CHESTERFIELD
BOROUGH COUNCIL

2020 Air Quality Annual Status Report (ASR)

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

June, 2020

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Derbyshire County Council; Endorsement from the Director of Public Health

Air pollution has a significant effect on public health, and poor air quality is the largest environmental risk to public health in the UK.

The annual status report is fundamental to ensuring the monitoring of trends and identification of areas of local air pollution exposure. The cumulative effect of a range of interventions has the greatest potential to reduce local air pollution and improve population health, as such the annual status report and associated action plans provide an opportunity to engage a range of partners. Since the publication of the last Annual Status Report both the County Health and Wellbeing Board and Joined up Care Derbyshire Board have approved the adoption of a County wide Air Quality Strategy, bringing together a breadth of public sector organisations, with the collective ambition to reduce the health impact of poor air quality for the people of Derbyshire County.

These are challenging times for the population of Derbyshire, however the recent restrictions on the way we live and travel, brought about in response to the recent pandemic, have demonstrated that large scale behaviour change can be achieved, and can have a positive effect on local air quality as well as our physical and mental health. It is crucial that we learn lessons from this experience and ensure that we create opportunities for positive change.

Dean Wallace, Director of Public Health, Derbyshire County Council
June 2020

Executive Summary: Air Quality in Our Area

Air Quality in Chesterfield

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].

The main pollutant of concern in Chesterfield is Nitrogen Dioxide (NO_2) and the predominant source is traffic. The overall trend in levels of the pollutant continues to show a gradual decline in levels, but year-on-year data show fluctuating levels and at pollutant hotspots this variation has demonstrated intermittent breaches of the Air Quality Objective. **There were no breaches of the Air Quality Objective for Nitrogen Dioxide during 2019.** Further details are given in section 2.5.1

One location (Church Street, Brimington) has required the declaration of an Air Quality Management Area and a second location (Sheffield Road, Stonegravels) is being considered due to the changes in levels of Nitrogen Dioxide.

Details of the Air Quality Management Area can be found on the Chesterfield BC website:https://www.chesterfield.gov.uk/health-and-environment/air-quality/air-quality-management-area-brimington.aspx

A map of the location can be found in Appendix D.

Fine particulate matter (PM_{10} and $PM_{2.5}$) is also a concern. The levels measured do not indicate a breach of the Air Quality Objectives, but as a general systemic irritant, measures are required to address the general increase in traffic congestion, as this is the pre-dominant source of pollution across the Borough.

[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

Actions to Improve Air Quality

Air quality monitoring, targeted on priority areas (where high traffic flows are located closely to housing), is continuing, allowing informed decisions on planning and public health initiatives to be made.

We attend, and participate in, the following policy and work groups:

i) Active Travel Group

ii) Planning and Health Group

iii) Active Transport Group

iv) Derbyshire Cycle Network

v) Local Sustainable Travel Group

vi) Derbyshire Air Quality Working Group

vii) Derbyshire Environmental Pollution Group

viii) Sheffield City Region Air Quality and Climate Group

Conclusions and Priorities

1) Conclusions

i) The levels of pollution, attributed to traffic, have shown a decrease (following the long term trend), reversing the short-term increase in 2018. Some variation across the borough has been noted, but the decrease is, with a few minor exceptions, uniform. AURN measurements indicate that this trend is duplicated across the wider region.

ii) Current levels within the Air Quality Management Area do not demonstrate an ongoing breach of the Air Quality Objective for Nitrogen Dioxide, but the results have demonstrated variability over time. As such, we will not revoke the Chesterfield No1 Air Quality Management Area, unless the reduction is demonstrated to continue.

iii) Levels on a single stretch of Sheffield Road (where terraced housing is close to a busy section of traffic light controlled road) have all below the Air Quality Objective for Nitrogen Dioxide. However, there is notable variation along the short stretch of road. Once again, given the historic variation in the data, targeted monitoring will continue at this location.

2) Priorities

i) Long term redevelopment schemes may have an adverse effect of the levels of traffic flow through the area of the Air Quality Management Area. The information supplied in support of these planning application required will be scrutinised carefully, in order to ensure that any such impacts are fully mitigated, by the use of (for example) travels plans, supporting car clubs, and supporting active travel schemes.

ii) The East Midland Air Quality Network planning guidance document on air quality has been adopted by Chesterfield BC. We will utilise the planning process to mitigate and reduce air pollution locally, in accordance with the National Institute for Health and Clinical Excellence Quality Statement 181.

iii) We will promote the adoption and use of Low Emission Vehicles, including the "future-proofing" of developments (including workplaces, commercial developments and residential areas) by requiring that the infrastructure for electric charging points be installed as part of the build phase. This is particularly important as central government has set an aspirational target for all new vehicles in the UK to be zero emission at source by 2035 (as contained in *The UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations: Detailed Plan*, published July 2017). We support the in the development and adoption of a County wide Low Emission Vehicle Initiative strategy.

iv) Where practical, and possible, Chesterfield BC's internal procurement policy will promote the use of Low Emission Vehicles.

v) Encourage the planting of landscape features (trees and vegetation) such as "green" walls, setbacks, and green spaces, in order to reduce pollution exposure.

vi) The raising of public awareness of air quality and health issues, by the use of the public facing sections of our website, and by publicising national initiatives (such as Clean Air Day on June 20th).

vii) We will work with County-wide sustainable travel initiatives to support modal shift either through our own workforce or wider population, through active travel, ensuring connectivity within communities and infrastructure such as (but not exclusively) cycle paths.

viii) Complete, and publish, the Air Quality Action Plan related to the Chesterfield Nº 1 AQMA.

Local Engagement and How to get Involved

Most inputs regarding managing air quality are related to the planning of local developments (either by assessing the possible impact of proposed works, or by promoting low emission infrastructure).

Following the VW emissions scandal in 2015, the reduction in the use of diesel fuels appears to be continuing. While this has a positive effect on public health and air quality grounds, it runs contrary to the previous policy which promoted the use of diesel as a positive action for addressing climate change. This continues to undermine the effectiveness of the air quality message. There is also a continued increase in the use of wood burning domestic heating appliances, again promoted as an effective alternative fuel source with positive climate change properties. Research indicates that these have an adverse effect on particulate pollution levels.

Information on action to improve air quality can be found on the Chesterfield BC website at:

https://www.chesterfield.gov.uk/health-and-environment/air-quality.aspx

Details on how the public can act to improve air quality can be found at:

https://www.chesterfield.gov.uk/health-and-environment/air-quality/the-publics-role-in-air-quality.aspx

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1 Local Air Quality Management

This report provides an overview of air quality in Chesterfield 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 Chesterfield 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.

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 Chesterfield BC can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at https://www.chesterfield.gov.uk/health-and-environment/air-quality/air-quality-management-area-brimington.aspx

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.

Table 2.1 – 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
Chesterfield No1	Declared 14th August 2015	NO_2 Annual Mean	Brimington, Chesterfield	4 to 18 (evens only) Church Street, Brimington	NO	42.5	µg/m3	38.9	µg/m3	Draft Action Plan for Chesterfield No1 AQMA	Currently in draft form	Not Applicable

☒ **Chesterfield BC confirm 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 Chesterfield

Defra's appraisal of last year's ASR concluded that the 2019 report was well structured and details. Annual NO_2 concentrations are generally decreasing steadily across the borough, this trend is also true for annual, and 24-Hour mean, levels for both PM_{10} and $PM_{2.5}$ concentrations at both AURN sites. The conclusions reached were acceptable for all sources and pollutants.

Chesterfield 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.

Chesterfield BC's priorities for the coming year are:

i) to continue to press for action by the local Highway Authority to implement action to address the issue of congestion and associated poor air quality within Chesterfield No1 AQMA, and by extension the wider area.

ii) to complete the AQMA Action Plan document.

iii) to closely assess applications for housing developments which may place an increased traffic loading on the road network where air pollution levels are close to, or have already exceeded, the air quality objective.

iv) to assess the suitability of the existing electric cars and vans currently in use, in order to look into the increased use of such vehicles across the local authority fleet, with the long term view being to encourage the introduction of low emission vehicles by partner agencies.

v) to continue to work in conjunction with existing regional bodies (East Midlands Air Quality Network, Sheffield City Region Climate Change and Air Quality Group, etc.) to share experience and best practice.

The principal challenges and barriers to implementation that Chesterfield BC anticipates facing are:

i) Chesterfield is a traffic node for goods vehicles and general traffic from the south of Manchester, Stockport, Macclesfield, and Stoke-on-Trent. These

vehicles use the A619 to enter Chesterfield through the Peak District and (if heading north) use this route to access the M-1. This places an increased traffic loading on the road passing through the AQMA.

ii) The changes to local authority funding which are due to come into effect may have an adverse effect, in that there will be pressure to approve applications for both commercial and residential developments which would have a deleterious impact on air quality both within the existing AQMA, and across the wider Chesterfield BC area.

iii) Lower than expected uptake of low emission vehicles across the region as a whole, in conjunction with a vehicle fleet which DVLA data suggest is older that the national average to a statistically significant degree, means that traffic pollution has a higher impact than traffic modelling data suggests.

iv) The local Highway Authority (Derbyshire County Council) has not signed up to the On-street Residential Chargepoint Scheme.

Progress on the following measures has been slower than expected due to slower than hoped action by the local Highway Authority in planning and implementing actions to free up vehicle flows along the road affected the AQMA. Pollution levels are currently not breaching the NO_2 air quality objective, but this may be due to underlying variations in regional emissions. Changes to traffic lights controlling vehicle flows through the existing AQMA may have a positive effect pending further works being carried out to change the road junction, in order to address the problem fully.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Chesterfield BC anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of Chesterfield No 1 AQMA.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Industrial Emissions	Environmental Permits	Other measure through permit systems and economic instruments	2010	LA Environmental Health	Internal	All Permitted process rated as Low/Medium Environmental Impact	General reduction in industrial emissions (including noise)	Completed	2014	Financial constraints on private businesses may exceed saving in Permit Fees
2	Joint Working	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	2017	LA Environmental Health	Internal	None assigned	General reduction in traffic emissions	Implementation on-going	Ongoing	Reduction in numbers of staff dedicated to air quality roles/ increase in non-air quality work leading to pressure on available resources
3	Electric Vehicles	Policy Guidance and Development Control	Other policy	2016	LA Environmental Health, LA Fleet Manager	Internal	None assigned	Reduced vehicle emissions	Implementation on-going	2018	Trial scheme completed, a small number of electric vehicles are being used. Funding sought to allow further uptake of Low Emission Vehicles for fleet, however budgetary pressures have made widespread uptake unlikely
4	Agile working	Promoting Travel Alternatives	Encourage / Facilitate home-working	2014	Corporate	Internal	Number of staff homeworking per day	Reduced vehicle emissions	Data no longer recorded	Ongoing	Conflicting requirement for staff (wish to encourage home working versus need to be present when required)
5	Publicity	Public Information	Via the Internet	2013	LA Environmental Health	Internal	Number of website hits	Possible Reduction in vehicle emissions	Website kept up to date	Ongoing	Lack of IT support
6	Car Parking	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	2017	Corporate	Internal	Increased Parking Income / Number of staff homeworking	Possible Reduction in vehicle emissions	Currently being planned	2020	Scheme is being brought in to gain parking income from staff, but may encourage home working
7	East Midlands Air Quality Network	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	2018	PHE/Derbyshire County Council/LA	Internal	N/A	Reduction in a Range of Pollutants	Work Plans/Action Plans Developed	N/A	Air Quality Working Group involves key players in public sector and voluntary sectors
8	Travel Plans Required as planning conditions for larger developments	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2016	LA	Internal	N/A	Reduced vehicle emissions	Implementation on-going	N/A	Travel Plans Required as planning conditions for larger developments
9	100% Coverage of Smoke Control Area	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	1992	LA	Internal	Air Quality Objective	Smoke and Sulphur Dioxide emissions reduced through Clean Air Act Regulation	Education and Enforcement, as required	N/A	Reduction in numbers of staff dedicated to air quality roles/ increase in non-air quality work leading to pressure on available resources
10	Making Air Quality Reports available to the Public	Public Information	Via the Internet	2008	LA	Internal	Air Quality Objective	Reduction in a Range of Pollutants	Implementation on-going	Ongoing	Raise awareness on actions individuals can take

2.3 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and/or Concentrations

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

Chesterfield BC is taking the following measures to address $PM_{2.5}$:

We are a member of the East Midlands Air Quality Network and we will continue to work with partner agencies to ensure effective traffic management, in order to minimise the impact of traffic pollution across the borough.

Chesterfield BC is also a non-constituent member of the Sheffield City Region combined authority, and works as part of the Sheffield City Region Air Quality and Climate group.

The whole of the borough area of Chesterfield is included in well-established Smoke Control Areas (often referred to as Smokeless Zones). However, the effectiveness of these is continuing to be undermined by the increase in the use of DEFRA approved wood burning appliances which are effectively exempt from local authority enforcement actions. Research results increasingly indicate that these fireplaces have an adverse effect on particulate air pollution.

We are working with Derbyshire County Council (the local highways authority) in order to achieve the incremental changes in traffic management which would have sufficient beneficial impact to ameliorate the effects of traffic within the vicinity of the declared AQMA, and a concomitant reduction in adverse health effects on the local population.

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.

Chesterfield undertook automatic (continuous) monitoring at 2 sites during 2019. Table A.1 in Appendix A shows the details of the sites. NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem. National monitoring results are available at https://uk-air.defra.gov.uk/data/data_selector

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

Chesterfield undertook non- automatic (passive) monitoring of NO_2 at 41 sites during 2019. Table A.2 in Appendix A shows the details of the sites.

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

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias[4], “annualisation” (where the data capture falls below 75%), and distance correction[5]. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 in Appendix A compares the ratified and adjusted (for bias factor – 0.82, travel blank adjustment – 1.4 µg/m^3 mean over-read, no annualisation was required

[4] https://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html
[5] Fall-off with distance correction criteria is provided in paragraph 7.77, LAQM.TG(16)

as data capture was at least 75% for all sites) 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.3 represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 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.

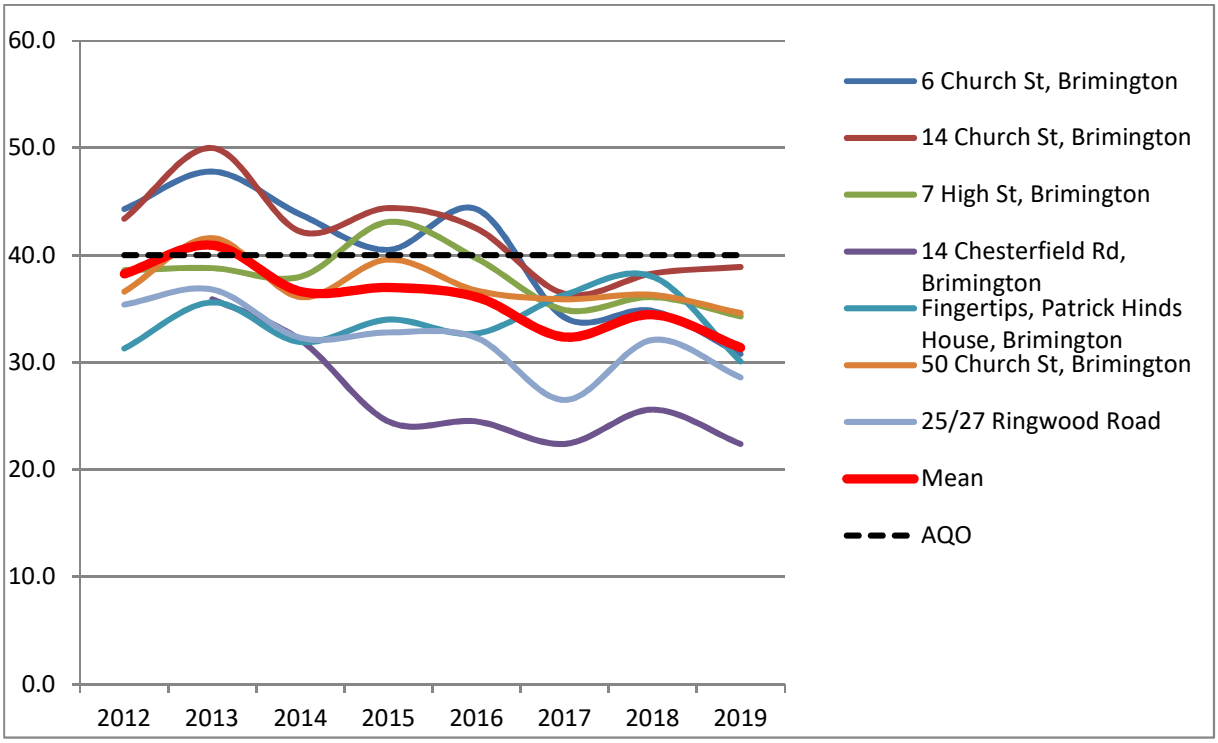
For diffusion tubes, the full 2019 dataset of monthly mean values is provided in Appendix B.

Table A.4 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.

No exceedences of the annual average levels of NO_2 has been found within, or in the vicinity of, the area of Chesterfield No1 AQMA.

Ongoing monitoring within, and in the vicinity of, the Chesterfield No.1 AQMA has demonstrated continued fluctation in levels, as shown in Figure 1 (below).

Figure 1: Variation in NO_2 in and around the vicinity of Chesterfield No.1 AQMA



The two monitoring locations within the AQMA do not demonstrate a breach of the AQO for NO_2. **Once again, none of the monitoring locations within or around the AQMA demonstrate a breach of the AQO for NO_2.**

Recent traffic modelling work, in support of large scale residential development proposals in the Staveley and Rother Valley Corridor, has indicated that the one-way system which flows past the residental façade in the AQMA is expected the reach capacity in the next few years, even if the proposed residental developments do not take place. The intensive monitoring will continue within, and around the vicinity of the AQMA.

Figure 2: Locations of Diffusion Tube monitoring within and in the vicinity of Chesterfield No1 AQMA

Note: The green locations are below the AQO for NO_2 during the current year's data. The extent of the AQMA is shown in blue

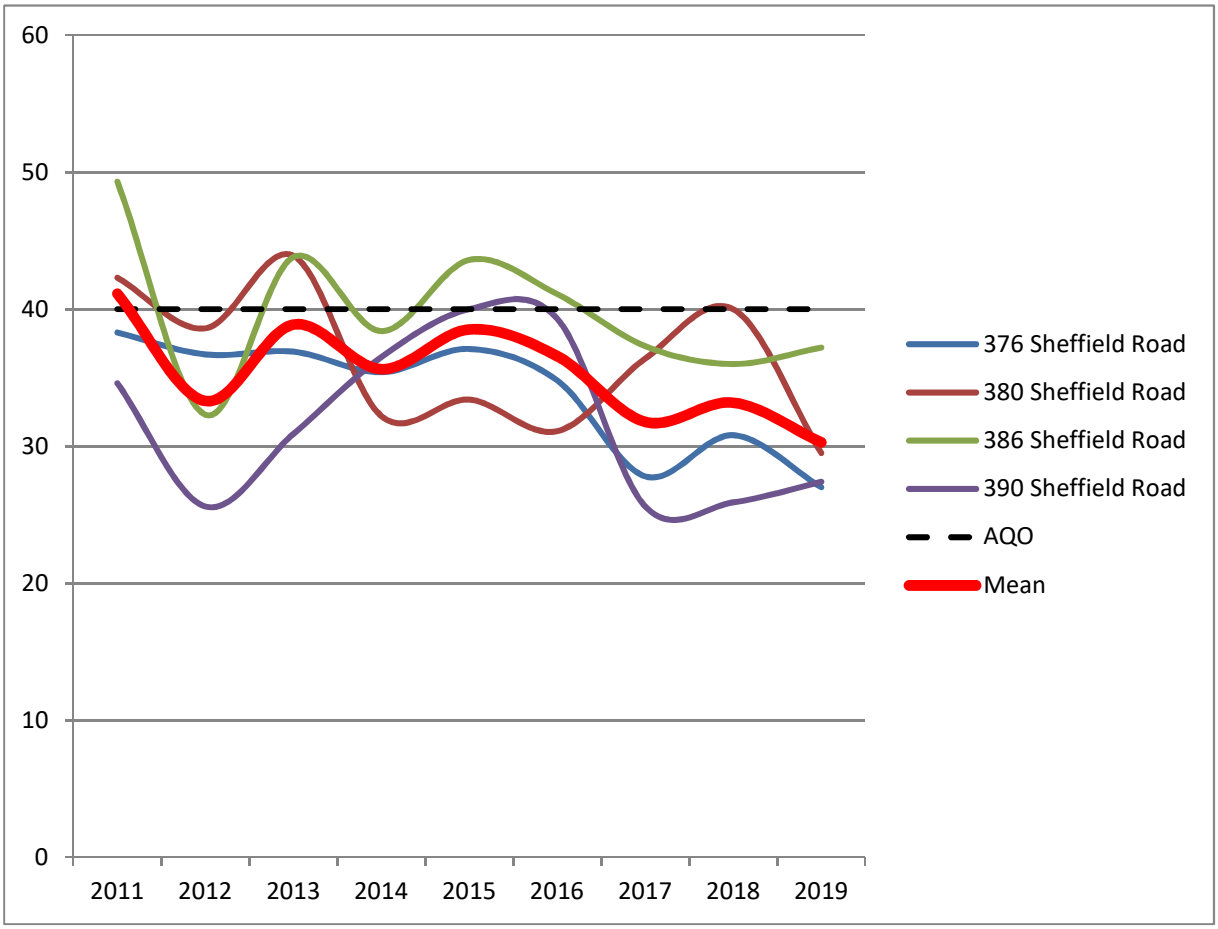
Intensive monitoring is also taking place at a row of houses affected by the change in a road junction serving a major supermarket (this has been discussed fully in the 2013 Detailed Assessment and 2014 Progress Report). This is a row of mixed commercial premises (comprising a public house, retail shop, sandwich shop, and hairdressers) and residential properties (7 homes). There are 4 diffusion tubes on this row of properties. **None of the locations on this façade demonstrate a breach of the air quality objective**.

This location was subject to a Detailed Assessment in 2012, and this was reported on in March 2013. The targetted intensive monitoring has continued at this location since that time, and levels have fluctuated around the air quality objective. There is little consistency in the monitoring results, but the overall trend demonstrates a gradual reduction on average levels (as shown in Figure 3, overleaf).

Figure 3 demonstrates the wide variation in results from the monitoring which is closely co-located. Due to this, we are not confident that the data is robust enough to justify the declaration of an AQMA, nor to draw any firm conclusions with regard to long term trends.

Given the above, intensive monitoring will continue at this location.

Figure 3: Variation in NO_2 on Sheffield Road



The locations of the monitoring, using diffusion tubes due to the restricted space available, on the façade of the terraced houses is shown in Figure 4 (overleaf).

Figure 4: Locations of Diffusion Tube monitoring on the affected façade

Note: The green locations are below the AQO for NO_2. For comparison with Figure 3 (above), the premises numbers run left to right.

Across the Borough, no annual mean results are greater than 60µg/m^3, as such we can be confident in concluding that there are no sites with an exceedance of the 1-hour mean objective.

3.2.2 Particulate Matter (PM_{10})

Both AURN sites monitor for PM10. The levels monitored do not breach either the annual mean or the 24 hour mean objectives.

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

Table A.6 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

3.2.3 Particulate Matter ($PM_{2.5}$)

Both AURN sites monitor for PM2.5. The data show that the levels of PM2.5 within the borough area comply with the annual average EU limit value (25µg/m^3 by 2020). The levels at Chatsworth Road have been fairly consistent for the last few years, and have shown a gradual slight reduction in levels. The levels at the Loundsley Green site, are also fairly consistent, but do not demonstrate a reduction in the background level. The levels at this background site are lower, as would be expected. Monitoring is continuing. The fraction of mortality attributable to particulate air pollution (as calculated by Public Health England, and made available in the Public Health Outcomes Framework: https://fingertips.phe.org.uk/static-reports/public-health-outcomes-framework/at-a-glance/e07000034.html?area-name=chesterfield) is 4.05%, this is slightly lower that the East Midlands region value (4.92%) and the England value (5.15%), but is not statistically significant

Table A.7 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years.

3.2.4 Sulphur Dioxide (SO_2)

Sulphur Dioxide is not a pollutant of concern, following the closure of a long standing chemical works which included a Sulphuric Acid production site in 2007. Prior to this the whole of the borough was covered by a number of smoke control areas. This, combined with the widespread uptake in the use of gas for domestic heating, meant that the use of coal and other solid fuels dramatically declined. As a result of these steps, **sulphur dioxide is no longer monitored in Chesterfield.**

3.2.5 Benzene

The Chesterfield Roadside site is part of the Non-Automatic Hydrocarbon Network. The results show that the **levels are well below the Air Quality Objective and demonstrate no likelihood of breaching the Air Quality Objective**, as the long term trend demonstrates a very gradual reduction in levels since 2010.

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)
AURN 1	Chesterfield Roadside	Roadside	463348	370651	NO_2, PM_{10}, $PM_{2.5}$, Benzene	NO	Chemiluminescent, Light Scattering, Pumped Tubes,	3	2	3
AURN 2	Chesterfield Loundsley Green	Urban Background	436472	372038	NO_2, PM_{10}, $PM_{2.5}$, Heavy Metals	NO	Chemiluminescent, Light Scattering, Pumped Filter	N/A	17	3

Notes:

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

(2) N/A if not applicable

Table A.2 – 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)
	150 Chatsworth Rd	Façade	437222	370956	NO_2	No	0	1m	N	2
	Bridge Inn, Hollis Lane	Facade	438710	370950	NO_2	No	0	2m	N	2
	376 Sheffield Road	Façade	438291	373006	NO_2	No	0	1m	N	2
	390 Sheffield Road	Façade	438284	373057	NO_2	No	0	1m	N	2
	17, South Place	Façade	438293	370863	NO_2	No	0	1m	N	2
	6 Church Street, Brimington	Façade	440440	373514	NO_2	Yes	0	1m	N	2
	DCC Offices, West Street	Roadside	437670	371490	NO_2	No	3m	1m	N	2
	212 Derby Road	Façade	438395	369776	NO_2	No	0	3m	N	2
	287 Derby Road	Façade	438385	369574	NO_2	No	0	2m	N	2
	7 High Street, Brimington	Façade	440531	373484	NO_2	No	0	1m	N	2
	42, Whittington Hill	Façade	438307	374560	NO_2	No	0	2m	N	2
	460, Sheffield Road	Façade	438279	373336	NO_2	No	0	2m	N	2
	10 Calow Lane, Hasland	Façade	439780	369440	NO_2	No	0	1m	N	2

14	348 Derby Road, Storforth Lane	Façade	438357	369410	NO_2	No	0	2m	N	2
15	Chatsworth Road AQ. Site	Co-location	436349	370658	NO_2	No	4m	4m	Y	3
16	Chatsworth Road AQ. Site	Co-location	436349	370658	NO_2	No	4m	4m	Y	3
17	Chatsworth Road AQ. Site	Co-location	436349	370658	NO_2	No	4m	4m	Y	3
18	1 New Beetwell Street	Roadside	438104	370989	NO_2	No	0	1m	N	2
19	28a Park Road	Façade	438090	370970	NO_2	No	0	1m	N	2
20	74 Park Road	Façade	438072	370758	NO_2	No	3m	1m	N	2
21	14 Chesterfield Road, Brimington	Roadside	440175	373396	NO_2	No	1m	1m	N	2
22	25/27 Ringwood Road, Brimington	Façade	440669	373711	NO_2	No	0	1m	N	2
23	29 Mansfield Road, Hasland	Façade	439830	369320	NO_2	No	0	2m	N	2
24	10, Compton Street, Saltergate	Façade	437686	371433	NO_2	No	0	1m	N	2
25	J+S Trophies, The Green, Hasland	Façade	439490	369608	NO_2	No	0	3m	N	2
26	Site Removed									
27	Lowgates, Staveley	Façade	443897	374912	NO_2	No	0	3m	N	2
28	Patrick Hinds House, Church St, Brimington	Façade	440323	373482	NO_2	No	0	1m	N	2

29	Hollywell Cross R/T, Old Post Restaurant	Façade	438417	371357	NO_2	No	0	1m	N	2
30	348, Chatsworth Rd, Brampton Mile	Façade	436702	370761	NO_2	No	0	1m	N	2
31	386 Sheffield Road	Façade	438289	373028	NO_2	No	0	2m	N	2
32	Warner Street, Hasland	Roadside	438976	370356	NO_2	No	2m	1m	N	2
33	55 Duke Street, Staveley	Façade	443452	374762	NO_2	No	0	4m	N	2
34	Travel Blank	-	-	-		-	-	-	-	-
35	632, Chatsworth Road, Storrs Road	Façade	435654	370537	NO_2	No	0	3m	N	2
36	Lite Bites, Mansfield Road, Hasland	Façade	439710	369420	NO_2	No	0	2m	N	2
37	50 Church Street, Brimington	Façade	440361	373513	NO_2	No	0	1m	N	2
38	14 Church Street, Brimington	Façade	440421	373515	NO_2	Yes	0	1m	N	2
39	43 Sheffield Road	Façade	438343	371908	NO_2	No	0	1m	N	2
40	380 Sheffield Road	Façade	438290	373014	NO_2	No	0	1m	N	2
41	James Street / Lockoford Lane	Roadside	438407	372798	NO_2	No	2	1m	N	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.3 – 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 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m³) (3) (4)				
						2015	2016	2017	2018	2019
AURN 1	463348	370651	Roadside	Automatic	98.6	19.9	20.3	18	16.8	17.4
AURN 2	436472	372038	Urban Background	Automatic	94.5	14.4	16.7	12.4	12.2	12.4
1	437222	370956	Roadside	Diffusion Tube	100	28.7	23.5	23.3	24.3	22.7
2	438710	370950	Roadside	Diffusion Tube	100	32.9	28.4	24.9	27	25.4
3	438291	373006	Roadside	Diffusion Tube	100	36.6	34.8	27.8	30.8	27.5
4	438284	373057	Roadside	Diffusion Tube	92	39.5	39.3	25.6	25.9	27.9
5	438293	370863	Roadside	Diffusion Tube	92	28.8	27.8	21.9	23.8	21.9
6	440440	373514	Roadside	Diffusion Tube	100	**40.5**	**44.3**	34.2	34.8	31.3
7	437670	371490	Roadside	Diffusion Tube	100	22.6	24.4	21	19.8	18.8
8	438395	369776	Roadside	Diffusion Tube	100	30.3	28.8	24	27.4	24.8
9	438385	369574	Roadside	Diffusion Tube	100	27.5	28		25.3	23.6
10	440531	373484	Roadside	Diffusion Tube	100	**43.1**	39.7	34.9	36.1	34.9
11	438307	374560	Roadside	Diffusion Tube	100	24.6	23.8	20.5	22.4	21.7
12	438279	373336	Roadside	Diffusion Tube	100	28.7	28.3	23	25.5	24.4

13	439780	369440	Roadside	Diffusion Tube	100	23.5	22.4	19.6	21.5	19.8
14	438357	369410	Roadside	Diffusion Tube	100	35.3	33.6	27.7	31.5	28.0
15	436349	370658	Roadside	Diffusion Tube	100	19.4	18.8	17.3	17.7	16.5
16	436349	370658	Roadside	Diffusion Tube	100	19.4	18.2	16.7	17.4	16.2
17	436349	370658	Roadside	Diffusion Tube	100	20	17.8	16.1	17.6	16.4
18	438104	370989	Roadside	Diffusion Tube	75	25.3	22.4	19.5	22.7	20.6
19	438090	370970	Roadside	Diffusion Tube	83	27.2	23.7	18.8	21.3	20.9
20	438072	370758	Roadside	Diffusion Tube	92	28.4	23.8	21.3	25.1	23.4
21	440175	373396	Roadside	Diffusion Tube	92	24.5	24.5	22.4	25.6	23.1
22	440669	373711	Roadside	Diffusion Tube	100	32.8	32.2	26.5	32.1	29.1
23	439830	369320	Roadside	Diffusion Tube	92	24.3	24.4	23.1	24.3	22.8
24	437686	371433	Roadside	Diffusion Tube	100	36.6	33	32.4	35.9	33.5
25	439490	369608	Roadside	Diffusion Tube	100	33	32.4	28.2	32	29.5
26	439490	369590	Roadside	Diffusion Tube	100	19.9	19.1			
27	443897	374912	Roadside	Diffusion Tube	100	30.6	31.9	28.3	29.6	27.2
28	440323	373482	Roadside	Diffusion Tube	100	34	32.7	36.3	38	30.6
29	438417	371357	Roadside	Diffusion Tube	75	36.3	32.4	30.7	36.1	34.0
30	436702	370761	Roadside	Diffusion Tube	92	28.5	26.6	23.9	26.9	24.6

31	438289	373028	Roadside	Diffusion Tube	100	**43.1**	**41.4**	37.3	36	37.8
32	438976	370356	Roadside	Diffusion Tube	92	31.4	33.3	28.7	34	31.1
33	443452	374762	Roadside	Diffusion Tube	100	38.4	36.6	34.1	37.5	33.1
34			Travel Blank	Diffusion Tube						
35	435654	370537	Roadside	Diffusion Tube	83	29.4	29.8	28.4	30.4	25.5
36	439710	369420	Roadside	Diffusion Tube	83	27.8	27.1	23	27.2	25.1
37	440361	373513	Roadside	Diffusion Tube	100	39.6	36.7	35.9	36.3	35.2
38	440421	373515	Roadside	Diffusion Tube	100	**44.4**	**42.5**	36.4	38.3	39.5
39	438343	371908	Roadside	Diffusion Tube	92	27.5	28	26	29.4	26.8
40	438290	373014	Roadside	Diffusion Tube	100	33	31.1	36.4	**40**	30.0
41	438407	372798	Roadside	Diffusion Tube	100	28.8	30	27.1	30.5	24.7

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

☐ **Annualisation has not been required**

☒ **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 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) 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

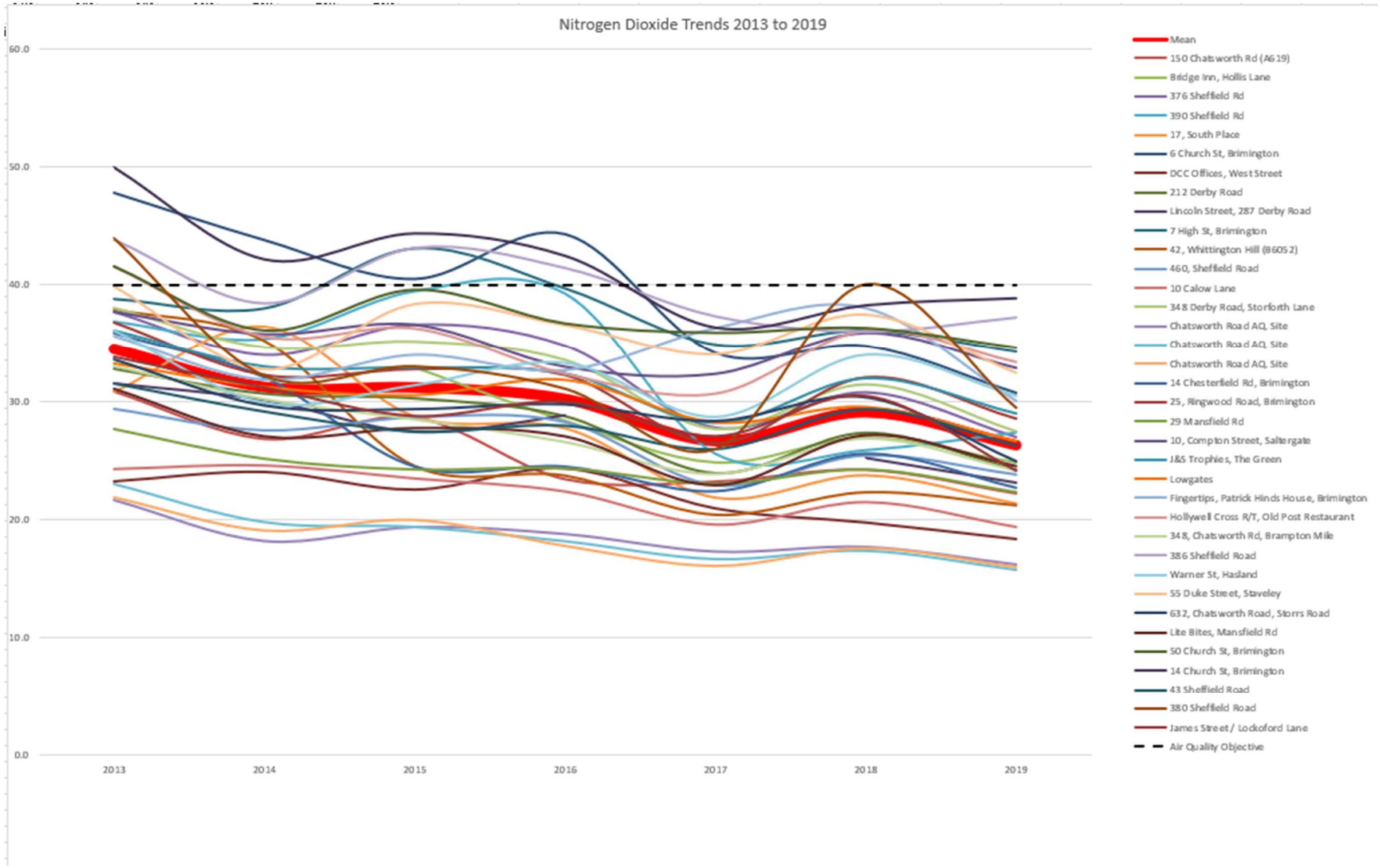


Table A.4 – 1-Hour Mean NO_2 Monitoring Results

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/m³ (3)				
							2015	2016	2017	2018	2019
AURN 1, Chesterfield Roadside	463348	370651	Roadside	Automatic		98.6	0	0	0	0	0
AURN 2, Chesterfield Loundsley Green	436472	372038	Urban Background	Automatic		94.5	**0 (53.5)**	0	**0 (58.2)**	0	0

Notes:

Exceedances of the NO_2 1-hour mean objective (200µg/m³ 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.

Table A.5 – Annual Mean PM_{10} Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	PM_{10} Annual Mean Concentration (µg/m³) (3)				
						2015	2016	2017	2018	2019
AURN 1	463348	370651	Roadside		94.2	19.8	17.7	14.3	16.8	14.1
AURN 2	436472	372038	Urban Background		96.8	14.4	14.8	12	14.4	12.7

☒ **Annualisation has not been required**

Notes:

Exceedances of the PM_{10} annual mean objective of 40µg/m³ 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) All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure A.2 – Trends in Annual Mean PM_{10} Concentrations

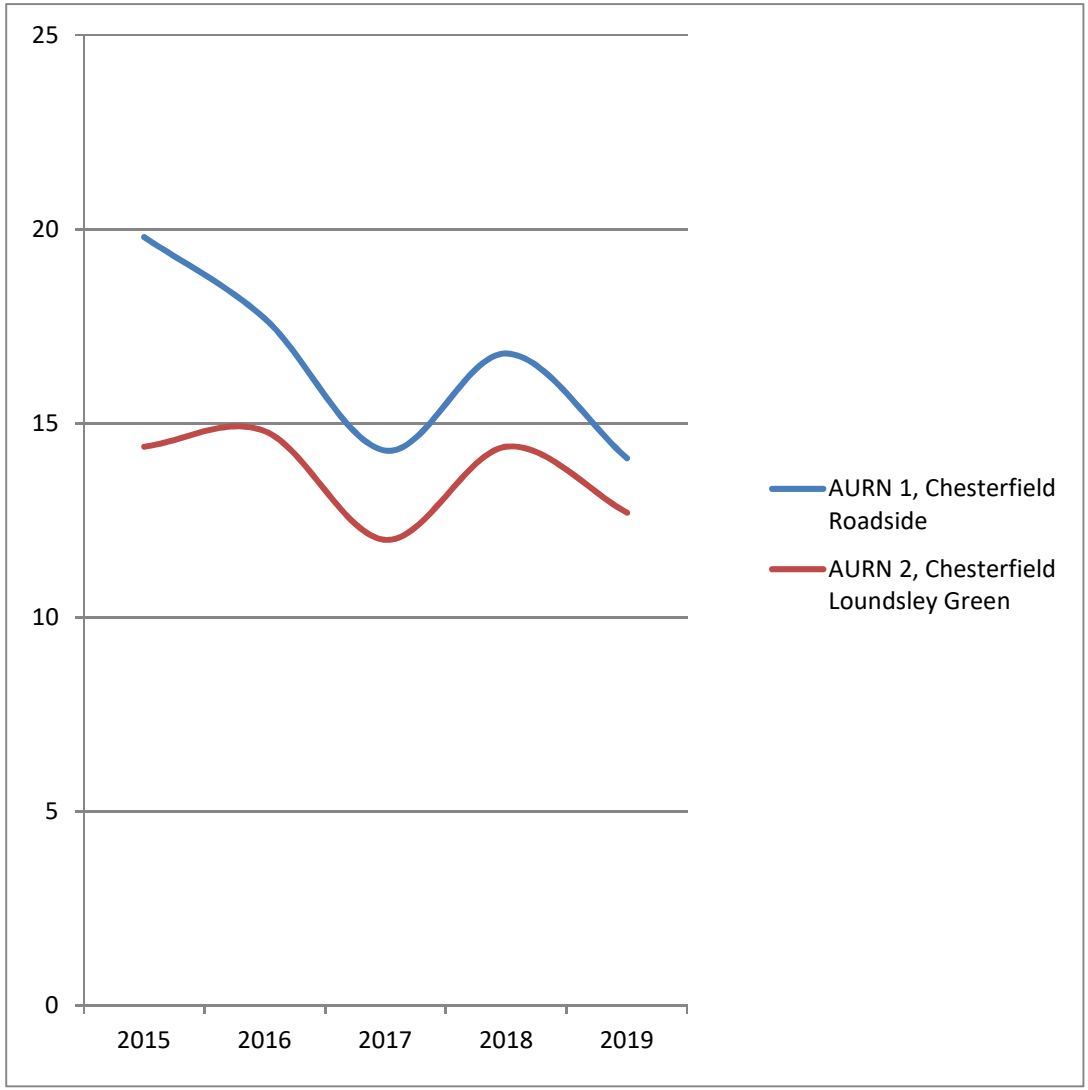


Table A.6 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	PM_{10} 24 Hour Means > 50µg/m³ (3)				
						2015	2016	2017	2018	2019
AURN 1	463348	370651	Roadside		93.9	2	0	3	3	3
AURN 2	436472	372038	Urban Background		96.4	1	0	3	2	3

Notes:

Exceedances of the PM_{10} 24-hour mean objective (50µg/m³ not to be exceeded more than 35 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 90.4th percentile of 24-hour means is provided in brackets.

Figure A.3 – Trends in Number of 24-Hour Mean PM_{10} Results >50µg/m^3

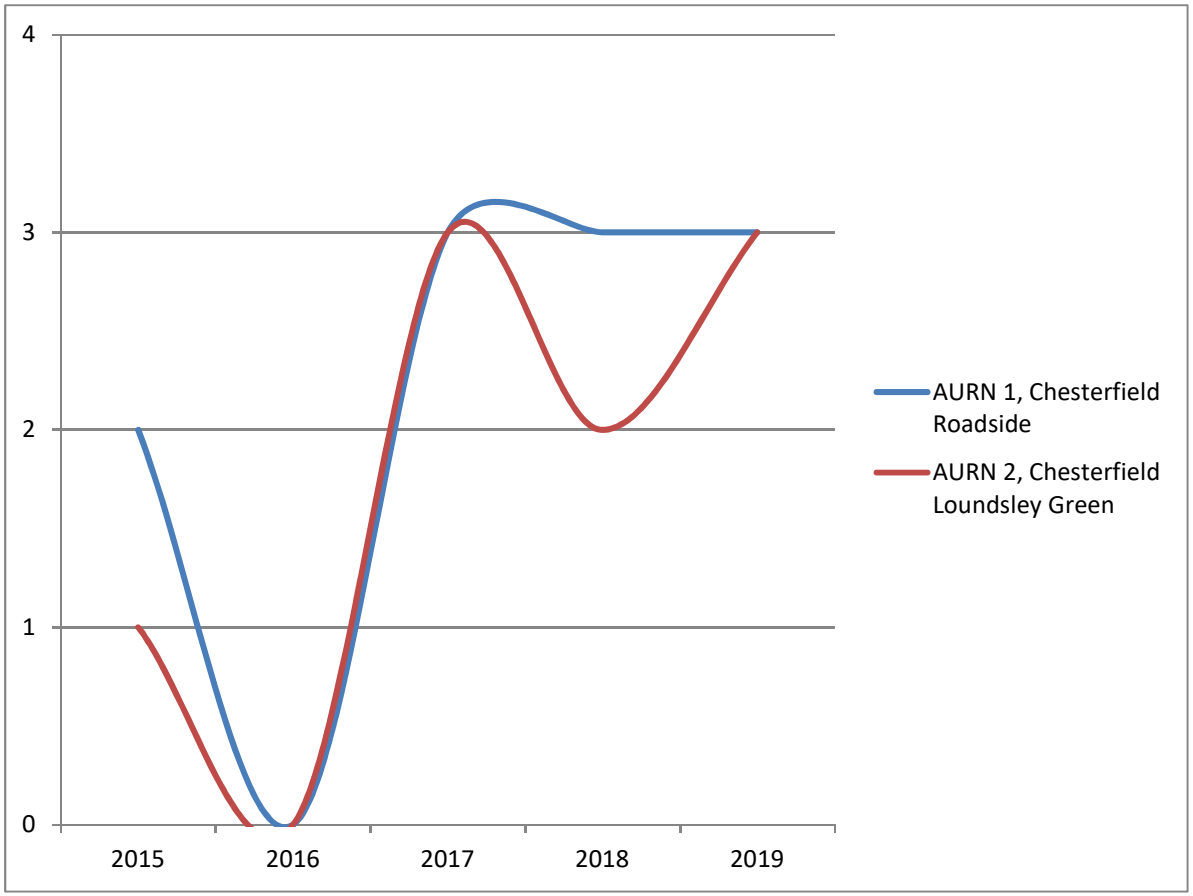


Table A.7 – $PM_{2.5}$ Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	$PM_{2.5}$ Annual Mean Concentration ($\mu g/m^3$) (3)				
						2015	2016	2017	2018	2019
AURN 1	463348	370651	Roadside		98.2	10.4	11.3	8.8	9.7	8.9
AURN 2	436472	372038	Urban Background		88.1	7.8	10.3	8.7	9.6	8.4

☒ **Annualisation has not been required**

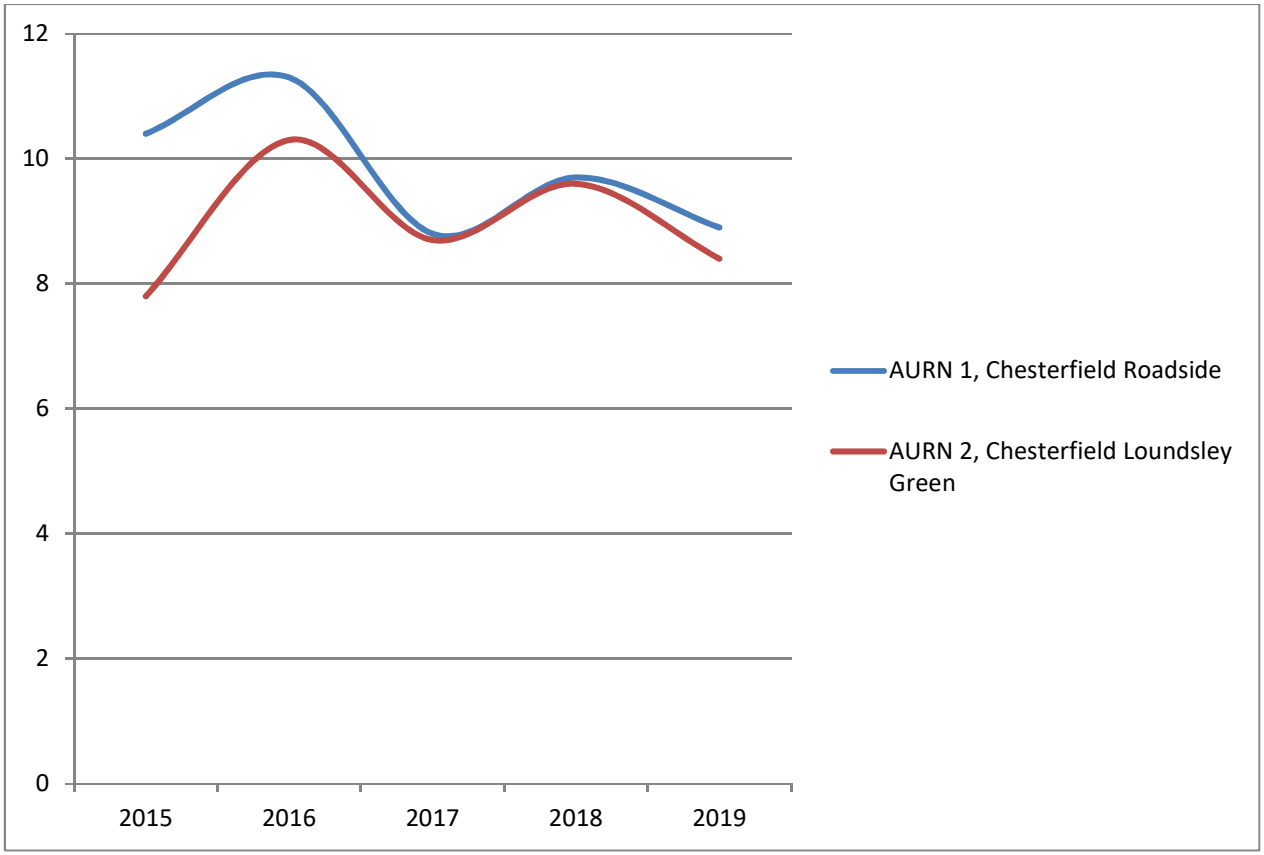
Notes:

(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) All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure A.4 – Trends in Annual Mean $PM_{2.5}$ Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2019

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations ($\mu g/m^3$)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.83) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
1	437222	370956	33.0	32.0	37.0	34.0	23.0	22.0	25.0	23.0	25.0	25.0	37.0	30.0	27.4	22.4	
2	438710	370950	36.0	32.0	37.0	36.0	28.0	27.0	31.0	29.0	29.0	24.0	35.0	37.0	30.6	25.1	
3	438291	373006	35	38	42	40	32	31	36	30	31	32	41	44	33.1	27.1	
4	438284	373057	37	35	37	29	25	25	33	26	24	28	33	35	33.6	27.6	
5	438293	370863		28	31		25	29	29	24	24	26	35	32	26.3	21.6	
6	440440	373514	39	47	46	45	39	38	42	32	34	39	39	44	37.8	31.0	
7	437670	371490	31	26	32		17	17	20	16	19	22	32	31	22.6	18.5	
8	438395	369776	33	33		39	30	30	29	25	26	28	38	43	29.9	24.5	
9	438385	369574	30		37	33	27	24	28		21		35	34	28.4	23.3	
10	440531	373484	49	38	44	39	33	40	44	42	44	37	38	53	42.0	34.5	
11	438307	374560		30	30	29	28	27	28	22	21	22	28	29	26.2	21.5	
12	438279	373336	33	35	33	30	26	25	30	25	27	27	32	38	29.4	24.1	
13	439780	369440	32	27		24			23	21	21	22	30	32	23.9	19.6	
14	438357	369410	36	32	41	39	35	39			30	33	41	41	33.8	27.7	
15	436349	370658	31	22	20	20	17		18	16	14	20	31	28	19.9	16.3	

16	436349	370658	26	24	21	21	16		15	16	18	20	27	29	19.5	16.0	
17	436349	370658	30	24	23	23	12		18	17	17	19	27	26	19.8	16.2	
18	438104	370989	32	29	33		22	25	23	21	22	26	31	34	24.8	20.4	
19	438090	370970	30	26	36		19	19	22	19	19	21	33	36	25.2	20.7	
20	438072	370758	29	28	30	37	30	29	32	24	22	28	35	32	28.2	23.2	
21	440175	373396	33	28	37	31	26	27	29	22	24		35	40	27.9	22.9	
22	440669	373711	39	35	42	35				32	32	31	38	52	35.1	28.8	
23	439830	369320	36	33	37	26	24	27	24	22	22	27	33	35	27.5	22.6	
24	437686	371433	46	37	44	44	35	31	45	43	42	34	46	52	40.4	33.1	
25	439490	369608	42	27	44	44	32	32	42	29		32	38	48	35.6	29.2	
27	443897	374912	40	30	44	40	30	28	34	30	31	34	34	41	32.8	26.9	
28	440323	373482	49	44	61	49	49	37		36	37	34	39	47	36.9	30.2	
29	438417	371357	41	37	44		47	43	45	33		35	42	51	40.9	33.6	
30	436702	370761	25	33	46	38	29	29	28	28	28	27	32	37	29.7	24.3	
31	438289	373028	47	40	50	43	39	35	47	39	40	37	41		45.6	37.4	
32	438976	370356	40	43	50	43	35		39	35	32	33	40	44	37.4	30.7	
33	443452	374762	44	37	49	43	40	36	47			43	39	55	39.9	32.7	
35	435654	370537	44	32	42	38		29	35	30	30	29	40	41	30.7	25.2	
36	439710	369420	40	34	40	37			25	23	24	28	35	34	30.2	24.8	
37	440361	373513	50	39	54	41	37	32	39	43	37	40	43	49	42.4	34.7	
38	440421	373515	49	33	49	38	35	42	48	45	42	41	47	61	47.6	39.0	
39	438343	371908	34	28	44	40	32	30	32	26		30	39	44	32.2	26.4	
40	438290	373014	51	36	56	46	43	37	47	43	44	46	47	57	36.2	29.7	
41	438407	372798	35	33	49		37	40	30	26	25		39	42	29.8	24.4	

☒ **Local bias adjustment factor used**

☐ **National bias adjustment factor used**

☒ **Annualisation has not been required**

☐ **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.

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

NO_2 diffusion tubes are supplied by South Yorkshire Air Quality Samplers, the preparation method being 50% triethanolamine in acetone. The laboratory follows the procedures set out in the Harmonisation Practical Guidance. The national bias factor for the tubes supplied by this source is 0.95. Data from the two sites operated by Chesterfield BC is supplied to DEFRA for input into the calculation of this factor.

Factor from Local Co-location Studies (if available)

The local bias factor for the traffic site operated by Chesterfield BC is as follows:

Chesterfield Roadside (Chatsworth Road): 0.83

The calculation for deriving this factor is shown below:

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Automatic Method: Period Mean	Automatic Method: Data Capture (% DC)	Data Quality Check: Tubes Precision Check	Data Quality Check: Automatic Monitor Data
1	09/01/2019	06/02/2019	24.0	21.0	24.0	23	1.7	8	4.3	22.10	93.1	Good	Good
2	06/02/2019	06/03/2019	29.0	28.0	27.0	28	1.0	4	2.5	22.70	96.6	Good	Good
3	06/03/2019	03/04/2019	20.0	21.0	23.0	21	1.5	7	3.8	14.60	100	Good	Good
4	03/04/2019	01/05/2019	23.0	21.0	24.0	23	1.5	7	3.8	21.30	100	Good	Good
5	01/05/2019	05/06/2019	19.0	16.0	15.0	17	2.1	12	5.2	14.00	100	Good	Good
6	05/06/2019	03/07/2019	16.0	18.0	17.0	17	1.0	6	2.5	13.30	96.6	Good	Good
7	03/07/2019	07/08/2019	15.0	15.0	14.0	15	0.6	4	1.4	10.50	97.2	Good	Good
8	07/08/2019	04/09/2019	16.0	15.0	14.0	15	1.0	7	2.5	10.10	89.7	Good	Good
9	04/09/2019	02/10/2019	18.0	17.0	19.0	18	1.0	6	2.5	13.40	100	Good	Good
10	02/10/2019	06/11/2019	20.0	22.0	22.0	21	1.2	5	2.9	20.70	97.2	Good	Good
11	06/11/2019	04/12/2019	31.0	31.0	31.0	31	0.0	0	0.0	27.90	100	Good	Good
12	04/12/2019	08/01/209	26.0	24.0	28.0	26	2.0	8	5.0	19.80	97.2	Good	Good
13													
											Overall survey -->	Good precision	Good Overall

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

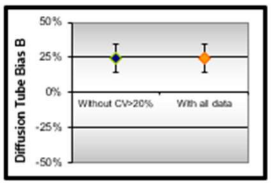
Site Name/ ID:

Precision: 12 out of 12 periods have a CV smaller than 20%

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 12 periods of data	
Bias factor A	0.83 (0.76 - 0.9)
Bias B	21% (11% - 31%)
Diffusion Tubes Mean:	21 µgm^{-3}
Mean CV (Precision):	6
Automatic Mean:	18 µgm^{-3}
Data Capture for periods used:	97%
Adjusted Tubes Mean:	18 (16 - 19) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 12 periods of data	
Bias factor A	0.83 (0.76 - 0.9)
Bias B	21% (11% - 31%)
Diffusion Tubes Mean:	21 µgm^{-3}
Mean CV (Precision):	6
Automatic Mean:	18 µgm^{-3}
Data Capture for periods used:	97%
Adjusted Tubes Mean:	18 (16 - 19) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Further details on the sites are given in Appendix D of this report

Discussion of Choice of Factor to Use

The bias factor used in adjusting the data for this report is a local factor and, more specifically, is calculated using the traffic site, Chesterfield Roadside. This site is used as it is in a very similar location to those where the diffusion tubes are all now placed. The local factor (0.83) varies from the national factor (0.78) but as the data is specific to this region and, more pertinently, to the roadside monitoring which is now being

uniformly undertaken, it is believed that the use of the local factor is fully justified. The locally derived bias factor has been calculated and used each year since 2011.

The reported results use the locally calculated bias factor, for the reasons discussed above.

Distance Correction
The monitoring locations are mounted on facades (or directly equivalent locations, such as lamp standards located at the façade), as such no distance correction is required.

Travel Blank
The mean result for analysis of the travel blank (which has not been exposed) is 2.1µg/m^3, prior to the bias factor adjustments being made.

Annualisation
Data capture for all sites is equal to or exceeds 75%, as such no annualisation of data is required.

PM Monitoring Adjustment
Monitoring was carried out using FDMS equipment, which has now been replaced by Palas Fidas 200 units, no data adjustment is required.

QA/QC of automatic monitoring

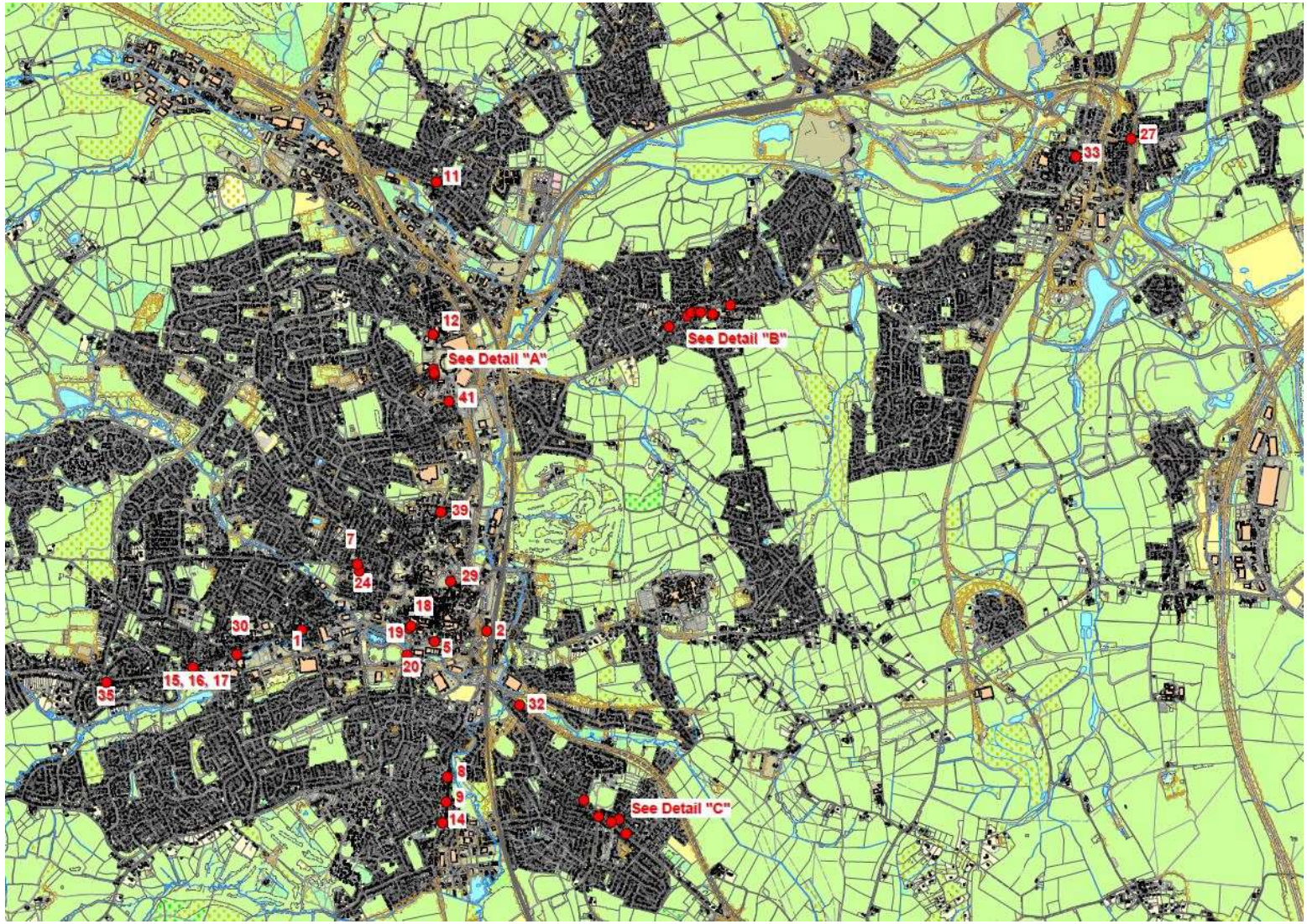
Data validation is carried out by BureauVeritas on behalf of DEFRA. On site calibration is carried out by Chesterfield BC staff on a 14 day cycle, using standard calibration gases, and the calibration data is sent direct to BureauVeritas, and RicardoAEA, by email. The margin of error for the NO_x Monitor at the Chesterfield Roadside site is 10.8%. The margin of error for the NO_x Monitor at the Chesterfield Loundsley Green site site is 11.6%. The margins of error for the Particulate Monitors at both sites are 8.9% and 16.6% for the PM_{10} and $PM_{2.5}$, respectively. This meets the requirements of the air quality Directive 2008/50/EC.

QA/QC of diffusion tube monitoring

The diffusion tube monitoring is carried out in full compliance with the guidance contained in the document “Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance for Laboratories and Users”.

The AIR-PT scheme results show the overall performance of the analysis laboratory as good

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



Detail A

Detail B

Note: See location details of Chesterfield No 1 AQMA (overleaf)

Detail C

Location and extent of Chesterfield No 1 AQMA

Note: the detail relates to the section of highway shown at the centre of Detail B (above)

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[6]	
	Concentration	Measured as
	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
	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

[6] 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
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

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A Review of Air Quality Station Type Classifications for UK Compliance Monitoring, Ricardo-AEA 2013

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