AIR POLLUTION SERVICES
KALACO GROUP LTD

2023 Air Quality Annual Status Report

Runneymede Borough Council ‘s 2023 Air Quality Annual Status (ASR) Report including 2022 monitoring date.

August 2023

Quality Assurance

Client: Runneymede Borough Council **Reference:** APS_L1009D_A1-1 **Date Published:** 11 September 2023

Rev.	Date	Description	Prepared	Reviewed	Authorised
02	11/09/2023	Final	TW	CH	CH

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AIR POLLUTION SERVICES

Experts in Air Quality, Odour and Climate Change

2023 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995 Local Air Quality Management, as amended by the Environment Act 2021

Date: August, 2023

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Report Reference Number	RBC/ASR/2023
Date	22/08/2023

Executive Summary: Air Quality in Our Area

Air Quality in Runnymede

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 (Benedict W Wheeler, 2005) (Defra, 2006).

The mortality burden of air pollution within the UK is equivalent to 29,000 to 43,000 deaths at typical ages (Defra, 2023), with a total estimated healthcare cost to the NHS and social care of £157 million in 2017 (Public Health England, 2018). The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion (Defra, 2013).

Air Quality Management Areas (AQMAs) have been declared at two locations in Runnymede for exceedances of the annual mean nitrogen dioxide objective, namely land adjacent to the M25, including an extended area where the M25 crosses over Vicarage Road and High Street Egham near junction 13, and at a traffic light-controlled junction in Addlestone town centre.

The Council is in the early stages of developing a new Air Quality Action Plan that will cover the two existing AQMAs, and possibly two other areas where high NO_2 concentrations have been measured. Although there are currently no exceedances of the objective in the Borough, there is insufficient reliable trend data to revoke them. This is due to the impacts of the Covid-19 restrictions in 2020 and 2021. The AQMAs will be kept under review in future reports.

Details of the current AQMAs can be found on the Defra UK Air website (www.uk-air.defra.gov.uk) or via the following link:

https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=26

The highways authorities for Runnymede are Highways England for the major strategic network roads (M25, M3) and Surrey County Council (SCC) for the other roads within the Borough. The SCC Local Transport Plan (LTP4) (2022) includes a number of policies, including those in support of the Government's Net Zero Plan, that are aimed at improving air quality particularly in the AQMAs, to support the future revocation of these AQMAs as soon as possible.

M25 AQMA

The M25 AQMA was originally declared in 2001. In 2015 it was extended to include the Pooley Green railway level-crossing in Egham due to measured exceedances of the objective. The last year an exceedance was measured in the AQMA was in 2019. In the years 2018 to 2021 concentrations were lower but still close to the objective (within 10%). In 2022 concentrations were significantly below the objective. Due to the impacts of the travel restrictions during the Covid-19 pandemic the 2020 and 2021 data is unlikely to be representative of long term trends. Should the current levels be maintained throughout 2023 and 2024 then there would be sufficient evidence for revoking the AQMA.

Addlestone AQMA

The roads leading up to the four-way traffic light-controlled junction in Addlestone town centre has been declared an AQMA. There has been a general decrease in nitrogen dioxide concentrations, to below the objective in this AQMA over recent years. No exceedance of the objective was measured in 2022. In 2021 an exceedance was measured at one location where there is relevant exposure. Given the year to year variability in air quality due to changes in the weather, monitoring will continue for at least another two years to be certain that the objective is complied with even in years when pollution levels are higher than normal.

Pollution hotspot in Chertsey

At the Bridge Road/Weir Road junction in Chertsey the nitrogen dioxide objective was exceeded in 2022 using the March 2023 national bias adjustment factor. Dispersion modelling and source apportionment was undertaken with a view to possibly declaring this area an AQMA and in preparation for the development of the new Air Quality Action Plan. The assessment recommended continued monitoring before declaring a new AQMA. The bias

adjustment factor was significantly reduced in June 2023 and using the revised factor there was no exceedances of the objective in Chertsey in 2022. Air quality in this area will be kept under review.

Pollution hotspot at the Ottershaw Roundabout

Nitrogen dioxide concentrations at the Ottershaw Roundabout (A320/A319 junction), in the southwest of the Borough, were close to 90% of the objective using the June 2023 national bias adjustment factor. This will be reviewed when the September 2023 national factor is available, to ensure it remains below 36 µg/m^3. Air quality in this area will be kept under review.

Sources of Air Pollution

Modelling undertaken for the development of the local development plan has clearly identified that road transport is the main source of high nitrogen dioxide levels in the Borough, as illustrated in Figure 1. Although this modelling was for 2015, the general pattern of levels across the Borough is likely to be similar today.

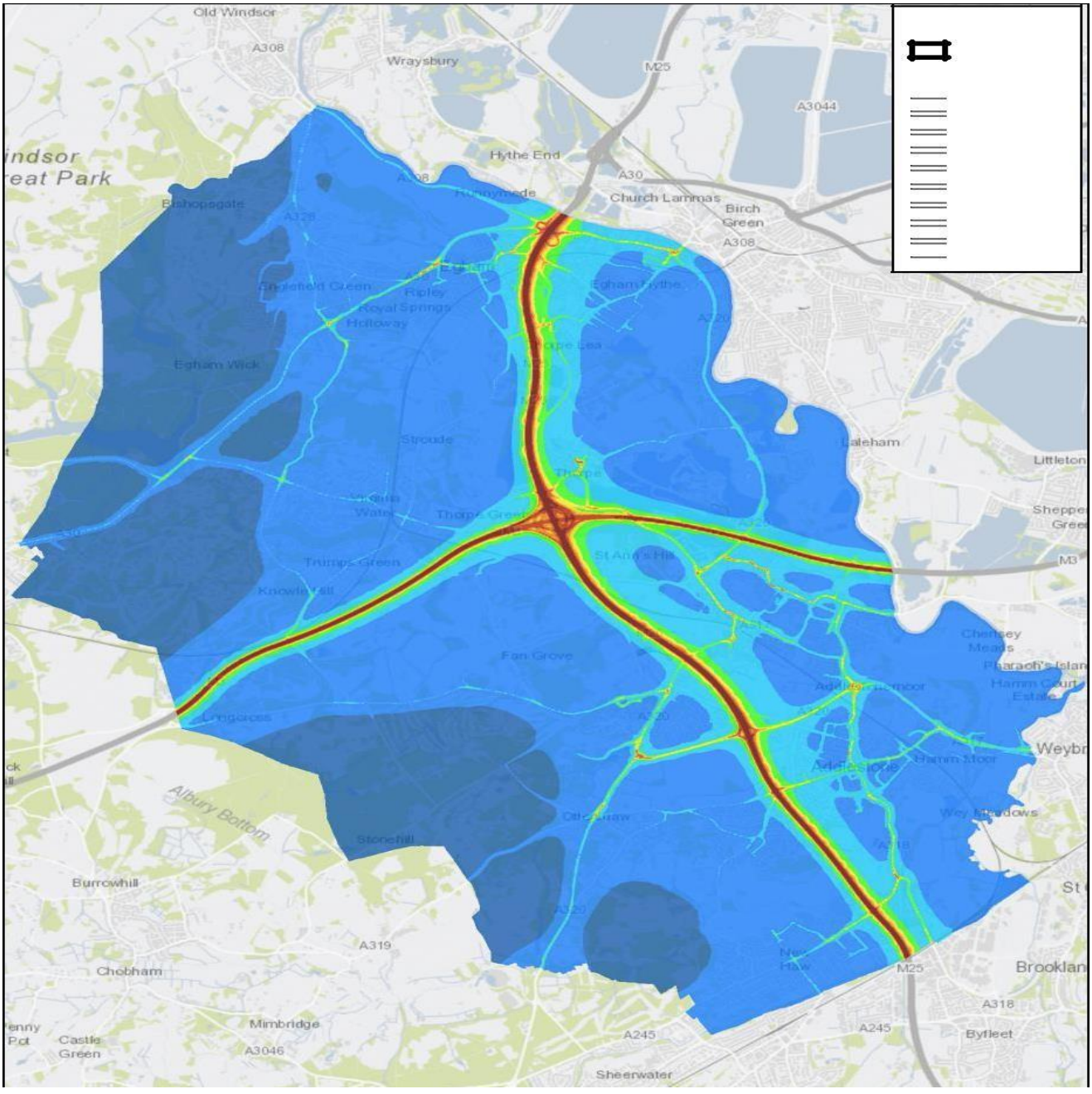
Surrey Air Alliance

Runnymede continues to support Surrey Air Alliance (SAA), a working group of air quality officers from across the Surrey Districts and Boroughs, which is also attended by officers from Surrey County Council and Surrey Public Health.

Major New Sources

There are no new major sources of air pollution in Runnymede.

Figure 1 – Predicted NO_2 Concentrations across the Borough



Notes: Figure shows 2015 modelled annual mean NO_2 concentrations (µg/m^3)

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades, there are some areas where local action is needed to protect people and the environment from the effects of air pollution.

The Environmental Improvement Plan (Defra, 2023) sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term $PM_{2.5}$ targets. The National Air Quality Strategy (Defra, 2023), published in 2023, provides more information on local authorities' responsibilities to work towards these new targets and reduce $PM_{2.5}$ in their areas. The Road to Zero (DfT, 2018) details the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

The key actions to improve air quality in Runnymede in 2022 included:

- Ongoing review of the potential impacts of new development on air quality in the Borough.
- Working with the Surrey Air Alliance and the Surrey Heartlands Health and Care Partnership's Children and Young People's Asthma Team to develop materials for asthma care in the county including the Asthma Toolkit. This included prioritising schools for support based on local air quality and providing input on ambient and indoor air quality.
- Working with Surrey Country Council to produce an Air Quality Pack for healthcare professionals, with the aim of ensuring air quality information is easily accessible and available, what messaging about poor air quality means for patients, and what actions they can take.
- Surrey County Council's new Eco Schools Engagement Officer post to encourage and promote the Eco Schools agenda in Surrey and to increase the number of Green Flag schools within the county.
- Working with Surrey Country County who offer resources to all schools across Surrey to promote sustainable transport modes. This includes Modeshift STARS Travel Plans, Bikeability cycle training, Golden Boot/ Green boot Challenge, Global Action Plan resources, and Anti-Idling Equipment to loan to schools.

- Domestic wood burning is a priority for the Council, and work is ongoing with Surrey County Council and Global Action Plan to seek funding to support the 'Clean Air Night' project and public information campaign.

Conclusions and Priorities

The air quality objectives were achieved across the Borough in 2022 including in the two AQMAs. The general trend is an improvement in air quality and the Council is working towards revoking the AQMAs in the coming years.

Due to the impact of the Covid-19 pandemic and associated travel restrictions the monitoring data for 2021 and 2020 may not be representative of long term trends. To ensure that the AQMAs are not revoked prematurely the Council intends to continue to monitor and review air quality in these areas for at least another two years.

It will also continue to review air quality in the pollution hotspots in Chertsey and near the Ottershaw Roundabout.

Although there were no exceedances in 2022 in the Borough the development of an updated air quality action plan is a priority for the Council as it is important to further improve air quality to protect public health. This is at the early stages of development.

The Council will continue to support countywide initiatives that support the shift to sustainable transport modes and engage with the public, schools and health professionals on air quality.

Local Engagement and How to get Involved

There is continual interest in air quality locally from Councillors, residents' groups, consultants and individual residents. Information is displayed on the Council's web site to promote special events such as Clean Air Day held annually in June and Air Alert, which provides warnings for those with pre-existing respiratory and cardiovascular disease to help them manage their symptoms.

As the main source of air pollution in the district is road traffic, there are some easy changes which we can all do to reduce emissions:

1. Do you need to take the car? – consider alternatives to using your car; public transport, walking or cycling will help reduce emissions. For timetables, guides and maps visit the Travel Smart in Surrey website: www.travelsmartsurrey.info/ . There is also information there on car sharing and car clubs.
2. Small changes to your driving style can save fuel, significantly reduce wear and tear, and improve the life of your vehicle.
3. Thinking about changing your car or van? – consider an ultra-low emission vehicle such as an electric or hybrid vehicle. More options are becoming available each year, technology is improving the range of vehicles, running and servicing costs are much lower, and grants are available to help towards their purchase.
4. Air Alert - Air Alert is a free service provided by the Council to help those with respiratory conditions manage their health when air quality is poor. While air pollution levels in Runnymede are generally “Low”, on about 20 days per year pollution levels are reached that are capable of causing short term health symptoms for people with pre-existing respiratory conditions. Further information is available from https://airalert.info/Surrey/Default.aspx, by email to airAlert@reigate-banstead.gov.uk and by telephone on 01737 276 403.

Further information on air quality in the UK, including the latest news, air quality monitoring results and forecasts, can be obtained by visiting the Defra website at:

https://uk-air.defra.gov.uk/

Local Responsibilities and Commitment

This ASR was prepared by the Environmental Health & Licencing Department of Runnymede Borough Council with the support and agreement of the following officers and departments:

Lucy Hawkings, Environmental Services.

This Annual Status Report (ASR) has been approved by:

Lisa Harvey-Vince, Health Protection Team Manager of Public Health, Surrey County Council

This ASR has been signed off on behalf of the Surrey County Council Director of Public Health. The Public Health team work closely with Surrey Air Alliance including District and Borough Council partners responsible for submitting Annual Status Reports (ASR) on air quality within their area; to develop initiatives and implement actions to improve air quality across the county of Surrey.

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

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1 Local Air Quality Management

This report provides an overview of air quality in Runnymede during 2022. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in order to achieve and maintain the objectives and the dates by which each measure will be carried out. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Runnymede 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 in Appendix E.

2 Actions to Improve Air Quality

Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority should prepare an Air Quality Action Plan (AQAP) within 18 months. The AQAP should specify how air quality targets will be achieved and maintained, and provide dates by which measures will be carried out.

A summary of AQMAs declared by RBC can be found in Table 2.1. The table presents a description of the two AQMAs that are currently designated within RBC. Appendix D provides maps of the AQMAs and also the air quality monitoring locations in relation to the AQMAs. The air quality objectives pertinent to the current AQMA designations are as follows:

- NO_2 annual mean.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP

AQMA M25	Declared 03/12/2001. Amended 20/10/2015	NO_2 Annual Mean	Entire length of M25 within the Borough and an extended area in December 2016 to include area in Egham near to railway crossing	YES	<40	32.9	3	AQAP, April 2014	https://www.runnymede.gov.uk/downloads/file/1322/management-area-action-plan
AQMA Addlestone town	Declared 04/07/2008	NO_2 Annual Mean	Addlestone	YES	<40	35.5	1	AQAP, April 2014	https://www.runnymede.gov.uk/downloads/file/1322/management-area-action-plan

Note: The NO_2 concentrations shown in the table above are from the monitoring sites, within the AQMAs, where the highest concentration was reported in the year of declaration and the current year. The maximum concentration will not necessarily be at the same monitoring site for both years.

Accessibility Note: The table shows the two AQMAs within the borough, when they were declared or amended, the exceedance of which pollutants they were exceeded for (annual mean NO_2), their description, the highest measured concentration within them in 2022 (both below the air quality objective) and the link to the most recent Air Quality Action Plan (which outlines how the air quality in the AQMAs are being improved).

☒ **RBC confirm the information on UK-Air regarding their AQMA(s) is up to date.**

☒ **RBC confirm that all current AQAPs have been submitted to Defra.**

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

Defra acknowledged the receipt of last year's ASR however there was no appraisal or further comment made in relation to the content of the report.

Runnymede Brough Council has taken forward a number of direct measures during the current reporting year of 2022 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. 10 measures are included within Table 2.2, with the type of measure and the progress Runnymede Borough Council have made during the reporting year of 2022 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

More details on these measures can be found in the Action Plan and the Surrey Local Transport Plan 4.

Details of Runnymede Borough Council's Air Quality Action Plan 2014 can be found at in the Council's website

https://www.runnymede.gov.uk/downloads/file/1322/management-area-action-plan

The key completed measures are:

- Consider planning applications near to or within the designated AQMAs to ensure that suitable measures are adopted in relation to air quality (on-going).
- Supporting Surrey County Council with plans and funding bids to assist with improving air quality within the Borough (on-going).
- Working with neighbouring local authorities through maintaining a strong presence within Surrey Air Alliance group (on-going).
- Modelling air quality in the Borough (completed).
- Joining the AirAlert scheme (completed).

Runneymede Borough Council expect the following measures to be completed over the course of the next reporting year:

- Significant progress with the preparation of a new Air Quality Action Plan to replace the 2014 Action Plan.

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

- Production of the new Air Quality Action Plan
- The continued monitoring of nitrogen dioxide in the Borough and reviewing concentrations in the AQMAs and the two identified hotspots.
- Modelling the two AQMAs and undertaking source apportionment to inform the preparation of the new Air Quality Action Plan. This may include the two pollution hotspots.
- Understanding the extent of wood burning in Runnymede, particularly from narrow boats moored on the canal.
- Continuing to work in partnership with neighbouring authorities through the Surrey Air Alliance, and the County Council to promote actions to improve air quality and to support those vulnerable to the health effects of poor air quality through the promotion of appropriate public information (e.g. AirAlert).
- To work closely with the Council's public health team.

The new Action Plan will identify new measures to be introduced to improve air quality and to promote understanding of its impacts on public health in the Borough.

Runnymede Borough Council will continue to work in partnership with Surrey Air Alliance, Surrey Heartlands Health and Care Partnership Team, and/or Surrey Country Council.

The following projects were undertaken in 2022:

- Working with the children and young People Asthma team to support asthma patients through the development of the Asthma Toolkit https://www.healthysurrey.org.uk/children-and-families/asthma-toolkit/parent-and-carer
- Supporting the production of an Air Quality Pack for healthcare professionals, with the aim of ensuring air quality information is easily accessible and available, what messaging about poor air quality means for patients, and what actions they can take.
- Briefing on air quality to the Surrey Asthma Network, including a discussion on ozone levels across the county and how this can also impact on health.
- Supporting the Surrey Asthma Learning Event, with a stand demonstrating the Surrey AirAlert service.
- A number of initiatives to promote sustainable transport modes in schools across Surrey including 'Feet First' walking Training, cycle training. school travel plans, school crossing patrols, and the Eco Schoos Programme with 232 Surrey Schools engaged. Domestic Burning of Wood is a priority for Runneymede and work is ongoing to seek funding to support the 'Clean Air Night' project and public information campaign.
- Runnymede Borough Council, in partnership with Surrey County Council, participated in a consortium bid for Defra funding for a public information campaign on domestic wood burning 'Clean Air Night'). The bid was unsuccessful; however, this topic remains a priority, and work is ongoing with Surrey County Council and Global Action Plan to seek funding to support the 'Clean Air Night' project.

Progress on the following measures has been slower than expected:

- Encouraging a greater uptake of electric vehicles as taxis in Surrey. Grant funding from Defra lapsed due to the covid pandemic.
- Liaison with Surrey County Council to improve the road layout and flow of traffic within the Addlestone AQMA. The County Council has not been able to identify any viable options.
- Liaison with both Surrey County Council and Highways England to ensure that any temporary road works adjacent to or within the AQMAs have strict conditions applied to any permit to minimise additional congestion within the AQMA.
- A single emissions policy for taxi licencing within all of Surrey to ensure consistency of approach.

Runneymede Borough Council anticipates that the measures stated above and outlined in Table 2.2, particularly the updated air quality action plan will achieve continued compliance with the air quality objectives in both the AQMAs in the Borough. Runnymede Borough Council anticipates that further additional measures not yet prescribed may be required in subsequent years to enable the revocation of the Addlestone and M25 AQMAs.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	AirAlert	Public Information	via other mechanisms	2018	Ongoing	Local Authorities in Surrey	Runnymede Borough Council	No	-	-	Implemented Ongoing	Protection of public health by providing air quality information to vulnerable residents	Uptake by residents, Reduced hospital admissions	Publicised on Council's website and via Council's publication.	Hard to reach residents
2	Working In Partnership with neighbouring authorities -	Policy, Guidance and Development Control	Regional Groups programmes to develop area wide strategies to reduce emissions and improve air quality	2015	Ongoing	Local Authorities in Surrey	Runnymede Borough Council	No	-	-	Implemented Ongoing	Protection of public health. Successful project implementation	Informed decision making	Officers actively participate in Surrey AQ Officers working group (Surrey Air Alliance).	-
3	Surrey-wide Air Quality Modelling	Policy, Guidance and Development Control	Other policy	2017	2020	Local Authorities in Surrey	Runnymede Borough Council	No	-	-	Completed	Scientific information to inform policy	Receipt of Surrey-wide air quality	Publication 2020	-
4	Runnymede Cycleways - upgrading existing routes	Transport Planning and Infrastructure	Cycle network LCWIP	2018	2021	Surrey County Council	partnership	No	-	-	Implemented	Improvements to active travel infrastructure facilitating more non car journeys	Increased uptake in cycle journeys made.	-	-
5	Land Use Planning	Policy, Guidance and Development Control	Air Quality Planning and Policy Guidance	2020	Ongoing	Runnymede Borough Council	Runnymede Borough Council	No	-	-	Planning Ongoing	Reduced vehicle emissions, heat and energy plant emissions and construction dust emissions.	Measured concentration of NO_2 at diffusion tube monitoring locations.	Policy EE2 requires consideration of air quality. Assessments include construction phase impacts. Mitigation measures enforced by condition or requirement for Construction Environmental Management or Dust Management Plans.	-
6	Alternatives to private vehicle at Thorpe Park	Alternatives to private vehicle use	Rail based Park & Ride	2005	Ongoing	Surrey County Council and Merlin	Thorpe Park	No	-	-	Implemented	Improved connectivity to Thorpe Park from the rail network.	Reduced congestion on Borough roads, reduced emissions.	Rail & Ride service provided during theme park season.	-
7	Encourage adoption minimum emissions standards into taxi licensing procedures	Promoting Low Emission Transport	Taxi Licensing conditions/incentives	2016	2020/21	Runnymede Borough Council	-	-	-	-	-	-	-	Air Quality officers representing the borough/district councils have suggested taxi licencing authorities for County wide policy on emissions	Lack of agreement with neighbouring authorities.
8	Encourage uptake of electric vehicles as taxis	Promoting Low Emission Transport	Taxi emission incentives	2020	Ongoing	Runnymede Borough Council	Defra Air Quality Grant	YES	-	-	-	Reduced vehicle emissions	Increased uptake of zero emission taxis	2020/2021 Defra grant funding lapse due to the pandemic .	Funding has expired. Alternative funding will need to be secured to continue the project.
9	Permitted premises	Environmental Permits	Other measure through permit systems & economic instruments	-	-	Runnymede Borough Council	-	-	-	-	Ongoing	-	Ensuring that all permitted process operate within control limits	-	-
10	Air Quality Action Plan produced and approved by committee	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	-	2014	Runnymede Borough Council	-	-	-	AQAP Published	Completed	2014	-		County with 2 tier authority

Accessibility Note: The table shows the measures being worked on in the Borough to improve air quality, the types of measures, the expected timescales, where they are likely to have most impact, how their impact is assessed and the funding pathways and any barriers to their success.

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

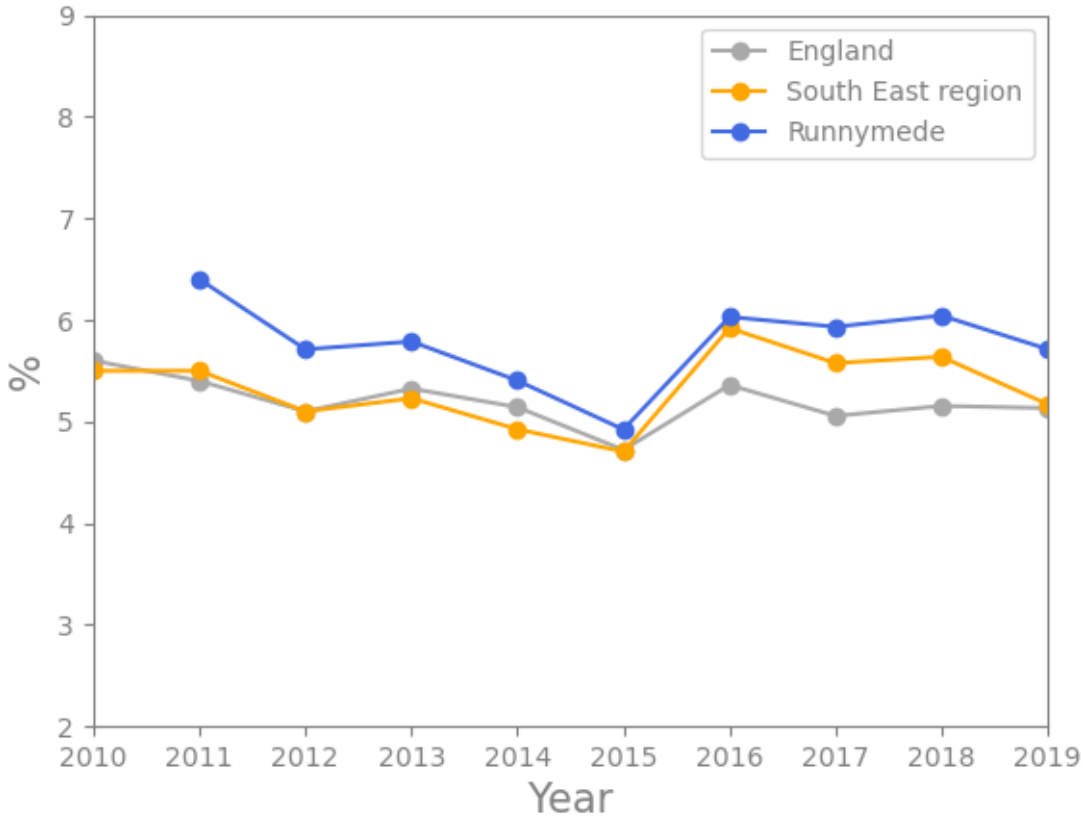
As detailed in Policy Guidance LAQM.PG22 (Chapter 8), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health,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

The air quality modelling undertaken for the development of the local plan indicates that levels of $PM_{2.5}$ are likely to be higher closer to the motorways and the strategic road network. The highest background $PM_{2.5}$ concentration in the Borough in 2022 was 11.6 µg/m^3. This is below the $PM_{2.5}$ target of 12.5 µg/m^3 to be achieved by 2028.

It is well established that $PM_{2.5}$ exposure can have a significant impact on human health including premature mortality and the Public Health Outcomes Framework uses this parameter is an indicator of the fraction of mortality attributable to particulate air pollution. Although levels of particulate matter (PM_{10} and $PM_{2.5}$) within the Borough are within air quality objectives, it is recognised that action to reduce particulate emissions will benefit public health.

The Public Health Outcomes Framework data tool (Public Health England, 2019) compiled by the UK Health Security Agency (UKSHA) (formerly Public Heath England) quantifies the mortality burden of $PM_{2.5}$ within England on a county and local authority scale. The latest available data shows that the 2019 fraction of mortality attributable to $PM_{2.5}$ pollution in Runnymede is 5.7%, which is above the South East's average of 5.2% and the national average of 5.1%.

Figure 2 – Public Health Framework D01 Fraction of all-cause adult mortality attributable to anthropogenic particulate air pollution



Runnymede Borough Council is taking the following measures to address $PM_{2.5}$:

- The Council requires developments that trigger an Air Quality Assessment to assess the impact of construction dust emissions and applies planning conditions to the developments requiring the developer to follow best practice guidance to mitigate dust impacts.
- The Council investigates and takes enforcement action where open burning of commercial waste as a source of $PM_{2.5}$ is sufficiently evidenced.
- The Council investigates and takes enforcement action where dust emissions can be sufficiently evidenced as to constitute a statutory nuisance.
- Promoting low emission transport and provision of charging points and hydrogen refilling stations.
- The Council is seeking funding via Surrey County Council for a public information campaign on domestic wood burning ('Clean Air Night')

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

Summary of Monitoring Undertaken

This section sets out the monitoring undertaken in 2022 by Runnymede Borough Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2018 and 2022 to allow monitoring trends to be identified and discussed.

3.1.1 Automatic Monitoring Sites

Runnymede Borough Council does not undertake automatic (continuous) monitoring within the Borough.

3.1.2 Non-Automatic Monitoring Sites

Runnymede Borough Council undertook non-automatic (i.e. passive) monitoring of NO_2 at 41 sites during 2022. 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.

All monitoring site locations have been checked and adjusted accordingly using Google Streetview. Where monitors were not visible on Google Streetview the Council's coordinates and distances have been used.

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.

3.1.3 Nitrogen Dioxide (NO_2)

Table A.2 in Appendix A compares the adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40 µg/m^3. Note that the concentration data presented in Table A.2 represent the concentrations at the locations of the monitoring sites, 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 the NO_2 diffusion tubes, the full 2022 dataset of monthly mean values is provided in Table B1 in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

Monitoring of NO_2 in 2022 has shown that:

- the annual mean NO_2 objective of 40 µg/m^3 was not exceeded at any monitoring locations in 2022;
- the highest measured NO_2 concentration was at RY58 in Chertsey (37.7 µg/m^3) close to the junction of Bridge Road and Weir Road. This is an improvement since 2021 when it was 39.7 µg/m^3. Three other tubes near the junction in 2021 and 2022 all had concentrations belwo but within 10% of the objective..
- the highest concentration measured in the M25 AQMA was 32.9 µg/m^3 at RY26 in the extended M25 AQMA. This is located in a location where queueing can occur due to a railway level crossing. It has reduced significantly since 2019 when it was 45.7 µg/m^3.
- previous research carried out on behalf of Defra and the devolved administrations (2022) identified that exceedences of the 1-hour mean NO_2 objective are unlikely to occur where annual mean concentrations are below 60 µg/m^3. Since the highest measured annual mean concentration was 37.7 µg/m^3, it is considered highly unlikely that the 1-hour mean NO_2 objective was exceeded within the borough in 2022;

- the number of locations exceeding the annual mean NO_2 objective in the AQMAs declined over the period 2019 – 2022 with seven exceedances in 2019, three in 2020, one in 2021 and none in 2022.
- the trend analysis for the last five years indicates an overall downward trend in annual mean NO_2 concentrations throughout the Borough. This is most likely due to vehicle emission improvements. A graph showing NO_2 concentrations over the last five years is presented in Figure A.1 in Appendix A; and
- monitoring of NO_2 will continue at all sites throughout 2023. The next air quality monitoring update will be provided in Runnymede Borough Council's next ASR, due June 2024.

3.1.4 Particulate Matter (PM_{10})

PM_{10} is not currently monitored in Runnymede. However, air quality modelling has shown that the levels of PM_{10} in the Borough do not exceed air quality objectives.

3.1.5 Particulate Matter ($PM_{2.5}$)

$PM_{2.5}$ is not monitored within the Runnymede,

3.1.6 Sulphur Dioxide (SO_2)

Sulphur dioxide is not currently monitored within the Runnymede as it has previously been established that levels of sulphur dioxide do not exceed air quality objectives.

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) (3)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
RY1	Civic Centre, Station Road, Addlestone	Roadside	505098	164624	NO_2	Y	1.2	2.1	No	2.5
RY4	Riverside, Pitson Close, Addlestone	Urban Background	505727	164624	NO_2	N	-1.5	4.3	No	2.0
RY8	Ongar Place First School, Milton Road, Addlestone	Suburban	504316	163955	NO_2	Y	6.1	21.1	No	1.9
RY14	1 High Street, Addlestone	Roadside	504993	164606	NO_2	Y	0.1	1.1	No	2.5
RY19	78 Woodham Lane, New Haw	Roadside	505227	162699	NO_2	Y	9.6	1.0	No	2.0
RY21	London Street/Heriot Rd Chertsey	Roadside	504263	166945	NO_2	N	1.9	0.7	No	1.5
RY23	37 Bridge Rd, Chertsey	Roadside	504878	166790	NO_2	N	14.2	1.1	No	2.0
RY25	1 Pooley Green Rd, Egham	Roadside	501748	171349	NO_2	N	9.6	13.7	No	2.4
RY26	19, Vicarage Road, Egham	Roadside	501717	171382	NO_2	N	10.6	1.5	No	2.5
RY39	Chobham Lane, Longcross,	Roadside	498902	166242	NO_2	N	n/a	2.3	No	2.1
RY40	Homewood Park, Stonehill Road	Urban Background	502072	165098	NO_2	N	n/a	98.7	No	2.5
RY43	New Court Chertsey Road Addlestone	Roadside	504999	165305	NO_2	N	16	2.1	No	2.3

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) (3)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
RY45	27/29 Weir Rd Chertsey	Roadside	504879	166762	NO_2	N	4.2	1.1	No	2.3
RY53	1-22 Wyvern Place, High St, Addlestone	Roadside	504963	164784	NO_2	Y	3.7	3.1	No	2.0
RY54	23 Brighton Rd, Addlestone	Roadside	505072	164478	NO_2	Y	2.9	1.4	No	2.3
RY55	158 Station Rd, Addlestone	Roadside	505529	164784	NO_2	N	2.3	0.4	No	1.8
RY56	34/36 Bridge Rd Chertsey	Roadside	504947	166753	NO_2	N	7.2	0.6	No	2.3
RY57	29 Bridge Rd, Cherstey	Roadside	504823	166823	NO_2	N	1.9	0.9	No	2.5
RY58	39 Weir Road, Chertsey	Roadside	504895	166774	NO_2	N	12.6	0.5	No	2.3
RY59	Bus shelter Chertsey Rd Addlestone	Roadside	504950	165139	NO_2	N	7.1	5.2	No	2.3
RY60	Renaissance flats, High Street Addlestone	Roadside	504965	164807	NO_2	Y	0.7	3.0	No	2.0
RY61	Pine Court, Addlestone	Roadside	504910	164558	NO_2	N	4.7	1.0	No	2.3
RY62	26/28 Brighton Road Addlestone	Roadside	505080	164439	NO_2	N	4.3	1.3	No	2.3
RY63	Garfield Road, (sign) Addlestone	Roadside	505250	164520	NO_2	N	19.9	0.6	No	2.0
RY64	Garfield Road, Hampshire Court, Addlestone	Roadside	505258	164394	NO_2	N	8.0	2.8	No	2.3
RY65	268 Station Road Addlestone	Roadside	505706	164952	NO_2	N	11.0	1.7	No	2.0
RY67	A320 roundabout Ottershaw	Roadside	502241	163885	NO_2	N	18.4	2.1	No	2.3
RY68	Addlestone moor roundabout	Roadside	504967	165747	NO_2	N	2.9	2.3	No	2.5
RY69	New Haw Road	Roadside	505363	163912	NO_2	N	4.4	1.5	No	1.6
RY70	Chertsey Lane Thorpe	Roadside	503411	171077	NO_2	N	9.1	2.4	No	2.2

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1) (3)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
RY71	185 Church Road adjacent to M25	Other	504212	164259	NO_2	Y	2.2	20.3	No	2.0
RY72	Albany Place Egham adj to M25	Other	501585	171489	NO_2	N	-24.7	52.7	No	2.0
RY73	Byfleet and New Haw Station	Roadside	505800	162303	NO_2	N	9.2	3.0	No	2.0
RY75	4 Crockford Park Road lamp post	Roadside	505208	164243	NO_2	N	9.9	1.1	No	2.0
RY76	Opposite the Chatterings, Green Road Thorpe	Roadside	501658	168253	NO_2	N	23.3	2.1	No	2.0
RY77	Under the M25 Flyover Egham roundabout on lamp post	Roadside	501865	171773	NO_2	Y	22.8	5.7	No	2.0
RY78	Clock house lane west at end of footpath	Roadside	501603	170111	NO_2	Y	4	11.2	No	2.0
RY79	On SCC lamppost outside of 13 Midway Ave, TW20 8QA	Roadside	501903	168756	NO_2	N	3.9	1.7	No	2.0
RY80	Weybourne, Addlestone Road	Kerbside	506452	164754	NO_2	N	4.4	1.9	No	2.0
RY81	1 Addlestone Road	Kerbside	506414	164756	NO_2	N	7	0.4	No	2.0
RY82	Navigation House	Kerbside	506225	164706	NO_2	N	8	1.4	No	2.0

Accessibility Note: The table shows all passive monitors (diffusion tubes) within the borough, their locations, their site type, their relevant distances (distance between kerb and exposure and distance between monitor and road), their heights and whether they are located in an AQMA or collocated with an automatic monitor.

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.

(3) Relative distance between relevant exposure and the nearest kerb, and the monitor and the kerb.

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 2022 (%) [2]	2018	2019	2020	2021	2022
RY1	505098	164624	Roadside	91.7	92.3	29.1	30.8	24.3	27.4	24.5
RY4	505727	164624	Urban Background	91.7	90.4	20.2	19.4	14.8	15.0	13.4
RY8	504316	163955	Suburban	66.7	67.3	22.5	20.5	17.4	18.2	16.2
RY14	504993	164606	Roadside	100	100.0	45.5	48.3	49.2	41.0	35.5
RY19	505227	162699	Roadside	91.7	92.3	32.3	32.1	28.4	26.2	25.3
RY21	504263	166945	Roadside	100	100.0	33.4	34.3	24.7	26.9	24.0
RY23	504878	166790	Roadside	91.7	92.3	47.5	56.4	41.6	37.7	34.6
RY25	501748	171349	Roadside	100	100.0	33.5	31.6	25.4	22.4	22.5
RY26	501717	171382	Roadside	100	100.0	36.5	45.7	38.2	36.0	32.9
RY39	498902	166242	Roadside			28.4	26.0	22.5	20.8	-
RY40	502072	165098	Urban Background	100	100.0	18.1	14.9	12.7	12.0	12.9
RY43	504999	165305	Roadside	100	100.0	36.9	38.4	29.4	28.1	26.7
RY45	504879	166762	Roadside	91.7	92.3	36.0	37.7	39.4	37.9	32.2
RY53	504963	164784	Roadside	91.7	92.3	35.8	40.8	34.0	31.5	28.8
RY54	505072	164478	Roadside			29.6	32.4	26.9	26.2	-
RY55	505529	164784	Roadside	91.7	92.3	32.7	34.4	26.3	25.1	22.4
RY56	504947	166753	Roadside	83.4	84.6	40.9	46.0	33.4	39.6	26.1
RY57	504823	166823	Roadside	91.7	92.3	30.5	35.3	24.3	22.7	23.5
RY58	504895	166774	Roadside	91.7	92.3	52.0	43.6	36.7	39.7	37.7
RY59	504950	165139	Roadside	100	100.0	34.7	33.8	36.3	26.5	26.2
RY60	504965	164807	Roadside	91.7	92.3	33.3	32.9	28.3	25.9	25.0
RY61	504910	164558	Roadside	75	75.0	30.1	29.1	23.0	24.1	18.5
RY62	505080	164439	Roadside	100	100.0	32.8	32.1	27.7	29.9	23.8
RY63	505250	164520	Roadside	100	100.0	21.6	25.5	20.7	20.5	20.5
RY64	505258	164394	Roadside			24.1	26.5	16.5	16.7	-
RY65	505706	164952	Roadside	100	100.0	26.7	32.2	21.5	28.5	20.9
RY67	502241	163885	Roadside	75	75.0	-	44.2	45.4	35.9	35.6
RY68	504967	165747	Roadside			-	38.0	27.8	26.3	-
RY69	505363	163912	Roadside			-	32.0	26.4	23.1	-
RY70	503411	171077	Roadside		7.7	-	25.1	19.3	20.4	-
RY71	504212	164259	Other	75	73.1	-	-	25.6	24.2	25.3
RY72	501585	171489	Other	100	100.0	-	-	18.2	20.0	20.1
RY73	505800	162303	Roadside	91.7	92.3	-	-	-	29.4	24.2

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
RY75	505208	164243	Roadside		100.0	-	-	-	-	22.3
RY76	501658	168253	Roadside	100	100.0	-	-	-	-	27.3
RY77	501865	171773	Roadside	100	100.0	-	-	-	-	25.7
RY78	501603	170111	Roadside	100	92.3	-	-	-	-	16.2
RY79	501903	168756	Roadside	91.7	84.6	-	-	-	-	19.3
RY80	506452	164754	Kerbside	91	42.3	-	-	-	-	13.4
RY81	506414	164756	Kerbside	100	42.3	-	-	-	-	16.8
RY82	506225	164706	Kerbside	100	17.3	-	-	-	-	-

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.**

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

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

Accessibility Note: The table shows all passive monitors (diffusion tubes) within the borough, their locations, their annual mean concentrations from 2018 to 2022 and the data capture % for 2022 (for both the monitoring period and the year).

Notes:

The 2022 monitoring results have been annualised and bias adjusted with Defra's Diffusion Tube Data Processing Tool v3 released in February 2023. The 2022 monitoring results have also been processed with a similar tool created by Air Pollution Services that has been thoroughly QA checked. This tool produced slightly different results. It is thought that the discrepancy is the result of differences in rounding. It should be noted though that neither tool produced results exceeding the air quality objective (or results within 10% of the air quality objective) and neither tool resulted in a difference in the number of monitors requiring distance correcting.

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.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

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

Figure A.1 – Trends in Annual Mean NO_2 Concentrations in Runnymede

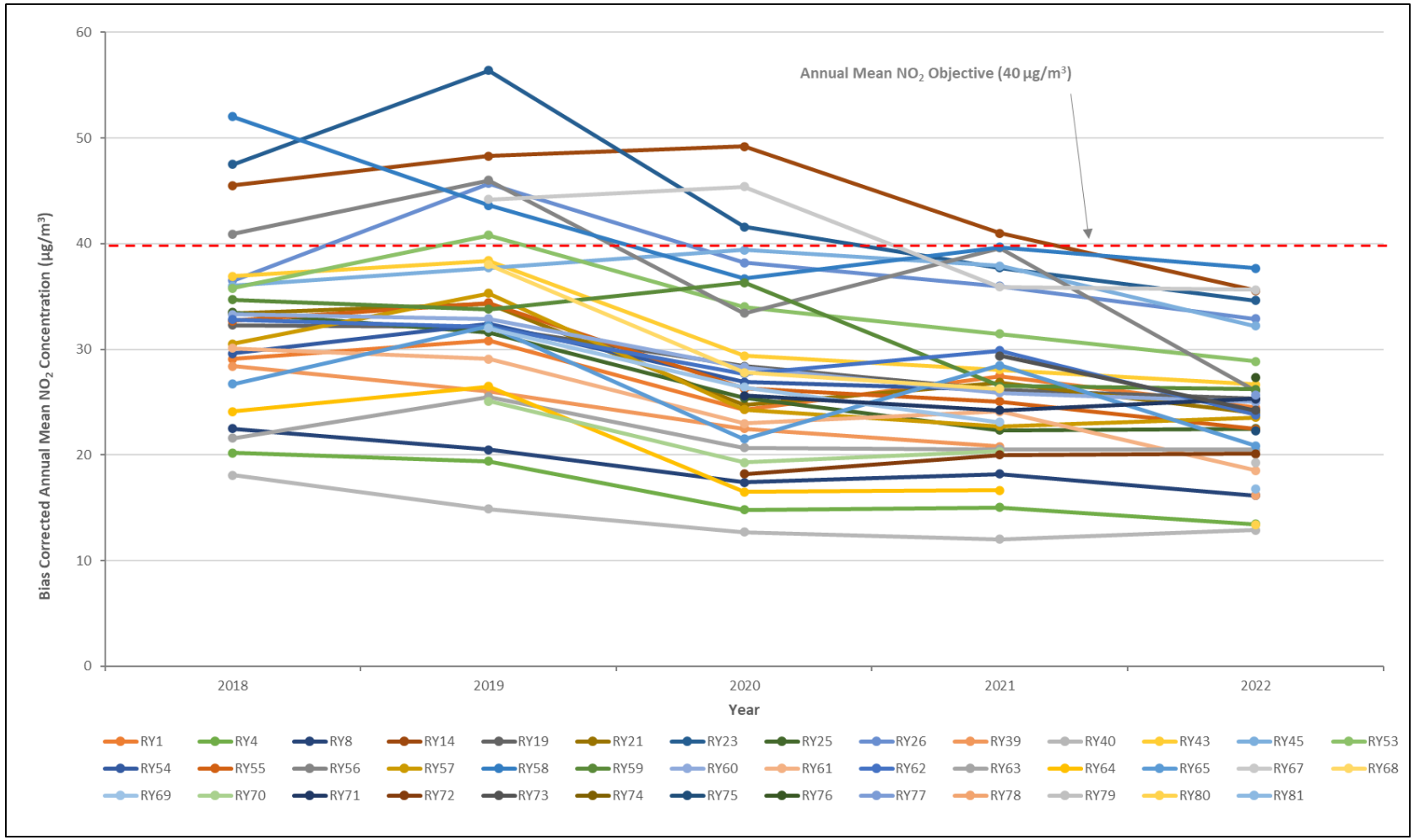


Figure A.2 – Trends in Annual Mean NO_2 Concentrations for M25 AQMA

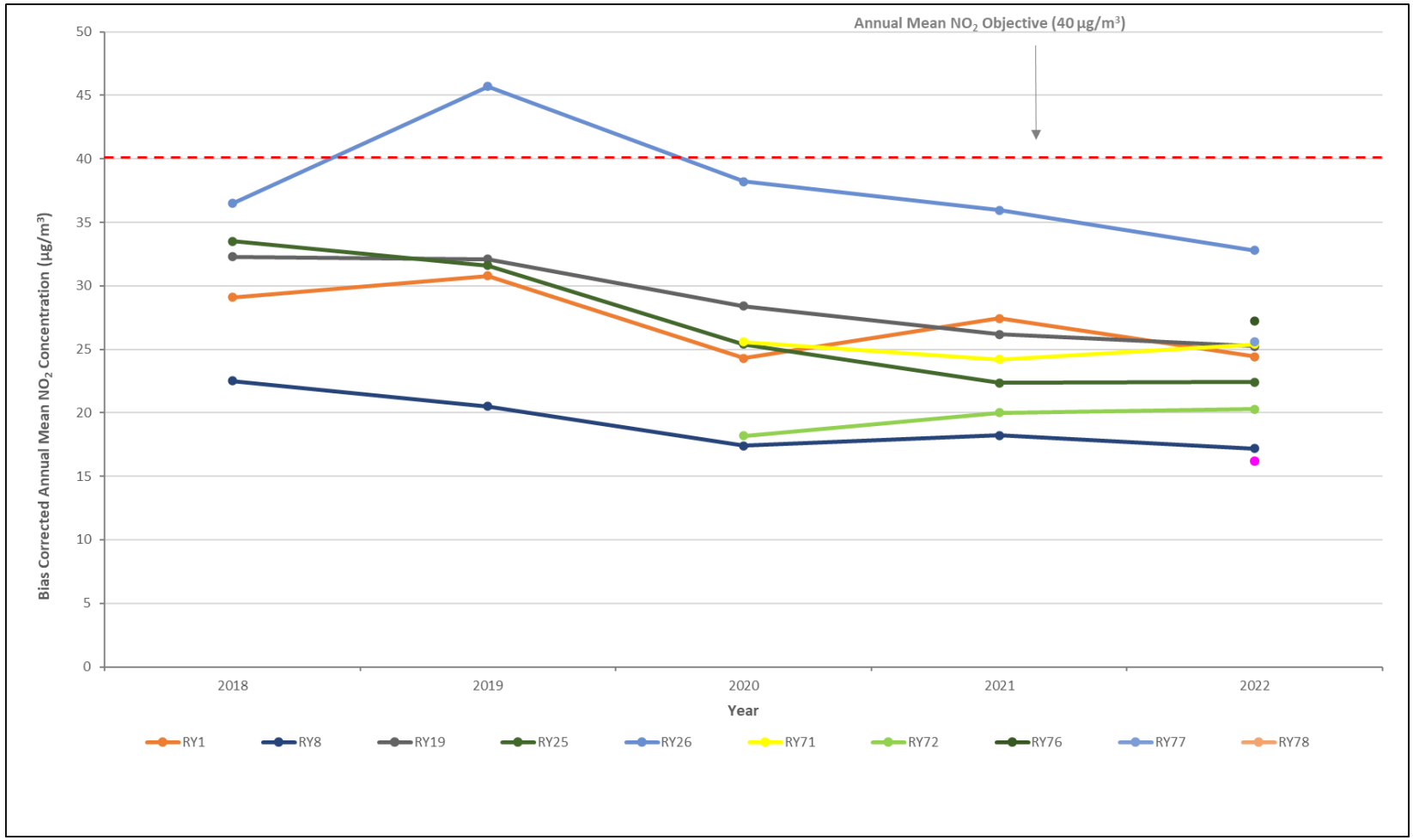
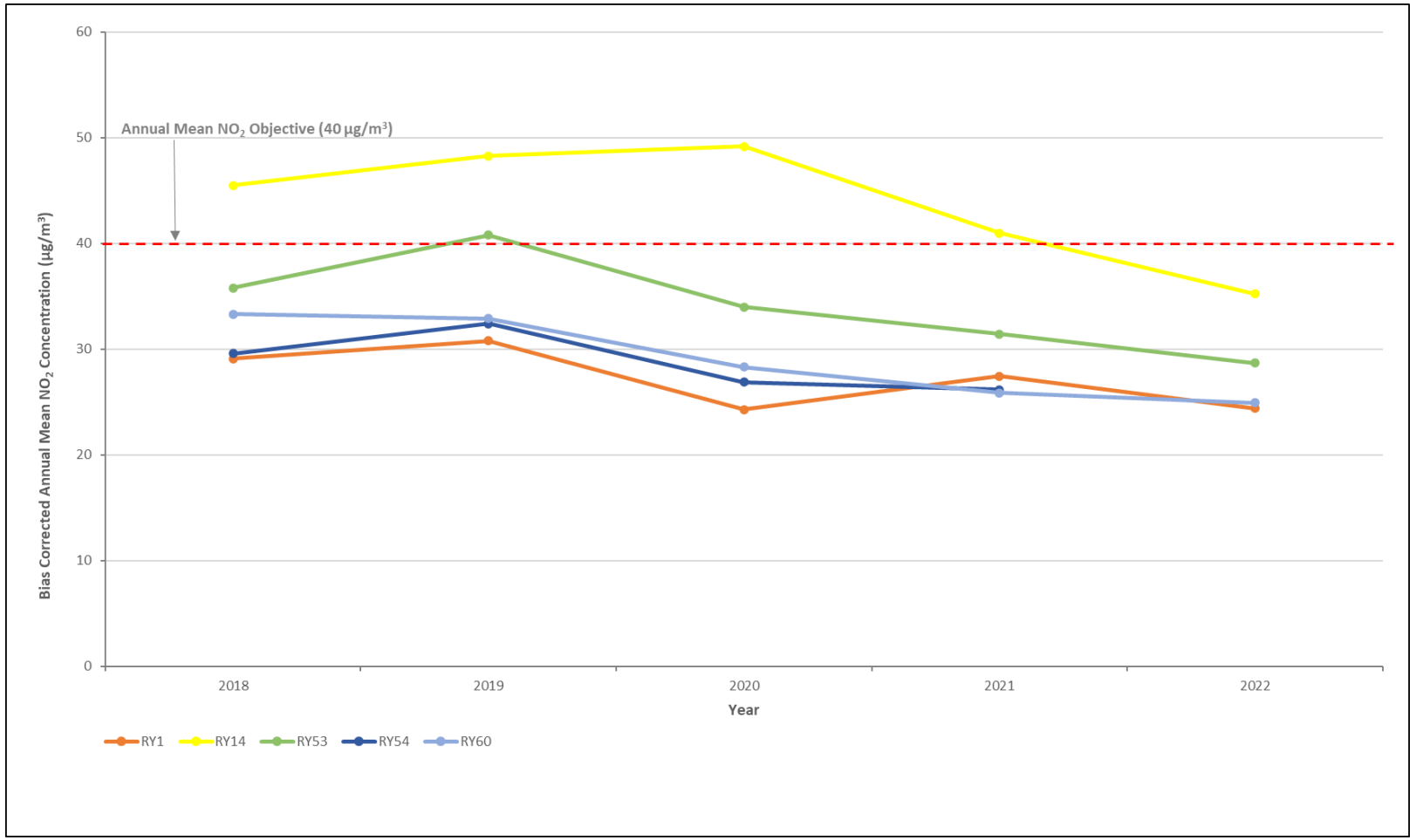


Figure A.3 – Trends in Annual Mean NO_2 Concentrations for Addlestone AQMA



Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1 – NO_2 2022 Diffusion Tube Results (µg/m^3)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.86)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
RY1	505098	164624	26.0	31.0	33.0	22.0	23.0	25.0		30.0	28.0	32.0	29.0	34.0	28.5	24.5	-	
RY4	505727	164624	22.0	23.0	18.0	11.0	14.0	10.0	12.0	16.0	15.0	16.0	15.0		15.6	13.4	-	
RY8	504316	163955	21.0	3.0	26.0	17.0	17.0			27.0	20.0	20.0			18.9	16.2	-	
RY14	504993	164606	46.0	40.0	37.0	27.0	33.0	41.0	52.0	45.0	48.0	41.0	40.0	46.0	41.3	35.5	-	
RY19	505227	162699	30.0	31.0	30.0	24.0	27.0	29.0	35.0	27.0	29.0	31.0		31.0	29.5	25.3	-	
RY21	504263	166945	29.0	29.0	31.0	22.0	23.0	20.0	28.0	31.0	31.0	32.0	27.0	32.0	27.9	24.0	-	
RY23	504878	166790	48.0	27.0		22.0	39.0	38.0	45.0	44.0	45.0	47.0	44.0	44.0	40.3	34.6	-	
RY25	501748	171349	28.0	28.0	26.0	24.0	20.0	25.0	24.0	27.0	26.0	25.0	31.0	30.0	26.2	22.5	-	
RY26	501717	171382	42.0	31.0	39.0	30.0	46.0	38.0	43.0	43.0	40.0	34.0	37.0	36.0	38.3	32.9	-	
RY39	498902	166242													-	-	-	
RY40	502072	165098	17.0	22.0	21.0	19.0	9.0	10.0	11.0	16.0	13.0	12.0	14.0	16.0	15.0	12.9	-	
RY43	504999	165305	40.0	30.0	33.0	24.0	27.0	28.0	37.0	29.0	33.0	31.0	31.0	29.0	31.0	26.7	-	
RY45	504879	166762	47.0	38.0		30.0	29.0	26.0	45.0	43.0	39.0	37.0	40.0	38.0	37.5	32.2	-	
RY53	504963	164784	43.0	33.0	32.0	22.0	25.0	29.0		36.0	37.0	37.0	34.0	41.0	33.5	28.8	-	
RY54	505072	164478													-	-	-	
RY55	505529	164784	26.0	27.0	28.0	14.0	22.0	25.0	34.0	33.0		23.0	33.0	22.0	26.1	22.4	-	
RY56	504947	166753	41.0	28.0		21.0	3.0	30.0	40.0		36.0	33.0	37.0	34.0	30.3	26.1	-	
RY57	504823	166823	39.0	28.0		19.0	17.0	25.0	26.0	27.0	30.0	27.0	30.0	33.0	27.4	23.5	-	
RY58	504895	166774	41.0	43.0	51.0	23.0	36.0	34.0	46.0	48.0		84.0	35.0	41.0	43.8	37.7	-	
RY59	504950	165139	34.0	30.0	31.0	17.0	25.0	24.0	32.0	30.0	32.0	33.0	35.0	43.0	30.5	26.2	-	
RY60	504965	164807	30.0	30.0	31.0	22.0	20.0	24.0	28.0	32.0		36.0	34.0	33.0	29.1	25.0	-	
RY61	504910	164558	23.0	3.0	3.0	17.0				32.0	29.0	26.0	27.0	34.0	21.6	18.5	-	
RY62	505080	164439	30.0	28.0	29.0	28.0	24.0	22.0	28.0	20.0	29.0	27.0	30.0	37.0	27.7	23.8	-	
RY63	505250	164520	25.0	29.0	27.0	25.0	18.0	17.0	21.0	25.0	21.0	21.0	25.0	32.0	23.8	20.5	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.86)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
RY64	505258	164394													-	-	-	
RY65	505706	164952	30.0	27.0	28.0	25.0	22.0	9.0	23.0	41.0	22.0	23.0	14.0	27.0	24.3	20.9	-	
RY67	502241	163885	34.0				23.0	35.0	47.0	44.0	44.0	46.0	51.0	49.0	41.4	35.6	-	
RY68	504967	165747													-	-	-	
RY69	505363	163912													-	-	-	
RY70	503411	171077	24.0												-	-	-	
RY71	504212	164259	32.0	30.0				25.0	31.0	30.0	29.0	33.0	26.0	29.0	29.4	25.3	-	
RY72	501585	171489	20.0	28.0	27.0	34.0	20.0	15.0	16.0	27.0	21.0	25.0	24.0	24.0	23.4	20.1	-	
RY73	505800	162303	31.0	27.0	28.0	20.0	22.0	24.0		33.0	32.0	28.0	30.0	35.0	28.2	24.2	-	
RY75	505208	164243	26.0	31.0	28.0	20.0	21.0	27.0	30.0	25.0	28.0	22.0	30.0	23.0	25.9	22.3	-	
RY76	501658	168253	32.0	33.0	35.0	26.0	22.0	24.0	33.0	37.0	30.0	46.0	33.0	30.0	31.8	27.3	-	
RY77	501865	171773	36.0	30.0	26.0	22.0	32.0	24.0	36.0	25.0	32.0	32.0	32.0	31.0	29.8	25.7	-	
RY78	501603	170111	17.0	19.0		14.0	19.0	15.0	18.0	29.0	16.0	21.0	19.0	20.0	18.8	16.2	-	
RY79	501903	168756		25.0	26.0	21.0	19.0	16.0	20.0	25.0	23.0	24.0		25.0	22.4	19.3	-	
RY80	506452	164754								8.0	14.0	17.0	19.0	21.0	15.8	13.4	-	
RY81	506414	164756								8.0	18.0	16.0	20.0	37.0	19.8	16.8	-	
RY82	506225	164706											18.0	23.0	-	-	-	

☒ **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.TG22.**

☐ **No Local bias adjustment factor used.**

☒ **National bias adjustment factor used.**

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

☒ **RBC confirm that all 2022 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.**

Accessibility Note: The table shows all passive monitors (diffusion tubes) within the borough, their monthly NO_2 concentrations for 2022, the raw annual mean concentration, the annualised and bias adjusted annual concentration and where relevant the distance corrected annual concentration.

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 Runnymede During 2022

Runnymede Borough Council has not identified any new sources relating to air quality within the reporting year of 2022.

Additional Air Quality Works Undertaken by RBC During 2022

Runnymede Borough Council installed eight new diffusion tubes (RY75 to RY82) at the start of 2022.

QA/QC of Diffusion Tube Monitoring

The diffusion tubes used by Runnymede Borough Council during 2022 were supplied and analysed by Lambeth Scientific Services Ltd. The analysis procedures are compliant with the Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance for users and laboratories (Defra, 2008).

The laboratory is UKAS accredited and participates in the AIR-PT Scheme, a continuation of the Workplace Analysis Scheme for Proficiency (WASP) for NO_2 tube analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO_2 concentrations are reported to a high level of accuracy. The lab follows the procedures set out in the Harmonisation Practical Guidance. The report analysing the performance of the laboratory hasn't been published for 2022. The most recently published report shows that for January 2021 to February 2021, May to June 2021, July to August 2021 and September to October 2021 the percentage of results submitted by Lambeth Scientific Services Ltd to the AIR PT scheme that were deemed to be satisfactory was 100% for rounds AR042 and AR043, and 75% for rounds

AR045 and AR046, respectively. Further information is available from Defra's LAQM webpage:

https://laqm.defra.gov.uk/wp-content/uploads/2022/07/LAQM-NO2-Performance-data_Up-to-June-2022_V2.1.pdf

Monitoring has been completed in close adherence with the 2022 Diffusion Tube Monitoring Calendar.

Diffusion Tube Annualisation

LAQM.TG22 states that for those nitrogen dioxide diffusion tube sites with fewer than nine months' worth of data (but more than three months in total), it is necessary to perform annualisation, to adjust short-term measurements to represent annual mean concentrations.

Data capture for 2021 was between 25-75% at three sites. Data for these sites have been annualised following the methodology set out in LAQM.TG22.

For the periods where diffusion tube data is available, period mean concentrations have been calculated from four AURN background automatic monitoring stations; Spelthorne Sunbury Cross, Hounslow Feltham, Horley and Southwark – Elephant and Castle. Ratios have been derived by comparing these period mean concentrations with annual mean concentrations from the automatic monitoring stations. The short-term concentrations have then been multiplied by the ratio to obtain annualised annual mean concentrations. The calculations are presented in Table C.1.

Table C.1 – Annualisation Summary (concentrations presented in µg/m^3)

Site ID	Annualisation Factor Spelthorne Sunbury Cross	Annualisation Factor Hounslow Feltham	Annualisation Factor Horley	Annualisation Factor Southwark – Elephant and Castle	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
RY8	0.9845	1.0145	1.0237	0.9584	0.9953	18.9	18.8
RY80	0.9838	1.0289	0.9557	0.9713	0.9849	15.8	15.6
RY81	0.9838	1.0289	0.9557	0.9713	0.9849	19.8	19.5

Accessibility Note: The table shows the automatic monitors used to annualise the diffusion tubes within the borough with data capture between 25% and 75% of the year. It also shows their raw and annualised NO_2 concentrations.

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2023 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG22 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Local Diffusion Tube Bias Adjustment

A local bias adjustment factor could not be calculated as no reference equivalent automatic (continuous) monitoring was undertaken by Runnymede Borough Council.

National Diffusion Tube Bias Adjustment

A database of national bias adjustment factors determined from Local Authority co-location studies throughout the UK has been collated by the Local Air Quality Management Helpdesk. Using orthogonal regression, combined bias adjustment factors have been calculated for each laboratory, year and preparation method combination for which data are available. For Lambeth Scientific Services Ltd, using a preparation method of 50% triethanolamine (TEA) solution, the national bias adjustment factor (June 2023) is 0.86, which has been based on 10 colocation studies as shown in Figure C.1.

Figure C.1 – National Bias Adjustment Factor

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 06/23

Follow the steps below **in the correct order** to show the results of **relevant** co-location studies

Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods

Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet

This spreadhseet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of September 2023

LAQM Helpdesk Website

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1:	Step 2:	Step 3:	Step 4:
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.
If a laboratory is not shown, we have no data for this laboratory.	If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data[4]	If you have your own co-location study then see footnote[5]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953

Analysed By[1]	Method (To undo your selection, choose (All) from the pop-up list)	Year[4] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision[6]	Bias Adjustment Factor (A) (Cm/Dm)
Lambeth Scientific Services	50% TEA in acetone	2022	KS	Marylebone Road Intercomparison	12	53	42	25.4%	G	**0.80**
Lambeth Scientific Services	50% TEA in acetone	2022	UB	Spelthorne Borough Council	12	23	20	16.3%	G	**0.86**
Lambeth Scientific Services	50% TEA in acetone	2022	UB	Spelthorne Borough Council	10	26	24	8.7%	P	**0.92**
Lambeth Scientific Services	50% TEA in Acetone	2022	R	Elmbridge Borough Council	12	30	28	4.8%	G	**0.95**
Lambeth Scientific Services	50% TEA in Acetone	2022	R	Elmbridge Borough Council	11	28	25	14.1%	P	**0.88**
Lambeth Scientific Services	50% TEA in Acetone	2022	R	Guildford Borough Council	11	24	20	21.6%	G	**0.82**
Lambeth Scientific Services	50% TEA in Acetone	2022	SU	Reigate And Banstead	11	20	17	16.4%	G	**0.86**
Lambeth Scientific Services	50% TEA in Acetone	2022	B	Reigate And Banstead	12	16	12	36.1%	P	**0.73**
Lambeth Scientific Services	50% TEA in Acetone	2022	R	Reigate And Banstead	12	37	35	4.6%	G	**0.96**
Lambeth Scientific Services	50% TEA in Acetone	2022	SU	Reigate And Banstead	12	20	17	16.5%	P	**0.86**
Lambeth Scientific Services	50% TEA in acetone	2022		**Overall Factor[3] (10 studies)**				**Use**		**0.86**

RBC have applied the national bias adjustment factor of 0.86 to the 2022 monitoring data. A summary of bias adjustment factors used by RBC over the past five years is presented in Table C.2.

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	National	06/23	0.86
2021	National	Unknown	0.95
2020	National	Unknown	0.95
2019	National	Unknown	0.92
2018	National	Unknown	1.04

Accessibility Note: The figure identifies each bias adjustment factor used to annualise the monitoring data in the last 5 years as well as whether a national or local factor was used (national in all years) and the version of the National Bias Adjustment Spreadsheet used for each year.

NO_2 Fall-off with Distance from the Road

Where monitoring sites are not representative of public exposure it is important to consider concentrations at locations of relevant exposure, e.g. if monitoring is located at roadside or kerbside, the concentrations at the façade of nearest properties set back further from the road should be considered.

Table C3 provide information on the one monitoring location where distance correction is required.

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
RY58	0.5	13.4	37.7	15.9	24.9	

Accessibility Note: The figure identifies the relevant monitor where fall off with distance calculations were carried out including the monitor distances, background concentrations and uncorrected and corrected annual mean NO_2 concentrations.

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

Figure D.1 – Map of Monitoring Locations within RBC

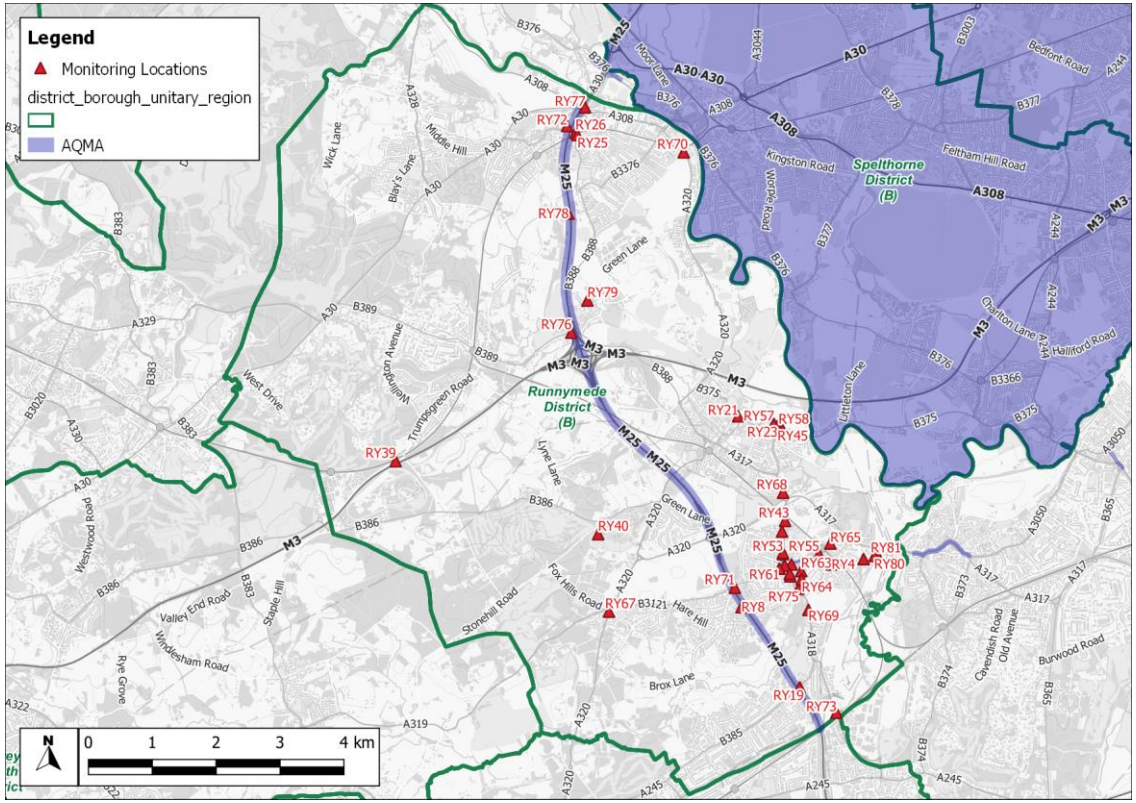


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Figure D.2 – Map of Addlestone AQMA Boundary and surrounding area monitoring locations

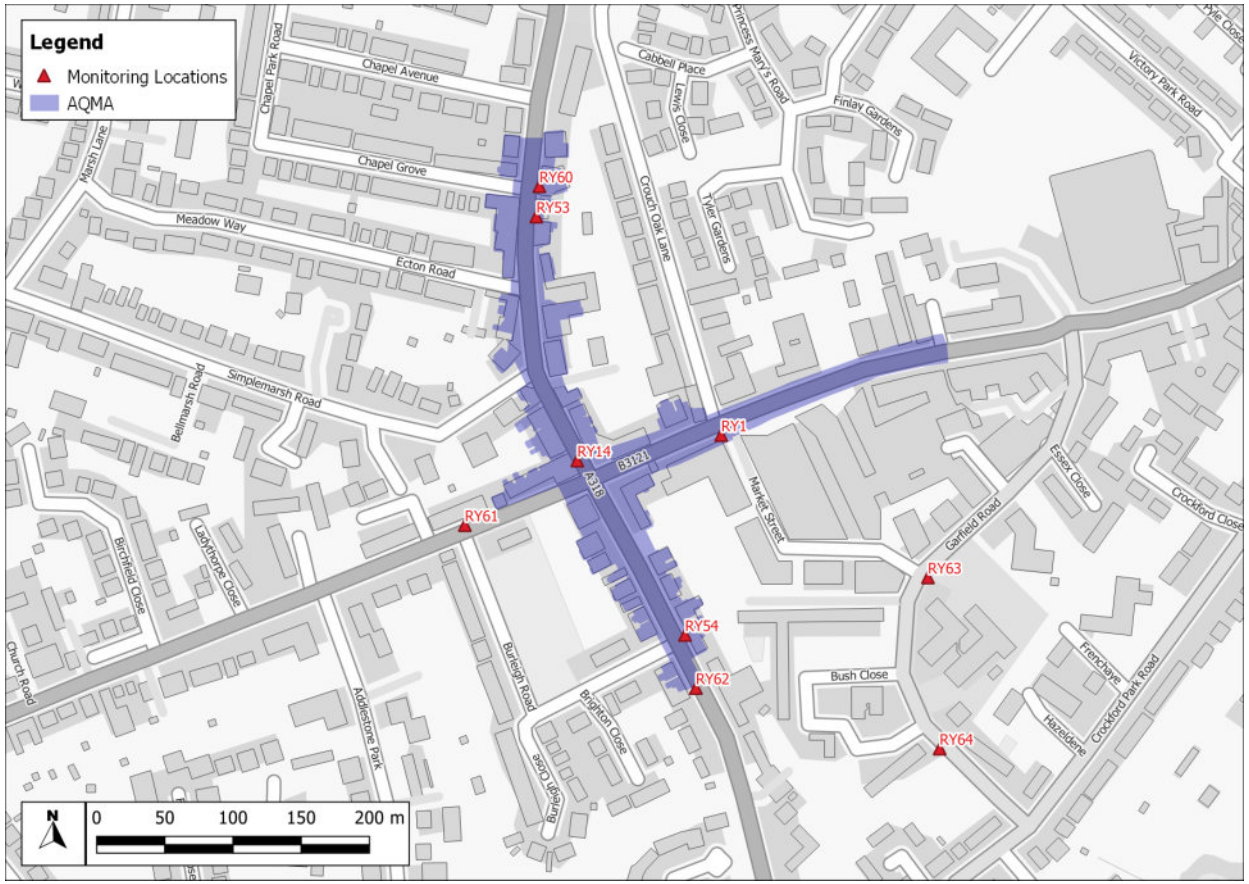

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Figure D.3 – Map of Monitoring Locations within Chertsey and the Surrounding area

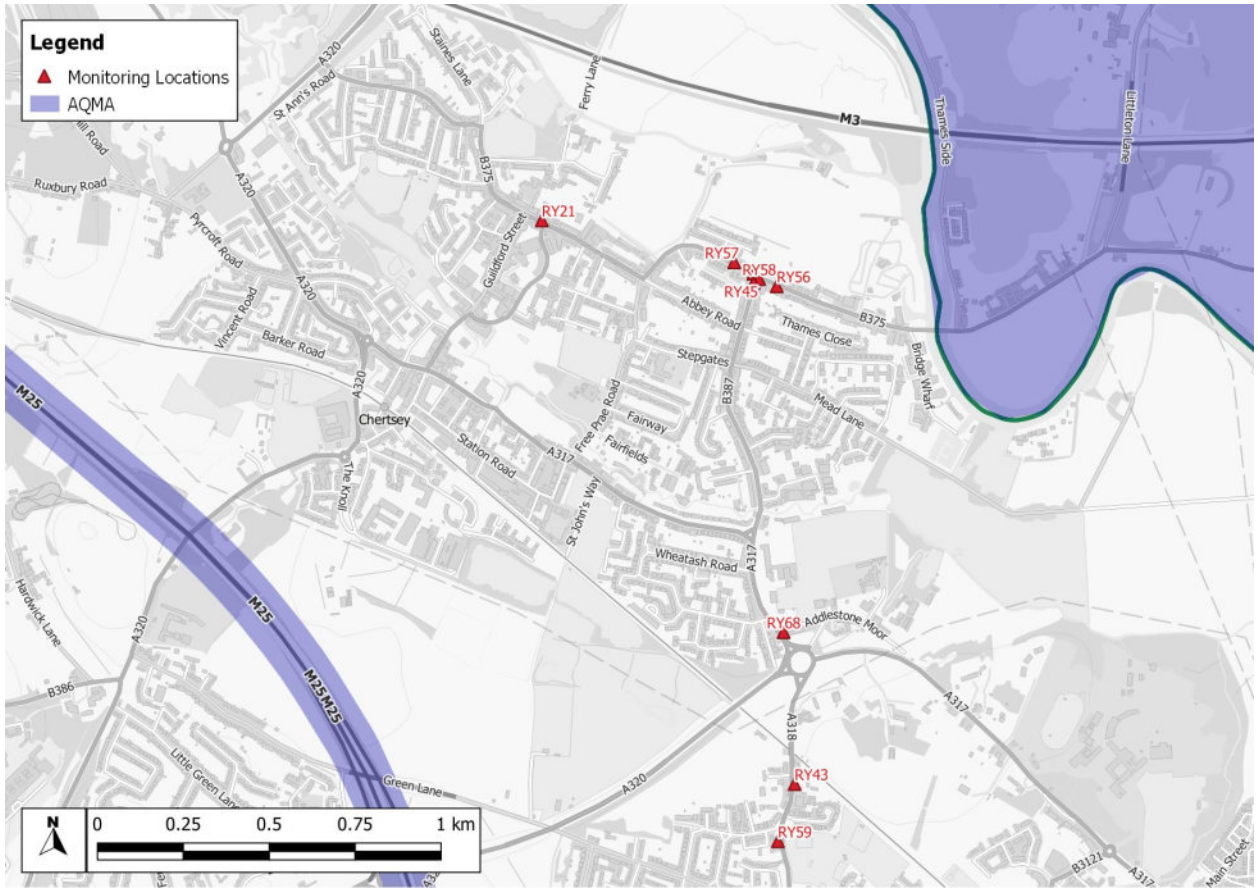

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Figure D.4 – Map of Monitoring Locations within southern extent of the M25 AQMA and surrounding area monitoring locations

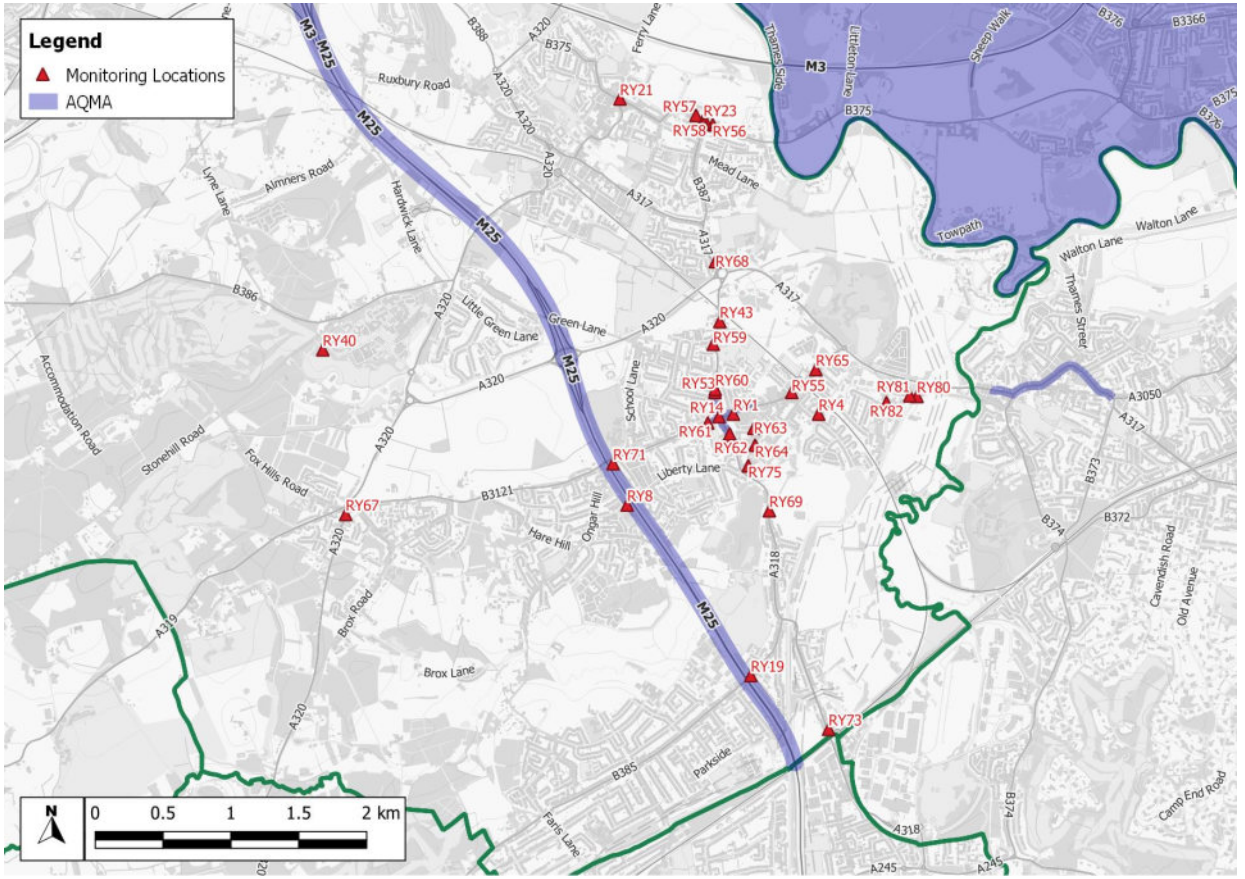

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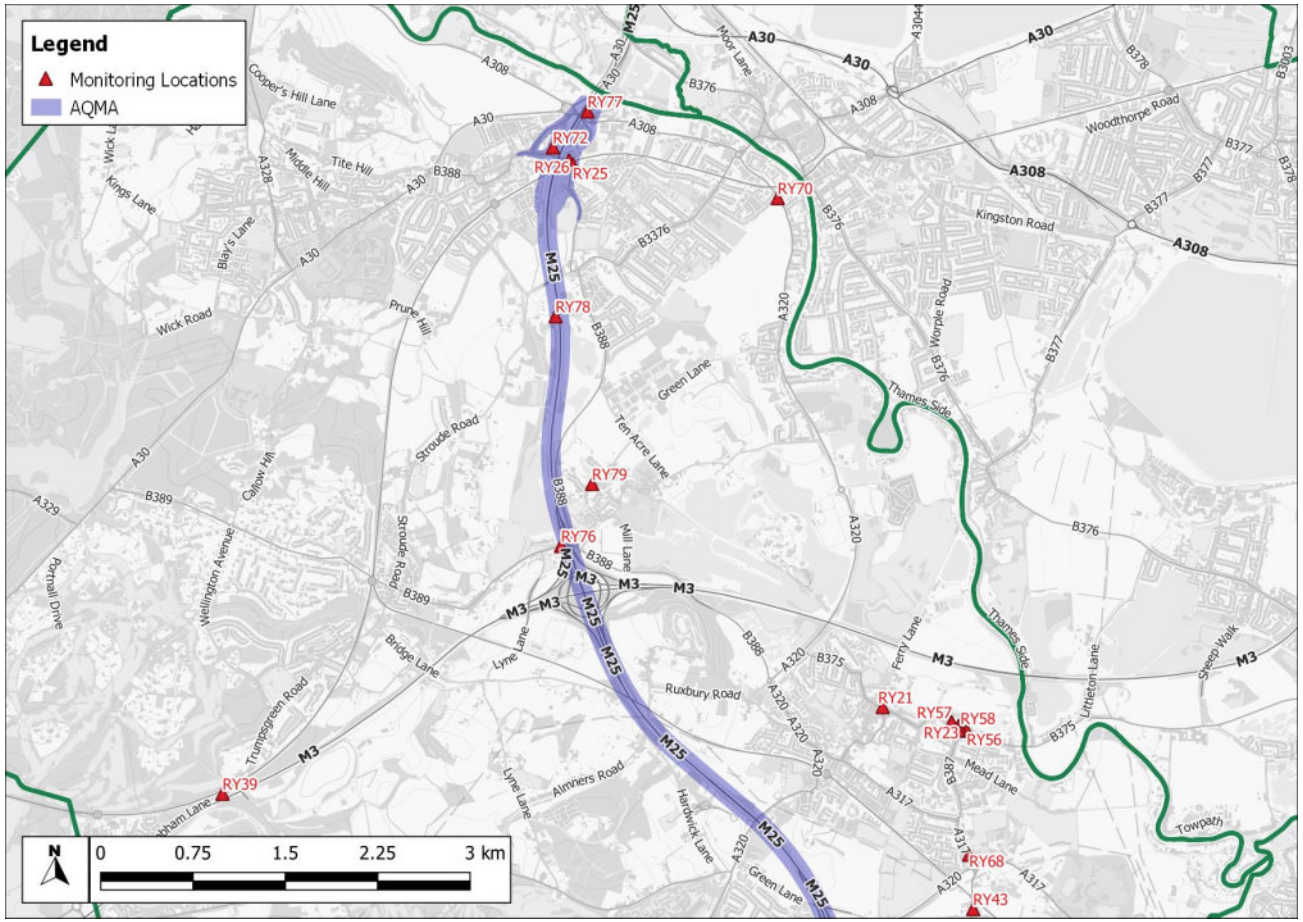
Figure D.5 – Map of Monitoring Locations within the Northern M25 AQMA extent and surrounding area



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Appendix E: Summary of Air Quality Objectives in England

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

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

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

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
µg/m3	Microgrammes of pollutant per cubic metre
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

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