2019 Air Quality Annual Status Report (ASR)

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

(May, 2019)
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<td>CBC ASR 2019</td>
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<td>Date</td>
<td>31st May 2019</td>
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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. Long-term exposure to air pollution has been shown to reduce life expectancy, due to its impact on cardiovascular and respiratory diseases and lung cancer. Many everyday activities such as transport, industrial processes, farming, energy generation and domestic heating can have a detrimental effect on air quality.

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.

The Public Health Department will continue work with partners to advocate for improvements in Air Quality and provide expertise and evidence to inform policy.

Dean Wallace, Director of Public Health, Derbyshire County Council
May 2019
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\textsuperscript{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\textsuperscript{3}.

The main pollutant of concern in Chesterfield is Nitrogen Dioxide (NO\textsubscript{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 demonstrates intermittent breaches of the Air Quality Objective. \textbf{One monitoring location showed a breach (albeit minor) of the Air Quality Objective for Nitrogen Dioxide during 2018.} 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\textsubscript{10} and PM\textsubscript{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.

\textsuperscript{1} Environmental equity, air quality, socioeconomic status and respiratory health, 2010
\textsuperscript{2} Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006
\textsuperscript{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 an increase when the levels across the borough, as a whole, are compared with the 2018 report. Some variation across the borough has been noted, but the increase is, with a single exception, 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 also shown an increase in levels, one of the four monitoring locations on the affected façade demonstrates a minor breach of the Air Quality Objective for Nitrogen Dioxide. 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 applications required will be scrutinised carefully, in order to ensure that any such impacts are fully mitigated, by the use of (for example) travel 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 2040 (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 N°1 AQMA.

Local Engagement and How to get Involved

Most inputs regarding managing air quality is 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. We note, and welcome, the DEFRA backed Woodsure Ready to Burn initiative, but also note the cautionary comments made by the House of Commons Environmental Audit Committee regarding scrutiny of the Draft Environment (Principles and Governance) Bill.

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


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

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1 Local Air Quality Management

This report provides an overview of air quality in Chesterfield during 2018. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

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

The statutory air quality objectives applicable to LAQM in England can be found in Appendix E.
2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

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

<table>
<thead>
<tr>
<th>AQMA Name</th>
<th>Date of Declaration</th>
<th>Pollutants and Air Quality Objectives</th>
<th>City / Town</th>
<th>One Line Description</th>
<th>Is air quality in the AQMA influenced by roads controlled by Highways England?</th>
<th>Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)</th>
<th>Action Plan</th>
<th>At Declaration</th>
<th>Now</th>
<th>Name</th>
<th>Date of Publication</th>
<th>Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chesterfield No1</td>
<td>Declared 14th August 2015</td>
<td>NO2 Annual Mean</td>
<td>Brimington, Chesterfield</td>
<td>4 to 18 (evens only) Church Street, Brimington</td>
<td>NO</td>
<td>42.5 μg/m³</td>
<td>39.3 μg/m³</td>
<td>Draft Action Plan for Chesterfield No1 AQMA</td>
<td>Currently in draft form</td>
<td>Not Applicable</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

☒☒ ☒☒ 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 report was well structured, detailed and provided the information required by the supporting guidance. The appraisal agreed that monitoring suggested that there may, occasionally, be additional exceedences of the Air Quality Objective for Nitrogen Dioxide outside the existing AQMA, and supported the decision to continue intensive monitoring of the terrace façade on Sheffield Road.

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 than 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 NO₂ 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

<table>
<thead>
<tr>
<th>Measure No.</th>
<th>Measure</th>
<th>EU Category</th>
<th>EU Classification</th>
<th>Organisations involved and Funding Source</th>
<th>Planning Phase</th>
<th>Implementation Phase</th>
<th>Key Performance Indicator</th>
<th>Reduction in Pollutant / Emission from Measure</th>
<th>Progress to Date</th>
<th>Estimated / Actual Completion Date</th>
<th>Comments / Barriers to implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Industrial Emissions</td>
<td>Environmental Permits</td>
<td>Other measure through permit systems and economic instruments</td>
<td>LA Environmental Health</td>
<td>2010</td>
<td>2012</td>
<td>All Permitted process rated as Low/Medium Environmental Impact</td>
<td>General reduction in industrial emissions (including noise)</td>
<td>Completed</td>
<td>2014</td>
<td>Financial constraints on private businesses may exceed saving in Permit Fees</td>
</tr>
<tr>
<td>2</td>
<td>Joint Working</td>
<td>Policy Guidance and Development Control</td>
<td>Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality</td>
<td>LA Environmental Health</td>
<td>2017</td>
<td>2018</td>
<td>None assigned</td>
<td>General reduction in traffic emissions</td>
<td>Implementation ongoing</td>
<td>Ongoing</td>
<td>Reduction in numbers of staff dedicated to air quality roles/ increase in non-air quality work leading to pressure on available resources</td>
</tr>
<tr>
<td>3</td>
<td>Electric Vehicles</td>
<td>Policy Guidance and Development Control</td>
<td>Other policy</td>
<td>LA Environmental Health, LA Fleet Manager</td>
<td>2016</td>
<td>2017</td>
<td>None assigned</td>
<td>Reduced vehicle emissions</td>
<td>Implementation ongoing</td>
<td>2018</td>
<td>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</td>
</tr>
<tr>
<td>4</td>
<td>Agile working</td>
<td>Promoting Travel Alternatives</td>
<td>Encourage / Facilitate home-working</td>
<td>Corporate</td>
<td>2014</td>
<td>2015</td>
<td>Number of staff homeworking per day</td>
<td>Reduced vehicle emissions</td>
<td>Data no longer recorded</td>
<td>Ongoing</td>
<td>Conflicting requirement for staff (wish to encourage home working versus need to be present when required)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>LA Environmental Health</td>
<td>2013</td>
<td>2015</td>
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<tr>
<td>5</td>
<td>Publicity</td>
<td>Public Information</td>
<td>Via the Internet</td>
<td></td>
<td></td>
<td>Number of website hits</td>
<td>Possible Reduction in vehicle emissions</td>
<td>Website kept up to date</td>
<td>Ongoing</td>
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<tr>
<td>6</td>
<td>Car Parking</td>
<td>Traffic Management</td>
<td>Workplace Parking Levy, Parking Enforcement on highway</td>
<td>Corporate</td>
<td>2017</td>
<td>Increased Parking Income / Number of staff homeworking</td>
<td>Possible Reduction in vehicle emissions</td>
<td>Currently being planned</td>
<td>2019</td>
<td></td>
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<tr>
<td>7</td>
<td>East Midlands Air Quality Network</td>
<td>Policy Development</td>
<td>Regional Groups Coordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality</td>
<td>PHE/Derbyshire County Council/LA</td>
<td>Ongoing</td>
<td>Ongoing</td>
<td>N/A</td>
<td>Reduction in a Range of Pollutants</td>
<td>Work Plans/Action Plans Developed</td>
<td>N/A</td>
<td></td>
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<tr>
<td></td>
<td>Travel Plans Required as planning conditions for larger developments</td>
<td>Policy Development</td>
<td>Air Quality Planning and Policy Guidance</td>
<td>LA</td>
<td>Ongoing</td>
<td>Ongoing</td>
<td>N/A</td>
<td>Reduced vehicle emissions</td>
<td>Implementation on-going</td>
<td>N/A</td>
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<tr>
<td>8</td>
<td>100% Coverage of Smoke Control Area</td>
<td>Policy Development</td>
<td>Air Quality Planning and Policy Guidance</td>
<td>LA</td>
<td>Completed</td>
<td>Completed</td>
<td>Air Quality Objective</td>
<td>Smoke and Sulphur Dioxide emissions reduced through Clean Air Act Regulation</td>
<td>Education and Enforcement, as required</td>
<td>N/A</td>
<td></td>
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<td></td>
<td>Making Air Quality Reports available to the Public</td>
<td>Public Information</td>
<td>Via the Internet</td>
<td>LA</td>
<td>Ongoing</td>
<td>Ongoing</td>
<td>Air Quality Objective</td>
<td>Reduction in a Range of Pollutants</td>
<td>Implementation on-going</td>
<td>Ongoing</td>
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Lack of IT support:
- Scheme is being brought in to gain parking income from staff, but may encourage home working.
- Air Quality Working Group involves key players in public sector and voluntary sectors.
- Reduction in numbers of staff dedicated to air quality roles/ increase in non-air quality work leading to pressure on available resources.
- 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.

Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance
2.4 Summary of Monitoring Undertaken

2.4.1 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 2018. Table A. 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.

2.4.2 Non-Automatic Monitoring Sites

Chesterfield undertook non-automatic (passive) monitoring of NO₂ at 38 sites during 2018. 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.

2.5 Individual Pollutants

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

2.5.1 Nitrogen Dioxide (NO₂)

Table A. in Appendix A compares the ratified and adjusted (for bias factor – 0.91, travel blank adjustment – 2.1 µg/m³ mean over-read, no annualisation was required as data capture was at least 75% for all sites) monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³.

For diffusion tubes, the full 2018 dataset of monthly mean values is provided in Appendix B.
Table A.4 in Appendix A compares the ratified continuous monitored NO\textsubscript{2} hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m\textsuperscript{3}, not to be exceeded more than 18 times per year.

**No exceedences of the annual average levels of NO\textsubscript{2} has been found within the area of Chesterfield No1 AQMA.**

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

**Figure 1: Variation in NO\textsubscript{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\textsubscript{2}. **Once again, none of the monitoring locations within or around the AQMA demonstrate a breach of the AQO for NO\textsubscript{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 residential façade in the AQMA is expected the reach capacity in the next few years, even if the proposed residential 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\textsubscript{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. **One of the locations on this façade demonstrate a borderline 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.
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\textsubscript{2}. The red location denotes an annual exposure at the AQO for NO\textsubscript{2}. For comparison with Figure 1 (above), the premises numbers run left to right.

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

2.5.2 Particulate Matter (PM\textsubscript{10})

Both AURN sites monitor for PM\textsubscript{10}. The levels monitored do not breach either the annual mean or the 24 hour mean objectives.

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

Table A. in Appendix A compares the ratified continuous monitored PM\textsubscript{10} daily mean concentrations for the past 5 years with the air quality objective of 50µg/m\textsuperscript{3}, not to be exceeded more than 35 times per year.
2.5.3 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 decrease in levels. No long term trend data is yet available at the Loundsley Green site, as it has only operated at this site for four years. The levels at this background site are lower, as would be expected. Monitoring is continuing. Table A.7 in Appendix A presents the ratified and adjusted monitored PM2.5 annual mean concentrations for the past 5 years.

2.5.4 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.

2.5.5 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**

<table>
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<tr>
<th>Site ID</th>
<th>Site Name</th>
<th>Site Type</th>
<th>X OS Grid Ref</th>
<th>Y OS Grid Ref</th>
<th>Pollutants Monitored</th>
<th>In AQMA?</th>
<th>Monitoring Technique</th>
<th>Distance to Relevant Exposure (m) (1)</th>
<th>Distance to kerb of nearest road (m) (2)</th>
<th>Inlet Height (m)</th>
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**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

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<th>Y OS Grid Ref</th>
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<th>In AQMA?</th>
<th>Dist to Relevant Exposure (m)</th>
<th>Dist to kerb of nearest road (m)</th>
<th>Tube collocated with a Continuous Analyser?</th>
<th>Height (m)</th>
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Notes:
(1) 0m if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property).
(2) N/A if not applicable.
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<th>Site ID</th>
<th>Site Type</th>
<th>Monitoring Type</th>
<th>Valid Data Capture 2018 (%)</th>
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<th>2015</th>
<th>2016</th>
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- Diffusion tube data has been bias corrected
- Annualisation has been conducted where data capture is <75% - Note: all data capture 75% or greater, no annualisation required

Notes:
Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.
NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).
(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.
Figure A.1 – Trends in Annual Mean NO$_2$ Concentrations
Table A.4 – 1-Hour Mean NO$_2$ Monitoring Results

<table>
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<tr>
<th>Site ID</th>
<th>Site Type</th>
<th>Monitoring Type</th>
<th>Valid Data Capture 2018 (%)</th>
<th>NO$_2$ 1-Hour Means &gt; 200µg/m$^3$&lt;sup&gt;(2)&lt;/sup&gt;</th>
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<td>Urban Background</td>
<td>Automatic</td>
<td>91.6</td>
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</table>

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 99.8$^{th}$ percentile of 1-hour means is provided in brackets.
Table A.5 – Annual Mean PM$_{10}$ Monitoring Results

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<th>Site ID</th>
<th>Site Type</th>
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<th>PM$_{10}$ Annual Mean Concentration (µg/m$^3$) (3)</th>
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<td>AURN 2, Chesterfield</td>
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<td>Loundsley Green</td>
<td>Background</td>
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</table>

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

Notes:
Exceedances of the PM$_{10}$ annual mean objective of 40µg/m$^3$ 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

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<th>Site ID</th>
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<th>PM$_{10}$ 24-Hour Means &gt; 50µg/m$^3$ (2)</th>
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**Notes:**

- Exceedances of the PM$_{10}$ 24-hour mean objective (50µg/m$^3$ 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 90.4$^{th}$ 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

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(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
### Table B.1 – NO\(_2\) Monthly Diffusion Tube Results - 2018

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</table>
Exceedances of the NO\textsubscript{2} annual mean objective of 40µg/m\textsuperscript{3} are shown in **bold**.
NO\textsubscript{2} annual means exceeding 60µg/m\textsuperscript{3}, indicating a potential exceedance of the NO\textsubscript{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

NO₂ 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): 0.91

The calculation for deriving this factor is shown below:

<table>
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<tr>
<th>Date</th>
<th>Start Time</th>
<th>End Time</th>
<th>Tube 1</th>
<th>Tube 2</th>
<th>Tube 3</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Coefficient of Variation (CV)</th>
<th>95% CI of mean</th>
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<td>9</td>
<td>1.5</td>
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<td>2.5</td>
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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 (0.91) varies from the national factor (0.95) 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 $2.1\mu g/m^3$, 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 is carried out using FDMS equipment, 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 11.1%. The margin of error for the NO$_x$ Monitor at the Chesterfield Loundsley Green site is 11.9%. The margins of error for the Particulate Monitors at both sites are 8.7% and 16.4% 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
Note: See location details of Chesterfield No 1 AQMA (overleaf)
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

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<tr>
<th>Pollutant</th>
<th>Air Quality Objective</th>
<th>Concentration</th>
<th>Measured as</th>
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<tbody>
<tr>
<td>Nitrogen Dioxide (NO₂)</td>
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<td>200 µg/m³, not to be exceeded more than 18 times a year</td>
<td>1-hour mean</td>
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<td>40 µg/m³</td>
<td>Annual mean</td>
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<tr>
<td>Particulate Matter (PM₁₀)</td>
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<td>50 µg/m³, not to be exceeded more than 35 times a year</td>
<td>24-hour mean</td>
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<tr>
<td></td>
<td></td>
<td>40 µg/m³</td>
<td>Annual mean</td>
</tr>
<tr>
<td>Sulphur Dioxide (SO₂)</td>
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<td>350 µg/m³, not to be exceeded more than 24 times a year</td>
<td>1-hour mean</td>
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<tr>
<td></td>
<td></td>
<td>125 µg/m³, not to be exceeded more than 3 times a year</td>
<td>24-hour mean</td>
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<tr>
<td></td>
<td></td>
<td>266 µg/m³, not to be exceeded more than 35 times a year</td>
<td>15-minute mean</td>
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</table>

4 The units are in microgrammes of pollutant per cubic metre of air (µg/m³).
## Glossary of Terms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>AQAP</td>
<td>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</td>
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<tr>
<td>AQMA</td>
<td>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</td>
</tr>
<tr>
<td>ASR</td>
<td>Air quality Annual Status Report</td>
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<tr>
<td>Defra</td>
<td>Department for Environment, Food and Rural Affairs</td>
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<td>DMRB</td>
<td>Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England</td>
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<td>EU</td>
<td>European Union</td>
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<td>FDMS</td>
<td>Filter Dynamics Measurement System</td>
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<td>LAQM</td>
<td>Local Air Quality Management</td>
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<td>NO₂</td>
<td>Nitrogen Dioxide</td>
</tr>
<tr>
<td>NOₓ</td>
<td>Nitrogen Oxides</td>
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<td>PM₁₀</td>
<td>Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less</td>
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<tr>
<td>PM₂.5</td>
<td>Airborne particulate matter with an aerodynamic diameter of 2.5µm or less</td>
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<tr>
<td>QA/QC</td>
<td>Quality Assurance and Quality Control</td>
</tr>
<tr>
<td>SO₂</td>
<td>Sulphur Dioxide</td>
</tr>
</tbody>
</table>
References

Air Quality (England) Regulations 2000

Air Quality (England) (Amendment) Regulations 2000

Environment Act 1995

Environment, Food and Rural Affairs Committee, Air Quality – Fourth Report of Session 2015-16

Air Quality Plan for the achievement of EU air quality limit value for nitrogen dioxide (NO\textsubscript{2}) in East Midlands (UK0032)

Improving air quality in the UK – Tackling nitrogen dioxide in our towns and cities. Technical report, December 2015

NO\textsubscript{2} Diffusion Tubes for LAQM: Guidance Notes for Local Authorities, March 2006

The Relationship Between Diffusion Tubes Bias and Distance From the Road July 2006

Diffusion Tubes for Ambient NO\textsubscript{2} Monitoring: Practical Guidance, Feb 2008

QA/QC Procedures for the UK Automatic Urban and Rural Air Quality Monitoring Network

Fine Particulate Matter (PM\textsubscript{2.5}) in the United Kingdom, DEFRA 2012

Assessment of Particulate Emissions from Wood Log and Wood Pellet Heating Appliances, Ricardo-AEA 2017

Airborne Particles from Wood Burning in UK Cities, King’s College London/National Physical Laboratory 2017

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

Evidential Value of DEFRA Air Quality Compliance Monitoring, AQEG 2015

Improving Air Quality, House of Commons 2018

Local Air Quality Management Policy Guidance (PG16) DEFRA 2016

Local Air Quality Management Technical Guidance (TG16) DEFRA 2018