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Cheshire West and Chester Borough Council

2025 Annual Status Report

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Company Name	Bureau Veritas UK Limited	Cheshire West and Chester Borough Council
Contact Name	Alicia Dale	Martin Doyle
Position	Senior Consultant	Lead Environmental Protection Officer
Address	Atlas Park 2nd Floor Atlantic House Wythenshawe Manchester M22 5PR	The Portal Wellington Road Ellesmere Port CH65 0BA
Email	alicia.dale@bureauveritas.com	martin.doyle@cheshirewestandchester.gov.uk

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	Name	Job Title	Signature
Prepared By	Louis Thomas	Junior Air Quality Consultant	<i>L Thomas</i>
Approved By	A Dale	Senior Consultant	

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Cheshire West
and Chester

2025 Air Quality Annual Status Report (ASR)

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

Date: 30 June 2025

Information	Cheshire West and Chester Council Details
Local Authority Officer	Martin Doyle
Department	Public Protection
Address	The Portal, Wellington Road, Ellesmere Port CH65 0BA
Telephone	0300 123 7038
E-mail	environmentalprotection@cheshirewestandchester.gov.uk
Report Reference Number	AIR26368588v2.0
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Local Responsibilities and Commitment

This ASR was prepared by Bureau Veritas on behalf of Cheshire West and Chester Council with the support and agreement of the following officers and departments:

Martin Doyle – Public Protection

Kristy Littler – Transport and Infrastructure

This ASR has been approved by: Maria Byrne – Director of Environment and Communities

This ASR has been signed off by: Helen Bromley – Director of Public Health.

If you have any comments on this ASR please send them to Martin Doyle at:

The Portal,

Wellington Road,

Ellesmere Port,

CH65 0BA

Tel: 0300 123 7038

Email: environmentalprotection@cheshirewestandchester.gov.uk

Executive Summary: Air Quality in Our Area

Air Quality in Cheshire West and Chester

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 year¹.

Air pollution particularly affects the most vulnerable in society, children, the elderly, and those with existing heart and lung conditions. Low-income communities are also disproportionately impacted by poor air quality, exacerbating health and social inequalities.

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

Table ES 1 - Description of Key Pollutants

Pollutant	Description
Nitrogen Dioxide (NO ₂)	Nitrogen dioxide is a gas which is generally emitted from high-temperature combustion processes such as road transport or energy generation.
Sulphur Dioxide (SO ₂)	Sulphur dioxide (SO ₂) is a corrosive gas which is predominantly produced from the combustion of coal or crude oil.
Particulate Matter (PM ₁₀ and PM _{2.5})	<p>Particulate matter is everything in the air that is not a gas.</p> <p>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.</p> <p>PM₁₀ refers to particles under 10 micrometres. Fine particulate matter or PM_{2.5} are particles under 2.5 micrometres.</p>

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

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 Plan² sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term targets for fine particulate matter (PM_{2.5}), the pollutant of most harm to human health. The Air Quality Strategy³ provides more information on local authorities' responsibilities to work towards these new targets and reduce fine particulate matter in their areas.

The Road to Zero⁴ details the Government's approach to reduce exhaust emissions from road transport through a number of mechanisms, in balance with the needs of the local community. This is extremely important given that cars are the most popular mode of personal travel, and the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

Cheshire West and Chester Council is taking proactive steps to address the issue of air pollution within the area. The council has developed a Low Emission Strategy (LES) that specifically targets the reduction of NO₂, PM₁₀, and PM_{2.5}.

The LES is based upon three key principles for the reduction of vehicles:

- Shift – change mode of transport from cars to public transport, cycling or walking
- Avoid – reduce the distance driven, reduce emissions from stationary vehicles, chimneys and construction
- Improve – improve our use of the latest vehicle technology to reduce emissions (specifically low emission vehicles)

The Council has been successful with a LEVI application and has been awarded £2 million grant funding. The application process was advanced throughout 2023, supported by the publication of the Council's Electric Vehicle Charging Infrastructure Strategy. It will enable

² Defra. Environmental Improvement Plan 2023, January 2023

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

⁴ DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

the installation of approximately 600 chargers across the borough in car parks and on-street locations with the roll-out expected to commence in early 2025.

A total of 21 additional fast chargers (41 sockets) were installed in April 2023 in the Council's New Market Car Park and further chargers providing 18 sockets became operational in Winsford town centre in Summer 2025.

In 2023, CW&C commenced work on the new Local Transport Plan. The plan aims to encompass the different ways the public currently accesses work, education, goods and services. It also aims to address climate change, deliver on net zero objectives and reduce social inequalities. Development continues with ongoing consulting on development of Core Strategy, with a view to adoption by the end of 2025

An analysis of the current Council fleet has determined that approximately 90% of the current fleet could be effectively replaced with electric alternatives. To facilitate this transition, the Council has introduced a managed replacement program. As part of this initiative, 49 internal combustion engine (ICE) vehicles have already been replaced - 27 with fully electric vehicles and 22 with hybrid models. Contingent on the continued expansion of charging infrastructure, the Council plans to further accelerate the electrification of its fleet in line with the ongoing replacement program. This strategic approach aligns with the Council's commitment to reducing emissions and transitioning to more sustainable modes of transportation.

Conclusions and Priorities

In 2024, monitored NO₂ concentrations across Cheshire West and Chester Council decreased at all but twelve existing monitoring locations compared to 2023. There were no sites that exceeded the UK Air Quality Objectives for both NO₂ and PM₁₀. There were also no exceedances of the NO₂ hourly objective of 200µg/m³, with the maximum hourly concentration recorded at Chester Bus Interchange automatic monitoring site (119µg/m³) during 2024.

At both TLP and ELT automatic monitoring sites, SO₂ concentrations remained compliant throughout the year. The 15-minute objective of 266 µg/m³ was exceeded at TLP site seventeen times and ELT recorded 9 exceedances in 2024

Long-term monitoring data shows a noticeable reduction in NO₂ levels over time and in June 2024 both Whitby Road/Station Road AQMA and Frodsham AQMA were revoked after over 5 years of compliance. AQAP measures, as well as measures from the Low

Emission Strategy (LES), may be required to bring forward compliance in coming years.

For 2025, the council's priorities remain as such:

- Implement the adopted EV strategy and expand the availability of electric vehicle charging points (EVCPs) in the borough funded by the £2 million LEVI grant award.
- Promote Low Emission Public Transport within the county and continue development of the Local Transport Plan (LTP4).
- Continue to lead by example and expand the number of ultra-low emission vehicles within the Council fleet.
- Review the status of the AQMA in Thornton-le-Moors and Chester City Centre.
- Engage with funding opportunities for the adoption of further air quality improvement measures.

How to get Involved

There are many ways that we can all help to reduce outdoor air pollution:

- Leave your car at home and walk, cycle or use public transport instead. Car drivers can be exposed to significantly more air pollution than pedestrians or cyclists using the same streets.
- When choosing your next car, consider alternatives to petrol and diesel such as electric cars or plug-in hybrids. Tailpipe emissions from these vehicles are much lower (or even zero) and running costs are significantly cheaper. Lease costs of electric cars are often similar to an equivalent petrol/diesel model, road tax is zero and the benefit in kind (BIK) tax cost is a fraction of that for traditional models.
- Switch your car's engine off whenever you're not moving and it's safe to do so. You'll improve air quality for yourself and others.
- Keep your car regularly serviced and the tyres correctly inflated.
- Adopt an efficient driving style – anticipate the road ahead, change up the gears earlier and brake smoothly. It could save you a lot of money over the course of a year.
- Burning wood and other solid fuels produces a lot of air pollutants. If you do intend to buy a wood-burning stove, choose a Department for Environment, Food and Rural Affairs (Defra) approved Eco-Design Ready model. Make sure that the wood

you use meets the 'Woodsure ready to burn' requirements (seasoned dry wood with moisture content below 20%).

- Compost your garden waste or use green wheelie bins rather than burning it.

Adults and children with lung problems and adults with heart problems may be particularly affected by air pollution. Information on local air quality is available on the Council's dedicated air quality website [Air Quality in Cheshire West and Chester](#) and general website www.cheshirewestandchester.gov.uk/airquality, and further information on forecasting and health advice is available on Defra's UK-air website <https://uk-air.defra.gov.uk/>.

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1 Local Air Quality Management

This report provides an overview of air quality in Cheshire West and Chester during 2024. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), and the relevant Policy and Technical Guidance documents.

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

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

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

A summary of AQMAs declared by Cheshire West and Chester can be found in Table 2.1. Whitby Road/ Station Road AQMA and Frodsham AQMA were both revoked as of June 2024, however, have still been included in Table 2.1 due to the relevance of the AQMA to monitoring in 2024. Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of AQMAs and also the air quality monitoring locations in relation to the AQMAs. The air quality objectives pertinent to the current AQMA designations are as follows:

- NO₂ annual mean; (Chester City Centre AQMA, Frodsham AQMA, Whitby Road/Station Road AQMA)
- SO₂ 15-minute mean (Thornton-le-Moors AQMA)

In June 2024, the council revoked the AQMAs at Whitby Road/Station Road and Frodsham following no exceedances for the past five years, 10% below the relevant objective at the point of exposure.⁵

Thornton-le-Moors AQMA and Chester city centre AQMA have both been compliant with the relevant Air Quality Objective for over five years. Therefore, the Council will proceed with plans to revoke Chester City Centre AQMA and remodel Thornton-le-Moors AQMAs with a view to revoking during 2025 and within the next year of reporting in line with LAQM TG.22.

⁵ <https://laqm.defra.gov.uk/faqs/faq-142-three-or-more-years-of-compliance-with-air-quality-objectives/>

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
Chester City Centre AQMA (No.5)	23/05/2017	NO ₂ Annual Mean	An area that incorporates the entire area within the inner ring road and the adjoining sections of Liverpool Road, Parkgate Road, Hoole Way, Boughton gyratory and Watergate Street	NO	50.3µg/m ³ (T6)	30.5µg/m ³ (C36)	5 years	Chester City Centre Air Quality Action Plan 2022	https://www.cheshirewestandchester.gov.uk/asset-library/pollution-and-air-quality/chester-air-quality-plan.pdf
Frodsham AQMA Cheshire West and Chester ⁶	27/11/2015	NO ₂ Annual Mean	An area at the junction of Fluin Lane with the A56 High St	NO	41.5µg/m ³ (FJ)	26.5µg/m ³ (FJ)	7 years	Frodsham air quality action plan 2018	https://www.cheshirewestandchester.gov.uk/document/s/pests-pollution-food-safety/pollution-and-air-quality/air-

⁶ Revoked as of June 2024

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
									quality-review-and-assessment/action-plans/action-plan-frodsham-0118.pdf
Thornton-le-Moors AQMA No. 4	30/09/2016	SO ₂ 15 Minute Mean	An area encompassing the entire village of Thornton-le-Moors, its surroundings and parts of the adjacent area of Stanlow	NO	56 exceedances (TLM)	17 exceedances of the 15 minute mean threshold (TLP) (35 exceedances allowed)	6 years	Thornton-le-Moors air quality action plan 2023	https://www.cheshirewestandchester.gov.uk/assets/library/aqap-thornton-le-moors-revised-2023-final.pdf
Whitby Road/Station Road AQMA ⁷	16/05/2005	NO ₂ Annual Mean	An area incorporating residential properties on Whitby Road, between Enfield Rd and Cromwell Rd, Princes Road,	NO	44.5µg/m ³ (SK)	26.0µg/m ³ (SR)	8 years	Ellesmere Port and Neston BC air quality action plan 2007	https://www.cheshirewestandchester.gov.uk/document/s/pests-pollution-food-safety/pollution-and-air-quality-

⁷ Revoked as of June 2024

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
			between Whitby Rd and Ashfield Rd and Station Road, in Ellesmere Port						review-and-assessment/action-plans/action-plan-ellesmere-port-011118.pdf

- Cheshire West and Chester confirm the information on UK-Air regarding their AQMA(s) is up to date.
- Cheshire West and Chester confirm that all current AQAPs have been submitted to Defra.

2.2 Progress and Impact of Measures to address Air Quality in Cheshire West and Chester Council

Defra's appraisal of last year's ASR concluded – 'The report is well structured, detailed, and provides the information specified in the Guidance. The following comments are designed to help inform future reports.'

The appraisers' comments said:

1. Thornton-le-Moors AQMA has been compliant with the relevant Air Quality Objective for five years and therefore should be revoked within the next year of reporting in line with LAQM TG.22.

Thornton-le-Moors AQMA and Chester city centre AQMA have both been compliant with the relevant Air Quality Objective for over five years and should be revoked within the next year of reporting in line with LAQM TG.22. It should be noted that Thornton-le-Moors will be remodelled to take into account the change in location of the monitoring station compared to that at the year of declaration. Consultants have been engaged and modelling is scheduled for 2025 accordingly.

2. In Table 2.1, the highest concentration in each AQMA should be reported in the "Level of Exceedance: Current Year" column. This is missing for all three AQMAs declared for exceedances of the NO₂ objective, and the wrong site is included for the AQMA declared for exceedances of the SO₂ objective. As stated within the ASR Template Guidance box for Table 2.1, even if there is no exceedance for this AQMA, please provide the maximum monitored concentration within the AQMA.

This has been noted, the highest concentration in each AQMA has been included in the 2025 ASR.

3. Chester AQMA is listed on LAQM Portal although no further information has been provided in the ASR regarding this declaration. CW&CC should notify the LAQM Helpdesk if the information on the LAQM Portal requires updating.

Chester AQMA is now a part of the larger Chester City Centre AQMA.

4. CW&CC have included a detailed description of measures to address PM_{2.5} concentrations including planning to deploy PM_{2.5} monitors in the future to ensure compliance with new environmental targets for PM_{2.5}, this it to be commended and continued in future ASRs.

Measures that address PM_{2.5} concentrations have been included in the 2025 ASR.

5. In Table A.6, the concentrations for CBI have been incorrectly bolded. Values should only be in bold if they exceed the Air Quality Objective of 40 µg/m³.

Only values that exceed the Air Quality Objective of 40 µg/m³ will be in bold in Table A.6 in the 2025 ASR.

6. CW&CC have presented the trends in monitoring concentrations very clearly, splitting the sites up into each AQMA and by location. This is welcomed and should be continued in future ASRs.

This will be continued in the 2025 ASR.

7. The national bias adjustment factor was applied to the diffusion tube data as one of the co-located sites had poor overall automatic monitoring data capture. However, the second co-located site could still be used and CW&CC should still have included this calculation within the ASR in order to make a fully informed decision on which bias adjustment factor to apply.

This has been noted for the 2025 ASR and the relevant Local Bias Factor calculations have been included.

8. CW&CC have included clear maps showing the location of all monitoring sites as well as AQMA boundaries. This is appreciated.

The maps produced will continue to be clear and show all monitoring sites, as well as AQMA boundaries in the 2025 ASR.

9. Table 2.2 in the ASR does not match the table in the excel template. There are 25 measures in the excel template compared to 29 in the ASR and some in the excel template do not seem to appear in the ASR. There needs to be consistency between these two documents.

This has been noted, though the submission of the Excel Template alongside the ASR is not a requirement for the 2025 submission.

10. Whitby Road/Station Road AQMA and Fluin Lane, Frodsham AQMA are listed as 'declared' on the LAQM Portal. CW&CC should notify the LAQM Helpdesk that the information on the LAQM Portal requires updating.

The LAQM portal has now been updated.

11. There are some discrepancies in the diffusion tube site type classifications, there are a number of locations that are not currently categorised in accordance with the LAQM site type classifications. All diffusion tube site type classifications should be reviewed to ensure consistency with LAQM TG.22 in future ASRs.

The comments are noted. Two sites were classified as “Other” as it was understood that they matched the special source criteria being located within a bus however we are happy to identify them as “Roadside”.

The Council has taken forward a number of direct measures during the current reporting year of 2024 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. 39 measures are included within Table 2.2, with the type of measure and the progress Cheshire West and Chester have made during the reporting year of 2024 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

More detail on these measures can be found in their respective Action Plans. Key completed measures for Chester City Centre AQMA are:

- Installation of 21 electric vehicle charge points at the New Market Multi-Storey Car Park in Chester city centre;
- Conduct behaviour change campaigns to reduce single occupancy car trips;
- Encourage flexible working and home working to reduce travel to work;
- Conduct Park and Ride schemes with Euro VI vehicles;
- Review active travel policy/strategy to identify opportunities to support delivery, for example improved signage and cycle route/parking;
- Work together with developers to improve sustainable transport links serving new developments;
- Conduct local air quality monitoring within the unitary authority to ensure a high standard of data is achieved;
- Produce a Low Emissions Strategy;
- Enforcement of anti-idling at all on-street locations and,
- Explore the potential for extension of 20mph zones throughout the Chester AQMA.
- Undertake a Clean Air Zone feasibility report.

- Completion of the development of a travel portal on the staff intranet to promote sustainable travel options to council sites. In addition, a public walking and cycling journey planner has been published
<https://www.cheshirewestandchester.gov.uk/residents/transport-and-roads/active-travel/cycling-and-walking-journey-planner>

Key completed measures for Thornton-le-Moors AQMA are:

- Remove sulphur compounds at different stages of processing;
- Schedule maintenance/ repair on sulphur critical plant to suit the weather;
- Isolation of sulphur recovery units to allow independent operation on environmental permit sites;
- Fuel gas scrubbing and fuel substitution on environmental permit sites;
- Address fugitive emissions on environmental permit sites;
- Air quality monitoring; and,
- Real-time data provision to operator with trigger capability for environmental permit sites.

Key completed measures for the wider borough are:

- 20mph limits on most residential streets;
- Promotion of national £2 bus fares “Get around for £2”;
- The introduction of itravel on demand rural bus service;
- Publication of Council Electric Vehicle Charging Infrastructure Strategy;
- Application for Local Electric Vehicle Infrastructure funding;
- Bus Service Improvement Plan; and,
- Local Cycling and Walking Infrastructure Plan.

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

- Promotion of the £3 bus fare cap.
- The promotion of Park and Ride and itravel services via social media.
-

- Assessment of the success of trial for 'de-SO_x' additive on the catalytic cracking unit. Further modelling is expected to demonstrate the measures success and enable revocation of AQMA.

The Council's priorities for the coming year are:

- The appointment by October of a delivery partner(s) for the roll out of public electric vehicle charging infrastructure and subsequent commencement of a borough wide public electric vehicle charging infrastructure installation programme in late Autumn 2025;
- The continued conversion of the Council transport fleet to Ultra Low Emission Vehicles in accordance with the Replacement Programme and the appointment of a delivery partner(s) for the roll out of electric vehicle charging infrastructure across private council offices and depot sites; and,
- Adoption of the new Local Transport Plan (LTP4) "Let's talk about transport" core strategy by the end of 2025.

The principal challenges and barriers to implementation that Cheshire West and Chester Council anticipates facing are:

- Tender process - A legal query raised around regulated concession contracts and whether it is lawful to procure one through a procurement framework led to a pause in the process. This has now been addressed and a two stage procurement process recommenced following a successful bidder event in mid-December 2024. The Invitation to Tender closed on 24 June 2025 with the stated objective of the tender to deliver 760 electric vehicle charging points on street and in car parks between 2026 and 2030.
- Resources – The loss of key personnel within the Environmental Protection Team and other departments and the current recruitment challenges experienced by the Council combined with reduction in capital could jeopardise delivery and/or reporting of measures. The lack of resources has impacted on the ability of the Council to review AQMAs with a view to revocation and to update the Low Emission Strategy.

Cheshire West and Chester worked to implement these measures in partnership with the following stakeholders during 2024:

- Department for Transport
- Office for Zero Emission Vehicles
- ETT Fuels Ltd Refinery

- The Environment Agency

The Council anticipates that the measures stated above and in Table 2.2 will achieve compliance in Chester City Centre AQMA, Thornton-le-Moors AQMA and the wider borough.

The measures stated above and in Table 2.2 have helped to contribute towards compliance in both the Chester City Centre AQMA and the Thornton-le-Moors AQMA, and now the Council can proceed with plans to revoke Chester City Centre AQMA and remodel Thornton-le-Moors AQMA. Where the Council has no declared AQMAs, the listed measures can be included within an Air Quality Strategy to further detail progress on reducing polluting activities.

Table 2.2 – 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
Chester AQAP measure number 5	Alternative fuel (EV) infrastructure development in city centre.	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2018	2030	CW&C	CW&C/LEP/DfT/3rd-party	NO	Funded	£500k - £1 million	Implementation	NO ₂ Emission Reduction	Number of alternative fuel (EV) infrastructure development in the city centre	Fast chargers delivered at Brook St & Bishop St car parks, EV hub comprising 21 fast chargers online 2023 at Northgate MSCP. Additional chargers planned as part of major EV charging infrastructure procurement 2024.	The Council has secured over £2m in grant funding for the rollout of public EV chargepoints, across the Borough. An ITT closed on 24 June 2025, with an aim to appoint a delivery partner during Autumn 2025. 5-year rollout period will commence at the start of 2026..
Chester AQAP measure number 6	Procuring low emission vehicles for council-owned fleets	Promoting Low Emission Transport	Public Vehicle Procurement -Prioritising uptake of low emission vehicles	2019	2030	CW&C	CW&C	NO	Funded	< £10k	Implementation	NO ₂ Emission Reduction	Number of council-owned low emission fleet vehicles	Procurement policy amended to require ULEV first approach. EV chargers installed at depots	Dependent on fleet renewal dates, replacement has commenced and will run until 2030. Present fleet now includes 32 electric vehicles and 34 hybrids.
Borough-wide measure 1	Development of Local Transport Plan 4 – “Let’s talk about transport”	Promoting Travel Alternatives	Promoting Low Emission Public Transport	2023	2025	CW&C	CW&C	NO	Funded	Existing budgets	In development	Pollutant emission reduction	Increase modal choice, improve connectivity and health outcomes	Ongoing – adoption 2025	Development ongoing. Currently consulting on development of Core Strategy, with a view to adoption by the end of 2025. Detailed modal policy papers to be developed through 2026. See www.cheshirewestandchester.gov.uk/LTP4 for more information.
Chester AQAP measure number 10	Behaviour change campaigns to reduce single occupancy car trips	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2018	2030	CW&C	CW&C	NO	Funded	£10k – 50k	Planning	NO ₂ Emission Reduction	% modal shift to car share/public transport	Funding has been identified and ring fenced.	A series of promotions have been planned to promote discussion around sustainable transport options.
Chester AQAP measure number 1	Freight delivery and service plans, work with local distribution centres to change delivery emissions	Freight and Delivery Management	Delivery and Service plans	2021	2025	CW&C Transport	Levelling Up Fund	NO	Not Funded	£1 million - £10 million	Planning	Reducing emissions contribution from HGVs, reduced queuing traffic in peak hours	Successful bid to the Levelling Up Fund. Detailed design completion.	Bid not successful.	A freight policy paper will be produced in 2026 as part of the Local Transport Plan, setting out the Council’s policy position and priorities for engaging with freight distributors.
Chester AQAP measure number 2	HGV/LGV recognition schemes for Council contracts	Promoting Low Emission Transport	Public Vehicle Procurement -Prioritising uptake of low emission vehicles	2021	2025	CW&C Transport	N/A	NO	Not Funded	£10k - 50k	Planning	NO ₂ Emission Reduction	Amended procurement procedure	Not commenced	To ensure Council contracts require use of FORS or similar in Chester AQMA – no update for 2024
Chester AQAP measure number 3	Collaborating with bus operators to introduce ultra-low emission vehicles into the bus fleet (new or retrofit). Target use of ULEV into the problem areas	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	2017	2023	CW&C Transport	N/A	NO	Not Funded	£500k - £1 million	Implementation	Reduced vehicle emissions	Number of ultra-low emission bus fleets introduced	On-going	Falling bus patronage and Covid disruption has impacted on operator priorities and profit. Bus Service Improvement Plan (BSIP) approved Oct 2021 - initial focus on passenger recovery. No update for 2024

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
Chester AQAP measure number 4	Update taxi / private hiring policy	Promoting Low Emission Transport	Taxi Licensing conditions	2021	2022	CW&C Licensing	CW&C	NO	Funded	£10k - 50k	Implementation	NO ₂ /PM Emission Reduction	Amendment of Taxi Licensing Policy	Amended policy change adopted Nov '21 - require fleet transition to ULEV by 2031/2036, commencing 2025. Age policy also revised	Policy implemented This measure requires successful implementation of charging infrastructure, either by commercial third parties or the Council (Measure 5 above). Also there needs to be sufficient availability of electric hackney carriages.
Chester AQAP measure number 5	Alternative fuel (EV) infrastructure development in town centre	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2018	2030	CW&CC	LEVI	NO	Funded	c.£2M	Implementation	NO ₂ /PM Emission Reduction	2025 – appointment of delivery partner October 2025	2 stage procurement underway, IIT of approved bidders closed 24/06/2025	EV deployment expected to commence January 2026. New annual targets will be developed.
Chester AQAP measure number 7	Work together with developers to promote the inclusion of electric charging points for electric/hybrid vehicles at new development sites	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2018	2030	CW&C	CW&C	NO	Funded	< £10k	Implementation	NO ₂ Emission Reduction	Number of properties and premises where charging points have been required through planning condition	Year 2022/23 planning permission issued for 64 residential schemes including 113 charge points, 160 dwellings with infrastructure/cabling, and 30 commercial schemes including 138 parking spaces with charge points. Now superseded by Approved Document Part S of Building regulations as of 15 June 2023.	As of 15 June 2023, Building Regulations Approved Document S: infrastructure for charging electric vehicles, now imposes a legal duty on all new development to provide a minimum provision.
Chester AQAP measure number 8	Public transport infrastructure improvements, e.g. - Enhanced bus shelters - Accurate electronic timetables - m-tickets / contactless payment options	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2018	2022	CW&C / Public transport bodies	CW&C	NO	Not Funded	£100k - £500k	Completed	NO ₂ Emission Reduction	% modal shift to car share/public transport	Completed	Real-time passenger info provided at P&R sites, bus interchanges and some bus stops e.g. rail stations. Quarterly timetable updates agreed in the BSIP. Accurate information is available on operators' and Council websites and iTravel Smart app. Contactless payment available on bus and operator apps. Ongoing enhancements underway as part of the Council's Bus Service Improvement Plan programme

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
Chester AQAP measure number 9	Incentivise public transport usage, e.g. - Provision of information about existing services - Campaigns - Season ticket loan/discounts - Subsidised tickets	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2021	2025	CW&C	tbc	NO	Not Funded	£50k - £100k	Implementation	NO ₂ Emission Reduction	% modal shift to car share/public transport	Work not commenced locally beyond national government scheme "Get around for £2".	<p>Promotion of the:</p> <ul style="list-style-type: none"> Revised Bus Service Improvement Plan June 2024 – maintained or increased services giving network stability for passengers. BSIP Delivery (including Bus Service Enhancements) P&R ticketing and fare structures has increase patronage. Promotion of P&R and itravel service via social media and CW&C website £3 Bus Fare Cap DfT Concessionary Fare Passes LTP4 Engagement Exercise on bus Bus Passenger Charter – setting out the standards our passenger can expect from the Enhance Partnership Independent Travel Training <p>Press releases e.g. about bus service satisfaction results, the P&R 40th anniversary and new services.</p>
Chester AQAP measure number 11	Flexible working and home working encouraged	Promoting Travel Alternatives	Encourage / Facilitate home-working	2019	2022	CW&C	CW&C	NO	Funded	< £10k	Planning	NO ₂ Emission Reduction	Number of people working from home	Modern workforce programme fully implemented 2022	Staff are now classed as either fully agile, hybrid or fixed workers. Ongoing
Chester AQAP measure number 12	Promoting Car Club / Car Sharing Schemes/ Car Pooling	Promoting Travel Alternatives	Workplace Travel Planning	2021	2025	CW&C	CW&C	NO	Not Funded	< £10k	Planning	NO ₂ Emission Reduction	% modal shift to car share/public transport	Not commenced	To be assessed in Chester Movement Strategy to be developed 2026
Chester AQAP measure number 13	Park and Ride Schemes with Euro VI Vehicles	Alternatives to private vehicle use	Bus based Park & Ride	2017	2023	CW&C / Bus operator	CW&C / Bus operator	NO	Funded	£1 million - £10 million	Implementation	NO ₂ Emission Reduction	% modal shift to car share/public transport	Implemented	Euro VI vehicles on the Park & Ride (P&R) services. The focus is now on growing the passenger base and reducing single occupancy journey into Chester.
Chester AQAP measure number 14	On and off-street parking charges linked to vehicle emission standards - including any residents permits.	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	2021	2030	CW&C	bid application required	NO	Not Funded	£100k - £500k	Planning	NO ₂ Emission Reduction	Improve traffic management	2021 funding application to appoint consultants unsuccessful.	This is a substantial work area and there is a need to identify funding to advance it both in terms of development, infrastructure / implementation.
Chester AQAP measure number 15	Restrict long stay parking in AQMA.	Traffic Management	Other	2021	2025	CW&C	CW&C	NO	Not Funded	£10k - 50k	Planning	NO ₂ Emission Reduction	Improve traffic management	Not commenced	To be assessed through the forthcoming Chester Movement Strategy, to be developed by 2026.
Chester AQAP measure number 16	Improve signage at main junctions within the AQMA and major spurs.	Transport Planning and Infrastructure	Other	2021	2025	CW&C	CW&C	NO	Not Funded	£50k - £100k	Planning	NO ₂ Emission Reduction	Improve traffic management	Not commenced	Focus on smart digital signage to assist driver choice. No update 2024

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Chester AQAP measure number 17	Review active travel policy/strategy to identify opportunities to support delivery, for example improved signage and cycle route/parking	Transport Planning and Infrastructure	Cycle network	2020	2023	CW&C	CW&C	NO	Funded	< £10k	Implementation	NO ₂ Emission Reduction	Improve traffic management	LCWIP published July 2020 Section 106 requirements successfully implemented through planning approval	LTN 1/20 published by Government. CW&C updating our Local Cycling and Walking Infrastructure Plan in line with new guidance. A walking, wheeling and cycling policy paper will be developed as part of LTP4.
Chester AQAP measure number 18	Work together with developers to improve sustainable transport links serving new developments	Transport Planning and Infrastructure	Other	2019	2023	CW&C	CW&C	NO	Funded	< £10k	Implementation	NO ₂ Emission Reduction	To be determined	Local Plan Part 2 adopted 18 July 2019 strengthening planning obligations.	Borough-wide impact. Sustainable criteria are a fundamental requirement of the Local Plan. The Council is developing a boroughwide design code which will embed requirements for sustainable transport into the design of new developments.
Chester AQAP measure number 19	Provision of high quality, bespoke and accessible information on sustainable travel, e.g. on a dedicated travel website with route/mode options	Public Information	Via the Internet	2017	2024	CW&C	CW&C	NO	Funded	£10k - 50k	Implementation	NO ₂ Emission Reduction	Number of hits on upgraded website per annum	Council have produced an app called iTravelsmart	The council has recently developed travel portal on the staff intranet to promote sustainable travel options to council sites. In addition, a public walking and cycling journey planner has been published https://www.cheshirewestandchester.gov.uk/residents/transport-and-roads/active-travel/cycling-and-walking-journey-planner
Chester AQAP measure number 20	Local air quality monitoring within the unitary authority to ensure a high standard of data is achieved	Public Information	Other	2021	2023	CW&C	CW&C	NO	Funded	£10k - 50k	Planning	NO ₂ Emission Reduction	Number of monitoring locations	Funding has been ring fenced to introduced portable real-time monitors	Assessment and selection of appropriate monitoring devices needs to be undertaken – no further progress in 2024.
Chester AQAP measure number 21	Low Emissions Strategy (LES)	Policy Guidance and Development Control	Low Emissions Strategy	2018	2021	CW&C	CW&C	YES	Funded	£10k - 50k	Completed	NO ₂ Emission Reduction	The implementation of Low Emissions Strategy	Published September 2018	Targeting and prioritising implementation of measures on the AQMA. LES applies borough wide. Revisions due but not delivered 2024
Chester AQAP measure number 22	Anti-idling enforcement at all on-street locations	Traffic Management	Other	2018	2020	CW&C	CW&C	NO	Funded	£10k - 50k	Completed	NO ₂ Emission Reduction	Idling reduction	Legislation adopted, regular patrols in place.	Periodic review of intelligence to enable targeted patrols. Implemented borough wide. Real funding cuts to Council make delivery challenging

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Chester AQAP measure number 23	Review access permissions and use of the Northgate Street traffic barrier.	Traffic Management	Other	2021	2022	CW&C	CW&C	NO	Not Funded	< £10k	Planning	NO ₂ Emission Reduction	Reduction in vehicles accessing the city centre during restricted day time hours.	Work not commenced	Presently access for taxis, hotel guests and disabled vehicles appears to be permitted although it is not clear whether this is supported by a traffic order. To be reviewed through the forthcoming study into the future of Town Hall Square, associated with redevelopment of Chester Northgate Phase 2
Chester AQAP measure number 24	Explore the potential for extension for 20mph zones throughout the Chester AQMA.	Traffic Management	Reduction of speed limits, 20mph zones	2018	2022	CW&C	CW&C	NO	Not Funded	£10k - 50k	Planning	NO ₂ Emission Reduction	Implementation of 20mph zones.	Work not commenced	A detailed scheme for reducing speed limits across the borough has been rolled out very successfully. The case for any further 20mph schemes within the city will be assessed through the forthcoming Chester Movement Strategy, to be developed by 2026.
Thornton AQAP measure number 1	Remove sulphur compounds in process	Environmental Permits	Measures to reduce pollution through IPPC Permits going beyond BAT	2017	2025	Essar refinery	Operator	NO	Funded	Implementation	Reduction in 15-min exceedances to less than 35 per year. Potential air quality benefit = medium (in the range of 25-40%)	SO ₂ measured at CCU stack / SO ₂ measured at local AQ monitoring stations	Number of exceedances in 2020 and 2021 significantly lower than previous years. Dosing percentage reformulated 2020 to optimise at 20-30% SO _x reduction. Trial ongoing to assess variables e.g. ambient conditions, operational parameters, feedstock concentrations. Ongoing monitoring.	Trial of 'de-SO _x ' additive on the catalytic cracking unit in progress. Improvement in emissions over last 3 substantially reduced SO _x emissions.	Assessment of success still ongoing but further modelling in 2024 is expected to demonstrate success and enable revocation of AQMA.
Thornton AQAP measure number 2	Schedule maintenance / repair on sulphur-critical plant to suit the weather	Environmental Permits	Other	2017	2030	Essar refinery	Operator	NO	Funded	Implementation	SO ₂ Emission Reduction (negligible)	SO ₂ measured at local AQ monitoring stations	Ongoing	Essar uses weather data to plan activities. Essar uses real time AQ monitoring data to respond rapidly to spikes.	
Thornton AQAP measure number 3	Isolation of sulphur recovery units (SRU) to allow independent operation	Environmental Permits	Other	2017	2018	Essar refinery	Operator	NO	Funded	Completed	SO ₂ Emission Reduction (negligible)	Reduced sour gas flaring	Complete. Installed during 2018 turnaround	This allows one SRU to be shut down for maintenance while keeping the other online. Reduces sour gas flaring	Completed reducing process contribution within AQMA.
Thornton AQAP measure number 4	Fuel gas scrubbing and fuel substitution	Environmental Permits	Other	2017	2018	Essar refinery	Operator	NO	Funded	Completed	SO ₂ Emission Reduction (negligible)	Sulphur content in refinery fuel gas	Complete. Installed during 2018 turnaround	Additional capability for removing sulphur from fuel gas (in addition to natural gas switch for some boilers)	Completed reducing process contribution within AQMA.

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Thornton AQAP measure number 5	Address fugitive emissions	Environmental Permits	Other	2017	2018	Essar refinery	Operator	NO	Funded	Completed	SO ₂ Emission Reduction (negligible)	SO ₂ measured at local AQ monitoring stations	Completed. Medium pressure (MP) superheater replaced in 2018 turnaround	Fugitive emissions are addressed as they are identified, e.g. MP superheater replaced as it was approaching end of life	Completed reducing process contribution within AQMA.
Thornton AQAP measure number 6	Air quality monitoring	Public Information	Via the Internet	2017	2017	CW&C	CW&C	NO	Funded	< £10k	Implementation	Nil	Real-time data published on website	Ongoing	Results published on Council website, updated hourly. Currently posted daily due to system fault. Replacement commissioned 2019. Launch delayed to late 2022
Thornton AQAP measure number 7	Real-time data provision to operator (with trigger capability)	Public Information	Via the Internet	2017	2021	CW&C / Essar	CW&C	NO	Funded	£10k - 50k	Implementation	Nil	Ongoing data sharing	Complete. Output data from both SO ₂ monitoring stations shared with Essar	Supports AQAP measure 2 above. Due to be superseded in tandem with measure 27 above
Borough-wide measure 2	LEVI grant funding application	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2023	2028	CW&C / DfT	DfT	No	Funded	£2M	In development	NO _x / Particulates	Number of alternative fuel (EV) infrastructure development throughout borough	Grant application successful, £2M awarded by DfT. Procurement for delivery partner underway.	Two stage procurement underway, following successful bidder event in mid-December 2024. <ul style="list-style-type: none"> SQ stage followed by ITT. <ul style="list-style-type: none"> 20-year contract term. 1 single Service Provider to cover all deployment in Council car parks and on-street. 790 charge point units to be deployed 2026 – 2030. As of June 2025 <ul style="list-style-type: none"> 14 bidders applied at SQ stage and 11 passed to ITT stage. ITT submission deadline is 24/6/25. EV charger deployment expected to start 1/1/26. 5-year rollout period.
Borough-wide measure 3	Bikeability campaign (schools and adults only schemes)	Promoting Travel Alternatives	Promotion of cycling	2010	2025	CW&C Road safety	CW&C / Active Travel	NO	Funded	£50k - £100k	Implementation	Pollutant emission reduction	Increase in number cyclists	Ongoing. Subject to annual project review	DfT Active Travel / Council funded programmes. Ongoing campaign with 3,392 children, 28 adults (through family courses) and 265 children with special educational needs trained last year.
Borough-wide measure 4	Let's Walk	Promoting Travel Alternatives	Promotion of walking	2015	2025	CW&C Road safety	CW&C	NO	Funded	< £10k	Implementation	Pollutant emission reduction	Improve pedestrian confidence to encourage more sustainable trips	Ongoing. Subject to annual project review	Lets Walk – ongoing campaign - Child training promotes independence. DfT Active Travel / Council / Sustrans funded programmes. Ongoing campaign. 72 primary schools have instructors. Last year 14 completed last financial year with 980 children trained. Living Streets WoW scheme has received ATE funding and they have contact schools in the borough to take part.
Borough-wide measure 5	Schools crossing patrols	Promoting Travel Alternatives	Promotion of walking	2010	2030	CW&C Road safety	CW&C	NO	Funded	£100k - £500k	Implementation	Pollutant emission reduction	Improve pedestrian confidence to encourage more sustainable trips	Ongoing. Subject to annual project review	Supporting vulnerable road users cross the highway – when arriving and leaving educational establishments
Borough-wide measure 6	20mph limits on residential streets (740km)	Traffic Management	Reduction of speed limits, 20mph zones	2015	2021	CW&C	CW&C	NO	Funded	£500k - £1 million	Implementation	Reduced vehicle emissions borough wide	Successful rollout of scheme over four-year programme	Implemented	Promotes smoother driving style. Emissions reduction from vehicles should lead to overall emissions reduction. Programme complete. Ongoing monitoring

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
Borough-wide measure 7	Moving traffic offences	Traffic Management	Reducing dangerous manoeuvres, congestion and disruption	2024	2028	CW&C	CW&C	NO	Funded	tbd	Planning	Reduced vehicle emissions borough wide	Successful rollout of scheme over four-year programme	Ongoing	Implemented in 4 locations as part of Phase 1.
Chester	Bus lane enforcement in Chester using automatic number plate recognition (ANPR)	Traffic Management	Strategic highway improvements, re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2019	2030	CW&C	CW&C	NO	Funded	£100k - £500k	Implementation	Reduced vehicle emissions	Bus patronage	Ongoing	To date over 1800 fines issued.

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 Strategy⁸, local authorities are expected to work towards reducing emissions and/or concentrations of fine particulate matter (PM_{2.5}). There is clear evidence that PM_{2.5} (particulate matter smaller 2.5 micrometres) has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

The Department of Health's Public Health Outcomes Framework⁹ has a number of public health indicators that are used for public health actions, to identify areas of health inequality and concern, and monitor the differences in health impacts across regions in the UK. This framework includes an indicator "D01- Fraction of Mortality Attributable to Particulate Air Pollution" which is calculated using background annual average PM_{2.5} concentrations, modelled at a 1km² resolution based on measured concentrations from the AURN. Cheshire West and Chester has a 4.6% fraction of mortality calculated for 2023, which is lower than the average for England overall (5.2%), and lower than the Northwest Region (4.9%). The 2023 data is presented as the 2024 dataset has not been made available at the time of writing.

Cheshire West and Chester Council is taking proactive steps to address the issue of PM_{2.5} pollution within the area. The council has developed a Low Emission Strategy (LES) that specifically targets the reduction of NO₂, PM₁₀, and PM_{2.5}.

The LES is based upon three key principles for the reduction of vehicles:

- Shift – change mode of transport from cars to public transport, cycling or walking
- Avoid - reduce the distance driven, reduce emissions from stationary vehicles, chimneys and construction
- Improve - improve our use of the latest vehicle technology to reduce emissions (specifically low emission vehicles)

⁸ Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

⁹ Public Health Outcomes Framework: D01- Fraction of Mortality Attributable to Particulate Air Pollution

The council's approach is guided by the action toolbox outlined in LAQM.TG22, which provides a range of measures that can be implemented to address PM_{2.5} pollution. Many of these recommended measures have been incorporated into the council's LES, demonstrating a comprehensive and evidence-based strategy to tackle this important environmental and public health concern.

Examples include:

- Transitioning to electric vehicles (EVs) is a key strategy for improving local air quality, as EVs do not produce tailpipe emissions of particulate matter (PM_{2.5}), nitrogen dioxide (NO₂), and other gaseous pollutants. To support this transition, the Council has been expanding the public charging infrastructure. In May 2021, the first 30 public charge point equipped bays were made operational. In April 2023, an additional 21 fast chargers with 41 sockets were commissioned as part of the New Market Car Park project. In November/December 2024, 18 sockets are expected to become operational in Winsford Town Centre as part of a redevelopment scheme. To enable the electrification of the Council's own fleet, charging coverage has been established across five depots, with plans for further installations in the near future. Looking ahead, the Council is planning to embark on a program to install ultra-rapid charging hubs across the borough, further expanding the public charging network and facilitating the wider adoption of EVs in the local area.
- The Council has introduced 20mph speed limits on numerous residential roads, particularly around schools, to encourage smoother driving and reduce emissions. This targeted approach to speed management aligns with the Council's efforts to create a safer and more sustainable local environment.
- Anti-idling enforcement on all street-locations, to help improve air quality within the borough. Under the Road Traffic (Vehicle Emissions) (Fixed Penalty) (England) Regulations 2002¹⁰, council officers now have powers to enforce stationary idling.
- The Council has been successful with a LEVI application and has been awarded £2 million grant funding. The application process was advanced throughout 2023, supported by the publication of the Council's Electric Vehicle Charging Infrastructure Strategy. The Council is now in the final stages of commencing a procurement

¹⁰ Available at: <https://www.legislation.gov.uk/ukxi/2002/1808/contents/made>

exercise to identify delivery partners for the rollout of charging infrastructure throughout the borough, both on-street and across the Council estate.

- In 2021, the Licensing Committee updated the vehicle age policy to accelerate ULEV adoption in the taxi/private hire fleet. All new entrants must be ULEVs from 2025, and there is no exit age for ULEVs, provided they pass inspection. To remove existing petrol/diesel vehicles, a phased exit age policy has been implemented, with the aim of phasing them out by 2030 for private hire vehicles and 2035 for hackney carriages. As a result, by 2031 for private hire and 2036 for hackney carriages, the entire fleet will comprise 100% ULEVs.

The Environmental Protection team has a good working relationship with the Public Health team and will continue to work collaboratively to determine how air quality can be prioritised across a wide range of policy areas as well identifying specific measures to address PM_{2.5}.

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

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

The council undertook automatic (continuous) monitoring at 6 sites during 2024. Table A.1 in Appendix A shows the details of the automatic monitoring sites¹¹. The [Air Quality in Cheshire West and Chester \(cheshirewest-air.info\)](https://cheshirewest-air.info) page presents automatic monitoring results for Cheshire West and Chester, with automatic monitoring results also available through the UK-Air website.

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

3.1.2 Non-Automatic Monitoring Sites

The council undertook non-automatic (i.e. passive) monitoring of NO₂ at 51 sites during 2024¹².

¹¹ NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem.

¹² Cheshire West and Chester Council maintain 55 monitoring sites, two of which are triplicate sites (CBI, WH).

Table A.2 in Appendix A presents the details of the non-automatic sites. At the end of 2023, the council discontinued 37 non-automatic monitoring sites and commissioned two additional sites; CA and TG. Commissioning of these two sites were requested by a resident and a local councillor, respectively.

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

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (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 represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

In 2024, monitored NO₂ concentrations across Cheshire West and Chester Council decreased at all but 12 existing monitoring locations compared to 2023. The twelve diffusion tube locations where annual NO₂ concentrations increased were: CBR, FM, HTC, LI2, LVS, OP, OW, RIV, RPS, SR, WCR and WG. The highest monitored NO₂ concentration in 2024 was 30.8µg/m³ at TBV. There were no sites that were within 10% of the NO₂ annual mean UK National Objective for in 2024.

Five-year trends in the annual mean NO₂ are presented in the bar charts in A-1 to A-13. Most sites, particularly those at roadside locations, show a noticeable reduction in NO₂ levels over time. Generally, concentrations are the same level as to those recorded during COVID-19 in 2020. The reduction in NO₂ concentrations in 2024 shows that the downward trend in annual mean NO₂ concentrations is likely caused by the measures implemented by

CW&C to decrease congestion and improve traffic flows, which includes support for remote and hybrid working.

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

Table A.5 in Appendix A compares the ratified continuous monitored 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 2024 there were no exceedances of the NO₂ hourly objective of 200µg/m³, with the maximum hourly concentration recorded at Chester Bus Interchange automatic monitoring site (119µg/m³). In addition, no single diffusion tube recorded an annual mean concentration greater than 60µg/m³, indicating that it is unlikely that the 1-hour objective was exceeded at any diffusion tube monitoring site in 2024.

In June 2024, Whitby Road/Station Road AQMA and Frodsham AQMA were revoked following over 5 years of compliance. Monitored concentrations from 2024 have shown that within Thornton-le-Moors AQMA, levels have not exceeded the NO₂ air quality objective of 40µg/m³ for 6 years. Similarly, data from concentrations in Chester City Centre AQMA, have shown that levels have not exceeded the NO₂ air quality objective of 40µg/m³ for 5 years. Therefore, the council should review the status of the AQMA due to their respective compliance with the National Air Quality Objective levels.

Three NO₂ monitoring sites were on (or close to) school premises in 2024 (sites BE, LVS and RPS) recording concentrations of 21.8µg/m³, 23.8µg/m³ and 26.9µg/m³, respectively. Monitoring station RPS, which recorded the highest annual mean at these locations, is not a concern as the concentration recorded is well below the annual mean Air Quality Objective for NO₂ and the school itself is set much further back from the carriageway than the monitoring site.

The Christleton and Tarvin areas were considered to be close to being a candidate for AQMA declaration in earlier rounds of LAQM review and assessment. Monitoring has demonstrated that there remains no need to declare an AQMA at these locations as measurements are considerably below 10% of the objective.

3.2.2 Particulate Matter (PM₁₀)

Monitored PM₁₀ concentrations were well below the annual mean PM₁₀ air quality objective 40µg/m³ at all three automatic monitoring locations in 2024. Concentrations of PM₁₀ have shown a decreasing trend in observed annual mean concentrations at CBI and TLP from 2020 - 2024. Concentrations of PM₁₀ at FMH have fluctuated over the past five years with concentrations in 2024 slightly higher than levels in 2023. CBI recorded the highest concentration of PM₁₀ of 15.9µg/m³ among the three automatic monitoring sites. Overall, concentrations of PM₁₀ are well below the annual mean PM₁₀ air quality objective of 40µg/m³.

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 40µg/m³.

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 50µg/m³, not to be exceeded more than 35 times per year.

3.2.3 Particulate Matter (PM_{2.5})

Cheshire West and Chester Council do not currently undertake monitoring of PM_{2.5}. However, PM_{2.5} concentrations can be estimated from monitored PM₁₀ concentrations, as per LAQM.TG(22) guidance. Three automatic monitoring sites; CBI, FMH and TLP monitor PM₁₀ concentrations in Cheshire West and Chester.

The methodology detailed within Box 7.7 of LAQM.TG(22) has been followed to calculate a national derived PM_{coarse} value of 6.0 for Roadside sites. Applied to the 2024 PM₁₀ annual mean concentration of 15.9µg/m³ at CBI, gives an estimated PM_{2.5} annual mean of 9.9µg/m³. The same methodology has been used to calculate estimated PM_{2.5} annual mean for the background site FMH. For Background sites the 2024 PM_{coarse} values is 4.5. Applied to the 2024 PM₁₀ annual mean concentration of 14.0µg/m³, gives an estimated PM_{2.5} annual mean for FMH of 9.5µg/m³. The estimated annual mean concentration at both monitoring stations is below to the indicative stage II annual mean limit value for PM_{2.5} (20µg/m³). PM₁₀ concentrations from Thornton-le-Moors were not included due to the monitoring site being characterised as industrial.

In April 2023, the UK Department for Environment, Food and Rural Affairs (Defra) published a new Air Quality Strategy (AQS) for local authorities. This strategy includes two legally

binding targets for PM_{2.5} concentrations that local authorities are responsible for working towards:

1. A nationwide annual mean PM_{2.5} concentration of 10 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) by 2040, with an interim target of 12 $\mu\text{g}/\text{m}^3$ by January 2028.
2. A 35% reduction in average population exposure to PM_{2.5} by 2040, with an interim target of a 22% reduction by January 2028, compared to a 2018 baseline.

This indicates that Cheshire West and Chester Council may need to implement additional air quality measures to reduce PM_{2.5} concentrations, as the current PM_{2.5} levels in the area are above the interim 2028 target of 12 $\mu\text{g}/\text{m}^3$.

From latest available 1 km x 1 km background maps for PM_{2.5} for 2024 (using 2021 baseline)¹³, the Cheshire West and Chester area has an average background annual mean PM_{2.5} concentration of 5.9 $\mu\text{g}/\text{m}^3$, which currently satisfies both PM_{2.5} objectives. This is an improvement on the average background annual mean PM_{2.5} concentration of 6.3 $\mu\text{g}/\text{m}^3$ in 2023. Considering each data point at 1 km resolution from 2024 background concentration projections, the entire area under Council's jurisdiction is still below the 12 $\mu\text{g}/\text{m}^3$ concentration objective for 2028 and only one exceedance above the 10 $\mu\text{g}/\text{m}^3$ concentration objective for 2040.

As there is disparity between the PM_{2.5} calculations using PM₁₀ measurements and the Defra modelled background PM_{2.5} concentrations for 2024, this suggests CW&C should deploy PM_{2.5} monitors in the future to ensure compliance with the new Environmental Targets for PM_{2.5}.

3.2.4 Sulphur Dioxide (SO₂)

Table A.8 in Appendix A compares the ratified continuous monitored SO₂ concentrations for 2024 with the air quality objectives for SO₂.

In 2024, the 15-minute objective of 266 $\mu\text{g}/\text{m}^3$ was exceeded at TLP automatic monitoring site 17 times. At the ELT automatic monitoring site, there were nine exceedances in 2024. Both sites were compliant, as the air quality objective allows for 35 exceedances of the 15-min mean each year. However, the AQMA will be remodelled in 2025 to determine whether it can be revoked. Five-year trends in the number of 15-minute mean SO₂ results

¹³ Available at: <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2021>

exceeding $266\mu\text{g}/\text{m}^3$ are presented in the bar charts in Figure A.17. In 2024, concentrations at both monitoring sites have significantly increased from 2023 but are attributable to a single event.

Both the hourly and daily mean standard were not exceeded at either Thornton-le-Moors or Elton in 2024. Overall, all sites complied with the UK national air quality objectives.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Which AQMA? ⁽¹⁾	Monitoring Technique	Distance to Relevant Exposure (m) ⁽²⁾	Distance to kerb of nearest road (m) ⁽¹⁾	Inlet Height (m)
BO	Boughton	Roadside	341864	366444	NO ₂	Yes	Chester City Centre	Chemiluminescent	25	3	1.0
CBI	Chester Bus Interchange	Roadside	340645	366802	NO ₂ , PM ₁₀	Yes	Chester City Centre	Chemiluminescent, BAM	5.1	6.6	1.6
ELT	Elton	Industrial	345642	375522	SO ₂	No	N/A	UV-fluorescent	0	N/A	2
FMH	Frodsham	Urban Background	352445	378031	NO ₂ , PM ₁₀	No	N/A	Chemiluminescent, TEOM	24	7	2.5
TLP	Thornton-le-Moors, Park Road	Industrial	344103	374330	PM ₁₀ , SO ₂	Yes	Thornton-le-Moors	Chemiluminescent UV-fluorescent BAM	38	N/A	2.5
WH	Whitby Road	Roadside	340197	376363	NO ₂	Yes	Whitby Road/Station Road	Chemiluminescent	25	3	1.0

Notes:

(1) N/A if not applicable

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

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

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
BE	Bedward Row	Roadside	340239	366418	NO ₂	Yes, Chester City Centre AQMA	0.5	2.4	No	2.4
BJ	Backpackers / Jade, Boughton	Roadside	341401	366512	NO ₂	Yes, Chester City Centre AQMA	0.1	2.5	No	2.4
C11	Christleton Road (11)	Roadside	341915	366427	NO ₂	Yes, Chester City Centre AQMA	0.0	1.0	No	2.0
C36	Christleton Road (36)	Roadside	342000	366374	NO ₂	Yes, Chester City Centre AQMA	0.5	1.4	No	2.5
CA	114 Castle St	Roadside	364982	373307	NO ₂	No	3.1	2.4	No	2.5
CBI1, CBI2, CBI3	Bus Interchange CBI	Roadside	340647	366803	NO ₂	Yes, Chester City Centre AQMA	5.1	6.6	Yes	1.6
CBR	Bus ramp CBR	Roadside	340676	366782	NO ₂	Yes, Chester City Centre AQMA	0.0	1.6	No	2.5
CN	Chester Way, Northwich	Roadside	366070	373905	NO ₂	No	3.8	1.6	No	3.0
FH	72 High St Frodsham	Roadside	352146	378139	NO ₂	Yes, Frodsham AQMA	0.2	2.0	No	2.5
FJ	Fluin Lane (r/o 76 Chester Rd).	Roadside	352171	378140	NO ₂	Yes, Frodsham AQMA	0.5	2.0	No	2.5
FM	Fluin Lane (r/o 10 Manor Fm Ct)	Roadside	352189	378094	NO ₂	Yes, Frodsham AQMA	0.3	2.0	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)
GE	George Street	Roadside	340657	366730	NO ₂	Yes, Chester City Centre AQMA	1.0	5.0	No	2.4
GR	Griffths Road, Lostock	Roadside	368634	374714	NO ₂	No	0.2	8.0	No	1.8
GSW	Gorse Stacks (Waterside)	Roadside	340700	366687	NO ₂	Yes, Chester City Centre AQMA	1.0	1.6	No	2.1
GT	George Street (10)	Roadside	340611	366747	NO ₂	Yes, Chester City Centre AQMA	0.0	1.9	No	2.6
HHB	Holme Bank Cott. Holme St	Roadside	347953	366723	NO ₂	No	5.3	2.9	No	2.5
HIN	Upper Raby/Chester High	Roadside	330317	378536	NO ₂	No	9.5	1.6	No	2.2
HTC	The Cottage, Holme St	Roadside	348333	366763	NO ₂	No	3.1	2.0	No	2.0
HW	Hoole Way	Roadside	340881	366826	NO ₂	Yes, Chester City Centre AQMA	1.0	1.9	No	2.4
IC	Ingham Close 8	Roadside	342068	366332	NO ₂	Yes, Chester City Centre AQMA	2.0	2.0	No	2.0
KR	King St. Rudheath	Roadside	368432	372988	NO ₂	No	4.5	2.2	No	2.0
LH	Lincoln House (r/o The Bars)	Roadside	341126	366540	NO ₂	Yes, Chester City Centre AQMA	3.0	2.0	No	3.0
LI2	Liverpool Road (2)	Roadside	340354	367034	NO ₂	Yes, Chester City Centre AQMA	7.0	2.5	No	2.2

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
LVS	Love Street	Roadside	340990	366317	NO ₂	Yes, Chester City Centre AQMA	8.0	1.8	No	2.2
MCC	Christleton (Mill Cottages)	Roadside	343785	365502	NO ₂	No	0.5	2.4	No	2.0
NIN	Nicholas Street (North)	Roadside	340284	366199	NO ₂	Yes, Chester City Centre AQMA	0.0	3.0	No	2.3
NSR	Station Rd crossroads, Northwich	Roadside	366796	373984	NO ₂	No	0.6	1.7	No	2.2
NWH	Winnington Hill, Northwich	Roadside	365590	373904	NO ₂	No	2.4	0.7	No	2.4
OB	105 Boughton	Roadside	341633	366510	NO ₂	Yes, Chester City Centre AQMA	0.6	2.5	No	2.5
OP	Oulton Place	Roadside	340636	366770	NO ₂	Yes, Chester City Centre AQMA	0.0	1.6	No	2.1
OSQ	Over Square, Winsford	Roadside	364053	365977	NO ₂	No	5.5	2.2	No	2.4
OW	St Oswalds Way	Roadside	340623	366823	NO ₂	Yes, Chester City Centre AQMA	2.3	2.3	No	2.3
PA	Parkgate Road (19)	Roadside	340313	367014	NO ₂	Yes, Chester City Centre AQMA	2.4	0.8	No	2.4
PG	Parkgate Road (5)	Roadside	340322	366989	NO ₂	Yes, Chester City Centre AQMA	0.2	1.8	No	2.0
QRN	Quarry Road, Neston	Roadside	330565	378063	NO ₂	No	0.0	3.0	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)
RIV	Rivacre Road	Roadside	337242	378569	NO ₂	No	14.4	4.5	No	1.8
RM	Rock Mount, Parkgate Road	Roadside	340291	367108	NO ₂	Yes, Chester City Centre AQMA	0.0	3.8	No	2.2
RPS	Rudheath Primary School	Roadside	367856	372667	NO ₂	No	19.0	5.2	No	2.2
SA	Samaritans, Liverpool Road	Roadside	340364	366929	NO ₂	Yes, Chester City Centre AQMA	0.2	2.5	No	2.5
SR	68 Station Rd	Roadside	340435	376790	NO ₂	Yes, Whitby Road/Station Road AQMA	0.0	1.6	No	2.5
ST	St Anne's Place	Roadside	340794	366778	NO ₂	Yes, Chester City Centre AQMA	18.4	0.1	No	2.2
SZ	Specialized Bikes, Boughton	Roadside	341819	366475	NO ₂	Yes, Chester City Centre AQMA	0.5	2.0	No	2.5
T44	Tarvin Road (44)	Roadside	342085	366446	NO ₂	Yes, Chester City Centre AQMA	3.5	1.0	No	2.5
T6	Tarvin Road (6)	Roadside	341926	366446	NO ₂	Yes, Chester City Centre AQMA	0.2	2.0	No	2.0
TA	Tarvin Road (52)	Roadside	344519	366898	NO ₂	No	6.0	2.0	No	2.0
TB	The Bars, Boughton (nr. Gyrotory)	Roadside	341202	366470	NO ₂	Yes, Chester City Centre AQMA	2.0	1.0	No	2.5
TBV	1 Tarvin Rd (Barnhouse Vets)	Roadside	344013	366830	NO ₂	No	14.4	1.4	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)
TG	The Green	Roadside	363743	372186	NO ₂	No	2.1	1.0	No	2.0
WCR	Whitchurch Road (58)	Roadside	342951	366029	NO ₂	No	7.2	1.5	No	2.0
WG	Watergate St.	Roadside	340217	366209	NO ₂	Yes, Chester City Centre AQMA	0.2	1.5	No	2.0
WH1, WH2, WH3	Whitby Rd collocated triplicate tubes	Roadside	340196	376363	NO ₂	Yes, Whitby Road/Station Road AQMA	15.0	1.2	Yes	3.5

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.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 2024 (%) ⁽²⁾	2020	2021	2022	2023	2024
BO	341864	366444	Roadside	99.5	99.5	17	19	18	15.5	16.0
CBI	340645	366802	Roadside	99.0	99.0	29	30	32	31.6	31.6
FMH	352445	378031	Urban Background	74.9	74.9	13	15	14	9.7	8.6
WH	340197	376363	Roadside	54.1	54.1	28	29	29	27.9	28.5

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

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

Where exceedances of the NO₂ annual mean objective occur at locations not representative of relevant exposure, the fall-off with distance concentration has been calculated and reported concentration provided in brackets for 2024.

Notes:

The annual mean concentrations are presented as µg/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 2024 (%) ⁽²⁾	2020	2021	2022	2023	2024
BE	340239	366418	Roadside	90.6	90.6	22.2	27.1	25.2	21.8	21.8
BJ	341401	366512	Roadside	90.6	90.6	24.6	26.1	26.4	25.7	24.9
C11	341915	366427	Roadside	100.0	100.0	27.8	31.8	30.6	29.9	26.0
C36	342000	366374	Roadside	100.0	100.0	31.8	33.6	36.4	32.7	30.5
CA	364982	373307	Roadside	75.0	75.0	-	-	-	-	27.0
CBI1, CBI2, CBI3	340647	366803	Other	100.0	100.0	26.4	28.2	29.5	28.3	27.6
CBR	340676	366782	Other	92.5	92.5	24.4	26.1	27.0	26.1	26.3
CN	366070	373905	Roadside	90.6	90.6	24.1	25.3	26.0	23.3	22.7
FH	352146	378139	Roadside	83.0	83.0	27.4	28.8	28.2	25.9	23.8
FJ	352171	378140	Roadside	75.0	75.0	28.6	28.3	28.4	26.5	26.5
FM	352189	378094	Roadside	75.0	75.0	24.3	28.5	27.5	22.4	23.7
GE	340657	366730	Roadside	100.0	100.0	20.1	26.4	25.5	25.9	24.5

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2024 (%) ⁽²⁾	2020	2021	2022	2023	2024
GR	368634	374714	Roadside	100.0	100.0	17.0	17.2	18.1	16.4	15.6
GSW	340700	366687	Roadside	100.0	100.0	23.2	28.1	27.9	25.6	24.9
GT	340611	366747	Roadside	100.0	100.0	23.0	29.0	25.9	24.3	23.9
HHB	347953	366723	Roadside	92.5	92.5	17.8	22.0	24.6	22.7	21.1
HIN	330317	378536	Roadside	100.0	100.0	-	-	-	24.3	22.3
HTC	348333	366763	Roadside	81.1	81.1	19.7	25.1	24.3	20.5	22.9
HW	340881	366826	Roadside	92.5	92.5	21.1	26.1	27.1	25.0	24.6
IC	342068	366332	Roadside	90.6	90.6	23.7	26.6	26.9	24.1	23.3
KR	368432	372988	Roadside	81.1	81.1	26.0	25.9	25.7	22.6	22.0
LH	341126	366540	Roadside	75.0	75.0	22.8	27.5	27.0	26.4	24.7
LI2	340354	367034	Roadside	100.0	100.0	27.6	29.9	30.9	28.9	29.1
LVS	340990	366317	Roadside	67.9	67.9	19.2	17.5	21.7	23.7	23.8
MCC	343785	365502	Roadside	75.0	75.0	22.9	27.4	25.8	23.7	23.5

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2024 (%) ⁽²⁾	2020	2021	2022	2023	2024
NIN	340284	366199	Roadside	100.0	100.0	24.0	29.8	26.2	25.8	25.8
NSR	366796	373984	Roadside	92.5	92.5	27.6	31.0	30.1	27.1	26.2
NWH	365590	373904	Roadside	100.0	100.0	27.8	34.6	35.9	30.2	30.2
OB	341633	366510	Roadside	92.5	92.5	29.0	30.2	30.8	29.0	26.9
OP	340636	366770	Roadside	90.6	90.6	22.3	26.2	26.3	25.0	25.2
OSQ	364053	365977	Roadside	66.0	66.0	23.2	29.0	29.4	26.0	25.3
OW	340623	366823	Roadside	90.6	90.6	27.2	32.2	33.7	31.1	32.5
PA	340313	367014	Roadside	100.0	100.0	27.9	30.3	30.7	27.7	25.4
PG	340322	366989	Roadside	90.6	90.6	29.9	33.1	32.6	30.1	29.3
QRN	330565	378063	Roadside	81.1	81.1	26.6	29.3	27.2	25.9	25.1
RIV	337242	378569	Roadside	75.0	75.0	-	-	-	28.0	28.2
RM	340291	367108	Roadside	100.0	100.0	28.6	31.4	30.6	29.9	28.8
RPS	367856	372667	Roadside	90.6	90.6	29.0	29.5	30.8	26.5	26.9

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2024 (%) ⁽²⁾	2020	2021	2022	2023	2024
SA	340364	366929	Roadside	100.0	100.0	24.8	27.5	28.2	26.1	25.1
SR	340435	376790	Roadside	100.0	100.0	26.3	29.3	27.3	25.7	26.0
ST	340794	366778	Roadside	100.0	100.0	30.1	33.8	30.8	30.2	28.9
SZ	341819	366475	Roadside	100.0	100.0	22.9	25.3	25.8	24.6	23.6
T44	342085	366446	Roadside	92.5	92.5	25.7	28.5	30.5	27.5	24.4
T6	341926	366446	Roadside	100.0	100.0	31.5	34.1	35.1	32.0	30.0
TA	344519	366898	Roadside	81.1	81.1	26.7	27.6	28.0	27.2	26.4
TB	341202	366470	Roadside	92.5	92.5	25.0	25.4	24.2	26.4	26.4
TBV	344013	366830	Roadside	100.0	100.0	28.2	30.9	33.4	31.8	30.8
TG	363743	372186	Roadside	90.6	90.6	-	-	-	-	20.6
WCR	342951	366029	Roadside	90.6	90.6	25.8	30.1	29.2	26.5	28.3
WG	340217	366209	Roadside	100.0	100.0	27.3	25.4	27.0	26.0	27.0
WH1, WH2, WH3	340196	376363	Roadside	90.6	90.6	25.8	27.4	27.0	25.7	25.4

- ☒ **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.

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 – Within Chester City Centre AQMA (North I)

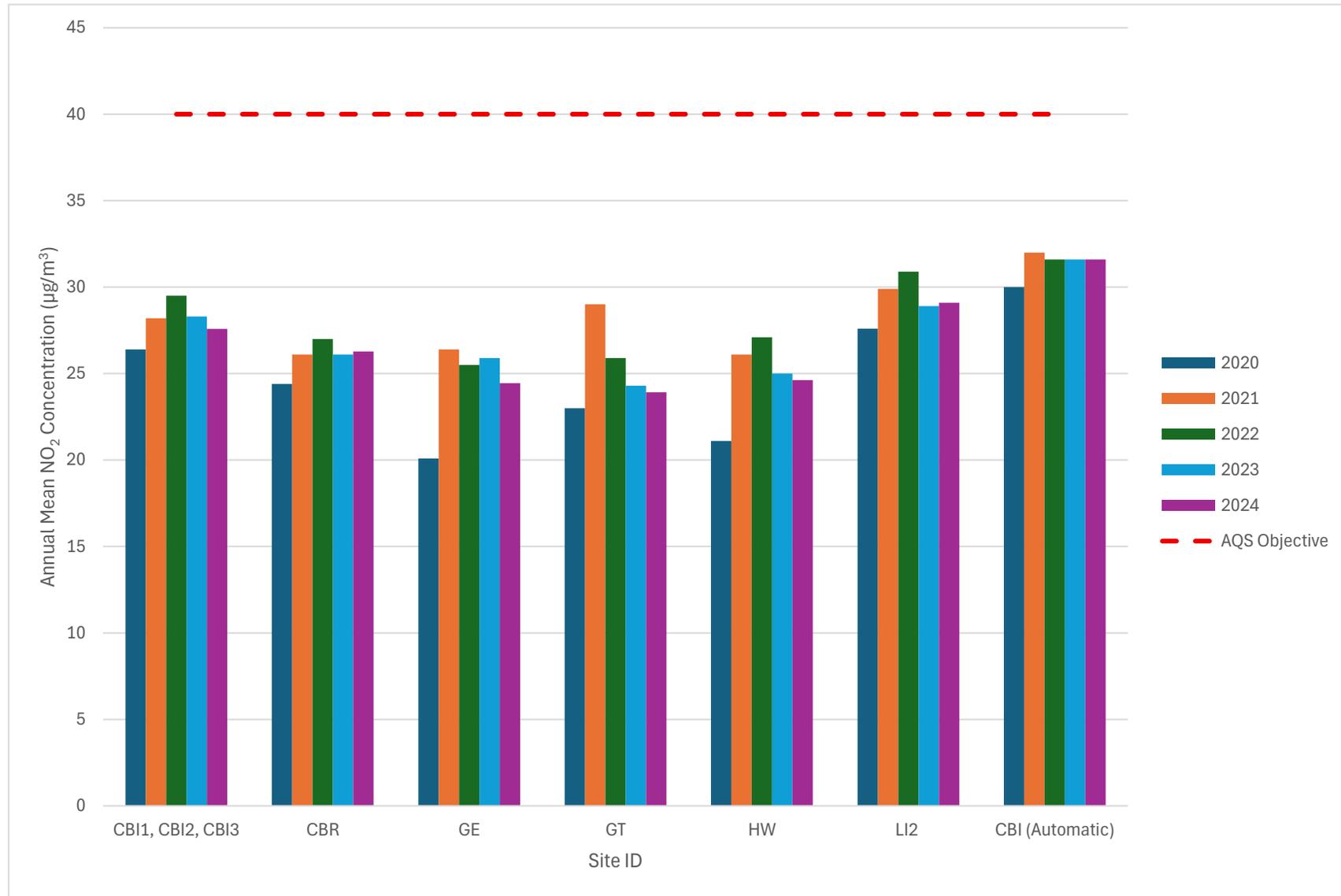


Figure A.2 – Trends in annual mean NO₂ concentrations – Within Chester City Centre AQMA (North II)

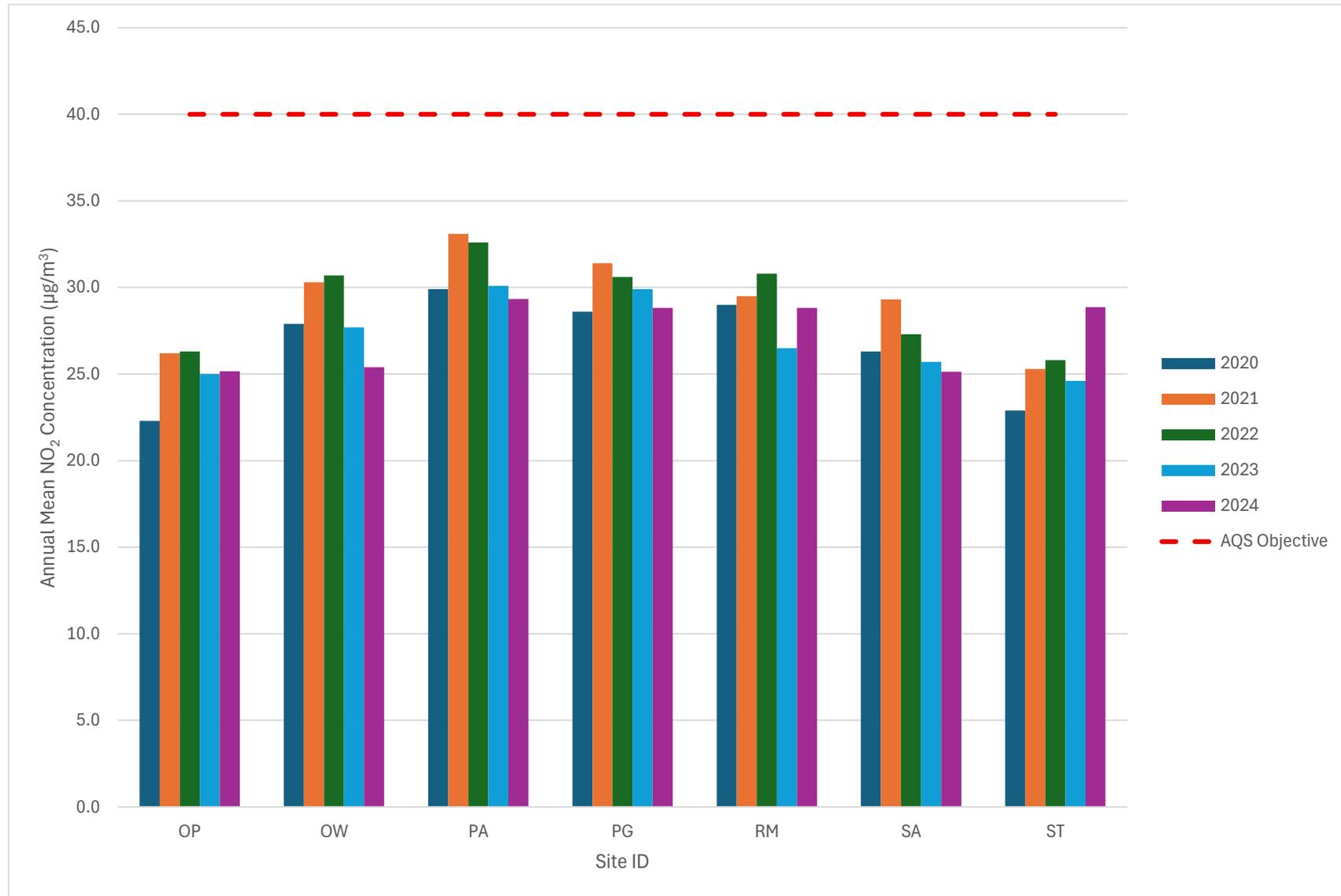


Figure A.3 – Trends in annual mean NO₂ concentrations – Within Chester City Centre AQMA (East/South I)

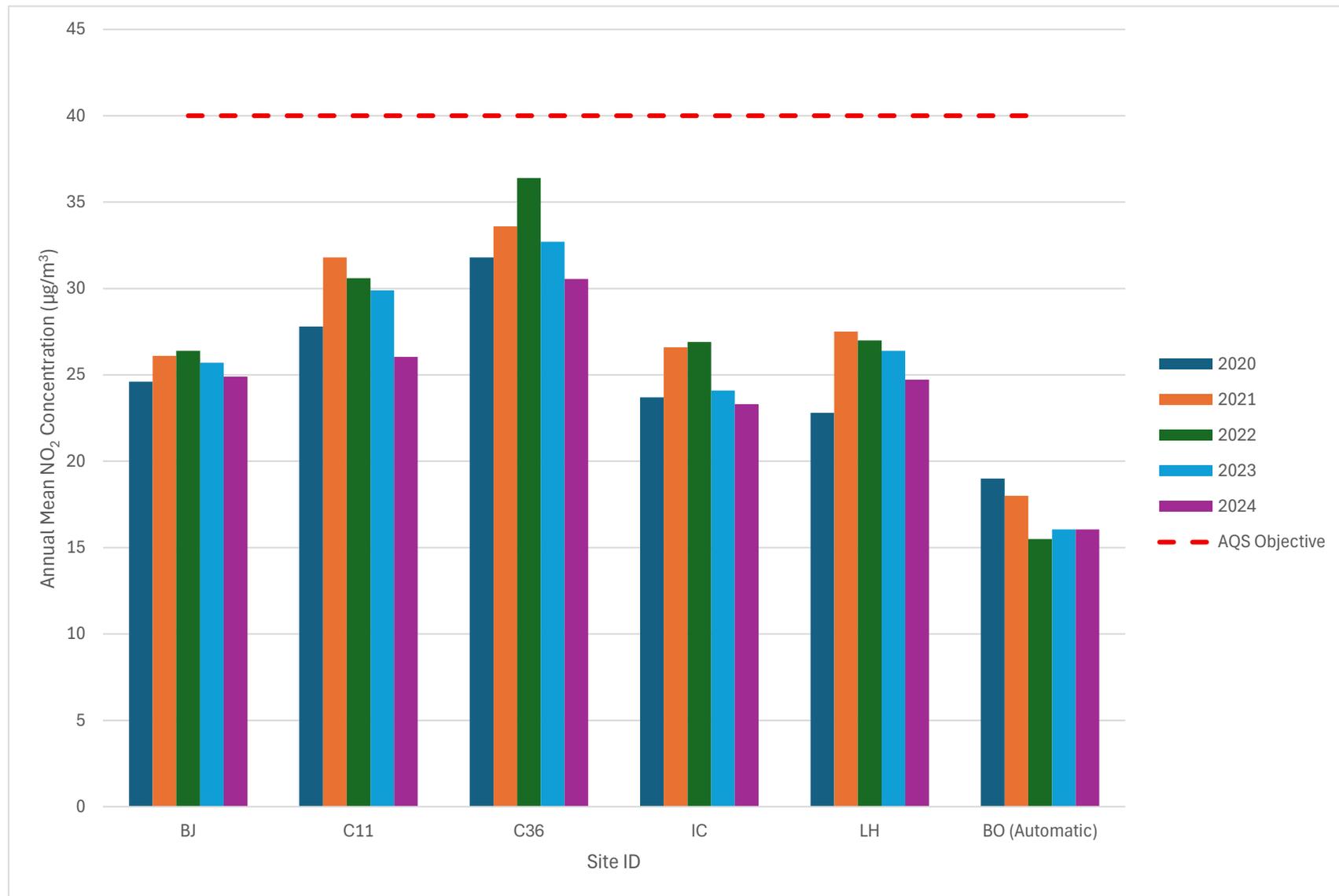


Figure A.4 – Trends in annual mean NO₂ concentrations – Within Chester City Centre AQMA (East/South II)

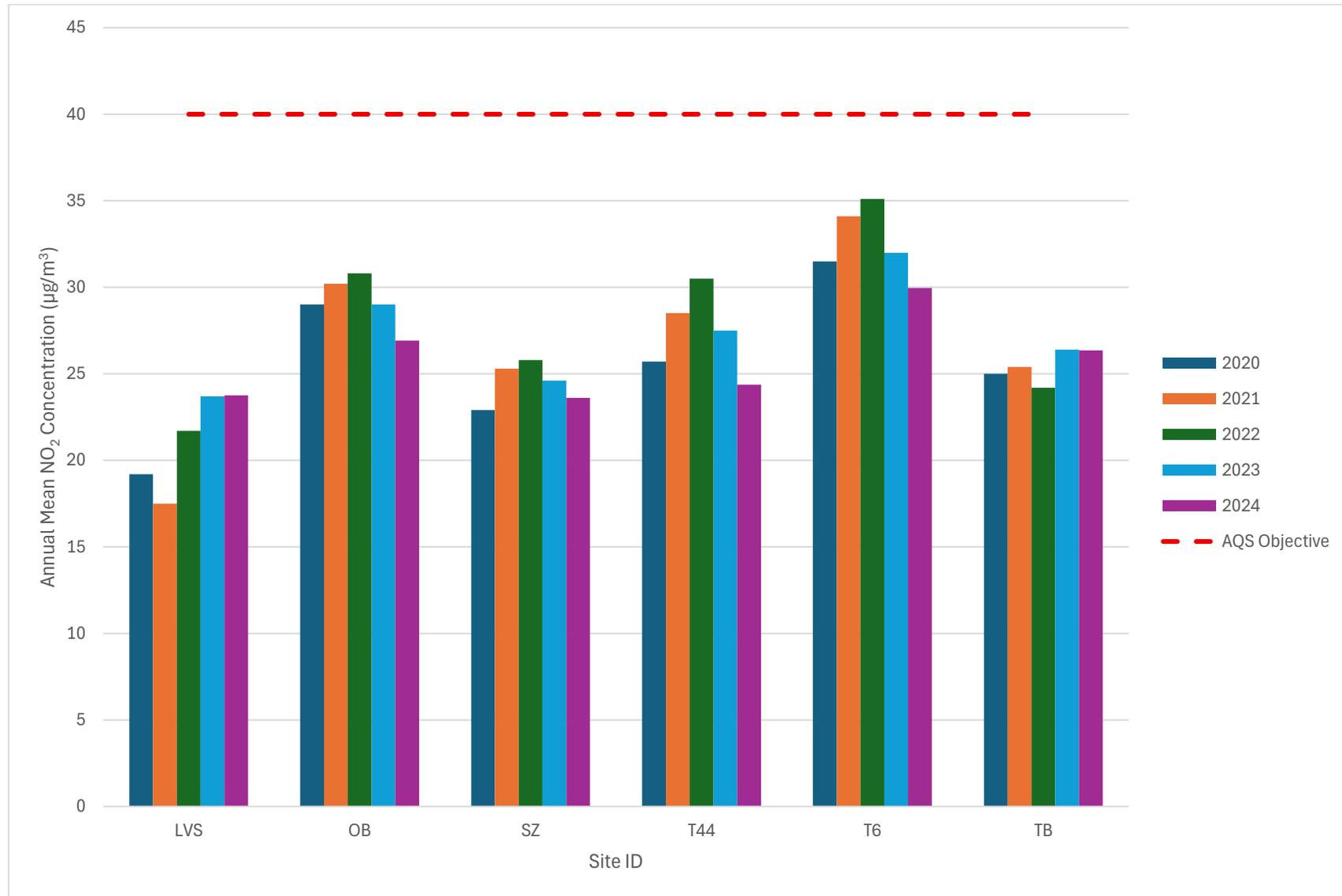


Figure A.5 – Trends in annual mean NO₂ concentrations – Within Chester City Centre AQMA (West)

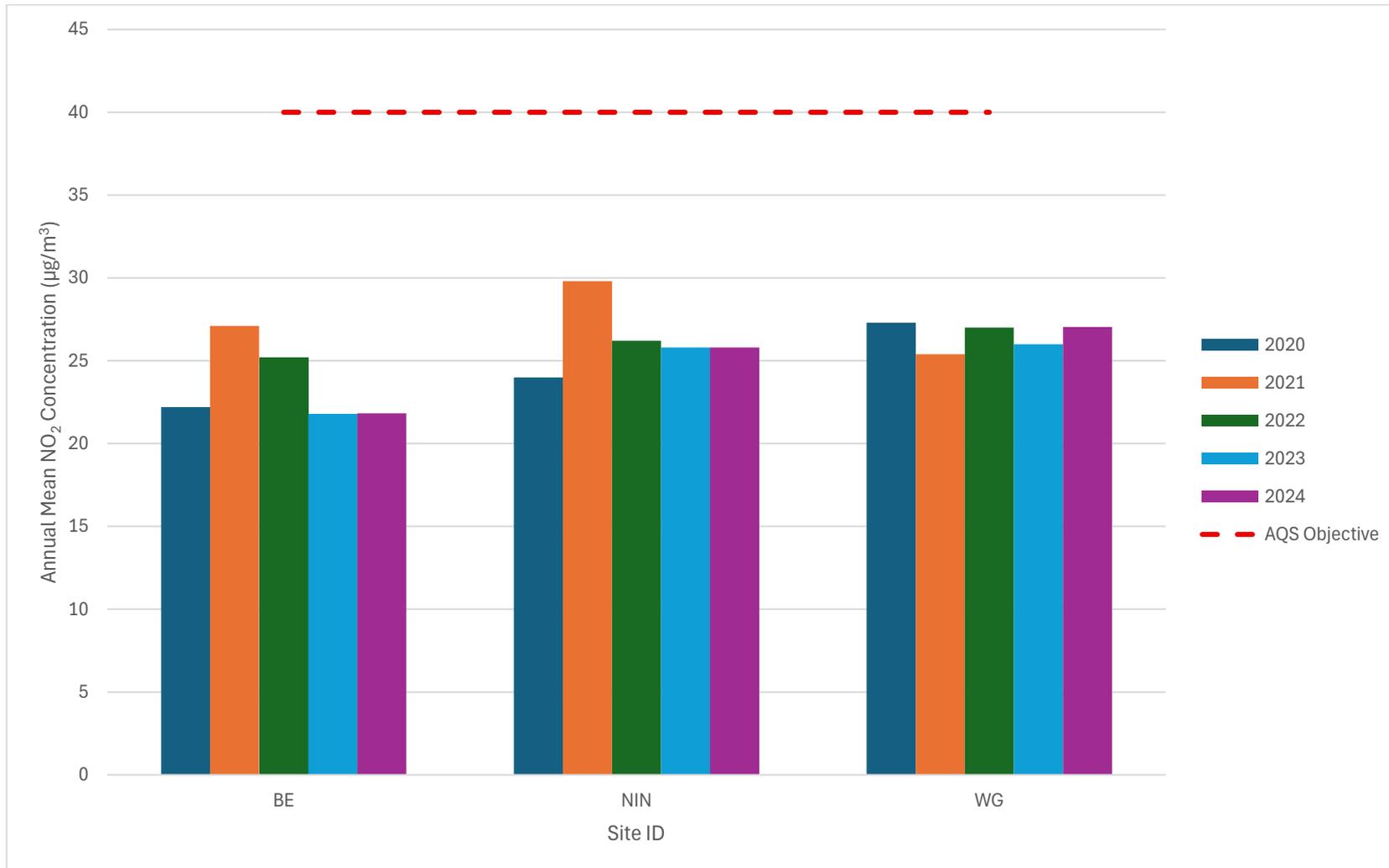


Figure A.6 – Trends in annual mean NO₂ concentrations – Within Whitby Road/ Station Road AQMA

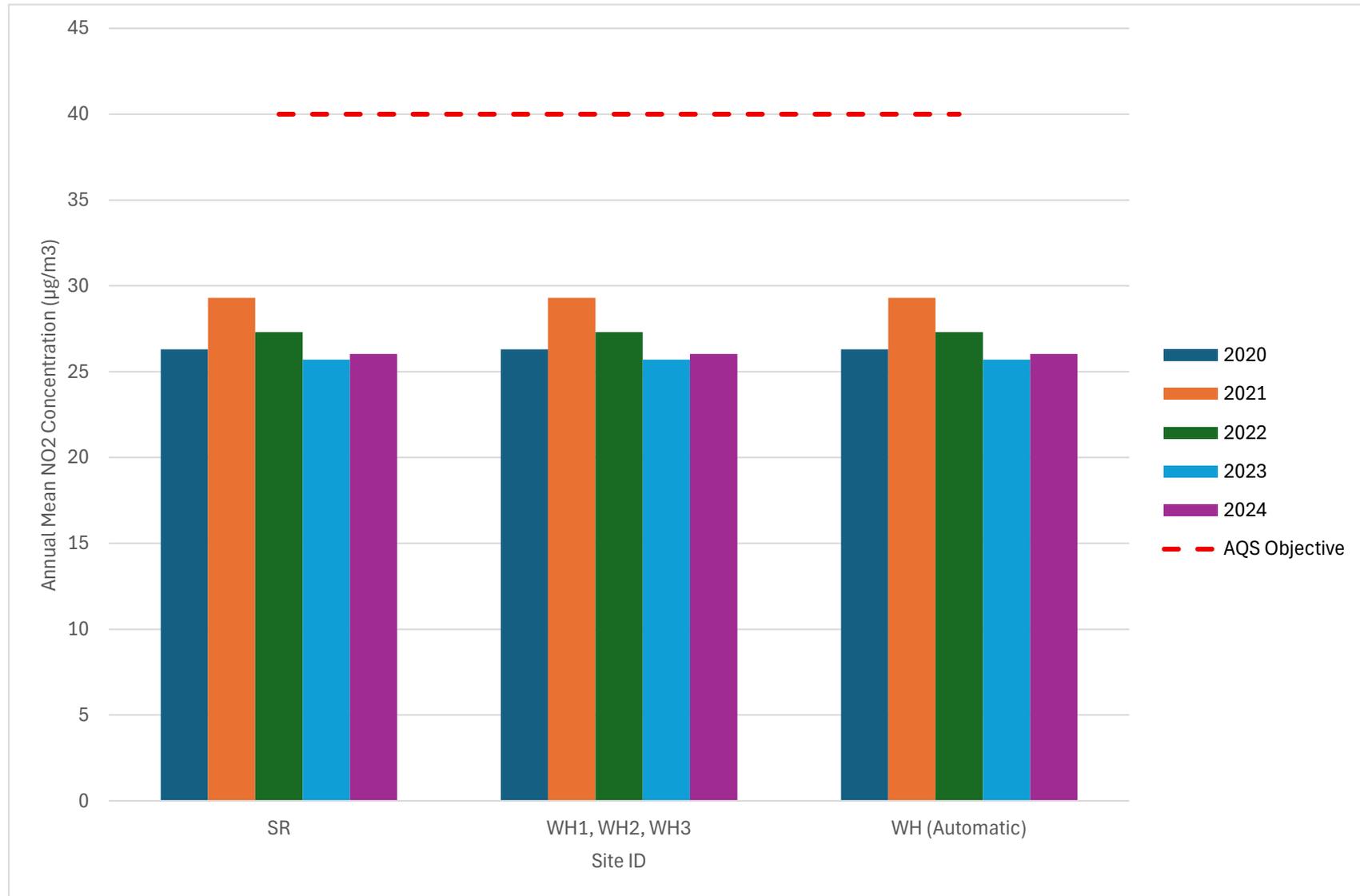


Figure A.7 – Trends in annual mean NO₂ concentrations – Within Frodsham AQMA

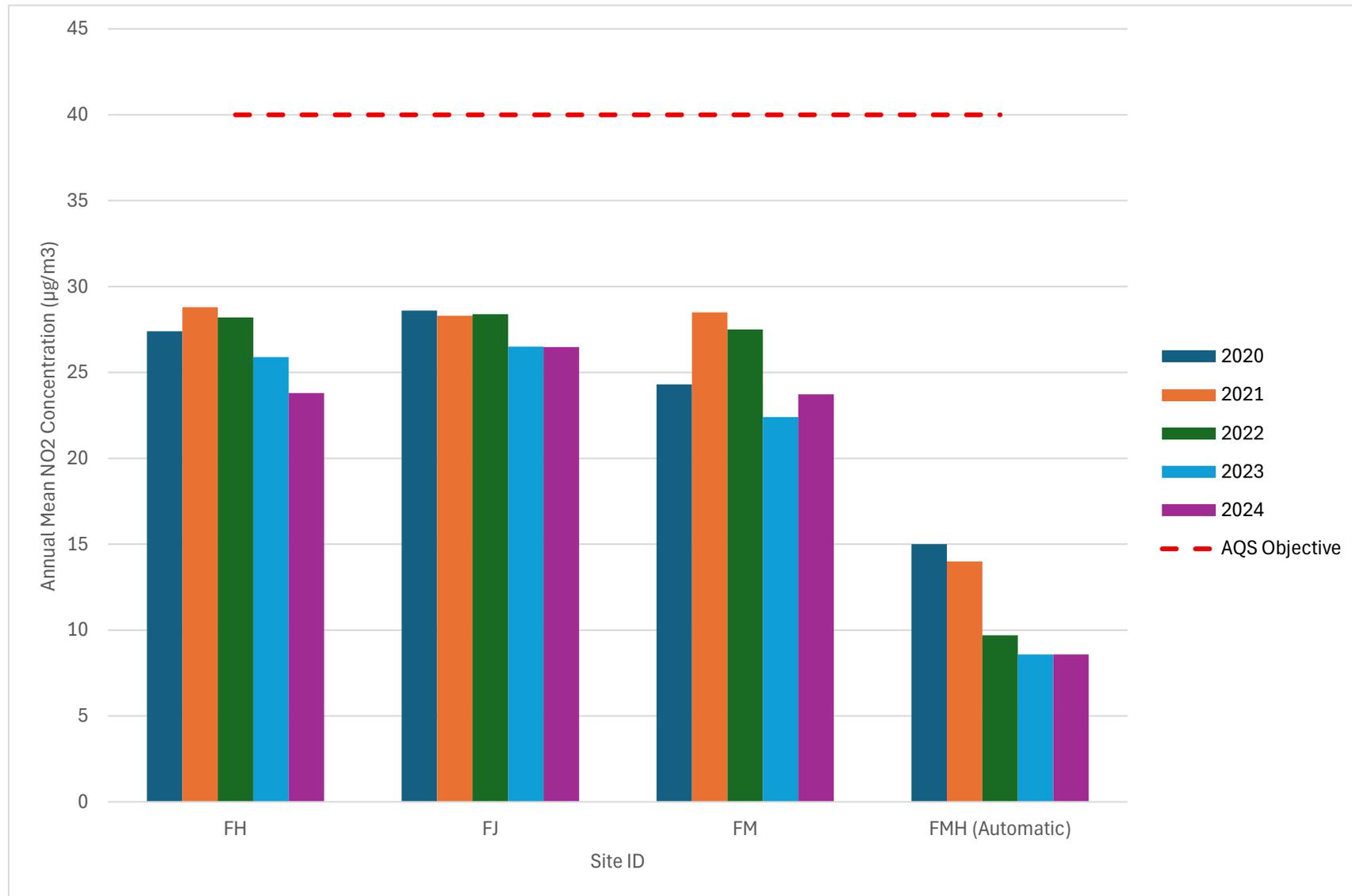


Figure A.8 – Trends in annual mean NO₂ concentrations – Christleton/ Littleton/ Boughton Heath

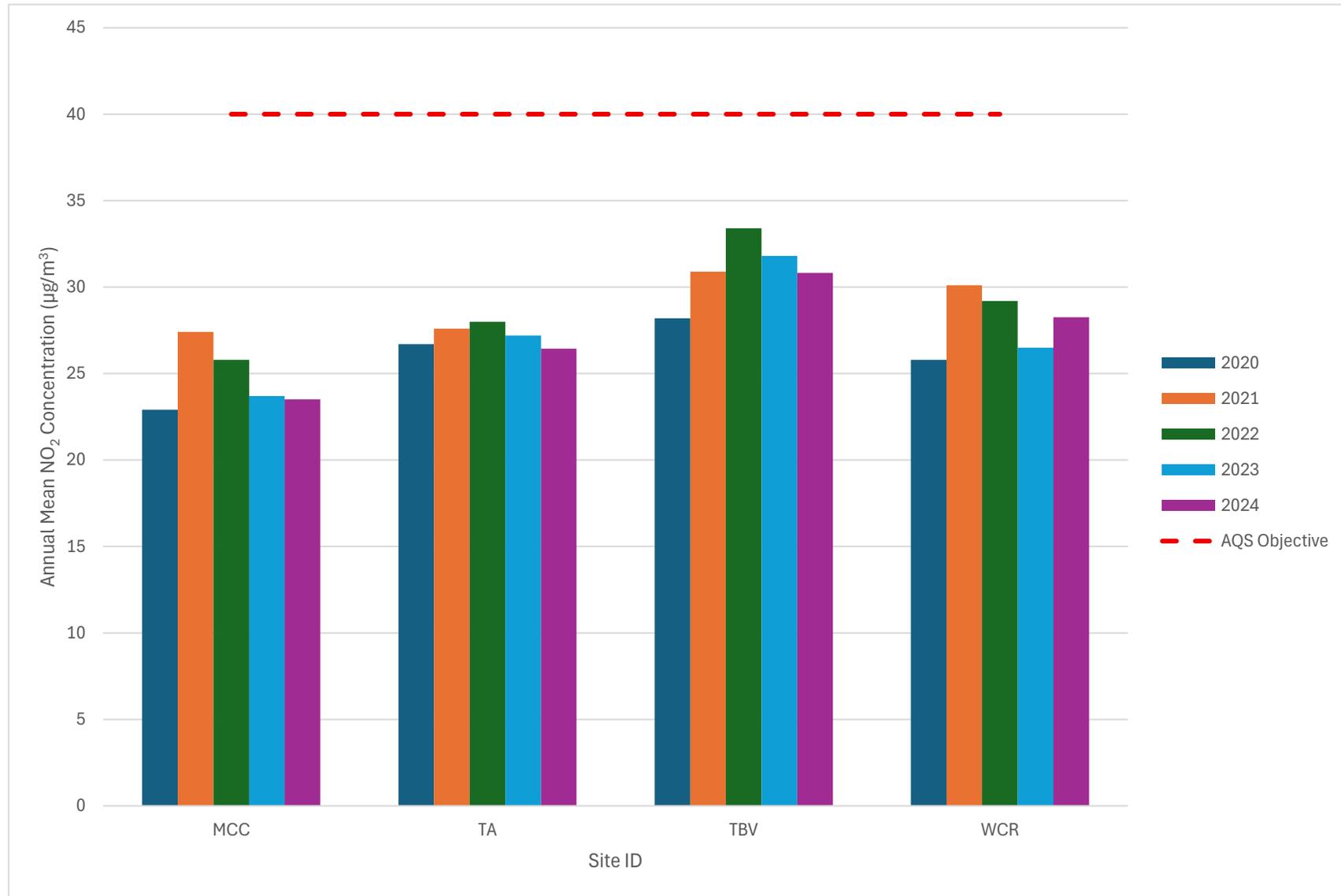


Figure A.9 – Trends in annual mean NO₂ concentrations – Tarvin

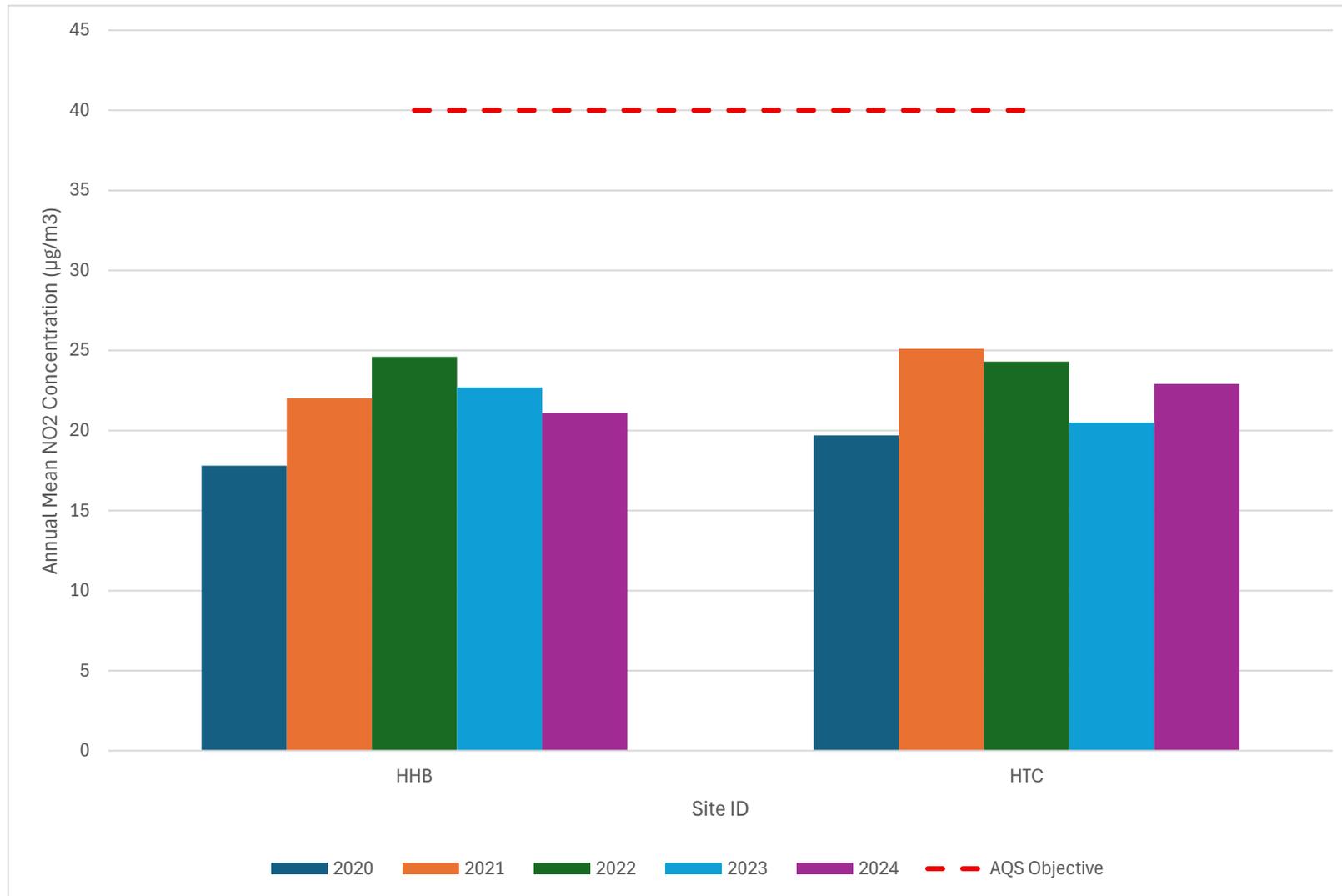


Figure A.10 – Trends in annual mean NO₂ concentrations – Neston

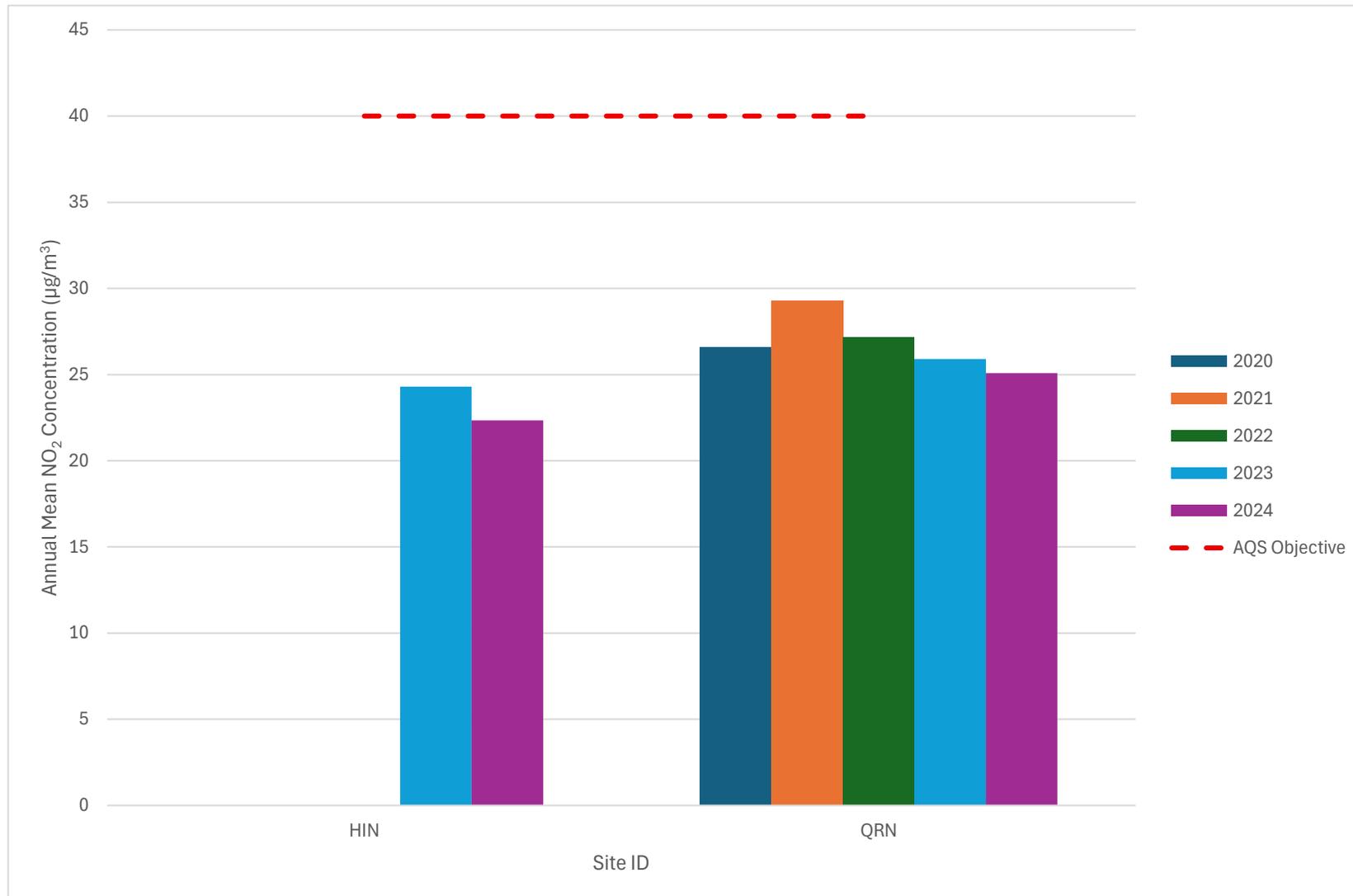


Figure A.11 – Trends in annual mean NO₂ concentrations – Northwich

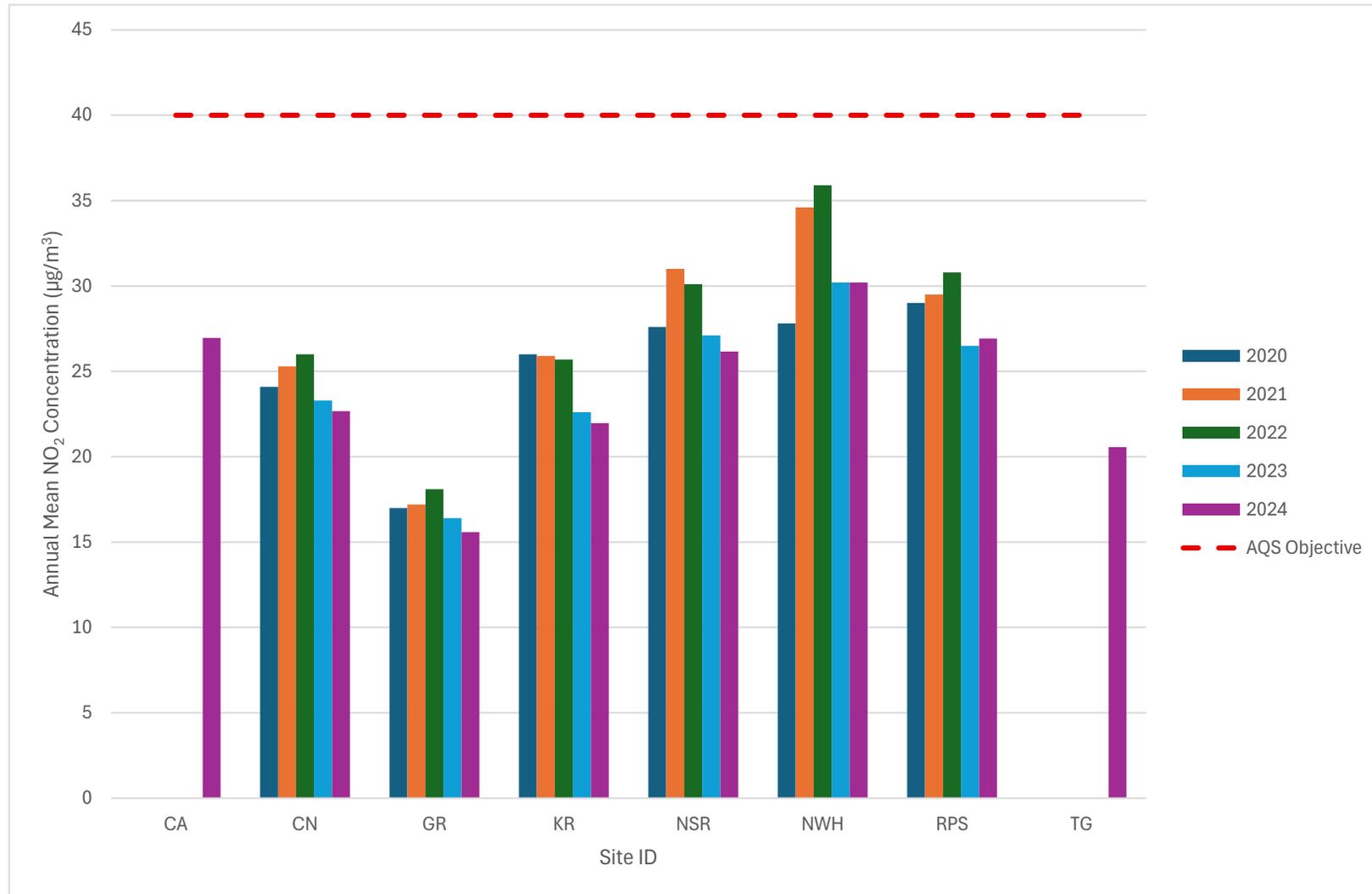


Figure A.12 – Trends in annual mean NO₂ concentrations – Winsford

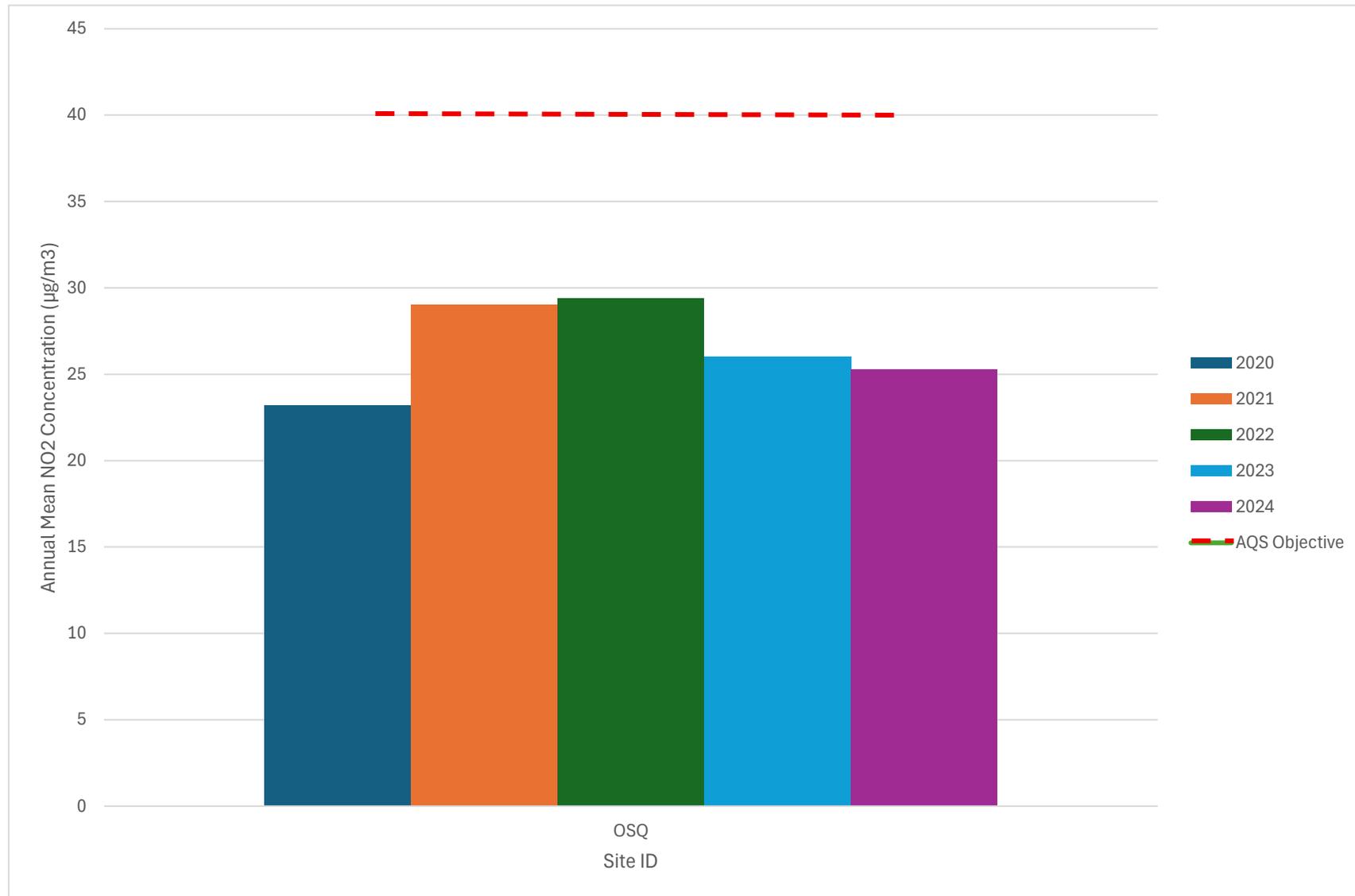


Figure A.13 – Trends in annual mean NO₂ concentrations – Childer Thornton, Ellesmere Port

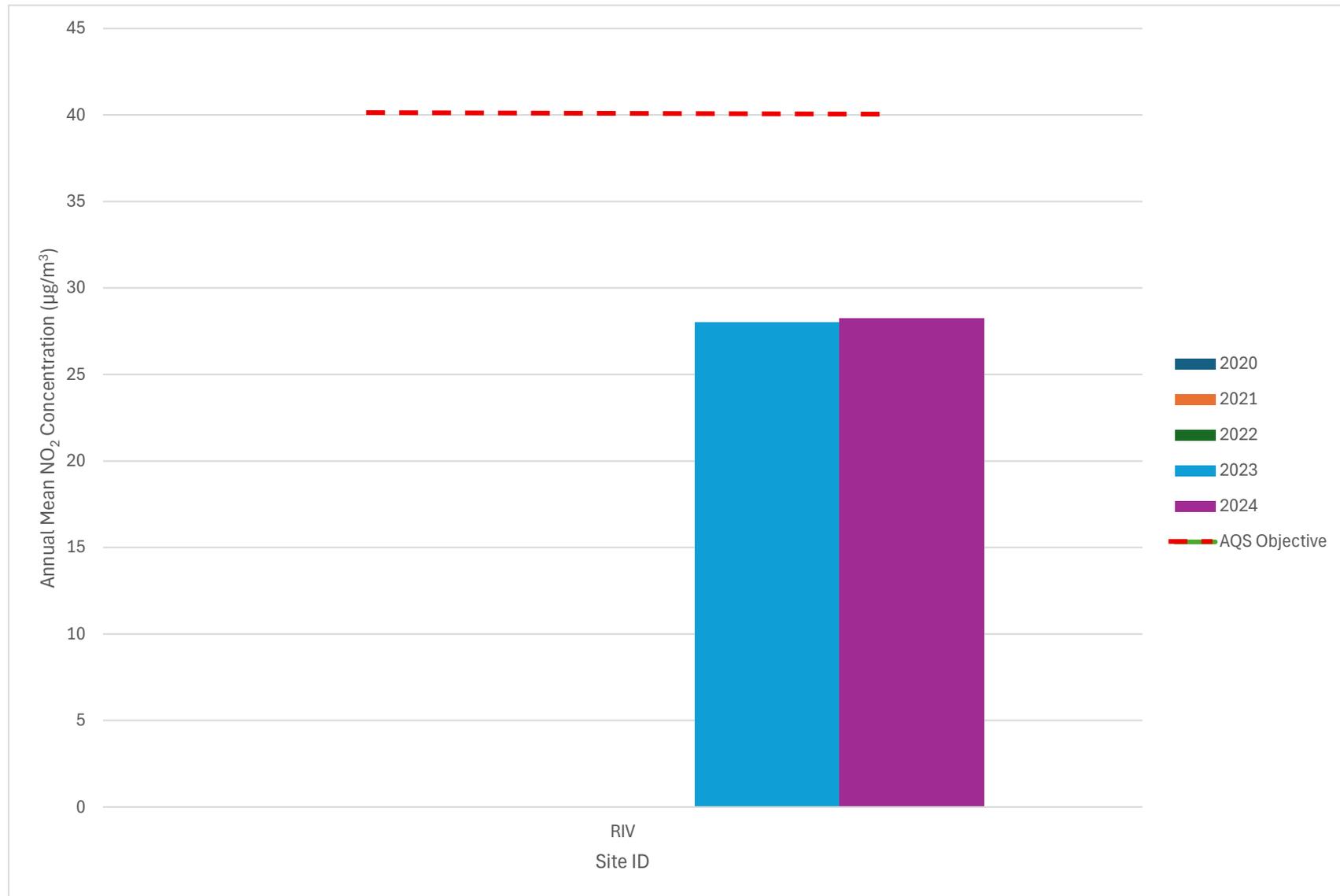


Table A.5 – 1-Hour Mean NO₂ Monitoring Results, Number of 1-Hour Means > 200µg/m³

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2024 (%) ⁽²⁾	2020	2021	2022	2023	2024
BO	341864	366444	Roadside	99.5	99.5	0	2	0	0	0
CBI	340645	366802	Roadside	99.0	99.0	0	0	0	2	0
FMH	352445	378031	Urban Background	74.9	74.9	0	0	0	0	0 (59)
WH	340197	376363	Roadside	54.1	54.1	0	0	0	0	0 (89)

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%).

Figure A.14 – Trends in Number of NO₂ 1-Hour Means > 200µg/m³

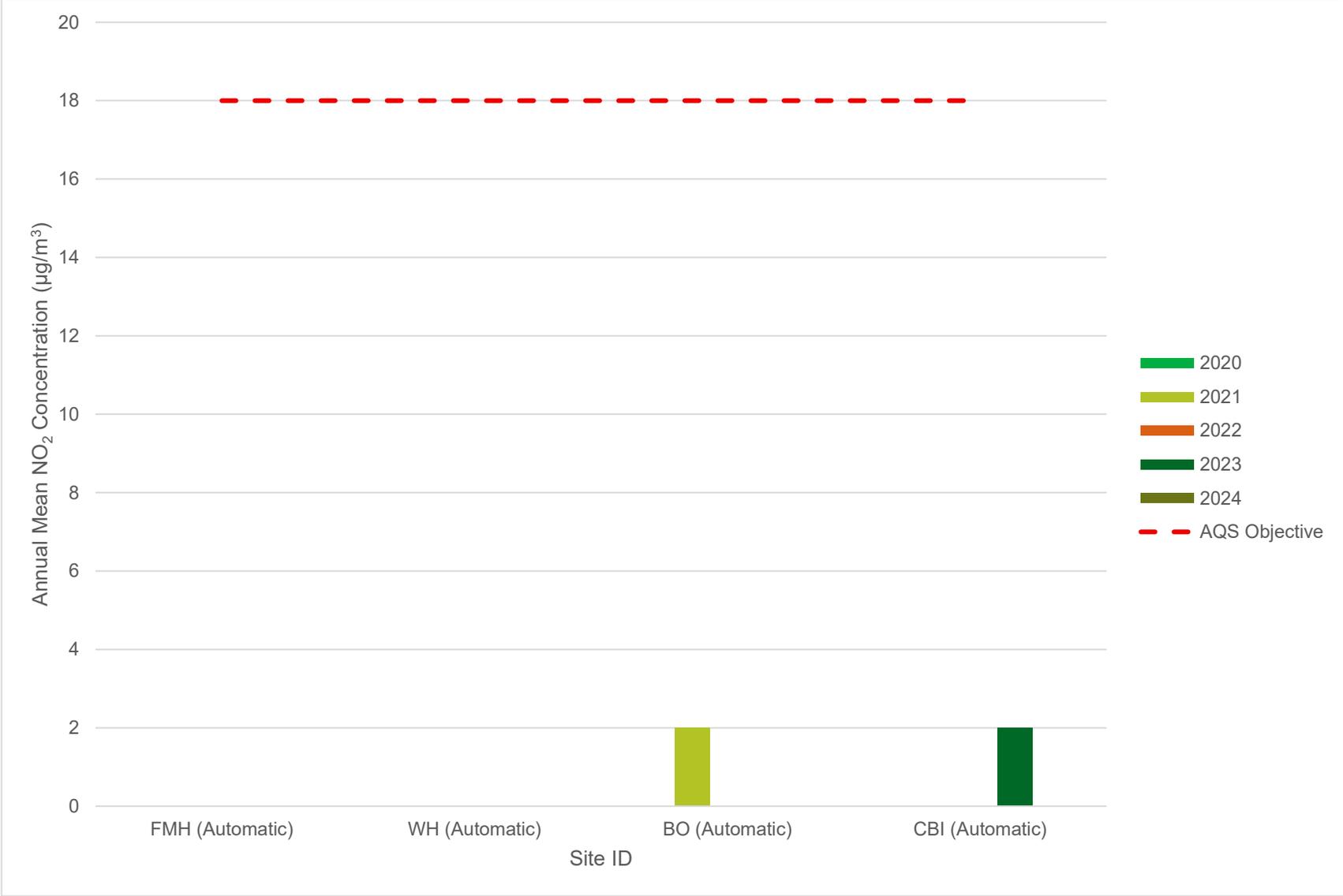


Table A.6 – Annual Mean PM₁₀ Monitoring Results (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2024 (%) ⁽²⁾	2020	2021	2022	2023	2024
CBI	340645	366802	Roadside	96.5	96.5	23	22	20	18.3	15.9
FMH	352445	378031	Urban Background	97.4	97.4	12	13	15	13.6	14.0
TLP	344103	374330	Industrial	97.8	97.8	13	13	13	11.9	10.6

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/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.15 – Trends in Annual Mean PM₁₀ Concentrations

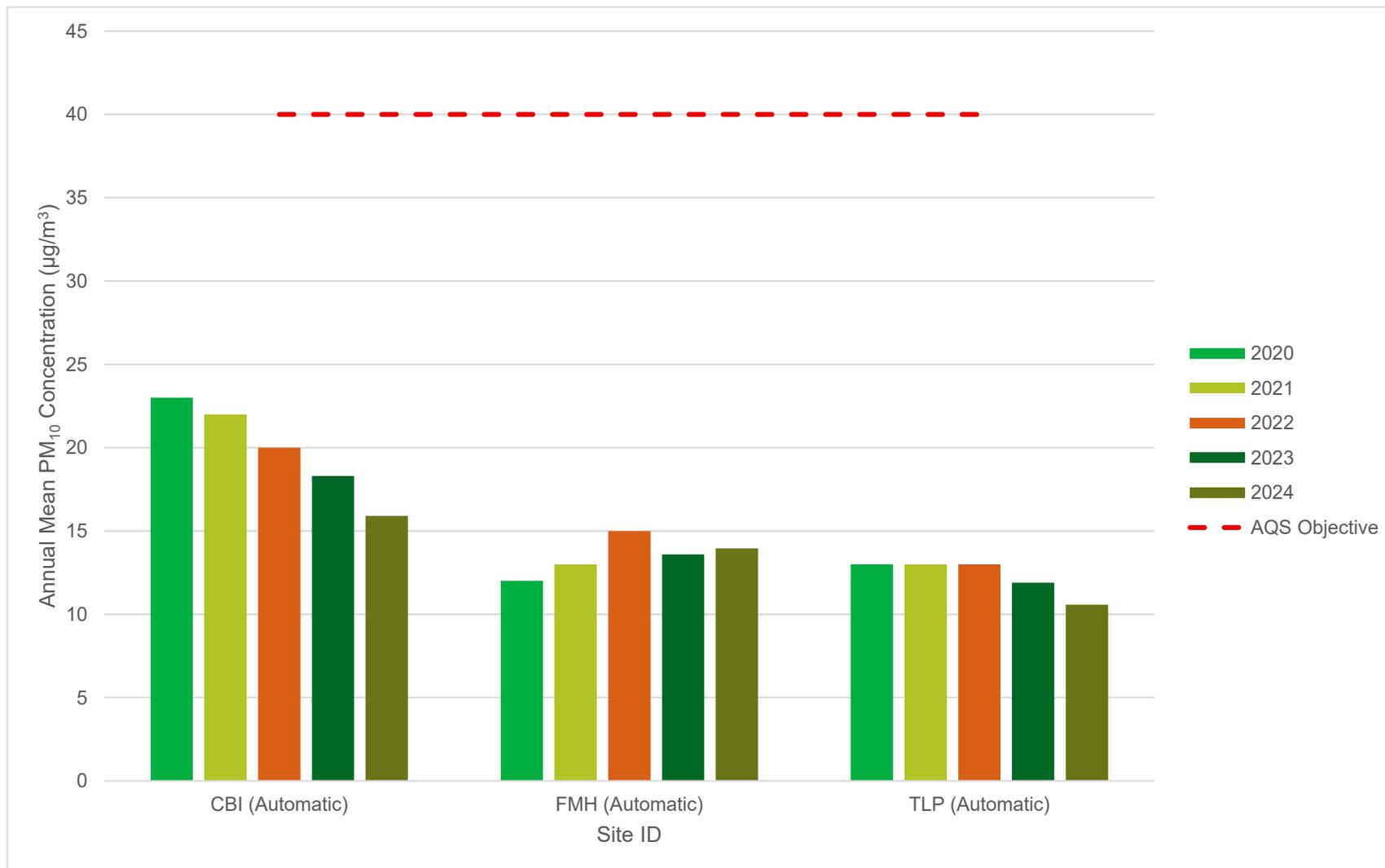


Table A.7 – 24-Hour Mean PM₁₀ Monitoring Results, Number of PM₁₀ 24-Hour Means > 50µg/m³

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2024 (%) ⁽²⁾	2020	2021	2022	2023	2024
CBI	340645	366802	Roadside	96.5	96.5	4	2	5	0	0
FMH	352445	378031	Urban Background	97.4	97.4	0	0	2	0	1
TLP	344103	374330	Industrial	97.8	97.8	0	0	0	0	0

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%).

Figure A.16 – Trends in Number of 24-Hour Mean PM₁₀ Results > 50µg/m³

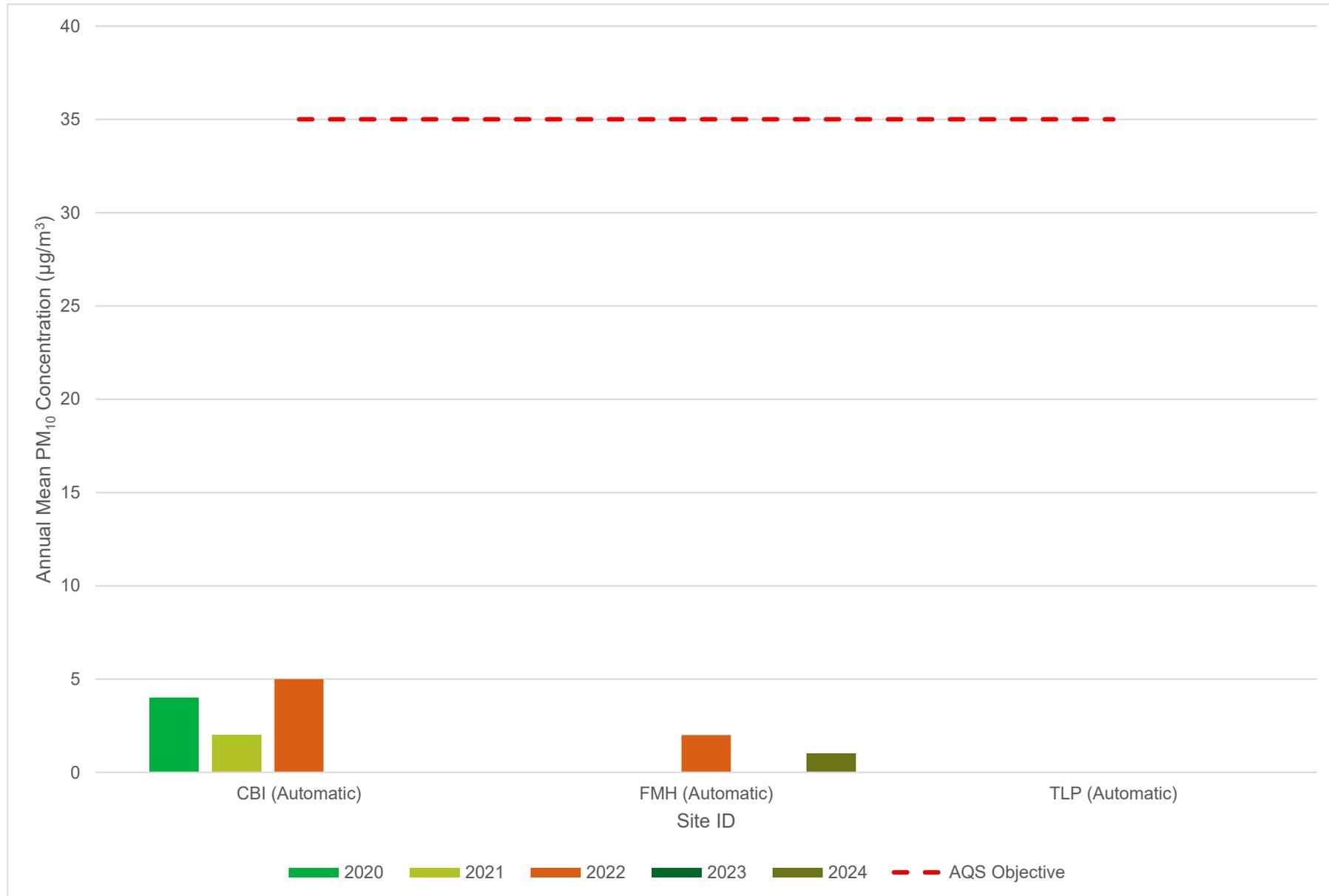


Table A.8 – SO₂ 2024 Monitoring Results, Number of Relevant Instances

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2024 (%) ⁽²⁾	Number of 15-minute Means > 266µg/m ³	Number of 1-hour Means > 350µg/m ³	Number of 24-hour Means > 125µg/m ³
ELT	345642	375522	Industrial	96.4	96.4	9	0	0
TLP	344103	374330	Industrial	99.1	99.1	17	0	0

Notes:

Results are presented as the number of instances where monitored concentrations are greater than the objective concentration.

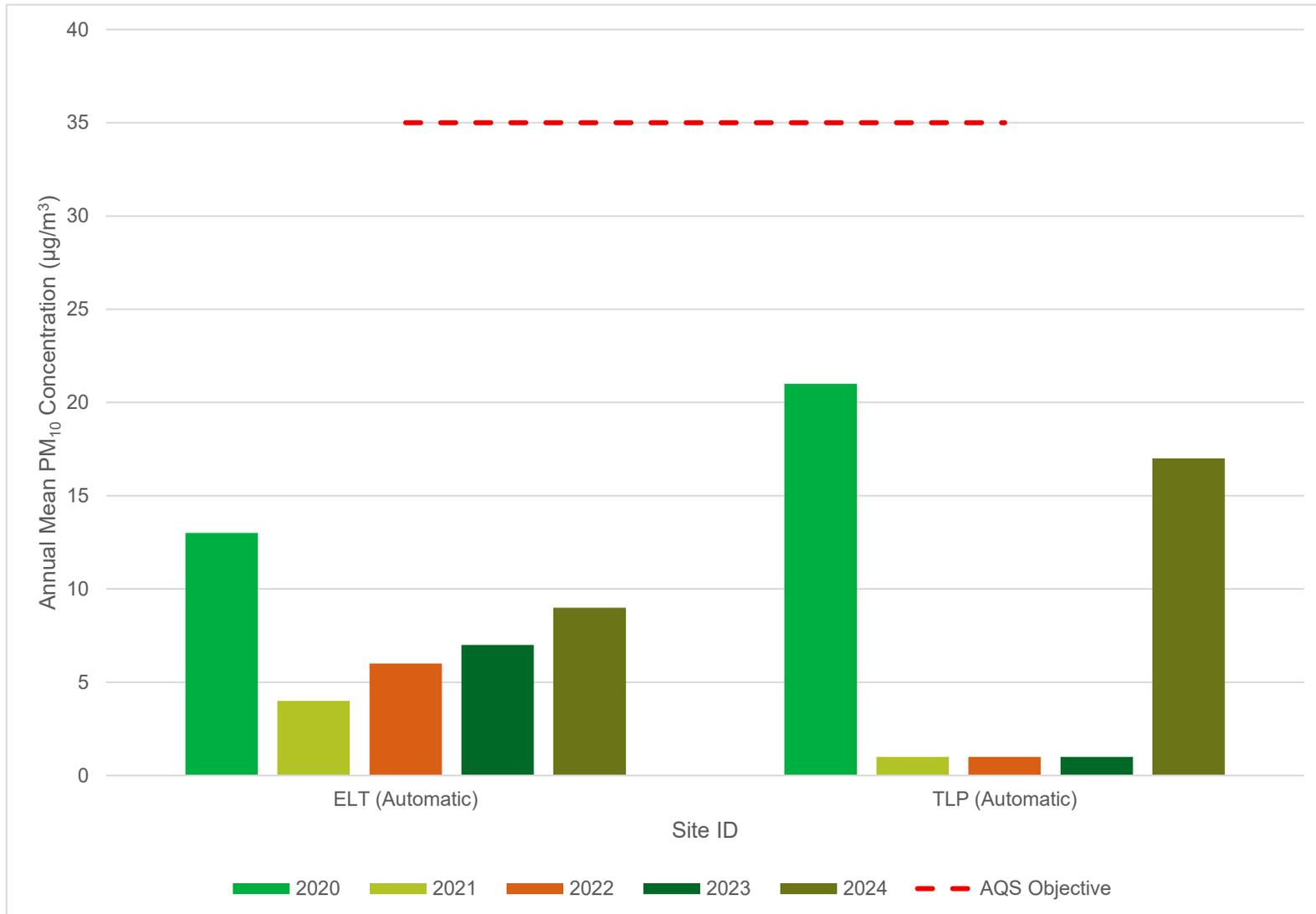
Exceedances of the SO₂ objectives are shown in **bold** (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed a year).

If the period of valid data is less than 85%, the relevant percentiles are 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%).

Figure A.17 – SO₂ 2024 Monitoring Results, Number of Relevant Instances



Appendix B: Full Monthly Diffusion Tube Results for 2024

Table B.1 – NO₂ 2024 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 (0.84)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
BE	340239	366418	32.0	29.3	26.7	24.5	25.5	19.5	21.5	21.8	27.5	25.8	31.7		26.0	21.8	-	
BJ	341401	366512	35.9	31.4	22.9	25.8	28.8	27.6	27.5	23.5	38.0	29.8	35.0		29.6	24.9	-	
C11	341915	366427	42.1	33.1	31.8	25.7	33.2	24.9	20.8	21.6	37.4	30.9	37.9	32.4	31.0	26.0	-	
C36	342000	366374	38.0	43.8	33.8	34.2	39.7	35.1	32.3	29.2	34.8	34.8	41.1	39.6	36.4	30.5	-	
CA	364982	373307	36.2		26.1	29.3	30.9	33.9	28.3		35.5		35.3	33.3	32.1	27.0	-	
CBI1	340647	366803	34.6	37.2	33.7	31.4	35.1		29.3	28.3	31.9	32.0	34.3	32.6	-	-	-	Triplicate Site with CBI1, CBI2 and CBI3 - Annual data provided for CBI3 only
CBI2	340647	366803	35.9	36.2	33.3	32.0	34.4	31.8	29.9	27.2	34.2	33.3	36.1	30.3	-	-	-	Triplicate Site with CBI1, CBI2 and CBI3 - Annual data provided for CBI3 only
CBI3	340647	366803	35.5	37.9	33.1	31.9		32.0	29.9	28.2	33.1	30.7	36.4	31.7	32.8	27.6	-	Triplicate Site with CBI1, CBI2 and CBI3 - Annual data provided for CBI3 only
CBR	340676	366782	35.3	34.6	31.3	30.5	32.0		26.9	24.1	32.4	30.5	35.1	31.6	31.3	26.3	-	
CN	366070	373905	34.2	32.3	28.6	24.5	24.7	21.8	20.6	22.3	24.2		34.5	29.4	27.0	22.7	-	
FH	352146	378139	35.1			26.9	27.0	23.0	26.9	23.5	27.0	29.1	35.0	30.0	28.3	23.8	-	
FJ	352171	378140	39.5			28.0		32.8	29.4	28.6	30.1	30.5	31.7	33.2	31.5	26.5	-	
FM	352189	378094	35.6			24.7	27.9		21.7	19.9	32.5	29.2	32.6	30.1	28.2	23.7	-	
GE	340657	366730	31.8	35.3	32.3	28.5	25.9	23.1	25.3	26.6	28.3	30.3	33.4	28.5	29.1	24.5	-	
GR	368634	374714	22.8	23.4	17.5	17.0	17.1	14.7	16.3	16.3	15.5	19.5	23.3	19.4	18.6	15.6	-	
GSW	340700	366687	33.6	34.1	28.0	27.3	28.2	26.6	27.8	26.8	30.5	30.0	33.9	28.9	29.6	24.9	-	
GT	340611	366747	32.8	33.3	32.5	26.4	28.9	23.5	24.8	26.0	23.4	30.8	32.8	26.6	28.5	23.9	-	
HHB	347953	366723	27.1	26.7		20.1	26.0	24.6	21.6	22.0	27.6	26.8	29.5	24.4	25.1	21.1	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.84)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
HIN	330317	378536	33.0	31.1	26.0	26.7	27.9	22.1	24.1	21.0	31.3	25.3	27.5	23.0	26.6	22.3	-	
HTC	348333	366763	31.6	29.2	30.7	25.9	28.7	22.8	22.6		27.1		29.5	24.7	27.3	22.9	-	
HW	340881	366826	35.1	33.4		25.7	25.3	20.7	24.6	24.0	32.2	31.0	36.7	33.7	29.3	24.6	-	
IC	342068	366332	31.8	34.2	25.3	23.5	27.7	24.8	24.0	23.2	29.2	26.3	35.0		27.7	23.3	-	
KR	368432	372988	34.0	31.6	26.6	22.4	22.9	20.4	21.8	23.3	24.3		34.0		26.1	22.0	-	
LH	341126	366540		31.7	25.1	28.9	30.9	29.7	29.4	24.4			33.6	30.9	29.4	24.7	-	
LI2	340354	367034	44.5	39.7	29.8	31.7	34.8	30.5	30.4	28.1	37.3	36.6	39.5	32.8	34.6	29.1	-	
LVS	340990	366317		18.9		26.4	26.3	23.6	25.7	22.3	33.7			30.2	25.9	23.8	-	
MCC	343785	365502	32.5	26.8	25.6			23.6	23.3		33.2	27.4	33.9	25.5	28.0	23.5	-	
NIN	340284	366199	31.7	32.3	27.3	33.1	31.4	31.5	28.8	26.5	32.1	27.1	33.5	33.3	30.7	25.8	-	
NSR	366796	373984		34.4	30.9	29.6	33.5	26.2	26.6	24.0	37.1	31.0	37.1	32.0	31.1	26.2	-	
NWH	365590	373904	39.5	40.8	39.6	37.4	36.8	39.0	32.3	31.1	31.1	34.7	34.6	34.5	35.9	30.2	-	
OB	341633	366510	36.7	36.5	31.2		31.4	23.3	27.5	23.5	38.5	30.6	38.0	35.5	32.1	26.9	-	
OP	340636	366770	34.2	32.6	29.6	29.3	29.0	27.3	26.8	26.3	32.7	28.4	33.3		30.0	25.2	-	
OSQ	364053	365977	37.8	39.5		27.2	29.7	21.7	24.9		32.1	31.3			30.5	25.3	-	
OW	340623	366823	41.4	46.3	39.6	36.9	38.1	38.1	36.6	32.6	34.1	36.9	44.8		38.7	32.5	-	
PA	340313	367014	37.9	35.1	32.4	29.6	30.7	23.2	23.7	25.1	34.0	36.3	24.5	30.2	30.2	25.4	-	
PG	340322	366989	33.9	40.0	34.0	35.2	33.7	31.9	30.6	31.1	37.2		41.4	35.1	34.9	29.3	-	
QRN	330565	378063	36.0	35.6	28.5	27.7	30.8	24.5	25.1	22.5	32.7		35.3		29.9	25.1	-	
RIV	337242	378569	44.7	41.7	30.9	31.4	30.1	28.9		20.2			39.4	35.2	33.6	28.2	-	
RM	340291	367108	38.3	36.3	36.8	31.1	36.0	30.2	29.9	24.9	40.9	37.2	40.0	29.9	34.3	28.8	-	

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 (0.84)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
RPS	367856	372667	35.0	39.2	34.2	24.5		24.3	27.2	28.7	24.6	39.9	42.4	32.4	32.1	26.9	-	
SA	340364	366929	36.1	35.5	31.9	28.0	29.0	19.9	22.7	22.6	32.0	31.6	39.5	30.3	29.9	25.1	-	
SR	340435	376790	39.4	35.5	27.3	30.4	31.2	29.1	27.4	23.2	31.2	28.5	37.5	31.1	31.0	26.0	-	
ST	340794	366778	35.9	39.1	36.1	32.0	33.5	30.3	27.8	29.6	37.0	36.1	39.6	35.4	34.4	28.9	-	
SZ	341819	366475	37.6	31.6	26.1	21.5	28.0	23.4	24.5	19.5	32.9	27.6	34.6	30.1	28.1	23.6	-	
T44	342085	366446		33.9	28.7	22.5	27.1	23.9	25.5	24.0	30.7	33.8	38.9	30.4	29.0	24.4	-	
T6	341926	366446	41.0	42.2	33.5	26.8	35.0	29.1	32.9	29.5	34.0	39.7	45.6	38.4	35.7	30.0	-	
TA	344519	366898	38.7	36.4	31.3	26.4	30.1	26.2	26.9		29.1	30.9	38.7		31.5	26.4	-	
TB	341202	366470	36.1	34.2	33.9	29.5	29.7		26.7	26.4	29.8	29.2	39.1	30.5	31.4	26.4	-	
TBV	344013	366830	38.7	39.0	36.1	33.1	35.6	37.2	34.3	36.4	33.3	35.6	42.7	38.4	36.7	30.8	-	
TG	363743	372186	30.2	29.6	24.3	23.0	23.4	22.5	19.7	16.4	23.3	25.1	31.7		24.5	20.6	-	
WCR	342951	366029	38.6	41.4	40.7	28.3	33.2	28.5	28.1	27.4	31.9		41.4	30.6	33.6	28.3	-	
WG	340217	366209	40.4	35.0	28.0	24.3	31.1	27.0	29.4	27.4	40.1	31.2	38.8	33.7	32.2	27.0	-	
WH1	340196	376363	38.3	32.9	30.5		28.5	25.2	27.4	25.0	31.5	27.3	34.0		-	-	-	Triplicate Site with WH1, WH2 and WH3 - Annual data provided for WH3 only
WH2	340196	376363	37.9	38.1	31.0	29.7	27.8	25.2	28.0	24.7	32.9	27.4	31.2		-	-	-	Triplicate Site with WH1, WH2 and WH3 - Annual data provided for WH3 only
WH3	340196	376363	37.5	38.4	30.7	27.8	27.7	27.1	26.3	24.5	31.5	27.2	35.6		30.2	25.4	-	Triplicate Site with WH1, WH2 and WH3 - Annual data provided for WH3 only

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.

Cheshire West and Chester County Council confirm that all 2024 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 Cheshire West and Chester During 2024

Cheshire West and Chester Council has not identified any new sources relating to air quality within the reporting year of 2024.

Additional Air Quality Works Undertaken by Cheshire West and Chester During 2024

CW&C undertook a Clean Air Zone feasibility Assessment, published in December 2024, to appraise a measure identified within the Low Emission Strategy. The study concluded that in terms of cost and benefits, the introduction of a scheme would represent poor value for money.

QA/QC of Diffusion Tube Monitoring

Environmental Protection staff follow internal QA/QC procedures relating to the use of diffusion tubes for the purpose of air quality monitoring. The procedures cover key stages in the monitoring process including storage, deployment, record keeping and management of NO₂ diffusion tube data.

The diffusion tubes for the year 2024 were supplied and analysed by Gradko Ltd Laboratory, the tubes were prepared using the 20% TEA in water preparation method.

Gradko is a UKAS accredited laboratory and participates in the AIR-PT Scheme for NO₂ tube analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO₂ concentrations reported are of a high calibre. The latest available AIR-PT results in 2024 are AIR-PT AR055 (January – February 2024), AIR-PT AR056 (April – June 2024), AIR-PT AR058 (July – August 2024) and AIR-PT AR059 (September – October 2024), in which SOCOTEC all scored 100%. The percentage score reflects the results deemed to be

satisfactory based upon the z-score of $< \pm 2$. Data from November 2024 onwards was not available at the time of writing.¹⁴

The precision of the current 27 local authority co-location studies in 2024 detailed within the national bias adjustment factor spreadsheet (version 04/25) were rated as 'good'. The tubes are considered to have "good" precision where the coefficient of variation of duplicate or triplicate diffusion tubes for eight or more periods during the year is less than 20%. Further information on the precision summary results can be found on the LAQM website.

Monitoring in 2024 had been completed in adherence with the 2024 Diffusion Tube Monitoring Calendar, whereby all changeovers were completed within ± 2 days of the specified date.

The 2024 national bias adjustment factor for Gradko 20% TEA in water preparation method is 0.84.

Figure C.1 – National Bias Adjustment Factor Database

National Diffusion Tube Bias Adjustment Factor Spreadsheet							Spreadsheet Version Number: 04/25			
Follow the steps below in the correct order to show the results of relevant co-location studies							This spreadsheet will be updated at the end of June 2025			
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							Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.			
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.										
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 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 2. 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 ³	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	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in water	2024	UV	Belfast City Council	10	24	20	19.9%	G	0.83
Gradko	20% TEA in water	2024	R	Belfast City Council	12	43	34	28.8%	G	0.78
Gradko	20% TEA in water	2024	R	Belfast City Council	12	24	21	13.9%	G	0.88
Gradko	20% TEA in water	2024	R	Belfast City Council	12	34	27	25.5%	G	0.80
Gradko	20% TEA in water	2024	R	Blackburn With Darwen Bc	12	22	17	32.9%	G	0.75
Gradko	20% TEA in water	2024	R	Bath & North East Somerset	12	25	20	22.6%	G	0.82
Gradko	20% TEA in water	2024	R	Cambridge City Council	12	19	15	28.5%	G	0.78
Gradko	20% TEA in water	2024	UB	Plymouth City Council	12	16	14	13.8%	G	0.88
Gradko	20% TEA in water	2024	R	Plymouth City Council	12	31	23	33.4%	S	0.75
Gradko	20% TEA in water	2024	R	Monmouthshire County Council	12	29	24	19.4%	G	0.84
Gradko	20% TEA in water	2024	KS	Manylebone Road Intercomparison	11	41	36	16.1%	G	0.86
Gradko	20% TEA in water	2024	R	Lisburn & Castlereagh City Council	12	24	19	27.8%	G	0.78
Gradko	20% TEA in water	2024	R	Ards And North Down Borough Council	11	28	20	44.5%	G	0.69
Gradko	20% TEA in water	2024	R	Eastleigh Borough Council	12	29	24	20.3%	G	0.83
Gradko	20% TEA in water	2024	UB	Eastleigh Borough Council	12	19	17	12.4%	G	0.89
Gradko	20% TEA in water	2024	R	Eastleigh Borough Council	12	19	17	12.0%	G	0.89
Gradko	20% TEA in water	2024	R	Gateshead Council	12	20	18	13.9%	G	0.88
Gradko	20% TEA in water	2024	R	Gateshead Council	11	20	17	19.7%	G	0.84
Gradko	20% TEA in water	2024	R	Gateshead Council	12	24	20	21.7%	G	0.82
Gradko	20% TEA in water	2024	R	Gateshead Council	12	27	23	19.0%	G	0.84
Gradko	20% TEA in water	2024	R	Gateshead Council	12	28	30	-8.0%	G	1.06
Gradko	20% TEA in water	2024	R	Brighton & Hove City Council	11	34	27	26.3%	G	0.79
Gradko	20% TEA in water	2024	R	Liverpool City Council	12	34	25	35.7%	G	0.74
Gradko	20% TEA in water	2024	KS	Liverpool City Council	10	52	47	10.2%	G	0.91
Gradko	20% TEA in water	2024	R	Nottingham City Council	10	29	26	12.2%	G	0.89
Gradko	20% TEA in water	2024	R	Wyichavon District Council	10	29	26	14.7%	G	0.87
Gradko	20% TEA in water	2024	R	Worcestershire	12	29	26	14.7%	G	0.87
Gradko	20% TEA in water	2024	R	Worcestershire	12	12	12	-3.4%	G	1.04
Gradko	20% TEA in water	2024		Overall Factor² (27 studies)					Use	0.84

¹⁴ Available at: <https://laqm.defra.gov.uk/wp-content/uploads/2025/04/AIR-PT-Rounds-55-to-68-January-2023-to-February-2025.pdf>

Diffusion Tube Annualisation

Annualisation is required for any site with data capture less than 75% but greater than 25%. 2024 data from two non-automatic monitoring sites in Table C.1. The Diffusion Tube Data Processing Tool was used for these calculations.

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

Site ID	Annualisation Factor Chester Boughton	Annualisation Factor Chester Bus Interchange	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
LVS	1.1157	1.0697	1.0927	25.9	28.3
OSQ	0.9935	0.9789	0.9862	30.5	30.1

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. 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.

Cheshire West and Chester Council have applied a national bias adjustment factor of 0.84 to the 2024 monitoring data. The local bias adjustment factor was not applied due to one out of two of the co-located sites having a poor overall automatic monitoring data capture. It is therefore advised that the Local Bias Adjustment Factor (0.93) be treated with caution and in order to provide consistency with previous reporting years, the national adjustment factor has been used in this ASR. A summary of bias adjustment factors used by Cheshire West and Chester over the past five years is presented in Table C.2. Table C.3 also shows the local bias adjustment factor calculations for completeness.

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2024	National	04/25	0.84
2023	National	03/24	0.81
2022	National	06/23	0.84
2021	National	03/22	0.84
2020	National	06/21	0.81

Table C.3 – Bias Adjustment Calculation

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2
Periods used to calculate bias	12	6
Bias Factor A	0.96 (0.91 - 1.02)	0.89 (0.83 - 0.95)
Bias Factor B	4% (-2% - 10%)	12% (5% - 20%)
Diffusion Tube Mean ($\mu\text{g}/\text{m}^3$)		
Mean CV (Precision)	32.8	31.3
Automatic Mean ($\mu\text{g}/\text{m}^3$)	2.1%	3.4%
Data Capture		
Adjusted Tube Mean ($\mu\text{g}/\text{m}^3$)	31.5	27.8

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.

Distance correction was not required at any NO₂ diffusion tube monitoring locations within Cheshire West and Chester during 2024.

QA/QC of Automatic Monitoring

The council staff perform routine calibrations on the air quality monitoring equipment at the BO, CBI, and WH roadside sites. Fortnightly span and zero calibrations are carried out on the chemiluminescent analysers at these locations. The remaining chemiluminescent and UV-fluorescent analysers at other sites undergo four-weekly span and zero calibrations. All calibrations use certified gas standards provided by BOC.

The resulting span and offset values from these calibrations are used in the ratification of the air quality datasets. Automated internal zero checks are also run daily overnight on the monitoring equipment.

To ensure data quality, comparisons are made regularly between measurements from the different monitoring sites. Data management and the overall ratification process is performed by an independent contractor, AQDM Ltd. This includes the production of weekly, quarterly, and annual data summaries, as well as any necessary notifications of air quality exceedance episodes.

The ratification process also involves comparing the local data against measurements from the national air quality monitoring network to identify regional patterns and trends.

All automatic analysers are serviced and calibrated at six-monthly intervals by Enviro Technology Services Ltd.

Air quality monitoring data for Cheshire West and Chester Council¹⁵ includes daily updates of the automatic monitoring data, presented as both air quality index gauges and static time series graphs. Historical datasets spanning over 10 years can also be downloaded from the site. In addition, diffusion tube data is also available on the website.

PM₁₀ and PM_{2.5} Monitoring Adjustment

PM₁₀ monitoring data recorded by the BAM analysers at Thornton-le-Moors (TLP) and Chester bus interchange (CBI) have been adjusted by the factor 0.96618, to give the indicative gravimetric equivalent figure.

The volatile correction model (VCM) was used to correct TEOM monitoring data at Frodsham (FMH) to produce a gravimetric equivalent figure.

Automatic Monitoring Annualisation

Annualisation is required for any site with data capture less than 75% but greater than 25%. 2024 data from two automatic monitoring sites Frodsham (FMH) and Whitby Road (WH) were annualised, as shown in Table C-3.

¹⁵ Available at: www.cheshirewestandchester.gov.uk/airquality

Table C.4 – Automatic NO₂ Annualisation Summary (concentrations presented in µg/m³)

Background Site	Annual Data Capture (%)	Annual Mean (A _m)	FMH		WH	
			Period Mean (P _m)	Ratio (A _m / P _m)	Period Mean (P _m)	Ratio (A _m / P _m)
Crewe Coppenhall	100.0	10.5	11.8	0.892	10.0	1.049
Stoke-on-Trent Centre	100.0	17.5	18.6	0.940	17.0	1.029
Average (R_a)			0.916		1.039	
Raw Data Annual Mean (M)			9.4		27.5	
Annualised Annual Mean (M x R_a)			8.6		28.5	

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 NO₂ fall-off with distance calculator available on the LAQM Support website. Where appropriate, automatic annual mean NO₂ concentrations corrected for distance are presented in Table A.3.

Distance correction was not required at any NO₂ automatic monitoring locations within Cheshire West and Chester during 2024.

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

Figure D.2 – Map of Monitoring sites and AQMA, Chester

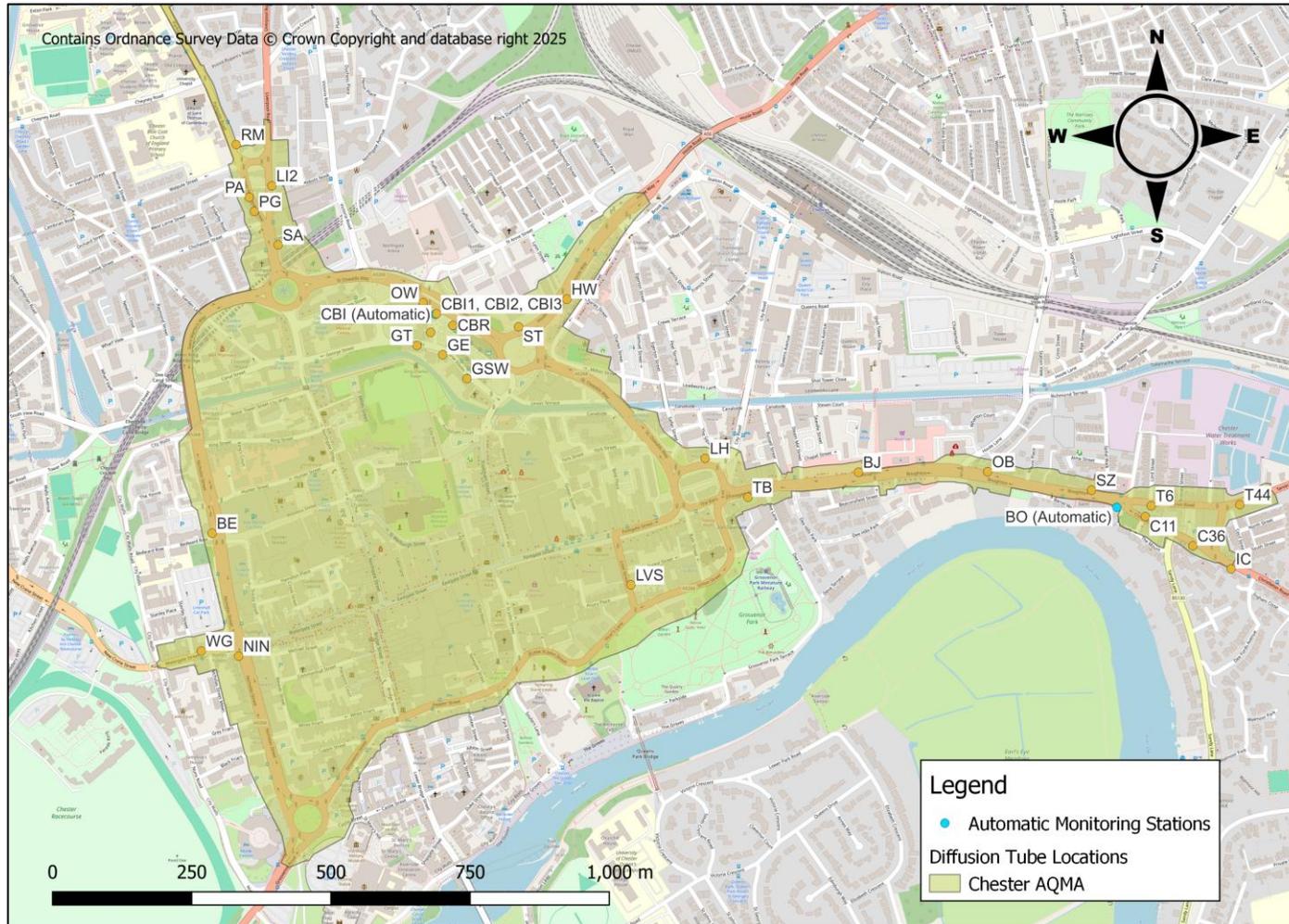


Figure D.3 – Map of Monitoring sites and AQMA, Whitby Road/Station Road Port



Figure D.4 – Map of Monitoring sites and AQMA, Frodsham

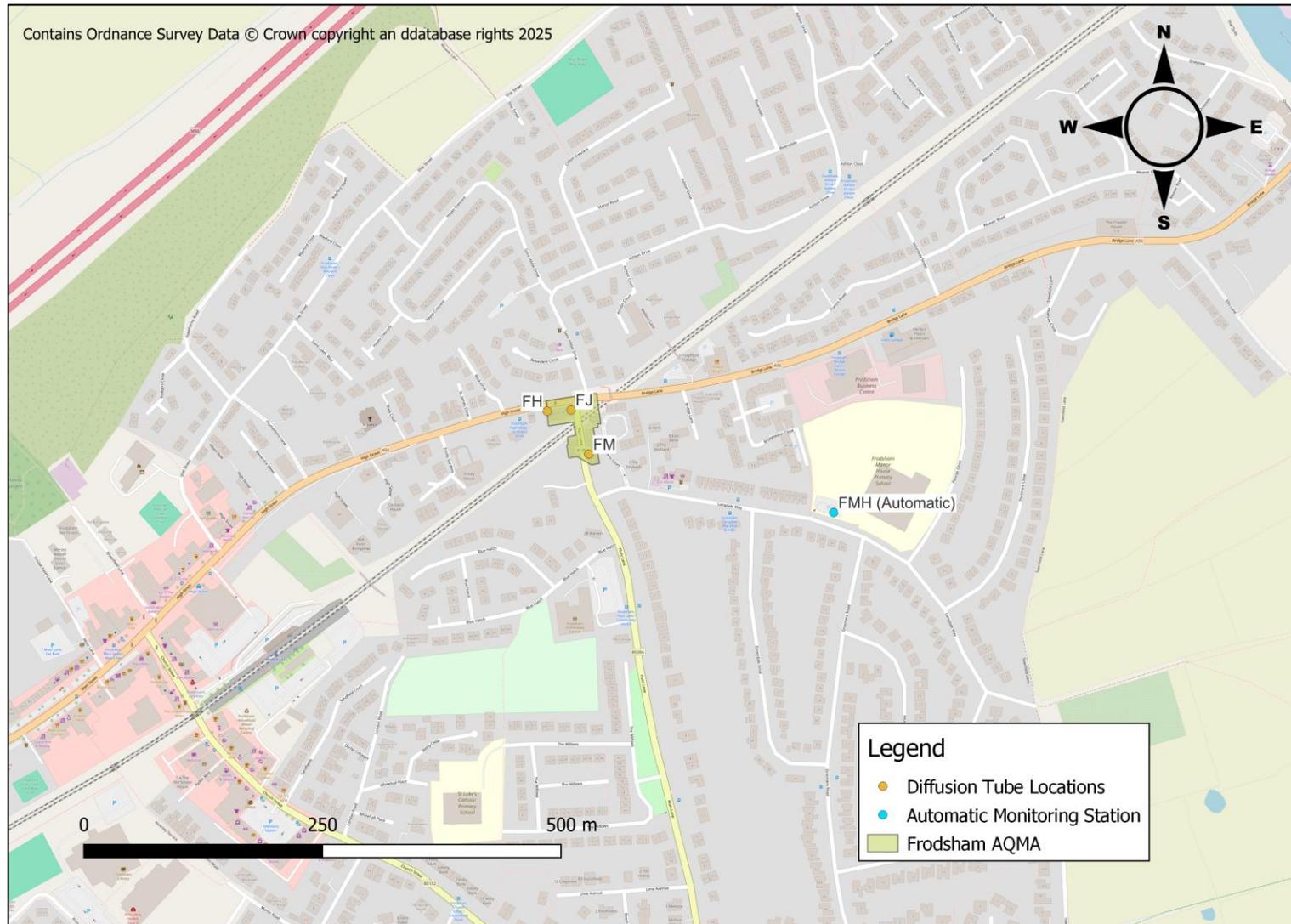


Figure D.5 – Map of Monitoring sites and AQMA, Thornton-le-Moors & Elton

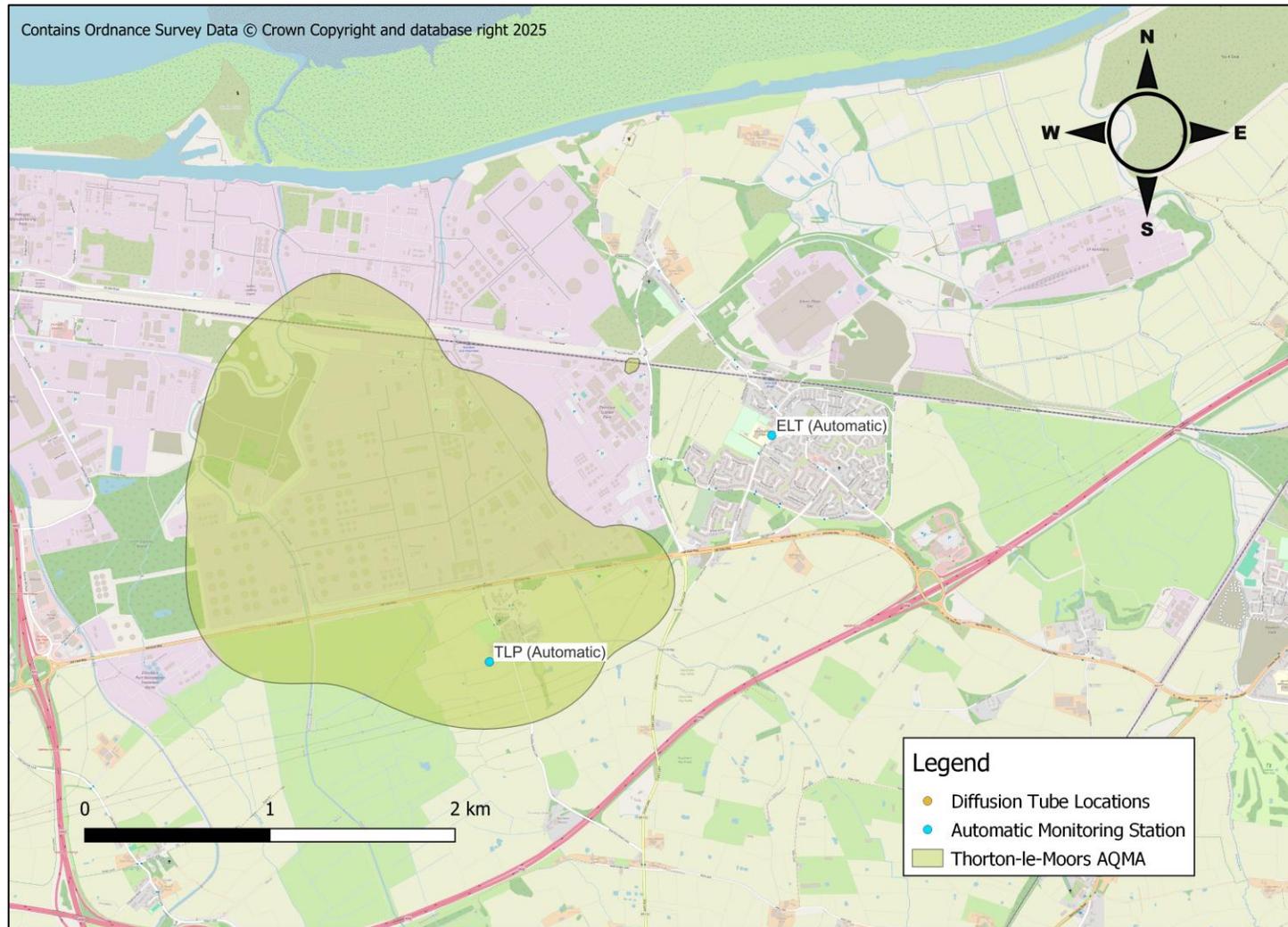


Figure D.6 – Map of Monitoring sites, Christleton / Littleton / Boughton Heath / Tarvin



Figure D.7 – Map of Monitoring sites, Neston

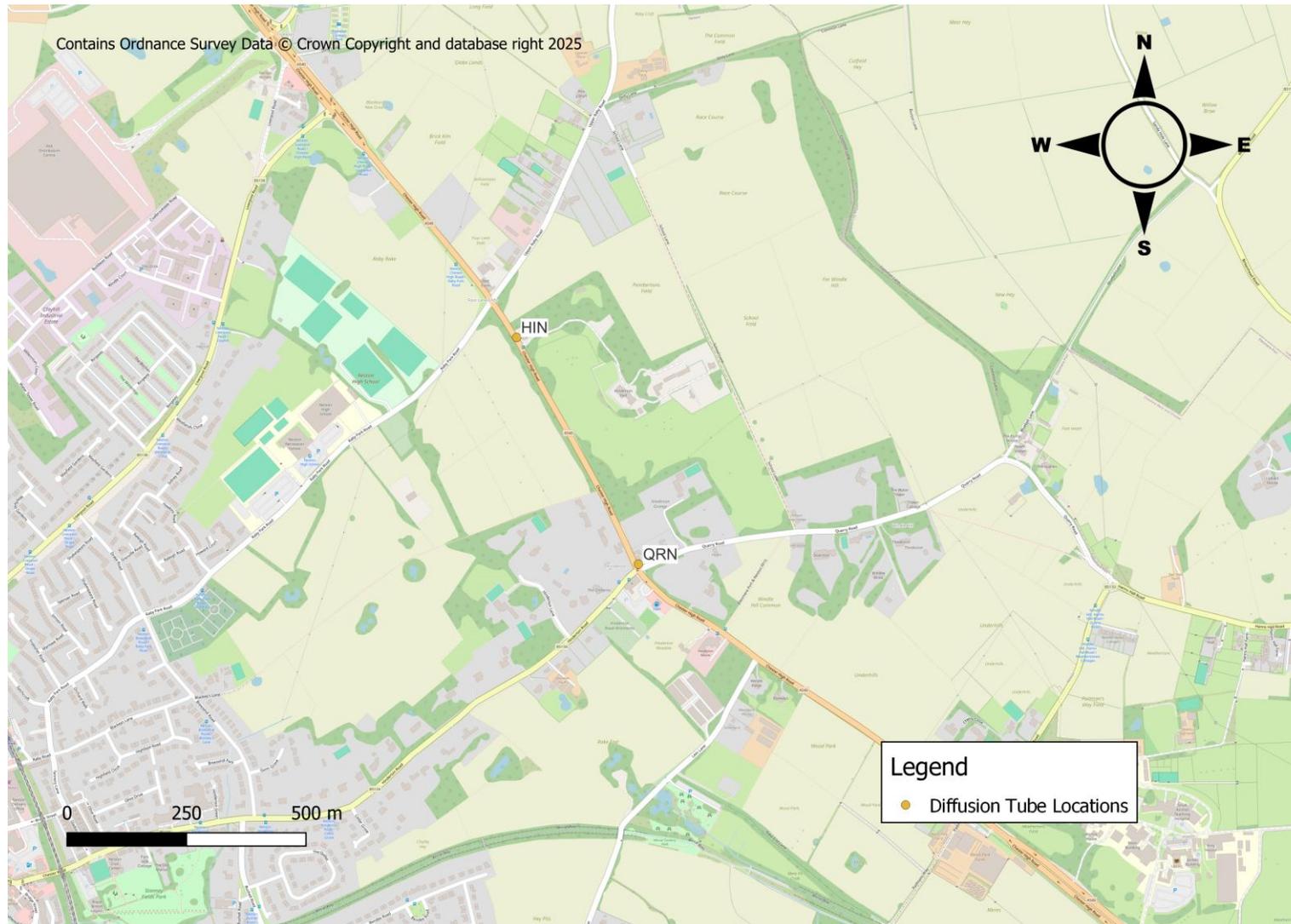


Figure D.8 – Map of Monitoring sites, Childer Thornton, Ellesmere Port



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England¹⁶

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

¹⁶ 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
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
LAQM	Local Air Quality Management
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO ₂	Sulphur Dioxide

References

- 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.
- 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.
- Chemical hazards and poisons report: Issue 28. June 2022. Published by UK Health Security Agency
- Air Quality Strategy – Framework for Local Authority Delivery. August 2023. Published by Defra.