2025 Air Quality Annual Status Report (ASR)

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

Date: June 2025

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Local Responsibilities and Commitment

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

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This ASR has been approved by:

Frances Soper, Environmental Health and Licensing Manager

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 ASRs on air quality within their area; to develop initiatives, air quality action plans, and implement actions to improve air quality across the county of Surrey. A copy of this ASR has been provided to Surrey Public Health.

If you have any comments on this ASR, please send them to Environmental Health at:

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Executive Summary: Air Quality in Our Area

Air Quality in Surrey Heath

Breathing in polluted air affects our health and costs the NHS and our society billions of pounds each year. Air pollution contributes to heart disease, cancer, and a range of health impacts including reduced lung function, asthma exacerbation, hospital admissions and mortality. The most vulnerable, children, the elderly and those with existing conditions, are particularly at risk and low-income communities are disproportionately affected, exacerbating health inequalities.

Table ES 1 provides a brief explanation of the key pollutants relevant to Local Air Quality Management and the kind of activities they might arise from.

Table ES 1 - Description of Key Pollutants

Pollutant	Description
Nitrogen Dioxide (NO_2)	Nitrogen dioxide is a gas which is generally emitted from high-temperature combustion processes such as road transport or energy generation.
Sulphur Dioxide (SO_2)	Sulphur dioxide (SO_2) is a corrosive gas which is predominantly produced from the combustion of coal or crude oil.
Particulate Matter (PM_{10} and $PM_{2.5}$)	Particulate matter is everything in the air that is not a gas. Particles can come from natural sources such as pollen, as well as human made sources such as smoke from fires, emissions from industry and dust from tyres and brakes. PM_{10} refers to particles under 10 micrometres. Fine particulate matter or $PM_{2.5}$ are particles under 2.5 micrometres.

The borough of Surrey Heath is located in the southeast region of England, to the southwest of London. The main air quality issues are associated with the emission of pollutants from road traffic, in particular the M3 motorway. The main pollutant of concern is nitrogen dioxide (NO_2), for which Air Quality Objective (AQO) values are listed in Appendix E.

Automatic monitoring of NO_2 and PM_{10} is carried out at one automatic monitoring station situated in Castle Road, Camberley, approximately 20 metres north of the M3. In addition,

the Council monitors NO_2 concentrations using diffusion tubes across a network which was expanded in 2022 to 53 locations, including one triplicate site co-located with the automatic monitoring station. SHBC also undertakes monitoring of $PM_{2.5}$ using a low-cost sensor, which has been deployed in areas likely to experience higher concentration, such as areas within the vicinity of major trunk roads, and/or areas with increased exposure risk, such as schools and community centre.

The data capture for the automatic monitoring station in 2024 was 95.7% for NO_2 concentrations and 95.4 % for PM10 concentrations. The 2024 annual mean NO_2 concentration for this automatic monitor was 21.5 µg/m^3, which meets the annual mean NO2 AQO of 40 µg/m^3 and is lower than concentrations recorded in the previous five years (see Table A.3). In 2024, the annual mean NO2 concentrations were below 40 µg/m^3 at all of the 53 diffusion tube monitoring locations.

The 2024 annual mean PM_{10} at the automatic monitoring station was 13.0 µg/m^3, remaining well below the objective of 40 µg/m^3. Results have been stable in recent years, with exceedances of the PM_{10} objectives considered very unlikely. Similarly to NO_2 concentrations, the results of the last 5-years of monitoring show that the PM_{10} have been gradually decreasing, only increasing between 2021 and 2022 due to rebounds in traffic flows. The $PM_{2.5}$ concentrations in the borough are also likely to be below the AQO of 20 µg/m^3, based on the empirical relationship published in LAQM.TG22[1].

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.

In 2024, SHBC continued to support the A331 Blackwater Valley NO_2 programme under the direction of Defra's Joint Air Quality Unit (JAQU). In accordance with Defra's Exiting NO_2 Programme Guidance, Blackwater Valley Group (BVG) has completed State 3 to demonstrate that annual average NO_2 concentrations are below 40 µg/m^3 at all measurement sites. The State Assessment 3 was a pass, and an Exit Plan to withdraw

[1] Defra – Local Air Quality Management Technical Guidance 2022

from the process was developed in 2024. This Exit Plan was presented to the Licensing Committee in November 2024 and the Committee resolved to exit the NO_2 Programme as set out in the Exit Plan.

The Environmental Improvement Plan[2] sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term targets for fine particulate matter ($PM_{2.5}$), the pollutant of most harm to human health. The Air Quality Strategy[3] provides more information on local authorities' responsibilities to work towards these new targets and reduce fine particulate matter in their areas. SHBC will continue to monitor the evolving national air quality targets introduced under the Environmental Improvement Plan 2023, including interim and long-term $PM_{2.5}$ objectives, to ensure its monitoring and future Air Quality Strategy remain aligned with national policy.

Following successful application, SHBC was awarded the Defra Local Authority Air Quality Grant in 2023. SHBC purchased a portable $PM_{2.5}$ and PM_{10} monitor with iMCERT certification in 2023. In 2024, SHBC continued to deploy this monitor in areas likely to experience higher concentration and/or with increased exposure risk, e.g. at schools, construction and demolition site, local community centre and location near trunk road, to establish indicative $PM_{2.5}$ concentrations at these locations.

A modelling report commissioned by the Surrey Air Alliance (SAA) was published in November 2019. Using 2017 data, the report detailed the influence of road traffic on pollutant concentrations, with major trunk routes such as the M3 motorway and A roads such as the A30, A322 and A325 being clearly demarked with higher concentrations above the national air strategy quality objective along the road corridors and at major junctions. Initial dialogue has started to carry out an updated modelling in 2026 / 2027, using 2024 data to understand how air quality has changed in the past seven years, and how the sources of the key pollutants may have changed. This work is subject to capital bid and funding.

SHBC will continue to install Electric Vehicle charging points in public spaces and upon Council owned land. The council has completed the installation of 46 EV charging bays funded by £250,000 of UK government grants and private finance. In addition, SHBC is

[2] Defra – Environmental Improvement Plan 2023, January 2023

[3] Defra – Air Quality Strategy – Framework for Local Authority Delivery, August 2023

scoping the installation of an additional 14 EV charging bays outside of this funding mechanism. All charging bays are scheduled to be installed by the end of 2026. Surrey Heath's air quality work also aligns with Surrey County Council's Local Transport Plan 4 (LTP4), which seeks to reduce transport emissions, encourage active travel and promote sustainable low-emission mobility across the county.

Conclusions and Priorities

The 2024 NO_2 monitoring results indicate a decrease in annual mean NO_2 concentrations at most monitoring sites across the borough in comparison to the previous year and have continued to remain compliant with the annual mean AQO.

Following over five years of consecutive compliance with the AQO within the AQMA, SHBC received recommendation from the Defra to revoke the AQMA in 2023. A committee report was prepared and presented to Licensing Committee in November 2024, which summarised the air quality in the AQMA and sought approval to revoke the AQMA. The Committee resolved to revoke the AQMA, and a Revocation Order was issued in December 2024.

Following the AQMA revocation, SHBC has maintained extensive monitoring across 53 sites to ensure ongoing compliance and early detection of any emerging issues. The Council will remain vigilant and continue to look closely at the monitoring data along the M3 to ensure good air quality is maintained and no new declarations regarding AQMAs need to be made. Air quality remains a high-profile matter and Surrey Heath Borough Council is developing a local air quality strategy to maintain compliance and further improve air quality through collaborative work.

Monitored NO_2 concentrations during 2024 suggest that traffic emissions from major trunk roads continue to be the greatest contributor to air pollution within the borough, which is outside the control of the Council. Nonetheless, the concentrations have continued to decrease and have been compliant with the AQOs in recent years. No new significant local sources of air pollution were identified within the borough during 2024.

The principal challenges SHBC anticipates facing are that the pollutants that residents are exposed to often come from pollution generated not only within the borough but also from 'background' levels transported in from outside the area. For oxides of nitrogen, up to 25% of concentrations recorded at locations away from main roads can be from these

background sources[4]. The main source of NO_2 produced within the borough is from road traffic exhausts, but the most significant of these sources, being the motorway and major trunk roads, are ones over which the Council has little control.

How to get Involved

As an active member of SAA, SHBC takes a collaborative approach with colleagues at Surrey County Council Public Health, Highways, School Project.

There is continual interest in air quality from Councillors, residents, and the public. SHBC ensures timely response to air quality enquiries, addressing concerns, and providing up-to-date information and appropriate action.

SHBC has redeveloped the Council's air quality webpages to include information on how the public can protect themselves from potential exposure and the actions they can take to improve local area. For more information please visit https://www.surreyheath.gov.uk/environment/air-and-land-quality/air-quality

[4] CERC (2019), Detailed Air Quality Modelling and Source Apportionment.

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1 Local Air Quality Management

This report provides an overview of air quality in Surrey Heath during 2024. 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 Surrey Heath Borough Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England are presented in Table E.1.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

Following over five consecutive years of compliance with the AQO, Defra recommended SHBC to revoke the AQMA which was declared in 2002. A revocation proposal was put forward in the 2024 ASR, and a Revocation Order was issued in December 2024. Information regarding this revocation has been provided to UK-Air.

Surrey Heath Borough Council currently does not have any declared AQMAs. A local Air Quality Strategy is under development to prevent and reduce polluting activities.

2.2 Progress and Impact of Measures to address Air Quality in Surrey Heath

Defra's appraisal of last year's ASR concluded the following points Main appraisal comments are presented as a bullet point list with response detailed.

- Table 2.2 within the excel document does not match the inputs in the ASR template. These should be reviewed to ensure consistency in future ASRs.
  Response: The Excel document is no longer a requirement, however consistency across reports and the DTDES and ADES submission has been checked.
- It is considered that the CM1 automatic monitoring station is not currently meeting the micro-scaling criteria within LAQM.TG22 and given the distance to the M3, also the site type classification for a roadside monitoring station. This site should be reviewed in future ASRs for its suitability for use as a co-location site for local bias adjustment.
  Response: Following the appraisal comment, this year's ASR will use national diffusion tube bias adjustment.
- There are some discrepancies in the diffusion tube site type classifications, there are a number of locations that are not currently categorised in accordance with the LAQM site type classifications. All diffusion tube site type classifications should be reviewed to ensure consistency.
  Response: Site types of the diffusion tubes have been reviewed and amended in line with LAQM TG (22).
- Trends of annual mean NO_2 concentrations are clearly presented in detail and discussed and a robust comparison with air quality objectives is provided.
  Response: SHBC will continue to analyse and present the trends of annual mean NO_2.
- Maps of the diffusion tube network are clear and comprehensive, showing the AQMA boundaries and monitoring undertaken in this area.
  Response: SHBC will continue to present the diffusion tube network across the borough.
- The continual collaborative approach that Surrey Heath Borough Council are taking, both with National Highways and through the Surrey Air Alliance, is welcomed.
  Response: SHBC will continue to collaborate with National Highways and the Surrey Air Alliance moving forwards.

- Measures to address $PM_{2.5}$ are detailed within the ASR. Links are provided and discussed in regard to the Public Health Outcomes Framework and fraction of mortality attributable to $PM_{2.5}$ emissions. Comparisons to the regional and national average as well as a trend analysis over time is included. This is welcomed and is encouraged to be included in all future reports.

  Response: In 2024 SHBC continued to deploy this portable monitor in areas likely to experience elevated $PM_{2.5}$ concentration, and areas with high sensitivity (e.g. schools).
- The Council has justified the use of a local bias adjustment factor as this is a more conservative approach and has clearly discussed this within the text. A screenshot of the national bias adjustment factor sheet was included as outlined in the previous appraisal letter which is welcomed.

  Response: SHBC will continue to calculate the local bias adjustment factor for comparison, however the national bias adjustment factor will be used going forwards in line with Defra advice above.
- At the time of appraisal, Diffusion Tube data had not been uploaded to the DTDES, this should be completed as soon as possible.

  Response: 2023 Diffusion Tube data have been uploaded to LAQM DTDES. SHBC will continue to upload 2024 data as required.

Surrey Heath Borough Council has taken forward a number of direct measures during the current reporting year of 2024 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.1. Twelve measures are included within Table 2.1, with the type of measure and the progress Surrey Heath Borough Council have made during the reporting year of 2024 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.1.

SHBC no longer have an AQMA but continue to monitor air quality using our monitoring network covering 53 locations across the borough which allows quick response should any deterioration in condition occur. SHBC is in the scoping stage to develop our local air quality strategy to ensure air quality remains a high-profile issue. This remains our high priority task.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	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	Develop a local air quality strategy	Policy Guidance and Development Control	Other Policy	2025	2027	SHBC / SCC	SHBC	<Partially funded>	<£10k	Planning	N/A	N/A	Scoping stage	N/A
2	Encourage the use of electric vehicles by providing public charging points	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	N/A	N/A	SHBC / SCC	<Defra and LA>	<Partially funded>	<£300K>	Implementation	N/A	N/A	N/A	N/A
3	AQ monitoring and modelling	N/A	N/A	N/A	N/A	SHBC	N/A	N/A	N/A	N/A	N/A	ongoing	N/A	Subject to future budget
4	Increase SHBC's EV fleet	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	N/A	N/A	SHBC	SHBC	N/A	N/A	Implementation	N/A	N/A	N/A	Five EVs were procured in 2024, thus over 25% of the fleet are now EVs (total fleet size is 19)
5	Air Quality information on the SHBC website	Public Information	Via the Internet	N/A	N/A	SHBC	N/A	N/A	N/A	N/A	N/A	ongoing	N/A	N/A
6	Surrey Air Alliance	Policy Guidance and Development Control	Regional Groups	N/A	N/A	SHBC / SCC	N/A	N/A	N/A	Ongoing	N/A	N/A	Ongoing	N/A
7	Age and emission requirements for taxi and private hire vehicle	Promoting Low Emission Transport	Taxi Licensing conditions	N/A	N/A	SHBC	N/A	N/A	N/A	Ongoing	N/A	N/A	Ongoing	N/A
8	Public information to discourage use of bonfire	Public Information	Via the Internet	N/A	N/A	SHBC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9	Hybrid working	Promoting Travel Alternatives	Encourage / Facilitate homeworking	N/A	N/A	SHBC	N/A	N/A	N/A	Ongoing	N/A	N/A	Ongoing	N/A
10	Reducing council staff transport emission	Promoting Travel Alternative	EV salary sacrifice scheme	N/A	N/A	SHBC	N/A	N/A	N/A	Ongoing	N/A	N/A	Ongoing	N/A
11	Prepare LCWIP and active travel funding	Promoting Travel Alternatives	Promotion of cycling and walking	N/A	N/A	SHBC	N/A	N/A	N/A	Ongoing	N/A	N/A	Ongoing	N/A
12	Promote DEFRA's smoky vehicle reporting	Public Information	Via social media and council website	N/A	N/A	SHBC	N/A	N/A	N/A	Ongoing	N/A	N/A	Ongoing	N/A

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

As detailed in Policy Guidance LAQM.PG22 (Chapter 8) and the Air Quality Strategy[5], local authorities are expected to work towards reducing emissions and/or concentrations of fine particulate matter ($PM_{2.5}$)). There is clear evidence that $PM_{2.5}$ (particulate matter smaller 2.5 micrometres) has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

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

To put the local concentrations of $PM_{2.5}$ in context within the borough, SHBC makes use of Defra background mapping and modelling. The background annual average $PM_{2.5}$ concentrations in Surrey Heath for 2023 ranged from 8.7 µg/m^3 to 12.7 µg/m^3; these are estimated to have decreased to between 6.8 µg/m^3 to 9 µg/m^3 in 2024. These concentrations are well below the limit of 20 µg/m^3 and slightly below 2040 target of 10 µg/m^3.

Following successful grant application, Surrey Heath was awarded the Defra's Local Authority Air Quality Grant of £12,280 in March 2023. This grant supported a 12-month project to procure a portable $PM_{2.5}$ / PM_{10} monitor with iMCERT certification to monitor $PM_{2.5}$ and PM_{10} levels at locations likely to experience higher concentration and/or increased exposure risk, develop website contents and engage with key stakeholders to raise air quality awareness. Following the completion of this project, this portable AQ monitor continued to be deployed in the Borough to establish the background concentration. In 2024, SHBC continued to deploy this monitor in areas likely to experience higher concentration and/or with increased exposure risk, e.g. at schools, area close to construction and demolition site, local community centre and location near trunk road, to establish indicative $PM_{2.5}$ concentrations at these locations.

Along with other members of the SAA, SHBC commissioned a countywide $PM_{2.5}$ dispersion modelling study which was carried out by CERC. Source apportionment was carried out to calculate the relative contributions of each source group (road sources, by vehicle type and non-exhaust component for PM; large industrial sources; other emissions

[5] Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

sources; and background) to pollutant emissions and concentrations. The report, published in November 2019 using 2017 data, identified the influence of road traffic on pollutant levels, with major trunk routes such as the M3 motorway and A-roads such as the A30, A322 and A325 being clearly demarked with higher levels above the national air quality objective along the road corridors and at major junctions. For particulate matter, background concentrations from outside Surrey were found to be the most significant contributors to PM_{10} and $PM_{2.5}$, and thus any local measures introduced would have a limited effect on overall levels. Early dialogue has started at SAA for a follow up modelling based on 2024 data. This work is subject to funding.

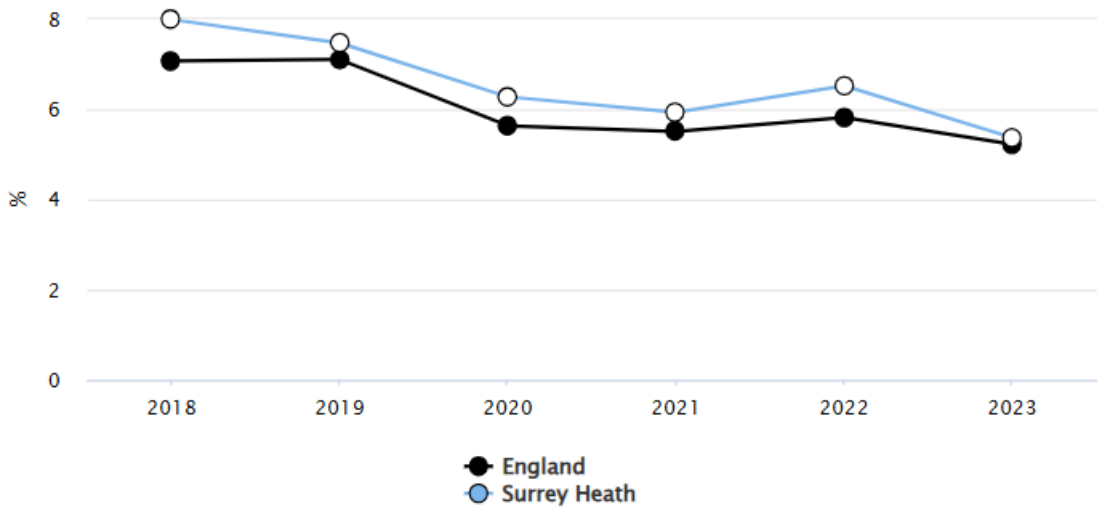
In addition to this, SHBC is continuing to enforce legislation that can have an impact on air quality such as reducing impacts from demolition and construction site, investigating commercial and domestic bonfires and smoke. More information can be found our website: https://www.surreyheath.gov.uk/environment/noise-and-nuisance/bonfires.

The Public Health Outcomes Framework (PHOF) has published statistics on the health effects of exposure of the public to fine particulate pollution[6]. SHBC notes PHOF indicator DO1 – Fraction of mortality attributable to particulate ($PM_{2.5}$) air pollution in 2023 (latest available) gives a value of 5.4% which is slightly above the average for both the Southeast region (5.1%) and England (5.2%).

The estimated fraction of mortality attributable to particulate ($PM_{2.5}$) air pollution between 2018 and 2023 is shown in Figure 2.1 for Surrey Heath and across England. The $PM_{2.5}$ fractions for Surrey Heath exhibited a slight increase between 2021 and 2022 and as did the average for England, however, there is an overall reduction within Surrey Heath and across England.

[6] Public Health Outcomes Framework. D01 – Fraction of mortality attributable to particular air pollution. Available At: https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/1/ati/301/are/E07000214. Accessed May 2025.

Figure 2-1: Public Health Outcomes Framework, Fine Particulate Matter ($PM_{2.5}$)



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

This section sets out the monitoring undertaken within 2024 by Surrey Heath Borough Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2020 and 2024 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Surrey Heath Borough Council undertook automatic (continuous) monitoring at one site at Castle Road during 2024. Table A.1 in Appendix A shows the details of the automatic monitoring sites. The automatic monitoring results for Surrey Heath Borough Council are available through the UK-Air website.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

Surrey Heath Borough Council undertook non- automatic (i.e. passive) monitoring of NO_2 at 53 sites during 2024, one of which is a triplicate site co-located with the automatic monitor.

Table A.2 in Appendix A presents the details of the non-automatic sites.

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

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2024 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

Table A.5 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past five years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

The automatic station at Castle Road (CM1), located within the former AQMA, recorded an annual mean NO_2 concentration of 21.5 µg/m³ in 2024. This represents a further decline from 23.8 µg/m³ in 2023, continuing the downward trend observed since 2020. Concentrations at CM1 have now decreased by approximately 33% over the past five years. No exceedances of the 1-hour mean NO_2 objective (200 µg/m³ not to be exceeded more than 18 times per year) were recorded at CM1 in 2024, consistent with results since 2020. These results confirm continued compliance with both short- and long-term NO_2 objectives at the borough's primary automatic monitoring site.

Across the non-automatic network, all 53 diffusion tube sites recorded annual mean NO_2 concentrations well below the 40 µg/m³ air quality objective. The highest recorded concentration was 18.0 µg/m³ at SH33 (Wood Road Garages). Notably, sites such as SH16 and SH33, which exceeded the annual mean objective in 2019, have shown substantial and sustained improvements. In 2024, SH16 (Wood Road) recorded 16.7 µg/m³, confirming a continued reduction in concentrations in areas previously identified as concern points.

Figures A.1 and A.3 illustrate a consistent borough-wide reduction in NO_2 concentrations over time. While concentrations rose slightly in 2022 following the easing of COVID-19 restrictions, the downward trend resumed in 2023 and continued into 2024. These reductions reflect the lasting effects of emissions improvements, vehicle fleet turnover, and SHBC's sustained monitoring and policy efforts.

It should be noted there is a marked drop in diffusion tube concentrations between 2023 and 2024, as seen in Figure A.1. This was influenced in part by the application of the national bias adjustment factor of 0.81, which is lower than the local bias adjustment factors applied in previous years. This methodological change was implemented following Defra's appraisal recommendations arising from the 2024 ASR regarding the suitability of CM1 as a co-location site, as the automatic monitor is not meeting the micro-scaling criteria within LAQM.TG (22). For comparison, should the local factor be applied, annual mean NO_2 concentrations would range from 12.2 µg/m^3 to 26.7 µg/m^3, demonstrating all sites are below the AQS objective and with all sites showing a decrease in concentrations compared to 2023.

Additionally, no diffusion tube locations recorded annual mean concentrations above 60 µg/m³, which indicates that none are likely to have exceeded the 1-hour mean objective, in accordance with guidance from LAQM.TG (22).

3.2.2 Particulate Matter (PM_{10})

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of 40µg/m^3.

Table A.7 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past five years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

The annual mean PM_{10} concentration at CM1 in 2024 was 15.6 µg/m³, a slight decrease from the 2023 value of 16.5 µg/m³ and continuing the overall downward trend observed since 2020. This value remains well below the annual mean AQO of 40 µg/m³. Similarly, the daily mean PM_{10} concentrations did not exceed the 50 µg/m³ threshold on any occasion during 2024, meaning the objective of no more than 35 exceedances was fully met.

The consistent reduction in PM_{10} concentrations over the past five years suggests that pollutant levels are stabilising at relatively low background levels in the absence of significant new emission sources. The temporary increase observed in 2022, likely linked to increased traffic and resumption of post-pandemic activities, has since reversed, with concentrations in 2023 and 2024 returning to levels similar to or lower than those recorded in 2021.

Based on these recent results, it is reasonable to conclude that PM_{10} concentrations in Surrey Heath are unlikely to increase significantly in the near future, provided that current emissions sources and trends remain consistent.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Which AQMA? (1)	Monitoring Technique	Distance to Relevant Exposure (m) (2)	Distance to kerb of nearest road (m) (1)	Inlet Height (m)
CM1	Castle Road, Camberley	Urban Centre	488647	159807	NO_2; PM_{10}	NO	N/A	Chemiluminescent; BAM	20	17	2.5

Notes:

(1) N/A if not applicable

(2) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

Table A.2 – Details of Non-Automatic Monitoring Sites

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
SH1	A30 Bagshot	Roadside	491010	163344	NO_2	NO	8.0	6.0	No	1.8
SH2	Windle Valley Daycare Centre	Roadside	491065	163337	NO_2	NO	<0.1	4.0	No	1.8
SH3	Snows Ride School Windlesham	Urban Background	492810	164408	NO_2	NO	<0.1	33.0	No	1.8
SH4	Shaftesbury Road Bisley	Urban Background	494654	159444	NO_2	NO	31.0	157.0	No	1.8
SH5	Chestnut Avenue	Roadside	489460	160586	NO_2	NO	24.0	15.0	No	1.8
SH6	Church Lane Bisley	Roadside	494974	159611	NO_2	NO	15.0	2.0	No	1.8
SH7	M3 Brickhill roadside	Other	496191	164418	NO_2	NO	78.0	30.0	No	1.8
SH8	M3 Brickhill 150m back	Urban Background	496170	164472	NO_2	NO	39.0	88.0	No	1.8
SH9	A30 Jolly Farmer	Roadside	489617	161874	NO_2	NO	20.0	15.0	No	1.8
SH10	A30 Homebase	Urban Centre	485796	160074	NO_2	NO	<0.1	16.0	No	1.8
SH11	Watchetts School Camberley	Urban Centre	486937	159011	NO_2	NO	4.0	18.0	No	1.8
SH12	High Street Camberley	Kerbside	487490	160788	NO_2	NO	3.0	1.0	No	1.8
SH13	Le Marchant Road	Urban Centre	488727	159591	NO_2	NO	12.0	25.0	No	1.8
SH14	Badgers Copse	Urban Centre	488603	159675	NO_2	NO	4.0	14.0	No	1.8
SH16	Wood Road	Urban Centre	486834	158336	NO_2	NO	18.0	23.0	No	1.8
SH17	Portsmouth Road at Ravenswood M3/A325	Other	489297	160440	NO_2	NO	33.0	21.0	No	1.8

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
SH20	Deepcut Bridge Road	Roadside	490396	157290	NO_2	NO	2.0	2.0	No	1.8
SH21	Benner Lane	Roadside	495156	161078	NO_2	NO	15.0	4.0	No	1.8
SH23	Red Road/Maultway	Roadside	490698	160351	NO_2	NO	9.0	12.0	No	1.8
SH24	High Street, Chobham	Roadside	497347	161697	NO_2	NO	2.0	2.0	No	1.8
SH15, SH22, SH25	AQM	Urban Centre	488647	159807	NO_2	NO	17.0	17.0	Yes	2.5
SH26	College Ride, Camberley	Roadside	487762	161393	NO_2	NO	7.0	5.0	No	1.8
SH27	361 Gford Road, Bisley	Roadside	495553	158854	NO_2	NO	6.0	8.0	No	1.8
SH28	Queens Road, Bisley	Roadside	495343	159031	NO_2	NO	10.0	7.0	No	1.8
SH29	Heath Park Windlesham	Suburban	494228	163480	NO_2	NO	102.0	36.0	No	1.0
SH30	Matalan, Frimley Road	Urban Centre	487318	158515	NO_2	NO	24.0	23.0	No	1.8
SH31	Old Pond Close	Urban Centre	487022	158419	NO_2	NO	6.0	19.0	No	1.8
SH32	Two Hoots, Old Pond Close	Urban Centre	486979	158393	NO_2	NO	4.0	21.0	No	1.0
SH33	Wood Road Garages	Urban Centre	486843	158319	NO_2	NO	17.0	25.0	No	1.8
SH34	Brackendale Road	Urban Centre	488052	159239	NO_2	NO	20.0	36.0	No	1.8
SH35	Prior End	Urban Centre	489189	160209	NO_2	NO	18.0	41.0	No	1.8
SH36	Youlden Drive	Urban Centre	489350	160389	NO_2	NO	20.0	18.0	No	1.8
SH37	Crawley Drive	Roadside	489082	160265	NO_2	NO	20.0	5.0	No	1.8
SH38	Swift Lane	Urban Centre	491702	163139	NO_2	NO	<0.1	16.0	No	1.8
SH39	Frimley Green Road	Roadside	488724	156857	NO_2	NO	4.0	6.0	No	1.8

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
SH40	Frimley Park Hospital	Kerbside	487845	158520	NO_2	NO	<0.1	1.0	No	1.8
SH41	Watchetts Drive	Kerbside	487196	158885	NO_2	NO	15.0	1.0	No	1.8
SH42	Tomlinscote Way	Roadside	489062	158770	NO_2	NO	17.0	2.0	No	1.8
SH43	Upper Chobham Road	Roadside	489242	159042	NO_2	NO	19.0	2.0	No	1.8
SH44	Frimley Park Hospital Denly	Roadside	487943	158549	NO_2	NO	26.0	2.0	No	1.8
SH45	Grove School	Roadside	488011	158513	NO_2	NO	128.0	13.0	No	1.8
SH46	Bagshot Green	Kerbside	491398	162885	NO_2	NO	7.0	1.0	No	1.8
SH47	Badger Drive	Roadside	492111	162110	NO_2	NO	17.0	10.0	No	1.8
SH48	Hawkswood Avenue	Roadside	488602	158448	NO_2	NO	11.0	2.0	No	1.8
SH49	High Street Bagshot	Roadside	491017	163181	NO_2	NO	<0.1	5.0	No	1.8
SH50	Guildford Road Bagshot	Roadside	491303	163313	NO_2	NO	4.0	3.0	No	1.8
SH51	School Lane Bagshot	Roadside	491033	162945	NO_2	NO	10.0	2.0	No	1.8
SH52	Freemantle Road	Roadside	491564	163565	NO_2	NO	5.0	2.0	No	1.8
SH53	Crawley Ridge	Roadside	489009	161166	NO_2	NO	3.0	2.0	No	1.8
SH54	Frimley High Street	Roadside	487485	157828	NO_2	NO	<0.1	5.0	No	1.8
SH55	Heatherside School	Roadside	490495	159630	NO_2	NO	8.0	3.0	No	1.8
SH56	Sherrard Way	Roadside	488421	155510	NO_2	NO	6.0	2.0	No	1.8
SH57	156 Mytchett Road	Roadside	488955	154901	NO_2	NO	<0.1	10.0	No	1.8

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results: Automatic Monitoring (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2024 (%) (2)	2020	2021	2022	2023	2024
CM1	488647	159807	Urban Centre	95.7	95.7	32.0	30.0	28.0	23.8	21.5

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

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

☒ **Where exceedances of the NO_2 annual mean objective occur at locations not representative of relevant exposure, the fall-off with distance concentration has been calculated and reported concentration provided in brackets for 2024.**

Notes:

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

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

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%).

Table A.4 – 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 2024 (%) [2]	2020	2021	2022	2023	2024
SH 1	491010	163344	Roadside	100.0	100.0	16.4	18.7	27.7	20.8	11.9
SH 2	491065	163337	Roadside	100.0	100.0	18.6	20.4	25.7	17.0	11.0
SH 3	492810	164408	Urban Background	100.0	100.0	15.1	18.1	20.3	14.8	9.0
SH 4	494654	159444	Urban Background	90.5	90.8	11.9	15.0	18.0	12.7	8.2
SH 5	489460	160586	Roadside	100.0	100.0	27.6	27.1	27.0	23.6	14.0
SH 6	494974	159611	Roadside	100.0	100.0	22.7	23.0	21.7	20.0	12.9
SH 7	496191	164418	Other	83.5	90.5	34.2	32.4	30.4	23.3	13.1
SH 8	496170	164472	Urban Background	100.0	100.0	19.2	20.2	23.9	19.2	10.2
SH 9	489617	161874	Roadside	100.0	100.0	19.2	19.2	22.6	18.0	11.5
SH 10	485796	160074	Urban Centre	92.4	92.1	29.3	30.8	30.4	26.4	16.3
SH 11	486937	159011	Urban Centre	100.0	100.0	25.0	28.3	27.7	22.4	15.3
SH 12	487490	160788	Kerbside	92.4	92.4	24.6	25.0	26.7	21.8	14.0
SH 13	488727	159591	Urban Centre	100.0	100.0	22.3	22.4	23.4	19.3	12.0
SH 14	488603	159675	Urban Centre	100.0	100.0	25.0	29.5	27.1	22.7	13.0
SH 16	486834	158336	Urban Centre	82.9	82.7	35.4	34.2	34.4	29.3	17.2
SH 17	489297	160440	Other	100.0	100.0	25.2	27.2	24.3	21.8	11.9
SH 20	490396	157290	Roadside	50.7	43.4	20.9	20.5	21.3	17.9	9.6
SH 21	495156	161078	Roadside	100.0	100.0	17.5	19.8	20.5	17.9	10.3
SH 23	490698	160351	Roadside	100.0	100.0	21.8	22.4	24.4	19.6	11.7
SH 24	497347	161697	Roadside	75.0	75.0	28.8	29.6	28.7	24.3	15.8
SH 15, SH 22, SH 25	488647	159807	Urban Centre	100.0	100.0	31.2	28.7	28.4	24.0	14.9
SH 26	487762	161393	Roadside	100.0	100.0	21.7	19.9	22.6	18.8	11.8
SH 27	495553	158854	Roadside	75.0	75.0	18.1	22.1	22.1	18.5	11.3
SH 28	495343	159031	Roadside	81.0	81.0	22.4	24.1	24.2	20.8	13.4
SH 29	494228	163480	Suburban	100.0	100.0	25.0	24.9	25.0	20.9	12.6

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2024 (%) [2]	2020	2021	2022	2023	2024
SH 30	487318	158515	Urban Centre	100.0	100.0	31.6	35.7	31.4	27.2	16.8
SH 31	487022	158419	Urban Centre	90.5	90.8	27.5	30.6	28.0	23.8	14.9
SH 32	486979	158393	Urban Centre	100.0	100.0	28.3	27.3	27.1	22.2	13.8
SH 33	486843	158319	Urban Centre	90.5	90.8	31.7	32.9	31.4	27.9	18.0
SH 34	488052	159239	Urban Centre	100.0	100.0	23.4	24.0	23.4	19.9	12.2
SH 35	489189	160209	Urban Centre	92.4	92.1	22.7	25.3	24.7	21.3	12.0
SH 36	489350	160389	Urban Centre	92.4	84.6	23.3	29.5	24.4	22.7	11.3
SH 37	489082	160265	Roadside	100.0	100.0	26.0	28.4	30.1	23.9	15.0
SH 38	491702	163139	Urban Centre	100.0	100.0	25.4	27.3	27.4	24.2	14.8
SH 39	488724	156857	Roadside	100.0	100.0	21.5	23.6	23.3	19.6	12.5
SH 40	487845	158520	Kerbside	100.0	100.0	30.0	32.6	34.7	25.8	16.5
SH 41	487196	158885	Kerbside	100.0	100.0	22.8	23.8	24.3	19.5	12.4
SH 42	489062	158770	Roadside	92.4	92.1	16.2	17.7	19.3	15.9	9.4
SH 43	489242	159042	Roadside	100.0	100.0	22.2	23.1	22.1	18.7	10.9
SH 44	487943	158549	Roadside	100.0	100.0	28.8	31.4	32.0	27.0	17.3
SH 45	488011	158513	Roadside	90.5	83.2	32.5	32.2	29.3	28.4	17.1
SH 46	491398	162885	Kerbside	100.0	100.0	18.8	19.0	22.5	16.4	9.5
SH 47	492111	162110	Roadside	92.4	92.4	14.8	19.4	20.4	16.5	9.2
SH 48	488602	158448	Roadside	100.0	100.0	18.9	20.6	23.4	17.3	9.8
SH 49	491017	163181	Roadside	100.0	100.0	27.6	26.7	27.7	23.1	15.2
SH 50	491303	163313	Roadside	100.0	100.0	27.6	27.4	26.7	25.6	15.1
SH 51	491033	162945	Roadside	100.0	100.0	16.6	18.4	22.2	15.4	9.3
SH 52	491564	163565	Roadside	100.0	100.0	22.8	22.2	24.2	19.4	12.0
SH 53	489009	161166	Roadside	82.9	82.9	18.0	19.4	22.2	15.4	9.1
SH 54	487485	157828	Roadside	100.0	100.0	26.6	29.8	29.5	22.9	14.3
SH 55	490495	159630	Roadside	100.0	100.0	19.2	19.9	23.5	18.0	10.3
SH 56	488421	155510	Roadside	100.0	100.0	-	-	21.3	17.0	10.5
SH 57	488955	154901	Roadside	100.0	100.0	-	-	25.6	18.3	11.0

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

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

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

Notes:

The annual mean concentrations are presented as 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 – Historic Roadside and Kerbside Locations

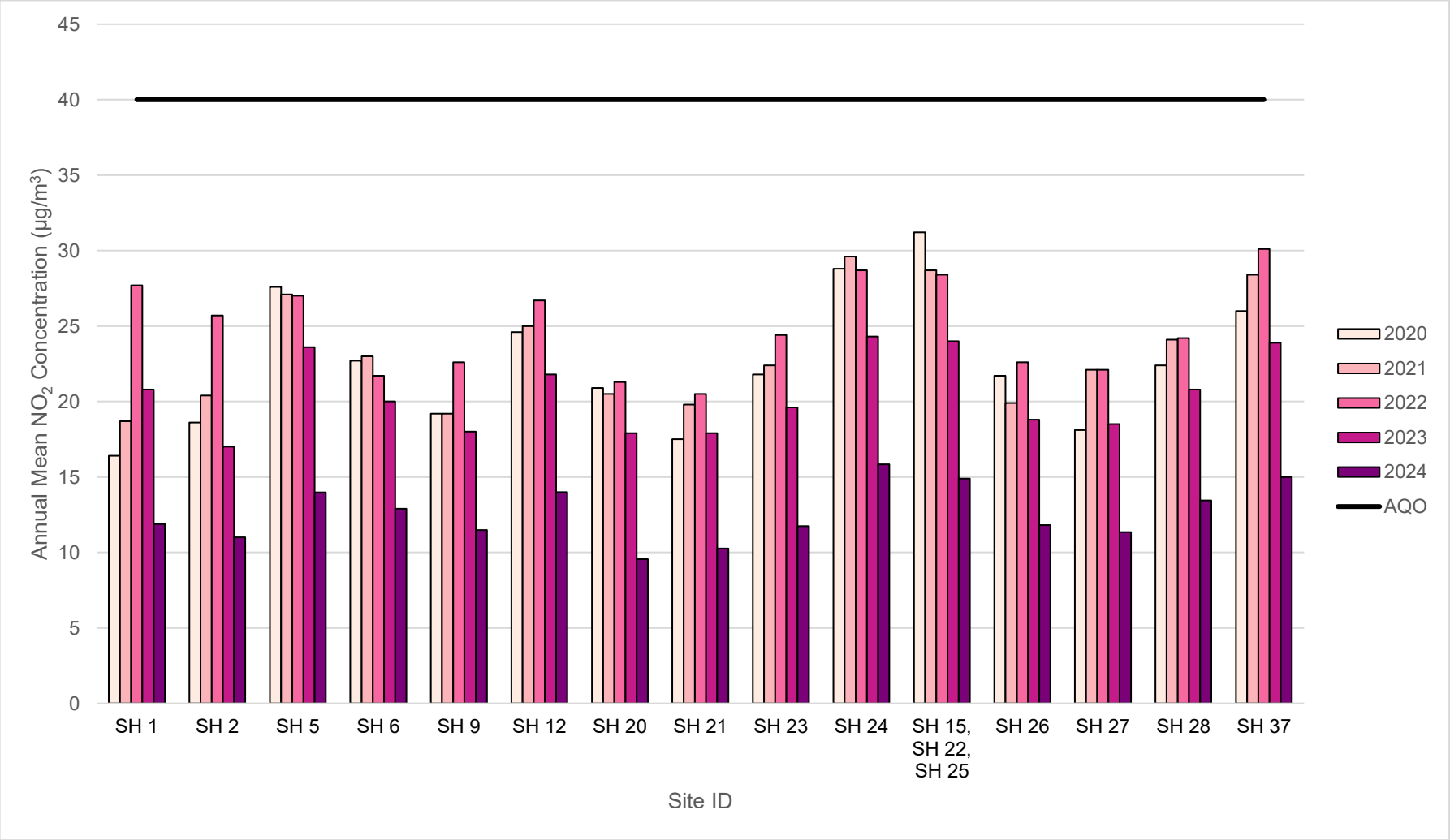


Figure A.2 – Trends in Annual Mean NO_2 Concentrations – Roadside Locations introduced in 2022.

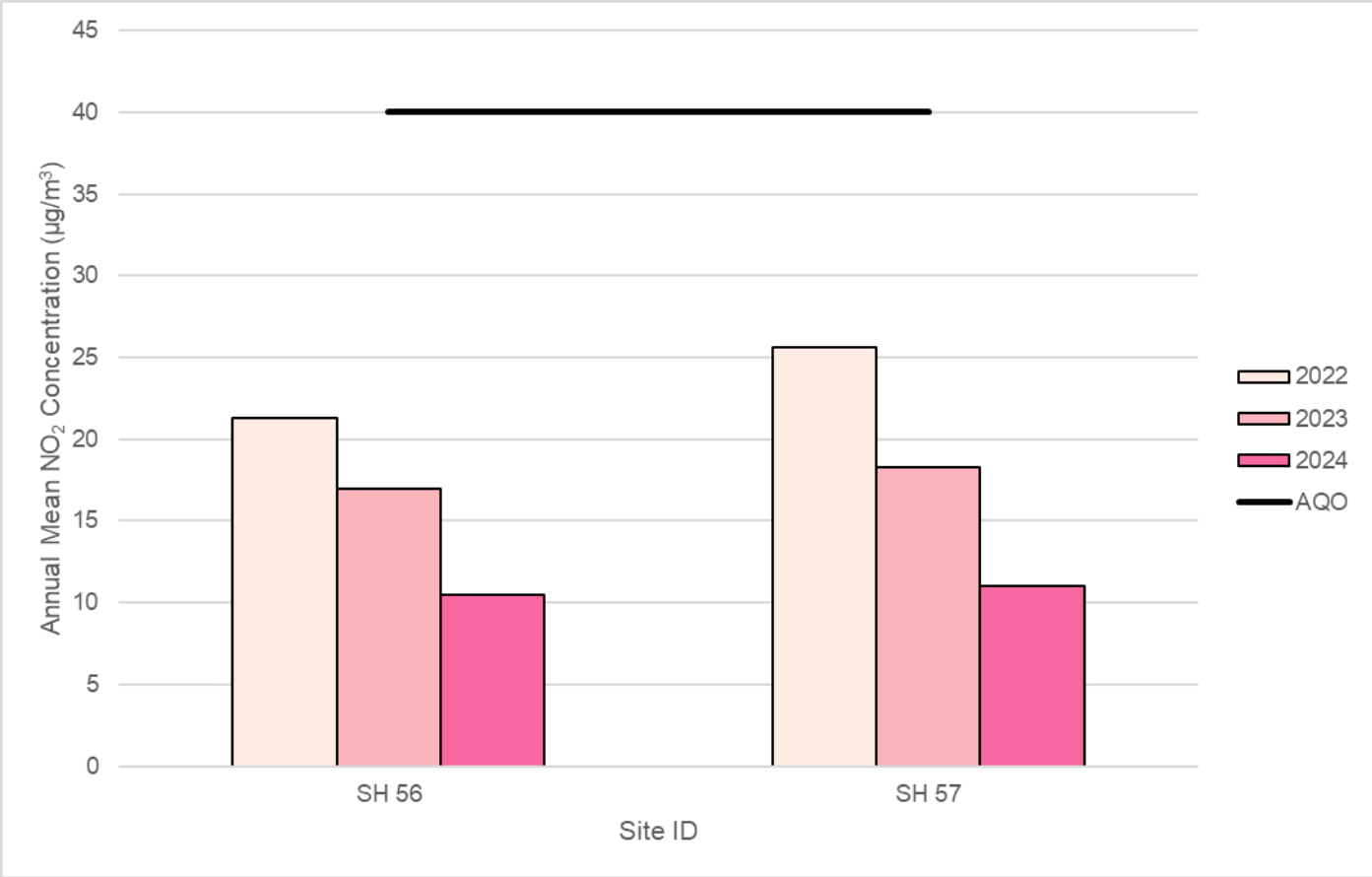


Figure A.3 – Trends in Annual Mean NO_2 Concentrations – Urban Background and Suburban Locations

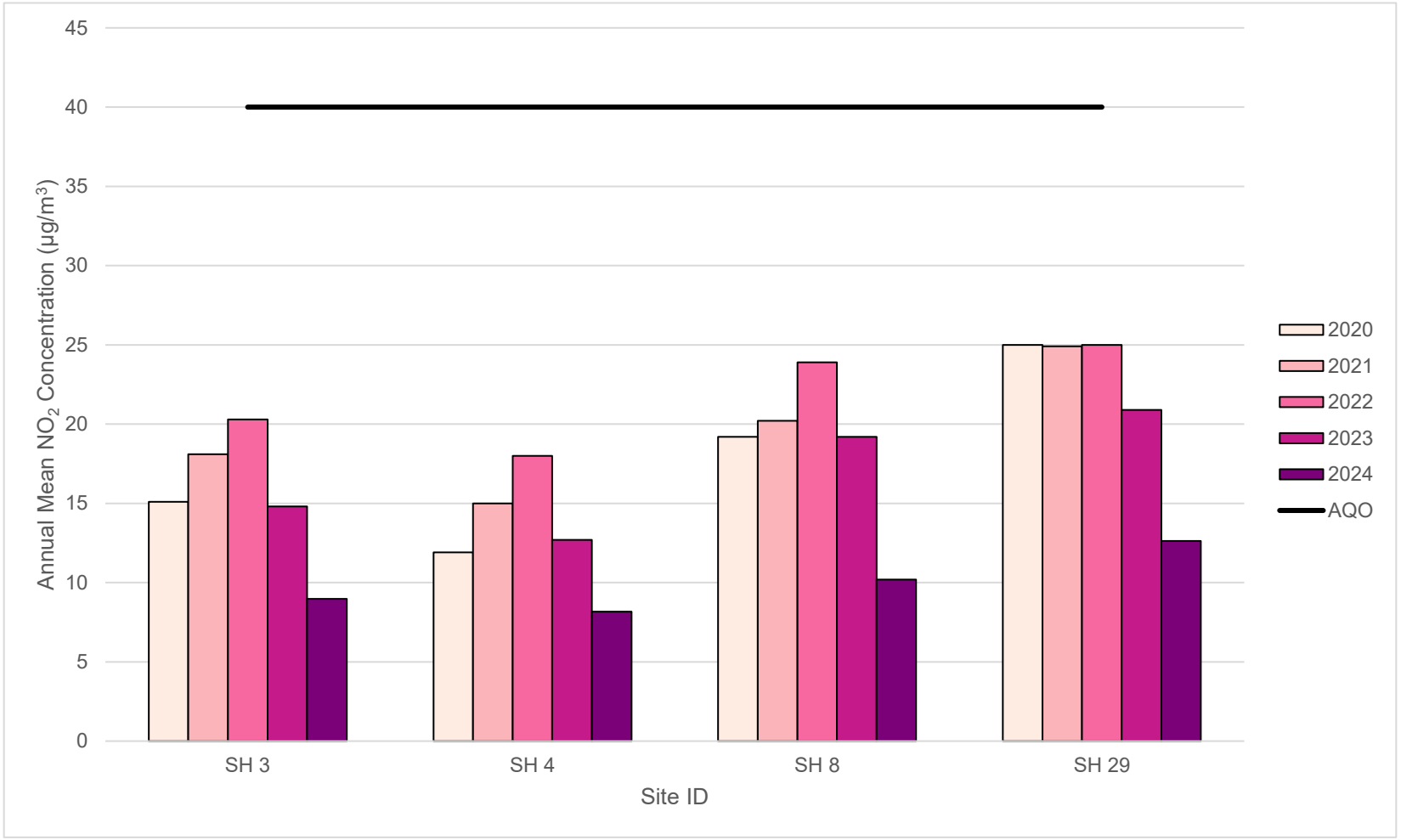


Figure A.4 – Trends in Annual Mean NO_2 Concentrations – Urban Centre and Other Locations

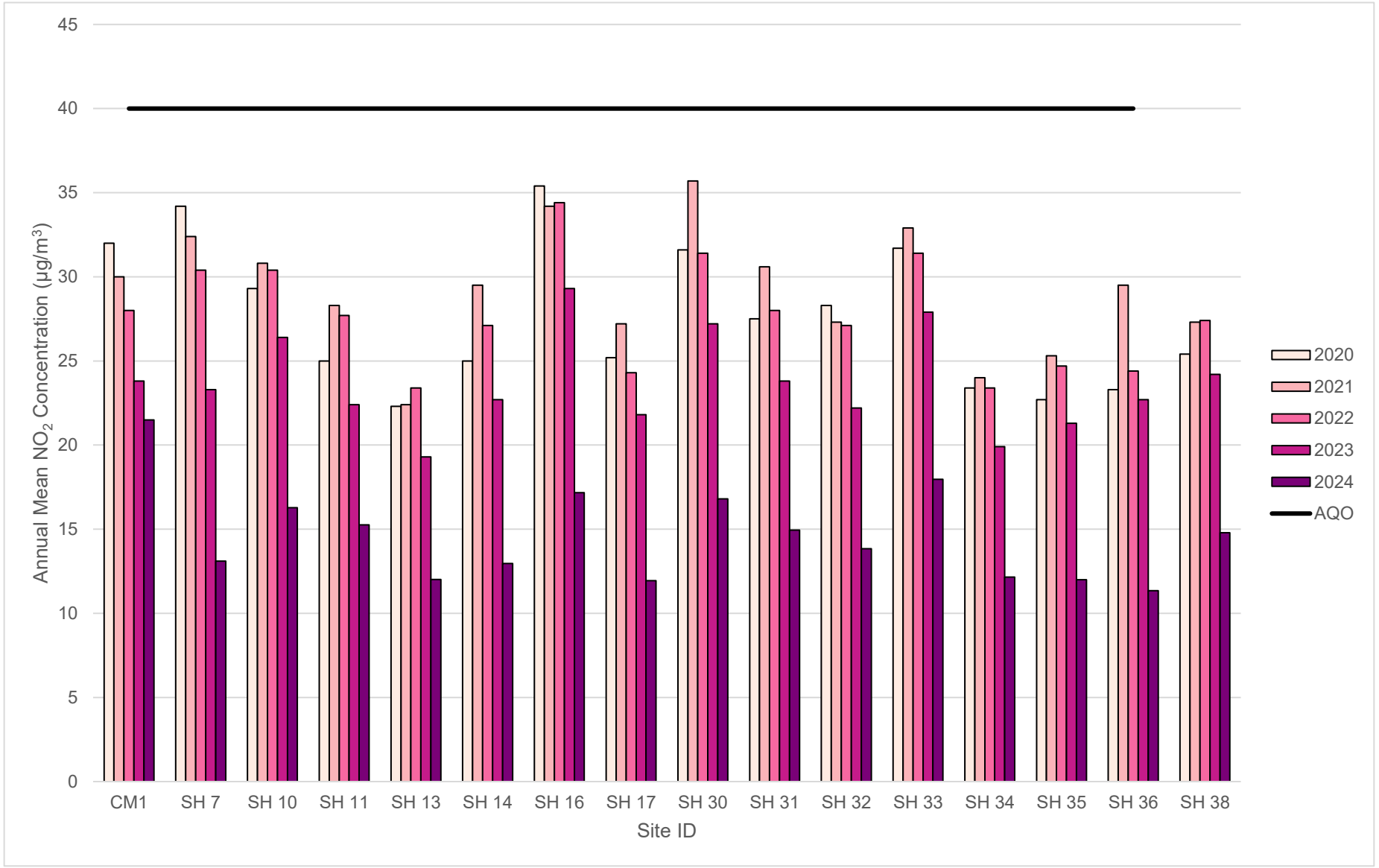


Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2024 (%) (2)	2020	2021	2022	2023	2024
CM1	488647	159807	Urban Centre	95.7	95.7	0	0	0	0	0

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m^3 have been recorded.

Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

(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%).

Table A.6 – Annual Mean PM_{10} Monitoring Results ($\mu g/m^3$)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2024 (%) (2)	2020	2021	2022	2023	2024
CM1	488647	159807	Urban Centre	95.4	95.4	16.0	14.0	19.8	16.5	15.6

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

Notes:

The annual mean concentrations are presented as $\mu g/m^3$.

Exceedances of the PM_{10} annual mean objective of 40$\mu g/m^3$ are shown in **bold**.

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.

(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.5 – Trends in Annual Mean PM_{10} Concentrations

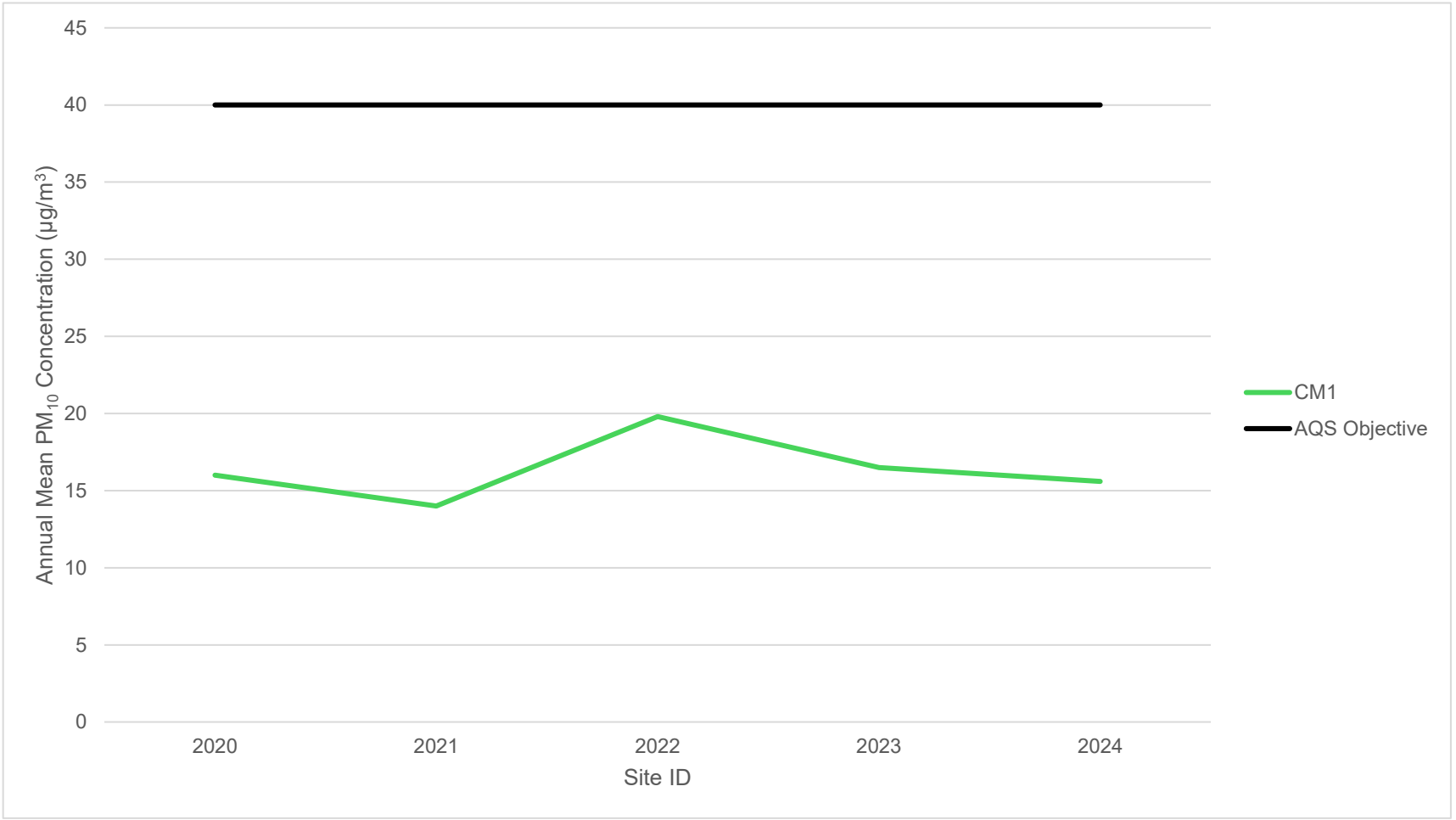


Table A.7 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2024 (%) (2)	2020	2021	2022	2023	2024
CM1	488647	159807	Urban Centre	95.4	95.4	0	0	0	0	0

Notes:

Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m^3 have been recorded.

Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

(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%).

Appendix B: Full Monthly Diffusion Tube Results for 2024

Table B.1 – NO_2 2024 Diffusion Tube Results ($\mu g/m^3$)

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 <0.81>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
SH 1	491010	163344	18.0	17.0	20.0	18.0	13.0	12.0	13.0	10.0	15.0	14.0	14.0	12.0	14.7	11.9		
SH 2	491065	163337	18.0	16.0	16.0	14.0	11.0	11.0	13.0	9.0	17.0	12.0	14.0	12.0	13.6	11.0		
SH 3	492810	164408	14.0	11.0	14.0	12.0	9.0	9.0	9.0	8.0	12.0	13.0	13.0	9.0	11.1	9.0		
SH 4	494654	159444	12.0	10.0	11.0	10.0	9.0	8.0	8.0	No Sample	12.0	12.0	10.0	9.0	10.1	8.2		
SH 5	489460	160586	23.0	21.0	22.0	19.0	14.0	12.0	15.0	15.0	17.0	18.0	17.0	14.0	17.3	14.0		
SH 6	494974	159611	21.0	20.0	20.0	21.0	16.0	15.0	9.0	8.0	16.0	15.0	15.0	15.0	15.9	12.9		
SH 7	496191	164418	19.0	19.0	24.0	20.0	15.0	13.0	13.0	9.0	15.0	16.0	15.0	No Sample	16.2	13.1		
SH 8	496170	164472	18.0	15.0	15.0	12.0	11.0	10.0	10.0	9.0	13.0	15.0	12.0	11.0	12.6	10.2		
SH 9	489617	161874	15.0	17.0	18.0	17.0	13.0	11.0	12.0	8.0	14.0	14.0	19.0	12.0	14.2	11.5		
SH 10	485796	160074	26.0	25.0	24.0	20.0	16.0	18.0	13.0	14.0	23.0	22.0	No Data	20.0	20.1	16.3		
SH 11	486937	159011	23.0	22.0	23.0	21.0	13.0	19.0	12.0	12.0	21.0	19.0	22.0	19.0	18.8	15.3		
SH 12	487490	160788	22.0	19.0	19.0	18.0	13.0	No Sample	14.0	10.0	20.0	15.0	24.0	16.0	17.3	14.0		
SH 13	488727	159591	24.0	21.0	12.0	13.0	13.0	15.0	11.0	9.0	18.0	14.0	15.0	13.0	14.8	12.0		
SH 14	488603	159675	23.0	19.0	17.0	16.0	13.0	16.0	11.0	9.0	20.0	16.0	16.0	16.0	16.0	13.0		
SH 15	488647	159807	22.0	22.0	18.0	18.0	17.0	17.0	17.0	13.0	17.0	18.0	18.0	15.0	-	-		Triplicate Site with SH 15, SH 22 and SH 25 - Annual data provided for SH 25 only
SH 16	486834	158336	26.0	25.0	28.0	No Sample	No Sample	20.0	15.0	13.0	21.0	23.0	21.0	20.0	21.2	17.2		
SH 17	489297	160440	21.0	19.0	17.0	16.0	13.0	15.0	14.0	9.0	15.0	16.0	16.0	6.0	14.8	11.9		
SH 20	490396	157290	No Sample	No Access	No Access	No Access	No Access	No Access	No Access	10.0	13.0	12.0	16.0	11.0	12.4	9.6		
SH 21	495156	161078	18.0	16.0	13.0	14.0	10.0	11.0	9.0	8.0	16.0	12.0	16.0	9.0	12.7	10.3		
SH 22	488647	159807	21.0	20.0	23.0	20.0	17.0	16.0	17.0	12.0	30.0	18.0	17.0	15.0	-	-		Triplicate Site with SH 15, SH 22 and SH 25 - Annual data provided for SH 25 only
SH 23	490698	160351	19.0	16.0	18.0	16.0	13.0	14.0	9.0	7.0	16.0	17.0	15.0	14.0	14.5	11.7		

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 <0.81>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
SH 24	497347	161697	28.0	20.0	23.0	23.0	No Sample	No Sample	14.0	11.0	22.0	17.0	No Data	18.0	19.6	15.8		
SH 25	488647	159807	22.0	22.0	26.0	21.0	17.0	17.0	17.0	12.0	19.0	17.0	19.0	15.0	18.4	14.9		Triplicate Site with SH 15, SH 22 and SH 25 - Annual data provided for SH 25 only
SH 26	487762	161393	20.0	18.0	18.0	17.0	13.0	13.0	10.0	8.0	15.0	17.0	14.0	12.0	14.6	11.8		
SH 27	495553	158854	17.0	16.0	16.0	14.0	No Access	No Access	9.0	No Sample	14.0	13.0	17.0	10.0	14.0	11.3		
SH 28	495343	159031	19.0	17.0	19.0	16.0	No Sample	14.0	12.0	No Sample	17.0	19.0	19.0	14.0	16.6	13.4		
SH 29	494228	163480	20.0	20.0	21.0	19.0	11.0	12.0	12.0	9.0	14.0	18.0	16.0	15.0	15.6	12.6		
SH 30	487318	158515	28.0	22.0	21.0	21.0	19.0	20.0	18.0	15.0	24.0	19.0	22.0	20.0	20.8	16.8		
SH 31	487022	158419	20.0	20.0	24.0	22.0	17.0	20.0	12.0	Contaminated	16.0	20.0	18.0	14.0	18.5	14.9		
SH 32	486979	158393	20.0	18.0	25.0	23.0	16.0	14.0	14.0	12.0	16.0	16.0	17.0	14.0	17.1	13.8		
SH 33	486843	158319	22.0	No Sample	31.0	27.0	19.0	21.0	23.0	18.0	23.0	22.0	19.0	19.0	22.2	18.0		
SH 34	488052	159239	18.0	17.0	20.0	18.0	14.0	12.0	10.0	8.0	16.0	16.0	17.0	14.0	15.0	12.2		
SH 35	489189	160209	21.0	17.0	15.0	14.0	11.0	16.0	12.0	8.0	19.0	16.0	No Data	14.0	14.8	12.0		
SH 36	489350	160389	Lost Solution	17.0	17.0	15.0	13.0	15.0	11.0	8.0	16.0	13.0	No Data	15.0	14.0	11.3		
SH 37	489082	160265	23.0	19.0	23.0	22.0	19.0	16.0	15.0	11.0	21.0	20.0	20.0	13.0	18.5	15.0		
SH 38	491702	163139	22.0	18.0	20.0	23.0	19.0	18.0	16.0	10.0	17.0	17.0	25.0	14.0	18.3	14.8		
SH 39	488724	156857	21.0	17.0	16.0	16.0	14.0	14.0	13.0	11.0	15.0	16.0	19.0	13.0	15.4	12.5		
SH 40	487845	158520	27.0	23.0	24.0	21.0	18.0	25.0	10.0	11.0	23.0	22.0	21.0	20.0	20.4	16.5		
SH 41	487196	158885	21.0	17.0	21.0	19.0	13.0	13.0	12.0	8.0	14.0	17.0	14.0	15.0	15.3	12.4		
SH 42	489062	158770	16.0	12.0	13.0	12.0	12.0	12.0	8.0	7.0	12.0	11.0	No Data	12.0	11.5	9.4		
SH 43	489242	159042	18.0	12.0	15.0	13.0	13.0	16.0	12.0	10.0	12.0	11.0	17.0	12.0	13.4	10.9		
SH 44	487943	158549	26.0	25.0	27.0	24.0	19.0	17.0	19.0	15.0	20.0	22.0	22.0	21.0	21.4	17.3		
SH 45	488011	158513	No Sample	No Sample	29.0	26.0	19.0	19.0	17.0	16.0	22.0	19.0	23.0	21.0	21.1	17.1		
SH 46	491398	162885	17.0	14.0	15.0	12.0	10.0	9.0	9.0	7.0	11.0	11.0	17.0	9.0	11.8	9.5		
SH 47	492111	162110	16.0	12.0	15.0	12.0	10.0	10.0	8.0	9.0	No Sample	10.0	13.0	10.0	11.4	9.2		
SH 48	488602	158448	19.0	14.0	15.0	11.0	10.0	12.0	9.0	8.0	17.0	12.0	6.0	12.0	12.1	9.8		
SH 49	491017	163181	27.0	25.0	21.0	19.0	16.0	19.0	13.0	9.0	19.0	15.0	25.0	17.0	18.8	15.2		
SH 50	491303	163313	24.0	21.0	24.0	20.0	20.0	16.0	12.0	9.0	23.0	18.0	22.0	15.0	18.7	15.1		

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 <0.81>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
SH 51	491033	162945	16.0	11.0	11.0	10.0	10.0	10.0	9.0	9.0	13.0	12.0	17.0	10.0	11.5	9.3		
SH 52	491564	163565	21.0	17.0	20.0	19.0	11.0	12.0	8.0	10.0	19.0	15.0	15.0	11.0	14.8	12.0		
SH 53	489009	161166	15.0	12.0	16.0	14.0	11.0	10.0	6.0	6.0	12.0	No Sample	No Data	10.0	11.2	9.1		
SH 54	487485	157828	26.0	21.0	24.0	21.0	15.0	17.0	12.0	9.0	19.0	10.0	18.0	20.0	17.7	14.3		
SH 55	490495	159630	17.0	12.0	16.0	12.0	11.0	10.0	9.0	7.0	13.0	21.0	14.0	11.0	12.8	10.3		
SH 56	488421	155510	18.0	15.0	16.0	12.0	11.0	12.0	8.0	7.0	14.0	14.0	16.0	12.0	12.9	10.5		
SH 57	488955	154901	18.0	15.0	15.0	14.0	12.0	13.0	9.0	7.0	16.0	15.0	17.0	12.0	13.6	11.0		

☒ **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.**

☐ **Local bias adjustment factor used.**

☒ **National bias adjustment factor used.**

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

☒ **SHBC confirm that all 2024 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.**

Notes:

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

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

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within SHBC During 2024

SHBC has not identified any new sources relating to air quality within the reporting year of 2024.

Additional Air Quality Works Undertaken by SHBC During 2024

SHBC has not completed any additional works within the reporting year of 2024.

QA/QC of Diffusion Tube Monitoring

SHBC's NO_2 diffusion tubes are supplied and analysed by Lambeth Scientific Services Ltd, a National Measurement Accreditation Service (NAMAS) approved laboratory, using the 50% triethanolamine (TEA) in Acetone method. This method conforms to the guidelines set out in Defra's 'Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance' document.

Diffusion tube deployments were done following the Defra Calendar where possible, slight delays of 1 – 2 days occurred for the collection of some deployments due to postal delays.

Diffusion Tube Annualisation

Annualisation is required for any site with data capture less than 75% but greater than 25%. Annualisation was required at 1 site, SH20, which had a data capture of 43.4%. This was due to personnel not being able to access the diffusion tube site from February to August. Annualisation requires the use of continuous monitors with a data capture of 85% or greater.

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

Diffusion Tube ID	Annualisation Factor Chilbolton Observatory	Annualisation Factor London Hillingdon	Annualisation Factor Oxford St Ebbes	Annualisation Factor Reading New Town	Average Annualisation Factor	Raw Data Simple Annual Mean	Annualised Data Simple Annual Mean
SH 20	0.9185	0.9679	0.8725	0.8730	0.9080	12.2	11.0

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2025 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.

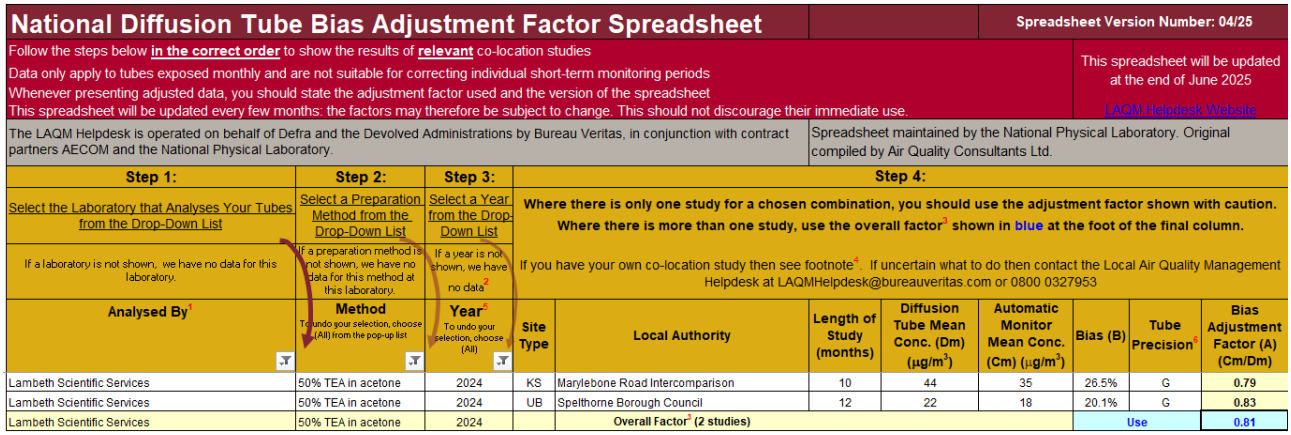
Due to concerns raised regarding the suitability of the CM1 automatic monitoring station for use as a co-location site, particularly that it may not meet the micro-siting criteria outlined in LAQM.TG(22) and is situated at a distance from the M3, SHBC has opted to apply the national bias adjustment factor for 2024 as advised by Defra. This leads to a significant change in bias adjustment factor in 2024 compared to previous years, and subsequently this impacts annual mean NO_2 concentrations.

SHBC have applied a national bias adjustment factor of 0.81 to the 2024 monitoring data. A summary of bias adjustment factors used by SHBC over the past five years is presented in Table C.2.The calculation using the LAQM national bias adjustment spreadsheet is shown in Figure C.1. The local bias adjustment factor was also calculated for comparison, which is provided in Table C.3

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2024	National	04/25	0.81
2023	Local	-	1.09
2022	Local	-	1.30
2021	Local	-	1.36
2020	Local	-	1.44

Figure C.1 - National Diffusion Tube Bias Adjustment Factor Spreadsheet



National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 04/25

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 spreadsheet 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 June 2025
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: Select the Laboratory that Analyses Your Tubes from the Drop-Down List
If a laboratory is not shown, we have no data for this laboratory.

Step 2: Select a Preparation Method from the Drop-Down List
If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down List
If a year is not shown, we have no data[2]

Step 4:
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 you have your own co-location study then see footnote[4]. 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[5] (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	2024	KS	Marylebone Road Intercomparison	10	44	35	26.5%	G	0.79
Lambeth Scientific Services	50% TEA in acetone	2024	UB	Spelthorne Borough Council	12	22	18	20.1%	G	0.83
Lambeth Scientific Services	50% TEA in acetone	2024		Overall Factor[3] (2 studies)				Use		0.81

Table C.3 – Local Bias Adjustment Calculation

	Local Bias Adjustment
Periods used to calculate bias	10
Bias Factor A	1.25 (1.11 - 1.44)
Bias Factor B	-20% (-31% - -10%)
Diffusion Tube Mean (µg/m³)	17.2
Mean CV (Precision)	4.0%
Automatic Mean (µg/m³)	21.6
Data Capture	96%
Adjusted Tube Mean (µg/m³)	22 (19 - 25)

Notes:

A single local bias adjustment factor has been calculated for the 2024 diffusion tube results.

NO_2 Fall-off with Distance from the Road

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

No NO_2 monitoring locations within the borough required distance correction during 2024, since none were within 10% of the objective (>36 µg/m³).

QA/QC of Automatic Monitoring

During 2024, the Castle Road site was locally operated by SHBC. QA/QC procedures involved maintenance and calibration of the kit by Wecare4Air as well as data validation, scaling and ratification and Quality Control by Air Quality Data Management. All data have been ratified according to Defra LAQM Technical Guidance (TG22) standards. Further details of the validation and ratification process are available in Appendix F of this report.

Automatic Monitoring Annualisation

The automatic monitoring location within SHBC recorded a data capture rate of greater than 75% therefore it was not required to annualise any monitoring data.

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

Figure D.1 – Map of Monitoring Sites Southwest

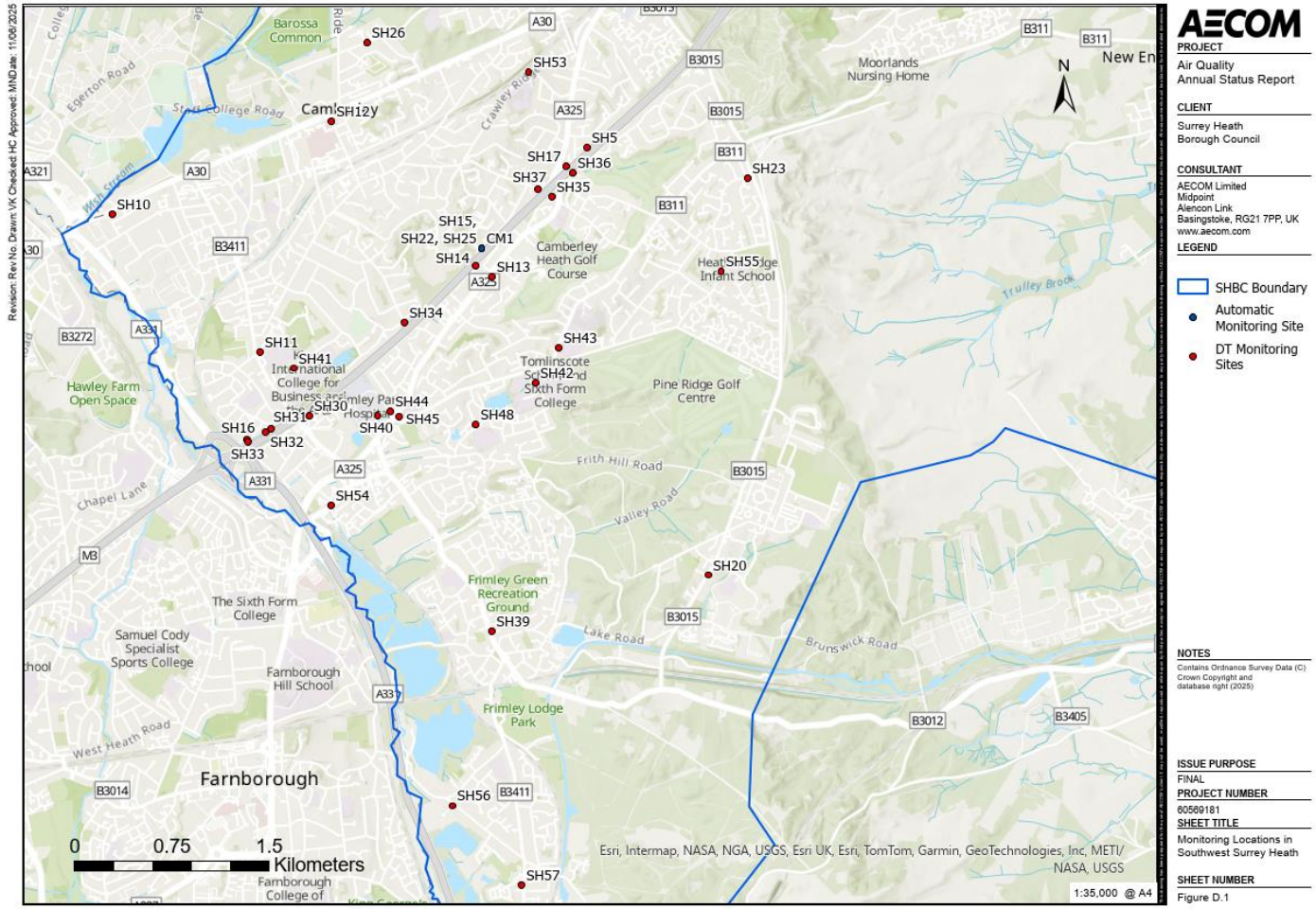
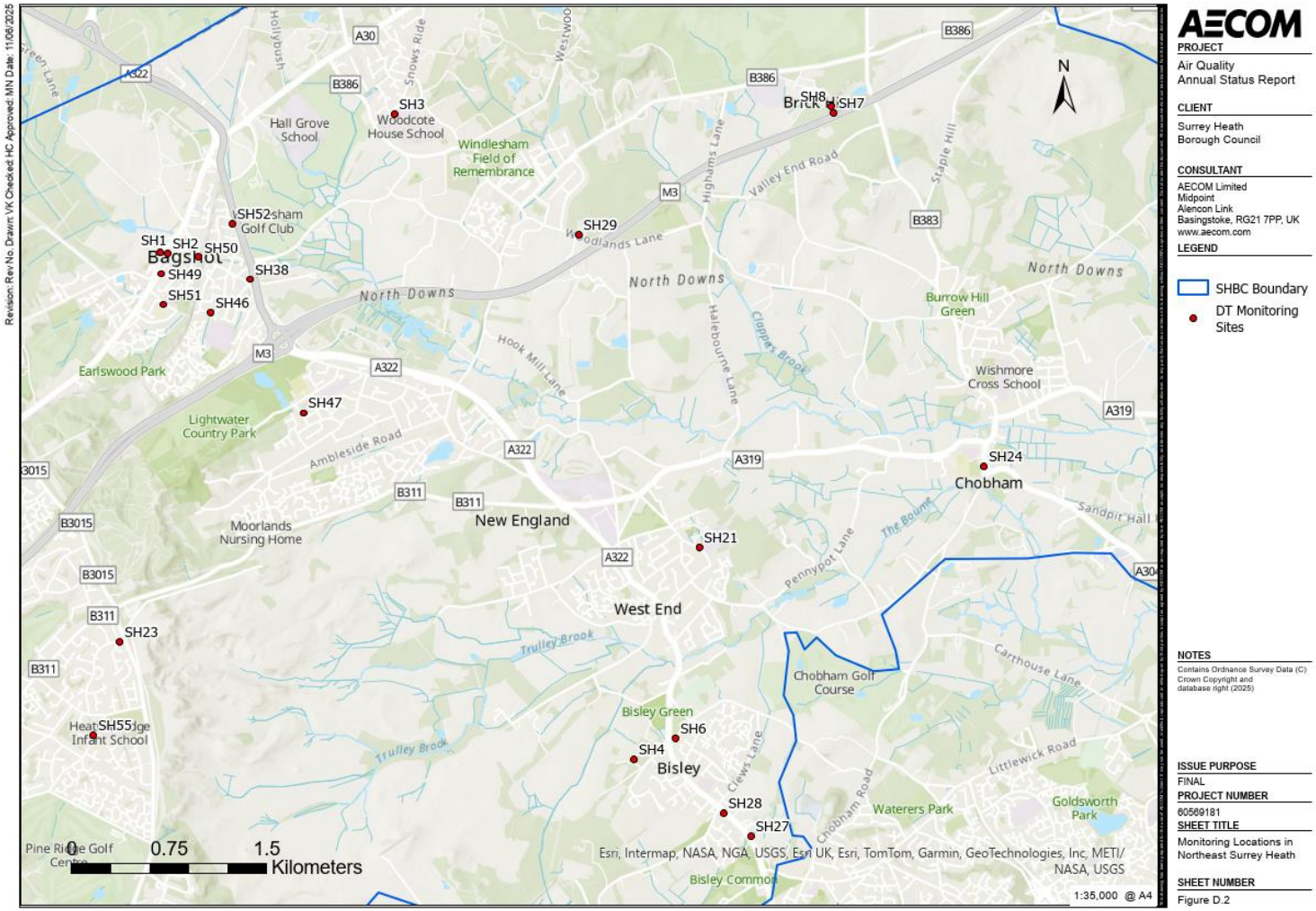


Figure D.2 – Map of Monitoring Sites Northeast



Appendix E: Summary of Air Quality Objectives in England

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

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

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

Appendix F: QA/QC of Automatic Air Quality Monitoring

Air quality measurements from the automatic instruments are validated and ratified by Air Quality Data Management (AQDM) http://www.aqdm.co.uk to the standards described in the Local Air Quality Management – Technical Guidance LAQM (TG22) The following measures have been taken as part of the QA/QC of SHBC's automatic AQ monitoring.

Validation

This process operates on data during the data collection stage. All data are continually screened algorithmically and manually for anomalies. There are several techniques designed to discover spurious and unusual measurements within a very large dataset. These anomalies may be due to equipment failure, human error, power failures, interference or other disturbances. Automatic screening can only safely identify spurious results that need further manual investigation.

Raw data from the gaseous instruments (e.g. NOx, O_3, SO_2 and CO) are scaled into concentrations using the latest values derived from the manual and automatic calibrations. These instruments are not absolute and suffer drifts. Both the zero baseline (background) and the sensitivity may change over time. Regular calibrations with certified gas standards are used to measure the zero and sensitivity. However, these are only valid for the moment of the calibration since the instrument will continue to drift. Raw measurements from particulate instruments (e.g. PM_{10} and $PM_{2.5}$) generally do not require scaling into concentrations. The original raw data are always preserved intact while the processed data are dynamically scaled and edited.

Ratification

This is the process that finalises the data to produce the measurements suitable for reporting. All available information is critically assessed so that the best data scaling is applied, and all anomalies are appropriately edited. Generally, this operates at three, six- or twelve-month intervals. However, unexpected faults can be identified during the instrument routine services or independent audits which are often at 6-monthly intervals. In practice, therefore, the data can only be fully ratified in 12-month or annual periods. The data processing performed during the three- and six-monthly cycles helps build a reliable dataset that is finalised at the end of the year.

There is a diverse range of additional information that can be essential to the correct understanding and editing of data anomalies. These may include

- the correct scaling of data
- ignoring calibrations that were poor e.g. a spent zero scrubber
- closely tracking rapid drifts or eliminating the data
- comparing the measurements with other pollutants and nearby sites
- corrections due to span cylinder drift
- corrections due to flow drifts for the particulate instruments
- corrections for ozone instrument sensitivity drifts
- eliminating measurements for NO2 conversion inefficiencies
- eliminating periods where calibration gas is in the ambient dataset
- identifying periods were instruments are warming-up after a power cut
- identification of anomalies due to mains power spikes
- correcting problems with the date and time stamp
- observations made during the sites visits and services

The identification of data anomalies, the proper understanding of the effects and the application of appropriate corrections requires expertise gained over many years of operational experience. Instruments and infrastructure can fail in numerous ways that significantly and visually affect the quality of the measurements. There are rarely simple faults that can be discovered by computer algorithms or can be understood without previous experience.

Further information about air quality data management, expert data ratification and examples of bad practices are given on the Air Quality Data Management (AQDM) website http://www.aqdm.co.uk.

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
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

References

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- Defra, LAQM, Local bias adjustment factor spreadsheet, https://laqm.defra.gov.uk/bias-adjustment-factors/local-bias.html accessed May 2025