



**Westmorland
& Furness
Council**

2023 Air Quality Annual Status Report (ASR)

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

June 2023

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Executive Summary: Air Quality in Our Area

None of the Council's monitoring positions met or breached the objective level for Nitrogen dioxide in 2022.

Due to Local Government Reorganisation, this report is being submitted by Westmorland and Furness Council but refers to the area previously monitored by Barrow Borough Council. Another two reports will be submitted by Westmorland and Furness Council, to cover the previous South Lakeland District Council and Eden District Council areas.

Air Quality in Westmorland and Furness (Barrow area)

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

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

In the Borough of Barrow-in-Furness (the Borough), 3.7% of mortality is attributable to particulate air pollution, the highest in Cumbria⁵.

NO₂ concentration levels across the Borough in 2022 remain lower than results were prior to the Covid-19 pandemic. Concentrations on the A590 near to Lindal-in-Furness remain the highest in the Borough, the A590 is the major road transport link into the area seeing

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

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

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

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

⁵ Public Health England, Public Health Profiles, 2019

19937 vehicle movements each day which is lower than it was in 2019⁶. In order to sustain this reduction in traffic, we need to encourage people to continue to work from home, use sustainable transport, car share, drive more efficient vehicles and reduce the number of home deliveries.

An additional two biomass plants at JJC Hire Ltd, Sandscale Park, Park Road, Barrow-in-Furness were approved in January 2022, they are required to comply with the conditions set within their environmental permit and will be inspected each year.

Planning permission was also approved for BAE Systems to build a Steam Generating Facility, currently in construction, close to residents on Stanley Road. Further to this, In September 2021 the UK, Australia and the United States of America announced an historic, trilateral endeavour to support Australia to acquire a conventionally-armed, nuclear-powered submarine or 'SSN' – a partnership known as AUKUS. The construction of the UK submarines will principally take place in Barrow, creating thousands of new jobs, but could also have an impact on air quality due to increased transport and production emissions.

Actions to Improve Air Quality

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

The Environmental Improvement Plan⁷ sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term PM_{2.5} targets. The National Air Quality Strategy, due to be published in 2023, will provide more information on local authorities' responsibilities to work towards these new targets and reduce PM_{2.5} in their areas. The Road to Zero⁸ details the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely

⁶ Department for Transport, 2022: <https://roadtraffic.dft.gov.uk/manualcountpoints/57340>

⁷ Defra. Environmental Improvement Plan 2023, January 2023

⁸ DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

Barrow-in-Furness Borough Council declared a climate emergency on 16th July 2019 and agreed a 5 year Climate Change Policy and Action Plan on 16th June 2020⁹. That policy set out the ambition for the Borough to be net zero carbon no later than 2037.

The Low Carbon Barrow project was the main vehicle for delivery, which included installing electric vehicle chargepoints in council owned car parks across the Borough and replacing council fleet diesel vehicles with electric ones.



In addition, low carbon measures such as installing LED lighting and solar panels were implemented in public buildings and council houses, as well as grants being offered to businesses to install relevant low carbon measures. Art Gene were the partner to this

⁹ Climate Change Policy 2020-2025, Barrow Borough Council, 2020:
https://www.barrowbc.gov.uk/_resources/assets/attachment/full/0/8373.pdf

project and also provided a public engagement programme to increase knowledge of the climate emergency and ways members of the public could reduce emissions.

We also ran the Furness Citizens Jury on Climate Change made up of local residents in 2021/22, to increase public awareness around climate change and to inform future policy. This was supported by an oversight panel made up of local influential organisations such as BAE Systems, Holker Estates, Extinction Rebellion Furness, Cando FM, Cumbria Action for Sustainability¹⁰.

We supported Active Travel's grant application for their 'Travel Actively' project which has now received £1.5million from the Department for Transport (DfT) Active Travel Social Prescribing Pilot Delivery fund, with the funding to be split between Barrow and Carlisle. Active Cumbria's new programme which aims to provide a wide range of cycling and walking interventions to help attract people into new ways of travelling actively in Barrow. The three-year programme aims to support, encourage and enable people to be more active by cycling, walking and wheeling for everyday journeys, and should have a positive impact on air quality.

It is also important that we raise awareness about emissions in the home which can harm health and also contribute significantly to emissions. Burning wood and coal in open fires and stoves makes up 38% of the UK's primary emissions of fine particulate matter (PM2.5). Local information indicating the actual use of solid fuels in the Borough is not currently available, however the housing stock of the Borough is dominated by older, terraced housing and 45% was built pre-1919, so it is safe to assume that this will also be an issue locally. The authority also regularly receives complaints in relation to smoke nuisances.

An application to Defra's Air Quality Grant was made in 2022 to fund a campaign around indoor air quality, however this was unsuccessful. Diagram A below shows the difference in particulate emissions inside your home from the various heating choices that are generally available.

¹⁰ Furness Citizens Jury on Climate Change, Barrow Borough Council, 2022:
<https://www.barrowbc.gov.uk/climate-emergency/citizens-jury/>

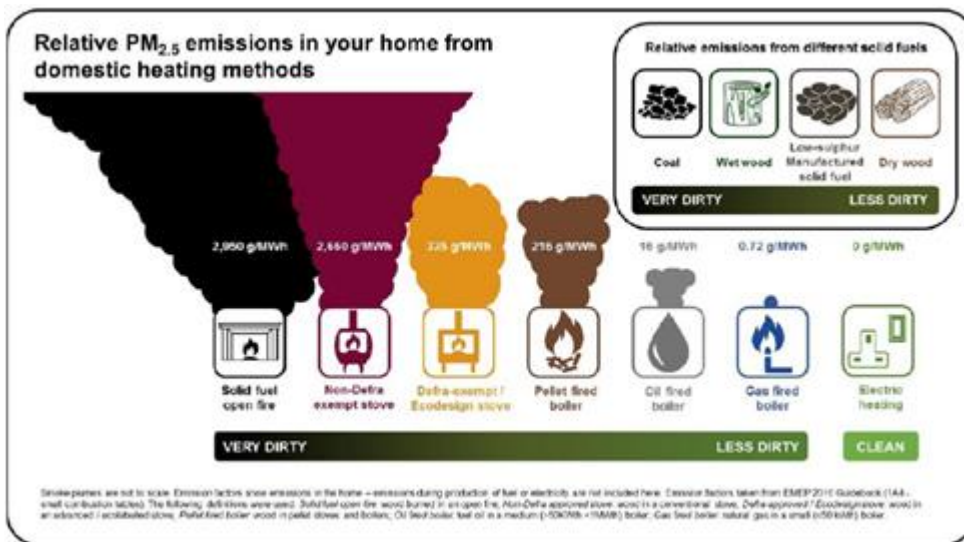


Diagram A – Diagram showing the difference in particulate emissions inside your home from different heating methods. (DEFRA, 2019)

In addition to regulatory requirements, this authority seeks to improve air quality by scrutinising planning applications and new developments that are required to carry out an air quality assessment and where appropriate, an outline of how emissions are to be mitigated. We therefore work closely with other agencies such as Cumbria County Council, the Environment Agency and neighbouring authorities, and consult on future developments and proposals taking into consideration air quality and potential cumulative effects.

Conclusions and Priorities

There are no exceedances at any site but there is still concern regarding high traffic flow on the A590 so NO₂ monitoring will continue at Lindal-in-Furness, as it is the site with the highest emissions and is not back to pre Covid-19 levels.

There is also an ambition to monitor PM_{2.5} in Barrow in Furness.

Local Engagement and How to get Involved

The general public can get involved and can comment on planning applications if they have concerns with regards to air quality. This Authority is open and transparent to air quality issues and seeks the opinion and views of individuals or groups that have a vested concern in air quality. Feedback on the contents of this document can be sent using the contact details at the start of this report.

For members of the public wanting to take a more active role in improving air quality within this district there are the following action groups:

- Art Gene is a unique, independent, international centre for art and environment based in Barrow, they engage people in programmes of work which identify and enhance the particularities of place, and consider the social, natural and built environment as a whole, suffusing it with an artistic sensibility.
- Cumbria Action for Sustainability (CAfS) are a climate change and sustainability organisation who inspire and support individuals, communities, and organisations across Cumbria and beyond to decarbonise, with the vision of a zero carbon Cumbria by 20237.
- Extinction Rebellion (XR) is a global environmental movement with the stated aim of using non-violent civil disobedience to compel government action to avoid tipping points in the climate system, biodiversity loss, and the risk of social and ecological collapse. Extinction Rebellion Furness and Extinction Rebellion South Lakes both operate locally.

Local Responsibilities and Commitment

This ASR was prepared by the Barrow-in-Furness Environmental Protection Team of Westmorland and Furness Council with the support and agreement of the following officers and departments:

Public Health and Public Protection

This ASR has been approved by:

Graham Barker, Head of Public Protection, Public Protection and Public Health

Philip Greenup, Assistant Director, Sustainable Transport

This ASR has been signed off by a Director of Public Health.

If you have any comments on this ASR please send them to Alison Coward at:

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1 Local Air Quality Management

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

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

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

2 Actions to Improve Air Quality

Air Quality Management Areas

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

Barrow-in-Furness Borough Council currently does not have any declared AQMAs. A local Air Quality Strategy for the new Westmorland and Furness Council will be developed to prevent and reduce polluting activities.

Progress and Impact of Measures to address Air Quality in Barrow-in-Furness Borough Council

Defra's appraisal of last year's ASR concluded that based on the evidence provided, our findings were accepted for all sources and pollutants. The following comments were also made and acted upon in this year's report, where necessary:

1. The Council have acted upon comments from the previous ASR appraisal including maintaining consistency in reporting monitoring results and the table format in line with the template.
2. It would be beneficial for the Council to include greater detail in the Local Engagement and How to get Involved sections of the Executive Summary to aid the residents of Barrow-in-Furness Borough.
3. The maps provided in the Appendix are comprehensive and clearly show the locations of the diffusion tube monitoring site locations.
4. The Council have reported their progress on measures being taken to improve air quality and have clearly outlined their priorities for the upcoming year.
5. The inclusion of long-term trends into the discussion of NO₂ results is welcomed. However, it would be beneficial to include trend graphs for all sites as well as improving the formatting of Figures A.2 – A.4, such as ensuring the axis titles do not overlap with the axis and a legend is added.

Barrow Borough Council has taken forward a number of direct measures during the current reporting year of 2022 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.1. Six measures are included within Table 2.1, with the type of measure and the progress Barrow Borough Council have made during the reporting year of 2022 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.1.

More detail on these measures can be found in their respective Action Plans. Key completed measures are:

- Electric vehicles for Council's car fleet are now in use;
- New cycle lanes completed on Michaelson Bridge and Ferry Road;

Westmorland and Furness Council expects the following measures to be completed over the course of the next reporting year:

- New cycle lanes along Abbey Road and Walney North

Westmorland and Furness Council's priorities for the coming year are to transition into the new authority well and to prepare an Air Quality Strategy for the new area.

Barrow in Furness Borough Council worked to implement these measures in partnership with the following stakeholders during 2022:

- Cumbria County Council;
- Active Cumbria;
- National Highways;
- Art Gene

The principal challenges and barriers to implementation that Westmorland and Furness Council anticipates facing are the difficulties that come with Local Government Reorganisation, a number of other strategies also need reviewing so there are competing priorities for the council.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	Low Carbon Barrow – Electric fleet vehicles	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	2020	2023	Barrow Borough Council / Art Gene	European Structural and Investment Fund / Local Enterprise Partnership	NO	Funded	£50k - £100k	Completed	More electric vehicles should lead to a reduction in NO2	Reduction in CO2 equivalent	EV pool cars delivered to replace previous fleet vehicles	The project also included: Solar farm on Piel Island, Public buildings energy efficiency projects, Barrow Public Housing Improvement Scheme, Barrow business exemplar projects and Grant Programme, and a public engagement programme.
2	Low Carbon Barrow - Installing electric vehicle chargepoints	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2020	2022	Barrow Borough Council	European Structural and Investment Fund / Local Enterprise Partnership	NO	Funded	£100k - £500k	Completed	More electric vehicles should lead to a reduction in NO2	Number of EV charging points installed / Charging point usage	18 EV chargepoints now installed and live in council owned carparks	See above
3	Zero Carbon Cumbria Partnership project	Other	Other	2020	2026	Over 80 organisations across Cumbria inc. district councils. Cumbria County Council and Cumbria Action for Sustainability chair the group	National lottery funding	NO	Funded	£1 million - £10 million	Implementation	Reduction in CO2 equivalents	Reduction in CO2 equivalents	Citizens Jury now completed in Barrow area	Programme includes citizens juries, low carbon food, repair cafes. See: https://cafs.org.uk/our-projects/zero-carbon-cumbria-programme/
4	Barrow Local Cycling and Walking Infrastructure Plan (LCWIP)	Transport Planning and Infrastructure	Cycle network	2020	2037	Cumbria County Council / Barrow Borough Council	Active Travel fund and Towns Deal	NO	Partially Funded	> £10 million	Planning	Cycling and walking produces no NO2 emissions	Increased cycling and walking rates	First phase of improvements started early 2022 - Michaelson Bridge and Ferry Road.	Michaelson Bridge and Ferry Road completed. Abbey Road and Walney North out for consultation. Further improvements not yet funded.
5	Furness Climate Change Citizens Jury	Public Information	Via the Internet	2021	2022	Barrow Borough Council / ZCCP	Part National lottery funded & Part Barrow BC funded	NO	Funded	£10k - 50k	Completed	Increased walking and cycling should lead to reduced NO2 emissions	N/A	Citizens Jury recommendations published in March 2022, includes recommendations around sustainable transport	Recommendations can help inform policy but Local Government Reorganisation means that Barrow is only 1/3 of new council footprint, so potentially less influence.
6	Travel Actively	Promoting Travel Alternatives	Promotion of Walking Promotion of Cycling	2023	2026	Active Cumbria, Cumbria County Council, Barrow Borough Council	Department for Transport	NO	Funded	£500k - £1m	Implementation	Increased walking and cycling should lead to reduced NO2 emissions	Increased cycling and walking rates	Funding awarded and team currently being created	Local Government Reorganisation may be a barrier as funded to work across Cumberland and Westmorland and Furness Council areas

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

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

PM_{2.5} is not monitored in the Barrow area, however according to the [Defra background mapping resource](#), the highest PM_{2.5} concentrations are at the BAE Systems site and North and North East of the site. The highest level is 9.26 µg/m³ which exceeds the World Health Organisation 2021 Air Quality Guidelines.

Barrow in Furness Borough Council is taking the following measures to address PM_{2.5}:

1. Measure 4: Upgrades to Local Cycling and Walking Infrastructure in partnership with Cumbria County Council. Cycle lanes have been introduced at Bridge Road and Michaelson Road

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

This section sets out the monitoring undertaken within 2022 by Barrow-in-Furness Borough Council and how it compares with the relevant air quality objectives.

Two monitoring sites were removed due to repeated results much lower than the annual objectives; these are IRE1 and RAMS1. Two additional sites were identified, firstly CLIVE1, which has been monitored previously but with the addition of a new Burger King it was considered appropriate to revisit the site to ensure air quality hadn't deteriorated. The second new site is ASKAM1, close to the IRE1 monitoring site, but closer to houses and on the opposite side of the road.

In addition, monitoring results are presented for a five-year period between 2018 and 2022 to allow monitoring trends to be identified and discussed. The trend shown for all of the sites is that emissions are increasing again since Covid-19, however none are near the annual objectives.

Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

No automatic air quality monitoring is carried out by Barrow-in-Furness Borough Council.

3.1.2 Non-Automatic Monitoring Sites

Barrow-in-Furness Borough Council undertook non-automatic (i.e. passive) monitoring of NO₂ at seven (7) sites during 2022. Table A.1 in Appendix A presents the details of the non-automatic sites.

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

Individual Pollutants

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

3.1.3 Nitrogen Dioxide (NO₂)

Table A.2 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past five years with the air quality objective of 40µg/m³. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2022 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

3.1.4 Particulate Matter (PM₁₀)

There is no monitoring of PM₁₀ concentrations carried out by Barrow-in-Furness Borough Council.

3.1.5 Particulate Matter (PM_{2.5})

There is no monitoring of PM_{2.5} concentrations carried out by Barrow-in-Furness Borough Council.

3.1.6 Sulphur Dioxide (SO₂)

There is no automatic or non-automatic monitoring of SO₂ concentrations carried out by Barrow-in-Furness Borough Council.

Appendix A: Monitoring Results

Table A.1 – Details of Non-Automatic Monitoring Sites

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
LIND1	Lindal	Roadside	325229	475856	NO2	NO	0	2.0	No	3
BKGD1	Dowdales School	Suburban	322732	474429	NO2	NO	0	N/A	No	3
GRN2	Greengate Street	Roadside	320290	469196	NO2	NO	0	2.0	No	3
FURN1	Furness Academy	Kerbside	320853	469737	NO2	NO	0	0.0	No	3
PIUS1	St Pius School	Kerbside	319490	471373	NO2	NO	0	0.7	No	3
CLIVE2	Clive Street	Roadside	319267	469482	NO2	NO	0	2.0	No	3
ASKAM1	Dalton Road, Askam	Roadside	321564	477473	NO2	NO	0	2.0	No	3

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable.

Table A.2 – Annual Mean NO₂ Monitoring Results: Non-Automatic Monitoring (µg/m³)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
LIND 1	325229	475856	Roadside	100.0	100	34.58	33.0	22.0	24.0	24.3
BKGD 1	322732	474429	Urban Background	92.0	92.0	8.45	7.59	5.5	6.0	6.3
GRN2	320290	469196	Roadside	92.0	92.0	N/A	N/A	16.3	17.4	18.5
RAMS1	320157	469585	Roadside	N/A	N/A	N/A	N/A	10.5	10.5	N/A
FURN1	320853	469737	Kerbside	100.0	100.0	N/A	N/A	11.5	11.7	12.1
PIUS1	319490	471373	Kerbside	100.0	100.0	N/A	N/A	11.1	11.0	13.5
IRE1	321563	477675	Roadside	N/A	N/A	N/A	N/A	10.9	11.6	N/A
CLIVE2	319267	469482	Roadside	92.0	92.0	N/A	N/A	N/A	N/A	14.7
ASKAM1	321564	477473	Roadside	100.0	100.0	N/A	N/A	N/A	N/A	12.3

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

☒ Diffusion tube data has been bias adjusted.

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

Notes:

The annual mean concentrations are presented as µg/m³.

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

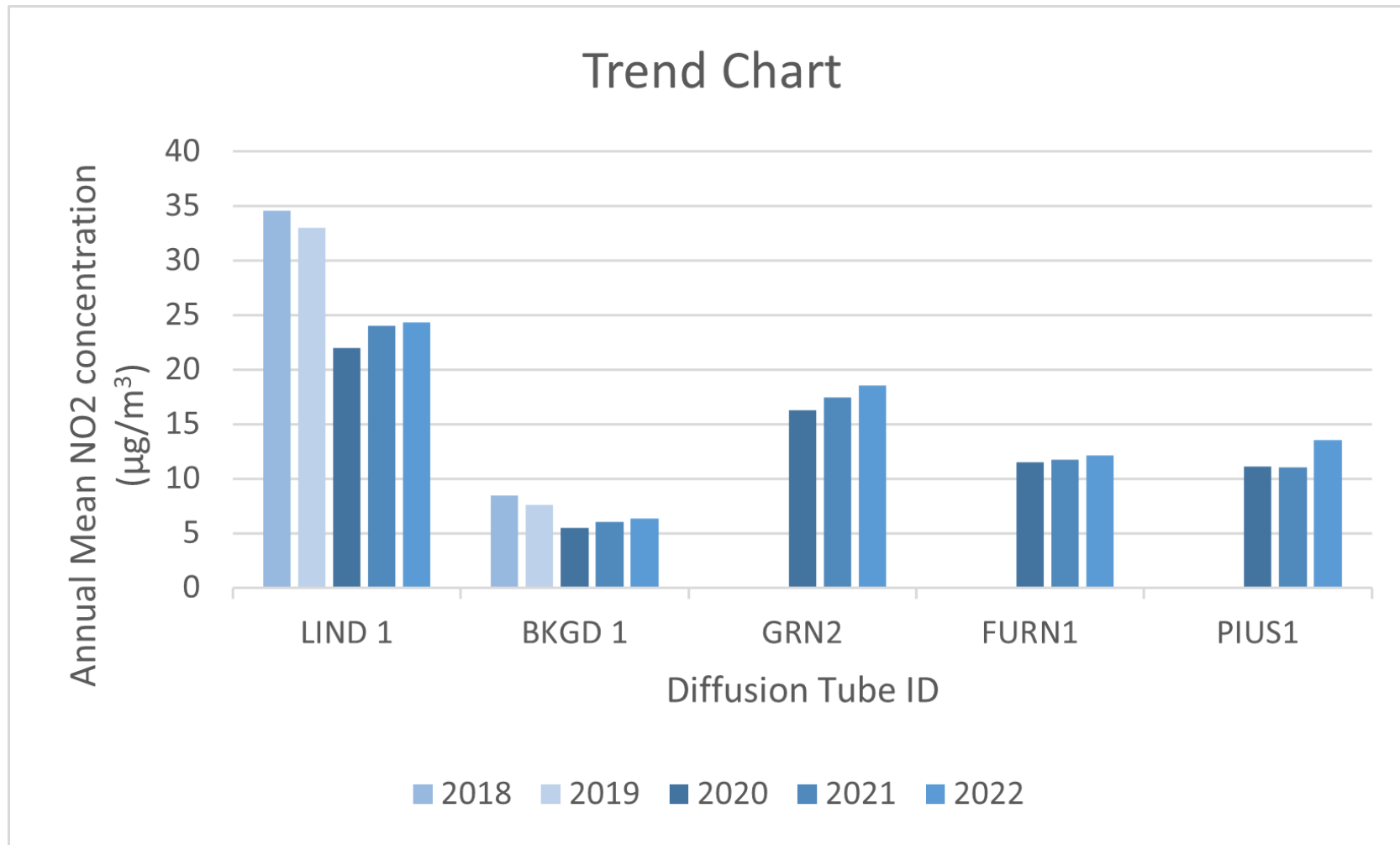
NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

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

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

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

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

Figure A.1 – Trends in Annual Mean NO₂ Concentrations

Appendix B: Full Monthly Diffusion Tube Results for 2022

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

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.83)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
LIND1	325229	475856	35.1	23.1	36.3	31.3	25.8	23.3	26.5	28.2	26.6	26.5	30.8	37.8	29.3	24.3		
BKGD ₁	322732	474429	12.8	-	10.4	5.6	4.0	3.9	4.9	5.0	5.2	7.0	11.3	13.7	7.6	6.3		
GRN2	320290	469196	31.5	-	25.7	18.5	19.3	18.3	17.1	18.5	20.1	20.5	25.5	29.7	22.2	18.5		
FURN ₁	320853	469737	20.9	12.1	21.4	12.4	9.5	10.2	9.6	10.7	14.8	14.1	17.6	22.0	14.6	12.1		
PIUS1	319490	471373	23.6	12.7	21.4	11.9	11.6	12.4	12.6	11.3	14.4	17.1	22.2	24.2	16.3	13.5		
CLIVE ₂	319267	469482	23.3	-	23.2	6.3	14.1	12.8	13.2	12.7	15.6	18.9	27.6	27.0	17.7	14.7		
ASKA M1	321564	477473	20.5	11.2	19.7	13.6	10.9	9.7	11.7	12.0	13.6	13.5	18.6	22.1	14.8	12.3		

- All erroneous data has been removed from the NO₂ diffusion tube dataset presented in Table B.1.
- Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.
- Local bias adjustment factor used.
- National bias adjustment factor used.
- Where applicable, data has been distance corrected for relevant exposure in the final column.
- Westmorland and Furness Council confirm that all 2022 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

Notes:

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

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

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within Barrow-in-Furness Borough Council During 2022

An additional two biomass plants at JJC Hire Ltd, Sandscale Park, Park Road, Barrow-in-Furness were approved in January 2022, they are required to comply with the conditions set within their environmental permit and will be inspected each year.

Planning permission was also approved for BAE Systems to build a Steam Generating Facility, currently in construction, close to residents on Stanley Road. Further to this, In September 2021 the UK, Australia and the United States of America announced an historic, trilateral endeavour to support Australia to acquire a conventionally-armed, nuclear-powered submarine or 'SSN' – a partnership known as AUKUS. The construction of the UK submarines will principally take place in Barrow, creating thousands of new jobs, but could also have an impact on air quality due to increased transport and production emissions.

Additional Air Quality Works Undertaken by Barrow-in-Furness Borough Council During 2022

Barrow-in-Furness Borough Council has not completed any additional works within the reporting year of 2022.

QA/QC of Diffusion Tube Monitoring

The laboratory supplying and analysing the nitrogen dioxide diffusion tubes is Gradko Environmental Ltd. The preparation method used by the laboratory is 20% TEA /Water, analyses are carried out using UV spectrophotometry.

- Tube Precision

The precision results for Gradko Environmental (A division of Gradko International Ltd.) are stated as GOOD on the following website:

<https://laqm.defra.gov.uk/air-quality/air-quality-assessment/precision-and-accuracy/>

• WASP Results

Information obtained from Gradko Environmental states the laboratory has taken part in the WASP proficiency scheme since it's inception, and has maintained the highest ranking of 'Satisfactory'. See Table Below for more information, from <https://laqm.defra.gov.uk/air-quality/air-quality-assessment/ga-gc-framework/>

Table 1: Laboratory summary performance for AIR NO₂ PT rounds AR037, 39, 40, 42, 43, 45, 46, 49 and 50

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

AIR PT Round	AIR PT AR037	AIR PT AR039	AIR PT AR040	AIR PT AR042	AIR PT AR043	AIR PT AR045	AIR PT AR046	AIR PT AR049	AIR PT AR050
Round conducted in the period	May – June 2020	July – August 2020	September – October 2020	January – February 2021	May – June 2021	July – August 2021	September – October 2021	January – February 2022	May – June 2022
Aberdeen Scientific Services	NR [4]	NR [4]	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Cardiff Scientific Services	NR [4]	NR [4]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Edinburgh Scientific Services	NR [4]	NR [4]	100 %	25 %	100 %	100 %	75 %	NR [2]	50 %
SOCOTEC	NR [4]	NR [4]	100 % [1]	100 % [1]	100 % [1]	87.5 % [1]	100 % [1]	100 % [1]	100 % [1]
Exova (formerly Clyde Analytical)	NR [4]	NR [4]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Glasgow Scientific Services	NR [4]	NR [4]	100 %	50 %	100 %	100 %	NR [2]	100 %	100 %
Gradko International	NR [4]	NR [4]	75 %	25 %	100 %	100 %	100 %	100 %	100 % [1]
Kent Scientific Services	NR [4]	NR [4]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Kirklees MBC	NR [4]	NR [4]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Lambeth Scientific Services	NR [4]	NR [4]	100 %	100 %	100 %	75 %	75 %	50 %	75 %
Milton Keynes Council	NR [4]	NR [4]	25 %	0 %	50 %	100 %	100 %	75 %	100 %
Northampton Borough Council	NR [4]	NR [4]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Somerset Scientific Services	NR [4]	NR [4]	100 %	100 %	100 %	100 %	100 %	75 %	100 %
South Yorkshire Air Quality Samplers	NR [4]	NR [4]	100 %	100 %	75 %	100 %	100 %	NR [2]	NR [2]
Staffordshire County Council	NR [4]	NR [4]	50 %	100 %	100 %	100 %	100 %	100 %	100 %
Tayside Scientific Services (formerly Dundee CC)	NR [4]	NR [4]	100 %	NR [2]	100 %	NR [2]	100 %	NR [2]	NR [2]
West Yorkshire Analytical Services	NR [4]	NR [4]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]

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

[2] NR, No results reported.

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

[4] Round was cancelled due to pandemic.

Monitoring has been completed in adherence with the 2022 Diffusion Tube Monitoring Calendar.

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2022 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG22 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO₂

continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Barrow-in-Furness Borough Council have applied a national bias adjustment factor of 0.83 to the 2022 monitoring data. A summary of bias adjustment factors used by Barrow-in-Furness Borough Council over the past five years is presented in Table C.1.

Table C.1 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	National	03/23	0.83
2021	National	06/22	0.84
2020	National	03/21	0.81
2019	National	03/20	0.93
2018	National	03/19	0.93

Notes:

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

NO₂ Fall-off with Distance from the Road

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

No diffusion tube NO₂ monitoring locations within Barrow-in-Furness Borough Council required distance correction during 2022.

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

Figure D.1 – Map of Non-Automatic Monitoring Site

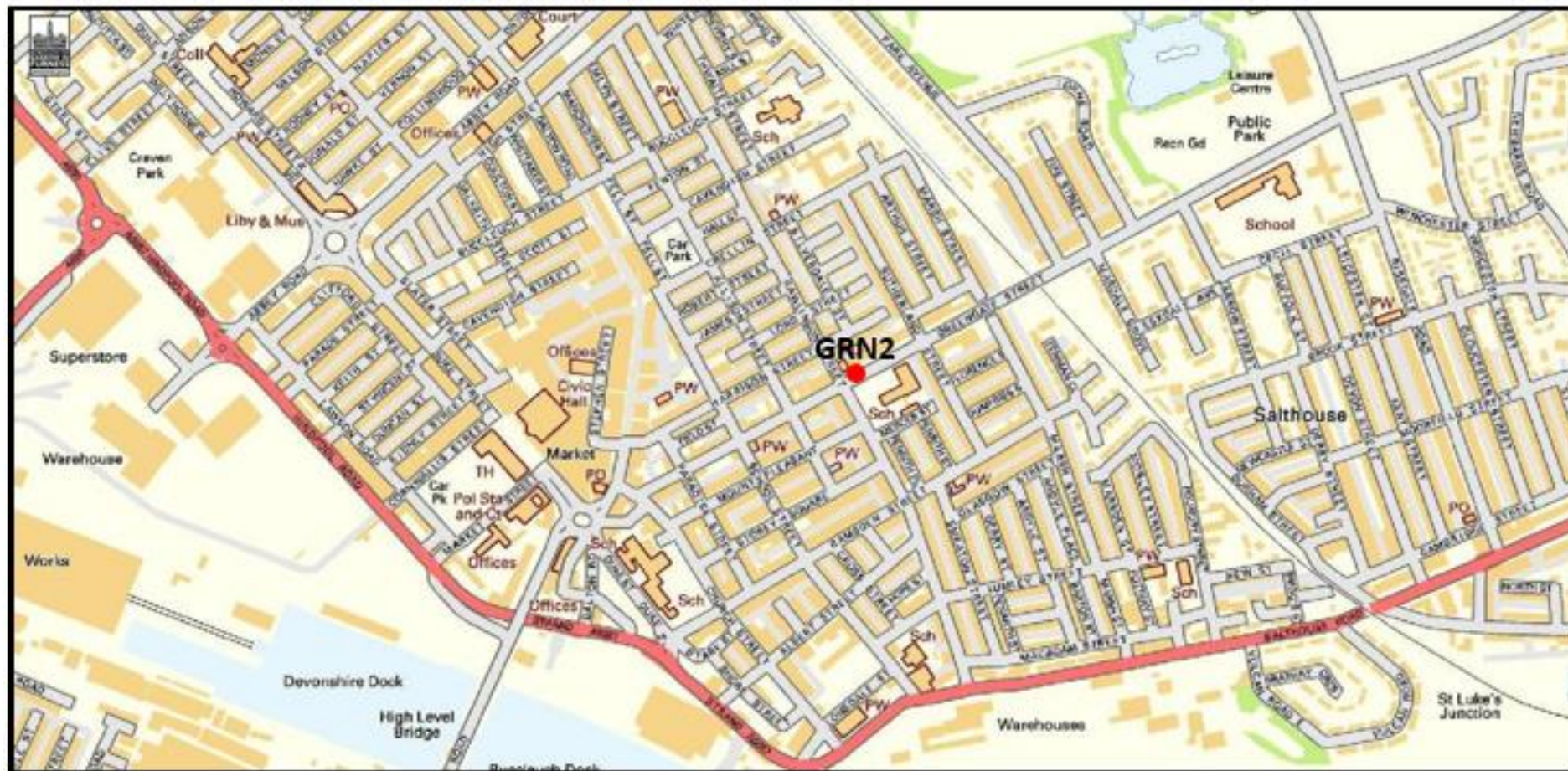
Lindal (LIND 1) – Ulverston Road:



Dowdales School (BKGD1) – Background:



Greengate Street (GRN2):



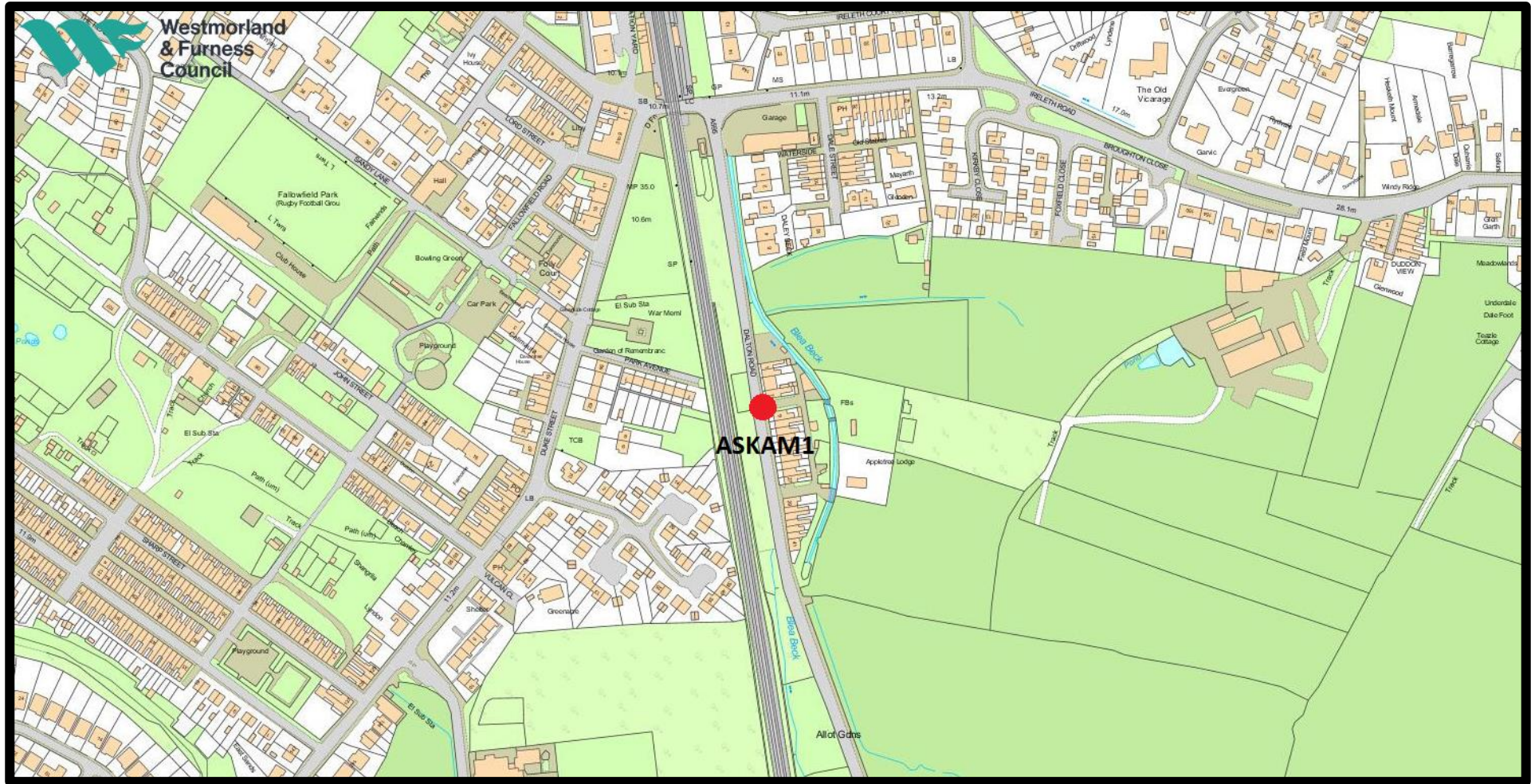
St Pius School (PIUS1):



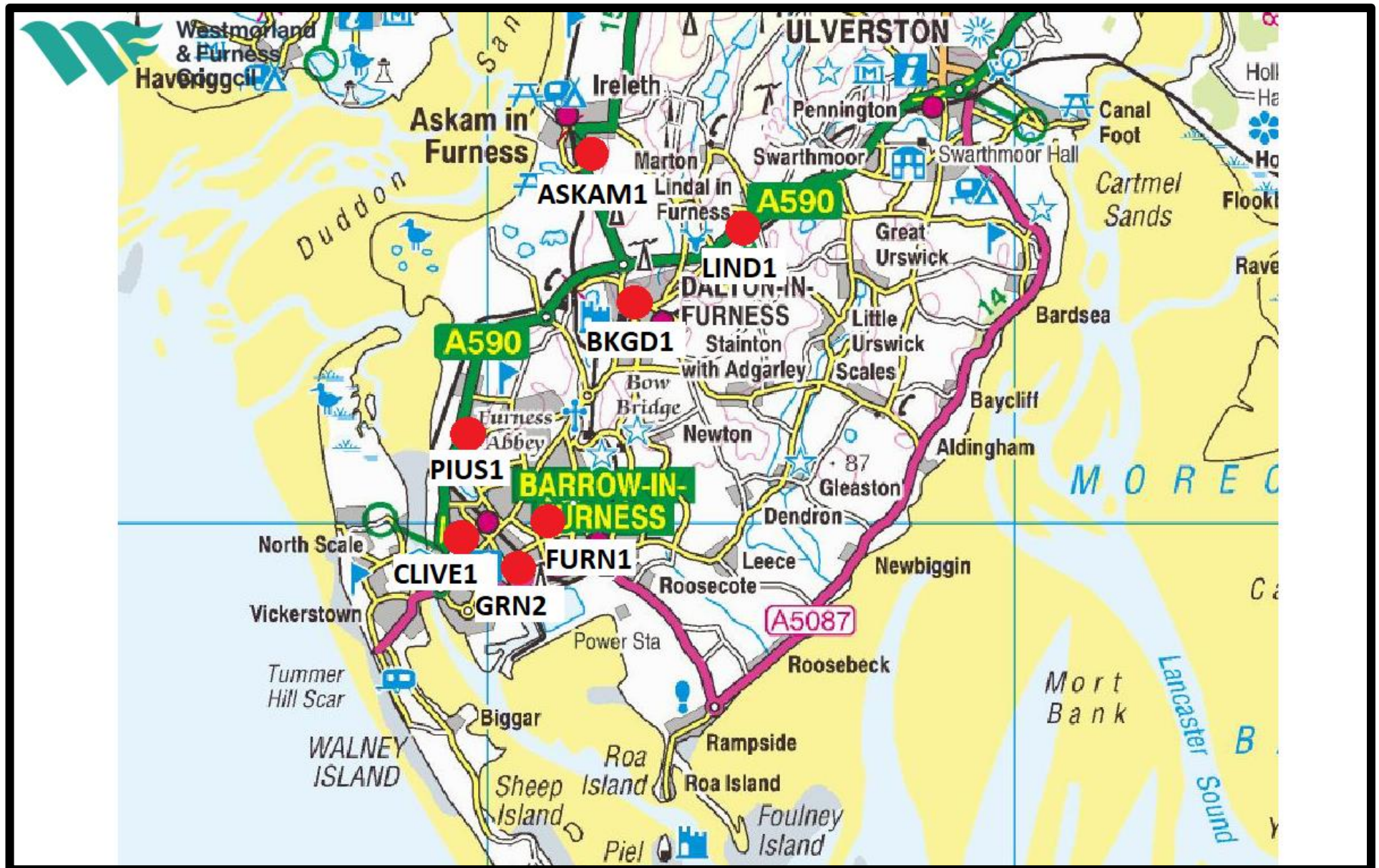
Clive Street (CLIVE1):



Askam Road (ASKAM1):



Map showing all diffusion tube locations in the Borough of Barrow-in-Furness:



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England¹¹

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

¹¹ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO ₂	Sulphur Dioxide

References

- Local Air Quality Management Technical Guidance LAQM.TG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Defra. Abatement cost guidance for valuing changes in air quality, May 2013
- Public Health England. Estimating Local Mortality Burdens Associated with Particulate Air Pollution, 2014
- Public Health Outcomes Framework – Public Health England (updated quarterly)