OXFORD CITY COUNCIL

2024 Air Quality Annual Status Report (ASR)

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

Date: June 2024

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Executive Summary

The Impacts of poor Air Quality

Breathing in polluted air affects our health and costs the NHS and our society billions of pounds each year. Air pollution is recognised as a contributing factor in the onset of heart disease and cancer and can cause a range of health impacts, including effects on lung function, exacerbation of asthma, increases in hospital admissions and mortality. In the UK, it is estimated that the reduction in healthy life expectancy caused by air pollution is equivalent to 29,000 to 43,000 deaths a year[1].

Air pollution particularly affects the most vulnerable in society, children, the elderly, and those with existing heart and lung conditions. Additionally, people living in less affluent areas are most exposed to dangerous levels of air pollution[2].

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

Table 1 - Description of Key Pollutants

Pollutant	Description
Nitrogen Dioxide (NO_2)	Nitrogen dioxide is a gas which is generally emitted from high-temperature combustion processes such as road transport or energy generation.
Particulate Matter (PM_{10} and $PM_{2.5}$)	Particulate matter is everything in the air that is not a gas. Particles can come from natural sources such as pollen, as well as human made sources such as smoke from fires, emissions from industry and dust from tyres and brakes. PM_{10} refers to particles under 10 micrometres. Fine particulate matter or $PM_{2.5}$ refers to particles under 2.5 micrometres.
Ozone (O_3)	Ozone (O_3) is not emitted directly into the atmosphere in significant quantities, but is a secondary pollutant produced by reaction between nitrogen dioxide (NO_2) and hydrocarbons, in the presence of sunlight. Peak O_3 episodes are therefore strongly linked to typical summer weather conditions (high temperatures, sunny weather), giving rise to the so called "summer smog".

1 UK Health Security Agency. Chemical Hazards and Poisons Report, Issue 28, 2022.

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

Air Pollution sources in Oxford

The city of Oxford, as with many urban areas throughout the United Kingdom, is subject to poor air quality, particularly in areas with high levels of road traffic. In Oxford, Nitrogen dioxide (NO_2) is still the pollutant of most concern, and the entire city has been a designated Air Quality Management Area (AQMA) for NO_2 since 2010.

According to Oxford's most recent source apportionment study, the transport sector continues to be by far the largest contributor (68%) to total emissions of Nitrogen Oxides (NO+ NO_2) in the city, followed by domestic combustion (19%), combustion from industry and services (12%) and others: waste, agriculture, solvents, nature (<1%).

The city's current Air Quality Action Plan (AQAP) sets out a list of actions that the city council and its partners have committed to deliver during the period 2021-2025 in pursuit of an improvement of Nitrogen Dioxide (NO_2) levels in the city. The city's action plan seeks to go further than the current UK legal annual mean limit value for NO_2 of 40 µg/m^3, by establishing a much more stringent local annual mean NO_2 target of 30 µg/m^3 to be achieved by 2025 in recognition that there's no safe level of air pollution.

Current status of air pollution in the city

Air pollution levels have significantly improved in the city of Oxford over the last few years.

Since 2021 (the year the city launched its current Air Quality Action Plan 2021-2025), we have seen an average reduction of 18% of Nitrogen Dioxide (NO_2) across the city, and in 2023 we have seen no exceedances of any of the UK legal limits[3] of this pollutant (annual mean and hourly mean). This is a very important milestone, if we remember that being in breach of these legal limits in the past, was what led to the designation of the entire city of Oxford an Air Quality management Area (AQMA).

However, despite the good news, the City Council is aware that there's still much more to be done. We all know that there is no safe level for air pollution, so we need to continue to bring NO_2 to the lowest and safest possible levels. Our commitment to deliver on our annual mean local target across the city by 2025 is a real testimony that the city of Oxford

3 In 2023 there have been no exceedances of the legal limits within Oxford city's jurisdiction in all places considered of relevant exposure (i.e. all locations where members of the public are likely to be regularly present for a period of time appropriate to the averaging period of the annual mean limit value);

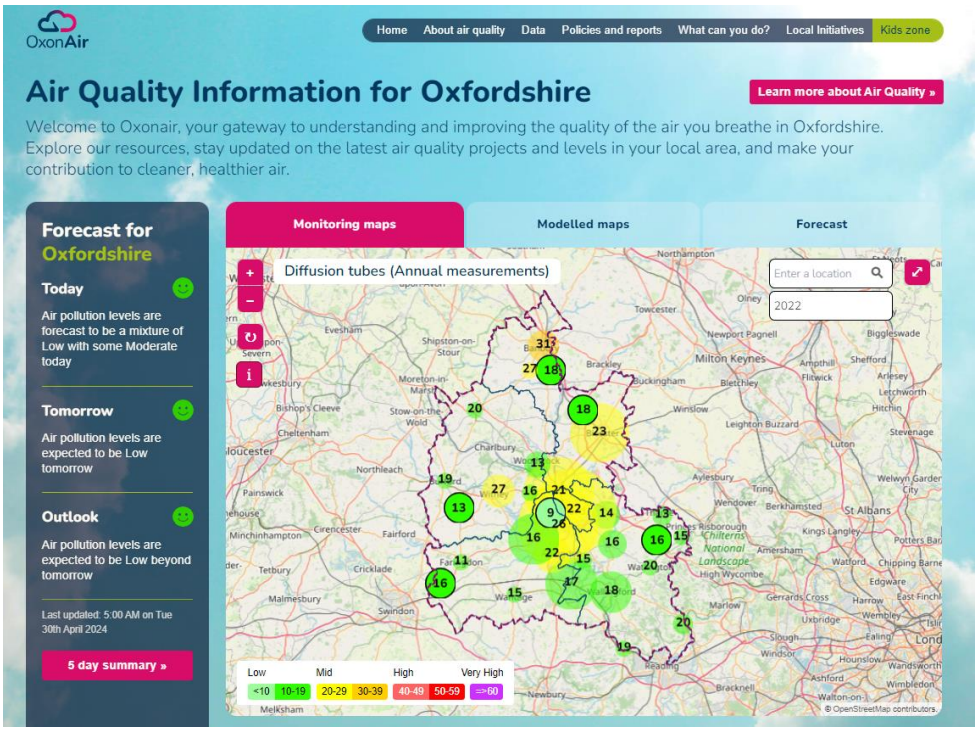
takes the health of its residents and visitors very seriously and of the commitment to improve health outcomes for all.

Actions to Improve Air Quality

Oxford's Air Quality Action Plan 2021-2025 focusses on measures the City Council can address, but also includes measures that we can influence, or work in partnership with others to deliver.

The following are actions that Oxford City Council and its partners have taken over the last reporting year to improve air quality in the city. This AQ ASR reports on all the measures that were delivered by Oxford City Council and its partners, covering the period that goes from May 2023 to May 2024, as the report is prepared and submitted for appraisal to DEFRA every year in June. The list below is presented in chronological order:

September 2023 – A new Oxfordshire air quality website was launched, to provide air quality guidance and resources for all residents and visitors in Oxfordshire.
The development of the new website (www.oxonair.uk) was led by Oxford City Council using £162,500 of DEFRA Air Quality Grant funding, and delivered in partnership with all the local authorities in Oxfordshire (Cherwell, West Oxfordshire, South Oxfordshire, Vale of White Horse, and Oxfordshire County Council) – link to press release:



October 2023 - The 2023's edition of the EV Summit took place at the Said Business School on the 30th and 31st October in Oxford. The event was run in partnership between Green TV, Oxford City Council, Oxfordshire County Council, Oxford University and Oxford Brookes University. This year's focus was on investment and growth in decarbonised e-mobility;

January 2024 – The first electric buses from a total of 159 buses which had been partly secured by the government's Zero Emission Bus Regional Areas (ZEBRA) have arrived in Oxford. The full delivery of all the 159 buses (which will represent 69% of all the bus mileage of the city) is still on schedule and is occurring gradually until June 2024. Once delivered, Oxford City will have one of the biggest UK fleets of electric buses outside London - link to press release;

January 2024 – Oxford City Council has provided an official letter of intent signed by the Leader of the Council (Cllr Susan Brown) in support of a major grant fund bid to the Green Heat Network Fund by 1Energy to create a privately funded District Heat Network in Oxford. If the grant bid is successful, it could provide zero carbon heat to major heat users

in Oxford including: both universities; colleges; hospitals; City and County Council etc, providing a key deliverable of the Zero Carbon Oxford Action Plan – link to website.

February 2024 – The planning and design stages of the eco-moorings project at Aristotle Lane were finalised in February 2024. The Canal & River Trust (Oxford City Council's delivery partner) is now expected to appoint a developer to deliver the work in June 2024. The project's delivery phase is expected to be concluded by November 2024. In February 2023, Oxford City Council has been granted £192,993 from DEFRA's Air Quality Grant to deliver six "eco-moorings" at the towpath visitors' moorings of Aristotle Lane, on the Oxford Canal, to provide electrical power for up to six visiting boaters to reduce their reliance on diesel engines, generators and wood burners for their day-to-day energy needs -link to press release;

March 2024 – Oxford City Council launched a new e-cargo bike delivery trial to support businesses operating in Oxford City Centre. The project is being delivered in partnership with local cargo bike delivery company Velocity Cycle Couriers and allows participating businesses to offer same day and next day zero emission deliveries to their customers – link to press release;

May 2024 – Oxford City Council decides to move ahead with its plans to expand Oxford's Smoke Control Area, after the plans to consult on the matter had been approved by Oxford City Council's cabinet meeting in September 2023, following the results of its public consultation, and confirmation of the Secretary of State by official letter sent to the City Council on the 21st May. Oxford currently has 23 Smoke Control Areas, which cover about 48% of the Oxford area. The plans for having a city-wide Smoke Control Area constitute an effort to try to reduce $PM_{2.5}$ emissions in the city -link to press release;

Conclusions and Priorities

Oxford's 2023 air quality monitoring results show the following:

Nitrogen Dioxide (NO_2)

- NO_2 was monitored at a total of 128 sites in the city in 2023.
- Only two of the 128 sites were in breach of the UK's legal annual mean limit value for this pollutant: Headington Hill (TF19) and Southern Bypass (TF35), at Oxford's ring road[4]
- None of the 128 sites is likely to have been in breach of the hourly mean objective for NO_2 (200µg/m^3)[5] – this was the case for the seventh consecutive year.
- Only nine of the 128 sites were in breach of Oxford's local annual mean target for NO_2 (30 µg/m^3) – a commitment laid out in the city's AQAP, and which is expected to be achieved across the city by 2025. Those locations are St Aldates, St Clements (DT55 and DT77), High Street (DT56), Holloway Road (DT80), Headington Hill (TF19), and Oxford's ring road (TF27, TF31, TF35).
- In 2023, NO_2 levels decreased (on average) by 14% across the city[6], when in comparison with the previous reporting year of 2022. For comparison purposes, the NO_2 concentrations at all UK's AURN Roadside and Urban Background automatic monitoring sites have decreased (on average) by 8% and 9% in 2023.
- In 2023, NO_2 levels are (on average) 33% below the levels in 2019 (the last pre-pandemic year).
- In April 2023 Botley road was closed to traffic due to the wider improvements to the western side of Oxford Railway station. NO_2 levels are currently being measured at

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4 Although in breach of the UK's annual mean limit value for this pollutant (40µg/m^3) , none of these sites is particularly relevant to LAQM: Headington Hill is not considered a location of relevant exposure (i.e., a location where members of the public are likely to be regularly present for a period of time appropriate to the averaging period of the annual mean limit value; and Southern bypass does not form part of Oxford City Council's jurisdiction). The purpose of monitoring at these locations relates solely with the evaluation of the possible impacts' future interventions (traffic filters) can cause in terms of traffic displacement in those areas.

5 According to LAQM TG22, only annual means NO_2 that are equal or above 60 µg/m^3 represent locations where exceedances of the hourly mean of this pollutant are likely.

6 According to traffic data provided by Oxfordshire County Council, traffic levels have decreased (on average) within the city of Oxford by 8% in 2023. The closure of Botley road from April 2023 is most likely the main factor that helps explaining this reduction.

4 different locations in Botley Road (DT33, DT35, DT36 and DT84). In 2022, the average NO_2 level measured at these locations was 19 µg/m^3. In 2023, the average NO_2 level measured was of 15.8 µg/m^3. This means that the closure of Botley road led to a 17% reduction of NO_2 levels in this road. Botley is expected to remain closed until October 2024.

Impacts of Zero Emission Zone Pilot (ZEZ)

The UK's first ZEZ was launched in February 2022.The monitoring results obtained in 2023 from all the locations in the ZEZ area show that:

- NO_2 levels have continued to reduce overall within the ZEZ.
- New Inn Hall St, Cornmarket St and Bonn Square all had reductions of 2µg/m^3 (or 13%, 11% and 9% respectively).
- St Michaels St and Queen St had marginal reductions of 1 µg/m^3 (7% and 5%).
- George St (Magdalen St) saw a slight increase of 2 µg/m^3 (or 9%).
- The highest reduction was seen at New Road (7 µg/m^3 or 24%). However, this relates with the interference of scaffolding works at St Peter's college, which have limited the effectiveness of the diffusion tube measurement.
- Overall, NO_2 annual mean measurements have varied from a minimum of 13 µg/m^3 (New Inn Hall St, S Michaels St) to a maximum of 21 µg/m^3 (Queen St) in all the areas covered by the zone.
- The measurement obtained at Queen St is the highest within the zone, due to this street being part of the city's bus route – however, this measurement is still 47.5% below the UK legal limit and 30% below the city's local target for this pollutant.

A significant reduction of NO_2 levels is expected on Queen St and more widely across the city in 2024, due to the recent delivery of the 159 fully electric buses from the Zero Bus Regional Areas (ZEBRA) scheme. The arrival of these buses will mean that 69% of the total bus mileage operating in the city will be done in electric mode.

Impacts of Low Traffic Neighbourhoods (LTNS)

On the 17th October 2023 Oxfordshire County cabinet decided that the East Oxford LTNs located at St Marys, St Clements and Divinity Road would remain in place. An Oxfordshire County cabinet decision was also made on the 22nd June 2023 to approve proposals to remove LTN bollards on three roads in Cowley (Littlemore Road, Crescent Road and Littlehay Road) and to enforce the traffic restrictions using Automatic Number Plate Recognition (ANPR) cameras.

Air Quality on LTN boundary roads

- Holloway road (DT80) - boundary road for Temple Cowley LTN, saw NO_2 reductions of 3 µg/m^3 (from 34 to 31 µg/m^3). This matches the concentration obtained in 2020 (the year of the lockdowns) and represents a reduction of 6 µg/m^3 (or 16%) in relation to the NO_2 levels obtained in 2019 (pre-pandemic).
- DT8 (Oxford Road/Cowley), DT7 (Oxford Road/In Between Towns Road) and TF32 (Garsington Road/St Lukes Road -boundary roads for Temple Cowley and Florence Park LTNs, saw NO_2 reductions of 4, 2 and 3 µg/m^3 (or 14%, 7% and 15%) respectively.
- Diffusion tube TF38 on Church Cowley Road (boundary road for Florence Park and Church Cowley LTNs) measured an annual mean NO_2 of 21 µg/m^3. NO_2 monitoring was only conducted at this location for the first time in 2023, reason why there is no element of comparison with 2022. The measurement obtained in 2023 is 48% below the UK legal limit for this pollutant and 30% below Oxford's local NO_2 annual mean target.
- Iffley Road/Henley Avenue/A4158 (boundary road with St Marys, Florence Park, and Church Cowley LTNs) saw NO_2 reductions of 4 µg/m^3 (or 15%) at the cross with Boundary brook road (DT4), of 6 µg/m^3 (or 23%) at the cross with Stanley Road (TF17) and of 8 µg/m^3 (or 23%) at the cross with Newmans Road (TF34).
- St Clements Street saw NO_2 reductions of 5 µg/m^3 (or 12%) at DT55, 1 µg/m^3 (3%) at DT77 and of 2 µg/m^3 (7%) at DT85.
- Morrel Avenue (boundary road for St Clements and Divinity Road LTNs) saw NO_2 reductions of 3 µg/m^3 (19%) at monitoring location TF18 and of 1 µg/m^3 (8%) at LT4.
- Cowley road (boundary road for St Clements, St Marys and Divinity Road LTNs) saw NO_2 reductions of 4 µg/m^3 (15%) at the cross with James Street (DT72) and of 3 µg/m^3 (16%) at DT81 (cross with Union Street).

Air Quality Inside LTNs

- St Marys LTN saw NO_2 reductions of 2 µg/m^3 (15%) at both Howard St and Hurst St;
- St Clements LTN saw an NO_2 reduction of 2 µg/m^3 (15%) on Prince St and of 1 µg/m^3 (8%) at East Oxford Primary school.
- Divinity Road (within Divinity Road LTN) saw an NO_2 reduction of 2 µg/m^3 (17%).
- Diffusion tube LT6, located at St Christophers School (within Temple Cowley LTN), saw an NO_2 reduction of 2 µg/m^3 (17%).

All the monitoring locations both inside and on the boundary roads of Oxford's LTNS showed a decrease in NO_2 levels measured in 2023, when in comparison with the previous year (2022).

None of the NO_2 levels measured both inside and on the boundary roads of Oxford's LTNS was above the UK legal limit value for this pollutant, and only 3 monitoring locations (St Clements: DT55 - 38 µg/m^3 and DT77 – 34 µg/m^3), and Holloway Road (DT80 - 31 µg/m^3) showed NO_2 levels above the city's local annual mean target for NO_2 (30 µg/m^3).

Particulate Matter (PM_{10} and $PM_{2.5}$)

- PM_{10} and $PM_{2.5}$ were both monitored by automatic continuous monitors at AURN St Ebbes (urban background) and Oxford High Street (roadside) in 2023.
- The PM_{10} annual means obtained for these sites were of 9 and 14 µg/m^3 respectively. These values are both below the current UK legal annual mean limit of this pollutant (40 µg/m^3) and of the WHO recommended annual mean (15 µg/m^3).
- These PM_{10} measurements represent reductions of 25% and 12.5% when compared with the levels measured at these sites in 2022.
- These reductions are much more pronounced than the overall average PM_{10} decrease seen at all Urban Background and Roadside monitoring sites across the UK in 2023 (equivalent to 10%).
- The $PM_{2.5}$ annual means obtained for these sites were of 6 and 8 µg/m^3 respectively. These values are below the current UK legal annual mean limit of this pollutant (10 µg/m^3) and slightly above (at Oxford High Street) the WHO recommended annual mean (5 µg/m^3).
- These $PM_{2.5}$ measurements represent a reduction of 14% (at AURN St Ebbes) and an increase of 33% (at Oxford High Street) when compared with the levels measured at these sites in 2022.However, it is important to consider that $PM_{2.5}$ data capture was relatively poor at Oxford High Street in 2022 (only 41%), as the new FIDAS instrument had only been installed in May. As a result, the annual mean $PM_{2.5}$ had to be annualised in 2022. This is likely to be the reason that explains the slight increase in the $PM_{2.5}$ levels measured at this location.
- $PM_{2.5}$ measurements obtained at AURN St Ebbes in Oxford are aligned with the UK's national trend for this pollutant. Analysis of the UK's $PM_{2.5}$ national trend show that average concentrations have reduced in 2023 on average by 12%, from 2022 levels.

Ozone

Ozone measurements obtained from the automatic monitor at AURN St Ebbes exceeded the legal air quality objectives for this pollutant 113 times, during a total of 19 days in 2023.

Priorities for 2024

Oxford City Council's priorities for the next reporting year are well defined.

Overall, during the course of the next reporting year, Oxford City Council and its partners will continue to progress delivery of the air quality measures committed in our Air Quality Action Plan 2021-2025 and will also initiate work to prepare a new AQAP for the city.

Local Engagement and How to get Involved

One key to changing the current threat of air pollution is educating the communities most impacted by it, providing them with the knowledge that allows them to make informed choices on how they can reduce their personal exposure to air pollution, and how they can contribute to the reduction of air pollution levels in the city.

Oxford City Council has taken significant action in recent years in raising air quality awareness in our communities and in primary schools, with several projects being delivered with that purpose, such as air quality anti-idling campaigns, air quality banner competitions, STOP, and the *Do You Fuel Good?* Campaign, on the negative impacts of wood burning.

This past year we have also launched (in partnership with all the Districts in Oxfordshire and Oxfordshire County Council OXONAIR: a new air quality website for Oxfordshire, where residents and visitors are provided with lots of useful information and advice related with Oxford's air quality (including amongst other useful tools, things like latest levels measured, air quality forecast and latest projects being delivered).

Oxford City Council's communication team also regularly publishes press releases and social media contents which relate to air quality news and projects that are being delivered in the city to raise awareness. We also seek to ensure that the implementation of any major air quality management scheme in the city provides the public with opportunity to have their say and contribute with their own ideas and suggestions.

However, air pollution is not a problem that the City Council and its partners can solve alone - everyone deserves to breathe clean air, but it is important to highlight that

everyone also has a role to play in improving air quality levels, as our everyday decisions can have an impact on the air we breathe. Some of the questions to ask ourselves are:

- Do I burn inappropriate fuels or use inappropriate appliances at home?
- Do I take the car when I could have cycled or used public transport?
- Do I drive my children to school when I could have walked?

We all have a huge role to play, and we can all be part of the solution. Encouraging walking and cycling in the city not only has a positive impact on air quality levels, but it also has multiple other benefits, including increasing the health of wellbeing of all those who live, work and visit Oxford.

Do you want to get involved?

- If you are a science teacher or a person responsible for running an environment club at your primary school, please have a look at our Air Quality Toolkit which contains a series of interesting scientific air quality activities, (linked with the national curricula), and which promote an understanding of the causes and impacts of air pollution with the aim to reduce children's exposure to air pollutants, within the school and through their travel;
- If you live in an area where idling of car engines is a concern, please have a look at the design resources that Oxford City Council has made available to the general public, and which you can download and use to run anti-idling campaigns in your local area;
- Do you have a wood burner or thinking of getting one? please have a look at our advice and our "Do You Fuel Good?" campaign materials, available here;
- If you are considering buying an Electric Vehicle and need to find out where to charge it, please register your interest in Oxford City Council's Go Ultra Low website (or if you are interested in a cable gully solution anywhere in Oxford register it at www.gul-e.co.uk/);
- Look out within your local communities for active groups which have specific interest in air quality matters (ex: Local Friends of the Earth);
- You can also contact Oxford City Council's air quality team directly at any time for any air quality related matter via the following email: airquality@oxford.gov.uk;

Full details of all of Oxford's air quality monitoring results, including real time data on pollutant levels and annual diffusion tube data, reference to the city's daily Air Quality Index (AQI), a metric on the daily levels of air pollution, together with recommended actions, health and/or air quality forecast advice are available on the new Oxfordshire Air Quality website OXONAIR.

Local Responsibilities and Commitment

This ASR was prepared by members of the Environmental Sustainability Team of Oxford City Council with the support and agreement of Oxfordshire County Council colleagues.

This ASR has been approved by:

Cllr Anna Railton

(Oxford City Council's Cabinet Member for Zero Carbon Oxford and Climate Justice)

Dr Rosie Rowe

(Healthy Place Shaping Lead for Oxfordshire with the responsibility within the Public Health team for Air Quality)

Ansaf Azhar

(Director of Public Health & Communites, Oxfordshire County Council)

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

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01865 249811 or email us at: airquality@oxford.gov.uk

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1 Local Air Quality Management

This report provides an overview of air quality in Oxford during 2023. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), and the relevant Policy and Technical Guidance documents.

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

The statutory air quality objectives applicable to LAQM in England are presented on Table 16

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

A summary of AQMAs declared by Oxford City Council can be found on Table 2. The table presents a description of the AQMA that is currently designated within Oxford City Council. Appendix D: Map of the City's AQMA, provides a map of this AQMA and a link to the recently launched OXONair, an air quality website for Oxfordshire, where all the air quality monitoring locations in relation to this AQMA and latest values measured can be found. The air quality objectives pertinent to the current AQMA designation are as follows:

- NO_2 annual mean.
- NO_2 hourly mean.

Table 2 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
The city of Oxford	Declared 2010	NO_2 annual and hourly mean	The whole of the administrative area of Oxford City Council	YES	78 µg/m^3	38 µg/m^3	NO_2 hourly mean: 7 years NO_2 annual mean: 1 year	AQAP (2021-2025) January 2021	Visit the AQAP for Oxford's city-wide AQMA here

☒ **Oxford City Council confirm the information on UK-Air regarding their AQMA is up to date.**

☒ **Oxford City Council confirm that all current AQAPs have been submitted to Defra.**

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

Oxford City Council has taken forward a number of direct measures during the current reporting year of 2023 in pursuit of improving local air quality. A complete list of thirty measures is included on Table 3, together with an update on the progress Oxford City Council and its partners have made during the reporting year of 2023 to deliver them.

Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within this table. More detail on these measures can be found in Oxford City Council's current Air Quality Action Plan (2021-2025).

Oxford City Council's key completed measures since last year's ASR can be found in more detail in this report's section "Actions to Improve Air Quality" (pages iii-v above).

Oxford City Council expects the following measures to be completed or progressed over the course of the next reporting year:

- ✓ To fully deliver a £192,993 DEFRA Air Quality Grant funded project for the delivery of six eco-moorings at the towpath visitors' moorings of Aristotle Lane, on the Oxford Canal to reduce boater's reliance on diesel engines, generators and wood burners for their day-to-day energy needs -delivery expected for November 2024.
- ✓ To continue the expansion of the City Council's fleet of electric vehicles.
- ✓ To progress the delivery of the traffic filters trials, which are expected to start in November 2024;
- ✓ To progress the preparation of ZEZ expansion, with the development of a comprehensive engagement programme with a wide range of stakeholders and resident groups across the city -a public consultation is expected for autumn 2024.
- ✓ To continue the roll out of EV chargers across the city, as part of the GULO project
- ✓ To progress with the delivery of Clean Heat Streets, project to install up to 150 heat pumps in Rose Hill and Iffley, aiming to help residents in these areas to make the switch from polluting gas boilers to modern, energy saving, clean and sustainable heat pumps.

Oxford City Council's priorities for the next reporting year are well defined.

Overall, during the course of the next reporting year, Oxford City Council and its partners will continue to progress delivery of the air quality measures committed in our Air Quality Action Plan 2021-2025 and will also initiate work to prepare a new AQAP for the city.

Oxford City Council has worked to implement the air quality measures highlighted in this report, in partnership with the following stakeholders in 2023/2024:

- ✓ Neighbouring local authorities (South, Vale, Cherwell, and West Oxfordshire District Councils);
- ✓ Oxfordshire County Council (The Highways Authority);
- ✓ Canal & River Trust;
- ✓ Birmingham University;
- ✓ Oxford University;
- ✓ Oxford Direct Services;
- ✓ Green TV;
- ✓ Local Friends of the Earth;
- ✓ Ricardo Energy & Environment.
- ✓ Velocity Cycle Couriers Ltd

The potential challenges and barriers to implementation that Oxford City Council and its partners anticipate facing are:

- ✓ The closure of Botley Road (at the point the rail bridge crosses the road near Oxford station) to traffic from 11 April 2023 until the end of October 2024, to enable station and track improvements and highways redevelopment. This will cause a significant impact in the way traffic moves around the city and has already resulted on traffic displacement to other entry points of the city, also producing direct changes on air quality levels in various area of the city as a result.
- ✓ Potential lack of central government funding to help local authorities implementing future air quality measures – the fact that the air quality minister decided to withhold DEFRA's Air Quality grant 2023/2024 (Around £6m in funding promised to local authorities to help tackle air pollution) is a motive of concern.

Table 3 - Progress on Measures to Improve Air Quality

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	Work with schools, vulnerable groups and hard to reach communities to raise awareness of air pollution and promote Active Travel	Public Information/ Promoting Travel Alternatives	Student Assemblies/ Air Quality campaigns/ Promotion of Cycling and Walking	2021	Annually 2021-2025	Oxford City Council + Oxfordshire County Council + Friends of the Earth	Active Travel Fund, LAs annual budget	NO	Fully Funded	< 5k (Per year)	**Completed**	NOx reduction not estimated, but increase of up to 23% in walking rates and reduction of up to 30% car journeys was observed with the delivery of the active travel programme WOW + communication campaigns can increase awareness of up to 12% and behaviour change of up to 6% (Clean Air Day)	Number of walking, cycling, scooting, car, and park & stride trips, Number of participating schools and deprived areas and of activities delivered	Oxford City Council's STOP Project remains active and is being delivered to Primary school upon request of teachers	Primary schools are very busy, and it is difficult for teachers sometimes to find the time to embrace new projects. Support is on-going and delivered on an annual basis.
2	Support city-wide events that aim to accelerate the uptake of sustainable transport	Public Information/ Promoting Low Emission Transport/ Freight and Delivery Management	Webinars/ Summits Physical Events	2021	Annually 2021-2025	Oxford City Council + Other Partners (ex :Green TV)	Sponsorship	NO	Fully Funded	Not estimated	**Completed**	NOx reduction not estimated, but communication campaigns can increase awareness of up to 12% and behaviour change of up to 6% (Clean Air Day)	Total amount of attendees and Businesses participating, number of business adopting sustainable delivery options, number of business compliant with the ZEZ	The 2023's edition of the EV Summit took place at the Said Business School on the 30th and 31st October in Oxford. The event was run in partnership between Green TV, Oxford City Council, Oxfordshire County Council, Oxford University and Oxford Brookes University. This year's focus was on investment and growth in decarbonised e-mobility	Support is on-going and delivered on an annual basis.
3	Support projects that increase Oxford's Air Quality/AQ & Health evidence base	Public Information	Other	2021	Annually 2021-2025	Oxford City Council + Oxfordshire County Council (Public Health/Innovation Teams)	Several types of funding possible (Innovate UK, DEFRA AQ Grant, UKRI)	NO	Partially funded	Not estimated (Successful bids and projects will be added on a regular basis)	**Completed**	Not directly applicable – NOx reduction not estimated	Total amount of partnerships created; number of AQ/health studies delivered	Oxford City and County Councils continue to be active partners of the TRANSITION Clean Air Network undertaking innovative research to address emerging indoor/outdoor air quality challenges across UK surface transport. In 2023 the network has contributed to the delivery of several toolkits and briefing notes A partnership between County and City Council and the University of Birmingham also allowed to publish a study on the impacts of ambient air quality on acute asthma hospital admissions during the COVID-19 pandemic in Oxford City, UK; a time series study (January 2024)	Find out more by visiting The Clean Air Transition Network here Support is on-going and delivered on an annual basis.
4	Develop partnership work with NHS, commissioners, and providers to increase awareness of air pollution amongst patients and	Public Information	Via the Internet/ Via other mechanisms	2021	2021-2025	Oxford City Council + Oxfordshire County Council (Public Health Team)	LAs annual budget	NO	Not funded yet	Not estimated	Implementation	NOx reduction not estimated, but communication campaigns can increase awareness of up to 12% and behaviour change of up to 6% (Clean Air Day)	Number of workshops /training sessions delivered, reduction in number of hospital admissions for COPD patients	Implementation on-going	Engagement with NHS professionals will continue throughout the still ongoing development of the OXONair website

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	reduce their personal exposure to air pollution														
5	Improve air quality communication on our website and associated websites to assist the public in accessing reliable information about air pollution	Public Information	Via the Internet	2021	Q1 2023	Oxford City Council + all other DCs in Oxfordshire + Oxfordshire County Council	DEFRA AQ Grant	YES	Fully Funded	£162,500	**Completed**	NOx reduction not estimated, but communication campaigns can increase awareness of up to 12% and behaviour change of up to 6% (Clean Air Day)	Number of website visitors, Number of website downloads, Reduction of public requests for AQ information,	OXONair website was launched in September 2023 Up until mid-April 2024 we had the following user stats for OXONair: total amount of user views since launch – 27,073 total amount of users since launch – 6,625	Oxford City Council and all the other local authorities in Oxfordshire are still actively working with Ricardo to improve some of the tools within the website
6	Explore opportunities to use green infrastructure to reduce exposure to poor AQ levels	Public Information	Other	2021	2021-2025	Oxford City Council + Oxfordshire County Council + Highways England	LA annual budget + Other sources of funding (still to be identified)	NO	Partially funded	Not estimated (Successful bids and projects will be added on a regular basis)	Planning	Reduction of up to 50% in exposure to air pollution levels where green infrastructure is installed (Greater London Authority)	Air Quality data, number of species planted	Oxford City Council has published its Urban Forest Strategy in November 2021 Oxfordshire County Council promotes (on its Tree Policy Planting 21) the use of tree planting and recognises the impact of correct choice of species to maximise air pollution improvements.	Defra acknowledges that vegetation can help to reduce air pollution in cities. However, they state this is primarily by affecting how these pollutants are dispersed and not by the removal of pollution. The delivery of the Urban Forest Strategy for Oxford, is likely to bring opportunities for the use of vegetation as air quality buffer which will contribute to a reduction of human exposure to air pollution.
7	Delivery of city-wide campaign on how to implement DEFRA's best practice on the use of open fires and wood burning stoves, and on how to reduce burning of inappropriate fuel	Public Information	Via Leaflets/ Via the Internet/ Via other mechanisms	2021	2022	Oxford City Council + Friends of the Earth+ River Trust	DEFRA AQ Grant	YES	Fully Funded	£45,000	**Completed**	NOx reduction not estimated, but communication campaigns can increase awareness of up to 12% and behaviour change of up to 6% (Clean Air Day)	Reduction of nuisance complaints, Reduction of NOx, PM_{10} and $PM_{2.5}$ concentrations	This campaign has been relaunched on social media during wintertime 2023/2024 Further developments and campaign materials are expected to be developed upon formal confirmation (by the secretary of state) of Oxford City Council's proposals for the creation of a city-wide Smoke Control Area	Oxford's "Do You Fuel Good?" campaign website available here
8	Work with the District and County Councils on a co-ordinated approach to public awareness and education	Public Information	Via Leaflets/ Via the Internet/ Via other mechanisms	2021	Annually 2021-2025	Oxford City Council + all other DCs in Oxfordshire + Oxfordshire County Council	LAs annual budget + Other sources of funding if required	NO	Fully Funded	Not estimated	Planning	NOx reduction not estimated, but communication campaigns can increase awareness of up to 12% and behaviour change of up to 6% (Clean Air Day)	Number of comms and other campaigns run together between all the District Councils in Oxfordshire	All the 4 District Councils in Oxfordshire together with Oxfordshire County in the improvement of some of the existing tools of OXONAIR We are also at the moment trying to explore ways to increase the evidence of public health impacts of future Air quality measures and interventions	The Air Quality Officers of all the DCs in Oxfordshire and a representative from Oxfordshire County Council already met regularly to discuss air quality projects and opportunities for future partnership work and will continue to do so in 2023/2024 as and when required
9	Introducing a Euro VI LEZ for buses in Oxford	Promoting Low Emission Transport	Low Emission Zone (LEZ) or Clean Air Zone (CAZ)	2021	2022	Oxford City Council + Oxfordshire County Council + local bus operators	LAs annual budget, CBTF	NO	Fully Funded	Staff time only	On hold	Estimated reductions of between 5% to 12.8% of total city Road NOx emissions (Ricardo's Source Apportionment Study)	LEZ Euro VI Approved bus database	This measure has been superseded by AQAP measure 15 (ZEBRA scheme)	

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10	Introducing Ultra Low emission standards for Hackney Carriage Vehicles	Promoting Low Emission Transport	Taxi Licensing conditions	2021	2025	Oxford City Council	LAs annual budget	NO	Fully Funded	Staff time only	**Completed**	Up to 0.2% total city Road NOx emissions (Ricardo's Source Apportionment Study)	Amount of New HCV Applications, enforcement stats	Delivery already in progress	
11	Delivery of Zero Emission Zone (measures to incentivise zero emission vehicles or place restrictions on other vehicles in Oxford)	Promoting Low Emission Transport/ Traffic Management	Low Emission Zone (LEZ) or Clean Air Zone (CAZ) / Road User Charging (RUC)/ Congestion charging	2021	2021-2025	Oxford City Council + Oxfordshire County Council	LAs annual budget, DEFRA AQ Grant and other sources of funding	YES	Partially Funded	ZEZ Pilot - £267,400	**Completed**	By 2035 (after ZEZ wider implementation), up to 66% reduction in city-wide transport NOx emissions and of 100% transport NOx emissions in the city centre are expected	Behavioural responses, AQ monitoring, ANPR counts	The city centre ZEZ Pilot was launched on 28th February 2022. Details of this now active scheme can be found here A report with the evaluation of the 1st Year of the ZEZ Pilot is available here	Expansion of the ZEZ is subject to further assessments, stakeholder engagement, consultation, and funding. Below is the current timeline: Winter/Spring 2024 – Pre-consultation engagement with stakeholders Autumn 2024 – Consultation on the wider ZEZ 2025 – Cabinet decision on whether to proceed with the wider ZEZ 2026 – go live if approved by cabinet
12	Increase the amount of EV charging infrastructure in the City	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging,	2021	2021-2025	Oxford City Council + Oxfordshire County Council	Innovate UK, AQ DEFRA Grant, OLEV Grant scheme, LAs budget	YES	Fully Funded	Not estimated	**Completed**	NOx reduction not estimated	Number of EV Chargers Installed	The GULO Taxi project is now completed offering 18 rapid charging sockets and 6 fast sockets in the city for taxi use. The Energy super hub completed 2022 hosts 42 chargers for general use which are used by Taxi drivers and in 2023 car clubs cars too. Via the ESO programme, 22 grant were given to taxi drivers towards the purchase of ULEV e-Taxi resulting in 26 out of 107 (@25%) Hackney carriages going electric. Lastly 38 charge points were installed across 4 ODS depots (as well as 5 for home charging of fleet vehicles).	A map of all EV charging point locations in Oxford can be found here The EST case study for the Gul-e project can be found here
13	Expansion of City Council's EV Fleet (Electrification of 25% of vehicle fleet)	Promoting Low Emission Transport	Company Vehicle Procurement -Prioritising uptake of low emission vehicles	2021	2023	Oxford City Council	Innovate UK, LAs annual budget	NO	Fully Funded	Not estimated	**Completed**	NOx reduction not estimated	Number of Electric vehicles purchased	20 cars, 64 vans, 11 tippers and 8 specialist EVs (including a sweeper, a milk float, a digger and a refuse collection vehicle).	By March 2024, 30% of Oxford City Council's fleet was EV (103 out of 338 vehicles)
14	Development of an EV Strategy for Oxfordshire	Policy Guidance and Development Control	Other Policy	2021	2021	Oxfordshire County Council + other DCs	LAs own budget	NO	Fully Funded	Not estimated	**Completed**	NOx reduction not estimated	Publication of EV strategy and adoption of Strategy by all District Councils	Oxfordshire EV Infrastructure Strategy (OEVIS) was adopted and published on March 21	Oxford City Council has also published in July 2022 an EV strategy specific for the city of Oxford, which sets out EV infrastructure targets for 2026, 2030, and 2040 to meet our Net Zero targets. This includes metrics for ensuring car clubs are situated in city car parks to encourage the move away from car ownership, residential

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															electric charging to stay in step with the increase in EV ownership and the move to electric for the council fleet.
15	Work with bus operators on the electrification of Oxford's Bus fleet	Promoting Low Emission Transport	Company Vehicle Procurement -Prioritising uptake of low emission vehicles	2021	2030 or sooner	Department for Transport + Oxfordshire County Council + local bus operators	Zero Emissions Buses Regional Area (ZEBRA) scheme: £32.8m Bus operators: £43.7m Oxfordshire CC: £6m	NO	Partly funded	No specific scheme estimates for complete electrification. ZEBRA: £82.5m	**Completed**	Up to 32% of the city's total road NOx emissions (Ricardo's Source Apportionment Study)	% of bus fleet ZEV	The ZEBRA project is practically delivered. Last new electric buses are expected to arrive by June 2024	The entire fleet of 159 electric buses corresponds to 69% of the entire bus mileage of Oxford City
16	Delivery of Oxford's Energy Super Hub	Promoting Low Emission Transport/ Promoting Low Emission Plant	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV charging. Replacement of combustion sources	2021	2022	Oxford City Council + Partners	Innovate UK	NO	Fully Funded	£41 million	**Completed**	10,000 tonnes of CO_2 per year saving by 2021, rising to 25,000 tonnes per year by 2032 + up to 22% reduction of NO2 emissions from transport by 2032	Number of EV chargers and Ground Source Heat Pumps (GSHP) installed, number of EVs purchased, AQ monitoring	Oxford City Council delivered 42 new fast and ultra-rapid charging points (powered entirely by renewable energy). .	All relevant info about this project can be found at the ESO website here
17	Delivery of Air Quality Benefits through Planning System (Reduce amount of car parking in the city + increase EV charging infrastructure + require more efficient/less pollutant domestic heating technologies)	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance/ Other Policy	2021	Annually 2021-2036	Oxford City Council	LAs own budget	NO	Fully Funded	Not estimated	**Completed**	NOx and PM reductions not estimated	Number of developments with EV chargers /number of EV chargers installed number of Planning conditions discharged	Already being delivered through Oxford's Local Plan New air quality policies under Oxford's proposed new local plan 2040 include the obligation of developers to comply with the city's current and future local annual mean targets for NO_2	The draft Oxford Local Plan 2040 was submitted to the Secretary of State for Levelling Up, Communities and Housing on 28 March 2024 More information here
18	Explore opportunities for the delivery of electric infrastructure that could accelerate the uptake of electric boats and reduce their reliance on fossil fuel use for domestic heating	Promoting Low Emission Transport/ Promoting Low Emission Plant	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Replacement of combustion sources	2021	2025	Oxford City Council + Oxfordshire County Council +River trust + Environment Agency	DEFRA Air Quality Grant	YES	Fully Funded	£192,993	Implementation	NOx and PM reductions not estimated	Number of installations delivered, number of boats relying on energy sources that are locally emissions free	Design stage and planning permission finalised in February 2024 Canal & River Trust to appoint developer to deliver the work in early June 2024 Delivery phase expected to be concluded in November 2024	In February 2023, Oxford City Council, in partnership with the Canal & River Trust, was granted £192,993 from DEFRA's Air Quality Grant to deliver six "*eco-moorings*" at the towpath visitors' moorings of Aristotle Lane, on the Oxford Canal. The power points at these moorings will provide electrical power for up to six visiting boaters to reduce their reliance on diesel engines, generators and wood burners for their day-to-day energy needs –link to press release
19	Upgrade Energy Efficiency of City Council's Housing stock	Promoting Low Emission Plant	Other Policy	2021	Annually 2021-2025	Oxford City Council	LAs own budget	NO	Partially funded	Not estimated	Implementation	NOx and PM reductions not estimated	Number of boiler upgrades, insulations and high efficiency storage heaters installed per year	Implementation on-going	In 23/24 one Air Source Heat pump (ASHP) was completed as part of Clean Heat Streets in the Council's own housing stock. The Social Housing Decarbonisation Fund (SHDF) has been secured for 2023-25, with 316 properties due to be upgraded to an EPC C in 24/25, with further plans to install Heat pumps
20	Provide Energy advice services: employ Energy	Promoting Low Emission Plant	Other Policy	2021	Annually 2021-2025	Oxford City Council	LAs own budget	NO	Fully Funded	Not estimated	Implementation	NOx and PM reductions not	Total amount of home visits and	As Warm Housing Scheme (WHD) has been changed by the central government for the season	

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	advice Officers to visit Council homes and advise tenants, whilst also identifying energy saving improvements to the properties											estimated	of energy savings per year	2023/2024, most tenants who were previously eligible were awarded with WHD automatically. For those who missed from the scheme, even if they were eligible before, we offered our expertise to appeal WHD decision – in total, 30 consultations on the subject have been provided. We issued 32 emergency fuel vouchers, providing £1,447 towards energy costs.	
21	Use of central government's ECO Flexible Eligibility funding to identify and designate households as eligible under the Affordable Warmth Scheme	Promoting Low Emission Plant	Other Policy	2021	Annually 2021-2025	Oxford City Council	ECO Flexible Eligibility funding	NO	Partially funded	Not estimated	Implementation	NOx and PM reductions not estimated	Total amount of households being granted with energy efficiency improvements	This year Oxford City Council published an updated Statement of Intent relating to the provision of ECO Flex and Great British Insulation Scheme (GBIS) funding. 15 properties have been through the declaration stage of ECO Flex with support from the National Energy Foundation (we do not hold local data on number of GBIS referrals because most of these go directly via ofgem or energy supplier). Since June 23 across Oxfordshire, the following have been completed: Warm and well assessments: 1496 Partner referrals into BHBH: 386 BHBH + visits: 152 New incomes identified: 700 Energy Efficiency Referrals: 259 PSR sign-ups: 314 Energy supplier/tariff enquiries: 284	Uptake of ECO Flex has been slow due to lack of installers and overly complicated application processes. Oxford City Council is actively trying to overcome barriers to uptake of grant funding. Oxford City Council has been actively promoting funding schemes such as ECO Flex, ECO4, GBIS and HUG2 to encourage uptake of retrofit measures. Marketing activities this year have included: social media campaigns, attendance at events, the creation and dissemination of marketing materials, and internal and external training of partners and colleagues on eligibility and funding criteria. Partnership work continues with Better Housing Better Health (BHBH) to support those in fuel poverty in Oxford. Since 1st November 2023, BHBH have also issued 281 emergency fuel vouchers worth £49 each, 22 households were provided with supermarket vouchers and 261 energy efficiency items have been given out. We are also now able to issue £50 energy cards following home visits to anyone struggling to pay their energy bill but not on a pre-payment meter and this has been well received by residents
22	Review of Smoke Controlled Zones and implementation of revised government legislation for smoke nuisance	Promoting Low Emission Plant	Other Policy	2021	2021-2025	Oxford City Council	LAs own budget	NO	Internal funding	Not estimated	**Completed**	NOx and PM reductions not estimated	Implementation of new enforcement methods/ reduction of the amount of nuisance complaints	Formal request submitted to the secretary of state in March 2024 to revoke Oxford's current 23 Smoke Control Areas and to replace them by a single (city-wide) smoke control area, covering the entire city. Colleagues from Environment Health that deal with enforcement are	Official approval of the new city-wide SCA was granted by the Secretary of State on the 21st May 2024. The new SCA is expected to be in place from 1st December 2024

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														currently updating regulatory and enforcement guidance as a result of these plans	
23	Encourage the development of local heat networks	Promoting Low Emission Plant	Other Policy	2021	Annually 2021-2025	Oxford City Council	LAs own budget	NO	Fully Funded	Not estimated	Implementation	NOx and PM reductions not estimated	Number of planning applications using heat networks	Already being encouraged and delivered (when feasible) through Oxford's Local Plan and Planning System A letter of intent was signed in January 2024 by the Leader of the Council in support of a grant fund bid to the Green Heat Network Fund by 1Energy to create a privately funded District Heat Network in Oxford.	If the grant bid is successful, it could provide zero carbon heat to major heat users in Oxford including: both universities; colleges; hospitals; City and County Council etc, providing a key deliverable of the Zero Carbon Oxford Action Plan
24	Delivery of Oxford Core Transport Schemes (explore opportunities for implementation of Workplace Paring levy + introduction of Traffic Filters)	Traffic Management	Workplace Parking Levy/ Traffic Filters	2021	2023-2024	Oxford City Council + Oxfordshire County Council	LAs own budgets, Bus Service Improvement Plan (BSIP), future income raised by the WPL	NO	Partially funded	£5-8m (excludes funding for complimentary bus and walking and cycling improvements)	Planning	NOx and PM reductions have been estimated here	Traffic counts, numbers of people travelling by bus, cycling, or walking, number of businesses enrolled, enforcement stats. Reduction of NOx, PM_{10} and $PM_{2.5}$ concentrations	The traffic filters were approved in November 2022 and are due to be implemented in November 2024 (once Botley Road reopens).	More details on our traffic filters page.
25	Delivery of sustainable transport measures such as cycling improvements and bus priority lanes	Transport Planning and Infrastructure/ Traffic management	Cycle network/ Bus priority	2021	2021-2025	Oxford City Council + Oxfordshire County Council	DfT Active Tranche 2 & Growth Deal	NO	Fully funded	£44m approx. for sustainable transport schemes on three Oxford radial routes and other locations	Implementation	NOx and PM reductions not estimated	Local cycling and walking infrastructure plans (LCWIP) 50% increase by 2030 (Active Lives Survey)	Updates in 2023: New/enhanced and retained bus services, provision of combined park 7 ride discounted fares, progress towards the central Oxford traffic filters **Update on schemes (due to be implemented by April 2025)** **Woodstock Road -** bus lane alterations, due to be implemented prior to the traffic filters trial going live) **Safer Roads Oxford: Banbury Road and Iffley Road –** includes provision of better pedestrian and cycle facilities. Construction in 2025. Further details on the scheme webpage**:** Safer Roads Oxford: Banbury Road and Iffley Road | Oxfordshire County Council	**Oxford City Quickways**: various schemes implemented as follows. Further details on the scheme webpage (Oxford City quickways | Oxfordshire County Council) - 20mph speed limits - Cowley Road/Oxford Road - Iffley Road/Henley - Avenue/Rose Hill - MorrellAvenue/ Warneford Lane - Marston Road - Donnington Bridge Road

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26	Roll-out of Controlled Parking Zones (CPZ) and Low Traffic Neighbourhoods (LTN)	Traffic Management	Traffic reduction	2021	2021-2023	Oxfordshire County Council	Department for Transport (Emergency Active Travel Fund); LAs own budget	NO	Fully Funded	£1m approx. for CPZs £311,000 for LTNs	**Completed**	NOx and PM reductions measured	Implementation of the new CPZs and LTNs	Most of the city now covered by a CPZ; recently introduced schemes include Upper Wolvercote, South Oxford Extension and Marston North. New controlled parking zones for remaining parts of Oxford are planned - officers are currently working on the latest programme, and once agreed, a new timetable of priority zones will be published. Full Evaluation reports for LTN East Oxford and LTN Cowley are available here	On the 17th October 2023 Oxfordshire County cabinet decided that the East Oxford LTNs located at St Marys, St Clements and Divinity Road would remain in place A cabinet decision was made on 22 June 2023 to approve proposals to remove LTN bollards on three roads in Cowley (Littlemore Road, Crescent Road and Littlehay Road) and to enforce the traffic restrictions using Automatic Number Plate Recognition (ANPR) cameras.
27	Work with businesses to explore the inclusion of innovative sustainable travel modes into their current business models	Freight and Delivery Management	Delivery and Service plans Freight Partnerships for city centre deliveries	2021	Annually 2021-2025	Oxfordshire County Council + Oxford City Council	DEFRA AQ Grant; LAs own budget, Energy Saving Trust	YES	Partially funded	Not estimated	Implementation	NOx and PM reductions not estimated	Number of businesses adopting sustainable travel modes	Oxford city Council launched in March 2024 and in partnership with Velocity Cycle Couriers, a sustainable delivery trial where all the parcels prepared by covered market and city centre traders can be picked up and delivered (same day or next day) by e-cargo bike to all their customers who live in postcode areas within the city ring road. Joining the trial is free to covered market traders, as Oxford City Council subsidises 100% of the cost of these deliveries.	The trial is expected to last at least until August 2024 23 businesses have signed up so far to the trial.
28	Explore opportunities for implementation of consolidation centre to address city centre freight emissions	Freight and Delivery Management	Freight Consolidation Centre	2021	2026	Oxfordshire County Council + Oxford City Council+ Oxford University	LAs annual budget, and other sources of funding, Horizon Europe/Innovate UK	NO	Partially funded	Not estimated (pending feasibility)	Planning/Implementation	NOx reduction not estimated	Number of businesses enrolled to be developed	Oxfordshire County Council is partner in the GreenLog project along with local patterns Pedal & Post, FEED, and University of Wolverhampton. The project will trial an e-commerce platform in which covered market traders can offer their most popular products and local customers can pick and choose items from multiple traders in one purchase and one delivery fee through Pedal & Post. Purchases will be consolidated into a single delivery—which will be completed by cargo bike and EV across Oxfordshire. Joining the platform will be free to covered market traders.	Timeline: first demonstration—Sept/Oct 2024 through December 2024 (there will be a second demonstration 1 year later)
29	Work with schools to reduce exposure to air pollution by reducing the need to travel during drop off/pick up	Alternatives to private vehicle use/ Promoting Travel Alternatives	Other	2021	2025	Oxfordshire County Council	Active Travel fund for LAs in England	NO	Partially funded	£60,000 approx. for School Streets	Implementation	NOx reduction not estimated	Number of streets closed; schools enrolled	School Street updates 2023: Windmill Primary School – permanent school street	

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	times (ex: School Streets)													St Ebbe's Primary School – permanent school street Larkrise Primary School – permanent school street St Mary and St John CE Primary School - due to commence school street trial in April/ May. Following the trial (approx. 6 weeks) there will be a public consultation to determine whether to make the school street permanent. Sandhills Community Primary School - due to commence school street trial in April/ May. Following the trial (approx. 6 weeks) there will be a public consultation to determine whether to make the school street permanent. Tyndale Community School - due to commence school street trial in April/ May. Following the trial (approx. 6 weeks) there will be a public consultation to determine whether to make the school street permanent. New Hinksey CE Primary School - due to commence school street trial in April/ May. Following the trial (approx. 6 weeks) there will be a public consultation to determine whether to make the school street permanent.	3 schools with permanent road closures during pick up and drop off times, and 4 being trialled.
30	Support Bikeability (free cycling lessons provided to pupils)	Promoting Travelling alternatives	Promotion of Cycling	2021	2021-2025	Oxfordshire County Council	DfT via The Bikeability Trust charity	NO	Partially funded	Not estimated	Implementation	NOx reduction not estimated	Number of schools enrolled	Implementation (On-going)	The complete Bikeability figures for the entire Oxfordshire in 2023/2024 are of 6124 children trained. This represents an increase of 33% in comparison with the previous reporting year.

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

As detailed in Policy Guidance LAQM.PG22 (Chapter 8) and the Air Quality Strategy[7], local authorities are also expected to work towards reducing emissions and/or concentrations of fine particulate matter ($PM_{2.5}$)). There is clear evidence that $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5 micrometres or less) has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

The Public Health Outcomes is a framework to set out a vision for public health. The framework develops a list of indicators that provide useful insight on how well public health is being improved and protected and concentrates on two high-level outcomes (healthy life expectancy and differences in life expectancy and healthy life expectancy between communities) to be achieved across the public health system.

The latest version of this framework present useful metrics for the year 2022. It estimates that in Oxford, 6,3% of deaths from all causes in those aged 30+ are attributable to $PM_{2.5}$ alone.

Figures 1 and 2 below show the existing relationship between the level of mortality attributed to $PM_{2.5}$ and life expectancy at birth for females and males in Oxford. A comparison is also made between Oxford's data and the data obtained for other District Councils (DCs) in Oxfordshire and for England.

7 Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

Figure 1– Mortality attributable to $PM_{2.5}$ vs female's life expectancy at birth

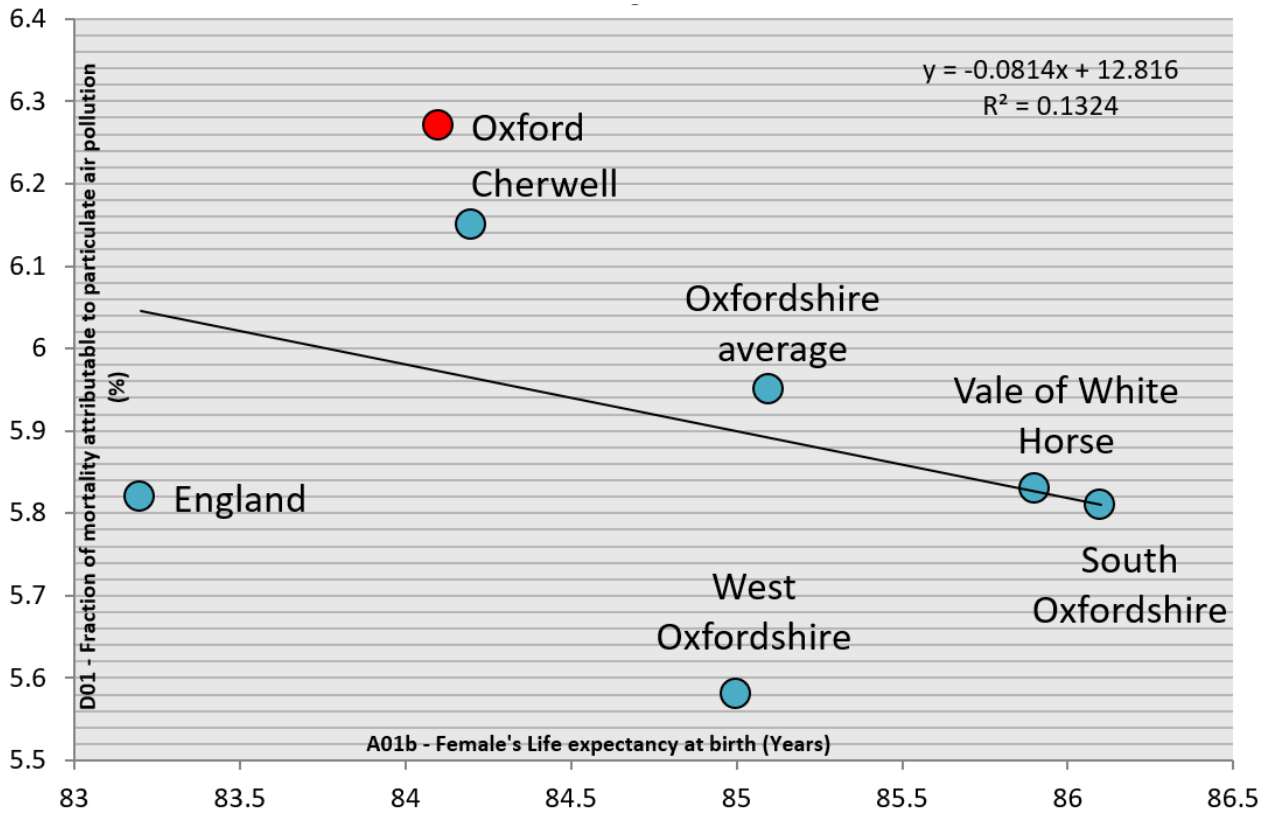
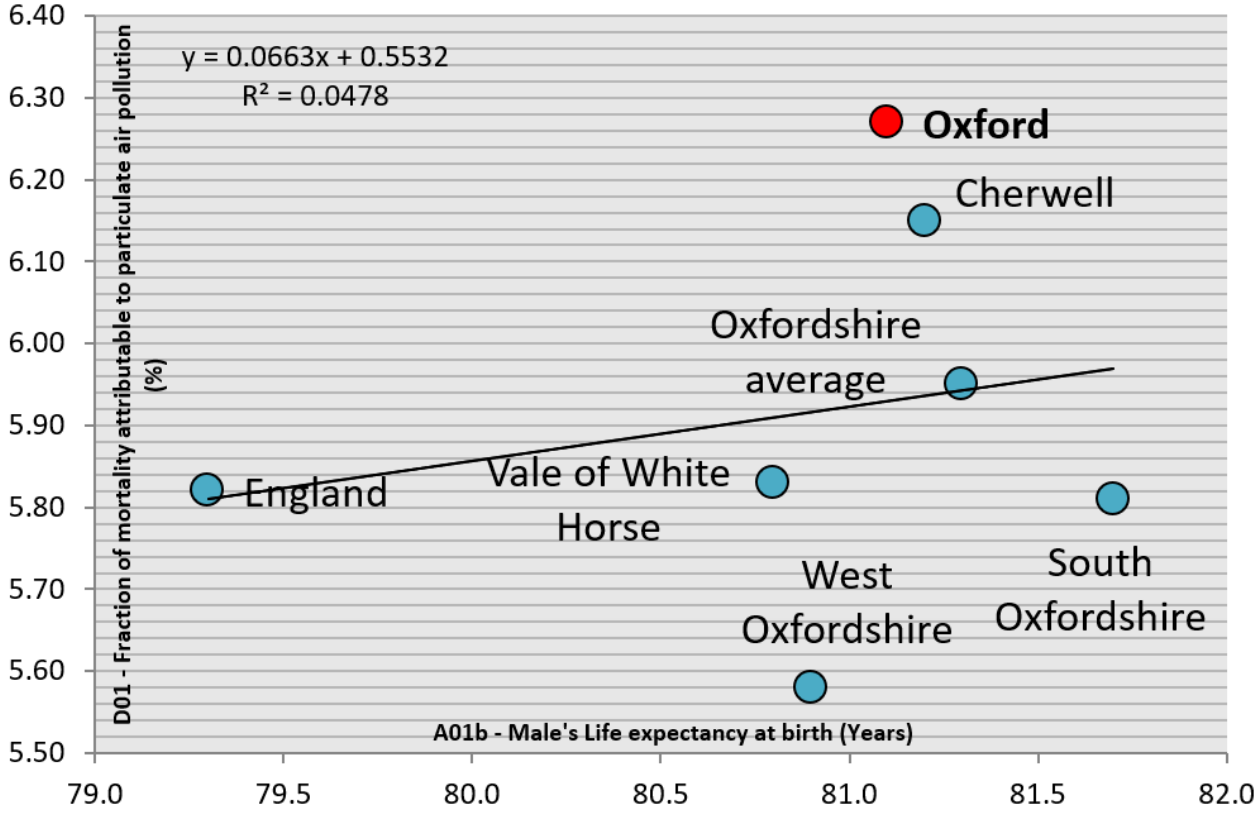


Figure 2 - Mortality attributable to $PM_{2.5}$ vs male's life expectancy at birth



Similar to what has been observed in previous years, Oxford's performance is, in general, worse when compared with the other DCs in Oxfordshire for these types of indicators, which is not a surprise, given that air pollution tends to be typically much higher in highly urbanised areas (city), when in comparison with the rest of Oxfordshire which is much more rural in nature.

In March 2024, Oxford City Council submitted to the Secretary of State a formal application to see Oxford's current 23 Smoke Control Areas revoked and replaced by a single (city-wide) Smoke Control Area, covering the entire administrative area of the city.

The proposals were accepted by the Secretary of State on the 21st May 2024. Oxford will now have its new city-wide Smoke Control Area in place from the 1st of December 2024. This is an important step for the reduction of local $PM_{2.5}$ emissions associated to uncontrolled burn of wood from stove appliances and fireplaces.

Other measures under the city's current AQAP that will also contribute to a reduction of local $PM_{2.5}$ are:

- ✓ Introducing Ultra Low emission standards for Hackney Carriage Vehicles
- ✓ Delivery of city-wide campaign on how to implement DEFRA's best practice on the use of open fires and wood burning stoves, and on how to reduce burning of inappropriate fuel.
- ✓ Increase the amount of EV charging infrastructure in the city.
- ✓ Expansion of City Council's EV Fleet (Electrification of 25% of vehicle fleet by 2023)
- ✓ Development of an EV Strategy for Oxford City
- ✓ Work with bus operators on the delivery of ZEBRA (electrification of Oxford's Bus fleet)
- ✓ Delivery of Oxford's Energy Super Hub
- ✓ Delivery of Air Quality Benefits through Planning System (Reduce amount of car parking in the city + Increase EV charging infrastructure + require more efficient/less pollutant domestic heating technologies)
- ✓ Upgrade Energy Efficiency of City Council's Housing stock and provision of energy advice services to city council's tenants, whilst identifying energy saving improvements to the properties
- ✓ Encourage the development of local heat networks.
- ✓ Delivery of sustainable transport measures such as cycling improvements and bus priority lanes
- ✓ Roll-out of Controlled Parking Zones (CPZ) and Low Traffic Neighbourhoods (LTN)
- ✓ Work with businesses to explore the inclusion of innovative sustainable travel modes into their current business models and explore opportunities for implementation of consolidation centre to address city centre freight emissions.
- ✓ Work with schools to reduce exposure to air pollution by reducing the need to travel during drop off/ pick up times (ex: School Streets)
- ✓ Support Bikeability (free cycling lessons provided to pupils)
- ✓ Expansion of Oxford's ZEZ, delivery of the Traffic filter trials and implementation of a workplace parking levy (WPL)

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

This section sets out the monitoring undertaken within 2023 by Oxford City Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2019 and 2023 to allow monitoring trends to be identified and discussed.

Maps covering current and historic air quality monitoring locations and levels measured are provided in OXONAIR, the new Oxfordshire Air Quality website. Further details on Quality Assurance/Quality Control (QA/QC), how the monitors are calibrated, how the data has been adjusted and the bias adjustment factors used for the diffusion tubes are included in Appendix C.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Oxford City Council undertook automatic (continuous) monitoring at three sites during 2023. Table 4 (Annex A) shows the details of the automatic monitoring sites. The OXONAIR website also presents the monitoring results and stats (current and historic) for all of Oxford City Council's automatic monitoring sites.

3.1.2 Non-Automatic Monitoring Sites

Oxford City Council undertook non- automatic (i.e., diffusion tubes) monitoring of NO_2 at 127 sites during 2023. Table 5 (Annex A) presents the details of the non-automatic sites.

For the purposes of deciding which locations to monitor, the City Council considers in the first instance locations where there is relevant public exposure. It is important that assessments focus on locations where members of the public are likely to be regularly present for a period of time appropriate to the averaging period of the objective. Monitoring is carried out in line with DEFRA's Technical Guidance LAQM.TG22.

Approximately half of the monitoring locations are within central Oxford at locations where the City Council believes relevant exposure is most likely to be significant. The remaining

locations are outside of the central area, again prioritised by locations where relevant exposure is most likely.

Monitoring of NO_2 cannot be undertaken at every location on a continuous basis. The City Council therefore makes the most efficient use of available resources by implementing a rotational system on a percentage of monitoring sites every year, ensuring such sites are covered on average every 2 to 3 years.

One important aspect of monitoring is to be able to demonstrate trends in air quality over long time periods. In order to do so, the City Council continues monitoring at a number of the same sites year on year, so that the results reported can provide a strong basis for showing trends that are independent of location.

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. Details of the UK air quality objectives for protection of human health, as well as of the WHO recommended guideline levels can be found in Appendix E.

3.2.1 Nitrogen Dioxide (NO_2)

In 2023, NO_2 was monitored at three locations in Oxford using automatic continuous monitors and at 127 locations using passive monitoring (diffusion tubes).

The annual mean air quality objective for NO_2 is 40 µg/m^3. In 2023, Oxford High Street measured annual mean for NO_2 was of 27 µg/m^3 and of 31 µg/m^3 at AURN Oxford Centre Roadside. At AURN St Ebbes, the NO_2 annual mean was 9 µg/m^3. This objective was therefore met at all automatic monitoring stations in 2023.

Table 6 in Appendix A compares all the monitored NO_2 annual mean concentrations obtained for the past five years from our 3 automatic monitoring sites with the air quality objective of 40µg/m^3. Figure 3 (below) shows the 19-year long term trend for levels of measured NO_2 at Oxford's three automatic monitoring stations. The results are expressed in µg/m^3.

Figure 15 on Appendix F shows the historic annual mean concentrations of NO_2 in the UK, between 1990 and 2023 for comparison purposes with Figure 3.

Figure 3- Long term trends of annual mean NO_2 of Oxford's automatic monitoring sites, 2004-2023.

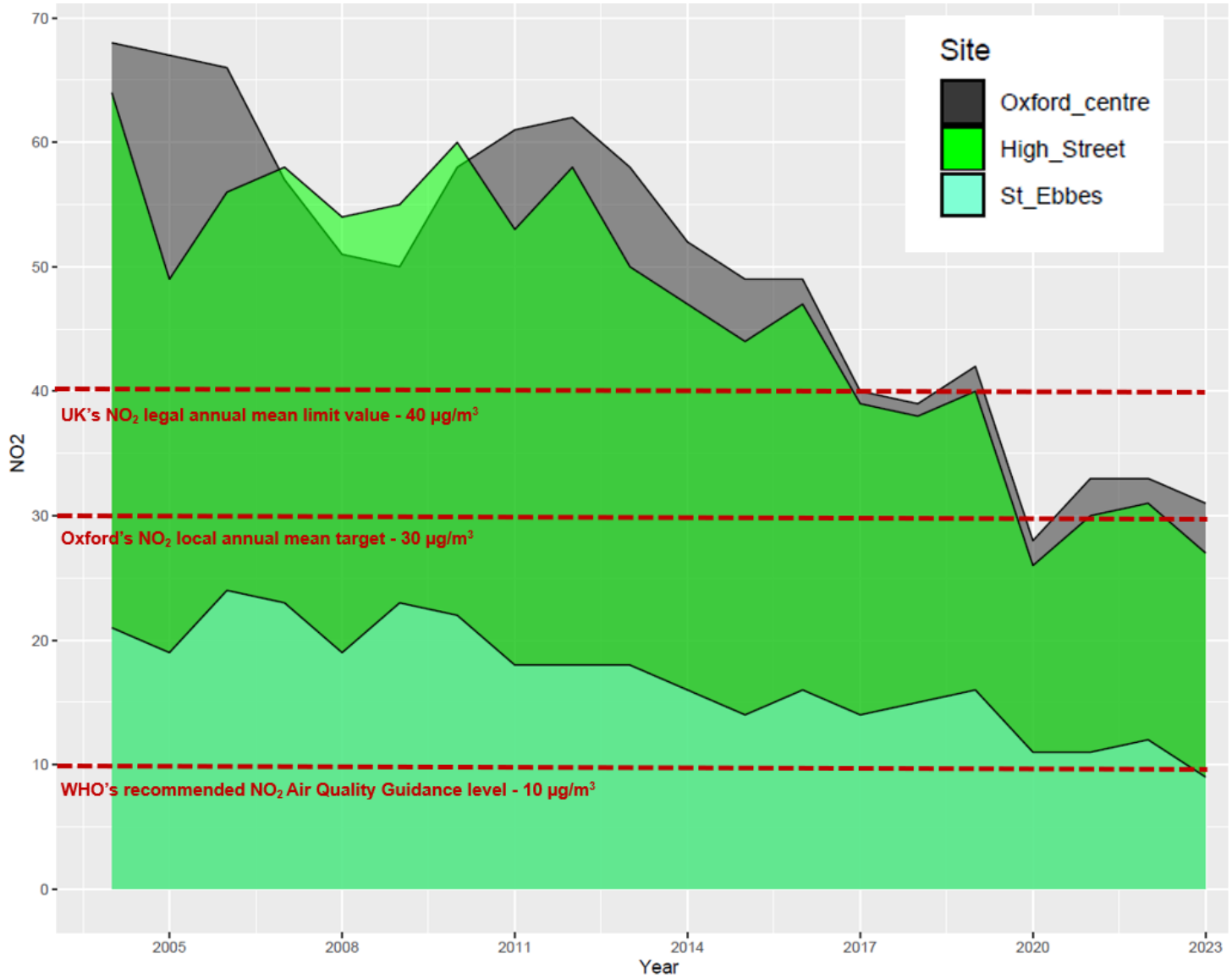


Figure 3 shows that the NO_2 levels measured in Oxford at the locations of our automatic monitoring sites have generally been decreasing since 2004.

A significant reduction of NO_2 levels at all our automatic monitoring stations can be seen in 2020, as a result of the successive restrictions of movements caused by the COVID-19 pandemic, and which had a direct effect on the reduction of traffic levels in the city.

In 2021 we saw an increase of NO_2 concentrations as a result of the lifting of those restrictions and of the recovery of the economy. After a period of short stabilisation in 2022, we now see that in 2023, NO_2 levels seem to be realigning again with the historic decreasing trajectory that we have seen in recent years.

For detailed information on time variations, daily means, and basic statistics of NO_2 at Oxford's three automatic monitoring stations please refer to Appendix F.

The AQ objective for hourly mean NO_2 concentration is 200 $\mu g/m^3$ and may be exceeded up to 18 times per calendar year. The time series of hourly averaged concentrations of NO_2 for the 3 automatic monitoring sites is compared against the UK's hourly mean limit value (dashed red line) in Figure 4 below. The results are expressed in $\mu g/m^3$.

Table 8 (Appendix A) compares the ratified continuous monitored NO_2 hourly mean concentrations for the past five years with the air quality objective of 200$\mu g/m^3$, not to be exceeded more than 18 times per year.

Figure 4 –Time series of hourly averaged concentrations of NO_2 at Oxford's automatic monitoring sites, 2023.

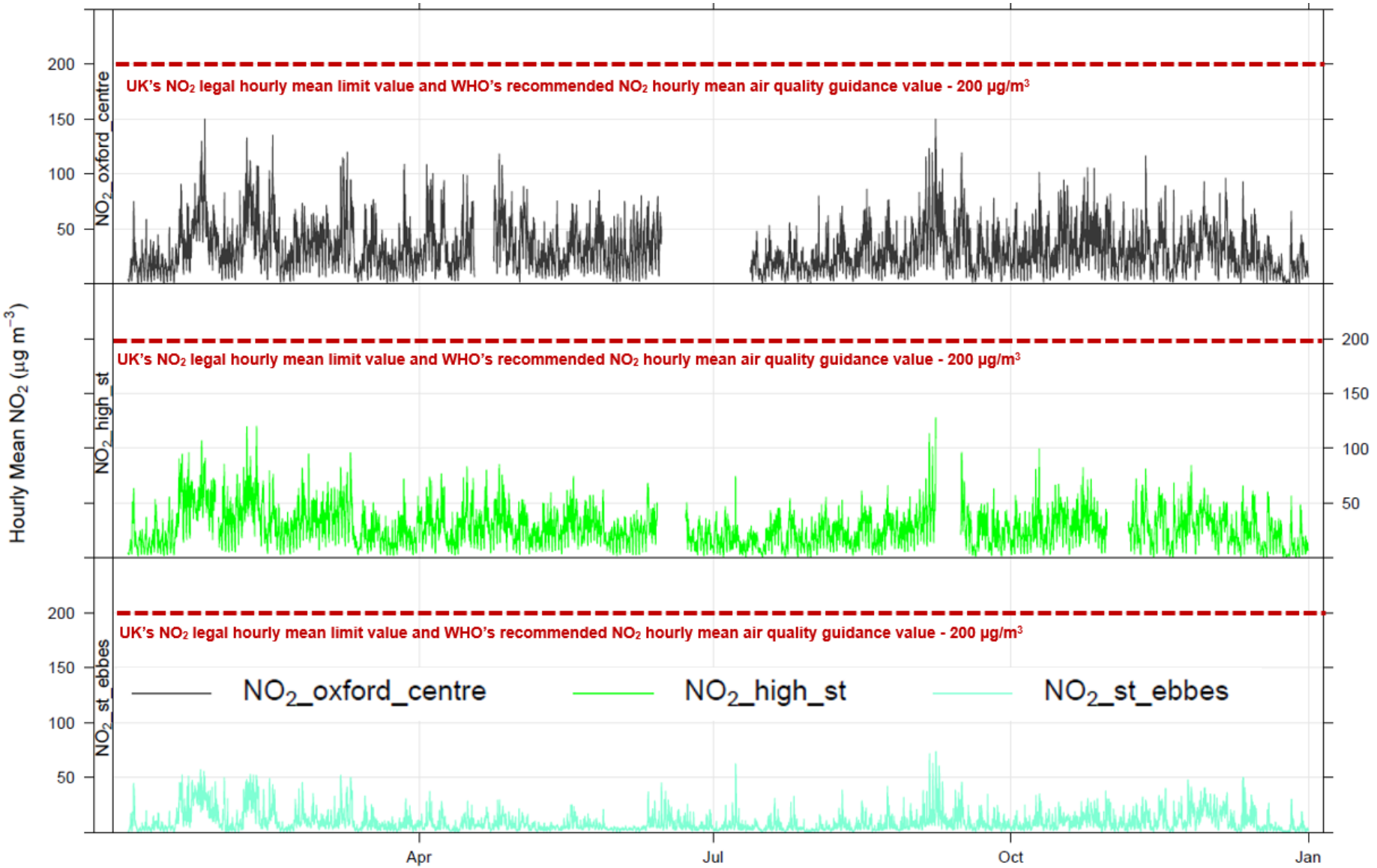


Figure 4 shows that there were no hourly mean NO_2 measurements exceeding 200 µg/m^3 in 2023. The highest hourly mean NO_2 measured was of 150 µg/m^3 and was registered twice: on the 24th of January 19:00 and on the 07th of September 18:00, both at AURN Oxford Centre Roadside.

The threshold of the "Moderate" air quality index band as set out by DEFRA for the NO_2 hourly mean ranges from 201 to 400 µg/m^3. NO_2 levels at all 3 sites were always recorded within the DEFRA "Low" Air Quality band in 2023. As none of the automatic monitoring sites have registered more than 18 exceedances of the AQ hourly objective for NO_2, this objective was therefore fully met in 2023.

Non-automatic monitoring using diffusion tubes took place at 127 Oxford locations in 2023.

The main observations of the monitoring carried out in 2023 using non-automatic monitoring are as follow:

- For the seventh consecutive year, none of the city's NO_2 diffusion tube monitoring sites located in areas considered of relevant exposure, presented an annual mean NO_2 equal or above 60 µg/m^3. According to LAQM (TG22), this is an indication that exceedances of the hourly mean objective for NO_2 are also not likely to have occurred in the city in 2023;
- The legal NO_2 annual mean objective of 40 µg/m^3 was exceeded at only two (2) of the 127 diffusion tube monitoring locations that formed part of the City Council's air quality network. From those:
    - One tube, (TF35) was installed at the residential properties located by the ring road, on the Southern Bypass - south of Botley Interchange. This tube measured a concentration of 42 µg/m^3. However, this location falls outside the City Council's jurisdiction, and forms part of an existing AQMA that is being managed by Vale of the White Horse District Council;
    - One tube (TF19) is located on the kerb at Headington Hill, a non-residential area, directly on the road. This location is far from relevant exposure, and where members of the public are not expected to be present at any time. The NO_2 annual mean concentration measured at this location was of 53 µg/m^3, (the highest NO_2 measurement of 2023);
- Nine locations within the city, were shown to be still above Oxford's local annual mean target of 30 µg/m^3 for NO_2 (a commitment laid out in the city's recent AQAP, and which is expected to be achieved across the city by 2025). Those locations are:

Holloway Road, High Street, St Clements (2x), St Aldates, Headington Hill, Oxford Ring Road (3x -Northern, Eastern and Southern bypasses). In 2022 **18** locations were in breach of this target.

- In 2023, NO_2 levels decreased (on average) by 14% across the city[8], when in comparison with the previous reporting year of 2022. For comparison purposes, NO_2 concentrations at all UK's AURN Roadside and Urban Background automatic monitoring sites have decreased (on average) by 8% and 9% in 2023.
- In 2023, NO_2 levels are (on average) 33% below the levels in 2019 (the last pre-pandemic year).
- In April 2023 Botley road was closed to traffic due to the wider improvements to the western side of Oxford Railway station. NO_2 levels are being measured in 4 different locations in Botley Road (DT33, DT35, DT36 and DT84). In 2022, the average NO_2 level measured at these locations was 19 µg/m^3. In 2023, the average NO_2 level measured was of 15.7 µg/m^3. This means that the closure of Botley road led to a 17% reduction of NO_2 levels in this road. Botley is expected to remain closed until October 2024.

Impacts of Zero Emission Zone Pilot (ZEZ)

The UK's first ZEZ was launched in February 2022.The monitoring results obtained in 2023 from all the locations in the ZEZ area show that:

- NO_2 levels have continued to reduce overall within the ZEZ.
- New Inn Hall St, Cornmarket St and Bonn Square all had reductions of 2µg/m^3 (or 13%, 11% and 9% respectively).
- St Michaels St and Queen St had marginal reductions of 1 µg/m^3 (7% and 5%).
- George St (Magdalen St) saw a slight increase of 2 µg/m^3 (or 9%).
- The highest reduction was seen at New Road (7 µg/m^3 or 24%). However, this relates with the interference of scaffolding works at St Peter's college, which have limited the effectiveness of the diffusion tube measurement.

8 According to traffic data provided by Oxfordshire County Council, traffic levels have decreased (on average) within the city of Oxford by 8% in 2023. The closure of Botley road from April 2023 is most likely the main factor that helps explaining this reduction.

- Overall, NO_2 annual mean measurements have varied from a minimum of 13 µg/m^3 (New Inn Hall St, S Michaels St) to a maximum of 21 µg/m^3 (Queen St) in all the areas covered by the zone.
- The measurement obtained at Queen St is the highest within the zone, due to this street being part of the city's bus route – however, this measurement is still 47.5% below the UK legal limit and 30% below the city's local target for this pollutant.

A significant reduction of NO_2 levels is expected on Queen St and more widely across the city in 2024, due to the recent delivery of the 159 fully electric buses from the Zero Bus Regional Areas (ZEBRA) scheme. The arrival of these buses will mean that 69% of the total bus mileage operating in the city will now be electric.

Impacts of Low Traffic Neighbourhoods (LTNS)

On the 17th October Oxfordshire County cabinet decided that the East Oxford LTNs located at St Marys, St Clements and Divinity Road would remain in place. An Oxfordshire County cabinet decision was also made on the 22nd June 2023 to approve proposals to remove LTN bollards on three roads in Cowley (Littlemore Road, Crescent Road and Littlehay Road) and to enforce the traffic restrictions using Automatic Number Plate Recognition (ANPR) cameras.

Air Quality on LTN boundary roads

- Holloway road (DT80) -boundary road for Temple Cowley LTN, saw NO_2 reductions of 3 µg/m^3 (from 34 to 31 µg/m^3). This matches the concentration obtained in 2020 (the year of the lockdowns) and represents a reduction of 6 µg/m^3 (or 16%) in relation to the NO_2 levels obtained in 2019 (pre-pandemic).
- DT8 (Oxford Road/Cowley), DT7 (Oxford Road/In Between Towns Road) and TF32 (Garsington Road/St Lukes Road -boundary roads for Temple Cowley and Florence Park LTNs, saw NO_2 reductions of 4, 2 and 3 µg/m^3 (or 14%, 7% and 15%) respectively.
- Diffusion tube TF38 on Church Cowley Road (boundary road for Florence Park and Church Cowley LTNs) measured an annual mean NO_2 of 21 µg/m^3. NO_2 monitoring was only conducted at this location for the first time in 2023, so there is no comparison with 2022. The measurement obtained in 2023 is 48% below the UK legal limit for this pollutant and 30% below Oxford's local NO_2 annual mean target.
- Iffley Road/Henley Avenue/A4158 (boundary road with St Marys, Florence Park and Church Cowley LTNs) saw NO_2 reductions of 4 µg/m^3 (or 15%) at the cross with

Boundary brook road (DT4), of 6 µg/m^3 (or 23%) at the cross with Stanley Road (TF17) and of 8 µg/m^3 (or 23%) at the cross with Newmans Road (TF34).

- St Clements Street saw NO_2 reductions of 5 µg/m^3 (or 12%) at DT55, 1 µg/m^3 (3%) at DT77 and of 2 µg/m^3 (7%) at DT85.
- Morrel Avenue (boundary road for St Clements and Divinity Road LTNs) saw NO_2 reductions of 3 µg/m^3 (19%) at monitoring location TF18 and of 1 µg/m^3 (8%) at LT4.
- Cowley road (boundary road for St Clements, St Marys and Divinity Road LTNs) saw NO_2 reductions of 4 µg/m^3 (15%) at the cross with James Street (DT72) and of 3 µg/m^3 (16%) at DT81 (cross with Union Street).

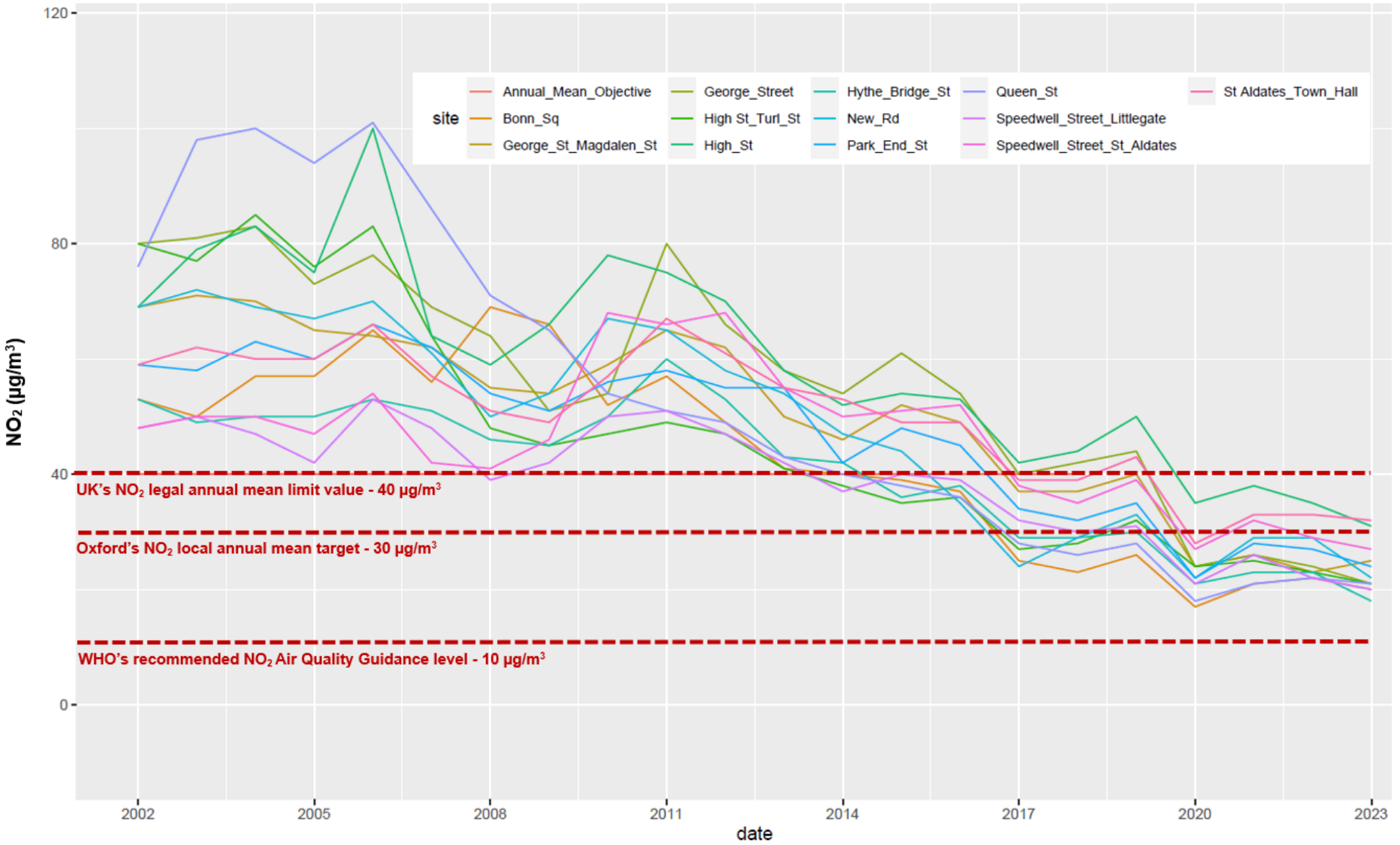
Air Quality Inside LTNs

- St Marys LTN saw NO_2 reductions of 2 µg/m^3 (15%) at both Howard St and Hurst St;
- St Clements LTN saw an NO_2 reduction of 2 µg/m^3 (15%) on Prince St and of 1 µg/m^3 (8%) at East Oxford Primary school.
- Divinity Road (within Divinity Road LTN) saw an NO_2 reduction of 2 µg/m^3 (17%).
- Diffusion tube LT6, located at St Christophers School (within Temple Cowley LTN), saw an NO_2 reduction of 2 µg/m^3 (17%).

All the monitoring locations both inside and on the boundary roads of Oxford's LTNS showed a decrease in NO_2 levels measured in 2023, when in comparison with the previous year (2022).

None of the NO_2 levels measured both inside and on the boundary roads of Oxford's LTNS was above the UK legal limit value for this pollutant, and only 3 monitoring locations (St Clements: DT55 - 38 µg/m^3 and DT77 – 34 µg/m^3), and Holloway Road (DT80 - 31 µg/m^3) showed NO_2 levels above the city's local annual mean target for NO_2 (30 µg/m^3).

Figure 5 - Long term trends of annual mean NO_2 at Oxford's diffusion tube monitoring locations, 2002-2023.



3.2.2 Particulate Matter (PM_{10} and $PM_{2.5}$)

In 2023, PM_{10} and $PM_{2.5}$ data were monitored by automatic continuous monitors at AURN St Ebbes and Oxford High Street.

In 2023, Oxford High Street (roadside) registered a PM_{10} annual mean of 14 µg/m^3. AURN St. Ebbes (urban background) of 9 µg/m^3. The annual mean PM_{10} concentration tends to be higher at roadside sites, when compared to urban background sites, due to the contribution of PM_{10} emissions from road transport sources, predominantly from non-exhaust sources (brakes, tyres, and road wear), as well as the impact of resuspension due to vehicle movements.

This objective was fully met at both these monitoring sites in 2023. These levels also show full compliance with the WHO recommended guidelines for this pollutant (15 µg/m^3.).

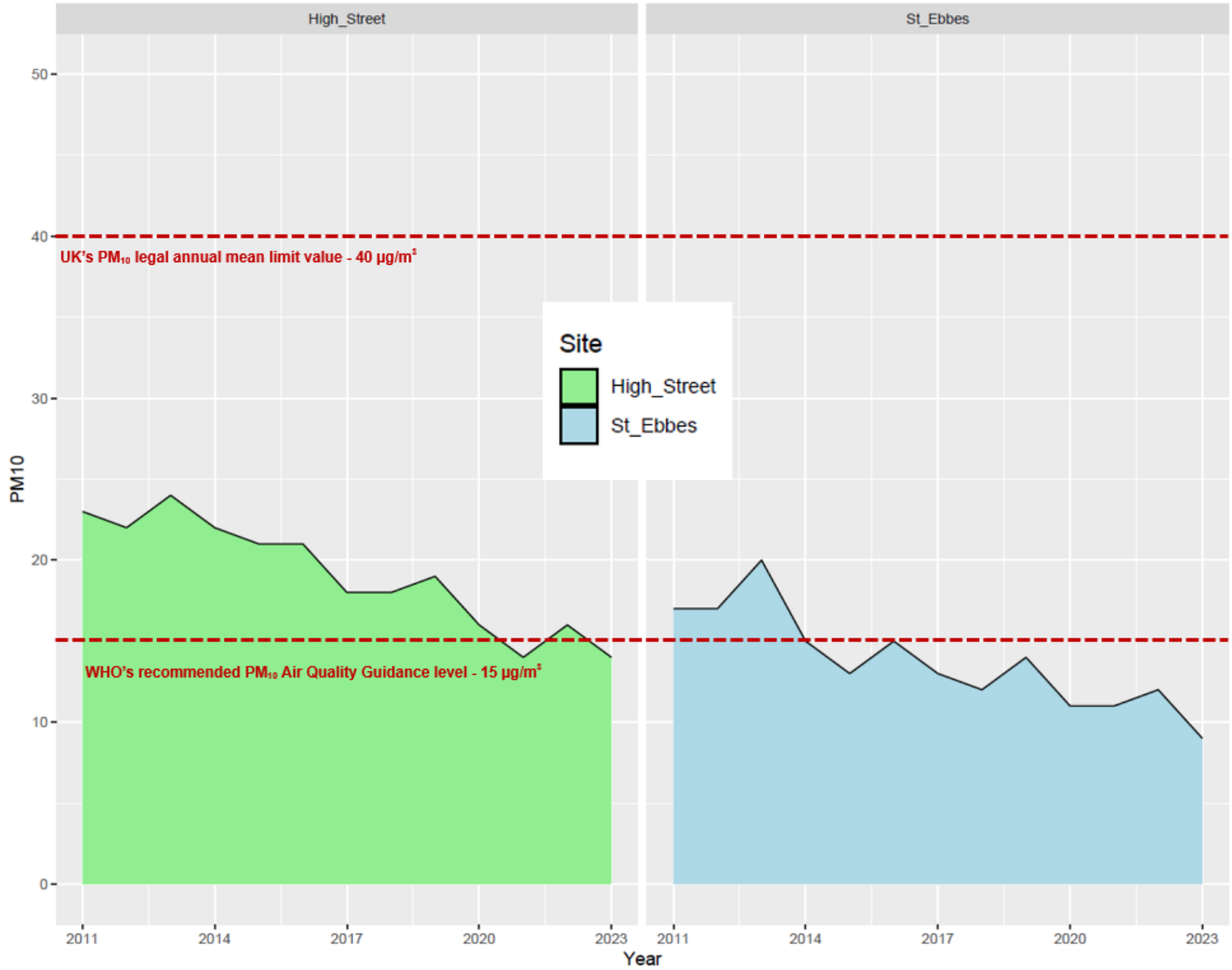
The annual mean AQ objective for PM_{10} is 40 µg/m^3. Table 9 (Appendix A) compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of 40 µg/m^3.

Figure 6 below show the 12-year long term trend for levels of measured PM_{10} at continuous monitoring stations in Oxford, along with the current recommended WHO guideline value for this pollutant, which is significantly lower than the current UK legal limit value. The overall trend of PM_{10} levels measured at our 2 automatic monitoring sites has been generally going downward since 2011.

In 2023 we can see important decreases in the levels measured at both AURN St Ebbes and High Street (3 and 2 µg/m^3 respectively, the equivalent to 25% and 12.5%), when in comparison with the previous year.

These decreases are much more pronounced than the overall average PM_{10} decrease seen at all Urban Background and Roadside monitoring sites across the UK for this pollutant in 2023, which both saw average reductions of 1.7 µg/m^3, the equivalent to 10%.

Figure 6 - Long Term Trends in Annual Mean PM_{10} ($\mu g/m^3$) at Oxford's continuous monitoring locations, 2011-2023.



A new UK air quality target now exists for $PM_{2.5}$, as a result of the Environmental Improvement Plan's (EIP) official publication on the 31st of January 2023. The legal target requires for a maximum annual mean concentration of 10 µg/m^3 to be achieved by 2040, with a new interim target of 12 µg/m^3 expected to be achieved by the end of January 2028.

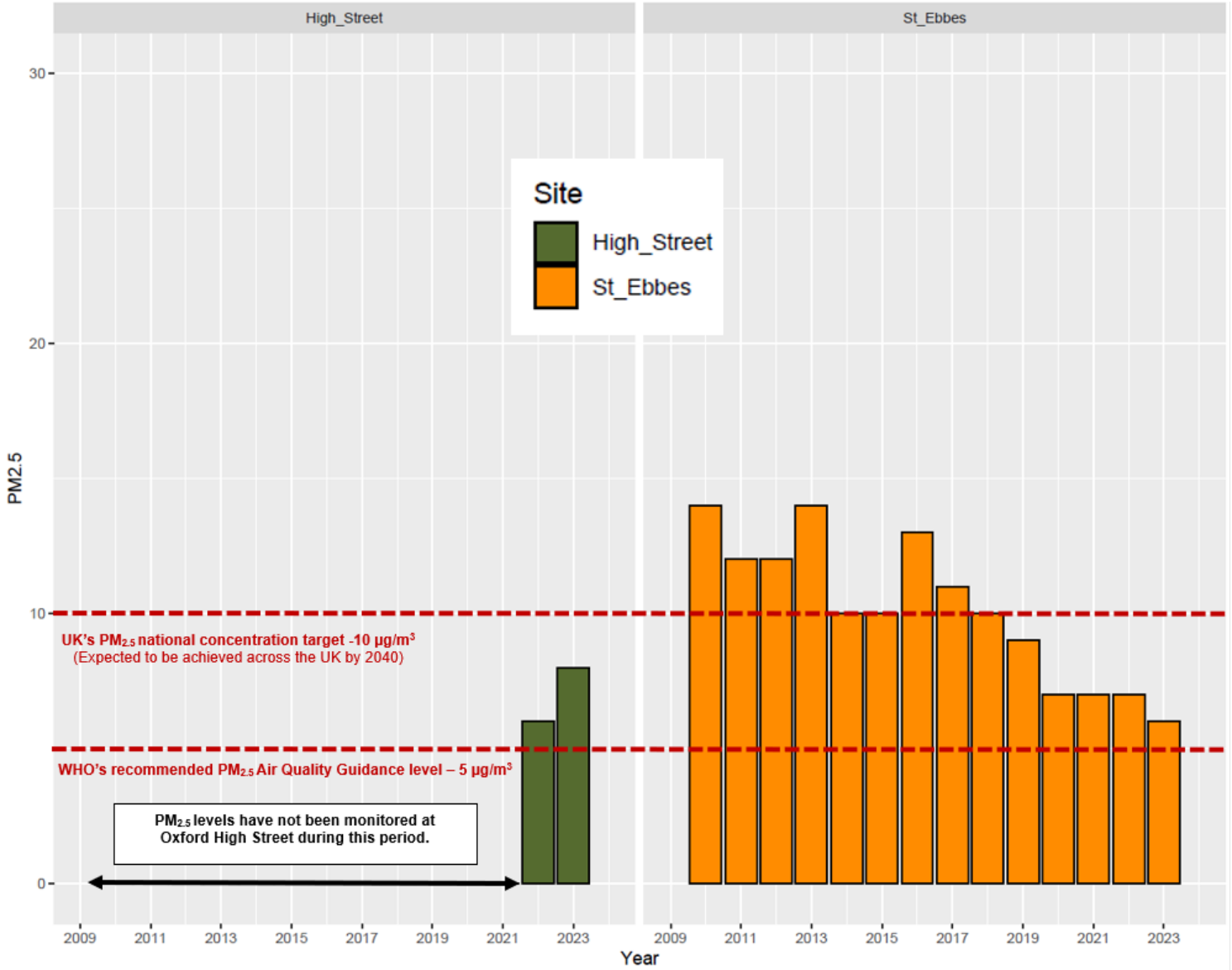
The monitored annual mean of $PM_{2.5}$ that was obtained in 2023 was of 6 µg/m^3 at AURN St. Ebbes and of 8 µg/m^3 at Oxford High Street. These annual means are very similar, both of them are in compliance with the new UK air quality target and relatively close to the annual mean of the 5 µg/m^3 which is recommended by WHO guidelines for this pollutant.

$PM_{2.5}$ measurements obtained in at AURN St Ebbes in Oxford are aligned with the UK's national trend for this pollutant. Analysis of the $PM_{2.5}$ UK national trend show that average concentrations have reduced in 2023 by 1.02 µg/m^3, (the equivalent to 12%), from 2022 levels. In 2023, $PM_{2.5}$ levels have reduced by 14% at AURN ST Ebbes (from 7 to 6 µg/m^3)

This is officially the second year we report an annual mean $PM_{2.5}$ measurement for Oxford High Street (roadside). In 2022 Oxford High Street reported an annual mean $PM_{2.5}$ of 6 ug/m^3, in 2023 of 8 µg/m^3. This slight increase seems to go against the general trend observed at AURN St Ebbes and which is also replicated nationally. However, it is important to consider that $PM_{2.5}$ data capture was relatively poor at Oxford High Street in 2022 (only 41%), as the FIDAS had only been installed in May. As a result, the annual mean $PM_{2.5}$ had to be annualised in 2022. This is likely to be the reason for the slight increase in the levels between 2022 and 2023.

Figure 7 below shows the long-term trends of $PM_{2.5}$ concentrations measured at Oxford's AURN St Ebbes and (more recently) Oxford High Street. Table 11 (Appendix A) presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations at these sites for the past five years.

Figure 7-Long term trends of annual mean $PM_{2.5}$ ($\mu g/m^3$) at Oxford's continuous monitoring stations, 2009-2023



3.2.3 Ozone

In Oxford, O_3 is measured at AURN St. Ebbes. The AQ objective for daily maximum on an 8-hour running mean is 100 µg/m^3 not to be exceeded more than 10 days a year.

The data capture of O_3 at AURN St. Ebbes in 2023 was only of 72.9%, due to several problems identified and related with the instrument's *autocal* system, faulty display and blown fuses.

In 2023, this site exceeded the AQ daily objective for ozone 113 times, during a total of 19 days during the year. AURN St. Ebbes has not met the AQ objectives for this pollutant in 2023.

Appendix A: Monitoring Results

Table 4 - Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Eastin g)	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)
CM1	AURN Oxford Centre	Roadside	451359	206157	NO_2	Yes/Oxford city-wide AQMA	Chemilumine scence	1	3	2.5
CM2	Oxford High Street	Roadside	451677	206272	NO_2; PM_{10}; $PM_{2.5}$	Yes/Oxford city-wide AQMA	Chemilumine scence and Mass spectrometry	1	2	1.5
CM3	AURN St Ebbes	Urban Background	451118	205353	NO_2; PM_{10}; $PM_{2.5}$; O_3	Yes/Oxford city-wide AQMA	Chemilumine scence, Mass spectrometry and UV Absorption	10	2	2.5

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 5 - 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)
DT1	St Ebbe's	UB	451118	205353	NO_2	YES/Oxford city-wide AQMA	10	2	YES	2.5
DT2	Weirs Lne./Abingdon Rd. LP1	RS	451904	204215	NO_2	YES/Oxford city-wide AQMA	2	2	NO	3
DT3	LP 52 Abingdon Rd.	RS	451914	204154	NO_2	YES/Oxford city-wide AQMA	3	2	NO	3
DT4	Boundary Brook Rd/ Iffley Rd	RS	452961	204662	NO_2	YES/Oxford city-wide AQMA	3	2	NO	3
DT5	Lenthall Rd Allotments	UB	452818	203448	NO_2	YES/Oxford city-wide AQMA	5	N/A	NO	1.5
DT7	Oxford Rd/ Between Towns Rd	RS	454472	204246	NO_2	YES/Oxford city-wide AQMA	3	2	NO	3
DT8	Oxford Rd(Cowley) LP13	RS	454355	204296	NO_2	YES/Oxford city-wide AQMA	3	1	NO	3
DT14	Windmill Rd. W	RS	454554	207102	NO_2	YES/Oxford city-wide AQMA	0	2.5	NO	3
DT15	London Rd./BHF	RS	454433	207058	NO_2	YES/Oxford city-wide AQMA	0	2.5	NO	3
DT16	Headley Way/London Rd. LP2	RS	453982	206817	NO_2	YES/Oxford city-wide AQMA	1	2	NO	3
DT18	The Roundway	RS	455596	207367	NO_2	YES/Oxford city-wide AQMA	0	5	NO	3
DT20	Barton Lane LP2	RS	454999	207759	NO_2	YES/Oxford city-wide AQMA	3	1	NO	3
DT25	Cuttleslowe Rbout 3 Elsfield Rd.	RS	450419	210256	NO_2	YES/Oxford city-wide AQMA	5	2	NO	3
DT26	Cuttleslowe 3 Summers Place	RS	450389	210189	NO_2	YES/Oxford city-wide AQMA	1	2	NO	3
DT27	Wolvercote 78 Sunderland Ave.	RS	449824	210198	NO_2	YES/Oxford city-wide AQMA	1	1	NO	3
DT28	Wolvercote 51 Sunderland Ave	RS	449856	210162	NO_2	YES/Oxford city-wide AQMA	1	1	NO	3
DT29	Pear Tree P&R N Gateway	RS	449530	210734	NO_2	YES/Oxford city-wide AQMA	10	4	NO	3
DT30	Osney Lne/Hollybush Row	RS	450668	206053	NO_2	YES/Oxford city-wide AQMA	2	2	NO	3
DT31	Beckett St.	RS	450566	206227	NO_2	YES/Oxford city-wide AQMA	5	2	NO	3
DT32	Royal Oxford Hotel	RS	450674	206273	NO_2	YES/Oxford city-wide AQMA	0	2.5	NO	3
DT33	Botley RD/ Mill St	RS	450409	206224	NO_2	YES/Oxford city-wide AQMA	1	1	NO	3
DT35	Botley Rd /Hillview Rd	RS	450029	206207	NO_2	YES/Oxford city-wide AQMA	1	2	NO	3
DT36	Botley Rd N (Prestwich Place)	RS	449657	206245	NO_2	YES/Oxford city-wide AQMA	1	2	NO	3
DT39	St Aldate's	RS	451359	206157	NO_2	YES/Oxford city-wide AQMA	0	2	YES	2.5
DT40	Queen St.	RS	451270	206144	NO_2	YES/Oxford city-wide AQMA	0	2	NO	3
DT41	Bonn Square	RS	451216	206133	NO_2	YES/Oxford city-wide AQMA	0	2	NO	3
DT42	New Rd.	RS	451073	206191	NO_2	YES/Oxford city-wide AQMA	2	3.5	NO	3
DT43	Park End St.	RS	450885	206275	NO_2	YES/Oxford city-wide AQMA	2	1	NO	3
DT44	Hythe Bridge St.	RS	450795	206343	NO_2	YES/Oxford city-wide AQMA	0	2	NO	3
DT45	Worcester St.	RS	450942	206424	NO_2	YES/Oxford city-wide AQMA	2	2	NO	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)
DT46	Beaumont St.	RS	451167	206519	NO_2	YES/Oxford city-wide AQMA	2	1	NO	3
DT47	George St. / Magdalen St.	RS	451222	206387	NO_2	YES/Oxford city-wide AQMA	2	0.5	NO	3
DT48	George St.	RS	450981	206344	NO_2	YES/Oxford city-wide AQMA	1	0.5	NO	3
DT49	Cornmarket St.	RS	451322	206242	NO_2	YES/Oxford city-wide AQMA	0	2	NO	3
DT50	High St. / Turl St.	RS	451467	206222	NO_2	YES/Oxford city-wide AQMA	1	2.5	NO	3
DT51	50 High St.	RS	451900	206250	NO_2	YES/Oxford city-wide AQMA	0	2.5	NO	3
DT52	Longwall St.	RS	451972	206283	NO_2	YES/Oxford city-wide AQMA	1	1	NO	3
DT53	Magdalen Bridge	RS	452099	206117	NO_2	YES/Oxford city-wide AQMA	10	2	NO	3
DT55	St Clements	RS	452326	205992	NO_2	YES/Oxford city-wide AQMA	2	0.5	NO	3
DT56	High St.	RS	451576	206232	NO_2	YES/Oxford city-wide AQMA	2.5	0.2	NO	3
DT57	Speedwell St. / St. Aldate's	RS	451407	205807	NO_2	YES/Oxford city-wide AQMA	1	3	NO	3
DT58	Folly Bridge	RS	451437	205529	NO_2	YES/Oxford city-wide AQMA	1	1	NO	3
DT59	Thames St.	RS	451353	205643	NO_2	YES/Oxford city-wide AQMA	1	3	NO	3
DT60	New Butterwyke P./ Thames St.	RS	451248	205710	NO_2	YES/Oxford city-wide AQMA	5	2	NO	3
DT64	Thames St. / Oxpens Rd.	RS	450887	205825	NO_2	YES/Oxford city-wide AQMA	5	1	NO	3
DT65	Speedwell St. / Littlegate	RS	451206	205780	NO_2	YES/Oxford city-wide AQMA	1	2	NO	3
DT68	Norfolk St.	RS	451030	205962	NO_2	YES/Oxford city-wide AQMA	0	1.5	NO	3
DT69	Paradise Square	RS	450982	205973	NO_2	YES/Oxford city-wide AQMA	0	1	NO	3
DT70	Castle St.	RS	451062	206067	NO_2	YES/Oxford city-wide AQMA	0	1.5	NO	3
DT71	BP City Motors	RS	449617	210216	NO_2	YES/Oxford city-wide AQMA	5	5	NO	3
DT72	Cowley Rd./ James Street	RS	452761	205745	NO_2	YES/Oxford city-wide AQMA	1	1	NO	3
DT73	Walton Street LP18	RS	450960	206590	NO_2	YES/Oxford city-wide AQMA	1	1	NO	3
DT76	St Gilles	RS	451226	206504	NO_2	YES/Oxford city-wide AQMA	0	2	NO	3
DT77	St Clements 2	RS	452451	205999	NO_2	YES/Oxford city-wide AQMA	0	1	NO	3
DT79	Old Abingdon Rd.	RS	451908	203919	NO_2	YES/Oxford city-wide AQMA	5	1.5	NO	3
DT80	Hollow way Road	RS	454651	204270	NO_2	YES/Oxford city-wide AQMA	4	1	NO	3
DT81	Cowley Rd/ Union Street	RS	452805	205731	NO_2	YES/Oxford city-wide AQMA	0	2	NO	3
DT82	Summertown Parade	RS	450806	208978	NO_2	YES/Oxford city-wide AQMA	2	1	NO	3
DT83	A44 Woodstock Rd.	RS	449681	210263	NO_2	YES/Oxford city-wide AQMA	8	0.5	NO	2
DT84	226 Botley Rd.	RS	449273	206274	NO_2	YES/Oxford city-wide AQMA	10	1.5	NO	3
DT85	St Clements 3	RS	452625	206068	NO_2	YES/Oxford city-wide AQMA	2.5	1	NO	3
DT86	72 Blackbird Leys	RS	455134	202841	NO_2	YES/Oxford city-wide AQMA	6	1.5	NO	2
DT87	New Inn Hall St	RS	451164	206246	NO_2	YES/Oxford city-wide AQMA	0	0.5	NO	2
DT88	St Michaels St	RS	451205	206341	NO_2	YES/Oxford city-wide AQMA	0	0.5	NO	2
DT89	Turl St/Market St	RS	451439	206330	NO_2	YES/Oxford city-wide AQMA	1	0.5	NO	2
DT90	Rose Hill (Ashhurst Way)	RS	453368	203323	NO_2	YES/Oxford city-wide AQMA	7	2	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)
DT91	Garsington Rd (Premier Place)	RS	455267	203719	NO_2	YES/Oxford city-wide AQMA	2	0.5	NO	2
DT92	BB Leys (Cuddesdon Way)	RS	455702	203062	NO_2	YES/Oxford city-wide AQMA	6	3	NO	2.5
DT93	Marston Ferry Rd	RS	451363	208785	NO_2	YES/Oxford city-wide AQMA	15	1	NO	2.5
DT94	Broad St LP6	RS	451360	206427	NO_2	YES/Oxford city-wide AQMA	4	0.1	NO	2.2
DT95	Broad S -Lbay	RS	451433	206438	NO_2	YES/Oxford city-wide AQMA	4	0.1	NO	2.2
DT96	45 Oxford Road	RS	453698	203059	NO_2	YES/Oxford city-wide AQMA	1	1.5	NO	2.6
DT97	14 Green Road flats	RS	455540	207352	NO_2	YES/Oxford city-wide AQMA	0	5.5	NO	2.4
TF1	Oxey Mead Lake 1	UB	447817	210695	NO_2	NO	(2) (3)	19	NO	1.5
TF2	Oxey Mead Lake 2	RS	447945	210710	NO_2	NO	(2) (3)	6	NO	1
TF3	Oxey Mead Lake 3	RS	448247	210661	NO_2	NO	(2) (3)	1	NO	2
TF4	Wolvercote Village	RS	449145	209732	NO_2	YES/Oxford city-wide AQMA	10	2	NO	3
TF5	Wolvercote Primary School	RS	449740	209866	NO_2	YES/Oxford city-wide AQMA	8	2	NO	2.5
TF6	306 Woodstock Road	RS	450300	209379	NO_2	YES/Oxford city-wide AQMA	10	2	NO	3
TF7	339 Banbury Road	RS	450602	209634	NO_2	YES/Oxford city-wide AQMA	10	2	NO	3
TF8	191 Woodstock Road	RS	450695	208278	NO_2	YES/Oxford city-wide AQMA	9	2	NO	2.5
TF9	48 Woodstock Road	RS	451009	207199	NO_2	YES/Oxford city-wide AQMA	6	2	NO	2.5
TF10	99 Banbury Road	RS	451035	207953	NO_2	YES/Oxford city-wide AQMA	10	2	NO	2.5
TF11	9 S. Park Road	RS	451626	206893	NO_2	YES/Oxford city-wide AQMA	5	1	NO	2.5
TF12	15 Banbury Road	RS	451170	207087	NO_2	YES/Oxford city-wide AQMA	10	2	NO	3
TF13	Walton Street 76	RS	450625	207212	NO_2	YES/Oxford city-wide AQMA	2	1	NO	3
TF14	69 Kingston Road	RS	450545	207728	NO_2	YES/Oxford city-wide AQMA	3	1	NO	2.5
TF15	Park End Street	RS	450789	206269	NO_2	YES/Oxford city-wide AQMA	2	1	NO	2.5
TF16	St Aldates 61	RS	451420	205729	NO_2	YES/Oxford city-wide AQMA	1	0.5	NO	2
TF17	23 Iffley Rd/Stanley Rd	RS	452718	205090	NO_2	YES/Oxford city-wide AQMA	6	1	NO	2.5
TF18	143 Morrell Avenue	RS	453263	205962	NO_2	YES/Oxford city-wide AQMA	6	1	NO	2.5
TF19	Headington Hill	RS	453248	206468	NO_2	YES/Oxford city-wide AQMA	(2) (3)	0.5	NO	2
TF20	Marston Rd/St Michaels Primary	RS	452853	206925	NO_2	YES/Oxford city-wide AQMA	10	1.5	NO	2.5
TF21	189 Headley Way	RS	453795	207074	NO_2	YES/Oxford city-wide AQMA	10	1	NO	2.5
TF22	255 London Rd/Gladstone Rd	RS	455154	207362	NO_2	YES/Oxford city-wide AQMA	10	1.5	NO	2.5
TF23	JR Hospital	RS	453861	207513	NO_2	YES/Oxford city-wide AQMA	5	1	NO	2
TF24	Marston Ferry Rd/Cherwell Drive	RS	452739	208351	NO_2	YES/Oxford city-wide AQMA	(2) (3)	1	NO	2.5
TF25	39 Marsh Lane	RS	453186	208209	NO_2	YES/Oxford city-wide AQMA	10	1.5	NO	2.5
TF26	Northway/Cutteslowe Park	RS	451091	210175	NO_2	YES/Oxford city-wide AQMA	(2) (3)	1	NO	1.5
TF27	Northern Bypass/Phillips Tyres	RS	452691	209225	NO_2	YES/Oxford city-wide AQMA	(2) (3)	0.5	NO	1.5
TF28	Horspath Driftway	RS	455454	205164	NO_2	YES/Oxford city-wide AQMA	10	1	NO	2
TF29	109 Old Road	RS	455138	206375	NO_2	YES/Oxford city-wide AQMA	9	2	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)
TF30	99 Oliver Road	RS	455405	204262	NO_2	YES/Oxford city-wide AQMA	10	2.5	NO	2.5
TF31	Brasenose Farm/Eastern Bypass	RS	455602	204986	NO_2	YES/Oxford city-wide AQMA	(2) (3)	1	NO	2
TF32	22 Garsington Road	RS	454690	204160	NO_2	YES/Oxford city-wide AQMA	9	2	NO	3
TF33	119 Barns Road	RS	454490	203748	NO_2	YES/Oxford city-wide AQMA	4	1.5	NO	2.5
TF34	Oxford Road/Newmans Road	RS	453717	203250	NO_2	YES/Oxford city-wide AQMA	10	1	NO	2.5
TF35	67 Southern Bypass Rd	RS	448957	205761	NO_2	NO	(2) (3)	2.5	NO	2.5
TF36	Wolvercote Meadows 1	RS	448095	208830	NO_2	NO	(2) (3)	1	NO	1.5
TF37	Wolvercote Meadows 2	RS	448688	210123	NO_2	NO	(2) (3)	1.5	NO	2
TF38	Church Cowley Rd	RS	453417	204026	NO_2	YES/Oxford city-wide AQMA	4	2.5	NO	2
LT1	26 Prince St	RS	452786	205860	NO_2	YES/Oxford city-wide AQMA	4	0.5	NO	2.5
LT2	1A Woodlands Rd	RS	453927	207068	NO_2	YES/Oxford city-wide AQMA	2	0.5	NO	2.5
LT3	47 Quarry Rd	RS	455310	206681	NO_2	YES/Oxford city-wide AQMA	4	2	NO	2.5
LT4	138-146 Morrell Av	RS	453575	206037	NO_2	YES/Oxford city-wide AQMA	4	2	NO	2.5
LT5	189 Divinity Rd	RS	453576	205938	NO_2	YES/Oxford city-wide AQMA	2	1	NO	2.5
LT6	St Christophers school	UB	454473	204588	NO_2	YES/Oxford city-wide AQMA	4	3	NO	2.5
LT7	126 The Slade	RS	454930	206287	NO_2	YES/Oxford city-wide AQMA	3	0.5	NO	2.5
LT8	East Oxford Primary School	UB	452903	205776	NO_2	YES/Oxford city-wide AQMA	3	12	NO	2.5
LT9	4 Quarry school	RS	455447	206966	NO_2	YES/Oxford city-wide AQMA	4	1	NO	2.5
LT10	23 Gladstone Rd	RS	455243	207170	NO_2	YES/Oxford city-wide AQMA	6	1	NO	2.5
LT11	19 Wharton Rd	RS	454918	207054	NO_2	YES/Oxford city-wide AQMA	6	2.5	NO	2.5
LT12	Ruskin Hall	RS	454260	207741	NO_2	YES/Oxford city-wide AQMA	0	1	NO	2.5
LT13	21 Latimer Rd	RS	454221	206796	NO_2	YES/Oxford city-wide AQMA	6	2	NO	2.5
LT14	94 Howard St	RS	453138	204917	NO_2	YES/Oxford city-wide AQMA	3	1	NO	2.5
LT15	96 Valentia Rd	RS	454013	206437	NO_2	YES/Oxford city-wide AQMA	3	1	NO	2.5
LT16	103-139 Hurst St	RS	452985	205185	NO_2	YES/Oxford city-wide AQMA	4	1	NO	2.5

Notes:

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

(2) N/A if not applicable

(3) These sites have not been put in place to directly assess the level of human exposure to air pollution, but instead to measure the potential impact of future transport schemes on traffic displacement. They are located in isolated areas, (mostly around Oxford's ring road), at a considerable distance from residential zones, and hence they are not relevant for the direct purposes of the LAQM regime.

Table 6 - 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 2023 (%) (2)	2019	2020	2021	2022	2023
CM1	451359	206157	Roadside	90.8	90.8	**42**	28	33	33	31
CM2	451677	206272	Roadside	93.2	93.2	40	26	30	31	27
CM3	451118	205353	Urban Background	99.8	99.8	16	11	11	12	9

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

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

☒ **Where exceedances of the NO_2 annual mean objective occur at locations not representative of relevant exposure, the fall-off with distance concentration has been calculated and reported concentration provided in brackets for 2023.**

Notes:

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

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

All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

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

Table 7 - Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3)

Diffusion Tube ID	Site name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2023 (%) [2]	2019	2020	2021	2022	2023
DT1	St Ebbes	451118	205353	UB	100	100	16	11	11	11	9
DT2	Weirs Lne./Abingdon Rd. LP1	451904	204215	RS	83	83	29	23	25	21	18
DT3	LP 52 Abingdon Rd.	451914	204154	RS	100	100	34	26	27	27	24
DT4	Boundary Brook Rd/ Iffley Rd	452961	204662	RS	92	92	28	23	26	27	23
DT5	Lenthall Rd Allotments	452818	203448	UB	100	100	14	10	11	10	8
DT7	Oxford Rd/ Between Towns Rd	454472	204246	RS	83	83	32	27	30	30	28
DT8	Oxford Rd(Cowley) LP13	454355	204296	RS	92	92	31	24	29	29	25
DT14	Windmill Rd. W	454554	207102	RS	100	100	35	28	30	28	27
DT15	London Rd./BHF	454433	207058	RS	100	100	27	21	23	23	21
DT16	Headley Way/London Rd. LP2	453982	206817	RS	100	100	27	19	22	21	18
DT18	The Roundway	455596	207367	RS	100	100	28	22	24	23	20
DT20	Barton Lane LP2	454999	207759	RS	100	100	28	22	23	20	18
DT25	Cuttleslowe Rbout 3 Elsfield Rd.	450419	210256	RS	92	92	35	26	28	25	24
DT26	Cuttleslowe 3 Summers Place	450389	210189	RS	100	100	**40**	31	34	32	28
DT27	Wolvercote 78 Sunderland Ave.	449824	210198	RS	100	100	29	22	22	20	19
DT28	Wolvercote 51 Sunderland Ave	449856	210162	RS	92	92	26	22	24	20	20
DT29	Pear Tree P&R N Gateway	449530	210734	RS	100	100	26	20	21	21	18
DT30	Osney Lne/Hollybush Row	450668	206053	RS	100	100	27	19	22	20	17
DT31	Beckett St.	450566	206227	RS	100	100	32	21	25	23	17
DT32	Royal Oxford Hotel	450674	206273	RS	92	92	32	24	27	25	21
DT33	Botley RD/ Mill St	450409	206224	RS	100	100	24	19	22	18	16
DT35	Botley Rd /Hillview Rd	450029	206207	RS	100	100	34	23	26	24	19
DT36	Botley Rd N (Prestwich Place)	449657	206245	RS	100	100	25	17	19	16	13
DT39	St Aldate's	451359	206157	RS	100	100	**43**	28	33	33	32
DT40	Queen St.	451270	206144	RS	100	100	28	18	21	22	21
DT41	Bonn Square	451216	206133	RS	92	92	26	17	21	22	20
DT42	New Rd.	451073	206191	RS	92	92	33	22	29	29	22
DT43	Park End St.	450885	206275	RS	92	92	35	22	28	27	24
DT44	Hythe Bridge St.	450795	206343	RS	100	100	30	21	23	23	18
DT45	Worcester St.	450942	206424	RS	92	92	**40**	26	29	31	25

Diffusion Tube ID	Site name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2023 (%) [2]	2019	2020	2021	2022	2023
DT46	Beaumont St.	451167	206519	RS	92	92	31	20	24	22	18
DT47	George St. / Magdalen St.	451222	206387	RS	83	83	**40**	24	26	23	25
DT48	George St.	450981	206344	RS	83	83	**44**	24	26	24	21
DT49	Cornmarket St.	451322	206242	RS	100	100	26	18	21	18	16
DT50	High St. / Turl St.	451467	206222	RS	92	92	32	24	25	23	21
DT51	50 High St.	451900	206250	RS	100	100	37	25	35	31	25
DT52	Longwall St.	451972	206283	RS	92	92	**41**	30	34	32	26
DT53	Magdalen Bridge	452099	206117	RS	100	100	23	16	19	17	16
DT55	St Clements	452326	205992	RS	100	100	**53**	36	39	**43**	38
DT56	High St.	451576	206232	RS	100	100	**50**	35	38	35	31
DT57	Speedwell St. / St. Aldate's	451407	205807	RS	100	100	39	27	32	29	27
DT58	Folly Bridge	451437	205529	RS	100	100	34	24	27	23	23
DT59	Thames St.	451353	205643	RS	100	100	26	18	22	19	17
DT60	New Butterwyke P./ Thames St.	451248	205710	RS	83	83	33	22	27	23	20
DT64	Thames St. / Oxpens Rd.	450887	205825	RS	100	100	23	15	18	16	13
DT65	Speedwell St. / Littlegate	451206	205780	RS	100	100	31	21	26	22	20
DT68	Norfolk St.	451030	205962	RS	75	75	27	19	24	22	22
DT69	Paradise Square	450982	205973	RS	100	100	26	18	20	18	16
DT70	Castle St.	451062	206067	RS	100	100	29	22	27	22	18
DT71	BP City Motors	449617	210216	RS	100	100	**40**	28	28	27	
DT72	Cowley Rd./ James Street	452761	205745	RS	100	100	31	22	20	27	23
DT73	Walton Street LP18	450960	206590	RS	100	100	24	15	18	18	15
DT76	St Gilles	451226	206504	RS	100	100	35	23	24	22	23
DT77	St Clements 2	452451	205999	RS	100	100	**42**	28	30	35	34
DT79	Old Abingdon Rd.	451908	203919	RS	100	100	24	17	20	18	17
DT80	Holloway Road	454651	204270	RS	92	92	37	31	35	34	31
DT81	Cowley Rd/ Union Street	452805	205731	RS	92	92	22	19	30	19	16
DT82	Summertown Parade	450806	208978	RS	92	92	27	20	21	17	17
DT83	A44 Woodstock Rd.	449681	210263	RS	100	100	**40**	30	32	30	27
DT84	226 Botley Rd.	449273	206274	RS	100	100	27	18	20	18	15
DT85	St Clements 3	452625	206068	RS	92	92	36	26	29	30	28
DT86	72 Blackbird Leys	455134	202841	RS	100	100	NM	16	18	16	15
DT87	New Inn Hall St	451164	206246	RS	100	100	NM	15	17	15	13
DT88	St Michaels St	451205	206341	RS	100	100	NM	15	17	14	13
DT89	Turl St/Market St	451439	206330	RS	92	92	NM	17	19	15	13
DT90	Rose Hill (Ashhurst Way)	453368	203323	RS	92	92	NM	NM	20	19	17
DT91	Garsington Rd (Premier Place)	455267	203719	RS	100	100	NM	NM	36	28	25

Diffusion Tube ID	Site name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2023 (%) [2]	2019	2020	2021	2022	2023
DT92	BB Leys (Cuddesdon Way)	455702	203062	RS	100	100	NM	NM	19	16	14
DT93	Marston Ferry Rd	451363	208785	RS	100	100	NM	NM	15	13	11
DT94	Broad St LP6	451360	206427	RS	92	92	NM	NM	NM	14	13
DT95	Broad S -Lbay	451433	206438	RS	75	75	NM	NM	NM	14	16
DT96	45 Oxford Road	453698	203059	RS	92	92	NM	NM	NM	NM	25
DT97	14 Green Road flats	455540	207352	RS	100	100	NM	NM	NM	NM	18
TF1	Oxey Mead Lake 1	447817	210695	UB	100	100	NM	NM	NM	9	11
TF2	Oxey Mead Lake 2	447945	210710	RS	92	92	NM	NM	NM	13	14
TF3	Oxey Mead Lake 3	448247	210661	RS	100	100	NM	NM	NM	25	21
TF4	Wolvercote Village	449145	209732	RS	100	100	NM	NM	NM	13	11
TF5	Wolvercote Primary School	449740	209866	RS	100	100	NM	NM	NM	14	12
TF6	306 Woodstock Road	450300	209379	RS	100	100	NM	NM	NM	15	13
TF7	339 Banbury Road	450602	209634	RS	100	100	NM	NM	NM	23	21
TF8	191 Woodstock Road	450695	208278	RS	100	100	NM	NM	NM	20	17
TF9	48 Woodstock Road	451009	207199	RS	100	100	NM	NM	NM	20	18
TF10	99 Banbury Road	451035	207953	RS	75	75	NM	NM	NM	19	18
TF11	9 S. Park Road	451626	206893	RS	83	83	NM	NM	NM	17	15
TF12	15 Banbury Road	451170	207087	RS	100	100	NM	NM	NM	17	14
TF13	Walton Street 76	450625	207212	RS	92	92	NM	NM	NM	20	16
TF14	69 Kingston Road	450545	207728	RS	100	100	NM	NM	NM	15	11
TF15	Park End Street	450789	206269	RS	83	83	NM	NM	NM	36	29
TF16	St Aldates 61	451420	205729	RS	100	100	NM	NM	NM	28	21
TF17	23 Iffley Rd/Stanley Rd	452718	205090	RS	100	100	NM	NM	NM	26	20
TF18	143 Morrell Avenue	453263	205962	RS	100	100	NM	NM	NM	16	13
TF19	Headington Hill	453248	206468	RS	75	75	NM	NM	NM	**70**	**53**
TF20	Marston Rd/St Michaels Primary	452853	206925	RS	100	100	NM	NM	NM	16	12
TF21	189 Headley Way	453795	207074	RS	100	100	NM	NM	NM	22	18
TF22	255 London Rd/Gladstone Rd	455154	207362	RS	100	100	NM	NM	NM	25	21
TF23	JR Hospital	453861	207513	RS	100	100	NM	NM	NM	23	20
TF24	Marston Ferry Rd/Cherwell Drive	452739	208351	RS	100	100	NM	NM	NM	16	12
TF25	39 Marsh Lane	453186	208209	RS	100	100	NM	NM	NM	17	15
TF26	Northway/Cutteslowe Park	451091	210175	RS	100	100	NM	NM	NM	23	19
TF27	Northern Bypass/Phillips Tyres	452691	209225	RS	75	75	NM	NM	NM	**42**	32
TF28	Horspath Driftway	455454	205164	RS	100	100	NM	NM	NM	22	18
TF29	109 Old Road	455138	206375	RS	100	100	NM	NM	NM	15	13
TF30	99 Oliver Road	455405	204262	RS	92	92	NM	NM	NM	34	25

Diffusion Tube ID	Site name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2023 (%) [2]	2019	2020	2021	2022	2023
TF31	Brasenose Farm/Eastern Bypass	455602	204986	RS	100	100	NM	NM	NM	**43**	34
TF32	22 Garsington Road	454690	204160	RS	100	100	NM	NM	NM	20	17
TF33	119 Barns Road	454490	203748	RS	92	92	NM	NM	NM	16	16
TF34	Oxford Road/Newmans Road	453717	203250	RS	100	100	NM	NM	NM	35	27
TF35	67 Southern Bypass Road	448957	205761	RS	100	100	NM	NM	NM	**57**	**42**
TF36	Wolvercote Meadows 1	448095	208830	RS	100	100	NM	NM	NM	36	29
TF37	Wolvercote Meadows 2	448688	210123	RS	83	83	NM	NM	NM	**42**	26
TF38	Church Cowley Rd	453417	204026	RS	75	75	NM	NM	NM	NM	21
LT1	26 Prince St	452786	205860	RS	83	83	NM	NM	17	13	11
LT2	1A Woodlands Rd	453927	207068	RS	100	100	NM	NM	12	10	10
LT3	47 Quarry Rd	455310	206681	RS	83	83	NM	NM	15	13	12
LT4	138-146 Morrell Av	453575	206037	RS	100	100	NM	NM	16	13	12
LT5	189 Divinity Rd	453576	205938	RS	92	92	NM	NM	18	12	10
LT6	St Christophers school	454473	204588	UB	100	100	NM	NM	13	12	10
LT7	126 The Slade	454930	206287	RS	100	100	NM	NM	26	22	19
LT8	East Oxford Primary School	452903	205776	UB	100	100	NM	NM	15	13	12
LT9	4 Quarry school	455447	206966	RS	82	82	NM	NM	13	13	11
LT10	23 Gladstone Rd	455243	207170	RS	100	100	NM	NM	13	13	10
LT11	19 Wharton Rd	454918	207054	RS	92	92	NM	NM	13	11	11
LT12	Ruskin Hall	454260	207741	RS	100	100	NM	NM	18	16	15
LT13	21 Latimer Rd	454221	206796	RS	100	100	NM	NM	13	12	11
LT14	94 Howard St	453138	204917	RS	100	100	NM	NM	16	13	11
LT15	96 Valentia Rd	454013	206437	RS	100	100	NM	NM	16	12	10
LT16	103-139 Hurst St	452985	205185	RS	92	92	NM	NM	16	13	11

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

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

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

Notes:

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

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

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

Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

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

Table 8 - 1Hour 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 2023 (%) (2)	2019	2020	2021	2022	2023
CM1	451359	206157	Roadside	90.8	90.8	3	0	0	1	0
CM2	451677	206272	Roadside	93.2	93.2	2	1	0	0	0
CM3	451118	205353	Urban Background	99.8	99.8	0	0	0	0	0

Notes:

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

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

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

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

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

Table 9 - Annual Mean PM_{10} Monitoring Results ($\mu g/m^3$)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
CM2	451677	206272	Roadside	99.3	99.3	19	16	14	16	14
CM3	451118	205353	Urban Background	99.9	99.9	14	11	11	12	9

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

Notes:

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

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

All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
CM2	451677	206272	Roadside	99.3	99.3	7	0	0	2	0
CM3	451118	205353	Urban Background	99.9	99.9	5	0	1	0	0

Notes:

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

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

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

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

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

Table 11 – Annual Mean $PM_{2.5}$ Monitoring Results (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 2023 (%) (2)	2019	2020	2021	2022	2023
CM2	451677	206272	Roadside	99.3	99.3	NM	NM	NM	6	8
CM3	451118	205353	Urban Background	99.9	99.9	9	7	7	7	6

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

Notes:

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

All means have be6en "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

NM – Not Monitored

Appendix B: Full Monthly Diffusion Tube Results for 2023

Table 12 - NO_2 2023 Diffusion Tube Results ($\mu g/m^3$)

DT ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.75)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DT1	St Ebbes	451118	205353	17.4	16.5	11.7	9.9	9.2	9.4	8.1	9.5	14.3	13.2	15.6	8.2	11.9	9		
DT2	Weirs Lne./Abingdon Rd. LP1	451904	204215	22.7	27.9	27.2	25.2	24.9	22.2	M	20.1	27.5	27.1	M	19.8	24.5	18		
DT3	LP 52 Abingdon Rd.	451914	204154	39.8	37.0	33.4	32.6	25.3	26.3	27.4	26.6	41.0	34.6	40.6	25.8	32.5	24		
DT4	Boundary Brook Rd/ Iffley Rd	452961	204662	35.2	33.7	32.4	30.9	M	29.8	26.2	24.2	38.2	29.4	32.1	28.5	31.0	23		
DT5	Lenthall Rd Allotments	452818	203448	17.2	14.4	12.0	9.3	8.8	7.8	6.8	8.7	13.8	10.3	12.2	10.3	11.0	8		
DT7	Oxford Rd/ Between Towns Rd	454472	204246	43.5	42.6	38.7	36.7	25.9	30.1	M	33.2	M	39.9	40.9	38.4	37.0	28		
DT8	Oxford Rd(Cowley) LP13	454355	204296	39.2	24.0	37.8	36.4	29.0	28.2	22.3	31.0	48.4	M	40.3	31.8	33.5	25		
DT14	Windmill Rd. W	454554	207102	34.0	43.7	36.3	31.5	24.3	28.6	35.9	32.0	43.9	40.5	44.0	37.8	36.0	27		
DT15	London Rd./BHF	454433	207058	30.7	31.8	29.9	31.7	24.9	27.1	21.7	27.5	37.8	35.3	17.2	22.5	28.2	21		
DT16	Headley Way/London Rd. LP2	453982	206817	27.1	27.2	23.9	28.0	26.7	25.7	16.5	24.0	27.0	22.3	28.8	16.9	24.5	18		
DT18	The Roundway	455596	207367	30.4	29.0	28.1	26.1	26.7	24.9	18.5	23.2	31.0	26.4	31.0	20.0	26.3	20		
DT20	Barton Lane LP2	454999	207759	28.9	26.9	25.3	29.7	26.5	23.6	12.6	21.2	22.9	20.8	28.2	18.0	23.7	18		
DT25	Cuttleslowe Rbout 3 Elsfield Rd.	450419	210256	40.6	M	34.1	33.4	30.6	26.5	27.0	27.3	35.8	34.9	31.9	31.8	32.2	24		
DT26	Cuttleslowe 3 Summers Place	450389	210189	40.6	43.3	37.3	46.8	41.0	41.4	22.3	34.9	42.5	36.5	41.6	25.3	37.8	28		
DT27	Wolvercote 78 Sunderland Ave.	449824	210198	30.8	32.1	25.2	24.3	16.1	28.6	20.9	21.4	29.5	26.5	31.3	22.8	25.8	19		
DT28	Wolvercote 51 Sunderland Ave	449856	210162	30.3	28.5	28.3	28.4	25.0	24.0	M	25.1	29.4	26.3	30.4	21.3	27.0	20		
DT29	Pear Tree P&R N Gateway	449530	210734	29.3	31.8	28.5	20.6	15.8	16.3	19.5	22.2	27.6	28.7	25.5	29.9	24.6	18		
DT30	Osney Lne/Hollybush Row	450668	206053	25.0	29.6	27.4	24.4	21.6	19.1	18.9	19.4	25.3	25.6	27.9	14.6	23.2	17		
DT31	Beckett St.	450566	206227	31.0	23.8	27.2	20.8	18.2	18.8	17.5	19.6	22.8	23.3	31.4	15.1	22.5	17		
DT32	Royal Oxford Hotel	450674	206273	32.4	35.3	31.4	30.4	22.0	M	19.6	25.2	32.8	28.4	29.0	14.7	27.4	21		
DT33	Botley RD/ Mill St	450409	206224	26.7	28.1	25.7	24.8	20.6	19.0	11.5	14.7	22.3	21.3	20.5	14.8	20.8	16		
DT35	Botley Rd /Hillview Rd	450029	206207	34.7	30.8	28.4	24.4	18.7	21.0	19.6	21.3	29.9	27.6	32.2	20.2	25.7	19		
DT36	Botley Rd N (Prestwich Place)	449657	206245	26.1	20.8	19.7	18.9	12.4	11.9	11.0	13.5	19.4	16.6	22.2	13.2	17.1	13		
DT39	St Aldate's	451359	206157	48.6	42.7	41.7	49.7	40.9	41.3	31.7	39.9	51.9	46.3	39.6	30.3	42.1	32		
DT40	Queen St.	451270	206144	28.6	22.7	27.8	34.3	26.2	29.1	20.5	28.6	35.5	26.3	34.2	25.3	28.3	21		
DT41	Bonn Square	451216	206133	33.9	32.5	27.2	29.4	23.2	22.5	19.8	26.2	M	28.1	34.8	20.8	27.1	20		
DT42	New Rd.	451073	206191	32.7	38.1	19.6	36.7	30.5	32.0	20.1	27.8	M	32.1	37.8	17.7	29.6	22		

DT ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.75)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DT43	Park End St.	450885	206275	36.1	39.5	33.2	33.6	25.4	28.2	24.7	29.9	36.7	M	35.8	23.3	31.5	24		
DT44	Hythe Bridge St.	450795	206343	28.3	26.8	28.0	25.2	22.2	23.8	18.6	22.5	30.2	25.7	29.7	11.3	24.4	18		
DT45	Worcester St.	450942	206424	40.3	30.7	24.6	36.3	29.9	34.6	24.3	33.0	38.7	M	39.3	30.9	33.0	25		
DT46	Beaumont St.	451167	206519	24.6	30.3	18.6	23.6	21.3	20.2	20.6	M	29.0	30.5	26.9	22.7	24.4	18		
DT47	George St. / Magdalen St.	451222	206387	M	23.7	32.1	37.3	29.3	31.5	29.0	35.7	M	35.3	42.4	35.7	33.2	25		
DT48	George St.	450981	206344	36.1	37.3	32.2	28.6	20.1	24.4	23.0	25.2	M	34.0	M	25.1	28.6	21		
DT49	Cornmarket St.	451322	206242	25.7	26.2	9.2	22.0	15.9	18.5	15.5	18.2	26.3	28.3	26.9	16.8	20.8	16		
DT50	High St. / Turl St.	451467	206222	32.0	29.4	30.9	31.9	26.8	29.3	18.9	25.2	36.3	M	30.9	22.5	28.6	21		
DT51	50 High St.	451900	206250	37.6	44.1	35.4	39.2	34.3	34.4	22.2	25.0	37.8	36.9	36.9	23.3	33.9	25		
DT52	Longwall St.	451972	206283	36.0	40.6	18.6	34.8	25.2	31.5	26.9	M	48.4	43.1	46.7	35.6	35.2	26		
DT53	Magdalen Bridge	452099	206117	25.1	15.8	37.3	25.0	19.8	17.9	12.0	18.8	23.1	21.2	18.6	15.4	20.8	16		
DT55	St Clements	452326	205992	42.7	44.4	52.4	55.2	41.7	53.2	46.2	47.2	67.3	59.6	52.8	48.0	50.9	**38**	31	NO_2 Fall off With Distance Calculator used (Please see Table 15 -Appendix C)
DT56	High St.	451576	206232	45.1	51.2	44.5	36.5	36.5	37.8	35.2	41.7	40.0	43.4	47.2	40.0	41.6	31		
DT57	Speedwell St. / St. Aldate's	451407	205807	41.2	45.1	35.4	33.4	35.3	32.6	29.1	33.1	39.3	38.2	35.7	29.5	35.7	27		
DT58	Folly Bridge	451437	205529	36.1	34.3	29.2	32.5	31.6	31.9	23.5	26.7	36.6	30.8	31.2	24.8	30.8	23		
DT59	Thames St.	451353	205643	24.5	24.7	22.9	30.2	30.5	26.7	13.9	18.9	24.3	20.0	27.1	15.1	23.2	17		
DT60	New Butterwyke P./ Thames St.	451248	205710	30.0	28.1	27.1	37.8	30.8	M	18.1	22.7	27.8	25.0	M	18.7	26.6	20		
DT64	Thames St. / Oxpens Rd.	450887	205825	19.6	20.5	20.2	17.1	18.8	17.7	11.7	17.1	18.9	18.1	20.6	10.9	17.6	13		
DT65	Speedwell St. / Littlegate	451206	205780	30.2	31.7	28.2	32.4	25.3	23.9	16.1	23.5	28.2	31.5	28.1	18.7	26.5	20		
DT68	Norfolk St.	451030	205962	38.4	40.2	35.9	32.5	M	23.3	21.8	24.1	30.4	22.5	M	M	29.9	22		
DT69	Paradise Square	450982	205973	26.7	26.2	18.7	21.6	17.5	17.3	16.0	18.5	27.1	25.9	24.9	15.6	21.3	16		
DT70	Castle St.	451062	206067	30.1	23.6	25.4	29.5	25.9	23.3	17.2	23.8	27.5	25.7	17.1	15.3	23.7	18		
DT71	BP City Motors	449617	210216	26.8	36.6	31.9	32.5	29.4	31.2	22.6	31.5	46.0	34.2	36.1	27.3	32.2	24		
DT72	Cowley Rd./ James Street	452761	205745	33.0	35.0	30.5	35.2	29.1	32.4	20.0	26.5	37.3	28.4	28.8	26.2	30.2	23		
DT73	Walton Street LP18	450960	206590	22.4	22.5	22.0	21.2	17.1	14.3	14.8	18.3	16.8	25.5	21.1	16.4	19.4	15		
DT76	St Gilles	451226	206504	35.1	35.3	29.7	24.8	20.9	23.1	25.6	30.5	37.4	43.0	32.5	36.2	31.2	23		
DT77	St Clements 2	452451	205999	44.2	44.2	46.1	46.1	34.3	39.8	40.4	43.4	61.9	51.8	49.9	41.3	45.3	34		
DT79	Old Abingdon Rd.	451908	203919	27.3	25.6	22.7	23.1	17.8	20.5	16.6	20.3	26.8	26.6	26.4	20.9	22.9	17		
DT80	Holloway Road	454651	204270	51.3	45.4	40.9	37.2	34.1	M	37.8	45.5	51.8	37.0	42.3	34.3	41.6	31		
DT81	Cowley Rd/ Union Street	452805	205731	M	25.7	20.1	21.4	17.1	16.5	16.3	17.4	25.2	23.9	26.2	19.3	20.8	16		
DT82	Summertown Parade	450806	208978	27.4	25.5	23.0	16.8	M	15.4	15.9	19.4	27.5	26.0	30.8	22.5	22.7	17		
DT83	A44 Woodstock Rd.	449681	210263	43.5	41.0	37.4	31.7	27.1	27.8	29.3	32.8	42.1	39.0	37.8	37.3	35.6	27		

DT ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.75)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DT84	226 Botley Rd.	449273	206274	28.0	29.6	22.9	19.5	12.3	14.4	14.6	17.1	22.3	21.1	21.1	18.3	20.1	15		
DT85	St Clements 3	452625	206068	42.0	34.3	38.0	M	41.6	39.2	25.9	33.9	44.5	37.3	43.3	29.7	37.2	28		
DT86	72 Blackbird Leys	455134	202841	26.2	25.0	19.9	18.3	15.4	16.1	13.5	14.6	22.3	21.0	26.1	18.0	19.7	15		
DT87	New Inn Hall St	451164	206246	24.6	24.3	20.5	16.2	14.5	13.2	11.1	14.6	18.4	20.2	23.7	11.6	17.7	13		
DT88	St Michaels St	451205	206341	24.3	25.3	17.5	14.4	15.1	12.4	9.9	13.7	17.5	20.6	13.5	15.8	16.7	13		
DT89	Turl St/Market St	451439	206330	22.6	21.5	18.0	18.2	13.7	12.6	10.8	13.3	M	20.2	14.9	18.0	16.7	13		
DT90	Rose Hill (Ashhurst Way)	453368	203323	25.7	27.5	24.3	19.8	M	18.3	15.6	19.6	26.6	25.6	28.3	14.2	22.3	17		
DT91	Garsington Rd (Premier Place)	455267	203719	46.4	32.4	37.6	33.7	27.4	31.1	29.1	28.6	40.8	33.9	28.4	34.2	33.6	25		
DT92	BB Leys (Cuddesdon Way)	455702	203062	25.8	16.5	16.8	19.3	18.1	16.2	12.2	15.7	21.1	20.9	27.9	17.6	19.0	14		
DT93	Marston Ferry Rd	451363	208785	18.5	20.6	14.5	12.8	11.7	11.7	9.6	12.8	20.2	15.8	18.7	12.9	15.0	11		
DT94	Broad St LP6	451360	206427	M	16.5	20.4	10.1	14.4	11.2	13.3	17.0	23.3	20.7	30.1	18.7	17.8	13		
DT95	Broad S -Lbay	451433	206438	26.9	M	21.2	22.2	M	14.3	13.3	M	22.5	28.1	16.9	23.3	21.0	16		
DT96	45 Oxford Road	453698	203059	33.2	43.0	32.6	36.5	M	31.3	24.1	30.7	36.6	33.7	36.3	21.7	32.7	25		
DT97	14 Green Road flats	455540	207352	32.0	26.5	21.0	24.9	24.7	22.6	20.4	19.7	23.1	23.2	25.7	16.2	23.3	18		
TF1	Oxey Mead Lake 1	447817	210695	16.7	12.2	10.0	13.0	10.8	6.4	5.6	7.9	11.1	10.8	57.6	17.9	15.0	11		
TF2	Oxey Mead Lake 2	447945	210710	19.5	17.4	14.4	17.3	15.8	18.4	8.4	11.5	14.8	13.4	57.3	M	18.9	14		
TF3	Oxey Mead Lake 3	448247	210661	30.8	32.1	22.8	31.3	35.1	30.1	18.9	27.5	35.9	31.6	26.5	15.6	28.2	21		
TF4	Wolvercote Village	449145	209732	20.5	15.7	13.6	14.3	13.7	10.4	9.6	10.4	15.7	14.7	17.4	12.1	14.0	11		
TF5	Wolvercote Primary School	449740	209866	21.8	18.8	15.1	17.6	16.7	10.8	8.6	12.4	20.4	16.1	21.0	11.5	15.9	12		
TF6	306 Woodstock Road	450300	209379	20.4	18.2	14.9	17.9	15.2	12.0	11.5	15.6	24.3	20.2	21.7	15.9	17.3	13		
TF7	339 Banbury Road	450602	209634	36.1	21.7	28.5	26.4	26.4	19.8	19.9	24.1	34.2	30.1	33.5	27.7	27.4	21		
TF8	191 Woodstock Road	450695	208278	29.3	14.6	22.9	23.7	18.5	18.0	17.8	21.3	29.2	27.6	29.8	23.2	23.0	17		
TF9	48 Woodstock Road	451009	207199	27.3	27.2	24.1	25.0	20.1	18.8	19.3	19.7	26.2	27.7	31.1	22.4	24.1	18		
TF10	99 Banbury Road	451035	207953	24.0	M	23.6	21.0	21.8	M	M	20.5	26.2	25.6	29.8	21.3	23.8	18		
TF11	9 S. Park Road	451626	206893	23.1	23.1	17.8	20.3	17.8	14.1	13.5	M	M	23.7	23.8	19.9	19.7	15		
TF12	15 Banbury Road	451170	207087	24.1	22.0	16.1	20.6	16.4	13.7	11.5	14.8	21.3	21.3	22.0	15.9	18.3	14		
TF13	Walton Street 76	450625	207212	29.9	30.0	21.1	18.6	13.6	12.7	15.5	16.8	24.4	22.8	25.3	M	21.0	16		
TF14	69 Kingston Road	450545	207728	18.1	18.5	15.4	13.3	10.8	9.4	9.5	12.6	18.5	17.9	18.4	14.1	14.7	11		
TF15	Park End Street	450789	206269	43.7	47.5	39.2	40.6	31.4	M	M	35.1	43.2	37.9	39.1	26.1	38.4	29		
TF16	St Aldates 61	451420	205729	37.9	32.6	29.8	27.9	23.3	19.0	19.7	26.1	30.2	30.1	32.6	26.6	28.0	21		
TF17	23 Iffley Rd/Stanley Rd	452718	205090	32.5	30.8	26.2	26.6	22.5	21.2	21.9	25.2	35.3	30.1	30.7	24.7	27.3	20		
TF18	143 Morrell Avenue	453263	205962	21.1	22.5	17.8	19.1	15.6	16.7	11.9	13.6	17.0	18.0	22.2	15.1	17.6	13		

DT ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.75)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
TF19	Headington Hill	453248	206468	M	71.0	69.7	68.0	71.3	77.6	68.4	73.4	72.5	M	58.4	M	70	**53 (*)**	**53 (*)**	Monitoring not for LAQM (assessing human exposure) purposes but to assess potential AQ impacts from traffic displacement that result from future transport schemes
TF20	Marston Rd/St Michaels Primary	452853	206925	23.7	19.0	16.8	21.6	10.1	9.7	10.8	12.5	17.8	16.1	20.6	11.9	15.9	12		
TF21	189 Headley Way	453795	207074	34.0	24.5	23.6	27.0	18.7	18.5	14.6	18.1	32.4	25.3	28.4	23.8	24.1	18		
TF22	255 London Rd/Gladstone Rd	455154	207362	41.3	24.1	29.8	30.4	22.2	22.9	21.6	25.7	35.9	31.1	31.0	27.7	28.6	21		
TF23	JR Hospital	453861	207513	32.8	26.6	24.2	28.7	23.3	24.1	19.6	24.5	34.1	31.4	31.4	21.0	26.8	20		
TF24	Marston Ferry Rd/Cherwell Drive	452739	208351	22.4	13.2	17.9	15.5	9.1	10.7	12.7	12.9	22.0	19.4	23.1	17.4	16.4	12		
TF25	39 Marsh Lane	453186	208209	28.8	24.7	19.9	19.3	17.4	14.2	14.8	16.0	23.6	22.1	26.2	16.0	20.3	15		
TF26	Northway/Cutteslowe Park	451091	210175	32.5	30.7	25.9	30.1	27.2	26.6	17.2	23.8	26.0	24.6	25.8	18.1	25.7	19		
TF27	Northern Bypass/Phillips Tyres	452691	209225	57.2	43.5	42.4	42.2	M	M	M	36.8	43.7	46.2	48.5	28.5	43.2	32		
TF28	Horspath Driftway	455454	205164	29.6	26.1	23.4	25.2	18.8	17.9	19.7	19.7	27.6	31.8	29.0	20.8	24.1	18		
TF29	109 Old Road	455138	206375	21.1	24.4	16.3	17.1	13.3	10.7	13.2	14.4	20.1	20.8	22.0	14.0	17.3	13		
TF30	99 Oliver Road	455405	204262	M	40.2	37.4	43.3	36.1	20.4	21.9	26.2	41.1	37.2	37.1	28.7	33.6	25		
TF31	Brasenose Farm/Eastern Bypass	455602	204986	53.5	51.6	44.0	45.9	53.4	48.7	35.2	42.4	45.7	43.7	45.2	36.9	45.5	34		
TF32	22 Garsington Road	454690	204160	29.6	27.7	18.6	26.1	20.5	18.1	13.2	19.3	27.3	26.5	25.2	17.1	22.4	17		
TF33	119 Barns Road	454490	203748	28.6	25.4	18.2	21.5	17.2	11.6	M	21.2	21.8	17.5	26.4	19.6	20.8	16		
TF34	Oxford Road/Newmans Road	453717	203250	44.7	43.7	35.2	37.6	38.3	38.0	30.9	32.9	M	34.8	M	23.5	36.0	27		
TF35	67 Southern Bypass Road	448957	205761	61.6	64.0	63.7	67.6	48.9	47.2	50.2	59.6	65.9	55.3	47.7	48.1	56.7	**42 (*)**	**42 (*)**	Monitoring not for LAQM (assessing human exposure) purposes but to assess potential AQ impacts from traffic displacement that result from future transport schemes
TF36	Wolvercote Meadows 1	448095	208830	25.6	46.6	42.9	38.1	38.5	42.3	32.8	41.3	52.1	46.2	34.8	29.4	39.2	29		
TF37	Wolvercote Meadows 2	448688	210123	28.4	38.5	33.7	32.1	M	22.1	65.1	M	38.2	35.3	25.3	28.0	34.7	26		
TF38	Church Cowley Rd	453417	204026	NM	NM	NM	30.1	25.6	24.2	24.2	25.4	28.1	30.2	34.8	23.9	27.4	21		
LT1	26 Prince St	452786	205860	20.5	18.5	12.8	M	11.9	9.5	9.5	10.2	15.8	16.3	19.2	M	14.4	11		
LT2	1A Woodlands Rd	453927	207068	21.7	16.7	12.8	12.8	11.8	6.7	M	9.4	13.7	14.7	16.9	11.4	13.5	10		
LT3	47 Quarry Rd	455310	206681	22.8	21.3	14.3	14.5	M	9.7	8.6	11.1	16.7	16.1	18.5	M	15.4	12		
LT4	138-146 Morrell Av	453575	206037	18.3	23.5	15.3	18.4	14.1	13.2	9.7	12.7	19.8	16.0	17.5	14.4	16.1	12		
LT5	189 Divinity Rd	453576	205938	22.4	13.7	13.5	11.6	M	7.8	7.5	9.0	14.3	14.0	19.8	11.8	13.2	10		
LT6	St Christophers school	454473	204588	24.2	17.7	13.7	12.5	9.5	7.0	8.5	9.3	17.7	14.2	12.9	14.0	13.4	10		
LT7	126 The Slade	454930	206287	34.2	31.2	26.5	29.1	23.4	20.9	16.6	22.3	26.8	22.5	26.6	23.2	25.3	19		

DT ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.75)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
LT8	East Oxford Primary School	452903	205776	26.3	20.9	14.7	13.8	11.4	9.8	9.1	10.4	18.4	16.5	21.0	14.9	15.6	12		
LT9	4 Quarry school	455447	206966	21.1	21.1	17.2	M	11.6	10.4	7.5	11.1	14.3	17.1	19.2	M	15.1	11		
LT10	23 Gladstone Rd	455243	207170	23.8	12.5	14.0	13.6	9.7	10.1	7.4	9.2	14.3	14.9	18.9	13.6	13.5	10		
LT11	19 Wharton Rd	454918	207054	26.1	15.7	13.0	M	10.8	9.4	7.7	9.7	14.9	14.2	18.1	14.9	14.0	11		
LT12	Ruskin Hall	454260	207741	29.5	19.4	22.6	21.3	16.3	13.8	16.4	14.6	23.0	21.1	26.9	8.6	19.5	15		
LT13	21 Latimer Rd	454221	206796	22.0	19.3	14.5	14.5	12.4	9.8	7.7	10.6	14.9	14.1	19.4	14.3	14.5	11		
LT14	94 Howard St	453138	204917	22.2	19.3	13.7	14.1	11.2	8.6	9.3	10.1	16.2	16.8	18.4	11.8	14.3	11		
LT15	96 Valentia Rd	454013	206437	20.0	17.3	10.9	16.0	10.7	7.4	8.8	8.6	14.1	14.3	18.0	10.4	13.0	10		
LT16	103-139 Hurst St	452985	205185	22.0	21.5	M	13.1	12.0	9.3	9.2	10.8	15.8	17.3	20.6	14.5	15.1	11		

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

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

☒ **Local bias adjustment factor used.**

☐ **National bias adjustment factor used.**

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

☒ **Oxford City Council confirm that all 2023 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.

(*) According to paragraph 7.84 of the LAQM TG (22), considerations should be given to distance correct all the diffusion tubes that are not representative of human exposure, and whose concentrations fall within 10% of the NO2 annual mean objective (i.e. > 36µgm^3), to account for the inherent uncertainty in diffusion tube monitoring concentration data. In 2023, only 3 of the diffusion tube monitoring results showed NO2 concentration levels > 36µgm^3 (Diffusion tubes DT55; TF19; and TF35).

Diffusion tubes TF19 and TF35 have been installed not to directly assess relevant human exposure to air pollution, but instead to assess the potential air quality impacts from traffic displacement, that may occur in these areas, as a result of future traffic schemes that are being considered for implementation in Oxford city. As such, these tubes have not been corrected for distance.

The only tube that was corrected for distance in this AQ AS Report was DT 55 – St Clements.

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

New or Changed Sources Identified Within Oxford City Council During 2023

Oxford City Council has not identified any new sources relating to air pollution within the reporting year 2023.

Additional Air Quality Works Undertaken by Oxford City Council During 2023

One extra monitoring location was added to the network in 2023, to increase our knowledge of air pollution across the city. Oxford City Council is now monitoring air quality at a total of 128 locations (127 with diffusion tubes, 3 with automatic monitors and 2 locations where both techniques are used simultaneously).

QA/QC of Diffusion Tube Monitoring

Oxford's diffusion tubes were supplied and analysed in 2023 by the accredited laboratory (SOCOTEC), using a 50% Triethanolamine (TEA) in Acetone method, and using a standard operating procedure (ANU/SOP/1015) that meets the guidelines set out in DEFRA's Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance.

SOCOTEC is subject to quality assurance testing as part of their accreditation. This involves an independent comparison to other laboratories, under the independent AIR-PT scheme. The results of the latest inter-comparisons are publicly available for scrutiny here.

All the diffusion tubes used in the 2023 monitoring campaign were replaced according to DEFRA's 2023 diffusion tube monitoring calendar and within the ± 2 days due date tolerance.

Diffusion Tube Annualisation

All diffusion tube monitoring locations within Oxford City Council recorded data capture of 75%, which is equivalent to a minimum of 9 or more valid monthly averages throughout the 12-month calendar year. Therefore, it was not required to annualise any monitoring data.

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2024 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. LAQMTG22 provides guidance regarding 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.

Oxford City Council have applied a local bias adjustment factor of **0.75** to the 2023 monitoring data. This factor was obtained from the local co-location study conducted at AURN Oxford Centre Roadside.

The average of the national bias correction factor for diffusion tubes from all the 28 studies tested at national level by SOCOTEC Didcot (the laboratory used by Oxford City Council) and using the same Acetone method (50% TEA) in 2023 (as of March 2024) was of **0.77**

Although recognising that this figure is slightly higher than our local one (by 0.2), Oxford City Council decided to still use its local bias adjustment factor in this report, for a question of methodology and consistency with previous AQ ASRs, and also due to the fact that our local co-location study at AURN Oxford Centre Roadside has presented again "good" diffusion tube precision in 2023, together with high quality chemiluminescence results, and high data capture rate for NOx (>90%).

A summary of bias adjustment factors used by Oxford City Council over the past five years is presented in Table 13.

Table 13 - Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor	Laboratory Associated
2023	Local	NA	0.75	SOCOTEC
2022	Local	NA	0.74	SOCOTEC
2021	Local	NA	0.98/0.98	South Yorkshire Samplers
2020	Local	NA	0.96/0.97	South Yorkshire Samplers
2019	Local	NA	0.94/1.05	South Yorkshire Samplers

Table 14 (below) shows the accuracy of the local bias adjustment factor used in 2023, as well as the most relevant figures resulting from the calculation of the bias adjustment factor, and which have been obtained using DEFRA's approved bias adjustment factor spreadsheet.

Table 14 – Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1
Periods used to calculate bias	10
Bias Factor A	0.75 (0.7-0.8)
Bias Factor B	34% (25% - 44%)
Diffusion Tube Mean (µg/m^3)	43
Mean CV (Precision)	8
Automatic Mean (µg/m^3)	32
Data Capture for periods used (%)	98
Adjusted Tube Mean (µg/m^3)	32 (30 – 35)

Notes:

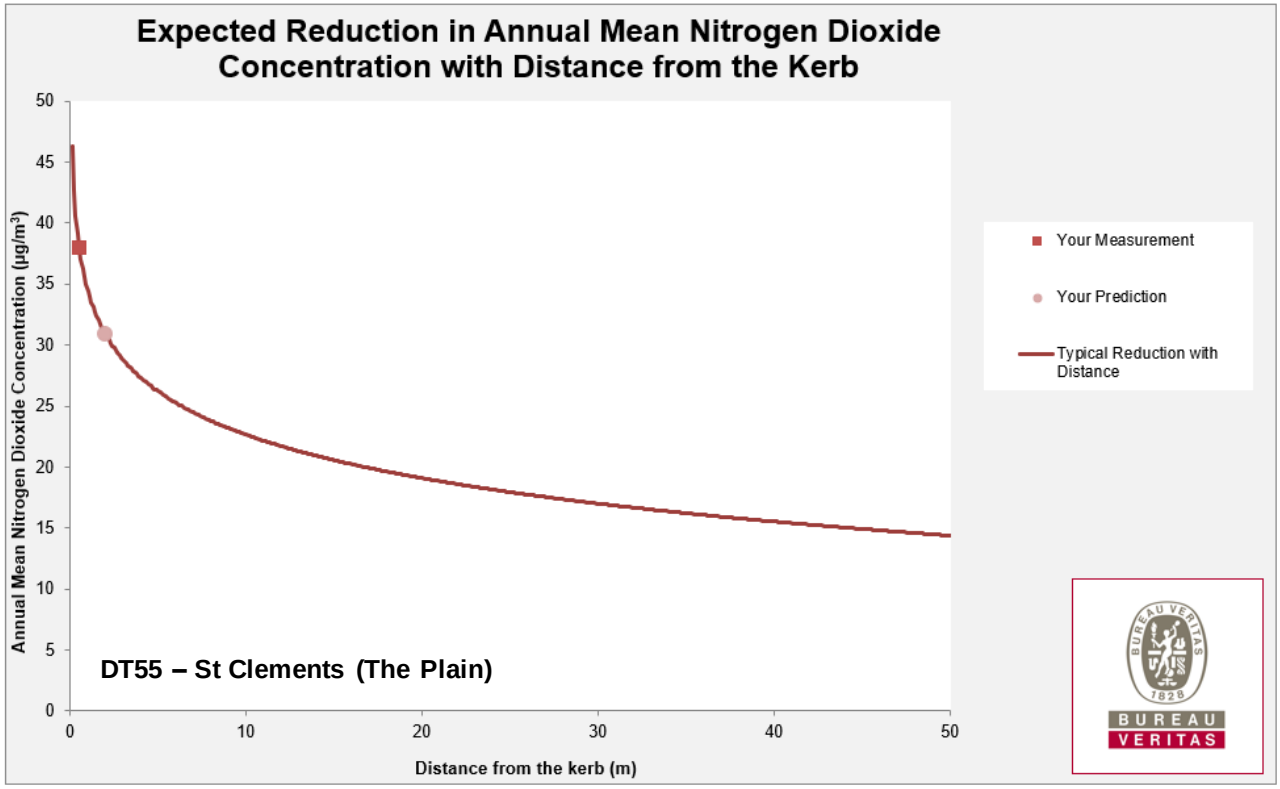
A single local bias adjustment factor has been used to bias adjust the 2023 diffusion tube results.

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented on Table 15.

Table 15 – Non-Automatic 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
DT55	0.5	2	38	9	30.9	The Urban background concentration value for this correction was obtained from AURN St Ebbes



Note:

According to paragraph 7.84 of the LAQM TG (22), considerations should be given to distance correct all the diffusion tubes that are not representative of human exposure, and whose concentrations fall within 10% of the NO_2 annual mean objective (i.e. > 36µgm^3), to account for the inherent uncertainty in diffusion tube monitoring concentration data.

In 2023, only 3 of the diffusion tube monitoring results showed NO_2 concentration levels > 36µgm^3 (Diffusion tubes DT55; TF19; and TF35). These tubes have been installed not to directly assess relevant human exposure to air pollution, but instead to assess the potential air quality impacts from traffic displacement, that may occur in these areas, as a result of future traffic schemes that are being considered for implementation in Oxford city. As such, these tubes have not been corrected for distance.

The only tube that was corrected for distance in this AQ AS Report was DT 55 (St Clements).

QA/QC of Automatic Monitoring

Oxford City Council currently operates three automatic monitoring sites. All routine calibrations and maintenance are carried out by members of Oxford City Council's Environmental Quality team and performed in accordance with manufacturers' and Automated Urban Monitoring Network site operators' manual. Instrument drift is routinely checked by:

- a daily internal instrument calibration which is carried out automatically using an electronic calibration check;
- every two to four weeks a manual external instrument calibration is carried out by Oxford City Council using gas cylinders that can be traced back to reference standards for each pollutant;
- every six months an audit of instrument response is carried out by an external organization using independent gas calibration standards.

The above checks enable data to be examined subsequently for instrument drift, which is expected, or for faulty data which is usually not expected. Before final publication of the air quality annual monitoring results for comparison against current legislation, the air quality data needs to be ratified.

Data Ratification is a detailed manual check of the data set carried out on a quarterly basis in all our automatic monitoring stations covered by the full QA/QC process. It requires a longer-term view of the dataset, incorporating the results from the independent QA/QC audits of the monitoring stations.

All the automatic monitoring data obtained in 2023 and presented within this ASR has been fully ratified by Ricardo Energy & Environment, following in full all the national AURN QA/QC procedures[9]**.** Live and Historic data from our 3 automatic monitoring sites can be found on the following websites:

- OXONair
- UK-Air
- AQ England

9 QA/QC Procedures for the UK Automatic Urban and Rural Air Quality Monitoring Network (AURN)

PM_{10} and $PM_{2.5}$ Monitoring Adjustment

The instruments used at AURN St Ebbes and Oxford High Street to measure PM_{10} and $PM_{2.5}$ data (FIDAS), do not require the application of any correction factor.

$PM_{2.5}$ data reported by the FIDAS instrument is automatically corrected to gravimetric equivalent by Ricardo Energy & Environment using the procedure described in TG22.

Automatic Monitoring Annualisation

All automatic monitoring locations within Oxford City Council recorded data capture of greater than 75% for all pollutants in 2023. Annualisation was therefore not required.

NO_2 Fall-off with Distance from the Road

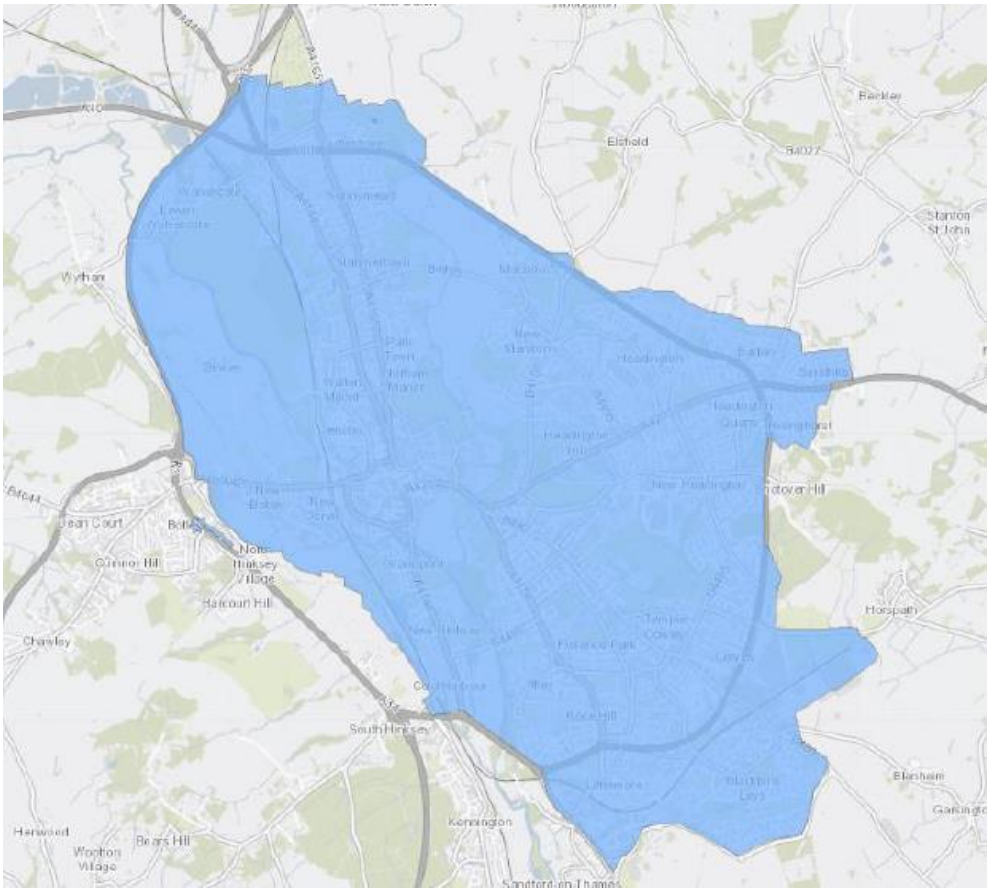
No automatic NO_2 monitoring locations within Oxford City Council required distance correction during 2023.

Appendix D: Map of the City's AQMA

The Council previously declared Air Quality Management Areas (AQMA's) in central Oxford (2003) and at Green Road roundabout (2005), as those were the locations where the UK nitrogen dioxide objectives were not being met at the time. Following further detailed assessments (2008 and 2009); several additional areas were identified where the nitrogen dioxide objectives were being breached.

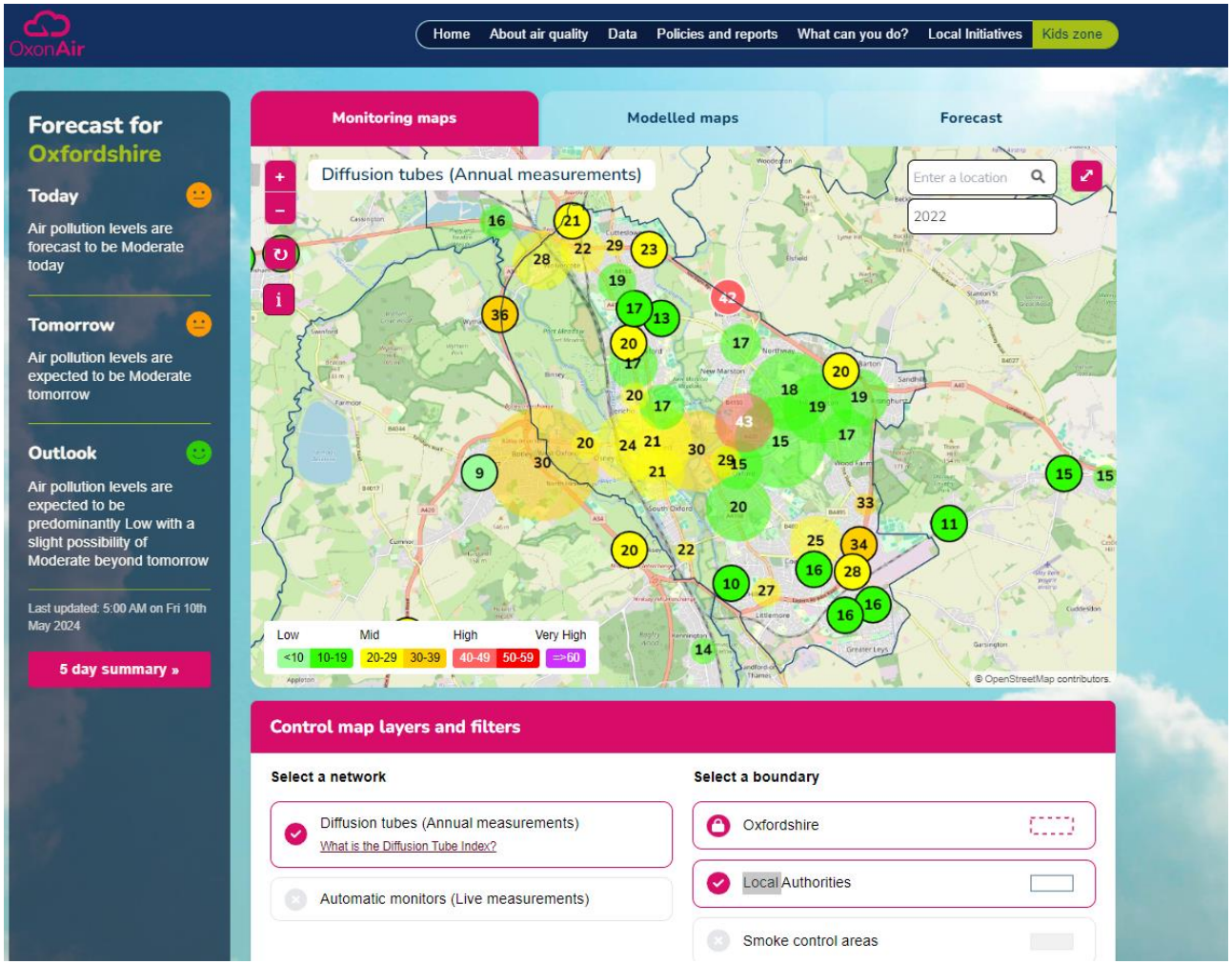
As such, in September 2010 the City Council made an Air Quality Management Order declaring the whole city an AQMA for NO_2. Figure 8 below shows (in blue) the area of the city covered by the current AQMA for NO_2 and its boundaries. Figures 9 shows a print screen of OXONAir's interactive map a resource where residents can identify all the locations where air quality monitoring was conducted throughout 2023 and the levels of NO_2 measured. All the monitoring locations are within Oxford's current AQMA, apart from the locations of diffusion tubes TF1, TF2, TF3 and TF35.

Figure 8-Boundary of Oxford's current city-wide AQMA for NO_2



Source: Defra's national AQMA Interactive map

Figure 9 – Landing page and Mapping tool of OXONAir's Website



All of Oxford City Council's diffusion tube locations and concentrations measured for the year 2023 can be consulted at Oxfordshire's new air quality website OXONAIR (oxonair.uk).

Appendix E: Air Quality Objectives and WHO recommended guidelines

Table 16 – Air Quality Objectives in England[10]

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
Particulate Matter ($PM_{2.5}$)	10µg/m^3	Annual mean
Ozone (O_3)	100 µg/m^3 not to be exceeded more than 10 times a year	8-hour mean

Table 17 -World Health Organisation recommended air pollution guidelines.

	Recommended guidelines for each pollutant	
Pollutant	Concentration (µg/m^3)	Measured as
Nitrogen Dioxide (NO_2)	200	1-hour mean
Nitrogen Dioxide (NO_2)	25	24-hour mean
Nitrogen Dioxide (NO_2)	10	Annual mean
Particulate Matter (PM_{10})	45	24-hour mean
Particulate Matter (PM_{10})	15	Annual mean
Particulate Matter ($PM_{2.5}$)	15	24-hour mean
Particulate Matter ($PM_{2.5}$)	5	Annual mean
Ozone (O_3)	60	Peak season[11]
Ozone (O_3)	100	8-hour mean

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

11 Average of daily maximum 8 hour mean O_3 concentration in the six consecutive months with the highest six-month average O_3 concentration.

Appendix F: Time variations and calendar plots of Oxford's automatic monitoring

Figure 10 – NO_2 time variations at Oxford's automatic monitoring sites along calendar year 2023

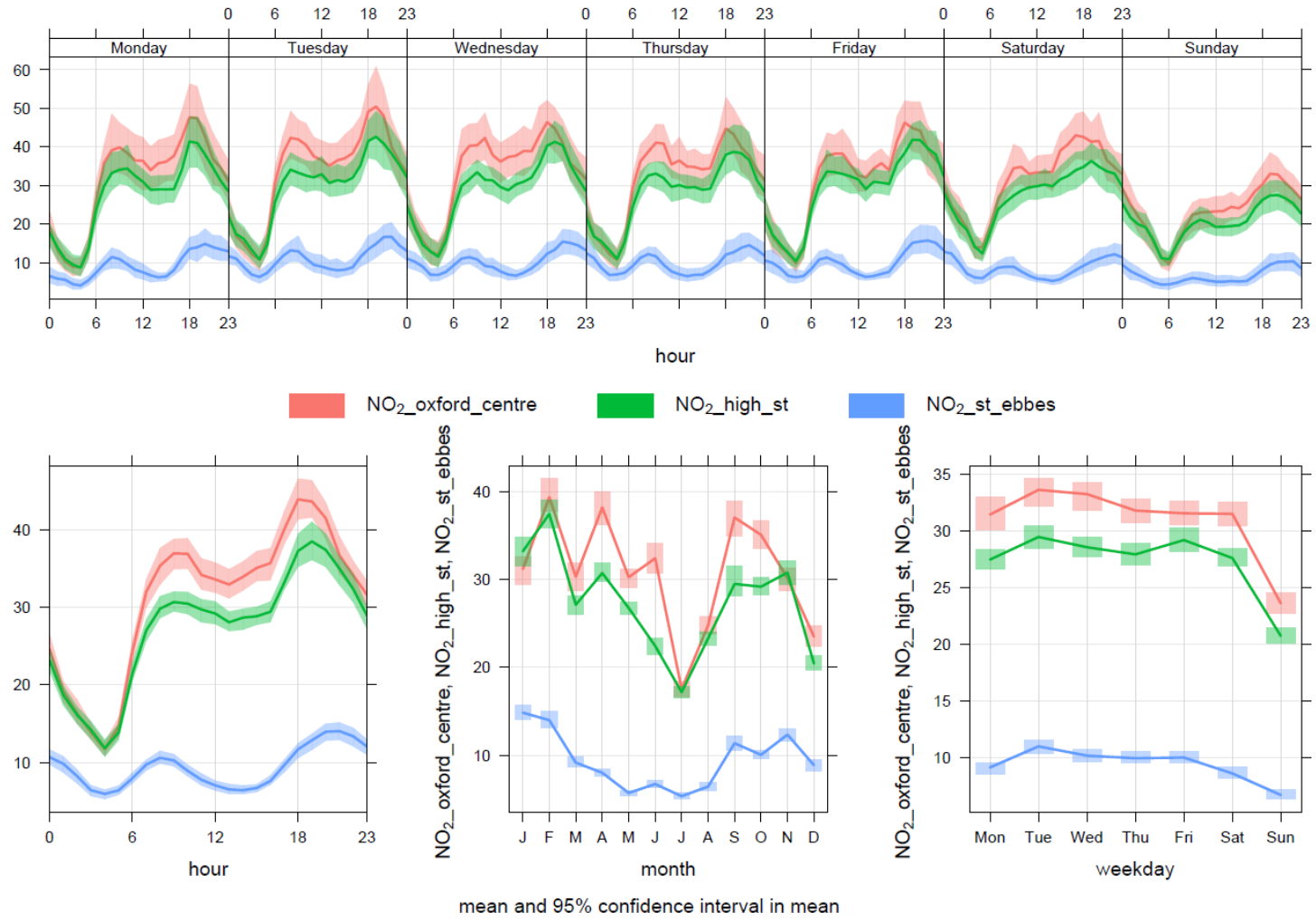


Figure 11 – Oxford's 3 NO_2 automatic monitoring sites (basic statistics 2023)

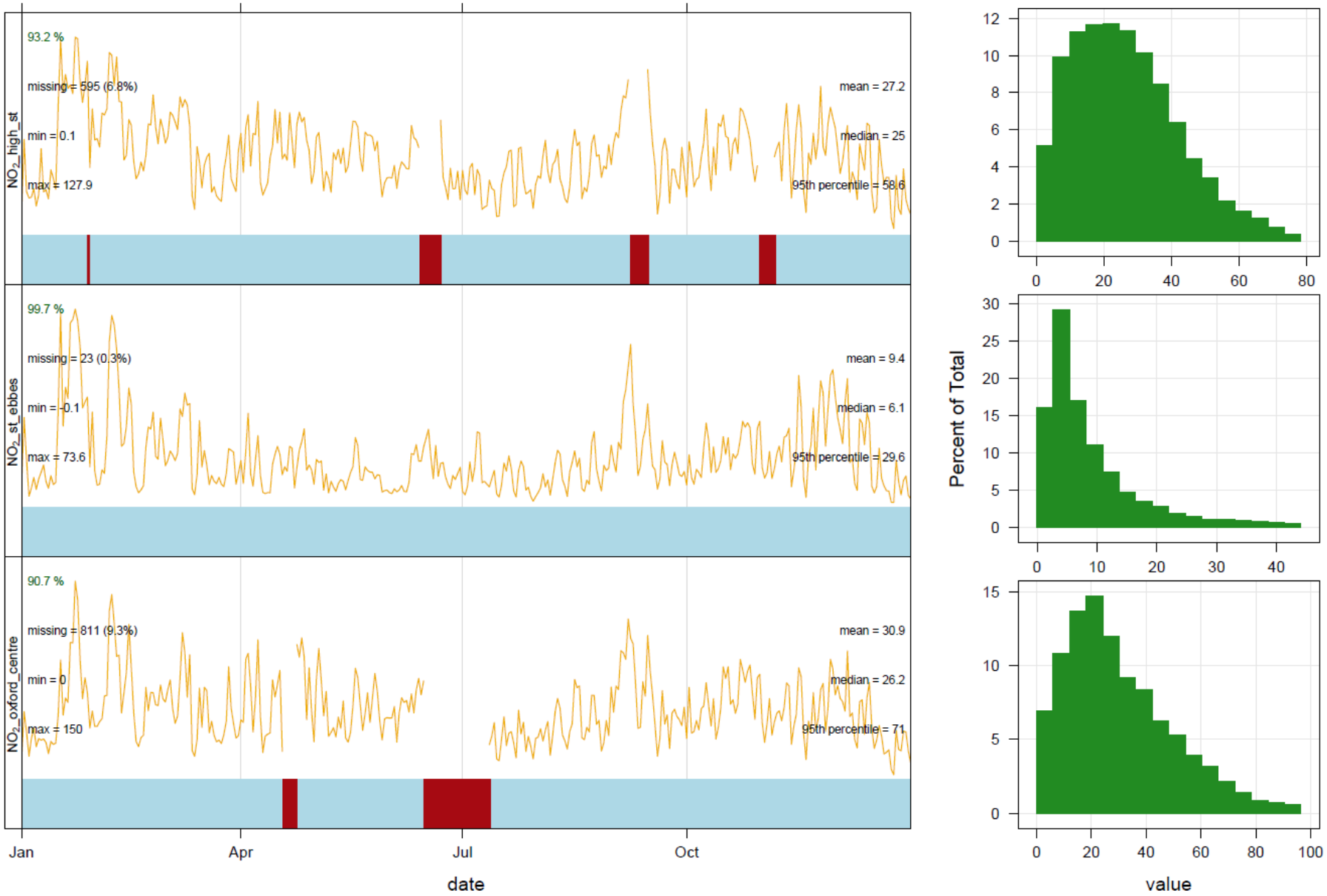


Figure 12 – Daily NO_2 averages (Calendar Plot) at AURN Oxford Centre in 2023

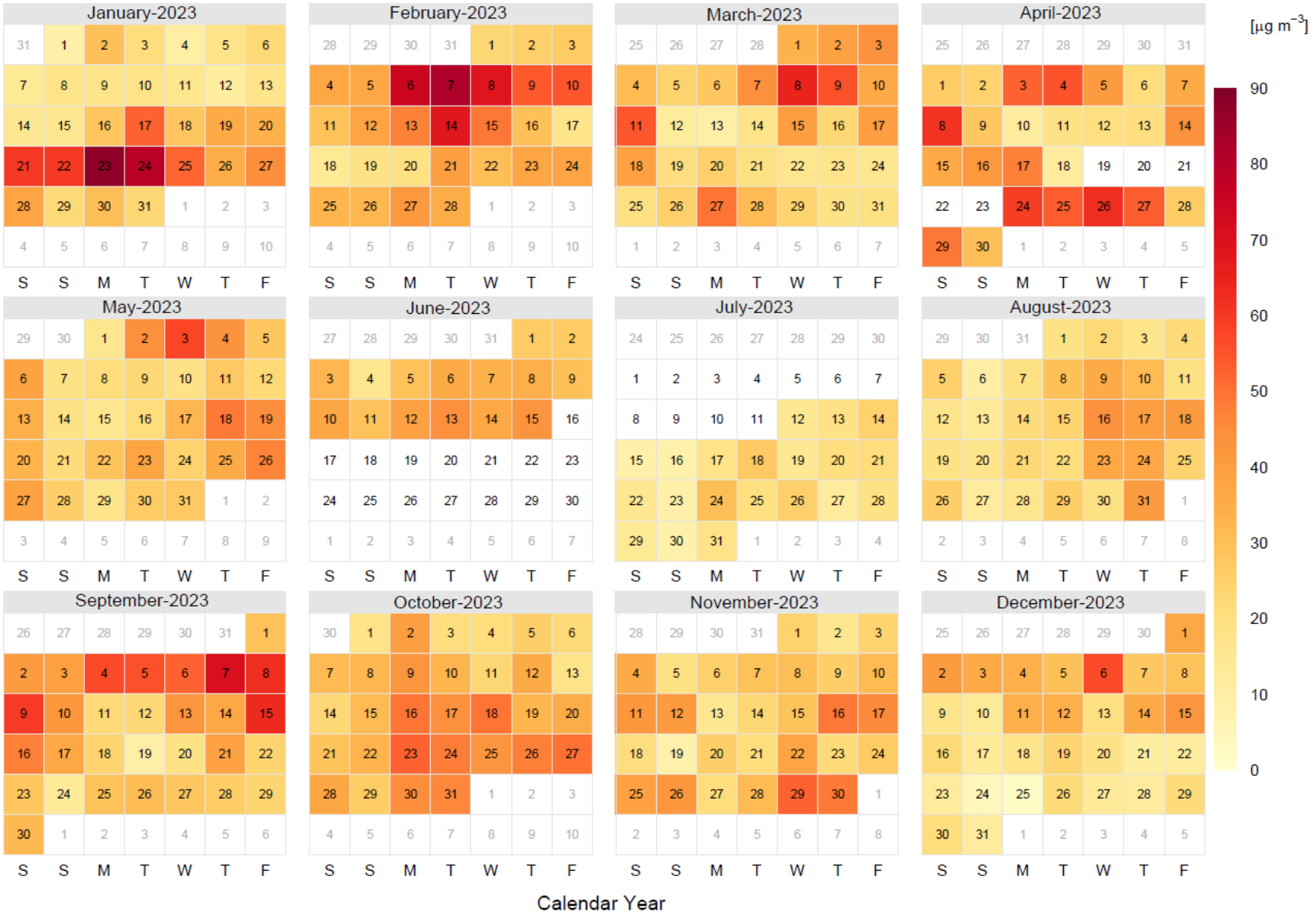


Figure 13 – Daily NO_2 averages (Calendar Plot) at AURN St Ebbes in 2023

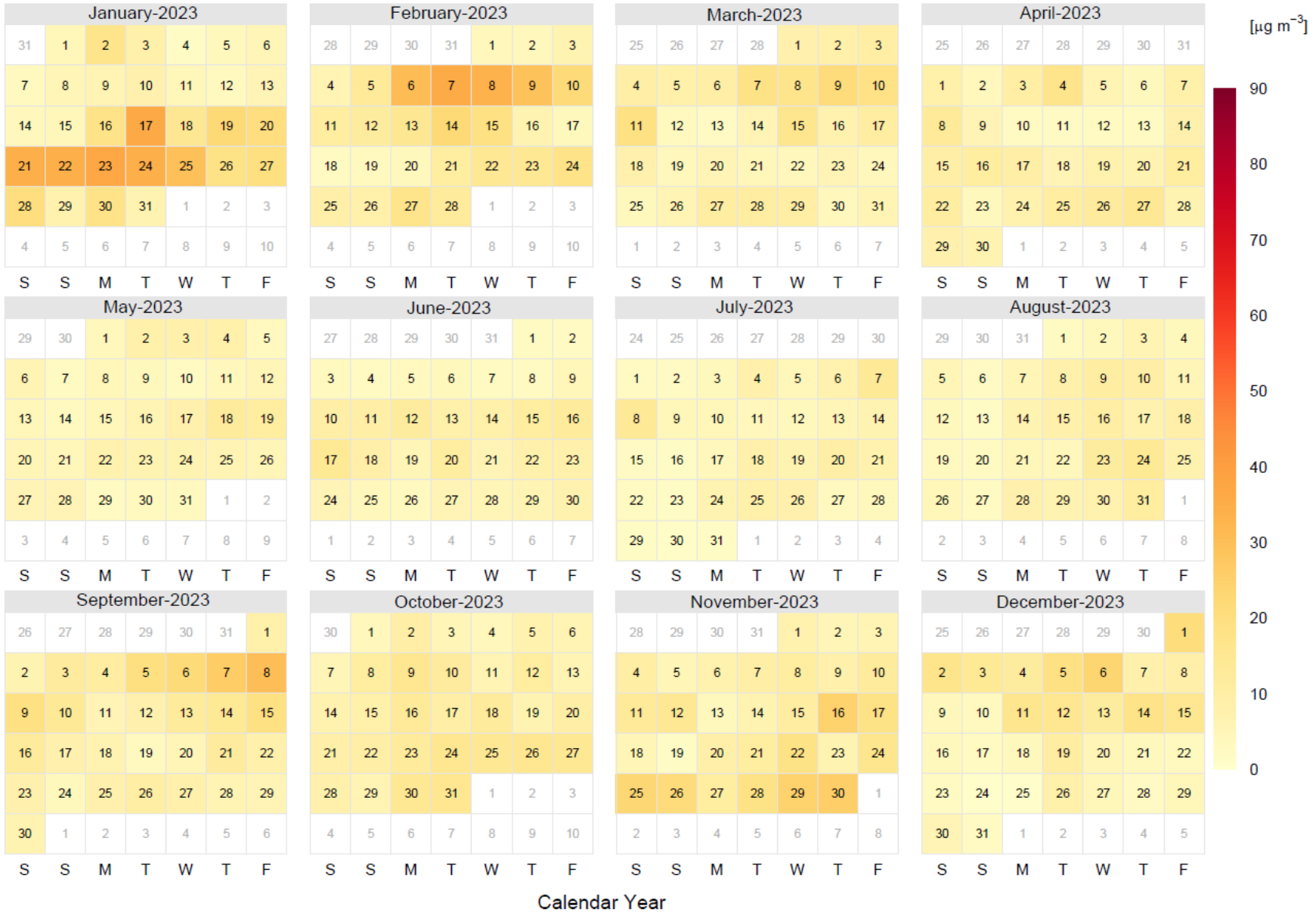


Figure 14 -Daily NO_2 averages (Calendar Plot) at Oxford High Street in 2023

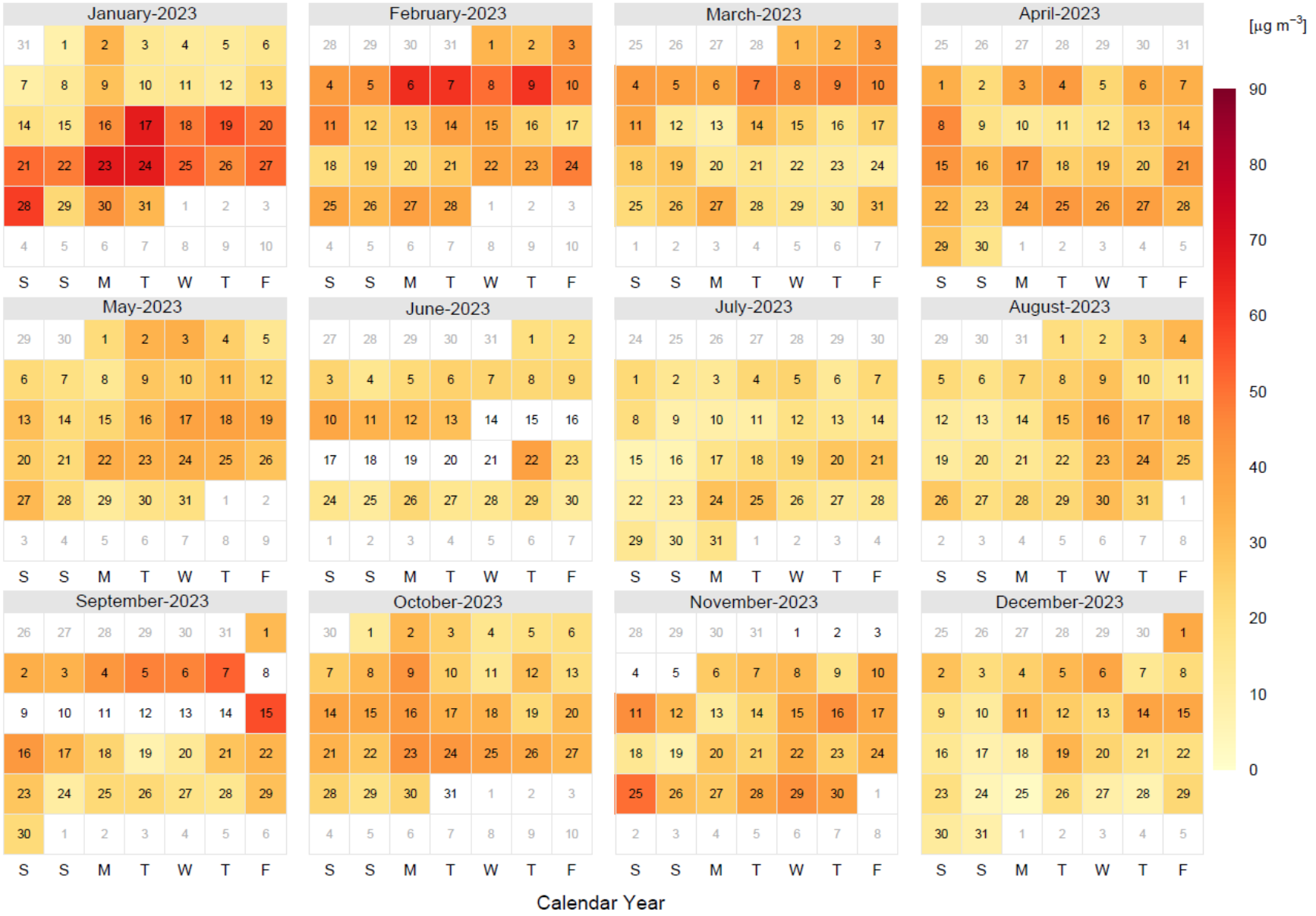
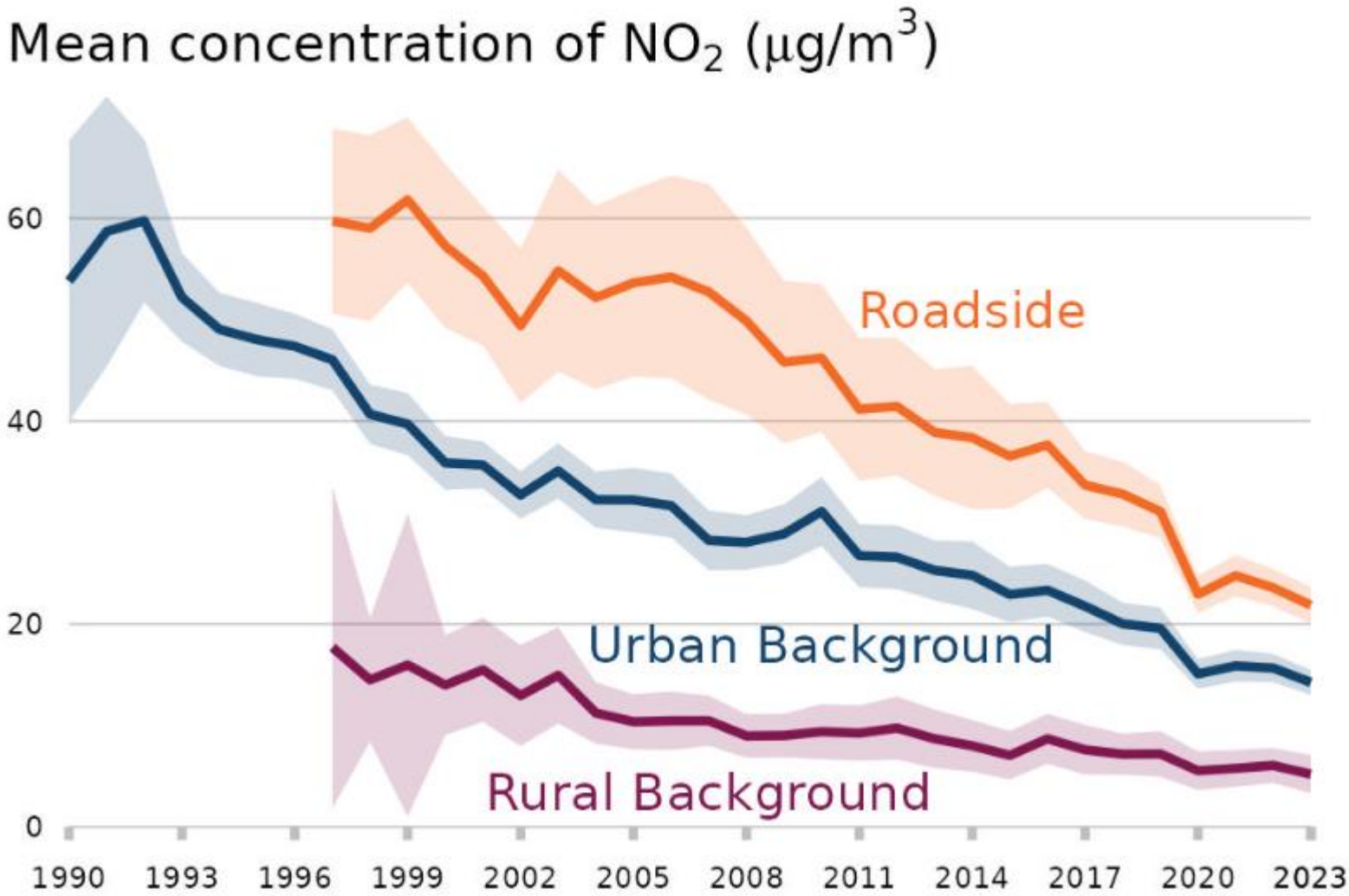


Figure 15 – Annual mean concentrations of NO_2 in the UK (1990-2023)



In 2023, average NO_2 concentrations at UK's AURN Roadside and Urban Background automatic monitoring sites have decreased (on average) by 8% and 9% respectively, when compared with the measurements obtained in the previous year.

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
AIR-PT	Independent analytical Proficiency Testing Scheme that offers a number of test samples designed to test the proficiency of laboratories undertaking analysis of chemical pollutants in ambient indoor, stack and workplace air.
ANPR	Automatic Number Plate Recognition technology.
AQ	Air Quality
AQI	Air Quality Index – The AQI Tells you about levels of air pollution and provides recommended actions and health advice. The index is numbered 1-10 and divided into four bands, low (1) to very high (10).
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.
ASHP	Air Source Heat Pump
ASR	Annual Status Report –Document that reviews on an annual basis current and likely future air quality and assess whether air quality objectives are currently being achieved or are likely to be achieved.
AURN	Automatic Urban & Rural Network.
BHBH	Better House Better Health is a service supporting residents to keep warm, stay safe & live well in their homes.
CAZ	Clean Air Zone.
COPD	Chronic obstructive pulmonary disease - a chronic inflammatory lung disease that causes obstructed airflow from the lungs. Symptoms include breathing difficulty, cough, mucus (sputum) production and wheezing.
COVID-19	Disease caused by a new strain of coronavirus. CO stands for corona, VI for virus, and D for disease.
CPZs	Controlled parking zones - areas where parking is only permitted in designated parking bays, and the rest of the kerbside space is restricted by yellow lines. Any illegally parked cars are issued with a parking ticket.
DCs	District Councils
DEFRA	Department for Environment, Food and Rural Affairs.
DfT	Department for Transport.
ECO	The Energy Company Obligation (ECO) is a government energy efficiency scheme in Great Britain to tackle fuel poverty and help reduce carbon emissions

Abbreviation	Description
EIP	Government's Environmental Improvement Plan
ETRO	Experimental traffic regulation order
EVs	Electric Vehicles.
FIDAS	Fine Dust Monitor System that uses optical light scattering to detect and measure aerosol particles.
GULO	Go Ultra Low Oxford project.
LAQM	Local Air Quality Management – A UK Government policy framework that requires local authorities to periodically review and assess the current and future air quality in their areas.
LAQM PG22	Local Air Quality Management Policy Guidance.
LAQM TG22	Local Air Quality Management Technical Guidance.
LAs	Local Authorities.
LCWIP	Local Cycling and Walking Infrastructure Plan.
LEZ	Low Emission Zone - defined area where access by some polluting vehicles is restricted or deterred with the aim of improving air quality. This may favour vehicles such as (certain) alternative fuel vehicles, hybrid electric vehicles, plug-in hybrids, and zero-emission vehicles such as all-electric vehicles.
LTNs	Low Traffic Neighbourhoods –residential areas where vehicles not stopping in the area are prevented or discouraged from driving through them.
LV	Limit Value – Legally binding pollution levels that must not be exceeded. LVs are set for individual pollutants and are made up of a concentration value, an averaging time over which it is to be measured, the number of exceedances allowed per year, if any, and a date by which it must be achieved. Some pollutants have more than one limit value covering different endpoints or averaging times.
NHS	National Health System
NO	Nitric Oxide – Formed from nitrogen (N) in the atmosphere during high temperature combustion
NO_2	Nitrogen Dioxide – Formed in small amounts in the atmosphere during high temperature combustion, but the majority is formed in the atmosphere through conversion of nitric oxide (NO) in the presence of ozone (O_3)
NO_x	Nitrogen Oxides – collective term used to refer to nitric oxide (NO) and nitrogen dioxide (NO_2). Nitrogen oxides are produced from fuel combustion in mobile (e.g., cars) and stationary (e.g., power plants) sources.
O_3	Ozone
ODS	Oxford Direct Services Limited commenced trading on 1st April 2018 and is wholly owned by Oxford City Council. The company brings together the majority of Oxford City Council's front line operational services.
OLEV	UK Government's Office for Low Emission Vehicles

Abbreviation	Description
OXONAIR	Name of the new air quality website for Oxfordshire, developed by Oxford City Council in partnership with County and all the districts in Oxfordshire
PM	Particulate Matter.
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.
SCAs	Smoke Control Areas – legally defined area where only approved solid fuels or exempted appliances can be used within buildings.
SHDF	Social Housing Decarbonisation Fund
STOP	Schools Tackling Oxford's Air Pollution
TEA	Triethanolamine – Viscous organic compound that is used in diffusion tubes as an absorbent for NO_2.
µg	Microgramme – One millionth of a gram
$\mu g/m^3$	Microgrammes per cubic metre of air – A unit for describing the concentration of air pollutants in the atmosphere, as a mass of pollutant per unit volume of clean air.
UK	United Kingdom.
UKRI	United Kingdom Research and Innovation
ULEV	Ultra Low Emission Vehicle
WHO	World Health Organisation.
WOW	Year round walk to school programme
WPL	Workplace Parking Levy – Charge that a local authority can place on private business commuter parking to both manage peak time traffic congestion, improve air quality, and generate revenue for transport investment.
ZEBRA	Zero Emission Bus Regional Areas scheme.
ZEV	Zero Emission Vehicle
ZEZ	Zero Emission Zone – area designed to reduce traffic volumes, encourage the uptake of zero emission vehicles and lead to other positive behavioural changes; all of these would reduce vehicle emissions and hence air pollution whilst maintaining access for those who need it.

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