5	35.7	34	50.7	44.4	50.3	44.2	36.7	20.7
S47	40.4	37.8	45.3	38.9	41.5		41.4	35.9	35.9	43.7	31.6		39.2	32.6	26.8
S48	47.9	31.4	35.6	38.3	35.7	25.3	39.6	31.8	34.3	39.4	40.4	48.7	37.4	31.0	31.0
S49	88.3	34.3	37.8	37.5	36.2	36.4	35.8	30.8	28.7		38.8	46.2	41.0	34.0	26.2
S50	33.8	30	34.5	25.7	22.4	14.4	23.1	22.2	23	32.2	32.4	36.8	27.5	22.9	17.7
S51	41.2	37.4	35.6	33.1	33.4	26.4	35.7	31		39.9	35.2	40.4	35.4	29.4	26.2
S52	29.5	24.3	31.5	21.1	27.5	20.2	22.3	21.8	20.3	30.5	28.3	23.4	25.1	20.8	23.7
S53	28.9	29	31.9	25.4	22.7	18.2	22.9	21.7	20.4	30.5	30.9	32.3	26.2	21.8	21.8
S54a*	59.8	52	55.4	57.1	51.7	38.9	52.3	48.5					52.0	46.1	46.1
S54b*									44.2	54.6	51	61.3	52.8	38.7	38.7

Site ID	NO ₂ Mean Concentrations (µg/m ³)												Annual Mean		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (factor) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
S55	32.8	15	25.8	21.7		17.8		23	22	29.9	31.6	31	25.1	20.8	20.0

- Local bias adjustment factor used
- National bias adjustment factor used
- Annualisation has been conducted where data a capture is <75%
- Where applicable, data has been distance corrected for relevant exposure

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**.
 (1) See Appendix C for details on bias adjustment and annualisation.
 (2) Distance corrected to nearest relevant public exposure.
 * Due to limited data capture at these sites, data should be viewed with caution. A full year of results will be reported on in next year's ASR.

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

QA/QC of Diffusion Tube Monitoring Data

Rugby Borough Council's NO₂ diffusion tubes are supplied and analysed by SOCOTEC Didcot using the 50%TEA in Acetone method. This method conforms to the guidelines set out in Defra's 'Diffusion Tubes for Ambient NO₂ Monitoring: Practical Guidance' document.

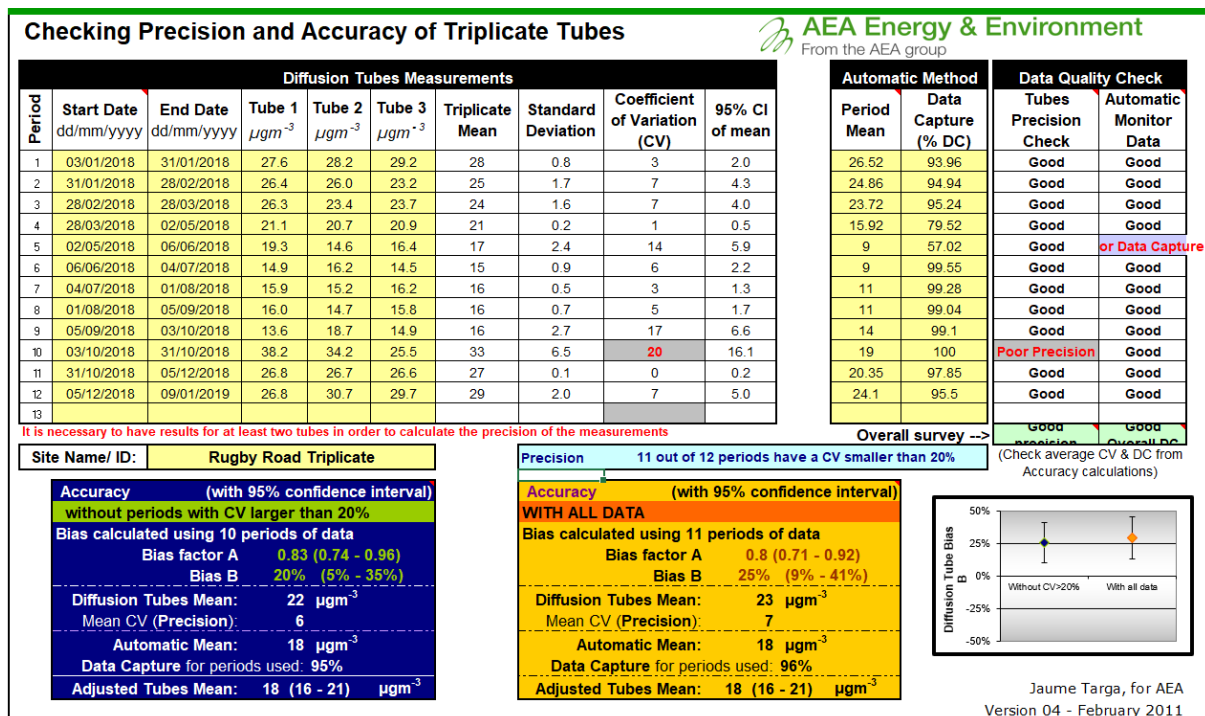
SOCOTEC Didcot participates in the AIR NO₂ PT scheme⁷. This scheme forms an integral part of the UK NO₂ Network's QA/QC, and is a useful tool in assessing the analytical performance of those laboratories supplying diffusion tubes to Local Authorities for use in the context of Local Air Quality Management (LAQM). In AIR NO₂ PT rounds AR030 SOCOTEC Didcot achieved 87.5% satisfactory scores and in AIR NO₂ PT rounds AR0024, 25, 27 and 28 SOCOTEC Didcot achieved 100% satisfactory scores.

Bias Adjustment of Diffusion Tube Data

A local bias adjustment factor was calculated from the triplicate co-location of diffusion tubes alongside the AURN monitoring station at Leamington Spa Rugby Road. The local bias adjustment factor was calculated as 0.83; details of the calculation are provided in Figure C.1.

⁷ LGC (2019) Summary of Laboratory Performance in AIR NO₂ Proficiency Testing Scheme (April 2017 – February 2019) Available at: <https://laqm.defra.gov.uk/assets/laqmno2performancedatauptofebruary2019v1.pdf>

Figure C.1 – Local Bias Adjustment Factor calculation tool



A national bias adjustment factor was obtained from the national Diffusion Tube Bias Adjustment Factors Spreadsheet for March 2019⁸. Based on the analytical laboratory (SOCOTEC Didcot) and tube preparation method (50%TEA/Acetone) a national bias adjustment factor of 0.76 was derived for 2018.

The use of the local bias adjustment factor is considered preferable, particularly when the data used for the calculation are precise and reliable. Given the good quality of the co-location data the local bias adjustment factor has been used to adjust the raw NO₂ diffusion tube results for 2018.

Annualisation

Data capture biases for 54 of the 56 diffusion tube monitoring sites exceed 75%, and therefore are considered representative of annual mean in accordance with Box 7.10 of LAQM.TG16. Consequently, it is not necessary to seasonally adjust any of these monitored concentrations.

However, due to a relocation of site 54 part-way through the year, seasonal adjustment was carried out for site 54a (prior to relocation) and site 54b (post-relocation) due to reduced data capture at these two locations. Seasonal adjustment was carried out

⁸ Defra, 2019. Diffusion Tube Bias Adjustment Factors Spreadsheet, March 2019.

using AURN data from four nearby automatic monitoring stations: Coventry Allesley; Leamington Spa; Northampton Spring Park; and Leicester University. Details are shown in Table C.1 below.

Table C.1 – Seasonal Adjustment Factor Calculation

Site	Statistic	Coventry Allesley	Leamington Spa	Northampton Spring Park	Leicester University
	Annual Mean [Am]	20.6	17.5	13.0	23.6
54a	Period Mean [Pm]	19.1	16.4	12.1	22.2
	Average Am/Pm ratio	1.07			
54b	Period Mean [Pm]	23.4	19.6	14.9	26.3
	Average Am/Pm ratio	0.88			

Distance Correction

It is not always possible to measure concentrations at precisely the desired location. It is recommended by LAQM TG.16 that measurements recorded at a site not representative of relevant exposure should be distance-corrected to estimate the annual mean NO₂ concentration at the nearest “receptor”.

In some cases, where a monitoring site is not representative of relevant exposure, an exceedance of the annual mean NO₂ objective at the monitoring site may not correspond to an exceedance at the closest point of relevant exposure.

Distance correction was undertaken for all appropriate sites using Defra’s NO₂ Fall-Off with Distance Calculator⁹. The distances from tube to receptor and tube to kerb that are used for the distance correction calculations can be found in Table A.2, and the distance corrected concentrations, where applicable, are found in Table B.1.

⁹ Defra (2018). NO₂ Fall-Off with Distance Calculator (Version 4.2). Available at: <https://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>

Figure C.2 – Façade distance correction calculations

Site Name/ID	Distance (m)		NO ₂ Annual Mean Concentration (µg/m ³)			Comment
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor	
S2	1.0	5.0	9.8	14.6	13.1	
S5	0.5	25.0	13.4	24.0	16.7	Warning: your receptor is more than 20m further from the kerb than your monitor - treat result with caution.
S8	1.0	10.0	18.5	30.0	24.7	
S13	3.0	15.0	16.2	34.8	27.1	
S20	3.0	25.0	18.5	27.8	22.7	Warning: your receptor is more than 20m further from the kerb than your monitor - treat result with caution.
S21	2.0	15.0	10.4	22.5	16.8	
S22	5.0	18.0	11.0	21.3	17.3	
S23	3.0	13.0	11.0	21.0	17.2	
S27	2.5	7.0	13.9	18.2	17.1	
S36	3.0	12.0	18.5	28.9	25.2	
S37	2.0	5.0	18.5	23.9	22.8	
S38	0.5	9.0	14.4	26.5	20.3	
S42	5.0	10.0	12.4	22.8	20.6	
S43	3.0	4.0	13.3	25.9	24.9	
S44	2.0	15.0	10.6	27.4	19.5	



Enter data into the pink cells

Site Name/ID	Distance (m)		NO ₂ Annual Mean Concentration (µg/m ³)			Comment
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor	
S45	3.0	11.0	11.2	22.5	18.7	
S46	1.0	30.0	13.4	36.7	20.7	Warning: your receptor is more than 20m further from the kerb than your monitor - treat result with caution.
S47	0.5	5.0	18.5	32.6	26.8	
S49	3.0	13.0	13.3	34.0	26.2	
S50	3.0	18.0	11.7	22.9	17.7	
S51	3.0	6.0	11.5	29.4	26.2	
S52	3.0	1.0	10.6	20.8	23.7	
S55	2.0	5.0	17.1	20.8	20.0	

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

Figure D.1 – Rugby Borough Council Non-Automatic Monitoring Sites and AQMA Boundary

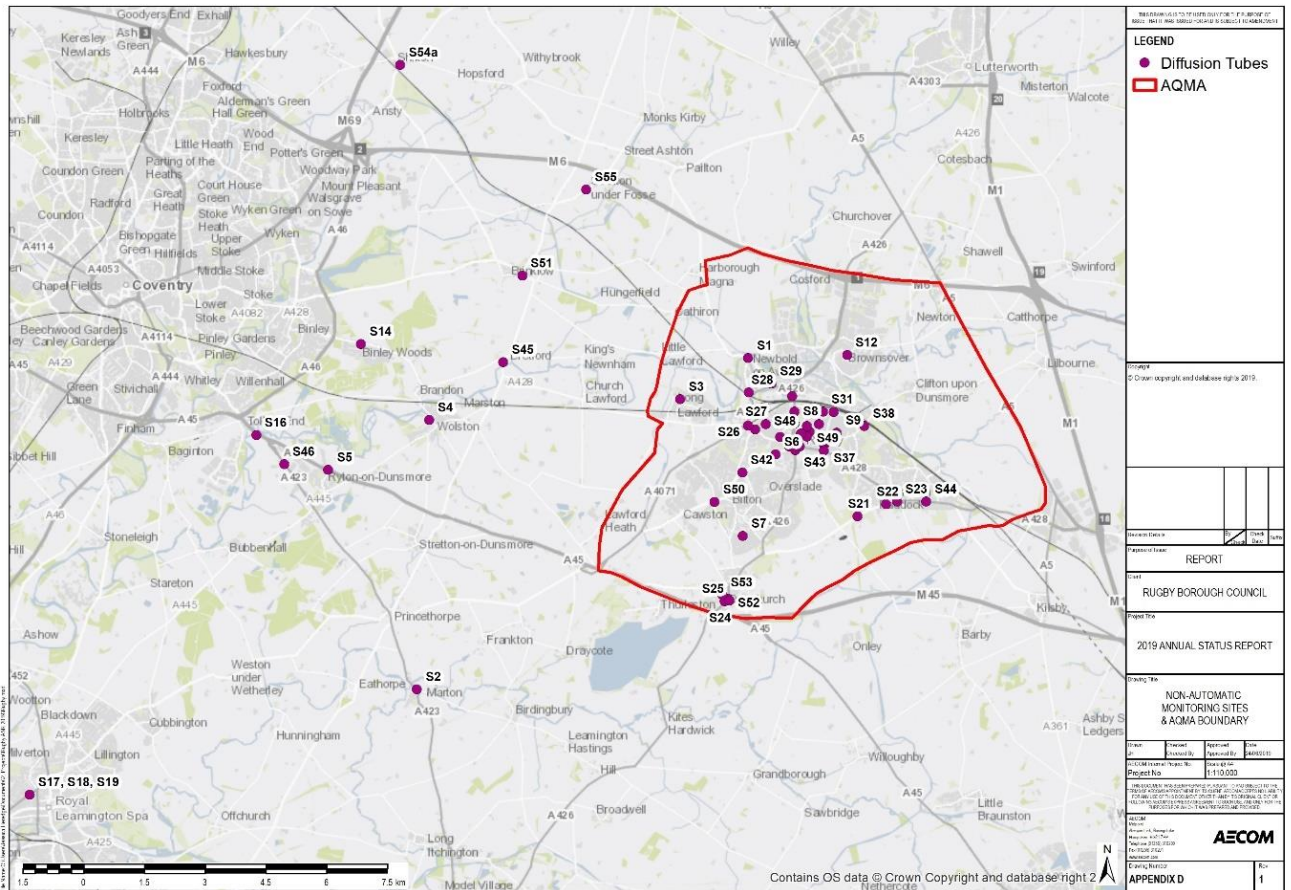
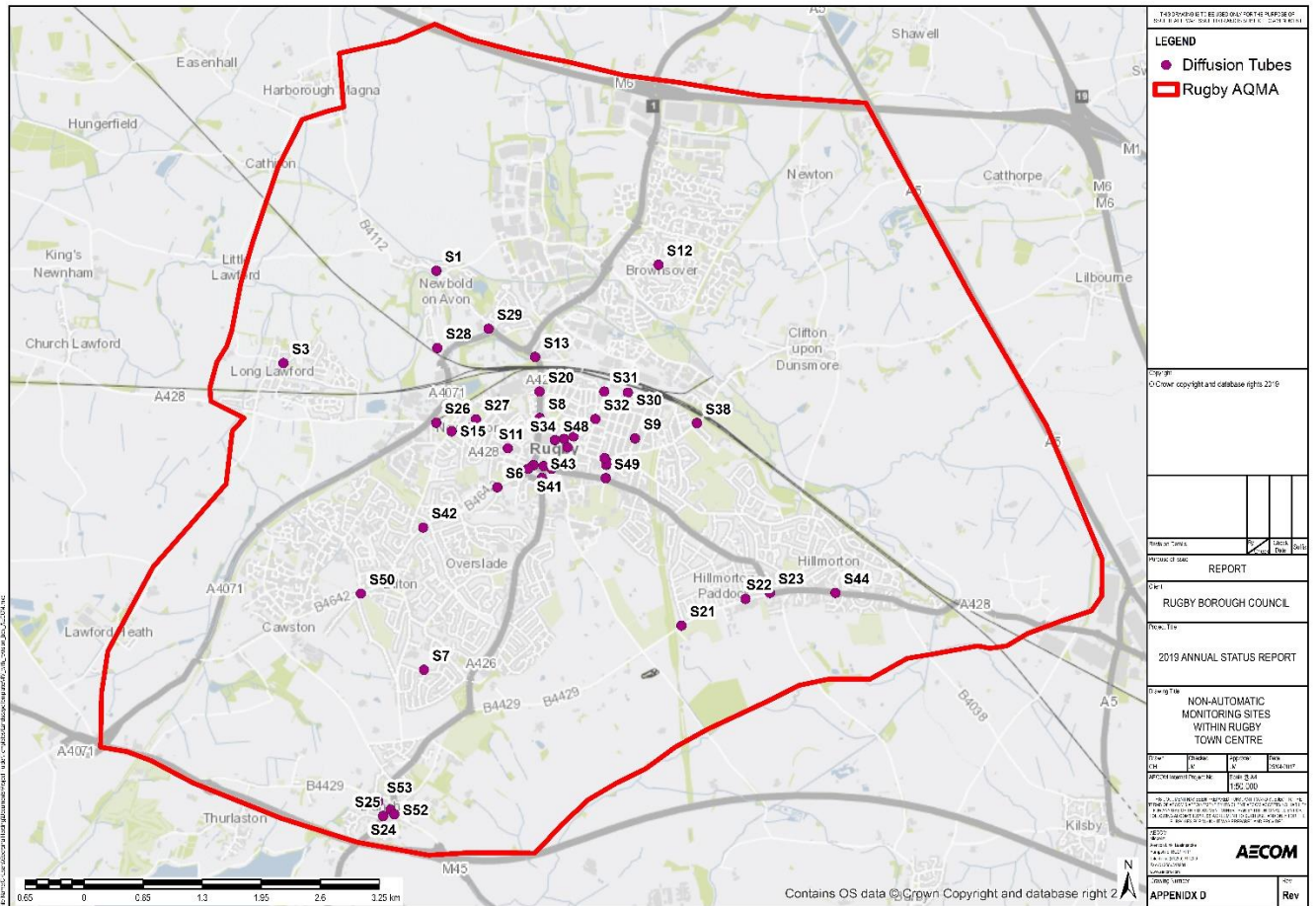


Figure D.2 – Map of NO₂ Diffusion Tubes in Rugby Town Centre



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective ¹⁰	
	Concentration	Measured as
Nitrogen Dioxide (NO ₂)	200 µg/m ³ not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m ³	Annual mean
Particulate Matter (PM ₁₀)	50 µg/m ³ , not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m ³	Annual mean
Sulphur Dioxide (SO ₂)	350 µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m ³ , not to be exceeded more than 35 times a year	15-minute mean

¹⁰ The units are in micrograms of pollutant per cubic metre of air (µg/m³).

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality 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 (micrometres or microns) 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

Rugby Borough Council Air Pollution website:

https://www.rugby.gov.uk/info/20021/pollution/217/air_pollution

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