# 2019 Air Quality Annual Status Report (ASR)
## Allerdale Borough Council

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

June 2019

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| Local Authority Officer | Richard Cain |
| Department | Environmental Health |
| Address | Allerdale House<br>Workington<br>Cumbria<br>CA14 3YJ |
| Telephone | 0303 123 1702 |
| E-mail | environmental.health@allerdale.gov.uk |
| Report Reference number | ASR2019 |
| Date | June 2019 |

# Executive Summary: Air Quality in Our Area

## Air Quality in Allerdale

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[1,2].

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[3].

Allerdale has relatively low levels of pollution due to the rural nature of the area. Allerdale is aware that air quality in both urban and rural areas is constantly threatened by pollution from human activity.

The main pollutant of concern in the Allerdale area is Nitrogen Dioxide ($NO_2$). Nitrogen Dioxide pollution in Allerdale is predominantly associated with road traffic sources and other transport links.

In 2018 monitoring of Nitrogen Dioxide was carried out in Allerdale via diffusion tube monitoring sites. The sites were positioned at ten locations across Allerdale felt most affected by road traffic pollution. As with previous years of monitoring the 2018 data demonstrates Nitrogen Dioxide levels are well below the national objectives.

Other pollutants of concern include Sulphur Dioxide ($SO_2$) and Particulate Matter in the form of $PM_{10}$ and $PM_{2.5}$. Allerdale takes a proactive approach to tackling these pollutants via smoke control areas, planning requirements, permitting polluting processes and general air pollution regulatory activities under the Clean Air Act.

Allerdale do not currently sample for $SO_2$ however brief studies and screening were previously carried out in relation to identifying possible $SO_2$ hotspots in 2017. This initial screening discounted the need for detailed assessment in relation to $SO_2$.

[1] Environmental equity, air quality, socioeconomic status and respiratory health, 2010
[2] Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006
[3] Defra. Abatement cost guidance for valuing changes in air quality, May 2013

Predictive data from 2016 in relation to $PM_{2.5}$ has been collated and modelled nationally by Public Health England. This can be viewed on the Public Health Wider Determinants website https://fingertips.phe.org.uk/profile/wider-determinants/data#page/0 Allerdale is proud to have again been stated in the above as the borough with the lowest $PM_{2.5}$ human exposure rate in the country.

Allerdale work closely with neighbouring local authorities, Cumbria County Council and Natural England to regulate and reduce air pollution. Allerdale have partaken in consultation of the Joint Public Health Strategy which is inclusive of air quality effects on public health in the region.

Due to the good quality of our air demonstrated by monitoring and data gathered, there is no requirement for an air quality management area in Allerdale to date. Allerdale recognise the significance of maintaining good air quality for good health and will continue to pursue further improvements where possible.

## Actions to Improve Air Quality

Recent information provided by DEFRA on domestic $PM_{2.5}$ sources such as wood burning stoves and other solid fuel appliances is triggering further investigation work in Allerdale to help reduce domestic source of $PM_{2.5}$ .Educational leaflet and social media campaigns have been undertaken to improve awareness and hopefully change fuel use behaviours.

Domestic Burning and Indoor Air Pollution within residential settings is also being addressed via educational events. Domestic solid fuel sales have been targeted via interaction with local supermarkets, petrol stations and other businesses who sell solid fuel within the Smoke Control Areas.

Allerdale have most recently partaken in Clean Air Day 2019 as an opportunity to push the above Air Quality agenda within the borough. The Allerdale stall was situated in Workington Town Centre with engaging activities and educational leaflets. The event was deemed a success and we are now planning for similar events around the borough.

**Air Quality Stall Event held in Workington Town Centre.**


**Pledge cards were made available to members of the public and also Allerdale Staff to really try and gain the community buy in needed to facilitate change.**

Via the development planning process Allerdale has been pro-active in ensuring the borough maintains its low levels of pollution. Air quality assessments have been required for developments with potentially polluting industrial applications. Industrial applications, combined heat and power systems or other combustion method energy production such as gas turbine or biomass boilers.

Allerdale Borough Council continues with its duties to regulate and control in regards to emissions from all Part A2 and B Processes located within the borough. Allerdale ensure best available techniques are adhered to and pollutant emissions are minimised.

Allerdale promote, support and influence plans and policies that may have a positive effect on the Allerdale air pollution levels. Most recently Allerdale have responded to Air Quality related consultations such as the Cumbria Joint Public Health Strategy, DEFRA Clean Air Acts Amendments and Domestic Fuels Consultation.

## Leading the way as an organisation

Allerdale promote a green travel hierarchy policy for all council business. This focuses on reducing car journeys whenever possible and encouraging sharing of the electric pool car where Public Transport or Web based meetings are unsuitable.

Allerdale also encourage their home working policy for its staff, reducing the need for daily commute and cutting road/ rail travel related pollution within the borough.

Allerdale offer a bike to work reduced cost cycle hire scheme available to all staff to encourage pollutant free commuting. Facilities have been made available at the council offices for secure storage of cycles and equipment.

The Street scene team have been utilising mountain bikes and leaving the vans behind when carrying out enforcement duties around the borough.


All air quality monitoring and collection of diffusion tubes is undertaken utilising a pollution friendly Allerdale electric vehicle.

A new Environmental Services contract has been formed with Tivoli. As part of the new contract award for street cleansing Tivoli have purchased two Addex Maxwind Pedestrian Sweepers to clean the streets of Allerdale. These sweepers are entirely electric giving an environmentally friendly approach to street cleansing, they also use a specialist industry leading staged PM filter system reducing particulate and dust output into the atmosphere.

The switch to electric from conventional petrol and diesel plant is currently being looked into across the whole of Allerdale contracted services undertaken by Tivoli Landscaping and Maintenance.

"*Over the next 18 months we are looking at introducing battery powered equipment into the contract, with the ultimate goal of 75% of handheld equipment being battery powered in 5 years' time. Significantly reducing air pollution, emissions and improving our carbon footprint. Handheld equipment on the Allerdale contract amounts to approx. 120 units, this being made up of strimmer's, blowers, hedge cutters and chainsaws so as we phase the old units out we will be replacing with battery powered."* Craig Hunter (Regional Director Tivoli)

## Conclusions and Priorities

This year monitored pollution levels have remained generally unchanged with a minor increase in $NO_2$ levels at Ramsay Brow Workington and King Street Wigton. Reductions were noted at Main Street, Keswick and a marginal reduction at Curzon Street, Maryport.

The general trend is that the Borough has very good air quality which has been demonstrated again by this year's monitoring. This has been previously highlighted by Public Health England as the lowest (best) borough in the country in relation to Human $PM_{2.5}$ exposure. Given the above our priority is to maintain the good air quality within the Allerdale Borough.

Allerdale's first priority will be to act on the objectives of the Government 2019 Clean Air Strategy. We will also utilise information produced by DEFRA and Public Health England to use best practice in reducing Air Pollution Health impacts throughout our area.

Allerdale will continue to manage the potential air quality impacts of ongoing major developments both individually and collectively. Detailed Air Quality Assessments have been required from developers via the planning process when relevant.

Improvements to agricultural practices have been recognised by increased development applications thought to be associated with incentive funding from Natural England to reduce Ammonia emissions. Natural England are also consulted on agricultural practice to ensure best design and operation of new agricultural developments.

New monitoring sites have also been identified by Allerdale specifically in relation to future increased road traffic / rail traffic associated with new and planned major development. Including the Strawberry How, Cockermouth housing development and also from surrounding boroughs to Allerdale, Moorside Nuclear Power Project (currently on hold) and West Cumbria Mining Plans in neighbouring Borough Copeland.

## Local Engagement and How to get involved

There are a number of ways in which the public can get involved with maintaining / improving air quality such as considering alternative travel arrangements e.g. using public transport, car share schemes, using cycle networks, use of electric vehicles/cycles, walk/cycle to school/work groups.

Allerdale are working towards greater public awareness of Air Quality. Improvements have recently been made to the Allerdale website with domestic burning information leaflets, Air Quality reports and DEFRA pollution forecast links are now accessible to the public directly at https://www.allerdale.gov.uk/en/your-environment/air-quality/

A new Visit Allerdale website was launched in 2018 and can be accessed on the following link http://visitallerdale.co.uk/ . The webpage is focussed on people visiting the area and has considered travel arrangements and sustainable cleaner transport systems for visitors accessing the borough. The webpage contains a new interactive travel planning guide focused on our less polluting public transport system of rail and bus network before considering car travel.

The Visit Allerdale website also contains an array of information of our cycle and walking routes throughout the borough. Allerdale have worked closely with Sustrans in developing and maintaining the local safe cycle and walking network. Further information on the network maps and routes in the Allerdale borough is available on the Sustrans website https://www.sustrans.org.uk/

Allerdale are keen to get the message out that we can all help improve Air Quality from businesses and Industry to individuals or communities. Whether that be by using public transport alternatives to car journeys or simply taking the active option of walking or cycling.

### Simple Steps we can all take to improve Air Quality

**Make Clean Air Travel Choices**

- Give your car a day off- Walk, cycle or take public transport to work or school or work from home if you can.
- Go Electric – Thinking of a new vehicle consider going Electric to really reduce your pollution impact. Electric Charging Points in and around the Allerdale Borough are available to view here https://www.zap-map.com/locations/workington-charging-points/
- Don't Idle- If you drive, turn off your engine when your vehicle is stationary, and it is safe to do so.

**Make Clean Air Decisions indoors and at Home**

The UK population spends up to 90% of its time indoors which means the air we are most exposed to is inside.

- Ventilate your home- Open windows and use extractor fans when cooking or using cleaning products, but close windows near busy roads during rush hours.
- Use Fragrance Free milder cleaning products
- Only burn dry, well-seasoned wood or smokeless fuel on your stove, open fire or barbeque.
- Choose paints and varnishes that are labelled Low Volatile Organic Compounds VOC's (Clean Air Day, 2019)

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# 1 Local Air Quality Management

This report provides an overview of air quality in Allerdale Borough Council during 2018. 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 Allerdale 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 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 compliance with the objectives.

Allerdale Borough Council has not identified from monitoring throughout 2018 or previous years any exceedance of an air quality objective and therefore no AQMAs have been declared. For reference, a map of Allerdale Borough Councils monitoring locations is available in Appendix D

## 2.2 Progress and Impact of Measures to address Air Quality in the Allerdale Borough

Defra's appraisal of last year's ASR concluded

*"The Report sets out the Annual Status Report, which forms part of the Review & Assessment process required under the Environment Act 1995 and subsequent regulations.*

*Allerdale Borough Council currently does not have any declared air quality management areas (AQMAs); as such there is no formal requirement to develop an air quality action plan (AQAP). The Council does however have a list of 22 measures to address air quality issues. During the last reporting period there were no exceedances of air quality objectives (AQOs). The Council undertake NO2 monitoring via a network of 10 diffusion tubes. The report provides good discussion of trends and site location justifications. During the last reporting period the Council updated their network, adding a number of new monitoring sites. Air quality in the Borough is generally good, with concentrations far below objective limits.*

*The report provides good commentary on local developments. The report provides good discussion of local PM2.5 issues and has a number of measures to address these, whilst also drawing links to the Public Health Outcomes Framework. QA/QC procedures have been applied for bias adjustment, using a national factor of 0.77. No other corrections are required.*

*On the basis of the evidence provided by the local authority the conclusions reached are acceptable for all sources and pollutants, with the provisos listed in the commentary below. The Council should continue to implement their air quality strategy and continue monitoring. Following the completion of this report Allerdale Borough Council should submit an Annual Status Report in 2019.*

***Commentary***

*The report is well structured, detailed, and provides the information specified in the Guidance. The following comments are designed to help inform future reports.*

*1. The report provides clear and correctly labels maps of monitoring sites.*

*2. The report is well written, concise and satisfies the requirements of relevant standards."*

Allerdale 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 2.1.

**Key completed measures are:**

- Funding secured for Allonby to Silloth Cycle Route
- A new Environmental Services contract gained with Tivoli
- A successful Clean Air Day 2019 event with supporting Social Media Campaign raising awareness of Domestic Burning, Indoor Air Pollution and the benefits of alternative travel.
- Improvements to The Allerdale Borough Council Website with updated links information sources and maps of Smoke Control Areas.
- Air Quality consultation on now completed County Wide Joint Strategic Needs Assessment.
- Engagement with Public Health Professionals via the Air Quality and Public Health events focused on reducing deaths and ill health caused by poor Air Quality in Cumbria and Lancashire.

**Allerdale expects the following measures to be completed over the course of the next reporting year**:

- Allerdale Borough Council Environmental Health department will continue to work with the Planning Authorities with regard to new developments, focussing on air quality implications including major developments within the region.
- Work to educate and push the principle of reduction of Public Exposure to Air Pollution in line with 2019 Clean Air Strategy. This will include stall events and media communications within the borough.
- Working with developers on national significant infrastructure projects ongoing within and around the Allerdale borough.
- Allerdale Borough Council Environmental Health department will continue with its statutory duty in connection with Part A2 and B processes.

- Continue to develop and encourage Allerdale's home working policy, travel hierarchy and cycle to work scheme.
- Increase public awareness of air pollution with a particular focus on domestic burning and $PM_{2.5}$
- Increase public awareness of air pollution with a particular focus on Indoor Air Pollution in line with the Government Strategy.
- Assessing agricultural development via the planning process in regards to Ammonia emissions. There has been a noticeable increase in agricultural improvements particularly the enclosure of slurry stores assisted by incentive schemes provided by Natural England.
- Allerdale Borough Council will continue to regulate and monitor combustion plant emission sources such Combined Heat Power plant, Biomass Boilers and Diesel STOR generator plants via the planning process.
- Bid for further Government funding whenever eligible to enable the widening of pollutants monitored and resource further Air Quality Initiative activities and events.
- Declaring a Climate Emergency, Joining other neighbouring Authorities including South Lakeland and Carlisle City Council. This will embed the reduction of Carbon emissions from the council's activities. Although not directly in respect of Air Quality, Carbon reduction principles should reduce Air Quality directly as they generally arise from the same combustion sources. Via lowering emissions from pollutant fossil fuels used for transport, heating etc.

**The principal challenges and barriers to implementation that Allerdale Borough Council anticipates facing are:**

- Maximising the best use of resources available including officer time and funding.
- Allerdale Borough Council is a two-tier Borough Council with Cumbria County Council, we continue to work together to improve air quality within Allerdale.
- Securing funding to extend the list of pollutants monitored within the borough.

- Funding issues regarding key national infrastructure projects some of which are now on hold.

**Progress on the following measures has been slower than expected due to staff absence and resource.**

- Working within rural communities to influence behaviours on domestic burning.

## Table 2.1 – Progress on Measures to Improve Air Quality

| Measure No. | Measure | EU Category | EU Classification | Organisations involved and Funding Source | Planning Phase | Implementation Phase | Key Performance Indicator | Reduction in Pollutant / Emission from Measure | Progress to Date | Estimated / Actual Completion Date | Comments / Barriers to implementation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Review Air Sampling Points for NO2. | Policy Guidance and Development Control | Air Quality Planning and Policy Guidance | Allerdale Borough Council | 2017 | 2018 | Evidence based variation in sampling points. | N/A | Completed for 2018 ongoing for 2019 | ongoing continual review | |
| 2 | Allerdale Borough Council Environmental Health to work with the Planning Authorities with regard to new developments considering air quality implications | Policy Guidance and Development Control | Air Quality Planning and Policy Guidance | Allerdale Borough Council | Ongoing | Ongoing | Planning Consultations made in accordance with consultation period. | N/A | Environmental Health are consulted at pre-planning sate on all proposed developments which may impact on air quality. Via the planning process Allerdale has been pro-active in ensuring the borough maintains its low levels of pollution. Air quality assessments have been required for developments including potentially polluting industrial applications. Industrial applications, combined heat and power systems or other combustion method energy production such as gas turbine or biomass boilers. | Ongoing | |
| 3 | Reducing levels of PM 2.5 | Public Information | Influence and change behaviours | Allerdale Borough Council | 2018 | Ongoing | N/A | N/A | Implementation on going | Ongoing | In particular, targeting off grid areas using solid fuels and also |

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| | (fine particulates) | | | | | | | | | | Smoke Control Areas |
| 4 | Reducing Ammonia Emissions from Farming | Policy Guidance and Development Control | Air Quality Planning and Policy Guidance | Allerdale / Natural England | 2018 | 2018 | Individual Merit / Number of Improvement applications granted | Ammonia Secondary PM2.5 | A number of enclosure applications have been received via the Allerdale Planning department due to the incentives offered by Natural England. Natural England are also consulted on any new applications to assist in incorporating best practice design and operation. Investigation of odour complaint will help identify poor practice of spreading. Close working with Environment Agency in relation to the spreading of sewage sludge and operation of Permitted Agricultural activities. | Ongoing | |
| 5 | National Significant Infra Structure Projects | Policy Guidance and Development Control | Air Quality Planning and Policy Guidance | United Utilities | 2016 | Ongoing | N/A | N/A | Implementation on going across Allerdale | 2022 | United Utilities West Cumbria Supplies project launched Tree Fund to community groups. The Cumbria Tree Fund is aimed to help support the planting of trees, hedges or woodlands to improve the environment and consequently improve air quality during 2018-2020. |
| 6 | National Significant Infra Structure Projects | Policy Guidance and Development Control | Air Quality Planning and Policy Guidance | National Grid | 2015 | On hold | N/A | N/A | On hold | Unknown | Funding issues regarding proposed NuGen development. |

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| 7 | Major Development | Policy Guidance and Development Control | Air Quality Planning and Policy Guidance | West Cumbria Mining | 2016 | ongoing | | Air Quality Assessments undertaken on request of County Planning Authority. Assessments indicate that impact will be negligable on Allerdale area. Thought to be an increase of 6 Freight Train Movements per day when in full operation | Ongoing | | Previous monitoring undertaken by Allerdale due to the Moorside Project has provided no issues with properties in close proximity to rail network. |
| 8 | Allerdale Borough Council Environmental Health will continue with its statutory duty in connection with Part A2 and B processes. Environment Agency are responsible for Part A1 | Environmental Permits | Introduction/increase of environment charges through permit systems and economic instruments | Allerdale Borough Council | Ongoing | Ongoing | Risk based inspections in accordance with Statutory Guidance | N/A | Allerdale Borough Council regulated permits for 32 Part B and 3 A2 processes. No enforcement action was required during 2018 and no unexpected air pollution incidents have been recorded. | Ongoing | |
| 9 | Adopted Local Policy: Section 19 Renewable Energy and Low Carbon | Policy Guidance and Development Control | Air Quality Planning and Policy Guidance | Allerdale Borough Council | Ongoing | Ongoing | N/A | N/A | N/A | 2029 | In order to achieve national renewable energy targets Allerdale Borough Council supports the development of new sources of renewable energy. On the |

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| | Technologies | | | | | | | | | | understanding measures taken avoid significant negative impacts to the local amenity. |
| 10 | Adopted Local Policy: Section 22 - Sustainable Travel Choices | Transport Planning and Infrastructure | Other | Allerdale Borough Council | Ongoing | Ongoing | N/A | N/A | N/A | 2029 | Key objective of spatial planning is to ensure that jobs, housing, shopping, leisure and services are accessible by public transport, walking and cycling. |
| 11 | Adopted Local Policy: Section 21: Developer contribution | Policy Guidance and Development Control | Other policy | Allerdale Borough Council | Ongoing | Ongoing | Ongoing | Ongoing | Ongoing | 2029 | Community Infrastructure Levy (CIL) is currently being explored as a levy that the Council may use to charge on new developments. This ensures that without compromising development viability. Contributions will provide necessary enhancements including energy initiatives and Climate change solutions with regard to air quality. |
| 12 | Adopted Local Policy: Section 36 Air, Water and Soil Quality | Policy Guidance and Development Control | Air Quality Planning and Policy Guidance | Allerdale Borough Council | Ongoing | Ongoing | N/A | N/A | N/A | 2029 | The policy sets out Allerdale Borough Council's approach to ensuring that air and water quality are protected and enhanced and that soil quality is maintained and not eroded. |
| 13 | Allerdale Travel Hierarchy | Promoting Travel Alternatives | Workplace Travel Planning | Fleet and Transport Vehicle Policy | 2018 | 2019 | Policy Adherence | Reduction in private vehicle mileage and associated pollutant impacts. PM NO2 etc. | Policy implemented 2019 | ongoing | |
| 14 | New Environm | Policy Guidance | Sustainable Procurement | Allerdale BC Tivoli FCC | 2019 | Ongoing | N/A | Particulate Matter PM 10 | A new Environmental Services contract has | The switch to electric from | Ongoing work which should have a positive |

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| | ental Services contracts. | and Developm ent Control | Guidance | | | | | PM 2.5 | been formed with Tivoli. As part of the new contract award for street cleansing Tivoli have purchased two Addex Maxwind Pedestrian Sweepers to clean the streets of Allerdale. These sweepers are entirely electric giving an environmentally friendly approach to street cleansing, they also use a specialist industry leading staged PM 10 and PM2.5 filter system reducing particulate and dust output into the atmosphere. | conventional petrol and diesel plant is being looked into across the whole of Allerdale contracted services undertaken by Tivoli. "Over the next 18 months we are looking at introducing battery powered equipment into the contract, with the ultimate goal of 75% of handheld equipment being battery powered in 5 years' time. Significantly reducing air pollution, emissions and improving our carbon footprint. Handheld equipment on the Allerdale contract amounts to approx. 120 units, this being made up of strimmer's, blowers, hedge cutters and chainsaws so as we phase the old units out we will be replacing with battery powered." | impact on the Borough. Allerdale will be leading by example with their newly appointed environmentally aware contractor. |

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| | | | | | | | | | | Craig Hunter Regional Director Tivoli | |
| 15 | Cycle to work | Promoting Travel Alternatives | Promotion of cycling | Allerdale Borough Council | 2017 | Ongoing | Promote cycling to work | N/A | Implementation on going | Ongoing | Active in house travel plan. Tax free bike scheme to help employees save money on new bike and bike safety equipment. |
| 16 | Investigation of complaints of black smoke and smoke nuisance and managing smokeless zone. When necessary enforcement action will be taken. | Public Information | Other | Allerdale Borough Council | Ongoing | Ongoing | Reductions in the number of repeat offenders through engagement. | N/A | Revised web page in March 2018. | Ongoing | |
| 17 | Review of traffic restrictions in Workington, Maryport and Keswick as part of the Cumbria Transport Plan Strategy 2011 - 2026 | Traffic Management | Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane | Cumbria County Council | 2018 | 2019 | N/A | N/A | Not yet implemented | 2019/2020 | No major schemes such as on-way systems or parking zones to date. With the exception of areas in Keswick. Where Cumbria County Council are looking to implement a sizeable disc parking scheme. Within the wider area, work to look into a multi-agency basis at utilising existing parking provision more efficiently whilst looking at medium to longer term planning strategy in terms of vehicle use and parking. |

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| 18 | Bid for funding | Policy Guidance and Development Control | Other policy | Allerdale DEFRA | 2019 | ongoing | | PM2.5 NO2 | Bid prepared for last round DEFRA funding in 2018. Doubts regard eligibility due to no AQMA. Confirmation now gained could be eligible to bid in future | 2019 | Uncertainty in regards to eligibility and legal position on submitted ng bids in 2018. Submission required declaration of AQMA on portal. Now clarified with DEFRA will compete for funding in 2019 if available. |
| 19 | Promote and encourage the Home Working Policy | Promoting Travel Alternatives | Encourage / Facilitate home-working | Allerdale Borough Council | Ongoing | Ongoing | Decrease the amount of travel undertaken in carrying out Council functions. | N/A | Ongoing | Completed 2019 | |
| 20 | Maryport Transport Hub | Alternatives to private vehicle use | Bus based Park & Ride | Cumbria County Council | 2015 | 2016 | Construction of 78 space car park and 4 spaces for motorcycles. | N/A | Completed | Completed 2018 | |
| 21 | Complete cycleway Allonby to Silloth | Promoting Travel Alternatives | Promotion of cycling | Solway and Silloth Coastal Community Team | 2015 | Ongoing | Promote easy walking and cycling. | N/A | Funding Secured from DCLG | Ongoing | Funding Secured Consultancy team have been appointed reviewing landownership. Ecological work has been carried out and is a current work in progress for completion in late 2019. Recent public health and LoveMyBeach event in Silloth to promote cycling across the borough and coastal area. |
| 22 | Allerdale Borough Council - Visit Allerdale (Tourism web page) | Public Information | Via the Internet | Allerdale Borough Council | 2018 | Ongoing | Public perception of issues. | Page with information about cycling routes and making the most of public transport within the Allerdale region | Contributing with information and using public transport. | Completed 2018 | |

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| 23 | Central Heating Fund | Promoting Low Emission Plant | Other Policy | Allerdale BC | 2016 | Improvement of 79 properties whose primary heat source would likely consist of solid fuel use such as wood or coal. The improvement to modern technology gas and oil central heating systems should gain substantial improvement in PM2.5 emissions. | 79 Properties improved | PM2.5 Reduction | Completed | 2018 | Although not set out as an initial air pollution intervention, in light of recent information given regards the burning of solid fuel in domestic properties as a significant producer of PM2.5.The following information has been included in this report as positive and relevant. |

## 2.3 $PM_{2.5}$ – 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 $PM_{2.5}$ (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.

The Wider Determinants of Health document 2017 published by Public Health England have stated in their statistics the annual concentration of human-made fine particulate ($PM_{2.5}$) matter at an area level, adjusted to account for population exposure is the lowest in the country for the Allerdale area.

"*In 2015 the England average value was 8.3 µg/m$^3$, and ranged from a low of 5.2 µg/m3 in Allerdale, up to 12.5 µg/m$^3$ in the City of London"*

Allerdale Borough Council is taking the following measures to address $PM_{2.5}$.

- Allerdale Borough Council will continue with its duties to regulate and control in regards to emissions from all Part A2 and B Processes located within the local Authority area.
- Allerdale Borough Council will continue to work with developers in regards to the planning and implementation of major developments which may affect air quality.
- Allerdale Borough Council will continue to monitor Intensive farming (including poultry) within the Borough via Environment Agency permitted links and the planning process. A review in the 2015 Updating and Screening Assessment demonstrated that there were no poultry farms meeting the specified criteria for detailed Assessment in Relation to $PM_{10.}$ (Similar source to $PM_{2.5}$)
- Allerdale Borough Council will consult with Natural England and Environmental Health via the Development Planning process to reduce emissions for new agricultural activities in the borough.

- Allerdale Borough Council continues to regulate and enforce Smoke Control Areas under the Clean Air Act please see Annex D for defined mapped areas.
- Allerdale Borough Council will continue to regulate and monitor combustion plant emission sources such Combined Heat Power plant, Biomass Boilers and Diesel STOR generator plants via the planning process.
- Educational Information has been distributed via online social media and stall events. The goal being changing domestic burning behaviours and choice of fuel used by those reliant on solid fuels. Particular focus has been paid to our Smoke Control Areas and we plan to extend our activities to off grid gas town and village locations.
- Allerdale has considered its own impact of it council's functions and has addressed via a Travel Hierarchy, Home Working Policy and formation of pollution friendly Environmental Service contracts with Tivoli.

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

## 3.1 Summary of Monitoring Undertaken

This section sets out what monitoring has taken place and how it compares with objectives.

Allerdale Borough Council undertook non- automatic (passive) monitoring of NO2 at eleven sites during 2018. All monitoring locations use duplicate tubes allowing precision of the tubes to be calculated from the duplicate exposure.

Allerdale Borough Council demonstrated no exceedances from monitoring undertaken in years previous including 2017.

The 2018 annual monitoring results are well within the annual objectives for Nitrogen Dioxide ($NO_2$). To date, there is no evidence that supports declaration of an Air Quality Management Area.

The 2018 Annual Screening Report carried out a further review of existing sampling locations. This was carried out in order to ensure that monitoring is carried out in areas where concentrations are expected to be highest and where the public (receptors) may be exposed over the averaging period of the objectives. As a result of this review the number of monitoring location were increased from 10 to 11 sites.

Prior to 2015 sampling points had previously remained relatively unchanged for a period of 5 years despite no objectives ever being exceeded. Some sampling points had poor data capture due to interference with sampling apparatus. This led to a change in location and addition of four extra sampling points for 2016 and 2017.

**Further changes for this reporting year (2018 monitoring) included decommissioning of previous sites:**

**DTS1 Harrington Road, Workington** was removed as a monitoring location. Two years of monitoring in a worst case position had demonstrated clear compliance with annual levels consistently below 20 µg/$m^{3.}$

**DTS9 Winscales Avenue, Distington** has been removed. Monitoring at this receptor point showed the lowest NO2 levels of all monitoring positions with a bias

adjusted annual mean of just 11.6 µg/m$^3$ . The information gained will be useful as a background to assess impacts of increased traffic or industrial development in the locality which is defined for development in the local plan.

**DTS10 Grasslot School, Maryport** has been removed from the Allerdale $NO_2$ monitoring position. Two years of monitoring have again demonstrated clear compliance with annual bias adjusted levels consistently below 20 µg/m$^3$. There had been a negligible increase in 2017.

**Relocated:**

**DTS8 Church Road, Workington (Harrington)** Two years of monitoring have demonstrated clear compliance with annual levels consistently below 20 µg/m$^3$ and a small reduction gained from last year. The monitoring site has been relocated a short distance along the same road (Main Road, Harrington A597) The new monitoring point is positioned on a receptor property selected due to the narrowing of the carriage way and relatively steep ascent of the road. This was felt to be a point of interest when assessed in line with TG16 guidance.

**DTS 3 Main Street, Cockermouth** Two years of monitoring have demonstrated consistent compliance with annual levels below 22 µg/m$^3$. The monitoring site has been relocated a short distance along the same road B 5292 on Crown Street. It was felt a narrowing of the carriage way and queuing between two mini roundabout may present higher levels from queuing cars and canyoning effects at the road facing residential receptors. This was felt to be a point of interest when assessed in line with TG16 guidance.

**New Monitoring Locations in 2018:**

**DTS 1 Hall Park View, Workington** this site was selected for monitoring to gain background data. The monitoring point is situated at a possible Moorside road improvement sites being Ramsay Brow to Hall Brow. Diffusion Tubes are situated at the worst case closest receptor on Hall Park View.

**DTS 9 Lawson Street, Aspatria** had been chosen partly due to concern expressed by residents in Aspatria in that it was thought the traffic flow of HGV's had increased in the town. The monitoring site is positioned on a receptor facade on the main thoroughfare being A596 which passes right through the centre of the town. The A596 connects the industrial West Coast of Allerdale with Carlisle and

the M6 motorway. Lawson Street was chosen as a worst case monitoring point as there are residential terrace properties on each side of the road in close proximity to the kerb. It is thought a canyon effect preventing dispersal of exhaust gasses is possible.

**DTS 10 Railway Villa, Wigton** monitoring point is situated on the facade of a residential receptor property that may be affected from any potential increased rail traffic from key infrastructure projects. The close proximity in this area of the busy A596 link to Carlisle is also likely to be a contribution to $NO_2$ levels.

**DTS 11 Penrith Road, Keswick** This sampling point is an intersection on the A591 providing access to Keswick from the Southern Lakes and A66. Residential receptors are situated along this roadside location. Information has been gathered suggesting the queuing of traffic from the A66, and A591 South lakes.

**Planned Changes for 2019 Monitoring:**

**Removal of Railway Villa**

Railway Villa produced the lowest concentration of all monitoring results with an annual Bias adjusted NO2 concentration of just 11.4µg/$m^3$. Allerdale has a worst case approach to monitoring pollution levels and so this sampling point was relocated.

**Re Siting of Crown Street, Cockermouth**

Crown Street Cockermouth was relocated closer to Goat Road Bridge on a Cumbria County Council Road sign. This action was taken as a number of Diffusion tubes had going missing causing issue with data sets thus requiring annualisation of the site for 2018 data. It was felt that the tubes had perhaps been removed by School children but this could not be confirmed.

**Station Street Cockermouth**

On discussion with the County Council Highways Authorities it was agreed this new site was beneficial for investigation due to an increase in traffic flow associated with newly developed and currently ongoing development of large housing developments within the town.

**North Side Primary School**

North Side Primary School is a receptor situated in close proximity to the A596. This location was chosen due to lack of past monitoring in this area and its proximity to the Workington Port. There are also potential industrial sources of NO2 in the locality.

### 3.1.1 Non-Automatic Monitoring 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.

## 3.2 Individual Pollutants

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

### 3.2.1 Nitrogen Dioxide ($NO_2$)

Table A. in Appendix A compares the ratified and adjusted monitored $NO_2$ annual mean concentrations for the past 5 years with the air quality objective of 40µg/$m^3$.

For diffusion tubes, the full 2018 dataset of monthly mean values is provided in Appendix B.

It can be seen from Table A.3 there is no exceedance of the lower annual 40µg/$m^3$ objective at any of the eleven monitoring sites.

As sites are situated for worst case scenario in close proximity to the pollutant source (road traffic), it is assumed that pollutant concentrations at the closest receptor would be lower. On discussion with Local Air Quality Management helpdesk it has been advised that there is no need to demonstrate modelling of pollutant dispersal and distance correction to the nearest receptor. This is due to the results being well below the national objectives and outside of the threshold recommendations outlined by TG16 (annual mean above 36 µg/$m^3$).

There are no annual means greater than 60µg/$m^3$ (highest recorded 32 µg/$m^3$), demonstrating in line with TG16 that exceedance of the 1-hour mean 200 µg/$m^3$ objective is very unlikely likely at any of the monitoring sites.

## Individual Site Data

**DTS1 Hall Park View** The monitoring point is situated at a possible Moorside road improvement sites being Ramsay Brow to Hall Brow. Diffusion Tubes are situated at the worst case closest receptor on Hall Park View. Eleven months diffusion tube data were gained with ten months being duplicate indicating good precision. The full data demonstrated an annual Bias adjusted mean of 16 µg/$m^3$

**DTS2 Murray Road, Workington** This Urban Centre / Roadside location was implemented for 2017 and is situated outside the Workington Bus station which is the largest bus station in the Allerdale Borough. The monitoring point is located on the facade of the building and facing Murray Road. Murray Road is a town centre single one way carriageway with parking, loading and taxi ranks in relatively close proximity. Twelve months of diffusion tube data including nine months duplicate tube data were gained for this site and demonstrated an annual Bias adjusted mean of 27.4µg/$m^3$ which was a minor reduction on last year's 28.5 µg/$m^3$. All duplicate data indicated as good precision.

**DTS 3 Crown Street Cockermouth** is situated on residential receptor property facing B 5292 on Crown Street where it was seen a narrowing of the carriage way and queuing between two mini roundabout may present higher levels from queuing cars and canyoning effects at the road facing residential receptors. This was felt to be a point of interest when assessed in line with TG16 guidance. Just seven months of data were collected for this site with 4 months of duplicate with good precision. Due to the limited data collection annualisation was required and undertaken using a similar local monitoring point. The annualised data demonstrated an annual Bias adjusted mean of 26µg/$m^3$.

**DTS 4 Main Street, Keswick** This is a roadside location on the A5271 in very close proximity to a Guest House (permanent residential receptor also) Traffic has been noted to queue at the B5289 - A5272 intersection (mini roundabout) as the only exit entry to Borrowdale Valley and Derwent Water lake shore. Cumbria County Council provided information indicates an average of 7317 vehicle movements per day in 2017. Twelve months of diffusion tube duplicate data were gained for this site. Precision over the monitoring period was good. An annual Bias adjusted mean of 26µg/$m^3$ was recorded which was a positive reduction on last year's 29.3 µg/$m^3$.

**DTS5 Curzon Street, Maryport** is a Kerbside location on the A596 adjacent to a busy four way traffic light controlled box junction which demonstrates worst case. The façade of the nearest residential exposure is situated 5m back from the site Cumbria County Council provided information indicating 11017 vehicle movements per day in 2017. Twelve months of diffusion tube data were gained for this site including eleven months of duplicate data indicating good precision. An annual Bias adjusted mean of 25.2µg/$m^3$ which was a minor reduction on 2017 26.2 µg/$m^3$ and 2016 26 µg/$m^3$.

**DTS6 Ramsay Brow, Workington** This Kerbside site is located at a receptor façade on the A66 in close proximity to the traffic light controlled A596 junction. This area is a known bottle neck into Workington which is the largest town in the borough. Eleven months of diffusion tube data were gained for this site including 10 months of duplicate data indicating good precision. The full data demonstrated an annual Bias adjusted mean of 32µg/$m^3$ which is a slight increase on last year's data of 30µg/$m^3$.

**DTS7 King Street, Wigton** This kerbside monitoring point at King Street Wigton had remained unchanged for 2018 and is the longest standing monitoring location with five years of data (minor relocation prior to 2015).Twelve months of duplicate diffusion data indicating good precision were gained. The full data demonstrated an annual Bias adjusted mean of 23.4µg/$m^3$ this was a minimal increase on the 2017 result of 23.1µg/$m^3$ and has not been deemed significant. The site has previously seen a slow and steady decline each year of 1-2 µg/$m^3$.

**DTS 8 Main Rd, Harrington** this is a Kerbside location. Cumbria County Council provided information indicates 10233 vehicle movements per day in 2017. Twelve months duplicate diffusion tube data were gained for this all indicating good precision. The full data demonstrated an annual Bias adjusted mean of 16.8µg/$m^3$.

**DTS 9 Lawson Street, Aspatria** this is a Kerbside location selected on request of residents who felt there had been an increase in HGV movements. Twelve months duplicate diffusion tube data were gained for this site with a good overall precision. The full data demonstrated an annual Bias adjusted mean of 16.7µg/$m^3$.

**DTS10 Railway Villa, Wigton** Twelve month's duplicate diffusion tube data were gained for this all indicating good precision. The full data demonstrated an annual Bias adjusted mean of 11.4µg/$m^3$.

**DTS11 Penrith Road, Keswick** Just seven months of data were collected for this site with six months being duplicate with good precision. Due to the limited data collection annualisation was required and undertaken using the most local monitoring point. The annualised data demonstrated an annual Bias adjusted mean of 21.7µg/$m^3$.

**Comments**

Figure 1.1 demonstrates annual mean concentrations across all ten sites. It can be clearly seen that all sites are well below the annual 40 µg/m3 objective level with the highest concentration being 32µg/$m^3$ at **DTS 6.**

**Trends**

Figure 1.1 shows the pollution trend for Nitrogen Dioxide annual levels over the last two years. The trend is relatively unchanged with last years (2017) results with no notable changes for the majority of the repeated sites.

Minor reductions have been noted at **DTS 2, DTS 5** and the largest reduction noted at **DTS 4**. **DTS 4** Dropping from previous 29µg/$m^3$ in 2016 and 2017 to 26µg/$m^3$ in 2018.

Slight increases were noted at **DTS 6** from 30µg/m3 in 2017 to 32µg/m3 in 2018 a minor increase was also noted at **DTS 7.**

Due to the ongoing changes in line with our monitoring methods the only site with 5 years of data is **DTS 7**. As stated above the levels at this site have shown a minor increase for 2018 from 2017 Data although is still reduced from all previous years. The site had previously shown a steady reduction from a peak at 2014.

# Appendix A: Monitoring Results

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

| Site ID | Site Name | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA? | Distance to Relevant Exposure (m) (1) | Distance to kerb of nearest road (m) (2) | Tube collocated with a Continuous Analyser? | Height (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| DTS 1 | Hall Park View Workington | Kerbside | 300721 | 528958 | NO2 | NO | 0 | 1 | NO | 2.5 |
| DTS 2 | Murray Road Workington | Urban Centre | 301194 | 528711 | NO2 | NO | n/a | 1 | NO | 2.5 |
| DTS 3 | Crown Street Cockermouth | Kerbside | 311681 | 530653 | NO2 | NO | 0 | 1 | NO | 2.5 |
| DTS 4 | Main Street Keswick | Roadside | 326419 | 523602 | NO2 | NO | 4 | 1.5 | NO | 2.5 |
| DTS 5 | Curzon Street Maryport | Kerbside | 303778 | 536534 | NO2 | NO | 5 | 1 | NO | 2.5 |
| DTS 6 | Ramsay Brow Workington | Kerbside | 300588 | 528682 | NO2 | NO | 0 | 1 | NO | 2.5 |
| DTS 7 | King Street Wigton | Kerbside | 325508 | 548419 | NO2 | NO | 2 | 1 | NO | 2.5 |
| DTS 8 | Main Rd Harrington | Roadside | 299591 | 525545 | NO2 | NO | 0 | 2 | NO | 2.5 |
| DTS 9 | Lawson Street Aspatria | Kerbside | 315299 | 542145 | NO2 | NO | 0 | 1 | NO | 2.5 |
| DTS 10 | Railway Villa Wigton | Roadside | 325362 | 548860 | NO2 | NO | 0 | 8 | NO | 2 |
| DTS 11 | Penrith Road Keswick | Kerbside | 327949 | 523766 | NO2 | NO | 7 | 1 | NO | 2.5 |

# Table A.3 – Annual Mean $NO_2$ Monitoring Results

| Site ID | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2018 (%) (2) | $NO_2$ Annual Mean Concentration ($\mu g/m^3$) (3) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2014 | 2015 | 2016 | 2017 | 2018 |
| DTS 1 | Kerbside | Diffusion Tube | 92 | 100 | | | | | 16 |
| DTS 2 | Urban Centre | Diffusion Tube | 100 | 100 | | | | 28.5 | 27.4 |
| DTS 3 | Kerbside | Diffusion Tube | 58 | 58 | | | | | 26 |
| DTS 4 | Roadside | Diffusion Tube | 100 | 100 | | | 29 | 29.3 | 26 |
| DTS 5 | Kerbside | Diffusion Tube | 100 | 100 | | | 26 | 26.2 | 25.2 |
| DTS 6 | Kerbside | Diffusion Tube | 92 | 92 | | | | 30 | 32 |
| DTS 7 | Kerbside | Diffusion Tube | 100 | 100 | 28.2 | 26 | 25.2 | 23.1 | 23.4 |
| DTS 8 | Roadside | Diffusion Tube | 100 | 100 | | | | | 16.8 |
| DTS 9 | Kerbside | Diffusion Tube | 100 | 100 | | | | | 16.7 |
| DTS 10 | Roadside | Diffusion Tube | 100 | 100 | | | | | 11.4 |
| DTS 11 | Kerbside | Diffusion Tube | 58 | 58 | | | | | 21.7 |

☒ **Diffusion tube data has been bias corrected**

☒ **Annualisation has been conducted where data capture is <75%**

**Notes:**

No exceedances of the $NO_2$ annual mean objective of 40µg/$m^3$ have been found

$NO_2$ annual means exceeding 60µg/$m^3$, indicating a potential exceedance of the $NO_2$ 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 Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

**Figure A.1 – Trends in Annual Mean $NO_2$ Concentrations**

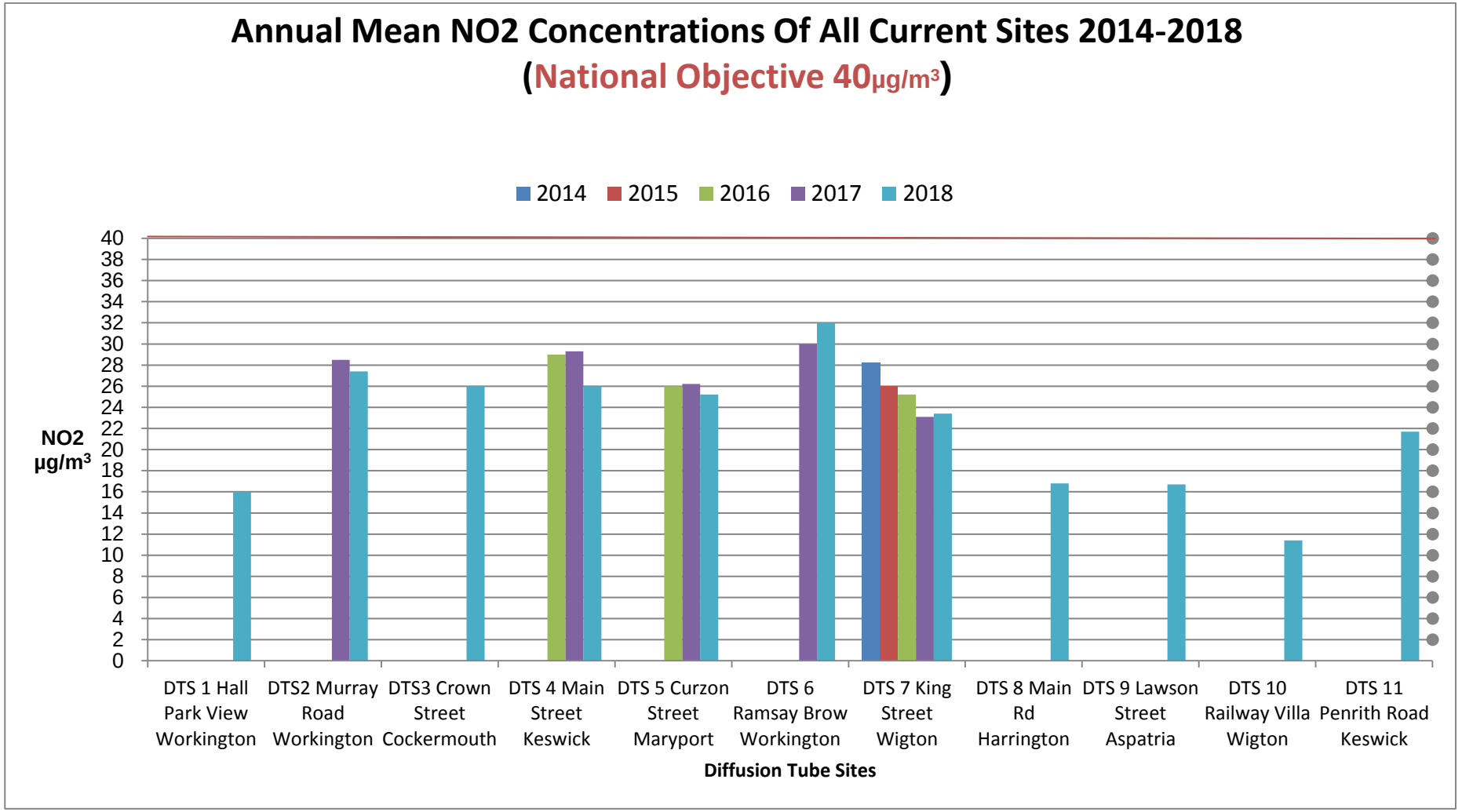
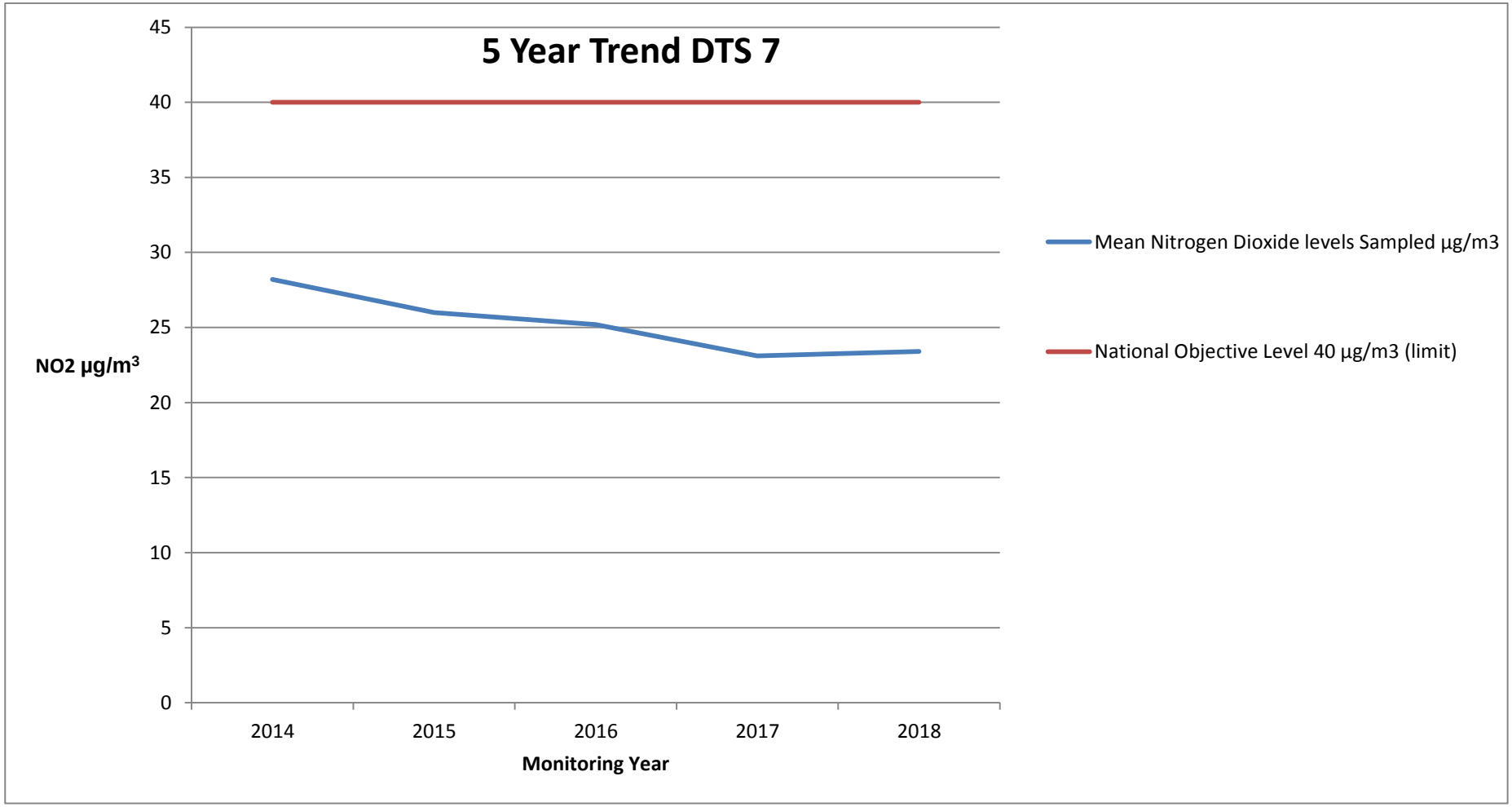


**Figure A.2 – Plotted Trend in Annual Mean $NO_2$ Concentrations DTS 7 Wigton**



# Appendix B: Full Monthly Diffusion Tube Results for 2018

## Table B.1 – $NO_2$ Monthly Diffusion Tube Results - 2018

| Site ID | $NO_2$ Mean Concentrations (µg/m$^3$) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual Mean | | |
| | | | | | | | | | | | | | Raw Data | Bias Adjusted (0.76) and Annualised (1) | Distance Corrected to Nearest Exposure (2) |
| DTS 1 | | 28.6 | 24.0 | 21.4 | 21.0 | 17.7 | 16.3 | 13.1 | 13.3 | 20.4 | 27.1 | 27.4 | 21.0 | **16** | **-** |
| DTS 2 | 44.1 | 41.4 | 32.0 | 36.7 | 31.9 | 37.7 | 32.4 | 29.6 | 35.6 | 36.9 | 34.0 | 39.4 | 36.0 | **27.4** | **-** |
| DTS 3 | 25.7 | 46.5 | 39.3 | 31.7 | 31 | | 33.7 | 29.4 | | | | | 33.9 | **26.0** | **-** |
| DTS 4 | 35.5 | 39.6 | 27.8 | 28 | 28.7 | 34.6 | 36.5 | 32.4 | 37.8 | 37 | 32.2 | 41.4 | 34.3 | **26.0** | N/A |
| DTS 5 | 39.8 | 34.4 | 35.4 | 31.4 | 29.1 | 30.7 | 32.6 | 26.6 | 30.3 | 32.4 | 32.2 | 42 | 33.1 | **25.2** | N/A |
| DTS 6 | 48.3 | 46.5 | 43.7 | 40.9 | 36.8 | 34.5 | 39.4 | 32.2 | | 40.3 | 47 | 54.2 | 42.1 | **32.0** | - |
| DTS 7 | 40.5 | 36 | 29.2 | 27.2 | 28.8 | 29.9 | 27.7 | 24 | 24.8 | 32.2 | 36.3 | 33.1 | 30.8 | **23.4** | N/A |
| DTS 8 | 26.9 | 27 | 26 | 19.6 | 34 | 18.4 | 12.4 | 12.3 | 12.5 | 21.5 | 28.1 | 26.4 | 22.1 | **16.8** | - |
| DTS 9 | 27.9 | 24.3 | 23.1 | 17 | 19 | 20.8 | 20.2 | 13.7 | 18.8 | 21.7 | 20.8 | 27.9 | 22.0 | **16.7** | - |
| DTS 10 | 19.9 | 17.3 | 15.1 | 11.3 | 12.3 | 12.7 | 13.4 | 12.4 | 13.8 | 17.6 | 14.9 | 18.2 | 15.0 | **11.4** | - |
| DTS 11 | | | | 23.5 | 26.1 | | 27.3 | 23.8 | | 28.7 | 30.7 | | 27.0 | **21.7** | N/A |

☒ **National bias adjustment factor used**

☒ **Annualisation has been conducted where data capture is <75%**

☒ **Where applicable, data has been distance corrected for relevant exposure N/A**

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

### Diffusion Tube Bias Adjustment Factors

Diffusion tubes may systematically under or over-read nitrogen dioxide concentrations when compared to a chemiluminescence analyser. This is known as 'bias' and can be corrected for to improve the accuracy of the diffusion tube results, using a suitable bias-adjustment factor. This factor can be determined from a local study that has co-located diffusion tubes with a chemiluminescence analyser. The Defra Local Air Quality Management Helpdesk has collated a database of bias adjustment factors determined from Local Authority co-location studies throughout the UK. Using orthogonal recession combined bias adjustment factors have been calculated for each laboratory, year and preparation method combination for which data is available. Table C.1 shows the bias adjustment factors used in the assessment, taken from the March (Version 3/19) of the Diffusion Tube Bias Adjustment Spreadsheet.

**Table C.1 Bias Adjustment Factors**

| Year | Bias Adjustment Factor |
|---|---|
| 2018 | 0.76 |

### Discussion of Choice of Factor to Use

As there is no co-location study the national nitrogen dioxide bias adjustment factor was used, as described above.

### QA/QC of Diffusion Tube Monitoring

The laboratory supplying and analysing the diffusion tubes is SOCOTEC (previously ESG) currently holds the highest rank of a "Satisfactory" laboratory. DEFRA information indicates the Laboratory precision as good for all 2018 data.
The nitrogen dioxide tubes are prepared by spiking acetone: triethanolamine (50:50) onto the grids prior to the tubes being assembled. They are desorbed with distilled water and the extract analysed using a segmented flow auto analyser with ultraviolet detection. The results are initially calculated assuming an ambient temperature of 11°C and are adjusted to 20°C to allow for direct comparison with the air quality objectives.

### Precision and Accuracy

Allerdale Borough Council monitoring site use two tubes referred to as duplicates. Tube precision is separated into two categories good or poor. Tubes are considered to have good precision where the coefficient of variation (CV) is less than 20% and the average CV of all monitoring periods is less than 10%. Tubes are considered to have poor precision where the CV of four or more periods is greater than 20% and/or the average CV is greater than 10%. All of the 10 Diffusion tube study periods had a CV of below 20% (good precision). These calculations are undertaken via use of the DEFRA Precision and accuracy check tool.

### Data Capture

Single tubes were on occasion missing from the duplicate monitoring sites. Please below table for further detail.

**Table C2 data capture record and precision**

| Site | Months of data | Annualisation Required (Less than 75% data Capture | Months of duplicate data | Precision poor/good |
|---|---|---|---|---|
| DTS1 | 11 | No | 10 | good |
| DTS2 | 12 | No | 9 | good |
| DTS3 | 7 | Yes | 4 | good |
| DTS4 | 12 | No | 12 | good |
| DTS5 | 12 | No | 12 | good |
| DTS6 | 11 | No | 10 | good |
| DTS7 | 12 | No | 12 | good |
| DTS8 | 12 | No | 12 | good |
| DTS9 | 12 | No | 12 | good |
| DTS10 | 12 | No | 11 | good |
| DTS11 | 7 | Yes | 6 | good |

**Annualisation**

Data capture at DTS3 and DTS11 was less than 75% of the 12 month period due to missing tubes; therefore in line with TG16 Guidance annualisation of the data was required for these two sites.

Annualisation was undertaken via reference method available in Box 7.10 of TG16 Guidance.

DTS 11 was annualised using data from DTS 4. DTS 4 data was full duplicate for a 12 month period and checked as good precision. This particular data set was chosen as the sites are within the same town (Keswick) which is affected greater by tourist traffic in holiday periods in comparison to the general area of Allerdale.

DTS 3 was annualised using data from DTS 5. DTS 5 data was full duplicate results for a 12 month period with good precision. This particular data set was chosen as the sites have similarities in terms of town structure, influences and geographic location.

**Distance Correction**

As sites are situated for worst case scenario in close proximity to the pollutant source (road traffic), it is assumed that pollutant concentrations at the closest receptor would be lower. On discussion with Local Air Quality Management helpdesk it has been advised that there is no need to demonstrate modelling of pollutant dispersal and distance correction to the nearest receptor. This is due to the results being well below the national objectives and outside of the threshold recommendations outlined by TG16 (annual mean above 36 µg/m3).

**Diffusion Tube Exposure Method**

Diffusion tubes are installed and changed on a monthly basis in line with the DEFRA exposure calendar. Allerdale store and handle the tubes in accordance with RIAMS produced document “Nitrogen Dioxide Diffusion Tube Monitoring” and TG16 Guidance.

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


**Figure 1 – Hall Park View Workington (DTS 1)**

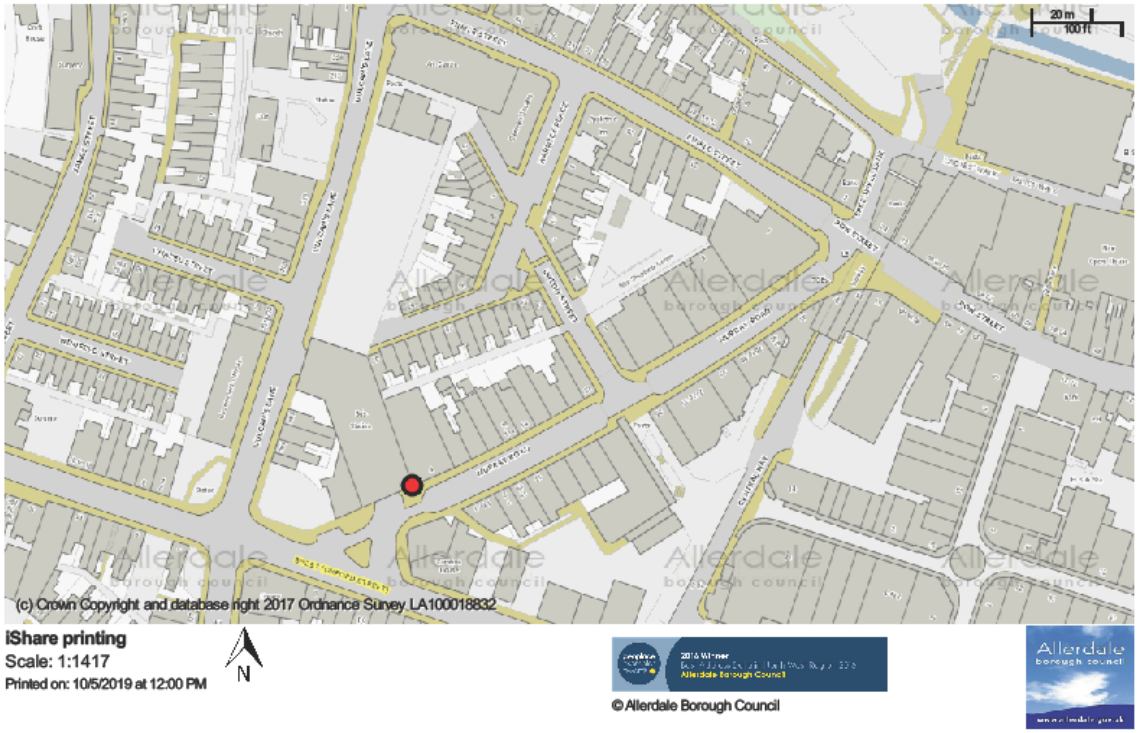



**Figure 2 – Murray Road, Workington (DTS 2)**

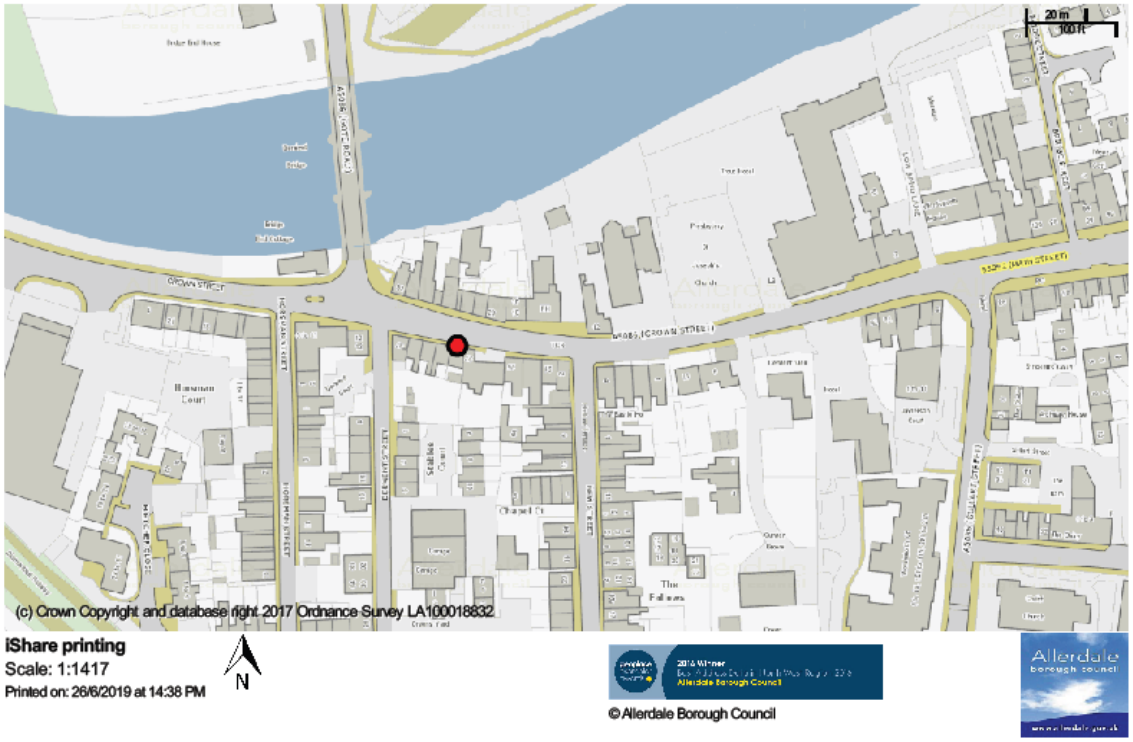



**Figure 3 – Crown Street, Cockermouth (DTS 3)**


**Figure 4 – Keswick, Main Street (DTS 4)**


**Figure 5 – Curzon Street Maryport (DTS 5)**

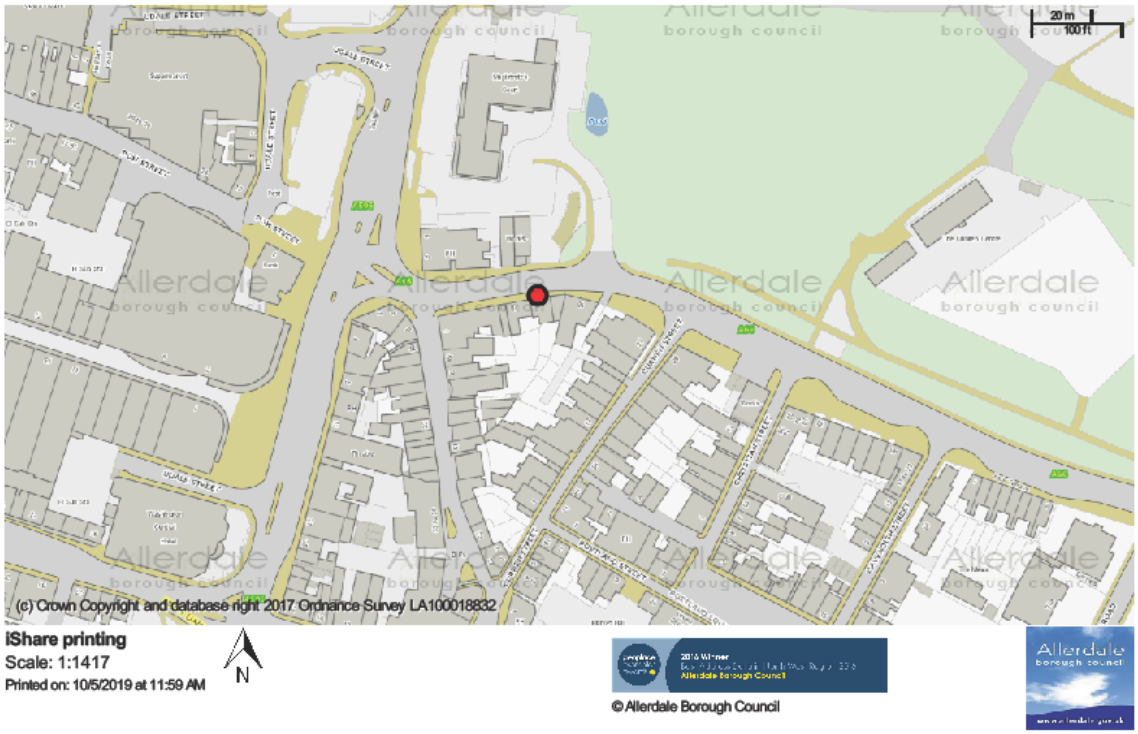



**Figure 6 – Ramsay Brow, Workington (DTS 6)**

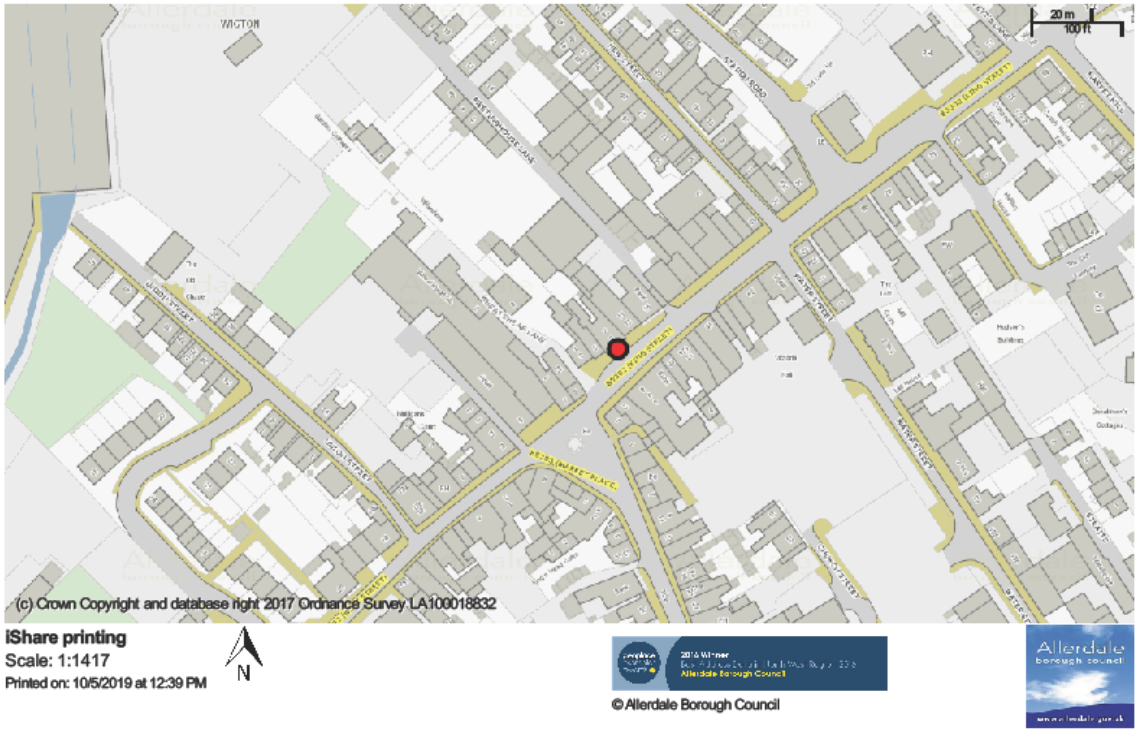



**Figure 7 – King Street, Wigton (DTS 7)**

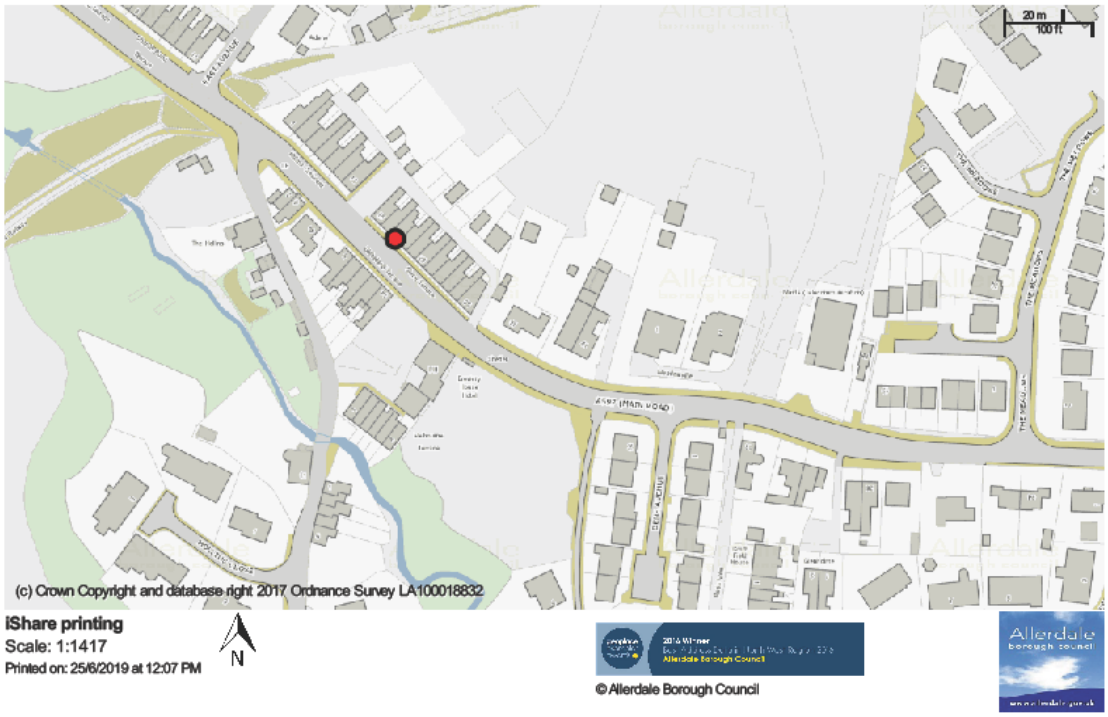



**Figure 8 – Main Road, High Harrington (DTS 8)**

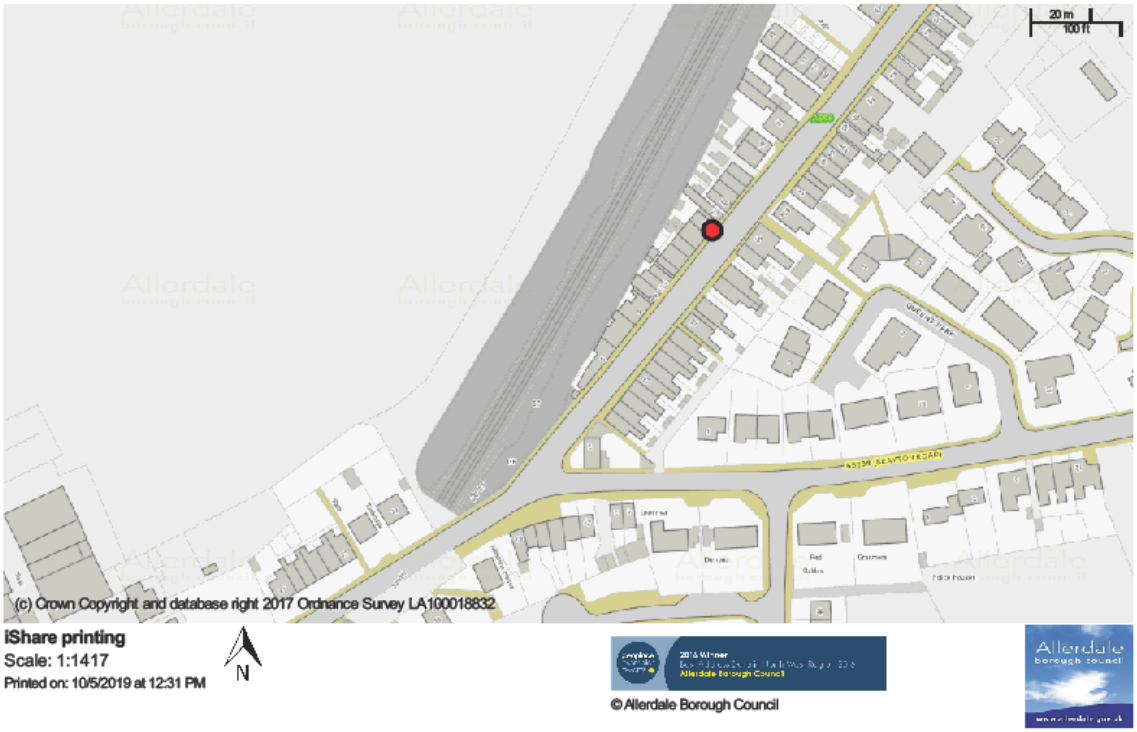



**Figure 9 – Lawson Street Aspatria (DTS 9)**

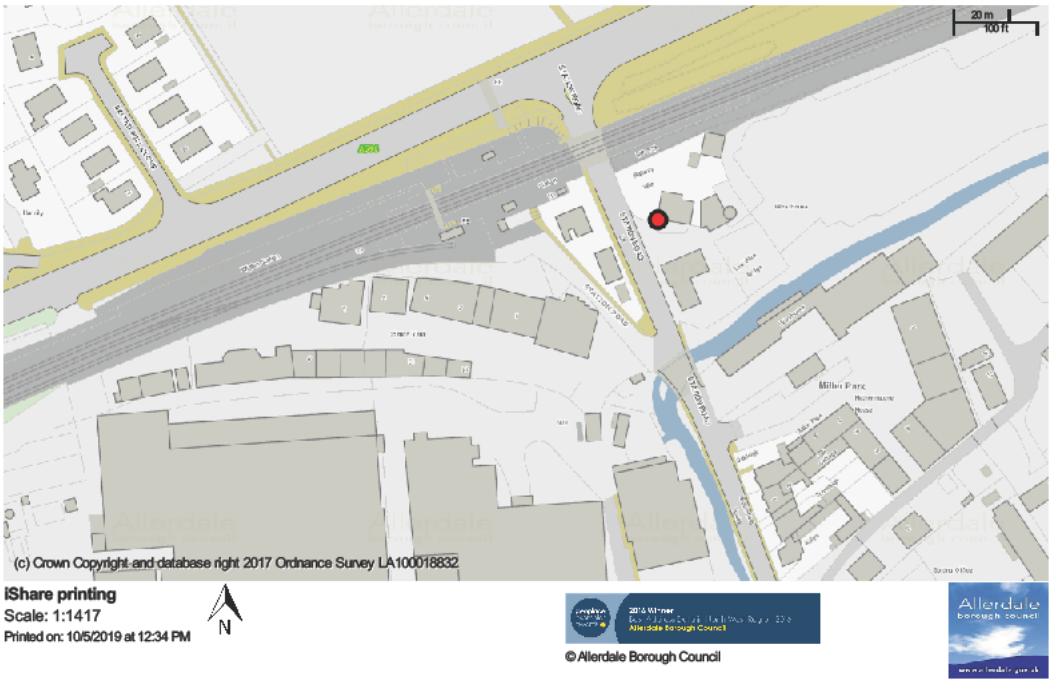



**Figure 10 – Railway Villa Wigton (DTS 10)**


**Figure 11 – Penrith Road, Keswick (DTS 11)**




**Figure 12- Smoke Control Areas (Red boundaries)**

# Appendix E: Summary of Air Quality Objectives in England

### Table E.1 – Air Quality Objectives in England

| Pollutant | Air Quality Objective[4] | |
|---|---|---|
| | Concentration | Measured as |
| Nitrogen Dioxide ($NO_2$) | 200 µg/m$^3$ not to be exceeded more than 18 times a year | 1-hour mean |
| | 40 µg/m$^3$ | Annual mean |
| Particulate Matter ($PM_{10}$) | 50 µg/m$^3$, not to be exceeded more than 35 times a year | 24-hour mean |
| | 40 µg/m$^3$ | Annual mean |
| Sulphur Dioxide ($SO_2$) | 350 µg/m$^3$, not to be exceeded more than 24 times a year | 1-hour mean |
| | 125 µg/m$^3$, not to be exceeded more than 3 times a year | 24-hour mean |
| | 266 µg/m$^3$, not to be exceeded more than 35 times a year | 15-minute mean |

[4] The units are in micrograms of pollutant per cubic metre of air (µg/m$^3$).

# 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 |
| LAQM | Local Air Quality Management |
| $NO_2$ | Nitrogen Dioxide |
| $NO_x$ | Nitrogen Oxides |
| $PM_{10}$ | Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) 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 |

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