



Preston
City Council

2023 Air Quality Annual Status Report (ASR)

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

Date: November 2023

Enter Local Authority Name Here

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Executive Summary: Air Quality in Our Area

Air Quality in Preston

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

The mortality burden of air pollution within the UK is equivalent to 29,000 to 43,000 deaths at typical ages³, with a total estimated healthcare cost to the NHS and social care of £157 million in 2017⁴.

Within Preston, the main pollutant of concern is nitrogen dioxide (NO₂), which is principally related to transport sources. Across the Preston district, the motorway network contributes 67.2% of the total emissions of 1,149 tonnes of NO_x⁵. High concentrations of nitrogen dioxide are restricted to a number of hotspots within the Council Boundary. These hotspots are known as Air Quality Management Areas (AQMAs), details of which are provided within [Table 2.1](#) below, and the locations can be seen by following [this link](#).

During 2022, the Council carried out monitoring within and outside the AQMAs (results in Appendix A: Monitoring Results). No exceedances of the nitrogen dioxide or particulate matter objectives were recorded at any monitoring locations in 2022; the last recorded exceedance of the annual mean nitrogen dioxide objective of 40µg/m³ was in AQMA 4 in 2019. In relation to trends, there is an overall decline in concentrations since 2017/2018, with particularly low concentrations in 2020 and 2021, reflecting reduced vehicle use in

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

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

³ Defra. Air quality appraisal: damage cost guidance, January 2023

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

⁵ Lancashire County Council. Preston district, 2023, online. Available:

<https://www.lancashire.gov.uk/lancashire-insight/area-profiles/local-authority-profiles/preston-district/>

years affected by Covid restrictions. 2020 was the year most hit by Covid restrictions, and hence reduction in travel and resulting emissions, with 2021 having some disruption, but not to the same extent. These trends largely follow the national trend, and although in many cases, 2022 has higher concentrations than 2020 and 2021, associated with the return to more 'typical' vehicle use patterns, 2022 follows the long-term downward trend. More information on national air quality trends can be found by following this [link](#).

Preston City Council (PCC) is committed to work with local authorities and partners, including Lancashire County Council, to deliver improvements to air quality across Preston.

Actions to Improve Air Quality

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

The Environmental Improvement Plan⁶ sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term PM_{2.5} targets. The National Air Quality Strategy, published in 2023, provides more information on local authorities' responsibilities to work towards these new targets and reduce PM_{2.5} in their areas. The Road to Zero⁷ details the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

The Central Lancashire Core Strategy has a dedicated air quality policy (Policy 30), which aims to '*Improve air quality through delivery of Green Infrastructure initiatives and through taking account of air quality when prioritising measures to reduce road traffic congestion*'. Air quality issues are a material consideration when reviewing development proposals. Ensuring air quality is considered within the planning system, along with encouraging the implementation of infrastructure for electric vehicles has been the main focus in 2022. The

⁶ Defra. Environmental Improvement Plan 2023, January 2023

⁷ DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

Preston Western Distributor Road has been completed in 2023, which is designed to help relieve congestion on the network, especially access to the motorway at junctions one and three of the M55, and on routes through Preston.

The main actions moving forward will be:

- Continuing to ensure EV charging points are a requirement on planning applications through a standard planning condition.
- Conducting a feasibility study on locations to install EV charging points across Council car parks and buildings and acting on the findings.
- Continue the planning of local cycling and walking infrastructure plans.
- Finalise plans for the new public transport priority corridors along seven routes into Preston to further the provision of sustainable transport to the city centre.

Conclusions and Priorities

From the local monitoring data, no exceedances of any of the air quality objectives have been recorded, and a general downward long term trend has been shown for nitrogen dioxide concentrations, which follows the national trend associated with roadside nitrogen dioxide concentrations. No new AQMAs are necessary, and this ASR recommends that AQMAs 1, 3 and 5 are revoked. An Air Quality Action Plan and Strategy will be completed to cover the requirement of an Air Quality Action Plan for the remaining 2 AQMAs, while incorporating strategic measures to reduce nitrogen dioxide and particulate matter emissions across the district.

Even though Preston City Council are successfully working towards compliance with the current air quality objectives, it is noted that health effects of air pollution are apparent even below objective levels, and Preston City Council will continue to work towards reducing emissions of both NO_x and particulate matter across the district. Due to new targets set within the Environment Act 2021, particulate matter, and especially PM_{2.5}, is likely to become a greater priority over the next few years.

Local Engagement and How to get Involved

The Council is working with key partners to deliver better air quality, in particular Lancashire County Council.

Walking and cycling ('Active Travel') provides opportunities to develop healthier communities and attractive places to live and work.

Lancashire Active Travel Strategy ('Actively Moving Forward' ⁸) sets out the ways in which people living and working in the County can engage in active travel, including the schemes and routes available to the public. This involves collaborating with active travel providers and disability related groups to enable Lancashire to be a place where many more people make cycling and walking part of their everyday lives.

There are 600 miles of on- and off-road cycle routes available for people of all cycling abilities in Lancashire, from quiet country lanes, gentle rides on promenades, canal towpaths, throughout cities, including Preston, and scenic hill routes. The Guild Wheel (link [here](#)) offers a 21 mile circular route around Preston that can be ridden or walked in any direction and joined at any point. It provides a safe and scenic route for people of all abilities.

As part of the Lancashire Actively Moving Forward strategy, Local Cycling and Walking Infrastructure Plans (LCWIPs) are being developed across the County to identify potential cycling and walking infrastructure improvements, including for central Lancashire, which includes Preston. More information about LCWIPs in Lancashire is available [here](#), and the Plan covering Preston is available [here](#).

Improvements to sections of the Penwortham to Preston Cycle Superhighway have now been completed to make travel easier and safer for pedestrians and cyclists. Two sections of the Liverpool Road/Fishergate Hill corridor between Penwortham and the City Centre have been improved and the cycle track on Liverpool Road was completed in March 2022. Improvements at the Broadgate/Fishergate Hill junction are now complete. This junction is a key part of the Penwortham to Preston Cycleway, and also forms part of the Preston Guild Wheel route. The improvements make the junction safer by separating people cycling from those who are walking or wheeling and general motor traffic to reduce conflicts. More information on the works can be found [here](#).

The Road Safety Team work with schools, workplaces and the community to encourage safe and sustainable modes of travel. Initiatives for schools are promoted through the Safer

⁸ Lancashire County Council. Actively Moving Forward. A ten year strategy for Cycling and Walking, 2018, online. Available: <https://www.lancashire.gov.uk/media/917305/6469-cycling-and-walking-strategy.pdf>

Travel Moodle (available [here](#)) and include: a series of cycling and walking safety training programmes; guidance and resources for teachers to encourage safe and active travel; and support for creating travel plans.

Further information on switching to cycling, training courses, and cycle routes available in Lancashire can be found by following this link [here](#). Walking routes, locations of country parks, nature reserves and picnic sites in Lancashire are available [here](#).

The Lancashire Insight website provides information on the sources and health impacts of air pollution across the county. Webpages include a Summary of Emissions Data, which can be accessed by clicking [here](#), and Monitoring of Air Quality and Health Impacts, which can be accessed by clicking [here](#).

Information regarding the air quality within Preston and our contact details can be found on our website below:

<https://www.preston.gov.uk/article/1015/Air-quality>

Local Responsibilities and Commitment

This ASR was prepared by Air Quality Consultants Ltd on behalf of the Environmental Health Department of Preston City Council.

A copy of the ASR has been provided to the Cabinet Member for Planning and Regulation.

This ASR has not been signed off by a Director of Public Health.

If you have any comments on this ASR please send them to Chris Hodson at:

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1 Local Air Quality Management

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

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in order to achieve and maintain the objectives and the dates by which each measure will be carried out. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Preston 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 in Table E.1.

2 Actions to Improve Air Quality

Air Quality Management Areas

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

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

- Nitrogen dioxide (NO₂) annual mean (all AQMAs); and
- Nitrogen dioxide (NO₂) 1-hour mean (AQMA 3).

Policy 12 in the Preston City Transport Plan 2019 aims to revoke all AQMAs by 2028 through driving investment in greater choice, and reducing the impact of existing, non-car modes. This will occur through supporting the case of alternative fuel buses, reducing congestion and promoting walking and cycling. Policy 13 focuses on ensuring new development is granted with appropriate EV charging technology through the provision of standards for new homes and wider development. An assessment of the local power network is required to ensure the capacity of infrastructure is sufficient to cope with an increase in the demand for electrical power.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
AQMA 1	Declared Sept 2005,	NO ₂ Annual Mean	Area of residential at the Prison junction on the A59 Ringway	NO	41	29.3	>5	PCC AQAP 2009	https://www.preston.gov.uk/article/1015/Air-quality
AQMA 2	Declared Sept 2005,	NO ₂ Annual Mean	Area of residential at the junction of Blackpool Road and Plungington Road	NO	51	29	>5 (within 10% of obj in 2019)	PCC AQAP 2009	https://www.preston.gov.uk/article/1015/Air-quality
AQMA 3	Declared May 2012,	NO ₂ Annual Mean and 1 hour mean	Area of residential in the centre of Broughton Village (A6)	NO	77	16	>5	PCC AQAP 2014	https://www.preston.gov.uk/article/1015/Air-quality

AQMA 4	Declared May 2012,	NO ₂ Annual Mean	Area of residential on New Hall Lane	NO	52	33	3	No Plan	https://www.preston.gov.uk/article/1015/Air-quality
AQMA 5	Declared March 2014,	NO ₂ Annual Mean	Area of residential on London Road	NO	41	29	>5	No Plan	https://www.preston.gov.uk/article/1015/Air-quality

Preston City Council confirm the information on UK-Air regarding their AQMA(s) is up to date.

Preston City Council confirm that all current AQAPs have been submitted to Defra.

Progress and Impact of Measures to address Air Quality in Preston City Council

Defra's appraisal of last year's ASR concluded that the conclusions reached are acceptable for all sources and pollutants. Commentary provided was largely positive, including that the maps were clear and concise, trends in NO₂ concentrations have been discussed, reference has been made to the Public Health Outcomes Framework with regard to PM_{2.5} and robust and accurate QA/QC procedures have been applied. There was one comment that AQMAs 1, 2 and 5 have been compliant with air quality objectives for the last 5 years and hence the Council should consider revoking these AQMAs, and that the Air Quality Action Plan is overdue for renewal. Both these issues have been addressed within this ASR.

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

More detail on these measures can be found in their respective Action Plans and the Lancashire Highways and Transport Strategy

(<https://www.lancashire.gov.uk/council/strategies-policies-plans/corporate/highways-and-transport-strategy-2023-2025/>). A key completed measure in Preston is the Preston Western Distributor Road which opened in the summer of 2023.

Preston City Council and Lancashire County Council expects the following measures to be a priority for the next reporting year and beyond:

- Further progress on the completion of road and public transport improvements as set out in the Lancashire County Council Highways and Transport Strategy 2023 – 2025. For example, the government's drive for smarter travel solutions will be explored through plans for managing urban traffic through technology solutions, beginning in Preston city centre as part the Transforming Cities Fund.
- Installation of further Electric Vehicle (EV) charging points within the City, including at Council car parks, buildings and with new developments, as appropriate.

- Further the planning stages of local cycling and walking infrastructure across the City, construction of Cottam Parkway railway station and new public transport priority corridors into Preston.

Preston City Council's priorities for the coming year are:

- Continue delivery of EV charging infrastructure across the district.
- Ensure monitoring of pollutants continues and is reported on in the statutory LAQM process.

The measures stated above will help to contribute towards continued compliance in Preston City Council.

The principal challenges and barriers to implementation that Preston City Council anticipates facing are:

- Internal resources.
- Issues faced by two-tier authority position - Preston City Council has no direct control over highways and is reliant on joint working with Lancashire County Council.
- The local plan proposes additional development, particularly housing, within the district that will potentially result in additional road traffic.
- Funding – limiting the installation of EV charging and cycling and walking infrastructure across the City.
- Increased cost of living may result in increase in the use of solid fuels, and potentially impact on the transition to electric vehicles.

Preston City Council anticipates that the measures stated above and in Table 2.2 will help maintain compliance within the remaining AQMAs.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	Require electric vehicle recharging points on planning applications	Promoting Low Emission Transport	Other	2016	Ongoing	PCC		NO	Funded	< £10k	Completed	N/A	N/A	Completed, standard planning condition used	N/A
2	Install electric vehicle recharge points to all Council car parks and buildings	Promoting Low Emission Transport	Other	2016		PCC/LCC		NO	Not Funded		Planning	N/A	N/A	Electric vehicle charging points installed in Avenham Car Park, Bus Station Car Park. Plus on street Chapel Street.	Funding, plus the need for a feasibility study on locations of EV points
3	Development and implementation of a Lancashire wide planning guidance	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance		n/a	Lancaster City Council, on behalf of all 14 Lancashire Authorities. PCC lead for implementation in Preston	None	NO	Not Funded	< £10k	Aborted	N/A	N/A	Aborted due to review of Central Lancs Core Strategy, Planning	N/A
4	Broughton Bypass	Transport Planning and Infrastructure	Other		2017	LCC		NO	Funded		Completed	modelled average of 60% reduction in NO2 concentrations	N/A	Completed, significant reductions, see monitoring data	N/A
5	Infrastructure improvements New Hall Lane	Transport Planning and Infrastructure	Other		2017	LCC		NO			Completed	AQMA 4, now compliant	N/A	Completed, help with compliance, Footpath width increased, moving traffic source slight away from residential, bus priority	N/A
6	Construction of Preston Western distributor Road	Transport Planning and Infrastructure	Other		2023	LCC/PCC	City Deal	NO	Funded	£100k - £500k	Completed	Allows future development, reducing congestion on existing road network	N/A	Completed	N/A
7	Local Cycling and Walking Infrastructure Plans	Transport Planning and Infrastructure	Cycle network		2032	LCC		NO	Not Funded		Planning	Potential to increase and improve Cycling and Walking infrastructure	N/A	In the planning process	Funding
8	Construction of Cottam Park Way rail station	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services		2025	LCC/PCC	Transforming Cities/City Deal	NO	Funded		Planning	Includes Park and Ride, provides alternative transport to Preston City Centre	N/A	In the Planning Process	N/A
9	New Public Transport priority corridors along 7 routes into Preston	Transport Planning and Infrastructure	Bus route improvements		2024	LCC		NO			Planning	May effect AQMA 4	N/A		

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

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

In Lancashire the strongest evidence we have on the population health impacts of air pollution comes from Public Health England's Public Health Outcomes Framework. This Framework estimates the 'fraction of annual all cause adult mortality attributable to particulate air pollution (measured as fine particulate matter, PM_{2.5}*)' each year. It shows that, while the overall mortality rate from particulate air pollution in Lancashire-12 (4.8%) is lower than the England average (5.5%), air pollution remains a significant public health issue for the county (2021).

Working with district councils, Lancashire County Council (LCC) has an important role to play in taking action to reduce the health impacts of air pollution. Responsible for transport planning, network management, highway maintenance, public health and procuring local vehicle fleets, there are a number of ways LCC can support local and county wide efforts to improve air quality. In summary, the following activities are underway or in development:

1. Encouraging the use of sustainable forms of travel

Lancashire's cycling and walking strategy, *Actively Moving Forward*, sets out an ambitious plan for increasing the number of people walking and cycling in the county by 2028. By improving and increasing access to cycling and walking infrastructure, alongside training and promotional activities, it aims to significantly increase the amount of cycling and walking people do across the county. Information on the County Council's ongoing activities in this area can be found on the *Active Travel in Lancashire* website.

As part of Lancashire's cycling and walking strategy, work has now commenced on developing Local Cycling and Walking Infrastructure Plans (LCWIPs) for Lancashire. LCWIP's have been defined for seven areas across Lancashire. These are:

- Lancaster
- Central Lancashire
- West Lancashire

- Fylde Coast
- Ribble Valley
- Burnley and Pendle
- Rossendale and Hyndburn

As part of the LCWIP process extensive public and stakeholder engagement is underway. Following on from this, it is planned for all LCWIP's to be completed by late 2023. The Plans will include a network plan for cycling and walking infrastructure and a prioritised list of schemes for delivery over short, medium and long term timeframes. These plans will be used to support future infrastructure decisions and to access new funding schemes as they become available.

The Road Safety Team work with schools, workplaces and the community to encourage safe and sustainable modes of travel. Initiatives for schools are promoted through the Safer Travel Moodle and include: a series of cycling and walking safety training programmes; guidance and resources for teachers to encourage safe and active travel; and support for creating travel plans.

Bus services across Lancashire operate in a deregulated market, meaning the County Council doesn't control the bus network, franchise routes or control fares. In the next three years, the county council will continue to work more closely with bus operators, alongside local communities, to create a network that people want and will use. The council has published a ten-year Enhanced Partnership Plan and Scheme alongside its Bus Service Improvement Plan which together will deliver measures to restore confidence and grow patronage numbers.

2. Supporting the transition to low emission vehicles

Lancashire County Council, working with BP Pulse, has installed 150 Electric Vehicle charge points either at the side of the adopted highway or in county council carparks. These chargepoints are ultra chargers which will allow most vehicles to take a full charge in less than an hour and Fast Chargers that will take around three hours to charge the vehicles. The mix of these units depends on location, power supply and demand.

Since the installation of these points the focus has been on supporting residents who do not have off-street parking charge at home, with the County Council trialing an innovative footway cable tray which will provide a low cost and practical solution to support residents without off street parking charge at home. The cable-tray enables residents to safely pass an electric cable across the footway from their property to the carriageway enabling charging their vehicle from their domestic supply. Two products (one designed in-house

and one adapted product) have been trialled at several residential properties in the county. The county council is one of 16 councils in England to secure funding from the Local Electric Vehicle Infrastructure (LEVI) extended pilot scheme to expand this trial to more residents and to trial lamp post integrated chargepoints in residential areas, helping those that do not have access to off-street parking.

In addition to the LEVI extended pilot the county council has been allocated indicative funding of £10.1m from the LEVI capital fund for the provision of local, low power, public on-street charging infrastructure. This is subject to the submission of a delivery plan in early 2024 that is accepted by the Department for Transport. This will help us scale up the deployment of local chargepoints and solutions for residents without access to off-street parking beyond the pilot projects and deliver the vision and aims of the Lancashire and Blackburn with Darwen EV Infrastructure Strategy.

The county council's parking services fleet is now fully electric, with charging infrastructure installed at the offices and depots where the vehicles are based, and regularly visit. Fleet services are continuing to deliver their programme to upgrade to ultra low emission vehicles.

3. Creating cleaner, healthier road networks

Work to develop the next Local Transport Plan (LTP4) for Lancashire, Blackpool and Blackburn with Darwen is underway. The Public Health team has submitted an evidence base to inform the process, highlighting transport related health challenges affecting the population of Lancashire and making recommendations about how local transport planning policy can make a contribution to addressing these. The local Highways and Transport Masterplans will be refreshed to align with the priorities of LTP4. This will provide an opportunity to identify longer-term network solutions that address issues in AQMAs and have a positive impact on air quality generally.

4. Embedding air quality into policy

The County Council works with district planners to ensure air quality is a key consideration of Local Plans, alongside wider public health issues. It supports district councils in developing policies that seek to ensure new developments do not contribute to increasing levels of air pollutants and that requirements for appropriate mitigation are in place.

The County Council, as part of its highways input into planning applications, actively encourages measures that aim to promote sustainable forms of travel. Working under the direction of the National Planning Policy Framework, the County Council seeks measures

that facilitate cycling and walking, increase the use of public transport and provide access to electric vehicle charge points. The County Council also seeks funding from developers, through section 106 contributions, to support existing bus services or to provide new bus services suitable to serve development sites once their built.

5. Raising awareness and increasing engagement

The Lancashire Insight website provides information on the sources and health impacts of air pollution across the county. Webpages include a Summary of Emissions Data and Monitoring of Air Quality and Health Impacts.

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

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

Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Preston City Council undertook automatic (continuous) monitoring at two sites during 2022. Table A.1 in Appendix A shows the details of the automatic monitoring sites. The <https://www.preston.gov.uk/article/1015/Air-quality> page presents automatic monitoring results for Preston City Council through the UK-Air website .

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

3.1.2 Non-Automatic Monitoring Sites

Preston City Council undertook non- automatic (i.e. passive) monitoring of NO₂ at 27 sites during 2022. Table A.2 in Appendix A presents the details of the non-automatic sites.

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

There was one change in diffusion tube location in AQMA1. The original tube on Lychgate went missing 6 months in a row, and therefore needed to change location. Church Street was chosen as being close by, but far enough away to reduce the risk of continued interference.

Individual Pollutants

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

3.1.3 Nitrogen Dioxide (NO₂)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO₂ annual mean concentrations for the past five years with the air quality objective of 40µg/m³. Note that the concentration data presented represent the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2022 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance-corrected values only where relevant (none are relevant for Preston in 2022).

Table A.5 in Appendix A compares the ratified continuous monitored NO₂ hourly mean concentrations for the past five years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year.

During 2022 no passive or automatic monitoring locations exceeded the nitrogen dioxide annual mean objective of 40 µg/m³. The last exceedance recorded in Preston was within AQMA 4 in 2019. There were no exceedances of the hourly mean nitrogen dioxide objective; a continuation of the trend in the last five years.

There were no objective exceedances monitored inside or outside the AQMAs, therefore no new AQMA designations are required or need consideration.

- AQMA 1 has no recorded exceedances since monitoring resumed in 2020, with concentrations well below the objective. Prior to 2020, monitoring was stopped as concentrations were well below the objectives. It is therefore considered that **this AQMA should be revoked.**
- AQMA 2 has had no exceedances of the objectives for the last five years, with the highest value of 37.1 µg/m³ in 2019, compared to a value of 29 µg/m³ in 2022. As there has not been 3 years below 90% of the objective level, outside of years affected by Covid, in line with TG(22), this AQMA will be retained.

- AQMA 3 has been in compliance for the last five years, with a highest value of $41.0\mu\text{g}/\text{m}^3$ measured in 2017, compared to $16\mu\text{g}/\text{m}^3$ in 2022. It is therefore considered that **this AQMA should be revoked**.
- AQMA 4 last recorded an exceedance of the objective ($42.2\mu\text{g}/\text{m}^3$) in 2019, with a maximum concentration of $33\mu\text{g}/\text{m}^3$ measured in 2022. As there has not been 3 years below 90% of the objective level, outside of years affected by Covid, in line with TG(22), this AQMA will be retained.
- AQMA 5 has been in compliance for over five years, with a maximum concentration of $36.0\mu\text{g}/\text{m}^3$ measured in 2019, compared to $29\mu\text{g}/\text{m}^3$ in 2022. As there has been over five years, at or below 90% of the air quality objective, it is therefore considered that **this AQMA should be revoked**.

In relation to trends, there is an overall decline in concentrations since 2017/2018, with particularly low concentrations in 2020 and 2021, reflecting reduced vehicle use in years affected by Covid restrictions. The local trends largely follow the national trend, and although in many cases, 2022 has higher concentrations than 2020 and 2021, associated with the return to more 'typical' vehicle use patterns, 2022 follows the long-term downward trend. More details on national trends can be found at <https://www.aqconsultants.co.uk/CMSPages/GetFile.aspx?guid=4f51f53e-0e95-4e33-9523-05d705ffbd21>.

It is anticipated that the current monitoring network will be maintained in 2023.

3.1.4 Particulate Matter (PM₁₀)

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM₁₀ annual mean concentrations for the past five years with the air quality objective of $40\mu\text{g}/\text{m}^3$.

Table A.7 in Appendix A compares the ratified continuous monitored PM₁₀ daily mean concentrations for the past five years with the air quality objective of $50\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times per year.

PM₁₀ monitoring of background concentrations in 2022 showed compliance with the annual mean objective, and was consistent with the previous years. There is no discernable trend in PM₁₀ concentrations.

Despite PM₁₀ objectives being anticipated to be met within the Preston district, particulate matter pollution is considered to be a non-threshold pollutant (i.e. there is no safe level)

and needs to be as low as possible to protect health. Emission reduction is still a priority for Preston City Council.

No AQMAs are required for PM₁₀.

3.1.5 Particulate Matter (PM_{2.5})

Table A.8 in Appendix A presents the ratified and adjusted monitored PM_{2.5} annual mean concentrations for the past five years.

During 2022, PM_{2.5} concentrations remained the same as 2021 levels at the urban background site (operated by Defra), following an increase in PM_{2.5} concentrations of 1µg/m³ from 2020 to 2021. There is no discernable trend in PM_{2.5} concentrations.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
PRA1	Meadow Street	Roadside	354138	429863	NO ₂	NO	Chemiluminescent;	7	5	2.5
PRA2	Bootle Street	Urban Background	355250	430126	NO ₂ , PM ₁₀ PM _{2.5} , O ₃	NO	Chemiluminescent, FIDAS	9	N/A	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 A.2 – Details of Non-Automatic Monitoring Sites

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
PR1	Red Rose Radio	Roadside	354307	429769	NO ₂	NO	0	3.3	No	2.0
PR5	215 Plungington Road	Roadside	353072	431014	NO ₂	YES (AQMA 2)	0	2.5	No	2.0
PR6	347 Blackpool Road	Roadside	353085	431045	NO ₂	YES (AQMA 2)	0	4.0	No	2.0
PR7	336 Blackpool Road	Roadside	353111	431080	NO ₂	YES (AQMA 2)	0	3.0	No	2.0
PR8	240 Plungington Road	Roadside	353054	431095	NO ₂	YES (AQMA 2)	0	2.3	No	2.0
PR9	78 Church Street	Roadside	354555	429624	NO ₂	YES (AQMA 1)	0	2.8	No	2.0
PR21 ³	Meadow Street 1	Roadside	354138	429864	NO ₂	NO	7.0	5.0	Yes	2.0
PR22 ³	Meadow Street 2	Roadside	354138	429864	NO ₂	NO	7.0	5.0	Yes	2.0
PR23 ³	Meadow Street 3	Roadside	354138	429864	NO ₂	NO	7.0	5.0	Yes	2.0
PR24	Garrison PH	Roadside	354775	431481	NO ₂	NO	0	2.3	No	2.0
PR25	160 Watling Street Road	Roadside	354751	431521	NO ₂	NO	4.5	4.5	No	2.0
PR44A	39 Whittingham Lane	Roadside	352808	435283	NO ₂	NO	-10.0 ⁴	24.0	No	2.0
PR45	503 Garstang Road	Roadside	352471	435012	NO ₂	YES (AQMA 3)	0	1.5	No	2.0
PR46	482 Garstang Road	Roadside	352483	435006	NO ₂	YES (AQMA 3)	0	1.6	No	2.0
PR39	7 New Hall Lane	Roadside	354841	429594	NO ₂	YES (AQMA 4)	0	3.5	No	2.0
PR40	23 New Hall Lane	Roadside	354880	429594	NO ₂	YES (AQMA 4)	0	3.5	No	2.0
PR41	St Matts Church, New Hall Lane	Roadside	355556	429906	NO ₂	YES (AQMA 4)	0	11.0	No	2.0

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)
PR42	St Matts School, New Hall Lane	Roadside	355585	429908	NO ₂	YES (AQMA 4)	0	3.0	No	2.0
PR38	149 London Road	Roadside	355070	429198	NO ₂	YES (AQMA 5)	0	4.0	No	2.0
PR47	181 London Road	Roadside	355124	429106	NO ₂	YES (AQMA 5)	4.0	4.0	No	2.0
PR48	119 London Road	Roadside	355015	429282	NO ₂	YES (AQMA 5)	0	3.0	No	2.0
PR49	24 Grosvenor Street	Roadside	354849	429437	NO ₂	YES (AQMA 5)	0	13.5	No	2.0
PR50	7 Moore Street	Roadside	355038	429207	NO ₂	YES (AQMA 5)	5.0	6.0	No	2.0
PR55	14 Watery Lane	Roadside	352400	429950	NO ₂	NO	0	5.7	No	2.0
PR56	Wheatsheaf Inn, Tulketh Road	Roadside	352442	430000	NO ₂	NO	0	2.6	No	2.0
PR57	228 Strand Road	Roadside	352465	429971	NO ₂	NO	0	4.8	No	2.0
PR58	291 Fylde Road	Roadside	352644	430082	NO ₂	NO	0	7.5	No	2.0

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) Triplicate
- (4) The location of relevant exposure is closer to the kerb than the monitoring site, hence a negative value.

Table A.3 – Annual Mean NO₂ Monitoring Results: Automatic Monitoring (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
PRA1	354138	429863	Roadside	99	99	23	24	20	21	20
PRA2	355250	430126	Urban Background	88	88	21	23	18	20	18

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22 (no annualisation required).

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

Notes:

The annual mean concentrations are presented as µg/m³.

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

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

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

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

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

Table A.4 – Annual Mean NO₂ Monitoring Results: Non-Automatic Monitoring (µg/m³)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
PR1	354307	429769	Roadside	75.0	75.0	35	35	28	34	30
PR5	353072	431014	Roadside	92.0	92.0	37	37	29	30	29
PR6	353085	431045	Roadside	92.0	92.0	33	31	26	30	28
PR7	353111	431080	Roadside	100.0	100.0	29	29	24	25	25
PR8	353054	431095	Roadside	100.0	100.0	34	33	24	27	26
PR9	354555	429624	Roadside	100.0	50.0					25.5
PR21	354138	429864	Roadside	92.0	92.0	24	24	21	21	20
PR22	354138	429864	Roadside	100.0	100.0	25	25	20	21	20
PR23	354138	429864	Roadside	100.0	100.0	25	24	20	21	20
PR24	354775	431481	Roadside	92.0	92.0	34	33	27	32	28
PR25	354751	431521	Roadside	92.0	92.0	31	32	27	29	27
PR44A	352808	435283	Roadside	92.0	92.0	27	23	18	19	18
PR45	352471	435012	Roadside	92.0	92.0	20	16	13	14	15
PR46	352483	435006	Roadside	100.0	100.0	23	18	15	17	16
PR39	354841	429594	Roadside	100.0	100.0	44	42	34	37	33
PR40	354880	429594	Roadside	100.0	100.0	37	38	31	32	32
PR41	355556	429906	Roadside	83.0	83.0	24	24	19	22	25
PR42	355585	429908	Roadside	83.0	83.0	31	32	24	26	26
PR38	355070	429198	Roadside	100.0	100.0	-	36	27	29	29
PR47	355124	429106	Roadside	100.0	100.0	32	32	27	29	28
PR48	355015	429282	Roadside	92.0	92.0	37	34	28	32	29
PR49	354849	429437	Roadside	83.0	83.0	24	22	17	19	17
PR50	355038	429207	Roadside	67.0	67.0	27	28	22	24	22.4
PR55	352400	429950	Roadside	100.0	100.0	24	-	-	20	19
PR56	352442	430000	Roadside	92.0	92.0	-	-	-	25	27
PR57	352465	429971	Roadside	83.0	83.0	-	-	-	28	27
PR58	352644	430082	Roadside	100.0	100.0	-	-	-	27	25

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 $\mu\text{g}/\text{m}^3$.

Exceedances of the NO_2 annual mean objective of $40\mu\text{g}/\text{m}^3$ are shown in **bold**.

NO_2 annual means exceeding $60\mu\text{g}/\text{m}^3$, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined**.

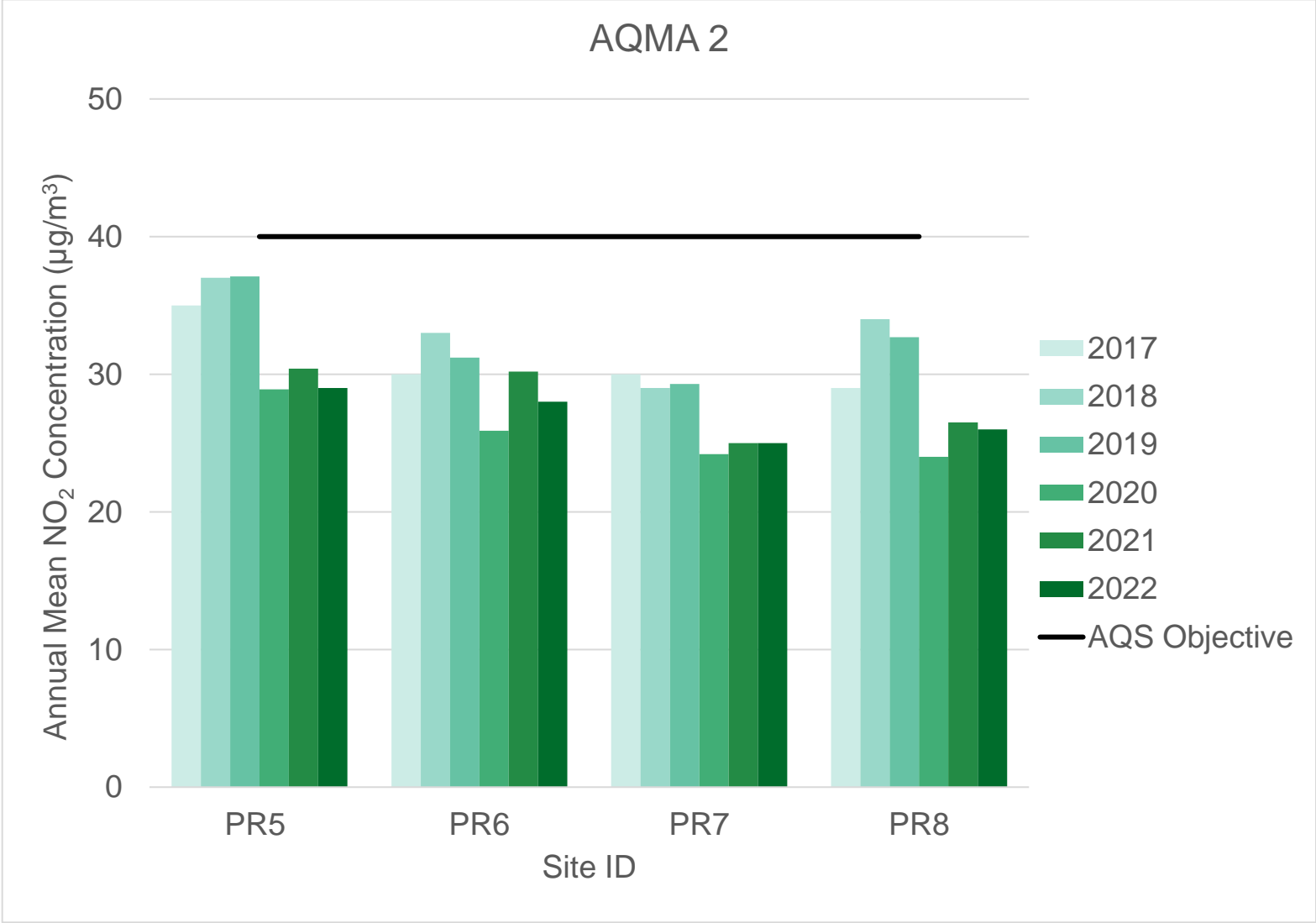
Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details. PR9 and PR50 have been annualised in Table A.4.

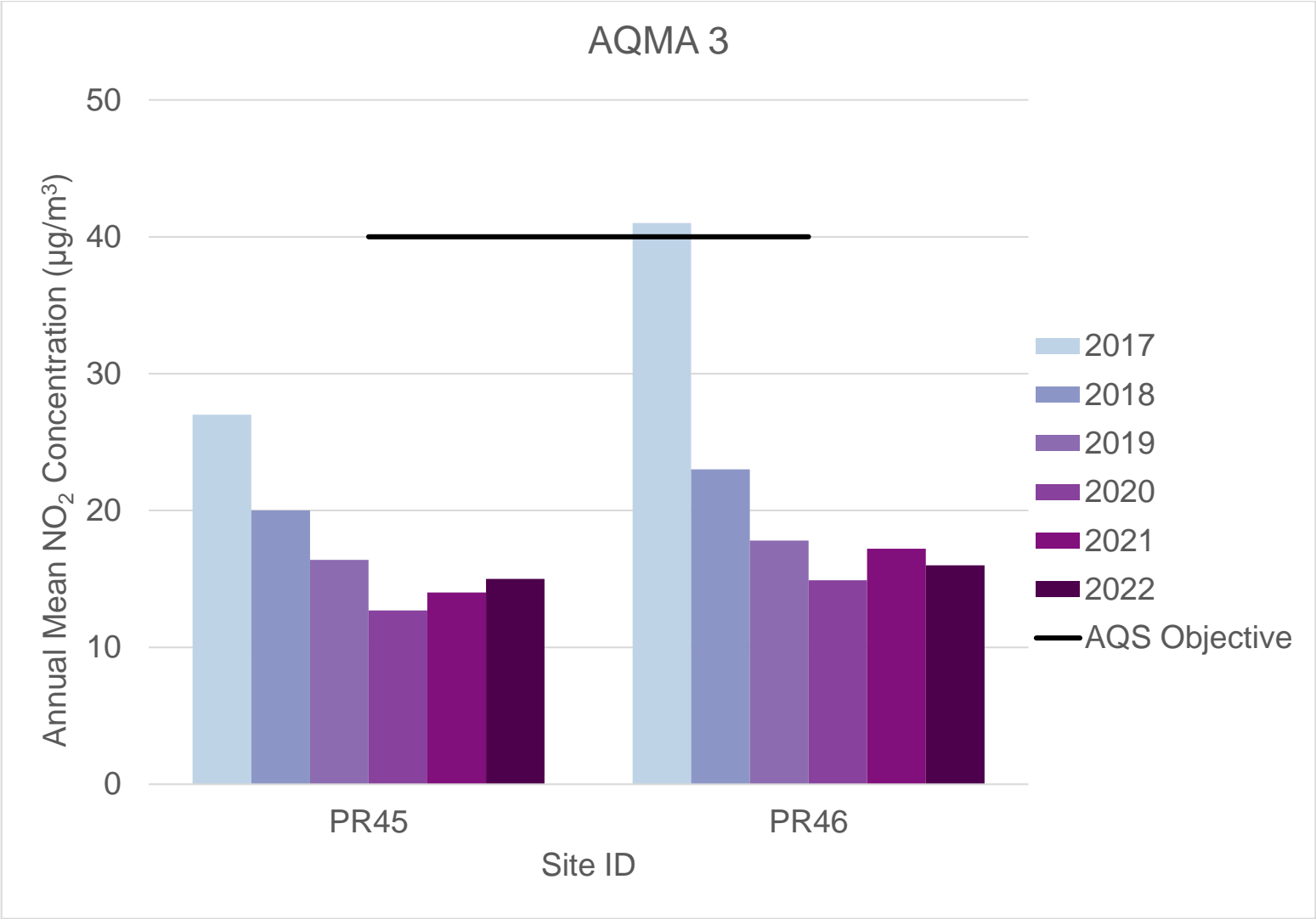
Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

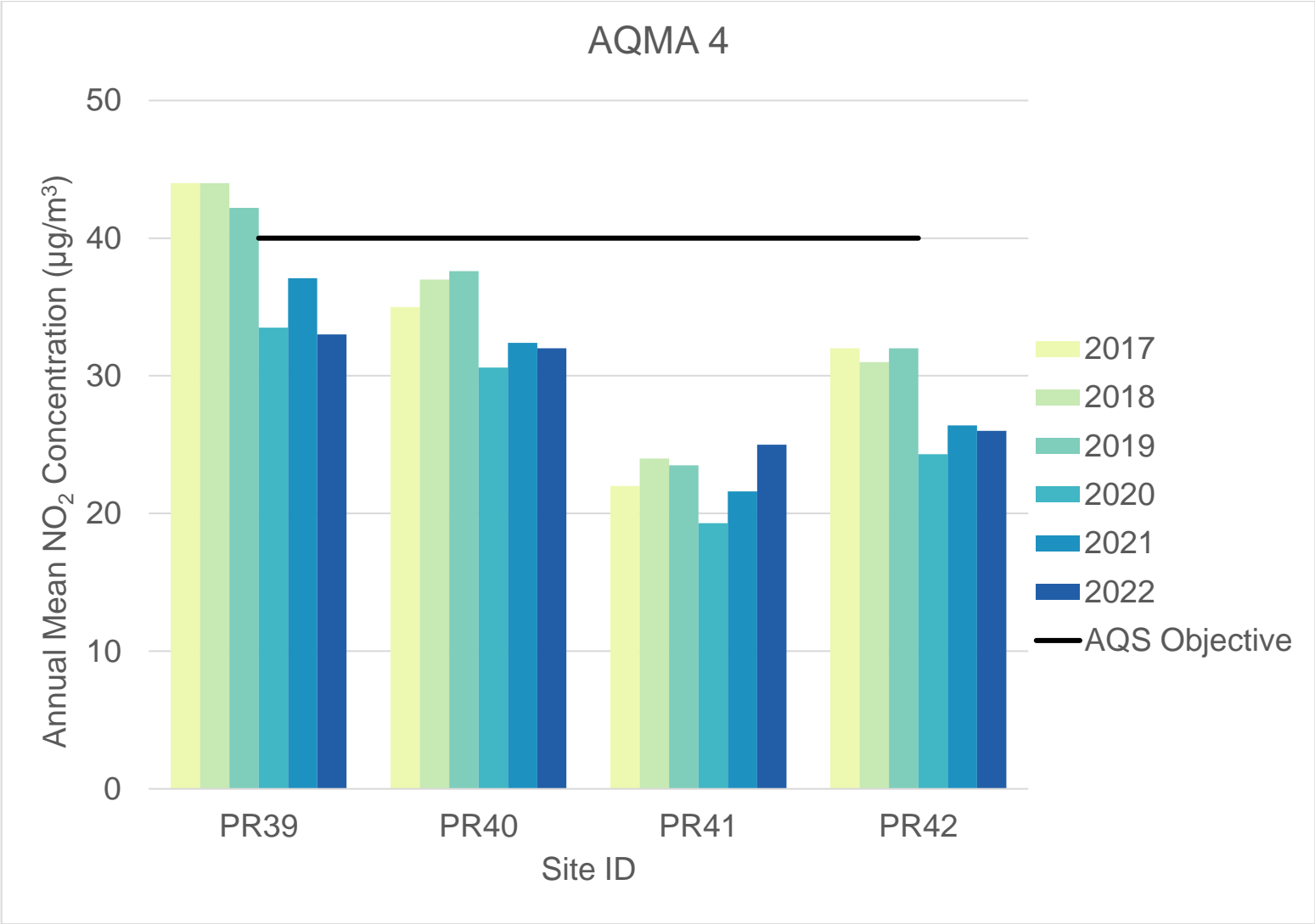
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

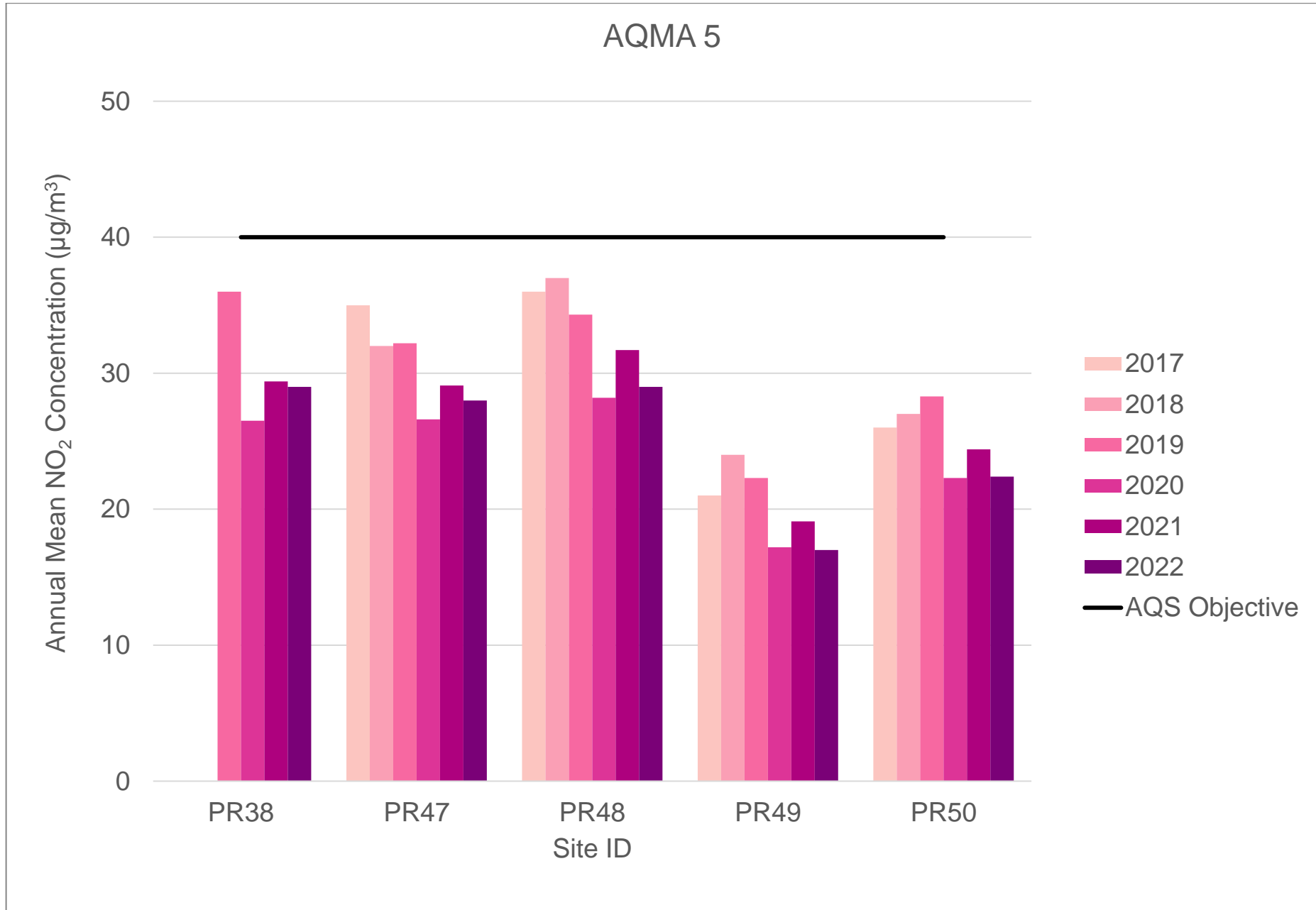
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Figure A.1 – Trends in Annual Mean NO₂ Concentrations









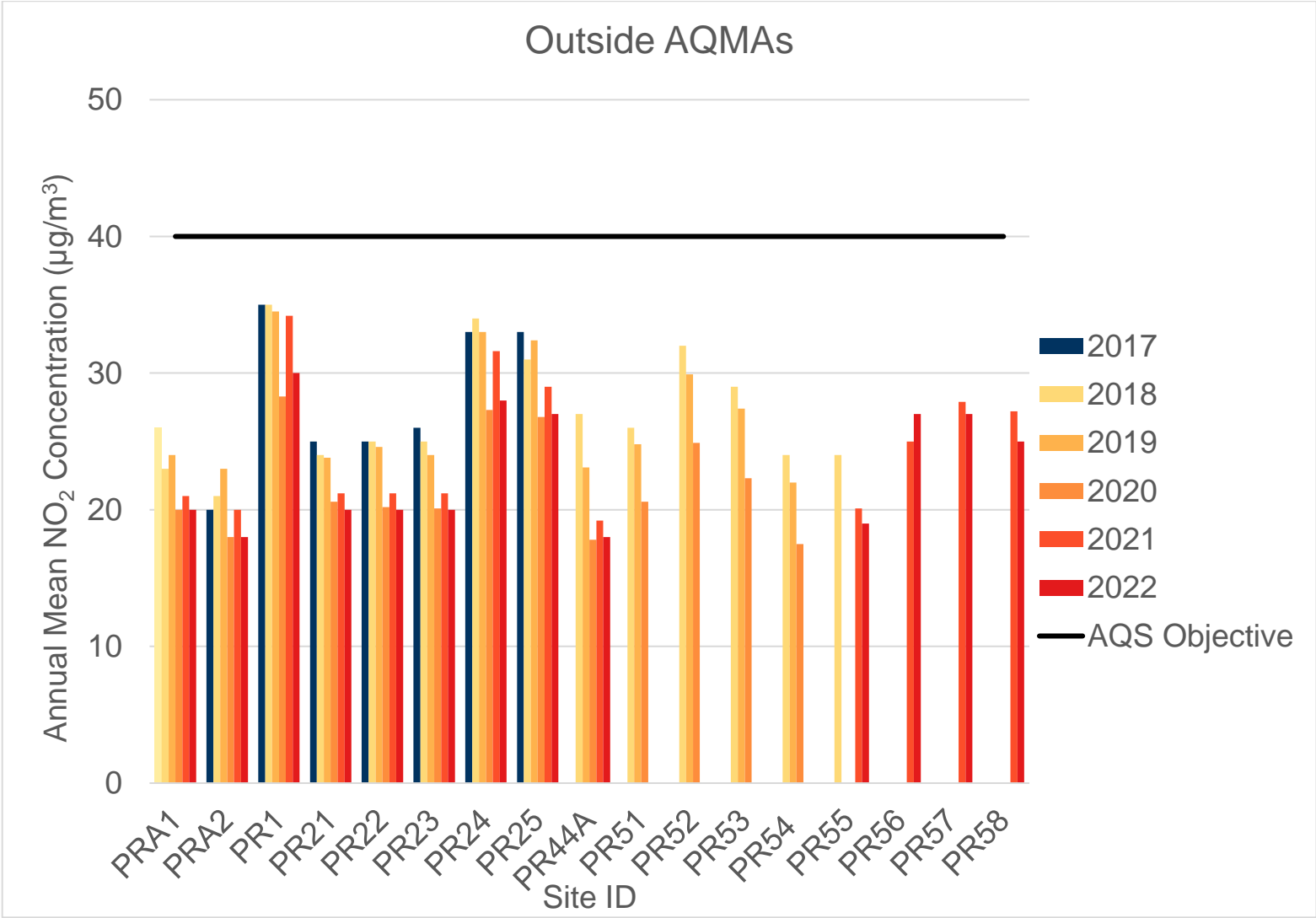


Table A.5 – 1-Hour Mean NO₂ Monitoring Results, Number of 1-Hour Means > 200µg/m³

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
PRA1	354138	429863	Roadside	99	99	0	0	0	0	0
PRA2	355250	430126	Urban Background	88	88	0	0	0	0	0

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m³ have been recorded.

Exceedances of the NO₂ 1-hour mean objective (200µg/m³ not to be exceeded more than 18 times/year) are shown in **bold**.

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

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

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

Table A.6 – Annual Mean PM₁₀ Monitoring Results (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
PRA2	355250	430126	Urban Background	100	100	no monitor	12	13	13	14

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22 (not required)

Notes:

The annual mean concentrations are presented as µg/m³.

Exceedances of the PM₁₀ annual mean objective of 40µg/m³ are shown in **bold**.

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

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

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

Figure A.2 – Trends in Annual Mean PM₁₀ Concentrations

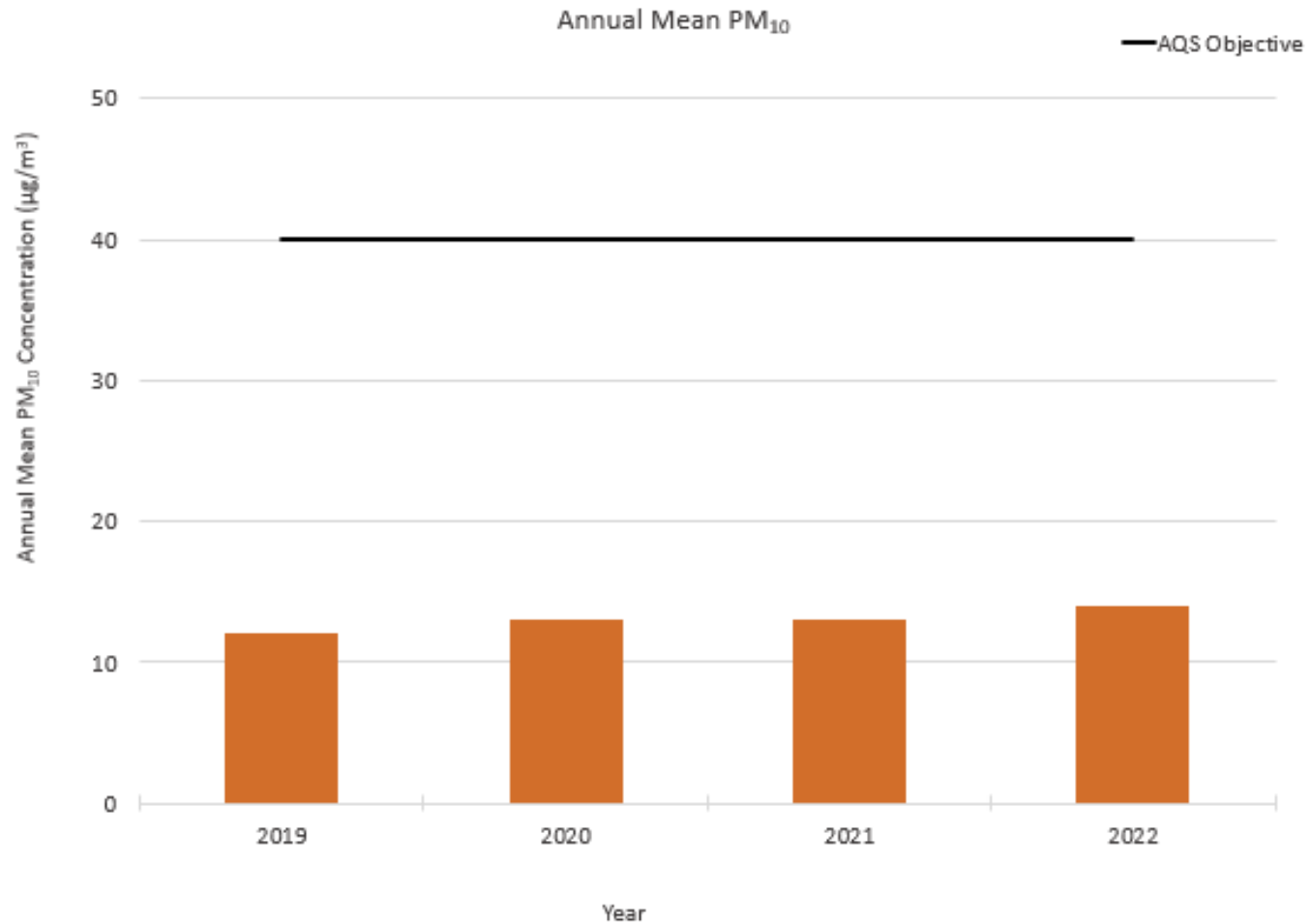


Table A.7 – 24-Hour Mean PM₁₀ Monitoring Results, Number of PM₁₀ 24-Hour Means > 50µg/m³

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
PRA2	355250	430126	Urban Background	100	100	no monitor	0	0	0	4

Notes:

Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m³ have been recorded.

Exceedances of the PM₁₀ 24-hour mean objective (50µg/m³ 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 A.8 – Annual Mean PM_{2.5} Monitoring Results (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
PRA2	355250	430126	Urban Background	100	100	no monitor	9	7	8	8

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22 (not required).

Notes:

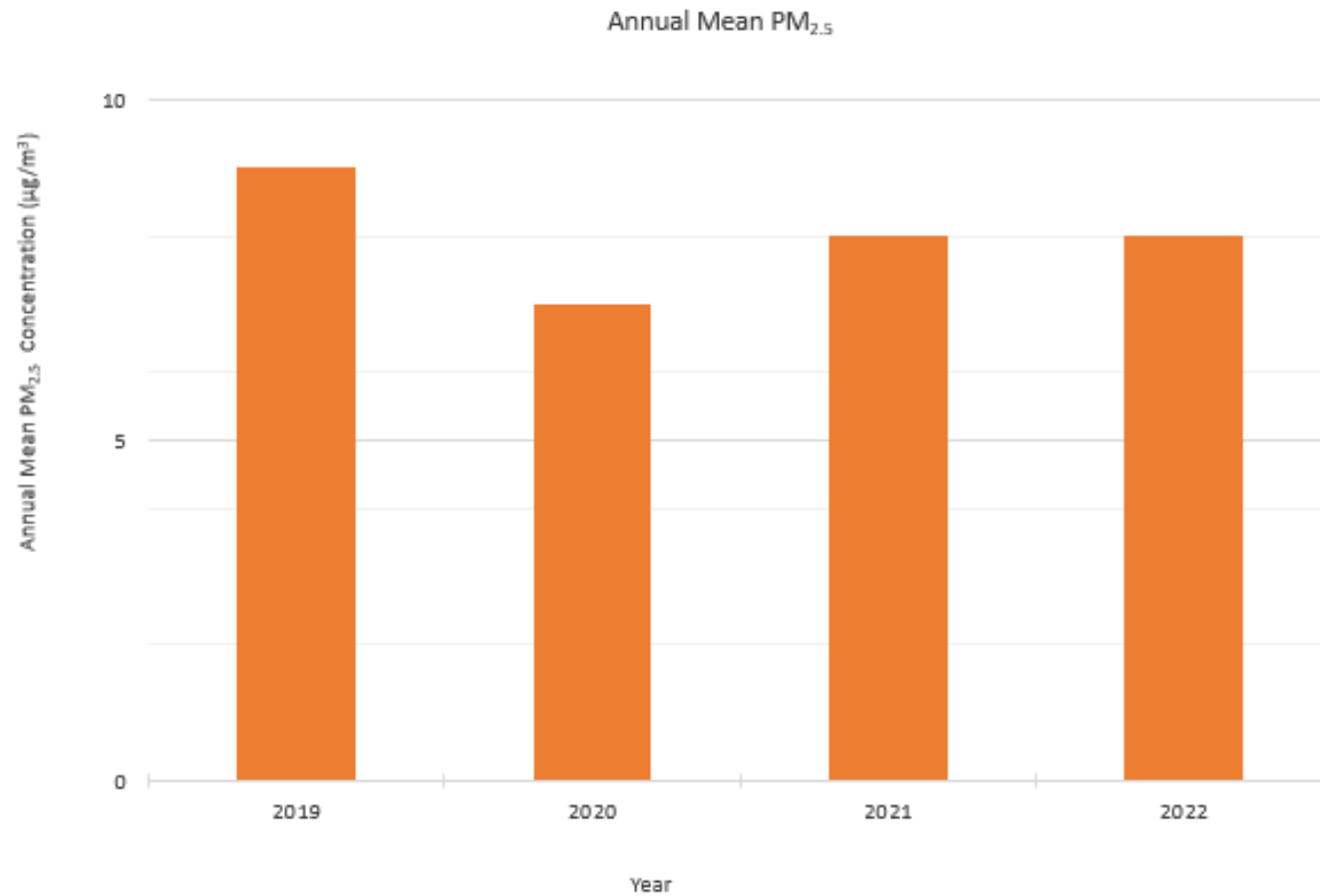
The annual mean concentrations are presented as µg/m³.

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

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

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

Figure A.3 – Trends in Annual Mean PM_{2.5} Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1 – NO₂ 2022 Diffusion Tube Results (µg/m³)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.87)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
PR1	354307	429769	42.5		36.8	29.2	26.5	32.7	32.9			27.3	49.3	34.2	34.6	30.1		
PR5	353072	431014	38.3	30,23	34.8	31.4	28.9	31.6	31.7	27.4	27.6		46.7	36.4	33.5	29.1		
PR6	353085	431045	35.8	25.8	30.1	32.1	28.2	27.5	29.9	27.2	34.0		43.4	35.0	31.7	27.6		
PR7	353111	431080	30.4	35.4	33.8	25.3	20.1	19.8	23.4	21.0	37.2	33.5	39.7	31.6	29.3	25.5		
PR8	353054	431095	26.3	34.0	34.2	29.6	19.2	19.2	22.5	27.8	27.3	33.0	50.3	29.3	29.4	25.6		
PR9	354555	429624							24.4	25.2	29.4	28.9	39.6	29.4	29.5	25.5		
PR21	354138	429864	29.0	23.5	23.5	19.0	16.2	17.4	19.1	18.6	24.1		35.7	26.9	23.0	20.0		
PR22	354138	429864	25.7	24.6	24.0	19.0	17.3	17.5	19.0	17.4	23.6	27.0	37.0	27.6	23.3	20.3		
PR23	354138	429864	31.0	24.0	23.0	18.5	17.2	17.4	19.3	18.2	23.3	21.6	35.3	26.6	23.0	20.0		
PR24	354775	431481	36.9		32.0	29.2	24.1	29.7	33.5	27.4	34.5	34.7	38.2	31.7	32.0	27.8		
PR25	354751	431521	38.3	32.2	33.2	24.7	23.2	25.7	28.9		31.2	32.7	41.1	29.4	31.0	26.9		
PR44 A	352808	435283	22.8	26.7	21.7	16.8	13.7	14.8	16.6	14.3	22.3	29.7	33.8		21.2	18.4		
PR45	352471	435012	19.7	12.1	15.7	10.6	8.8	10.3	11.9	12.0	19.5	27.9	43.2		17.4	15.2		
PR46	352483	435006	19.7	17.0	18.8	14.7	11.7	13.1	14.3	16.7	17.8	20.5	32.8	20.5	18.1	15.8		
PR39	354841	429594	37.7	34.7	39.6	39.1	34.9	35.6	38.6	34.2	39.2	33.5	44.7	36.9	37.4	32.5		
PR40	354880	429594	40.0	33.6	35.5	36.7	34.7	36.0	34.4	32.0	38.0	31.4	47.8	35.1	36.3	31.5		
PR41	355556	429906	34.5	25.1	28.5		22.0	21.1	23.5		29.4	28.1	43.3	30.9	28.6	24.9		
PR42	355585	429908	39.8	27.0	36.5	28.2	21.9	24.9	24.9	24.1			40.0	28.9	29.6	25.8		
PR38	355070	429198	38.2	32.1	31.3	30.6	25.2	27.9	32.5	29.1	34.4	36.8	43.4	34.6	33.0	28.7		
PR47	355124	429106	38.3	32.0	34.9	24.0	26.1	25.3	30.6	31.7	30.9	32.4	46.0	36.1	32.3	28.1		
PR48	355015	429282	37.4	32.3		27.0	25.2	29.3	36.2	34.1	34.3	33.2	48.2	29.8	33.3	29.0		
PR49	354849	429437	22.2	21.1	24.4	19.7	14.5	15.3		23.7	20.5	20.3		18.2	20.0	17.4		
PR50	355038	429207	26.9	30.9	30.2		15.3	18.0	23.2		23.8		32.6		25.1	22.4		
PR55	352400	429950	21.9	22.5	26.9	21.2	13.8	12.9	17.2	20.9	21.1	23.9	37.6	21.9	21.8	19.0		
PR56	352442	430000	29.9	30.4	35.9	31.4	22.9	21.4	22.6		32.0	33.6	44.3	30.9	30.5	26.5		
PR57	352465	429971		32.7	33.1	29.9	24.6	25.2	27.7	28.5	32.2		46.6	34.7	31.5	27.4		
PR58	352644	430082	13.0	24.2	35.4	28.8	22.6	22.0	29.1	28.8	27.0	33.5	43.0	32.7	29.7	24.6		

- All erroneous data has been removed from the NO₂ 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 (not required).
- Preston City Council confirm that all 2022 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within Preston City Council During 2022

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

Additional Air Quality Works Undertaken by Preston City Council During 2022

Preston City Council has not completed any additional works within the reporting year of 2021.

As detailed above, Preston City Council is working with Lancashire County Council to develop transport plans for the city centre that benefit air quality.

QA/QC of Diffusion Tube Monitoring

The NO₂ diffusion tubes used for monitoring in 2022 were provided and analysed by Gradko International Ltd. The preparation method was 20% TEA in water. Gradko participate in the AIR-PT scheme which is an independent analytical proficiency-testing (PT) scheme, operated by LGC Standards and supported by the Health and Safety Executive (HSE). In 2022 Gradko had 100% of results determined to be 'Satisfactory' in each of the four rounds.

Diffusion Tube Annualisation

Most diffusion tube monitoring locations (excluding PR9 and PR50) within Preston City Council recorded data capture of 75% or more meaning it was not required to annualise most monitoring data. Sites PR9 and PR50 had data capture of 50% and 67% respectively, thus required annualisation.

Table C.1 – Annualisation Summary (concentrations presented in $\mu\text{g}/\text{m}^3$)

Site ID	Annualisation Factor Preston	Annualisation Factor Blackpool	Annualisation Factor <Site 3 Name>	Annualisation Factor <Site 4 Name>	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
PR9	1.014	0.98	-	-	0.995	29.47	29.33
PR50	1.014	1.04	-	-	1.025	25.11	25.74

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2022 ASR have been corrected for bias using an adjustment factor calculated using triplicate tubes at the PRA1 Meadow Street analyser. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG22 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Preston City Council have applied a local bias adjustment factor of 0.87 to the 2022 monitoring data to provide consistency with previous years. A summary of bias adjustment factors used by Preston City Council over the past five years is presented in Table C.2. The local factor is slightly higher than the National Bias Adjustment Factor for 2022 of 0.85 (see below), providing a worst-case approach to bias adjustment.

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	Local	-	0.87
2021	Local	-	0.89
2020	Local	-	0.87
2019	Local	-	0.94
2018	Local	-	0.96

Table C.3 – Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4	Local Bias Adjustment Input 5
Periods used to calculate bias	12				
Bias Factor A	0.87 (0.83 – 0.91)				
Bias Factor B	15% 10% - - 20%)				
Diffusion Tube Mean ($\mu\text{g}/\text{m}^3$)	23				
Mean CV (Precision)	4				
Automatic Mean ($\mu\text{g}/\text{m}^3$)	20				
Data Capture	99%				
Adjusted Tube Mean ($\mu\text{g}/\text{m}^3$)	20 (19-21)				

Notes:

A single local bias adjustment factor has been used to bias adjust the 2022 diffusion tube results.

National Diffusion Tube Bias Adjustment Spreadsheet Studies for 2022 (Gradko / 20% TEA in water) (Spreadsheet Version Number: 09/23)

AutoSave Off Database_Diffusion_Tube_Bias_Factors_v09_23-FINAL

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National Diffusion Tube Bias Adjustment Factor Spreadsheet										Spreadsheet Version Number: 09/23	
Follow the steps below in the correct order to show the results of relevant co-location studies										This spreadsheet will be updated at the end of March 2024	
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods										LAQM Helpdesk Website	
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet											
This spreadsheet will be updated every few months; the factors may therefore be subject to change. This should not discourage their immediate use.											
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.										Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.	
Step 1:		Step 2:		Step 3:		Step 4:					
Select the Laboratory that Analyses Your Tubes from the Drop-Down List		Select a Preparation Method from the Drop-Down List		Select a Year from the Drop-Down List		Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor ³ shown in blue at the foot of the final column.					
If a laboratory is not shown, we have no data for this laboratory.		If a preparation method is not shown, we have no data for this method at this laboratory.		If a year is not shown, we have no data.		If you have your own co-location study then see footnote ¹ . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953					
Analysed By ¹	Method ²	Year ²	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m ³)	Automatic Monitor Mean Conc. (Cm) (µg/m ³)	Bias (B)	Tube Precision ³	Bias Adjustment Factor (A) (Cm/Dm)	
Gradko	20% TEA in Water	2022	R	Monmouthshire County Council	12	35	28	23.8%	G	0.81	
Gradko	20% TEA in Water	2022	KS	Marleybone Road Intercomparison	12	52	42	22.8%	G	0.91	
Gradko	20% TEA in Water	2022	UB	Plymouth City Council	12	18	18	3.2%	G	0.97	
Gradko	20% TEA in Water	2022	UC	Belfast City Council	10	27	21	25.5%	G	0.80	
Gradko	20% TEA in Water	2022	R	Belfast City Council	12	47	36	28.1%	G	0.78	
Gradko	20% TEA in Water	2022	R	Belfast City Council	12	25	22	14.0%	G	0.88	
Gradko	20% TEA in Water	2022	R	Belfast City Council	12	36	28	29.0%	G	0.78	
Gradko	20% TEA in Water	2022	UB	Hertsmere Borough Council	12	16	15	7.1%	G	0.93	
Gradko	20% TEA in Water	2022	R	SOUTHAMPTON CITY COUNCIL	12	36	28	30.6%	G	0.77	
Gradko	20% TEA in Water	2022	UC	Southampton City Council	12	28	24	15.4%	G	0.87	
Gradko	20% TEA in Water	2022	R	SOUTHAMPTON CITY COUNCIL	12	34	31	8.4%	G	0.92	
Gradko	20% TEA in Water	2022	R	Worcestershire	11	13	12	4.2%	G	0.96	
Gradko	20% TEA in Water	2022	R	Lancaster City Council	13	34	27	25.8%	G	0.79	
Gradko	20% TEA in Water	2022	R	Lancaster City Council	12	28	24	15.2%	G	0.87	
Gradko	20% TEA in Water	2022	KS	Cheltenham Bc	12	29	27	7.1%	G	0.93	
Gradko	20% TEA in Water	2022	UI	Crawley Borough Council	10	21	21	2.5%	G	0.98	
Gradko	20% TEA in Water	2022	R	Dudley Mbc	11	29	25	13.6%	G	0.88	
Gradko	20% TEA in Water	2022	R	Dudley Mbc	11	42	38	10.5%	G	0.90	
Gradko	20% TEA in Water	2022	UB	Dudley Metropolitan Borough Council	12	21	15	38.1%	G	0.72	
Gradko	20% TEA in Water	2022	R	Nottingham City Council	9	32	36	-9.8%	G	1.11	
Gradko	20% TEA in Water	2022	R	Eastleigh Borough Council	12	23	22	7.5%	G	0.93	
Overall Factor³ (33 studies)								Use	0.85		

¹ For Casella Stanger/Bureau Veritas (NOT Bureau Veritas Labs) use Gradko 50% TEA in Acetone.
² For Casella Seal/GMSSI/Casella CRE/Bureau Veritas Label/Eurofins use Environmental Scientific Groups.
³ From 2011 for Environmental Scientific Groups use ESG Glasgow.

NO₂ Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO₂ fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO₂ concentrations corrected for distance are presented in Table B.1.

No diffusion tube NO₂ monitoring locations within Preston City Council required distance correction during 2022 as all sites not representative of exposure were below 36µg/m³.

QA/QC of Automatic Monitoring

Bootle Street AURN – DEFRA, through the use of its designated contractors, carry out the QA/QC function for this air quality station. Preston City Council was the contracted Local Site Operative in 2022 and carried out calibrations on a monthly basis.

Meadow Street – Air Quality Data Management are contracted to carry out the QA/QC of the raw data and Enviro Technology Services maintain the air quality station. Preston City Council carries out calibrations of the monitor on a monthly basis.

Live and historic data are available at the <http://www.ukairquality.net/> web site.

PM₁₀ and PM_{2.5} Monitoring Adjustment

The type of PM₁₀ and PM_{2.5} monitors utilised within Preston City Council do not currently require the application of a correction factor.

Automatic Monitoring Annualisation

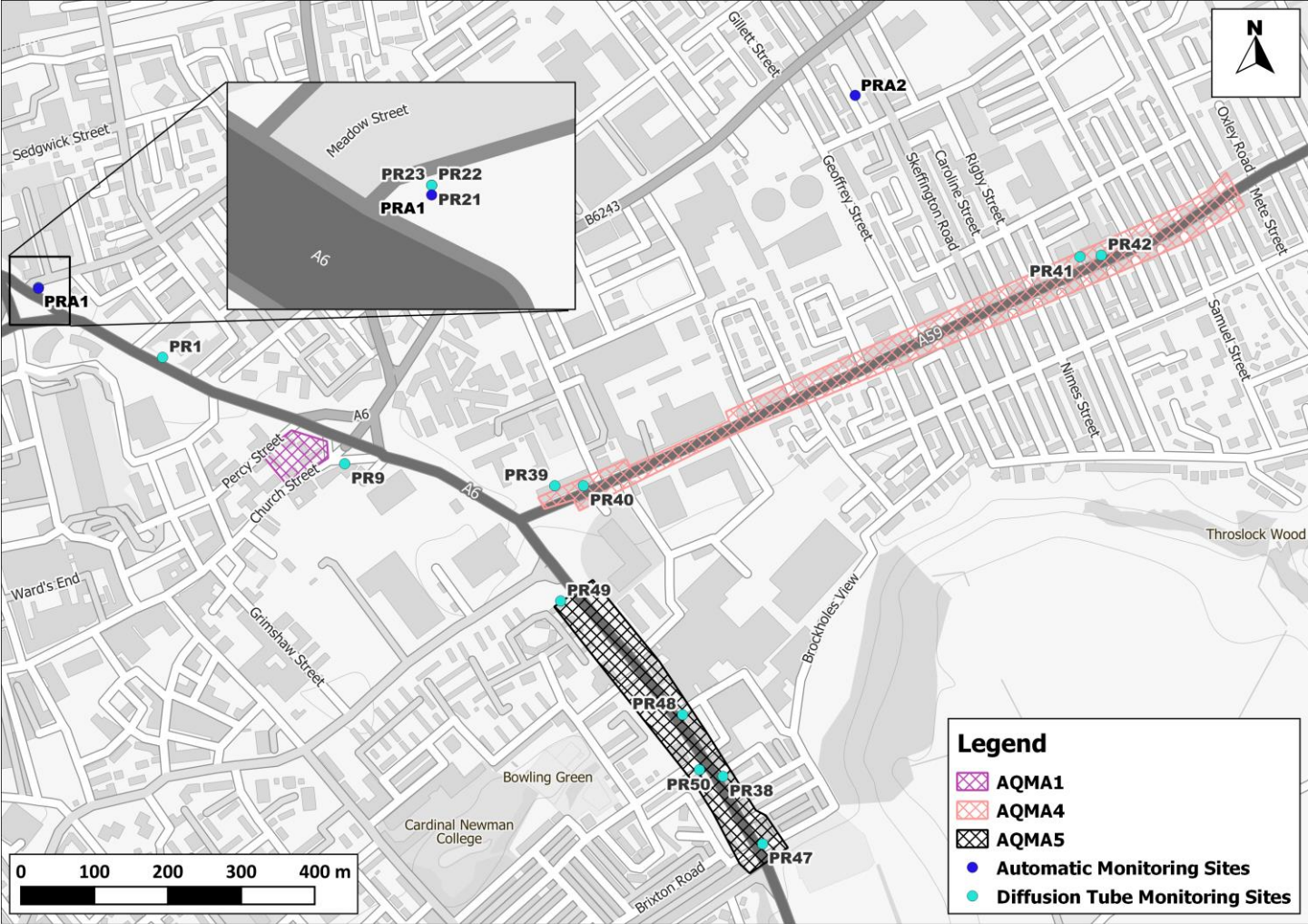
All automatic monitoring locations within Preston recorded data capture of at least 75% therefore annualisation was not required.

NO₂ Fall-off with Distance from the Road

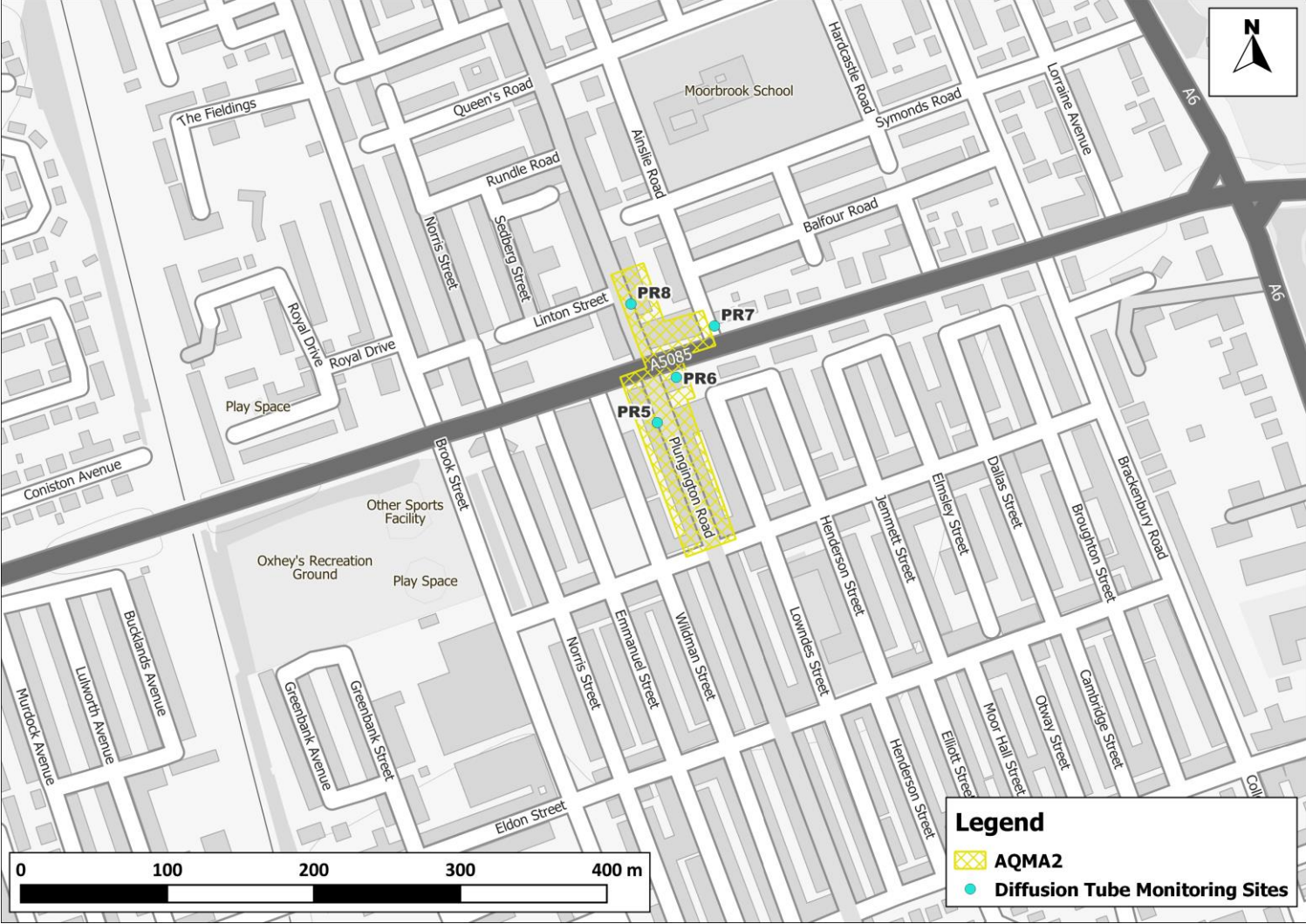
No automatic NO₂ monitoring locations within Preston City Council required distance correction during 2022.

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Appendix D: Maps of Monitoring Locations and AQMAs



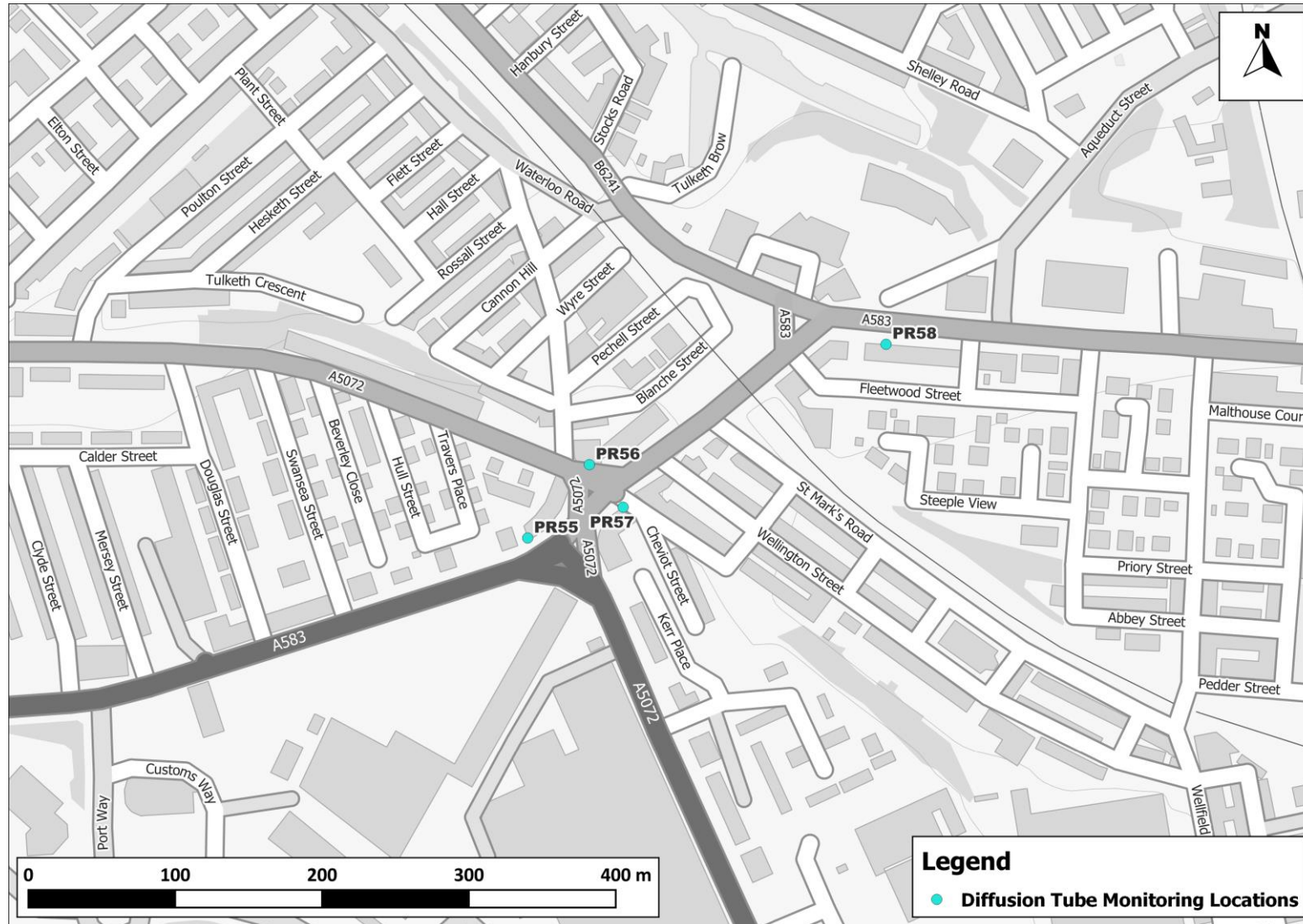
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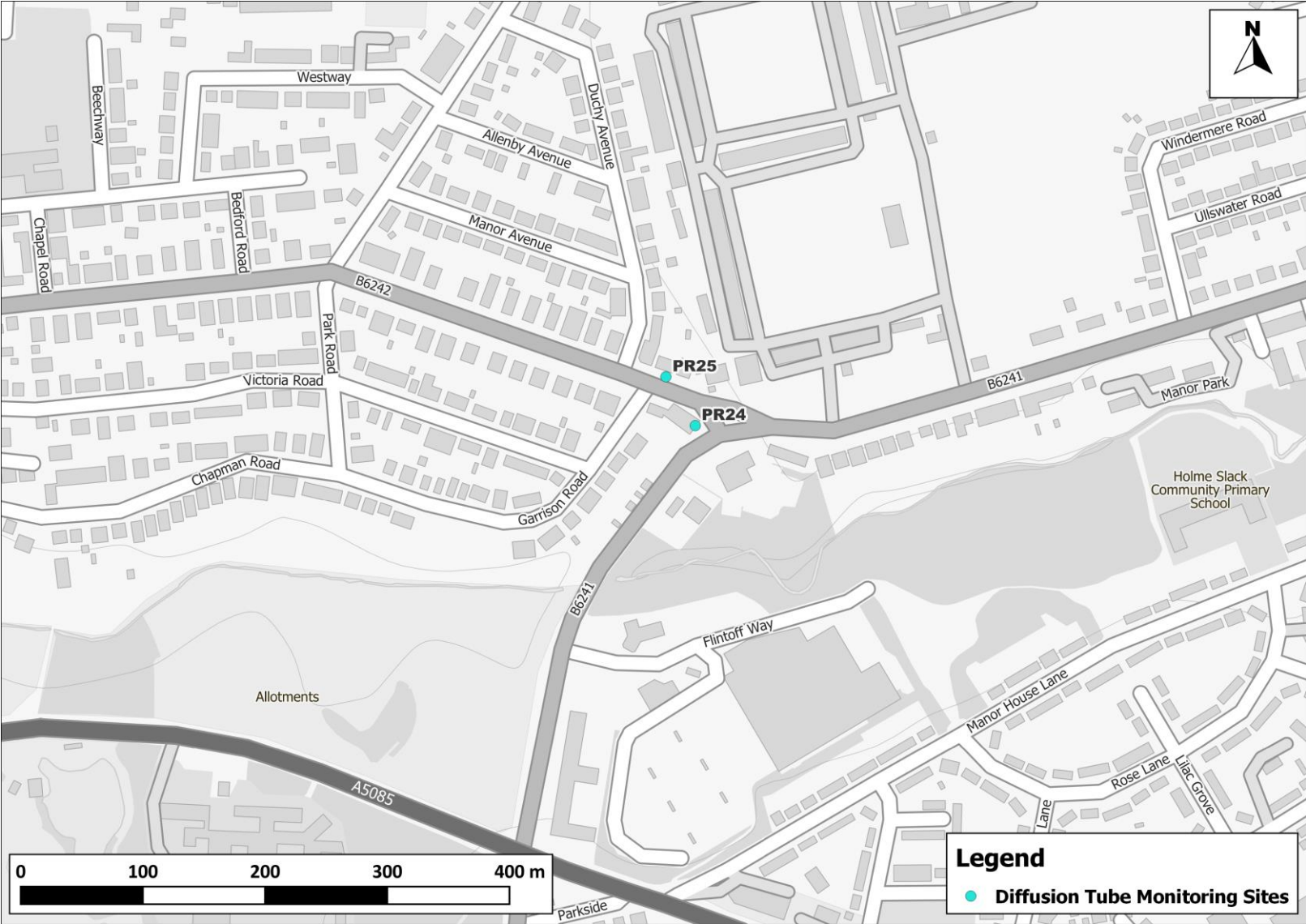
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Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England⁹

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

⁹ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DT	Diffusion Tube
EU	European Union
EV	Electric Vehicle
LAQM	Local Air Quality Management
LCC	Lancashire County Council
LCWIPs	Local Cycling and Walking Infrastructure Plans
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
PCC	Preston City Council
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO ₂	Sulphur Dioxide

References

- Air Quality Consultants. Trends in UK NO_x and NO₂ Concentrations – May 2022 Update, 2022, online. Available: https://www.aqconsultants.co.uk/getattachment/cfaa1005-0241-4f22-9f7e-c51f174d35bd/Trends-in-UK-NOx-and-NO2-Concentrations-May-2022-Update_.pdf.aspx?lang=en-GB
- Defra. Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006, online. Available: https://uk-air.defra.gov.uk/assets/documents/reports/cat09/0701110944_AQinequalitiesFNL_AEAT_0506.pdf
- Defra. Clean Air Strategy, 2019, online. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770715/clean-air-strategy-2019.pdf
- Defra. UK-AIR, 2023, online. Available: <https://uk-air.defra.gov.uk/>
- DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018, online. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/739460/road-to-zero.pdf
- Lancashire County Council. Actively Moving Forward. A ten year strategy for Cycling and Walking, 2018, online. Available: <https://www.lancashire.gov.uk/media/917305/6469-cycling-and-walking-strategy.pdf>
- Lancashire County Council. Air Quality, 2023, online. Available: <https://www.lancashire.gov.uk/lancashire-insight/environment/air-quality/>
- Lancashire County Council. Central Lancashire Highways and Transport Masterplan, 2013, online. Available: <https://www.lancashire.gov.uk/council/strategies-policies-plans/roads-parking-and-travel/highways-and-transport-masterplans/central-lancashire-highways-and-transport-masterplan/>
- Lancashire County Council. Cycling, 2023, online. Available: <https://www.lancashire.gov.uk/leisure-and-culture/cycling/>

- Lancashire County Council. Highways and Transport Strategy 2023 – 2025., n.d. online. Available: <https://www.lancashire.gov.uk/media/940050/highways-and-transport-strategy.pdf>
- Lancashire County Council. Installation of electric vehicle charge points throughout Lancashire, 2023, online. Available: <https://www.lancashire.gov.uk/council/strategies-policies-plans/roads-parking-and-travel/installation-of-electric-vehicle-charge-points/>
- Lancashire County Council. Local Cycling and Walking Infrastructure Plans, 2023, online. Available: <https://www.lancashire.gov.uk/council/strategies-policies-plans/roads-parking-and-travel/cycling-and-walking-strategy/>
- Lancashire County Council. Monitoring of air quality and health impacts, 2023, online. Available: <https://www.lancashire.gov.uk/lancashire-insight/environment/monitoring-of-air-quality-and-health-impacts/>
- Lancashire County Council. Penwortham to Preston Cycle Superhighway, 2023, online. Available: <https://www.lancashire.gov.uk/roads-parking-and-travel/active-travel-schemes/penwortham-to-preston-cycle-superhighway/>
- Lancashire County Council. Preston district, 2023, online. Available: <https://www.lancashire.gov.uk/lancashire-insight/area-profiles/local-authority-profiles/preston-district/>
- Lancashire County Council. Preston Guild Wheel, 2023, online. Available: <https://www.lancashire.gov.uk/leisure-and-culture/cycling/guild-wheel/>
- Lancashire County Council. Safer Schools Moodle, 2023, online. Available: <http://www.saferschools.lancsngfl.ac.uk/>
- Lancashire County Council. Walking, 2023, online. Available: <https://www.lancashire.gov.uk/leisure-and-culture/walking/>
- Local Air Quality Management Policy Guidance LAQM.PG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland. Online. Available: <https://laqm.defra.gov.uk/air-quality/featured/england-exc-london-policy-guidance/>
- Local Air Quality Management Technical Guidance LAQM.TG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland. Online.

Available: <https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-TG22-August-22-v1.0.pdf>

- OHID. Public Health Outcomes Framework, Preston., 2023, online. Available: <https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/1/gid/1000043/pat/6/par/E12000002/ati/101/are/E07000123/yr/1/cid/4/tbm/1>
- Preston City Council. Air quality, 2023, online. Available: <https://www.preston.gov.uk/article/1015/Air-quality>
- Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017, online. Available: https://www.local.gov.uk/sites/default/files/documents/6.3091_DEFRA_AirQualityGuide_9web_0.pdf
- Public Health England. Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report, May 2018, online. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/708855/Estimation_of_costs_to_the_NHS_and_social_care_due_to_the_health_impacts_of_air_pollution_-_summary_report.pdf