

2024

Air Quality Updating and Screening Assessment

In fulfilment of Environment
(Northern Ireland) Order 2002
Local Air Quality Management

June 2024



**Mid & East
Antrim**
Borough Council

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Executive Summary

Mid and East Antrim Borough Council (MEABC) has completed this 2024 Updating and Screening Assessment in accordance with the provisions of the Environment (Northern Ireland) Order 2002, the Northern Ireland Local Air Quality Management Technical Guidance document (TG22) and associated tools.

In completing this Updating and Screening Assessment, we have undertaken a review of potentially significant sources of air pollution across the Borough in order to identify new sources, sources with increased emissions and locations close to air pollution sources where public exposure did not previously exist.

We have completed a review of recent ambient air quality monitoring data for the Borough in order to identify locations where new or existing exceedances of Air Quality Strategy objectives and European Commission limit values are occurring.

Mid and East Antrim Borough Council currently have two declared Air Quality Management Areas (AQMA) enacted due to exceedances of the AQS objectives for Nitrogen Dioxide (NO₂) and Particulate Matter (PM₁₀):

- Ballymena Ballykeel AQMA - PM₁₀
- Ballymena Linenhall Street AQMA - NO₂

Monitoring of NO₂, PM₁₀ and SO₂ is completed across Mid and East Antrim Borough Council by two automatic monitoring sites and a network of passive NO₂ diffusion tubes.

This report confirms that the results from automatic NO₂, PM₁₀ and SO₂ monitoring within the Mid and East Antrim Borough Council area during 2023 showed that all NO₂, PM₁₀ and SO₂ AQS objectives were met at the Ballymena Ballykeel monitoring site, located within the Ballykeel AQMA, and all NO₂ AQS objectives were met at the Ballymena Antrim Road monitoring site.

The annual mean NO₂ concentrations have remained constant at Ballymena Ballykeel site while at Ballymena Antrim Road site they have decreased slightly since the previous year, showing levels comparable with 2020 levels, during the period when the government had issued strict travel restrictions. Overall, NO₂ concentrations have been showing a declining trend over the past five years, a possible reflection of the pandemic-driven shifts towards hybrid working and the transition from diesel to electric or hybrid vehicles.

The 2023 monitoring data has been analysed for all 37 passive NO₂ diffusion tube locations within the Mid and East Antrim Borough Council area and the results show that the annual mean NO₂ AQS objective was met at all monitoring locations. NO₂ concentrations at diffusion tube monitoring sites in 2023 are all lower than pre-covid concentrations, when the Government guidance imposed strict travel restrictions as a result of the Covid pandemic in 2020. Annual mean NO₂ concentrations at the majority of the monitoring sites fluctuate around last year's levels with the exception of BDT07 (George Street) which is located on the boundary of the existing Ballymena Linenhall Street AQMA (declared for NO₂ exceedances) has fallen to 35.3 µg/m³, a 4.7 µg/m³ decrease from 2022 and BDT15 (Linenhall Street), which is located within the existing Ballymena Linenhall Street AQMA, has increased by 0.8 µg/m³ from 2022 levels. It is recommended that monitoring is continued at these sites.

The monitoring results for PM₁₀ within the Ballymena Ballykeel AQMA remain well below the Air Quality Strategy objective for Particulate Matter. It is recommended to revoke the Ballymena Ballykeel AQMA as no exceedances of PM₁₀ AQS objectives have been identified at the automatic monitoring site within this AQMA since monitoring commenced in 2015 and levels remain well below the objective target values.

The 2023 monitoring data shows compliance with the air quality objectives at monitoring sites within the borough including within the two declared AQMA's and that there is no need to proceed to a detailed assessment based on the 2023 monitoring data.

This 2024 Updating and Screening Assessment has identified that there is a need to proceed to a detailed assessment for potential exceedances of nitrogen dioxide (NO₂) and particulate matter (PM₁₀) AQS objectives, in relation to the newly identified source: St. Patrick's Barracks Link Road, Ballymena.

The proposed actions from the Mid and East Antrim 2024 Updating and Screening Assessment are as follows:

- Continue to undertake both automatic (NO₂, PM₁₀, PM_{2.5} and SO₂) and passive (NO₂) monitoring within the Borough to identify future trends in concentration and any exceedances of the AQS objectives.
- The Ballymena Linenhall Street AQMA to be retained and passive NO₂ monitoring will continue at diffusion tube site BDT15 (Linenhall Street) to assess the need for retention of this AQMA.
- Passive NO₂ monitoring to be continued at diffusion tube site BDT07 (George Street) to assess the need for the boundaries of the Ballymena Linenhall Street AQMA to be altered.
- Recommend that the Ballymena Ballykeel AQMA is revoked. Progress to a Detailed Assessment in relation to revoking this declared AQMA for exceedances of the particulate matter (PM₁₀) AQS objective.
- Progress to Detailed Assessment for potential exceedances of the nitrogen dioxide (NO₂) and particulate matter (PM₁₀) AQS objectives in relation to the newly identified road source: St. Patrick's Barrack Link Road, Ballymena.
- Review of 2024 diffusion tube monitoring data with the view to assessing the need for existing diffusion tube monitoring sites throughout the Borough and/or the re-location of diffusion tube sites.
- Continue to gather emissions information for identified new local developments potential sources to determine the impact upon local air quality.
- Continue to examine all planning applications within the Borough to ensure compliance with Air Quality Strategy objectives.
- Submit the 2025 Progress Report.

Table of Contents

Executive Summary	1
1 Introduction	1
1.1 Description of Local Authority Area	1
1.2 Purpose of Report.....	2
1.3 Air Quality Objectives.....	3
1.4 Summary of Previous Review and Assessments	4
2 New Monitoring Data	7
2.1 Summary of Monitoring Undertaken.....	7
2.1.1 Automatic Monitoring Sites	7
2.1.2 Non-Automatic Monitoring Sites	10
2.2 Comparison of Monitoring Results with Air Quality Objectives	14
2.2.1 Nitrogen Dioxide (NO ₂)	14
2.2.2 Particulate Matter (PM ₁₀)	27
2.2.3 Sulphur Dioxide (SO ₂).....	30
2.2.4 Benzene	31
2.2.5 Other pollutants monitored.....	31
2.2.6 Summary of Compliance with AQS Objectives.....	32
3 Road Traffic Sources	33
3.1 Narrow Congested Streets with Residential Properties Close to the Kerb.....	33
3.2 Busy Streets Where People May Spend 1 hour or More Close to Traffic	33
3.3 Roads with a High Flow of Buses and/or HGVs.....	33
3.4 Junctions	33
3.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment.....	33
3.6 Roads with Significantly Changed Traffic Flows.....	34
3.7 Bus and Coach Stations	34
4 Other Transport Sources	35
4.1 Airports	35
4.2 Railways (Diesel and Stream Trains).....	35
4.2.1 Stationary Trains	35
4.2.2 Moving Trains.....	35
4.3 Ports	35
5 Industrial Sources	36
5.1 Industrial Installations	36
5.1.1 New or Proposed Installations for which an Air Quality Assessment has been Carried Out	36
5.1.2 Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been Introduced	36
5.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment.....	36

5.2	Major Fuel Depots	36
5.3	Petrol Stations	36
5.4	Poultry Farms	36
6	Commercial and Domestic Sources	37
6.1	Biomass Combustion – Individual Installations	37
6.2	Biomass Combustion – Combined Impacts.....	37
6.3	Domestic Solid Fuel Burning.....	37
7	Fugitive or Uncontrolled Sources	38
8	Conclusions and Proposed Actions.....	39
8.1	Conclusions from New Monitoring Data	39
8.2	Conclusions from Assessment of Sources	40
8.3	Proposed Actions.....	40
9	References	42
	Appendices	43
	Appendix A: Maps of Non-Automatic Monitoring Sites within Mid and East Antrim Borough Council.....	44
	Appendix B Quality Assurance / Quality Control (QA/QC) Data	51
	QA/QC of Diffusion Tube Monitoring	51
	Diffusion Tube Annualisation.....	51
	Diffusion Tube Bias Adjustment Factors	51
	NO ₂ Fall-off with Distance from the Road.....	52
	QA/QC of Automatic Monitoring	53
	PM ₁₀ and PM _{2.5} Monitoring Adjustment	55
	Automatic Monitoring Annualisation	55
	NO ₂ Fall-off with Distance from the Road.....	55
	Appendix C: Diffusion Tube Monitoring Data	51

Figures

Figure 1.1 – Map showing location of MEABC within Northern Ireland.....	1
Figure 1.2 – Map of Mid and East Antrim Borough Boundaries.....	2
Figure 1.3 – Map of Ballymena Ballykeel AQMA.....	6
Figure 1.4 – Map of Ballymena Linenhall Street AQMA.....	6
Figure 2.1 – Location of Ballymena Ballykeel Automatic Monitoring Site.....	8
Figure 2.2 – Location of Ballymena Antrim Road Automatic Monitoring Site.....	8
Figure 2.3 – Annual Mean NO ₂ Concentrations at Automatic Monitoring Sites 2019-2023.....	16
Figure 2.4 – Trends in Annual Mean NO ₂ Concentrations at Ballymena Diffusion Tube Sites.....	24
Figure 2.5 – Trends in Annual Mean NO ₂ Concentrations at Carrickfergus Diffusion Tube Sites.....	25
Figure 2.6 – Trends in Annual Mean NO ₂ Concentrations at Larne Diffusion Tube Sites.....	26
Figure 2.7 – Trends in Annual Mean PM ₁₀ Concentrations.....	29
Figure 2.8 – Trends in PAH (Benzo(a)pyrene) Concentrations 2019-2023.....	32
Figure B.1 – National bias adjustment factor calculation.....	52

Tables

Table 1.1 – Air Quality Objectives included in Regulation	3
Table 1.2 – Summary of Mid and East Antrim Borough Council Previous Review and Assessment Reports..	5
Table 2.1 – Details of Automatic Monitoring Sites.....	9
Table 2.2 – Details of Non-Automatic Monitoring Sites.....	11
Table 2.3 – Results of Automatic Monitoring for NO ₂ : Comparison with Annual Mean Objective.....	15
Table 2.4 – Results of Automatic Monitoring for NO ₂ : Comparison with 1-hour Mean Objective.....	15
Table 2.5 – Results of NO ₂ Diffusion Tubes 2023.....	19
Table 2.6 – Results of NO ₂ Diffusion Tubes (2019 to 2023)	22
Table 2.7 – Results of Automatic Monitoring for PM ₁₀ : Comparison with Annual Mean Objective.....	28
Table 2.8 – Results of Automatic Monitoring for PM ₁₀ : Comparison with 24-Hour Mean Objective.....	28
Table 2.9 – Results of Automatic Monitoring for SO ₂ : Comparison with AQS Objectives.....	30
Table 2.10 – Results for PAH (Benzo(a)pyrene) 2019-2023.....	31
Table B.1 – Bias adjustment factor	52

1 Introduction

1.1 Description of Local Authority Area

Mid and East Antrim Borough Council (MEABC) was established on the 1st of April 2015 through the merging of three separate Boroughs: Ballymena Borough Council, Carrickfergus Borough Council and Larne Borough Council, following Local Government reorganisation in Northern Ireland. Mid and East Antrim is located within County Antrim along the eastern coast from Greenisland in the south, to north of Carnlough and stretching west to bound with Lough Beg. The Borough covers an area just over 400 square miles with the main settlements being Ballymena to the West, Larne to the East, and Carrickfergus to the Southeast. It has a population of over 139,000 people.

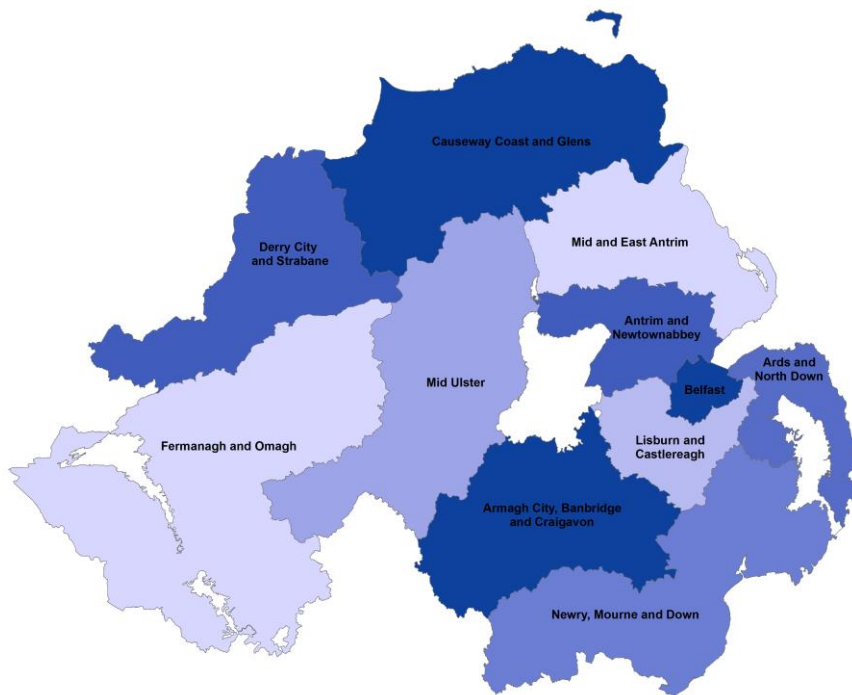


Figure 1.1 - Map showing location of MEABC within Northern Ireland



Figure 1.2 - Map of Mid and East Antrim Borough Boundaries

The main source of air pollution within the Borough is from road traffic, with good road links to Belfast and its two associated airports and also to the seaports of Larne and Belfast. A number of homes within the Borough continue to burn solid fuel although this number has declined over the years due to the arrival of Phoenix piped natural gas and the Northern Ireland Housing Executive home improvement schemes.

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 $\mu\text{g}/\text{m}^3$ (milligrammes 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 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004

	0.25µg/m ³	Annual mean	31.12.2008
Nitrogen dioxide	200µg/m ³ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40µg/m ³	Annual mean	31.12.2005
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

Mid and East Antrim Borough Council was formed on 1st April 2015 comprised of the former Ballymena, Larne and Carrickfergus Borough Councils. The 2015 Updating and Screening Assessment was the first air quality report produced for this new geographical area. Included in Table 1.2 below are summaries of the reviews and assessments completed since that time. Previous reports submitted by Larne Borough Council and Carrickfergus Borough Council showed that air quality objectives had been met, that no detailed assessments were required and no AQMA's had been declared. Previous reports submitted by Ballymena Borough Council highlighted that three AQMA's had been declared in relation to the exceedance of the Nitrogen Dioxide (NO₂) and Particulate Matter (PM₁₀) air quality objectives. Ballymena Dunclug AQMA was declared in 2004 for the exceedance of PM₁₀ however has since been revoked in 2011. Ballymena Ballykeel AQMA, shown in Figure 1.3, was declared in 2004 in respect of PM₁₀ concentrations predicted by domestic fuel modelling exceeding the AQS annual mean objective and Ballymena Linenhall Street AQMA shown in Figure 1.4, was declared in 2010 due to modelled and monitored concentrations of NO₂ exceeding the AQS annual mean objective, both these AQMA's are currently in force.

Table 1.2 Summary of Mid and East Antrim Borough Council Previous Review and Assessment Reports

Previous Assessment	Date completed	Summarised Outcomes
LAQM Updating and Screening Assessment 2015	August 2015	Exceedance of NO ₂ annual mean AQS objective within Linenhall Street AQMA. No detailed assessment required for any of the seven pollutants. Ballykeel and Linenhall Street AQMAs to remain. Monitoring of SO ₂ , NO ₂ and PM ₁₀ to continue.
LAQM Annual Progress Report 2016	November 2016	Exceedance of NO ₂ annual mean AQS objective within Linenhall Street AQMA. SO ₂ and PM ₁₀ objectives met. No requirement for detailed assessment.
LAQM Annual Progress Report 2017	August 2017	Exceedance of NO ₂ annual mean AQS objective within Linenhall Street AQMA. SO ₂ and PM ₁₀ objectives met. No requirement for detailed assessment.
LAQM Updating and Screening Assessment 2018	November 2018	Renewal of Detailed assessment for NO ₂ . Exceedance of NO ₂ annual mean AQS objective within Linenhall Street AQMA. Monitoring of SO ₂ , NO ₂ , PM ₁₀ to continue. Some relocation of NO ₂ tubes required.
LAQM Annual Progress Report 2019	August 2019	Exceedance of NO ₂ annual mean AQS objective within Linenhall Street AQMA. SO ₂ and PM ₁₀ objectives met. No requirement for detailed assessment.
LAQM Annual Progress Report 2020	August 2020	Exceedance of NO ₂ annual mean AQS objective within Linenhall Street AQMA. SO ₂ and PM ₁₀ objectives met. No requirement for detailed assessment.
LAQM Updating and Screening Assessment 2021	November 2021	No further detailed assessments required for any pollutants. No exceedances of NO ₂ , SO ₂ and PM ₁₀ AQS objectives. Ballykeel and Linenhall Street AQMAs to remain. Monitoring of NO ₂ , SO ₂ and PM ₁₀ to continue.
LAQM Annual Progress Report 2022	June 2022	No further detailed assessments required for any pollutants. No exceedance of NO ₂ , SO ₂ and PM ₁₀ AQS objectives. Ballykeel and Linenhall Street AQMAs to remain. Monitoring of NO ₂ , SO ₂ and PM ₁₀ to continue.
LAQM Annual Progress Report 2023	November 2023	No further detailed assessments required for any pollutants. No exceedance of NO ₂ , SO ₂ and PM ₁₀ AQS objectives. Ballykeel and Linenhall Street AQMAs to remain. Monitoring of NO ₂ , SO ₂ and PM ₁₀ to continue.

Figure 1.3 Map of Ballymena Ballykeel AQMA declared for PM₁₀, showing location of Automatic Analyser, which is part of AURN Network

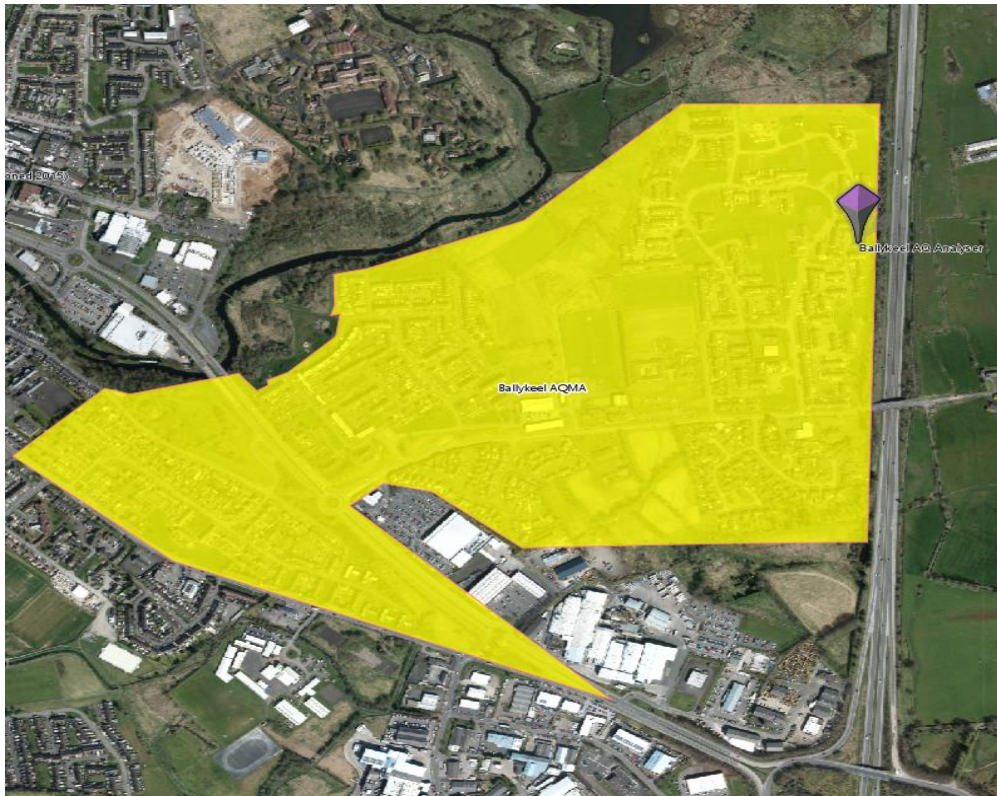


Figure 1.4 Map of Ballymena Linenhall Street AQMA, declared for NO₂



2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Mid and East Antrim Borough Council has two automatic monitoring sites:

- **Ballymena Ballykeel**

This is a long established, part of the DEFRA AURN Network, urban background monitoring site and is located within the Ballymena Ballykeel AQMA declared for PM₁₀.

- Concentrations of Sulphur Dioxide (SO₂) are continuously monitored using a real time ultraviolet fluorescent SO₂ analyser.
- Concentrations of Particulate Matter (PM₁₀) are continuously monitored using a FIDAS analyser, enabling monitoring of PM₁₀ and PM_{2.5} concentrations.
- A real time NO_x chemiluminescence analyser continuously monitors concentrations of Nitrogen Oxide (NO), Nitrogen Oxides (NO_x) and Nitrogen Dioxide (NO₂).
- Also located at this site is a DEFRA PAH and black carbon monitor.

- **Ballymena Antrim Road**

Ballymena Antrim Road site was installed in 2017 as part of an expansion of the DEFRA UK Automatic Urban and Rural Network (AURN) in compliance with the UK's monitoring requirements to comply with The Ambient Air Quality Directive 2008/50/EC.

- This is an urban roadside real-time NO_x chemiluminescence analyser continuously monitoring concentrations of Nitrogen Oxide (NO), Nitrogen Oxides (NO_x) and Nitrogen Dioxide (NO₂).
- A co-location study for the NO₂ diffusion tubes is also located at this site.

Table 2.1 provides further details on both automatic monitoring sites within the Borough and their locations are shown in Figures 2.1 and 2.2. Figure 1.3 also shows the location of the Ballymena Ballykeel monitoring site in relation to the Ballymena Ballykeel AQMA. Data management/auditing details for the analysers are included in Appendix B.

Figure 2.1 Location of Ballymena Ballykeel Automatic Monitoring Site



Figure 2.2 Location of Ballymena Antrim Road Automatic Monitoring Site



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?
BALY	Ballymena Ballykeel	Urban Background	312365	402940	3.0	PM ₁₀ SO ₂ NO ₂	Y Ballymena Ballykeel AQMA	FIDAS (Fine Dust Analysis System) Fluorescent Chemiluminescence	Y (11m)	N/A	N
BAAR	Ballymena Antrim Road	Urban Traffic	310843	401776	1.5	NO ₂	N	Chemiluminescence	Y (9m)	4.3	Y

2.1.2 Non-Automatic Monitoring Sites

In 2023, Mid and East Antrim Borough Council had 37 sites monitored with 41 passive NO₂ diffusion tubes. Details of the monitoring network are provided in Table 2.2 and maps showing the locations of these sites are shown in Appendix A.

29 of these sites are roadside/kerbside, being located on arterial routes within the three main towns of the borough: Ballymena, Carrickfergus and Larne. There are also 5 urban background monitoring sites.

A triplicate set of NO₂ diffusion tubes are co-located with the automatic NO_x analyser at the Ballymena Antrim Road site. In addition, there are two sets of duplicate diffusion tubes located at 55 Shore Road, Greenisland and Model PS Belfast Road, Carrickfergus.

Table 2.2 Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Site Height (m)	Pollutants Monitored	In AQMA? Which AQMA?	Is monitoring co-located with a Continuous Analyser (Y/N)	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?
BDT01	Leighinmohr Ave, Ballymena	Urban Background	310228	402546	4.0	NO ₂	N	N	Y (5.5)	N/A	N
BDT02	Galgorm Rd, Ballymena	Kerbside	310336	403196	3.0	NO ₂	N	N	Y (1.0)	1.8	Y
BDT03	Main St, Cullybackey	Kerbside	305841	405690	3.0	NO ₂	N	N	Y (1.0)	1.0	Y
BDT04	Cullybackey Rd, Ballymena	Kerbside	310350	403443	4.0	NO ₂	N	N	Y (11.6)	2.3	Y
BDT05	Larne St, Ballymena	Kerbside	310602	402920	4.0	NO ₂	N	N	Y (6.2)	3.2	Y
BDT06	Ballyloughan Ave, Ballymena	Urban Background	309532	404425	3.0	NO ₂	N	N	N	N/A	N
BDT07	George St, Ballymena	Kerbside	310584	403239	3.0	NO ₂	N	N	Y (0)	1.7	Y
BDT08	Wellington St, Ballymena	Kerbside	310795	403386	3.0	NO ₂	N	N	Y (0)	1.7	Y
BDT09	Ballymoney St, Ballymena	Kerbside	310796	403582	3.0	NO ₂	N	N	Y (0)	3.7	Y
BDT10	Parkway, Ballymena	Kerbside	311000	403905	4.0	NO ₂	N	N	Y (1.0)	1.5	Y
BDT11	Lisnevenagh Rd, Ballymena	Roadside	311884	397037	4.0	NO ₂	N	N	Y (38.0)	2.6	Y
BDT12	Queen St, Ballymena	Kerbside	310743	402219	4.0	NO ₂	N	N	Y (0)	2.5	Y
BDT13	North Road, Ballymena	Roadside	310638	403079	2.0	NO ₂	N	N	Y (7.0)	5.0	Y
BDT15	Linenhall St, Ballymena	Kerbside	310687	403122	3.0	NO ₂	Y Ballymena Linenhall St AQMA	N	Y (0)	1.2	Y

BDT16	Bridge St, Ballymena	Kerbside	310710	403119	3.0	NO ₂	N	N	Y (14.0)	3.0	Y
BDT17	Galgorm Rd, Ballymena	Kerbside	310491	403314	4.0	NO ₂	N	N	Y (13.0)	3.5	Y
BDT18	Antrim Rd, Ballymena	Roadside	310843	401776	1.6	NO ₂	N	Co Located Antrim Rd	Y (8.8)	4.3	Y
BDT18A	Antrim Rd, Ballymena	Roadside	310843	401776	1.6	NO ₂	N	Co Located Antrim Rd	Y (8.8)	4.3	Y
BDT18B	Antrim Rd, Ballymena	Roadside	310843	401776	1.6	NO ₂	N	Co Located Antrim Rd	Y (8.8)	4.3	Y
CDT01	27 Upper Rd, Greenisland	Roadside	336388	385733	3.0	NO ₂	N	N	Y (1.0)	2.0	Y
CDT02	32 Mullaghmore Pk, Greenisland	Urban Background	336901	385621	2.0	NO ₂	N	N	N	N/A	N
CDT03 (Duplicate)	55 Shore Rd, Greenisland	Roadside	337882	384850	3.0	NO ₂	N	N	Y (14.0)	3.0	Y
CDT04 (Duplicate)	55 Shore Rd, Greenisland	Roadside	337882	384850	3.0	NO ₂	N	N	Y (14.0)	3.0	Y
CDT05	Seapark R'about, Carrickfergus	Roadside	338747	385764	3.0	NO ₂	N	N	Y (58.0)	1.0	Y
CDT06	93 Belfast Rd, Carrickfergus	Roadside	339915	386731	2.0	NO ₂	N	N	Y (0)	1.7	Y
CDT07 (Duplicate)	Model PS Belfast Rd, Carrickfergus	Roadside	340798	387122	2.0	NO ₂	N	N	Y (0)	3.0	Y
CDT08 (Duplicate)	Model PS Belfast Rd, Carrickfergus	Roadside	340798	387122	2.0	NO ₂	N	N	Y (0)	3.0	Y
CDT09	Minorca Pl/ Tesco Jct, Carrickfergus	Roadside	340898	387391	3.0	NO ₂	N	N	Y (3.0)	2.5	Y
CDT10	42 Albert Rd Carrickfergus	Roadside	341192	387556	3.0	NO ₂	N	N	Y (0)	1.0	Y
CDT11	Fergus Ave, Carrickfergus	Railway	341200	387723	3.0	NO ₂	N	N	Y (39.0)	2.0	Y
CDT12	North Road, Carrickfergus	Roadside	341065	388892	3.0	NO ₂	N	N	Y (3.0)	2.0	Y
CDT13	Victoria Rd/Larne Rd Jct, C'fergus	Roadside	342388	388154	3.0	NO ₂	N	N	Y (0)	2.0	Y

CDT14	Islandmagee Rd, Whitehead	Roadside	347333	392459	3.0	NO ₂	N	N	Y (10.0)	1.9	Y
LDT01	Antville Rd/A8 Jct, Larne	Roadside	338658	402187	3.0	NO ₂	N	N	Y (45.0)	4.0	Y
LDT02	Latharna House, Larne	Urban Background	339815	402444	3.0	NO ₂	N	N	Y (9.0)	N/A	N
LDT03	Main St, Larne	Urban Centre	340093	402590	3.0	NO ₂	N	N	Y (0)	N/A	N
LDT04	1 Old Glenarm Rd, Larne	Kerbside	340346	402845	4.0	NO ₂	N	N	Y (1.0)	2.4	Y
LDT05	Upper Caincastle Rd, Larne	Kerbside	339212	403188	3.0	NO ₂	N	N	Y (1.0)	1.5	Y
LDT06	Larne Harbour R'about, Larne	Roadside	341246	401970	3.0	NO ₂	N	N	Y (11.0)	5.6	Y
LDT07	Coastguard Rd/Castle Ter, Larne	Urban Background	341321	401696	3.0	NO ₂	N	N	Y (1.0)	N/A	N
LDT08	Ballylumford Rd, Islandmagee	Industrial	342069	402090	3.0	NO ₂	N	N	Y (9.0)	N/A	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide (NO₂)

There are two AQS objectives for NO₂, namely:

- The annual mean of 40 µg/m³ and
- The 1-hour mean of 200 µg/m³ not to be exceeded more than 18 times per year.

Results of the NO₂ monitoring within the borough at the automatic and diffusion tube sites for 2023 have been compared with the objectives.

2.2.1.1 Automatic Monitoring Data

Within the monitoring period of 2023, there was an urban background automatic NO₂ analyser at Ballymena Ballykeel and a roadside automatic NO₂ analyser at Ballymena Antrim Road. Both of these analysers are part of DEFRA operated AURN network. Table 2.3 and Figure 2.3 present the annual mean concentrations of NO₂ determined at the automatic sites from 2019 to 2023. Results from both automatic monitoring sites are also compared with the 1-hour mean objective in Table 2.4. Full details of the QA/QC procedures for the automatic monitors are provided in Appendix B. Data capture was above 75% at the automatic monitoring sites during 2023, therefore annualisation was not required at any site.

The results for 2023 indicate that both the AQS annual mean and hourly mean objectives were met at Ballymena Ballykeel and Ballymena Antrim Road sites and there have been no exceedances of the AQS annual mean objectives in the previous five years of monitoring. The annual mean NO₂ concentrations have remained constant at Ballymena Ballykeel while at Ballymena Antrim Road site they have decreased slightly since the previous year, showing levels comparable with 2020 levels, during the period when the government had issued strict travel restrictions. Overall, NO₂ concentrations have been showing a declining trend over the past five years, a possible reflection of the change in work patterns as a result of the Covid pandemic, with an increase in hybrid working practices.

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 %	Valid Data Capture 2023 %	2019	2020	2021	2022	2023
BALY (Ballymena Ballykeel)	Urban Background	Y Ballymena Ballykeel AQMA	94	94	14	10	11	10	10
BAAR (Ballymena Antrim Rd)	Roadside	N	97	97	21	16	17	16	15

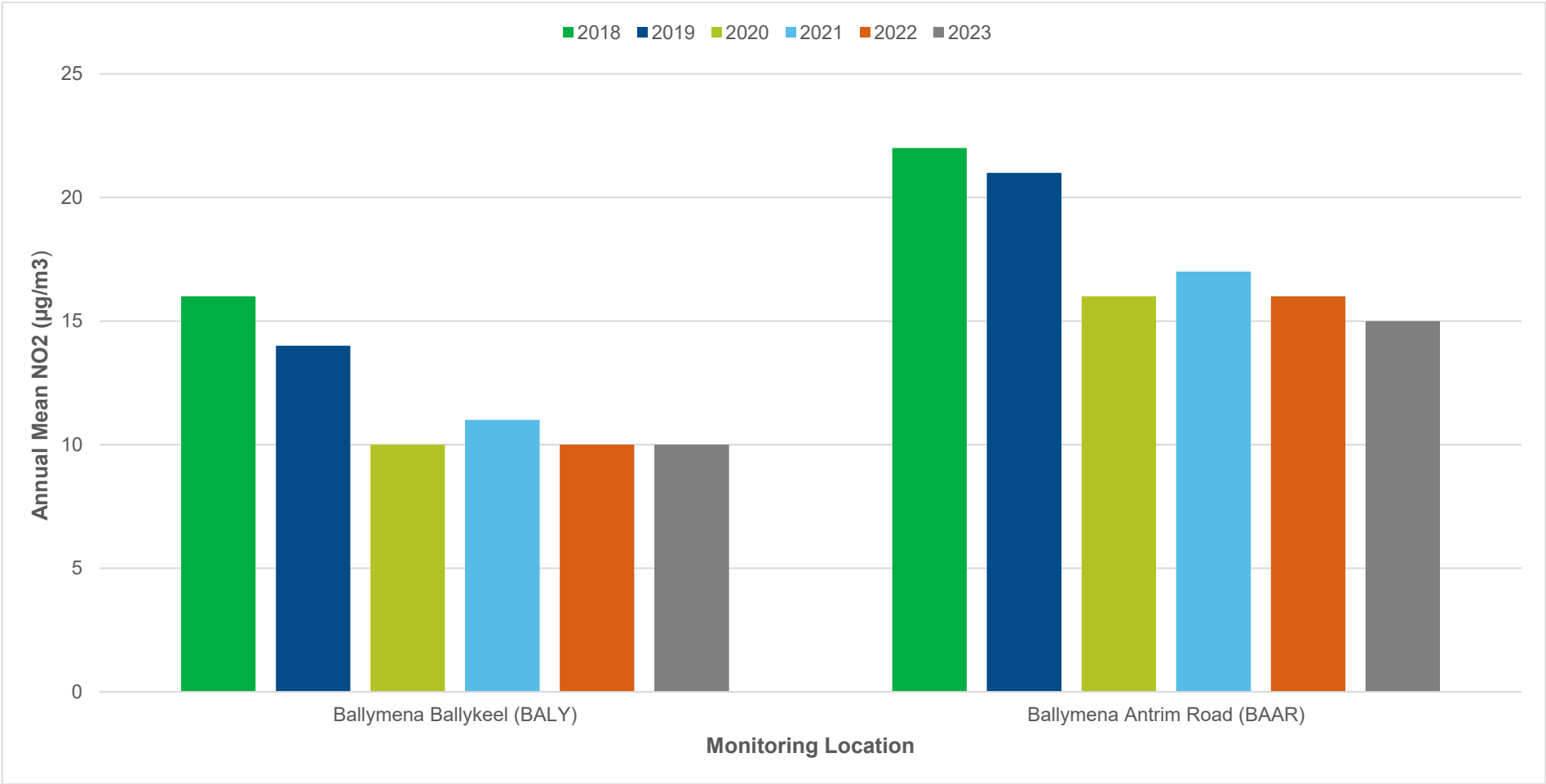
In **bold**, exceedance of the NO₂ annual mean AQS objective of 40µg/m³.

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 %	Valid Data Capture 2023 %	2019	2020	2021	2022	2023
BALY (Ballymena Ballykeel)	Urban Background	Y Ballymena Ballykeel AQMA	94	94	0	0	0	0	0
BAAR (Ballymena Antrim Rd)	Roadside	N	97	97	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)

Figure 2.2 Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Automatic Monitoring Sites



2.2.1.2 Diffusion Tube Monitoring Data

Diffusion tube data obtained for the year 2023 was supplied by Socotec, Diffusion Tube Laboratory, Didcot, the tubes were prepared using the 20% triethanolamine (TEA) in water preparation method. There were no monitoring locations where data capture was below 75% therefore no sites have been annualised. QA/QC details for diffusion tubes are provided within Appendix B.

It is necessary to apply a bias adjustment factor to NO₂ diffusion tube results. This is an estimate of the difference between diffusion tube concentration and continuous monitoring. Co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data from continuous NO_x analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

The national bias adjustment factor is calculated at 0.76 from the national database of diffusion tube co-location surveys, for Socotec 20% TEA diffusion tubes, based on 8 studies. This national bias factor has been used to adjust the diffusion tube results which is deemed representative. Further details of the national bias adjustment factor are provided in Appendix B.

The results of annual mean NO₂ concentrations measured using diffusion tubes in 2023 following bias adjustment are reported in Table 2.5. Monthly results of NO₂ concentrations in 2023 without bias adjustment are also provided in Appendix C.

The annual mean concentration results of NO₂ diffusion tube data (2019 - 2023) are presented in Table 2.6 and Figures 2.4 to 2.6 show the changing trends of annual mean NO₂ concentrations over the same time period.

The results of the diffusion tube data for 2023 show that there were no exceedances of the AQS NO₂ objectives. It is noted that the monitoring site BDT07 (George Street) which is located on the boundary of the existing Ballymena Linenhall Street AQMA, which is declared for NO₂ exceedances, has fallen to 35.3 µg/m³, a 4.7 µg/m³ decrease from 2022. It is observed that concentrations at the rest of the monitoring sites fluctuate around last year's levels however, the concentration levels at the BDT15 (Linenhall Street) diffusion tube site, which is located within the existing Ballymena Linenhall Street AQMA, have increased by 0.8 µg/m³ from 2022 levels.

NO₂ concentrations at diffusion tube monitoring sites in 2023 are all lower than pre-covid concentrations, when the Government guidance imposed strict travel restrictions as a result of the Covid pandemic in 2020.

There were no exceedances of the annual mean AQS objective which required NO₂ fall-off with distance calculations.

It is recommended that the Ballymena Linenhall Street AQMA remains as declared and passive monitoring of NO₂ levels continue, to assess if the existing boundaries of this AQMA require adjustment.

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 %)	2023 Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) - Bias Adjustment factor = 0.76
BDT01	Leighinmohr Ave, Ballymena	Urban Background	N	N	12 Months	8.4
BDT02	Galgorm Rd, Ballymena	Kerbside	N	N	11 Months	25.2
BDT03	Main St, Cullybackey	Kerbside	N	N	12 Months	16.8
BDT04	Cullybackey Rd, Ballymena	Kerbside	N	N	12 Months	19.8
BDT05	Larne St, Ballymena	Kerbside	N	N	11 Months	18.3
BDT06	Ballyloughan Ave, Ballymena	Urban Background	N	N	12 Months	7.4
BDT07	George St, Ballymena	Kerbside	N	N	12 Months	35.3
BDT08	Wellington St, Ballymena	Kerbside	N	N	11 Months	14.5
BDT09	Ballymoney St, Ballymena	Kerbside	N	N	11 Months	15.2
BDT10	Parkway, Ballymena	Kerbside	N	N	12 Months	20.4
BDT11	Lisnevenagh Rd, Ballymena	Roadside	N	N	12 Months	17.5
BDT12	Queen St, Ballymena	Kerbside	N	N	12 Months	21.2
BDT13	North Rd, Ballymena	Roadside	N	N	12 Months	20.7
BDT15	Linenhall St, Ballymena	Kerbside	Y Ballymena Linenhall St AQMA	N	12 Months	31.9
BDT16	Bridge St, Ballymena	Kerbside	N	N	12 Months	23.0
BDT17	Galgorm Rd, Ballymena	Kerbside	N	N	12 Months	28.2

BDT18	Antrim Rd, Ballymena	Roadside	N	Triplicate and Co-located	12 Months	-
BDT18A	Antrim Rd, Ballymena	Roadside	N	Triplicate and Co-located	12 Months	-
BDT18B	Antrim Rd, Ballymena	Roadside	N	Triplicate and Co-located	12 Months	15.6
CDT01	27 Upper Rd, Greenisland	Roadside	N	N	12 Months	13.1
CDT02	32 Mullaghmore Pk, Carrickfergus	Urban Background	N	N	12 Months	6.2
CDT03 (Duplicate)	Shore Rd, Carrickfergus	Roadside	N	N	11 Months	-
CDT04 (Duplicate)	Shore Rd, Carrickfergus	Roadside	N	N	12 Months	19.7
CDT05	Seapark Roundabout, Carrickfergus	Roadside	N	N	11 Months	9.0
CDT06	93 Belfast Rd, Carrickfergus	Roadside	N	N	12 Months	17.9
CDT07 (Duplicate)	Model PS Belfast Rd, Carrickfergus	Roadside	N	N	12 Months	-
CDT08 (Duplicate)	Model PS Belfast Rd, Carrickfergus	Roadside	N	N	12 Months	22.4
CDT09	Minorca PI/Tesco Jct, Carrickfergus	Roadside	N	N	12 Months	16.6
CDT10	42 Albert Rd Carrickfergus	Roadside	N	N	12 Months	14.3
CDT11	Fergus Ave, Carrickfergus	Railway	N	N	12 Months	10.4
CDT12	North Rd, Carrickfergus	Roadside	N	N	10 Months	12.8
CDT13	Victoria Rd/Larne Rd Jct, Carrickfergus	Roadside	N	N	12 Months	16.1
CDT14	Islandmagee Rd, Whitehead	Roadside	N	N	11 Months	8.3

LDT01	Antiville Rd/A8 Jct, Larne	Roadside	N	N	12 Months	15.2
LDT02	Latharna House, Larne	Urban Background	N	N	12 Months	8.9
LDT03	Main St, Larne	Urban Centre	N	N	12 Months	12.1
LDT04	1 Old Glenarm Rd, Larne	Kerbside	N	N	12 Months	17.8
LDT05	Upper Caincastle Rd, Larne	Kerbside	N	N	12 Months	12.2
LDT06	Larne Harbour Roundabout, Larne	Roadside	N	N	12 Months	11.1
LDT07	Coastguard Rd/Castle Ter, Larne	Urban Background	N	N	12 Months	6.1
LDT08	Ballylumford Rd, Islandmagee	Industrial	N	N	10 Months	7.3

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.

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

Site ID	Site Type	Within AQMA? Which AQMA?	2019 (Bias Adjustment Factor = 0.92)	2020 (Bias Adjustment Factor = 0.76)	2021 (Bias Adjustment Factor = 0.77)	2022 (Bias Adjustment Factor = 0.77)	2023 (Bias Adjustment Factor = 0.76)
BDT01	Urban background	N	11.0	7.47	8.2	8.3	8.4
BDT02	Kerbside	N	29.5	22.15	25.7	26.2	25.2
BDT03	Kerbside	N	21.5	14.93	17.1	17.3	16.8
BDT04	Kerbside	N	26.7	17.45	20.5	20.6	19.8
BDT05	Kerbside	N	23.6	16.18	18.1	19.2	18.3
BDT06	Urban background	N	9.2	6.41	7.8	7.5	7.4
BDT07	Kerbside	N	43.9	32.21	35.6	40.0	35.3
BDT08	Kerbside	N	21.9	13.33	13.2	13.9	14.5
BDT09	Kerbside	N	22.1	14.57	15.0	15.3	15.2
BDT10	Kerbside	N	26.7	18.07	19.9	21.2	20.4
BDT11	Roadside	N	27.1	17.19	20.7	17.1	17.5
BDT12	Kerbside	N	26.9	18.27	21.4	20.7	21.2
BDT13	Roadside	N	27.3	17.43	21.7	21.0	20.7
BDT15	Kerbside	Y Ballymena Linenhall St AQMA	44.1	32.79	33.4	31.1	31.9
BDT16	Kerbside	N	30.2	19.13	23.4	23.0	23.0
BDT17	Kerbside	N	34.5	23.88	30.6	28.8	28.2
BDT18	Roadside	N	22.2	15.34	17.2	15.9	15.6
BDT18A	Roadside	N	22.0	14.80	17.2	15.9	15.6
BDT18B	Roadside	N	22.1	14.87	17.2	15.9	15.6
CDT01	Roadside	N	17.6	13.76	15.1	11.9	13.1
CDT02	Urban background	N	12.9	7.22	7.4	6.7	6.2
CDT03	Roadside	N	26.8	21.22	20.8	22.4	19.7
CDT04	Roadside	N	24.7	19.71	20.8	22.4	19.7
CDT05	Roadside	N	26.7	10.22	8.8	9.3	9.0
CDT06	Roadside	N	26.1	17.90	21.7	18.5	17.9
CDT07	Roadside	N	30.1	18.95	23.1	22.5	22.4
CDT08	Roadside	N	27.6	20.49	23.1	22.5	22.4
CDT09	Roadside	N	24.4	16.99	16.4	17.0	16.6
CDT10	Roadside	N	21.8	14.60	15.2	15.8	14.3
CDT11	Roadside	N	11.8	11.59	10.9	12.1	10.4
CDT12	Roadside	N	17.9	10.79	14.2	13.7	12.8
CDT13	Roadside	N	23.1	15.09	17.5	18.2	16.1

CDT14	Roadside	N	15.6	8.20	9.9	9.3	8.3
LDT01	Roadside	N	22.8	14.36	17.3	16.8	15.2
LDT02	Urban background	N	13.8	9.33	9.9	9.3	8.9
LDT03	Kerbside	N	18.1	12.68	13.2	12.3	12.1
LDT04	Kerbside	N	19.8	15.05	18.5	19.4	17.8
LDT05	Kerbside	N	17.4	11.59	14.0	13.1	12.2
LDT06	Roadside	N	13.1	10.80	11.7	10.6	11.1
LDT07	Urban background	N	9.1	7.78	8.1	7.7	6.1
LDT08	Industrial	N	9.2	9.21	8.4	8.2	7.3

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.

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

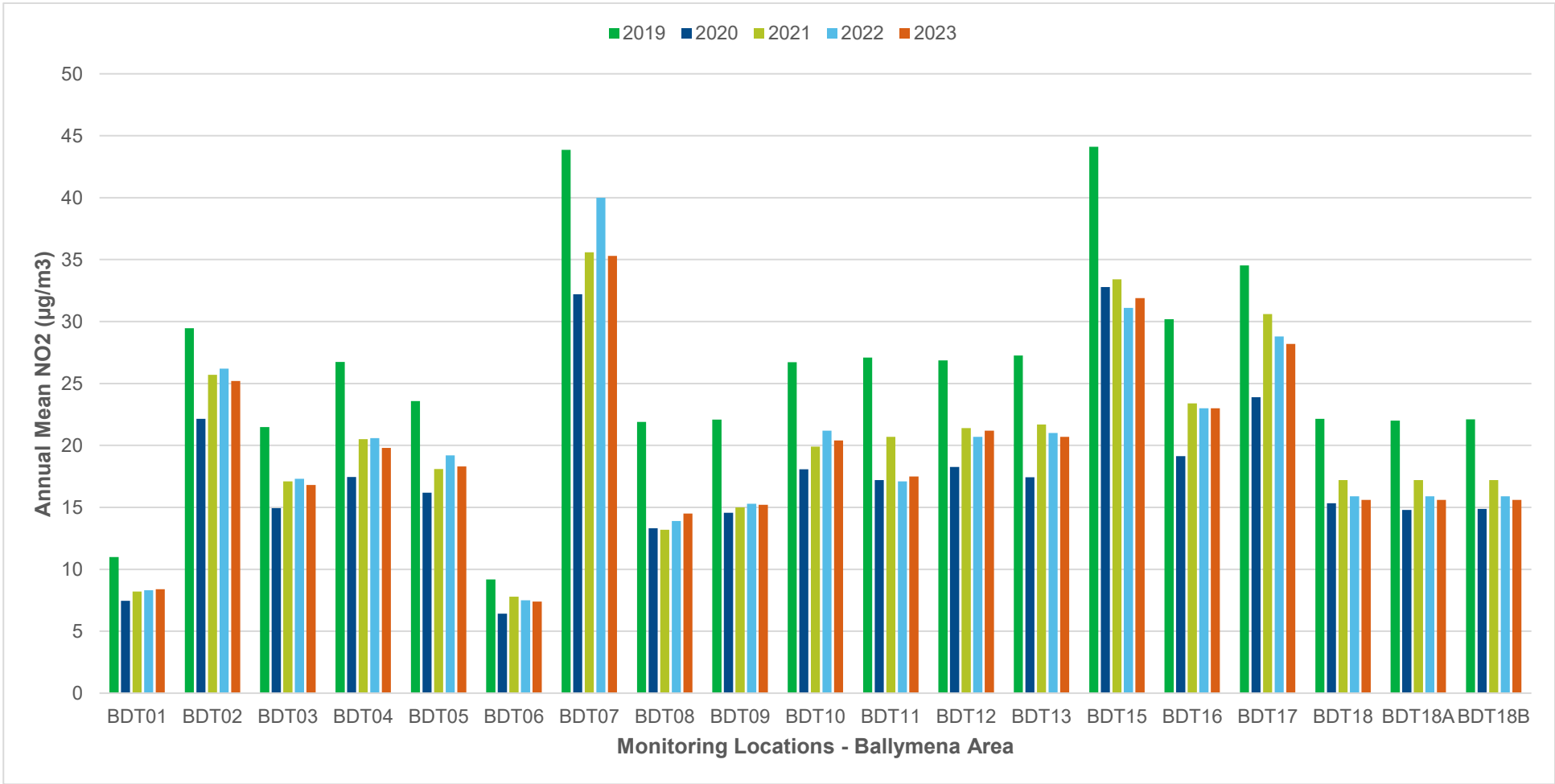


Figure 2.5 Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Carrickfergus Diffusion Tube Monitoring Sites

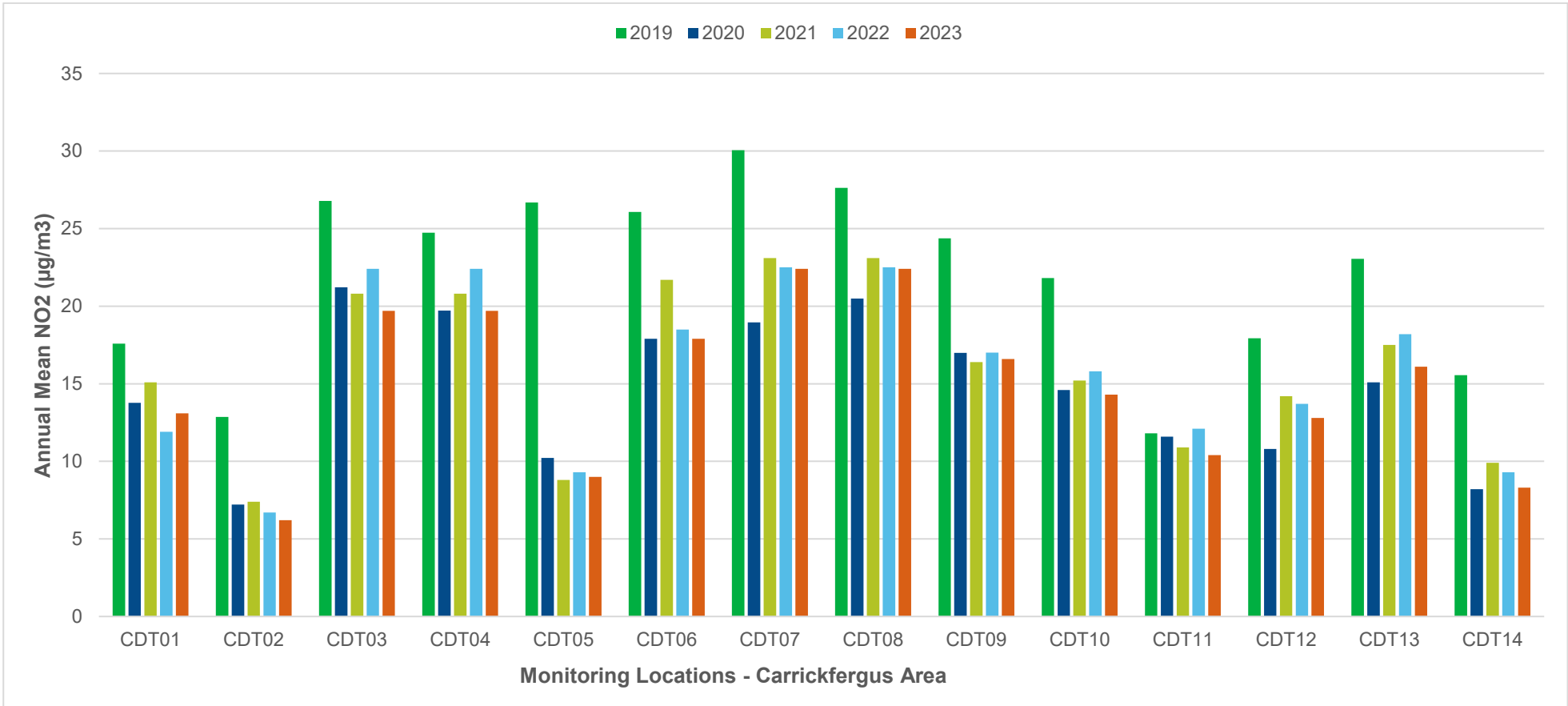
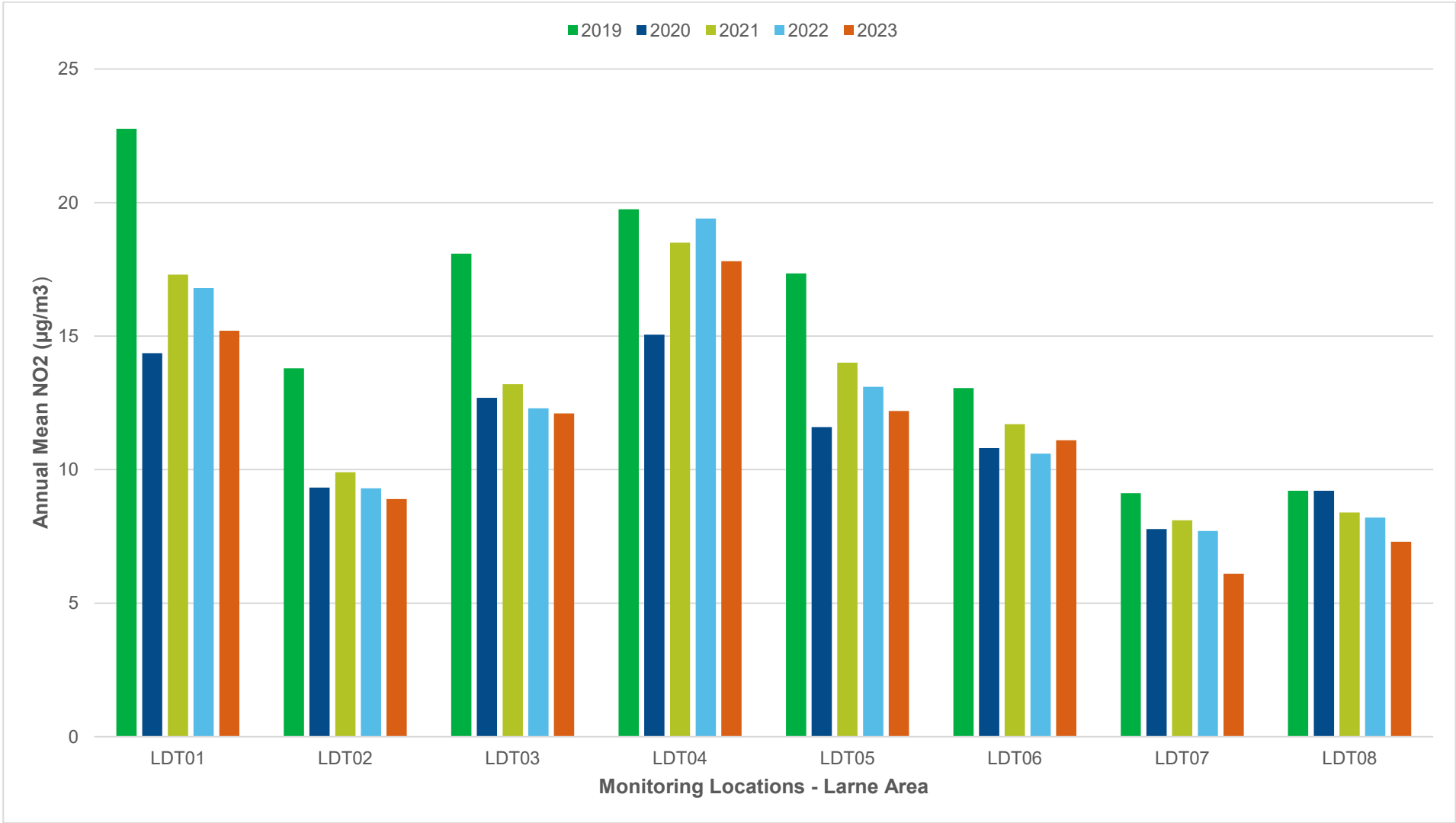


Figure 2.6 Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Larne Diffusion Tube Monitoring Sites



2.2.2 Particulate Matter (PM₁₀)

There are two AQS objectives for PM₁₀ namely:

- The annual mean of 40 µg/m³; and
- The 24-hour mean of 50 µg/m³ not to be exceeded more than 35 times a year.

Mid and East Antrim Borough Council continue to undertake real time monitoring of PM₁₀ at the urban background Ballymena Ballykeel automatic monitoring site, which is located within the existing Ballymena Ballykeel AQMA (declared for exceedances of PM₁₀). During 2023, monitoring was conducted using a FIDAS 200 real-time analyser, facilitating measuring of PM_{2.5} also. Full details of the QA/QC procedures are provided in Appendix B.

Comparison between the annual mean objective and the PM₁₀ Annual Mean concentration monitoring data for 2019 to 2023 is presented in Table 2.7. Annual mean PM₁₀ levels for 2023 have decreased since 2022, with no exceedance of the PM₁₀ annual mean AQS objective. Table 2.8 shows that there have been no exceedances of the 24-hour Mean AQS objective.

The trend graph presented as Figure 2.7 shows that 2023 concentrations have decreased since pre-Covid levels of 2019 and remain well below the annual mean objective. It is recommended to revoke the Ballymena Ballykeel AQMA as monitoring results have shown that the AQS objectives continue to be met since monitoring of PM₁₀ commenced in 2015 and remain well below the objective target values.

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
BALY (Ballymena Ballykeel)	Urban Background	Y Ballymena Ballykeel AQMA	99	99	Y	14.0	11.0	10.0	12.0	10.0

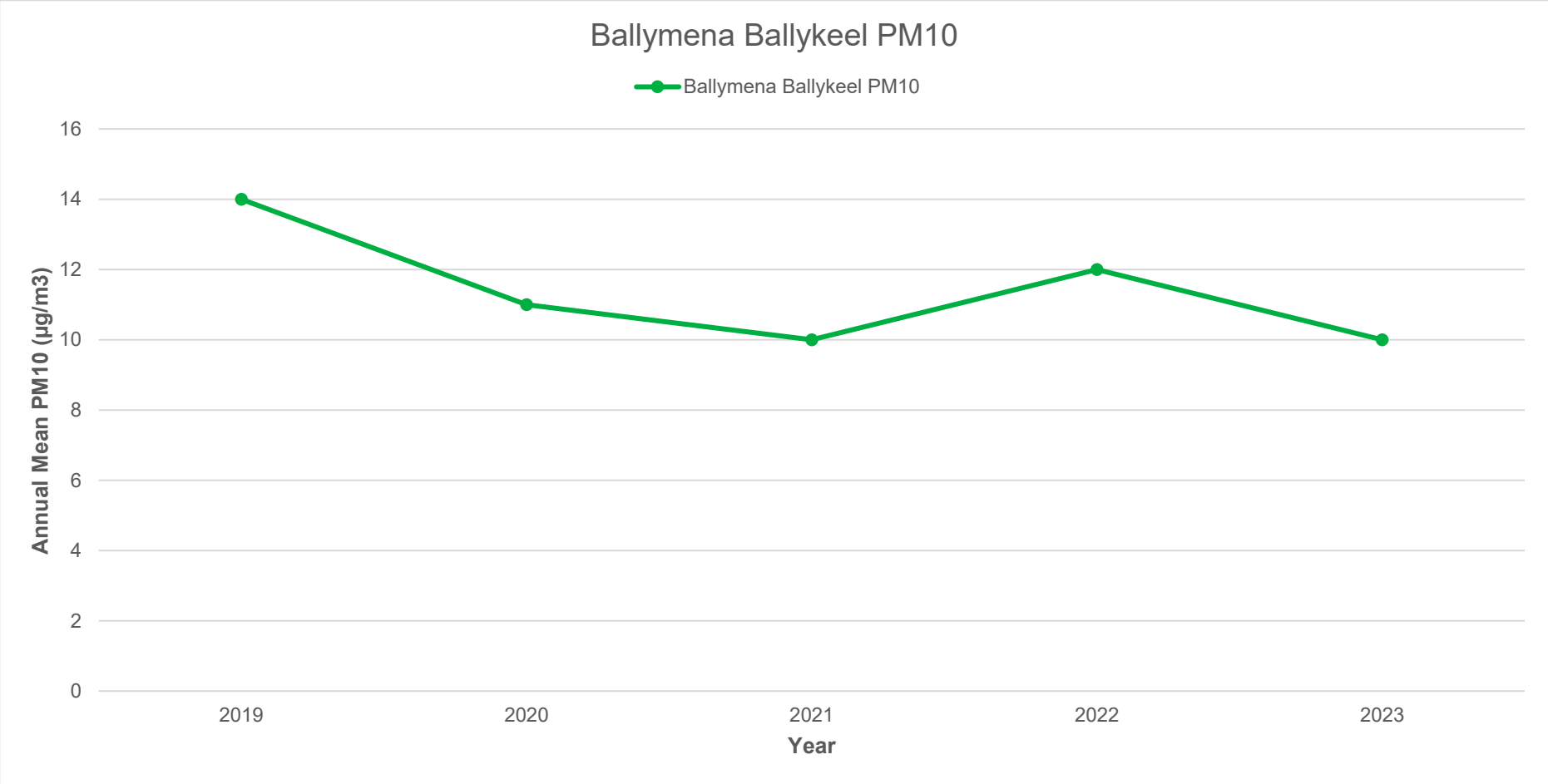
In **bold**, exceedance of the PM₁₀ annual mean AQS objective of 40µg/m³.

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 %	Valid Data Capture 2023 %	Confirm Gravimetric Equivalent	2019	2020	2021	2022	2023
BALY (Ballymena Ballykeel)	Urban Background	Y Ballymena Ballykeel AQMA	99	99	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).

Figure 2.7 Trends in Annual Mean PM₁₀ Concentrations



2.2.3 Sulphur Dioxide (SO₂)

There are three air quality objectives for Sulphur Dioxide, namely:

- the 1-hour mean of 350µg/m³, not to be exceeded more than 24 times a year,
- the 24-hour mean of 125µg/m³ not to be exceeded more than 3 times a year, and
- the 15-minute mean of 266µg/m³ not to be exceeded more than 35 times a year.

The 2023 SO₂ automatic monitoring data for Ballymena Ballykeel is presented in Table 2.9 and when compared with the relevant AQS objectives, all AQS objectives for SO₂ were met for 2023.

Table 2.9 Results of Automatic Monitoring of SO₂: Number of Exceedances of Objectives

Site ID	Site Type	Within AQMA? Which AQMA?	Valid Data Capture for monitoring Period %	Valid Data Capture 2023 %	15-minute Means > 266µg/m ³	1-hour Means > 350µg/m ³	24-hour Means > 125µg/m ³
BALY	Urban Background	Y Ballymena Ballykeel AQMA	87	87	0	0	0

In **bold**, exceedance of the relevant AQS objective (15-min mean = 35 allowed/year; 1-hour mean = 24 allowed/year; 24-hour mean = 3 allowed/year).

2.2.4 Benzene

No monitoring of Benzene has been carried out within Mid and East Antrim Borough Council. All submitted planning applications are reviewed and no significant changes have been identified requiring further assessment of Benzene.

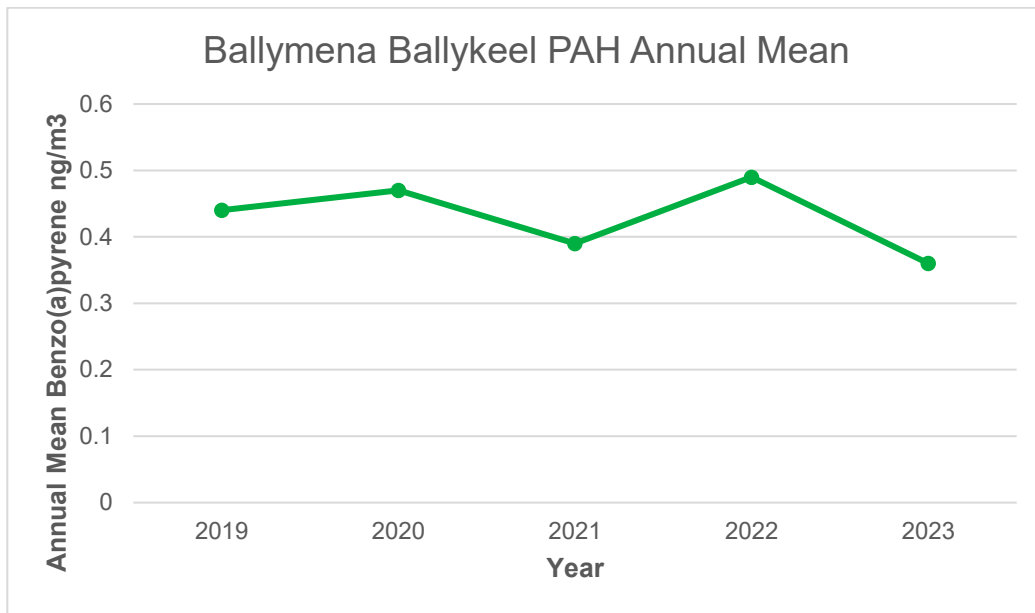
2.2.5 Other pollutants monitored

Polycyclic aromatic hydrocarbons (PAH)

The national network monitoring for PAH includes four monitoring sites in Northern Ireland, operated by Ricardo Energy & Environment, Ballymena Ballykeel site in Mid and East Antrim Borough Council being one of these. The UK National Air Quality objective for PAH (Benzo(a)pyrene) is an annual average of 0.25ng/m³ and the EU target annual mean value is 1ng/m³. Table 2.10 shows that results for PAH Benzo(a)pyrene concentrations at the Ballymena Ballykeel monitoring site in 2023 is 0.36ng/m³ which is below the EU objective but above the UK non-mandatory objective. The trend graph in Figure 2.8 shows that 2023 PAH levels have decreased from 2022, with the lowest levels recorded in the past 5 years, remaining below the EU target annual mean value.

Table 2.10 Results for PAH (Benzo(a)pyrene) 2019 - 2023.

Site	Data Capture for 2023 (%)	2019 Annual mean ng/m ³	2020 Annual mean ng/m ³	2021 Annual mean ng/m ³	2022 Annual mean ng/m ³	2023 Annual mean ng/m ³
Ballymena Ballykeel (BALY)	98.6	0.44	0.47	0.39	0.49	0.36

Figure 2.8 Trends in PAH (Benzo(a)pyrene) concentrations 2019 – 2023

Particulate Matter (PM_{2.5})

Under the current LAQM regime there is no requirement for Local Authorities to review and assess PM_{2.5} against objectives set out in the UK Air Quality Regulations.

A new FIDAS 200 analyser was installed at Ballymena Ballykeel automatic monitoring site in June 2021, capable of monitoring PM₁₀ and PM_{2.5}. The 2023 annual data capture for PM_{2.5} was 99%.

The annual mean concentration for PM_{2.5} in 2023 was 6.0 µg/m³, well below the annual mean target value of 25 µg/m³, showing a slight decrease from 7.0 µg/m³ in 2022.

2.2.6 Summary of Compliance with AQS Objectives

Mid and East Antrim 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

Mid and East Antrim 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

Mid and East Antrim 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.

Mid and East Antrim Borough Council confirms that there are no new/newly identified roads with high flows of buses/HGVs.

3.4 Junctions

Mid and East Antrim 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

Since the last Updating and Screening Assessment the St. Patrick's Barracks Link Road, Ballymena, 1.4 miles in length, opened on 16th June 2023 (0.9 miles of new road and the

remainder is an upgrade of existing roads), connecting the A26 Larne Road to the A42 Broughshane Road to the north.

Mid and East Antrim Borough Council has assessed new/proposed roads meeting the criteria in Table 7.1 of Chapter 7 of LAQM.TG22 and concluded that **it will be necessary to proceed to a Detailed Assessment for nitrogen dioxide (NO₂) and particulate matter (PM₁₀).**

3.6 Roads with Significantly Changed Traffic Flows

Mid and East Antrim Borough Council confirms that there are no new/newly identified roads with significantly changed traffic flows.

3.7 Bus and Coach Stations

Mid and East Antrim Borough Council confirms that there are no relevant bus stations in the Local Authority area.

4 Other Transport Sources

4.1 Airports

Mid and East Antrim 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

Mid and East Antrim 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

Mid and East Antrim 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

Mid and East Antrim 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

Mid and East Antrim 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

Mid and East Antrim 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

Mid and East Antrim Borough Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.2 Major Fuel Depots

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

5.3 Petrol Stations

Mid and East Antrim Borough Council confirms that there are no petrol stations meeting the specified criteria.

5.4 Poultry Farms

Mid and East Antrim Borough Council confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

Mid and East Antrim Borough Council confirms that there are no biomass combustion plant in the Local Authority area.

6.2 Biomass Combustion – Combined Impacts

Mid and East Antrim Borough Council confirms that there are no biomass combustion plant in the Local Authority area.

6.3 Domestic Solid Fuel Burning

Mid and East Antrim Borough Council confirms that there are no areas of significant domestic fuel use in the Local Authority area.

7 Fugitive or Uncontrolled Sources

Mid and East Antrim 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

Mid and East Antrim Borough Council has presented a range of monitoring data within this Updating and Screening Assessment Report that addresses a number of the pollutants prescribed within the UK Air Quality Strategy.

During 2023 monitoring of NO₂, PM₁₀ and SO₂ was completed within Mid and East Antrim Borough Council using continuous automatic analysers at two sites and passive NO₂ diffusion tubes at 37 locations: seventeen within Ballymena, twelve in Carrickfergus and eight in Larne.

The 2023 monitoring data has been analysed and the results shows compliance with the air quality objectives for NO₂, PM₁₀ and SO₂ at the Ballymena Ballykeel automatic monitoring location, for NO₂ at the Ballymena Antrim Road automatic monitoring location and for NO₂ at the diffusion tubes sites.

The results for 2023 indicate that both the AQS annual mean and hourly mean objectives for nitrogen dioxide were met at Ballymena Ballykeel and Ballymena Antrim Road automatic monitoring sites. The annual mean NO₂ concentrations have remained constant at Ballymena Ballykeel site while at Ballymena Antrim Road site they have decreased slightly since the previous year, showing levels comparable with 2020 levels, during the period when the government had issued strict travel restrictions. Overall, NO₂ concentrations have been showing a declining trend over the past five years, a possible reflection of the change in work patterns as a result of the Covid pandemic, with an increase in hybrid working practices.

Mid and East Antrim Borough Council continue to undertake real time monitoring of PM₁₀ at the Ballymena Ballykeel automatic monitoring site, which is located within the existing Ballymena Ballykeel AQMA (declared for exceedances of PM₁₀). Annual mean PM₁₀ levels for 2023 have decreased since pre-Covid levels of 2019, with no exceedance of the PM₁₀ annual mean AQS objective or the 24-hour Mean AQS objective.

The 2023 SO₂ automatic monitoring data for Ballymena Ballykeel demonstrates that all AQS objectives for SO₂ were met for 2023, within the Ballymena Ballykeel air quality management area.

The results of the diffusion tube data for 2023 show that there were no exceedances of the AQS NO₂ objectives, including within the Ballymena Linenhall Street Air quality management area, declared for nitrogen dioxide (NO₂) exceedances. It is noted that the monitoring site BDT07 (George Street) which is located on the boundary of the existing Ballymena Linenhall Street AQMA, has fallen to 35.3 µg/m³, a 4.7 µg/m³ decrease from 2022. It is observed that concentrations at the rest of the monitoring sites fluctuate around last year's levels however, the concentration levels at the BDT15 (Linenhall Street) diffusion tube site, which is located within the existing Ballymena Linenhall Street AQMA, have increased by 0.8 µg/m³ from 2022 levels. NO₂ concentrations at diffusion tube monitoring sites in 2023 are all lower than pre-covid concentrations, when the Government guidance imposed strict travel restrictions as a result of the Covid pandemic in 2020.

8.2 Conclusions from Assessment of Sources

It will be necessary to proceed to a Detailed Assessment for nitrogen dioxide (NO₂) and particulate matter (PM₁₀) in relation to the newly identified source: St. Patrick's Barracks Link Road.

8.3 Proposed Actions

This 2024 Updating and Screening Assessment has identified that there is a need to proceed to a detailed assessment for potential exceedances of nitrogen dioxide (NO₂) and particulate matter (PM₁₀) AQS objectives, in relation to the newly identified source: St. Patrick's Barracks Link Road, Ballymena.

The need for additional monitoring within the Borough has not been identified by this Updating and Screening Assessment. However, reviewing the nitrogen dioxide diffusion tube data over the past five years has demonstrated that the levels at a number of sites have remained relatively low in comparison to the NO₂ AQS objectives. It is recommended

to review all nitrogen dioxide diffusion tube sites with a view to reducing the number of monitoring sites within the borough, where monitoring data shows continuing levels well below the AQS objectives.

This Updating and Screening Assessment supports the recommendation of revoking the Ballymena Ballykeel Air Quality Management Area, which was declared for exceedances of Particulate Matter (PM₁₀). Therefore, it will be necessary to proceed to a Detailed Assessment.

The proposed actions from the Mid and East Antrim 2024 Updating and Screening Assessment are as follows:

- Continue to undertake both automatic (NO₂, PM₁₀, PM_{2.5} and SO₂) and passive (NO₂) monitoring within the Borough to identify future trends in concentration and any exceedances of the AQS objectives.
- The Ballymena Linenhall Street AQMA to be retained and passive NO₂ monitoring will continue at diffusion tube site BDT15 (Linenhall Street) to assess the need for retention of this AQMA.
- Passive NO₂ monitoring to be continued at diffusion tube site BDT07 (George Street) to assess the need for the boundaries of the Ballymena Linenhall Street AQMA to be altered.
- Recommend that the Ballymena Ballykeel AQMA is revoked. Progress to a Detailed Assessment in relation to revoking this declared AQMA for exceedances of the particulate matter (PM₁₀) AQS objective.
- Progress to Detailed Assessment for potential exceedances of the nitrogen dioxide (NO₂) and particulate matter (PM₁₀) AQS objectives in relation to the newly identified road source: St. Patrick's Barrick Link Road, Ballymena.
- Review of 2024 diffusion tube monitoring data with the view to assessing the need for existing diffusion tube monitoring sites throughout the Borough and/or the re-location of diffusion tube sites.
- Continue to gather emissions information for identified new local developments potential sources to determine the impact upon local air quality.
- Continue to examine all planning applications within the Borough to ensure compliance with Air Quality Strategy objectives.
- Submit the 2025 Progress Report.

9 References

- I. Local Air Quality Management Technical Guidance (TG22), prepared by the Department for Environment, Food and Rural Affairs, August 2022
- II. The Environmental (Northern Ireland) Order 2002
- III. Air Quality Regulations (Northern Ireland) 2003
- IV. The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, DEFRA (2007)
- V. Northern Ireland Air – Air Quality in Northern Ireland website
<http://www.airqualityni.co.uk/>
- VI. Mid and East Antrim Borough Council Local Development Plan 2030
- VII. National Diffusion Tube Bias Adjustment Spreadsheet v06/25
- VIII. The Regional Development Strategy 2035, DRD
- IX. Diffusion Tubes for Ambient NO₂ Monitoring: Practical Guidance for Laboratories and Users, Issue 1a Feb 2008

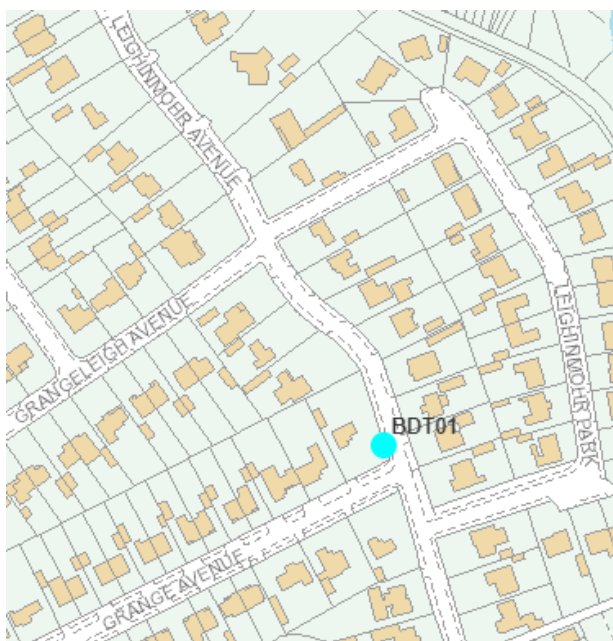
Appendices

Appendix A: Maps of non-automatic monitoring sites within Mid and East Antrim Borough Council

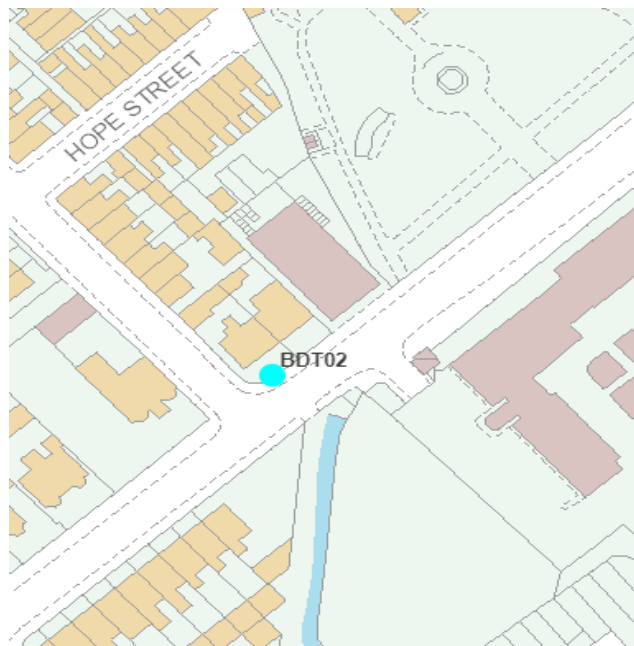
Appendix B: Quality Assurance / Quality Control (QA/QC) Data

Appendix C: Diffusion Tube Monitoring Data

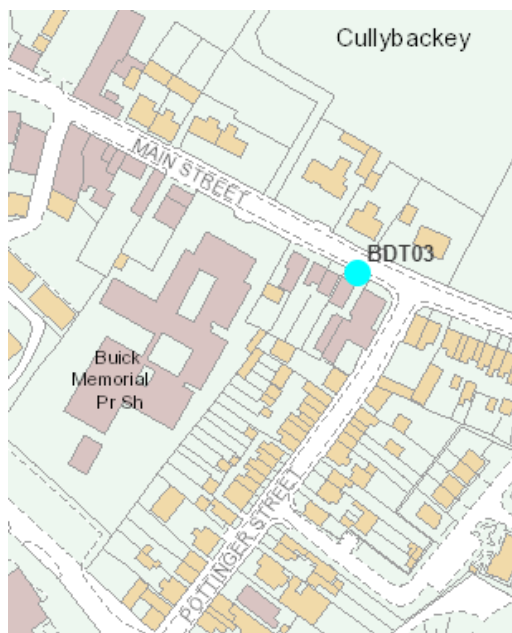
Appendix A: Maps of Non-Automatic Monitoring Sites within Mid and East Antrim Borough Council



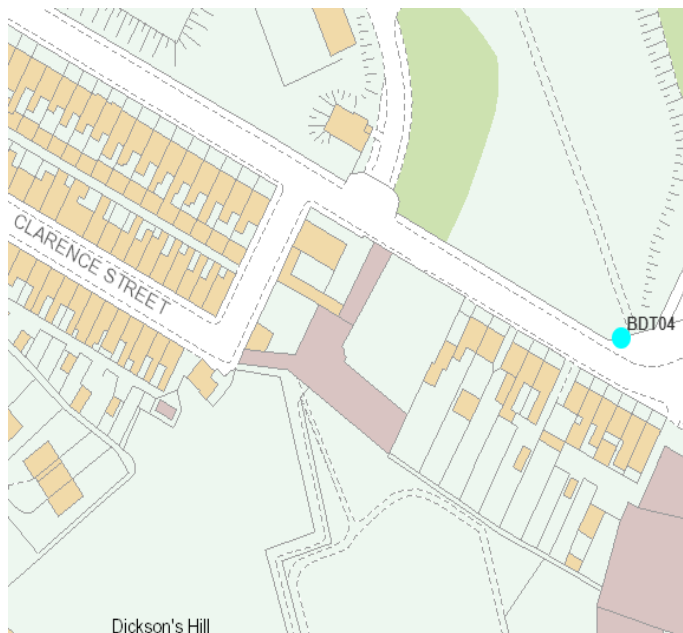
BDT01 – Leighinmohr Avenue, Ballymena



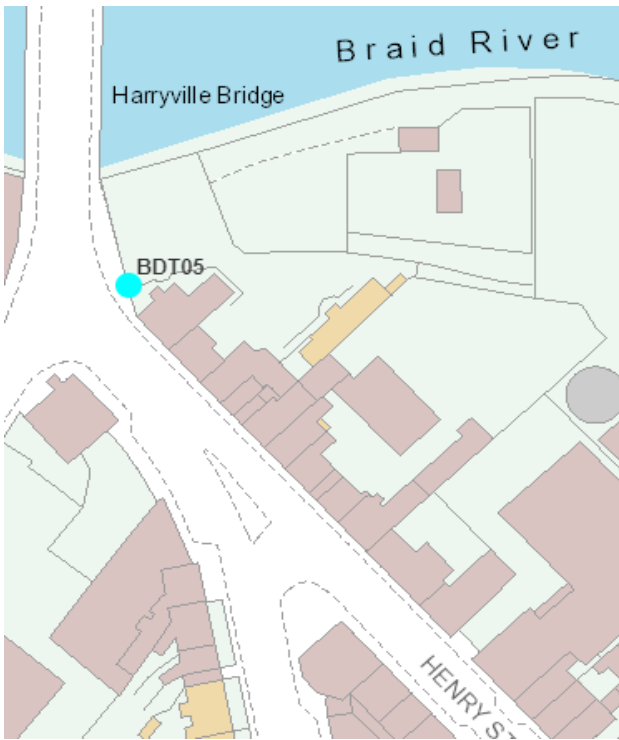
BDT02 – Galgorm Road, Ballymena



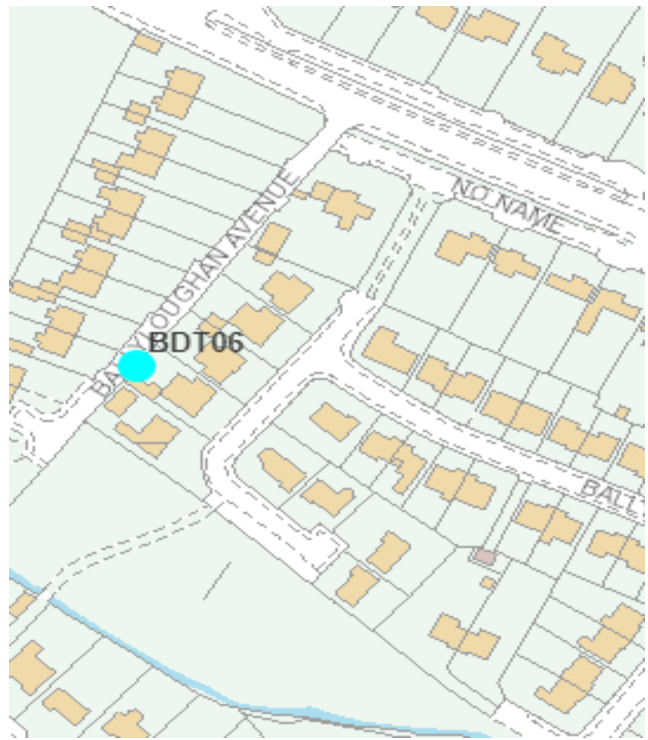
BDT03 – Main Street, Cullybackey



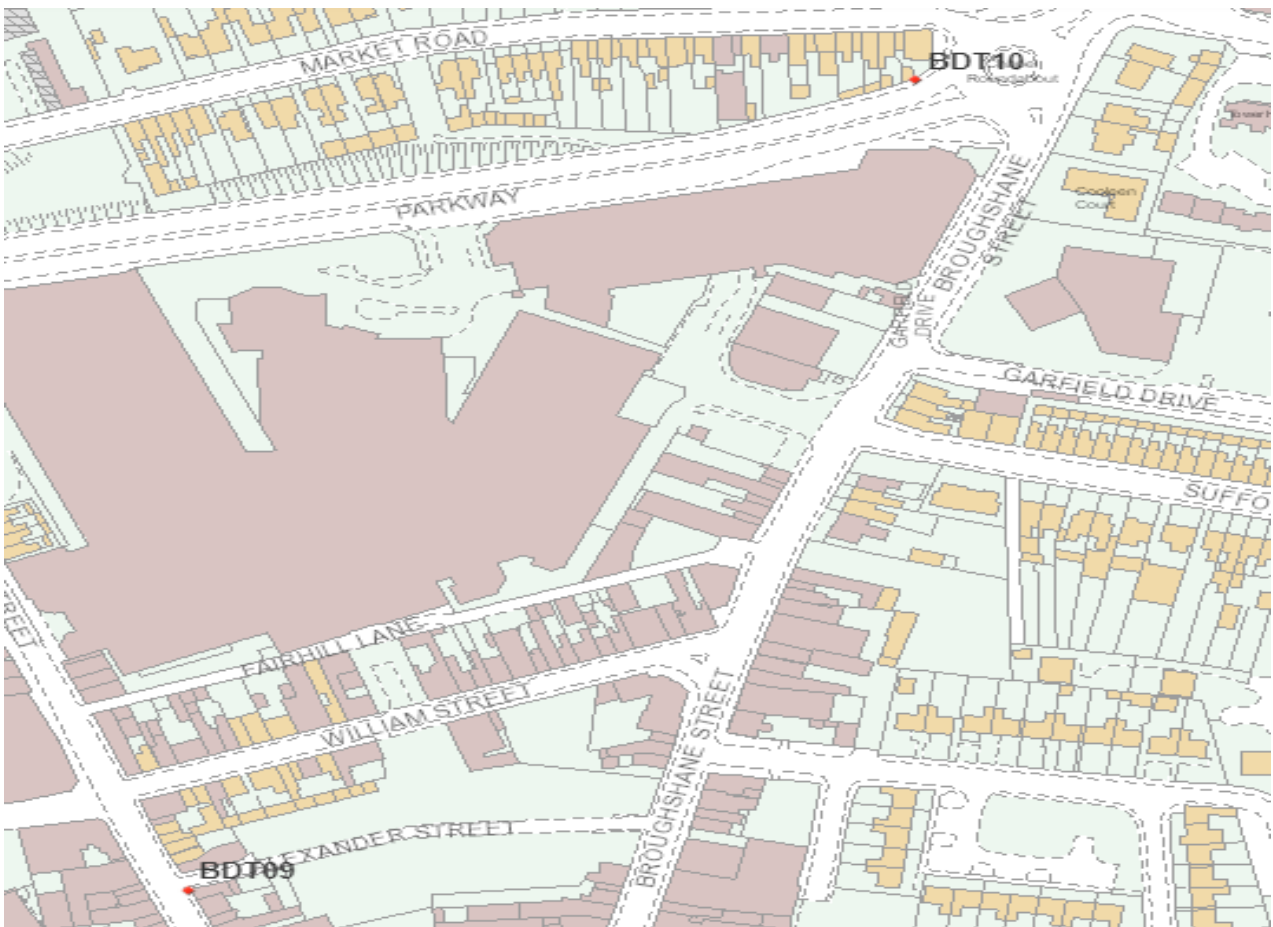
BDT04 – Cullybackey Road, Ballymena



BDT05 – Larne Street, Ballymena



BDT06 – Ballyloughan Ave, Ballymena



BDT09 – Ballymoney Street, Ballymena

BDT10 – Parkway, Ballymena



BDT07 – George Street, Ballymena

BDT08 – Wellington Street, Ballymena

BDT13 – North Road, Ballymena

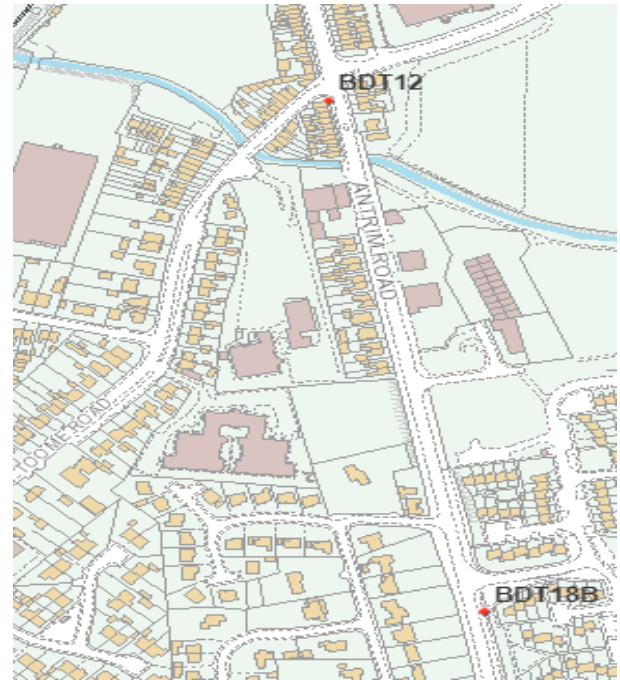
BDT15 – Linenhall Street, Ballymena

BDT16 – Bridge Street, Ballymena

BDT17 – Galgorm Road, Ballymena

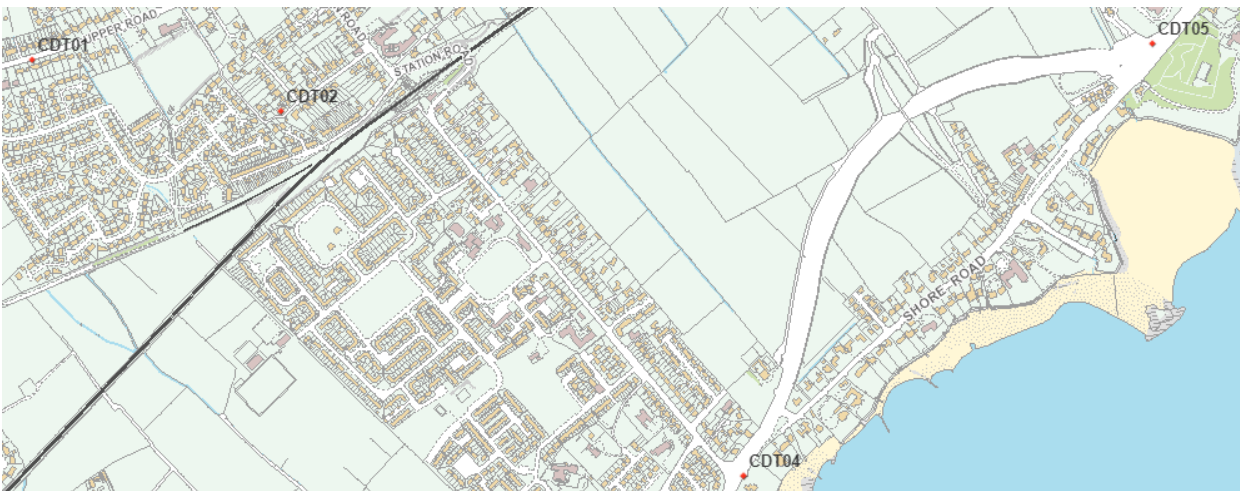


BDT11 – Lisnevenagh Road, Ballymena



BDT12 – Queen Street, Ballymena

BDT18, 18A & 18B – Antrim Road, Ballymena

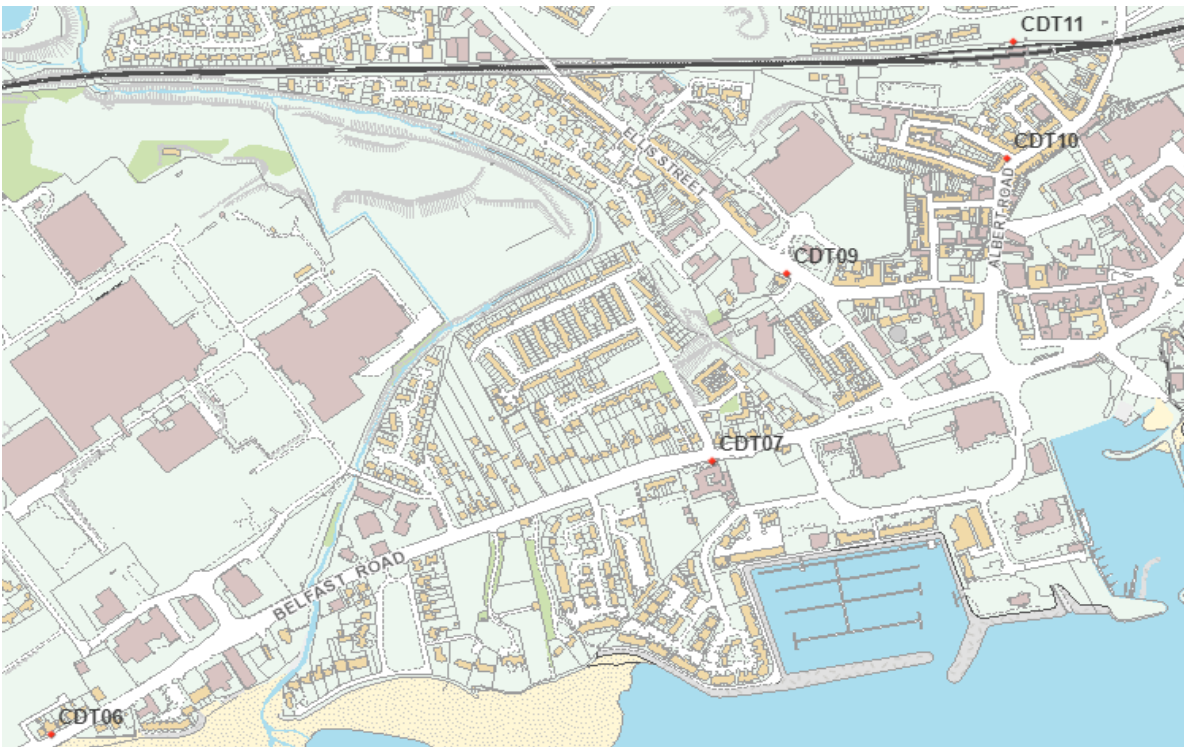


CDT01 - 27 Upper Road, Greenisland

CDT02 – 32 Mullaghmore, Carrickfergus

CDT03 & CDT04 – Shore Road Roundabout, Carrickfergus (Duplicate)

CDT05 – Seapark Roundabout, Carrickfergus



CDT06 – 93 Belfast Road, Carrickfergus

CDT07 & CDT08 – Model Primary School, Belfast Road, Carrickfergus (Duplicate)

CDT09 – Minorca Place/Tesco Junction, Carrickfergus

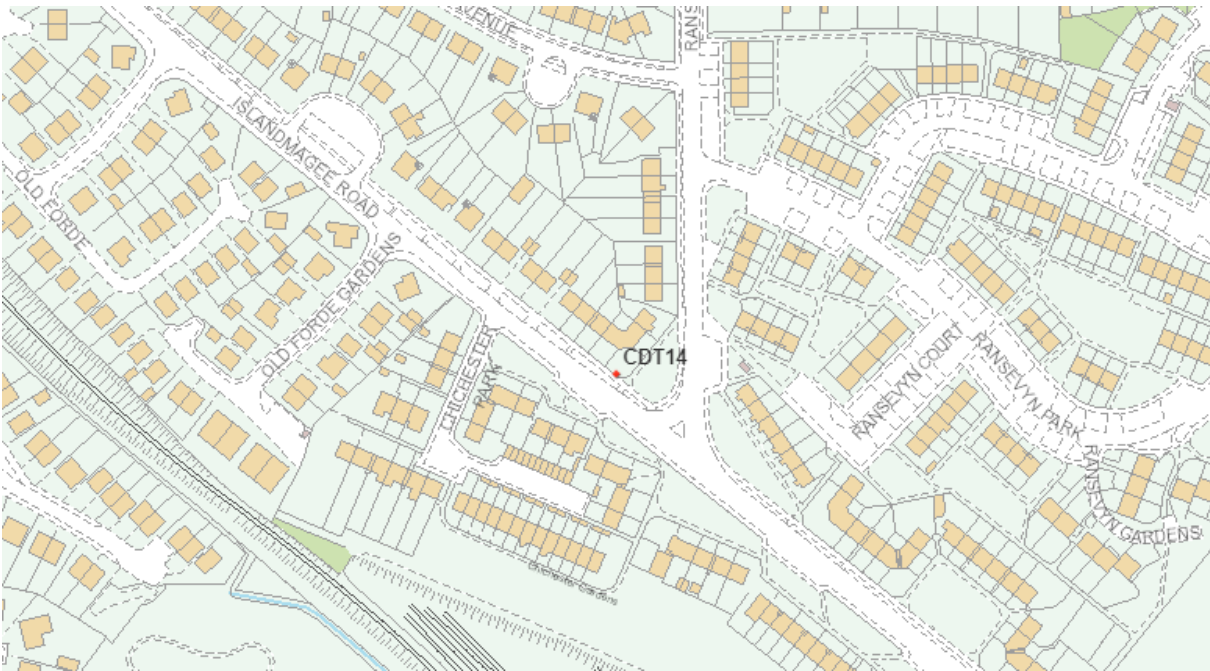
CDT10 – 42 Albert Road, Carrickfergus

CDT11 – Railway Station, Fergus Avenue, Carrickfergus

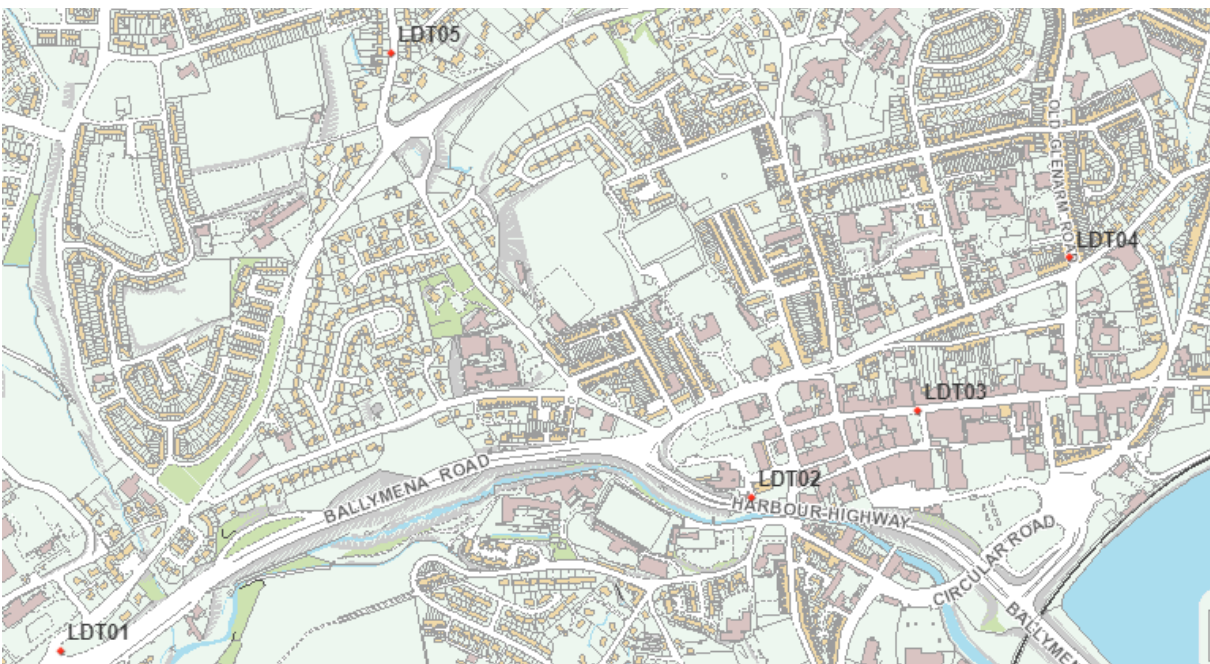


CDT12 – North Road, Carrickfergus

CDT13 – Victoria Rd/Larne Road Junction, Carrickfergus



CDT14 – Islandmagee Road, Carrickfergus



LDT01 – Antville/A8 Junction, Larne

LDT02 – Latharna House, Larne

LDT03 – Main Street, Larne

LDT04 – Victoria Road/Old Glenarm Road Junction, Larne

LDT05 – Upper Cairncastle Road, Larne



LDT06 – Larne Harbour Roundabout

LDT07 – Coastguard Road/Castle Terrace, Larne

LDT08 – Ballylumford Road, Islandmagee (Ballylumford Power Station)

Appendix B Quality Assurance / Quality Control (QA/QC) Data

QA/QC of Diffusion Tube Monitoring

Defra and the Devolved Administrations provide a set of centralised QA/QC services, to assist local authorities using diffusive samplers for monitoring NO₂. In 2023, Mid and East Antrim Borough Council utilised SOCOTEC, Didcot, England to supply, analyse and report data for its diffusion tubes. The analysis methodology used was 20% triethanolamine solution for monitoring ambient nitrogen dioxide which adheres to the requirements of the government's 'Diffusion Tubes for Ambient NO₂ Monitoring: Practical Guidance for Laboratories and Users' publication. SOCOTEC, Didcot is a UKAS accredited laboratory and participates in laboratory performance and proficiency testing scheme, namely the independent AIR-PT scheme. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO₂ concentrations reported are of a high quality, SOCOTEC achieved 100% analytical performance in 2023.

Diffusion tube monitoring was completed in adherence with the 2023 Diffusion Tube Monitoring calendar.

Diffusion Tube Annualisation

All diffusion tube monitoring locations within Mid and East Antrim Borough Council recorded data capture of 75% therefore it was not required to annualise any monitoring data.

Diffusion Tube Bias Adjustment Factors

Mid and East Antrim Borough Council have applied a national bias adjustment factor of 0.76 to the 2023 monitoring data, calculated from the national database of diffusion tube co-location surveys, for Socotec 20% TEA diffusion tubes, based on 8 studies for 2023.

Figure B.1 National bias adjustment factor calculation

National Diffusion Tube Bias Adjustment Factor Spreadsheet						Spreadsheet Version Number: 06/25				
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 September 2025				
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods						Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet				
This spreadsheet will be updated every few months; the factors may therefore be subject to change. This should not discourage their immediate use.						LAQM Helpdesk Website				
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.						Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.				
Step 1:		Step 2:	Step 3:	Step 4:						
Select the Laboratory that Analyses Your Tubes from the Drop-Down List		Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor ² 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 ²	If you have your own co-location study then see footnote ¹ . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953						
Analysed By ¹	Method	Year ²	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m ³)	Automatic Monitor Mean Conc. (Cm) (µg/m ³)	Bias (B)	Tube Precision ³	Bias Adjustment Factor (A) (Cm/Dm)
SOCOTEC Didcot	20% TEA in water	2023	KS	New Forest District Council	10	32	21	50.1%	G	0.67
SOCOTEC Didcot	20% TEA in water	2023	KS	Marylebone Road Intercomparison	11	52	38	37.1%	G	0.73
SOCOTEC Didcot	20% TEA in water	2023	R	South Oxfordshire District Council	12	22	16	33.9%	G	0.75
SOCOTEC Didcot	20% TEA in water	2023	R	South Oxfordshire District Council	10	33	29	15.8%	G	0.86
Socotec Didcot	20% TEA in water	2023	R	London Borough Of Ealing	12	57	40	40.6%	G	0.71
Socotec Didcot	20% TEA in water	2023	R	London Borough Of Ealing	12	37	29	29.1%	G	0.77
Socotec Didcot	20% TEA in water	2023	R	London Borough Of Ealing	12	43	30	42.1%	G	0.70
Socotec Didcot	20% TEA in water	2023	R	Rhondda Cynon Taf Cbc	11	24	23	4.2%	G	0.96
SOCOTEC Didcot	20% TEA in water	2023		Overall Factor² (8 studies)					Use	0.76

A summary of bias adjustment factors used by Mid and East Antrim Borough Council over the past five years is presented in Table B.1.

Table B.1 Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2023	National	06/25	0.76
2022	Local	-	0.77
2021	National	09/22	0.77
2020	Local	-	0.76
2019	National	06/20	0.92

NO₂ Fall-off with Distance from the Road

No diffusion tube NO₂ monitoring locations within Mid and East Antrim Borough Council required distance correction during 2023.

QA/QC of Automatic Monitoring

The role of Central Management and Co-ordination Unit (CMCU) for the Ballymena Ballykeel and Ballymena Antrim Road AURN analysers is contracted to Bureau Veritas, whilst formal Quality Assurance/Quality Control (QA/QC) data management duties are contracted to Ricardo Energy & Environment, to ensure reliability and accuracy of the concentrations recorded. Audits of all the automatic analysers at the monitoring sites are completed on a six-monthly basis by Ricardo Energy & Environment.

The maintenance and any urgent call outs of both monitoring sites are completed by Enviro Technology Services Ltd.

Calibrations and minor maintenance of the automatic monitors is completed by an air quality management officer from Mid and East Antrim Borough Council acting as the Local Site Operator (LSO) under a contract from Bureau Veritas. Calibration duties are completed monthly at Ballymena Ballykeel and Ballymena Antrim Road sites. Manual Calibrations are carried out for each analyser in accordance with AURN requirements. Calibration gases for the network are supplied by BOC Limited and are provided with a UKAS certificate of calibration by Ricardo Energy & Environment.

Data verification and ratification process

DAERA have put in place a comprehensive system of both automatic and manual reviews and updates for the UK Automatic Urban and Rural Monitoring Network (AURN) data.

Hourly mean monitoring results from the AURN are uploaded as **provisional data** every hour. These figures undergo basic screening criteria to exclude clearly faulty data. The objective is to provide data for human health concerns on a near real-time basis, so the checks have to be essentially automatic and rapid. This means that full Quality Assurance and Quality Control (QA/QC) procedures cannot be applied and the data are therefore likely to be of lower accuracy and reliability than that required for final reporting.

Provisional data and statistics are clearly marked with a flag in the database to indicate their status.

Following the publication of initial provisional data, there are at least a further two stages which all automatic monitoring data are required to go through to meet the standards required for National Air Quality Monitoring networks.

Data Verification is carried out on an ongoing basis and is nominally a process to "clean-up" the initial provisional data. Any corrections to the data made during the verification process are automatically uploaded (still as PROVISIONAL at this stage) to the UK-AIR for end-users to access. The process includes:

- Further manual review of the data to exclude any data from instrument malfunctions or faulty calibrations.
- Incorporation of any data which were initially missing due to communications failure with a monitoring station.
- Updates to data scaling following application of the most recent calibration factors.

Data Ratification is a detailed manual check of the data set carried out on a quarterly basis for the AURN. It requires a longer-term view of the dataset incorporating the results from **independent QA/QC audits** of the monitoring stations.

Data ratification reviews all calibration data, information from analyser services and repairs and any other information available for the particular site or analyser over the whole ratification period. In addition, the results from the independent QA/QC audits are incorporated to take account of any problems detected during the QA/QC audits such as:

- Long-term drift in an ozone instrument calibration.
- Faulty NOx converters.
- Drifts in calibration cylinder concentrations.
- Instrument leaks or flow faults.
- Faulty instrument configuration.

Incorporation of the QA/QC audits ensures that ratified data are traceable to UK national and international gas calibration standards.

Once all the ratification checks and corrections have been made then the data are re-loaded to the UK-AIR with a new status flag of "Ratified".

All data presented within the 2024 Updating and Screening Assessment is ratified. Live and historical data for air quality monitoring within Mid and East Antrim Borough Council is available at <https://uk-air.defra.gov.uk/> and <https://www.airqualityni.co.uk/data>.

PM₁₀ and PM_{2.5} Monitoring Adjustment

The type of PM₁₀/PM_{2.5} monitor utilised within Mid and East Antrim Borough Council do not require the application of a correction factor.

Automatic Monitoring Annualisation

All automatic monitoring locations within Mid and East Antrim Borough Council recorded data capture of greater than 75% therefore it was not required to annualise any monitoring data.

NO₂ Fall-off with Distance from the Road

No automatic NO₂ monitoring locations within Mid and East Antrim Borough Council required distance correction during 2023.

Appendix C: Diffusion Tube Monitoring Data

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO ₂ Mean Concentrations (µg/m ³)												NO ₂ Annual Mean (µg/m ³)
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
BDT1	310228	402546	14.6	11.1	12.3	11.1	6.7	7.7	8.0	10.5	11.3	13.2	16.1	9.9	11.0
BDT2	310336	403196	44.7	36.3	34.6	29.7	26.2	27.4	23.5	24.3	33.5	32.3	52.8		33.2
BDT3	305841	405690	27.4	22.6	26.6	21.5	18.9	18.0	15.9	17.9	20.2	24.8	25.4	25.5	22.1
BDT4	310350	403443	31.6	26.7	30.7	28.6	22.2	24.9	15.3	19.8	26.9	29.4	33.8	23.2	26.1
BDT5	310602	402920	35.3	25.2	28.5	23.3	18.2	16.9		17.3	24.9	22.8	25.6	26.2	24.0
BDT6	309532	404425	14.8	9.6	13.4	9.4	7.4	5.7	5.0	6.1	10.1	10.2	13.4	11.0	9.7
BDT7	310584	403239	57.4	52.8	49.2	43.8	41.1	35.6	38.6	42.4	46.3	45.3	56.9	47.2	46.4
BDT8	310795	403386	25.0	21.6	20.0	19.1	12.1	13.5	14.4	14.3	22.9	19.5	27.9		19.1
BDT9	310796	403582	29.1	21.5	21.6		14.3	14.0	16.7	16.3	15.0	16.7	30.2	24.4	20.0
BDT10	311000	403905	35.7	28.9	32.9	27.0	23.7	22.3	19.9	17.9	28.0	27.7	30.2	27.6	26.8
BDT11	311884	397037	26.6	24.6	26.1	22.7	17.4	22.5	18.1	18.9	26.3	22.6	31.2	19.9	23.1
BDT12	310743	402219	34.1	28.4	34.5	24.6	26.3	20.3	20.1	23.8	28.0	32.4	37.7	25.2	28.0
BDT13	310638	403079	30.7	22.3	33.0	29.8	22.7	24.3	18.2	23.0	27.8	31.4	36.3	27.8	27.3
BDT15	310687	403122	55.8	45.5	45.3	35.3	35.2	35.2	32.8	36.9	45.4	38.9	51.3	45.9	42.0
BDT16	310710	403119	36.5	31.7	35.3	28.6	32.8	21.7	25.1	26.8	33.2	26.5	37.2	27.8	30.3
BDT17	310491	403314	54.7	39.7	41.7	29.8	30.3	30.8	26.4	27.7	37.6	37.2	45.8	43.0	37.1
BDT18	310843	401776	31.2	23.3	25.2	18.1	15.5	13.9	12.6	16.5	21.6	21.1	28.3	21.5	-
BDT18A	310843	401776	31.7	24.2	23.0	14.0	17.4	14.5	15.0	17.0	23.6	19.4	27.8	19.3	-

BDT18B	310843	401776	28.9	23.8	21.9	11.9	18.6	14.7	14.5	16.2	23.1	20.8	30.3	17.1	20.5
CDT1	336388	385733	24.8	19.1	19.1	16.5	14.2	16.4	12.7	14.3	16.3	20.5	23.2	10.3	17.3
CDT2	336901	385621	10.7	9.0	9.5	9.7	6.7	8.3	6.3	5.4	6.4	10.3	6.2	8.9	8.1
CDT3	337882	384850	34.8	29.1	31.0	21.3		19.8	21.5	23.9	28.7	22.6	32.4	26.7	-
CDT4	337882	384850	34.8	34.7	27.6	24.3	23.8	23.1	17.0	23.1	28.8	16.9	32.7	20.8	26.0
CDT5	338747	385764	14.1	11.2	11.0	14.3	9.7	10.7	9.4		11.6	11.7	15.2	11.7	11.9
CDT6	339915	386731	28.1	27.1	24.0	25.1	18.4	24.0	15.9	23.7	19.6	26.6	27.5	22.7	23.6
CDT7	340798	387122	31.3	25.8	30.8	34.6	28.3	38.5	23.3	26.0	24.7	32.6	36.5	24.2	-
CDT8	340798	387122	30.2	23.1	30.0	36.8	28.8	33.8	21.9	25.5	24.6	38.4	36.5	22.0	29.5
CDT9	340898	387391	24.4	21.8	26.6	24.1	23.2	18.2	17.1	19.2	19.5	22.6	25.7	19.7	21.8
CDT10	341192	387556	27.0	22.8	22.9	22.4	15.3	17.8	14.6	15.6	14.7	15.8	19.5	17.0	18.8
CDT11	341200	387723	19.7	18.2	15.3	14.5	11.1	13.3	11.6	12.1	14.6	13.4	13.7	6.3	13.7
CDT12	341065	388892	16.9	15.5	22.1	19.8	17.6			14.1	15.6	16.4	19.8	11.1	16.9
CDT13	342388	388154	27.0	27.6	25.3	24.1	18.9	21.6	18.1	16.5	23.6	15.7	16.2	19.6	21.2
CDT14	347333	392459	12.2	11.1	12.0	12.5	10.5	9.7	9.6	8.5	11.3	12.1		10.3	10.9
LDT1	338658	402187	22.6	22.4	21.7	19.1	17.6	20.2	15.6	17.8	21.7	25.1	20.6	16.2	20.1
LDT2	339815	402444	11.1	10.9	11.1	14.5	8.4	11.8	8.7	11.4	10.6	15.0	16.3	11.5	11.8
LDT3	340093	402590	18.5	16.3	16.2	19.1	15.2	15.6	14.8	13.9	12.8	19.7	19.5	10.2	16.0
LDT4	340346	402845	27.8	21.9	24.1	20.7	23.3	22.5	20.2	24.3	23.0	25.3	27.1	20.2	23.4
LDT5	339212	403188	16.0	17.1	18.6	16.8	14.2	17.4	15.3	12.6	15.6	20.0	16.8	12.8	16.1
LDT6	341236	401970	14.3	15.6	13.9	13.2	11.2	13.5	14.8	10.1	13.6	23.6	17.6	13.6	14.6
LDT7	341321	401696	7.2	6.6	8.5	8.0	7.5	10.4	8.3	7.8	7.9	11.6	6.0	6.5	8.0
LDT8	342069	402090	14.0	9.5	10.3	12.6	8.4	9.0	10.0	9.0	10.4	3.5			9.7

