Newcastle-under-Lyme Borough Council

2020 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the

Environment Act 1995

Local Air Quality Management

July 2020

Newcastle-under-Lyme Borough Council

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Foreword from the Director of public health – Staffordshire County Council

Annual Status Report (ASR) – Air Quality

Endorsement from the Director of Health and Care, Staffordshire County Council
Staffordshire County Council is committed to working with partners to ensure that Staffordshire will be a place where improved health and wellbeing is experienced by all. Poor air quality has a negative impact on public health, with potentially serious consequences for individuals, families and communities. Identifying problem areas and ensuring that actions are taken to improve air quality forms an important element in protecting the health and wellbeing of Staffordshire residents. Improving air quality is often a complex issue, presenting a multi-agency challenge – so it is essential that all agencies work together effectively to deliver improvements where they are needed. As Director of Health and Care across Staffordshire I endorse this Annual Status Report which sets out the position in all the Local Authorities across Staffordshire and Stoke-on-Trent

As well as the ongoing work programme to address air quality issues in Staffordshire and Stoke-on-Trent through the Defra Funded Air Quality Project.

Staffordshire County Council led the bid for the ADEPT Live Lab programme and were successful in receiving £1.97 million to deliver the SIMULATE programme with partners AMEY, Keele University, Catapult Connected Places and ADEPT Live Labs. The programme is based on challenges in two areas: urban air quality and mobility.

SIMULATE is a new kind of infrastructure partnership, designed to accelerate innovative solutions in Air Quality and Intelligent Mobility within local authorities. SIMULATE is funded by the DfT and is part of the ADEPT Smart Places Research Programme.

In addition, Officers from Newcastle Borough Council, Stoke City Council and Staffordshire County Council are jointly working under Ministerial Direction to improve transport related air pollution in North Staffordshire.

Dr Richard Harling

Director of Health and Care
Staffordshire County Council
[26 May 2020]

Executive Summary: Air Quality in Our Area

Air Quality in Newcastle under Lyme

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]. At the local level, estimated costs of the health impacts of air pollution is thought to be between £20 - 47 million for Newcastle-under-Lyme and between £39 – 93 million for Stoke-on-Trent. Costs to the NHS and Social Care are thought to be between £96 – 176 thousand for Newcastle-under-Lyme and between £189 – 349 thousand for Stoke-on-Trent.

The Borough is located in North Staffordshire and covers an area of 21,096 hectares (81 square miles), with a population of approximately 123,000. Newcastle's strategic location at the important junction between the roads running north from London to Carlisle and west to Chester has ensured that transport has played a major part in its growth. In addition to these historical routes, modern trunk roads also pass Through the Borough. These include the M6, which is currently one of the most heavily trafficked and congested roads in the country along with the A500, which is a major route linking many areas of Newcastle-under- Lyme and Stoke on Trent with junctions 15 and 16 of the M6. Both of these junctions are adjacent to the Borough boundary and thus contribute to the traffic congestion in the area. A number of main roads converge on the two main towns in the Borough, notably Newcastle-under- Lyme and Kidsgrove. The A34, A52, A525, A527 and the A53 pass Through Newcastle and the A50, A5011 and A34 pass through Kidsgrove.

Traffic on these roads is a significant source of air pollutants affecting the air quality of the Borough. The other sources are industry and domestic properties. Particular industries with the greatest potential to cause air pollution have been prescribed for air pollution control under the Environmental Permitting (England and Wales) Regulations 2016. Some processes are regulated by the Environment Agency (these are referred to as Part A1 processes) and others regulated by local authorities (these are referred to as Part A2 and Part B processes). Within the Borough there are two Part A1 processes, three Part A2 processes and 39 Part B processes holding a permit. Details of the processes regulated by the Borough Council can be found on our website at www.newcastle-staffs.gov.uk/airquality.

[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

Air Quality in Newcastle-under- Lyme Town AQMA in 2019

Air Quality in this area is influenced by traffic utilising the major arterial routes, which converge on the town centre. There are a number of relevant receptors located at the back of pavement. The network is heavily congested at peak times of the day with high volumes of low speed mixed traffic. The town centre is experiencing a period of regeneration with provision for developments to provide upto 3000 student bed spaces by 2020.

Furthermore, a number of office spaces are able to covert to residential use without Planning Permission or requiring consideration of air quality. This has resulted in significant increases in the numbers of relevant receptors within the area, especially those located at back of pavement in terraced type properties, where the Council is unable to influence development. The planned mixed retail and accommodation development for the Ryecroft site has not progressed. Any new proposals for this site will need to be supported by an appropriate air quality assessment, which demonstrates that the development will not lead to exceedances of air quality objectives or EU limit values. In addition, the rural areas of the Borough are facing increased demands for applications for residential development, with people in these areas heavily reliant on cars to access services and employment opportunities within the town centre and wider areas.

There continue to be exceedances of the 40ug/m^3 $N0_2$ annual mean objective in this area at the following four locations representative of relevant exposure for LAQM purposes, DT11– 34 London Road -41.2 ug/m^3, DT85 – 106 King Street - 44.2 ug/m^3; DT102 -Belong Care Home, Lower Street – 44.8 ug/m^3, DT104 – 7 King Street- 54.5ug/m^3

The following seven sites were below but within 10% of the $N0_2$ annual mean objective at locations representative of relevant exposure for LAQM purposes and are considered to remain at risk of exceedance in future years, DT72 - 134 High Street, Newcastle-36.7; DT74 - 39 London Road Newcastle -35.7 ug/m^3; DT76 - 11 Brunswick Street -37.7 ug/m^3; DT84 -102 King Street - 37.1 ug/m^3; DT87 - 1 King Street -39.4 ug/m^3, DT96 - JJ Design London Road -39.5 ug/m^3; DT98 - Newcastle Taxi's Brunswick Street – 38.8 ug/$m^{3.}$

Comparison of results for 2019 against all years since 2012 shows a generally decreasing trend. However, the sites which have exceeded or which were below but within 10% of the annual mean objective in 2019 are proving challenging to reduce exposure to $N0_2$.

At locations being monitored for compliance against the $N0_2$ annual mean EU Limit Value, the following locations have exceeded in 2019, DT85 – 106 King Street - 44.2 ug/m^3; DT102 -Belong Care Home, Lower Street – 44.8 ug/m^3, DT104 – 7 King Street- 54.5ug/$m^{3;}$ DT85 – 106 King Street - 44.2 ug/$m^{3;}$ N26 – 120 Etruria Road – 43.2ug/$m^{3.}$

For sites which exceed or are close to exceeding the LAQM $N0_2$ annual mean objective and /or the $N0_2$ annual mean EU Limit Value it is considered that levels are significantly influenced by the following which are not conducive to reducing levels of $N0_2$ volume and composition of traffic, congestion and local geography, with a number of properties being located at back of pavement.

Based on an assessment for compliance with the EU Limit Value undertaken in 2018, compliance based on expected changes in fleet composition, traffic growth and changes in vehicular emissions is not predicted to occur before 2026 without measures to positively influence changes in emissions. Work is currently underway to identify appropriate measures.

Air Quality in Kidsgrove AQMA in 2019

Air Quality in this location is heavily influenced by traffic using the A50 Liverpool Road and local traffic accessing side roads from Liverpool Road within the centre of Kidsgrove. Relevant receptors are located back of footway and in close proximity to junctions and areas of congestion.

For the 2019 calendar year, there were no exceedances of the 40ug/m^3 $N0_2$ annual mean objective in this area at any locations representative of relevant exposure for LAQM purposes. The highest $N0_2$ annual mean objective level at a location of relevant exposure was DT 6 106 Liverpool Road with a façade level of 38.6ug/$m^{3,}$ similar to that measured in 2012, followed by DT 94 - 116 Liverpool Road 38.66ug/m^3 with a façade level of 38.2ug/m^3 and DT64 – 57-59 Liverpool Road with a façade level of 36.76ug/$m^{3.}$ Comparison of results in this area since 2012 shows there has been an overall decreasing trend in the $N0_2$ annual mean with no exceedances recorded since 2016.

Air Quality in Maybank, Wolstanton and Porthill AQMA in 2019

Air Quality in this area is influenced by local road traffic and traffic utilising the junctions associated with the A500 dual carriageway. Relevant receptors in this location are mainly located at the back of footway. The main route through the area is single carriageway with traffic lighted junctions, signal controlled crossings, on street bus stops and significant sections of on street parking. Porthill Bank and Grange Lane are on significant gradients.

There have continued to be no measured exceedances of the 40ug/m^3 $N0_2$ annual mean objective in this area at any locations representative of relevant exposure, with this being the case since 2012. In 2019, the highest $N0_2$ annual mean objective representative of relevant exposure for LAQM purposes was recorded for site DT24 – 26 High Street May Bank with a result of 34.8ug/m_3, an increase of 4.4ug/m3 compared to 2018. Site DT9 – 32 Porthill Bank , DT24 – 26 High Street Maybank and DT49-2 Vale View Porthill, recorded an increase on the $N0_2$ annual mean objective compared to 2018. However, comparison of results in this area since 2012 shows there has been an overall decreasing trend in the $N0_2$ annual mean with no exceedances recorded since 2012.

Air Quality in Little Madeley AQMA in 2019

Air Quality in this location is heavily influenced by traffic using M6 motorway which runs within 20 metres of the nearest receptor at Collingwood, 3 Newcastle Road, Little Madeley.

There have continued to be no measured exceedances of the 40ug/m^3 $N0_2$ annual mean objective in this area at locations of relevant exposure. The highest measured level in 2019 was 27ug/m^3. When results for the 2019 reporting year are compared to 2018, there is a slight increase in the measured

$N0_2$ annual mean objective. However since 2012, there has been an overall decreasing trend in the $N0_2$ annual mean in this area.

Air Quality Management areas and Air Quality Action Plans

Air Quality Management Areas (AQMA) Are currently in force in four areas of the Borough due to past exceedances of the nitrogen dioxide annual mean objective, principally at the façade of residential premises adjacent to busy congested roads. Air Quality Action Plans (AQAP) for each AQMA and the Borough are now in place. Development of these AQAP's involved input from a number of different sectors including Highways England, neighbouring local authorities, planning, highways, and Public Health at Staffordshire County Council. The AQAPs address the different ways in which levels of pollution can be reduced by managing traffic more efficiently, and encouraging walking, cycling, and the use of public transport across the Borough. Since declaring the AQMA's no new major sources of emissions have been identified.

Further information about the AQMAs and Action Plan can be found at:

https://www.newcastle-staffs.gov.uk/airquality

http://uk-air.DEFRA.gov.uk/aqma/list

EU Limit Value exceedances

The High Court have ruled that the UK is failing at a national level to comply with its duties and obligations under the Ambient Air Quality Directive. This has resulted in Newcastle under Lyme being served with Ministerial Directions. At the time of writing this report there are two active directions in force.

The limit value applies to all locations to which the public have access and includes footpaths and open space as opposed to the air quality objectives which apply to facades of relevant locations or where people may spend time relevant to the objective averaging period.

The first of the current directions requires the Borough Council to deliver a bus retrofit scheme by 2021 for buses running across a stretch of the A53 at Basford. This will result in the upgrade of 25 buses, operated by First Potteries, to meet the latest EURO VI emissions standards for NOx. This work will be completed by winter 2020. This work by itself is predicted to bring forward compliance with the $N0_2$ annual mean EU Limit Value from 2026 to 2025. Improvements in emissions will also lead to reductions in bus related NO_2 and diesel particulate matter within the Newcastle-under- Lyme Town and Kidsgrove AQMA's.

The second current direction has been served jointly on Stoke on Trent City Council and Newcastle-under-Lyme Borough Council. The two councils are working together alongside Staffordshire County Council, as the Highways Authority for Newcastle-under-Lyme, to assess and understand the scale of exceedances of the $N0_2$ annual mean EU Limit Value across the North Staffordshire area. Where exceedances are identified to occur beyond the end of 2021, the councils are required to assess and

identify measures to bring about compliance in the shortest possible time. All measures are required to be assessed against chargeable Clean Air Zone of an appropriate size and classification. The councils are required to deliver a full business case to DEFRA detailing the measures required by 2021.

Actions to Improve Air Quality

The Council will be funding the upgrade of 25 buses operating on services 3, 4 and 4a to achieve the latest Euro VI emissions standards. These buses will be in service by Winter 2020 and will help to bring forward compliance with the EU NO_2 annual mean limit value from 2026 to 2025 on the A53 at Etruria Road as well as contributing to improvements and reductions in $N0_2$ levels within the Newcastle under Lyme Town AQMA and Kidsgrove AQMA. More information can be found at https://www.newcastle-staffs.gov.uk/news/retro-fit-buses

The Borough Council in conjunction with Stoke on Trent City Council and Stafford Borough Council is in receipt of grant funding under the OLEV Low Emission Taxi Infrastructure Scheme (LETIS). With the assistance of a commercial partner, it is hoped that a network of rapid charging infrastructure within the three council areas for electric vehicle will be established by 2021. These chargers will be primarily dedicated to the taxi and private hire trade, with placement and operation designed to overcome range anxiety and encourage uptake of low / zero emission vehicles by the trade in coming years. As all sites will be capable of charging two vehicles at a time, there will also be provision for public use. More information can be found at https://moderngov.newcastle-staffs.gov.uk/documents/s31504/Report%20To%20Cabinet%20December%202019.pdf

Staffordshire County Council (SCC) is the highways authority for Newcastle under Lyme. Supported by the Borough Council, the County Council launched the Staffordshire Air Aware initiative to coincide with National Clean Air Day in June 2019. This initiative has already seen a number of schools within areas of poor air quality within Newcastle under Lyme, which are located within designated AQMA's undertake anti-idling campaigns around schools and encourage parents and children to think and actively participate in more suitable and less polluting ways of getting to and from school. Alongside this, there is also a social media initiative for residents and businesses to pledge to make a positive contribution to improving air quality. Workplace travel planning assistance is also being offered to all local businesses. Find out more by visiting https://www.staffordshire.gov.uk/DoingOurBit/Get-Inspired/Clean-green-and-safe/Air-aware/Air-aware.aspx

Location 3: City centre ring road
Newcastle Under Lyme
Location reference - 53°00'43.4"N 2°13'50.3"W

The Simulate Live Labs programme is being led by Staffordshire County Council and it highways delivery partner Amey. A challenge has been issued to the private sector to identify innovative technology solutions to improve air quality across three air quality management areas within Staffordshire. For Newcastle under Lyme, this will see market identified solutions being trialled around the Belong Care Home on Lower Street, where there are currently exceedances of the annual mean NO_2 objective. Chosen solutions will be trialled for a period of upto 12 months assess their impact on improving air quality

Newcastle-under-Lyme Ring road centred on Lower Street between the roundabout for Knutton Lane and the roundabout for the A525. A specific focus should be on the Belong Care Home adjacent to Lower Street.

Conclusions and Priorities

Overall Nitrogen dioxide levels in the Borough are falling, with the majority of monitoring sites showing annual mean concentrations below the annual mean objective. This indicates that the strategies currently in place are already helping to reduce the NO_2 concentration within these areas of the Borough.

However, there remain exceedances of the $N0_2$ annual mean objective within the Newcastle-under-Lyme Town AQMA. There are also know exceedances of the $N0_2$ Annual Mean EU Limit Value on a section of the A53 at Basford. Although there are no exceedances within the Kidsgrove AQMA, there is considered to be a risk of exceedance in future years.

Work needs to be done to ensure that any further developments, and changes to the road networks across the Borough do not lead to an increase in the annual NO_2 concentration above the annual mean objective of 40µg/m^3 as well as bringing exceeding locations below this objective.

The priorities for the local authority in addressing air quality are therefore centred on ways in which;

1. The amount of traffic on the road can be reduced.
2. Assessing and improving emissions from the vehicles using the roads within the Borough
3. Road traffic can be better managed to reduced stop-start, idling and congestion.
4. Traffic light signalling systems can be improved to enable a more fluid movement of traffic, particularly around the Town Centre ring road.
5. Residents can be encouraged to take up other forms of transport, including public transport, cycling and walking.
6. Securing the retrofit of 25 buses to the latest EURO emissions standard.
7. Work on producing a plan to reduce exceedances of the $N0_2$ annual mean EU Limit Value to bring forward compliance in the shortest possible time. This work is being overseen by

the Joint Air Quality Unit within DEFRA and is subject to final approval from the relevant government minister.

Local Engagement and How to get Involved

How to Get Involved

If residents and businesses reduce the amount of fuel and chemicals used, it will improve air quality. The following ways can help:

Commute

- ✓ Leaving the car at home one day a week. Further information can be found at www.staffssaferroads.co.uk/
- ✓ Consider car sharing your journey further guidance can be found at https://share-a-lift.co.uk/
- ✓ Using public transport whenever practicable will reduce traffic congestion and improve air quality. Travel planning APP's are available for most smart phones. You can also find information online at http://travelsmartns.co.uk/
- ✓ By avoiding idling engines and/or air conditioning running continuously - switch your engine off; to save fuel, money and improve local air quality.

School Run

- ✓ Walking or cycling to school is not only good for health but it will save on fuel costs and help reduce local air pollution. Further guidance can be found within Travel into School www.staffordshire.gov.uk/transport/Stafford/Schools/Schools.aspx
- ✓ Take turns with friends, neighbours or family to drive or walk the children to school. Check whether your school has a travel plan.

Energy Efficiency

- ✓ Improving the energy efficiency of your home / school / workplace will help reduce energy bills, as well reducing the air pollution associated with power generation. For further information, please visit the Energy Savings Trust (EST) website www.energysavingtrust.org.uk, which is a non-profit organisation that promotes energy savings, funderd by the Government and private sector.

Workplace transport

- ✓ ECO Stars (Efficient and Cleaner Operations) Fleet Recognition Scheme encourages and helps operators of HGVs, buses, coaches, vans and taxis to run fleets in the most efficient and green way. The scheme provides recognition for best operational practices, and guidance for making improvements. The ultimate aim is to reduce fuel consumption, which naturally leads to fewer vehicle emissions and has the added benefit of saving money!

  ECO Stars is currently managed by specialist transport consultants, Transport and Travel Research Ltd (TTR).

It is free and straightforward to join ECO Stars. Simply contact the ECO Stars team by phone or email. They can complete the application form with you. One of the team can visit you in person to take you through the application

Phone: 01543416416 Email: ecostars@ttr-ltd.com . To find out more about ECO-Stars visit https://www.ecostars-uk.com/

✓ Grants may be available to support your business in becoming more energy efficient and towards the purchase of cleaner vehicles and support with charging infrastructure. Further information can be found at;

- Office for Low Emission Vehicles: https://www.gov.uk/government/organisations/office-for-low-emission-vehicles

- Energy Saving Trust: www.energysavingtrust.org.uk

Around The Home

- ✓ Use water-based or low solvent paints, glues, varnishes and wood preservatives, look for brands with a low VOC content.
- ✓ Make sure your home is well ventilated especially during DIY or cleaning.
- ✓ Have your central heating system checked regularly to avoid risking exposure to toxic carbon monoxide.
- ✓ Keep wood stoves and fireplaces well maintained, and make sure that wood burners are exempted for use in smoke control areas. See our webpage for further advice (https://www.newcastle-staffs.gov.uk/all-services/environment/environmental-protection/smoke-control-advice)
- ✓ Purchase "Green Power" for the electricity in your home. (Contact your energy supplier).
- ✓ Be energy efficient- make sure your house is well insulated and use energy efficient appliances. Your energy supplier may offer grants to insulate your home.
- ✓ Avoid using bonfires to dispose of waste and never burn household waste, especially plastics, rubber and treated timber. See our webpages for advice on disposal / recycling and composting, at www.newcastle-staffs.gov.uk/bonfires

Newcastle-under- Lyme Borough Council's air quality reports and action plan documents are accessible from the following link https://www.newcastle-staffs.gov.uk/airquality

For enquires or suggestions on how to improve air quality please feel free to contact us:

Write to:	The Environmental Protection Team, Newcastle-under- Lyme Borough Council Castle House Barracks Road Newcastle under Lyme ST5 1BL
Email:	environmental_health@newcastle-staffs.gov.uk
Telephone:	01782 717717

Table of Contents

List of Tables

List of Figures

1. Local Air Quality Management

This report provides an overview of air quality in Newcastle-under- Lyme 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 Newcastle-under-Lyme 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 compliance with the objectives.

A summary of AQMAs declared by Newcastle-under- Lyme can be found in Table 1.1 Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at https://uk-air.DEFRA.gov.uk/aqma/local-authorities?la_id=170. Alternatively, see Appendix D: Map(s) of Monitoring Locations and AQMAs, which provides for a map of air quality monitoring locations in relation to the AQMA(s).

Table 1.1 - Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)				Action Plan		
						At Declaration		Now		Name	Date of Publication	Link
Kidsgrove AQMA No. 1	Jan-15	NO_2 Annual Mean	Kidsgrove	Declared due to exceedance of the N02 annual mean objective along Liverpool Road A50, Kidsgrove.	NO	47.99	µg/m3	47.2	µg/m3	Kidsgrove AQAP	2019	www.newcastle-staffs.gov.uk/airquality
Newcastle-under-Lyme Town Centre AQMA No. 2	Jan-15	NO_2 Annual Mean	Newcastle-under-Lyme	Declared due to exceedance of the N02 annual mean objective. Covers Newcastle-under-Lyme Town Centre including the ring road A53, King Street, George Street and London Road to the boundary with the City of Stoke on Trent AQMA	YES	58.8	µg/m3	54.5	µg/m3	Newcastle-under-Lyme Town Centre AQAP	2019	
Maybank-Wolstanton-Porthill AQMA No. 3	Jan-15	NO_2 Annual Mean	Newcastle-under-Lyme	Covers the principal routes between Maybank, Wolstanton and Porthill. Declared due to exceedances of the N02 annual mean in Maybank High Street and in the Porthill area	YES	46.5	µg/m3	34.8	µg/m3	Maybank-Wolstanton-Porthill AQAP	2019	
Little Madeley AQMA No. 4	Jan-15	NO_2 Annual Mean	Madeley	Declared around two properties at Little Madeley due to an exceedance of the NO_2 annual mean arising from the M6 motorway.	YES	52.1	µg/m3	27.3	µg/m3	Madeley AQAP	2019	

☒ **Newcastle-under-Lyme Borough Council confirms the information on UK-Air regarding their AQMA(s) is up to date**

2.2. Progress and Impact of Measures to address Air Quality in Newcastle under Lyme

DEFRA's appraisal of last year's ASR concluded that the report was not acceptable for all sources and pollutants. The appraisal comments and details of how these have been addressed are detailed below.

2019 ASR - Appraisal Comments	Response
The information presented within the accompanying excel data sheet does not match the information presented in the report with regard to Table 2.1, specifically the action plan publication date. The action plan referenced in the report has a publication year of 2018, whereas the data sheet notes this to be 2019. The Council should confirm which action plan has been reported on within the ASR and update accordingly. The following major issues which are sufficient to justify refection are: - The report does not disclose the bias adjustment factor. The Council need to state the applied factor in Table B.1 of the template. The report cannot be approved without this information. - The Council must provide up to date 2018 information regarding tube preparation and analysis and provide supporting evidence for the bias adjustment factor used, from the correct version of the national spreadsheet (available to download from DEFRA (https://laqm.DEFRA.gov.uk/bias-adjustment-factors/national-bias.html) - Cross-checks with the report and data sheet have revealed inconsistencies. The coordinated of the continuous monitor do not match between the two documents. This must be reviewed and updated accordingly. The Council are strongly advised to carry out checks prior to submission. It is noted that the Council have had issues with their diffusion tube monitoring results, for which they have sought clarification from the laboratory. The outcome of this enquiry should be included prior to re-submission, or, if not available, addressed in the Council's 2020 ASR. The report outlines the progress of measures to address Air Quality in the Borough, which appears to be limited. Priorities for the coming year have however been outlined. The report noted a new AQAP published in 2019; it is expected that detail and progress on these measures be addressed in the 2020 ASR. The report provides a discussion of $PM_{2.5}$ emissions and the Public Health Outcomes Framework. There is reference to measures to address $PM_{2.5}$ however these do not appear to be $PM_{2.5}$-specific. It would be beneficial for the Council to consider implementing specific measures to address $PM_{2.5}$, given the health impacts.	The $N0_2$ results reported for 2018 and assessment thereof remain valid. The action plan was formally adopted in January 2019 by the Borough Council. Table 2.1 has been updated to reflect this. The 2019 ASR has been reviewed to address the comments made and is to be resubmitted alongside the 2020 ASR.

On the basis of the evidence provided by the local authority the conclusions reached are not acceptable for all sources and pollutants. Following the adequate completion of this report, Newcastle-under-Lyme Borough Council should re-submit their 2019 Annual Status Report.	

Newcastle-under-Lyme 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.

Newcastle-under-Lyme Borough Council expects the following measures to be completed over the course of the next reporting year:

BW7	• Installation of Electric Vehicle rapid charging infrastructure under the LETIS at upto 10 sites within the Borough. This will provide rapid charging provision dedicated. As charging points will also be capable of serving two vehicles, one side will be dedicated to the Licensed Taxi and Private Hire trade from across Newcastle under Lyme, Stoke-on-Trent and Stafford Borough Council whilst the other side will be available for general public use. • The Borough Council will take delivery of three electric vans for use by the Borough Council's Pest Control and Dog Warden Team.
BW 12 –	• Delivery of bus retrofit programme for buses running on route 3 / 4 and 4a. This will see all buses running on these routes within the Borough retrofitted with CVRAS accredited emissions control technology to bring them upto to the latest EURO IV emissions standard. This will have a positive effect of reducing bus related emissions in the Newcastle-under- Lyme Town AQMA and Kidsgrove AQMA. The Borough and First PMT as the operator of these buses will also be promoting the air quality benefits of travelling by the upgraded buses
New measure Simulate Live Labs, Newcastle under Lyme[4]	• To identify solutions, demonstrated through trials, which improve air quality, with a specific focus on improving air quality outside the Belong Care Home. To understand the commercial model behind making these solutions sustainable. ▪ Where trials are successful, explore how, (the private sector) through working with Staffordshire County Council, these can be transitioned to fully commercial solutions which can be deployed as a service on the Highways network (both major and local roads).
K1	• A revised scheme to reduce congestion on Liverpool Road, Kidsgrove is to be implemented by the County Council. This will see optimisation of traffic light signals at the junction of Liverpool Road / The Avenue and also a partial ban on turns out of Heathcote Street onto Liverpool Road.

[4] https://simulate-adeptlivelabs.co.uk/media/qvvdmls3/aq-challenges-v9.pdf

K2	• A formal decision is to be made by the County Council on whether to relocate the bus stop away from the Liverpool Road / The Avenue junction to ease congestion and improve air quality in this area.
N6	• LSTF funding of cycling walking and bus links between N-u-L and Stoke. A new footpath and cycling link is to be installed as part of HE junction improvement works between the A500 at Wolstanton and Porthill

Progress on the following measures has been slower than expected for the reasons indicated.

Borough Wide Action Plan

BW1	Borough Wide Air Quality Strategy - delayed pending publication of the revised joint local development plan for Newcastle under Lyme and Stoke on Trent City Council.
BW3	Inclusion of air quality related planning policies in new joint local plan – delayed pending publication of the revised joint local development plan for Newcastle under Lyme and Stoke on Trent City Council.
BW4	Develop policies to promote EV charging infrastructure in the Development Planning Process – Paused pending outcome of consultation on changes to building regulations concerning EV infrastructure for new and upgraded developments
BW5	Develop policies to support alternative vehicle fuelling technologies - delayed pending publication of the revised joint local development plan for Newcastle under Lyme and Stoke on Trent City Council. Work is still continuing on drafting policies.
BW11	Voluntary Quality Network Partnership with bus operators. A decline in bus passenger travel and withdrawal and reliability of bus services is of major concern. Outside of a VQNP with operators, there is engagement with operators on an informal basis to identify issues and to jointly address challenges.

Kidsgrove Air Quality Action Plan

K1	Kidsgrove Railway Station Transport hub including parking and improved bus/rail interchange with new bus facilities closer to the station, Real Time Passenger Information provided at Kidsgrove station and at the bus stops, disabled/cycle parking, drop off and taxi facilities, and safer pedestrian and cycle access routes to the station. This scheme has been delayed to due unforeseen ground conditions on site.
K3	Review location of bus stops to facilitate traffic flow around Liverpool Road / The Avenue. This has been completed and the public have been consulted on a proposal to relocate the bus stop away from the junction. An objection has been received which has led to the proposal being reviewed prior to a formal decision being made on whether to proceed

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Newcastle-under-Lyme Borough Council anticipates that further additional measures not yet

prescribed will be required in subsequent years to achieve compliance and enable the revocation of the four AQMA's within the Borough.

Newcastle-under- Lyme Borough Councils' priorities for the coming year are

- To continue monitoring at all established monitoring sites operational in 2019.
- To progress delivery of air quality action measures, where currently feasible.
- To work with key partners to identify and capitalise upon opportunities to improve air quality, incorporating these into a revised air quality action plan as appropriate.
- To work with Stoke on Trent City Council, Staffordshire Highways, Highways England and DEFRA to achieve compliance with the $N0_2$ annual mean objective and EU Limit Value in the shortest possible time.

The principal challenges and barriers to implementation that Newcastle-under-Lyme Borough Council anticipates facing are funding as well as public and political support for measures. In addition there is a year on year decline in bus travel with Government figures[5] showing that 9.3 million journeys were taken by bus passengers in the Potteries in 2018/19, down from 10.4 million in the previous year – a reduction of more than 10 per cent in just 12 months. The Council has also identified that the local vehicle fleet EURO standard emissions profile is some 20% worse than the national fleet.

[5] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/870647/tsgb-2019.pdf

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
Borough Wide Air Quality Action Plan Measures											
BW1	Borough Wide Air Quality Strategy	Policy Guidance and Development Control	Other policy	Jan-19	LA Environmental Health.	NULBC	Strategy in place	Reduction in emissions	Funding secured, planning phase	Delayed	Requires formal consultation and committee approval
BW2	Air Quality Planning Guidance	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Jan-19	LA Environmental Health	NULBC	Planning Guidance in Place	Reduction in emissions	Funding secured, planning phase	Completed Summer 2019	Promoted via Local Validation List as a guide for developers.
BW3	Inclusion of air quality related planning policies in new joint local plan	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Jan-19	LA Environmental Health and Planning (Joint project with Stoke on Trent City Council)	NULBC / SoTCC	Policies in JLP	Reduction in emissions	Implementation on-going	Winter 2020	Requires formal consultation and approval from Stoke and Newcastle Councils
BW4	Develop policies to promote EV charging infrastructure in the Development Planning Process	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Jan-19	Newcastle-under- Lyme BC / Staffordshire County Council	NULBC	Planning related EV policies in place	Reduction in emissions	Policy drafted however consultation paused See comments. Interim approach based on securing a provision by condition linked to NPPF Policies which support EV and AQ	Pending outcome of Building Regulation amendments	Policy developed in draft format. Proposed changes in Building Regulations in respect of EV infrastructure has put policy on hold. Will require formal consultation if to be progressed.
BW5	Develop policies to support alternative vehicle fuelling technologies	Policy Guidance and Development Control	Other policy	Jan-19	Newcastle-under- Lyme BC	NULBC	Policies in place	Reduction in emissions	Draft policies developed for inclusion in Joint Local Plan	Dependent on progress of Joint Local Plan Development	Awaiting further development of joint local plan. Requires formal consultation and approval from Stoke and Newcastle Councils
BW6	Support and participate in appropriate initiatives to encourage uptake of Zero and Low Emission Vehicle Technologies.	Vehicle Fleet Efficiency	Air Quality Planning and Policy Guidance	Jan-19	Newcastle-under- Lyme BC / Staffordshire County Council / Staffordshire Districts	DEFRA / OLEV / HE / Private sector	Details of technologies and initiatives	Reduction in emissions	1. Successful bid to OLEV LETIS Fund for 30 chargers across 3 local authorities. Stoke, Newcastle Under Lyme, Stafford BC. Tendered issued in March 2020. Awaiting evaluation by lead authority (Stoke on Trent City Council) prior to progressing. 2. NULBC participating in initiatives led by Staffs County Council for EV in Staffordshire.	1. Delivery now anticipated 2020/21 Financial Year 2. Currently being led by Staffs County Council on behalf of Staffordshire LA's	1. Procurement is being led by Stoke on Trent City Council. OLEV funds transferred. Tender issued March 2020. 2. Requires formal approval by Staffordshire LA's. Strategy currently in development.
BW6	Review the Borough Council's Hackney Carriage and Private Hire Licensing Policy to reduce tail pipe emissions from this sector	Vehicle Fleet Efficiency	Other policy		Newcastle-under- Lyme BC	NULBC	Policy updated	Reduction in emissions	Policy approved in Spring 2019	Policy approved in Spring 2019	Policies to support air quality improvement and improvements to latest emission standards and reduction in licence vehicle age not taken forward. Vehicles can be no older than 7 years old at date of first licence with council and no upper limit on age, subject to six month testing from 10 years old. If fails a retest will no longer be licensed.
BW7	Transition the Council Vehicle fleet to Zero and Low Emission Vehicle Technologies	Vehicle Fleet Efficiency	Other policy	Jan-19	Newcastle-under- Lyme BC	NULBC	Progress reported	Reduction in emissions	1. EURO IV refuse fleet and recycling vehicles delivered March 2020. 2. Orders to be placed for 3 EV vans for pest control and dog warden service 3.EV chargers installed and operational for	2025	Requires budget for capital expenditure by council

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
									council fleet vehicles at Knutton Depot.		
BW8	Staffordshire and Stoke on Trent Eco-Stars	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	2016	Staffordshire Local Authorities (Lead by Cannock Chase DC)	Active	Target 20 HGV /HDV operators per LA area	Reduced vehicle emissions	Implementation on-going	Scheduled completion 2018	Slow take up by operators across County
BW9	Eco Stars award for Council Street scene and Waste fleet	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	2016	NULBC Street scene Division	Active	Fleet achieves 5* rating	Reduced vehicle emissions	Implementation on-going	Scheduled completion 2018	4* Ecostars award with action plan to move to 5*
BW10	Green Travel Plan for new Civic Hub development in Town Centre	Promoting Travel Alternatives	Workplace Travel Planning	2016	Lead by Staffordshire County Council as building owner in conjunction with Borough Council, Police, Library Service, Social Services, Aspire Housing	Requires monitoring		reduced vehicle emissions	Completed	Completed 2019.	Now in monitoring phase
BW11	Voluntary Quality Network Partnership with bus operators	Alternatives to private vehicle use	Other		Staffordshire County Council / Stoke on Trent City Council/ Local Bus Companies	Not yet started	Voluntary quality network operative across area	Reduced vehicle emissions /	Not yet commenced. Identified in Newcastle-under- Lyme LTP		Requires commitment from bus operators and councils. Decline in bus passenger numbers and services affects financial viability for improvements. Local operators use older fleet vehicles across area.
BW12 New measure2020	Bus Retrofit	Vehicle fleet efficiency	Vehicle Retrofitting programmes	2020	Newcastle under Lyme Borough Council / First Potteries / JAQU	DEFRA grant (100%)	25buses retrofitted to EURO VI	EU $N0_2$ Annual mean exceedance non-compliance reduced by 1 year.	Grant secured. Legal agreement entered into between operator and council	Winter 2020	Operator is legally committed to upgrading buses. New buses which come onto route are hoped to be EURO VI by a traffic regulation condition
Little Madeley AQMA - Air Quality Action Plan											
M1	Continue to monitor N02 at relevant location in Little Madeley	Other	Other	Jan-19	Newcastle-under- Lyme Borough Council Environmental Health	Ongoing	Monitoring	As per reported results	Ongoing	To at least 2027 (Five years post smart motorway opening in 2022 to junction 15 and from junction 16)	Nil
M2	Engage with HE concerning proposals to introduce smart managed motorway / hard shoulder running in Madeley area between junctions 15 and 16 of the M6 motorway	Traffic Management	Other	Jan-19	Lead by Highways England	Unknown	Project delivered	Has potential to reduce congestion and vehicle emissions	Not yet commenced	Will review to identify if in next RIS round. Widening / smart managed motorways are running to junction 15 and from junction 16 and is scheduled to be completed in 2022. The section past Madeley will remain a traditional 3 lane motorway.	Scheme not yet identified. Sections either side of junctions 15 and 16 of the M6 are being smart managed with hard shoulder running. Local geography is an issue to identifying appropriate solutions
Maybank, Wolstanton, Porthill AQMA - Air Quality Action Plan Measures											
W1	Improvements to Wolstanton and Porthill Junctions on A500 to reduce congestion	Traffic Management	UTC, Congestion management, traffic reduction		Highways England	Commencement by 2020	Modelling of air quality impacts and monitoring	Reduction in congestion / improved journey times	Scheme commenced in 2019. Due for completion by Summer 2020.	Scheduled for completion Summer 2020.	Funding identified by HE. Project flagged as high risk for air quality along A500 due to exceedance of EU action level
W2	Short term routing strategy to mitigate impact of congestion associated with works to A500	Traffic Management	UTC, Congestion management, traffic reduction		Highways England / Staffs County Council / Stoke on Trent City Council and NULBC Environmental Health	from commencement of works and for up to 3 years	Modelling of air quality impacts and monitoring	Potential short term -ve impact during build	Impacts not yet quantified	Summer 2020	Negative impacts not identified through monitoring or congestion impacts
W3	Evaluate the impact of the Etruria Valley Link Road in the May Bank, Porthill, Wolstanton area and provide	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management,		Lead by Stoke on Trent City Council with planning application to Newcastle-under- Lyme Borough Council/ Staffordshire County Council involved	Commencement by 2020	Modelling of air quality impacts and monitoring	unclear	Minor adverse impact but no exceedances identified	Development planned to commence in 2020 (subject to DFT approval) and to open to traffic in late 2022	Potential -ve effects on Maybank Porthill, Wolstanton AQMA. Potential to improve AQ in Stoke on Trent at Basford Bank where hourly mean N02 is being exceeded.

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
	appropriate mitigation		Selective vehicle priority, bus priority, high vehicle occupancy lane								Monitoring will continue in both areas for at least 5 years post opening.
Newcastle-under- Lyme Town AQMA - Air Quality Action Plan Measures											
N1	Ensure that effects of additional traffic generated by Ryecroft mixed retail / student development are properly understood	Other	Other		Henry Davidson Developments / Planning Application to Newcastle-under- Lyme B.C.	18/19	Monitoring	Not calculated	Planning Permission Granted	Project cancelled	Development is no longer going ahead. The Council is currently reviewing options to reinvigorate the town centre. Air quality is being considered in developing a strategy and bid to under the Future High Streets Fund.
N2	Ensure that effects of emissions from plant associated with Ryecroft mixed retail / student development are properly understood	Other	Other		Henry Davidson Developments / Planning Application to Newcastle-under- Lyme B.C.	2018/19	Emissions modelled and quantified	Not yet quantified	Planning condition awaiting discharge	Project cancelled	Development is no longer going ahead. The Council is currently reviewing options to reinvigorate the town centre. Air quality is being considered in developing a strategy and bid to under the Future High Streets Fund.
N3	Wayfinding strategy Newcastle-under-Lyme Town Centre and outlying areas for walking and cycling	Promoting Travel Alternatives	Promotion of walking		Lead by Newcastle-under- Lyme Borough Council with support from Staffordshire County Council, Sustrans and Town Centre Business Improvement District	2019/20	Delivery of strategy	Not quantified		Anticipated 2021	Strategy awaiting public consultation. Plans are likelt to be rolled forward for inclusion within bid under the FHSF
N4	Cycle route improvements on A34 North (Cedar Road to Lower Milehouse Lane and Milehouse) and A527 (Town to Keele University)	Promoting Travel Alternatives	Promotion of cycling		Lead by Newcastle-under- Lyme Borough Council with support from Staffordshire County Council, Sustrans and Town Centre Business Improvement District	2018/19	Cycle routes installed	Reduced vehicle emissions	Routes identified	Completed for areas outside of Town Centre	Completed for areas outside of town centre. Cycling strategy within the town centre currently being developed.
N5	Local Transport Package	Traffic Management	UTC, Congestion management, traffic reduction		Staffordshire County Council	Complete	Measurement of journey times between reference points	Reduced vehicle emissions	System optimised	Completed	UTC optimised on network around ring road and King Street / Etruria Road (A53) Limited capacity for physical works as network is heavily congested and constrained by local geography. Borough lies at centre of major road network for cross-country freight.
N6	LSTF funding of cycling walking and bus links between N-u-L and Stoke	Alternatives to private vehicle use	Other		Lead by Newcastle-Staffordshire County Council and Stoke on Trent City Council	2019 onwards	Funding secured and links in place	Reduced vehicle emissions	Strategy and plans still under development. Improvements in air quality and congestion considered as a priority along with walking cycling and public transport connectivity. New cycle and pedestrian link included as part of HE scheme at Grange La	2019 onwards	Capacity to improve network. EVLR link once opened will provide additional cross valley route from Newcastle into Stoke on Trent City Centre
N7	Ring-Road enhanced signage & subway	Traffic Management	UTC, Congestion management, traffic reduction		Lead by Newcastle-under- Lyme Borough Council with support from Staffordshire County Council, Sustrans and Town	2018/19		Reduced vehicle emissions	Strategy and plans still under development. Improvements in air quality and congestion considered as a priority along with walking cycling	2021	Options identified for consultation / Funding possibly through FHSF.

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
					Centre Business Improvement District				and public transport connectivity.		
N8	Car Park Variable Message Signing / Street parking restrictions	Traffic Management	Other		Lead by Newcastle-under- Lyme Borough Council with support from Staffordshire County Council, Sustrans and Town Centre Business Improvement District	NULBC / Staffs CC	VMS signs in place and street parking restrictions enforced	Reduced vehicle emissions	Strategy and plans still under development. Improvements in air quality and congestion considered as a priority along with walking cycling and public transport connectivity.	2021	Options identified for consultation / Potential funding constraints
N9	RTPI and subsidised bus travel / green travel plans sought for large-scale multi occupancy residential accommodation. Town centre expected to accommodate 3000 students for local universities	Public Information	Other		Staffordshire County Council with support via conditions on planning applications for inclusion in high occupancy student / keyworker accommodation	Developers / Staffs County Council		Reduced vehicle emissions	A number of development within the town centre are capitalising on proximity to public transport links, cycling infrastructure improvement on development and in network sought through planning. Travel planning sought via planning and monitored via county highways. Reduced rate bus passes for university students promoted.	2021	Financial viability of development schemes to support required S106 / Resistance from developers.
N10 (New Measure 2020)	To identify solutions, demonstrated through trials, which improve air quality, with a specific focus on improving air quality outside the Belong Care Home. To understand the commercial model behind making these solutions sustainable. ▪ Where trials are successful, explore how, (the private sector) through working with Staffordshire County Council, these can be transitioned to fully commercial solutions which can be deployed as a service on the Highways network (both major and local	Other	Other	2020	Staffordshire County Council	DFT grant		Reduced vehicle emissions	Package of measures to be identified and delivered on a trial from Summer 2020 for 12 months	Summer 2021	Measures will be trialled as part of a County Council led scheme to assess effectiveness in reducing emissions. Selected measures will be in place for upto 12 months
Kidsgrove AQMA - Air Quality Action Plan Measures											

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
K1	Kidsgrove Railway Station Transport hub including parking and improved bus/rail interchange with new bus facilities closer to the station, Real Time Passenger Information provided at Kidsgrove station and at the bus stops, disabled/cycle parking, drop off and taxi facilities, and safer pedestrian and cycle access routes to the station	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	East Midlands Trains	2015	2018/19	Delivery of measure	Has potential to increase patronage / increase use of public transport and private car	In planning phase	2020	Funding priorities and reliant on completion by East Midlands Trains Unexpected ground conditions on site have significantly impacted on delivery of scheme
K2	Traffic light optimisation to reduce congestion ALONG Liverpool Road and prevention of right turn into Heathcote Street from A50	Traffic Management	UTC, Congestion management, traffic reduction	Staffordshire County Council	2017	2018	Delivery of measure	Reduced vehicle emissions		2020	Community support / Funding Scheme to be revised from original proposal to allow right turn into Heathcote Street
K3	Review location of bus stops to facilitate traffic flow around Liverpool Road / The Avenue	Traffic Management	UTC, Congestion management, traffic reduction	Staffordshire County Council	2017	2018	Delivery of measure	Reduced vehicle emissions		2020	Community support / Funding Objection from a resident has caused the scheme to be reviewed for a decision on whether this is to be taken forward.

2.3 PM2.5 – 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.

Newcastle under Lyme Borough Council and Staffordshire County Council are taking the measures detailed within Table 3 - Actions being taken within Newcastle-under-Lyme to reduce $PM_{2.5}$to address $PM_{2.5}$:

2.3.1. $PM_{2.5}$ and Mortality in Newcastle under Lyme

Although the levels of $PM_{2.5}$ within the County and City of Stoke on Trent are below the 2020 EU Limit value, the impact on adult mortality directly attributable to $PM_{2.5}$ is nonetheless still an important public health issue within Staffordshire and Stoke-on-Trent.

Approximately 4.4% of deaths within the County can be attributed to $PM_{2.5}$. For Newcastle-under-Lyme this equates to 4.2% of deaths or 60 deaths. This is shown in Figure 1. The information for Staffordshire councils is drawn from Public Health Outcomes Framework indicator 3.01[6], percentage estimated number of deaths attributable to $PM_{2.5}$ in adults over 30. The data presented to 2018 is the latest data available at time of publication of this report.

[6] Public Health Outcomes Framework 2016-2019 Indicator 3.01 Fraction of mortality attributable to particulate air pollution https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/520457/At_a_glance.pdf

Figure 1 ***Public Health Outcomes Framework Indicator 3.01- Fraction of annual all cause adult mortality attributable to anthropogenic (human made) particulate air pollution (measured as fine particulate matter, $PM_{2.5}$) for Staffordshire Authorities 2014 to 2018***[8]

Estimated numbers of annual all-cause adult mortality attributable to anthropogenic (human-made) particulate air pollution (measured as fine particulate matter, $PM_{2.5}$*) for Staffordshire 2014 to 2018[8] * Fraction of annual all-cause adult mortality attributable to anthropogenic (human-made) particulate air pollution (measured as fine particulate matter, $PM_{2.5}$*)															
	2014			2015			2016			2017			2018		
District/County	Deaths - all causes persons 30+	%*	Estimated attributable deaths	Deaths - all causes persons 30+	%*	Estimated attributable deaths	Deaths - all causes persons 30+	%*	Estimated attributable deaths	Deaths - all causes persons 30+	%*	Estimated attributable deaths	Deaths - all causes persons 30+	%*	Estimated attributable deaths
Newcastle-under-Lyme	55	4.7	60	55	4.2	50	1291	4.7	60	1197	4.2	50	1334	4.2	60
Stafford	65	4.8	60	60	4.7	60	1254	4.8	60	1267	4.3	50	1336	4.2	60
East Staffordshire	55	5.1	50	55	4.8	50	1065	5.6	60	1098	5.0	50	1093	4.6	50
South Staffordshire	55	5	50	55	4.7	60	1128	5.1	60	1239	4.5	60	1211	4.6	60
Lichfield	50	5	50	50	4.6	50	1044	5.5	60	1070	4.9	50	1087	4.6	50
Staffordshire Moorlands	45	4.5	50	45	4	40	1110	4.6	50	1127	3.9	40	1108	3.8	40
Cannock Chase	45	5.1	40	45	4.6	40	879	5.4	50	940	4.7	40	976	4.6	50
Tamworth	35	5.4	30	30	4.9	30	615	6	40	634	5.3	30	653	5.1	30
Stoke on Trent	2318	5.0	115	2479	4.9	110	2454	5.0	120	2490	4.4	110	2746	4.4	120
Staffordshire County	400	4.9	400	390	4.5	390	8386	5.2	430	8572	4.5	390	8792	4.4	390

8 Source Public Health England https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/3/gid/1000043/pat/6/par/E12000005/ati/102/are/E10000028/iid/30101/age/230/sex/4

Table 3 - Actions being taken within Newcastle-under-Lyme to reduce $PM_{2.5}$

Measures category	Measure Classification	Effect on reducing NOx and PM10 emissions(low, medium, high)	Reduces PM2.5 emissions	Measure in Newcastle under Lyme
Traffic Management	**Urban Traffic Control systems, Congestion management, traffic reduction**	low	✓	UTC in areas of Newcastle Town Centre AQMA and Kidsgrove AQMA
Promoting Travel Alternatives	**Workplace Travel Planning**	low	✓	www.staffordshire.gov.uk/Transport/Air-quality/Businesses.aspx www.staffordshire.gov.uk/DoingOurBit/Get-Inspired/Clean-green-and-safe/Clean-green-and-safe.aspx
	Encourage / Facilitate home-working	low	✓	Agile working policy adopted by Council
	School Travel Plans	low	✓	https://www.staffordshire.gov.uk/Education/Schooltransport/Active-school-travel/Active-school-travel-team.aspx Funderd STPs for school expansions: 14 Newcastle Borough,
	Promotion of cycling	low	✓	The Local Cycling and Walking Infrastructure Plan is currently under development by SCC www.staffordshire.gov.uk/DoingOurBit/Get-Inspired/Clean-green-and-safe/Clean-green-and-safe.aspx
	Promotion of walking	low	✓	The Local Cycling and Walking Infrastructure Plan is currently under development by SCC www.staffordshire.gov.uk/DoingOurBit/Get-Inspired/Clean-green-and-safe/Clean-green-and-safe.aspx
	Staffordshire Share a Lift Scheme		✓	The Staffordshire Left Scheme is available at: https://share-a-lift.co.uk/ A new provider is currently being sought
Transport Planning & Infrastructure	**Local Transport Plans and District Strategies**	high	✓	www.staffordshire.gov.uk/Transport/transportplanning/District-integrated-transport-strategies/districtintegratedtransportstrategies.aspx
	Public transport improvements-interchanges stations and services	low	✓	Kidsgrove Station interchange plans
	Cycle network	low	✓	www.staffordshire.gov.uk/Transport/cycling/cyclemaps.aspx SCC currently looking to implement improved mapping software for future developments
	Bus route improvements	high	✓	RTPI routes 3 & 4 Newcastle Town Centre. Improved future bus services to Chatterley Valley
Policy Guidance and Development Control	**Planning applications to require assessment of exposure / emissions for development requiring air quality impact assessment**	high	✓	Local Validation list draws attention to requirements https://www.newcastle-staffs.gov.uk/all-services/planning/planning-applications/information-requirements-and-validation-planning
	Planning Policies		✓	Joint local plan under development with Stoke on Trent City Council – to include policies which will benefit air quality
	STOR Sites (Short Term Operating Reserve) Energy Generation . Regulation via planning / permitting regime	high	✓	1 Storr site regulated for emissions via Environmental Permit – Norkier Power Holditch
	Route Management Plans/ Strategic routing strategy for HGV's	high	✓	https://www.staffordshire.gov.uk/transport/transportplanning/localtransportplan/home.aspx
Vehicle Fleet Efficiency	**Promoting low emission public transport**	high	✓	Planned promotion of retrofitted buses in routes 3 / 4 and 4a in preference to private car
	Vehicle retrofitting programmes	medium	✓	£370,000 DEFRA grant to retrofit 25 buses running on routes 3/ 4 and 4a to latest EURO IV – To be completed November 2020.

	Fleet efficiency and recognition schemes	medium	✓	Staffordshire and Stoke-on-Trent Eco-Stars http://www.ecostars-uk.com/eco-stars-schemes/
Promoting low emission transport	**Low emission zone (LEZ) Clean Air Zone (CAZ)**	high	✓	Assessment of compliance with NO_2 annual mean EU Limit Value currently being undertaken in conjunction with Stoke on Trent City Council. Measures to address exceedances being identified and benchmarked against a CAZ
	Public Vehicle Procurement -Prioritising uptake of low emission vehicles	high	✓	Electric vans proposed for dog warden and pest control teams in 2020/21
	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, G	high		Joint grant award to Newcastle under Lyme, Stoke on Trent and Staffordshire County Council under Olev Low Emission Taxi Infrastructure Scheme to roll out upto 30 rapid electric charging points for taxi / phv and public use
Environmental permits	**Regulation of designated installations for emissions via Environmental Permit**	medium	✓	https://www.newcastle-staffs.gov.uk/all-services/environment/environmental-protection
Other measures	**Smoky Diesel Hotline**	low	✓	https://www.gov.uk/report-smoky-vehicle
	Domestic Smoke Control advice and Enforcement	medium	✓	www.newcastle-staffs.gov.uk/airquality
	Garden Bonfires - Advice and nuisance enforcement	high	✓	https://www.newcastle-staffs.gov.uk/all-services/environment/environmental-protection/garden-bonfires
	Commercial burning advice and enforcement	high	✓	https://www.newcastle-staffs.gov.uk/all-services/environment/environmental-protection
	Multi agency working with Fire Service and Environment Agency for trade burning	low	✓	
	Multi agency working with Staffordshire Fire Service and Local Authority Building Control regarding chimney fires and complaints about DIY domestic heating systems	low	✓	

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

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

Newcastle-under-Lyme Borough Council undertook automatic (continuous) monitoring at 1 site during 2019. Appendix A shows the details of this site.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

Newcastle-under-Lyme Borough Council undertook non- automatic (passive) monitoring of NO_2 at 81 sites during 2019. 41 of these sites are relevant for LAQM purposes whilst 40 new locations were established to assist with work being undertaken in connection with the annual mean NO_2 EU Limit Value Ministerial Direction. Table A.1 in A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix D: Map(s) of Monitoring Locations and AQMAs. 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: Supporting Technical Information / Air Quality Monitoring Data QA/QC.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias[7], “annualisation” (where the data capture falls below 75%), and distance correction[8]. Further details on adjustments are provided in Appendix C.

3.3 Nitrogen Dioxide (NO_2)

Table A.2 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. Note that the concentration data presented in Table A.2 represents the concentration at the location of the

[7] https://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html

[8] Fall-off with distance correction criteria is provided in paragraph 7.77, LAQM.TG(16)

monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2019 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

Table A.3 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year. The highest hourly NO_2 hourly mean concentration measured in 2019 was 111 µg/m^3. There have been no exccedances of the NO_2 hourly mean concentrations identified in the past 5 years at any locations relevant for LAQM or the EU Limit Values.

3.3.1 Newcastle-under- Lyme Town AQMA

Figure A.1 shows the results of monitoring in this area since 2012, which are distance corrected where relevant.

There continue to be exceedances of the N0$_2$ annual mean objective in this area at the following four locations representative of relevant exposure for LAQM purposes, DT11– 34 London Road -41.2 ug/m^3, DT85 – 106 King Street - 44.2 ug/m^3; DT102 -Belong Care Home, Lower Street – 44.8 ug/m^3, DT104 – 7 King Street- 54.5ug/m^3

The following seven sites were below but within 10% of the N0$_2$ annual mean objective at locations representative of relevant exposure for LAQM purposes and are considered to remain at risk of exceedance in future years, DT72 - 134 High Street, Newcastle-36.7; DT74 - 39 London Road Newcastle -35.7 ug/m^3; DT76 - 11 Brunswick Street -37.7 ug/m^3; DT84 -102 King Street - 37.1 ug/m^3; DT87 - 1 King Street -39.4 ug/m^3, DT96 - JJ Design London Road -39.5 ug/m^3; DT98 - Newcastle Taxi's Brunswick Street – 38.8 ug/m^3.

Comparison of results for 2019 against all years since 2012 shows a generally decreasing trend. However, the sites which have exceeded or which were below but within 10% of the annual mean objective in 2019 are proving challenging to reduce exposure to N0$_2$.

At locations being monitored for compliance against the N0$_2$ annual mean EU Limit Value, the following locations have exceeded in 2019, DT85 – 106 King Street - 44.2 ug/m^3; DT102 -Belong Care Home, Lower Street – 44.8 ug/m^3, DT104 – 7 King Street- 54.5ug/m^3; DT85 – 106 King Street - 44.2 ug/m^3; N26 – 120 Etruria Road – 43.2ug/m^3.

For sites which exceed or are close to exceeding the LAQM N0$_2$ annual mean objective and /or the N0$_2$ annual mean EU Limit Value it is considered that levels are significantly influenced by the

following which are not conducive to reducing levels of $N0_2$ volume and composition of traffic, congestion and local geography, with a number of properties being located at back of pavement.

Based on an assessment for compliance with the EU Limit Value undertaken in 2018, compliance based on expected changes in fleet composition, traffic growth and changes in vehicular emissions is not predicted to occur before 2026 without measures to positively influence changes in emissions. Work is currently underway to identify appropriate measures.

3.3.2 Kidsgrove AQMA

Figure A. 2 shows the results of monitoring in this area since 2012.

For the 2019 calendar year, there were no exceedances of the $N0_2$ annual mean objective representative of relevant exposure for LAQM purposes. The highest $N0_2$ annual mean objective level at a location of relevant exposure was DT 6 106 Liverpool Road with a façade level of 38.6ug/$m^{3,}$ similar to that measured in 2012, followed by DT 94 - 116 Liverpool Road 38.66ug/m^3 with a façade level of 38.2ug/m^3 and DT64 – 57-59 Liverpool Road with a façade level of 36.76ug/$m^{3.}$ Comparison of results in this area since 2012 shows there has been an overall decreasing trend in the $N0_2$ annual mean with no exceedances recorded since 2016.

3.3.3 Maybank, Wolstanton and Porthill AQMA

Figure A. 3 shows the results of monitoring in this area since 2012.

There have continued to be no measured exceedances of the $N0_2$ annual mean objective in this AQMA with this being the case since 2013. In 2019, the highest $N0_2$ annual mean objective representative of relevant exposure for LAQM purposes was recorded for site DT24 – 26 High Street May Bank with a result of 34.8ug/m_3, an increase of 4.4ug/m3 compared to 2018. Site DT9 – 32 Porthill Bank , DT24 – 26 High Street Maybank and DT49- 2 Vale View Porthill, recorded an increase on the $N0_2$ annual mean objective compared to 2018. However, comparison of results in this area since 2012 shows there has been an overall decreasing trend in the $N0_2$ annual mean with no exceedances recorded since 2012.

3.3.4 Little Madeley AQMA

Figure A. 4 shows the results of monitoring in this area since 2012.

There have continued to be no measured exceedances of the $N0_2$ annual mean objective in this AQMA. In 2019, the $N0_2$ annual mean objective representative of relevant exposure for LAQM purposes was 27ug/m^3. When results for the 2019 reporting year are compared to 2018, there is a slight increase in the measured $N0_2$ annual mean objective. However since 2012, there has been an overall decreasing trend in the $N0_2$ annual mean in this area.

Appendix A: Monitoring Results

Table A. 1 - Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
CM1	Newcastle-under- Lyme Queen's Gardens	Roadside	385046	346147	NO_2	YES	Chemiluminescent	2	3	2

Notes:

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

(2) N/A if not applicable

Table A.1 – 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) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
DTK1	A34 Holy Trinity	Kerbside	385051	345726	NO_2	Yes - Newcastle Town Centre	22	3	NO	2.5
DTK2	76 King St, N/C	Urban Centre	385469	346362	NO_2	Yes - Newcastle Town Centre	0	3	NO	2
DTUB1	Wolstanton, Haritngton St	Kerbside	384739	348326	NO_2	NO	7	2	NO	2.5
DTUB2	Westlands, 4 Sneyd Crescent	Kerbside	383916	345059	NO_2	NO	23	2	NO	3
DT3	Collingwood, 3 Newcastle Rd	Rural	378116	345488	NO_2	Yes - Little Madeley	0	128	NO	-2
DT6	106 Liverpool Rd	Suburban	384014	354429	NO_2	Yes - Kidsgrove	0	4	NO	3
DT9	32 Porthill Bank	Suburban	385519	349055	NO_2	Yes - Maybank, Wolstanton, Porthill	0	6	NO	3
DT11	34 London Road, N/C	Suburban	385112	345636	NO_2	Yes - Newcastle Town Centre	0	3	NO	3
DT24	26 High St, May Bank	Roadside	385574	347530	NO_2	Yes - Maybank, Wolstanton, Porthill	0	3	NO	3
DT28	Limbrick Cottage Shraleybrook	Rural	377994	350105	NO_2	NO	0	45	NO	6
DT34	15 Barracks Road	Urban Centre	385059	345840	NO_2	Yes - Newcastle Town Centre	1	4	NO	3
DT 39	4/6 Liverpool Road, Kidsgrove	Suburban	383560	354739	NO_2	Yes - Kidsgrove	0	2	NO	3
DT40	Banktop Court, Porthill	Suburban	385128	348811	NO_2	Yes - Maybank, Wolstanton, Porthill	0	20	NO	5
DT46	1 London Road (Trinity Court)	Urban Centre	385073	345685	NO_2	Yes - Newcastle Town Centre	3	4	NO	3
DT47	1 London Rd (Brook La)	Urban Centre	385023	345678	NO_2	Yes - Newcastle Town Centre	0	5	NO	3
DT49	2 Vale View, Porthill	Urban Centre	385595	349129	NO_2	Yes - Maybank, Wolstanton, Porthill	0	6	NO	3
DT64	Kidsgrove Carpets 57 - 59 Liverpool Road	Urban Centre	383950	354445	NO_2	Yes - Kidsgrove	0	10	NO	10
DT72	134 High Street Newcastle	Roadside	384980	345787	NO_2	Yes - Newcastle Town Centre	0	3	NO	3
DT73	21 London Road Newcastle	Roadside	385070	345738	NO_2	Yes - Newcastle Town Centre	0	4	NO	3
DT74	39 London Road Newcastle	Roadside	385132	345640	NO_2	Yes - Newcastle Town Centre	0	4	NO	3
DT76	11 Brunswick Street Newcastle	Roadside	385226	346156	NO_2	Yes - Newcastle Town Centre	0	2	NO	3
DT84	102 King Street Newcastle	Roadside	385548	346400	NO_2	Yes - Newcastle Town Centre	0	2	NO	3
DT85	106 King Street Newcastle	Urban Centre	385575	346413	NO_2	Yes - Newcastle Town Centre	0	5	NO	3
DT86	Hassell C.P. School Barracks Road N/C	Urban Centre	385075	345910	NO_2	Yes - Newcastle Town Centre	0	5	NO	2
DT87	Blue Chilli 1 King Street Newcastle	Urban Centre	385105	346225	NO_2	Yes - Newcastle Town Centre	0	5	NO	3

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) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
DT88	27 Lower Street Newcastle	Urban Centre	384709	345881	NO_2	Yes - Newcastle Town Centre	0	5	NO	2
DT89	Queens Gardens Newcastle	Urban Centre	385054	346134	NO_2	Yes - Newcastle Town Centre	1	5	YES	2
DT90	Queens Gardens Newcastle	Urban Centre	385054	346134	NO_2	Yes - Newcastle Town Centre	1	5	YES	2
DT91	Queens Gardens, Newcastle	Urban Centre	385054	346134	NO_2	Yes - Newcastle Town Centre	1	5	YES	2
DT92	41/43 Liverpool Road Kidsgrove	Urban Centre	383890	354461	NO_2	Yes - Kidsgrove	1	5	NO	1
DT93	118 Liverpool Road Kidsgrove	Urban Centre	384056	354393	NO_2	Yes - Kidsgrove	0	2	NO	3
DT94	116 Liverpool Road Kidsgrove	Urban Centre	384030	354416	NO_2	Yes - Kidsgrove	3	1	NO	3
DT95	76 London Road Newcastle	Urban Centre	385171	345539	NO_2	Yes - Kidsgrove	0	4	NO	4
DT96	On Lamppost Next JJ Design London Road Newcastle	Roadside	385131	345601	NO_2	Yes - Newcastle Town Centre	0	2	NO	4
DT97	Blackfriars/ Lower Street	Roadside	384795	345796	NO_2	Yes - Newcastle Town Centre	0	3	NO	3
DT98	Newcastle Taxis Brunswick Street	Roadside	385327	346148	NO_2	Yes - Newcastle Town Centre	0	2	NO	2
DT100	Sainsbury's Carpark Near to Courts	Roadside	384689	346284	NO_2	Yes - Newcastle Town Centre	0	2	NO	2
DT101	Blackburn House Lower Street Newcastle	Roadside	384806	345842	NO_2	Yes - Newcastle Town Centre	0	2	NO	2
DT102	Maxims Lower Street Newcastle	Roadside	384609	346007	NO_2	Yes - Newcastle Town Centre	0	2	NO	2
DT103	Grange Lange/High Street Wolstanton	Roadside	385682	347909	NO_2		0	2	NO	2
DT104	7 King Street Newcastle	Roadside	385213	346270	NO_2	Yes - Newcastle Town Centre	0	2	NO	2
DT105	The Avenue Kidsgrove	Roadside	383991	354418	NO_2	Yes - Kidsgrove	0	2	NO	2
N1	Knutton Lane	Kerbside	384415	346325	NO_2	Yes - Newcastle Town Centre	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N2	24A Clayton Road, Newcastle	Roadside	384849	345379	NO_2	No	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N3	Clayton Road (Opp Nuffield)	Roadside	385084	343365	NO_2	No	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5

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) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
N4	Holiday Inn Layby	Roadside	385011	342364	NO_2	No	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N5	Talke Road A34 Bradwell	Roadside	383769	349663	NO_2	No	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N6	A53 Whitmore Road	Roadside	382161	341984	NO_2	No	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N7	A53 Whitmore Road/Seabridge Lane	Roadside	382910	343672	NO_2	No	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N8	9 Sneyd Avenue	Roadside	383858	344881	NO_2	No	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N9	Newcastle Community School Layby	Roadside	383446	345227	NO_2	No	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N10	Gallowstree Lane	Roadside	383065	345462	NO_2	No	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N11	Clough Hall Drive	Roadside	383104	352781	NO_2	No	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N12	152 Newcastle Road	Roadside	382843	353461	NO_2	No	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N13	Butt Lane Primary School	Roadside	382505	354096	NO_2	No	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N14	Pets & Pastimes, Butt Lane	Roadside	382613	354340	NO_2	No	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5

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) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
N15	One-Sure Insurance, Butt Lane	Roadside	382637	354385	NO_2	No	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N16	Aldi Bus Stop, Liverpool Road, Kidsgrove	Roadside	384266	354246	NO_2	No	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N17	Skate Park, Liverpool Road, Kidsgrove	Roadside	384537	354167	NO_2	No	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N18	47 Kidsgrove Bank	Roadside	384924	353865	NO_2	No	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N19	Adlington House Care Home, Wolstanton	Roadside	385297	348425	NO_2	No	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N20	Morris Square, Wolstanton	Roadside	385462	348269	NO_2	No	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N21	Victoria Public House, May Bank	Roadside	385421	347424	NO_2	No	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N22	34 Brampton Road	Roadside	385311	347101	NO_2	No	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N23	Ebanezer House, Newcastle	Roadside	384872	346268	NO_2	Yes - Newcastle Town Centre	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N24	St Georges Church, Brampton	Roadside	385003	346435	NO_2	No	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N25	25 King Street, Newcastle	Roadside	385371	346411	NO_2	Yes - Newcastle Town Centre	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5

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) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
N26	120 Etruria Road	Roadside	385544	346500	NO_2	Yes - Newcastle Town Centre	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N27	Charlotte House, Etruria Road	Roadside	383833	346621	NO_2	Yes - Newcastle Town Centre	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N28	526 Etruria Road, Basford	Roadside	385918	346632	NO_2	Yes - Newcastle Town Centre	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N29	Andrew Place	Roadside	385420	346167	NO_2	Yes - Newcastle Town Centre	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N30	No 1 London Road Trinity Court on Road Sign	Roadside	384988	345712	NO_2	Yes - Newcastle Town Centre	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N31	Old Garage site, Cemetry Road	Roadside	382698	346042	NO_2	NO	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N32	Post Office Depot, Church Lane	Roadside	383017	346619	NO_2	NO	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N33	Church Lane/ Arcacia Gardens	Roadside	383203	346763	NO_2	NO	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N34	Lower Milehouse Lane opposite Morrisons Delivery	Roadside	383836	347318	NO_2	NO	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N35	Pelican Crossing Lower Milehouse Lane near to Milehouse Restaurant	Roadside	384239	347572	NO_2	NO	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N36	A34 Bustop by Bakery	Roadside	384106	347962	NO_2	NO	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5

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) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
N37	Back of Road Sign near to Rosendale Avenue	Roadside	383928	348963	NO_2	NO	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N38	A34 On Traffic Sign near to Parkhouse Industrial West (Screwfix)	Roadside	383679	379932	NO_2	NO	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N39	On Entrance to Beta Way on lamp post with Camera Sign.	Roadside	383575	350363	NO_2	NO	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5
N40	On Give way sign exit to High Carr Business Park.	Roadside	383492	350822	NO_2	NO	EU Limit Value - Pavement	EU Limit Value - Pavement	NO	2.5

Notes:
(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).
(2) N/A if not applicable.
Tubes prefixed N are representative of exposure for EU Limit Value purposes only.

Table A.2 – Annual Mean NO_2 Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3) (4)				
							2015	2016	2017	2018	2019
CM1	385046	346147	Urban Centre	Automatic	99.7	99.7	25.7	37.5	23.1	23	25.6
DTK1	385051	345726	Kerbside	Diffusion Tube	92%	92%	39.6	**44.6**	**41.7**	37.2	**47.4**
DTK2	385469	346362	Urban Centre	Diffusion Tube	100%	100%	29.3	32.7	29.7	26	28.9
DTUB1	384739	348326	Kerbside	Diffusion Tube	100%	100%	18.4	19.7	19	17.7	17.9
DTUB2	383916	345059	Kerbside	Diffusion Tube	100%	100%	16.3	17.4	15.5	15.3	15
DT3	378116	345488	Rural	Diffusion Tube	100%	100%	35.9	31.9	30.7	24.8	27.3
DT6	384014	354429	Suburban	Diffusion Tube	100%	100%	36.7	**41.8**	37.7	37.1	38.6
DT9	385519	349055	Suburban	Diffusion Tube	100%	100%	31.1	36	33.4	29.3	33.2
DT11	385112	345636	Suburban	Diffusion Tube	83%	83%	39.2	**41.5**	39.5	35.1	**41.2**
DT24	385574	347530	Roadside	Diffusion Tube	92%	92%	34.3	37.7	35.3	30.4	34.8
DT28	377994	350105	Rural	Diffusion Tube	92%	92%	32.8	30.8	29.9	25.2	25.9
DT34	385059	345840	Urban Centre	Diffusion Tube	100%	100%	32.7	35	32.1	29.2	33.7
DT 39	383560	354739	Suburban	Diffusion Tube	100%	100%	30.8	37.4	33.4	31.7	34.9
DT40	385128	348811	Suburban	Diffusion Tube	92%	92%	29.5	31.8	28.3	25.2	26.5
DT46	385073	345685	Urban Centre	Diffusion Tube	100%	100%	30	31.1	30.1	27.3	28.3
DT47	385023	345678	Urban Centre	Diffusion Tube	100%	100%	27.2	31.1	25.8	24.7	28
DT49	385595	349129	Urban Centre	Diffusion Tube	100%	100%	30.9	32.6	31.5	27.2	31.9
DT64	383950	354445	Urban Centre	Diffusion Tube	100%	100%	35.9	37.9	35.9	32.7	36.7
DT72	384980	345787	Roadside	Diffusion Tube	92%	92%	29.4	30.4	30.4	26.9	36.7
DT73	385070	345738	Roadside	Diffusion Tube	67%	67%	30	33.6	32	29.3	34.3
DT74	385132	345640	Roadside	Diffusion Tube	92%	92%	32	33	33	31.9	35.7
DT76	385226	346156	Roadside	Diffusion Tube	100%	100%	31.7	34.6	36.5	33.1	37.7
DT84	385548	346400	Roadside	Diffusion Tube	100%	100%	35.8	38.3	35.1	33.6	37.1
DT85	385575	346413	Urban Centre	Diffusion Tube	100%	100%	39.2	**45.3**	**40**	38.8	**44.2**
DT86	385075	345910	Urban Centre	Diffusion Tube	100%	100%	29.1	30.4	29.7	27.9	28.6
DT87	385105	346225	Urban Centre	Diffusion Tube	92%	92%	37.6	39.3	37.9	34.9	39.4
DT88	384709	345881	Urban Centre	Diffusion Tube	92%	92%	30.7	31.2	29.9	28.2	30.8
DT89	385054	346134	Urban Centre	Diffusion Tube	100%	100%	25.9	31.9	30.4	29	30.2
DT90	385054	346134	Urban Centre	Diffusion Tube	100%	100%	27.6	32.1	30	29.2	30.3
DT91	385054	346134	Urban Centre	Diffusion Tube	100%	100%	28.4	31.5	30.3	31.1	29.9
DT92	383890	354461	Urban Centre	Diffusion Tube	100%	100%	31.4	33.9	33.5	31.9	33.3
DT93	384056	354393	Urban Centre	Diffusion Tube	100%	100%	29.3	33.4	30.4	28.2	31.5

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2019 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3] [4]				
							2015	2016	2017	2018	2019
DT94	384030	354416	Urban Centre	Diffusion Tube	100%	100%	32.8	34.8	32.1	31.8	**47.2**
DT95	385171	345539	Urban Centre	Diffusion Tube	100%	100%	31.5	33.7	34.3	28.5	33.2
DT96	385131	345601	Roadside	Diffusion Tube	83%	83%	36.8	**40.2**	39.8	35.8	39.5
DT97	384795	345796	Roadside	Diffusion Tube	100%	100%	29.6	29.5	28.6	27.6	29.8
DT98	385327	346148	Roadside	Diffusion Tube	100%	100%	35.8	39	37.7	36.5	38.8
DT100	384689	346284	Roadside	Diffusion Tube	100%	100%		32.05	29.98	27.92	30.4
DT101	384806	345842	Roadside	Diffusion Tube	100%	100%		38.88	32.97	32.75	32.9
DT102	384609	346007	Roadside	Diffusion Tube	100%	100%		38.5	**60.4**	**44.15**	**44.8**
DT103	385682	347909	Roadside	Diffusion Tube	100%	100%		27.09	24.07	25.11	23.1
DT104	385213	346270	Roadside	Diffusion Tube	83%	83%		**42**	38.23	37.89	**54.5**
DT105	383991	354418	Roadside	Diffusion Tube	83%	83%			27.15	25.99	29.7
N1	384415	346325	Roadside	Diffusion Tube	100%	100%					26.6
N2	384849	345379	Roadside	Diffusion Tube	100%	100%					28.3
N3	385084	343365	Roadside	Diffusion Tube	100%	100%					27.4
N4	385011	342364	Roadside	Diffusion Tube	100%	100%					32.1
N5	383769	349663	Roadside	Diffusion Tube	0%	0%					0
N6	382161	341984	Roadside	Diffusion Tube	100%	100%					23.1
N7	382910	343672	Roadside	Diffusion Tube	83%	83%					27.3
N8	383858	344881	Roadside	Diffusion Tube	100%	100%					32.6
N9	383446	345227	Roadside	Diffusion Tube	92%	92%					17.1
N10	383065	345462	Roadside	Diffusion Tube	100%	100%					24.2
N11	383104	352781	Roadside	Diffusion Tube	100%	100%					38.8
N12	382843	353461	Roadside	Diffusion Tube	100%	100%					27.6
N13	382505	354096	Roadside	Diffusion Tube	100%	100%					30.5
N14	382613	354340	Roadside	Diffusion Tube	100%	100%					38.1
N15	382637	354385	Roadside	Diffusion Tube	83%	83%					30
N16	384266	354246	Roadside	Diffusion Tube	92%	92%					31.7
N17	384537	354167	Roadside	Diffusion Tube	83%	83%					32.5
N18	384924	353865	Roadside	Diffusion Tube	100%	100%					**42.4**
N19	385297	348425	Roadside	Diffusion Tube	100%	100%					31.3
N20	385462	348269	Roadside	Diffusion Tube	83%	83%					29.1
N21	385421	347424	Roadside	Diffusion Tube	100%	100%					29.3
N22	385311	347101	Roadside	Diffusion Tube	92%	92%					33.1
N23	384872	346268	Roadside	Diffusion Tube	92%	92%					30.4

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3) (4)				
							2015	2016	2017	2018	2019
N24	385003	346435	Roadside	Diffusion Tube	92%	92%					39.3
N25	385371	346411	Roadside	Diffusion Tube	92%	92%					38.8
N26	385544	346500	Roadside	Diffusion Tube	100%	100%					36.9
N27	383833	346621	Roadside	Diffusion Tube	100%	100%					**43.2**
N28	385918	346632	Roadside	Diffusion Tube	100%	100%					35.9
N29	385420	346167	Roadside	Diffusion Tube	100%	100%					35.9
N30	384988	345712	Roadside	Diffusion Tube	100%	100%					36.5
N31	382698	346042	Roadside	Diffusion Tube	100%	100%					23.4
N32	383017	346619	Roadside	Diffusion Tube	83%	83%					27.2
N33	383203	346763	Roadside	Diffusion Tube	100%	100%					20.4
N34	383836	347318	Roadside	Diffusion Tube	100%	100%					30.4
N35	384239	347572	Roadside	Diffusion Tube	100%	100%					38
N36	384106	347962	Roadside	Diffusion Tube	100%	100%					29.4
N37	383928	348963	Roadside	Diffusion Tube	100%	100%					**42.1**
N38	383679	379932	Roadside	Diffusion Tube	92%	92%					25.1
N39	383575	350363	Roadside	Diffusion Tube	100%	100%					**49.1**
N40	383492	350822	Roadside	Diffusion Tube	100%	100%					31.8

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

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

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

Notes:

Exceedances of the NO_2 annual mean objective of $40\mu g/m^3$ are shown in **bold**.

NO_2 annual means exceeding $60\mu g/m^3$, 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.

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

Figure A.1 – Trends in Annual Mean NO_2 Concentrations Newcastle-under- Lyme Town AQMA 2012 - 2019

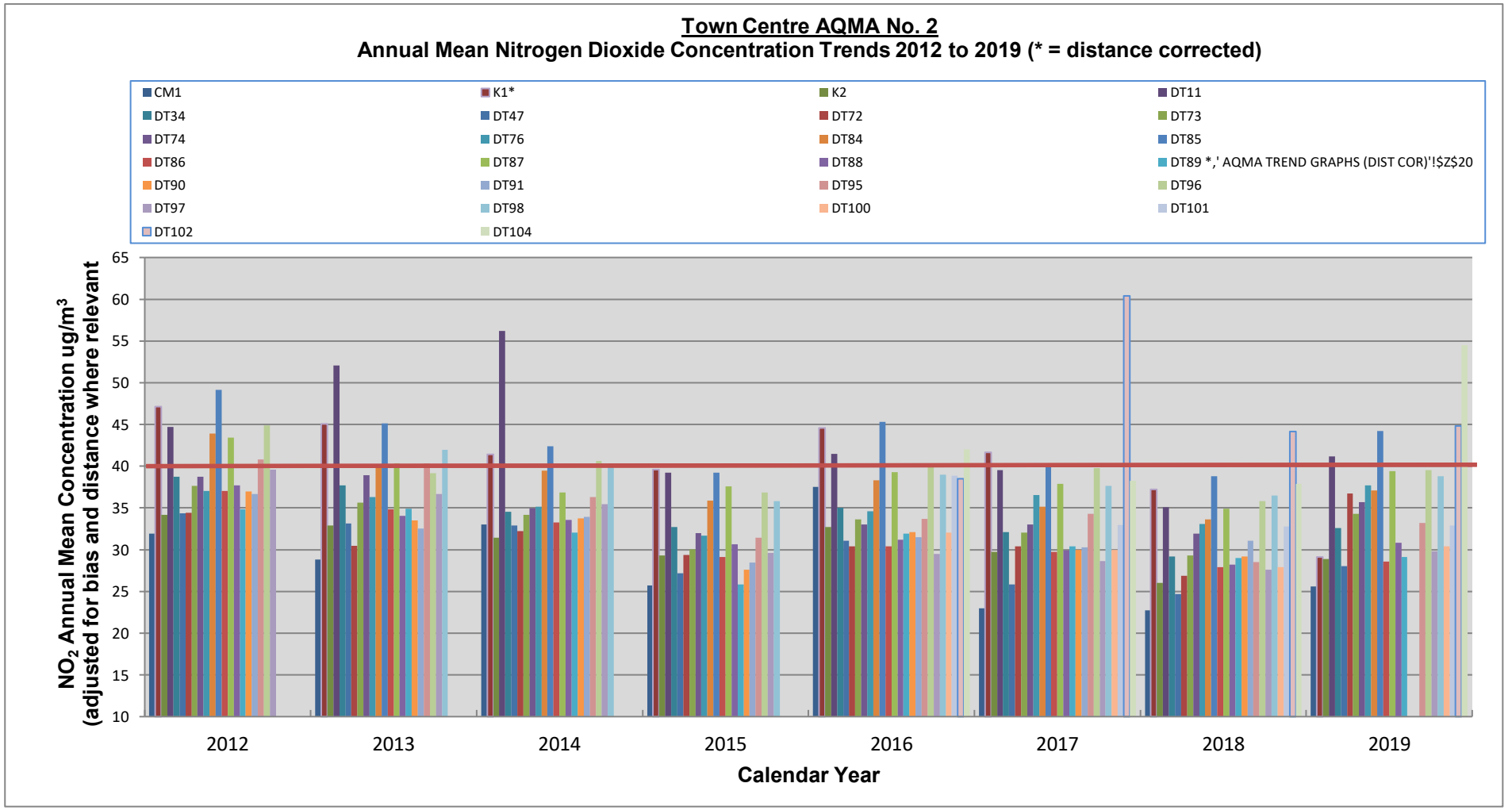


Figure A. 2 - Kidsgrove AQMA Trends in Annual Mean NO_2 Concentrations 2012 - 2019

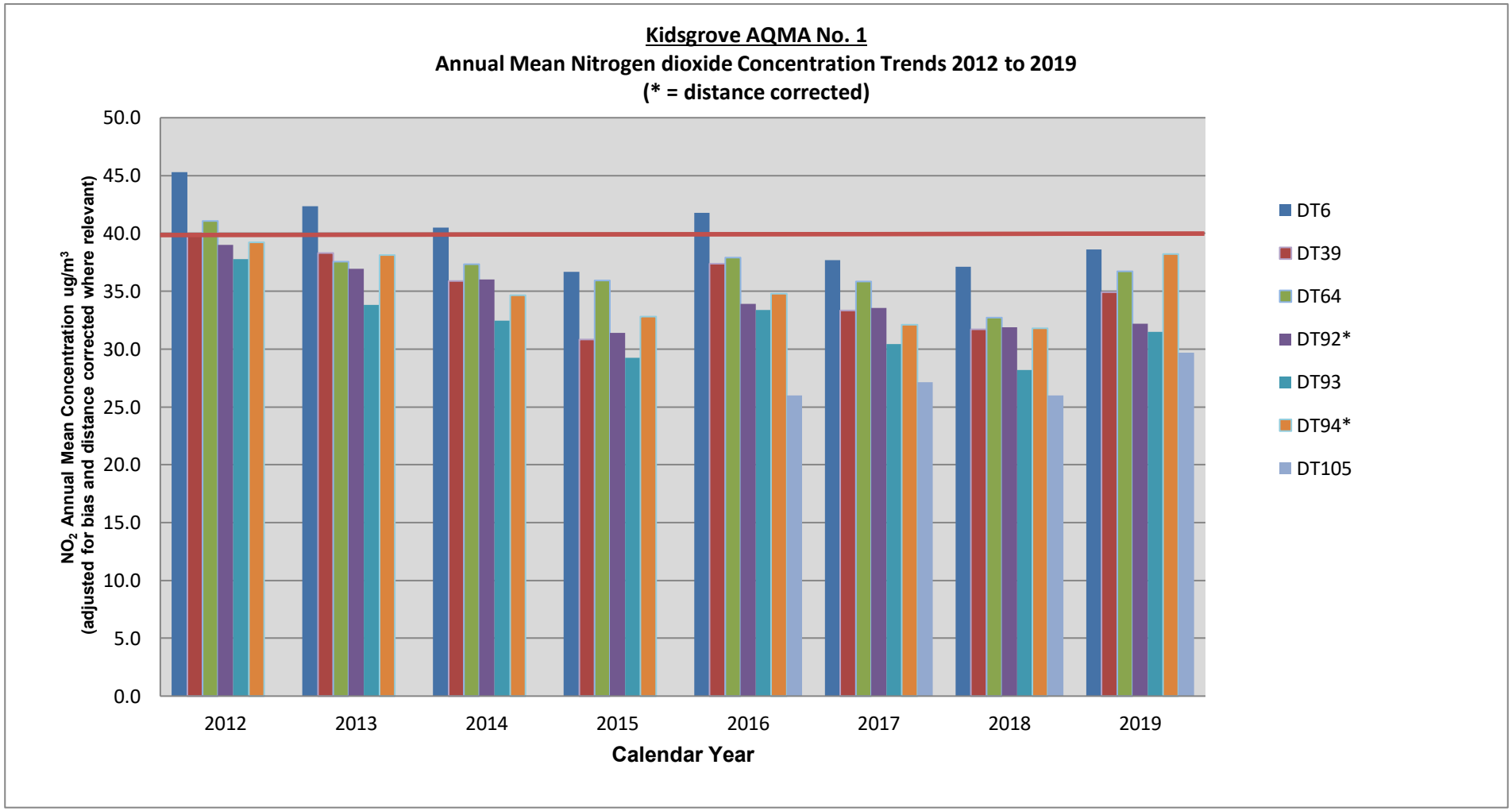


Figure A. 3 - Maybank, Wolstanton, Porthill AQMA Trends in $N0_2$ annual mean objective concentrations 2012 - 2019

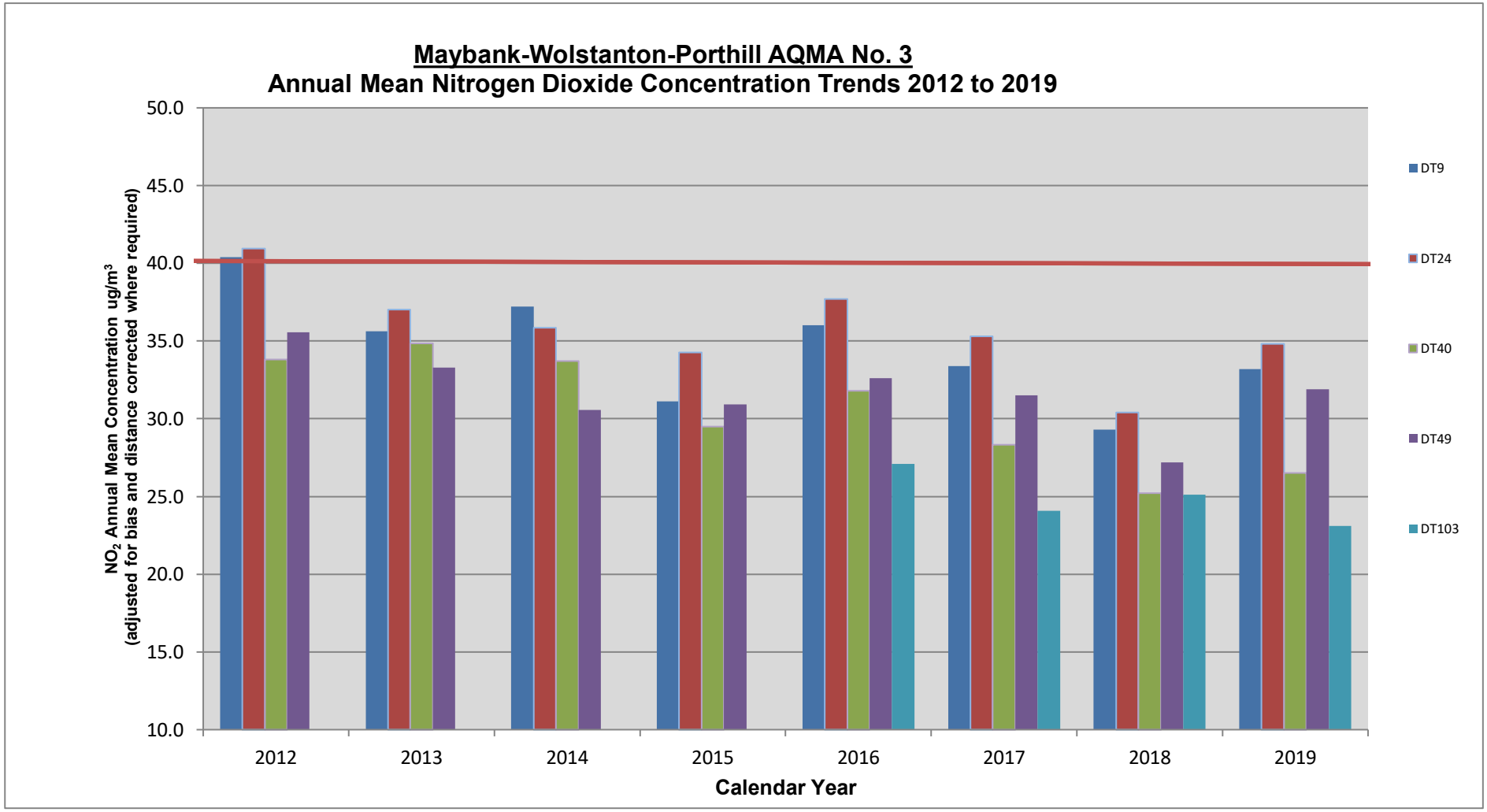


Figure A. 4 - Madeley AQMA Trends in $N0_2$ annual mean concentrations 2012 to 2019

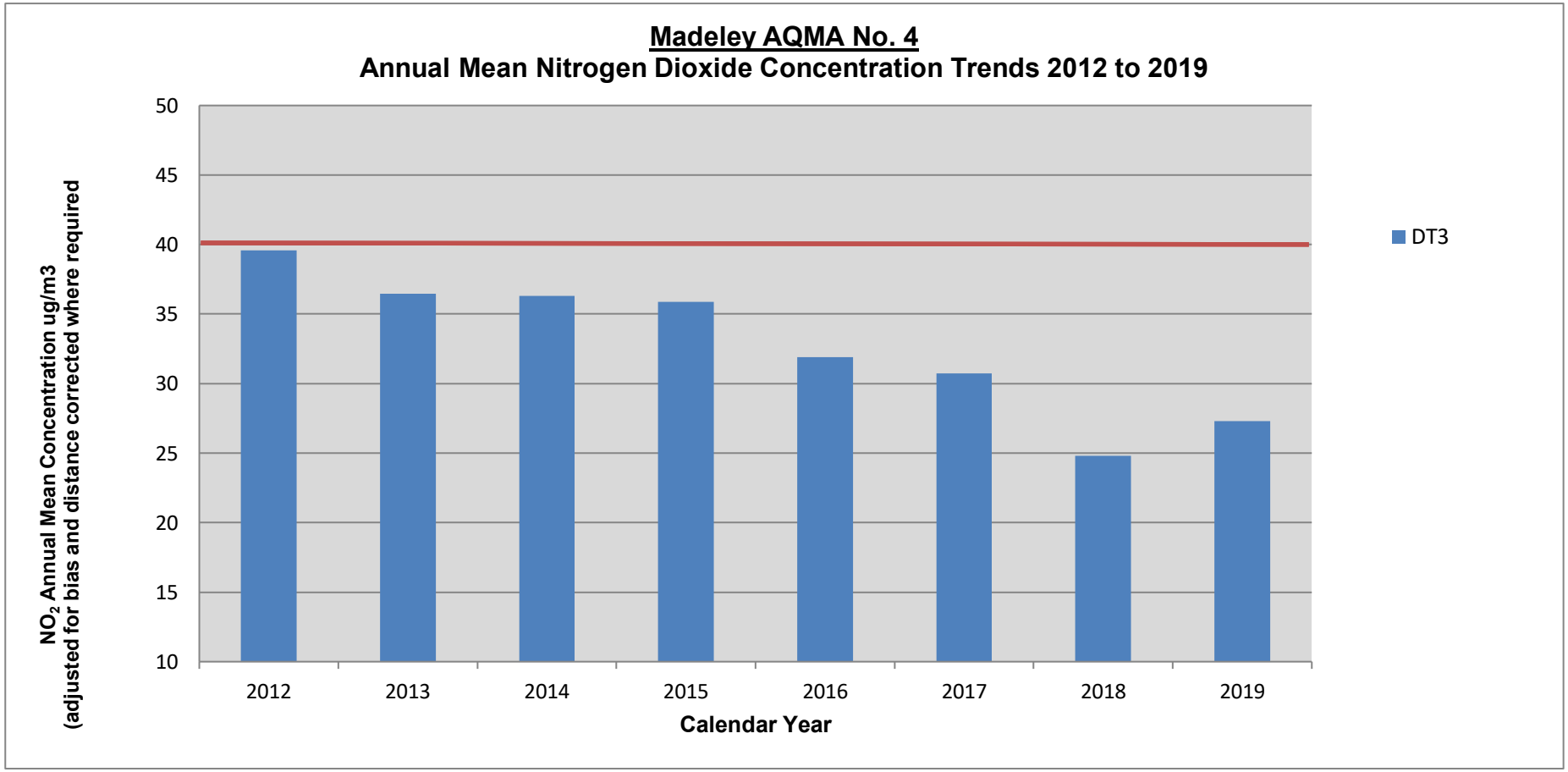


Table A.3 – 1-Hour Mean NO_2 Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
							2015	2016	2017	2018	2019
CM1	385046	346147	Urban Centre	Automatic	99.7	99.7	0	0	0	0	0

Notes:

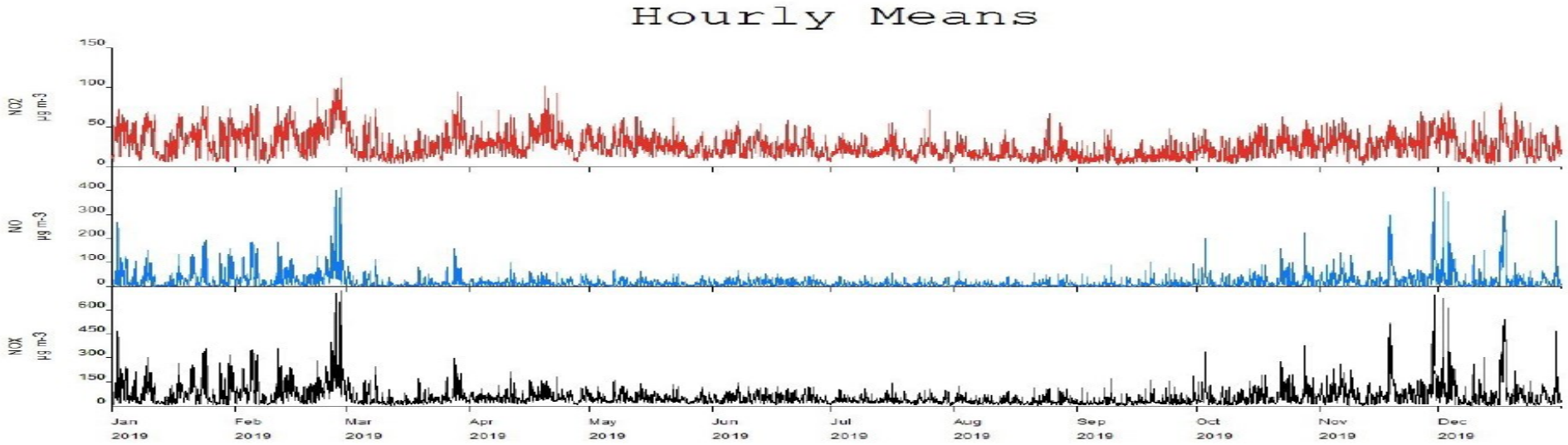
Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold.**

(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) If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

Figure A. 5 - Hourly means 2019 - Queen's Gardens



Appendix B: Full Monthly Diffusion Tube Results for 2019

Table B.1 - NO_2 Monthly Diffusion Tube Results – 2019

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)												Annual Mean		
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.93) and Annualised	Distance Corrected to Nearest Exposure (2)
DTK1	385051	345726	78.0	54.9	40.6	35.3	33.7	36.8		79.2	45.7	57.1	55.0	44.9	51.0	**47.4**	29.1
DTK2	385469	346362	34.6	42.0	26.4	35.6	25.3	27.5	23.2	24.6	31.6	36.0	43.7	22.1	31.1	28.9	
DTUB1	384739	348326	34.5	22.5	14.5	16.8	14.0	14.4	11.9	11.7	17.9	24.0	32.2	16.4	19.2	17.9	16.7
DTUB2	383916	345059	27.8	20.9	10.7	12.9	9.3	11.8	11.0	10.1	15.6	17.9	28.0	17.7	16.1	15.0	14.8
DT3	378116	345488	40.7	36.7	37.2	21.6	27.4	22.7	25.9	25.7	26.9	26.1	31.2	29.7	29.3	27.3	
DT6	384014	354429	46.8	44.7	35.4	44.9	38.1	42.9	37.3	32.0	42.0	43.4	50.6	40.4	41.5	38.6	
DT9	385519	349055	49.9	45.1	36.0	33.0	29.9	34.4	29.3	28.6	32.7	37.1	42.2	30.1	35.7	33.2	
DT11	385112	345636		83.2	72.0	27.7	32.1	32.7	32.9	31.1		46.0	43.9	41.3	44.3	**41.2**	
DT24	385574	347530	52.3	46.0		27.7	35.0	32.9	30.9	30.8	37.5	31.8	47.9	38.8	37.4	34.8	
DT28	377994	350105		32.9	32.2	24.0	25.0	23.5	25.7	27.1	26.3	28.8	32.8	27.9	27.8	25.9	
DT34	385059	345840	47.8	41.9	32.6	34.6	32.4	33.9	29.8	26.3	33.7	39.2	48.1	34.2	36.2	33.7	32.6
DT 39	383560	354739	45.9	40.9	28.3	50.3	37.5	38.3	35.4	28.7	18.1	38.9	52.4	35.0	37.5	34.9	
DT40	385128	348811	42.8	38.1	25.0	28.7	20.9	23.9	23.2	22.6	27.1	31.8		29.6	28.5	26.5	
DT46	385073	345685	37.4	37.9	30.2	18.5	25.6	25.8	26.9	25.8	30.6	32.0	43.7	31.4	30.5	28.3	
DT47	385023	345678	35.9	34.3	23.1	37.6	27.5	27.9	25.5	20.4	28.5	34.6	39.4	26.9	30.1	28.0	
DT49	385595	349129	47.8	43.0	33.7	23.6	26.4	30.9	30.1	30.5	32.7	37.6	41.1	33.7	34.3	31.9	
DT64	383950	354445	52.0	49.5	38.8	34.2	33.3	34.4	33.5	33.2	35.7	42.3	44.5	41.9	39.4	36.7	
DT72	384980	345787	49.4	45.4	37.4	38.0	34.2	37.3	35.7	35.7		37.5	42.4	40.5	39.4	36.7	
DT73	385070	345738	46.7					33.0	30.3	29.1	34.5	35.2	46.4	25.3	35.1	31.9	
DT74	385132	345640	51.4	40.8	34.0	39.3	35.4	33.5	31.9	25.8	37.4	41.0	51.4		38.4	35.7	
DT76	385226	346156	51.4	48.2	34.7	31.7	33.7	40.4	38.4	33.9	44.7	46.1	50.0	32.7	40.5	37.7	
DT84	385548	346400	49.2	49.8	32.2	41.1	32.1	38.4	34.7	33.1	36.7	39.1	51.3	41.6	39.9	37.1	
DT85	385575	346413	53.1	53.0	37.6	53.5	43.6	45.6	44.4	39.1	47.4	52.5	55.7	44.4	47.5	**44.2**	
DT86	385075	345910	47.5	34.6	26.3	28.1	25.7	23.6	26.0	22.6	29.8	31.6	43.3	30.5	30.8	28.6	
DT87	385105	346225	51.5	44.7	36.2		38.5	41.1	38.8	36.7	43.8	43.8	50.6	40.8	42.4	39.4	
DT88	384709	345881	40.4	36.0	32.2	28.8	28.4	30.4	28.8	27.0	33.3	35.2	44.2	I/S	33.2	30.8	
DT89	385054	346134	39.6	44.3	25.1	25.4	26.2	28.1	27.0	23.8	31.5	38.6	44.6	36.0	32.5	30.2	
DT90	385054	346134	48.7	44.4	26.2	32.3	26.0	29.9	25.0	23.7	30.4	38.3	38.0	28.4	32.6	30.3	
DT91	385054	346134	47.9	43.4	24.6	30.1	26.3	26.8	25.3	24.1	30.4	37.3	33.2	35.9	32.1	29.9	29.6

DT92	383890	354461	51.6	48.3	32.1	37.8	30.0	31.0	29.4	27.0	30.9	38.5	44.6	28.1	35.8	33.3	32.2
DT93	384056	354393	45.1	38.7	27.1	35.3	30.5	29.1	30.2	25.2	33.9	37.6	43.5	30.6	33.9	31.5	
DT94	384030	354416	68.4	51.5	43.0	54.3	48.7	50.7	42.8	35.1	51.7	54.9	64.9	42.5	50.7	**47.2**	38.2
DT95	385171	345539	51.3	41.9	31.3	26.2	32.2	32.2	31.0	27.3	35.4	38.9	50.3	30.7	35.7	33.2	
DT96	385131	345601	60.7	48.8			35.9	35.8	34.5	30.0	39.7	43.8	57.0	38.4	42.5	39.5	
DT97	384795	345796	43.2	37.0	21.7	46.8	26.7	27.9	24.9	21.9	29.5	28.4	43.5	32.7	32.0	29.8	
DT98	385327	346148	53.1	46.4	37.5	37.7	34.9	33.9	37.4	34.8	42.1	45.2	50.9	46.8	41.7	38.8	
DT100	384689	346284	46.5	37.6	29.9	26.8	24.5	28.8	25.3	21.9	31.3	38.9	49.0	32.1	32.7	30.4	
DT101	384806	345842	45.8	39.5	27.9	37.6	32.4	34.4	29.5	22.7	34.2	40.0	48.5	31.9	35.4	32.9	
DT102	384609	346007	64.9	53.2	48.8	36.6	39.4	45.7	45.7	42.8	48.1	56.0	50.4	46.7	48.2	**44.8**	
DT103	385682	347909	37.2	34.7	22.7	28.7	19.1	20.7	18.7	17.4	22.8	27.7	22.2	25.9	24.8	23.1	
DT104	385213	346270	56.0	69.0	41.1	32.7	36.0		37.2	37.0	53.9	90.9	132.5	109.0	63.2	**58.8**	
DT105	383991	354418	42.8	38.6			22.9	23.1	23.5	21.9	27.1	46.5	40.8	32.5	32.0	29.7	
N1	384415	346325	43.3	35.7	22.2	32.8	22.9	24.3	7.7	21.0	27.5	34.9	38.0	32.4	28.6	26.6	
N2	384849	345379	41.6	39.4	31.8	23.2	24.2	26.9	26.2	25.1	28.5	26.3	38.4	33.3	30.4	28.3	
N3	385084	343365	46.0	38.9	26.4	24.4	24.7	27.0	23.4	21.2	30.0	28.2	40.7	22.3	29.4	27.4	
N4	385011	342364	46.5	43.5	34.7	26.4	29.1	34.2	30.3	31.6	35.5	36.1	37.7	28.0	34.5	32.1	
N5	383769	349663															
N6	382161	341984	27.1	34.4	17.9	25.0	18.6	21.5	20.6	19.9	23.9	26.0	34.6	29.0	24.9	23.1	
N7	382910	343672	35.3	33.3		24.7	21.7	20.9	22.6	I/S	17.1	31.7	40.5	45.9	29.4	27.3	
N8	383858	344881	41.1	36.6	20.7	23.4	20.4	33.5	21.0	17.7	27.2	59.0	88.2	31.5	35.0	32.6	
N9	383446	345227	29.1	20.9	15.0		15.9	17.3	13.4	9.8	18.1	19.5	27.5	15.3	18.3	17.1	
N10	383065	345462	31.6	30.6	19.6	22.2	22.7	23.4	21.2	16.6	27.2	29.5	41.1	26.7	26.0	24.2	
N11	383104	352781	67.8	55.3	36.7	25.1	36.5	39.8	37.9	37.2	42.3	39.4	50.6	32.2	41.7	38.8	
N12	382843	353461	40.5	42.6	22.7	27.9	24.7	25.5	24.3	21.2	24.6	35.4	33.7	32.7	29.7	27.6	
N13	382505	354096	44.6	41.7	22.3	33.2	26.7	30.4	25.9	25.5	30.4	37.5	43.5	32.3	32.8	30.5	
N14	382613	354340	54.7	49.4	40.9	35.8	39.9	39.1	33.9	28.9	42.5	41.1	48.6	36.3	40.9	38.1	
N15	382637	354385	45.2	38.1			25.9	27.4	26.3	24.1	30.5	33.2	41.9	30.5	32.3	30.0	
N16	384266	354246	42.1	36.9	29.4	39.7	29.3	32.7	27.2	24.1	32.4		48.5	32.1	34.0	31.7	
N17	384537	354167	50.7	45.6	32.9	22.5	23.8		27.9		32.6	36.3	43.4	34.1	35.0	32.5	
N18	384924	353865	57.3	65.6	34.5	35.8	35.9	39.8	40.0	40.9	42.8	48.6	55.3	50.7	45.6	**42.4**	
N19	385297	348425	43.2	44.0	30.9	26.3	26.4	26.5	27.1	27.4	33.3	37.6	44.2	36.6	33.6	31.3	
N20	385462	348269	46.5	35.1			21.7	24.1	24.3	22.2	30.9	34.7	39.2	34.3	31.3	29.1	
N21	385421	347424	43.9	49.6	20.7	26.4	23.3	25.4	23.7	22.0	29.0	38.8	45.5	30.3	31.6	29.3	
N22	385311	347101	51.6	40.2	29.5	36.2	32.6		27.5	28.6	35.2	34.8	44.0	31.3	35.6	33.1	
N23	384872	346268	33.7	43.1		34.9	25.3	26.6	25.1	24.3	31.3	37.2	44.9	33.7	32.7	30.4	
N24	385003	346435	54.7	52.8	34.5	43.0	36.9	39.3	35.6	I/S	39.0	46.6	43.0	39.8	42.3	39.3	
N25	385371	346411	53.3	47.2	37.9	36.4	36.9	35.8	35.5	33.9	42.6		55.7	44.2	41.8	38.8	

N26	385544	346500	47.2	43.8	38.7	25.9	28.7	37.7	37.8	35.8	43.6	44.5	52.7	39.1	39.6	36.9	
N27	383833	346621	53.5	60.1	37.0	41.7	37.5	38.4	39.9	40.6	43.8	56.9	55.2	53.1	46.5	**43.2**	
N28	385918	346632	49.2	46.0	34.9	39.6	30.2	33.2	32.5	32.0	37.4	42.1	45.5	41.1	38.6	35.9	
N29	385420	346167	55.0	43.1	32.2	32.0	33.2	34.4	35.1	30.6	37.2	42.7	49.2	38.1	38.6	35.9	
N30	384988	345712	57.8	40.9	39.3	26.5	33.6	33.0	32.5	33.9	39.6	42.4	50.0	41.5	39.3	36.5	
N31	382698	346042	27.4	31.3	18.4	31.1	19.9	23.0	20.4	15.6	23.5	28.2	37.2	25.6	25.1	23.4	
N32	383017	346619	39.4	38.7	22.2		20.3	23.6	21.6		26.1	31.8	35.7	32.8	29.2	27.2	
N33	383203	346763	35.7	29.9	15.8	21.1	14.9	16.3	14.2	14.3	18.8	24.8	32.4	25.1	21.9	20.4	
N34	383836	347318	43.3	39.8	29.6	32.3	26.4	30.7	27.7	26.2	31.0	36.9	37.3	31.1	32.7	30.4	
N35	384239	347572	56.6	49.4	35.6	29.8	33.5	38.1	36.0	33.6	40.6	44.7	50.0	42.6	40.9	38.0	
N36	384106	347962	41.7	38.1	24.1	27.9	25.3	26.2	23.9	20.9	30.6	36.6	49.8	34.2	31.6	29.4	
N37	383928	348963	31.6	52.8	46.0	43.0	44.3	44.0	46.8	41.3	44.6	48.8	57.0	42.5	45.2	**42.1**	
N38	383679	379932		48.3	12.9	27.5	21.5	24.1	20.5	15.9	26.6	33.5	41.1	24.9	27.0	25.1	
N39	383575	350363	60.6	64.1	47.9	53.3	54.5	54.5	51.4	46.2	47.0	61.2	61.2	32.1	52.8	**49.1**	
N40	383492	350822	46.5	33.9	32.6	20.3	32.2	34.8	30.6	33.5	36.9	36.1	39.6	32.8	34.2	31.8	

☐ **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 in the final column**

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

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) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure.

Tubes prefixed N are for EU Limit Value $N0_2$ annual mean compliance and modelling.

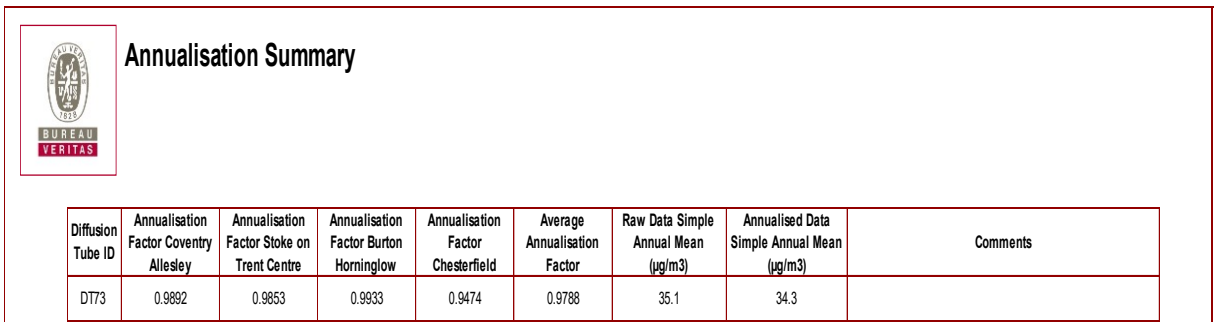
Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

C1. Diffusion Tube Bias Factor for 2019

Newcastle-under- Lyme Borough Council used Staffordshire Highways Laboratory for the supply and analysis of NO_2 diffusion tubes in 2019. The most recent bias factor was 0.93 at time of writing which was applied to bias correct the raw results for 2019. (Source Spreadsheet Version Number: 03/20 https://laqm.DEFRA.gov.uk/assets/Database_Diffusion_Tube_Bias_Factors_v03_20_FINAL.xlsx)

C2. Annualisation for DT73

As data for site DT73 is only available for 67% of the calendar year it has been necessary to annualise the results following the methodology described within Box 7.9 of LAQM (TG16). The Bureau Veritas annualisation tool Version 1.0 June 2020 has been used for this purpose. Annualisation factors have been derived from hourly sequential $N0_2$ data obtained for AURN Urban Background Automatic Monitoring Location network sites located within a 50 mile radius of Newcastle-under- Lyme for the 2019 calendar year https://uk-air.DEFRA.gov.uk/data/data_selector_service#mid . The resulting factors and annualised result are given in Table C 1.



Annualisation Summary

Diffusion Tube ID	Annualisation Factor Coventry Allesley	Annualisation Factor Stoke on Trent Centre	Annualisation Factor Burton Horninglow	Annualisation Factor Chesterfield	Average Annualisation Factor	Raw Data Simple Annual Mean (µg/m3)	Annualised Data Simple Annual Mean (µg/m3)	Comments
DT73	0.9892	0.9853	0.9933	0.9474	0.9788	35.1	34.3	

Table C 1 Annualisation for site DT73

C3. Diffusion Tube Distance Correction

Where diffusion tubes were not sited at locations representative of receptor locations (i.e. Residential properties in the case of the annual mean NO_2 objective) then the distance correction tool at https://laqm.DEFRA.gov.uk/tools-monitoring-data/no2-falloff.html (Version 4.2 March 2018 release) was used. The calculations are shown in Table C.2 for 2019.

Table C 2 - Diffusion tube distance correction to receptor

Enter data into the pink cells

Site Name/ID	Distance (m)		NO_2 Annual Mean Concentration ($\mu g/m^3$)			Comment
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor	
DTK1	3.0	25.0	14.0	47.4	29.1	Warning: your receptor is more than 20m further from the kerb than your monitor - treat result with caution.
DTUB1	2.0	9.0	14.8	17.9	16.8	
DTUB2	2.0	25.0	14.7	15.0	14.8	Warning: your receptor is more than 20m further from the kerb than your monitor - treat result with caution.
DT34	4.0	5.0	15.5	33.7	32.6	
DT91	5.0	6.0	15.7	30.4	29.6	
DT92	5.0	6.0	10.9	33.3	32.1	
DT94	1.0	4.0	15.0	47.2	38.2	Predicted concentration at Receptor within 10% the AQS objective.

C4. Queens Garden's Monitoring Station QA/ QC

Calibration

Calibration of nitrogen dioxide analysers are carried out fortnightly by Newcastle-under- Lyme Borough Council personnel.

Data management

Air quality measurements from the automatic instruments are validated and ratified by Air Quality Data Management (AQDM) http://www.aqdm.co.uk to the standards described in the Local Air Quality Management – Technical Guidance LAQM (TG16) https://laqm.DEFRA.gov.uk/technical-guidance.

Validation

This process operates on data during the data collection stage. All data are continually screened algorithmically and manually for anomalies. There are several techniques designed to discover spurious and unusual measurements within a very large dataset. These anomalies may be due to equipment failure, human error, power failures, interference or other disturbances. Automatic screening can only safely identify spurious results that need further manual investigation.

Raw data from the gaseous instruments (e.g. NOx, O3, SO_2 and CO) are scaled into concentrations using the latest values derived from the manual and automatic calibrations. These instruments are not absolute and suffer drifts. Both the zero baseline (background) and the sensitivity may change over time. Regular calibrations with certified gas standards are used to measure the zero and sensitivity. However, these are only valid for the moment of the calibration since the instrument will continue to drift. Raw measurements from particulate instruments (e.g. PM10 and PM2.5) generally do not require scaling into concentrations. The original raw data are always preserved intact while the processed data are dynamically scaled and edited.

Ratification

This is the process that finalises the data to produce the measurements suitable for reporting. All available information is critically assessed so that the best data scaling is applied and all anomalies are appropriately edited. Generally this operates at three, six or twelve month intervals. However, unexpected faults can be identified during the instrument routine services or independent audits which are often at 6-monthly intervals. In practice, therefore, the data can only be fully ratified in 12-month or annual periods. The data processing performed during the three and six monthly cycles helps build a reliable dataset that is finalised at the end of the year.

There is a diverse range of additional information that can be essential to the correct understanding and editing of data anomalies. These may include

- the correct scaling of data
- ignoring calibrations that were poor e.g. a spent zero scrubber
- closely tracking rapid drifts or eliminating the data
- comparing the measurements with other pollutants and nearby sites
- corrections due to span cylinder drift
- corrections due to flow drifts for the particulate instruments
- corrections for ozone instrument sensitivity drifts
- eliminating measurements for NO_2 conversion inefficiencies

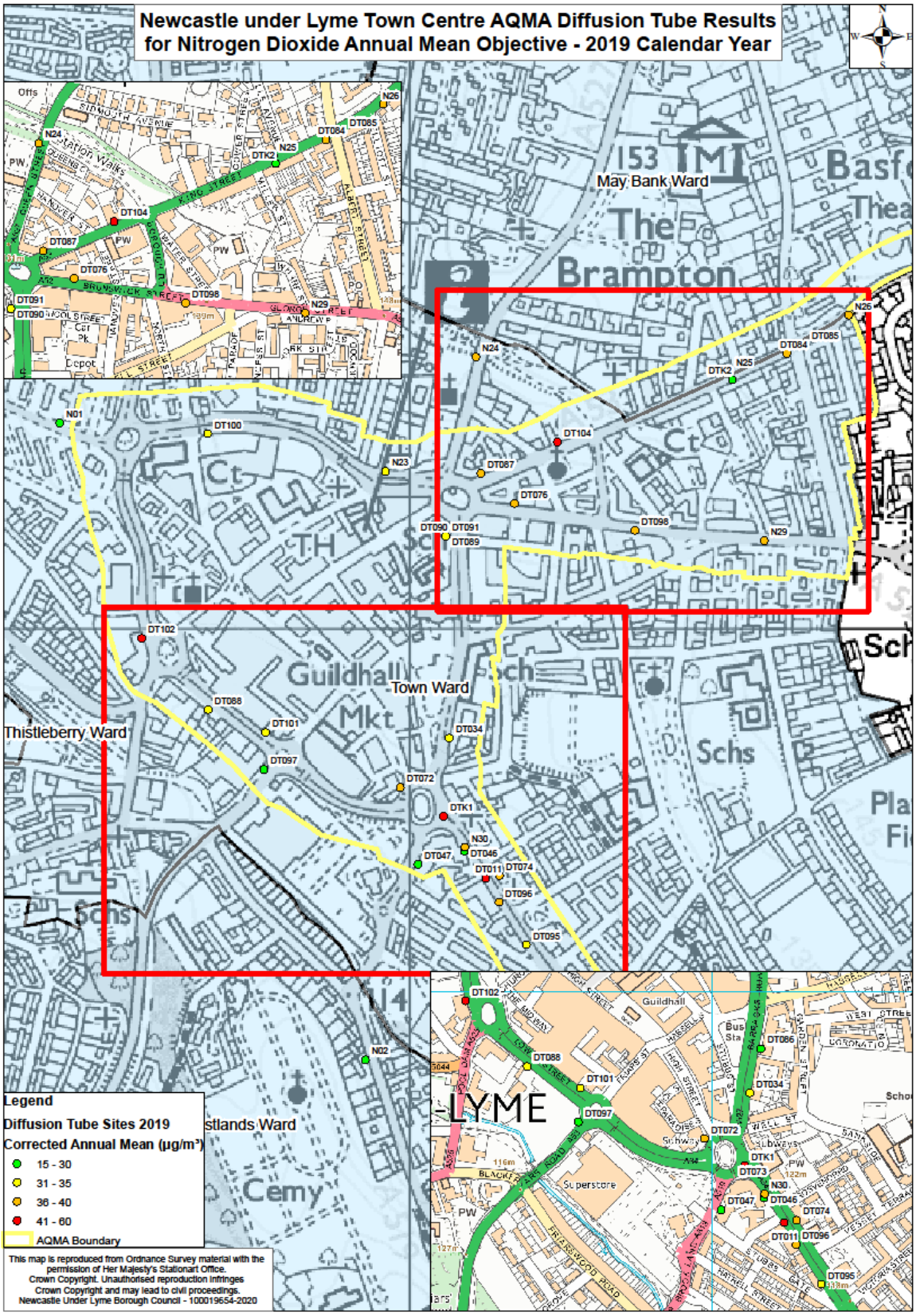
- eliminating periods where calibration gas is in the ambient dataset
- identifying periods were instruments are warming-up after a powercut
- identification of anomalies due to mains power spikes
- correcting problems with the date and time stamp
- observations made during the sites visits and services

The identification of data anomalies, the proper understanding of the effects and the application of appropriate corrections requires expertise gained over many years of operational experience. Instruments and infrastructure can fail in numerous ways that significantly and visually affect the quality of the measurements. There are rarely simple faults that can be discovered by computer algorithms or can be understood without previous experience.

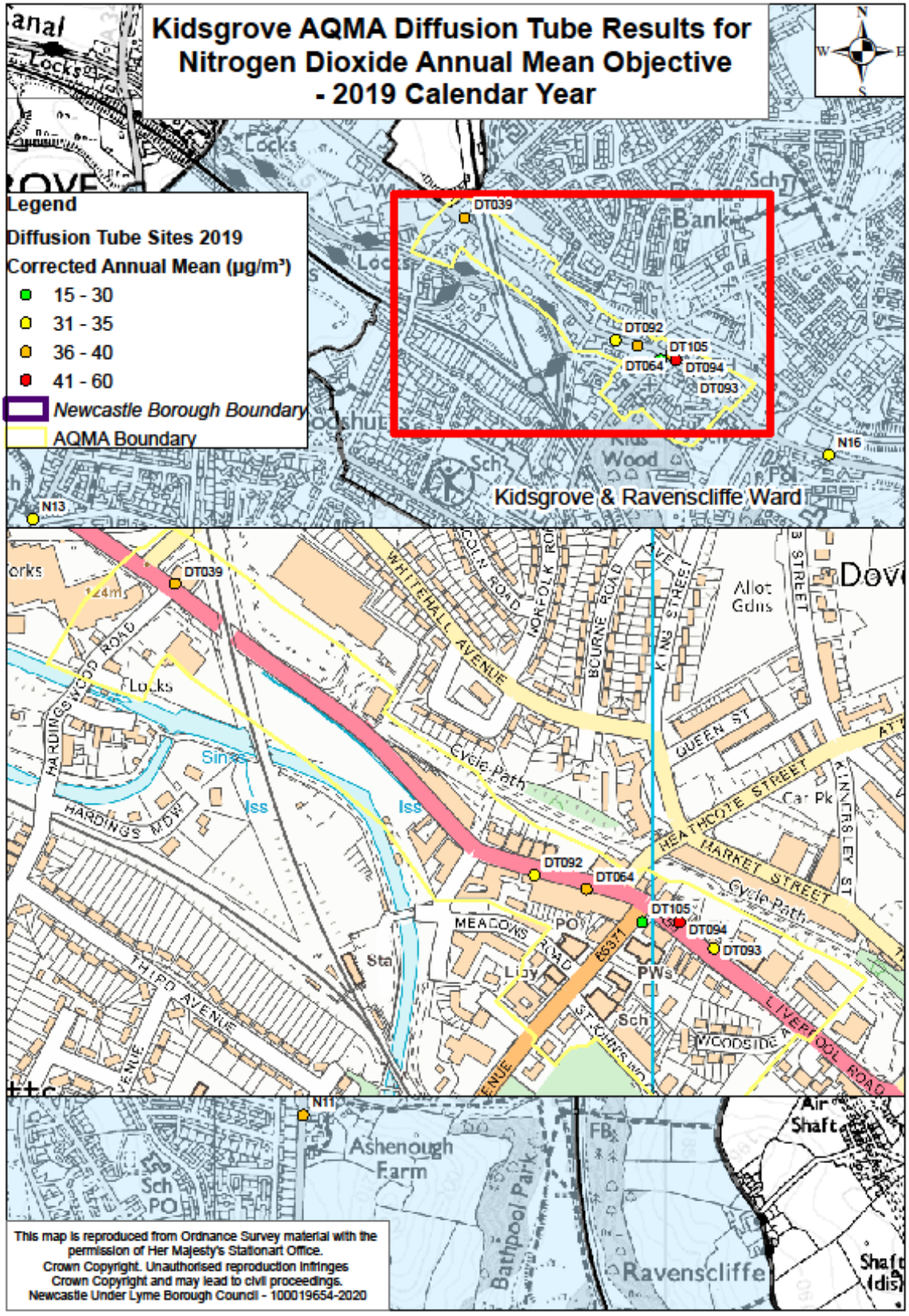
Further information about air quality data management, expert data ratification and examples of bad practices are given on the Air Quality Data Management (AQDM) website http://www.aqdm.co.uk.

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

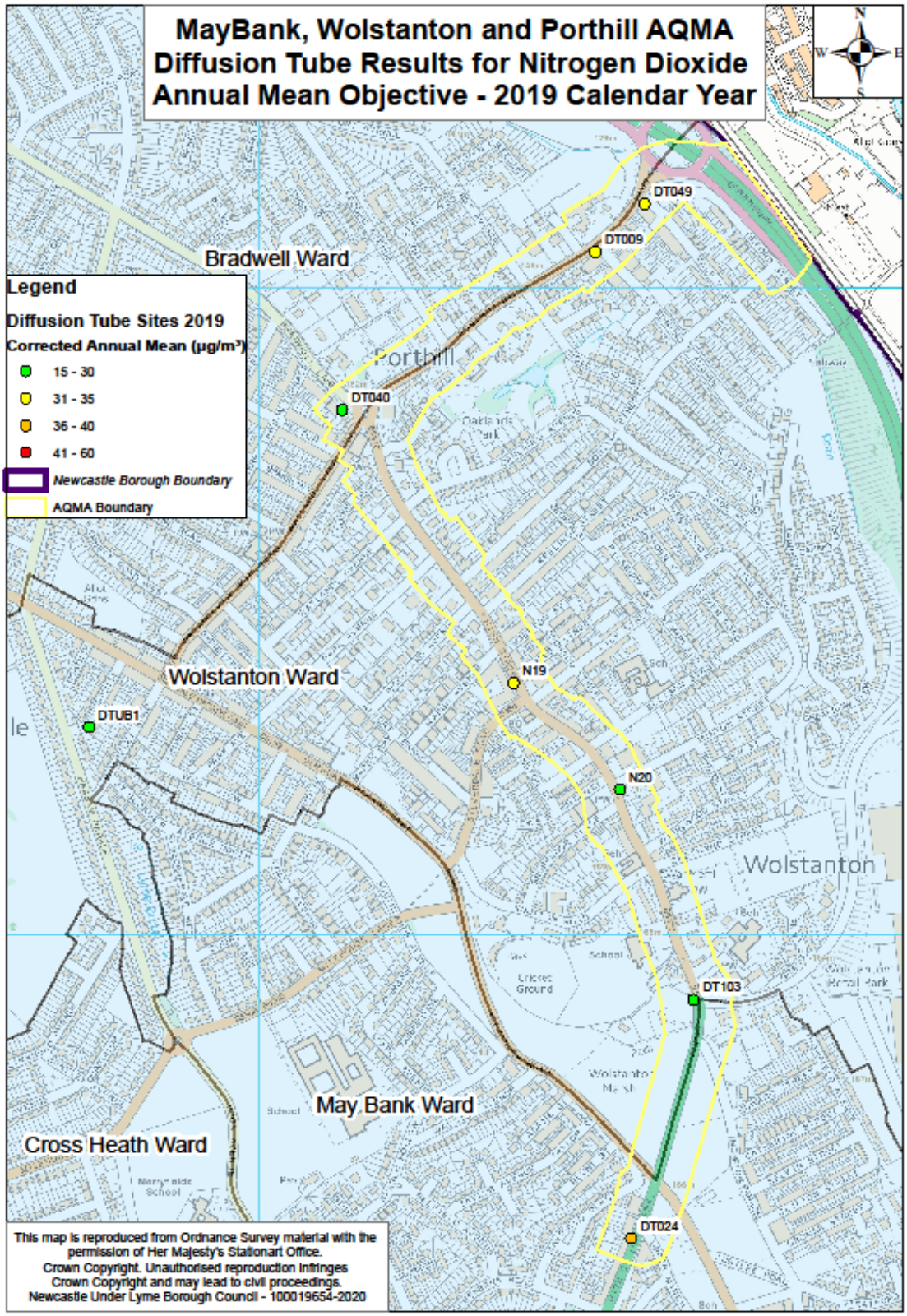
Appendix D1 - Newcastle-under- Lyme Town AQMA and monitoring locations 2019



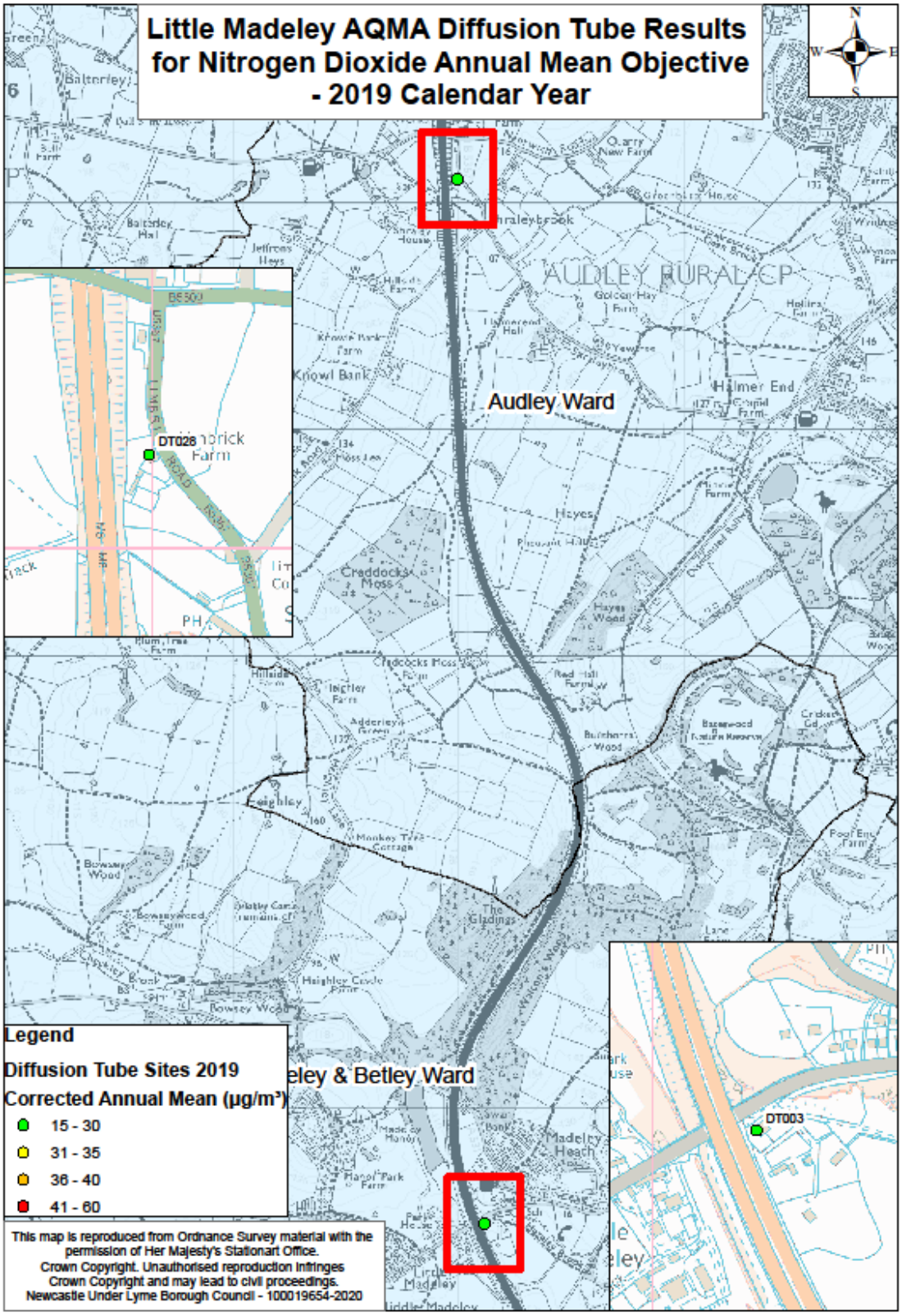
Appendix D2. - Kidsgrove AQMA and monitoring locations 2019



Appendix D3 - Maybank, Wolstanton and Porthill AQMA and monitoring locations 2019



Appendix D4 - Little Madeley AQMA and monitoring locations 2019



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[9]	
	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

[9] The units are in microgrammes 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
EU Limit Value	Limit Values are specified in the Ambient Air Quality Directive and apply to locations where public have access, typically pavements and parkland.
FDMS	Filter Dynamics Measurement System
FHSF	Future High Street Fund
HS2	High Speed 2 Rail Phase 2
JAQU	Joint Air Quality Unit – located within DEFRA
LAQM	Local Air Quality Management
LETIS	Low Emission Taxi Infrastructure Scheme – administered by OLEV
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
NULBC	Newcastle under Lyme Borough Council
OLEV	Office for Low Emission Vehicles – Government Department
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
SAQF	Staffordshire Air Quality Forum
SCC	Staffordshire County Council – Highways Authority for Newcastle under Lyme
SoTCC	Stoke on Trent City Council

SO_2	Sulphur Dioxide

References

1. Environmental equity, air quality, socioeconomic status and respiratory health, 2010 (http://www.euro.who.int/__data/assets/pdf_file/0003/78069/E93670.pdf)

2. Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006 (https://ukair.defra.gov.uk/assets/documents/reports/cat09/0701110944_AQinequalitiesFNL_AEAT_0506.pdf)

3. Department for Environment, Food and Rural Affairs: Abatement cost guidance for valuing changes in air quality, May 2013 (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/197898/pb13912-airquality-abatement-cost-guide.pdf)

4. https://www.newcastle-staffs.gov.uk/airquality 5. http://www.stoke.gov.uk/ccm/content/planning/planning-general/local-developmentframework/joint-local-plan.en

6. Public Health Outcomes Framework 2016 – 2019 indicator 3.01 Fraction of mortality attributable to particulate air pollution https://fingertips.phe.org.uk/profile/public-healthoutcomesframework/data#page/3/gid/1000043/pat/6/par/E12000005/ati/102/are/E10000028/iid/301 01/age/230/sex/4

7. Every Breath we Take: The Lifelong Impact of Air Pollution; Report of a working Party, February 2016, ISBN 978-1-86016-567-2

8. Mortality attributable to particulate air pollution Public Health Outcomes Framework

9. Public Health Outcome Framework, Public Health England, http://www.phoutcomes.info/ 10. Public Health England https://fingertips.phe.org.uk/profile/public-health-outcomesframework/data#page/3/gid/1000043/pat/6/par/E12000005/ati/102/are/E10000028/iid/30101/age/230/sex/4

11. Public Health England http://fingertips.phe.org.uk/

12. Adverse effects of outdoor pollution in the elderly, Marzia Simoni et al. Journal of Thoracic Disease 2015 Jan; 7(1): 34–45. doi:10.3978/j.issn.2072-1439.2014.12.10