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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Executive Summary: Air Quality in Our Area

This Annual Status Report forms part of the annual review of air quality review and assessment carried out by Dacorum Borough Council. It sets out updated air quality monitoring data and assesses whether any new or proposed developments are likely to have a significant effect on air quality concentrations.

Furthermore, this report fulfils the requirement of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), THE Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 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 exceedances are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepared an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

Air Quality in Dacorum

For its local air quality monitoring the Council utilises one real-time analyser in the Northchurch AQMA. This monitors for nitrogen dioxide (NO_2) as well fine particulate matter (both PM_{10} and $PM_{2.5}$). The Council also has a network of 74 non-automatic (passive) diffusion tubes which monitor for NO_2 at 54 locations across the district.

When comparing monitoring results with the previous year local pollutant concentrations are noted to have decreased in some locations and increased at others. In other words there is no general trend towards improvement or worsening. Longer-term trends of monitoring around the Councils Air Quality Management Areas (AQMA) do typically show a trend of stable or slightly decreasing concentrations for NO_2.

Exceedances of the National Air Quality Objective continue to only be measured in identified areas of poor air quality, that being the AQMAs of Lawn Lane and London Road (Apsley).

For the second consecutive year monitoring in the Northchurch AQMA (Northchurch, Berkhamsted) is demonstrating ambient NO_2 concentrations below intervention limits.

However revocation of an AQMA will typically be feasible after **three or more years** of compliance and thus the status of the AQMA should remain unchanged in the short-term.

Air quality issues in Dacorum are predominantly a result of emissions from road transport, for example, slow moving and congested traffic at busy junctions.

Not all car journeys made will start or end within the borough boundaries and so it is vital to work with other agencies. The Council is part of the Hertfordshire and Bedfordshire Air Quality Network which meets approximately four times and includes officers from the County Council's highways team.

The Council has also produced a draft air quality action plan. A steering group has been formed and which meets on a quarterly basis to support development of the plan.

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].

Actions to Improve Air Quality

Since early 2019 the Council has been working on a revision to its existing air quality action plan. The previous AQAP was set over a three year period, 2015 – 2018.

The Council has now produced a draft AQAP which replaces the previous plan, and is set to run over 5 years, 2019 – 2024. The AQAP was recently approved at Cabinet, but remains in draft following feedback from DEFRA. The Council has a steering group to guide development of the draft AQAP which meets quarterly. However due to the current situation regarding COVID-19 meetings by the group were temporarily suspended.

[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

In order for the action plan to truly remain a live document individual measures will be implemented at varying stages, noting that the evidence burden will be greater to support some measures over others. It will also allow the Council greater flexibility to redefine existing measures or introduce new measures, where appropriate.

Conclusions and Priorities

Noting that the Council has developed a draft revision of its AQAP a clear priority will be to bring forward various measures for implementation. As a district Dacorum is ear-marked for substantial growth both in terms of new housing and business which could impact on air quality locally.

Within the region of South West Herts notable growth is planned also in the neighbouring authorities of Luton, St Albans and Watford and so it will be important that good links are maintained through the Herts and Beds air quality group.

The Council is now working on an update on its local plan. The Environmental and Community Protection Team are engaged with policy planners to provide evidence on air quality for inspection of the local plan.

The 2nd year of compliance within the Northchurch AQMA is also a positive sign for air quality in this locality. Noting guidance issued to local authorities in Policy Guidance (LAQM.PG16) that revocation of an AQMA will typically be feasible after **three or more years** of compliance the status of the AQMA should remain unchanged in the short-term. The Council shall continue to ensure that monitoring continues in this locality.

Local Engagement and How to get Involved

As part of the delivery of the AQAP the Council intends to consult when appropriate on individual measures. This will include actively consulting with key partners, the public and businesses.

As part of the AQAP delivery a steering group is being set-up which will allow for feedback from the public, visitors and businesses to be reported.

As part of maintaining contact with the public the Council will continue to ensure that reports and monitoring results are made publically available through the Council's web pages.

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1 Local Air Quality Management

This report provides an overview of air quality in Dacorum 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 Dacorum 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

As noted in the executive summary the Council is in the process of renewing its air quality action plan (AQAP), having produced a new draft AQAP which is set to run from 2019 – 2024. Cabinet approval was granted for the revised draft AQAP.

The continued development of the AQAP is agreed by a steering group which meets on a quarterly basis and is formed of internal partners and colleagues from Hertfordshire County Council. However due to the current situation regarding COVID-19 the function of this group were temporarily suspended.

The emphasis of the draft AQAP is to promote and achieve a general emissions reduction. Whilst the main focus must be on reducing concentrations of NO_2 in the identified AQMAs, secondary aims are to address other pollutants, such as fine particulate and emissions linked to greenhouse gases.

A current overview of measures proposed as part of the draft AQAP are:

- Maintaining close links with the Local Transport Plan, Local Planning and Public Health
- Influencing emission reduction from new developments
- Potential to relocate bus stops and on-street parking in the Northchurch AQMA
- Clean Air Zone feasibility study
- Workplace parking levy
- Private hire and taxi vehicle emissions policy
- Advanced quality bus partnership
- Reducing council emissions
- Emission based parking charges
- Electric vehicle charging infrastructure study / strategy
- Promoting sustainable travel and discouraging the use of single car journeys

Since completing its draft AQAP the Council has sought to pursue and develop some of the draft measures. This has included submitted a bid to DEFRA under the air

quality grant programme for £45k during 2019/20 for support to assess the feasibility of a clean air zone. However, this bid was unsuccessful.

The Council has also produced an internal draft for influencing emissions from new development, noting how different areas of National Planning Policy seek to achieve similar goals. This is also discussed in further detail under action on $PM_{2.5}$. The Council is also working on an update of its local plan and draft guidance may be used to develop appropriate policy hooks.

The County Council has also completed consultation on its enhanced bus quality partnership which proposes setting of emissions standards for buses operating across the county. The emissions standards proposed will be based on voluntary compliance noting that had this been made a mandatory element of the scheme this may have affected viability of services. A copy of the scheme proposal is available at:

https://www.hertfordshire.gov.uk/media-library/documents/about-the-council/consultations/intalink-enhanced-partnership-plan-and-scheme-v4.5.pdf

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 Dacorum 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://uk-air.defra.gov.uk/aqma/list. Alternatively, see Appendix D: Map(s) of Monitoring Locations and AQMAs, which provides for a map of air quality monitoring locations in relation to the AQMA(s).

Monitoring of NO_2 in the Northchurch AQMA has identified for a 2nd consecutive year of ambient concentrations below the objective for this pollutant. However to support revocation of the AQMA, Policy Guidance LAQM.PG16 specifies this will typically be feasible after **three or more years** of compliance and thus the status of the AQMA should remain unchanged in the short-term.

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
Lawn Lane, Hemel Hempstead	1st June 2012	NO_2 annual mean	Hemel Hempstead	An area encompassing a number of properties overlooking to Lawn Lane, and the boundary declared between Belswains Lane and Seaton Road	NO	57	ug/m^3	52.1	ug/m^3	In draft	In draft	N/A
London Road, Apsley	1st June 2012	NO_2 annual mean	Hemel Hempstead	An area encompassing a number of properties overlooking London Road, and the boundary declared between Featherbed Lane and Weymouth Street	NO	55.9	ug/m^3	49.9	ug/m^3	In draft	In draft	N/A

High Street, Northchurch	June 2012, amended Oct 2013	NO_2 annual mean	Berkhamsted	An areas encompassing a number of properties overlooking High Street, Northchurch, and the boundary declared between Mandelyns and Bell Lane	NO	42.2	ug/m^3	37.6	ug/m^3	In draft	In draft	N/A

☒ **Dacorum Borough Council 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 Dacorum

Defra's appraisal of last year's ASR commentary included the following:

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

1. The Council are currently in the process of updating their Air Quality Action Plans and intend for implementation to commence by the end of 2019. Despite working to produce a new AQAP, the Council are still required to detail **any progress during 2018** on current AQAP measures. This has not been included within their 2019 ASR and is required in order for the report to be accepted.
2. The Council do not provide detailed discussion of $PM_{2.5}$, nor detail any specific measures to reduce emissions. The report does not draw links to the fraction of mortality attributable to $PM_{2.5}$ emissions. The Council are encouraged to include this in future reports, in addition to a discussion of historical trends, a comparison between Dacorum Borough and England as a whole, and a comparison to neighbouring authorities. For further guidance, please refer to LAQM Technical Guidance TG16.
3. The Council undertook a review of their monitoring regime and ceased monitoring at three sites, although the reasons for this have not been disclosed. The Council are encouraged to discuss any changes to their monitoring network.
4. Inconsistencies have been noted surrounding the number of passive monitoring sites. The Council state that passive monitoring was undertaken at 63 sites in Section 3.1, and at 57 sites in the Executive Summary, section 3.1.2 and Appendix C. Upon review, there appears to be 77 tubes across 63 monitoring sites, of which three were discontinued for 2018 but have still been included within the report. It is not necessary to include location details of past tubes. The Council are required to clarify this and update their 2019 ASR accordingly.

5. Distance correction has not been carried out. Whilst the decision to not distance-correct may be viewed as conservative, the Council are encouraged to calculate annual mean concentrations at the nearest relevant exposure.
6. QA/QC of monitoring data has been discussed, however evidence to support derivation of the national bias adjustment factor is required in all future reports.
7. The Council are encouraged to provide improved maps of monitoring locations in future reports. A clear, fully labelled map of passive and automatic monitoring locations showing AQMA boundaries is required. Close-up maps showing AQMA boundaries have been included, however it would be extremely beneficial for the Council to depict monitoring locations on these maps, and label these monitoring sites as in the results table (e.g. DC40 etc).
8. Annual mean concentrations of NO_2 within the Northchurch AQMA were below the annual mean objective for NO2 for the first time in 2018. The Council are commended on this achievement. It is to be noted, however, that consistent compliance is required before revocation of AQMA status can be considered.
9. Annualisation has been carried out correctly, and example calculations provided. In future, the Council could consider reviewing their monitoring regime to include a co-location site. Derivation of a local bias adjustment factor is encouraged, however use of the national factor is appropriate.
10. The Council have not included comments from last year's appraisal, and it is therefore difficult to tell if these have been addressed. The Council are advised to include and respond to comments made during the appraisal process in all future ASRs.
11. The Council has listed a number of priorities for the next year, which includes the publication of their new AQAP. These priorities are appropriate and the council should provide an update on the progress of these in the next reporting year.

In respect of the commentary above, where appropriate, this has been addressed either through revisions of the ASR 2019 or inclusions into the ASR 2020. Both documents will be submitted together as part of the 2020 ASR submission.

As noted in the preceding chapter, the Council has created a steering group to aid development of its draft AQAP. This has included revisiting the draft AQAP that was submitted to DEFRA. The group has worked to update the draft AQAP, however due to the current challenges presented in response to COVID-19, the work by the steering group has been temporarily suspended.

In advancing work on some of the proposed draft measures the Council has submitted a grant application for £45k in support from the 2019 - 2020 Air Quality Grant to support the feasibility assessment for a clean air zone. However the bid was unsuccessful.

In July 2019 the Council and the County Council also declared a climate change emergency with the overarching aim of working towards all council activities being net carbon neutral by 2030. The Council has progressed towards the development of an action plan.

The draft action plan aims to recognise the mutual benefits that can be achieved from a general emissions and collectively how this can benefit both local air quality and greenhouse emissions. The Council has appointed a new Climate Change and Sustainability Programme Lead Officer to lead on the action plan, and which will incorporate the action plan measure of reducing Council Emissions.

The principal challenges and barriers to implementation that Dacorum anticipates facing are that all AQMAs are declared based on emissions from road transport, and for which it has no administrative control over the road network.

Whilst the measures stated above will help to contribute towards compliance, Dacorum anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of the Lawn Lane and London Road AQMA. The approach to action planning by the Council is flexible to allow inclusion or removal from its AQAP measures as appropriate.

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

Particulate matter, whether PM_{10} (aerodynamic diameter <10um), $PM_{2.5}$ (aerodynamic diameter <2.5um), or $PM_{1.0}$ (aerodynamic diameter <1um) is emitted from exhausts as a result of the combustion process within engines and also from tyre and brake wear and other vehicle component wear such as the chassis and clutch (Air Quality Expert Group 2005).

The Air Quality Expert Group (2015) estimate that UK emissions contribute to approximately 50-55% of the total annual average $PM_{2.5}$ in the UK. The European Environment Agency estimates that road transport sources contribute to 13% of European emissions of $PM_{2.5}$ in 2013. Data presented by the Air Quality Expert Group (2015) estimated the contribution from traffic to be 7% in the UK. This emphasises that a large proportion of airborne $PM_{2.5}$ originate from other sources, including sea-salt, inorganic aerosols, organic aerosols and non-traffic generated rural and urban particulates including biomass burning both domestic and commercial.

There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

The obligation placed upon local authorities in respect of $PM_{2.5}$ is that they are expected to work towards reducing emissions and concentrations of $PM_{2.5}$ in their local area as practicable and consider action if necessary to address $PM_{2.5}$ issues in their area, and aligning those interests with those public health officers.

However policy guidance LAQM.PG16 does not prescribe what the local authority role should be; it is for the local authority in consultation with its public health officials and others to consider how it wishes to define this role.

Whilst there are no numerical limit values prescribed for $PM_{2.5}$ for England and no statutory obligations on local authorities in respect of monitoring concentrations of $PM_{2.5}$ in the ambient air, the EU Ambient Air Quality Directive has identified 25ug/m^3 as a limit value to be met by 2020 and the World Health Organisation (WHO) has set an air quality guideline of 10ug/m^3 as an annual mean for $PM_{2.5}$.

The only specific indicator for $PM_{2.5}$ is included within the Public Health Outcomes Framework (Public Health Outcome Indicator (PHOI) 3.01) which is stated as:

'The fraction of annual all-cause mortality attributable to long-term exposure to current levels of anthropogenic particulate pollution.'

This indicator is based on an estimated amount of $PM_{2.5}$ derived by Defra modelling from local measurement, including one site in Borehamwood, Hertfordshire and another in Bedfordshire. That data has been adjusted by way of population to give a population weighted figure before its use in deriving the PHOI.

The $PM_{2.5}$ focused PHOI reflects the adverse impact that this type of air pollution can have on public health as a result of the fine particles being carried deep into the lungs where they can cause inflammation and a worsening of heart and lung diseases.

Within Hertfordshire joint working on air quality issues between the local authorities and Hertfordshire County Council for $PM_{2.5}$ as part of the Herts and Beds air quality group has included a local monitoring project. The aim has enabled the collection of real-time direct measurements of $PM_{2.5}$ concentrations from multiple locations within Hertfordshire in order to address the paucity of $PM_{2.5}$ data available within the County.

The Hertfordshire Local Authorities Report on Particulate Matter ($PM_{2.5}$) in Ambient Air in 2018 for Hertfordshire County Council Public Health (November 2019) identifies that it is important to recognise that the figures published for PHOI 3.01 are estimates and therefore cannot be used for performance monitoring; they can only provide an indication of the scale of the issue. Further information on the use of health related air quality data is available at: https://hertshealthevidence.org/documents/thematic/airqualitydatafaq-briefing-2019-07.pdf.

It is for this reason that the report does not make direct reference to the PHOI figures, but uses the population weighted Defra modelled $PM_{2.5}$ concentrations in their place.

The report makes the following broad observations:

- The number of days on which the levels of $PM_{2.5}$ were measured above a concentration defined by the Daily Air Quality Index for air pollution to be representative of 'moderate', 'high' and 'very high' air pollution typically occur in the winter months in weather conditions that are still and cold. The apparent seasonal trend is as would be expected because it is recognised that cold, still weather conditions typically prevent the dispersal of local air pollution including particulate matter.
- Breaches are likely to be associated with regional or national scale air pollution episodes and only partially associated with locally derived road vehicle pollution
- Breaches may also arise if weather conditions are such that air pollution from the continent (and potentially further afield) is transported across to Britain
- Defra modelled $PM_{2.5}$ concentrations for each local authority area are broadly consistent with the concentrations being measured by the analysers within each local authority
- Where data capture rates have been reliable the mean annual average concentrations of $PM_{2.5}$ recorded have not varied significantly from 2016 to 2018.
- When elevated concentrations of $PM_{2.5}$ were detected they were typically detected at multiple Hertfordshire based analysers. This is suggestive that on the majority of the days where breaches were measured these would have been associated with a non-localised air pollution episode.

The Daily Air Quality Index for air pollution is a UK Air Information resource for inform the public on levels of air pollution and provides recommended actions and health advice. The index is numbered 1-10 and divided into four bands, low (1) to very high (10). Air pollution bandings are defined as:

- Moderate is defined as being above 36µg/m^3 but less than 54µg/m^3
- High is defined as being between 54µg/m^3 and 70µg/m^3
- Very High is defined as being 71µg/m^3 or higher

All are calculated as a 24-hour running mean.

However, beyond its participation in the Herts and Beds Air Quality group the Council currently has no specified measures for emissions reduction for $PM_{2.5}$, however the Council has proposed through its draft AQAP measures designed at achieving an overall emissions reduction, such as emission reduction from new development or setting of emission standards (e.g. local policy for taxi and private hire, bus emission standards and feasibility assessment for a clean air zone).

Furthermore the Council has declared a Climate Change emergency with a commitment to ensure that all council activities are net carbon neutral by 2030 and the development of an action plan. To fulfil this commitment the Council has recently created and appointed to a new lead officer role for climate change.

Whilst climate change focuses on greenhouse gas emissions reduction this can play a complimentary role in respect of local air quality management and vice versa. The developing climate change emergency action plan does propose incorporating reductions from Council emissions in the draft AQAP into actions on climate change.

The Council is now also working on the development of the next iteration of its local plan. Influencing emissions reduction from planning has also formed part of the draft AQAP, and internal draft planning guidance was produced to demonstrate how different areas of national policy can be positive for local air quality.

An extract of the internal draft is presented in the table below to note how different areas of national planning policy can be used to promote mitigation from development, but which is not exclusively linked to air quality.

Promoting health and safe communities	
Paragraph 91(c) Planning polices and decisions should aim to achieve healthy, inclusive safe spaces which: • Enable and support healthy lifestyles, ….. for example	Healthy outcomes that support walking and cycling enabling people to use alternative forms of travel

through layouts that encourage walking and cycling	
Promoting sustainable transport	
Paragraph 102(c) & (d) Transport issues should be considered from the earliest stages of plan-making and development proposals, so that: • Opportunities to promote walking, cycling and public transport use are identified and pursued • The environmental impacts of traffic and transport infrastructure can be identified, assessed and taking into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains	LTP 4 identifies there is high demand for road travel across Hertfordshire meaning the county's road network is under great pressure. As a consequence there is regular congestion and network disruption resulting in unreliable journeys and limited resilience, as well as harmful vehicle emissions and other environmental impacts. The current low level of sustainable mode use and the forecast growth in transport demand and pressure underlines the need to rethink the long term transport strategy for the county.
Paragraph 103 The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need for travel and offering a genuine choice of transport modes. This can help reduce congestion and emissions, and improve air quality and public health. However	

opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making.	
Paragraph 105 (e) If setting local parking standards for residential and non-residential development, policies should take account: • the need to ensure an adequate provision of spaces for charging plug-in and other ultra-low emissions vehicles	
Paragraph 110 (a), (e) Within this context, applications for development should: • give priority first to pedestrian and cycle movements, both within the scheme and with neighbouring areas, and second – so far as possible – to facilitating access to high quality public transport • be designed to enable charging of plug-in and other ultra-low emission vehicles in safe, accessible and convenient locations	
Paragraph 111	

All developments that will generate significant amounts of movement should be required to provide a travel plan, and the application should be supported by a transport statement or transport assessment so that the likely impacts of the proposal can be assessed.	
Achieving well designed places	
Paragraph 131 In determining applications, great weight should be given to outstanding or innovative designs which promote high levels of sustainability.	
Meeting the challenge of climate change	
Paragraph 150 (b) New development should be planned for in ways that can help reduce greenhouse gas emissions, such as through location, orientation and design.	

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

3.1 Summary of Monitoring Undertaken

The Council operates one automatic monitoring station which monitors for nitrogen dioxide (NO_2), and fine particles (PM10 and PM2.5) as well as deploying a network of 74 non-automatic (passive) diffusion tubes which monitor for NO_2 across 54 locations across the district.

With the exception of local monitoring in the Lawn Lane and London Road Air Quality Management Areas (AQMA), the objectives for NO_2 and PM10 are being met in all other areas of the district.

Monitoring in the Northchurch AQMA has demonstrated for a 2nd consecutive year that ambient NO_2 concentrations remain below intervention levels at all monitoring locations. However to support revocation of the AQMA, Policy Guidance LAQM.PG16 specifies this will typically be feasible after **three or more years** of compliance.

With respect to the Lawn Lane and London Road AQMAs local monitoring indicates elevated local NO_2 concentrations remain, and an increase in ambient concentrations when compared with the 2018 results. Noting that local NO_2 concentrations remain considerably above the objective for this pollutant in the AQMAs the status of these AQMAs will remain unchanged.

As part of its work on LAQM, for 2020 the Council has revised parts of its air quality network to introduce or increase monitoring at locations where air quality may be a concern. These locations have been identified from local knowledge of the district and / or reports produced by consultants for new development that have suggested ambient NO_2 levels approaching the annual average objective. Monitoring has been revised / introduced at the following locations:

- A section along St Albans Road, between Bennetts End and Leverstock Green Way – Hemel Hempstead
- The junction at Maylands Avenue and Wood Lane End – Hemel Hempstead
- The roundabout at Coombe Street and Leighton Buzzard Road – Hemel Hempstead

- The roundabout at Queensway and Marlowes – Hemel Hempstead
- The junction formed by Lower Kings Road, Kings Road and High Street – Berkhamsted
- A section along Brook Street near to the Silk Mill Industrial Estate – Tring

Results from these locations will be published as part of the Councils 2021 ASR submission.

3.1.1 Automatic Monitoring Sites

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

Dacorum undertook automatic (continuous) monitoring at one site during 2019. The automatic monitoring station is located on the High Street, Northchurch and forms part of the local monitoring network of the Northchurch AQMA. The site has been in operation since 2012, but it is not affiliated to the national network.

The site monitors for NO_2, PM_{10} and $PM_{2.5}$. In 2018 data capture at the site was above 99% for fine particulate and 94% for NO_2. The monitoring results show that:

- The annual mean objective for all pollutants monitored was achieved at site
- The hourly mean objective for NO_2 was achieved at site, i.e. there were less than 18 separate hourly exceedances of 200µg/m^3
- The daily mean for PM_{10} was achieved at site, i.e. there were less than 35 occaisions where the daily mean exceeded 50µg/m^3

Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at https://www.airqualityengland.co.uk/

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

Dacorum undertook non-automatic (passive) monitoring of NO_2 at 54 sites during 2019. Table A.2 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites in AQMAs only 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)

With the exception of the Lawn Lane and London Road AQMAs the results for the diffusion tube monitoring from 2019 show compliance with the annual mean objective for NO_2. In comparison with results from 2018 an increase in ambient NO_2 concentrations occurred at 23 monitoring locations, and which represents under half of all sites monitored. At sites exposed as triplicate diffusion tubes, the change in concentration year on year has been based on comparing the triplicate average of 2019 against 2018, as opposed to comparing the individual results.

As stated above, monitoring in the Northchurch AQMA has demonstrated ambient NO_2 concentrations remain below intervention levels at all monitoring locations for a 2nd consecutive year.

Trends in NO_2 concentrations within the Northchurch AQMA are also presented in Figure A.1. At the High Street and Northchurch analyser monitoring locations NO_2 concentrations are noted to be stable or in decline. However at the New Road location the trend suggests a gradually increasing NO_2 concentration across 2015 – 2019, peaking at 37.8µg/m^3. Despite results which are below the objective limit, continued monitoring at the location will be required to ensure an exceedance at this location is not recorded.

To support revocation of the AQMA, Policy Guidance LAQM.PG16 specifies this will typically be feasible after three or more years of compliance, and noting compliance has only been measured over 2 years and the reported trend at New Road, it would not be appropriate to suggest revocation of the AQMA in the short-term.

[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)

Monitoring of NO_2 in the Lawn Lane and London Road AQMA continues to demonstrate elevated local concentrations within both AQMAs, and noticeably above the objective limit at a number of monitoring positions. A comparison of 2019 results with that of 2018 indicate some increases in local NO_2 concentrations.

Trends in NO_2 concentrations within the Lawn Land and London Road AQMA are also presented in Figure A.1. Despite some local increases in 2019 data, the overall picture between 2015 – 2019 is stable or slowly improving local air quality.

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

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.

3.2.2 Particulate Matter (PM_{10})

The Council has been monitoring PM_{10} at the automatic monitoring station on the High Street, Northchurch, since August 2015.

In 2019 valid data capture for the monitoring period was 99%. No exceedances were measured for either of the objectives relevant to PM_{10}. However results for 2019 showed a marked increase on previous years both for the annual average and number of 24 hour periods exceeded 50µg/m^3.

The reason for this increase can be attributed to the surface re-dressing of the main road that runs parallel to the automatic station. This led to exceptionally high readings between the 14th – 18th April. The activities of surface re-dressing are known to have contributed to 5 of the 8 days in 2019 of 24 hour periods that exceeded 50µg/m^3. The highest concentration measured in any single 24 hour period was 399µg/m^3. These results have been communicated to Hertfordshire County

Council, as the Highways Authority, noting at its peak the dust caused by surface re-dressing led to local concentrations 8 times that of the objective for a 24 hour period.

By removing these events from the dataset, noting the irregularity with which surface re-dressing occurs, 3 exceedances of the 24 hour objective occurred in 2019 and is comparable with the low number of exceedances that have been measured year on year.

Similarly and with respect to the annual average, which although measured at 19µg/m^3 and the highest concentration measured to date, if removing contributions from surface re-dressing activities the annual average is 15µg/m^3. This is broadly comparable with results of previous years monitoring.

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 ($PM_{2.5}$)

The Council has been monitoring $PM_{2.5}$ at the automatic monitoring station on the High Street, Northchurch, since August 2015. The objective for $PM_{2.5}$ is not a numerical objective, but an expectation that local authorities should work towards reducing emissions/concentrations of fine particulate matter.

For 2018 data capture at this station achieved 99%. The annual average measured was 10µg/m^3. This is a decrease of 2018 monitoring results, but overall represents an increase in previous year's annual averages of 8µg/m^3 (2015 – 2017). The results of 2019.

However, when accounting for the activities of surface re-dressing it can be demonstrated that this also impacted local $PM_{2.5}$ concentrations. Although not as pronounced a reduction when compared with local PM_{10} monitoring, when removing the results between 14th – 18th April this does result in a 0.4µg/m^3 reduction, from 10µg/m^3 to 9.6µg/m^3.

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)

The Council does not monitor for sulphur dioxide as there are no relevant sources for this pollutant identified under previous rounds of review and assessment.

Appendix A: Monitoring Results

Table A.1 - Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
CM1	High Street, Northchurch	Roadside	497295	208901	NO2; PM10; PM2.5	YES	Chemiluminescent; FIDAS	10	3	2

Notes:

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

(2) N/A if not applicable

Table A.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?
DC40	Sawyers Way HH	Roadside	506780	207180	NO2	NO	5	2	NO
DC42	Wood Lane End HH	Urban Background	508177	207934	NO2	NO	N/A	1	NO
DC46	High Street Bovingdon	Roadside	501541	203659	NO2	NO	13	1	NO
DC47	High Street Berkhamsted	Roadside	499365	207724	NO2	NO	20	1	NO
DC48	Prince Edward Street Berkhamsted	Urban Background	499207	207754	NO2	NO	N/A	45	NO
DC50	High Street Northchurch	Roadside	497346	208835	NO2	YES	1	1	NO
DC51	Brook Street Tring	Roadside	492552	211824	NO2	NO	8	2	NO
DC52	High Street Tring	Roadside	492335	211386	NO2	NO	6	2	NO
DC54	Watford Road Kings Langley	Roadside	507606	201624	NO2	NO	34	2	NO
DC55	High Street Kings Langley	Roadside	507184	202690	NO2	NO	15	2	NO
DC57	Lawn Lane 1 HH	Roadside	505923	205761	NO2	YES	4	1	NO
DC58	Gammon Close HH	Urban Background	507058	206727	NO2	NO	N/A	22	NO
DC59	Wadley Close HH	Urban Background	506981	206829	NO2	NO	N/A	11	NO

DC60	Field Road HH	Urban Background	507483	206898	NO2	NO	N/A	17	NO
DC61	St Agnells Lane HH	Roadside	507121	209252	NO2	NO	10	1	NO
DC62	New Road Northchurch	Roadside	497335	208860	NO2	YES	1	1	NO
DC63	Darrs Lane Northchurch	Roadside	497264	208927	NO2	YES	5	1	NO
DC64	Lawn Lane 2 HH	Roadside	505969	205726	NO2	YES	4	1	NO
DC65	Lawn Lane 3 HH	Roadside	505930	205740	NO2	YES	1	1	NO
DC66	London Road Apsley	Roadside	505674	205514	NO2	YES	1	1	NO
DC67	Allandale	Roadside	505948	207814	NO2	NO	16	1	NO
DC68	Belswains Sappi	Roadside	507005	204677	NO2	NO	3	1	NO
DC69	Lawn Lane Belswains	Urban Background	506053	205664	NO2	YES	N/A	25	NO
DC70	Lawn Lane 4	Roadside	505888	205801	NO2	YES	6	2	NO
DC71	Orchard Street	Roadside	505636	205504	NO2	YES	3	1	NO
DC73	Durrants Hill Road	Roadside	505734	205519	NO2	YES	1	2	NO
DC74	Avia Close	Roadside	505841	205395	NO2	YES	6	1	NO
DC75	The Meads	Roadside	497472	208730	NO2	NO	10	2	NO
DC76	The Cotterells	Roadside	505355	206504	NO2	NO	5	1	NO
DC81	Sappi 2	Roadside	507122	204470	NO2	NO	10	1	NO
DC85	Health Centre, London Road	Roadside	505754	205437	NO2	YES	4	1	NO
DC86	Northchurch Co-location A	Roadside	497295	208901	NO2	YES	10	3	YES
DC87	Northchurch Co-location B	Roadside	497295	208901	NO2	YES	10	3	YES

DC88	Northchurch Co-location C	Roadside	497295	208901	NO2	YES	10	3	YES
DC89	High Street, Markyate	Roadside	506227	216317	NO2	NO	0	2	NO
DC90	High Street Northchurch A	Roadside	497346	208835	NO2	YES	1	N/A	NO
DC91	High Street Northchurch B	Roadside	497346	208835	NO2	YES	1	N/A	NO
DC92	New Road Northchurch A	Roadside	497335	208860	NO2	YES	1	N/A	NO
DC93	New Road Northchurch B	Roadside	497335	208860	NO2	YES	1	N/A	NO
DC94	Health Centre, London Road A	Roadside	505754	205437	NO2	YES	4	1	NO
DC95	Health Centre, London Road B	Roadside	505754	205437	NO2	YES	4	1	NO
DC96	Durrants Hill Road A	Roadside	505734	205519	NO2	YES	1	2	NO
DC97	Durrants Hill Road B	Roadside	505734	205519	NO2	YES	1	2	NO
DC98	London Road Apsley A	Roadside	505674	205514	NO2	YES	1	1	NO
DC99	London Road Apsley B	Roadside	505674	205514	NO2	YES	1	1	NO
DC100	Lawn Lane 1A	Roadside	505923	205761	NO2	YES	4	1	NO
DC101	Lawn Lane 1B	Roadside	505923	205761	NO2	YES	4	1	NO
DC102	Lawn Lane 2A	Roadside	505969	205726	NO2	YES	4	1	NO
DC103	Lawn Lane 2B	Roadside	505969	205726	NO2	YES	4	1	NO
DC104	Lawn Lane 3A	Roadside	505930	205740	NO2	YES	1	1	NO
DC105	Lawn Lane 3B	Roadside	505930	205740	NO2	YES	1	1	NO
DC106	Outside 24 Cotterells	Roadside	505349	206667	NO2	YES	4	14	NO
DC107	Marlowes R/B	Roadside	505508	207613	NO2	NO	0.5	3	NO

DC111	St Marys 3	Roadside	496938	209235	NO2	NO	1	1.5	NO
DC112	High Street Markyate 2	Roadside	505876	216805	NO2	NO	0.5	1	NO
DC113	Chapel Street, Berkhamsted	Roadside	499448	207870	NO2	NO	0.5	2	NO
DC114	Lower Kings Road, Berkhamsted	Roadside	499127	207935	NO2	NO	0.5	1	NO
DC115	Kings Road, Berkhamsted	Roadside	498887	207520	NO2	NO	1	1	NO
DC116	Castle Street, Berkhamsted	Roadside	499384	207722	NO2	NO	0.75	2	NO
DC117	High Street, Berkhamsted 2	Roadside	498417	208214	NO2	NO	0.25	2	NO
DC118	O/S 158 Marlowes	Roadside	505508	207613	NO2	NO	10	7	NO
DC119	The Point Hemel A	Roadside	505529	206298	NO2	NO	36	13	NO
DC120	The Point Hemel B	Roadside	505529	206298	NO2	NO	36	13	NO
DC121	The Point Hemel C	Roadside	505529	206298	NO2	NO	36	13	NO
DC122	Bridge Street Hemel Hempstead	Roadside	505551	206947	NO2	NO	2	1	NO
DC123	High St/Lower Kings Rd Junct., Berkhamsted	Roadside	498417	208214	NO2	NO	1	1.5	NO
DC124	Waitrose Entrance, Lower Kings Rd, Berkham	Roadside	499108	207860	NO2	NO	5	1	NO
DC125	Canal, Lower Kings Road, Berkhamsted	Roadside	499108	207860	NO2	NO	3	3	NO

DC126	Broadwater, Berkhamsted	Urban Background	499208	208140	NO2	NO	N/A	1	NO
DC127	BFI, Kings Road, Berkhamsted	Roadside	498287	206978	NO2	NO	5	2	NO
DC128	Shootersway, Berkhamsted	Roadside	495608	208711	NO2	NO	10	2	NO
DC129	Stone Cottage, Kings Road, Berkhamsted	Roadside	498293	207011	NO2	NO	0	5	NO
DC130	2 The Cottages, Kingshill Way	Roadside	498313	206945	NO2	NO	0	2	NO
DC131	Gravel Path, Berkhamsted	Roadside	499703	207838	NO2	NO	0	1	NO

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 for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3) (4)				
							2015	2016	2017	2018	2019
CM1	497295	208901	Roadside	Automatic	94	94	26.0	29.0	29.0	29.3	24.0
DC40	506780	207180	Background	Diffusion Tube	92	92	19.0	19.4	18.2	17.3	17.8
DC42	508177	207934	Background	Diffusion Tube	92	92	21.0	21.5	19.4	20.8	19.6
DC46	501541	203659	Kerbside	Diffusion Tube	83	83	19.7	19.0	19.1	17.8	18.2
DC47	499365	207724	Roadside	Diffusion Tube	100	100	31.4	32.7	32.1	29.5	30.8
DC48	499207	207754	Background	Diffusion Tube	100	100	19.0	19.6	18.1	17.9	17.5
DC50	497346	208835	Roadside	Diffusion Tube	100	100	39.4	**42.4**	**42.3**	33.0	32.7
DC51	492552	211824	Kerbside	Diffusion Tube	100	100	25.3	23.7	24.4	25.4	25.8
DC52	492335	211386	Roadside	Diffusion Tube	100	100	27.7	28.7	29.4	26.3	23.2
DC54	507606	201624	Roadside	Diffusion Tube	100	100	**44.0**	**44.6**	**44.3**	**40.8**	38.1
DC55	507184	202690	Roadside	Diffusion Tube	100	100	30.1	31.0	29.9	28.5	29.1
DC57	505923	205761	Roadside	Diffusion Tube	100	100	**47.8**	**52.6**	**46.8**	**41.6**	**41.5**
DC58	507058	206727	Background	Diffusion Tube	92	92	24.4	33.4	23.8	24.1	22.7
DC59	506981	206829	Background	Diffusion Tube	92	92	28.9	29.2	27.8	25.7	26.7

DC60	507483	206898	Background	Diffusion Tube	92	92	20.9	22.4	19.2	20.3	20.8
DC61	507121	209252	Roadside	Diffusion Tube	92	92	26.3	27.0	26.0	24.5	26.1
DC62	497335	208860	Roadside	Diffusion Tube	100	100	31.8	33.3	34.2	36.2	38.6
DC63	497264	208927	Roadside	Diffusion Tube	100	100	25.2	25.8	25.3	23.5	24.2
DC64	505969	205726	Roadside	Diffusion Tube	100	100	31.2	32.5	31.2	28.5	30.6
DC65	505930	205740	Roadside	Diffusion Tube	100	100	**53.3**	**48.3**	**48.9**	**48.7**	**52.1**
DC66	505674	205514	Roadside	Diffusion Tube	100	100	**51.6**	**51.1**	**54.0**	**48.6**	**48.6**
DC67	505948	207814	Roadside	Diffusion Tube	83	83	25.0	26.9	25.0	26.0	24.9
DC68	507005	204677	Roadside	Diffusion Tube	100	100	32.9	33.3	32.2	32.9	30.4
DC69	506053	205664	Roadside	Diffusion Tube	100	100	21.0	23.6	21.1	20.6	20.2
DC70	505888	205801	Roadside	Diffusion Tube	83	83	34.2	35.1	34.1	36.4	32.2
DC71	505636	205504	Kerbside	Diffusion Tube	92	92	23.0	26.0	23.9	22.3	23.7
DC73	505734	205519	Roadside	Diffusion Tube	100	100	27.7	29.2	27.5	26.2	27.6
DC74	505841	205395	Roadside	Diffusion Tube	100	100	35.0	34.7	36.1	32.2	31.9
DC75	497472	208730	Roadside	Diffusion Tube	92	92	24.0	26.6	23.4	24.7	24.7
DC76	505355	206504	Kerbside	Diffusion Tube	100	100	31.7	32.9	32.1	31.8	31.2
DC81	507122	204470	Roadside	Diffusion Tube	92	92	33.8	35.1	35.4	32.1	33.2
DC85	505663	205528	Kerbside	Diffusion Tube	100	100	34.0	31.3	34.6	32.0	33.3

DC86	497295	208901	Roadside	Diffusion Tube	100	100	26.6	26.1	23.9	25.4	23.8
DC87	497295	208901	Roadside	Diffusion Tube	92	92	25.3	25.4	23.4	25.9	24.3
DC88	497295	208901	Roadside	Diffusion Tube	100	100	25.4	24.8	23.9	24.8	24.9
DC89	506227	216317	Roadside	Diffusion Tube	100	100	23.2	24.0	23.0	22.4	20.8
DC90	497346	208835	Roadside	Diffusion Tube	100	100	38.0	**43.6**	**40.4**	**34.2**	32.9
DC91	497346	208835	Roadside	Diffusion Tube	100	100	**40.7**	**40.5**	**42.6**	33.6	33.9
DC92	497335	208860	Roadside	Diffusion Tube	100	100	33.3	34.6	33.1	35.5	37.6
DC93	497335	208860	Roadside	Diffusion Tube	100	100	31.0	35.2	35.2	37.8	37.2
DC94	505663	205528	Kerbside	Diffusion Tube	100	100	35.8	35.3	35.6	35.5	33.8
DC95	505663	205528	Kerbside	Diffusion Tube	100	100	33.5	37.1	35.2	33.8	35.1
DC96	505734	205519	Roadside	Diffusion Tube	100	100	33.1	30.2	29.1	27.5	26.6
DC97	505734	205519	Roadside	Diffusion Tube	100	100	30.7	30.9	28.6	28.0	28.8
DC98	505674	205514	Roadside	Diffusion Tube	100	100	**52.0**	**55.2**	**55.8**	**48.3**	**47.1**
DC99	505674	205514	Roadside	Diffusion Tube	100	100	**51.6**	**52.4**	**52.9**	**48.3**	**49.9**
DC100	505923	205761	Roadside	Diffusion Tube	83	83	**48.1**	**49.9**	**44.6**	**44.6**	**45.3**
DC101	505923	205761	Roadside	Diffusion Tube	100	100	**41.8**	**52.6**	**46.6**	**42.9**	**42.4**
DC102	505969	205726	Roadside	Diffusion Tube	100	100	30.8	**44.5**	38.5	29.2	29.8
DC103	505969	205726	Roadside	Diffusion Tube	100	100	30.6	31.8	31.7	29.4	29.4

DC104	505930	205740	Roadside	Diffusion Tube	100	100	**54.8**	**54.7**	**55.6**	**48.6**	**51.0**
DC105	505930	205740	Roadside	Diffusion Tube	100	100	**55.3**	**57.3**	**54.6**	**48.3**	**49.3**
DC106	505349	206667	Roadside	Diffusion Tube	92	92	28.3	29.3	26.9	26.6	25.8
DC107	505508	207613	Roadside	Diffusion Tube	100	100	28.0	27.4	29.5	27.2	27.9
DC111	496938	209235	Background	Diffusion Tube	100	100	24.6	25.4	26.3	25.6	25.2
DC112	505876	216805	Roadside	Diffusion Tube	100	100	19.6	21.9	19.3	19.6	19.1
DC113	499448	207870	Roadside	Diffusion Tube	100	100	16.8	19.5	17.6	16.1	16.9
DC114	499127	207935	Roadside	Diffusion Tube	100	100	36.2	35.4	33.3	29.2	30.7
DC115	498887	207520	Roadside	Diffusion Tube	92	92	22.4	22.2	19.0	19.0	19.0
DC116	499384	207722	Roadside	Diffusion Tube	92	92	23.8	23.2	21.9	26.0	24.9
DC117	498417	208214	Kerbside	Diffusion Tube	100	100	27.8	28.8	27.4	27.3	26.0
DC118	505508	207613	Roadside	Diffusion Tube	100	100	27.7	30.9	30.6	26.9	28.8
DC119	505529	206298	Roadside	Diffusion Tube	92	92	36.2	37.3	34.6	33.2	32.2
DC120	505529	206298	Roadside	Diffusion Tube	92	92	35.3	37.4	34.6	34.8	31.2
DC121	505529	206298	Roadside	Diffusion Tube	92	92	35.9	38.2	36.1	34.1	31.8
DC122	505551	206947	Kerbside	Diffusion Tube	83	83	37.2	30.9	31.3	27.7	27.3
DC123	498417	208214	Kerbside	Diffusion Tube	92	92	n/a	n/a	32.9	30.9	28.8
DC124	499108	207860	Kerbside	Diffusion Tube	100	100	n/a	n/a	21.1	20.0	21.7

DC125	499108	207860	Kerbside	Diffusion Tube	83	83	n/a	n/a	19.9	20.6	19.4
DC126	499208	208140	Background	Diffusion Tube	100	100	n/a	n/a	14.1	15.2	16.4
DC127	498287	206978	Kerbside	Diffusion Tube	100	100	n/a	n/a	35.7	33.3	29.0
DC128	495608	208711	Background	Diffusion Tube	100	100	n/a	n/a	29.9	31.8	28.1
DC129	498293	207011	Roadside	Diffusion Tube	100	100	n/a	n/a	25.3	27.2	24.0
DC130	498313	206945	Roadside	Diffusion Tube	100	100	n/a	n/a	35.0	35.5	32.5
DC131	499703	207838	Kerbside	Diffusion Tube	100	100	n/a	n/a	23.6	25.1	25.3

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

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

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

Notes:

Exceedances of the NO_2 annual mean objective of 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.

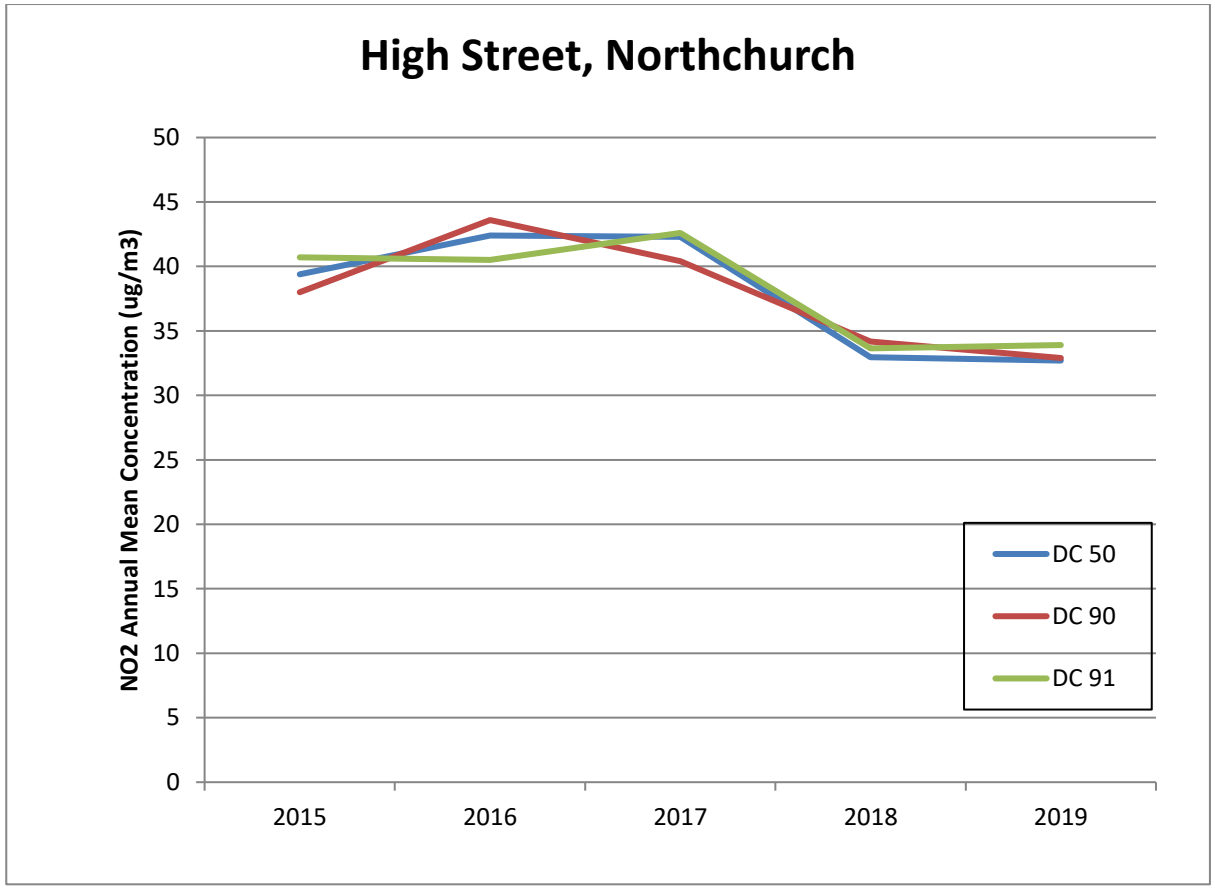
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

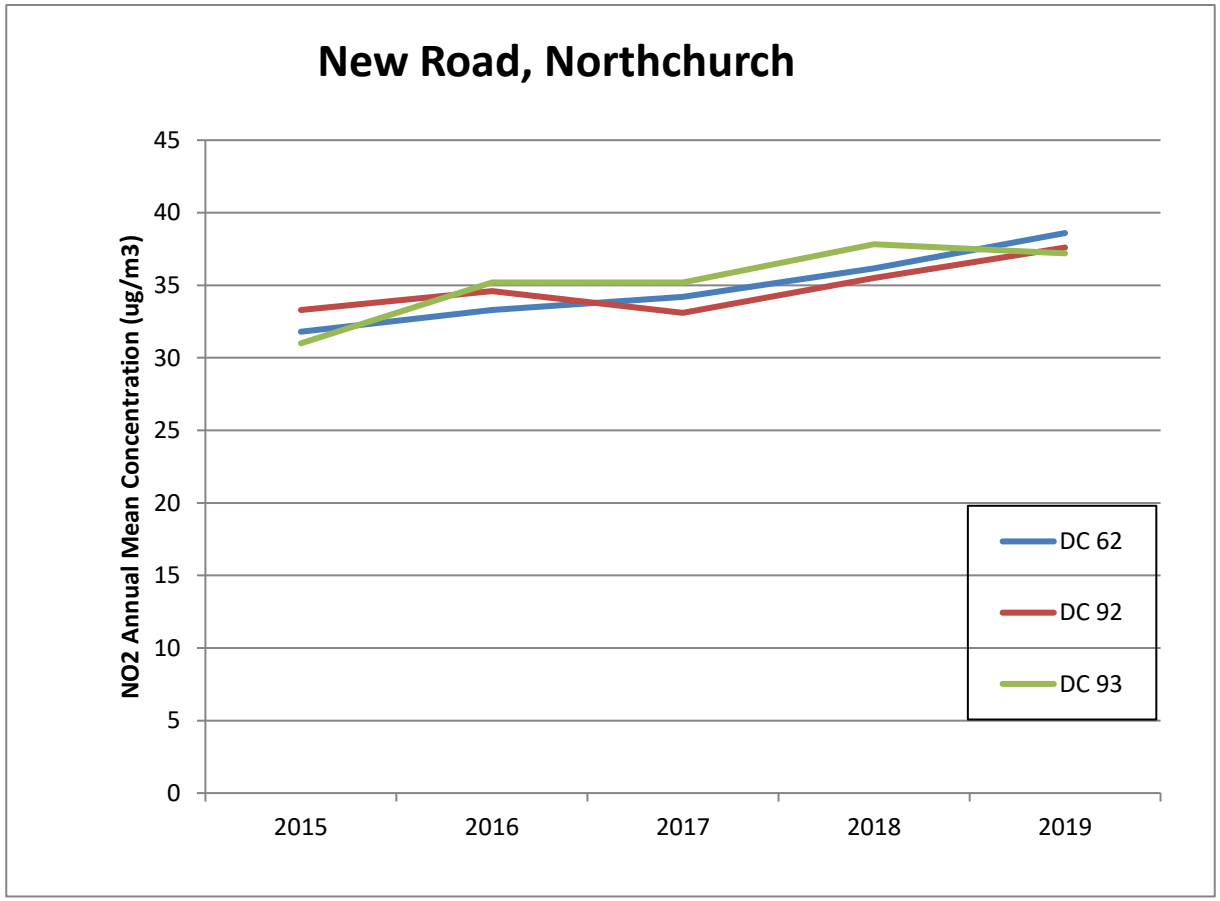
(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

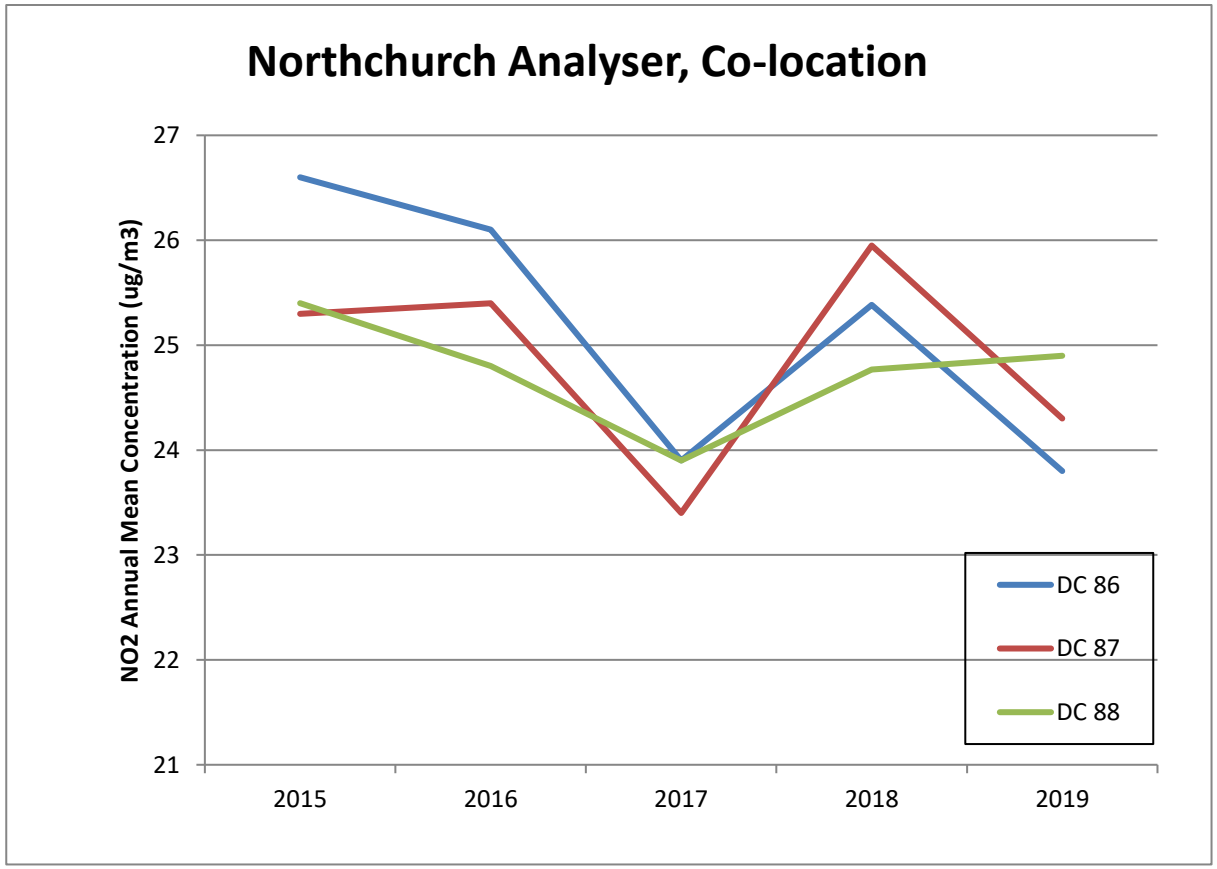
(4) Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

Figure A.1 – Trends in Annual Mean NO_2 Concentrations

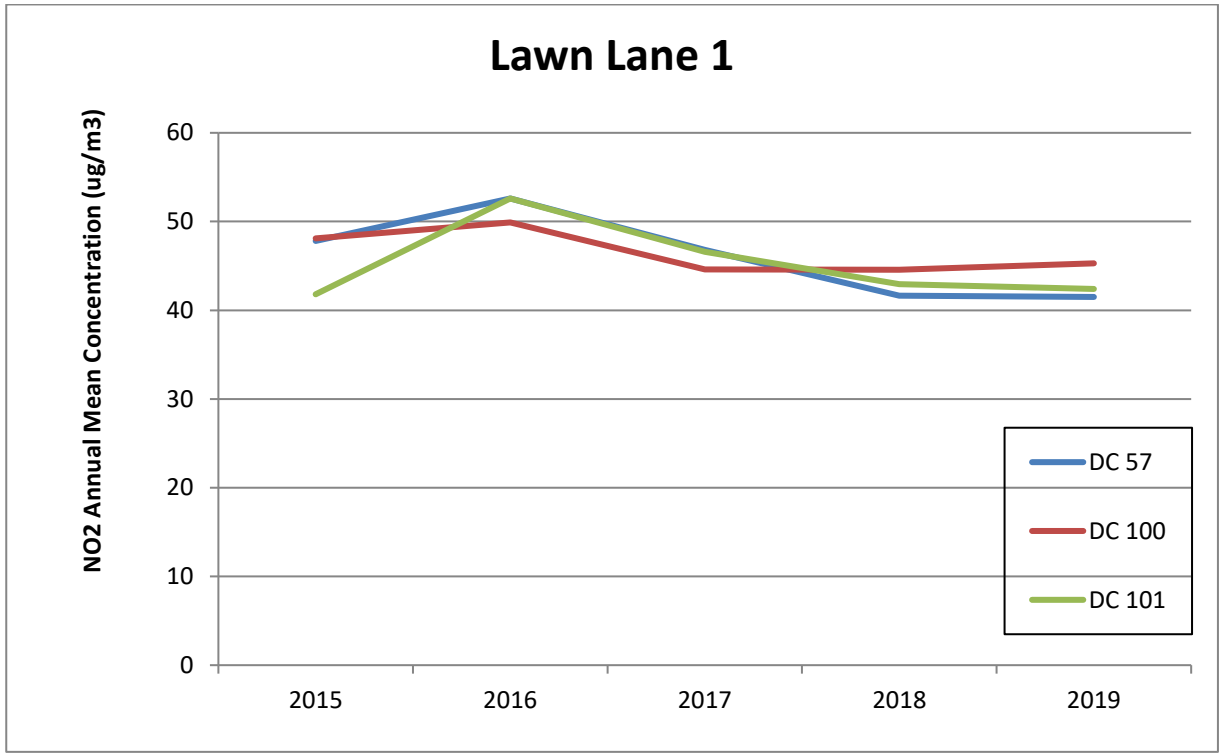
Northchurch AQMA

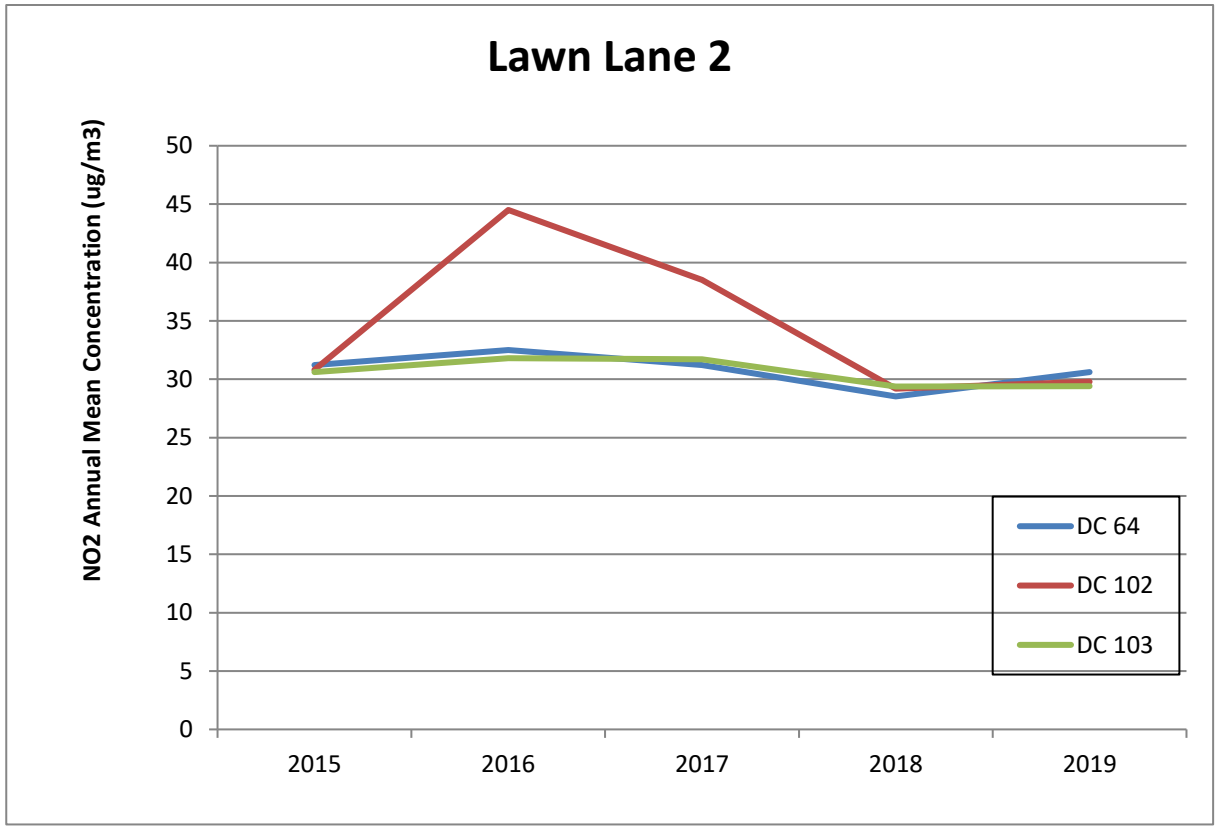


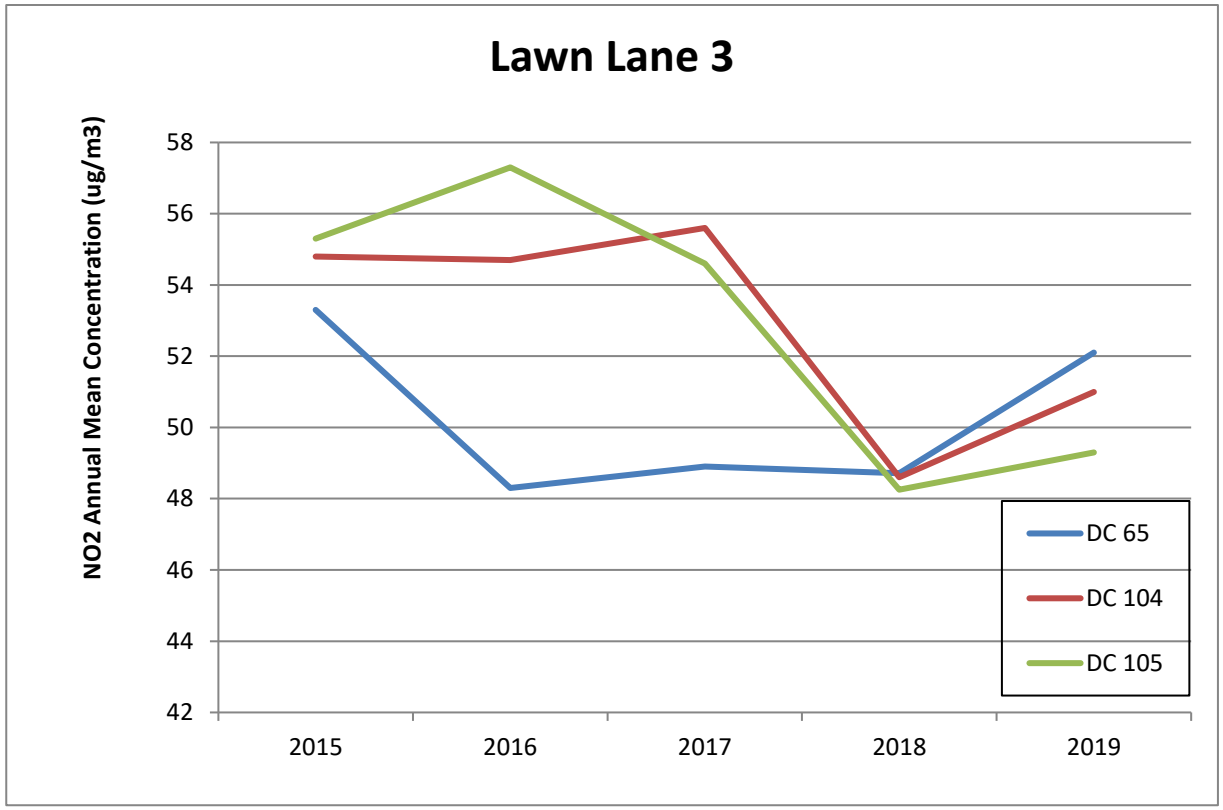

New Road, Northchurch
NO2 Annual Mean Concentration (ug/m3)
45
40
35
30
25
20
15
10
5
0
2015
2016
2017
2018
2019
DC 62
DC 92
DC 93


Northchurch Analyser, Co-location
NO2 Annual Mean Concentration (ug/m3)
27
26
25
24
23
22
21
2015
2016
2017
2018
2019
DC 86
DC 87
DC 88

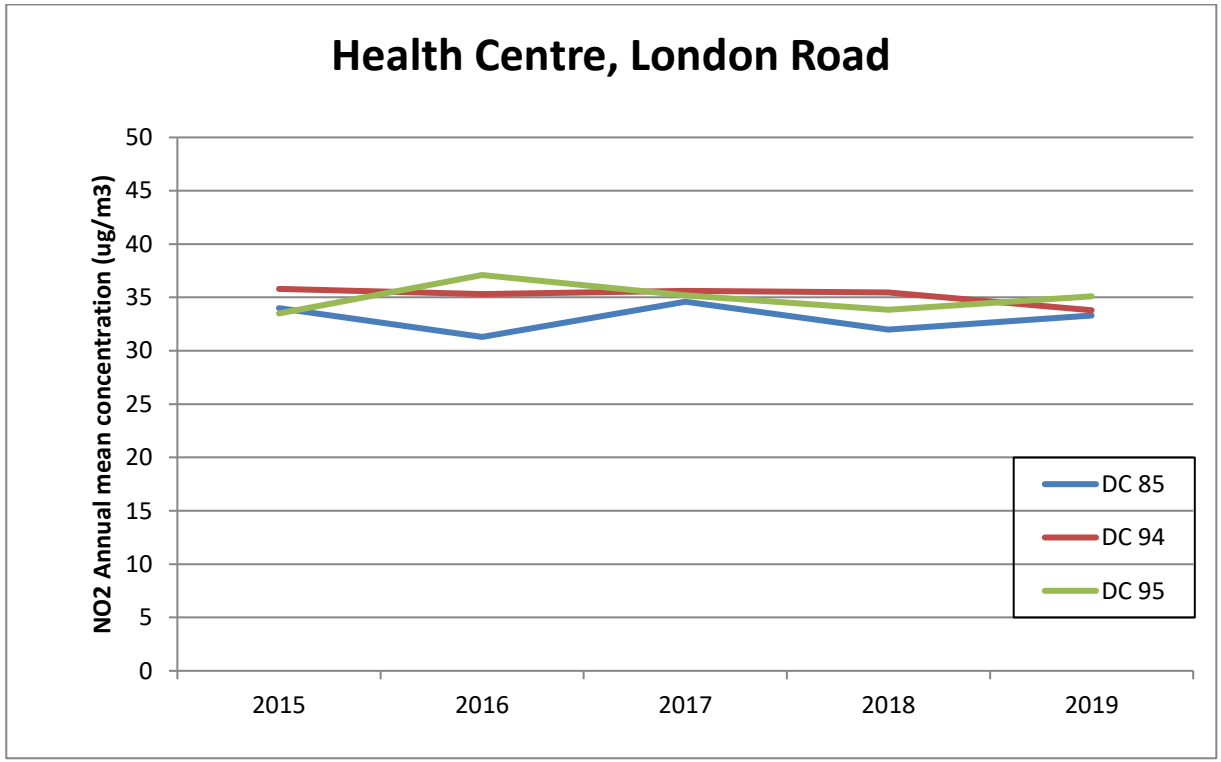
Lawn Lane AQMA

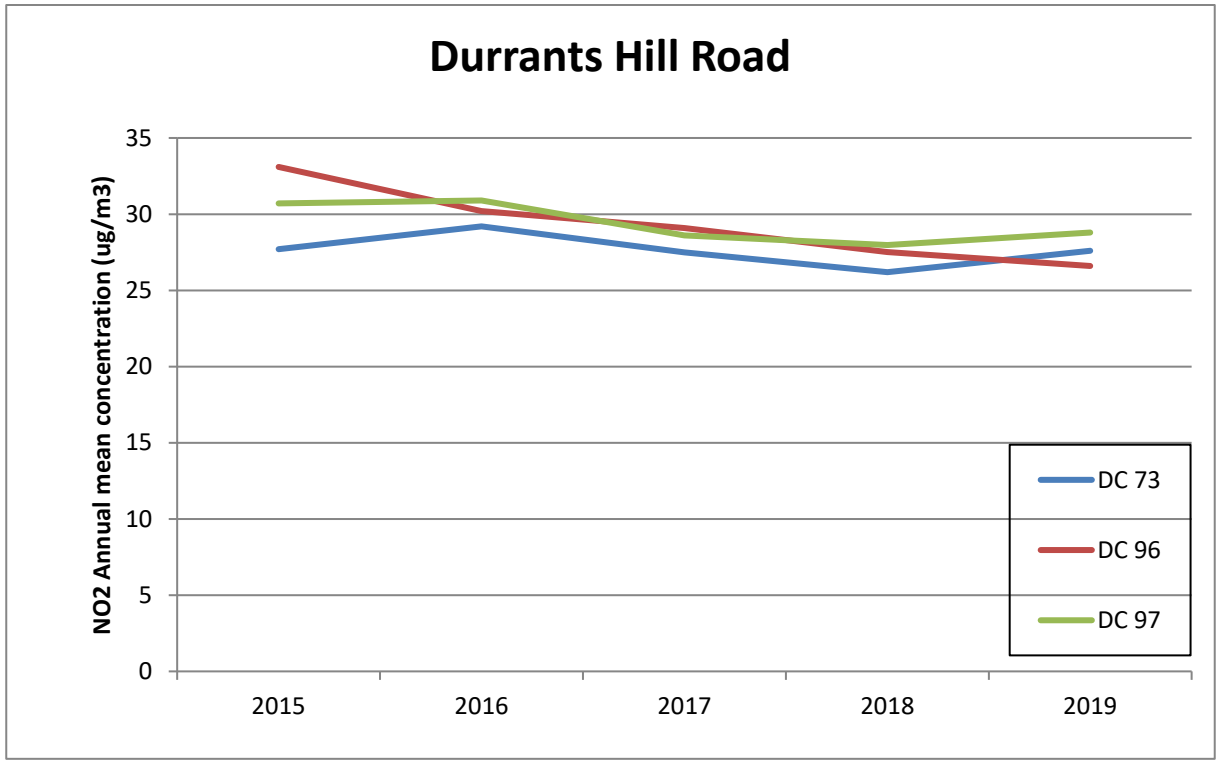



Lawn Lane 2
NO2 Annual Mean Concentration (ug/m3)
50
45
40
35
30
25
20
15
10
5
0
2015
2016
2017
2018
2019
DC 64
DC 102
DC 103


Lawn Lane 3
NO2 Annual Mean Concentration (ug/m3)
58
56
54
52
50
48
46
44
42
2015
2016
2017
2018
2019
DC 65
DC 104
DC 105

London Road AQMA




Durrants Hill Road
NO2 Annual mean concentration (ug/m3)
35
30
25
20
15
10
5
0
2015
2016
2017
2018
2019
DC 73
DC 96
DC 97

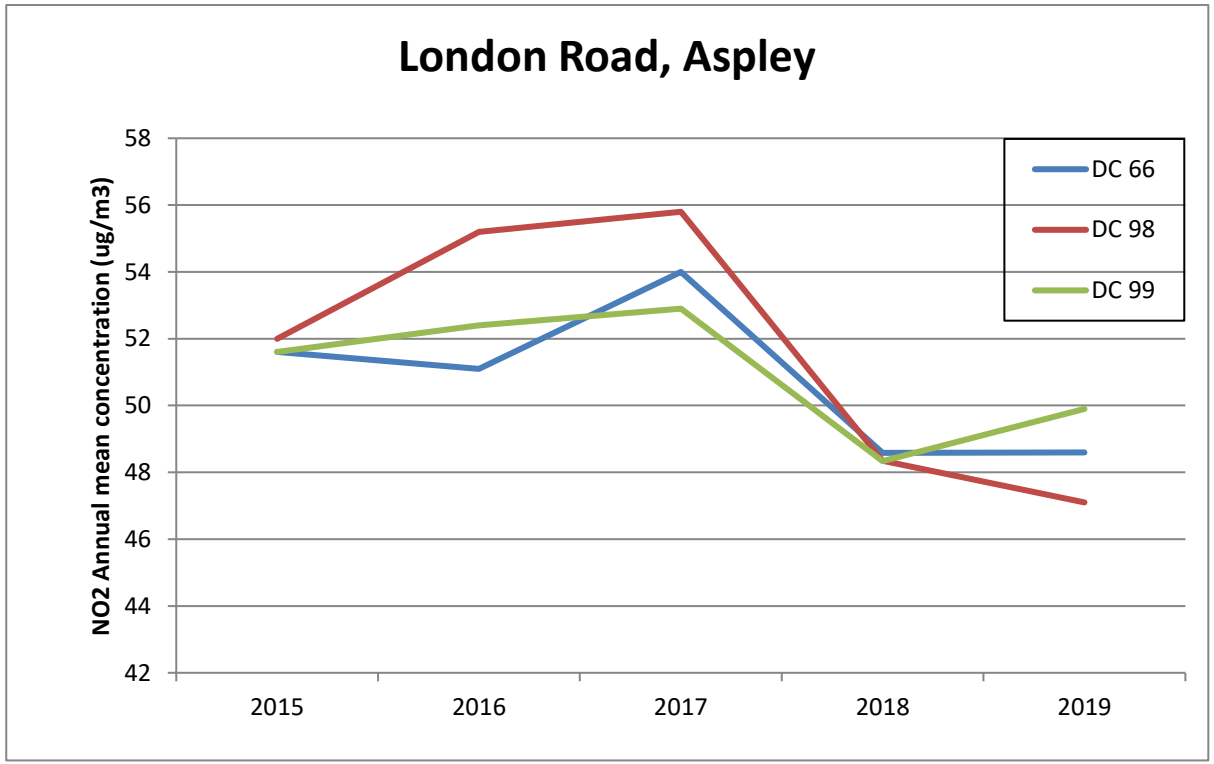

London Road, Aspley
NO2 Annual mean concentration (ug/m3)
58
56
54
52
50
48
46
44
42
2015
2016
2017
2018
2019
DC 66
DC 98
DC 99

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/m^3 (3)				
							2015	2016	2017	2018	2019
CM1	497295	208901	Roadside	Automatic	94	94	0	0	0	0	0

Notes:

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

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

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

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/m^3) (3)				
						2015	2016	2017	2018	2019
CM1	497295	208901	Roadside	99	99	13	12	12	17	18

☒ **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.

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/m^3 (3)				
						2015	2016	2017	2018	2019
CM1	497295	208901	Roadside	99	99	**1**	1	0	3	8

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 90.4th percentile of 24-hour means is provided in brackets.

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
CM1	497295	208901	Roadside	99	99	8	8	8	11	10

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

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.

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 (0.77) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
DC40	506780	207180	28.5	34.4	30.9	20.8	15.2	15.8	14.3	14.7	19.0	25.5	35.7	-	23.2	17.8	
DC42	508177	207934	28.3	35.6	20.6	29.2	21.2	21.2	19.3	17.7	22.7	27.5	36.5	-	25.4	19.6	
DC46	501541	203659	33.7	34.9	17.4	20.6	18.2	-	17.4	3.7	22.2	28.1	40	-	23.6	18.2	
DC47	499365	207724	41.6	49.3	34.8	45.9	34.7	33.4	32.9	32.6	39.3	40.4	54.2	41.3	40.0	30.8	
DC48	499207	207754	35.7	29.2	18.7	31.3	16.3	19	12.1	12.6	20.6	19.3	35.9	22.8	22.8	17.5	
DC50	497346	208835	50.1	49	35.6	50.3	39.7	40	36.4	28.5	41.2	42.7	58	37.5	42.4	32.7	
DC51	492552	211824	41.8	38	27.3	41.3	27	28.3	28.9	24.6	35	35.5	47.6	27.5	33.6	25.8	
DC52	492335	211386	44.8	39.7	33.1	30.2	24.8	24.2	23.7	18	21.1	27.2	41.7	33.7	30.2	23.2	
DC54	507606	201624	65	31.1	42	49.6	42.6	41.3	44.6	49.6	50.8	55.1	65.7	56.3	49.5	38.1	
DC55	507184	202690	45	46.6	35.8	41.9	31.3	32.3	32.5	29	31.8	37.9	49.1	40.4	37.8	29.1	
DC57	505923	205761	67	59.3	49.7	63.3	47.1	51.4	47.6	43.2	50.5	51.1	70.6	46.4	53.9	**41.5**	33.2
DC58	507058	206727	41.1	33.2	27.2	31.8	25.5	23.7	21.7	20.5	25	30.1	44.7	-	29.5	22.7	
DC59	506981	206829	44.2	54.1	31.7	32.5	25	25.7	28.1	28.8	30.5	33.6	46.8	-	34.6	26.7	
DC60	507483	206898	33.2	36.6	22.5	31.2	20.3	21.6	21	20.3	22.6	28.7	39.4	-	27.0	20.8	
DC61	507121	209252	43	52.3	27.4	29.6	24.9	25	26.6	25	31.9	37.2	50	-	33.9	26.1	

DC62	497335	208860	54.8	63.3	39.2	51.1	42.6	42.6	46.1	43.9	50.1	51.4	59.4	57	50.1	38.6	
DC63	497264	208927	42.5	40.4	25.6	33.8	24.6	24.7	25.5	24.6	29.2	30.3	44.7	30.7	31.4	24.2	
DC64	505969	205726	51.8	51.5	35.1	38.3	33	30.4	31.3	30.2	36.9	43.9	54.3	40.5	39.8	30.6	26.5
DC65	505930	205740	82.5	81.8	67.6	65.7	58.5	51	61.8	65.9	64.1	68.7	79	65.3	67.7	**52.1**	
DC66	505674	205514	78.6	72.3	64.3	58.6	57.2	51.4	64.3	57.4	62.3	62.4	66.7	62.1	63.1	**48.6**	
DC67	505948	207814	36.4	43	-	30.9	24.5	25.9	24.4	24	31.7	35.6	46.5	-	32.3	24.9	
DC68	507005	204677	51.8	50.4	34.8	33.5	32.4	31.4	32.4	32.3	39.4	43	51.7	41.2	39.5	30.4	
DC69	506053	205664	39.6	33.4	24	26	18.7	18.7	18.1	18.6	24.2	26.9	38	28.8	26.3	20.2	
DC70	505888	205801	54.3	50.7	35.6	-	35	-	31.1	31.8	37	43	59	40.1	41.8	32.2	
DC71	505636	205504	44.6	39.5	26.4	35.5	25.2	21.4	21.7	21.6	27.3	-	45.2	29.6	30.7	23.7	
DC73	505734	205519	40.1	43.6	29.2	45.3	30.9	31.4	30.3	28.4	33.9	36.5	45.3	34.8	35.8	27.6	24.6
DC74	505841	205395	54.7	54.5	34.3	41.1	35.5	30.1	33	37.4	39.4	44.4	50.6	41.4	41.4	31.9	
DC75	497472	208730	44.3	38.3	29.8	-	24.9	25.2	25.4	23.6	28	33.3	45.8	34	32.1	24.7	
DC76	505355	206504	45.6	57	33.3	45.5	32.2	33.4	32.3	35.7	38.2	45	48.3	40.4	40.6	31.2	
DC81	507122	204470	56.9	45.4	37.6	32.1	-	41.7	40.6	38.9	38	48.1	52.2	42.4	43.1	33.2	
DC85	505663	205528	57.4	55.1	35.4	47.4	37	32.6	39.5	34.5	40.7	41.6	57	40.4	43.2	33.3	29.6
DC86	497295	208901	41.3	30.8	27.3	35.1	26.3	24.2	26.5	24.7	28.9	31.8	39.4	34.3	30.9	23.8	
DC87	497295	208901	43.1	38.2	26.8	33.8	25.3	-	26.3	24.7	29.9	32.1	34.8	32.2	31.6	24.3	
DC88	497295	208901	42.1	44.5	23.9	38.7	25.4	23.9	25	24.4	28.8	34.9	44.2	32.7	32.4	24.9	
DC89	506227	216317	42.4	39.4	26.4	26.1	22.8	3.6	20.8	19	24.5	27.2	43.3	29.3	27.1	20.8	
DC90	497346	208835	54.8	49	37.6	49.1	36.2	33.3	34.7	28.7	42.6	45.2	62.2	38.7	42.7	32.9	
DC91	497346	208835	55.8	49.7	36	50.1	40.4	38.4	35.7	29.7	42.9	45.2	63.1	40.9	44.0	33.9	
DC92	497335	208860	39.4	68.4	45.5	48	43.5	43.2	44.9	42.1	44	50.7	63.2	52.9	48.8	37.6	
DC93	497335	208860	55.2	46.2	45.2	46.3	39.3	44.1	46	41.3	50.4	49.5	62.9	53.4	48.3	37.2	
DC94	505663	205528	55.6	49.6	39.6	53.4	34.8	34.7	33.8	36.8	42.8	45.5	58.5	40.9	43.8	33.8	30.0
DC95	505663	205528	58.8	53.5	34.7	51	37.7	35.6	36.1	37.6	42.2	47.1	65.7	46.9	45.6	35.1	31.0

DC96	505734	205519	39	49.6	31.6	40.1	26.3	5.6	28.7	29.8	35.5	38.8	49.9	39.6	34.5	26.6	25.0
DC97	505734	205519	44.9	45.6	31.2	46.1	30.7	31.1	29.6	29.8	33.3	39.5	49.4	37.8	37.4	28.8	26.9
DC98	505674	205514	75.7	78.2	58.3	54.4	56.9	48.3	61.9	60.7	54.7	58.5	62	64	61.1	**47.1**	
DC99	505674	205514	69.5	83.9	61.2	61.2	55.7	50.7	60.5	64.6	62.6	64.6	76.3	67	64.8	**49.9**	
DC100	505923	205761	64.9	-	-	60.9	48.2	95.5	49.4	43.8	55.5	48.1	72.2	49.2	58.8	**45.3**	35.8
DC101	505923	205761	63.6	59.4	50	64.8	48.1	57	50.1	44.5	53.7	51.4	68	50.8	55.1	**42.4**	33.8
DC102	505969	205726	51.8	50.1	39.8	37	32	30	31.2	30.2	35.3	38.8	49.9	38.7	38.7	29.8	25.9
DC103	505969	205726	51.3	49.3	36.2	36.6	32.2	29.4	31.4	31.1	35.2	38.4	49.7	37.9	38.2	29.4	25.7
DC104	505930	205740	87.2	76.4	62.5	61.5	61.7	52.4	60.9	63.3	62	66.8	75.1	64.6	66.2	**51.0**	
DC105	505930	205740	73.2	80.6	58.2	58.6	58.3	47.5	60.5	66.5	59.8	64.1	75	65.6	64.0	**49.3**	
DC106	505349	206667	49.3	45.5	30	37	26.2	23.6	22.2	22.1	33	33.7	46.3	-	33.5	25.8	
DC107	505508	207613	45.2	44.3	32.6	33.6	30.2	30	31.2	29.4	32.8	37.6	46.6	41.5	36.3	27.9	
DC111	496938	209235	47.7	38.2	31.4	35.7	25.7	24	26.7	24.4	28.7	32	44	34.5	32.8	25.2	
DC112	505876	216805	32.8	29.7	19.8	32.1	19.3	19.2	17.1	14	20.8	26.7	41.7	24.1	24.8	19.1	
DC113	499448	207870	30.2	31	19	21.8	14.8	14.9	16.7	15.9	19.1	21.9	33.2	24.5	21.9	16.9	
DC114	498417	208214	47.7	51	36.4	36.6	30.1	32.7	32.9	33.4	38.8	44	50.5	44.2	39.9	30.7	
DC115	498287	206978	36.8	31.4	21.9	26.6	16.8	16.4	16	16.4	23.3	25.4	39.8	-	24.6	19.0	
DC116	499384	207722	30.6	38.7	22.8	-	43.8	50.9	21.3	20	26.2	28.9	43.3	29.4	32.4	24.9	
DC117	498417	208214	47.4	40.8	28.1	32.5	30.4	26.7	25.9	21.6	31.6	34.8	52.2	32.9	33.7	26.0	
DC118	505508	207613	42.8	48	34.5	33.7	28.5	30.1	-	32.1	35.1	40.3	47.8	39	37.4	28.8	
DC119	505529	206298	52.5	48.7	40.4	41.4	35.1	36.6	36.9	26.7	39.9	45.1	57.1	-	41.9	32.2	
DC120	505529	206298	48.6	48.2	35	41.7	36.1	36.7	34.7	32.3	39.2	39.9	53.4	-	40.5	31.2	
DC121	505529	206298	35	49.5	38.5	46.8	34	35.4	35	36	42.4	45.9	55.8	-	41.3	31.8	
DC122	505551	206947	46.3	43.2	33.9	37.8	26.5	28.6	-	29.9	29.5	34.8	44.1	-	35.5	27.3	
DC123	498417	208214	39.5	48.2	36.6	41.4	35.6	31.4	31	31	39.3	40	-	37.5	37.4	28.8	
DC124	499108	207860	35.1	37.2	22.8	24.9	21.2	22.9	20.3	22.5	28.4	32.4	34.3	35.6	28.1	21.7	

DC125	499108	207860	32.8	-	20.4	32	20.9	23.4	20.4	19.1	24	-	32.1	26.8	25.2	19.4	
DC126	499208	208140	28.3	30.1	16.8	23.3	15.7	15	15.8	14.1	19.5	22	32.2	23.2	21.3	16.4	
DC127	498287	206978	51.4	44	32.2	44.9	34.1	34.8	28.9	26	31.7	37.6	52.3	33.3	37.6	29.0	
DC128	495608	208711	40.5	42.1	33.9	40.3	29.3	32.2	30.8	29.7	38	39.4	50.8	30.4	36.5	28.1	
DC129	498293	207011	39.6	39.6	30.4	31.7	27.3	25	23.5	23.9	29.8	30.8	42.3	30.6	31.2	24.0	
DC130	498313	206945	53.9	43.2	42.6	42.5	37.9	39.9	33.7	30.6	39.7	43	56.1	42.7	42.2	32.5	
DC131	499703	207838	38.8	40.7	27.5	40.2	28.3	29.9	29.4	24.8	32.7	29.9	40.1	31.4	32.8	25.3	

☒ **Local bias adjustment factor used**

☐ **National bias adjustment factor used**

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

☒ **Where applicable, data has been distance corrected for relevant exposure in the final column**

Notes:

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

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

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

(2) Distance corrected to nearest relevant public exposure.

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

QA/QC of Automatic Monitoring

The High Street, Northchurch automatic monitoring station has been operating a NO_2 chemiluminescent analyser since November 2012 and FIDAS for particulate matter since August 2015. The 2019 data validation and ratification was carried out by Ricardo – AEA.

The Local Site Operative (LSO) duties and bi – annual services of the NOx analyser were undertaken by Enviro Technology Services; with the routine calibrations carried out once a month.

The particulate matter analyser bi-annual service in 2018 was completed by air monitors in accordance with the manufacturers' instructions. Quality control audits are undertaken twice yearly and supplied by the National Physics Laboratory (NPL).

QA/QC of Diffusion Tube Monitoring

During 2019, NO_2 monitoring was undertaken at 54 sites within the borough using passive diffusion tubes. The Northchurch diffusion tubes at location DC86, 87 and 88 were used as a co-location site with triplicate tubes co-located with the continuous monitor.

The tubes were supplied and analysed by SOCOTEC (a UKAS accredited laboratory). The tubes were prepared by spiking acetone:triethanolamine (50:50) onto the grids prior to the tubes being assembled. The tubes were desorbed with distilled water and the extract analysed using a segmented flow auto analyser with ultraviolet detection.

The exposure periods for the diffusion tubes are those of the UK Nitrogen Dioxide Diffusion Tube Network run by NETCEN which effectively is a four or five week duration. QA/QC procedures are as detailed in the UK NO_2 Diffusion Tube Network Instruction Manual which can be found in the link below:

https://uk-air.defra.gov.uk/assets/documents/reports/cat06/no2instr.pdf

All diffusion tube results have been corrected for bias by applying the local bias adjustment factor of 0.77 using the Local Bias Adjustment Factor Tool. A local bias adjustment factor has been applied, since at the time of writing, the national bias

adjustment factor dataset is incomplete and therefore provisional. For completeness a screenshot of the local bias adjustment tool calculator is presented below. However the provisional national bias adjustment factor for results analysed by SOCOTEC (Didcot) provides an adjustment factor of 0.75. If applying the provisional national adjustment factor of 0.75 (compared with a local bias of 0.77), this would only result in a slight downward revision of 2019 results, and thus no correction is considered necessary.

The National Diffusion Tube Bias Adjustment Factors for 2019 diffusion tube monitoring data can be found here:

https://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html

SOCOTOEC confirms that the methods and procedures they follow meet the guidelines set out in Defra's "Diffusion Tubes for Ambient Monitoring: Practical Guidance". SOCOTEC also takes part in the WASP Proficiency Scheme and the laboratory performance is rated at the highest level of "good".

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
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	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	09/01/2019	06/02/2019	41.3	43.1	42.1	42	0.9	2	2.2	37.7	99	Good	Good
2	06/02/2009	06/03/2019	30.8	38.2	44.5	38	6.9	18	17.0	32	99	Good	Good
3	06/03/2019	03/04/2019	27.3	26.8	23.9	26	1.8	7	4.6	21.6	99	Good	Good
4	03/04/2019	02/05/2019	35.1	33.8	38.7	36	2.5	7	6.3	25.5	99	Good	Good
5	02/05/2019	06/06/2019	26.3	25.3	25.4	26	0.6	2	1.4	21	95	Good	Good
6	06/06/2019	03/07/2019	24.2	4.0	23.9	17	11.6	67	28.8	17	100	Poor Precision	Good
7	03/07/2019	08/08/2019	26.5	26.3	25.0	26	0.8	3	2.0	18	78	Good	Good
8	08/08/2019	05/09/2019	24.7	24.7	24.4	25	0.2	1	0.4	18	99	Good	Good
9	05/09/2019	02/10/2019	28.9	29.9	28.8	29	0.6	2	1.5	20	99	Good	Good
10	02/10/2019	06/11/2019	31.8	32.1	34.9	33	1.7	5	4.2	22	99	Good	Good
11	06/11/2019	05/12/2019	39.4	34.8	44.2	39	4.7	12	11.7	31.6	99	Good	Good
12	05/12/2019	09/01/2020	34.3	32.2	32.7	33	1.1	3	2.7	23	69	Good	or Data Capture
13													
										Overall survey -->		Good precision	Good Overall DC

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

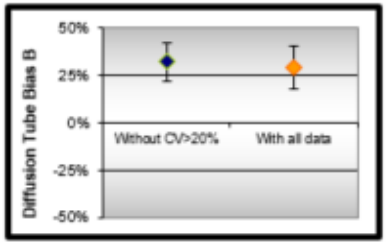
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:

Precision 11 out of 12 periods have a CV smaller than 20%

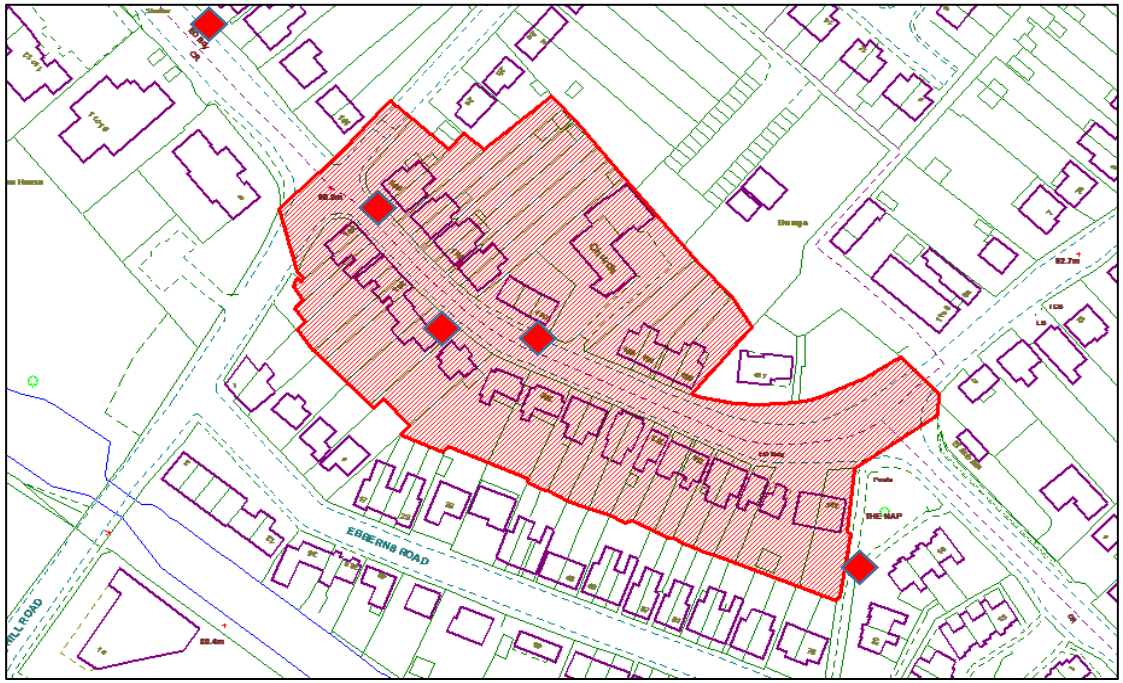
Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 10 periods of data	
Bias factor A	0.77 (0.72 - 0.83)
Bias B	30% (20% - 39%)
Diffusion Tubes Mean:	32 μgm^{-3}
Mean CV (Precision):	6
Automatic Mean:	25 μgm^{-3}
Data Capture for periods used:	97%
Adjusted Tubes Mean:	25 (23 - 27) μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 11 periods of data	
Bias factor A	0.78 (0.72 - 0.86)
Bias B	28% (17% - 39%)
Diffusion Tubes Mean:	31 μgm^{-3}
Mean CV (Precision):	11 caution
Automatic Mean:	24 μgm^{-3}
Data Capture for periods used:	97%
Adjusted Tubes Mean:	24 (22 - 26) μgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

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



Legend

Diffusion Tube Location

AQMA Boundary

Location: Lawn Lane, Hemel Hempstead

AQMA Order No. 1 – Lawn Lane, Hemel Hempstead incorporating local monitoring locations

Declared June 2012

Figure No. 1

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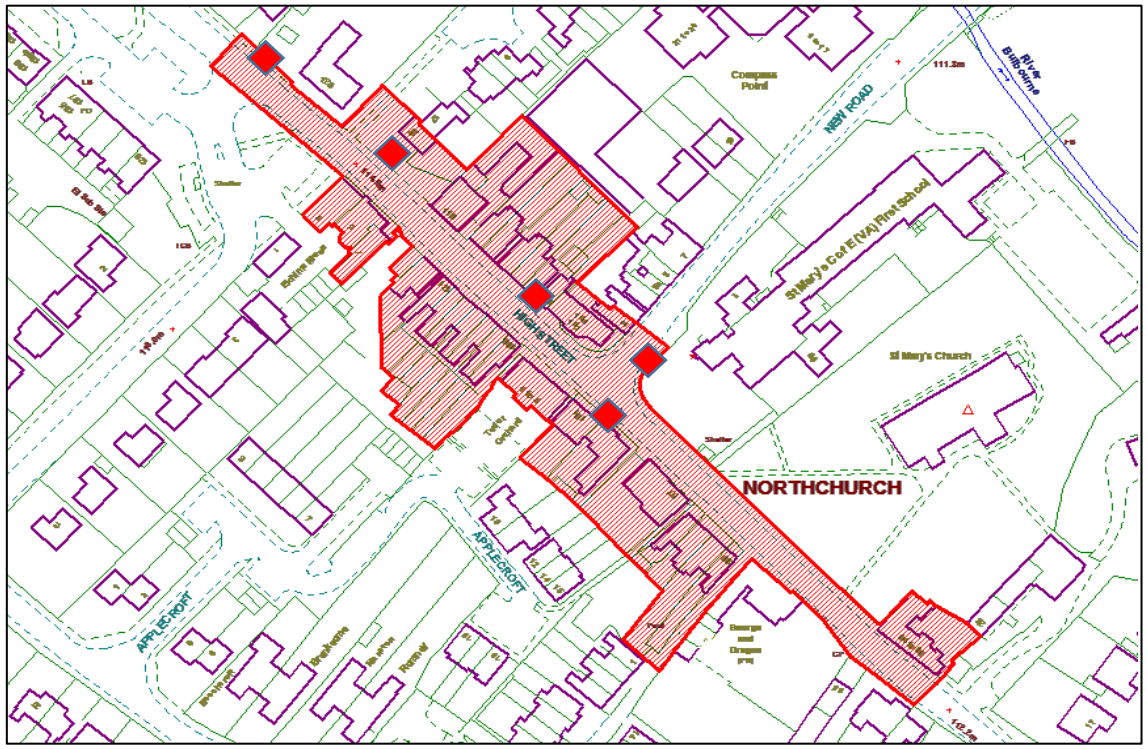
Location: London Road, Apsley

AQMA Order No. 2 – London Road, Aspley incorporating local monitoring locations

Declared June 2012	**Figure No. 1**



Legend

Diffusion Tube Location

AQMA Boundary

Location: High Street, Northchurch

AQMA Order No. 3 – High Street, Northchurch incorporating local monitoring locations

Declared June 2012, amended Oct 2013

Figure No. 1

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
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

[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

References

1. DEFRA (2009). Part IV of the Environment Act 1995 Environment (Northern Ireland) Order 2002 Part III Local Air Quality Management Technical Guidance LAQM.TG(09)
2. DEFRA UK Air Information Resource website: http://uk-air.defra.gov.uk
3. Hertfordshire and Bedfordshire Air Quality Network: www.hertsandbedsair.net
4. Local Air Quality Management, Policy Guidance LAQM. PG (09) (2009) Department for Environment, Food and Rural Affairs
5. Local Air Quality Management, Technical Guidance LAQM. TG (09) (2009) Department for Environment, Food and Rural Affairs
6. The Environment Act 1995, HMSO The Environmental Permitting (England and Wales) Regulations 2010 (as amended)
7. https://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html
8. Hertfordshire Local Authorities Report on Particulate Matter (PM2.5) in Ambient Air in 2018 for Hertfordshire County Council Public Health [November 2019]: www.hertsandbedsair.net