



# 2020 Air Quality Annual Status Report (ASR) Barrow Borough Council

In fulfillment of Part IV of the  
Environment Act 1995  
Local Air Quality Management

June 2020

## Barrow-in-Furness Borough Council

<b>Local Authority Officer</b>	Alison Coward
<b>Department</b>	Public Protection Services
<b>Address</b>	Town Hall Duke Street Barrow-in-Furness Cumbria LA14 2LD
<b>Telephone</b>	01229 876382
<b>E-mail</b>	acoward@barrowbc.gov.uk
<b>Report Reference number</b>	ASR2020
<b>Date</b>	June 2020

## Executive Summary: Air Quality in Our Area

### Air Quality in the Borough of Barrow-in-Furness

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 and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas<sup>1,2</sup>.

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion<sup>3</sup>. In the Borough of Barrow-in-Furness (the Borough), 4% of mortality is attributable to particulate air pollution, the highest in Cumbria<sup>4</sup>.

The Borough has not declared any Air Quality Management Areas (AQMA's) and NO<sub>2</sub> concentrations remain below the annual 'Air Quality Objective' of 40µg/m<sup>3</sup>. Measured background levels for NO<sub>2</sub> in the Borough have shown an encouraging steady decrease since monitoring began in the early 1990's.

Measured concentrations of NO<sub>2</sub> 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 22614 vehicle movements each day<sup>5</sup>. However 2019 levels are slightly lower than 2018, breaking the recent trend of rising concentrations. In order to continue this decline, we need to encourage more people to work from home, use sustainable transport, car share and drive more efficient vehicles.

---

<sup>1</sup> Environmental equity, air quality, socioeconomic status and respiratory health, 2010

<sup>2</sup> Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

<sup>3</sup> Defra. Abatement cost guidance for valuing changes in air quality, May 2013

<sup>4</sup> Public Health England, 2018, Public Health Profiles, <https://fingertips.phe.org.uk/search/air%20pollution/page-options/ovw-do-0#page/0/gid/1/pat/6/par/E12000002/ati/201/are/E07000027/iid/30101/age/230/sex/4/cid/4/tbm/1/page-options/ovw-do-0>

<sup>5</sup> Department for Transport: <https://roadtraffic.dft.gov.uk/manualcountpoints/57340>

## Actions to Improve Air Quality

Barrow-in-Furness Borough Council declared a climate emergency on 16th July 2019 and made a commitment to reduce carbon emissions. Following the climate emergency declaration, a working group was established comprising cross party councillors and cross-departmental council officers to look at all areas of policy and delivery. The working group created a 5 year Climate Change Policy which was agreed at full council on 16th June 2020. That policy sets out the ambition for the Borough to be net zero carbon no later than 2037. The full policy can be accessed here: [Barrow Borough Councils Climate Change Policy 2020-2025](#). To achieve this, Barrow Borough Council has committed to:

1. Reduce emissions from Barrow Borough Councils estate and operations;
2. Reduce energy consumption and emissions from homes and businesses in the Borough;
3. Reduce emissions from transport;
4. Reduce consumption of resources, increasing recycling and reducing waste;
5. Increase carbon capture to offset emissions;
6. Increase public awareness around climate change.

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 (PM<sub>2.5</sub>)<sup>6</sup>. 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.

A 2018 report by the British Lung Foundation highlighted Barrow in Furness as a place with a number of health centres in areas which exceed estimated safe PM<sub>2.5</sub> concentrations<sup>7</sup>. They did this by extracting postcodes of health centres from the

---

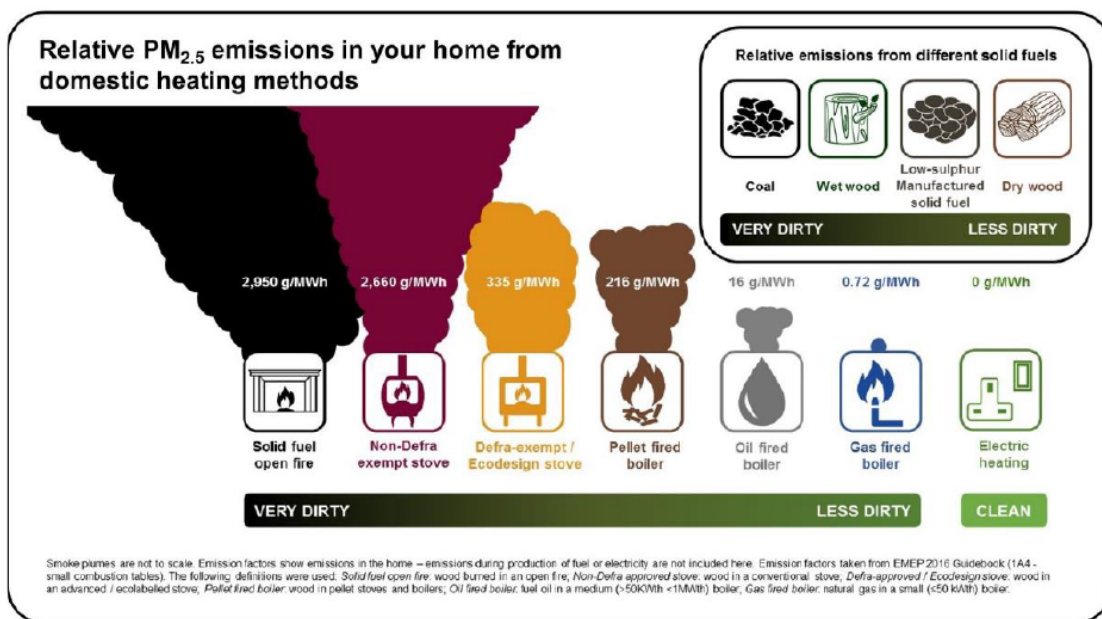
<sup>6</sup> DEFRA, 2019, Clean Air Strategy, Available: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/770715/clean-air-strategy-2019.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770715/clean-air-strategy-2019.pdf)

<sup>7</sup> British Lung Foundation, 2018, Toxic air at the door of the NHS, Available: <https://www.blf.org.uk/take-action/campaign/nhs-toxic-air-report>

NHS Digital Database and then modelling 2018 concentrations, based on the Defra 2015 background maps, which are modelled at a one kilometre by one kilometre grid square resolution. Analysis of the figures show that in all cases, the contributions from domestic, institutional and commercial space heating are greatest (defined as domestic sources within or outside the grid square).

While we may not agree with this modelled data, it may be necessary to target a campaign around indoor air quality to highlight the fact that health is affected when breathing air affected by smoke, either inside or outside your home. Diagram A below shows the difference in particulate emissions inside your home from the various heating choices that are generally available.

**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.

## Barrow-in-Furness Borough Council

In May 2019 we attempted to run a poster competition for local primary schools, for Clean Air Day 2019 but there was no uptake so we decided to run a different schools project the next school year. We also issued a press release and used social media to get messages out for Clean Air Day 2019.

The new air quality project with local schools started in November 2019, aimed at educating students about the effect of transport on public health. This included a presentation on air quality, support to create school community awareness projects and diffusion tubes were set up outside some of the schools to measure NO<sub>2</sub> throughout 2020. There was lots of interest from schools about this and we encouraged them to take part in a No Idling campaign in February 2020 to amplify the message around the Borough.



## Conclusions and Priorities

This authority has seen an influx of investment into the area and will continue to have implications over the next few years. Investment into BAE Systems Submarines, Kimberley Clark, Centrica Energy, North West Coast Connections Project and many more small scale projects will have implications on local air quality and this Authority

## **Barrow-in-Furness Borough Council**

will continue to scrutinise planning applications, air quality reports and liaise with industry to improve air quality.

There are still concerns regarding high traffic flow on the A590 so NO<sub>2</sub> monitoring will continue at Lindal-in-Furness. There is also a priority to monitor PM<sub>2.5</sub> in Barrow in Furness, which means we will be investing in a particulate monitor to start monitoring in 2021.

### **Local Engagement and How to Get Involved**

The general public can get involved and can comment on planning applications if they have further 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.

# Table of Contents

<b>Executive Summary: Air Quality in Our Area</b> .....	<b>i</b>
Air Quality in the Borough of Barrow-in-Furness .....	i
Actions to Improve Air Quality .....	ii
Conclusions and Priorities .....	iv
Local Engagement and How to Get Involved .....	v
<b>1 Local Air Quality Management</b> .....	<b>1</b>
<b>2 Actions to Improve Air Quality</b> .....	<b>2</b>
2.1 Air Quality Management Areas.....	2
2.2 Progress and Impact of Measures to address Air Quality in the Borough of Barrow-in-Furness .....	2
2.3 PM <sub>2.5</sub> – Local Authority Approach to Reducing Emissions and/or Concentrations.....	7
<b>3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance</b> .....	<b>9</b>
3.1 Summary of Monitoring Undertaken .....	9
3.1.1 Automatic Monitoring Sites .....	9
3.1.2 Non-Automatic Monitoring Sites.....	9
3.2 Individual Pollutants .....	9
3.2.1 Nitrogen Dioxide (NO <sub>2</sub> ) .....	9
3.2.2 Particulate Matter (PM <sub>10</sub> ) .....	12
3.2.3 Particulate Matter (PM <sub>2.5</sub> ).....	13
3.2.4 Sulphur Dioxide (SO <sub>2</sub> ).....	13
<b>Appendix A: Monitoring Results</b> .....	<b>14</b>
<b>Appendix B: Full Monthly Diffusion Tube Results for 2019</b> .....	<b>16</b>
<b>Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC</b> .....	<b>17</b>
<b>Appendix D: Map(s) of Monitoring Locations</b> .....	<b>19</b>
<b>Appendix E: Summary of Air Quality Objectives in England</b> .....	<b>22</b>
<b>Glossary of Terms</b> .....	<b>23</b>
<b>References</b> .....	<b>24</b>



**List of Tables**

**Table 2.2** – Progress on Measures to Improve Air Quality .....5  
**Table A.2** – Details of Non-Automatic Monitoring Sites.....14  
**Table A.3** – Annual Mean NO<sub>2</sub> Monitoring Results .....15  
**Table B.1** – NO<sub>2</sub> Monthly Diffusion Tube Results - 2019.....16

**List of Figures**

**Figure A.1** – Concentrations for NO<sub>2</sub>, SO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> in May 2019 .....7  
**Figure A.2** – Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Diffusion Tube Background Site (Dowdales School 1993-2019 [Bias Adjusted]).....11  
**Figure A.3** – Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Diffusion Tube Background Site (Dowdales School 2009-2019 [Bias Adjusted]).....11  
**Figure A.4** – Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Diffusion Tube Roadside Site (Lindal-in-Furness 2009-2019 [Bias Adjusted]).....12

## **1 Local Air Quality Management**

This report provides an overview of air quality in Barrow-in-Furness Borough during 2019. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) 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 pursuit of the objectives. 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 can be found in Table E.1 in Appendix E.

## 2 Actions to Improve Air Quality

### 2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of the objectives.

Barrow-In-Furness Borough currently does not have any AQMAs. The Barrow Borough Local Plan 2016-2030 sets out how the authority will improve local air quality, for more information see:

<https://www.barrowbc.gov.uk/residents/planning/planning-policy/local-plan/>.

The Climate Change policy and action plan, agreed on 18<sup>th</sup> June 2020 encompass a number of initiatives which will improve air quality. See:

<https://www.barrowbc.gov.uk/residents/public-protection-services/environmental-protection/climate-change/>

For reference, a map of Barrow Borough Council's monitoring locations is available in Appendix D.

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

Defra's appraisal of last year's ASR concluded that:

- 1.The trend at the background monitoring site is clearly presented and discussed. All other locations are recent and have little trend history. However, in next years ASR, trends from all sites could be presented.  
BBC response: trend data has been updated to include all long term sites.
- 2.QA/QC for monitoring data is robust.  
BBC response: Noted
- 3.The diffusion tube mapping is comprehensive and clearly demonstrates the location of each site. A wider scale map would be helpful to see the distribution of the monitoring network.  
BBC response: A wider scale map has been included at Appendix D

4. Additional monitoring is required in Lindal-in-Furness where concentrations have been increasing for the past 3 years. The diffusion tube monitoring site proposed on Greengate Street is therefore encouraged.

BBC response: Noted.

5. Could make links to the Public Health Outcome Frameworks.

BBC response: Added information about mortality rates attributable to particulates in summary.

6. Comments from the previous appraisal are provided and it is discussed how the recommendations made for the monitoring strategy will be implemented next year.

BBC response: Noted.

7. It could be made clearer what progress on the measures to improve air quality has taken place in 2018 and what actions are planned for the following reporting year.

BBC response: Noted.

Barrow-in-Furness Borough Council has taken forward a number of direct measures during the current reporting year of 2019 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

Key completed measures are:

- Climate Change Emergency Declaration;
- Social media and press release on Clean Air Day 2019;
- Loaned the AQ Mesh from South Lakeland District Council in May 2019 to assess PM<sub>2.5</sub>;
- Schools air quality project started in November 2019 with air quality presentations carried out over November and December;
- Low Carbon Barrow project - bids submitted to European Structural and Investment Funds and Cumbria Local Enterprise Partnership.

## Barrow-in-Furness Borough Council

Barrow-in-Furness Borough Council expects the following measures to be completed over the course of the next reporting year:

- Climate Change Policy and Action Plan created and approved, work to start on action plan;
- Low Carbon Barrow project – work to start on projects if approved and further funding sought if bids rejected;
- Introduction of electric cars and supporting infrastructure to Council's pool car fleet;
- Working with county highways and public health particularly in relation to electric vehicle infrastructure plans;
- To start monitoring PM<sub>2.5</sub> by the end of 2020;
- Work closely with Public Health to raise awareness about air pollution, especially PM<sub>2.5</sub>.

Barrow Borough Council's priorities for the coming year are to improve electric vehicle infrastructure across the Borough, to promote the use of electric vehicles by upgrading council fleet vehicles to electric and to start monitoring PM<sub>2.5</sub>.

The principal challenges and barriers to implementation that Barrow-in-Furness Borough Council anticipates facing are a lack of funding and the disruption caused by COVID-19.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Barrow Borough Local Plan 2016-2031	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	4th June 2019	Barrow Borough Council Planning Department	Barrow Borough Council	N/A	N/A	The Council adopted the Barrow Borough Local Plan 2016-2031 on 4th June 2019. It now forms part of the Barrow Borough Council Development Plan.	Ongoing	The plans objectives include supporting the creation of sustainable businesses and communities in a way that minimises pollution and protects the environment. Environmental Protection is consulted on all proposed developments which may impact on air quality. Responses are aimed at minimising AQ impacts, improving sustainable transport and increasing electric vehicle charging infrastructure. See: <a href="https://www.barrowbc.gov.uk/residents/planning/planning-policy/local-plan/">https://www.barrowbc.gov.uk/residents/planning/planning-policy/local-plan/</a>
2	Cumbria Cycling Strategy 2017-22	Transport Planning and Infrastructure	Cycle network	2017	Cumbria County Council, District Councils, National Parks, Sustrans, British Cycling	Cumbria County Council	N/A	Cycling and walking produces no NO <sub>2</sub> emissions	Implementation on-going	Ongoing	The strategy aims to promote cycling and improve cycling infrastructure across Cumbria. See: <a href="https://councilportal.cumbria.gov.uk/documents/s66323/App%201%20Cumbria%20Cycling%20Strategy.pdf">https://councilportal.cumbria.gov.uk/documents/s66323/App%201%20Cumbria%20Cycling%20Strategy.pdf</a>
3	Climate Change Policy and Action Plan	Policy Guidance and Development Control	Low Emissions Strategy	16-Jun-20	Barrow Borough Council	Barrow Borough Council	Reduction in CO <sub>2</sub> equivalents	Reduction in CO <sub>2</sub> equivalents	Policy and action plan agreed on 16th June 2020, quarterly working group meetings to oversee actions	Ongoing	Additional funding will be needed to implement some measures. See: <a href="https://www.barrowbc.gov.uk/residents/public-protection-services/environmental-protection/climate-change/">https://www.barrowbc.gov.uk/residents/public-protection-services/environmental-protection/climate-change/</a> The Low Carbon Barrow project is the initial focus for funding.
4	Zero Carbon Cumbria Partnership project	Other	Other	Ongoing	Cumbria Action for Sustainability, Cumbria County Council, District Councils, Lake District National Park Partnership, Cumbria Local Enterprise Partnership, Art Gene and many more (68 partners in total)	National Lottery funding,	Reduction in CO <sub>2</sub> equivalents; annual reductions of 5% from food, 13% from energy and 5% from purchased goods across Cumbria	Reduction in CO <sub>2</sub> equivalents	Stage two submission submitted 27th March 2020, expect to find out July 2020	Ongoing	Funding required to make necessary reductions. See: <a href="https://cafs.org.uk/2019/05/01/cumbrian-leaders-pledge-to-work-together-to-tackle-climate-change/">https://cafs.org.uk/2019/05/01/cumbrian-leaders-pledge-to-work-together-to-tackle-climate-change/</a>
5	Local Cycling and Walking Infrastructure Plan (LCWIP)	Transport Planning and Infrastructure	Cycle network	Ongoing	Cumbria County Council, Barrow Borough Council	Cumbria County Council	N/A	Cycling and walking produces no NO <sub>2</sub> emissions	Workshop in Jan 2020, led by CCC	Ongoing	No additional funding attached to the plan but it's being prepared to support future bids.
6	Low Carbon Barrow	Other	Other	Ongoing	Barrow Borough Council / Art Gene	European Structural and Investment Fund / Local Enterprise Partnership / Barrow Borough	Reduction in CO <sub>2</sub> equivalents	More electric vehicles should lead to a reduction in NO <sub>2</sub>	Awaiting outcome of bids, expected July 2020	Ongoing	The project includes: Carbon Neutral Piel Island, Electric Vehicle charging stations, Town Hall, Craven House and public buildings energy efficiency projects, Barrow Public Housing Improvement Scheme, Barrow home

Barrow-in-Furness Borough Council

						Council / Art Gene					and business exemplar projects and Grant Programme, 'Extreme Views' delivering a public engagement programme and Low Carbon Demonstration Projects. The total cost of the programme would be c. £1,900,000 so grant funding will need to be secured.
7	Burning waste social media, press releases and webpage	Public Information	Via the Internet	Oct-19	Barrow Borough Council / Cumbria County Council	Barrow Borough Council	N/A	Reduction in particulates	Ongoing	Ongoing	Social media and press releases to highlight pollution caused by burning waste in October 2019, followed up with webpage and further press releases and social media following increase in fires during lockdown in March/April 2020.
8	Barrow Borough Council will continue to provide comprehensive control over emissions from all Part A2 and B Processes located within the local authority area.	Environmental Permits	Other measure through permit systems and economic instruments	Ongoing	Barrow Borough Council	Permit charging scheme	Risk based inspections showing that emission limits are being met and efforts are being made to improve on national objectives	Not calculated	There are currently 16 part B & 1 A2 processes which are permitted by Barrow BC. No enforcement action required during 2019 in relation to emissions.	Ongoing	No new major polluting processes in previous year. Inspections difficult during 2020 due to COVID-19.
9	Promoting electric vehicle chargepoints	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	Ongoing	Barrow Borough Council / Cumbria County Council	Barrow Borough Council / Cumbria County Council	Number of EV charging points installed Charging point usage	Electric vehicles have no NO2 emissions	Workshop in Jan 2020 with Energy Savings Trust and interested partners. List of possible sites throughout the Borough created.	Ongoing	Funding required, further funding bids due following outcome of Low Carbon Barrow bids.
10	Schools air quality project	Public Information	Other	Nov-19	Barrow Borough Council / Cumbria County Council	Barrow Borough Council	N/A	Increased walking and decreased idling should lead to reduced NO2 emissions	8 air quality presentations delivered to school groups from Nov 2019 - Jan 2020; diffusion tubes placed outside 4 schools in Jan 2020; 3 schools involved in no idling campaign in Feb 2020.	Ongoing	Unable to continue with programme as planned for 2020 due to COVID-19. Furness Academy have been successful in securing 400 trees and hedgerows to plant in school grounds in Nov 2020.
11	Replacing fleet vehicles with electric vehicles	Promoting Low Emission Transport	Company Vehicle Procurement -Prioritising uptake of low emission vehicles	Ongoing	Barrow Borough Council	Barrow Borough Council	Amount of electric vehicles and charging infrastructure	Electric vehicles have no NO2 emissions	Ongoing	Ongoing	Need to ensure infrastructure is there before replacing vehicles. Need to agree a suitable location for chargepoint. Vehicles to be replaced as leases expire.

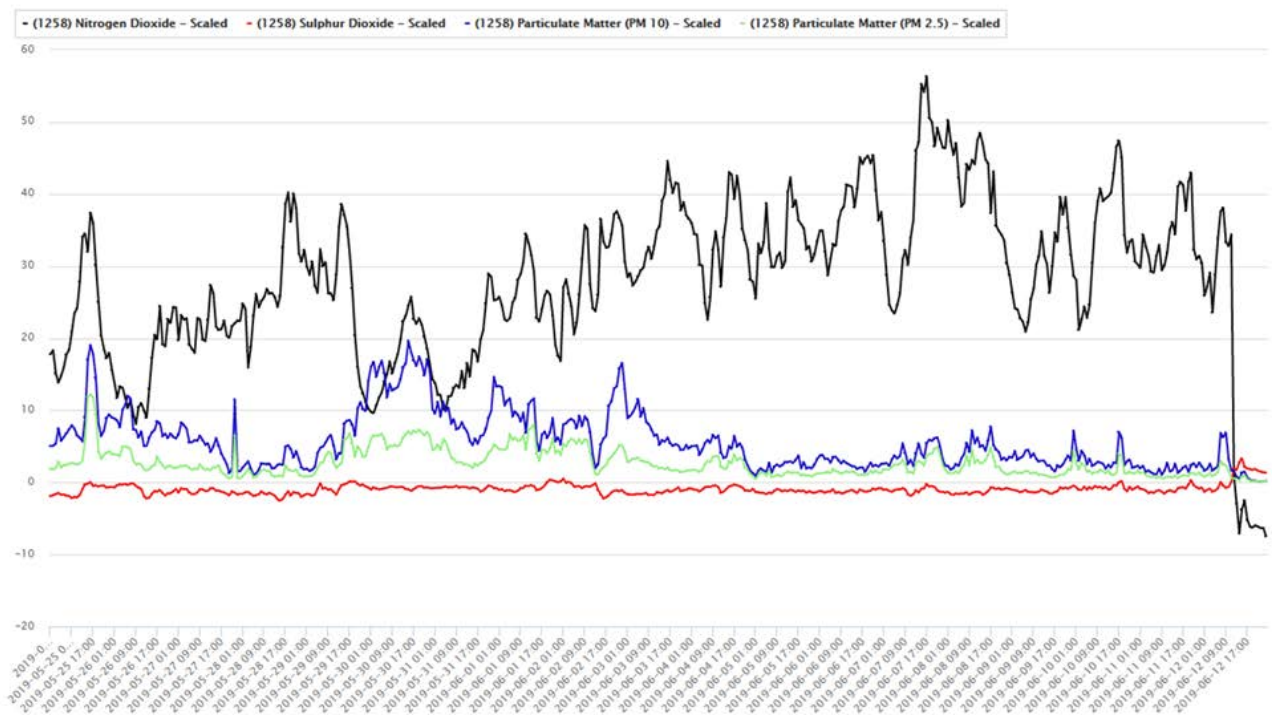
## 2.3 PM<sub>2.5</sub> – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of PM<sub>2.5</sub> (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM<sub>2.5</sub> has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Barrow-in-Furness Borough Council is taking the following measures to address PM<sub>2.5</sub>:

1. An AQ Mesh PM<sub>2.5</sub> Monitoring Device was trialed for 3 weeks in May 2019 to provide indicative levels of PM<sub>2.5</sub>. It was placed on the corner of Hartington St and Abbey Road, this location was chosen because it had a doctors surgery, major trunk road and residential housing nearby. The highest daily average for PM<sub>2.5</sub> was 6.161 µg/m<sup>3</sup> and the highest 15 minute mean for PM<sub>2.5</sub> was 23.27 µg/m<sup>3</sup>, see Figure A.1 below. These results are not particularly high and don't breach national air quality objectives or WHO recommended levels. However we know that during the summer our diffusion tubes can be a third or half of levels found during winter, so we can't rely on these results alone.

**Figure A.1:** Concentrations for NO<sub>2</sub>, SO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> in May 2019





## Barrow-in-Furness Borough Council

2. The Authority is currently looking at the options available to fully monitor PM<sub>2.5</sub> during the full 2021 monitoring season at a key area of concern, i.e. where reported background concentrations were estimated at 15-20µg/m<sup>3</sup> in 2015, although the modelled data is showing 5-10µg/m<sup>3</sup> in 2018. This area covers three 1km x 1km squares including Ironworks Road, where NO<sub>2</sub> levels were monitored over 2017, 2018 and 2019 and Greengate Street which was monitored for NO<sub>2</sub> in 2019 and again in 2020, though at a different location.
3. This Authority carefully scrutinises developments at the planning stage that may give rise to PM<sub>2.5</sub> levels. Conditions are imposed that require an appropriate assessment of air quality including PM<sub>2.5</sub> whereby appropriate mitigations measures may be required.
4. If a Pollution Prevention Control (PPC) substantial permitting variation or a new application is received, an air quality assessment may be required depended upon the specific nature of the installation.
5. Regularly check local PM<sub>2.5</sub> levels via the Automatic Urban and Rural Network (AURN) available at the nearest monitoring location (Blackpool, Marton) and the DEFRA Data manager 1km x1km squares. Available from: [https://uk-air.defra.gov.uk/networks/site-info?uka\\_id=UKA00488](https://uk-air.defra.gov.uk/networks/site-info?uka_id=UKA00488), <https://uk-air.defra.gov.uk/data/> & <https://uk-air.defra.gov.uk/data/gis-mapping>

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

### 3.1 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 (passive) monitoring of NO<sub>2</sub> at four (4) sites during 2019. Table A.2 in Appendix A shows the details of these sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

### 3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias. Further details on adjustments are provided in Appendix C.

#### 3.2.1 Nitrogen Dioxide (NO<sub>2</sub>)

The measured annual mean concentrations in 2019 for NO<sub>2</sub> indicate that the objective of 40µg/m<sup>3</sup> was not exceeded at any of the monitoring locations in the Borough. The 2019 monitoring campaign for of NO<sub>2</sub> at Lindal In Furness has resulted in an annual mean which has decreased slightly to 33.00 µg/m<sup>3</sup> from 34.58 µg/m<sup>3</sup> in 2018 and 33.15µg/m<sup>3</sup> in 2017, although it is still slightly higher than the 32.95µg/m<sup>3</sup> in 2016 and 30.01µg/m<sup>3</sup> in 2015. Background NO<sub>2</sub> continues to reduce, suggesting traffic at Lindal in Furness is a causal factor for these emissions and is not reflective of the larger district.

Barrow is the second largest settlement in Cumbria and is situated at the tip of the Furness Peninsula in the south west corner of Cumbria. Surrounded by a rural hinterland, the Borough is remote from other centres of population and services, and

## **Barrow-in-Furness Borough Council**

the sole link to the motorway network is via the A590. At 78km<sup>2</sup>, the Borough is the smallest area of any district in Cumbria, yet is the most densely populated.

The Walney Road diffusion tube was also removed at the end of 2016 as levels were 59% below the air quality NO<sub>2</sub> objective.

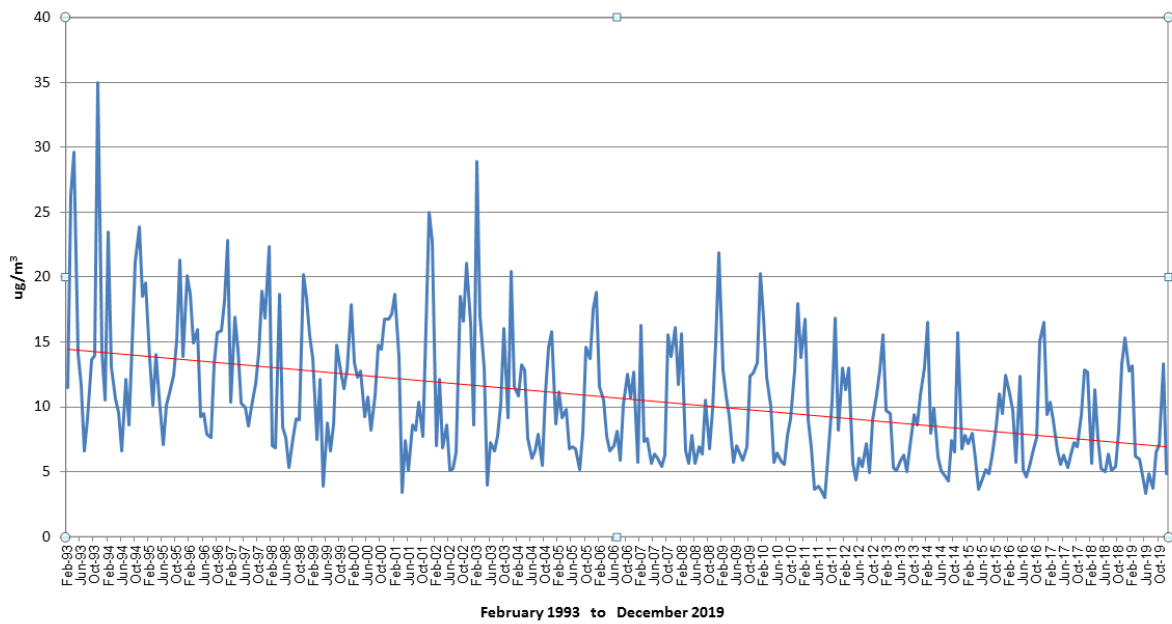
The Dalton-in-Furness roadside location was removed in December 2018 because levels were nearly 40% below the objective.

The diffusion tube on Iron Works Road was 57% below the NO<sub>2</sub> air quality objective so this was removed at the end of 2019.

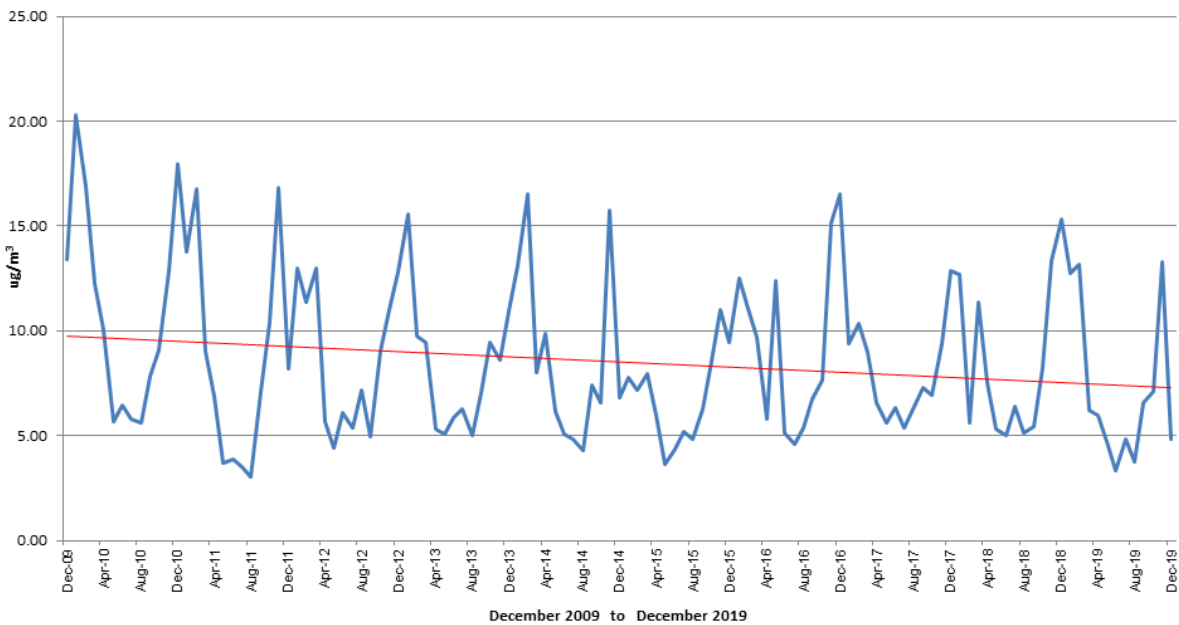
Monitoring increased to seven roadside locations in 2020 to obtain additional information on NO<sub>2</sub> concentrations outside schools and a new medical centre on Duke Street, Barrow in Furness, while continuing to monitor the busiest roads in the Borough and the background location.

At the end of 2019, all diffusion tube positions were also amended to enable officers to change diffusion tubes using grabbers instead of ladders. The diffusion tube on Greengate Street (see Appendix D) was removed due to fear of tampering and moved to the junction of Greengate Street and Rawlinson Street.

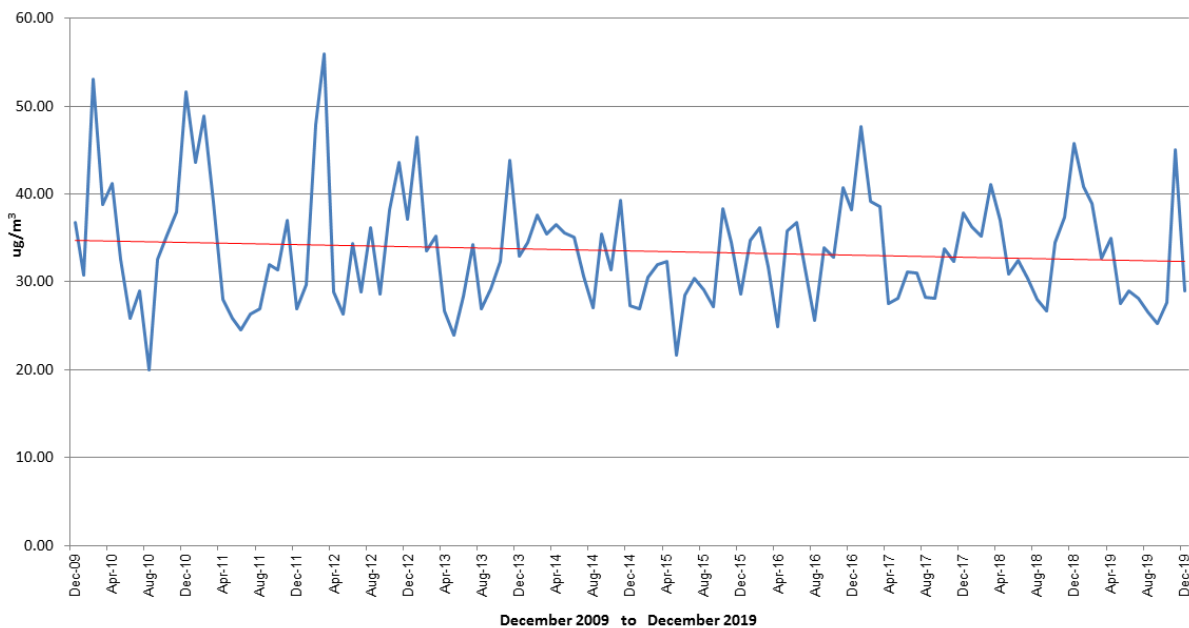
**Figure A.2:** Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Diffusion Tube Background Site (Dowdales School 1993-2019 [Bias Adjusted])



**Figure A.2:** Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Diffusion Tube Background Site (Dowdales School 2009-2019 [Bias Adjusted])



**Figure A.4:** Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Diffusion Tube Roadside Site (Lindal in Furness 2009-2019 [Bias Adjusted])



Background monitoring at the only location remaining from the original monitoring programme is shown in Figure A.2 (Dowdales School) and Figure A.3 for the 10 year trend. Both graphs indicates a decreasing trend in annual mean background NO<sub>2</sub> concentrations in the Borough. Figure A.4 shows the 10 year trend at the Lindal in Furness Roadside site, showing only a slight decrease over the long term. The other two sites monitored in 2019 had been monitored for less than 5 years so trends have not been mapped for those sites.

Table A.3 in Appendix A compares the ratified and adjusted monitored NO<sub>2</sub> annual mean concentrations for the past 5 years with the air quality objective of 40µg/m<sup>3</sup>, following the application of bias adjustment, as required.

For diffusion tubes, the full 2019 season dataset of monthly mean values is provided in Appendix B.

### 3.2.2 Particulate Matter (PM<sub>10</sub>)

There is no monitoring of PM<sub>10</sub> concentrations carried out by Barrow-in-Furness Borough Council.

**3.2.3 Particulate Matter (PM<sub>2.5</sub>)**

There is no monitoring of PM<sub>2.5</sub> concentrations carried out by Barrow-in-Furness Borough Council.

**3.2.4 Sulphur Dioxide (SO<sub>2</sub>)**

There is no automatic or non-automatic monitoring of SO<sub>2</sub> concentrations carried out by Barrow-in-Furness Borough Council.

## Appendix A: Monitoring Results

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

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube collocated with a Continuous Analyser?	Height (m)
LIND 1	Lindal	Roadside	325229	475856	NO <sub>2</sub>	NO	0	2	NO	3
IRON 1	Ironworks Road	Roadside	318986	469541	NO <sub>2</sub>	NO	0	2	NO	3
BKGD 1	Dowdales School	Urban Background	322732	474429	NO <sub>2</sub>	NO	N/A	N/A	NO	3
GRN 1	Greengate St	Roadside	320169	469138	NO <sub>2</sub>	NO	0	2	NO	3

Table A.3 – Annual Mean NO<sub>2</sub> Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2019 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3) (4)</sup>				
							2015	2016	2017	2018	2019
LIND 1	325229	475856	Roadside	Diffusion Tube	100	100	30.01	32.95	33.15	34.58	33
DALT 1	323235	474138	Roadside	Diffusion Tube	0	0	23.15	26.26	25.22	26.91	N/A
WALN 1	319246	469502	Roadside	Diffusion Tube	0	0	14.44	16.43	N/A	N/A	N/A
IRON 1	318986	469541	Roadside	Diffusion Tube	100	100	N/A	N/A	16.6	17.02	17.52
BKGD 1	322732	474429	Urban Background	Diffusion Tube	100	100	6.85	9.38	8.66	8.45	7.59
GRN 1	320169	469138	Roadside	Diffusion Tube	100	100	N/A	N/A	N/A	N/A	29.95

Diffusion tube data has been bias corrected

Annualisation has been conducted where data capture is <75%

**Notes:** Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 1-hour mean objective are shown in **bold and underlined**.

(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%).

(3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per Technical Guidance LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.



## Appendix B: Full Monthly Diffusion Tube Results for 2019

Table B.1 – NO<sub>2</sub> Monthly Diffusion Tube Results - 2019

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.93) and Annualised <sup>(1)</sup>	Distance Corrected to Nearest Exposure <sup>(2)</sup>
LIND 1	325229	475856	43.9	41.8	35.2	37.7	29.7	31.1	30.3	28.6	33.9	34.0	48.5	31.1	35.5	33.0	33.0
IRON 1	318986	469541	27.0	26.6	11.1	20.5	14.5	14.2	14.2	10.3	17.5	23.2	29.5	17.5	18.8	17.5	17.5
BKGD 1	322732	474429	13.7	14.1	6.9	6.4	5.1	3.6	5.2	4	7.1	7.6	14.3	10	8.2	7.6	7.6
GRN 1	320169	469138	40.1	43.1	31.9	34.4	27.8	26.8	24.7	24.8	27.2	29.8	42.7	33.3	32.2	30.0	30.0

(1) See Appendix C for details on bias adjustment factor

(2) Distance corrected to nearest relevant public exposure.

- Local bias adjustment factor used
- National bias adjustment factor used
- Annualisation has been conducted where data capture is <75%
- Where applicable, data has been distance corrected for relevant exposure

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

### QA:QC Data

#### **Factor from Local Co-location Studies (if available)**

There are no local co-location studies therefore the national NO<sub>2</sub> bias factor has been used (see below):

#### **Diffusion Tube Bias Adjustment Factors**

- 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.
- The current bias factor of **0.93** has been applied to the annual mean values of diffusion tube analyses for each monitoring location. The factor was obtained from the Review and Assessment web-site: <https://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html> The spreadsheet version number is 03/20.

#### **Discussion of Choice of Factor to Use**

The national NO<sub>2</sub> bias factor was obtained from the National Diffusion Tube Bias Adjustment Spreadsheet provided by Defra LAQM, as there is no co-location study.

#### **PM Monitoring Adjustment**

Barrow-in-Furness Borough Council does not undertake any particulate matter monitoring.

#### **Short-term to Long-term Data adjustment**

No short-term to long-term data adjustments are necessary as datasets for the diffusion tube monitoring were for a complete 12 month period.

#### **QA/QC of automatic monitoring**

Barrow-in-Furness Borough Council does not undertake any automatic monitoring.

QA/QC of diffusion tube monitoring

- **Tube Precision**

The precision results for Gradko Environmental (A division of Gradko International Ltd.) are stated as **GOOD**, with the exception of two **POOR** months on the following website:

<https://laqm.defra.gov.uk/diffusion-tubes/precision.html>

- **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.

Table 1: Laboratory AIR-PT Round Results & Gradko NO<sub>2</sub> Proficiency Scheme 2018

Table 1: Laboratory summary performance for AIR NO<sub>2</sub> PT rounds AR0024, 25, 27, 28, 30, 31, 33 and 34

The following table lists those UK laboratories undertaking LAQM activities that have participated in recent AIR NO<sub>2</sub> 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 AR024	AIR PT AR025	AIR PT AR027	AIR PT AR028	AIR PT AR030	AIR PT AR031	AIR PT AR033	AIR PT AR034
Round conducted in the period	January – February 2018	April – May 2018	July – August 2018	September – October 2018	January – February 2019	April – May 2019	July – August 2019	September – November 2019
Aberdeen Scientific Services	100 %	100 %	100 %	100 %	75 %	100 %	100 %	100 %
Cardiff Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Edinburgh Scientific Services	100 %	100 %	100 %	100 %	100 %	NR [2]	100 %	25 %
SOCOTEC	100 % [1]	100 % [1]	100 % [1]	100 % [1]	87.5 % [1]	100 % [1]	100 % [1]	100 % [1]
Exova (formerly Clyde Analytical)	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Glasgow Scientific Services	100 %	100 %	50 %	100 %	100 %	100 %	100 %	50 %
Gradko International [1]	100 % [1]	100 %	100 %	100 %	75 %	100 %	100 %	100 %
Kent Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Kirklees MBC	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Lambeth Scientific Services	NR [2]	NR [2]	NR [2]	25 %	50 %	100 %	50 %	100 %
Milton Keynes Council	100 %	75 %	100 %	100 %	100 %	100 %	50 %	100 %
Northampton Borough Council	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Somerset Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
South Yorkshire Air Quality Samplers	100 %	100 %	100 %	100 %	100 %	100 %	100 %	75 %
Staffordshire County Council	50 %	100 %	100 %	100 %	100 %	75 %	75 %	75 %
Tayside Scientific Services (formerly Dundee CC)	100 %	NR [2]	100 %	NR [2]	100 %	NR [2]	100 %	NR [2]
West Yorkshire Analytical Services	50 %	75 %	100 %	100 %	100 %	100 %	100 %	50 %

[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] Northampton Borough Council, Kent Scientific Services, Cardiff Scientific Services, Kirklees MBC and Exova (formerly Clyde Analytical) no longer carry out NO<sub>2</sub> diffusion tube monitoring and therefore did not submit results.

For more information the AIR-PT scheme, please visit the following website:

<https://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html>.

## Appendix D: Map(s) of Monitoring Locations

Lindal 1 (LIND 1) – Ulverston Road.

Longitude -3.14692 Latitude 54.17303



Iron Works Road (IRON 1).

Longitude -3.17703 Latitude 54.15729



Greengate Street (GRN 1)

Longitude -3.2226 Latitude 54.1119

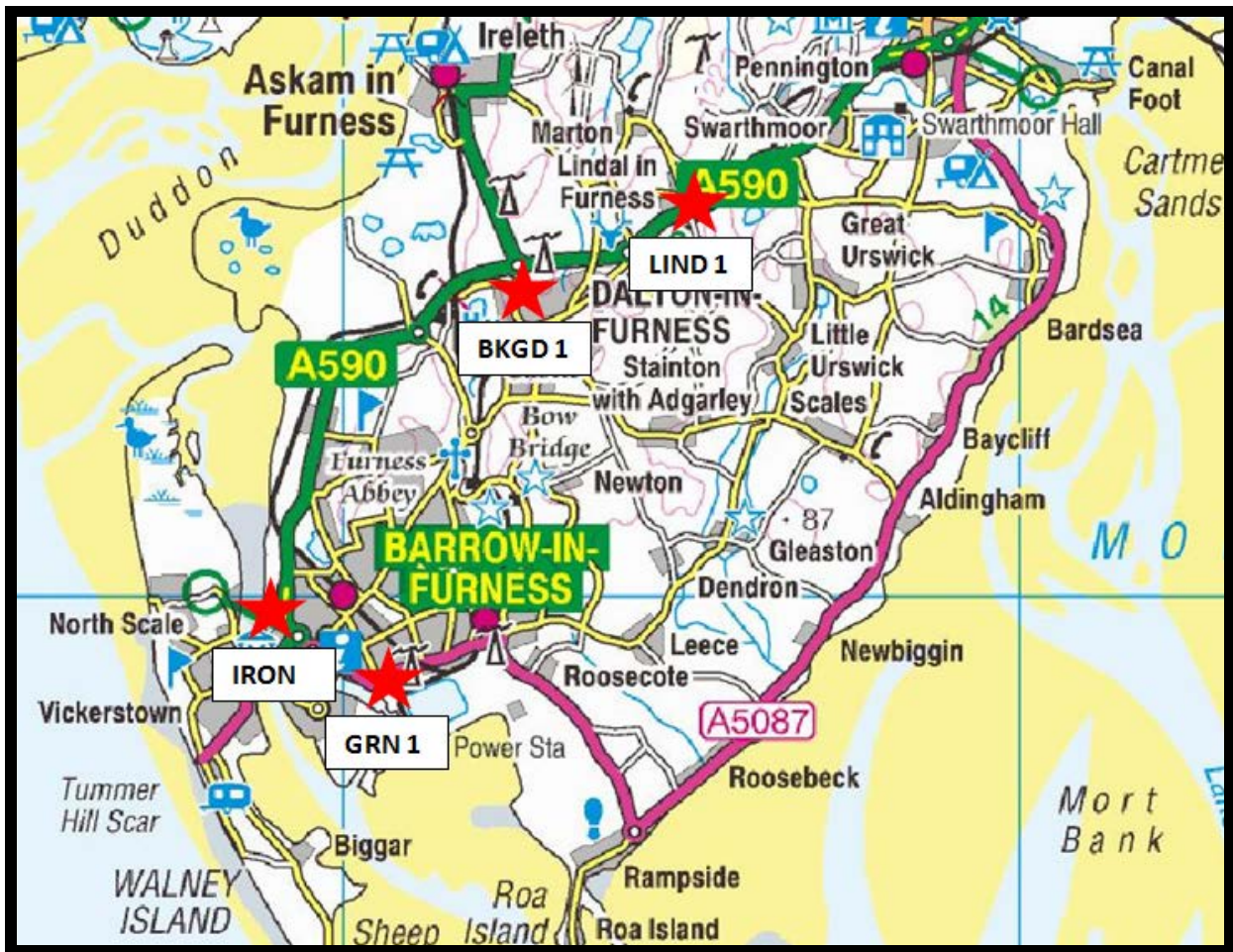


Dowdales School (BKGD 1)- Urban Background.

Longitude -3.18467 Latitude 54.15969



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 England

Pollutant	Air Quality Objective <sup>8</sup>	
	Concentration	Measured as
Nitrogen Dioxide (NO <sub>2</sub> )	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Particulate Matter (PM <sub>10</sub> )	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Sulphur Dioxide (SO <sub>2</sub> )	350 µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean

<sup>8</sup> The units are in microgrammes of pollutant per cubic metre of air (µg/m<sup>3</sup>).

## 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	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM <sub>2.5</sub>	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO <sub>2</sub>	Sulphur Dioxide



## References

- EPUK Guidance: Development Control-Planning for Air Quality (2010)
- Air Quality Annual Status Report (ASR) 2018
- Diffusion Tubes for Ambient Monitoring: Practical Guidance, 2008 (AEA Energy & Environment)
- Environmental equity, air quality, socioeconomic status and respiratory health, 2010 (Wheeler BW, Ben-Shlomo Y)
- AEA Technology. Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006
- 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)
- Defra. LAQM TG16, February 2018