2022 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

Date: June, 2022

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Executive Summary: Air Quality in Our Area

Air Quality in Ipswich Borough

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

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

In order to comply with its duty to review the air quality within its area, Ipswich Borough Council (IBC) monitors nitrogen dioxide (NO_2) levels within the town using two automatic monitors located on St Matthews Street and Chevallier Street and a total of 101 diffusion tubes positioned at 90 carefully selected locations across the borough. Changed and analysed on a monthly basis, the data from the diffusion tubes provides a measure of how nitrogen dioxide levels vary over time and is used to calculate an annual mean concentration at each monitoring location. Once corrected for experimental bias and adjusted to take into account the location of the tubes relative to any likely human exposure, these annual values should not exceed the national air quality objective level of 40µg/m3. In the event that this level is, or is likely, to be exceeded on a consistent basis Local Authorities have a legal duty to declare an Air Quality Management Area (AQMA) encompassing the relevant locations. Both nationally and locally the main source of high levels of nitrogen dioxide is road transport.

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

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

[3] Defra. Air quality appraisal: damage cost guidance, July 2021

[4] Public Health England. Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report, May 2018

Currently, Ipswich Borough Council has a total of four AQMAs, all due to continued exceedance of the annual mean NO_2 objective level:

- *Ipswich AQMA No.1* - Encompassing the land in and around the junction of Norwich Road, Chevallier Street and Valley Road, this area extends along Chevallier Street to the junction with Providence Lane. (declared 2006; amended in 2017 and 2021);
- *Ipswich AQMA No. 2* - From the junction with Peel Street, extending along Crown Street, St Margarets Street and St Helens Street to the junction with Palmerston Road, and from St Margarets Street extending up Woodbridge Road to just beyond the junction with Argyle Street. (declared 2006; amended 2017);
- *Ipswich AQMA No. 3* - Encompassing the land in and around College Street, Key Street, Salthouse Street, Fore Street, Star Lane, Neptune Square and Grimwade Street. (declared 2006; amended in 2017 and 2021);
- *Ipswich AQMA No*. 5 - Incorporating the land in or around St. Matthews Street / Norwich Road between the Civic Drive roundabout and Bramford Road (declared 2017).

Further information on the above AQMAs (including maps showing their location and boundaries) is available on Ipswich Borough Council's AQMA webpage on the DEFRA website.

Following the amendment of AQMA Nos. 1 to 3 and the revocation of AQMA No. 4 (Incorporating the Bramford Road / Yarmouth Road / Chevallier Street junction and part of Chevallier Street (declared 2010)) in August 2021, Ipswich Borough Council worked closely with the local Highway Authority, Suffolk County Council and other stakeholders, including Public Health, to update the 2019 - 2024 Air Quality Action Plan (AQAP). The updated AQAP was published in October 2021.

Ipswich Borough Council is a member of the Suffolk Air Quality Management Group which includes all of the Suffolk Local Authorities.

When comparing the 2021 results to the 2020 results generated using the locally derived bias adjustment factor, in 2020 there were no exceedances and in 2021 there were three recorded exceedances (one exceedance within AQMA 2 and two exceedances within

AQMA 5). In 2021, six sites recorded concentrations within 10% below the annual mean NO_2 objective level.

Figures A.1 – A.6 shows bias corrected trendline plots for clusters of passive monitoring locations in and around each of the 4 AQMAs. Despite AQMA 4 being revoked in August 2021, it is included for transparency. All would appear to indicate that annual mean NO_2 levels remained essentially unchanged between 2013 - 2019, with a marginal downward trajectory when looking at the results analysed via the local bias correction factor. However, during this period average daily traffic flows across Ipswich increased by approximately 3%, indicating some air quality improvements have occurred despite higher traffic volumes.

When looking at the bias and distance corrected data for 2020, annual mean NO_2 concentrations dropped considerably compared to previous years. The outbreak of COVID-19 and the Government imposed lockdowns undoubtedly had an impact on air quality in 2020. Emissions reduced significantly, with diffusion tube sites experiencing an average reduction in NO_2 concentrations of approximately 23% in 2020 compared to 2019. This equated to a reduction of around 7µg/m^3 experienced at each diffusion tube site. No exceedances of the annual NO_2 concentration were noted in any of the AQMA's following both local bias adjustment and distance correction in 2020.

An increase in the annual mean NO_2 concentration can be seen in 2021 compared to 2020, but concentrations remained below 2019 levels. It is likely that the increase in concentrations in 2021 compared to 2020 was linked to the relaxation of Government travel restrictions associated with the COVID-19 pandemic.

At this time of writing this year's ASR submission it is still too early to assess whether traffic levels will fully return to pre-pandemic levels. Currently, it is known that a number of large organisations within Ipswich are still allowing employees to fully work at home or as part of a 'hybrid' working model. Further changes to emissions will be reported on in subsequent ASR's.

Actions to Improve Air Quality

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

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

Commitment to an Air Quality Improvement Budget

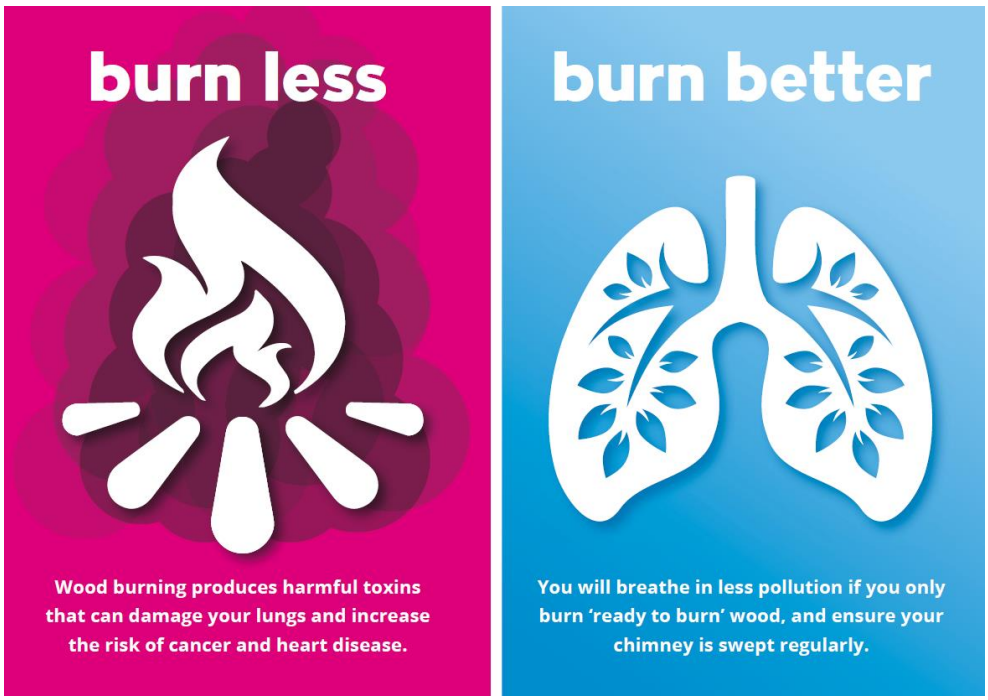
The Council are committed to improving air quality within the Borough. In light of this, the Council have committed £100k of funding, each year, for the next two years (plus £100k in the 2021-2022 previous financial year) to air quality improvement projects. Officers have proposed ideas on how the funding may be directed and are seeking support and guidance from both senior management and Councillors on their views and priorities for expenditure.

Delivery of Defra grant funded monitoring and behavioural change campaign focused on domestic burning.

The Council has been awarded £115,632 from Defra in March 2022 as part of its Air Quality Grant Programme. The two-year project is focused on a monitoring and behavioural change campaign around domestic burning. At the time of writing this report, monitor and sensor locations have been selected for the project and initial draft behaviour change materials are being prepared. The Council are committed to delivering this project to help better inform the public on the harmful impact of domestic burning and to reduce concentrations of particulate matter.

[5] Defra. Clean Air Strategy, 2019

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

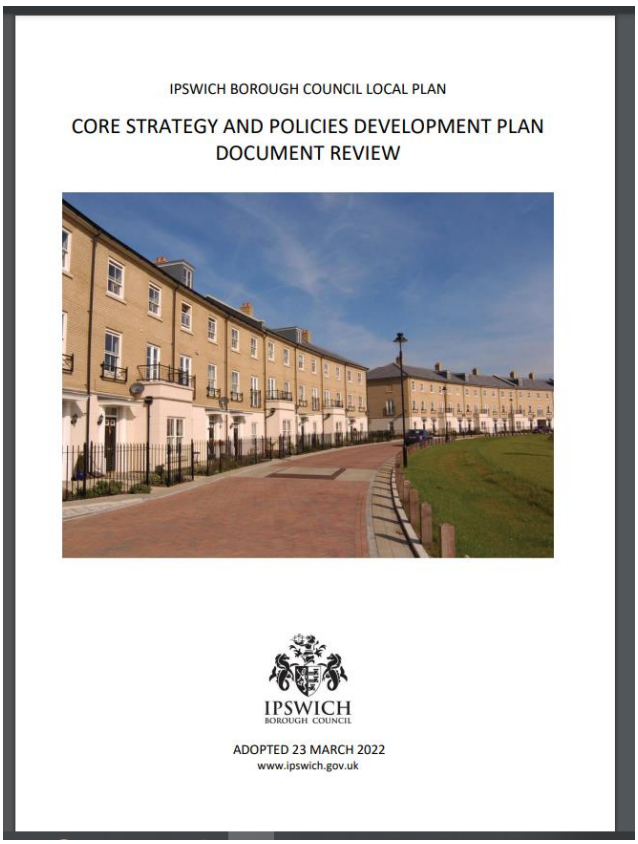


Publication of the Ipswich Borough Council Low Emissions Supplementary Planning Document (SPD) and the Local Plan

In November 2021, the Councils Low Emissions SPD was adopted. This guidance includes guidance on appropriate maximum levels of car parking for the IP-ONE area. Given the availability of alternative transport options, car-free development may be acceptable in the IP-ONE area.

In addition to the above, the Councils Local Plan was adopted in March 2022 which includes a policy on Air Quality.

All new developments are required to adhere to the requirements set out in these documents, which in turn, should help to ensure air quality is maintained and improved in the town.



Continued commitment to procuring Zero Emission Fleet

At the time of writing this report, the Council have 20 electric cars and 26 small electric vans within the fleet, replacing a proportion of the older diesel vehicles. One more Euroclass VI van and 6 new Euroclass VI pickups are due to arrive by September 2022. In addition, the larger vehicle fleet now includes 10 pickups, 16 tippers, 18 refuse collection vehicles, 1 glass collection vehicle, 1 road sweeper, and 1 tail lift vehicle, all of which are Euroclass VI standard. The 3-year replacement plan for small vehicle fleet to zero emission is to be concluded in 2022. However, the Council are committed to reducing emissions within the fleet and the renewal programme has been extended. Half a million pounds has been set aside for fleet renewal each year for the next two years.

Delivery of Public Health Suffolk Air Quality Summit and publication of an Air Quality Profile for Suffolk

During the latter part of 2019 and in 2020, the Council, together with all the other Local Authorities across Suffolk worked with Suffolk County Council's Transport and Public Health colleagues to prepare an 'Air Quality Profile' report for Suffolk. The report maps, at a district and borough level, local air pollution levels and explores evidence-based interventions that can be undertaken by local authorities, businesses, communities and individuals to improve air quality. Unfortunately, due to the COVID-19 pandemic and the

associated impact on resource, the report was not finalised in 2020. The report has since been published in June 2021 following sign-off from the Suffolk Director of Public Health and discussed at the Suffolk Health and Wellbeing Board.

Following on from the publication of the Suffolk Air Quality Profile, an officer from the Council, together with other stakeholders, presented the findings at an Air Quality Summit held in January 2022. The summit was attended by elected members and senior Council Officers from Local Authorities across Suffolk. Officers also discussed matters pertaining to air quality in general. It is hoped that the summit will trigger further action to reduce air pollution. The summit findings have led to a mapping exercise to be undertaken in Suffolk County Council, to understand the available levels which could impact on air quality – these will be used to inform development of an action plan. Further, community work is planned at the end of the Summer 2022 focused on Ipswich.

Conclusions and Priorities

For the fourth year running the Council opted to analyse this year's data using the locally derived bias adjustment factor. Once bias adjusted using the local factor and distance corrected, the nitrogen dioxide diffusion tube data for 2021 shows that the national air quality objective for mean annual NO_2 concentrations were exceeded at three of Ipswich Borough Councils monitoring locations. These sites were located within AQMAs 2 and 5. No exceedances were noted in AQMA 1 and 3 following bias adjustment and distance correction.

The Council has several key challenges/priorities for addressing air quality over the forthcoming reporting year. These include:

- The spending of the allocated air quality budget of £100k, per year, for the next two years. Officers have proposed ideas on how the funding may be directed but are seeking support and guidance from both senior management and Councillors on their views and priorities for expenditure.
- The continued delivery of the Councils 2020-2030 Climate Change Strategy and Action Plan. There are a number of actions within the strategy that will benefit air quality and will be priorities for the foreseeable future.
- The continued growth in housing development and business activity will be a major challenge when addressing air quality in the Borough. Ensuring all developments have suitable measures in place to mitigate against their impacts will be essential in

ensuring air quality is maintained and improved in Ipswich; the Low Emissions SPD (adopted in November 2021) should assist with this.

- The Council was awarded £115,632 from Defra in March 2022 as part of its Air Quality Grant Programme. The two-year project is focused on a monitoring and behavioural change campaign around domestic burning. Delivering this project will be a key priority for the Council over the next two reporting periods.

The Council will continue to monitor air quality across Ipswich as this is essential for informing our air quality work and developing measures that can provide potential improvements.

Local Engagement and How to get Involved

The main source of air pollution in Ipswich is road traffic. We are working to meet the challenge set by the Government for NO_2, PM_{10} and $PM_{2.5}$ targets but it will also require a concerted public effort with each person doing their bit in order to try and increase active travel and reduce the use of the motor vehicle where possible. Below are a few suggestions on how to get involved:

- Try to use your car less. Walking and cycling are much cleaner, cheaper and healthier forms of travel. A map showing cycle routes across Ipswich is available on the Way to go Suffolk Website.
- Use public transport, such as the bus and train.
- If you have to use your car, you can reduce emissions by not idling when parked. You can also reduce emissions from your car by ensuring it is regularly serviced and by driving efficiently.
- Consider purchasing an electric vehicle. The Council is working to improve the local charging infrastructure across Ipswich. Electric vehicles are reducing in cost and technology is improving to make this technology more viable. If you opt to purchase a traditionally fuelled vehicle, consider the most fuel efficient petrol vehicle rather than buying a diesel vehicle. See the Zap Map website for locations of charging points.
- Consider car sharing to reduce emissions and save money. See the Suffolk Car Share website for details.

- Avoid having bonfires. If you do choose to have a fire, only burn dry garden waste and avoid burning on days that already have high pollution levels.
- Avoid burning solid fuel. If you do choose to burn solid fuel, always ensure the appliance is well maintained and fuel is clean and dry

More information on air quality within Ipswich is available on the Ipswich Borough Council Air Quality Management website.

If you have any specific questions or concerns, or if you would like to make suggestions on possible improvements and/or supply additional air quality information, please contact Environmental Health at Ipswich Borough Council on 01473 433115 or environmental.health@ipswich.gov.uk.

If you would like any further information on national air quality, including the latest news, air pollution forecasts, the latest measured levels and a summary, interactive monitoring, and general information about air pollution, consult the Defra website.

Local Responsibilities and Commitment

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

Public Protection, Ipswich Borough Council

- Principal Environmental Health Officer (Environmental Protection)
- Environmental Health Officer (Environmental Protection)

Planning and Development, Ipswich Borough Council

- Operations Manager Planning and Development
- Planning Policy Team Leader

Culture and Environment, Ipswich Borough Council

- Climate Change Project Manager

Growth, Highways and Infrastructure, Suffolk County Council

- Transport Policy & Development Manager
- Senior Principal Transport Planner
- Behaviour Change Manager

Public Health and Communities, Suffolk County Council

- Health Protection Manager

This ASR has been approved by the: Director for Housing & Community Services (Ipswich Borough Council)

This ASR has been signed off by a Director of Public Health.

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

Ipswich Borough Council, Grafton House, Ipswich, Suffolk, IP1 2DE

Telephone: 01473 433115

Email: environmental.health@ipswich.gov.uk

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1 Local Air Quality Management

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

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

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

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority should prepare an Air Quality Action Plan (AQAP) within 12 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

A summary of AQMAs declared by Ipswich Borough Council can be found in Table 2.1. The table presents a description of the four AQMAs that are currently designated within Ipswich. Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of AQMAs and also the air quality monitoring locations in relation to the AQMAs. The air quality objectives pertinent to the current AQMA designations are as follows:

- NO_2 annual mean annual mean less than 40µg/m^3

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 National Highways?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
Ipswich AQMA No.1	Declared 11/04/2006 Amended 12/09/2017 Amended 19/09/2021	NO2 Annual Mean	Encompassing the land in and around the junction of Norwich Road, Chevallier Street and Valley Road, this area extends along Chevallier Street to the junction with Providence Lane	NO	50µg/m^3	34µg//m^3	Ipswich Borough Council Air Quality Action Plan 2019-2024 (updated 2021)	https://www.ipswich.gov.uk/sites/www.ipswich.gov.uk/files/air_quality_action_plan_2019-2024_updated_2021.pdf
Ipswich AQMA No.2	Declared 11/04/2006 Amended 12/09/2017	NO2 Annual Mean	An area from the junction with Peel Street, extending along Crown Street, St Margarets Street and St Helens Street to the junction with Palmerston Road, and from St Margarets Street extending up Woodbridge Road to just beyond the junction with Argyle Street.	NO	45µg/m3	42µg/m3	Ipswich Borough Council Air Quality Action Plan 2019-2024 (updated 2021)	https://www.ipswich.gov.uk/sites/www.ipswich.gov.uk/files/air_quality_action_plan_2019-2024_updated_2021.pdf

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by National Highways?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
Ipswich AQMA No.3	Declared 11/04/2006 Amended 12/09/2017 Amended 19/08/2021	NO2 Annual Mean	Encompassing the land in and around College Street, Key Street, Salthouse Street, Fore Street, Star Lane, Neptune Square and Grimwade Street.	NO	50µg/m3	35µg/m3	Ipswich Borough Council Air Quality Action Plan 2019-2024 (updated 2021)	https://www.ipswich.gov.uk/sites/www.ipswich.gov.uk/files/air_quality_action_plan_2019-2024_updated_2021.pdf
Ipswich AQMA No.5	Declared 12/09/2017	NO2 Annual Mean	An area incorporating the land in or around St. Matthews Street / Norwich Road between the Civic Drive roundabout and Bramford Road.	NO	49µg/m3	41µg/m3	Ipswich Borough Council Air Quality Action Plan 2019-2024 (updated 2021)	https://www.ipswich.gov.uk/sites/www.ipswich.gov.uk/files/air_quality_action_plan_2019-2024_updated_2021.pdf

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

☒ **Ipswich Borough Council confirm that all current AQAPs have been submitted to Defra.**

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

Following on from the submission of the 2021 update to the Councils 2019 – 2024 Air Quality Action Plan for appraisal to Defra, it was concluded that:

"Overall, the AQAP appears well considered and is therefore accepted".

Some of the supporting commentary related to updating the source apportionment data and the more accurate quantification of the impacts of specific measures. Typically, source apportionment studies and quantification of emission reductions based on specific measures can be both costly and difficult to accurately predict. The Council is currently exploring the procurement of dispersion modelling to use internally to assist with the more accurate quantification of measures. Further progress on this will be reported in the 2023 ASR.

Defra's appraisal of last year's ASR concluded that:

"*On the basis of the evidence provided by the local authority the conclusions reached are acceptable for all sources and pollutants. The next step for Ipswich Borough Council is to submit the next Annual Status Report, which is due to be submitted in 2022*."

Defra stated that: "*Overall, the report is detailed, concise and satisfies the criteria of relevant standards. The Council should continue their good and thorough work."*

Ipswich Borough 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. Measures are included within Table 2.2, with the type of measure and the progress Ipswich 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 detail on these measures can be found in the Ipswich Borough Council Air Quality Action Plan 2019 – 2024 (updated 2021). Key completed measures are:

- EV charging infrastructure has now been installed at the Council's headquarters to support the delivery of the new fleet. The Council's electric fleet now consists of 20 electric cars and 26 small electric vans. In addition, the larger vehicle fleet now includes ten pickups, sixteen tippers, eighteen refuse collection vehicles, one glass

collection vehicle, one road sweeper, and one tail lift vehicle, all of which are Euroclass VI standard.

- EV charging infrastructure continues to be installed at the Council's offices and Council owned car parks. See measure B3 in table 2.2. below for further information on the locations and numbers of charging points installed.
- The Suffolk anti-idling campaign has been launched.
- The Introduction of a Hackney Carriage and Private Hire Licensing Policy 2019 - 2022 which sets standards in relation to vehicle age to help reduce the levels of pollutants emitted from the local taxi fleet.
- The Councils Low Emissions SPD was adopted in November 2021 which requires developers to mitigate against air quality impacts arising from development.
- The Councils Local Plan was adopted in March 2022 which includes a policy on Air Quality.
- The Council has success in obtaining grant funding from Defra under the 2021 Air Quality Grant Programme to run a campaign around domestic burning. The Council aspires to continue to bid for future Defra grant funding when opportunities are available.
- Although not a specific measure listed within the AQAP, an Air Quality Profile for Suffolk has been produced. The report maps, at a district and borough level, local air pollution levels and explores evidence-based interventions that can be undertaken by local authorities, businesses, communities and individuals to improve air quality.

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

- The final installation and delivery of air quality messages on IBC procured variable messaging signs.
- The development and implementation of the Ipswich Air Aware Campaign.

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

- To continue to work towards implementing the measures in the AQAP.
- To continue to monitor air quality across Ipswich as this is essential for informing our air quality work and developing measures that can provide potential improvements.

- To deliver air quality projects using the £200k of funding allocated by the Council to air quality improvements over the next year.
- To work with officers implementing the Council's Climate Change Strategy to ensure a joined-up approach in tacking both climate change and air quality. There are several actions within the strategy that will benefit air quality and will be priorities for the foreseeable future. At the time of writing this year's ASR submission, a Climate Change Officer working group has recently been created, made up of officers across the Council, and it includes an air quality representative from the Environmental Protection department.
- To continue to assess and comment on planning applications and major developments in relation to air quality. This is essential in order to ensure future emission reductions within the district, and to reduce the likelihood of additional AQMAs being declared and further deterioration of air quality in existing AQMAs.
- To progress the Councils monitoring and behavioural change campaign focused on domestic burning.

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

- Limitations on the level of dedicated resource available for air quality management activities; and
- Difficulty in obtaining sufficient support to include potentially more intrusive and/or costly interventions to secure significant and necessary improvements in air quality throughout the AQMAs.
- Officers have previously tried to engage with Primary Schools with the air quality campaign being rolled out across Ipswich, particularly those nearest to our AQMAs. Unfortunately, to date, only one school near to an AQMA has expressed an interest in participating. Officers will continue to attempt to engage with schools, but it is anticipated that uptake will be low.

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

- Work with other Bus Operators in the town to encourage the renewal of their fleets - SCC advise that match funding requirements prevented them making bids under the recent "All Electric Bus Town" and "Zero Emission Bus (ZEBRA)" opportunities put forward by the DfT. Conversion to electric or alternative fuels (e.g. Hydrogen) requires significant investment in depot facilities as well as the vehicles themselves being more expensive than diesel buses. Although support funding has been

available throughout the pandemic period to help operators continue running with massive reductions in passengers (at one point averaging 20% of pre-covid use) they have not been able to plan ahead for new bus purchases. Suffolk operators are now seeing the same level of patronage return as the national picture. Pandemic support funding will cease in October, but operators are predicting they will still only be up to 90% by then and do not expect to reach 100% and start growth again for another year without help. As such, they still have no spare funding to invest in new vehicles of any kind.

- Supporting, where appropriate, the measures identified in the Ipswich Strategic Planning Area Transport Mitigation Strategy – delays encountered as Local Planning Authorities not yet agreed apportionment of funding towards strategy.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Ipswich Borough Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of all current AQMAs.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
A1	Development and implementation of an anti-idling campaign, including where appropriate an enforcement regime	Other	Other	2019	2024	Ipswich Borough Council	Ipswich Borough Council	No	Funded	< £10k	Implementation	Low	Development of campaign materials	Campaign materials previously produced by the Suffolk Air Quality Working Group. Implementation on-going. Internal staff within Environmental Health and Waste Operations have been given anti-idling training.	Ongoing campaigns, hence completion date listed for lifetime of current AQAP. Exact costs unknown – will be from officer time and material costs.
A2	Campaign to raise awareness of air quality issues in schools near AQMAs to subsequently influence behavioural change and improve air quality near schools	Public Information	Other	2019	2024	Ipswich Borough Council	No	NO	Funded	£10k - 50k	Implementation	Low	Present information to schools near AQMAs and within the borough.	IBC have produced an 'Air Aware Ipswich' Schools Toolkit. A 12-week programme aimed at raising awareness of air quality issues with school children. This has been adapted from initiatives used in London and Oxford. This is available at: https://www.ipswich.gov.uk/content/air-quality-resources-schools. SCC have a School Streets Policy which was approved by Cabinet members last year. The final copy is to be published. Schools are to lead and be the voice of a scheme.	It has been difficult to engage with some schools, possibly due to competing demands they face. One school is considering trialling a school street. Ongoing campaigns, hence completion date listed for lifetime of current AQAP. Costs unknown – will be officer and material costs.
A3	Promote the Councils Green Travel Plan to employees, including use of agile working. Confirm SCC and Mid Suffolk and Babergh DC are promoting their own travel plans	Promoting Travel Alternatives	Workplace Travel Planning	2019	2024	Ipswich Borough Council	Ipswich Borough Council	No	Funded	Unknown	Implementation	Low	Annual promotion of travel plan. Increase in the number of employees walking, cycling or using public transport in the Councils Travel Plan survey	Staff travel plan promoted on the intranet as staff now able to return to the office following COVID-19 pandemic.	Pre-COVID19 pandemic, an average of 248 staff were working from Grafton House per day. In May 2021, the average number of employees working from Grafton House per day was 36. In May 2022, an average of 150 employees were working from Grafton House per day.

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
A4	Active participation in annual Clean Air Days	Public Information	Other	2019	2024	Ipswich Borough Council	Ipswich Borough Council	No	Funded	Unknown	Implementation	Low	Participation in annual Clean Air Days	Clean Air Day 2022 is currently being planned at the time of writing this year's ASR. One school has signed up for a workshop and anti-idling event on the day. It is hoped that officers will also work with the local Clinical Commissioning Group and Public Health to raise awareness. Officers also intend to publish information relating to a domestic burning campaign.	Ongoing commitment, hence completion date listed for lifetime of current AQAP. Costs unknown – will be officer and material costs
A5	Investigate the feasibility of promoting air quality messages on IBC procured variable message signs around Ipswich	Public Information	Other	2019	2024	Ipswich Borough Council	Ipswich Borough Council	No	Funded	£100k - £500k	Completed	Low	Promote anti-idling messages quarterly.	VMS project cost £259,000. At the time of writing this year's ASR, all VMS had been installed bar one which was due to be installed shortly. Anti-idling messages to be prepared and agreed with the relevant operational team.	Ongoing promotion of messages once installed, hence completion date listed for lifetime of AQAP.
A6	Promotion of travel alternatives e.g. walking, cycling, public transport, car sharing & air quality matters. Measure includes: Development and implementation of the Ipswich Air Aware Campaign. Investigate the feasibility of promoting air quality messages on non IBC owned variable message signs around Ipswich (e.g. Bury Road)	Public Information	Other	2019	2024	Ipswich Borough Council	Ipswich Borough Council	NO	Partially Funded	Unknown	Implementation	Low	Website patronage, number of Facebook posts/comments, number of video views Air quality messages being displayed	Ipswich Air Aware Communications campaign drafted. Climate Change Working Group now established but working on other projects initially. Officers will now proceed with campaign based on materials already drafted. SCC advise that DfT are considering a "get back on the bus" campaign but no details yet. SCC are due to receive the final tranche of pandemic support funding this month and the spending rules have been relaxed so they are able to use some of this for promotional work. "Park and Cycle" is available from the Martlesham P&R site and will be extended to Copdock in the next few weeks. SCC are funding Mobilityways (£6,300) to work with Willis (large employer in Ipswich) for one year and they will produce a full carbon audit of the staff commute at Willis along with advice for employees to travel more sustainably. SCC have also trialled electric cargo bikes with the university and there have been discussions with a national cargo bike operator with a view to them setting up a 'last mile delivery' hub in the town.	Messages can also link to other campaigns: anti-idling/ domestic burning/ clean air day/ discounted public transport promotions SCC requirements to use the VMS largely restrict messages that can be displayed. They cannot be too long, refer to secondary sources of information or ask a question.

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B1	Explore opportunities to increase Ipswich's Park and Ride scheme, including consideration given to re-opening the Bury Road Park and Ride, and promote current schemes to incentivise people coming into Ipswich town centre to use public transport over private cars	Alternatives to private vehicle use	Bus based Park & Ride	2019	2023	Suffolk County Council and Ipswich Borough Council	Suffolk County Council and Ipswich Borough Council	NO	Not Funded	Unknown	Planning	Low	Increase in Park and Ride uptake	It's understood that SCC intend to apply to the Levelling Up Fund (round 2) for a package of transport schemes to include a P&R site in North West Ipswich. This is likely to be on the land acquired by IBC in the last 2 years behind Anglia Retail Park. There is a master planning exercise for the Whitton area due to commence this summer and report back before Christmas. The report will include a range of items including the proposed P&R to ensure it properly integrates with other development activity in this part of Ipswich. If the Levelling Up bid fails the scheme would need to be picked up as part of the implementation of the masterplan.	SCC indicate that increasing the use of the Park & Ride scheme, along with other bus patronage, is an objective of the Enhanced Bus Partnership (EP) and is identified in the Ipswich Strategic Planning Area (ISPA) mitigation strategy. To ensure the financial viability of the North West Park & Ride services, the existing service would need to increase patronage before additional sites could be viable. Opening the North West P&R site is included within the ISPA strategy. Barriers to the development of this measure include increasing bus patronage, linked to level and cost of parking in the town (particularly company-owned car parks), and also continued home-working for many. SCC have had an initial discussion with Ipswich Central about promoting the services and potential discounts to businesses.
B2	Procurement of low emission vehicles in Ipswich Borough Council Fleet	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	2019	2022	Ipswich Borough Council	Ipswich Borough Council	NO	Funded	£1 million - £10 million	Implementation	Low	Provision of new vehicles	The Council have 52 electric vehicles in total: 20 electric cars, 26 small electric vans, and 6 large electric vans, replacing a proportion of the older diesel vehicles. 1 more Euroclass VI vans and 6 new Euroclass VI pickups are due to arrive by September 2022. In addition, the larger vehicle fleet now includes 10 pickups, 16 tippers, 18 refuse collection vehicles, 1 glass collection vehicle, 1 road sweeper, and 1 tail lift vehicle, all of which are Euroclass VI standard. It is estimated that there has been a 50% reduction in NOx emissions from the Council's fleet as a result of these vehicle replacements.	3-year replacement plan for small vehicle fleet to zero emission is to be concluded in 2022. However, the Council are committed to reducing emissions within the fleet and the renewal programme has been extended. Half a million pounds has been set aside for fleet renewal each year for the next two years.

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B3	Provision of EV charging points across IBC offices, Crown Street and Elm Street public car parks and investigate the feasibility of additional charging points across IBC car parks	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2019	2019	Ipswich Borough Council	Ipswich Borough Council	No	Partially Funded	£500k - £1 million	Completed	Low	Provision of 4 charging stations (8 points) at Grafton House. Usage of EV charging points by the public	Number of charging points now installed at the following locations: Grafton House – 26 Gipping House – 8 Christchurch Mansion – 4 Chantry Park – 2 Holywells Park – 2 Crematorium – 1 Gainsborough sports centre – 2 Crown Car Park – 28 Elm St Car Park – 2 rapid chargers Majors Garage – 1 Upper Orwell Street North Car Park - 2. 149 points proposed at Portman Road Car Park with capacity for 298 EV charging spaces - approx. cost £500k	Provision of additional charging points depends on success of usage of current charging points. Crown car park – Between June 2021 and April 2022 – there has been 8718hrs4mins of charging sessions using total of 41,569.22kWh. Upper Orwell North car park – Between June 2021 and April 2022 there has been 1485hrs26mins of charging sessions using total of 3755.47kWhr. Elm Street Car Park - Between June 2021 and April 2022 - there has been 3678hrs13 mins of charging sessions using total of 83,998.29kWh.Delivery of new Portman Road Car Park now linked with a review of Sports and Leisure.
B4	Promote the use of Norwich Road Shoppers Car Park, short term parking bays behind businesses on Norwich Road. Incentivising use of allocated parking and enforcement against unauthorised on street loading/ parking to assist with the reduction of congestion in the area.	Traffic Management	Other	2019	2024	Ipswich Borough Council	Ipswich Borough Council	NO	Funded	Unknown	Implementation	Low	Reduction in congestion along Norwich Road/St Matthews Street. Number of penalty notices served	Between 01/06/2021 - 16/05/2022 the following number of PCNs were served along Norwich Road and St Matthews Street: 86 for parking on yellow lines / 48 for parking where a loading restriction is present /1 for parking in a bus stop or stand/ 2 for parking on a pedestrian crossing. 20 PCN's were issued in Norwich Road Shoppers Car Park for overstaying in the free parking bays.	Implementation costs not known.

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B5	Investigate what other organisations in the town are doing with regards to fleet renewal (e.g. other Local Authorities and large businesses) and whether there are opportunities (and funding) for an accelerated take up of ULEVs in the town.	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	2019	TBC	Ipswich Borough Council. Other organisations	Depends on the organisation as to the funding source	No	Partially Funded	Unknown	Implementation	Low	-	SCC has been increasing the number of electric vehicles in its fleet, including site inspection vehicles. SCC is in the process of compiling a bid for the LEVI funding from central Government to make a continuation for the highly successful Plug in Suffolk Project which has accelerated the rollout of publicly accessible EV charging infrastructure across the County. In the Environment Strategy Team SCC have upgraded the Nissan eNV200 van to a Renault ZOE van which gives enough extra range so that there are now no issues with the distances required. Through the Carbon Charter there is ongoing focus on air quality including webinars and events such as on June 16th Clean air day https://www.eventbrite.co.uk/e/air-quality-and-your-business-tickets-347388477287 IBC have supported the local CCG to develop their ICS Green Plan which is due to be rolled out on 1st July 2022. In terms of the ICS Green Plan, they have started some EV exploratory work. The NHS has committed to investing in Trust fleets being ELV or ULEV to help improve air quality and deliver net zero emission. All Trusts are undertaking a fleet review to this end. There is a commitment to switch the fleets.	Completion date unknown as likely to be an ongoing measure.
B6	Accelerate the provision of on-street public EV charging points	Promoting Low Emission Transport	Other	2021	TBC	Suffolk County Council	Suffolk County Council	NO	Partially Funded	Unknown	Implementation	Low	Provision of EV	The County Council has not installed any on-street charge points and is awaiting the outcome and evaluation of numerous national trial projects before making any further decisions on the provision of on street charging. At this time SCC has not changed its current position with respect to on-street residential parking. Their position can be found here: https://www.suffolk.gov.uk/roads-andtransport/transportplanning/electric-vehiclecharging-policy/. Members of the public who are interested in community on-street charging can request it via this link. This will help SCC identify where more residential charging facilities may be required in the future. Works are underway to install additional public charging points at both Park & Ride sites – these will be open to all, not just P&R users.	
B7	Assist the Councils Car Parking Services in the development of their policies and strategies to promote clean travel and improved air quality. Review use of short and long stay car parks	Promoting Low Emission Transport	Other	2019	2024	Ipswich Borough Council	Ipswich Borough Council	NO	Not Funded	Unknown	Planning	Low	-	A report on ‘Off-Street Car Parks Review’ is going to Executive on 14th June 2022 which proposes increases to the Council’s car park tariffs and charging hours. Additionally, a report of ‘On-Street Parking Review’ is also going to Executive on 14th June 2022 which proposes increases to tariffs, tariff structures and charging hours for on-street paid for parking locations in the Ipswich town centre area, excluding residents parking zones.	

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B8	Continue to explore the possibility and apply to DEFRA for grant funding under Air Quality Grant Schemes and any other appropriate funding	Public Information	Other	2019	2024	Ipswich Borough Council	Ipswich Borough Council	YES	Funded	£100k - £500k	Implementation	Low	Depends on the nature of the works relating to grant funding. Current grant project will be a reduction in domestic burning complaints. Reduced PM concentrations	Ipswich secured £115,632 from Defra as part of the 2021 Air Quality Grant Programme to run a monitoring and behavioural change campaign around domestic burning. Ipswich have committed £33,939 in match funding.	Project currently in the implementation phase. Locations for sensors and monitoring equipment selected and initial messages/design materials being prepared.
B9	Work with Bus Operators in the town (i.e. Ipswich Buses, First, Norse, Beestons), to encourage the renewal of their fleet to cleaner i.e. Euro VI or better and/or low emission, hybrid buses, on certain routes	Vehicle Fleet Efficiency	Other	2019	2024	Suffolk County Council and Ipswich Borough Council	Bus Operators (plus other sources of funding)	NO	Partially Funded	Unknown	Implementation	Low	Reduced fleet emissions	Ipswich Buses - 13 Euro V buses acquired in 2019. 3 Euro VI buses acquired in 2020. 5 Euro VI buses acquired in 2021. This projection may not be feasible given the current economic uncertainty following the impact of Covid but ideally would see the following numbers of vehicles being replaced each year as they reach 15 years old: 2022 x 5 vehicles; 2023 x 7 vehicles; 2024 x 8 vehicles; 2025 x 12 vehicles; 2026 x 12 vehicles; 2027 x 12 vehicles; 2028 x 11 vehicles. Such a plan would depend on shape and size of the bus network following the pandemic along with advances in alternative fuels and available funding for vehicles and associated re-fuelling infrastructure. Following on from the Covid pandemic, there is uncertainty across the economy, and particularly regarding high street retail footfall and employment. Given this, it is unlikely that any fleet will be replaced in 2022. First - The Enhanced Partnership is up and running, but as Suffolk were unsuccessful in their bid for funding under the Bus Back Better bid, they are concentrating on the measures put in the original EP Plan. Given the wholescale uncertainty around the bus industry at the moment, especially when the last tranche of DfT funding finishes at the start of October, there is uncertainty with regards to fleet renewal.	SCC advise that match funding requirements prevented them making bids under the recent "All Electric Bus Town" and "Zero Emission Bus (ZEBRA)" opportunities put forward by the DfT. Conversion to electric or alternative fuels (e.g. Hydrogen) requires significant investment in depot facilities as well as the vehicles themselves being more expensive than diesel buses. Although support funding has been available throughout the pandemic period to help operators continue running with massive reductions in passengers (at one point averaging 20% of pre-covid use) they have not been able to plan ahead for new bus purchases. Suffolk operators are seeing the same level of patronage return as the national picture, with 70-85% of fare-payers and around 50% of concessionary pass journeys when compared to pre-covid numbers. Pandemic support funding will cease in October, but operators are predicting they will still only be up to 90% by then and do not expect to reach 100% and start growth again for another year without help. As such, they still have no spare funding to invest in new vehicles of any kind. We are more likely to see early adoption of EVs from the Community Transport operators – a number of them are actively pursuing options at present. The key issue for larger buses is range, with hydrogen being the preferred option for inter-urban routes but no fuelling facilities available in Suffolk as yet. This may be delivered through the hydrogen hub at Sizewell C.

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B10	Work with other Bus Operators in the town (i.e. First, Norse, Beestons) to encourage the renewal of their fleets to cleaner i.e. Euro VI or better and/or low emission, hybrid buses, on certain routes.	Transport Planning and Infrastructure	Other											Amalgamated measure B10 with measure B9 so the combined measure refers to all bus operators in the town	
B11	Introduction of taxi emissions standards policy	Promoting Low Emission Transport	Taxi Licensing conditions	2018	2018	Ipswich Borough Council	Ipswich Borough Council	No	Funded	Unknown	Completed	Low	Reduction in non-euro 6 diesel	Completed - New Hackney Carriage and Private Hire Licensing Policy 2019-2022	Policy came into place relating to age of vehicles in 2020. Average age of vehicle licenced by IBC approx. 8 years. In order to be licenced, vehicles must be less than 15 years old. Costs not known for introducing measure.
B12	Review opportunities for alterations to traffic management to reduce congestion in AQMAs, including the provision of red routes.	Traffic Management	UTC, Congestion management, traffic reduction	2019	TBC	Suffolk County Council	Suffolk County Council	NO	Not Funded	Unknown	Planning	AQMA No.5 approx. 2% reductio n in NOx	Reduction in congestion on Civic Drive/ St Matthews Street roundabout	Opportunities to alterations to traffic management linked to ISPA mitigation work and town strategy.	No completion date known. Possible mitigation dependant on funding and appropriate support from stakeholders. Likely that funding will be sought as and when opportunity arises, unless suitable funding agreement made available from other sources e.g. Defra or DfT

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B13	Review (in conjunction with other IBC/ SCC work streams), the traffic management arrangements in the St Matthews St/ Norwich Rd corridor. Maintaining delivery facilities, whilst minimising disruption to traffic flows.	Freight and Delivery Management	Quiet & out of hours delivery	2019	TBC	Suffolk County Council	Suffolk County Council	No	Not Funded	Unknown	Planning	Low	Reduction in congestion along Norwich Road & St Matthews Street	This will tie into the IPSA transport mitigation work. See measure C7.	
C1	Develop and implement a Low Emission Strategy SPD	Policy Guidance and Development Control	Low Emissions Strategy	2019	2021	Ipswich Borough Council	Ipswich Borough Council	No	Funded	Unknown	Completed	Medium	Implementation of SPD	Low Emissions SPD formally adopted in November 2021.	The Low Emissions Supplementary Planning Document was adopted in November 2021 and is now in use. Training was delivered to Council planning staff, whilst agents and developers were alerted to the new requirements to enable planning applications to be validated. Work is due to commence on two remaining guidance notes to support its implementation, relating to:the use of green infrastructure in developments to help manage air quality, and mechanisms needed to allocate damage cost payments through S106 to AQ projects.
C2	Embed air quality considerations in the Councils Local Plan	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2019	2021	Ipswich Borough Council	Ipswich Borough Council	NO	Funded	Unknown	Completed	Medium	Air quality considerations embedded in Local Plan	Local Plan formally adopted on 23rd March 2022. Includes policy DM3 Air Quality	

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C3	Comment on best practice measures in relation to air quality in planning applications and major developments. Support alternatives to single occupancy car use arising from new developments, through the use of robust travel plans secured through the planning process	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2019	2024	Ipswich Borough Council	Ipswich Borough Council	NO	Funded	£10k - 50k	Implementation	Medium	100% of relevant planning applications assessed	Ongoing measure - all relevant applications assessed	Air Quality Assessments asked for in line with EPUK/IAQM guidance. Low emissions SPD should support this measure. SCC are able to deliver travel plans to new developments, which helps with a number of factors and ensures consistency of messages regarding active and sustainable travel options across all developments.

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C4	Support Suffolk County's development of Local Ipswich Cycling and Walking Infrastructure Plans, and work to improve existing cycle routes	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	2019	TBC	Suffolk County Council	Suffolk County Council	NO	Partially Funded	Unknown	Implementation	Medium	Implementation of Walking and Cycling Infrastructure Plan	The Planning Policy Team met transport officers from Suffolk County Council on 10th February 2022 to discuss taking forward work on an Ipswich Local Cycling and Walking Infrastructure Plan (LCWIP). The plan would act as a bidding vehicle for active travel funding available nationally. A significant amount of work has already been done both by Suffolk County Council, which developed a draft Ipswich LCWIP in 2020, and Ipswich Borough Council, which adopted a Cycling Strategy Supplementary Planning Document in 2016. There is significant alignment between the strategies. Work needed to ensure they meet LCWIP criteria, prioritise measures and consult the public is currently being scoped out. It also links to work on the Ipswich Strategic Planning Area Transport Mitigation Strategy.	
C5	Support the Local Transport Plan to create a more efficient use of the highway in and around the town, and across Suffolk	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	2019	2026	Suffolk County Council	Suffolk County Council	NO	Partially Funded	Unknown	Planning	Medium	Development of LTP	SCC is updating its Local Transport Plan to reflect the Council's and Government's zero carbon ambitions. As part of this process, an evidence base will be developed to inform the strategic town plans that will follow the overarching policy. The emerging LTP will emphasise the need to manage demand on the existing network ahead of providing more capacity. As such, it is planned that the LTP reflects the hierarchy of road users which places sustainable transport modes at the highest priority levels for interventions and provides for single-occupancy car use last.	The DfT is due to announce a change in guidance for LTPs in October 2022 with a focus on decarbonisation and a requirement to quantify carbon reductions to achieve a locally developed pathway to net zero. The DfT has suggested that Local Transport Authorities, with the support of their Sub-National Transport Bodies, should develop a carbon model to calculate baseline emissions and assess the impact of scheme proposals as early as possible. SCC is working with Transport East on the development of an Agent Based Model for the region that will help to assess the impact of schemes against carbon reduction targets.

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C6	Supporting, where appropriate, Suffolk Climate Change, Environment & Energy Board's development and implementation of the Suffolk Climate Emergency Plan.	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	2019	2030	Suffolk Climate Change, Energy & Environment Board (SCCEEB) reporting to Suffolk Public Sector Leaders (SPSL)	Suffolk Climate Change, Energy & Environment Board (SCCEEB) reporting to Suffolk Public Sector Leaders (SPSL)	NO	Partially Funded	£1 million - £10 million	Implementation	- (Relates to CO2 emissions not NO2)	Reduction in absolute CO2 emissions in Suffolk	The Suffolk Climate Emergency Plan has been agreed by Suffolk's Public Sector Leaders and is available at: https://www.greensuffolk.org/about/suffolk-climatechange-partnership/. IBC have involvement in all of the SCEP action themes: https://www.greensuffolk.org/app/uploads/2021/07/Suffolk-CEP-Table-of-actions.pdf	Since the last update, a Programme Manager has been appointed and work is progressing in delivering the Plan. Theme groups have been set up for each of the key themes within the SCEP and are progressing Action delivery. SPSL have pledged £1.5mn to support this work, of which £310k has been committed for resource support and a study and a further £380k allocated for specific project work.
C7	Supporting, where appropriate, the measures identified in the Ipswich Strategic Planning Area Transport Mitigation Strategy developed by Suffolk County Council to support the Ipswich Strategic Plan Area (ISPA) local plans, works to be funded by the ISPA authorities	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	2021	TBC	Suffolk County Council. IPSA authorities	IPSA authorities	NO	Not Funded	Unknown	Planning	Medium	Implementation of transport mitigation strategy	The primary strands of work ongoing relate to the preparation of a five-year Implementation Plan and, integral to this, seeking sources of funding to supplement developer contributions. SCC is preparing a Levelling Up bid around Ipswich linked to transport mitigation. SCC and ISPA Authorities met with WSP in November 2021 to discuss how costs on implementing the plan will be apportioned. It is proposed that this will be calculated via the proportion of trips arising from new development within Suffolk passing into/out of Ipswich. WSP will now make recommendations on how plan will be paid for and to be agreed by LPA's. WSP also reviewing the August 2019 ISPA strategy to ensure it is current and to develop an implementation plan. IPSA strategy and implementation plan needs to align with the Transport Strategy for the East of England. SCC are aware of this.	SCC have not yet received agreement from the LPA's on funding the ISPA transport mitigation work. However, they have recruited 2 additional active travel officers (last October), they are fixed-term 2 year posts, but if further funding becomes available (e.g., through ISPA) we would seek to maintain & expand these roles.

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D1	Development and implementation of campaign to provide information about the impacts of domestic burning and good practice, including wood burners and burning of garden waste	Public Information	Other	2021	2024	Ipswich Borough Council	Ipswich Borough Council	YES	Funded	Unknown	Implementation	Low	Reduction in number of domestic burning complaints received. Reduction in PM concentrations	Information produced on IBC website relating to domestic burning. Bonfire complaint letters also updated with information. Ipswich secured £115,632 from Defra as part of the 2021 Air Quality Grant Programme to run a monitoring and behavioural change campaign around domestic burning. Ipswich have committied £33,939 in match funding. Further information on domestic burning will be provided as part of the Defra grant funded project and link to the Ipswich 'Air Aware' Campaign being planned.	
D2	Consider and explore the feasibility of further measures that would improve air quality within both AQMAs and across the borough, including emissions testing within AQMAs, clean air zones, low emission zones and congestion charging	Promoting Low Emission Transport	Other	2019	2026	Suffolk County Council and Ipswich Borough Council	Suffolk County Council and Ipswich Borough Council	NO	Not Funded	Unknown	Planning	High (if LEZ/ congestion charging introduced)	-	Following on from the findings of the Air Quality Assessment commissioned by the Ipswich Strategic Planning Area, the Council need to explore how we address the predicted future exceedance within AQMA 2 in both 2026 and 2036 further with SCC. We are now monitoring at this location to ascertain current concentrations. Current concentrations below NO2 objective level. Neither IBC or SCC are intending to implement a low emission zone or congestion charging at this time.	2026 and 2036 for local plan growth across the ISPA areas. Possible mitigation dependant on funding and appropriate support from stakeholders. Indicative costs for delivery of the IPSA mitigation strategy have been provided to all LPAs and formed the basis of the IDP.
D3	Provision of A rated boilers in IBC owned housing stock	Promoting Low Emission Plant	Other Policy	2019	2022	Ipswich Borough Council	Ipswich Borough Council	NO	Funded		Implementation	Low	All larger properties are to have low NOx boilers, defined as boilers that meet a dry NOx emission rating of 40mg/kWh	Ongoing installation	IBC are exploring alternative technology for heating which will be trialled as part of a pilot project. This will help IBC learn from the product installations and use so we can update our strategy to meet future emissions targets.

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D4	Work with the Private Sector Housing team to improve their renovation grant criteria and include air quality considerations	Policy Guidance and Development Control	Other policy	2019	2024	Ipswich Borough Council	Ipswich Borough Council	NO	Funded	£100k - £500k	Completed	Low	100% of all grants with air quality implications	Policy revised to include energy efficient measures e.g. A rated boilers and insulation, thereby helping to reduce energy use and associated emissions. £100k budget set aside for grants annually.	

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

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

The Suffolk Air Quality Group, of which Ipswich Borough Council is a member, has engaged with Suffolk County Council (SCC) Public Health and Protection to pursue a unified approach to tackling $PM_{2.5}$. This is focused on promoting modal shift away from motor vehicle use towards active means of travel such as walking and cycling.

The Public Health Outcomes Framework (PHOF) is a Public Health England data tool, intended to focus public health action on increasing healthy life expectancy and reducing differences in life expectancy between communities. The PHOF includes an indicator, based on the effect of particulate matter ($PM_{2.5}$) on mortality. According to the public health outcomes framework, the fraction of mortality in those aged over 30 years, attributable to particulate air pollution (measured as $PM_{2.5}$) in 2020 in Ipswich is 6.2%, above the average for England (5.6%), and similar to that of the East of England Region (5.80%). This would suggest that $PM_{2.5}$ concentrations in Ipswich are slightly higher than other areas in the UK[7].

The Council does not currently conduct any real time monitoring for either PM_{10} or $PM_{2.5}$. However, as highlighted in the 2021 and 2020 ASRs, the Council commissioned a study to assess the air quality impact of the proposed aligned local plans for the Ipswich Strategic Planning Area (ISPA). The assessment considered the impacts of the IBC Local Plan without and with Transport Mitigation Measures. The results of the assessment show that, based on the significance criteria taken from the Environmental Protection UK / Institute of Air Quality Management (EPUK/IAQM) guidance '*Land-Use Planning & Development*

[7] Public Health England, Public Health Outcomes Framework, accessed 31/05/2022. Available at: https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/1/gid/1000043/pat/6/par/E12000006/ati/101/are/E07000202/yrr/3/cid/4/tbm/1

Control: Planning For Air Quality'[8], the effects of the Ipswich Local Plan are predicted to be negligible in 2026 and 2036 for PM_{10} and $PM_{2.5}$. This is a positive finding, but the Council will continue to work towards reducing concentrations of particulates. The modal shift to more active & sustainable travel choices, delivered through the ISPA strategy will also contribute to the reduction of particulates. Through reduced vehicle use, tyre and brake dust will lessen. Increased walking and cycling will reduce the need for short journeys in urban areas in and through the AQMAs.

When using the current Defra background mapping resource (base year 2018, assessment year 2021), the maximum predicted background annual mean $PM_{2.5}$ concentration within Ipswich is 11.1µm/m^3. This is below the air quality standard for $PM_{2.5}$ of 25µm/m^3 but above the World Health Organisation (WHO) air quality guideline value of 5µm/m^3.

Following on from the Councils successful bid to Defra, the Council secured £115,632 from Defra as part of the 2021 Air Quality Grant Programme to run a monitoring and behavioural change campaign around domestic burning. As part of this, the Council will be procuring a reference analyser and six portable sensors. The analyser and sensors will measure both PM_{10} and $PM_{2.5}$. Findings from the monitoring programme, together with how the behavioural change aspect of the campaign is progressing, will be reported in the 2023 ASR. It is hoped that the behavioural change aspect of the campaign will lead to a reduction in concentrations of particulate matter associated with domestic burning.

During the latter part of 2019 and in 2020, the Council, together with all the other Local Authorities across Suffolk worked with Suffolk County Council's Transport and Public Health colleagues to prepare an 'Air Quality Profile' report for Suffolk. The report maps, at a district and borough level, local air pollution levels and explores evidence-based interventions that can be undertaken by local authorities, businesses, communities and individuals to improve air quality. Unfortunately, due to the COVID-19 pandemic and the associated impact on resource, the report was not finalised in 2020. The report has since been published in June 2021 following sign-off from the Suffolk Director of Public Health.

Following on from the publication of the Suffolk Air Quality Profile, an officer from the Council, together with other stakeholders, presented the findings at an Air Quality Summit

[8] 8 EPUK/IAQM, 2017, Land use Planning & Development Control: Planning for Air Quality. Available at: http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf

held in January 2022. The summit was attended by elected members and senior Council Officers from Local Authorities across Suffolk. Officers also discussed matters pertaining to air quality in general. It is hoped that the summit will trigger further action to reduce air pollution.

We will continue to consult with Suffolk County Council Public Health colleagues and be advised by them, and national guidance, on any relevant measures that will reduce exposure to $PM_{2.5}$.

In addition to the above, Council officers are keenly awaiting the introduction of new $PM_{2.5}$ targets following the requirement under the Environment Act 2021. It is hoped that Defra will produce guidance to support local authorities in achieving these targets.

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

This section sets out the monitoring undertaken within 2021 by Ipswich Borough Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2017 and 2021 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Ipswich Borough Council undertook automatic (continuous) monitoring at two sites during 2021 (IPS3 – Chevallier Street / IPS04 – St Matthews Street). Table A.1 in Appendix A shows the details of the automatic monitoring sites. The Air Quality England page presents automatic monitoring results for Ipswich Borough Council, with automatic monitoring results also 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.

Following on from the Councils successful bid to Defra, the Council secured £115,632 from Defra as part of the 2021 Air Quality Grant Programme to run a monitoring and behavioural change campaign around domestic burning. As part of this, the Council will be procuring a reference analyser and six portable sensors. The analyser and sensors will measure both PM_{10} and $PM_{2.5}$. Findings from the monitoring programme will be reported in the 2023 ASR.

3.1.2 Non-Automatic Monitoring Sites

As part of its normal monitoring programme, Ipswich Borough Council undertook non-automatic (i.e. passive) monitoring of NO_2 at 90 sites during 2021. 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.

In order to further understand pollution levels around the town, two additional non-automatic monitoring locations were installed in 2021. These locations are at:

- Tube 97 - Crown Street at the junction with Northgate Street. Location chosen due to air quality modelling as part of the Council's emerging Local Plan indicating that the air may experience an exceedance of the annual mean objective level in both 2026 and 2036.
- Tube 98 - Fore Street. Location chosen to help ensure the Council has appropriately defined the boundary of AQMA 3.

Due to issues, the following diffusion tubes were relocated in 2021:

- Tube 6 – Kings Avenue. Relocated to a nearby receptor on Kings Avenue due to street furniture being moved.
- Tube 75 – Grimwade Street. Relocated to another nearby relevant receptor on Grimwade Street due to issues with access.
- Tube 92 – Ipswich Hospital. Relocated to a nearby lamppost at the hospital due to street furniture being moved.

All relocated tubes were classed as new locations in 2021 for the purposes of accurate data analysis and the reporting of trends.

Once bias and distance corrected, none of the new locations (including relocated locations) were in exceedance of the annual mean NO_2 concentration. Further details can be found in Appendix B. The Council will continue to monitor levels of pollution at these sites in 2022 and report on them in the 2023 ASR.

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 2021 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. There are no annual averages greater than 60µg/m^3 that would indicate an exceedance of the 1-hour mean objective.

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.

Looking at the locally bias adjusted and distance corrected data for the non-automatic monitoring locations, there were three exceedances of the annual mean NO_2 concentration. The sites that recorded exceedances were:

- 1 site located within AQMA 2. Tubes 11, 12 & 19 – triplicate.
- 2 sites located within AQMA 5. Tube 52 and tubes 64 & 65 – duplicate.

No sites recorded an annual means greater than 60µg/m^3 so an exceedance of the 1-hour mean objective is not indicated.

Six sites recorded concentrations within 10% below the annual mean NO_2 objective level, these were:

- 1 site located within AQMA 2. Tube 68.
- 2 sites located within AQMA 3. Tubes 30 and 39.
- 1 site located within AQMA 5. Tube 49.
- 2 sites located outside AQMAs. Tubes 18 and 31. It should be noted that tube 31 has no relevant receptor near to this site so the annual mean objective level does not apply.

When comparing the 2021 results to the 2020 results generated using the locally derived bias adjustment factor, in 2020 there were no exceedances and in 2021 there were three recorded exceedances (listed above). In 2020, there were three sites that recorded

concentrations within 10% below the annual mean NO_2 objective level. These sites were in AQMA 2 (sites 11, 12 & 19 – triplicate) and AQMA 5 (sites 52 and 64 & 65 – duplicate).

Figures A.1 – A.6 shows bias corrected trendline plots for clusters of passive monitoring locations in and around each of the 4 AQMAs. Despite AQMA 4 being revoked in August 2021, it is included for transparency. All would appear to indicate that annual mean NO_2 levels remained essentially unchanged between 2013 - 2019, with a marginal downward trajectory when looking at the results analysed via the local bias correction Ipswich Borough Council LAQM Annual Status Report 2021 factor. When looking at the bias corrected data for 2020, annual mean NO_2 concentrations dropped considerably compared to previous years. An increase in the annual mean NO_2 concentration can be seen in 2021 compared to 2020, but concentrations generally remained below 2019 levels. It is likely that the increase in concentrations in 2021 compared to 2020 was linked to the relaxation of Government restrictions associated with the COVID-19 pandemic.

3.2.2 Particulate Matter (PM_{10})

Ipswich Borough Council does not monitor for particulate matter (PM_{10}). However, as part of the Councils successful air quality grant application to Defra in 2021, the Council will begin to monitor for PM_{10} in 2022. Data collected in 2022 will be reported on in the 2023 ASR submission.

3.2.3 Particulate Matter ($PM_{2.5}$)

Ipswich Borough Council does not monitor for particulate matter ($PM_{2.5}$). However, as part of the Councils successful air quality grant application to Defra in 2021, the Council will begin to monitor for $PM_{2.5}$ in 2022. Data collected in 2022 will be reported on in the 2023 ASR submission.

3.2.4 Sulphur Dioxide (SO_2)

Ipswich Borough Council does not monitor for Sulphur Dioxide (SO_2) – previous screening work has not suggested that there will be any exceedance of the objective levels.

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?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
IPS3	Chevallier Street	Roadside	615261	245350	NO2	NO. Was in AQMA 1 until amended on 19/08/2021	Chemiluminescent	2.5	2.5	1.5
IPS04	St Matthews Street	Roadside	615870	244858	NO2	NO	Chemiluminescent	12.8	2.9	1.38

Notes:

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

(2) N/A if not applicable

Table A.2 – 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)
1	Civic Drive	Roadside	615992	244412	NO2	No	18.8	6.0	No	2.6
2	Chevallier Street	Roadside	615144	245245	NO2	No following revocation of AQMA 4 on 19/08/2021	1.6	2.0	No	2.4
3	Coprolite Street / Duke Street	Kerbside	617070	244039	NO2	No	N/A	0.8	No	2.6
4	Norwich Road	Roadside	615620	245000	NO2	No	0.0	5.7	No	2.4
5	Fore Street	Roadside	616887	244128	NO2	Yes - AQMA 3	0.9	3.3	No	2.4
6	Kings Avenue	Background	617288	244429	NO2	No	0.0	4.3	No	2.1
7	Bramford Road	Roadside	615007	245239	NO2	No	0.0	5.6	No	2.3
8, 9, 10	Bramford Road	Roadside	615125	245209	NO2	No	4.3	2.2	No	2.5
13	Bramford Lane	Roadside	615117	245305	NO2	No	3.3	1.2	No	2.5
14	Chevallier Street	Roadside	615285	245393	NO2	Yes - AQMA 1	0.4	2.5	No	2.2
15	Tavern Street	Background	616282	244643	NO2	No	N/A	N/A	No	2.6
16	Valley Road / Westwood Court	Roadside	615362	245437	NO2	No	2.6	3.1	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
17	Woodbridge Road	Roadside	616993	244659	NO2	No	2.1	1.8	No	2.5
18	Yarmouth Road	Roadside	615090	245178	NO2	No	0.0	3.2	No	2.2
11, 12, 19	St Margaret's Street / Piper's Court	Roadside	616593	244753	NO2	Yes - AQMA 2	0.0	2.5	No	2.3
20	Fonnereau Road	Roadside	616458	244829	NO2	No	1.8	2.2	No	2.6
21	St Margaret's Plain	Roadside	616494	244807	NO2	Yes - AQMA 2	N/A	2.0	No	2.4
22	St Margaret's Plain / Northgate Street	Roadside	616489	244785	NO2	Yes - AQMA 2	N/A	1.6	No	2.6
23	St Margaret's Green	Roadside	616645	244784	NO2	No	0.0	3.3	No	2.5
24	St Margaret's Street	Roadside	616663	244692	NO2	Yes - AQMA 2	N/A	3.3	No	2.4
25	St Helen's Street	Roadside	616753	244582	NO2	Yes - AQMA 2	1.1	3.0	No	2.5
26	St Helen's Street / Grimwade Street	Roadside	616971	244511	NO2	No	0.0	3.6	No	2.3
27	Argyle Street	Roadside	616965	244546	NO2	Yes - AQMA 2	0.3	1.2	No	2.3
28	Chevallier Street	Roadside	615194	245292	NO2	No following revocation of AQMA 4 on 19/08/2021	2.6	1.9	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
29	Fore Hamlet	Roadside	617118	244074	NO2	No	0.0	2.2	No	2.7
30	Fore Street	Roadside	616939	244114	NO2	Yes - AQMA 3 from 19/08/2021 following amendment	1.4	2.7	No	2.5
31	Star Lane	Roadside	616332	244149	NO2	No	N/A	2.4	No	2.3
32	Spring Road	Roadside	617398	244573	NO2	No	2.9	2.0	No	2.5
33	Key Street	Roadside	616666	244114	NO2	Yes - AQMA 3	0.0	2.0	No	2.5
34	College Street	Roadside	616467	244072	NO2	Yes - AQMA 3	N/A	1.8	No	2.5
35	Cobden Place	Roadside	616746	244696	NO2	No	0.0	1.1	No	2.4
36	Valley Road	Roadside	616820	246158	NO2	No	15.0	2.2	No	2.5
37	Star Lane	Roadside	616845	244252	NO2	No	0.0	1.1	No	2.5
38	Civic Drive	Kerbside	615904	244805	NO2	No	6.3	0.9	No	2.5
39	Star Lane	Kerbside	616712	244228	NO2	Yes - AQMA 3	1.3	0.8	No	2.4
40	Norwich Road	Roadside	615460	245148	NO2	No	5.7	2.8	No	2.4

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)
41	Bramford Road / Norwich Road	Roadside	615564	245010	NO2	No	0.5	1.3	No	2.5
42	Norwich Road	Roadside	615744	244901	NO2	Yes - AQMA 5	0.0	2.3	No	2.5
43	Bramford Road / Yarmouth Road	Roadside	615109	245200	NO2	No following revocation of AQMA 4 on 19/08/2021	0.6	3.6	No	2.4
44	Bramford Road	Roadside	615052	245237	NO2	No	4.8	1.6	No	2.4
45, 46, 47	Chevallier Street	Roadside	615261	245350	NO2	No following amendment to AQMA 1 on 19/08/21	2.5	4.2	Yes	1.2
48	Valley Road	Roadside	615425	245486	NO2	No	7.4	2.6	No	2.7
49	St Matthew's Street	Roadside	615792	244876	NO2	Yes - AQMA 5	0.0	1.9	No	2.6
50	Barrack Lane	Roadside	615773	244890	NO2	Yes - AQMA 5	1.5	1.4	No	2.4
51	St Matthew's Street	Kerbside	615769	244866	NO2	Yes - AQMA 5	4.5	0.9	No	2.6
52	St Matthew's Street	Roadside	615826	244871	NO2	Yes - AQMA 5	0.0	2.2	No	2.5
53	St Matthew's Street	Roadside	615820	244858	NO2	Yes - AQMA 5	0.0	2.2	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)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
54	St Matthew's Street Roundabout	Roadside	615893	244855	NO2	No	10.4	1.3	No	2.5
55	Berners Street	Roadside	615917	244898	NO2	No	0.0	2.3	No	2.5
56	Berners Street	Roadside	615931	244911	NO2	No	0.0	1.5	No	2.5
57	Berners Street	Roadside	615941	244981	NO2	No	0.0	8.1	No	2.5
58	Berners Street	Kerbside	615978	245042	NO2	No	7.7	0.5	No	2.5
59	St Matthew's Street Roundabout	Roadside	615926	244837	NO2	No	N/A	2.9	No	2.5
60	Colchester Road	Roadside	617438	246168	NO2	No	14.5	3.1	No	2.4
61	Valley Road	Roadside	616099	246105	NO2	No	19.5	2.4	No	2.5
62	St Matthew's Street	Roadside	615935	244803	NO2	No	2.9	1.8	No	2.6
63	St Matthew's Street	Roadside	615950	244790	NO2	No	0.0	3.3	No	2.4
64, 65	Norwich Road	Roadside	615688	244939	NO2	Yes - AQMA 5	0.4	1.3	No	2.4
66	Woodbridge Road	Roadside	616807	244669	NO2	Yes - AQMA 2	0.0	3.4	No	2.4

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)
67	Blanche Street	Roadside	616890	244676	NO2	No	6.3	1.4	No	2.6
68	Woodbridge Road	Roadside	616905	244657	NO2	Yes - AQMA 2	0.0	3.4	No	2.5
69	Argyle Street	Roadside	616978	244590	NO2	No	0.0	4.8	No	2.5
70	Argyle Street	Roadside	616965	244583	NO2	No	N/A	1.6	No	2.3
71	St Helen's Street	Roadside	617032	244537	NO2	No	0.0	14.5	No	2.5
72	St Helen's Street	Roadside	617123	244535	NO2	Yes - AQMA 2	0.0	1.9	No	2.6
73	Regent Street	Kerbside	617124	244517	NO2	No	0.0	1.0	No	2.6
74	Grimwade Street	Roadside	616953	244443	NO2	No	N/A	2.1	No	2.5
75	Grimwade Street	Roadside	616927	244395	NO2	No	0.0	7.0	No	2.2
76	St Helen's Street	Roadside	616951	244521	NO2	Yes - AQMA 2	0.0	3.0	No	2.5
77	St Helen's Street	Roadside	616902	244542	NO2	No	0.0	4.7	No	2.5
78	Orchard Street	Roadside	616870	244586	NO2	No	1.5	1.4	No	2.6
79	Woodbridge Road	Kerbside	617052	244677	NO2	No	N/A	0.5	No	2.4

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)
80, 81, 82	St Helen's Street	Kerbside	616821	244546	NO2	Yes - AQMA 2	N/A	1.0	No	2.4
83	Bond Street	Roadside	616792	244498	NO2	No	1.6	1.6	No	2.2
84	Carr Street / Major's Corner	Roadside	616702	244601	NO2	No	N/A	4.4	No	2.5
85	Old Foundry Road	Roadside	616681	244623	NO2	No	0.2	1.3	No	2.5
86	Upper Orwell Street	Kerbside	616727	244566	NO2	No	0.0	0.9	No	2.2
87	Northgate Street	Roadside	616481	244725	NO2	No	0.0	1.8	No	2.3
88	Stoke Street	Roadside	616307	243875	NO2	No	0.0	1.8	No	2.5
89	Hadleigh Road	Roadside	614816	244585	NO2	No	4.2	2.8	No	2.5
90	Hadleigh Road	Roadside	614893	244558	NO2	No	0.0	12.1	No	2.4
91	London Road	Roadside	615195	244621	NO2	No	0.0	7.2	No	2.4
92	Ipswich Hospital	Other	619407	244712	NO2	No	3.8	N/A	No	2.1
93	Grove Lane	Roadside	617360	244536	NO2	No	0.0	4.8	No	2.4
94	Fore Hamlet	Roadside	617363	243887	NO2	No	0.0	7.5	No	2.7

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)
95	Vernon Street	Roadside	616415	243776	NO2	No	0.0	6.1	No	2.4
96	Crown Street	Kerbside	616279	244807	NO2	Yes - AQMA 2	2.2	0.9	No	2.4
97	Crown Street/Northgate Street	Kerbside	616474	244795	NO2	Yes - AQMA 2	5.8	2.9	No	2.2
98	Fore Street	Kerbside	617037	244085	NO2	No	0.0	2.3	No	2.4
99, 100, 101	St Matthew's Street	Roadside	615870	244858	NO2	No	11.9	4.2	Yes	1.4

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 2021 (%) (2)	2017	2018	2019	2020	2021
IPS3	615261	245350	Roadside	98.24	98.24	29	28	26	20.7	23
IPS04	615870	244858	Roadside	99.33	99.33	**N/A**	**N/A**	37	26.3	28

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

☒ **Reported concentrations are those at the location of the monitoring site (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**.

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

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

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

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

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 2021 (%) [2]	2017	2018	2019	2020	2021
1	615992	244412	Roadside	100	100.0	27.0	26.0	24.0	18.5	19.3
2	615144	245245	Roadside	100	100.0	**40.0**	**42.0**	38.0	30.1	30.9
3	617070	244039	Kerbside	100	100.0	26.0	27.0	26.0	19.5	20.9
4	615620	245000	Roadside	100	100.0	**N/A**	**N/A**	31.0	24.5	26.3
5	616887	244128	Roadside	100	100.0	**44.0**	**42.0**	39.0	32.1	33.3
6	617288	244429	Background	100	100.0	**N/A**	**N/A**	**N/A**	**N/A**	12.1
7	615007	245239	Roadside	100	100.0	32.0	31.0	30.0	23.4	25.4
8, 9, 10	615125	245209	Roadside	100	100.0	35.0	34.0	32.0	25.4	29.1
13	615117	245305	Roadside	100	100.0	25.0	24.0	23.0	18.3	20.4
14	615285	245393	Roadside	100	100.0	**45.0**	**45.0**	**41.0**	32.1	34.2
15	616282	244643	Background	100	100.0	24.0	26.0	22.0	16.7	17.8
16	615362	245437	Roadside	100	100.0	37.0	35.0	33.0	25.6	27.3
17	616993	244659	Roadside	100	100.0	**46.0**	**46.0**	**42.0**	32.9	35.2

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 2021 (%) [2]	2017	2018	2019	2020	2021
18	615090	245178	Roadside	100	100.0	**N/A**	**N/A**	**41.0**	33.4	36.3
11, 12, 19	616593	244753	Roadside	100	100.0	**50.0**	**48.0**	**47.0**	36.7	**41.9**
20	616458	244829	Roadside	100	100.0	34.0	33.0	29.0	21.9	24.2
21	616494	244807	Roadside	91.8	91.8	37.0	38.0	34.0	25.7	27.2
22	616489	244785	Roadside	100	100.0	36.0	39.0	34.0	23.6	25.4
23	616645	244784	Roadside	100	100.0	23.0	21.0	21.0	15.9	17.3
24	616663	244692	Roadside	100	100.0	37.0	**40.0**	38.0	30.3	34.2
25	616753	244582	Roadside	100	100.0	38.0	39.0	36.0	29.6	34.8
26	616971	244511	Roadside	91.8	91.8	32.0	36.0	34.0	25.4	30.0
27	616965	244546	Roadside	100	100.0	**42.0**	**43.0**	38.0	29.0	31.6
28	615194	245292	Roadside	100	100.0	36.0	38.0	35.0	26.4	29.6
29	617118	244074	Roadside	100	100.0	33.0	32.0	31.0	24.0	27.6
30	616939	244114	Roadside	100	100.0	**51.0**	**49.0**	**46.0**	34.7	37.5
31	616332	244149	Roadside	92.9	92.9	**43.0**	**45.0**	**44.0**	33.8	38.6

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 2021 (%) (2)	2017	2018	2019	2020	2021
32	617398	244573	Roadside	100	100.0	34.0	31.0	30.0	23.3	25.2
33	616666	244114	Roadside	100	100.0	33.0	34.0	32.0	23.4	27.7
34	616467	244072	Roadside	100	100.0	**40.0**	39.0	33.0	25.0	27.7
35	616746	244696	Roadside	100	100.0	27.0	27.0	26.0	19.6	21.2
36	616820	246158	Roadside	100	100.0	33.0	31.0	31.0	22.8	22.6
37	616845	244252	Roadside	100	100.0	**N/A**	**N/A**	31.0	22.4	25.2
38	615904	244805	Kerbside	100	100.0	34.0	35.0	33.0	25.1	27.7
39	616712	244228	Kerbside	100	100.0	**N/A**	**N/A**	**41.0**	30.5	36.5
40	615460	245148	Roadside	100	100.0	31.0	30.0	27.0	20.1	23.8
41	615564	245010	Roadside	100	100.0	35.0	37.0	36.0	27.2	29.2
42	615744	244901	Roadside	100	100.0	33.0	38.0	37.0	29.1	35.1
43	615109	245200	Roadside	91.2	91.2	39.0	38.0	36.0	28.8	30.9
44	615052	245237	Roadside	100	100.0	38.0	38.0	34.0	26.1	30.4
45, 46, 47	615261	245350	Roadside	100	100.0	27.0	28.0	26.0	19.9	22.3

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 2021 (%) (2)	2017	2018	2019	2020	2021
48	615425	245486	Roadside	100	100.0	29.0	27.0	25.0	19.0	20.7
49	615792	244876	Roadside	100	100.0	**41.0**	**46.0**	**42.0**	32.0	37.5
50	615773	244890	Roadside	100	100.0	28.0	27.0	24.0	19.2	20.2
51	615769	244866	Kerbside	100	100.0	37.0	**42.0**	37.0	26.5	30.3
52	615826	244871	Roadside	100	100.0	**47.0**	**46.0**	**45.0**	36.4	**40.1**
53	615820	244858	Roadside	100	100.0	**42.0**	**46.0**	**44.0**	33.8	35.8
54	615893	244855	Roadside	100	100.0	36.0	37.0	36.0	27.5	29.2
55	615917	244898	Roadside	100	100.0	28.0	29.0	27.0	20.1	23.2
56	615931	244911	Roadside	92.6	92.6	29.0	29.0	27.0	20.9	24.0
57	615941	244981	Roadside	100	100.0	27.0	25.0	24.0	17.4	18.2
58	615978	245042	Kerbside	100	100.0	25.0	25.0	24.0	17.4	19.1
59	615926	244837	Roadside	100	100.0	33.0	32.0	32.0	24.2	25.4
60	617438	246168	Roadside	100	100.0	31.0	29.0	28.0	20.5	21.8
61	616099	246105	Roadside	100	100.0	**42.0**	**40.0**	38.0	28.3	30.2

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 2021 (%) (2)	2017	2018	2019	2020	2021
62	615935	244803	Roadside	100	100.0	37.0	36.0	34.0	26.6	28.6
63	615950	244790	Roadside	100	100.0	37.0	36.0	37.0	27.0	30.6
64, 65	615688	244939	Roadside	100	100.0	**56.0**	**55.0**	**51.0**	**40.3**	**41.9**
66	616807	244669	Roadside	100	100.0	**40.0**	**42.0**	39.0	31.0	33.3
67	616890	244676	Roadside	100	100.0	26.0	28.0	27.0	21.3	23.2
68	616905	244657	Roadside	100	100.0	**45.0**	**44.0**	**43.0**	33.2	36.2
69	616978	244590	Roadside	100	100.0	26.0	27.0	26.0	20.5	22.2
70	616965	244583	Roadside	100	100.0	36.0	38.0	36.0	25.8	28.0
71	617032	244537	Roadside	100	100.0	24.0	25.0	24.0	17.3	20.6
72	617123	244535	Roadside	100	100.0	38.0	38.0	35.0	26.0	30.3
73	617124	244517	Kerbside	100	100.0	23.0	23.0	22.0	16.0	17.4
74	616953	244443	Roadside	91.8	91.8	27.0	27.0	26.0	20.1	22.1
75	616927	244395	Roadside	100	100.0	**N/A**	**N/A**	**N/A**	**N/A**	18.9
76	616951	244521	Roadside	100	100.0	36.0	37.0	36.0	28.0	31.0

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 2021 (%) [2]	2017	2018	2019	2020	2021
77	616902	244542	Roadside	100	100.0	28.0	29.0	26.0	20.2	23.1
78	616870	244586	Roadside	100	100.0	25.0	24.0	23.0	17.6	20.1
79	617052	244677	Kerbside	100	100.0	36.0	36.0	35.0	27.8	31.1
80, 81, 82	616821	244546	Kerbside	100	100.0	36.0	38.0	36.0	27.4	30.1
83	616792	244498	Roadside	100	100.0	29.0	31.0	29.0	21.8	25.9
84	616702	244601	Roadside	100	100.0	25.0	26.0	24.0	18.0	20.1
85	616681	244623	Roadside	100	100.0	31.0	32.0	30.0	23.9	26.4
86	616727	244566	Kerbside	83.8	83.8	**N/A**	**N/A**	**N/A**	19.9	22.7
87	616481	244725	Roadside	100	100.0	**N/A**	**N/A**	**N/A**	22.3	21.3
88	616307	243875	Roadside	100	100.0	**N/A**	**N/A**	**N/A**	28.4	32.8
89	614816	244585	Roadside	100	100.0	**N/A**	**N/A**	**N/A**	21.8	24.0
90	614893	244558	Roadside	100	100.0	**N/A**	**N/A**	**N/A**	20.1	21.1
91	615195	244621	Roadside	91.2	91.2	**N/A**	**N/A**	**N/A**	19.4	21.6
92	619407	244712	Other	100	100.0	**N/A**	**N/A**	**N/A**	**N/A**	14.0

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 2021 (%) [2]	2017	2018	2019	2020	2021
93	617360	244536	Roadside	100	100.0	**N/A**	**N/A**	32.0	24.2	25.8
94	617363	243887	Roadside	100	100.0	**N/A**	**N/A**	26.0	20.6	20.6
95	616415	243776	Roadside	100	100.0	**N/A**	**N/A**	24.0	17.4	19.8
96	616279	244807	Kerbside	91.2	91.2	**N/A**	**N/A**	**42.0**	30.5	32.9
97	616474	244795	Kerbside	100	100.0	**N/A**	**N/A**	**N/A**	**N/A**	32.2
98	617037	244085	Kerbside	100	100.0	**N/A**	**N/A**	**N/A**	**N/A**	30.7
99, 100, 101	615870	244858	Roadside	100	100.0	**N/A**	**N/A**	**41.0**	26.8	29.6

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

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

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

Notes:

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

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

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

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

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

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

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

Figure A.1 – Trends in Annual Mean NO_2 Concentrations in AQMA No. 1

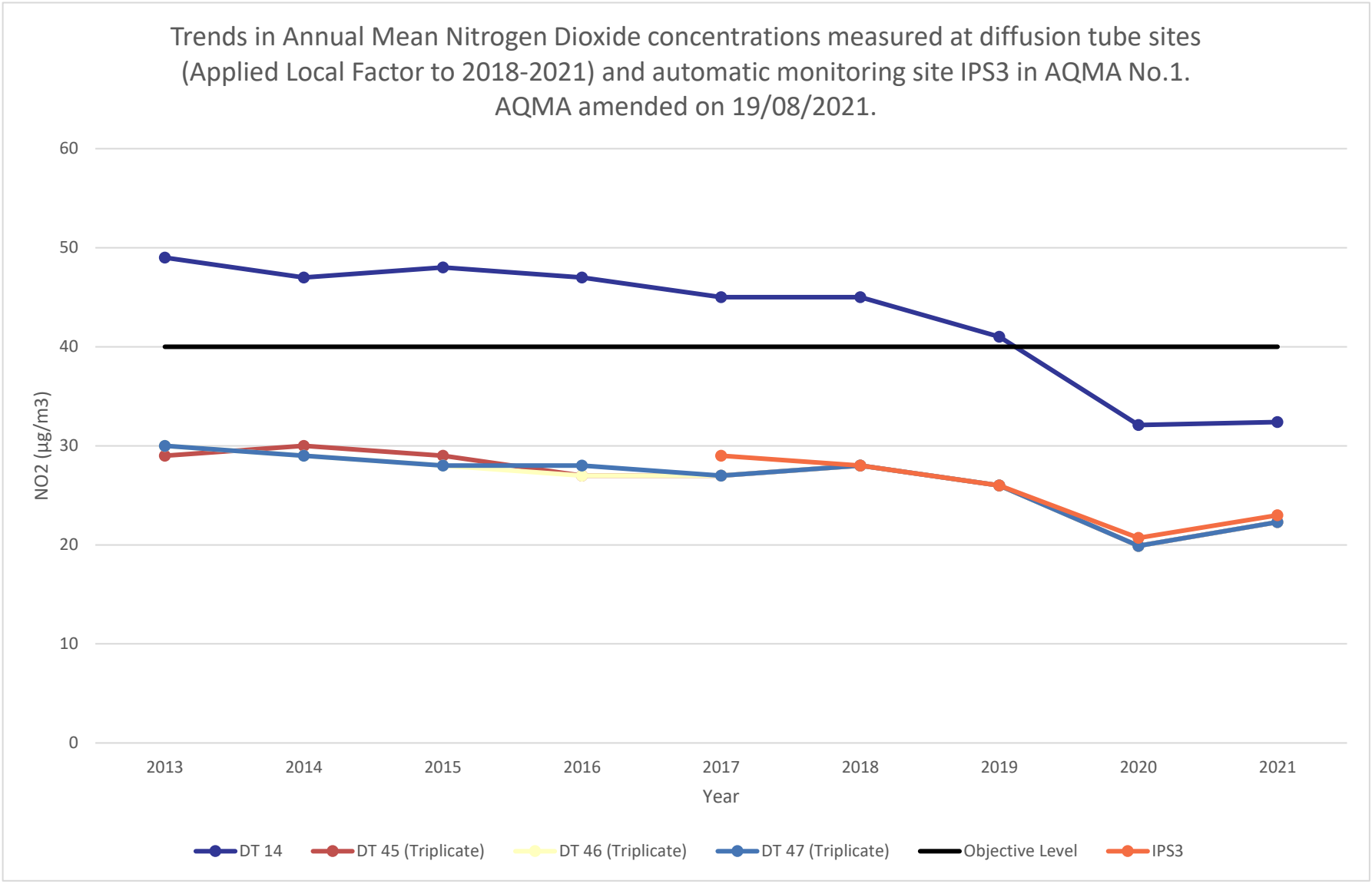


Figure A.2 – Trends in Annual Mean NO_2 Concentrations in AQMA No.2

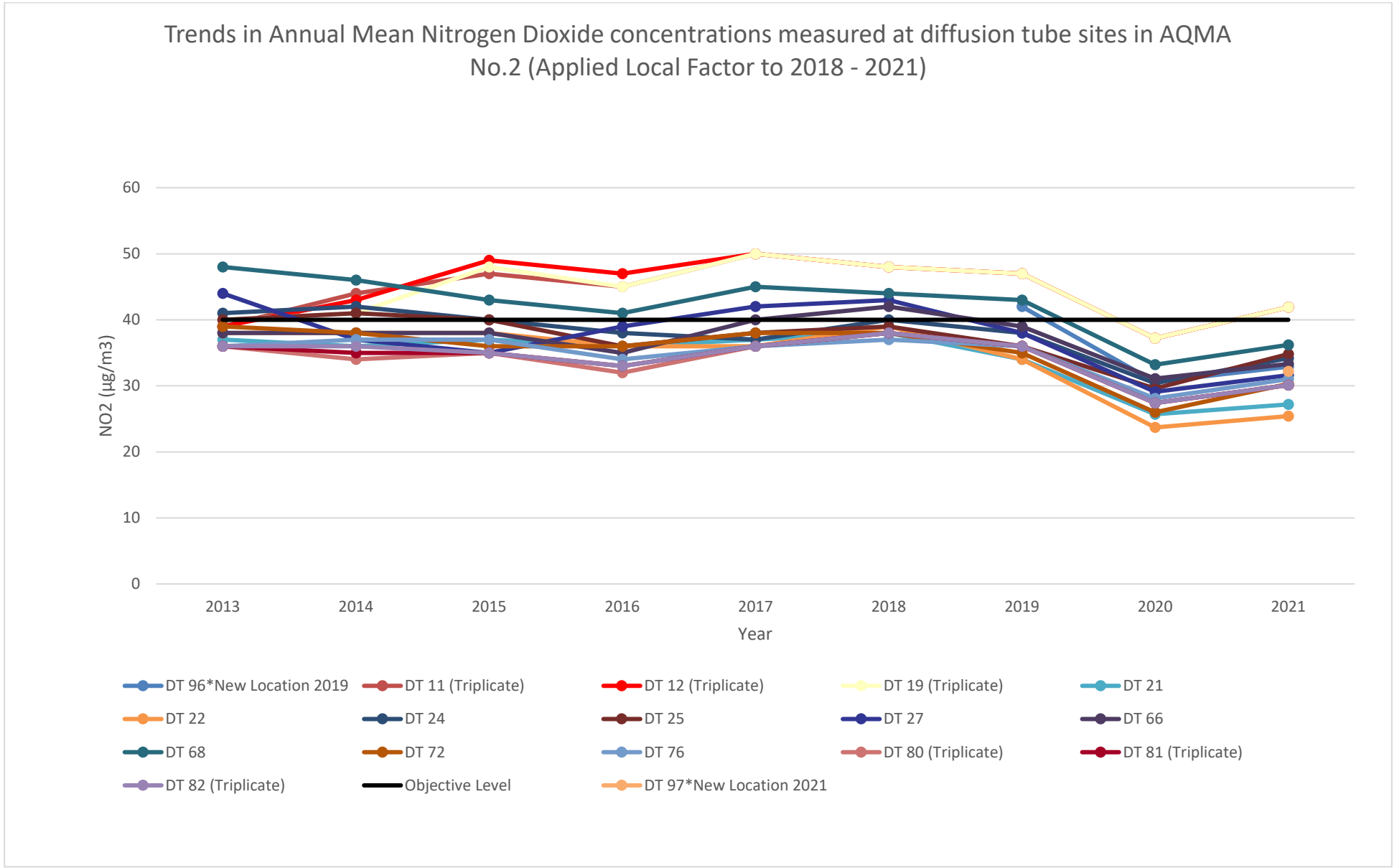


Figure A.3 – Trends in Annual Mean NO_2 Concentrations in AQMA No.3

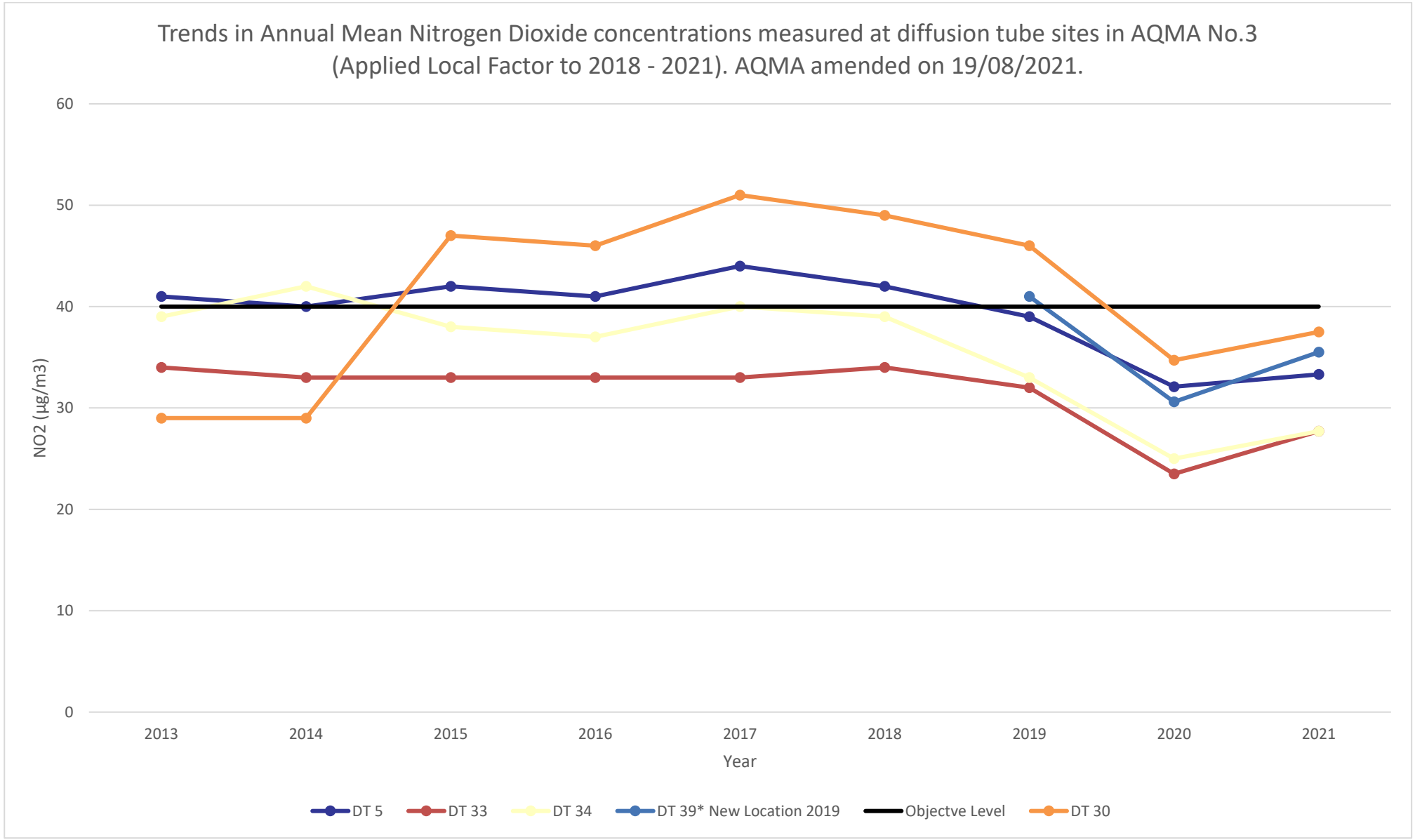


Figure A.4 - Trends in Annual Mean NO_2 Concentrations in former AQMA No.4. AQMA revoked on 19/08/2021.

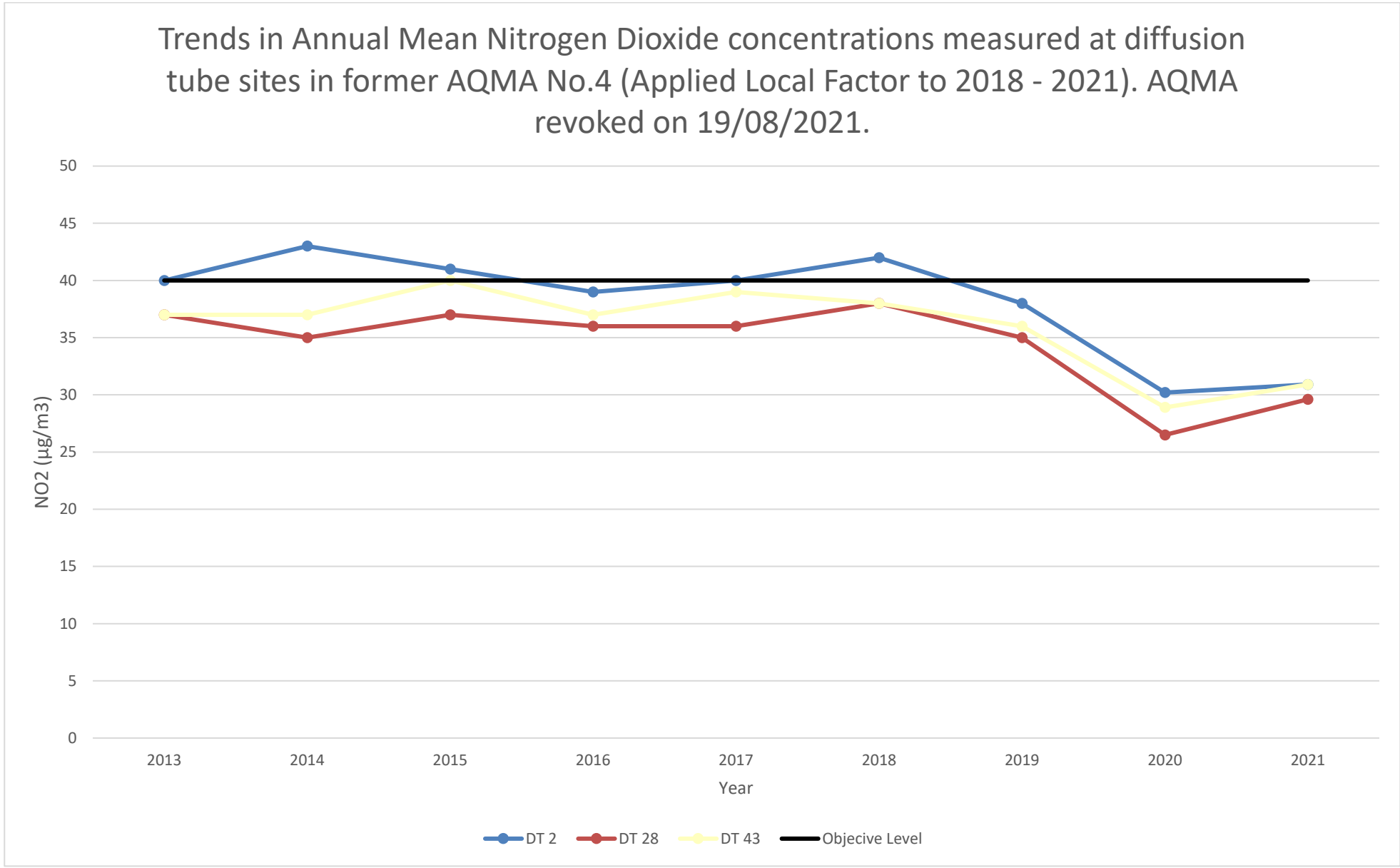


Figure A.5 - Trends in Annual Mean NO_2 Concentrations in AQMA No.5

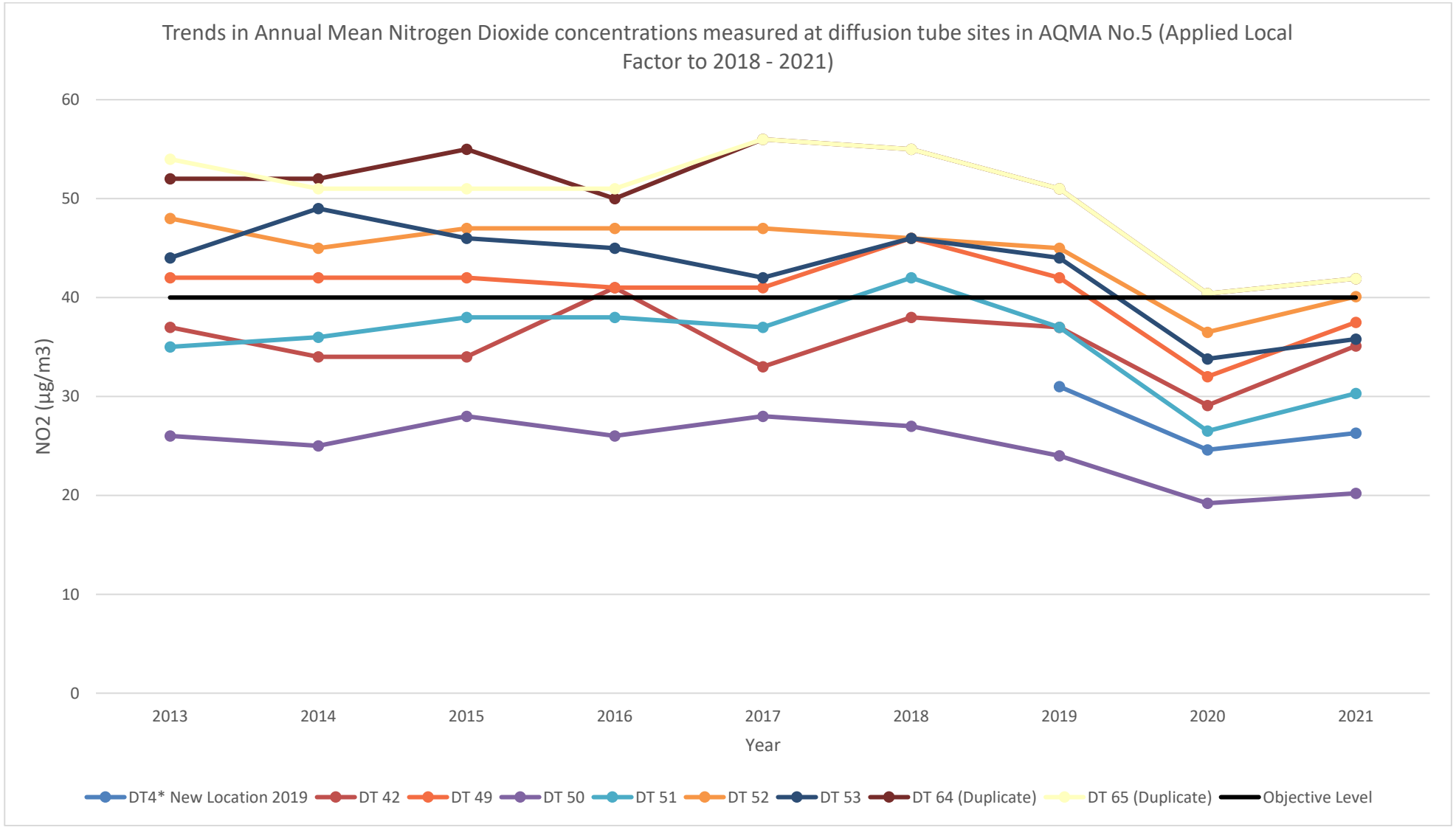


Figure A.6 – Trends in Annual Mean NO_2 Concentrations outside of AQMA sites

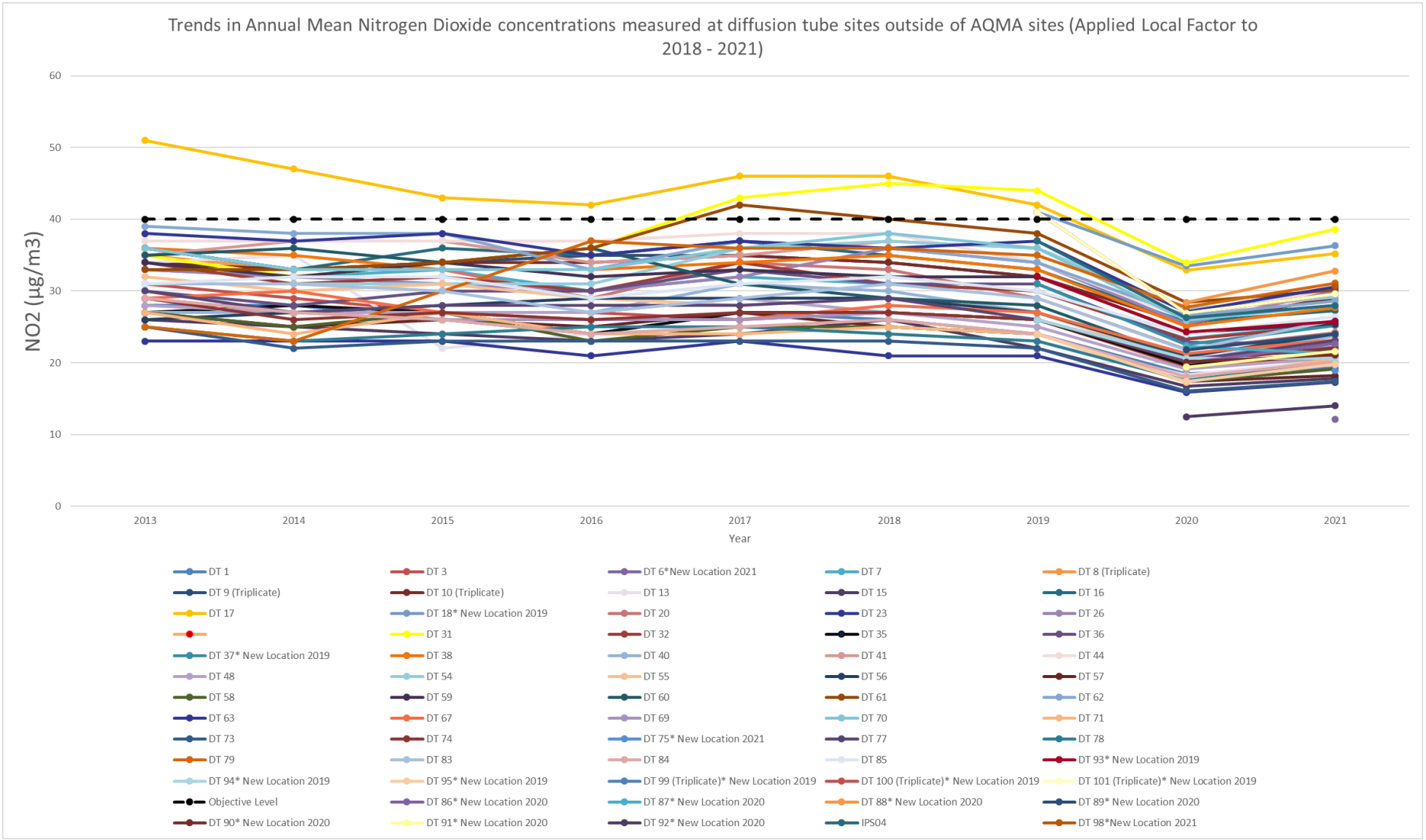


Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
IPS3	615261	245350	Roadside	98.24	98.24	0	0	0	0	0
IPS04	615870	244858	Roadside	99.33	99.33	**N/A**	**N/A**	**0(117)**	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%).

Appendix B: Full Monthly Diffusion Tube Results for 2021

Table B.1 – NO_2 2021 Diffusion Tube Results (µg/m^3)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.78)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
1	615992	244412	33.0	23.8	27.7	14.9	21.2	19.3	19.4	15.0	29.9	29.0	32.5	31.8	24.8	19.3	17.0	
2	615144	245245	37.3	41.2	40.3	35.6	41.3	35.2	38.8	33.4	52.2	39.7	40.7	40.8	39.7	30.9	28.5	
3	617070	244039	31.7	26.2	26.6	21.1	23.1	22.6	23.3	17.8	32.3	34.0	29.6	33.3	26.8	20.9	-	
4	615620	245000	38.7	37.2	35.4	36.8	26.6	34.5	23.6	24.4	42.9	30.6	36.6	37.5	33.7	26.3	-	
5	616887	244128	46.9	41.5	43.5	34.2	44.5	41.2	39.7	34.2	51.6	49.1	45.2	42.1	42.8	33.3	32.2	
6	617288	244429	21.5	18.2	18.9	14.5	13.3	11.9	10.8	8.6	18.2	17.2	20.6	12.8	15.5	12.1		
7	615007	245239	36.0	33.7	33.6	27.1	30.1	29.8	26.0	25.2	37.3	37.2	36.7	38.2	32.6	25.4		
8	615125	245209	43.0	40.1	41.1	40.8	35.4	35.9	32.0	27.5	42.7	38.6	38.5	38.0	-	-		Triplicate Site with 8, 9 and 10 - Annual data provided for 10 only
9	615125	245209	45.0	36.5	39.6	36.7	34.8	37.0	32.8	29.7	41.6	36.9	39.0	35.8	-	-		Triplicate Site with 8, 9 and 10 - Annual data provided for 10 only
10	615125	245209	35.6	39.2	38.3	34.3	36.0	32.8	31.3	31.9	44.7	36.5	46.0	39.5	37.4	29.1	25.0	Triplicate Site with 8, 9 and 10 - Annual data provided for 10 only
11	616593	244753	62.5	54.6	50.9	37.4	51.9	47.4	45.9	40.7	61.2	64.2	70.3	62.7	-	-	-	Triplicate Site with 11, 12 and 19 - Annual data provided for 19 only
12	616593	244753	65.0	48.6	54.9	38.3	63.4	46.4	46.5	44.2	64.5	63.9	57.5	58.7	-	-	-	Triplicate Site with 11, 12 and 19 - Annual data provided for 19 only
13	615117	245305	34.2	30.5	28.3	21.8	22.7	18.1	19.7	18.7	29.6	27.3	30.9	32.1	26.2	20.4	18.4	
14	615285	245393	45.0	37.3	42.9	40.1	39.4	46.3	37.5	40.0	51.5	45.5	52.7	49.0	43.9	34.2	33.5	
15	616282	244643	32.0	25.2	23.8	18.7	18.7	15.0	14.6	15.9	21.9	27.4	30.2	31.4	22.9	17.8	-	
16	615362	245437	39.5	34.8	33.7	21.5	35.8	33.3	25.8	31.2	43.5	41.7	41.8	39.0	35.1	27.3	25.1	
17	616993	244659	45.6	41.1	42.5	38.4	36.2	43.5	41.2	36.9	58.9	53.8	52.9	51.7	45.2	35.2	31.8	
18	615090	245178	43.5	60.5	45.2	39.7	48.3	44.8	45.1	37.4	57.0	50.0	41.1	47.0	46.6	36.3	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.78)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
19	616593	244753	61.6	47.9	45.1	36.5	55.0	46.7	45.9	46.8	58.9	70.4	58.2	62.0	53.8	**41.9**	-	Triplicate Site with 11, 12 and 19 - Annual data provided for 19 only
20	616458	244829	36.6	29.8	21.7	23.7	29.0	29.9	27.8	26.6	40.1	33.0	37.1	37.3	31.1	24.2	23.1	
21	616494	244807	23.5	36.7	38.9	37.5	36.0		30.1	29.5	43.4	36.7	30.7	41.5	35.0	27.2	-	Very low unusual tube reading for June so did not include
22	616489	244785	30.0	33.7	30.2	28.5	31.1	33.2	28.2	21.8	41.0	36.8	37.9	38.6	32.6	25.4	-	
23	616645	244784	26.2	23.1	20.5	14.8	20.3	20.0	15.4	17.4	26.3	26.8	27.2	29.2	22.3	17.3	-	
24	616663	244692	45.7	47.1	39.3	30.1	41.2	43.5	35.6	36.5	51.3	52.9	53.3	50.5	43.9	34.2	-	
25	616753	244582	50.8	41.5	45.0	36.0	47.8	45.4	42.2	28.5	52.3	51.2	45.6	49.9	44.7	34.8	33.3	
26	616971	244511	41.8	39.6	38.6	38.6	30.7		30.5	31.1	47.8	39.5	44.7	40.9	38.5	30.0		Water in tube in June so did not include
27	616965	244546	41.5	43.6	39.2	34.6	40.7	38.0	31.4	33.9	47.7	46.5	43.9	46.1	40.6	31.6	30.9	
28	615194	245292	37.9	48.2	38.0	32.6	37.2	33.0	28.3	29.6	47.8	42.1	39.2	42.1	38.0	29.6	26.5	
29	617118	244074	33.5	33.7	36.4	37.8	32.0	38.5	28.5	28.0	43.8	34.9	40.7	37.5	35.4	27.6	-	
30	616939	244114	52.4	51.6	49.1	33.8	44.5	47.6	45.7	35.9	58.4	57.6	49.6	51.3	48.1	37.5	35.2	
31	616332	244149	56.9	48.2	51.5	40.0	46.2	45.3	39.9	38.1	60.5	59.5		59.8	49.6	38.6	-	Missing tube in November
32	617398	244573	39.4	32.3	36.8	23.9	32.2	27.1	27.6	12.8	38.1	39.7	40.5	38.5	32.4	25.2	22.7	
33	616666	244114	44.8	35.3	36.4	33.7	30.4	31.7	27.5	25.7	43.1	38.7	39.8	39.5	35.6	27.7	-	
34	616467	244072	37.4	39.3	35.8	29.0	34.1	32.3	30.5	26.0	43.0	42.6	39.5	37.4	35.6	27.7	-	
35	616746	244696	33.7	31.4	26.1	17.5	25.8	20.6	21.6	21.4	28.4	34.1	33.7	32.4	27.2	21.2	-	
36	616820	246158	33.9	30.0	32.7	20.0	29.7	28.4	20.6	14.3	34.7	37.0	39.4	27.9	29.1	22.6	17.0	
37	616845	244252	34.6	31.3	35.6	31.7	31.5	33.2	27.7	18.7	36.9	36.6	33.2	37.5	32.4	25.2	-	
38	615904	244805	32.8	37.9	34.9	27.0	36.7	33.6	32.8	27.1	45.7	41.6	39.1	38.6	35.7	27.7	22.0	
39	616712	244228	50.5	40.8	46.9	41.7	43.3	46.2	38.0	35.4	57.0	52.2	59.7	51.4	46.9	36.5	32.7	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.78)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
40	615460	245148	39.7	30.9	32.0	27.3	25.5	27.7	23.7	19.3	35.6	31.8	39.0	33.9	30.5	23.8	20.8	
41	615564	245010	41.8	36.2	36.7	27.4	39.9	30.7	35.9	30.5	46.1	44.7	38.7	41.3	37.5	29.2	28.1	
42	615744	244901	46.9	42.8	45.3	49.8	41.9	47.4	43.1	34.6	55.7	40.6	49.7	44.0	45.2	35.1	-	
43	615109	245200	42.1	43.2	45.0	36.0	34.0	36.7		32.6	46.6	33.3	42.6	44.0	39.6	30.9	30.2	Missing tube in July
44	615052	245237	42.8	41.1	39.4	34.9	35.8	39.2	29.4	31.8	44.4	42.6	46.6	41.1	39.1	30.4	25.1	
45	615261	245350	31.9	31.0	29.6	26.2	27.4	29.9	23.9	22.0	34.8	31.3	29.9	30.1	-	-	-	Triplicate Site with 45, 46 and 47 - Annual data provided for 47 only
46	615261	245350	31.1	33.7	30.7	24.2	25.6	28.8	24.6	22.8	35.1	27.8	29.8	31.4	-	-	-	Triplicate Site with 45, 46 and 47 - Annual data provided for 47 only
47	615261	245350	30.7	31.6	28.3	25.9	26.2	28.3	22.1	16.1	35.9	31.4	32.2	30.7	28.7	22.3	21.1	Triplicate Site with 45, 46 and 47 - Annual data provided for 47 only
48	615425	245486	24.7	27.3	31.2	21.3	23.7	22.5	20.1	21.4	32.1	29.2	33.1	32.7	26.6	20.7	18.2	
49	615792	244876	50.7	52.9	44.6	49.9	49.7	49.3	44.6	34.4	62.2	47.0	46.5	46.0	48.2	37.5	-	
50	615773	244890	34.9	29.0	26.9	16.6	23.6	20.1	18.2	17.8	28.5	33.3	32.1	31.1	26.0	20.2	19.2	
51	615769	244866	44.9	43.3	34.7	35.2	38.6	34.9	32.2	27.1	51.8	41.1	40.0	42.9	38.9	30.3	24.5	
52	615826	244871	58.7	46.0	57.6	48.9	49.0	50.1	39.1	43.1	62.0	53.8	57.9	52.9	51.6	**40.1**		
53	615820	244858	50.0	49.8	44.0	34.1	44.6	39.8	45.8	30.4	60.6	56.7	43.1	52.4	45.9	35.8		
54	615893	244855	42.4	43.3	38.5	28.6	24.3	32.3	32.4	28.5	46.0	47.8	44.6	42.1	37.6	29.2	22.1	
55	615917	244898	34.4	28.9	33.3	17.2	25.3	27.1	23.0	25.5	32.5	37.1	37.0	37.0	29.9	23.2	-	
56	615931	244911	33.8	33.1	30.6	24.3		25.6	22.3	21.9	37.9	37.5	35.1	37.3	30.9	24.0	-	Very low unusual tube reading for May so did not include
57	615941	244981	31.7	13.9	27.0	16.8	19.9	18.2	17.0	15.7	28.3	31.4	31.3	30.0	23.4	18.2	-	
58	615978	245042	29.7	29.4	25.4	17.6	19.8	18.2	18.0	17.0	27.6	27.7	30.9	32.7	24.5	19.1	16.2	
59	615926	244837	41.3	35.0	31.5	27.4	28.8	28.3	27.7	25.2	40.1	37.5	29.8	39.2	32.7	25.4		
60	617438	246168	30.7	27.9	30.7	18.3	26.5	23.3	19.5	19.0	31.5	34.4	39.4	35.4	28.1	21.8	16.8	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.78)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
61	616099	246105	40.7	40.1	41.5	30.2	36.2	38.5	33.8	32.2	47.2	42.1	40.7	43.2	38.9	30.2	19.9	
62	615935	244803	37.5	34.9	36.4	25.4	35.7	32.2	32.8	26.6	46.5	45.9	43.1	43.5	36.7	28.6	25.4	
63	615950	244790	42.3	36.7	38.1	27.3	42.4	35.2	32.6	27.9	50.5	48.2	45.7	44.4	39.3	30.6	-	
64	615688	244939	64.7	55.6	59.0	41.7	43.9	45.5	44.8	44.3	62.9	64.0	50.7	53.9	-	-	-	Duplicate Site with 64 and 65 - Annual data provided for 65 only
65	615688	244939	68.2	56.0		36.0	53.2	49.6	48.1	26.8	64.4	65.4	68.3	65.7	53.8	**41.9**	**40.5**	Duplicate Site with 64 and 65 - Annual data provided for 65 only. Missing tube in March
66	616807	244669	46.1	41.6	39.4	31.6	44.9	38.4	40.0	33.8	53.3	52.2	45.2	46.5	42.8	33.3	-	
67	616890	244676	32.6	33.7	29.1	22.7	28.5	23.4	23.9	19.3	42.4	34.6	30.4	36.4	29.8	23.2	20.6	
68	616905	244657	53.4	46.4	43.4	38.3	47.5	45.1	37.9	34.3	58.2	48.4	54.3	50.7	46.5	36.2	-	
69	616978	244590	33.6	34.4	25.8	28.9	24.4	23.4	21.4	20.8	34.3	30.7	32.0	32.8	28.5	22.2	-	
70	616965	244583	47.5	33.9	39.9	31.7	35.2	28.4	25.4	25.7	38.9	41.0	43.3	41.0	36.0	28.0	-	
71	617032	244537	29.5	25.4	28.7	24.4	22.2	23.9	19.4	21.7	29.4	30.5	34.4	28.8	26.5	20.6	-	
72	617123	244535	45.9	33.8	36.6	38.6	33.6	39.1	29.6	31.7	47.6	41.9	44.5	44.1	38.9	30.3	-	
73	617124	244517	29.5	25.5	21.0	19.2	18.2	17.8	16.6	15.1	26.9	24.0	27.1	28.0	22.4	17.4	-	
74	616953	244443	31.6	31.6	29.9	26.3	24.4		22.6	18.7	29.0	32.7	32.6	33.0	28.4	22.1	-	Missing tube in June
75	616927	244395	27.2	27.5	25.4	13.5	20.6	20.5	17.5	23.8	27.8	29.2	29.0	28.8	24.2	18.9	-	
76	616951	244521	44.3	42.2	38.9	35.4	36.6	37.7	34.2	25.6	48.5	48.1	40.9	46.3	39.9	31.0	-	
77	616902	244542	37.3	29.2	30.3	31.3	27.3	27.1	21.5	17.2	35.0	31.2	35.7	33.6	29.7	23.1	-	
78	616870	244586	34.6	29.3	27.9	19.2	21.8	19.2	17.3	16.4	27.6	32.1	32.3	32.6	25.9	20.1	19.5	
79	617052	244677	46.8	39.1	42.7	36.0	37.5	33.8	33.3	25.6	46.8	42.9	48.7	46.3	40.0	31.1	-	
80	616821	244546	36.2	37.1	36.1	28.7	31.6	24.6	34.9	29.5	44.8	49.8	47.2	47.1	-	-	-	Triplicate Site with 80, 81 and 82 - Annual data provided for 82 only
81	616821	244546	44.5	39.8	34.9	31.9	35.3	38.5	32.1	32.6	48.9	50.4	51.8	43.1	-	-	-	Triplicate Site with 80, 81 and 82 - Annual data provided for 82 only

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.78)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
82	616821	244546		40.4	39.8	26.6	42.1	37.9	33.5	26.0	48.2	47.8	40.9	38.7	38.7	30.1	-	Triplicate Site with 80, 81 and 82 - Annual data provided for 82 only
83	616792	244498	34.4	32.1	29.5	28.7	34.6	32.3	28.0	25.2	41.7	37.3	35.3	40.7	33.3	25.9	24.4	
84	616702	244601	31.4	26.7	26.2	25.6	21.7	21.6	19.3	18.7	32.6	28.9	27.2	30.2	25.8	20.1		
85	616681	244623	36.1	35.3	33.2	23.2	34.1	30.1	26.2	27.5	40.6	41.6	40.8	38.2	33.9	26.4	26.1	
86	616727	244566	32.7	32.7	31.1	28.8	23.4	16.7		22.0		33.5	36.0	35.0	29.2	22.7	-	Missing tube in July and September
87	616481	244725	25.3	37.1	20.9	23.9	27.2	24.5	21.8	19.4	33.2	32.8	28.5	33.2	27.3	21.3	-	
88	616307	243875	43.9	36.9	49.0	39.0	30.3	43.4	32.9	35.8	46.8	48.2	54.6	45.5	42.2	32.8	-	
89	614816	244585	28.0	37.4	30.1	27.1	28.0	30.7	28.9	19.8	38.7	37.5	30.3	34.0	30.9	24.0	20.9	
90	614893	244558	33.9	28.2	29.2	19.7	26.3	24.2	21.9	14.3	34.2	32.2	29.6	32.1	27.2	21.1	-	
91	615195	244621	32.3	23.7	28.7	19.9	23.7	36.6		17.4	31.1	29.1	32.7	30.3	27.8	21.6	-	Very low unusual tube reading for July so did not include
92	619407	244712	23.2	20.9	20.0	13.1	14.4	13.9	12.5	12.0	20.2	18.1	23.9	23.9	18.0	14.0	-	
93	617360	244536	40.2	32.7	39.2	28.8	32.3	28.7	14.3	25.8	37.4	35.7	43.4	38.6	33.1	25.8	-	
94	617363	243887	33.7	25.9	32.9	18.8	24.7	22.4	19.1	15.4	30.2	31.8	30.0	33.0	26.5	20.6	-	
95	616415	243776	26.5	27.7	31.3	21.6	23.2	27.2	22.8	18.6	30.1	24.6	29.6	22.4	25.5	19.8	-	
96	616279	244807	31.2	44.5	40.5	38.7	39.1	32.8		36.6	56.4	49.7	51.5	44.7	42.3	32.9	28.8	Missing tube in July
97	616474	244795	41.0	46.3	43.9	33.2	42.6	38.2	37.6	33.0	51.9	44.3	38.9	45.1	41.3	32.2	27.7	
98	617037	244085	44.0	40.6	41.7	32.5	40.1	35.8	30.4	31.2	46.7	43.6	45.2	41.5	39.4	30.7	-	
99	615870	244858	37.8	42.6	39.0	32.8	38.1	34.4	29.1	26.2	47.8	44.3	39.8	39.1	-	-		Triplicate Site with 99, 100 and 101 - Annual data provided for 101 only
100	615870	244858	43.6	38.5	38.7	30.6	35.6	33.9	27.0	29.7	47.0	44.4	38.8	44.2	-	-		Triplicate Site with 99, 100 and 101 - Annual data provided for 101 only
101	615870	244858	44.6	41.2	37.8	32.7	41.2	34.4	30.3	28.0	50.0	40.3	40.3	44.3	38.0	29.6	23.7	Triplicate Site with 99, 100 and 101 - Annual data provided for 101 only

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

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

☒ **Local bias adjustment factor used**

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

☒ **Ipswich Borough Council confirm that all 2021 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 Ipswich During 2021

Ipswich Borough Council has not identified any new sources relating to air quality within the reporting year of 2021.

Additional Air Quality Works Undertaken by Ipswich Borough Council During 2021

Ipswich Borough Council has not completed any additional works within the reporting year of 2021.

QA/QC of Diffusion Tube Monitoring

Nitrogen dioxide diffusion tubes are supplied by SOCOTEC, Didcot. The method of preparation is 50% TEA in acetone.

Monitoring has been completed in adherence with the 2021 Diffusion Tube Monitoring Calendar. The exposed tubes are analysed in accordance with SOCOTEC's standard operating procedure which complies with the guidelines set out in DEFRA's *'Diffusion Tubes for Ambient NO2 Monitoring: Practical Guidance'*. The analysis of diffusion tube samples to determine the amount of nitrogen dioxide present on the tubes is within the scope of their UKAS schedule. SOCOTEC participates in the AIR NO_2 PT scheme, the results of which indicate that between January – March 2021 (more recent data unavailable at the time of writing this report) 100% of QC samples reported were analysed satisfactorily.

Using the *AEA_DifTPAB_v04.xls* spreadsheet published on the DEFRA LAQM Support website to check the precision of collocated tubes, the results for all collocated monitoring sites within Ipswich were shown to demonstrate "*Good*

precision" (see Figure C.1).

A control tube (travel blank) is sent with each month's tubes.

Figure C.1 – Precision and Accuracy of Collocated Diffusion Tubes

a) Bramford Road (Site ID: 8, 9 & 10)

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	06/01/2021	04/02/2021	43.0	45.0	35.6	41	5.0	12	12.3			Good	
2	04/02/2021	04/03/2021	40.1	36.5	39.2	39	1.9	5	4.7			Good	
3	04/03/2021	31/03/2021	41.1	39.6	38.3	40	1.4	4	3.5			Good	
4	31/03/2021	05/05/2021	40.8	36.7	34.3	37	3.3	9	8.2			Good	
5	05/05/2021	01/06/2021	35.4	34.8	36.0	35	0.6	2	1.5			Good	
6	01/06/2021	01/07/2021	35.9	37.0	32.8	35	2.2	6	5.4			Good	
7	01/07/2021	02/08/2021	32.0	32.8	31.3	32	0.8	2	1.9			Good	
8	02/08/2021	02/09/2021	27.5	29.7	31.9	30	2.2	7	5.5			Good	
9	02/09/2021	29/09/2021	42.7	41.6	44.7	43	1.6	4	3.9			Good	
10	29/09/2021	05/11/2021	38.6	36.9	36.5	37	1.1	3	2.8			Good	
11	05/11/2021	01/12/2021	38.5	39.0	46.0	41	4.2	10	10.4			Good	
12	01/12/2021	06/01/2022	38.0	35.8	39.5	38	1.9	5	4.6			Good	
13													
											Overall survey -->	Good	

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

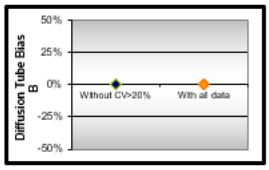
Site Name/ ID: Bramford Road O/S No. 122

Precision: 12 out of 12 periods have a CV smaller than 20%

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

If you have any enquiries about this spreadsheet please contact the LAQM Helpdesk at: LAQMHelpdesk@uk.bureauveritas.com

b) Piper's Court (Site ID: 11, 12 & 19)

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	06/01/2021	04/02/2021	62.5	65.0	61.6	63	1.8	3	4.4			Good	
2	04/02/2021	02/03/2021	54.6	48.6	47.9	50	3.7	7	9.1			Good	
3	02/03/2021	30/03/2021	50.9	54.9	45.1	50	4.9	10	12.2			Good	
4	30/03/2021	05/05/2021	37.4	38.3	36.5	37	0.9	2	2.2			Good	
5	05/05/2021	01/06/2021	51.9	63.4	55.0	57	6.0	10	14.8			Good	
6	01/06/2021	01/07/2021	47.4	46.4	46.7	47	0.5	1	1.3			Good	
7	01/07/2021	03/08/2021	45.9	46.5	45.9	46	0.3	1	0.9			Good	
8	03/08/2021	01/09/2021	40.7	44.2	46.8	44	3.1	7	7.6			Good	
9	01/09/2021	29/09/2021	61.2	64.5	58.9	62	2.8	5	7.0			Good	
10	29/09/2021	03/11/2021	64.2	63.9	70.4	66	3.7	6	9.1			Good	
11	03/11/2021	01/12/2021	70.3	57.5	58.2	62	7.2	12	17.9			Good	
12	01/12/2021	03/01/2022	62.7	58.7	62.0	61	2.1	3	5.3			Good	
13													
											Overall survey -->	Good precision	

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

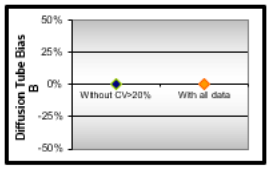
Site Name/ ID:	Pipers Court

Precision: 12 out of 12 periods have a CV smaller than 20%

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 0 periods of data
Bias factor A
Bias B
Diffusion Tubes Mean: µgm^{-3}
Mean CV (Precision):
Automatic Mean: µgm^{-3}
Data Capture for periods used:
Adjusted Tubes Mean: µgm^{-3}

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 0 periods of data
Bias factor A
Bias B
Diffusion Tubes Mean: µgm^{-3}
Mean CV (Precision):
Automatic Mean: µgm^{-3}
Data Capture for periods used:
Adjusted Tubes Mean: µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

If you have any enquiries about this spreadsheet please contact the LAQM Helpdesk at: LAQMHelpdesk@uk.bureauveritas.com

c) Chevallier Street (Site ID: 45, 46 & 47 co-located with IPS3)

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	06/01/2021	04/02/2021	31.9	31.1	30.7	31	0.6	2	1.5			Good	
2	04/02/2021	04/03/2021	31.0	33.7	31.6	32	1.4	4	3.5			Good	
3	04/03/2021	31/03/2021	29.6	30.7	28.3	30	1.2	4	3.0			Good	
4	31/03/2021	05/05/2021	26.2	24.2	25.9	25	1.1	4	2.7			Good	
5	05/05/2021	01/06/2021	27.4	25.6	26.2	26	0.9	3	2.3			Good	
6	01/06/2021	01/07/2021	29.9	28.8	28.3	29	0.8	3	2.0			Good	
7	01/07/2021	02/08/2021	23.9	24.6	22.1	24	1.3	5	3.2			Good	
8	02/08/2021	02/09/2021	22.0	22.8	16.1	20	3.7	18	9.1			Good	
9	02/09/2021	29/09/2021	34.8	35.1	35.9	35	0.6	2	1.4			Good	
10	29/09/2021	05/11/2021	31.3	27.8	31.4	30	2.1	7	5.1			Good	
11	05/11/2021	01/12/2021	29.9	29.8	32.2	31	1.4	4	3.4			Good	
12	01/12/2021	06/01/2022	30.1	31.4	30.7	31	0.7	2	1.6			Good	
13													
											Overall survey -->	Good precision	

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

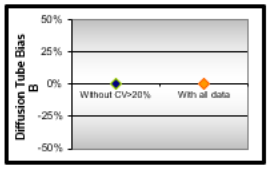
Site Name/ ID:	Chevallier Street

Precision: 12 out of 12 periods have a CV smaller than 20%

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 0 periods of data
Bias factor A
Bias B
Diffusion Tubes Mean: µgm^{-3}
Mean CV (Precision):
Automatic Mean: µgm^{-3}
Data Capture for periods used:
Adjusted Tubes Mean: µgm^{-3}

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 0 periods of data
Bias factor A
Bias B
Diffusion Tubes Mean: µgm^{-3}
Mean CV (Precision):
Automatic Mean: µgm^{-3}
Data Capture for periods used:
Adjusted Tubes Mean: µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

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d) Norwich Road (Site ID: 64 & 65)

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	06/01/2021	04/02/2021	64.7	68.2		66	2.5	4	22.2			Good	
2	04/02/2021	04/03/2021	55.6	56.0		56	0.3	1	2.5			Good	
3	04/03/2021	31/03/2021	59.0										
4	31/03/2021	05/05/2021	41.7	36.0		39	4.0	10	36.2			Good	
5	05/05/2021	01/06/2021	43.9	53.2		49	6.6	14	59.1			Good	
6	01/06/2021	01/07/2021	45.5	49.6		48	2.9	6	26.0			Good	
7	01/07/2021	02/08/2021	44.8	48.1		46	2.3	5	21.0			Good	
8	02/08/2021	02/09/2021	44.3	26.8		36	12.4	35	111.2			Poor Precision	
9	02/09/2021	29/09/2021	62.9	64.4		64	1.1	2	9.5			Good	
10	29/09/2021	05/11/2021	64.0	65.4		65	1.0	2	8.9			Good	
11	05/11/2021	01/12/2021	50.7	68.3		60	12.4	21	111.8			Poor Precision	
12	01/12/2021	06/01/2022	53.9	65.7		60	8.3	14	75.0			Good	
13													
											Overall survey -->	Good precision	

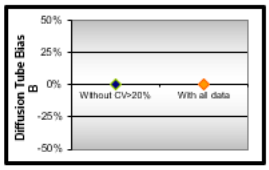
It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Norwich Road between No's. 13 & 15
Precision	9 out of 11 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}



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Version 04 - February 2011

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e) St. Helens Street (Site ID: 80, 81 & 82)

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	06/01/2021	04/02/2021	36.2	44.5		40	5.9	15	52.7			Good	
2	04/02/2021	02/03/2021	37.1	39.8	40.4	39	1.8	4	4.4			Good	
3	02/03/2021	30/03/2021	36.1	34.9	39.8	37	2.6	7	6.3			Good	
4	30/03/2021	05/05/2021	28.7	31.9	26.6	29	2.7	9	6.6			Good	
5	05/05/2021	01/06/2021	31.6	35.3	42.1	36	5.3	15	13.2			Good	
6	01/06/2021	01/07/2021	24.6	38.5	37.9	34	7.9	23	19.5			Poor Precision	
7	01/07/2021	03/08/2021	34.9	32.1	33.5	34	1.4	4	3.5			Good	
8	03/08/2021	01/09/2021	29.5	32.6	26.0	29	3.3	11	8.2			Good	
9	01/09/2021	29/09/2021	44.8	48.9	48.2	47	2.2	5	5.4			Good	
10	29/09/2021	03/11/2021	49.8	50.4	47.8	49	1.4	3	3.4			Good	
11	03/11/2021	01/12/2021	47.2	51.8	40.9	47	5.5	12	13.6			Good	
12	01/12/2021	03/01/2022	47.1	43.1	38.7	43	4.2	10	10.4			Good	
13													
											Overall survey -->	Good precision	

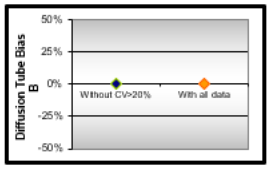
It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	St Helens Street - County Hall
Precision	11 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}



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Version 04 - February 2011

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f) St. Matthews Street (Site ID: B5, B6 & B7 co-located with IPS04)

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Automatic Method: Period Mean	Automatic Method: Data Capture (% DC)	Data Quality Check: Tubes Precision Check	Data Quality Check: Automatic Monitor Data
1	06/01/2021	04/02/2021	37.8	43.6	44.6	42	3.7	9	9.1			Good	
2	04/02/2021	04/03/2021	42.6	38.5	41.2	41	2.1	5	5.2			Good	
3	04/03/2021	31/03/2021	39.0	38.7	37.8	39	0.6	2	1.6			Good	
4	31/03/2021	05/05/2021	32.8	30.6	32.7	32	1.2	4	3.1			Good	
5	05/05/2021	01/06/2021	38.1	35.6	41.2	38	2.8	7	7.0			Good	
6	01/06/2021	01/07/2021	34.4	33.9	34.4	34	0.3	1	0.7			Good	
7	01/07/2021	02/08/2021	29.1	27.0	30.3	29	1.7	6	4.1			Good	
8	02/08/2021	02/09/2021	26.2	29.7	28.0	28	1.8	6	4.3			Good	
9	02/09/2021	29/09/2021	47.8	47.0	50.0	48	1.6	3	3.9			Good	
10	29/09/2021	05/11/2021	44.3	44.4	40.3	43	2.3	5	5.8			Good	
11	05/11/2021	01/12/2021	39.8	38.8	40.3	40	0.8	2	1.9			Good	
12	01/12/2021	06/01/2022	39.1	44.2	44.3	43	3.0	7	7.4			Good	
13													

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

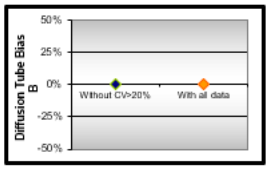
Overall survey --> Good precision

Site Name/ ID: St Matthews Street

Precision: 12 out of 12 periods have a CV smaller than 20%

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%		Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using	0 periods of data	Bias calculated using	0 periods of data
Bias factor A		Bias factor A	
Bias B		Bias B	
Diffusion Tubes Mean:	µgm^{-3}	Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):		Mean CV (Precision):	
Automatic Mean:	µgm^{-3}	Automatic Mean:	µgm^{-3}
Data Capture for periods used:		Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}	Adjusted Tubes Mean:	µgm^{-3}



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Diffusion Tube Annualisation

All diffusion tube monitoring locations within Ipswich recorded data capture of 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2022 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG16 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Following the resumption of automatic air quality monitoring at the Chevallier Street site (IPS3) in December 2016, for the fifth consecutive year it has been possible to compare mean collocated diffusion tube values with data captured by the cheminescence

analyser using the AEA_DifPAB_v04.xls spreadsheet to obtain a local bias adjustment factor of 0.78. This is also the second year it has been possible to compare mean collocated diffusion tube values with data captured by the cheminescence analyser at the St Matthews Street site (IPS04). The analyser was commissioned in June 2019, just outside the boundary of AQMA 5. Both co-location sites were used to derive a local bias adjustment factor of 0.78%. Table C.2 below details how the local bias adjustment factor was calculated.

Consulting the *National Diffusion Tube Bias Adjustment Factor Spreadsheet Version 03/22* published on the DEFRA LAQM Support website, for the SOCOTEC, Didcot laboratory; preparation method 50% TEA in acetone; for the year 2021, a bias adjustment figure of 0.78 was obtained based on 23 studies. For 2021, both the local and national bias correction factors are 0.78.

Ipswich Borough Council have applied a local bias adjustment factor of 0.78 to the 2021 monitoring data. A summary of bias adjustment factors used by Ipswich Borough Council over the past five years is presented in Table C.1.

The decision to apply the local bias adjustment factor gave consideration to the guidance in Box 7.11 of LAQM.TG16. The reason for the decision was due to:

- This is the fifth year running where the Council has been able to obtain a high data capture rate (98%) of continuous analyser data to benchmark this year's data against.
- The co-located sites have good precision for the diffusion tubes and high quality chemiluminescence results.

To assist with providing transparency to the reader, an example of the bias correction factor being applied to a diffusion tube is shown below.

<u>Example of applying the bias correction to diffusion tube data:</u>

Diffusion tube 35 (Cobden Place) – annual mean 27.2µg/m^3 (average from 12 months of monthly diffusion tube readings).
27.2µg/m^3 x 0.78 = 21.2µg/m^3

Table C.1 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2021	Local	-	0.78
2020	Local	-	0.75
2019	Local	-	0.75
2018	Local	-	0.83
2017	National	03/18	0.77

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.

Distance correction should be considered at any monitoring site where the annual mean concentration is greater than 36µg/m^3 and the monitoring site is not located at a point of relevant exposure. Once corrected for bias, the only monitoring sites that required distance correction due to being greater than 36µg/m^3 and not located at a point of relevant exposure were sites, 30, 39 and 64&65 (duplicate). Site 31 was listed as requiring distance correction, but there is no relevant receptor in the vicinity of the site. The corrections were undertaken using the *NO_2 Fall-Off with Distance Calculator Version 4.2* available on the Defra LAQM Support website. The outputs are presented in Table C.3.

For thoroughness, distance correction was also applied to all non-automatic monitoring sites not located at a point of relevant exposure.

QA/QC of Automatic Monitoring

The automatic monitors located on Chevallier Street (IPS3) and St Matthews Street (IPS04) are subject to fortnightly routine calibration by an Ipswich Borough Council Environmental Health Officer or Technical Officer.

The analysers are also serviced and the monitoring site audited biannually by Matts Monitors and Ricardo Energy & Environment respectively. Copies of the Certificate of Calibration issued following the most recent site audits (December 2021) are displayed below (Figures C.2 and C.3).

All automatic monitoring data collected at the Chevallier Street and St Matthews Street sites are managed by Ricardo Energy & Environment using the same quality control procedures utilised by Defra's national air quality network stations. These procedures represent best practice and fully meet the requirements set out in LAQM.TG(16). Ricardo Energy & Environment currently provide UKAS accredited quality control audits and data management services to all Defra national network (AURN) air quality monitoring stations.

All collected data is screened and scaled (based on site calibrations) and the final data sets presented within this report (Figures C.4 and C.5) have benefitted from a full process of data ratification, including thorough additional data quality checks that include site audits and a ratification process that corrects data for instrument sensitivity drift between routine calibrations.

Live and historic monitoring data can be found on the Air Quality England Website

Figure C.2 – Certificate of Calibration for IPS3

0401

CERTIFICATE OF CALIBRATION

Ricardo Energy and Environment, Gemini Building, Fermi Avenue Harwell, Oldcot,

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Page 1 of 3

Approved Signatories:

- ☐ S. Eaton
- ☐ D Hector
- ☑ N Rand
- ☐ B Davies
- ☐ D Lane
- ☐ S Copsey
- ☐ B Stacey
- ☐ S Stratton
- ☐ S Telfer
- ☐ S Gray
- ☐ T Green

Signed:

Date of issue: 23 Dec 21

Certificate Number: 05678

Customer Name and Address:

Ipswich Borough Council
Grafton House
15-17 Russell Road
Ipswich
IP1 2DE

Description: Calibration factors for the air monitoring station at Ipswich Chevallier Street

Ricardo Energy & Environment ID: ED79001143/December 2021

The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor k=2 providing a level of confidence of approximately 95% The uncertainty evaluation has been carried out in accordance with UKAS requirements.

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory

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Registered office
Shoreham Technical Centre
Shoreham-by-Sea
West Sussex
BN43 5FG

Registered in England No.
08229264

VAT Registration No.
GB 212 8365 24

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Ipswich Chevalier St 13_12_2021_Cert 5678 1 of 3

0401

CERTIFICATE OF CALIBRATION

Date of issue: 23 Dec 21

Certificate Number: 05678

Ricardo Energy & Environment ID: ED79001143/December 2021

Ipswich Chevallier Street
Date of audit: 13 Dec 2021

	Species	Analyser Serial no	Zero Response[1]	Zero uncertainty nmol/mol	Calibration Factor[2]	Factor uncertainty %	Converter eff. (%)[3]
thermo42i	NOx	CM08050004	3.9	2.5	0.9297	3.8449	98.3
	NO	CM08050004	3.8	2.5	0.9295	4.0055	n/a

CERTIFICATE OF CALIBRATION

0401

Date of issue: 23 Dec 21

Certificate Number: 05678

Ricardo Energy & Environment ID: ED79001143/December 2021

The gaseous ambient analysers listed above have been tested for zero response, calibration factor, linearity and converter efficiency (NOx analysers) by documented methods. The factors have been calculated using certified gas standards. The particulate analysers listed above have been tested for sample flow rates and k0(where appropriate) by documented methods. Note that the test results are valid on the day of test only, as analyser drift over time cannot be quantified. All results for gaseous species are given in nmol/mol mole fractions or µmol mole fractions.

[1] The zero response is the zero reading on the data logging system of the analyser when audit zero gas was introduced to the analysers under test.

[2] The calibration factor is the multiplying factor required to scale the reading on the data logging system of the analyser into reported concentration units (nmol/mol for NO, NOx, SO2, O3 and µmol/mol for CO). It should be used in conjunction with the zero response. A corrected concentration is calculated using the following equation:

Concentration = F(Output - Zero Response)
Where F = Calibration Factor provided on this certificate
Output = Reading on the data logging system of the analyser
Zero Response = Zero Response provided on this certificate

[3] Converter eff. is the measured efficiency of the NO_2 to NO converter within the oxides of nitrogen analyser under test.

The calibration results shaded are those that fall within our scope of accreditation, all other results on this certificate are not UKAS accredited, but have been included for completeness.

Figure C.3 – Certificate of Calibration for IPS04

0401

CERTIFICATE OF CALIBRATION

Ricardo Energy and Environment, Gemini Building, Fermi Avenue Harwell, Didcot,

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Page 1 of 3

Approved Signatories:

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- ☐ D Hector
- ☑ N Rand
- ☐ B Davies
- ☐ D Lane
- ☐ S Copsey
- ☐ B Stacey
- ☐ S Stratton
- ☐ S Telfer
- ☐ S Gray
- ☐ T Green

Signed:

Date of issue: 23 Dec 21

Certificate Number: 05679

Customer Name and Address:

Ipswich Borough Council
Grafton House
15-17 Russell Road
Ipswich
IP1 2DE

Description: Calibration factors for the air monitoring station at Ipswich St Matthews Street

Ricardo Energy & Environment ID: ED79001143/December 2021

The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor k=2 providing a level of confidence of approximately 95% The uncertainty evaluation has been carried out in accordance with UKAS requirements.

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory

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Ipswich St Matthews St 13_12_2021_Cert 5679 1 of 3

CERTIFICATE OF CALIBRATION

0401

Date of issue: 23 Dec 21

Certificate Number: 05679

Ricardo Energy & Environment ID: ED79001143/December 2021

Ipswich St Matthews Street
Date of audit: 13 Dec 2021

	Species	Analyser Serial no	Zero Response[1]	Zero uncertainty nmol/mol	Calibration Factor[2]	Factor uncertainty %	Converter eff. (%)[3]
API T200	NOx	2696	-0.7	2.6	1.0820	3.5	98.7
	NO	2696	-0.5	2.5	1.0618	3.6105	n/a

0401

CERTIFICATE OF CALIBRATION

Date of issue: 23 Dec 21

Certificate Number: 05679

Ricardo Energy & Environment ID: ED79001143/December 2021

The gaseous ambient analysers listed above have been tested for zero response, calibration factor, linearity and converter efficiency (NOx analysers) by documented methods. The factors have been calculated using certified gas standards. The particulate analysers listed above have been tested for sample flow rates and k0(where appropriate) by documented methods. Note that the test results are valid on the day of test only, as analyser drift over time cannot be quantified. All results for gaseous species are given in nmol/mol mole fractions or µmol mole fractions.

[1] The zero response is the zero reading on the data logging system of the analyser when audit zero gas was introduced to the analysers under test.

[2] The calibration factor is the multiplying factor required to scale the reading on the data logging system of the analyser into reported concentration units (nmol/mol for NO, NOx, SO2, O3 and µmol/mol for CO). It should be used in conjunction with the zero response. A corrected concentration is calculated using the following equation:

Concentration = F(Output - Zero Response)
Where F = Calibration Factor provided on this certificate
Output = Reading on the data logging system of the analyser
Zero Response = Zero Response provided on this certificate

[3] Converter eff. is the measured efficiency of the NO_2 to NO converter within the oxides of nitrogen analyser under test.

The calibration results shaded are those that fall within our scope of accreditation, all other results on this certificate are not UKAS accredited, but have been included for completeness.

Figure C.4 – 2021 Air Pollution Report – Ipswich Chevallier Street (Site ID: IPS3)

Air Pollution Report

1st January to 31st December 2021

Air Quality England

Ipswich Chevallier Street (Site ID: IPS3)

These data have been fully ratified
Only relevant statistics for LAQM are presented in the table. Cells with - indicate no data available or calculated.

Pollutant	NO µg/m³	NO_2 µg/m³	NO_x as NO_2 µg/m³
Number Days Low	-	365	-
Number Days Moderate	-	0	-
Number Days High	-	0	-
Number Days Very High	-	0	-
Max Daily Mean	114	70	226
Annual Max	495	113	863
Annual Mean	15	23	46
99.8th Percentile of hourly mean	-	92	-
98th Percentile of hourly mean	89	62	191
95th Percentile of hourly mean	46	52	119
50th Percentile of hourly mean	9	20	34
% Annual data capture	**98.24**	**98.24**	**98.24**

All gaseous pollutant mass units are at 20°C and 1013mb. Particulate matter concentrations are reported at ambient temperature and pressure. NO_X mass units are NO_X as NO_2 µg m-3

Pollutant	Air Quality Standards regulations 2010	Exceedances	Days
Nitrogen dioxide	Hourly Mean > 200 microgrammes per metre cubed	0	0
Nitrogen dioxide	**Annual Mean > 40 microgrammes per metre cubed**	**0**	-

Annual Graph

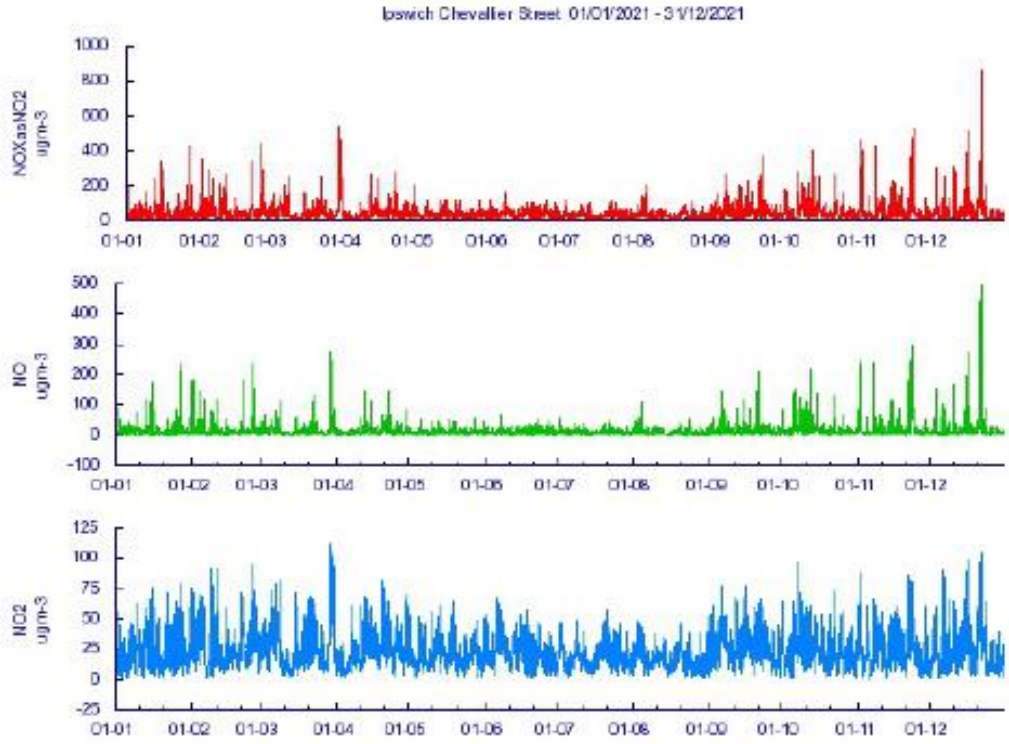


Figure C.5 – 2021 Air Pollution Report – Ipswich St Matthews Street (Site ID: IPS04)

Air Pollution Report

1st January to 31st December 2021

Air Quality England

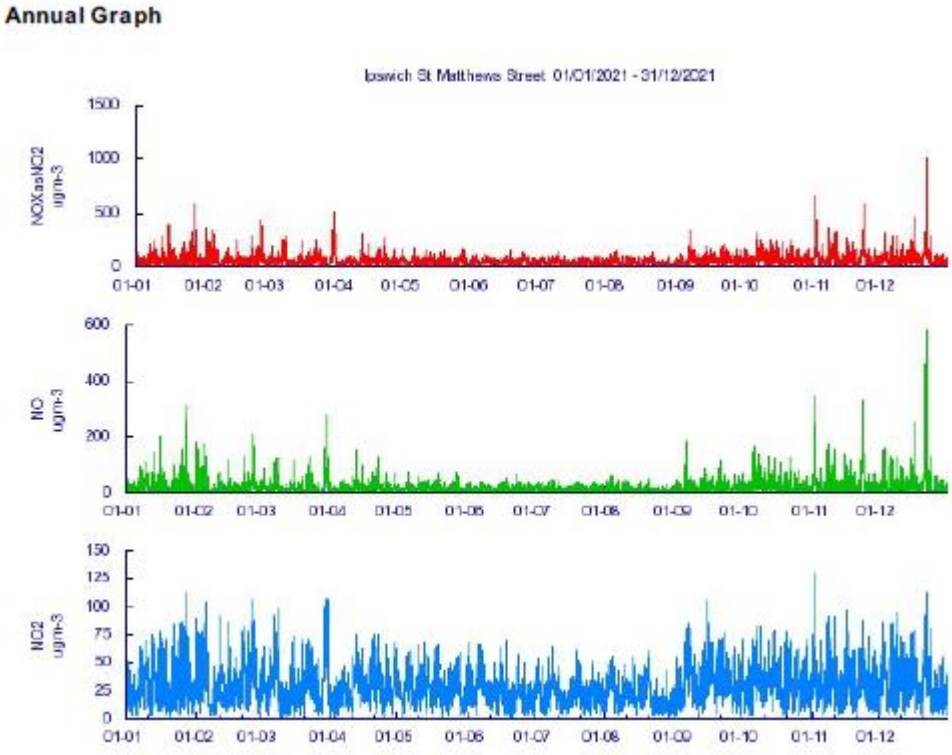
Ipswich St Matthews Street (Site ID: IPS04)

These data have been fully ratified
Only relevant statistics for LAQM are presented in the table. Cells with - indicate no data available or calculated.

Pollutant	NO µg/m³	NO_2 µg/m³	NO_x as NO_2 µg/m³
Number Days Low	-	365	-
Number Days Moderate	-	0	-
Number Days High	-	0	-
Number Days Very High	-	0	-
Max Daily Mean	129	78	256
Annual Max	581	129	1,003
Annual Mean	21	28	61
99.8th Percentile of hourly mean	-	98	-
98th Percentile of hourly mean	95	72	209
95th Percentile of hourly mean	64	60	157
50th Percentile of hourly mean	16	25	50
% Annual data capture	**99.33**	**99.33**	**99.33**

All gaseous pollutant mass units are at 20°C and 1013mb. Particulate matter concentrations are reported at ambient temperature and pressure. NO_X mass units are NO_X as NO_2 µgm-3

Pollutant	Air Quality Standards regulations 2010	Exceedances	Days
Nitrogen dioxide	Hourly Mean > 200 micrograms per metre cubed	0	0
Nitrogen dioxide	**Annual Mean > 40 micrograms per metre cubed**	**0**	-



Automatic Monitoring Annualisation

All automatic monitoring locations within Ipswich recorded data capture of greater than 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

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 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.

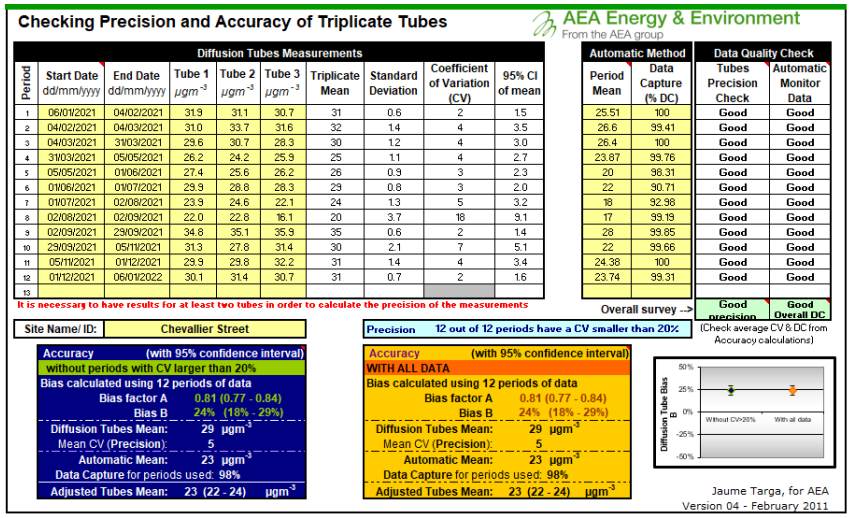
Table C.2– Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1 (Chevallier Street)	Local Bias Adjustment Input 2 (St Matthews Street)	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4	Local Bias Adjustment Input 5
Periods used to calculate bias	12	12			
Bias Factor A	0.81 (0.77 – 0.84)	0.75 (0.72 – 0.78)			
Bias Factor B	24% (19% - 30%)	33% (27% - 39%)			
Diffusion Tube Mean (µg/m^3)	28.7	38.0			
Mean CV (Precision)	5.0%	4.8%			
Automatic Mean (µg/m^3)	23.1	28.5			
Data Capture	98%	99%			
Adjusted Tube Mean (µg/m^3)	23 (22 – 24)	29 (27 – 30)			

Notes:

A combined local bias adjustment factor of 0.78 has been used to bias adjust the 2021 diffusion tube results. The calculation of the local bias adjustment factor was performed in accordance as per Chapter 7 of LAQM.TG16.

Calculation of combined bias correction factor:
24% (Chevallier Street) + 33% (St Matthews Street) / 2 = 33.5
0.285% + 1 = 1.285
1/1.285 = **0.78**


Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	06/01/2021	04/02/2021	31.9	31.1	30.7	31	0.6	2	1.5
2	04/02/2021	04/03/2021	31.0	33.7	31.6	32	1.4	4	3.5
3	04/03/2021	31/03/2021	29.6	30.7	28.3	30	1.2	4	3.0
4	31/03/2021	05/05/2021	26.2	24.2	25.9	25	1.1	4	2.7
5	05/05/2021	01/06/2021	27.4	25.6	26.2	26	0.9	3	2.3
6	01/06/2021	01/07/2021	29.9	28.8	28.3	29	0.8	3	2.0
7	01/07/2021	02/08/2021	23.9	24.6	22.1	24	1.3	5	3.2
8	02/08/2021	02/09/2021	22.0	22.8	16.1	20	3.7	18	9.1
9	02/09/2021	29/09/2021	34.8	35.1	35.9	35	0.6	2	1.4
10	29/09/2021	05/11/2021	31.3	27.8	31.4	30	2.1	7	5.1
11	05/11/2021	01/12/2021	29.9	29.8	32.2	31	1.4	4	3.4
12	01/12/2021	06/01/2022	30.1	31.4	30.7	31	0.7	2	1.6
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
25.51	100	Good	Good
26.6	99.41	Good	Good
26.4	100	Good	Good
23.87	99.76	Good	Good
20	98.31	Good	Good
22	90.71	Good	Good
18	92.98	Good	Good
17	99.19	Good	Good
28	99.85	Good	Good
22	99.66	Good	Good
24.38	100	Good	Good
23.74	99.31	Good	Good

Overall survey --> Good precision | Good Overall DC

(Check average CV & DC from Accuracy calculations)

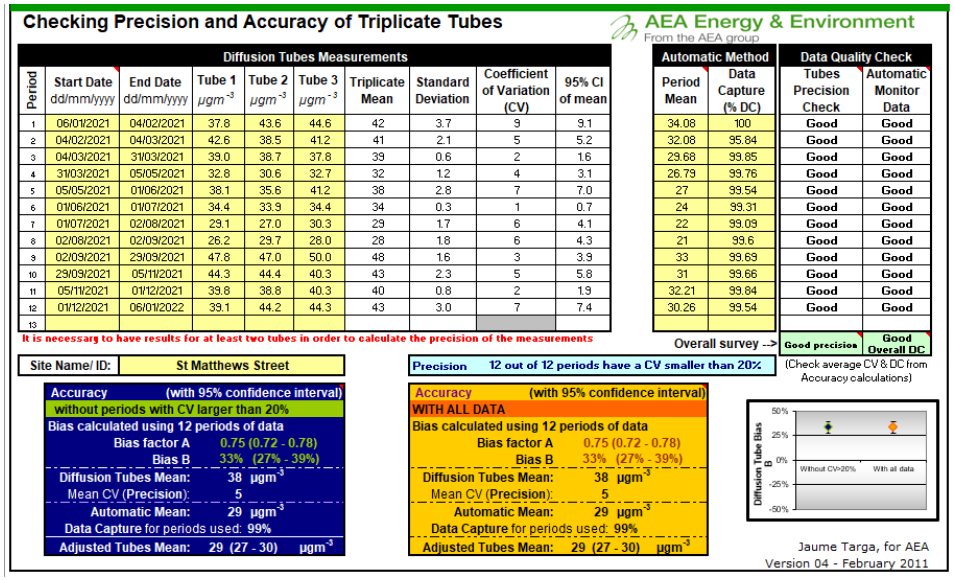
Site Name/ ID: Chevallier Street

Precision: 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%
Bias calculated using 12 periods of data
Bias factor A: 0.81 (0.77 - 0.84)
Bias B: 24% (18% - 29%)
Diffusion Tubes Mean: 29 µgm^{-3}
Mean CV (Precision): 5
Automatic Mean: 23 µgm^{-3}
Data Capture for periods used: 98%
Adjusted Tubes Mean: 23 (22 - 24) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA
Bias calculated using 12 periods of data
Bias factor A: 0.81 (0.77 - 0.84)
Bias B: 24% (18% - 29%)
Diffusion Tubes Mean: 29 µgm^{-3}
Mean CV (Precision): 5
Automatic Mean: 23 µgm^{-3}
Data Capture for periods used: 98%
Adjusted Tubes Mean: 23 (22 - 24) µgm^{-3}

Jaume Targa, for AEA
Version 04 - February 2011


Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	06/01/2021	04/02/2021	37.8	43.6	44.6	42	3.7	9	9.1
2	04/02/2021	04/03/2021	42.6	38.5	41.2	41	2.1	5	5.2
3	04/03/2021	31/03/2021	39.0	38.7	37.8	39	0.6	2	1.6
4	31/03/2021	05/05/2021	32.8	30.6	32.7	32	1.2	4	3.1
5	05/05/2021	01/06/2021	38.1	35.6	41.2	38	2.8	7	7.0
6	01/06/2021	01/07/2021	34.4	33.9	34.4	34	0.3	1	0.7
7	01/07/2021	02/08/2021	29.1	27.0	30.3	29	1.7	6	4.1
8	02/08/2021	02/09/2021	26.2	29.7	28.0	28	1.8	6	4.3
9	02/09/2021	29/09/2021	47.8	47.0	50.0	48	1.6	3	3.9
10	29/09/2021	05/11/2021	44.3	44.4	40.3	43	2.3	5	5.8
11	05/11/2021	01/12/2021	39.8	38.8	40.3	40	0.8	2	1.9
12	01/12/2021	06/01/2022	39.1	44.2	44.3	43	3.0	7	7.4
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
34.08	100	Good	Good
32.08	95.84	Good	Good
29.68	99.85	Good	Good
26.79	99.76	Good	Good
27	99.54	Good	Good
24	99.31	Good	Good
22	99.09	Good	Good
21	99.6	Good	Good
33	99.69	Good	Good
31	99.66	Good	Good
32.21	99.84	Good	Good
30.26	99.54	Good	Good

Overall survey --> Good precision | Good Overall DC

(Check average CV & DC from Accuracy calculations)

Site Name/ ID: St Matthews Street

Precision: 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%
Bias calculated using 12 periods of data
Bias factor A: 0.75 (0.72 - 0.78)
Bias B: 33% (27% - 39%)
Diffusion Tubes Mean: 38 µgm^{-3}
Mean CV (Precision): 5
Automatic Mean: 29 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 29 (27 - 30) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA
Bias calculated using 12 periods of data
Bias factor A: 0.75 (0.72 - 0.78)
Bias B: 33% (27% - 39%)
Diffusion Tubes Mean: 38 µgm^{-3}
Mean CV (Precision): 5
Automatic Mean: 29 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 29 (27 - 30) µgm^{-3}

Jaume Targa, for AEA
Version 04 - February 2011

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
30	2.7	4.1	37.5	16.2	35.2	
39	0.8	2.0	36.5	16.2	32.7	
64, 65	1.3	1.7	41.9	14.05944	**40.5**	*Predicted concentration at Receptor above AQS objective.*

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

Figure D.1 – Overview of Ipswich AQMA boundaries and Monitoring Locations

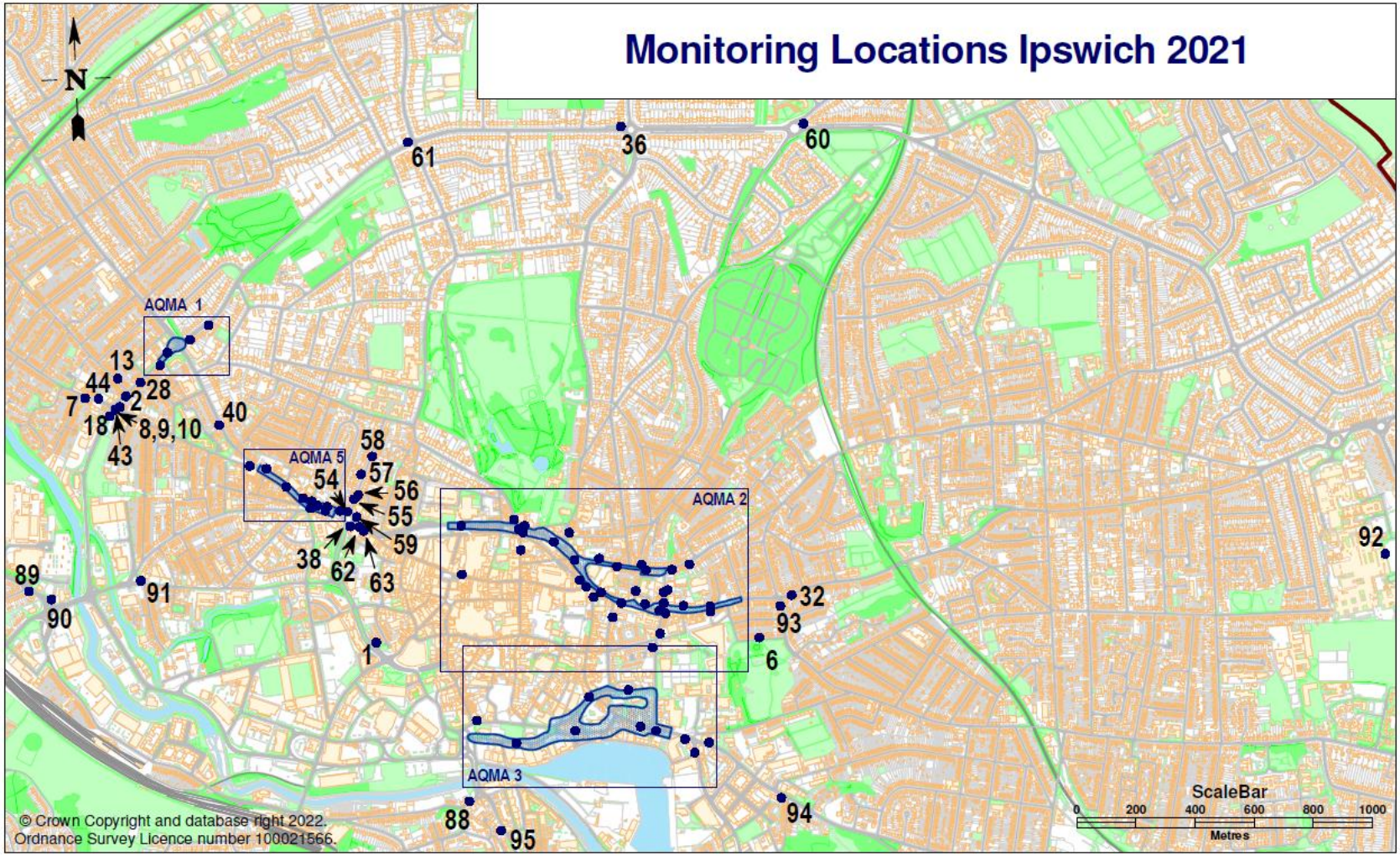


Figure D.2 – Ipswich Air Quality Management Area 1

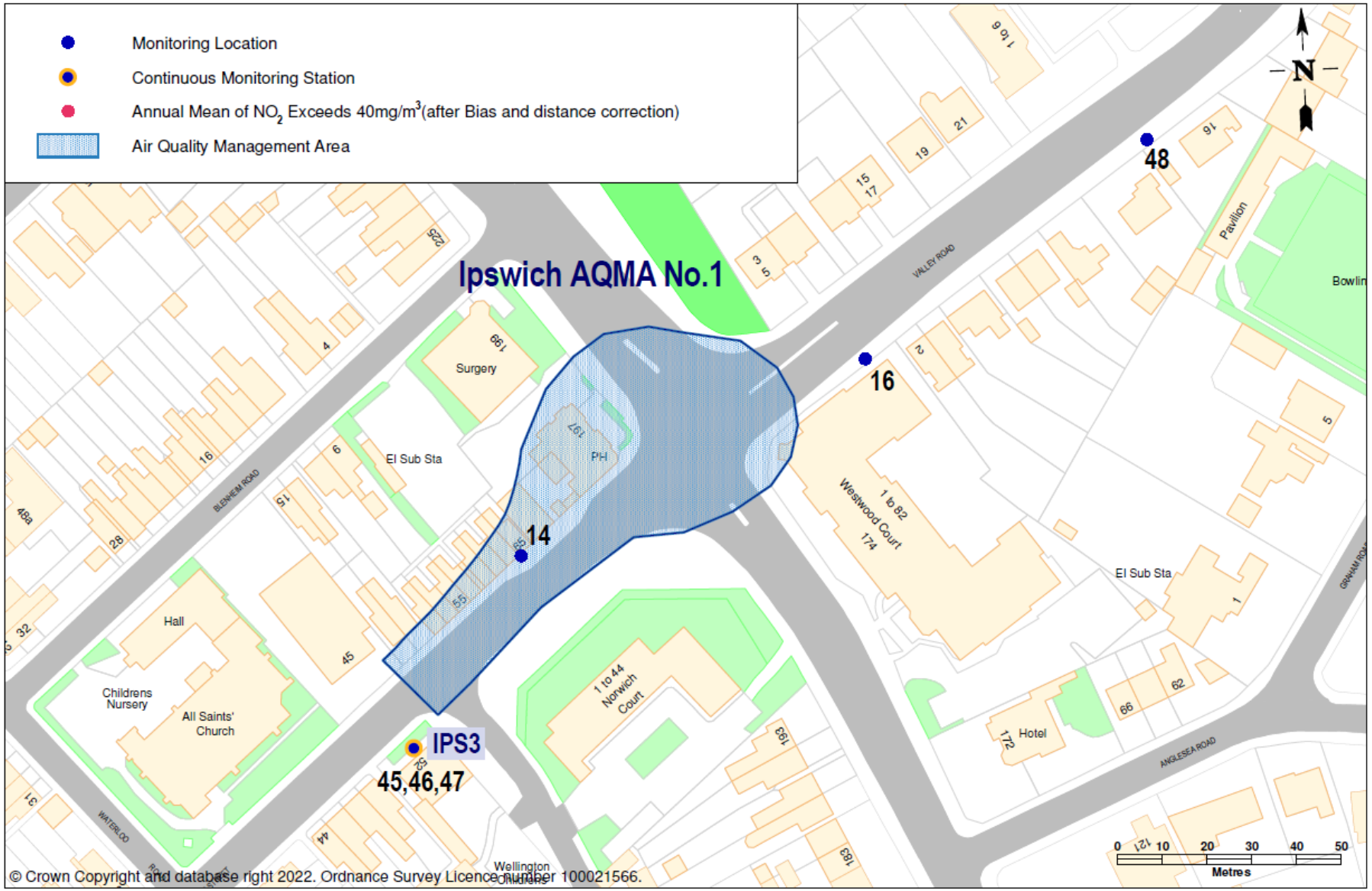


Figure D.3 – Ipswich Air Quality Management Area 2

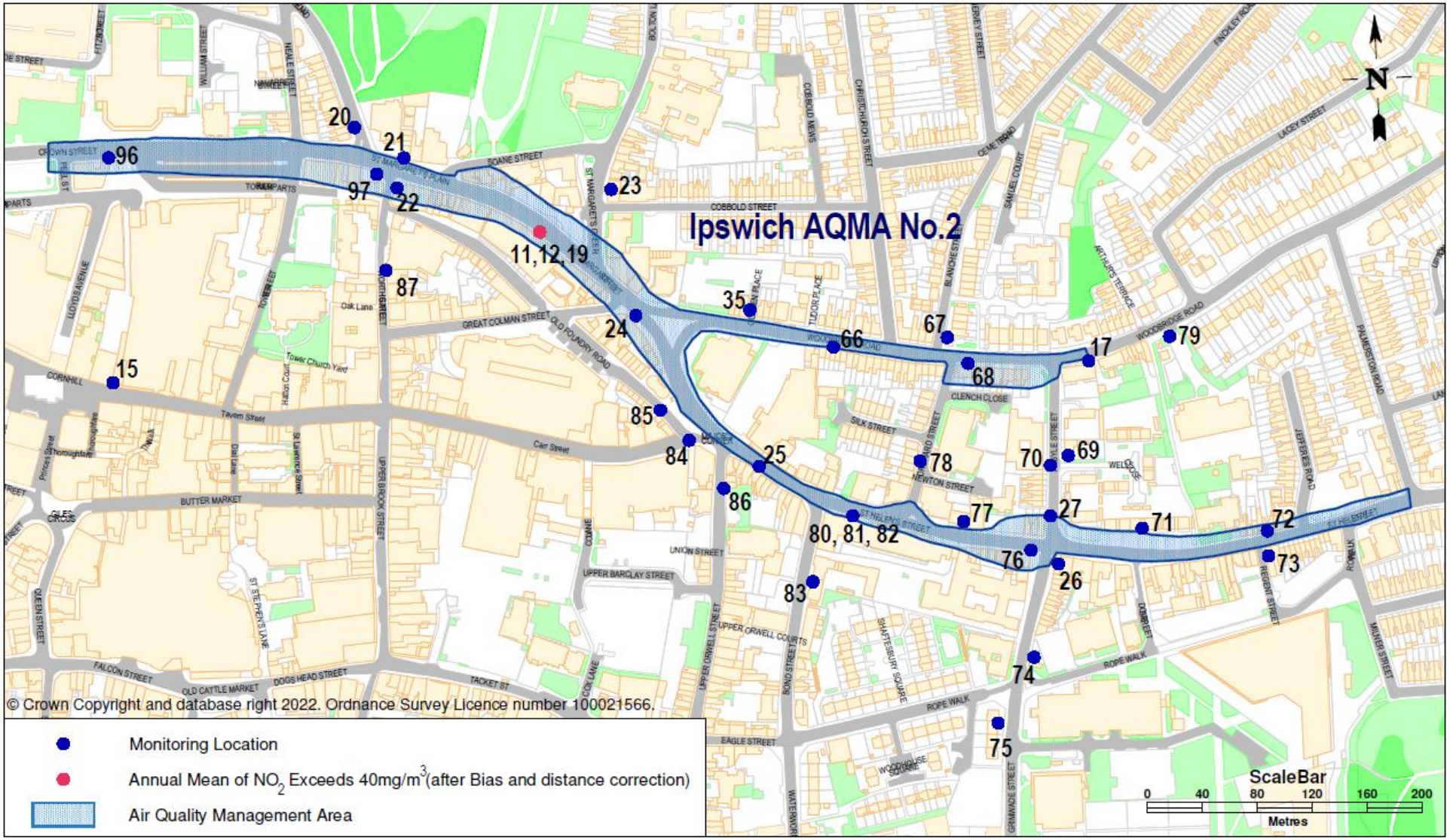


Figure D.4 – Ipswich Air Quality Management Area 3

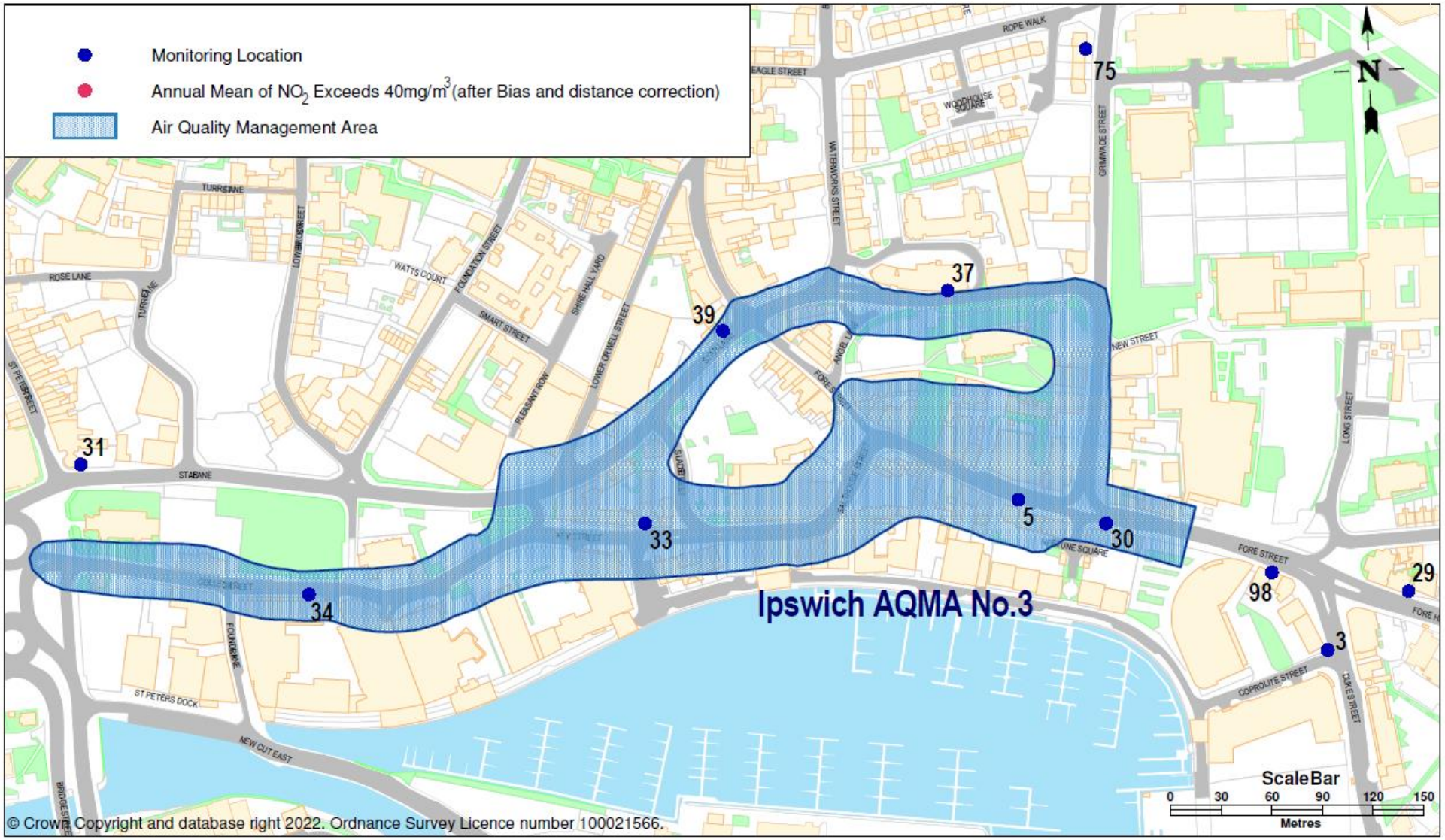
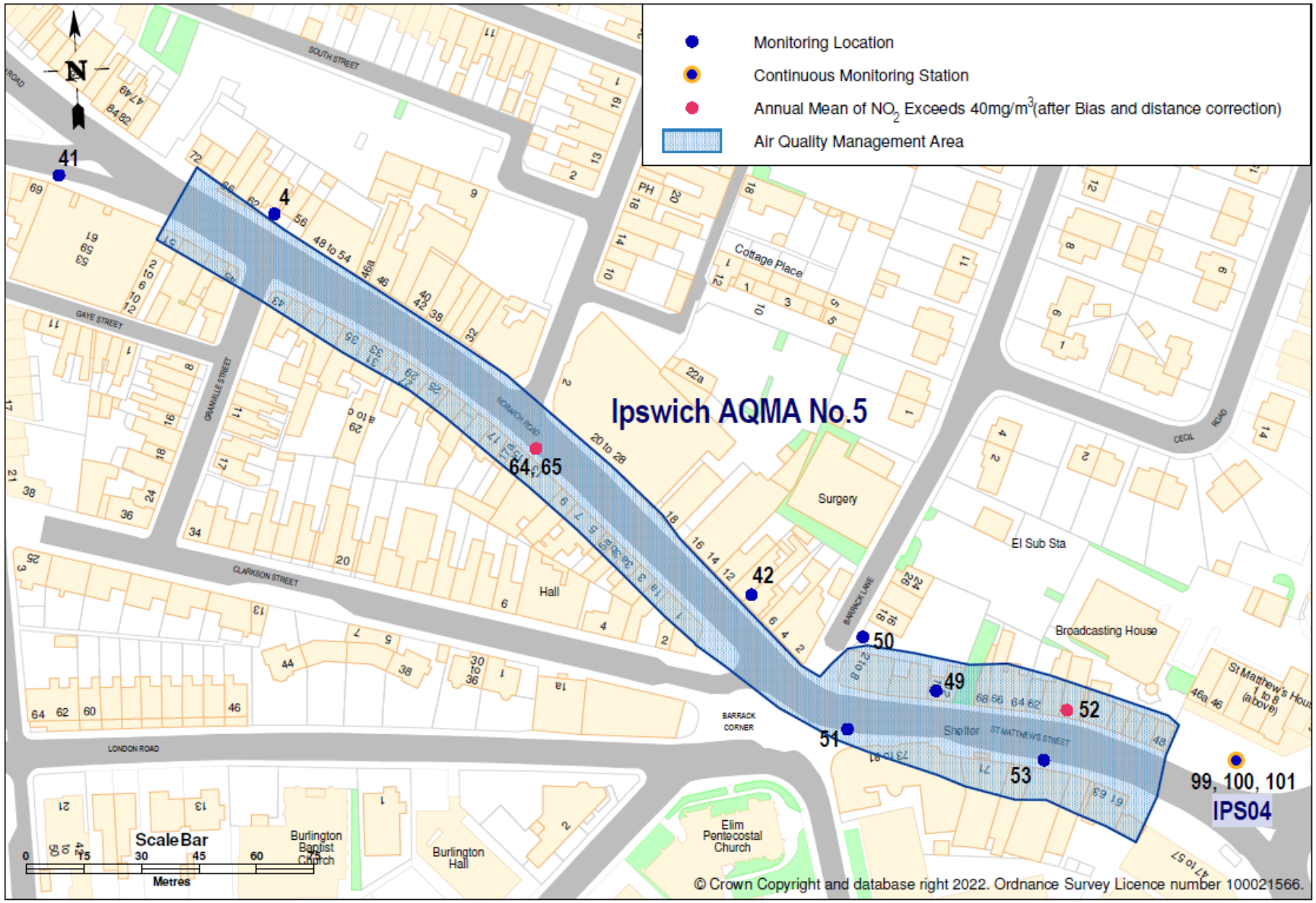


Figure D.5 – Ipswich Air Quality Management Area 5



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[9]

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

[9] 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
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

References

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