2021 Air Quality Updating and Screening Assessment

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

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Mid & East Antrim Borough Council

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Executive Summary

Mid and East Antrim Borough Council has completed this 2021 Updating and Screening Assessment in accordance with the provisions of the Environment (Northern Ireland) Order 2002 and the Northern Ireland Local Air Quality Management Policy Guidance document LAQM.PGNI(09).

In completing this Updating and Screening Assessment, we have undertaken a review of potentially significant sources of air pollution across the city 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 has declared two Air Quality Management Areas (AQMAs) or exceedances of the nitrogen dioxide (NO2) annual mean Air Quality Strategy objectives for Nitrogen Dioxide (NO_2) and Particulate Matter (PM10): -

- Ballymena Ballykeel (PM10)
- Ballymena Linenhall Street (NO2)

Following the conclusions of this report it is recommended that the present AQMA declarations should remain.

Results from automatic analysers located at Ballymena Ballykeel showed that PM10 and SO2 levels continue the trend of levelling out with gradual decreasing over time.

Results of NO2 Diffusion tubes monitoring showed that there continues to be exceedences of the AQS objectives for NO2 within the Ballymena Linenhall AQMA.

Table of Contents

Tables

Figures

1 Introduction

1.1 Description of Local Authority Area

The Borough of Mid and East Antrim was created on the 1st of April 2015 through the merging of three separate Boroughs; Ballymena Borough Council, Carrickfergus Borough Council and Larne Borough Council. 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 main settlements within the Borough are Ballymena to the West, Larne to the East, and Carrickfergus to the South East.

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 Island Housing Executive home improvement schemes.

There are currently two AQMA's in force within the Borough, both are located within Ballymena; Ballykeel AQMA and Linenhall Street AQMA. Ballykeel AQMA has been declared in respect of PM10 concentrations predicted by domestic fuel modelling, and Linenhall AQMA has been declared due to modelled and monitored concentrations of NO2 being above the AQS annual mean objective.

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 objective 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.

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 micrograms per cubic metre µg/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	16.25µg/m^3	Running annual mean	31.12.2003
Benzene	3.25µg/m^3	Running annual mean	31.12.2010
1,3-Butadiene	2.25µg/m^3	Running annual mean	31.12.2003
Carbon monoxide	10.0mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5µg/m^3	Annual mean	31.12.2004
Lead	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
Nitrogen dioxide	40µg/m^3	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50µg/m^3, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
Particles (PM_{10}) (gravimetric)	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

Sulphur dioxide	125µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
Sulphur dioxide	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

Previous Assessment	Date completed	Summarised Outcomes
LAQM Updating and Screening Assessment 2015	August 2015	No detailed assessment required for any of the seven pollutants. Air quality objectives met. Monitoring of SO_2, NO_2 and PM_{10} to continue.
LAQM Annual Progress Report 2016	Nov 2016	NO_2 objectives met, no AQMA declared.
LAQM Annual Progess Report 2017	August 2017	NO_2 objectives met, no AQMA declared.
LAQM Updating and Screening Assessment 2018	Nov 2018	Renewal of Detailed assessment for NO_2. Monitoring of SO_2, NO_2, PM_{10} to continue. Relocation of some NO_2 tubes required due to road development in Carrick Area
LAQM Annual Progess Report 2019	August 2019	NO_2 objectives met, no AQMA declared.

LAQM Annual Progess Report 2020	August 2020	NO_2 objectives met, no AQMA declared.

Figure 1.1 Map of Ballymena Ballykeel AQMA declared for PM10, showing location of Automatic Analyser, which is part of AURN Network

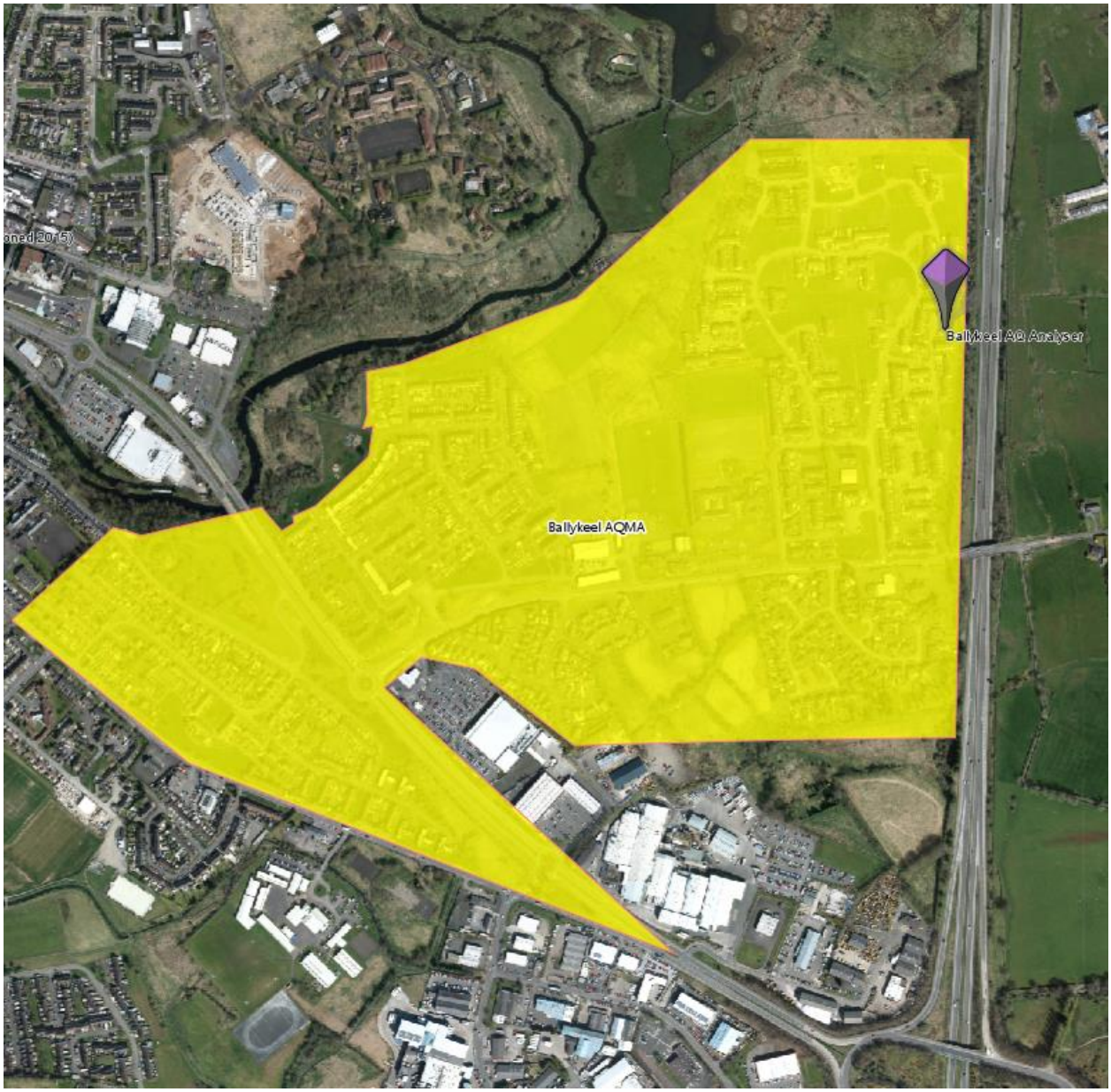
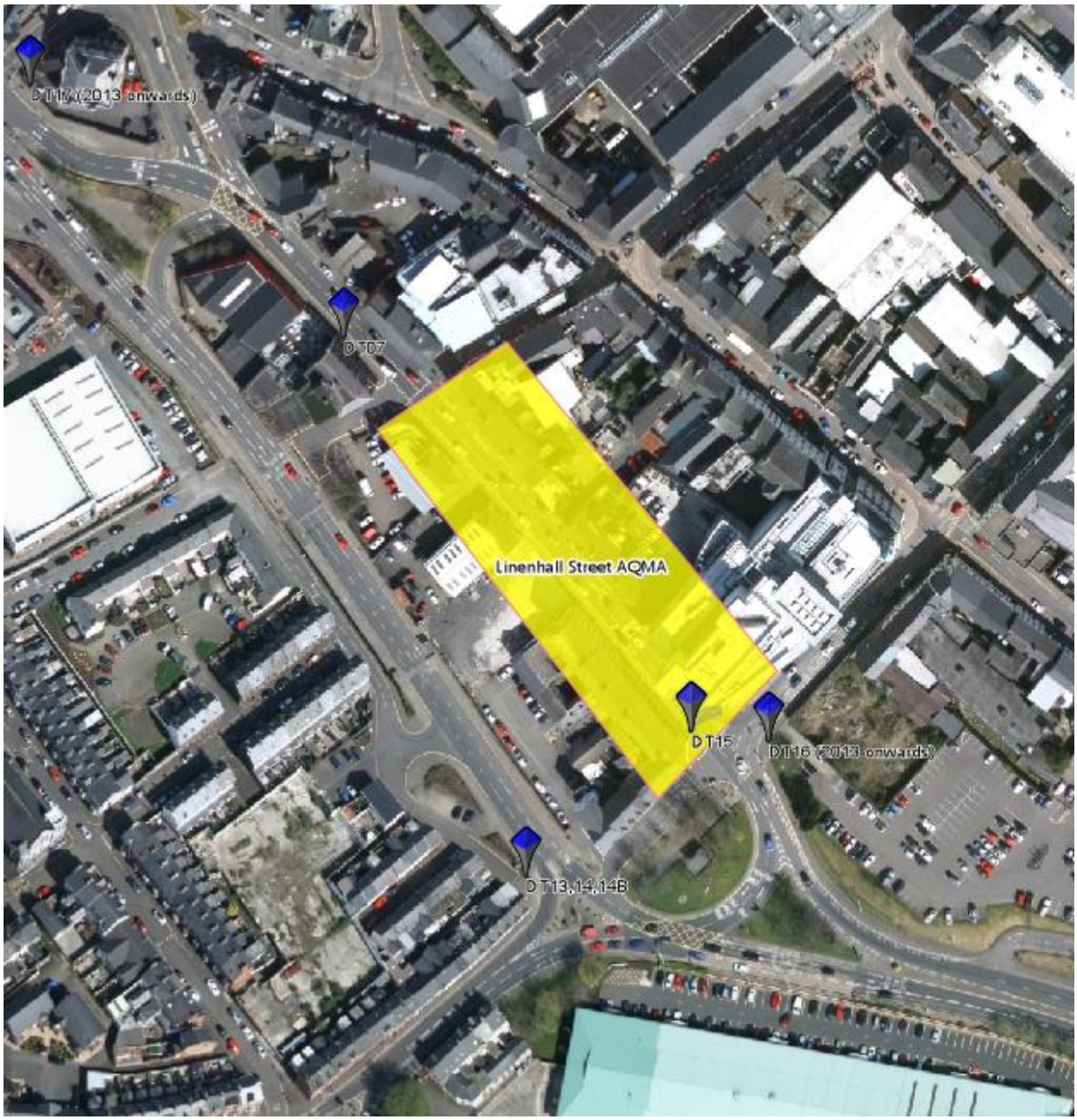


Figure 1.2 Map of Ballymena Linenhall Street AQMA declared for NO_2



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 urban background monitoring site and is located with the Ballykeel AQMA declared for PM_{10}.

This site also houses DEFRA AURN network of SO2, NO2. Also located at the site is defra PAH and black carbon monitor.

Ballymena Antrim Road

Ballymena Antrim Road 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 NO2 analyser and came online in 2017.

Data Management / Auditing for Analysers

All AURN analysers at both sites are centrally managed (CMCU) for DEFRA by Bureau Veritas UK, with according QA/QC standards in place. Mid and East Antrim Borough Council provide the role of Local Support Operators in relation to these sites.

Council also operate affliate SO_2, and PM_{10} at Ballykeel, with Data Management and QA/QC managed by Ricardo AEA in accordance with AURN requirements.

Manual Calibrations are carried out for each analyser in accordance with AURN requirements.

The aim of all analysers is to achieve 90% data capture for all pollutants within any one year.

Table 2 Ballymena Ballykeel Automatic Analyser Data Capture Rates

NO2	99.29% Data Capture
SO2	39.03% Data Capture*
PM10	94.08% Data Capture

Table 3 Ballymena Antrim Road Automatic Analyser Data Capture Rates

NO2	89.33% Data Capture

*Ballymena Ballykeel SO2 analyser experienced a complete failure of the equipment. This analyser was replaced by a new SO2 analyser which can online in July 2020. This analyser was fully funded by DEFRA.

Figure 2.1 Map of Automatic Monitoring Site Ballymena Ballykeel

Figure 2.2 Map of Automatic Monitoring Site Ballymena Antrim Road


Antrim Road AQ Analyser

Table 2.4 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?
	Ballymena Ballykeel	Urban Background	311900	402600	**3**	PM_{10} SO_2 NO_2	Y	TEOM* Fluorescent Chemiluminescence	N	N/A	Y
	Ballymena Antrim Road	Urban Traffic	310843	401776	**2**	NO2	N	Chemiluminescence	N	5m	Y

2.1.2 Non-Automatic Monitoring Sites

Mid and East Antrim Borough Council in 2018 had 37 sites monitored with passive NO2 diffusion tubes:

- 31 of these sites are Roadside, being located on arterial routes within the three main towns of the borough being Ballymena, Carrickfergus and Larne.

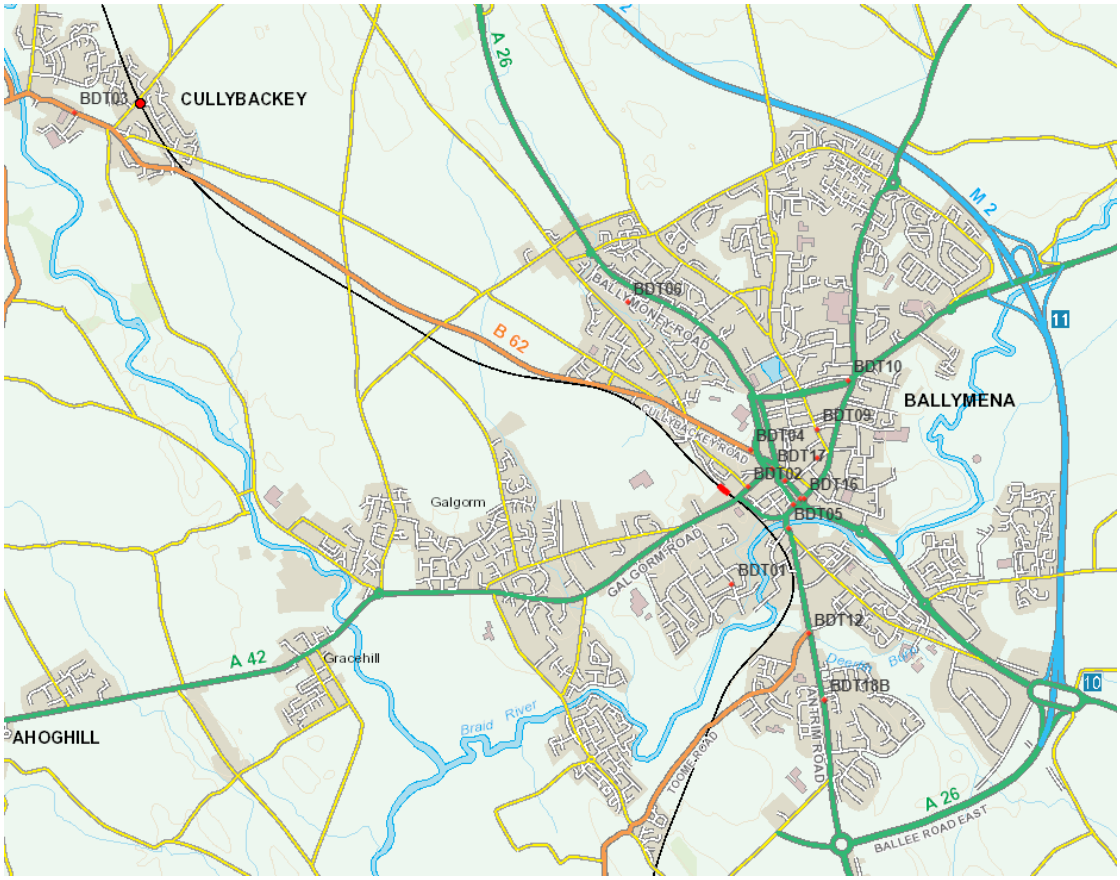
- A triplicate diffusion tube study is co-located at Ballymena Antrim Road Automatic NO_2 Analyser site.

- 4 urban background monitoring sites.

- All NO2 tubes are supplied by Gradko

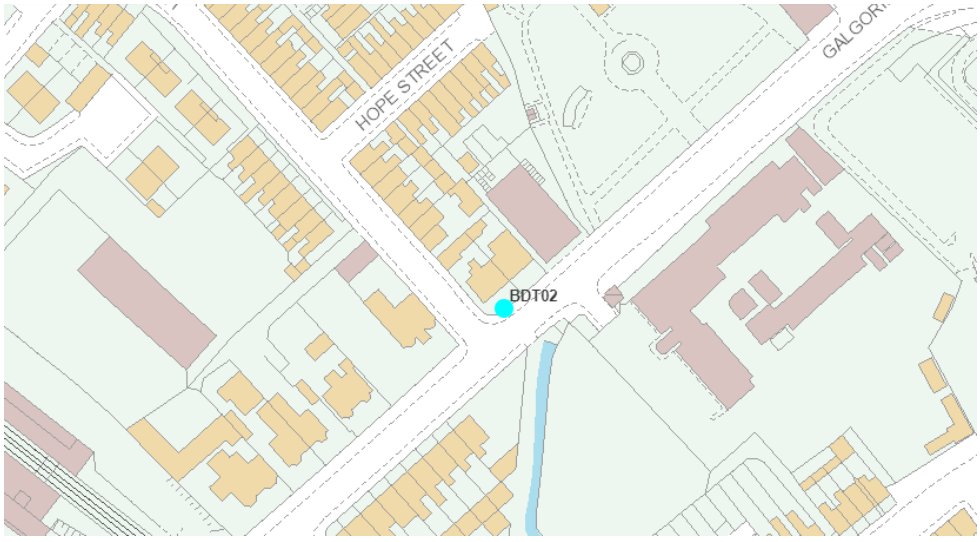
Diffusion Tube monitoring results and the choice of bias adjustment factor is included within Appendix to this report.

Figure 2.3 Map(s) of Non-Automatic Monitoring Sites

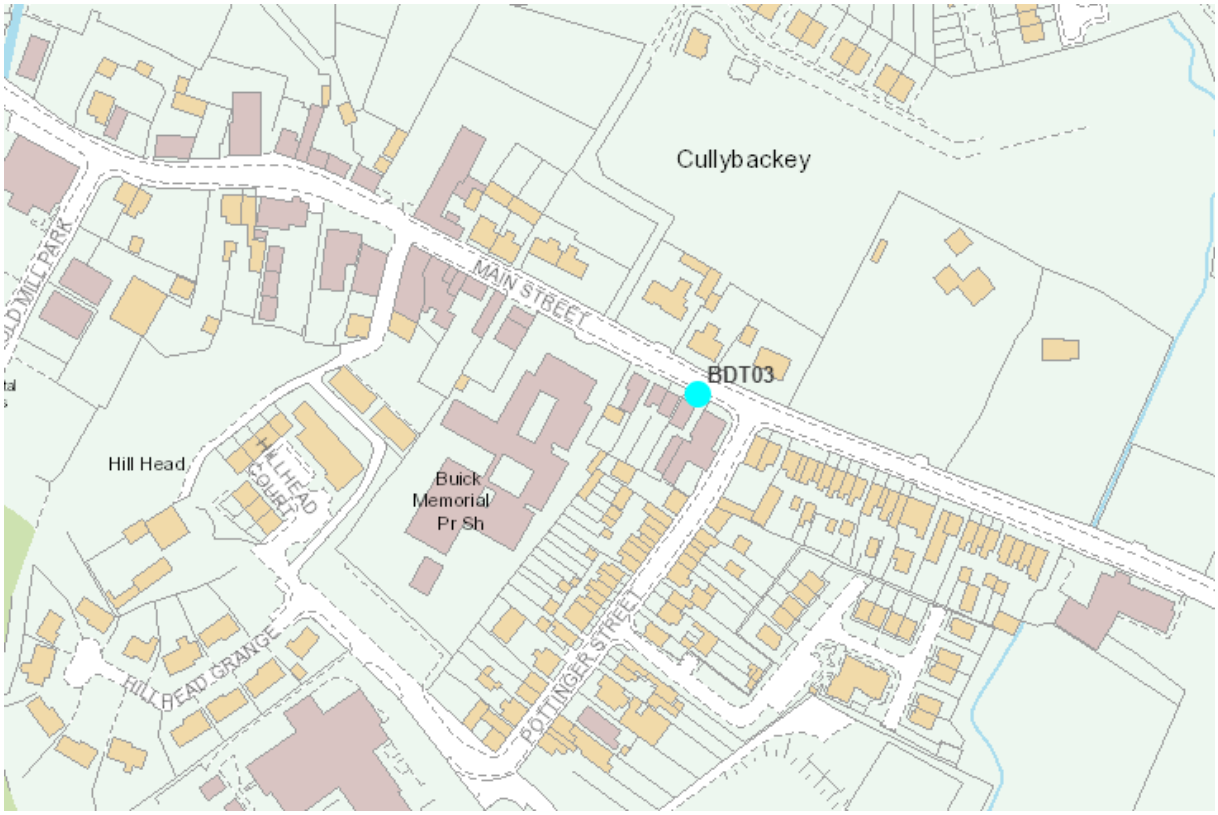


BDT01 – Urban Background Leighinmohr Avenue

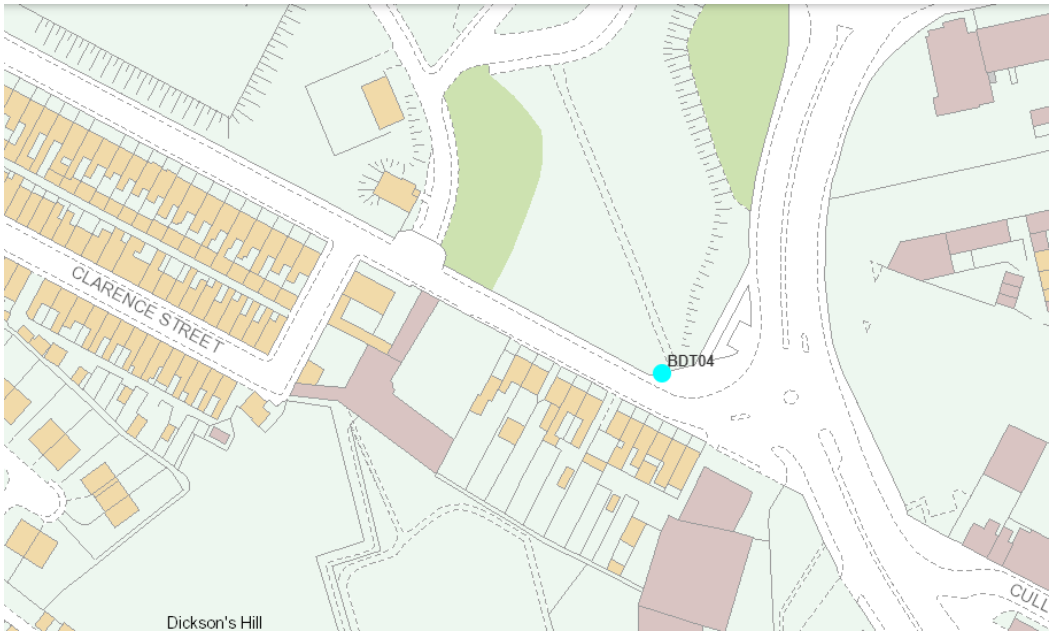
BDT02 – Kerbside – Galgorm Road



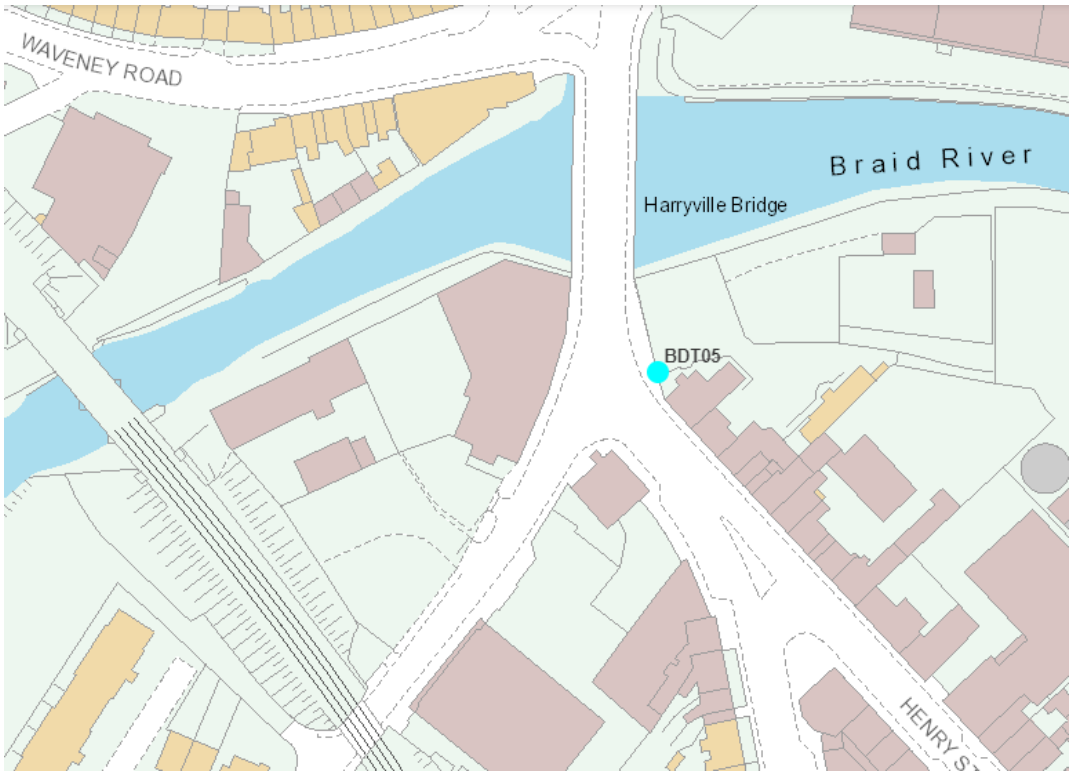
BDT03 – Kerbside – Main Street, Cullybackey



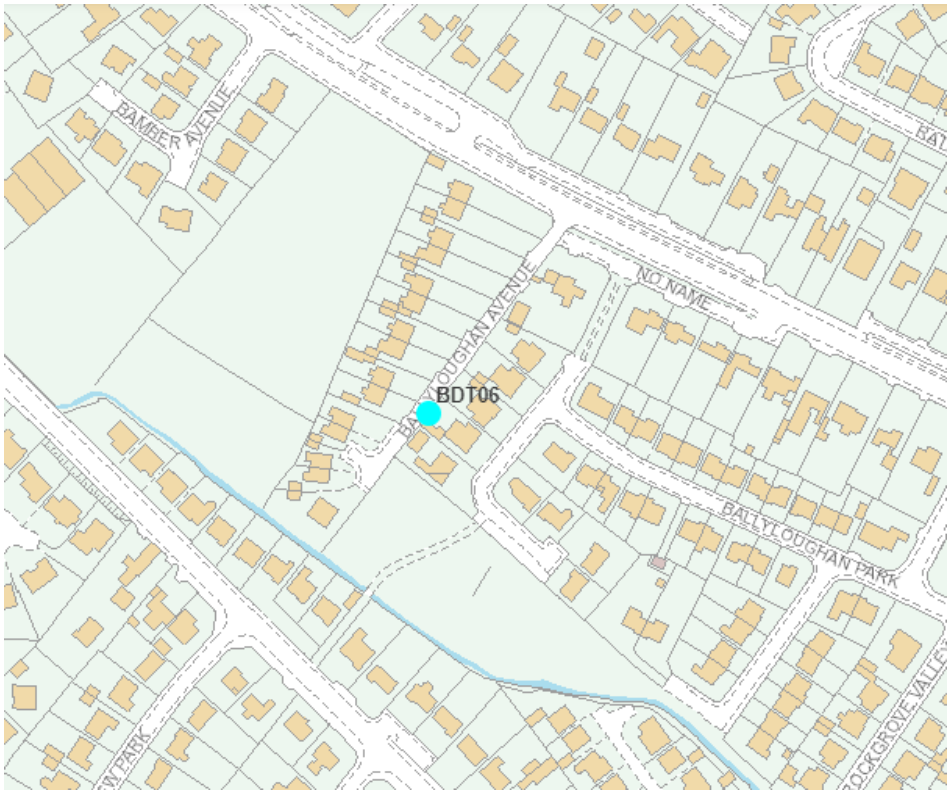
BDT04 – Kerbside – Cullybackey Road



BDT05 – Kerbside – Larne Street



BDT06 – Urban Background – Ballyloughan Avenue



BDT07 – Kerbside – George Street

BDT08 – Kerbside – Wellington Street

BDT13 – Roadside – North Road

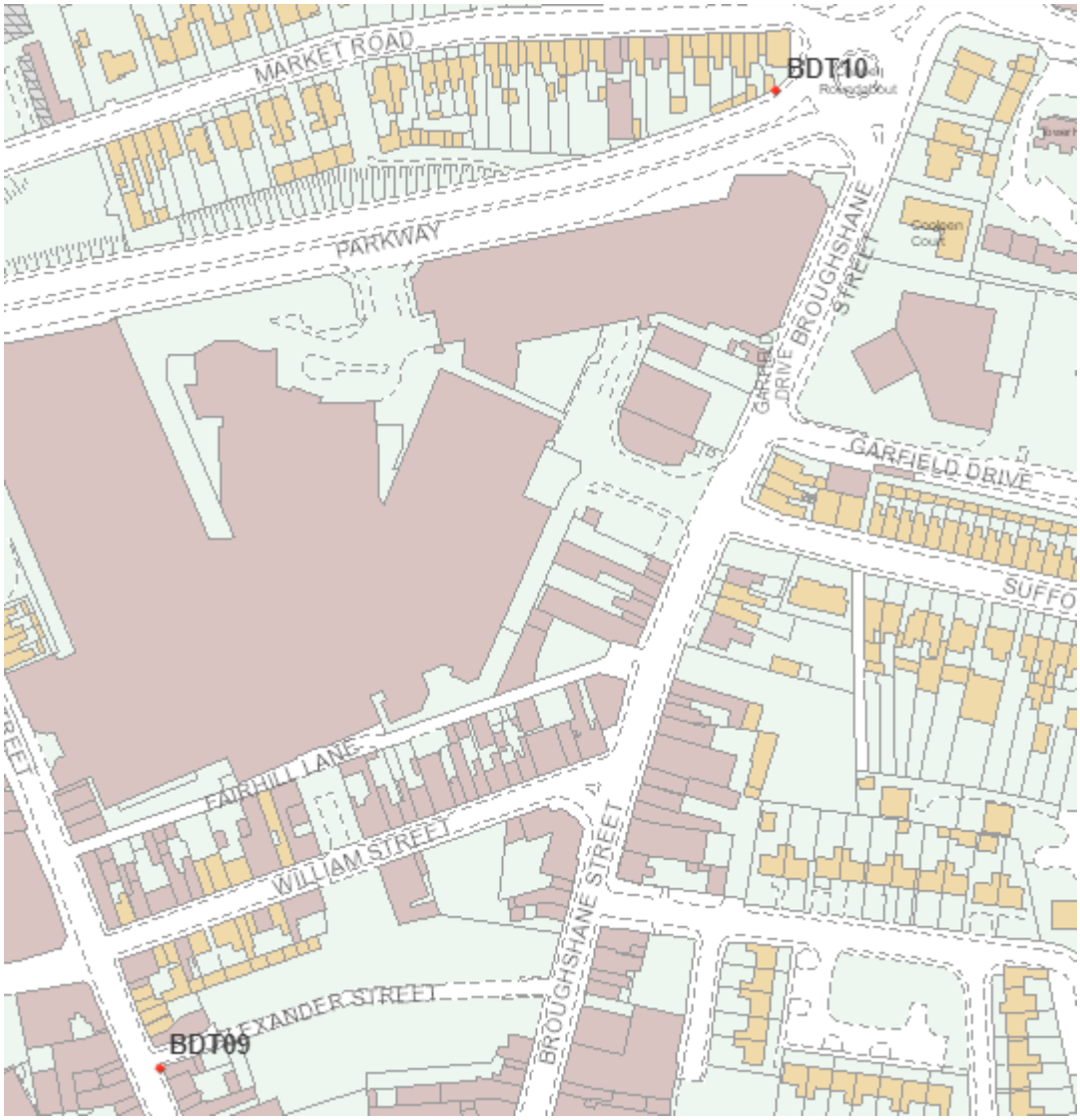
BDT15 – Kerbside – Linenhall Street

BDT16 – Kerbside – Bridge Street

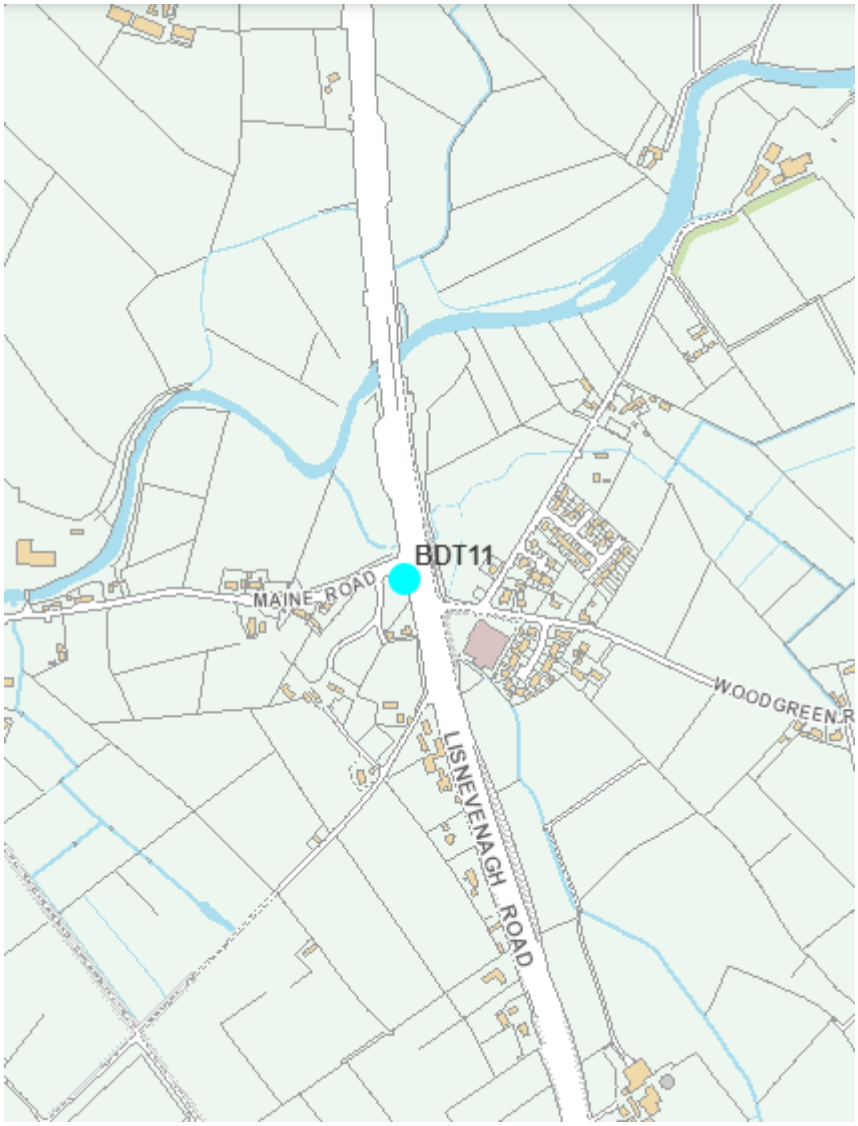
BDT17 – Kerbside – Galgorm Road

BDT09 – Kerbside – Ballymoney Street

BDT10 – Kerbside – Parkway



BDT11 – Roadside – Lisnevenagh Road (A26 Dual Carriageway)

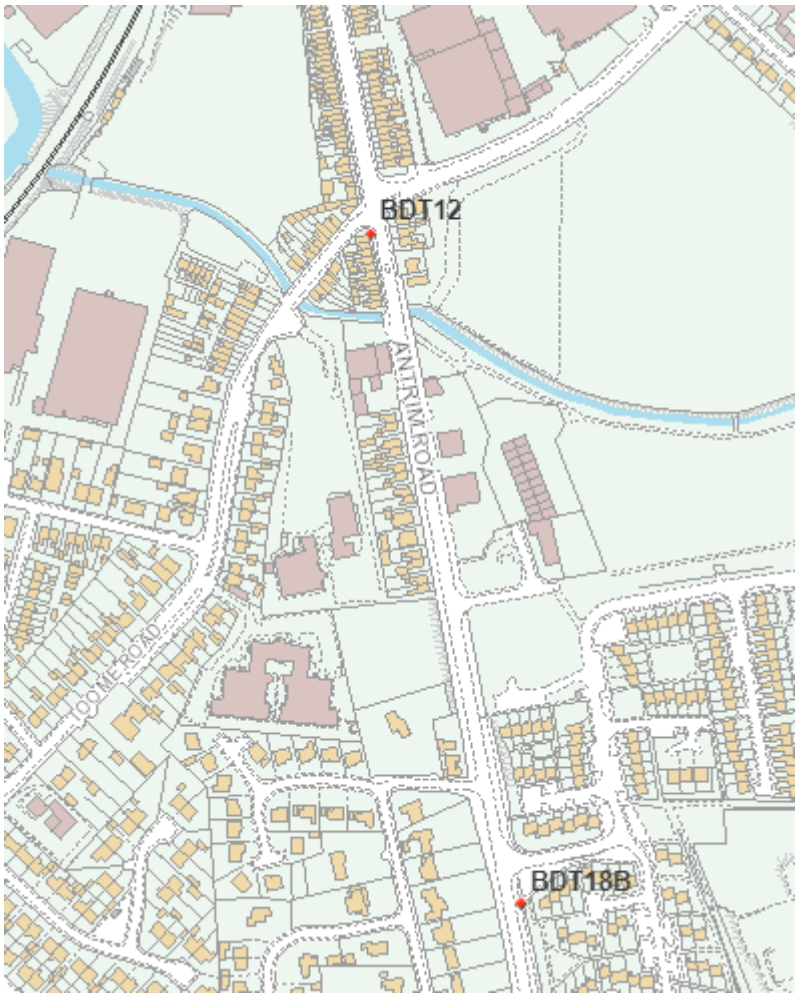


BDT12 – Kerbside – Queen Street

BDT18 – Roadside – Antrim Road Triplicate Study collocated at Automatic Analyser

BDT18A – Roadside – Antrim Road Triplicate Study collocated at Automatic Analyser

BDT18B – Roadside – Antrim Road Triplicate Study collocated at Automatic Analyser



Overview of Carrickfergus Diffusion Tube Locations

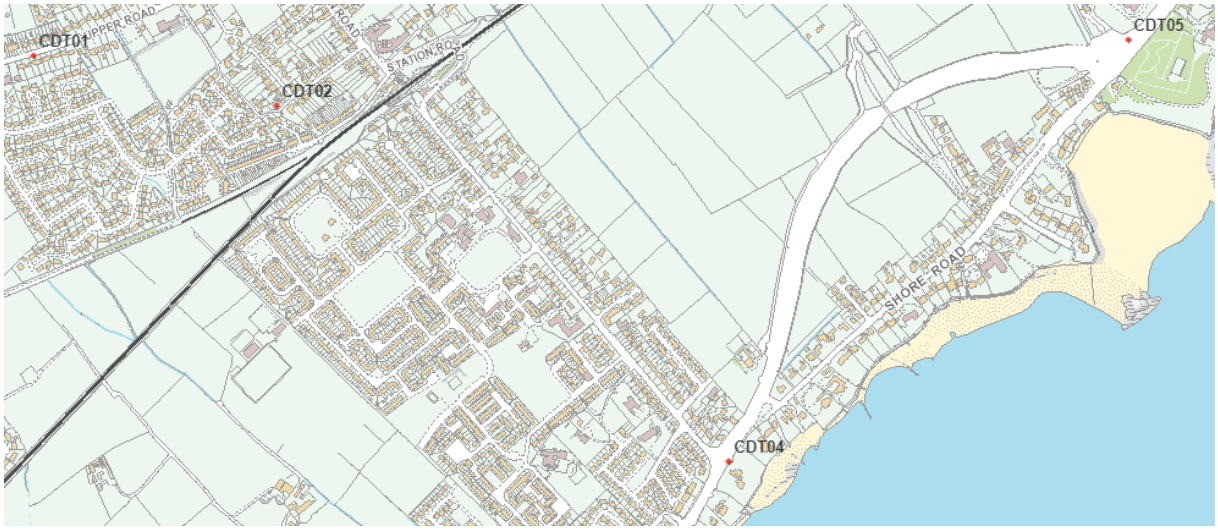
CDT01 – Roadside – 27 Upper Road, Greenisland

CDT02 – Urban Background – 32 Mullaghmore

CDT03 – Roadside – Shore Road Roundabout (Duplicate)

CDT04 - Roadside – Shore Road Roundabout (Duplicate)

CDT05 – Roadside – Seapark Roundabout



CDT06 – Roadside – 93 Belfast Road

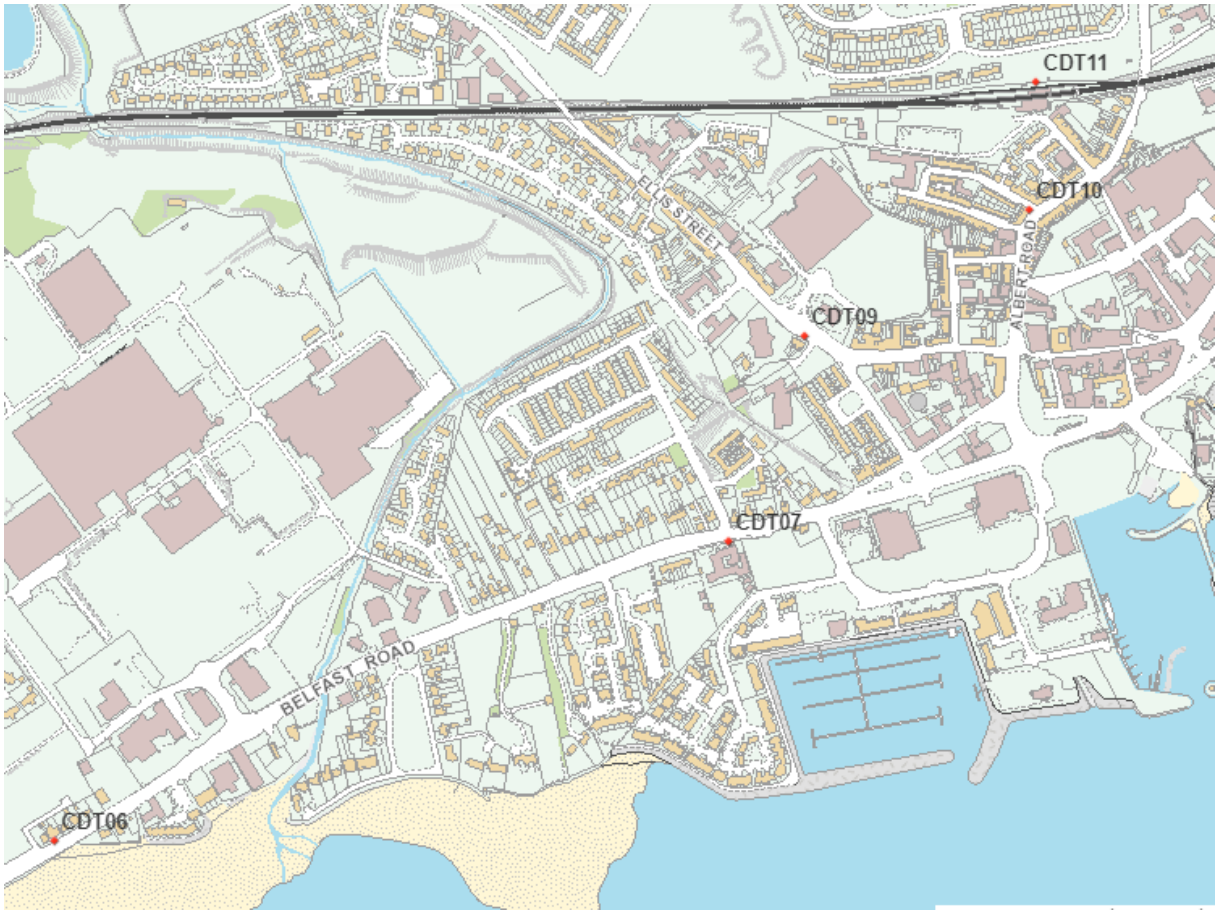
CDT07 – Roadside – Model Primary School, Belfast Road (Duplicate)

CDT08 – Roadside – Model Primary School, Belfast Road (Duplicate)

CDT09 – Roadside – Minorca Place/Tesco Junction

CDT10 – Roadside – 42 Albert Road

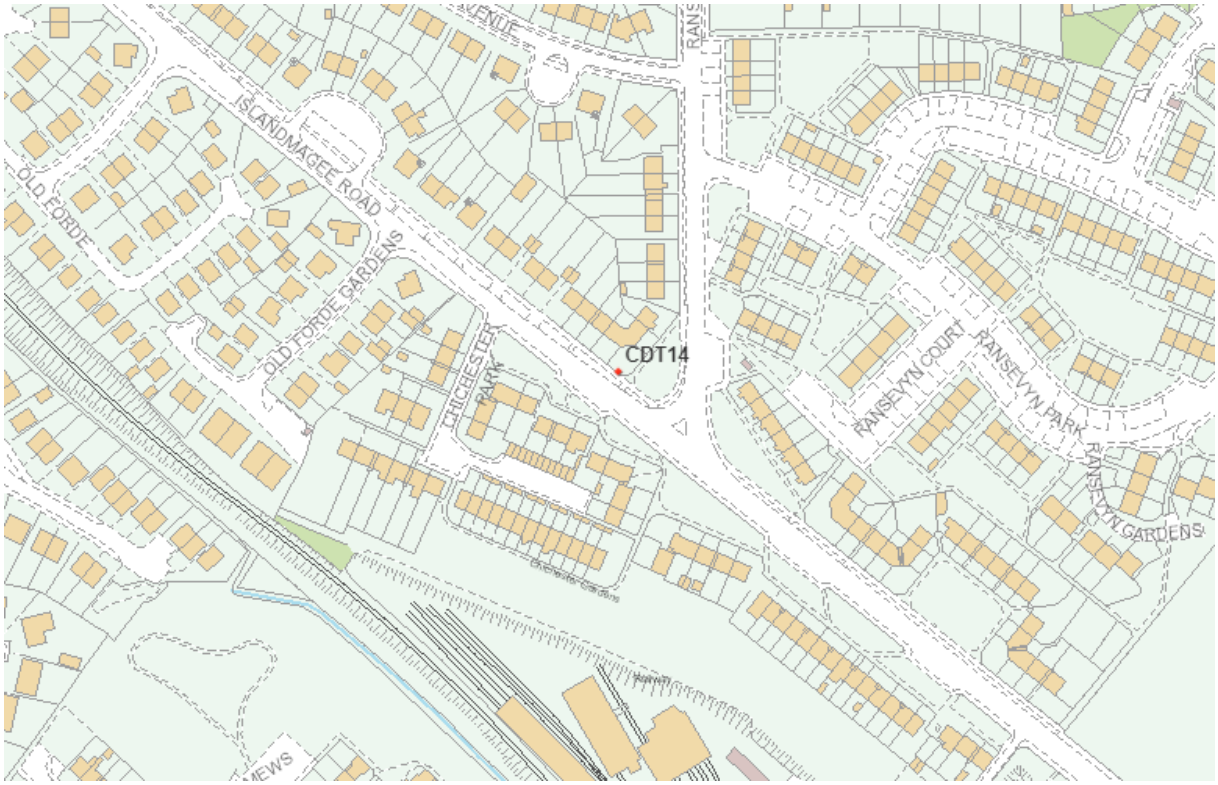
CDT11 – Railway – Railway Station Fergus Avenue



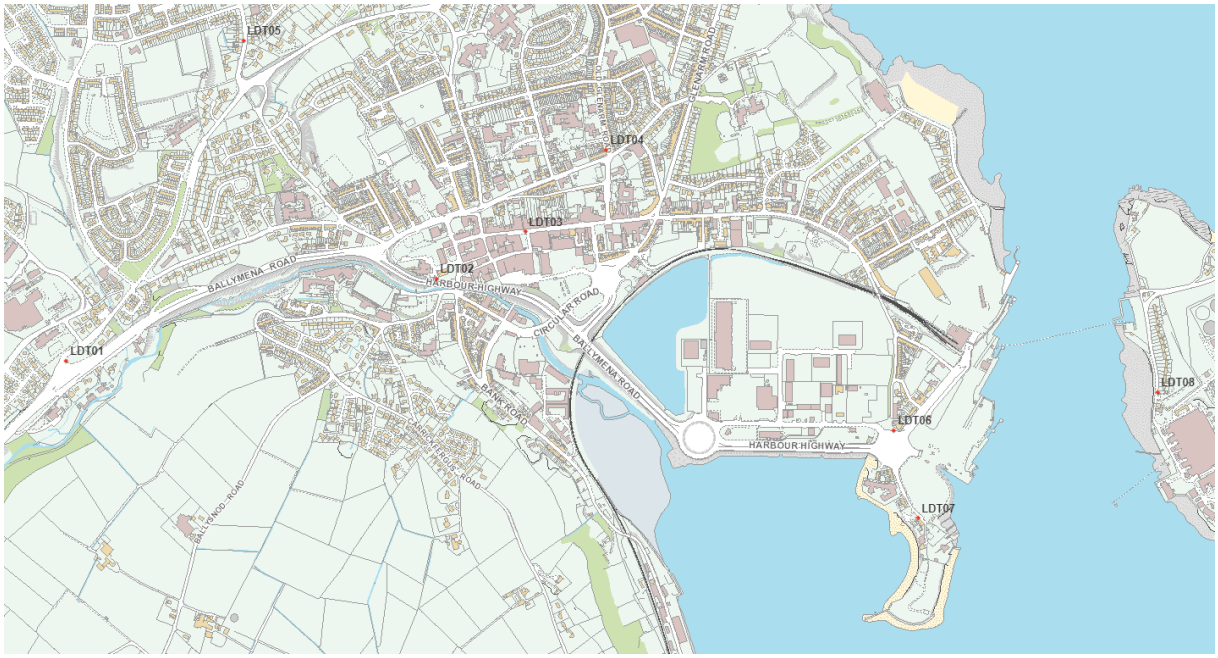
CDT12 – Roadside – Carrick College, North Road

CDT13 – Roadside – Victoria Rd/Larne Road Junction

CDT14 – Roadside – Islandmagee Road, Whitehead



Overview of Diffusion Tube Locations Larne



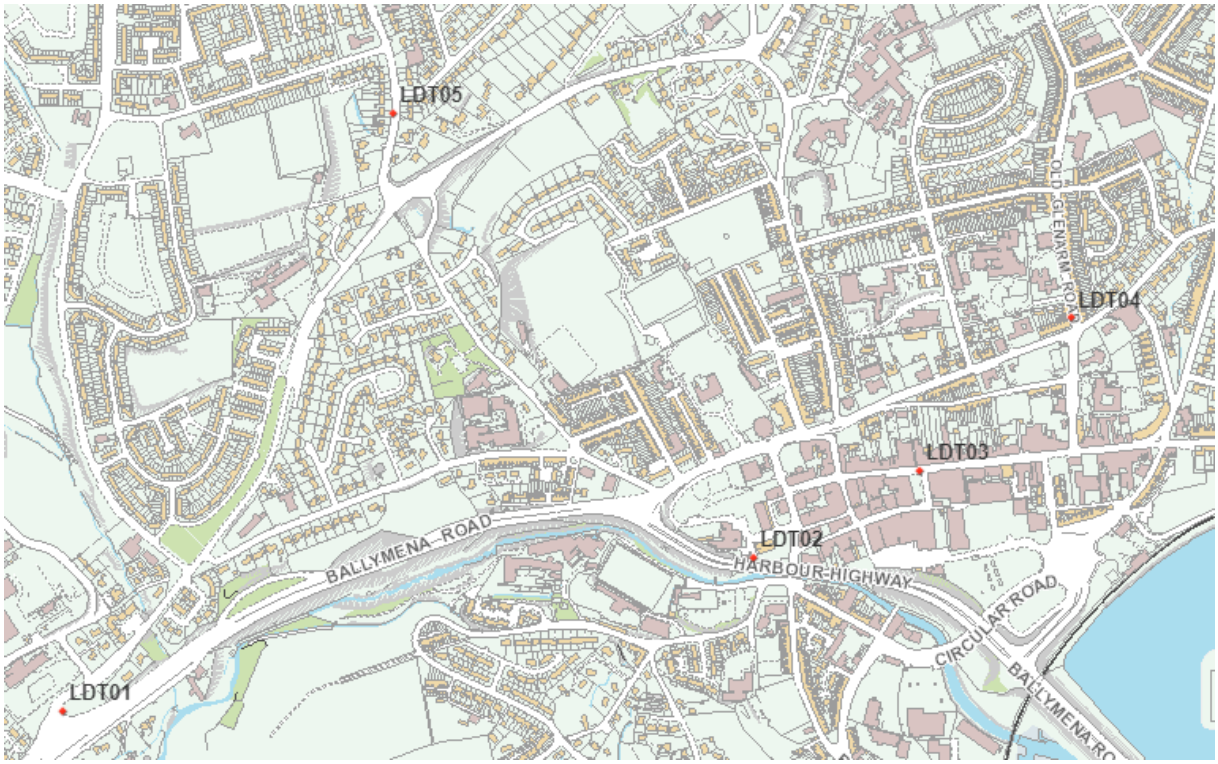
LDT01 – Roadside – A8 Junction

LDT02 – Urban Background – Latharna House, Riverdale

LDT03 – Kerbside – Main Street Larne

LDT04 – Kerbside – Victoria Road/Old Glenarm Road Junction

LDT05 – Roadside – Upper Cairncastle Road



LDT06 – Roadside – Larne Harbour Roundabout

LDT07 – Urban Background – Coastguard Road / Castle Terrace

LDT08 – Industrial – Ballylumford Road, Islandmagee (Ballylumford Power Station)

Table 2.5 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?
BDT01	Leighinmohr Ave	Urban Background	310228	402546	4	NO2	N	N	Y	1.5	N
BDT02	Galgorm Road	Kerbside	310336	403196	3	NO2	N	N	Y	1.8	Y
BDT03	Main St, Cullybackey	Kerbside	305841	405690	3	NO2	N	N	Y	1.0	Y
BDT04	Cullybackey Road	Kerbside	310350	403443	4	NO2	N	N	Y	2.3	Y
BDT05	Larne St	Kerbside	310602	402920	4	NO2	N	N	Y	3.2	Y
BDT06	Ballyloughan Ave	Urban Background	309532	404425	3	NO2	N	N	N	N/A	Y
BDT07	George St	Kerbside	310584	403239	3	NO2	N	N	Y	1.7	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?
BDT08	Wellington St	Kerbside	310795	403386	3	NO2	N	N	Y	1.7	Y
BDT09	Ballymoney St	Kerbside	310796	403582	3	NO2	N	N	Y	3.65	Y
BDT10	Parkway	Kerbside	311000	403905	4	NO2	N	N	Y	1.5	Y
BDT11	Lisnevenagh Rd	Roadside	311884	397037	4	NO2	N	N	Y	2.6	Y
BDT12	Queen St	Kerbside	310743	402219	4	NO2	N	N	Y	2.5	Y
BDT13	North Road	Roadside	310638	403079	2	NO2	N	N	Y	4.0	Y
BDT15	Linenhall St	Kerbside	310687	403122	3	NO2	Y	N	Y	1.2	Y
BDT16	Bridge St	Kerbside	310710	403119	3	NO2	N	N	Y	3.0	Y
BDT17	Galgorm Rd	Kerbside	310491	403314	4	NO2	N	N	Y	3.5	Y
BDT18	Antrim Road	Roadside	310843	401776	1.6	NO2	N	Co Located Antrim Rd	Y	4.0	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?**
BDT18A	Antrim Road	Roadside	310843	401776	1.6	NO2	N	Co Located Antrim Rd	Y	4.0	Y
BDT18B	Antrim Road	Roadside	310843	401776	1.6	NO2	N	Co Located Antrim Rd	Y	4.0	Y
CDT01	27 Upper Road, Greenisland	Roadside	336386	385717	3	NO2	N	N	Y	2.0	Y
CDT02	32 Mullaghmore	Urban Background	336901	385621	2	NO2	N	N	N	N/A	N
CDT03 (Duplicate)	Shore Road Roundabout, Greenisland	Roadside	337882	384850	3	NO2	N	N	Y	3.0	Y
CDT04 (Duplicate)	Shore Road Roundabout, Greenisland	Roadside	337882	384850	3	NO2	N	N	Y	3.0	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?**
CDT05	Seapark Roundabout, Greenisland	Roadside	338747	385764	3	NO2	N	N	Y	1.0	Y
CDT06	93 Belfast Road, Carrickfergus	Roadside	339915	386731	2	NO2	N	N	Y	1.7	Y
CDT07 (Duplicate)	Model PS Belfast Road, Carrickfergus	Roadside	340798	387122	2	NO2	N	N	Y	3.0	Y
CDT08 (Duplicate)	Model PS Belfast Road, Carrickfergus	Roadside	340798	387122	2	NO2	N	N	Y	3.0	Y
CDT09	Minorca Place/ Tesco Junction, Carrickgfergus	Roadside	340898	387391	3	NO2	N	N	Y	2.5	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?
CDT10	42 Albert Road Carrickfergus	Roadside	341192	387556	3	NO2	N	N	Y	5.0	Y
CDT11	RailwayStation Fergus Avenue, Carrickfergus	Railway	341200	387723	3	NO2	N	N	Y	2.0	Y
CDT12	College North Road, Carrickfergus	Roadside	341065	388892	3	NO2	N	N	Y	2.0	Y
CDT13	Victoria Road/Larne Road Junction, Carrickfergus	Roadside	342388	388154	3	NO2	N	N	Y	4.0	Y
CDT14	Islandmagee Road, Whitehead	Roadside	347333	392459	3	NO2	N	N	Y	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?
LDT01	Antiville Road/A8 Junction	Roadside	338658	402187	3	NO2	N	N	Y	3.5	Y
LDT02	Riverdale/Latharna House	Urban Background	339815	402444	3	NO2	N	N	Y	N/A	Y
LDT03	Main Street, Larne	Urban Centre	340093	402590	3	NO2	N	N	Y	N/A	Y
LDT04	Victoria Rd/ Agnew St Junction	Kerbside	340346	402845	4	NO2	N	N	Y	2.4	Y
LDT05	Upper Caincastle Rd	Kerbside	339212	403188	3	NO2	N	N	Y	0.5	Y
LDT06	Larne Harbour Roundabout	Roadside	341246	401970	3	NO2	N	N	Y	5.6	Y
LDT07	Coastguard Rd/Castle Terrace	Urban Background	341321	401696	3	NO2	N	N	N	N/A	N

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?**
LDT08	Ballylumford Rd/ Islandmage	Industrial	342069	402090	3	NO2	N	N	Y	N/A	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

Tables 2.3 and 2.4 summarise recent monitoring data from the council's nitrogen dioxide automatic analysers for 2020 and preceding years from 2016.

Any exceedances of the Air Quality Strategy Objectives are highlighted in bold. In addition, trends in annual mean monitoring data for nitrogen dioxide are summarised in Figure 4.

Operation of the NO_2 analysers was stable throughout the measurement period and data capture rates for both sites is above 85% and so annualised data is not required.

Annual mean concentrations at the at both Ballymena Antrim Road and Ballymena Ballykeel site remain below the 40 µg/m3 annual mean objective for nitrogen dioxide.

No breaches of the 1-hour means above 200µg/m3 noted at either Ballymena Ballykeel, or Ballymena Antrim Road Site.

Table 2.6 Results of Automatic Monitoring for Nitrogen Dioxide: Annual Mean NO_2 Monitoring Results (µg/m^3) 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 2020 % [b]	2016* [c]	2017* [c]	2018* [c]	2019* [c]	2020 [c]
BALY (Ballymena Ballykeel)	Urban Background	Y (not declared for NO_2)	99.29	99.29	**15**	14	16	14	10
BAAR (Ballymena Antrim Road)	Roadside	N	89.33	89.33	N/A	22	22	21	16

In **bold**, exceedance of the NO_2 annual mean AQS objective of 40µg/m^3.

[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.TG16, if monitoring was not carried out for the full year.

*Annual mean concentrations for previous years are optional.

Figure 2.4 Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Automatic Monitoring Sites

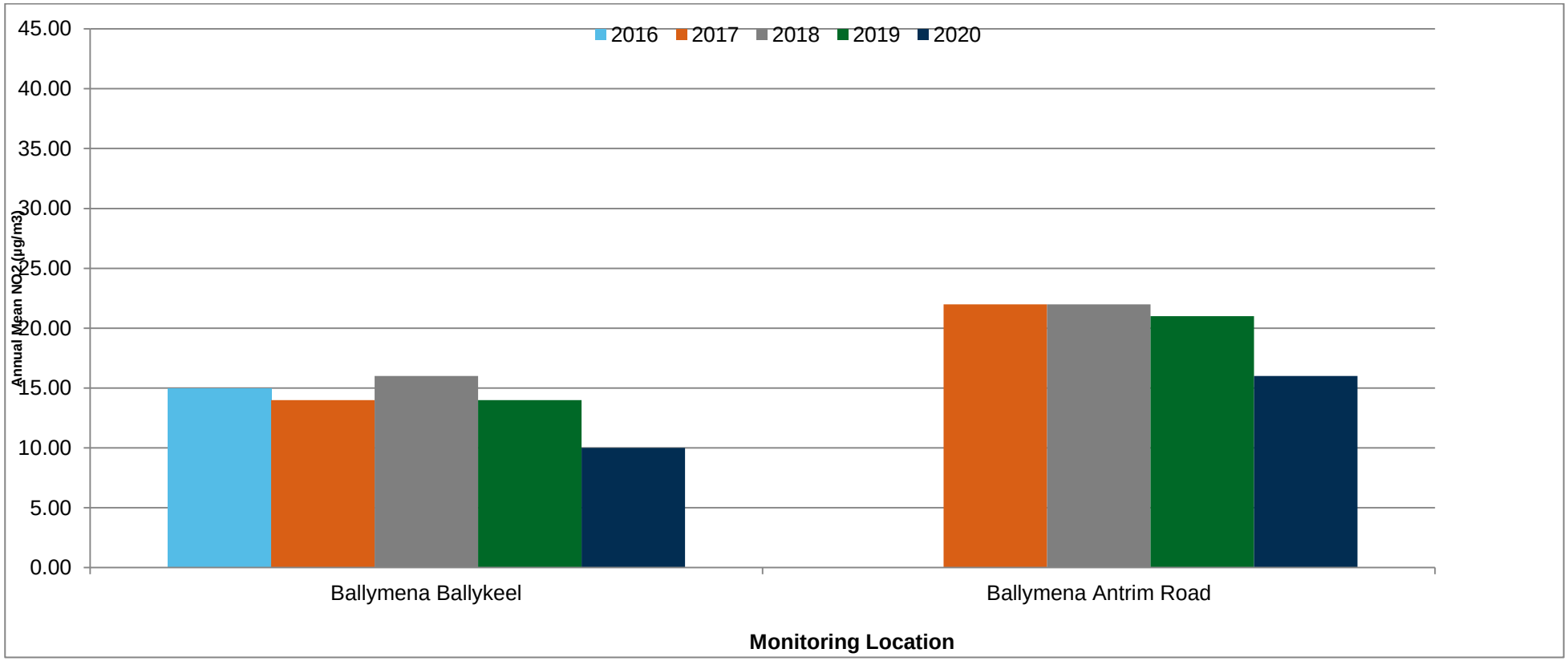


Table 2.7 Results of Automatic Monitoring for Nitrogen Dioxide: Number of Exceedances of 1-hour mean Objective (200µg/m^3)

Site ID	Site Type	Within AQMA? Which AQMA?	Valid Data Capture for period of monitoring %[a]	Valid Data Capture 2020 % [b]	2016* [c]	2017* [c]	2018* [c]	2019* [c]	2020 [c]
BALY (Ballymena Ballykeel)	Urban Background	N	99.29	99.29	**0**	0	0	**0**	**0**
BAAR (Ballymena Antrim Road)	Roadside	N	89.33	89.33	N/A	0	0	0	0

In **bold**, exceedance of the NO_2 hourly mean AQS objective (200µg/m^3 – 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

Diffusion tube data obtained for the year 2020 was supplied by Socotec, the tubes were prepared using the 20% triethanolamine (TEA) in water preparation method.

A triplicate colocation study was introduced at the site of the Ballymena Antrim Road Analyser Site from April 2017 onwards (BT18, BT18A, BT18B)

National bias adjustment factor from the national database for Socotec 20% TEA diffusion tubes based on 37 studies (0.74).

Utilising the measurement data of the triplicate colocation study at Ballymena Antrim Road, the local bias adjustment factor is calculated at 0.76.

There is good correlation between the local and national adjustment All diffusion tube results have been adjusted utilising the local bias factor.

The results of annual mean NO2 concentrations measured using diffusion tubes in 2020 following bias adjustment are reported in Table 2.5

Monthly results of NO2 concentrations without bias adjustment are also provided in Appendix B

The results of NO2 diffusion tube data (2015 – 2020) are presented in Table 2.6

Table 2.8 Results of Nitrogen Dioxide Diffusion Tubes in 2020

Site ID	Location	Site Type	Within AQMA? Which AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2020 (Number of Months or %) [a]	2020 Annual Mean Concentration (µg/m^3) - Bias Adjustment factor = 0.76 [b]
BDT01	Leighinmohr Ave	Urban background	N	N	12	7.47
BDT02	Galgorm Road	Kerbside	N	N	12	22.15
BDT03	Main St, Cullybackey	Kerbside	N	N	12	14.93
BDT04	Cullybackey Road	Kerbside	N	N	12	17.45
BDT05	Larne St	Kerbside	N	N	12	16.18
BDT06	Ballyloughan Ave	Urban background	N	N	12	6.41
BDT07	George St	Kerbside	Y	N	11	32.21
BDT08	Wellington St	Kerbside	N	N	12	13.33
BDT09	Ballymoney	Kerbside	N	N	12	14.57
BDT10	Parkway	Kerbside	N	N	12	18.07
BDT11	Lisnevenagh Rd	Road Side	N	N	12	17.19
BDT12	Queen St	Kerbside	N	N	10	18.27
BDT13	North Road	Road Side	Y	N	12	17.43
BDT15	Linenhall St	Kerbside	Y	N	12	32.79
BDT16	Bridge St	Kerbside	N	N	11	19.13
BDT17	Galgorm Rd	Kerbside	N	N	12	23.88
BDT18	Antrim Road	Road Side	N	Co Located	12	15.34
BDT18A	Antrim Road	Road Side	N	Co Located	12	14.80
BDT18B	Antrim Road	Road Side	N	Co Located	12	14.87
CDT01	Upper Road	Road Side	N	N	10	13.76

CDT02	32 Mullaghmore Park	Urban background	N	N	12	7.22
CDT03	Station Road Traffic Lights	Road Side	N	N	12	21.22
CDT04	Station Road Traffic Lights	Road Side	N	N	12	19.71
CDT05	Sea Park	Road Side	N	N	12	10.22
CDT06	91 Shore Road	Road Side	N	N	11	17.90
CDT07	Model PS	Road Side	N	N	12	18.95
CDT08	Model PS	Road Side	N	N	12	20.49
CDT09	Tesco Minorca Place	Road Side	N	N	10	16.99
CDT10	Albert Road	Road Side	N	N	11	14.60
CDT11	Fergus Ave	Road Side	N	N	12	11.59
CDT12	North Road	Road Side	N	N	12	10.79
CDT13	Larne Road	Road Side	N	N	12	15.09
CDT14	Islandmagee Road	Road Side	N	N	10	8.20
LDT01	Antville Roundabout	Road Side	N	N	11	14.36
LDT02	Latharna House	Urban background	N	N	11	9.33
LDT03	Main Street	Kerbside	N	N	12	12.68
LDT04	Old Glenarm Rd	Kerbside	N	N	12	15.05
LDT05	Upper Cairncaster Rd	Kerbside	N	N	12	11.59
LDT06	Harbour	Road Side	N	N	12	10.80
LDT07	Castle Terrace	Urban background	N	N	12	7.78
LDT08	Ballylumford	Industrial	N	N	12	9.21

In **bold**, exceedance of the NO_2 annual mean AQS objective of 40µg/m^3.

Underlined, annual mean > 60µg/m^3, indicating a potential exceedance of the NO_2 hourly mean AQS objective.

[a] Means should be “annualised” as per LAQM.TG16, 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, NO_2 concentration at the nearest relevant exposure should be estimated based on the NO_2 fall-off with distance calculator, and results should be discussed in a specific section.

Table 2.9 Results of Nitrogen Dioxide Diffusion Tubes, adjusted for bias (µg/m^3): 2016 to 2020

Site ID	Site Type	Within AQMA? Which AQMA?	2016[a] (Bias Adjustment Factor = 0.92)	2017[a] (Bias Adjustment Factor = 0.87)	2018[a] (Bias Adjustment Factor = 0.93)	2019[a] (Bias Adjustment Factor = 0.93)	2020[a] (Bias Adjustment Factor = 0.76)
BDT01	Urban background	N	9.6	10.2	11.4	11.1	7.47
BDT02	Kerbside	N	35.1	29.7	32.0	29.8	22.15
BDT03	Kerbside	N	24.4	21.9	22.0	21.7	14.93
BDT04	Kerbside	N	28.4	26.3	26.9	27.0	17.45
BDT05	Kerbside	N	24.5	25.6	26.3	23.8	16.18
BDT06	Urban background	N	10.6	9.6	10.8	9.3	6.41
BDT07	Kerbside	Y	41.7	41.2	48.7	44.3	32.21
BDT08	Kerbside	N	23.6	25.2	23.2	22.1	13.33
BDT09	Kerbside	N	24.3	21.7	21.7	22.3	14.57
BDT10	Kerbside	N	29.4	27.9	27.6	27.0	18.07
BDT11	Road Side	N	27.7	25.1	29.3	27.4	17.19
BDT12	Kerbside	N	28.3	26.1	27.8	27.2	18.27
BDT13	Road Side	Y	27.5	24.2	27.9	27.6	17.43
BDT14	Road Side	Y	28.2	Site Removed			
BDT14B	Road Side	Y	26.2	Site Removed			
BDT15	Kerbside	N	45.6	44.4	46.1	44.6	32.79
BDT16	Kerbside	N	32.1	28.0	29.3	30.5	19.13
BDT17	Kerbside	N	37.9	35.1	37.3	34.9	23.88
BDT18	Road Side	N	-	21.1	22.5	22.4	15.34
BDT18A	Road Side	N	-	20.9	23.7	22.2	14.80
BDT18B	Road Side	N	-	20.2	22.2	22.3	14.87
CDT01	Road Side	N	22.1	20.7	20.0	17.8	13.76
CDT02	Urban background	N	8.9	8.6	14.9	13.0	7.22

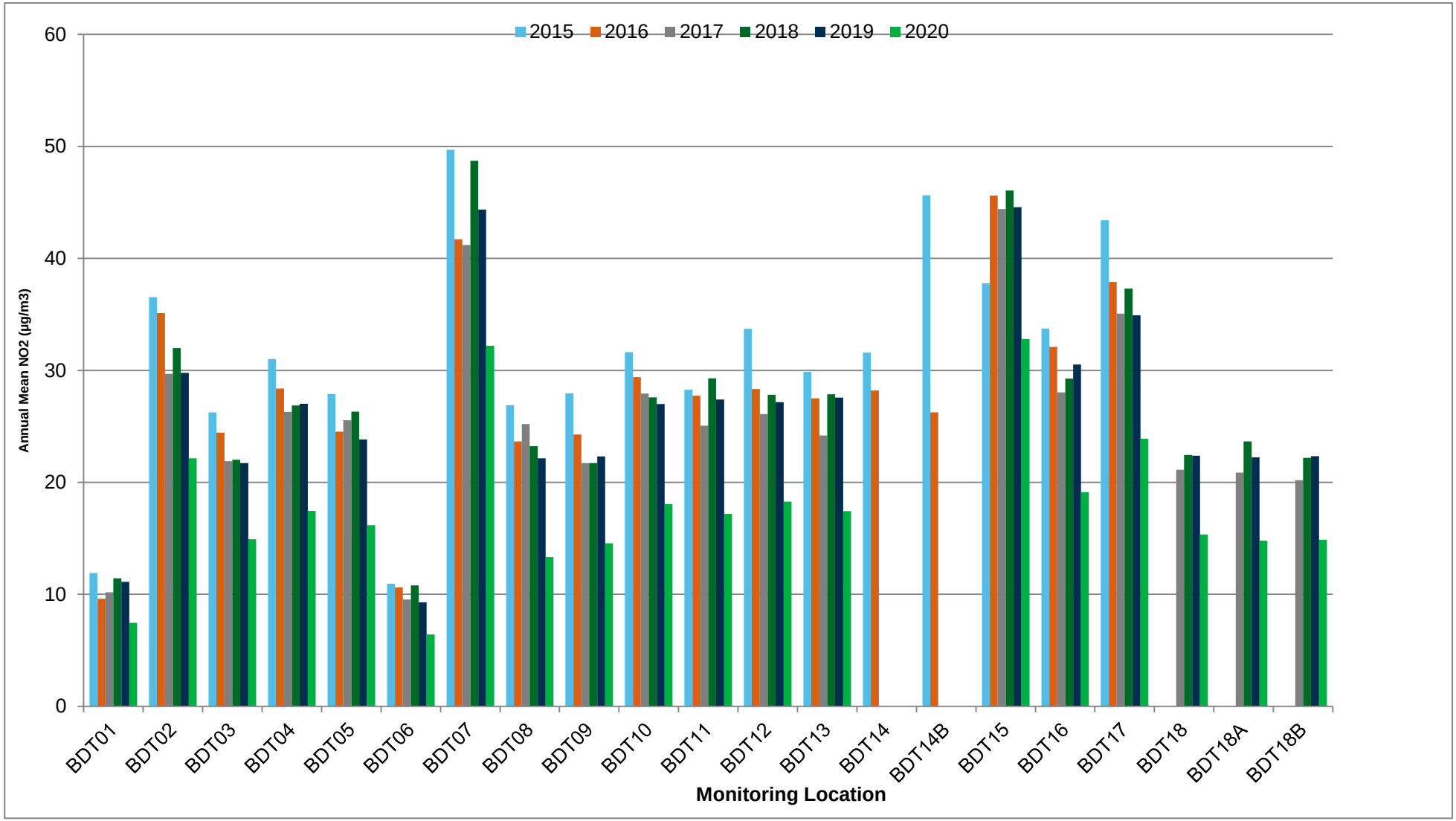
CDT03	Road Side	N	30.1	32.0	28.3	27.1	21.22
CDT04	Road Side	N	29.6	29.5	23.8	25.0	19.71
CDT05	Road Side	N	28.4	28.5	28.6	27.0	10.22
CDT06	Road Side	N	33.5	26.6	26.6	26.4	17.90
CDT07	Road Side	N	29.6	26.6	28.2	30.4	18.95
CDT08	Road Side	N	30.4	25.2	30.5	27.9	20.49
CDT09	Road Side	N	25.8	22.7	27.1	24.6	16.99
CDT10	Road Side	N	20.9	20.5	24.4	22.0	14.60
CDT11	Road Side	N	13.4	13.8	14.3	11.9	11.59
CDT12	Road Side	N	19.0	16.0	20.6	18.1	10.79
CDT13	Road Side	N	26.0	24.7	24.5	23.3	15.09
CDT14	Road Side	N	12.0	12.1	17.4	15.7	8.20
LDT01	Road Side	N	20.2	19.9	22.9	23.0	14.36
LDT02	Urban background	N	12.3	11.4	14.1	13.9	9.33
LDT03	Kerbside	N	21.0	19.1	21.1	18.3	12.68
LDT04	Kerbside	N	22.1	24.1	18.2	20.0	15.05
LDT05	Kerbside	N	17.0	16.0	16.3	17.5	11.59
LDT06	Road Side	N	10.8	12.4	13.5	13.2	10.80
LDT07	Urban background		10.4	9.6	12.7	9.2	7.78
LDT08	Industrial		9.9	10.3	10.9	9.3	9.21

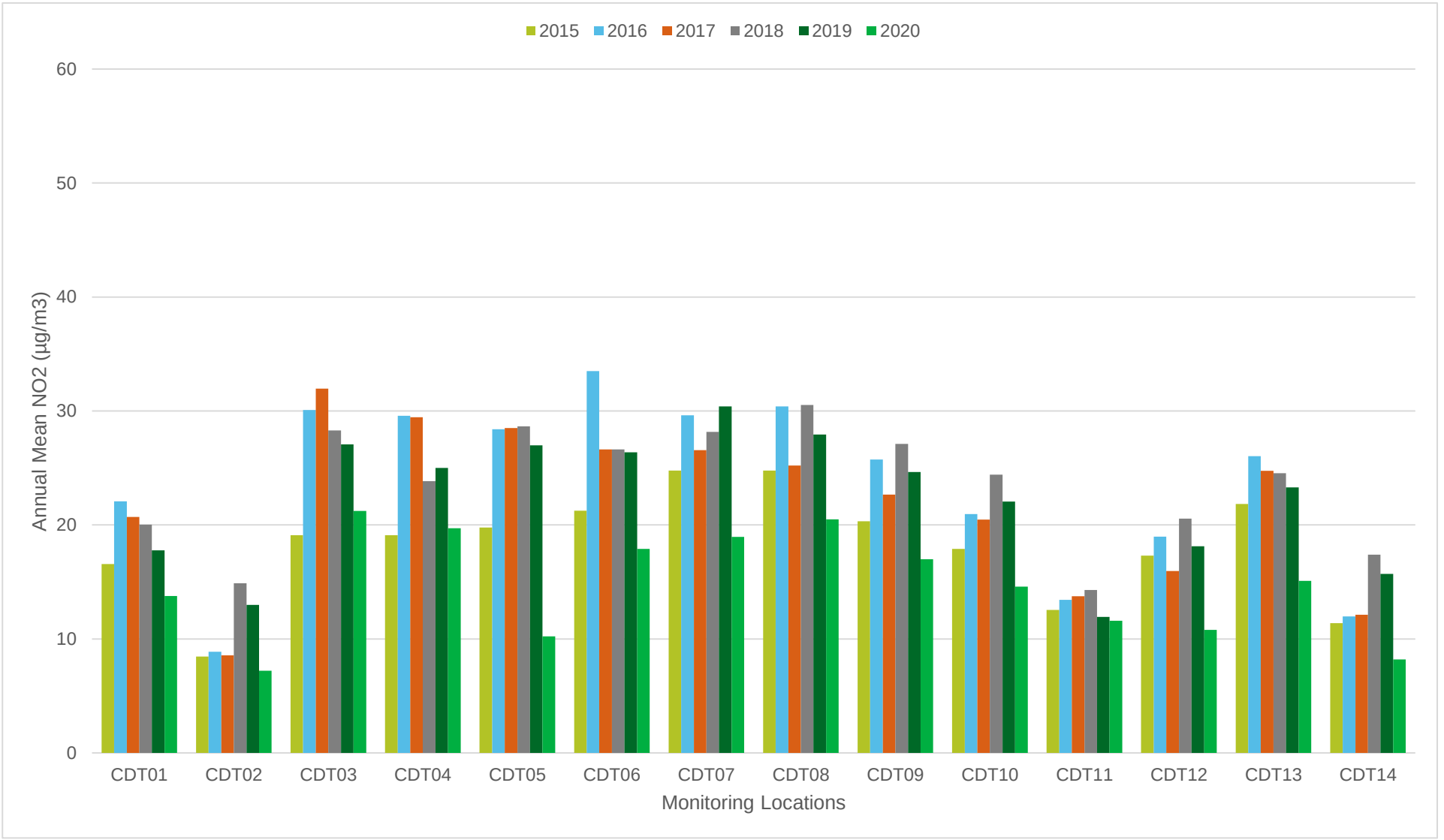
In **bold**, exceedance of the NO_2 annual mean AQS objective of 40µg/m^3.

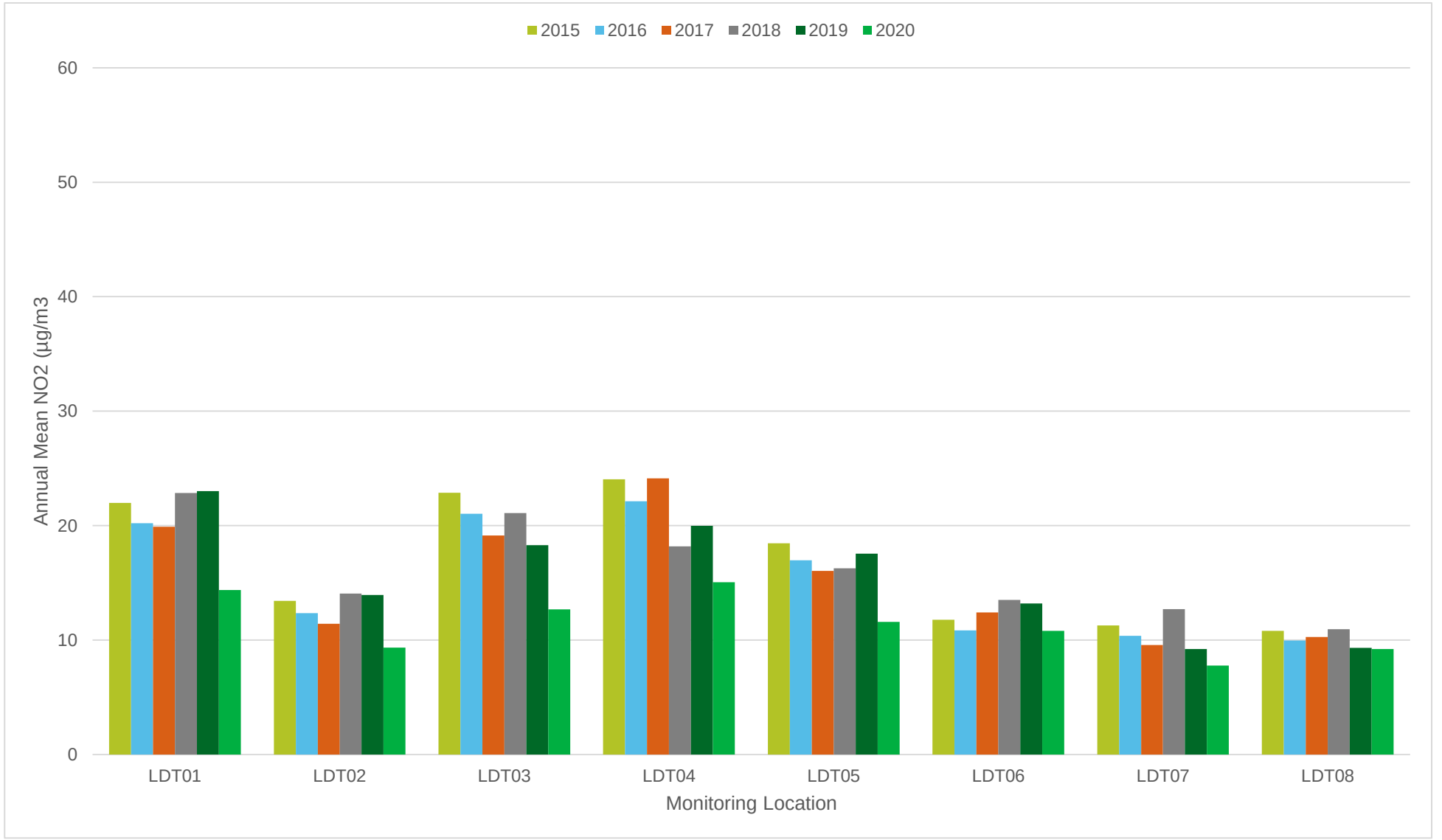
Underlined, annual mean > 60µg/m^3, indicating a potential exceedance of the NO_2 hourly mean AQS objective.

[a] Means should be “annualised” as per LAQM.TG16, if full calendar year data capture is less than 75%.

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




2015
2016
2017
2018
2019
2020
60
50
40
30
20
10
0
Annual Mean NO2 (µg/m3)
CDT01
CDT02
CDT03
CDT04
CDT05
CDT06
CDT07
CDT08
CDT09
CDT10
CDT11
CDT12
CDT13
CDT14
Monitoring Locations


2015
2016
2017
2018
2019
2020
60
50
40
30
20
10
0
Annual Mean NO2 (µg/m3
LDT01
LDT02
LDT03
LDT04
LDT05
LDT06
LDT07
LDT08
Monitoring Location

2.2.2 Particulate Matter (PM_{10})

Ballykeel Air Quality Management Area was declared due to the high reliance on solid fuel for domestic heating.

The Action Plan for reducing

Mid and East Antrim Borough Council undertook real time monitoring of PM10 using a TEOM analysis.

No exceedences of PM10 AQS objectives noted in 2020 monitoring period at the site.

Table 2.10 Annual Mean PM_{10} Monitoring Results ($\mu g/m^3$) for Comparison with the Annual Mean Objective

Site ID	Site Type	Within AQMA? Which AQMA?	Valid Data Capture for monitoring Period %[a]	Valid Data Capture 2020 %[b]	Confirm Gravimetric Equivalent (Y or N/A)	2016	2017	2018	2019	2020
BALY (Ballymena Ballykeel)	Urban Background	Y	94.08	94.08	Y	15.0	15.32	14.0	14.0	15.0

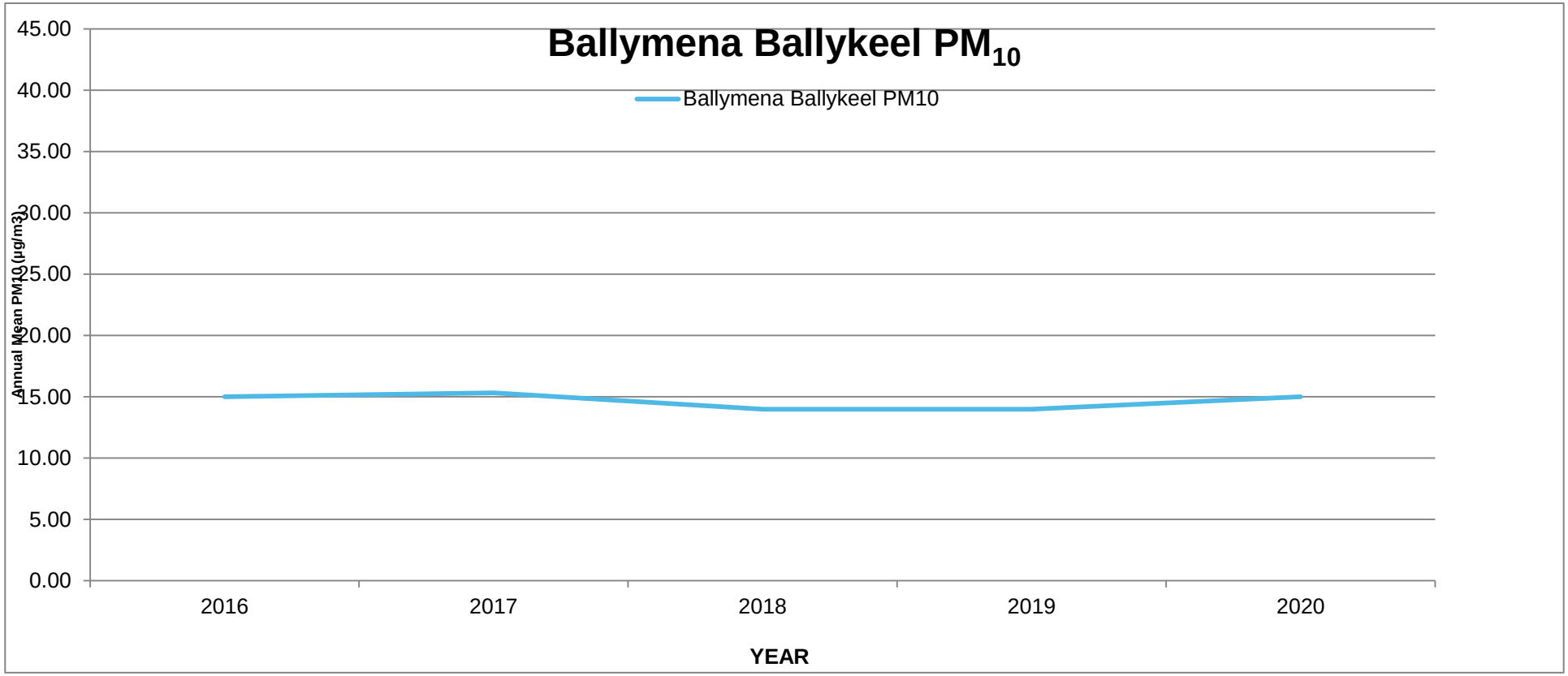
In **bold,** exceedance of the PM_{10} annual mean AQS objective of 40$\mu g/m^3$.

Table 2.11 Results of Automatic Monitoring for PM_{10}: Number of Exceedances of 24-hour mean Objective (50µg/m^3)

Site ID	Site Type	Within AQMA? Which AQMA?	Valid Data Capture for monitoring Period %[a]	Valid Data Capture 2020 %[b]	Confirm Gravimetric Equivalent	2016	2017	2018	2019	2020
BALY (Ballymena Ballykeel)	Urban Background	Y	94.08	94.08	Y	0	2	0	0	0

In **bold**, exceedance of the PM_{10} daily mean AQS objective (50µg/m^3 – not to be exceeded more than 35 times per year).

Figure 2.6 Trends in Annual Mean PM_{10} Concentrations



2.2.3 Sulphur Dioxide

If SO_2 monitoring is available then provide a table of results. A recommended format for the table of results is given below. This should answer the following questions:

- Are there more than 35 15-minute means greater than 266µg/m^3? (Or if the period of valid data is less than 85% of a full year, is the 99.9th percentile of 15-minute means greater than this value?)
- Are there more than 24 1-hour means greater than 350µg/m^3? (Or if the period of valid data is less than 85% of a full year, is the 99.7th percentile of 1-hour means greater than this value?)
- Are there more than 3 24-hour means greater than 125µg/m^3? (Or if the period of valid data is less than 85% of a full year, is the 99.2th percentile of 24-hour means greater than this value?)

Comment on whether there are exceedances of the air quality objectives for SO_2 and whether they occur within or outside AQMAs.

Ensure that the monitoring site locations are representative of relevant public exposure. Also flag if there are concentrations above the air quality objectives for SO_2 measured at monitoring sites which are not representative of public exposure.

Exceedances of the relevant SO_2 AQS objectives (or relevant percentiles if data capture is less than 85% for a full year) should be highlighted in **bold**.

Where possible, previous years' statistics should be included for comparison but this is not a requirement.

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As a result of a historic reliance upon solid fuel for domestic heating, Air Quality Management area was declared for Ballymena Ballykeel Area.

However with the completion of works within the air quality action plan, namely Northern Ireland Housing Executive carrying out works to install Gas heating within their housing

stock, there have been decreasing levels of sulphur dioxide and there have been no exceedances of any sulphur dioxide objective in the city since pre 2010.

The SO2 Analyser at Ballykeel is part of AURN network and is associated with the PM10 analysis for the area. Whilst the air quality management area, is no longer required to reduce the level of SO2, it has been decided to maintain the level of monitoring of pollutants at the site,, including SO2.

In later months of 2019, a new SO2 analyser was installed at the Ballymena Ballykeel Site, under a direct contract by DEFRA. Sadly there was an issue with this analyser and due to the travel restrictions starting in March 2020, under Covid-19 travel restrictions we were unable to get ESU support to remove the analyser for repair.

This was finally achieved with the reinstallation of the analyser and commissioning in Summer 2020.

Data management for the AURN SO2 analyser is carried out by Bureau Veritas and they were unable to ratify data from the analyser until its repair, with data being beyond permitted perameters.

As a result the data capture rate for SO2 at the Ballymena Ballykeel monitoring station was 39%, and so methodology is available to carry out any reliable data analysis or annualising.

Table 2.12 Results of Automatic Monitoring of SO_2: Number of Exceedances of Objectives (percentile in bracket)

Site ID	Site Type	Within AQMA? Which AQMA?	Valid Data Capture for monitoring Period %[a]	Valid Data Capture 2020 %[b]	15-minute Means > 266µg/m^3	1-hour Means > 350µg/m^3	24-hour Means > 125µg/m^3
BALY	Urban Background	Y	39	39			

[c] if data capture is less than 85%, include the relevant percentile in brackets (in µg/m^3): 15-min mean = 99.9th ; 1-hour mean = 99.7th ; 24-hour mean = 99.2th percentile.

The level of data capture is such that no methodologies are available to provide annualised results.

2.2.4 Summary of Compliance with AQS Objectives

Mid and East Antrim Borough Council has examined the results from monitoring in the borough. Concentrations outside of the AQMA are all below the objectives at relevant locations, 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/HDVs.

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

Mid and East Antrim Borough Council confirms that there are no new/proposed roads.

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 Stream 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

Located within the Borough is the Port of Larne. Diffusion tube analysis is recorded at several locations in the vicinity of the Port, and no noted increase in NO_2 is noted.

The screening assessment approach is to collect information regarding the number of ship movements per year, where such movements are confined to large ships, including cross-channel ferries, roll-on and roll-off vessels, container ships and cruiseliners and movements' number between 5,000 and 15,000 per annum.

No change has been noted in the frequency of ferry transport at the harbour in the year 2020

Analysis of the geographic location of the Port confirms that there is little potential for relevant public exposure within 250 metres for 15-minute periods.

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

In Northern Ireland, the permitting of prescribed industrial activities under the Pollution Prevention and Control (Industrial Emissions) Regulations (Northern Ireland) 2013 is undertaken by both local authorities (Part C processes) and the Industrial Pollution and Radiochemical Inspectorate (IPRI) of the Department of Agriculture, Environment and Rural Affairs (Part A and B processes).

Part A processes have the greatest capacity to pollute and as a result can impact detrimentally upon air, land and water. For this reason, they require an integrated approach to controlling whereas Part B and Part C processes are regulated for emissions to air only.

Mid and East Antrim Borough Council have 55 permitted Part A or B Processes within the borough. Public Register of Part A and B Processes by DAERA NI is available here - https://appsd.daera-ni.gov.uk/ipri/

Mid and East Antrim Borough Council have 42 Part C Permitted Processes within the Borough. Public Register of Part C Processes by Mid and East Antrim Borough Council is available by emailing – MEAenvhealth@midandeastantrim.gov.uk

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.

5.1.2 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.

There are major fuel (petrol) storage depots within the Local Authority area, but these have been considered in previous reports.

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 relevant 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.

There were no monitored exceedances for any of the Air Quality Strategy objectives for sulphur dioxide, and particulate matter during 2020.

There were no exceedances of the nitrogen dioxide annual mean and hourly objectives in 2020, including within the Linenhall Street Air quality management area declared for NO2.

NO_2 concentrations in 2020, were greatly affected by Covid restrictions on Travel, with greatly reduced road transport evident.

8.2 Conclusions from Assessment of Sources

8.3 Proposed Actions

The 2021 Updating and Screening Assessment has not identified the need to proceed to a Detailed Assessment for any pollutant under consideration.

Council is aware of the current and developing policy areas of air quality, and have introduced $PM_{2.5}$ FIDAS real time analyser, located at the Ballymena Ballykeel Site. In further air quality reports, monitoring and comment will be made on levels of PM2.5

With regard to the 2 Local Air Quality Management Areas:

Ballymena Linenhall Street (NO_2)

Continued assessment would indicate that they should remain.

Ballymena Ballykeel

Mid and East Antrim Borough Council will liase with DAERA NI and DEFRA AURN networks, regarding the continued declaration of this site as an Air Quality Management Area for SO2, given the now dramatic reduced levels of SO2 now monitored. Given the failure of SO2 monitoring at the site in 2020, it should not be considered at this point in time.

Appendices

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

Appendix B: Impact of COVID-19 upon LAQM

Appendix C: DMRB Calculations

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

QA/QC of Diffusion Tube Monitoring

In 2020, Mid and East Antrim Borough Council utilised SOCOTEC 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.

All diffusion tube monitoring locations within Mid and East Antrim Borough Council recorded data capture of at least 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.

Diffusion Tube Bias Adjustment Factors

Mid and East Antrim Borough Council have applied a local bias adjustment factor of 0.76 to the 2020 monitoring data. A summary of bias adjustment factors used by Mid and East Antrim Borough Council over the past five years is presented in Table A.1.

Table A.1 Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2020	Local	-	0.76
2019	National	09/20	0.93
2018	National	06/19	0.87
2017	National	09/18	0.87
2016	National	06/17	0.92

NO_2 Fall-off with Distance from the Road

No diffusion tube NO_2 monitoring locations within Mid and East Antrim Borough Council required distance correction during 2020

QA/QC of Automatic Monitoring

Formal Quality Assurance/Quality Control (QA/QC) data management duties are currently provided by Ricardo Energy & Environment at Ballymena Ballykeel 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.

The maintenance and any urgent call outs of both monitoring sites are completed by Environmental Monitoring Systems Ltd (EMS) who have a 24-hour response time to any urgent call outs.

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), these duties are completed on a fortnightly basis.

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

Mid and East Antrim Borough Council operated a Tapered Element Oscillating Microbalances (TEOM) PM_{10} analyser at Ballymena Ballykeel with data managed and corrected by Ricardo AEA in compliance with DEFRA UK Standards. On this bais no further correction factor needs to be applied to this monitoring data

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. In addition, any sites with a data capture below 25% do not require annualisation.

Due to instrument error, the newly installed SO2 analyser at Ballykeel had a data capture rate of 39%, and data has not been used for the year.

NO_2 Fall-off with Distance from the Road

No automatic NO_2 monitoring locations within Mid and East Antrim Borough Council required distance correction during 2020

Table A.2 Annualisation Summary (concentrations presented in µg/m^3)

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (m)	Tube Co-located with a Continuous Analyser	Height (m)
MEABC CDT01	27 Upper Road, Greenisland	Roadside	336376	385729	NO2	No	2.0	2.0	No	2.6
MEABC CDT02	32 Mullaghmore	Urban Background	336903	385619	NO2	No			No	1.7
MEABC CDT03	50 Shore Road	Roadside	337878	384846	NO2	No	3.0	3.0	No	2.7
MEABC CDT04	50 Shore Road	Roadside	337878	384846	NO2	No	3.0	3.0	No	2.7
MEABC CDT05	Seapark, Greenisland	Roadside	338747	385762	NO2	No	1.0	1.0	No	2.5
MEABC CDT06	93 Belfast Road, Carrick	Roadside	339915	386731	NO2	No	1.7	1.7	No	2.4
MEABC CDT07	Model PS, Belfast Road, Carrick	Roadside	340798	387121	NO2	No	3.0	3.0	No	2.3
MEABC CDT08	Model PS, Belfast Road, Carrick	Roadside	340798	387121	NO2	No	3.0	3.0	No	2.3
MEABC CDT09	Tesco Minorca Place	Roadside	340898	387391	NO2	No	2.5	2.5	No	2.8
MEABC CDT10	42 Albert St	Roadside	341192	387556	NO2	No	5.0	5.0	No	2.6
MEABC CDT11	Fergus Avenue	Other	341195	387723	NO2	No	2.0	2.0	No	2.9

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (m)	Tube Co-located with a Continuous Analyser	Height (m)
MEABC CDT12	North Road	Roadside	341058	388903	NO2	No	2.0	2.0	No	2.7
MEABC CDT13	Victoria Road	Roadside	342384	388153	NO2	No	4.0	4.0	No	2.5
MEABC CDT14	Islandmagee	Roadside	347333	392459	NO2	No	1.9	1.9	No	2.9
MEABC LDT01	Antiville	Roadside	338660	402185	NO2	No	3.5	3.5	No	2.5
MEABC LDT02	Latharna	Urban Background	339815	402444	NO2	No			No	2.9
MEABC LDT03	Main Street Larne	Urban Centre	340093	402590	NO2	No			No	2.6
MEABC LDT04	Old Glenarm Road Larne	Kerbside	340346	402845	NO2	No	2.4	2.4	No	3.5
MEABC LDT05	Upper Cairncastle Road, Larne	Kerbside	339212	403191	NO2	No	0.5	0.5	No	2.5
MEABC LDT06	Harbour Road R'about, Larne	Roadside	341238	401970	NO2	No	5.6	5.6	No	2.7
MEABC LDT07	Castle Terrace, Larne	Urban Background	341321	401697	NO2	No			No	2.8
MEABC LDT08	Ballylumford, Islandmagee	Industrial	342069	402089	NO2	No			No	3.0
MEABC BDT01	Leighinmohr Ave	Urban Background	310228	402546	NO2	No			No	3.5
MEABC BDT02	Galgorm Road	Kerbside	310336	403196	NO2	No	3.0	3.0	No	3.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (m)	Tube Co-located with a Continuous Analyser	Height (m)
MEABC BDT03	Main St, Cullybackey	Kerbside	305841	405690	NO2	No	2.0	2.0	No	3.3
MEABC BDT04	Cullybackey Road	Kerbside	310350	403443	NO2	No	3.0	3.0	No	3.8
MEABC BDT05	Larne St	Kerbside	310602	402920	NO2	No	3.0	3.0	No	3.8
MEABC BDT06	Ballyloughan Ave	Urban Background	309532	404425	NO2	No			No	2.5
MEABC BDT07	George St	Kerbside	310584	403239	NO2	Linenhall St AQMA	1.0	1.0	No	3.3
MEABC BDT08	Wellington St	Kerbside	310795	403386	NO2	No	2.0	2.0	No	2.7
MEABC BDT09	Ballymoney St	Kerbside	310796	403582	NO2	No	2.0	2.0	No	2.8
MEABC BDT10	Parkway	Kerbside	311000	403905	NO2	No	2.0	2.0	No	3.5
MEABC BDT11	Lisnevenagh Rd	Roadside	311884	397037	NO2	No	6.0	6.0	No	3.5
MEABC BDT12	Queen St	Kerbside	310743	402219	NO2	No	3.0	3.0	No	3.5
MEABC BDT13	North Road	Kerbside	310638	403079	NO2	No	2.0	2.0	No	1.5
MEABC BDT15	Linenhall St	Kerbside	310687	403122	NO2	Linenhall St AQMA	1.0	1.0	No	2.7
MEABC BDT16	Bridge St	Kerbside	310710	403119	NO2	No	2.0	2.0	No	3.4

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (m)	Tube Co-located with a Continuous Analyser	Height (m)
MEABC BDT17	Galgorm Rd	Kerbside	310491	403314	NO2	No	2.0	2.0	No	3.7
MEABC BDT18	Antrim Road, Analyser	Roadside	310832	401759	NO2	No	4.0	4.0	Yes	1.7
MEABC BDT18A	Antrim Road, Analyser	Roadside	310832	401759	NO2	No	4.0	4.0	Yes	1.7
MEABC BDT18B	Antrim Road, Analyser	Roadside	310832	401759	NO2	No	4.0	4.0	Yes	1.7

Table A.3 Local Bias Adjustment Calculations

Notes:

A single local bias adjustment factor has been used to bias adjust the 2020 diffusion tube results.

Local Bias Adjustment Outputs - Information Only

Go back to STEP 3 - Bias Adjustment to define factor

	STEP 3a Local Bias Adjustment Input 1	STEP 3b Local Bias Adjustment Input 2	STEP 3c Local Bias Adjustment Input 3	STEP 3d Local Bias Adjustment Input 4	STEP 3e Local Bias Adjustment Input 5
Periods used to calculate bias	12				
Bias Adjustment Factor A	0.76 (0.7 - 0.84)				
Diffusion Tube Bias B	31% (19% - 42%)				
Diffusion Tube Mean (µg/m^3)	20.3				
Mean CV (Precision)	6.1%				
Automatic Mean (µg/m^3)	15.5				
Data Capture	99%				
Adjusted Tube Mean (µg/m^3)	15 (14 - 17)				

Overall Diffusion Tube Precision	Good Overall Precision					
Overall Continuous Monitor Data Capture	Good Overall Data Capture					

Local Bias Adjustment Factor	0.76	

Table A.4 Diffusion Tube Monitoring Results 2020

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)												Simple Annual Mean (µg/m3)		
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.76)	Distance Corrected to Nearest Exposure
MEABC CDT01	336376	385729	23.4	21.7	17.5	12.2	14.9	14.5	14.1		18.0		27.7	22.0	18.6	14.1	-
MEABC CDT02	336903	385619	11.4	11.1	14.0	7.4	10.1	6.4	6.3	7.7	8.1	9.0	13.8	11.7	9.8	7.4	-
MEABC CDT03	337878	384846	52.4	32.0	25.5	13.5	17.1	21.4	20.7	25.3	29.5	31.2	39.2	36.3	28.7	21.8	-
MEABC CDT04	337878	384846	43.4	31.7	20.5	10.7	12.1	20.0	20.6	23.4	31.7	32.3	41.5	31.8	26.6	20.2	-
MEABC CDT05	338747	385762	16.1	11.4	16.5	22.1	30.0	8.3	6.9	8.9	9.3	9.2	15.0	12.1	13.8	10.5	-
MEABC CDT06	339915	386731		37.6	23.4	11.1	17.1	23.3	19.5	22.1	27.0	27.7	33.0	24.3	24.2	18.4	-
MEABC CDT07	340798	387121	32.3	27.6	26.4	15.1	19.6	21.9	19.5	24.4	26.5	29.2	33.3	31.5	25.6	19.5	-
MEABC CDT08	340798	387121	32.7	27.7	22.0	19.8	24.8	26.9	19.8	30.5	32.4	29.1	31.9	34.7	27.7	21.0	-
MEABC CDT09	340898	387391	29.7	22.2			10.0	19.2	12.9	17.5	31.6	23.5	27.4	35.6	23.0	17.4	-
MEABC CDT10	341192	387556		26.7	27.0	13.1	20.6	13.4	11.4	16.1	18.4	19.9	28.4	22.0	19.7	15.0	-
MEABC CDT11	341195	387723	22.5	20.1	27.5	11.9	19.1	8.5	7.7	10.5	11.9	13.3	20.0	15.0	15.7	11.9	-

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations ($\mu g/m^3$)												Simple Annual Mean (µg/m3)		
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.76)	Distance Corrected to Nearest Exposure
MEABC CDT12	341058	388903	19.3	15.0	11.2	7.1	8.4	14.8	8.5	17.4	15.8	13.3	21.4	22.8	14.6	11.1	-
MEABC CDT13	342384	388153	39.0	26.9	8.8	8.5	9.2	16.4	14.3	20.1	22.7	23.1	31.3	24.4	20.4	15.5	-
MEABC CDT14	347333	392459		16.8	17.5	6.4	14.9	7.6	7.5	8.0	10.7	8.9		12.5	11.1	8.4	-
MEABC LDT01	338660	402185	34.1		11.5	9.1	10.2	15.1	14.7	19.9	24.4	21.6	31.3	21.6	19.4	14.8	-
MEABC LDT02	339815	402444	16.1		13.3	12.1	13.5	8.2	7.8	11.5	12.3	12.1	16.0	15.8	12.6	9.6	-
MEABC LDT03	340093	402590	19.0	15.4	20.3	15.3	18.1	13.0	12.1	16.1	17.3	17.1	22.4	19.6	17.1	13.0	-
MEABC LDT04	340346	402845	31.8	29.7	10.1	9.3	8.3	18.1	19.2	18.8	22.0	24.8	28.4	23.6	20.3	15.5	-
MEABC LDT05	339212	403191	23.0	17.3	10.5	8.2	7.4	13.6	15.1	15.5	17.4	16.1	25.5	18.4	15.7	11.9	-
MEABC LDT06	341238	401970	19.4	13.8	16.4	10.8	14.3	10.5	10.8	16.6	14.0	15.4	20.6	12.6	14.6	11.1	-
MEABC LDT07	341321	401697	9.9	7.2	13.9	11.1	12.1	9.9	6.0	11.7	10.0	10.0	11.0	13.3	10.5	8.0	-
MEABC LDT08	342069	402089	13.9	13.6	18.0	15.0	16.7	5.3	10.2	7.5	10.5	11.2	16.8	10.6	12.4	9.5	-
MEABC BDT01	310228	402546	14.2	10.3	10.8	6.9	7.4	5.9	5.2	7.3	10.9	11.8	12.2	18.2	10.1	7.7	-

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations ($\mu g/m^3$)												Simple Annual Mean (µg/m3)		
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.76)	Distance Corrected to Nearest Exposure
MEABC BDT02	310336	403196	41.2	37.4	32.4	13.9	21.9	23.5	20.6	24.9	32.5	34.1	39.5	37.3	29.9	22.7	-
MEABC BDT03	305841	405690	26.3	25.0	18.7	12.5	16.4	15.9	15.6	16.4	21.9	25.2	23.7	24.5	20.2	15.3	-
MEABC BDT04	310350	403443	32.3	26.2	24.1	11.0	18.0	18.8	17.2	20.2	26.9	26.8	32.8	28.6	23.6	17.9	-
MEABC BDT05	310602	402920	33.5	25.3	23.6	10.0	17.3	16.0	14.8	17.6	22.6	24.2	32.7	24.7	21.9	16.6	-
MEABC BDT06	309532	404425	11.0	10.1	11.1	5.7	6.0	5.5	4.3	6.1	8.8	9.6	12.0	13.8	8.7	6.6	-
MEABC BDT07	310584	403239	57.7	45.6	40.3	18.4	30.3	28.4		42.1	52.8	54.3	49.0	59.9	43.5	33.1	-
MEABC BDT08	310795	403386	25.5	20.5	16.1	9.1	11.8	11.9	10.3	16.2	18.8	21.1	27.3	27.5	18.0	13.7	-
MEABC BDT09	310796	403582	30.4	26.3	20.8	7.3	12.3	12.9	14.8	13.9	20.7	23.0	26.2	27.6	19.7	15.0	-
MEABC BDT10	311000	403905	33.6	27.1	25.1	10.7	16.1	17.5	18.3	22.2	28.9	28.7	32.8	32.0	24.4	18.6	-
MEABC BDT11	311884	397037	34.1	21.3	21.4	12.1	18.3	16.6	14.0	23.2	26.9	24.4	33.2	33.3	23.2	17.7	-
MEABC BDT12	310743	402219	29.9	31.4	25.4	14.2	18.3	20.0	15.5	22.4			38.0	31.8	24.7	18.8	-
MEABC BDT13	310638	403079	34.1	26.3	25.9	14.1	19.2	19.4	20.5	22.5	26.1	29.4	15.3	29.8	23.6	17.9	-

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations ($\mu g/m^3$)												Simple Annual Mean (µg/m3)		
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.76)	Distance Corrected to Nearest Exposure
MEABC BDT15	310687	403122	62.0	57.4	47.8	20.6	33.7	31.5	35.4	37.6	47.1	48.0	57.3	53.3	44.3	33.7	-
MEABC BDT16	310710	403119	34.4	30.9	20.2	13.5	17.5	19.6	19.9	24.1	30.4		32.0	41.9	25.9	19.6	-
MEABC BDT17	310491	403314	47.9	42.8	33.9	15.0	27.0	25.0	25.2	0.7	35.8	42.5	46.8	44.7	32.3	24.5	-
MEABC BDT18	310832	401759	30.3	22.2	19.9	10.3	14.9	17.5	13.3	16.2	22.5	28.0	29.2	24.4	20.7	15.8	-
MEABC BDT18A	310832	401759	29.1	24.0	17.0	9.7	14.3	14.9	13.9	16.5	22.1	21.6	27.6	29.3	20.0	15.2	-
MEABC BDT18B	310832	401759	29.7	22.3	19.2	10.3	15.6	17.0	15.0	15.0	20.8	22.7	26.7	26.8	20.1	15.3	-

Appendix B: Impact of COVID-19 upon LAQM

COVID-19 has had a significant impact on society. Inevitably, COVID-19 has also had an impact on the environment, with implications to air quality at local, regional and national scales. COVID-19 has presented various challenges for Local Authorities with respect to undertaking their statutory LAQM duties in the 2021 reporting year.

Despite the challenges that the pandemic has given rise to, the events of 2020 have also provided Local Authorities and other organisations with an opportunity to quantify the air quality impacts associated with wide-scale and extreme intervention and changes in behaviour such as reduced road traffic and working from home.