



**Armagh City
Banbridge
& Craigavon**
Borough Council

2024 Updating Screening Assessment for Armagh City Banbridge and Craigavon Borough Council

In fulfilment of Environment (Northern Ireland) Order
2002

Local Air Quality Management

Date: October 2024

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Executive Summary

Air quality monitoring throughout the Borough continues to provide the data needed for policy decisions and enforcement activity. Since the last USA (which showed the impacts of pandemic lockdowns) economic and social activity and hence the emissions associated with traffic have returned to normal. The overall trend remains downward with air quality being excellent across the majority of the Borough when assessed against the extant Air Quality Standards Regulations.

Research and policy developments continue to establish the links between morbidity and mortality associated with the direct and indirect effects of air pollution. In 2021 the World Health Organisation revised its Global Air Quality Guidelines with a lowering of the target concentrations and the introduction of additional measures particularly on ultra-fine particulate matter. <https://www.who.int/news-room/questions-and-answers/item/who-global-air-quality-guidelines>

This Borough has declared its entire area as an Air Quality Management Area and seeks to use its Air Quality Action Plan 2022-2024 to minimise any unnecessary fossil fuel transport use as well as ensuring the maximum efficiency in those journeys that are made i.e. through car-sharing and public transport provision as well as the efficient flow of vehicles through our urban areas. Whilst the overall downward trend in nitrogen dioxide concentrations is welcomed and appears to be steady below the 40 microgramme per metre cubed threshold.

The UK Government has not yet sought to amend the Air Quality Standards Regulations to reflect the revised World Health Organisation targets.

Whilst having regard to the latest science on air quality and health this Borough will continue to monitor and action plan for emissions reductions.

Since the last Update and Screening Assessment there have been no new public transport initiatives within the Borough that will have led to a significant improvement in private vehicle emissions. Similarly there has been no significant investment in cycling provision which would encourage modal shift. Furthermore, there has been no significant road investment which would lead to improvements in the areas of concern where nitrogen dioxide is highest within the Borough.

We have noted the UK Government's ambitious regulation on the sale of fossil fuel cars and vans – to be banned in 2035, then 2030, then 2035 again. It is undoubted that the uptake of electric vehicles will result in a reduction of tail pipe emissions, but we believe there is much more to be done with adequate provision for charging and the generation and transmission capacity in NI.

Since the last Update and Screening Assessment, this Council has also commenced sampling in relation to the sulphur content of solid fuels sold within this Borough following some concerns about non-compliance with the 1998 Regulations. We believe that any slippage in compliance with these regulations may be having an adverse impact within our Borough and as such it is receiving regulatory attention.

New permitting requirements for medium scale combustion plant and specified generators under the Pollution Prevention and Control Regulations has led to the identification of numerous combustion processes in the Borough which produce relatively large amounts of nitrogen dioxide. In a rolling programme these installations will be subject to emissions limits (some which will require abatement) by 2030 thereby reducing point source emissions across the Borough.

This Borough is highly active in relation to Climate Change Adaptation and Mitigation and work continues on a roadmap towards a net zero Borough by 2030 and the authority's own reporting targets under the Climate Change (NI) Act. Furthermore, as a Council we engage locally with place plans being published or developed for Armagh, Banbridge and Dromore. To support both these corporate aims and to better inform our own policies in relation to our local air quality we have reviewed our nitrogen dioxide monitoring locations and expanded these to include further small and medium urban areas.

Unfortunately, since the last Update and Screening Assessment there has been no consultation on a new Clean Air Strategy for Northern Ireland. The prevailing legislation was drafted in the late 1970s and deals with industrial furnaces and chimney stacks and does not reflect the modern challenges in relation to solid fuel/stove burning in domestic environments. This Council awaits Government progress on this matter and note the progress made in other UK regions and the Republic of Ireland.

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1 Introduction

1.1 Description of Local Authority Area

The Borough is a beautiful rural, historic area served by the main motorway network in Northern Ireland, with major road links to the business capitals of Belfast and Dublin. Armagh City, Banbridge and Craigavon Borough has a mixture of heavy industry, services such as local government, the local education authority, health and social services, retail and agriculture. The greatest contribution to air quality pollution in the Borough is from road traffic, particularly in the city/town centres of Armagh, Portadown and Lurgan where the road network is frequently congested. Given the size of the rural hinterland, public transport options are limited and there is a greater tendency to rely on the private car as the primary means of transport. The road network within the Borough is regarded as a route hub to the border with the Republic of Ireland and is a main through-route between mid-Ulster and the south-east of Northern Ireland and hence has a traffic flow higher than that which could be created by local traffic alone. Particulate Matter (PM₁₀) and NO₂ would be considered as the pollutants most at risk of breaching the objective limits in the Borough as a result of road traffic.

1.2 Purpose of Report

This report fulfils the requirements of the Local Air Quality Management process as set out in the Environment (Northern Ireland) Order 2002, the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 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 exceedances are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

The aim of this Updating and Screening Assessment is to identify any matters that have changed which may lead to risk of an air quality objective being exceeded. A checklist

approach and screening tools are used to identify significant new sources or changes and whether there is a need for a Detailed Assessment. The USA report should provide an update of any outstanding information requested previously in Review and Assessment reports.

If an Updating and Screening Assessment has not been submitted in accordance with the dates set in the DEFRA Local Air Quality Management Technical Guidance (currently LAQM TG22), DAERA will be unable to pay staff costs offered under the conditions of the LAQM Grant.

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM in Northern Ireland are set out in the Air Quality Regulations (Northern Ireland) 2003, Statutory Rules of Northern Ireland 2003, no. 342, and are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre $\mu\text{g}/\text{m}^3$ (milligrams per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedances in each year that are permitted (where applicable).

Table 1.1 Air Quality Objectives included in Regulations for the purpose of LAQM in Northern Ireland

Pollutant	Air Quality Objective Concentration	Air Quality Objective Measured as	Date to be achieved by
Benzene	$16.25\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	$3.25\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2010
1,3-Butadiene	$2.25\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
Carbon monoxide	$10.0\text{mg}/\text{m}^3$	Running 8-hour mean	31.12.2003
Lead	$0.5\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	$0.25\mu\text{g}/\text{m}^3$	Annual mean	31.12.2008
Nitrogen dioxide	$200\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	$40\mu\text{g}/\text{m}^3$	Annual mean	31.12.2005

Pollutant	Air Quality Objective Concentration	Air Quality Objective Measured as	Date to be achieved by
Particles (PM₁₀) (gravimetric)	50µg/m ³ , not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40µg/m ³	Annual mean	31.12.2004
Sulphur dioxide	350µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266µg/m ³ , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

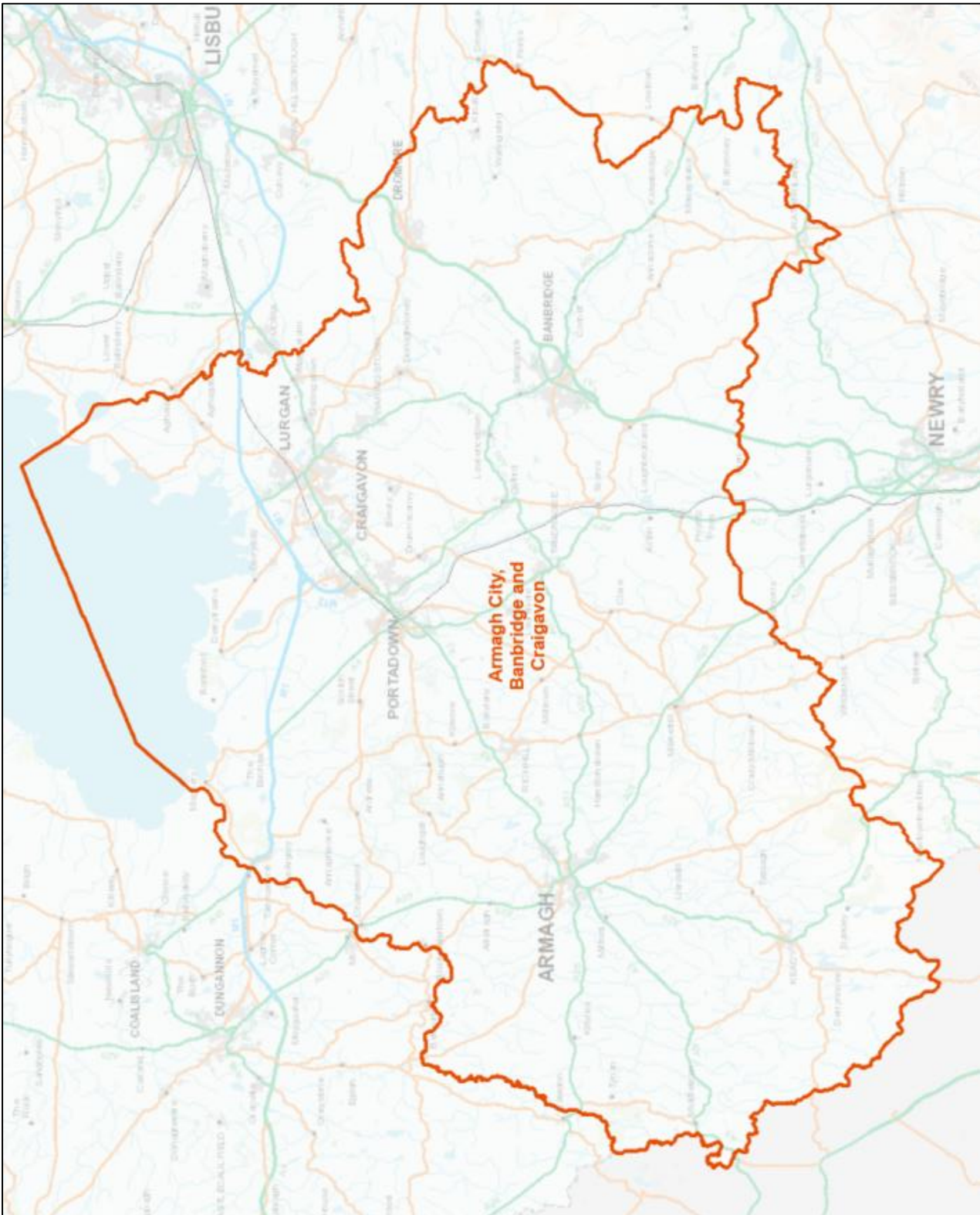
1.4 Summary of Previous Review and Assessments

Report Type	Date	Exceedences	Detailed Assessment Required	AQMA's Declared
Initial Review and Assessment	Jan 2001	None	No	None
Progress Report	April 2005	None	No	None
Updating & Screening Assessment	April 2006	None	No	None
Progress Report	April 2007	None	No	None
Detailed Assessment for NO ₂	Nov 2007	None	No	None
Progress Report	April 2008	NO ₂	No	Yes

Report Type	Date	Exceedences	Detailed Assessment Required	AQMA's Declared
Updating & Screening Assessment	April 2009	NO ₂	No	In the previous year
Progress Report	May 2010	NO ₂	Yes	None
Progress Report	May 2011	NO ₂	No	Yes
Updating and Screening Assessment	April 2012	NO ₂	No	Yes
Progress Report	April 2013	NO ₂	No	No
Progress Report	April 2014	NO ₂	No	No new AQMAs
Updating and Screening Assessment	April 2015	NO ₂	Yes	No new AQMAs
Progress Report & DA (hereby presented)	April 2016 (May 2017)	NO ₂	Yes	To be declared
Progress Report	August 2017	NO ₂	Yes	Declaration prepared
Update and Screening Assessment	October 2018	NO ₂	No	Borough-wide declaration made

Report Type	Date	Exceedences	Detailed Assessment Required	AQMA's Declared
Progress Report	2019	NO2	No	Borough-wide AQMA remains unchanged
Progress Report	2020	NO2	No	Borough-wide AQMA remains unchanged
Updating and Screening Assessment	2021	NO2	No	Borough-wide AQMA remains unchanged
Progress Report	2022	NO2	No	Borough-wide AQMA remains unchanged
Progress Report	2023	NO2	No	Borough-wide AQMA remains unchanged.

Figure 1.1 Map(s) of AQMA Boundaries



2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Armagh Banbridge Craigavon Borough Council operates one automatic monitoring station located at Lonsdale Road, Armagh

This station forms part of DEFRA's Automatic Urban and Rural Network (AURN) network.

As an AURN Network site, to ensure that the data is both accurate and representative, a four-weekly calibration is carried out by Council staff in accordance with the procedures detailed in the DEFRA Automatic Urban and Rural Network local site operators' manual.

Data management, quality assurance and quality control and service and maintenance support are all provided by DEFRA's appointed contractors. The data from our sites is made available to the Department of Agriculture, Environment and Rural Affairs and is reported on the 'Northern Ireland Air' website in near real time.

All data is validated and corrected in accordance with Government technical guidance, such as Bata Attenuation Monitoring (BAM) for PM₁₀.

For consistency, all automatic monitoring data reported in this progress report has been obtained from the 'Northern Ireland Air Quality' website.

Automatic data reported in this report relates to the calendar year (i.e. January – December) and data capture levels exceed substantially the Department's 75% data capture threshold for the calculation of annual statistics.

Figure 2.1 Map(s) of Automatic Monitoring Sites

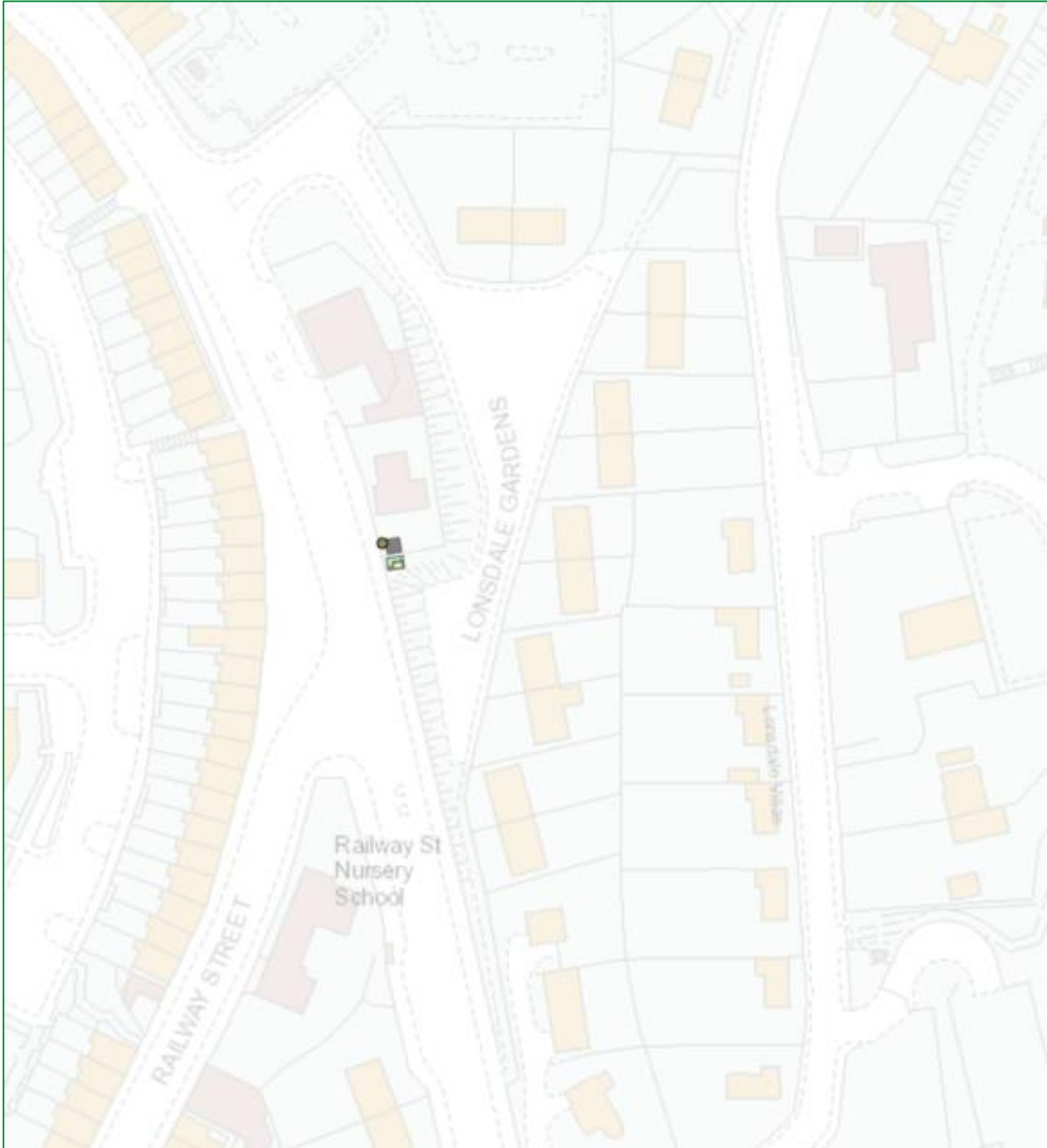


Table 2.1 Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Inlet Height (m)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (m) (N/A if not applicable)	Does this location represent worst-case exposure?
AURN1	Lonsdale Road	Roadside	287520	345840	2.5	NO ₂ NO _x NO PM ₁₀ PAH	Y	API (NO _x) BAM (PM ₁₀) DIGITEL(PAH)	Y(20m)	3m	Y

2.1.2 Non-Automatic Monitoring Sites

During the monitoring period in 2023 Armagh Banbridge Craigavon Borough Council carried out monitoring of nitrogen dioxide by diffusion tube exposure at 25 sites within the Borough using 29 tubes.

A new monitoring location of William Street, Lurgan [ABCNO2DIF029] has been introduced as a roadside monitoring location, due to risk assessment of exposure at this location.

Non-automatic monitoring sites are selected as risk based exposure assessment of nitrogen dioxide levels and how they vary at main road locations and background locations across the borough.

Full details of diffusion tube monitoring sites are included within Appendix 2 of this report.

Diffusion tubes are placed in accordance with Government Technical guidance for Ambient NO₂ monitoring.

Armagh Banbridge Craigavon Borough Council's diffusion tubes are exposed for successive four or five week periods, in approximate accordance with the DEFRA Diffusion Tube Monitoring Calendar and, as a result, they provide a good general indication of average nitrogen dioxide concentrations, thereby allowing a comparison with the annual mean objective.

Council changed diffusion tube provider in April 2023 from Gradko to Socotec (Didcot) for supply and analysis of diffusion tubes (January – March 2023 Gradko tubes were used).

Both Gradko and Socotec follow the requirements of Government Technical guidance for Ambient NO₂ monitoring. Tubes are prepared with a 20% triethanolamine solution (TEA) for monitoring ambient nitrogen dioxide. Analysis is by UV spectrophotometry.

Laboratory performance regarding NO₂ Proficiency Testing Scheme is assessed under AIR. AIR is an independent analytical proficiency-testing (PT) scheme, operated by LGC Standards and supported by the Health and Safety Executive (HSE). AIR PT is a new scheme, started in April 2014, which combined two long running PT schemes: LGC Standards STACKS PT scheme and HSE WASP PT scheme.

Performance documentation for Socotec can be found : <https://laqm.defra.gov.uk/wp-content/uploads/2021/02/AIR-PT-Rounds-50-to-63-June-2022-to-June-2024.pdf>

In the AIR PT intercomparison scheme for comparing spiked Nitrogen Dioxide diffusion tubes, Socotec currently holds the highest rank of a Satisfactory laboratory.

Table 1: Laboratory summary performance for AIR NO₂ PT rounds AR050, 52, 53, 55, 56, 58, 59, 62 and 63

The following table lists those UK laboratories undertaking LAQM activities that have participated in recent AIR NO₂ PT rounds and the percentage (%) of results submitted which were subsequently determined to be **satisfactory** based upon a z-score of $\leq \pm 2$ as defined above.

AIR PT Round	AIR PT AR050	AIR PT AR052	AIR PT AR053	AIR PT AR055	AIR PT AR056	AIR PT AR058	AIR PT AR059	AIR PT AR062	AIR PT AR063
Round conducted in the period	May – June 2022	July – August 2022	September – October 2022	January – February 2023	May – June 2023	July – August 2023	September – October 2023	January – February 2024	April – June 2024
Aberdeen Scientific Services	100 %	100 %	100 %	0 %	100 %	100 %	75 %	100 %	100 %
Cardiff Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Edinburgh Scientific Services	50 %	100 %	100 %	100 %	75 %	100 %	50 %	100 %	100 %
SOCOTEC	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]
Exova (formerly Clyde Analytical)	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Glasgow Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	100 %	75 %	100 %
Gradko International	100 % [1]	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Kent Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Kirklees MBC	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Lambeth Scientific Services	75 %	100 %	50 %	0 %	75 %	50 %	0 %	50 %	50 %
Milton Keynes Council	100 %	100 %	100 %	50 %	75 %	100 %	100 %	100 %	NR [2]
Northampton Borough Council	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Somerset Scientific Services	100 %	75 %	100 %	100 %	75 %	100 %	100 %	100 %	100 %
South Yorkshire Air Quality Samplers	NR [2]	NR [2]	NR [2]	NR [2]	NR [2]	NR [2]	NR [2]	NR [2]	NR [2]
Staffordshire County Council, Scientific Services	100 %	0 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Tayside Scientific Services (formerly Dundee CC)	NR [2]	100 %	100 %	NR [2]	100 %	NR [2]	NR [2]	NR [2]	NR [2]
West Yorkshire Analytical Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]

[1] Participant subscribed to two sets of test results (2 x 4 test samples) in each AIR PT round.

[2] NR, No results reported.

[3] Cardiff Scientific Services, Exova (formerly Clyde Analytical), Kent Scientific Services, Kirklees MBC, Northampton Borough Council and West Yorkshire Analytical Services; no longer carry out NO₂ diffusion tube monitoring and therefore did not submit results.

To further ensure that diffusion tube monitoring data is as accurate as possible tubes are co-located at the Armagh Lonsdale Road continuous monitoring station (chemiluminescent).

This allows a bias adjustment factor (with a 95% confidence interval as an estimate of the uncertainty on the bias adjustment factor) to be calculated that can be used to correct the diffusion tube monitoring data.

For the purposes of reporting, and in accordance with Government technical guidance all diffusion tube data is presented with a national bias adjustment factor. In 2023 for Socotec the national diffusion tube bias adjustment factor of 0.76 has been utilised.

Figure 2.2 Map of Non-Automatic Monitoring Sites



Table 2.2 Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
ABCNO2DIF001	Lonsdale Road, Armagh 1	Roadside	287527	345839	2.3	NO ₂	Y	Y	Y(15m)	4.6	Y
ABCNO2DIF002	Lonsdale Road, Armagh 2	Roadside	287527	345839	2.3	NO ₂	Y	Y	Y(15m)	4.6	Y
ABCNO2DIF003	Lonsdale Road, Armagh 3	Roadside	287527	345839	2.3	NO ₂	Y	Y	Y(15m)	4.6	Y
ABCNO2DIF004	Mall West, Armagh	Roadside	287834	345152	2.7	NO ₂	Y	N	Y(1m)	5.5	Y
ABCNO2DIF005	Railway Street, Armagh	Roadside	287456	345963	2.6	NO ₂	Y	N	Y(1m)	2	Y
ABCNO2DIF006	Greenpark Terrace, Armagh	Roadside	287336	344775	2.6	NO ₂	Y	N	Y(1m)	2.4	Y
ABCNO2DIF007	Greenfield Way, Armagh	Urban Background	288792	344257	2.8	NO ₂	Y	N	Y(5m)	N/A	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
ABCNO2DIF008	Desart Lane, Armagh	Urban Background	286786	345752	2.7	NO ₂	Y	N	Y(5m)	N/A	Y
ABCNO2DIF009	Mill Street Tandragee 1	Roadside	303319	345870	2.7	NO ₂	Y	N	Y(1m)	1.5	Y
ABCNO2DIF010	Mill Street Tandragee 2	Roadside	303319	345870	2.7	NO ₂	Y	N	Y(1m)	1.5	Y
ABCNO2DIF011	Mill Street Tandragee 3	Roadside	303319	345870	2.7	NO ₂	Y	N	Y(1m)	1.5	Y
ABCNO2DIF012	Barrack Street, Armagh	Roadside	287888	345054	3	NO ₂	Y	N	Y(1m)	3	Y
ABCNO2DIF013	Scarva Road, Tandragee	Roadside	303414	345722	2.7	NO ₂	Y	N	Y(3m)	1.5	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
ABCNO2DIF014	Market Street, Tandragee	Roadside	303235	346085	2.7	NO ₂	Y	N	Y(1m)	6	Y
ABCNO2DIF015	Church Street, Tandragee	Roadside	303118	346311	2.7	NO ₂	Y	N	Y(2m)	3.6	Y
ABCNO2DIF016	Portadown Road, Tandragee	Roadside	303093	346461	2.7	NO ₂	Y	N	Y(1m)	1.6	Y
ABCNO2DIF017	Irish Street, Armagh	Roadside	287288	344628	2.7	NO ₂	Y	N	Y(2m)	4.1	Y
ABCNO2DIF018	Upper Irish Street, Armagh	Roadside	287385	344856	2.7	NO ₂	Y	N	Y(1m)	1.3	Y
ABCNO2DIF019	Bridge Street, Portadown	Roadside	301548	354231	2.6	NO ₂	Y	N	Y(1m)	1.9	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
ABCNO2DIF020	Ardboe Drive, Lurgan	Urban Background	308128	357820	2.5	NO ₂	Y	N	Y(1m)	N/A	Y
ABCNO2DIF021	Ballyhannon Road, Portadown	Urban Background	303172	354283	1.8	NO ₂	Y	N	Y(5m)	N/A	Y
ABCNO2DIF022	Flush Place, Lurgan	Roadside	308824	357773	2.7	NO ₂	Y	N	Y(1m)	2	Y
ABCNO2DIF023	Springfields, Banbridge	Urban Background	311938	344065	2.7	NO ₂	Y	N	Y(5m)	N/A	Y
ABCNO2DIF024	Fortfield, Dromore	Urban Background	319804	353510	2.7	NO ₂	Y	N	Y(5m)	N/A	Y
ABCNO2DIF025	Church Street, Dromore	Roadside	320014	353392	2.6	NO ₂	Y	N	Y(1m)	2.8	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
ABCNO2DIF026	Mill Street, Gilford	Roadside	306679	348352	2.9	NO ₂	Y	N	Y(1m)	2.2	Y
ABCNO2DIF027	High Street, Gilford	Roadside	306261	348905	2.9	NO ₂	Y	N	Y(1m)	2.6	Y
ABCNO2DIF028	Castle Street, Gilford	Roadside	306724	348303	2.9	NO ₂	Y	N	Y(1m)	4	Y
ABCNO2DIF029	William Street, Lurgan	Roadside	307798	358835	2.6	NO ₂	Y	N	Y(1m)	5	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide

The AURN site at Lonsdale Road has continued to be supported by DAERA and hence is maintained by ACBCBC to provide data to support policy development.

Automatic Monitoring Data

The site does not show an exceedance of the AQS objective for nitrogen dioxide in 2023. This has been consistently the case.

Table 2.3 Results of Automatic Monitoring for Nitrogen Dioxide: Annual Mean NO₂ Monitoring Results (µg/m³) for Comparison with the Annual Mean Objective

Site ID	Site Type	Within AQMA? Which AQMA?	Valid Data Capture for period of monitoring % ^a	Valid Data Capture 2023 % ^b	2019* ^c	2020* ^c	2021* ^c	2022* ^c	2023 ^c
Armagh Roadside	Roadside	Y	99	99	24	20	21	21	21

In **bold**, exceedance of the NO₂ annual mean AQS objective of 40µg/m³.

^a i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

^b i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%).

^c Means should be “annualised” as per LAQM.TG22, if monitoring was not carried out for the full year.

*Annual mean concentrations for previous years are optional.

Table 2.4 Results of Automatic Monitoring for Nitrogen Dioxide: Number of Exceedances of 1-hour mean Objective (200µg/m³)

Site ID	Site Type	Within AQMA? Which AQMA?	Valid Data Capture for period of monitoring % ^a	Valid Data Capture 2023 % ^b	2019* ^c	2020* ^c	2021* ^c	2022* ^c	2023 ^c
Armagh Roadside	Roadside	Y	99	99	0	0	0	0	0

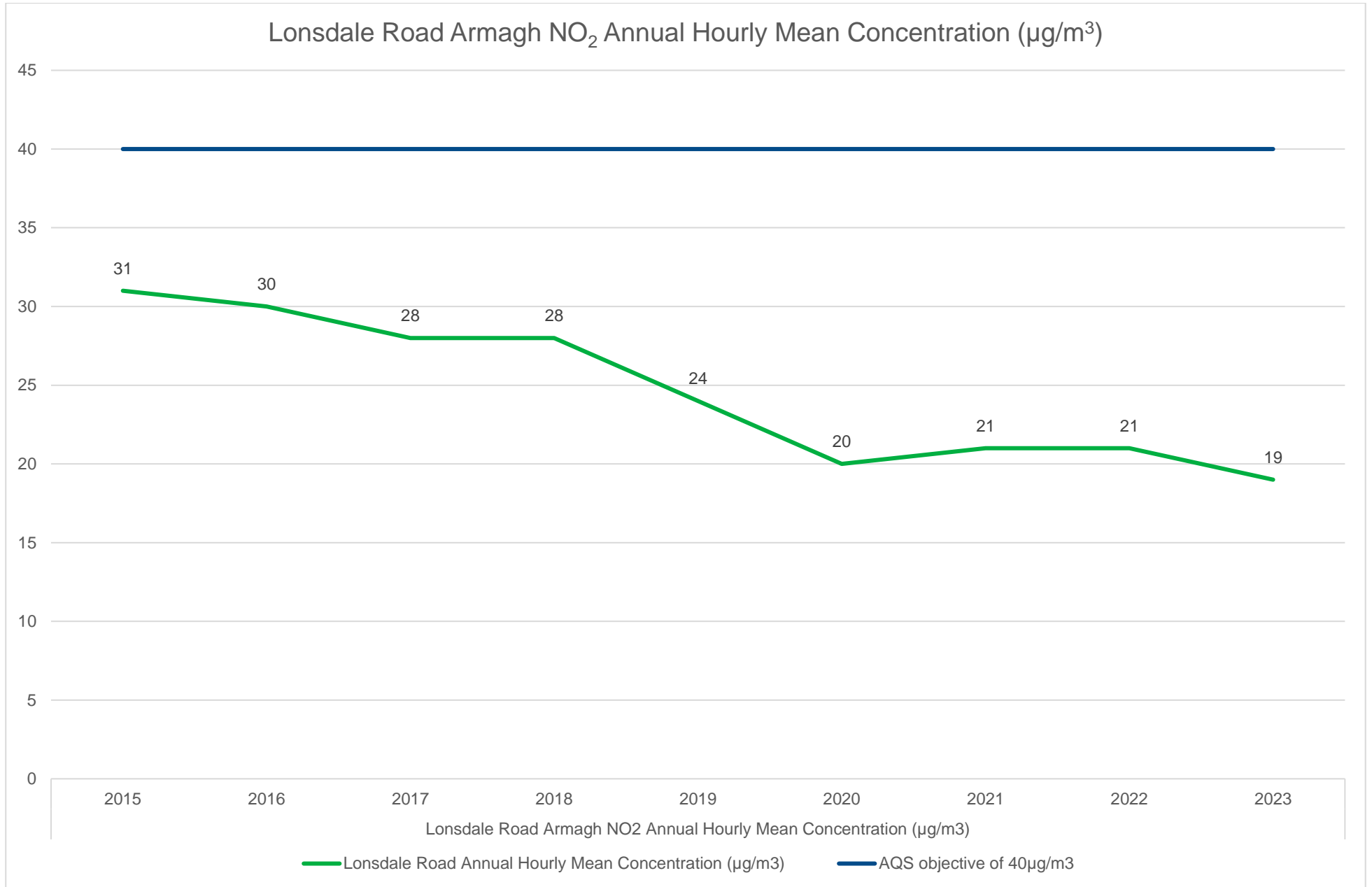
In **bold**, exceedance of the NO₂ hourly mean AQS objective (200µg/m³ – not to be exceeded more than 18 times per year

^a i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

^b i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%).

^c If the period of valid data is less than 85%, include the 99.8th percentile of hourly means in brackets

* Number of exceedances for previous years are optional.



Diffusion Tube Monitoring Data

The following table and chart show the results and trends in nitrogen dioxide monitoring by diffusion tube.

The general trend remains downward which is to be welcomed. The 'dip' in concentrations linked with lockdown measures during 2020 and 2021 has ended but the 2023 levels remain lower than those in 2019.

Table 2.5 Results of Nitrogen Dioxide Diffusion Tubes in 2023

Site ID	Location	Site Type	Within AQMA? Which AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2023 (Number of Months or %) ^a	2023 Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) - Bias Adjustment factor = 0.76
ABCNO2DIF001,002,003	Lonsdale Rd 1,2,3	Roadside	Yes	Co Located Tube	92.3	24.8
ABCNO2DIF004	Mall West	Roadside	Yes		84.6	30.6
ABCNO2DIF005	Railway St	Roadside	Yes		92.3	34.0
ABCNO2DIF006	Green Park Terrace	Roadside	Yes		75.0	33.3
ABCNO2DIF007	Greenfield Way	Urban_Background	Yes		82.7	5.8
ABCNO2DIF008	Desart Lane	Urban_Background	Yes		84.6	8.8
ABCNO2DIF009,010,011	Mill St Tandragee 1,2,3	Roadside	Yes	Triplicate	92.3	32.3
ABCNO2DIF012	Barrack St	Roadside	Yes		92.3	25.3
ABCNO2DIF013	Scarva St, Tandragee	Roadside	Yes		82.7	13.0
ABCNO2DIF014	Market St, Tandragee	Roadside	Yes		84.6	12.7
ABCNO2DIF015	Church St, Tandragee	Roadside	Yes		67.3^a	24.86(annualised)
ABCNO2DIF016	Portadown Rd, Tandragee	Roadside	Yes		92.3	24.8
ABCNO2DIF017	Irish St, Armagh	Roadside	Yes		92.3	26.6
ABCNO2DIF018	Upper Irish Street, Armagh	Roadside	Yes		75.0	26.7
ABCNO2DIF019	Bridge St Portadown	Roadside	Yes		65.4^a	25.4(annualised)
ABCNO2DIF020	Ardbe Drive	Urban_Background	Yes		92.3	7.9
ABCNO2DIF021	Ballyhannon Road	Urban_Background	Yes		92.3	6.1

ABCNO2DIF022	Flush Place	Roadside	Yes		92.3	23.2
ABCNO2DIF023	Springfields Banbridge	Urban_Background	Yes		67.3^a	10.26(annualised)
ABCNO2DIF024	Fortfield Drive	Urban_Background	Yes		92.3	7.7
ABCNO2DIF025	Lurgan Rd Dromore	Roadside	Yes		92.3	18.9
ABCNO2DIF026	Mill St Gilford	Roadside	Yes		92.3	23.5
ABCNO2DIF027	High St Gilford	Roadside	Yes		92.3	16.2
ABCNO2DIF028	Castle St Gilford	Roadside	Yes		75.0	19.2
ABCNO2DIF029	William St, Lurgan	Roadside	Yes		57.7^a	33.3(annualised)

In **bold**, exceedance of the NO₂ annual mean AQS objective of 40µg/m³.

Underlined, annual mean > 60µg/m³, indicating a potential exceedance of the NO₂ hourly mean AQS objective.

^a Means should be “annualised” as per LAQM.TG22, if full calendar year data capture is less than 75%.

^b If an exceedance is measured at a monitoring site not representative of public exposure, NO₂ concentration at the nearest relevant exposure should be estimated based on the NO₂ fall-off with distance calculator, and results should be discussed in a specific section.

Table 2.6 Results of Nitrogen Dioxide Diffusion Tubes, adjusted for bias ($\mu\text{g}/\text{m}^3$): 2019 to 2023

Site ID	Site Type	Within AQMA? Which AQMA?	2019 ^a (Bias Adjustment Factor = 0.91)	2020 ^a (Bias Adjustment Factor = 0.81)	2021 ^a (Bias Adjustment Factor = 0.84)	2022 ^a (Bias Adjustment Factor = 0.76)	2023 ^a (Bias Adjustment Factor = 0.76)
Lonsdale Road, Armagh 1, Lonsdale Road, Armagh 2, Lonsdale Road, Armagh 3	Roadside	Yes	30.95	25.06	26.20	25.88	24.8
Mall West, Armagh	Roadside	Yes	36.51	29.03	28.55	29.60	30.6
Railway Street, Armagh	Roadside	Yes	40.53	32.59	34.17	32.98	34.0
Greenpark Terrace, Armagh	Roadside	Yes	40.59	32.58	33.91	34.36	33.3
Greenfield Way, Armagh	Urban_Background	Yes	8.14	6.34	6.77	6.56	5.8
Desart Lane, Armagh	Urban_Background	Yes	12.71	9.94	12.43	9.79	8.8
Mill Street Tandragee 1, Mill Street Tandragee 2, Mill Street Tandragee 3	Roadside	Yes	41.52	32.25	32.93	33.44	32.3
Barrack Street, Armagh	Roadside	Yes	33.03	24.36	27.60	26.35	25.3

Site ID	Site Type	Within AQMA? Which AQMA?	2019 ^a (Bias Adjustment Factor = 0.91)	2020 ^a (Bias Adjustment Factor = 0.81)	2021 ^a (Bias Adjustment Factor = 0.84)	2022 ^a (Bias Adjustment Factor = 0.76)	2023 ^a (Bias Adjustment Factor = 0.76)
Scarva Road, Tandragee	Roadside	Yes	17.05	13.37	14.65	14.14	13.0
Market Street, Tandragee	Roadside	Yes	18.86	14.93	14.60	13.73	12.7
Church Street, Tandragee	Roadside	Yes	30.33	25.64	26.74	25.91	24.86(annualised)
Portadown Road, Tandragee	Roadside	Yes	28.17	24.09	24.95	25.39	24.8
Irish Street, Armagh	Roadside	Yes	32.58	25.97	29.01	27.47	26.6
Upper Irish Street, Armagh	Roadside	Yes	33.39	26.73	28.05	26.48	26.7
Bridge Street, Portadown	Roadside	Yes	34.49	26.30	24.97	26.16	25.4(annualised)
Ardboe Drive, Lurgan	Urban_Background	Yes	12.62	7.48	7.75	8.29	7.9
Ballyhannon Road, Portadown	Urban_Background	Yes	7.95	6.55	9.56	8.29	6.1
Flush Place, Lurgan	Roadside	Yes	26.98	24.16	22.22	25.06	23.2
Springfields, Banbridge	Urban_Background	Yes	14.06	8.80	10.70	10.28	10.26(annualised)
Fortfield, Dromore	Urban_Background	Yes	12.17	8.09	9.40	9.72	7.7

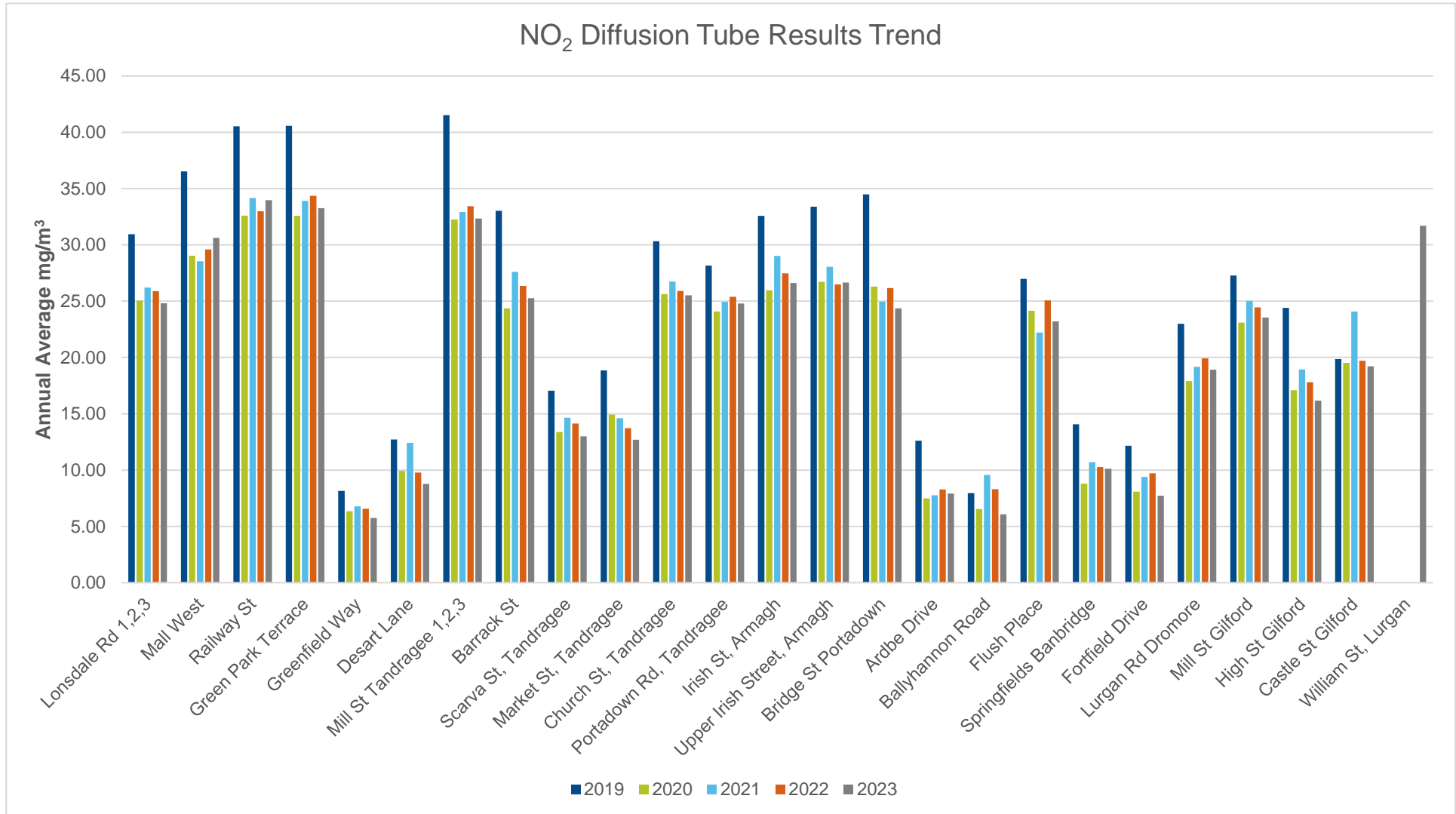
Site ID	Site Type	Within AQMA? Which AQMA?	2019 ^a (Bias Adjustment Factor = 0.91)	2020 ^a (Bias Adjustment Factor = 0.81)	2021 ^a (Bias Adjustment Factor = 0.84)	2022 ^a (Bias Adjustment Factor = 0.76)	2023 ^a (Bias Adjustment Factor = 0.76)
Church Street, Dromore	Roadside	Yes	23.00	17.91	19.18	19.92	18.9
Mill Street, Gilford	Roadside	Yes	27.29	23.09	25.03	24.46	23.5
High Street, Gilford	Roadside	Yes	24.40	17.10	18.94	17.81	16.2
Castle Street, Gilford	Roadside	Yes	19.87	19.53	24.08	19.71	19.2
William Street, Lurgan	Roadside	Yes					33.3(annualised)

In **bold**, exceedance of the NO₂ annual mean AQS objective of 40µg/m³.

Underlined, annual mean > 60µg/m³, indicating a potential exceedance of the NO₂ hourly mean AQS objective.

^a Means should be “annualised” as per LAQM.TG22, if full calendar year data capture is less than 75%.

Figure 2.3 Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Diffusion Tube Monitoring Sites



2.2.2 Particulate Matter (PM₁₀)

PM₁₀ is monitored on an hourly basis at the AURN site at Lonsdale Road, Armagh. This site provides information for DAERA and is supported by the Local Air Quality Management funding.

PM₁₀ concentrations have never exceeded the objectives at this location despite its situation within an AQMA declared for traffic source NO₂. The general trend is downward and to be welcomed.

The following tables provide information on particulate matter which is monitored at the automatic station on Lonsdale Road, Armagh.

Table 2.7 Annual Mean PM₁₀ Monitoring Results (µg/m³) for Comparison with the Annual Mean Objective

Site ID	Site Type	Within AQMA? Which AQMA?	Valid Data Capture for monitoring Period %	Valid Data Capture 2023 %	Confirm Gravimetric Equivalent (Y or N/A)	2019	2020	2021	2022	2023
Armagh Lonsdale Road	Roadside	Y	93	93	Y	17	17	16	16	14

In **bold**, exceedance of the PM₁₀ annual mean AQS objective of 40µg/m³.

^a i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

^b i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%).

^c Means should be “annualised” as per LAQM.TG22, if monitoring was not carried out for the full year.

* Optional.

Table 2.8 Results of Automatic Monitoring for PM₁₀: Number of Exceedances of 24-hour mean Objective (50µg/m³)

Site ID	Site Type	Within AQMA? Which AQMA?	Valid Data Capture for monitoring Period % ^a	Valid Data Capture 2023 % ^b	Confirm Gravimetric Equivalent	2019* ^c	2020* ^c	2021* ^c	2022* ^c	2023 ^c
Armagh Lonsdale Road	Roadside	Y	93	93	Y	0	0	0	0	0

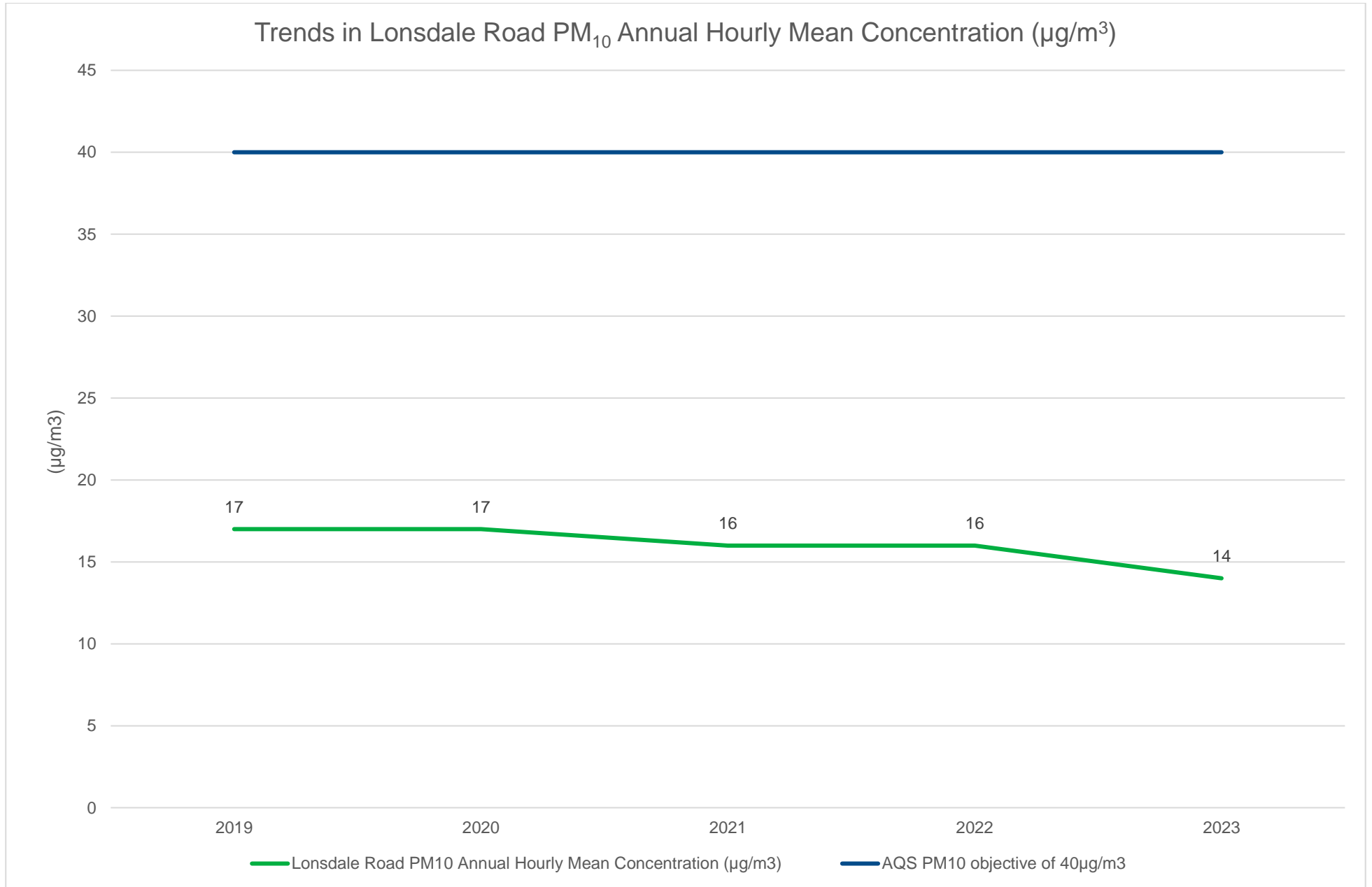
In **bold**, exceedance of the PM₁₀ daily mean AQS objective (50µg/m³ – not to be exceeded more than 35 times per year).

^a i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

^b i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%).

^c if data capture is less than 85%, include the 90.4th percentile of 24-hour means in brackets.

* Optional.



2.2.3 Sulphur Dioxide

No Sulphur dioxide monitoring was deemed necessary. The Council is working on testing of solid fuels for compliance with sulphur content requirements.

2.2.4 Benzene

No benzene monitoring has been considered necessary.

2.2.5 Other pollutants monitored

Polycyclic aromatic hydrocarbons (PAH)

PAH monitoring was introduced in 2022 at Armagh Lonsdale Road site on behalf of DAERA/ DEFRA. Armagh Lonsdale Road is part of the National network monitoring for PAH (Digital solid phase).

2.2.6 Summary of Compliance with AQS Objectives

Armagh City, Banbridge and Craigavon Borough Council has examined the results from monitoring in the Borough. Concentrations are all below the objectives, therefore there is no need to proceed to a Detailed Assessment.

3 Road Traffic Sources

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Armagh City, Banbridge and Craigavon Borough Council confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

3.2 Busy Streets Where People May Spend 1 hour or More Close to Traffic

Armagh City, Banbridge and Craigavon Borough Council confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

3.3 Roads with a High Flow of Buses and/or HGVs.

Armagh City, Banbridge and Craigavon Borough Council confirms that there are no new/newly identified roads with high flows of buses/HDVs.

3.4 Junctions

Armagh City, Banbridge and Craigavon Borough Council confirms that there are no new/newly identified busy junctions/busy roads.

3.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment

Armagh City, Banbridge and Craigavon Borough Council confirms that there are no new/proposed roads.

3.6 Roads with Significantly Changed Traffic Flows

Armagh City, Banbridge and Craigavon Borough Council confirms that there are no new/newly identified roads with significantly changed traffic flows.

3.7 Bus and Coach Stations

Armagh City, Banbridge and Craigavon Borough Council confirms that there are no relevant bus stations in the Local Authority area.

4 Other Transport Sources

4.1 Airports

Armagh City, Banbridge and Craigavon Borough Council confirms that there are no airports in the Local Authority area.

4.2 Railways (Diesel and Steam Trains)

4.2.1 Stationary Trains

Armagh City, Banbridge and Craigavon Borough Council confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

4.2.2 Moving Trains

Armagh City, Banbridge and Craigavon Borough Council confirms that there are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

4.3 Ports

Armagh City, Banbridge and Craigavon Borough Council confirms that there are no ports or shipping that meet the specified criteria within the Local Authority area.

5 Industrial Sources

5.1 Industrial Installations

5.1.1 New or Proposed Installations for which an Air Quality Assessment has been Carried Out

Armagh City, Banbridge and Craigavon Borough Council has assessed new/proposed industrial installations, and concluded that it will not be necessary to proceed to a Detailed Assessment.

5.1.2 Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been Introduced

Armagh City, Banbridge and Craigavon Borough Council confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

5.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment

Armagh City, Banbridge and Craigavon Borough Council has assessed new/proposed industrial installations, and concluded that it will not be necessary to proceed to a Detailed Assessment.

5.2 Major Fuel Depots

There are no major fuel (petrol) storage depots within the Local Authority area.

5.3 Petrol Stations

Armagh City, Banbridge and Craigavon Borough Council confirms that there are no petrol stations meeting the specified criteria.

5.4 Poultry Farms

Armagh City, Banbridge and Craigavon Borough Council confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

Armagh City, Banbridge and Craigavon Borough Council has assessed the biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment.

6.2 Biomass Combustion – Combined Impacts

Armagh City, Banbridge and Craigavon Borough Council has assessed the biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment.

6.3 Domestic Solid Fuel Burning

Armagh City, Banbridge and Craigavon Borough Council confirms that there are no areas of significant domestic fuel use in the Local Authority area.

7 Fugitive or Uncontrolled Sources

Armagh City, Banbridge and Craigavon Borough Council confirms that there are no potential sources of fugitive particulate matter emissions in the Local Authority area.

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

New monitoring data has shown that nitrogen dioxide emissions at roadside locations have stabilized following decreases in 2020 and 2021 associated with lockdown restrictions. It is encouraging to see that urban background locations have decreased further.

The Council's Air Quality Action Plan focuses upon emissions reduction across the Borough and this supports our local net zero and sustainability objectives.

In 2023 we reassessed the urban populations for new roadside monitoring locations and from 2024 will bring forward a number of additional monitoring sites which gives a much broader picture of the air quality across our urban areas. This is in response to the demand for such information from local representatives and members of the public and also to support place planning and local area planning development within the Borough.

8.2 Conclusions from Assessment of Sources

No new sources were identified. In 2023 work has progressed with new legislative requirements to permit Medium Scale Combustion Plant and Specified Generators across the Borough. Each of these is likely to require screening for LAQM impacts.

8.3 Proposed Actions

The Council intends to proceed with air quality action planning and will produce an updated Action Plan in 2025 to replace the extant 2022-2024 document. It is hoped that a Clean Air Strategy for Northern Ireland will have been released prior to 2025 which can influence the direction and priorities of future action planning. Nitrogen dioxide emissions remain the key focus for action planning but measures to electrify domestic heating and private car travel will be the largest influencing factors. Government policies and support for such transitions will be the determining factor in the speed of uptake of this change.

Both of these measures are critical to meeting even the least ambitious of Northern Ireland's Climate Change targets.

9 References

- Local Air Quality Management Guidance – TG22
<https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-TG22-August-22-v1.0.pdf>
- Department for Infrastructure (DfI) – Regional Development Strategy for NI 2035
<https://www.infrastructure-ni.gov.uk/publications/regional-development-strategy-2035>
- DAERA – Environment Strategy
<https://www.daera-ni.gov.uk/news/poots-approves-finalised-environment-strategy>
- DfI – Strategic Planning Policy Statement
<https://www.infrastructure-ni.gov.uk/publications/strategic-planning-policy-statement>
- Environment (Northern Ireland) Order 2002.
<http://www.legislation.gov.uk/nisi/2002/3153/contents/made>
- Northern Ireland Air – Air Quality in Northern Ireland website
- <http://www.airqualityni.co.uk/>

Appendices

Appendix A: Quality Assurance / Quality Control (QA/QC) Data

Appendix B: Non-Automatic Nitrogen Dioxide Diffusion Tube monitoring site details.

Appendix A: Quality Assurance / Quality Control (QA/QC) Data

QA/QC of Diffusion Tube Monitoring

In 2023 Council utilised SOCOTEC to supply and analyse diffusion tubes. SOCOTEC follows the requirements Government Technical guidance for Ambient NO₂ monitoring. Tubes are prepared with a 20% triethanolamine solution (TEA) for monitoring ambient nitrogen dioxide. Analysis is by UV spectrophotometry.

Laboratory performance regarding NO₂ Proficiency Testing Scheme (May 2020 – June 2022) is assessed under AIR. AIR is an independent analytical proficiency-testing (PT) scheme, operated by LGC Standards and supported by the Health and Safety Executive (HSE). AIR PT is a new scheme, started in April 2014, which combined two long running PT schemes: LGC Standards STACKS PT scheme and HSE WASP PT scheme.

Performance documentation for Socotec can be found :

https://laqm.defra.gov.uk/wp-content/uploads/2022/07/LAQM-NO2-Performance-data_Up-to-June-2022_V2.1.pdf

In the AIR PT intercomparison scheme for comparing spiked Nitrogen Dioxide diffusion tubes, SOCOTEC currently holds the highest rank of a Satisfactory laboratory.

To further ensure that diffusion tube monitoring data is as accurate as possible, Tubes are co-located at the Armagh Lonsdale Road continuous monitoring station (chemiluminescent).

Diffusion Tube Annualisation

Any sites requiring annualisation should be clearly defined along with details of the calculation method undertaken provided in Table A.2. Annualisation is required for any site with data capture less than 75% but greater than 25%.

Diffusion Tube Bias Adjustment Factors

Armagh Banbridge Craigavon Borough Council have applied a national bias adjustment factor of 0.76 to the 2023 monitoring data. A summary of bias adjustment factors used by Armagh Banbridge Craigavon Borough Council over the past five years is presented in In order for a consistent approach to data in particular long term trend comparison national factor bias adjustment is used. For reference the local bias adjustment factor calculated from triplicate co-located tubes at Armagh Lonsdale Road using the diffusion tube processing tool was 0.76 for year 2023.

Table A.1.

In order for a consistent approach to data in particular long term trend comparison national factor bias adjustment is used. For reference the local bias adjustment factor calculated from triplicate co-located tubes at Armagh Lonsdale Road using the diffusion tube processing tool was 0.76 for year 2023.

Table A.1 Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2023	National	09/24-FINAL	0.76 (Socotec Didcot (8 Studies))
2022	National	09/23	0.76 (Socotec Didcot 11 Studies)
2021	National	09/23	0.84 (Gradko 34 Studies)
2020	National	09/23	0.81 (Gradko 27 Studies)
2019	National	09/23	0.91 (31 Studies)

NO₂ Fall-off with Distance from the Road

No diffusion tube NO₂ monitoring locations within Armagh Banbridge Craigavon Borough Council required distance correction during 2023.

QA/QC of Automatic Monitoring

Armagh Banbridge Craigavon Borough Council operates a single automatic monitoring site at Armagh Lonsdale Road.

This station forms part of DEFRA's Automatic Urban and Rural Network (AURN) network and provides information for the draft Programme for Government Air Quality Indicator.

As an AURN Network site, to ensure that the data is both accurate and representative, a four-weekly calibration is carried out by Council staff in accordance with the procedures detailed in the DEFRA Automatic Urban and Rural Network local site operators' manual.

Data management, quality assurance and quality control and service and maintenance support are all provided by DEFRA's appointed contractors. The data from our sites is made available to the Department of Agriculture, Environment and Rural Affairs and is reported on the 'Northern Ireland Air' website in near real time.

All data is validated and corrected in accordance with Government technical guidance, such as Bata Attenuation Monitoring (BAM) for PM10.

For consistency, all automatic monitoring data reported in this progress report has been obtained from the 'Northern Ireland Air Quality' website.

Automatic data reported in this report relates to the calendar year (i.e. January – December) and data capture levels exceed substantially the Department's 75% data capture threshold for the calculation of annual statistics.

Automatic Monitoring Annualisation

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

NO₂ Fall-off with Distance from the Road

No automatic NO₂ monitoring locations within Armagh Banbridge Craigavon Borough Council required distance correction during 2023/

Table A.2 Annualisation Summary (concentrations presented in $\mu\text{g}/\text{m}^3$)

Diffusion Tube ID	Site Name	Annualisation Factor Armagh Lonsdale Road	Annualisation Factor Newry Canal Street	Annualisation Factor Lisburn Castlereagh	Annualisation Factor Ballymena Antrim Road	Average Annualisation Factor	Raw Data Simple Annual Mean ($\mu\text{g}/\text{m}^3$)	Annualised Data Simple Annual Mean ($\mu\text{g}/\text{m}^3$)
ABCNO2DIF015	Church Street, Tandragee	0.9754	0.9718	0.9760	0.9689	0.9730	33.6	32.7
ABCNO2DIF019	Bridge Street, Portadown	1.0190	1.0870	1.0420	1.0220	1.0425	32.1	33.4
ABCNO2DIF023	Springfields, Banbridge	1.0110	1.0703	1.0016	0.9734	1.0141	13.3	13.5
ABCNO2DIF029	William Street, Lurgan	1.0761	1.0065	1.0357	1.0831	1.0504	41.7	43.8

Table A.3 Local Bias Adjustment Calculations

	STEP 3a Local Bias Adjustment Input 1
Periods used to calculate bias	10
Bias Adjustment Factor A	0.64 (0.59 - 0.7)
Diffusion Tube Bias B	57% (44% - 71%)
Diffusion Tube Mean ($\mu\text{g}/\text{m}^3$)	32.8
Mean CV (Precision)	3.9%
Automatic Mean ($\mu\text{g}/\text{m}^3$)	20.9
Data Capture	100%
Adjusted Tube Mean ($\mu\text{g}/\text{m}^3$)	21 (19 - 23)
Overall Diffusion Tube Precision	Good Overall Precision
Overall Continuous Monitor Data Capture	Good Overall Data Capture
Combined Local Bias Adjustment Factor	0.64

Notes:

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

Appendix B: Non-Automatic Nitrogen Dioxide Diffusion Tube monitoring site details.

