2019 Air Quality Annual Status Report (ASR)

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

July, 2019

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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 Monitoring Data

Across Dacorum, where monitoring is undertaken, the concentrations of nitrogen dioxide (NO_2) are generally showing a decline. For the first year this also includes monitoring within one the AQMAs (Northchurch, Berkhamsted) that now appear to be below intervention limits.

For its local monitoring the Council utilises one real-time analyser in the Northchurch AQMA. This monitors for oxides of nitrogen as well fine particulate (both PM_{10} and $PM_{2.5}$). The Council also has a network of diffusion tubes across the district which currently totals 77 tubes across 63 locations, and is used to monitor nitrogen dioxide. Exceedances of the National Air Quality Objective have only been measured in the Council's other AQMAs, namely Lawn Lane and London Road (Apsley).

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.

Air Quality in Dacorum

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas[1,2].

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

The main pollutants of interest in Dacorum continue to be NO_2 and fine particulates. These are mainly associated with road transportation sources.

From the data gathered in 2018, there has been a general overall reduction in NO_2 concentrations. Within the Northchurch AQMA the reduction in NO_2 concentrations has resulted in monitoring at all locations falling below intervention limit values. However as this is the first year of monitoring below intervention values, it is too early to consider revoking this AQMA.

Within the Apsley and London Road AQMAs the annual average for NO_2 has seen a decline, but despite this ambient levels at a number of locations still remain notably above the objective limit value.

A summary of the three AQMAs within Dacorum are:

- AQMA 1: Lawn Lane, Hemel Hempstead
- AQMA2 : London Road, Apsley
- AQMA 3: Northchurch, Berkhamsted

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

Actions to Improve Air Quality

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 a draft plan before submission to DEFRA.

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.

A current overview of measures proposed by 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

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 recent monitoring results within the Northchurch AQMA are also a positive sign for air quality in this locality. The Council shall continue to ensure that monitoring continues to determine if conditions remain favourable to consider revoking this AQMA as well as ensuring that it maintains the local monitoring network across the district.

Local Engagement and How to get Involved

As part of the AQAP delivery 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 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 Dacorum 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 **Error! Reference source not found.** in Appendix E.

2 Actions to Improve Air Quality

As noted in the executive summary the Council has reviewed its current air quality action plan (AQAP) which was set to run from 2015 – 2018.

Cabinet approval was granted for the revised draft AQAP which is be implemented over 5 years, 2019 – 2024. The council has arranged for a steering group to be set-up which will be made up of internal partners and the County Council.

As part of the AQAP implementation a copy of the draft AQAP will be submitted to Defra along with this ASR for comment.

The emphasis of the draft AQAP is to promote a general emissions reduction. Whilst it must focus on reducing concentrations of nitrogen dioxide locally, it is also expected to benefit other pollutants, i.e. fine particulate.

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

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 Borough Council 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/local-authorities?la_id=73

Alternatively, see Appendix D: Map(s) of Monitoring Locations and AQMAs, which provides for a map of air quality monitoring locations in relation to the AQMA(s).

Table 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	48.7	ug/m^3	Under review	Under review	Under review
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	48.6	ug/m^3	Under review	Under review	Under review

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	37.8	ug/m^3	Under review	Under review	Under review

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

2.2 Progress and Impact of Measures to address Air Quality in Dacorum

As stated earlier in this chapter the Council has reviewed and approved a draft revision of its current AQAP. The Council has begun to put in place arrangements for the creation of a steering group to outline a work programme for the remainder of the year as well as prioritisation of each measure.

Alongside the submission for its ASR for 2019, a copy of the draft AQAP has been submitted to Defra for review and comment.

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.

In reviewing its AQAP the Council has put forward 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).

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, PM_{10} and $PM_{2.5}$ as well as deploying a network non-automatic (passive) diffusion tubes which monitor for nitrogen dioxide at 63 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 nitrogen dioxide and PM_{10} are being met in all other areas of the district. This also includes monitoring of the Northchurch AQMA.

This is the first year since declaring the AQMA that local monitoring has been shown to be below the objective limit. Should the Council intend to revoke the AQMA however it is understood that it will need to demonstrate that local monitoring is year on year consistently below the objective limit.

With respect to the Lawn Lane and London Road AQMAs there is a notable improvement at all locations when comparing results for 2017. However nitrogen dioxide levels in these AQMAs remain considerably above the objective for this pollutant and therefore no change is being considered to the status of these AQMAs.

3.1.1 Automatic Monitoring Sites

The Council undertook automatic (continuous) monitoring at one site during 2018. 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 nitrogen dioxide, PM_{10} and $PM_{2.5}$. In 2018 data capture at the site was above 99% for fine particulate and 85% for nitrogen dioxide. The monitoring results show that:

- The annual mean objective for all pollutants monitored was achieved at site
- The hourly mean objective for nitrogen dioxide 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

The Council undertook non- automatic (passive) monitoring of NO_2 at 57 sites during 2018. Table A.2 in Appendix A shows the details of the sites.

With the exception of DC67 (Allandale), DC108 (Old Town), DC109 and DC110 (St Mary's) data capture for all monitoring sites was over 75%. The results for Allandale have been annualised by following guidance outlined in Box 7.10 of Technical Guidance LAQM.TG16. This has not been completed for DC108 – DC110 as these sites were not monitored in 2018.

All diffusion tube results have been subject to bias adjustment by applying the national bias adjustment value of 0.76 for diffusion tubes analysed by SOCOTEC Didcot.

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

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO_2)

With the exception of the Lawn Lane and London Road AQMA the results for the diffusion tube monitoring undertaken throughout 2018 show compliance with the annual mean objective for nitrogen dioxide. Overall monitoring results for 2018 show

a general decline in ambient nitrogen dioxide concentrations when compared with 2017 monitoring results.

In the Northchurch AQMA monitoring of nitrogen dioxide at all locations have been measured below the objective limit. This is the 1st year that local monitoring can be used to demonstrate the objective for this pollutant is now being met, however if the Council seeks to revoke this AQMA it will need to demonstrate compliance with the objective for nitrogen dioxide year on year.

Ambient levels for nitrogen dioxide from monitoring in the Lawn Lane and London Road AQMA are also noted to have decreased when compared with monitoring results from 2017. However pollutant levels for nitrogen dioxide still remain well above the objective limit at a number of monitoring positions.

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.

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_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 2018 data capture was identified as good. No exceedances were measured for either of the objectives relevant to PM_{10}, and when noting results over the last four years these are fairly consistent and remain well below intervention levels.

The annual average measured in 2018 was 17µg/m^3, whereas the objective limit is 40µg/m^3. A 24 hour average that exceeded 50µg/m^3 was measured on only 3 occasions, whereas the objective limit is 50µg/m^3 not to be exceeded more than 35 times a year.

Error! Reference source not found. 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.5 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 11.3µg/m^3. This is an increase on the previous 3 years of monitoring where the annual average was 8µg/m^3 year on year.

Table A.6 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations since 2015.

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	Y OS Grid Ref	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	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
DC40	Sawyers Way HH	Background	506780	207180	NO2	NO	5	2	NO	
DC42	Wood Lane End HH	Background	508177	207934	NO2	NO	12	1	NO	
DC46	High Street Bovingdon	Kerbside	501541	203659	NO2	NO	13	N/A	NO	
DC47	High Street Berkhamsted	Roadside	499365	207724	NO2	NO	20	N/A	NO	
DC48	Prince Edward Street Berkhamsted	Background	499207	207754	NO2	NO	12	35	NO	
DC50	High Street Northchurch	Roadside	497346	208835	NO2	YES	1	N/A	NO	
DC51	Brook Street Tring	Kerbside	492552	211824	NO2	NO	8	N/A	NO	
DC52	High Street Tring	Roadside	492335	211386	NO2	NO	30	N/A	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	N/A	NO	
DC57	Lawn Lane 1 HH	Roadside	505923	205761	NO2	YES	2	N/A	NO	
DC58	Gammon Close HH	Background	507058	206727	NO2	NO	6	22	NO	
DC59	Wadley Close HH	Background	506981	206829	NO2	NO	10	11	NO	

DC60	Field Road HH	Background	507483	206898	NO2	NO	1	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	N/A	NO	
DC63	Darrs Lane Northchurch	Roadside	497264	208927	NO2	YES	5	1	NO	
DC64	Lawn Lane 2 HH	Roadside	505969	205726	NO2	YES	8	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	Roadside	506053	205664	NO2	NO	8	25	NO	
DC70	Lawn Lane 4	Roadside	505888	205801	NO2	NO	6	2	NO	
DC71	Orchard Street	Kerbside	505636	205504	NO2	NO	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 Northchurch	Roadside	497472	208730	NO2	NO	10	2	NO	
DC76	The Cotterells	Kerbside	505355	206504	NO2	NO	5	1	NO	
DC81	Sappi 2	Roadside	507122	204470	NO2	NO	10	1	NO	
DC85	Health Centre, London Road	Kerbside	505663	205528	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	Kerbside	505663	205528	NO2	YES	4	1	NO	
DC95	Health Centre, London Road B	Kerbside	505663	205528	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	2	N/A	NO	

DC101	Lawn Lane 1B	Roadside	505923	205761	NO2	YES	2	N/A	NO	
DC102	Lawn Lane 2A	Roadside	505969	205726	NO2	YES	8	1	NO	
DC103	Lawn Lane 2B	Roadside	505969	205726	NO2	YES	8	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	
DC108	Old Town Hemel Hempstead	Kerbside	499703	207838	NO2	NO	0	6	NO	
DC109	St Marys 1	Background	496938	209235	NO2	NO	0	9	NO	
DC110	St Marys 2	Background	496938	209235	NO2	NO	0	3.5	NO	
DC111	St Marys 3	Background	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	Kerbside	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	Kerbside	505551	206947	NO2	NO	2	1	NO	
DC123	High St/Lower Kings Rd Junct., Berkhamsted	Kerbside	498417	208214	NO2	NO	1	1.5	NO	
DC124	Waitrose Entrance, Lower Kings Rd, Berkham	Kerbside	499108	207860	NO2	NO	5	1	NO	
DC125	Canal, Lower Kings Road, Berkhamsted	Kerbside	499108	207860	NO2	NO	3	3	NO	
DC126	Broadwater, Berkhamsted	Background	499208	208140	NO2	NO	N/A	1	NO	
DC127	BFI, Kings Road, Berkhamsted	Kerbside	498287	206978	NO2	NO	5	2	NO	
DC128	Shootersway, Berkhamsted	Background	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	Kerbside	499703	207838	NO2	NO	0	1	NO	

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.

Table A.3 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2018 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2014	2015	2016	2017	2018
CM1	Roadside	Automatic	85	85	30	26	29	29	29.3
DC40	Background	Diffusion Tube	100	100	21.1	19	19.4	18.2	17.3
DC42	Background	Diffusion Tube	100	100	n/a	21	21.5	19.4	20.8
DC46	Kerbside	Diffusion Tube	100	100	23.5	19.7	19	19.1	17.8
DC47	Roadside	Diffusion Tube	100	100	36.7	31.4	32.7	32.1	29.5
DC48	Background	Diffusion Tube	100	100	20.7	19	19.6	18.1	17.9
DC50	Roadside	Diffusion Tube	100	100	**44.8**	39.4	**42.4**	**42.3**	33.0
DC51	Kerbside	Diffusion Tube	100	100	29.2	25.3	23.7	24.4	25.4
DC52	Roadside	Diffusion Tube	100	100	32	27.7	28.7	29.4	26.3
DC54	Roadside	Diffusion Tube	100	100	54.5	44	44.6	44.3	40.8
DC55	Roadside	Diffusion Tube	100	100	34.4	30.1	31	29.9	28.5
DC57	Roadside	Diffusion Tube	100	100	**53.9**	**47.8**	**52.6**	**46.8**	**41.6**
DC58	Background	Diffusion Tube	100	100	27.3	24.4	33.4	23.8	24.1
DC59	Background	Diffusion Tube	100	100	34.4	28.9	29.2	27.8	25.7
DC60	Background	Diffusion Tube	100	100	24.7	20.9	22.4	19.2	20.3

DC61	Roadside	Diffusion Tube	100	100	29.6	26.3	27	26	24.5
DC62	Roadside	Diffusion Tube	100	100	39.7	31.8	33.3	34.2	36.2
DC63	Roadside	Diffusion Tube	100	100	29	25.2	25.8	25.3	23.5
DC64	Roadside	Diffusion Tube	100	100	36.6	31.2	32.5	31.2	28.5
DC65	Roadside	Diffusion Tube	100	100	**59.9**	**53.3**	**48.3**	**48.9**	**48.7**
DC66	Roadside	Diffusion Tube	100	100	**56.9**	**51.6**	**51.1**	**54**	**48.6**
DC67	Roadside	Diffusion Tube	67	67	28.5	25	26.9	25	26.0
DC68	Roadside	Diffusion Tube	92	92	36.3	32.9	33.3	32.2	32.9
DC69	Roadside	Diffusion Tube	92	92	24.5	21	23.6	21.1	20.6
DC70	Roadside	Diffusion Tube	92	92	39.4	34.2	35.1	34.1	36.4
DC71	Kerbside	Diffusion Tube	100	100	26.7	23	26	23.9	22.3
DC73	Roadside	Diffusion Tube	100	100	34.8	27.7	29.2	27.5	26.2
DC74	Roadside	Diffusion Tube	100	100	**43.5**	35	34.7	36.1	32.2
DC75	Roadside	Diffusion Tube	83	83	27.6	24	26.6	23.4	24.7
DC76	Kerbside	Diffusion Tube	100	100	37.4	31.7	32.9	32.1	31.8
DC81	Roadside	Diffusion Tube	83	83	**43 (40.3)**	33.8	35.1	35.4	32.1
DC85	Kerbside	Diffusion Tube	100	100	**40.5**	34	31.3	34.6	32.0
DC86	Roadside	Diffusion Tube	75	75	30	26.6	26.1	23.9	25.4

DC87	Roadside	Diffusion Tube	75	75	28.9	25.3	25.4	23.4	25.9
DC88	Roadside	Diffusion Tube	75	75	29	25.4	24.8	23.9	24.8
DC89	Roadside	Diffusion Tube	100	100	27	23.2	24	23	22.4
DC90	Roadside	Diffusion Tube	100	100	**47.9**	38	**43.6**	**40.4**	34.2
DC91	Roadside	Diffusion Tube	100	100	**47.1**	**40.7**	**40.5**	**42.6**	33.6
DC92	Roadside	Diffusion Tube	100	100	39.5	33.3	34.6	33.1	35.5
DC93	Roadside	Diffusion Tube	92	92	37.8	31	35.2	35.2	37.8
DC94	Kerbside	Diffusion Tube	100	100	**43**	35.8	35.3	35.6	35.5
DC95	Kerbside	Diffusion Tube	100	100	**40.4**	33.5	37.1	35.2	33.8
DC96	Roadside	Diffusion Tube	100	100	37.1	33.1	30.2	29.1	27.5
DC97	Roadside	Diffusion Tube	100	100	35	30.7	30.9	28.6	28.0
DC98	Roadside	Diffusion Tube	100	100	**48.9**	**52**	**55.2**	**55.8**	**48.3**
DC99	Roadside	Diffusion Tube	100	100	**60.2**	**51.6**	**52.4**	**52.9**	**48.3**
DC100	Roadside	Diffusion Tube	100	100	**55.8**	**48.1**	**49.9**	**44.6**	**44.6**
DC101	Roadside	Diffusion Tube	100	100	**53.5**	**41.8**	**52.6**	**46.6**	**42.9**
DC102	Roadside	Diffusion Tube	100	100	36.8	30.8	**44.5**	38.5	29.2
DC103	Roadside	Diffusion Tube	100	100	36.5	30.6	31.8	31.7	29.4
DC104	Roadside	Diffusion Tube	100	100	**59.1**	**54.8**	**54.7**	**55.6**	**48.6**

DC105	Roadside	Diffusion Tube	92	92	**64.2**	**55.3**	**57.3**	**54.6**	**48.3**
DC106	Roadside	Diffusion Tube	100	100	34.6	28.3	29.3	26.9	26.6
DC107	Roadside	Diffusion Tube	92	92	32	28	27.4	29.5	27.2
DC108	Kerbside	Diffusion Tube	0	0	21.8	18.2	19.2	18	n/a
DC109	Background	Diffusion Tube	0	0	19.8	20.6	18.3	18.3	n/a
DC110	Background	Diffusion Tube	0	0	25.9	25	25.1	25.2	n/a
DC111	Background	Diffusion Tube	92	92	26.9	24.6	25.4	26.3	25.6
DC112	Roadside	Diffusion Tube	100	100	26.6	19.6	21.9	19.3	19.6
DC113	Roadside	Diffusion Tube	100	100	20.9	16.8	19.5	17.6	16.1
DC114	Roadside	Diffusion Tube	100	100	**44.9**	36.2	35.4	33.3	29.2
DC115	Roadside	Diffusion Tube	100	100	23.7	22.4	22.2	19	19.0
DC116	Roadside	Diffusion Tube	92	92	31.2	23.8	23.2	21.9	26.0
DC117	Kerbside	Diffusion Tube	100	100	36.5	27.8	28.8	27.4	27.3
DC118	Roadside	Diffusion Tube	83	83	39.6	27.7	30.9	30.6	26.9
DC119	Roadside	Diffusion Tube	100	100	**45**	36.2	37.3	34.6	33.2
DC120	Roadside	Diffusion Tube	100	100	**44**	35.3	37.4	34.6	34.8
DC121	Roadside	Diffusion Tube	83	83	**43.8**	35.9	38.2	36.1	34.1
DC122	Kerbside	Diffusion Tube	100	100	**55.7**	37.2	30.9	31.3	27.7

DC123	Kerbside	Diffusion Tube	100	100	n/a	n/a	n/a	32.9	30.9
DC124	Kerbside	Diffusion Tube	100	100	n/a	n/a	n/a	21.1	20.0
DC125	Kerbside	Diffusion Tube	100	100	n/a	n/a	n/a	19.9	20.6
DC126	Background	Diffusion Tube	100	100	n/a	n/a	n/a	14.1	15.2
DC127	Kerbside	Diffusion Tube	92	92	n/a	n/a	n/a	35.7	33.3
DC128	Background	Diffusion Tube	92	92	n/a	n/a	n/a	29.9	31.8
DC129	Roadside	Diffusion Tube	83	83	n/a	n/a	n/a	25.3	27.2
DC130	Roadside	Diffusion Tube	92	92	n/a	n/a	n/a	35	35.5
DC131	Kerbside	Diffusion Tube	100	100	n/a	n/a	n/a	23.6	25.1

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

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

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m^3 and where there is relevant exposure are shown in **bold**

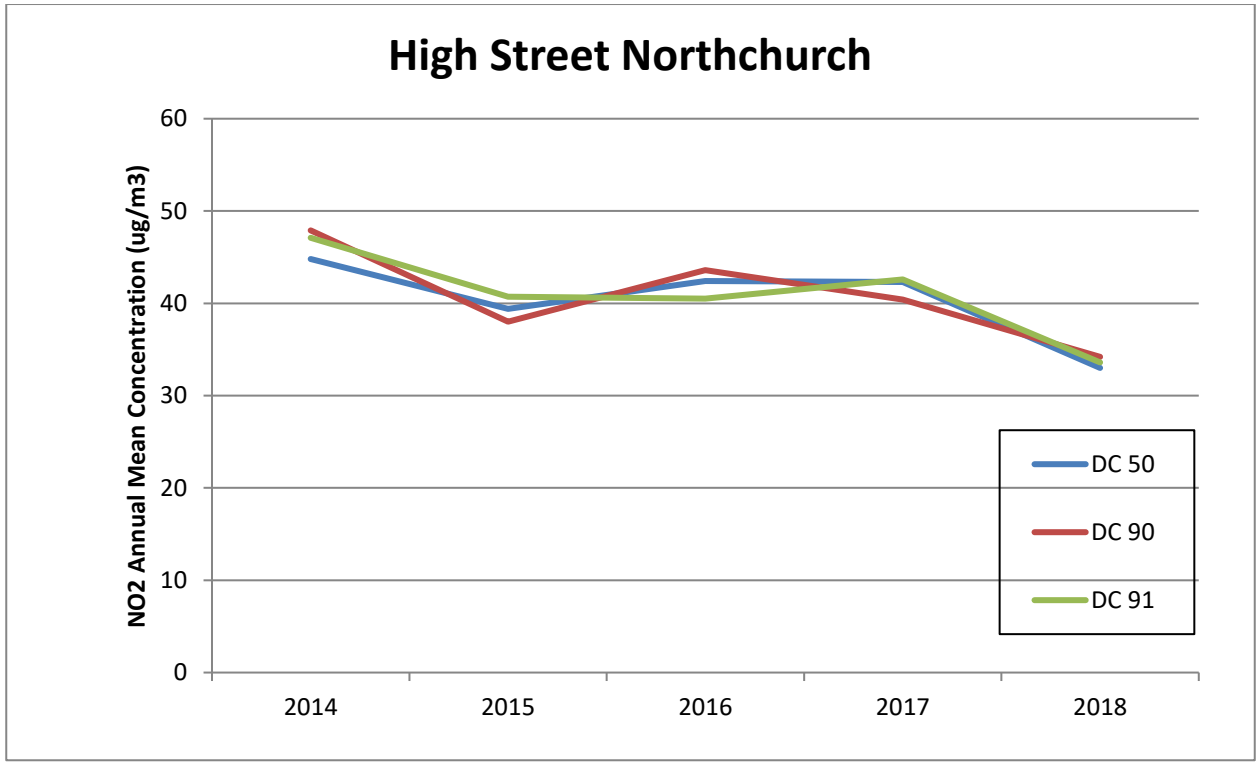
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

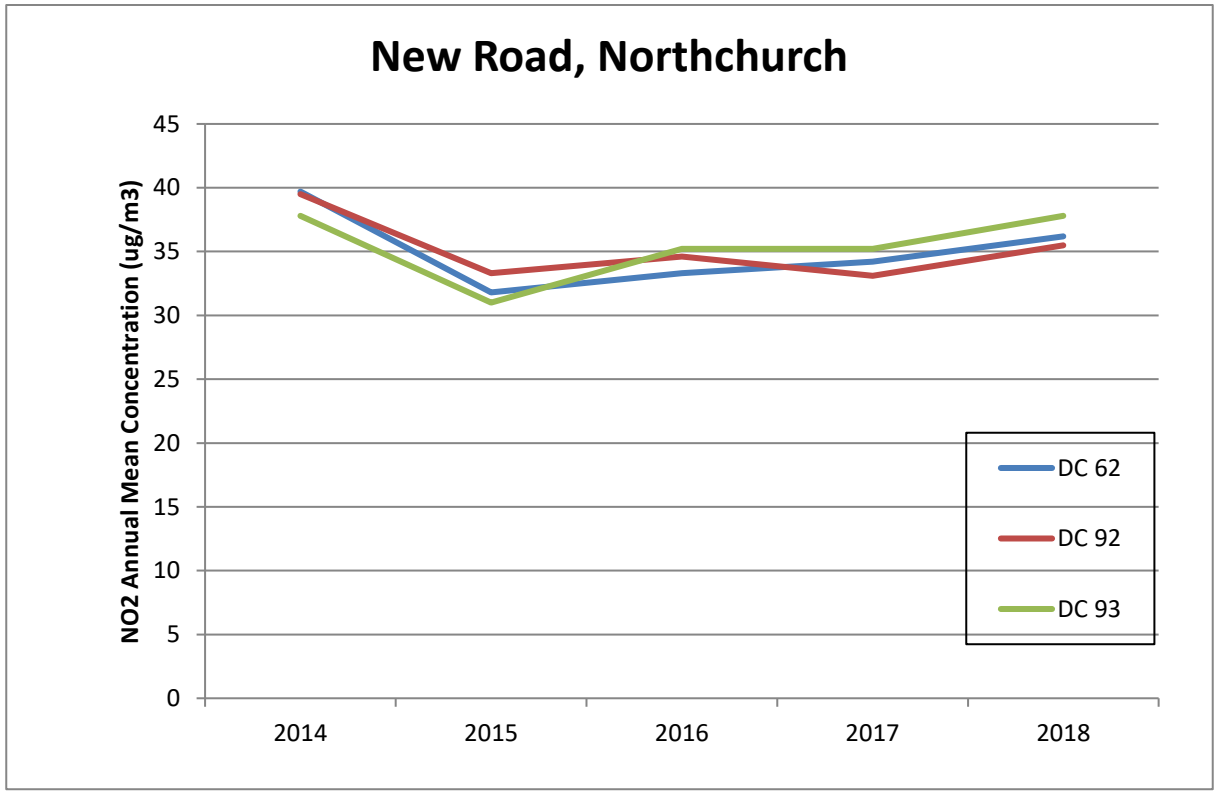
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

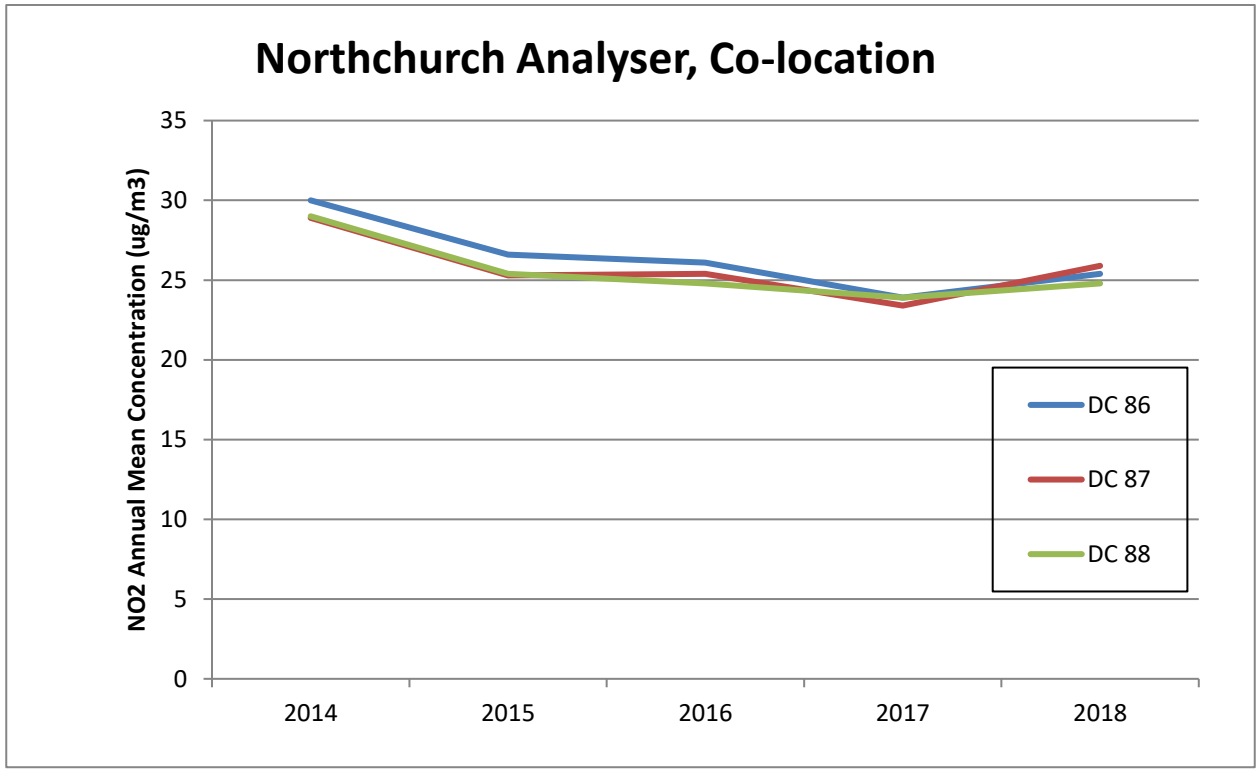
(3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure A.1 – Trends in Annual Mean NO_2 Concentrations

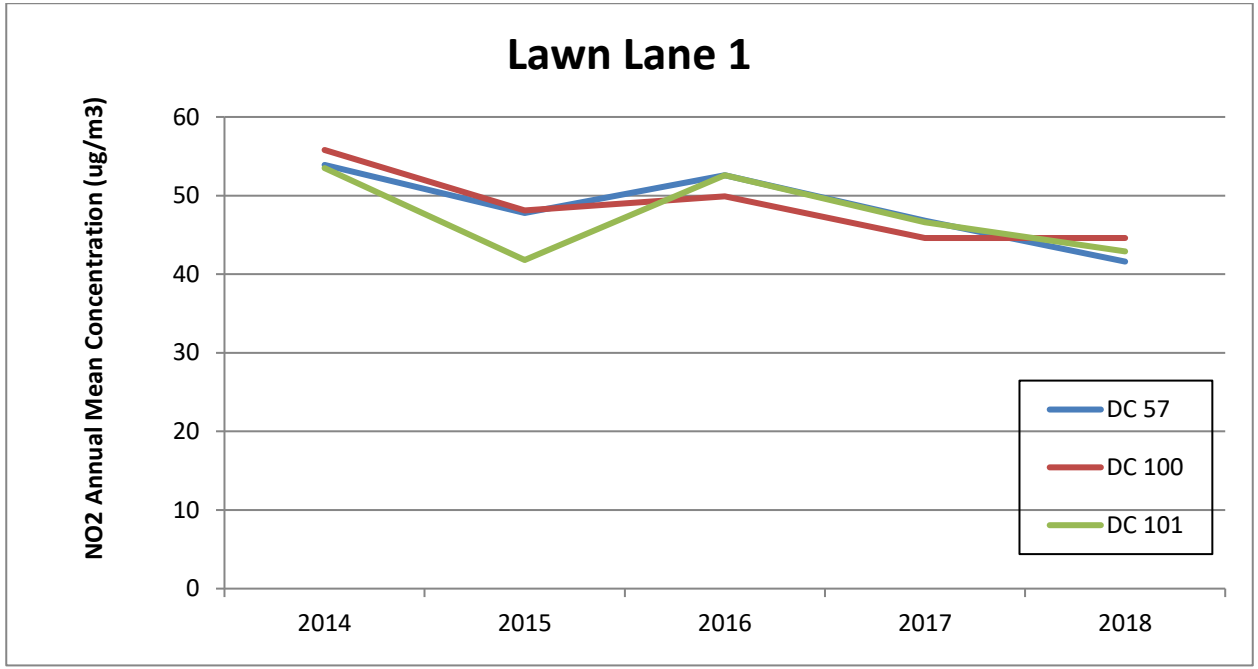
Northchurch AQMA

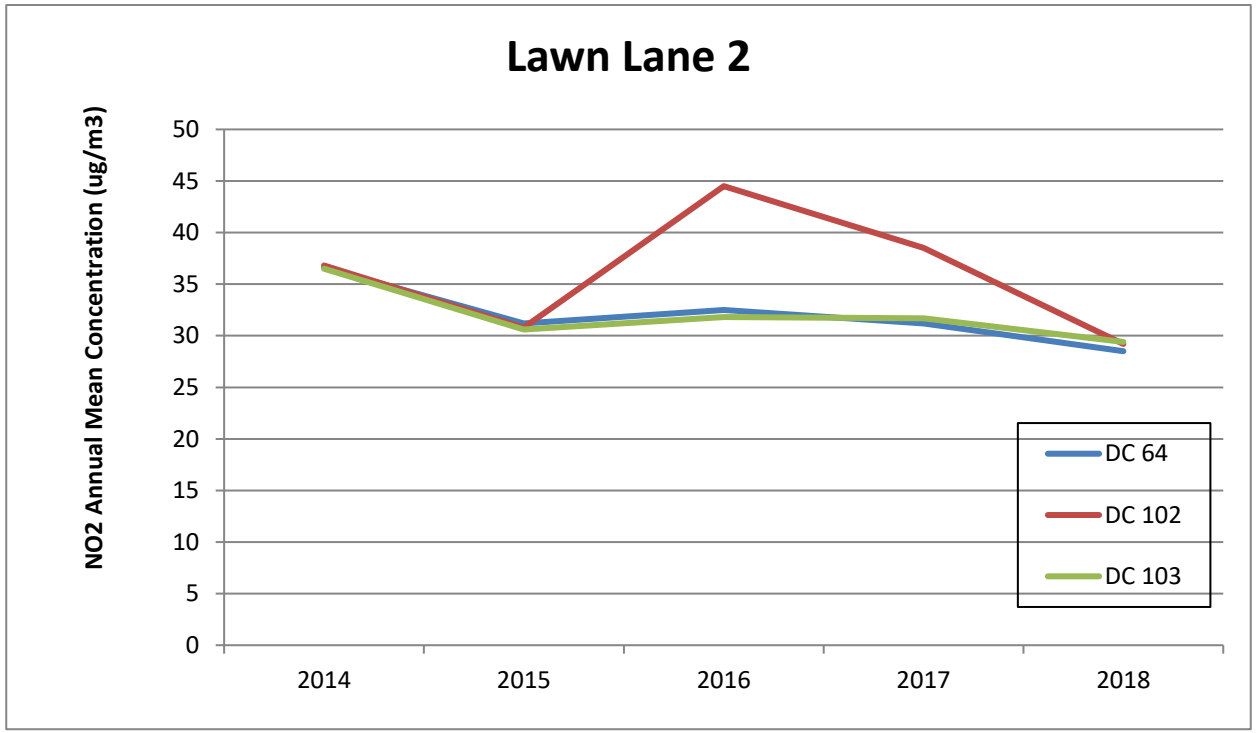


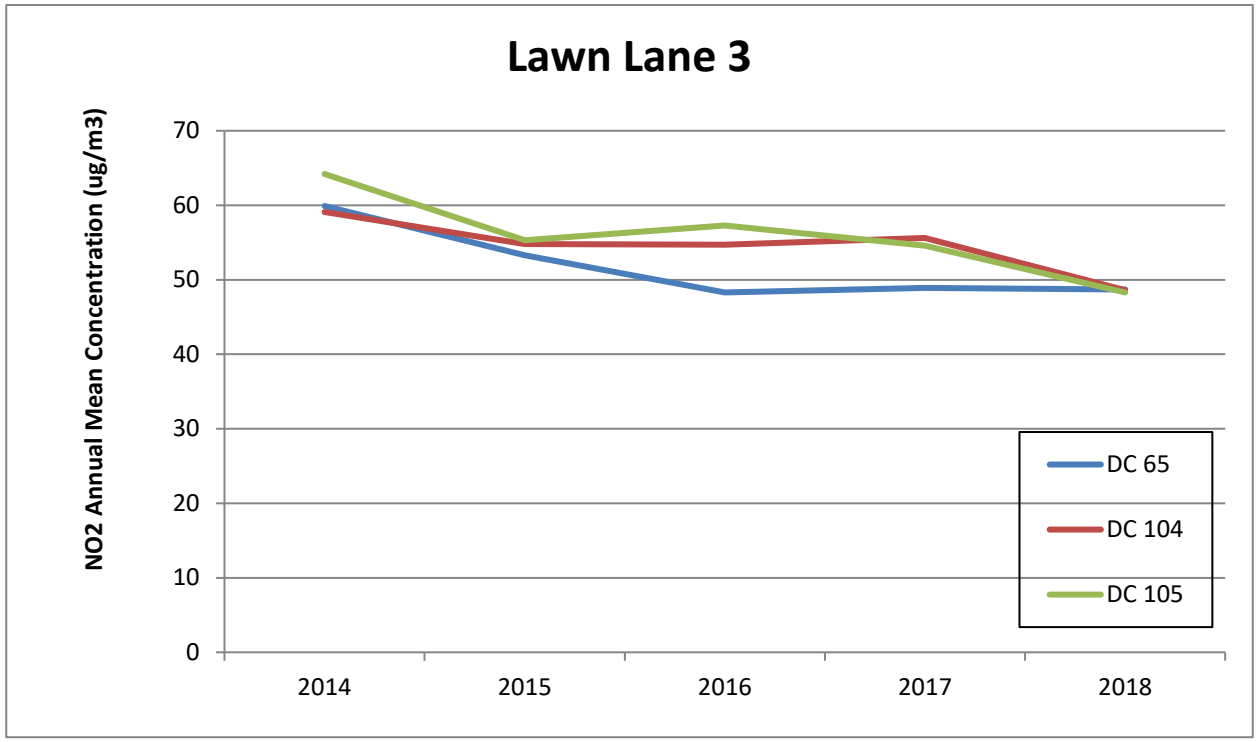

New Road, Northchurch
NO2 Annual Mean Concentration (ug/m3)
45
40
35
30
25
20
15
10
5
0
2014
2015
2016
2017
2018
DC 62
DC 92
DC 93


Northchurch Analyser, Co-location
NO2 Annual Mean Concentration (ug/m3)
35
30
25
20
15
10
5
0
2014
2015
2016
2017
2018
DC 86
DC 87
DC 88

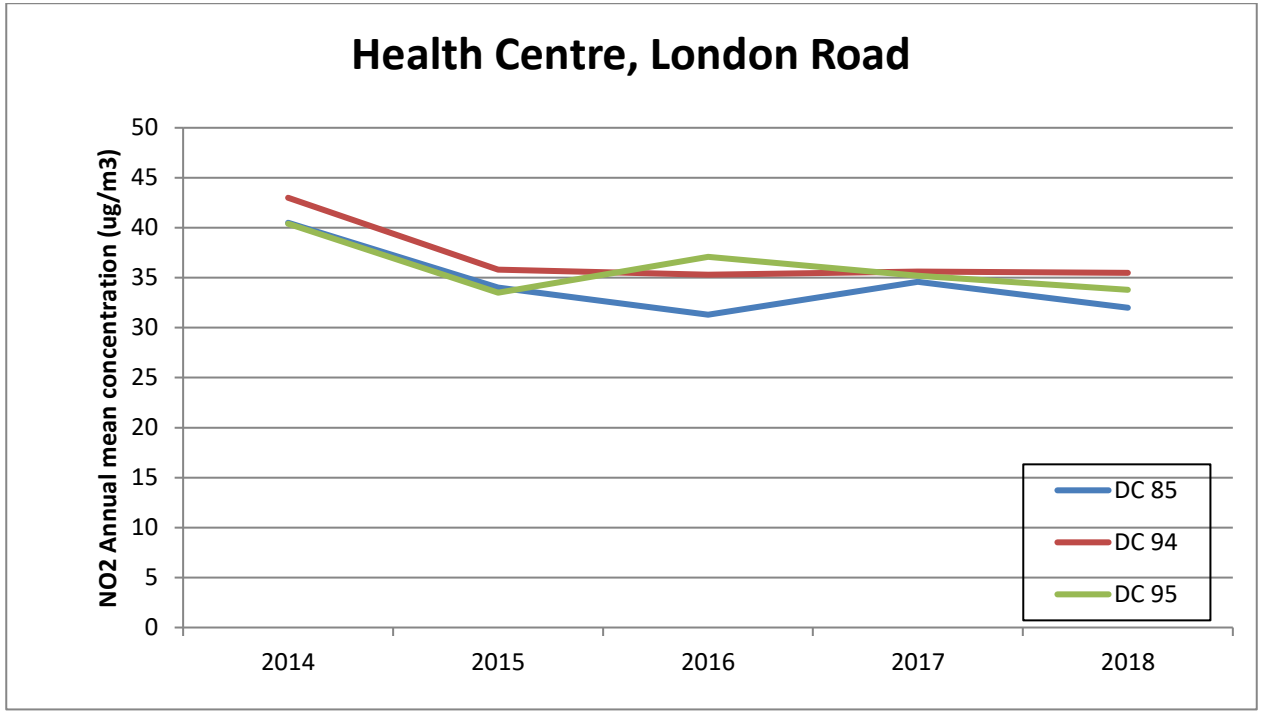
Lawn Lane AQMA

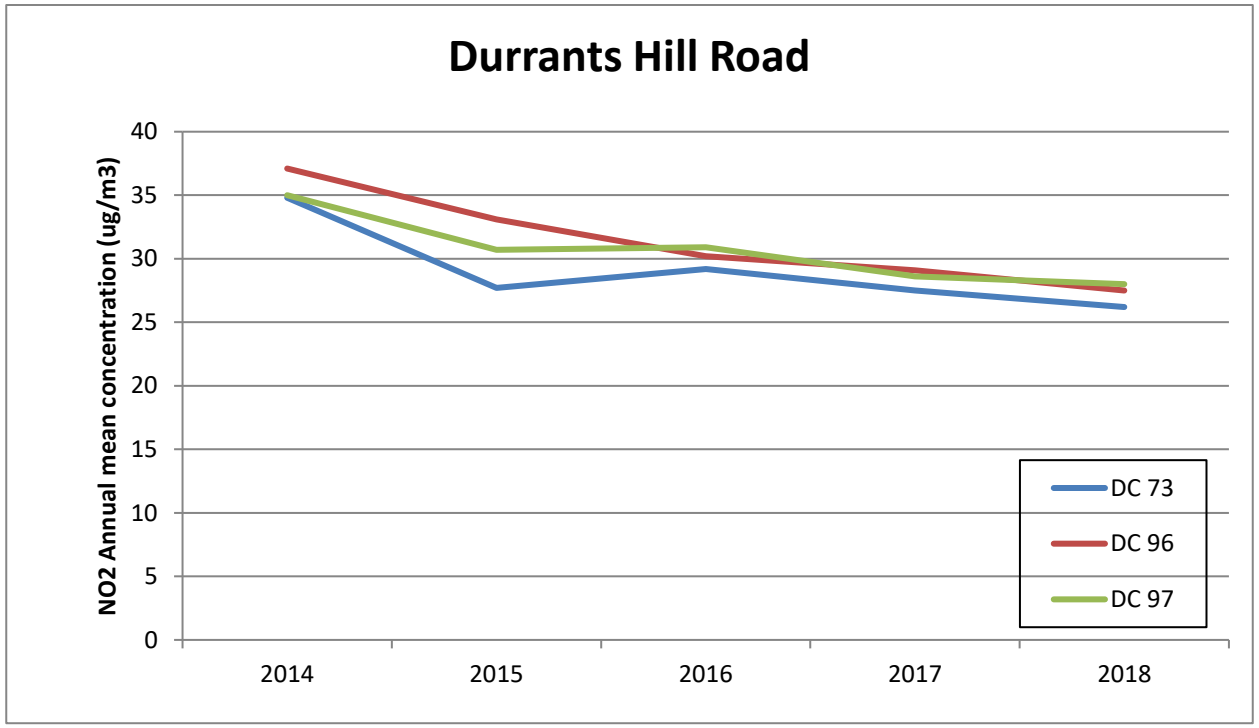



Lawn Lane 2
NO2 Annual Mean Concentration (ug/m3)
50
45
40
35
30
25
20
15
10
5
0
2014
2015
2016
2017
2018
DC 64
DC 102
DC 103


Lawn Lane 3
NO2 Annual Mean Concentration (ug/m3)
70
60
50
40
30
20
10
0
2014
2015
2016
2017
2018
DC 65
DC 104
DC 105

London Road AQMA




Durrants Hill Road
NO2 Annual mean concentration (ug/m3)
40
35
30
25
20
15
10
5
0
2014
2015
2016
2017
2018
DC 73
DC 96
DC 97

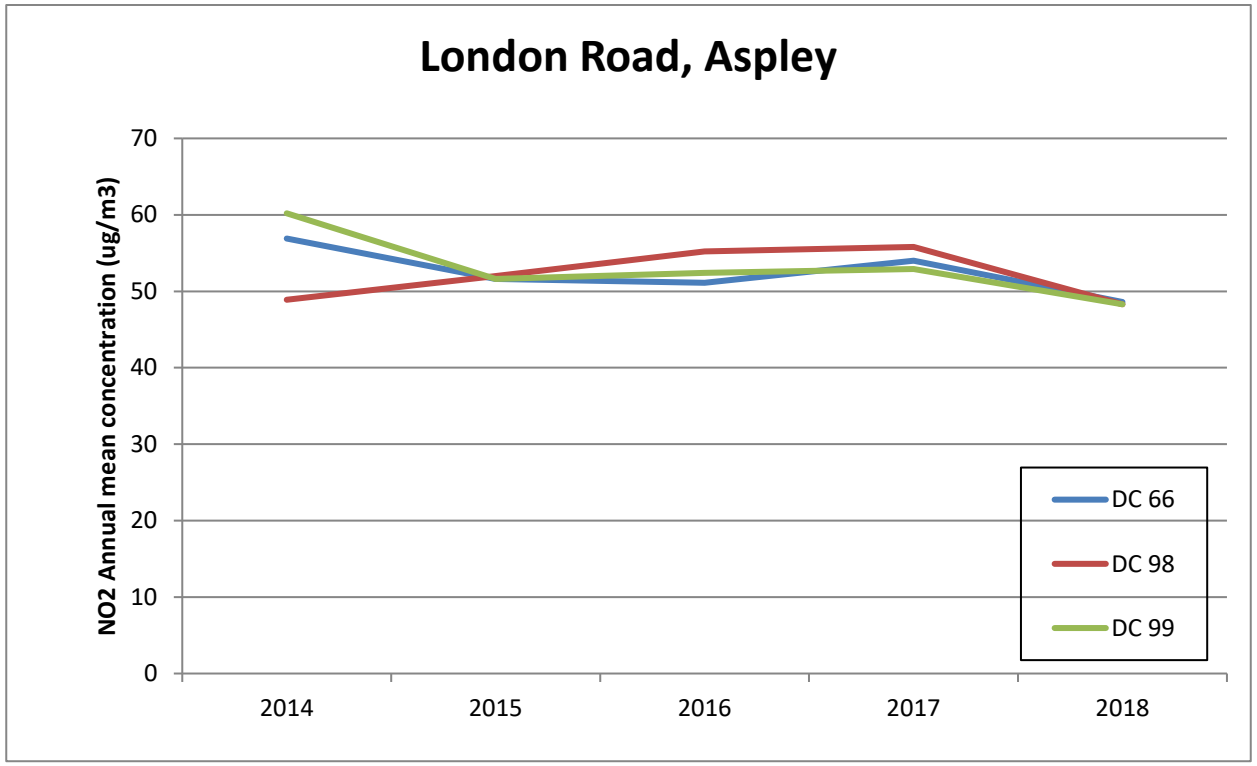

London Road, Aspley
NO2 Annual mean concentration (ug/m3)
70
60
50
40
30
20
10
0
2014
2015
2016
2017
2018
DC 66
DC 98
DC 99

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

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2014	2015	2016	2017	2018
CM1	Roadside	Automatic	84	84	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	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	PM_{10} Annual Mean Concentration ($\mu g/m^3$) (3)				
				2014	2015	2016	2017	2018
CM1	Roadside	99	99	n/a	13	12	12	17

Notes:

Exceedances of the PM_{10} annual mean objective of 40$\mu g/m^3$ 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.5 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
				2014	2015	2016	2017	2018
CM1	Roadside	99	99	n/a	1	1	0	3

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.6 – $PM_{2.5}$ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	$PM_{2.5}$ Annual Mean Concentration ($\mu g/m^3$) (3)				
				2014	2015	2016	2017	2018
CM1	Roadside	99	99	n/a	8	8	8	11

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 2018

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

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.76) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
DC40	26.6	29.0	29.7	23.7	17.1	11.5	16.6	16.0	18.0	24.2	34.7	26.7	22.8	17.3	-
DC42	27.3	32.6	32.1	27.5	28.5	21.6	24.0	20.1	21.4	27.7	35.4	31.0	27.4	20.8	-
DC46	28.6	21.4	27.9	25.6	18.7	14	17.8	18	19.8	26.8	32.1	30.6	23.4	17.8	-
DC47	38.4	48.5	48.4	38.7	36.3	29.9	37.6	33.3	35.8	44.5	28.3	46.3	38.8	29.5	-
DC48	27.4	30.1	30.5	22.9	18.2	14.9	18.7	14.9	18	23.7	34.2	28.9	23.5	17.9	-
DC50	51.4	51.1	41.4	40.5	37.6	37.5	42	33.9	33.3	48.4	52.4	51.1	43.4	33.0	-
DC51	32.8	41.2	38.4	33.8	36.5	30.2	32.1	24.1	25.8	34.4	34.5	37.3	33.4	25.4	-
DC52	37.5	43.4	37.9	37.6	31.7	25.3	30.9	27.4	30.6	36.3	37.7	38.9	34.6	26.3	-
DC54	65.3	56.5	60.7	61.1	47.7	37.7	48.6	46.4	49.7	57.3	55.6	58.1	53.7	40.8	-
DC55	46.4	42.3	43	40.6	34.3	23.5	31.2	26.5	32.8	39.1	44.6	45.2	37.5	28.5	-
DC57	58.7	62.8	62.6	41.2	48.2	33.2	71.4	51.2	49.4	56.4	60	62.5	54.8	41.6	-
DC58	33.6	33.6	35	32.2	30.4	25	26.8	22.7	28.4	35.9	37.3	40.1	31.8	24.1	-
DC59	42.6	25.5	36.8	39.5	32.6	20.6	29.8	29.3	31.9	32.6	44.5	40.6	33.9	25.7	-
DC60	26.6	29.7	28.6	28.3	22.3	15.7	25.9	21.5	24.1	28.8	36.9	31.9	26.7	20.3	-
DC61	34.9	36.2	39.3	34.3	27.2	18	27.2	24.3	24.5	33	46.1	41.1	32.2	24.5	-
DC62	40.9	43.4	50.3	52	44.4	33.9	48	45.3	46.9	54.1	63.8	47.9	47.6	36.2	-

DC63	34.1	32.9	35.8	34.4	28.6	19.4	27.3	24.8	24.4	30.9	40	39	31.0	23.5	-
DC64	42.1	40.2	40.6	36.2	36.9	20.8	38.2	32.3	34.8	40.7	42.2	45.4	37.5	28.5	-
DC65	70	61.6	53	70.8	61	39.7	79.8	62.7	65.9	57.2	64.7	82.8	64.1	48.7	-
DC66	61.7	62.7	67.3	68.4	58.9	45.7	74.2	59.3	64.4	67.4	67.5	69.6	63.9	48.6	-
DC67	32.5	24.2	38.2	29.7	29.8	-	-	-	-	35.3	44.1	39.6	31.5	23.9	-
DC68	-	42.4	46.9	46.5	45.2	30.9	45.9	34.4	34.3	44.8	52.1	53	43.3	32.9	-
DC69	-	30.9	31.7	30.3	23.1	15.5	26.3	22.4	21	30.7	30.6	35.8	27.1	20.6	-
DC70	48.4	41.2	54.9	47.4	62	43.3	50.8	35.4	-	44.3	50.6	49.1	47.9	36.4	-
DC71	33.7	37.1	37.7	23.8	27.3	15.2	28.8	23.1	18.7	34.1	33.3	39.8	29.4	22.3	-
DC73	32.4	39.4	42.9	32.9	31.5	24.3	36	27.5	31	34	38.3	43.4	34.5	26.2	-
DC74	41.5	42.2	46.7	46.9	41.1	26.4	43.8	35	38.3	41.8	54	50.5	42.4	32.2	-
DC75	32.1	39.1	34	31	26.5	20.2	26.3	-	-	37.8	37.9	40.7	32.6	24.7	-
DC76	43.1	42.3	42.3	44.4	35.8	24	50.1	35.5	40.3	41.6	53.1	49.1	41.8	31.8	-
DC81	41.9	46.5	46.7	42.7	33.5	21.6	-	-	40.9	48.3	47.1	53	42.2	32.1	-
DC85	42.3	36.7	48.3	46	39.4	27.5	43.9	35.2	37	39.7	57.1	52.1	42.1	32.0	-
DC86	31.6	33.8	37.7	32.8	29.6	20.4	34.5	-	-	-	40.9	39.3	33.4	25.4	-
DC87	34.4	37.6	36.5	29.8	32	19.2	36	-	-	-	41	40.8	34.1	25.9	-
DC88	35.1	28.7	35.5	33	28.8	19.4	35.2	-	-	-	39.9	37.7	32.6	24.8	-
DC89	33.4	31.5	34.5	31.7	25.3	13.1	32.2	22	26.8	32.7	36.2	34.5	29.5	22.4	-
DC90	42.6	40.7	48.3	45.7	49.1	37.3	43.7	35.5	49.6	49.8	49.3	48	45.0	34.2	-
DC91	55.4	55.1	45.8	40.6	47.6	31.6	44.3	34.8	31.1	43.5	53.6	47.9	44.3	33.6	-
DC92	39.6	48.3	53.5	52.3	45.6	33.7	46.9	43.6	46.1	39.3	60.8	50.9	46.7	35.5	-
DC93	-	53.4	53.6	55.7	46.6	31.4	60.4	46.2	35.4	48.8	56.7	59.3	49.8	37.8	-
DC94	46.4	43.1	55.9	51.7	39.7	23.1	58.2	39.3	39.7	48	60.5	54.6	46.7	35.5	-
DC95	42.9	46.5	54.7	49.7	40.5	22.3	53.2	38	36.1	42.2	52.3	55.9	44.5	33.8	-
DC96	39.1	37.8	39	38.2	30.2	21	45.4	29.5	31	38.2	43.5	41.6	36.2	27.5	-
DC97	40.4	38.6	42.2	37.4	31.4	17.5	47.4	30.1	31.9	36.6	44.4	43.8	36.8	28.0	-

DC98	63.5	63.9	54.1	68.1	57.2	48.9	71.3	64.1	60.2	70.2	65.6	76.2	63.6	48.3	-
DC99	65.5	64.5	62.8	66.9	59.4	44.2	66.8	60.4	64.8	66.7	65.9	75.3	63.6	48.3	-
DC100	59.8	61.6	69.6	48.5	65.9	48	73	50.8	49.4	55.9	60.5	60.7	58.6	44.6	-
DC101	59.6	65.2	63.3	47.3	61.5	42.1	70.4	48.5	44.9	56	56.7	62.3	56.5	42.9	-
DC102	41	34.3	46.6	38.4	35.1	21.2	40.2	33.6	35.3	43	45	47.2	38.4	29.2	-
DC103	40.5	42.7	44.3	36.1	40.3	22	38.6	32.5	35.5	41.9	42.2	47.2	38.7	29.4	-
DC104	64.7	57	67.5	67.4	59.1	40.6	77.3	61.8	68.3	65	61.9	76.8	64.0	48.6	-
DC105	71.1	62.3	67.9	64.4	55.5	42.3	83	62	61.2	67.6	61.1	-	63.5	48.3	-
DC106	39.1	45.6	37.2	36.2	29.7	17.6	34.1	26	28.3	34	45.6	46.5	35.0	26.6	-
DC107	35.5	41.2	39.4	37.8	-	20	39	28.9	28.5	36.5	42.8	43.6	35.7	27.2	-
DC108	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DC109	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DC110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DC111	37.5	38.1	34.8	32.1	-	19.1	32.4	28	32	37.2	38.6	40.6	33.7	25.6	-
DC112	25.5	29.6	33.7	28.6	22.5	16.2	24.5	18.7	19.6	25.9	36.5	28.5	25.8	19.6	-
DC113	27.2	21.3	22.9	22.8	15	9.7	18.3	16.7	17.8	21.7	31.2	29	21.1	16.1	-
DC114	45.5	39.1	40.3	40.6	34.3	24.1	40.2	34.4	38.2	40.7	42	42.4	38.5	29.2	-
DC115	32	27.6	30.4	26.3	19.6	13.4	22.3	18.2	20.3	25.4	32.4	32.7	25.1	19.0	-
DC116	33.6	32.9	37.3	27.8	25.4	16.6	28.3	-	51.1	50.8	38.5	34.2	34.2	26.0	-
DC117	35.4	40.8	41.8	37.9	34.3	27.1	38.4	27.3	25.9	37.6	43.9	40.4	35.9	27.3	-
DC118	42.2	43.5	30.5	39.1	28.7	24.6	34.2	-	33.9	37.7	39.3	-	35.4	26.9	-
DC119	41.5	56.5	38.9	45.2	44	33.9	49.8	39.8	39.4	46.4	45.2	43.1	43.6	33.2	-
DC120	48.2	57.5	39.6	52.4	47.6	35.1	48.9	39.2	38.4	49	43.2	50	45.8	34.8	-
DC121	48.6	55.2	-	-	48.1	31.4	44.2	38.4	41.3	48	45.5	47.6	44.8	34.1	-
DC122	37.8	43.9	34.6	38.6	35	26	37.6	31.4	33.8	37	40.3	41.5	36.5	27.7	-
DC123	46.1	43.3	43.8	42.9	37.6	27.9	42.4	34.1	35.8	41	46.5	45.8	40.6	30.9	-
DC124	31.3	32	31	27.9	20.9	15.3	26.9	20.5	22.8	28.1	29.4	30.2	26.4	20.0	-

DC125	29.6	29.1	29.5	29.8	25.2	17.3	27.6	18.9	22.4	27.1	38.6	30.5	27.1	20.6	-
DC126	24.1	25	21.5	21.3	14.8	10.1	19.9	15.7	16.5	19.8	26.5	25.1	20.0	15.2	-
DC127	45.7	46.1	49.3	43.3	45.9	31.8	42.7	33.9	32.5	-	66.6	44.8	43.9	33.3	-
DC128	54	33.5	43	38.5	39.5	30	44.7	33.2	34.7	-	67.5	41.5	41.8	31.8	-
DC129	44.5	35.9	34.7	31.5	-	40.5	30	25.1	25.1	-	54.3	36.1	35.8	27.2	-
DC130	39.4	46.7	51.2	57.7	48.8	36.6	44.8	36	39.5	-	65.7	46.7	46.6	35.5	-
DC131	35.6	32.6	39.3	31.7	35.4	22.3	40.5	26.8	23	33.6	41.6	34.1	33.0	25.1	-

☐ **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**

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 nitrogen dioxide chemiluminescent analyser since November 2012 and FIDAS for particulate matter since August 2015. The 2018 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 2018, NO_2 monitoring was undertaken at 63 sites within the borough using passive diffusion tubes. The Northchurch diffusion tubes location DC86, 87 and 88 were used as a co-location site with triplicate tubes co-located with the continuous monitor. However the data capture for the year was only able to cover 8 out of 12 periods and so the national bias adjustment factor was used to adjust results of diffusion tube monitoring (noted below).

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 NO2 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

With the exception of DC 67 data capture for diffusion tube has been equal to or greater than 9 months. At DC 67 data capture covered 8 months and so the result at this site has been annualised.

All diffusion tube results have also been corrected for bias by applying the national bias adjustment factor of 0.76 using results analysed by SOCOTEC (Didcot).

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".

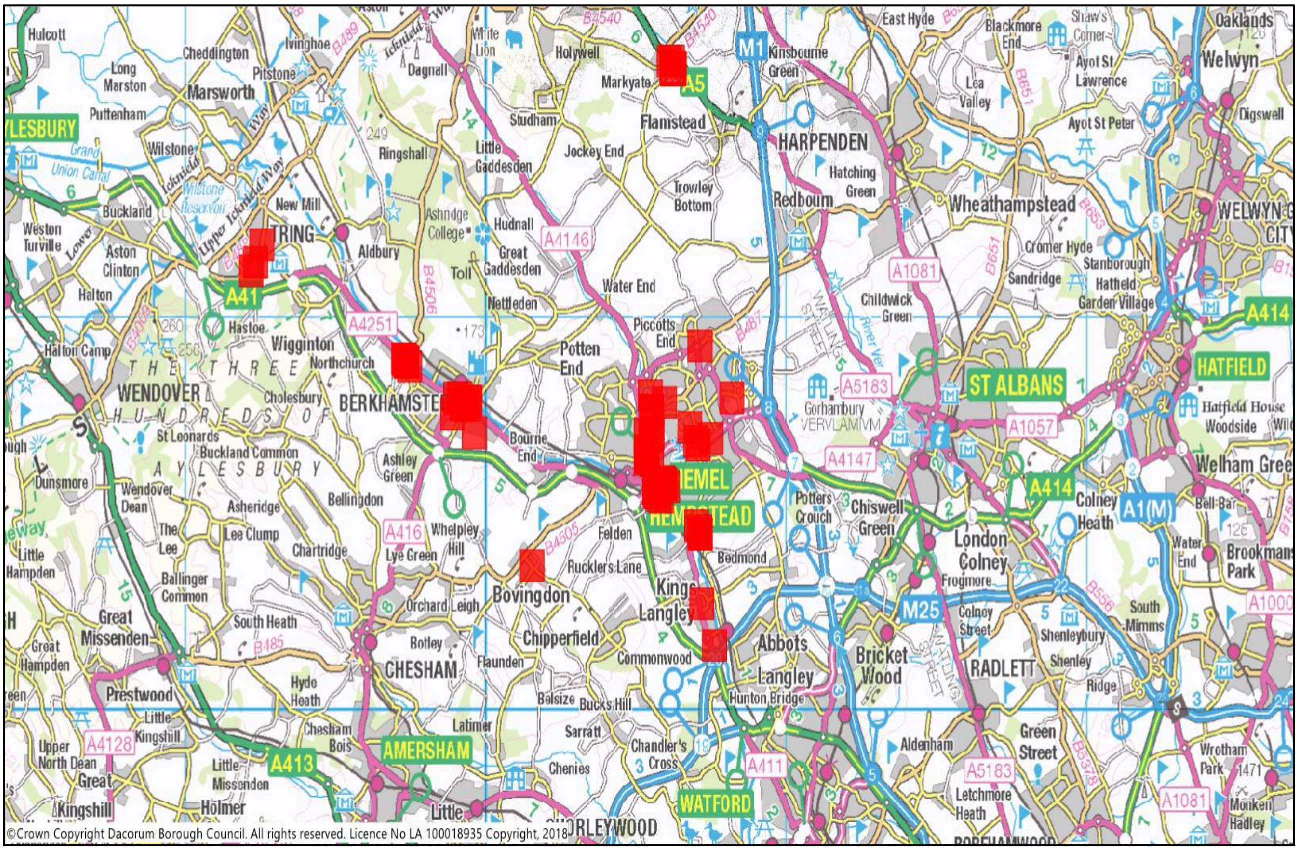
Annualisation information According to Box 7.10 TG (16)

Start Date	End Date	B1 (Am)	D1	B1 when D1 is available (Pm)
3 January 2018	30 January 2018	26.6	32.5	26.6
30 January 2018	26 February 2018	29.7	24.2	29.7
26 February 2018	27 March 2018	28.6	38.2	28.6
27 March 2018	2 May 2018	28.3	29.7	28.3
2 May 2018	04 June 2018	22.3	29.8	22.3
4 June 2018	2 July 2018	15.7	-	
2 July 2018	31 July 2018	25.9	-	
31 July 2018	5 September 2018	21.5	-	
5 September 2018	2nd Oct 18	24.1	-	
2nd Oct 18	29 October 2018	28.8	35.3	28.8
29th Oct 18	3rd Dec 18	36.9	44.1	36.9
3rd Dec 18	9th Jan 19	31.9	39.6	31.9
Average		**26.7**	**34.2**	**29.1**

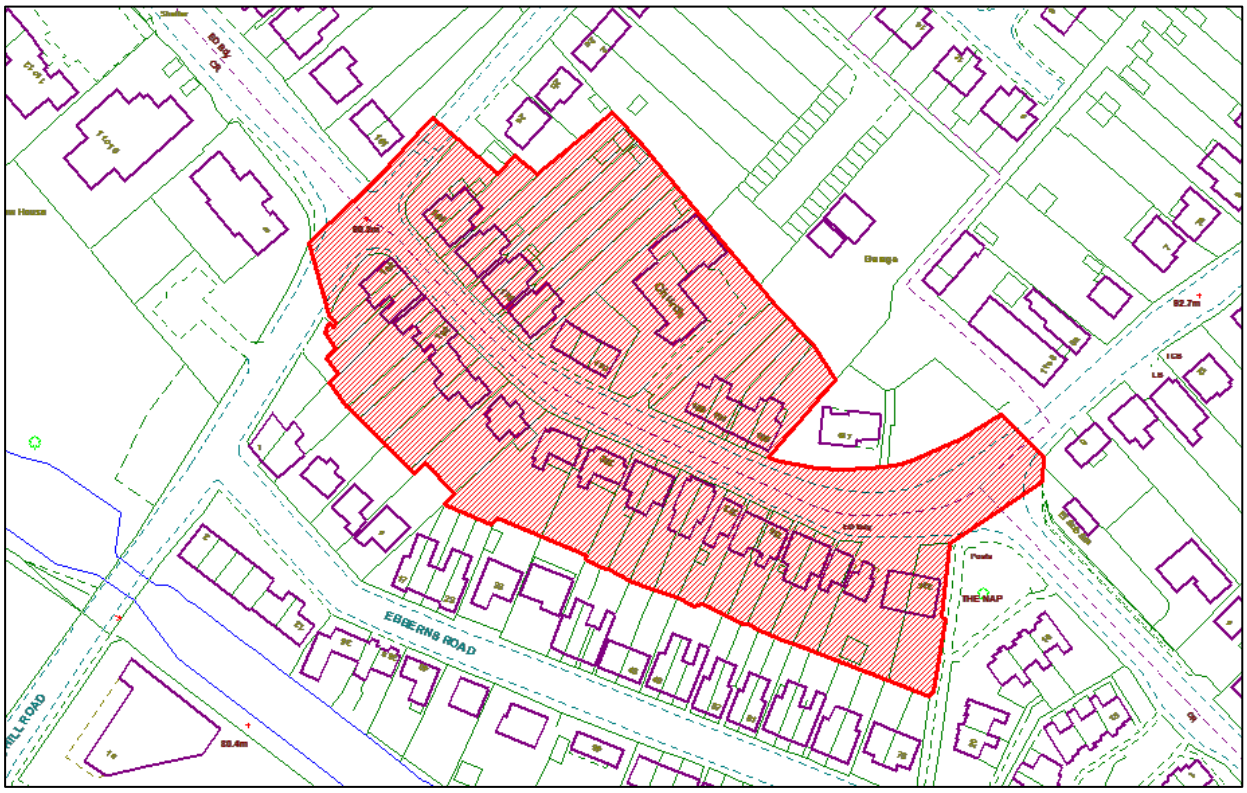
The annual mean (A_m) for B1 (using DC60 Fields Road) as the background site data is 26.7 µg/m^3. The period mean (P_m) of B1 is 29.1 µg/m^3. The ratio (R) of the annual mean to period mean (A_m/P_m) is 0.92.

Therefore the measured period mean concentration D1 becomes 31.5 µg/m^3.

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

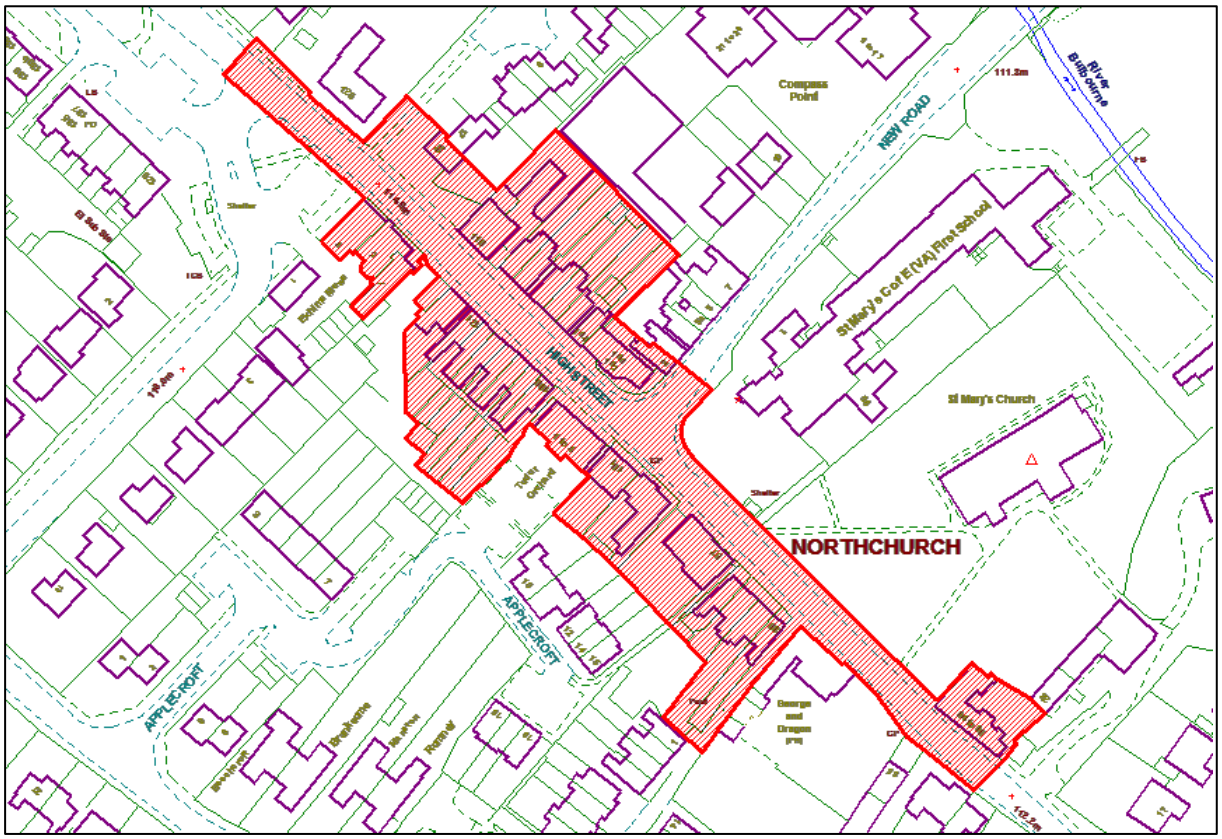


Map of non-automatic monitoring sites



AQMA Order No. 1 – Lawn Lane, Hemel Hempstead

AQMA order No. 2 – London Road, Apsley



AQMA Order No. 3 – High Street, Northchurch

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

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

[4] The units are in 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