2019 Air Quality Annual Status Report (ASR)

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

Date (November 2019)

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Executive Summary: Air Quality in Our Area

Air Quality in Preston City Council

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].

Within Preston, the main pollutant of concern is Nitrogen Dioxide, which is mainly related to transport sources and restricted to a number of hotspots within the Council Boundary.

These hotspots are known as Air Quality Management Areas (AQMA`s) and the location of these can be seen within table 2.1 below.

During 2018, the Council carried out monitoring within 4 of AQMA`s (results in Appendix A) and when looking at these results the only monitoring locations that exceeded the Nitrogen Dioxide annual mean objective of 40µg/m^{3} were within AQMA 4 . All other areas that were monitored were in compliance. Also due to the opening of the Broughton Bypass in October 2017, there were no exceedances within AQMA 3 in relation to both the annual and hourly limit, which was a common occurrence looking at the 5 yearly trend.

Actions to Improve Air Quality

During 2018 there have been a number of actions that have progressed this year. The Council is committed to the development of a Lancashire wide air quality and planning policy and has started this process with the use of planning conditions to ensure that all new development contains electric vehicle charging points. However

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[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

the planning policy has been put on hold due to progress on other Central Lancashire Plans.

To address one of the most polluted areas of Preston (AQMA 3) at Broughton, Lancashire County Council finished the construction of the bypass in October 2017. The monitoring performed during 2018 has showed a significant improvement in the air quality with a reduction in the Nitrogen Dioxide levels below the Air Quality Objectives.

Conclusions and Priorities

From looking at the data obtained this year from the monitoring, the main report below contains our priorities for the coming year. These relate to keeping a watching brief over AQMA`s 1 and 2, ongoing work on the Central Lancashire Plans that relate to planning and transport and the work that Lancashire County Council have discussed in section 2.3.

Local Engagement and How to get Involved

Information regarding the air quality within Preston and our contact details can be found on our website below.

https://www.preston.gov.uk/article/1015/Air-quality

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1   Local Air Quality Management

This report provides an overview of air quality in Preston City Council 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 Preston City 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

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 Preston City 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://www.preston.gov.uk/article/1015/Air-quality

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
AQMA 1	Declared Sept 2005,	NO2 Annual Mean	Preston	Area of residential at the Prison junction on the A59 Ringway	NO	41	µg/m3	no longer monitor, propose to revoke. (compliant for 5 years)	µg/m3	Action Plan	2009	https://www.preston.gov.uk/article/1015/Air-quality
AQMA 2	Declared Sept 2005,	NO2 Annual Mean	Preston	Area of residential at the junction of Blackpool Road and Plungington Road	NO	51	µg/m3	37	µg/m3	Action Plan	2009	https://www.preston.gov.uk/article/1015/Air-quality
AQMA 3	Declared May 2012,	NO2 Annual Mean	Preston	Area of residential in the centre of Broughton Village (A6)	NO	77	µg/m3	23	µg/m3	Action Plan	2014	https://www.preston.gov.uk/article/1015/Air-quality

AQMA 3	Declared May 2012,	NO2 1 Hour Mean	Preston	Area of residential in the centre of Broughton Village (A6)	NO	As abo ve	µg/m3	as above	µg/m3	Action Plan	2014	https://www.pres ton.gov.uk/articl e/1015/Air- quality
AQMA 4	Declared May 2012,	NO2 Annual Mean	Preston	Area of residential on New Hall Lane	NO	52	µg/m3	44	µg/m3	No Plan		
AQMA 5	Declared March 2014,	NO2 Annual Mean	Preston	Area of residential on London Road	NO	41	µg/m3	37	µg/m3	No Plan		

☒ **Preston City 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 Preston City Council

Preston City Council and Lancashire County Council have taken forward a number of measures during the current reporting year of 2018 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. More detail on these measures can be found in their respective Action Plans as shown above.

However, due to other Department priorities and work that was started on a City Centre Transport Plan, progress on the items that were suggested for completion in 2018, namely the revocation of AQMA 1 and 2, the completion of an Air Quality Action Plan and implementation of the Lancashire wide Air Quality and Planning Guidance were put on hold.

The following items completed during 2018 are contained within section 2.3 of this report.

Preston City Council and Lancashire County Council expects the following measures to be completed over the course of the next reporting year:

- Due to planned development in the City, it has been decided to continue to monitor AQMA`s 1 and 2. With possible revocation if there is a continual improvement.

- Further progress on the completion of road and public transport improvements within the City as set out in the [Central Lancashire Highways and transport Masterplan](). Many of which are incorporated within Action Plan 2014.

- Installation of further electric vehicle charging points within the City.

- Work will progress on the review of the Councils Local Plan, which will become a joint Central Lancashire Plan. Climate change and improvements to the air quality will be included within this plan.

- Work will continue on the completion of a City Centre Transport Plan.

It has been mentioned in a number of these reports that there is a need to produce an action plan for AQMA`s 4 and 5. Due to other conflicting priorities this has not occurred, however the plans and documents listed above are being created with sections focusing on improvements in air quality and measures to address climate change. The City Centre Transport Plan is the most relevant to these two areas and therefore the air quality action plan will be delayed until this is published.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Preston City Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve full compliance.

Table 2.2 – Progress on Measures to Improve Air Quality

No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Require electric vehicle recharging points on planning applications	Promoting Low Emission Transport	Alternative refuelling Infrastructure	PCC	-	01/04/2016	N/A	N/A	Standard Planning condition approved and used	ongoing	
2	Install electric vehicle recharge points to all Council car parks and buildings	Promoting Low Emission Transport	Alternative refuelling Infrastructure	PCC/LCC	2016	-	Fitting of EVR points to car parks and other areas	N/A	Electric vehicle charging points installed in Avenham Car Park, Bus Station Car Park. Others planned	ongoing	
3	Development and implementation of a Lancashire wide planning guidance	Policy Guidance and Development	Air Quality and Planning Guidance	Lancaster City Council, on behalf of all 14 Lancashire Authorities. PCC lead for implementation in Preston	Ongoing		N/A	N/A	Draft guidance produced and published to all LA`s in Lancashire. Central Lancs Core Strategy is due for a review. Further work held until then.	TBA	Currently held, following the review of the Central Lancs Local Plan
4	Broughton Bypass	Transport Planning and Infrastructure	Other	LCC		Early 2016	N/A	modelled average of 60% reduction in NO2 concentrations	Completed	2017	NO2 levels have reduced significantly
5	Infrastructure improvements New Hall Lane	Transport Planning and Infrastructure	Other	LCC			N/A		Completed	2017	Only one area of AQMA 4 is now above the AQ Objective.

6	Construction of Preston Western distributor Road	Transport Planning and Infrastructure	Other	LCC	2016		N/A		Planning Phase as started.	2022	
7	To increase the length of road cycle path network in the city by 2 km a year	Transport Planning and Infrastructure	Cycle networks	LCC			Km of cycle path in 18/19			Ongoing	
8	Construction of Cottam Park Way rail station	Alternatives to Private vehicle use	Rail based Park and Ride	LCC/Network Rail					Masterplan Stage	2023	
9	New Public Transport priority corridors along 7 routes into Preston	Transport Planning and Infrastructure	Bus Route Improvements	LCC	2016				Planning Phase, first likely to influence AQMA 4	2024	

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.

Lancashire County Council are taking the following measures to address PM$_{2.5}$:

1. Encourage the use of sustainable forms of travel

- Lancashire's cycling and walking strategy – [Actively Moving Forward]() – sets out an ambitious plan for increasing the number of people walking and cycling in the county by 2028. Through improving and increasing access to cycling and walking infrastructure, alongside training and promotional activities, it aims to significantly increase the amount of cycling and walking people do across the county.

- As part of Lancashire's cycling and walking strategy, work has now commenced on developing Local Cycling and Walking Infrastructure Plans (LCWIPs) for the five Lancashire Highway and Transport Masterplan areas. The Plans will include a network plan for cycling and walking infrastructure and a prioritised list of schemes for delivery over short, medium and long term timeframes. These plans will be used to support future infrastructure decisions and access new funding schemes as they become available.

- [Connecting East Lancashire]() is a 'smarter travel choices' campaign designed to encourage healthier and greener ways of travelling in East Lancashire. A dedicated team of Business Travel Planners work with individuals and organisations across east Lancashire to support a shift towards more sustainable and active forms of travel.

- The Safe and Healthy Travel team work with schools, workplaces and the community to encourage safe and sustainable modes of travel. Initiatives for schools are promoted though the [Safer Travel Moodle]() and include: a series of cycling and walking safety training programmes; guidance and resources for teachers to encourage safe and active travel; and support for creating travel plans.

2. Support the transition to low emission vehicles

- The County Council is working with BP Chargemaster to deliver 150 electric vehicle charge points across the County. [The charging network](#) will be accessible to drivers from all over the country and will support local and national efforts to increase the number of drivers purchasing electric vehicles.

- The County Council is supporting six district councils with a low emission taxi infrastructure scheme. Funded by the Office for Low Emission Vehicles, the scheme will provide taxi drivers with access to 24 new rapid electric vehicle charge points across the six districts. This, alongside a series of promotional activities and suggested regulatory changes, is designed to produce a transition towards more low emission taxi vehicles across Lancashire.

3. Create cleaner, healthier road networks

- Work to develop the next Local Transport Plan (LTP4) for Lancashire, Blackpool and Blackburn with Darwen is now underway. The Public Health team has submitted an evidence base to the process highlighting transport related health challenges affecting the population of Lancashire and making recommendations about how local transport planning policy can make a contribution to addressing these. Air quality is one of the key themes of the evidence base and will be an identified priority in LTP4. Stakeholder engagement and consultation will be carried out during 2019. Approaches to improving air quality could include:

  o Redesigning road networks to reduce congestion and separate vehicle emissions from places where people live, work and congregate;

  o Increasing access to cycling and walking infrastructure, and cleaner public transport;

  o Facilitating the move towards the use of low emission vehicles through upgrading public transport and public sector vehicle fleets and introducing new electric vehicle charge points;

  o Targeting areas with high levels of air pollution, including considering the introduction of Clean Air Zones.

The Local [Highways and Transport Masterplans](#) will be refreshed to align with the priorities of LTP4, which will provide an opportunity to identify longer-term network solutions that address issues in AQMAs and have a positive impact on air quality generally.

- The Lancaster City Centre Movement Strategy is looking at how vehicular, public transport and pedestrian walking movements can be improved across the city. A key facet of the study is to examine what improvements can be implemented to prioritise public transport, reduce severance, improve air quality and effectively make the city centre a more welcoming environment for people. The intention is for a similar approach to be adopted as part of future transport and highways masterplans.

- The County Council's vehicle fleet will be fitted with a driver behaviour tracking system to monitor and influence driver behaviour. The aim of the tracking system is to improve driver performance, reducing fuel costs, road accidents and vehicle emissions.

4. Embed air quality into policy

- The County Council works with district planners to ensure air quality is a key consideration of Local Plans, alongside wider public health issues.   Providing support to districts to develop policies that seek to ensure that new development does not contribute to increasing levels of air pollutants and that requirements for appropriate mitigation are in place.

- The County Council, as part of its highways input into planning applications, actively encourages measures that aim to promote sustainable forms of travel. Working under the direction of the National Planning Policy Framework, the Council seeks measures that facilitate cycling and walking, increase the use of public transport and provide access to electric vehicle charge points. The Council also seeks funding from developers, through section 106 contributions, to support existing bus services or to provide new bus services suitable to serve development sites once their built.

- The County Council is working with Lancaster and Birmingham Universities to develop evidence based guidance for the use of green infrastructure as an approach to mitigating the health impacts of road transport emissions. The

guidance will enable spatial planners, public services and the public to introduce the most effective infrastructure at the most appropriate sites. In time, there may be opportunities for further projects around this work.

5. Raise awareness and increase engagement

- The Lancashire Insight website provides information on the sources and health impacts of air pollution. Webpages include a [Summary of Emissions Data](#), [Monitoring of Air Quality and Health Impacts](#) and an [Air Quality and Health Dashboard](#).

- The County Council is the process of developing a clean air programme for schools. The scheme will include: guidance and support for schools on developing a clean air strategy; lesson plans, activities and resources for teachers; provision of LCC's cycling and walking programmes; and resources to deliver a clean air event, campaign and poster competition.

- The County Council's Lead Member for Health and Adult Services has established network for elected members from across Lancashire and Cumbria to come together to gain an understanding of the issues and the key messages to champion and advocate in their communities.

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

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

Preston City Council undertook automatic (continuous) monitoring at 2 sites during 2018. Table A.1 in Appendix A shows the details of the sites. Monitoring results are available at https://www.preston.gov.uk/article/1015/Air-quality

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

Preston City Council undertook non- automatic (passive) monitoring of NO_2 at 28 sites during 2018. Table A.2 in Appendix A shows the details of the sites.

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

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)

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.

During 2018, the only monitoring location that exceeded the Nitrogen Dioxide annual mean objective of 40µg/m^3 was within AQMA 4. All other areas that were monitored were in compliance. Also this monitoring data shows a full year of the effect of the opening of the Broughton Bypass in October 2017. There are now no exceedances of the annual and hourly Nitrogen Dioxide limits, which was a common occurence as can be seen in the 5 yearly trend data. We also stopped monitoring AQMA 1, as we were looking at revoking the area. However, for 2019 we have decided to place one tube to enable us to monitor the effcts of any nearby development.

In relation to trends, it can be seen that AQMA 2 has had no exceedances of the objectives for the last 5 years, with the highest value of 38µg/m^3 in 2014, compared to a value of 37µg/m^3 in 2018. AQMA 4 has also been in compliance for the last 2 years, with a highest value of 41 µg/m^3 in 2015, compared to 37 µg/m^3 in 2018.

3.2.2   Particulate Matter (PM$_{2.5}$)

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

During 2018, the PM$_{2.5}$ monitoring results at the Urban Background site operated by DEFRA has shown a slight decrease of 3 µg/m^3 over the last 5 years. The urban background at this monitoring location is therefore below the annual limit defined in the Air Quality Objectives of 25µg/m^3 and is also below the World Health Organisations target value of 10 µg/m^3.

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)
PRA1	Meadow Street	Roadside	354138	429863	NO2	NO	Chemiluminescent;	7	5	2.5
PRA2	Bootle Street	Urban Background	355250	430126	NO2, PM2.5, O3	NO	Chemiluminescent, FDMS	9	N/A	2.5

Notes:

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

(2) N/A if not applicable.

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)
PR1	Red Rose Radio	Roadside	354307	429769	NO2	NO	0	3.25	NO	2
PR5	215 Plungington Road	Roadside	353072	431014	NO2	YES	0	2.5	NO	2
PR6	347 Blackpool Road	Roadside	353085	431045	NO2	YES	0	4	NO	2
PR7	336 Blackpool Road	Roadside	353111	431080	NO2	YES	0	3	NO	2
PR8	240 Plungington Road	Roadside	353054	431095	NO2	YES	0	2.3	NO	2
PR21	Meadow Street 1	Other	354138	429864	NO2	NO	N/A	N/A	YES	2
PR22	Meadow Street 2	Other	354138	429864	NO2	NO	N/A	N/A	YES	2
PR23	Meadow Street 3	Other	354138	429864	NO2	NO	N/A	N/A	YES	2
PR24	Garrison PH	Roadside	354775	431481	NO2	NO	0	2.3	NO	2
PR25	160 Watling Street Road	Roadside	354751	431521	NO2	NO	4.5	4.5	NO	2
PR39	7 New Hall Lane	Roadside	354841	429594	NO2	YES	0	3.5	NO	2
PR40	23 New Hall Lane	Roadside	354880	429594	NO2	YES	0	3.5	NO	2
PR43	211 New Hall Lane	Roadside	355701	429963	NO2	YES	0	2.3	NO	2

PR41	St Matts Church, New Hall Lane	Roadside	355556	429906	NO2	YES	0	11	NO	2
PR42	St Matts School, New Hall Lane	Roadside	355585	429908	NO2	YES	0	3	NO	2
PR44	507 Garstang Road	Roadside	352467	435024	NO2	YES	0	1.8	NO	2
PR45	503 Garstang Road	Roadside	352471	435012	NO2	YES	0	1.5	NO	2
PR46	482 Garstang Road	Roadside	352483	435006	NO2	YES	0	1.6	NO	2
PR38	149 London Road	Roadside	355070	429198	NO2	YES	0	4	NO	2
PR47	181 London Road	Roadside	355124	429106	NO2	YES	4	4	NO	2
PR48	119 London Road	Roadside	355015	429282	NO2	YES	0	3	NO	2
PR49	24 Grosvenor Street	Roadside	354849	429437	NO2	YES	0	13.5	NO	2
PR50	7 Moore Street	Roadside	355038	429207	NO2	YES	5	6	NO	2
PR44A	39 Whittingham Lane	Roadside	352808	435283	NO2	NO	-10	24	NO	2
PR51	326 Sharoe Green Lane	Roadside	353139	432997	NO2	NO	0	4.3	NO	2
PR52	323 Sharoe Green Lane	Roadside	353143	432977	NO2	NO	0	7.2	NO	2

| PR53 | 313 Garstang Road | Roadside | 353065 | 432965 | NO2 | NO | 0 | 6.3 | NO | 2 |
| PR54 | 273 Black Bull Lane | Roadside | 353015 | 432965 | NO2 | NO | 0 | 7 | NO | 2 |

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 NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	NO₂ Annual Mean Concentration (µg/m³) (3)				
					2014	2015	2016	2017	2018
PRA1	Roadside	Automatic	77	77	27	27	27	26	23
PRA2	Urban Background	Automatic	99	99	27	22	24	20	21
PR1	Roadside	Diffusion Tube	100	100	38	37	37	35	35
PR5	Roadside	Diffusion Tube	100	100	38	37	37	35	37
PR6	Roadside	Diffusion Tube	100	100	34	31	31	30	33
PR7	Roadside	Diffusion Tube	83	83	34	29	30	30	29
PR8	Roadside	Diffusion Tube	100	100	34	30	33	29	34
PR21	Other	Diffusion Tube	100	100	26	26	28	25	24
PR22	Other	Diffusion Tube	100	100	27	27	27	25	25
PR23	Other	Diffusion Tube	100	100	28	27	27	26	25
PR24	Roadside	Diffusion Tube	100	100	35	34	34	33	34
PR25	Roadside	Diffusion Tube	100	100	32	31	34	33	31
PR39	Roadside	Diffusion Tube	100	100	**47**	**44**	**46**	**44**	**44**
PR40	Roadside	Diffusion Tube	100	100	**40**	39	**44**	35	37
PR43	Roadside	Diffusion Tube	42	42	35	30	32	29	22

PR41	Roadside	Diffusion Tube	100	100	27	23	25	22	24
PR42	Roadside	Diffusion Tube	83	83	32	35	33	32	31
PR44	Roadside	Diffusion Tube	42	42	**46**	**50**	**44**	32	19
PR45	Roadside	Diffusion Tube	100	100	36	33	37	27	20
PR46	Roadside	Diffusion Tube	92	92	**<u>65</u>**	**55**	**<u>61</u>**	**41**	23
PR38	Roadside	Diffusion Tube	92	92	38	35	39	35	37
PR47	Roadside	Diffusion Tube	100	100	37	36	37	35	32
PR48	Roadside	Diffusion Tube	100	100	**40**	**41**	**41**	36	37
PR49	Roadside	Diffusion Tube	100	100	25	23	24	21	24
PR50	Roadside	Diffusion Tube	100	100	30	26	29	26	27
PR44A	Roadside	Diffusion Tube	100	42					27
PR51	Roadside	Diffusion Tube	100	100					26
PR52	Roadside	Diffusion Tube	100	100					32
PR53	Roadside	Diffusion Tube	100	100					29
PR54	Roadside	Diffusion Tube	100	100					24

☒ **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 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 **<u>bold and underlined.</u>**

(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.

Table A.4 – 1-Hour Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2018 (%) [2]	NO₂ 1-Hour Means > 200µg/m³ [3]				
					2014	2015	2016	2017	2018
PRA1	Roadside	Automatic	77	77	**0**	**0**	**0**	**0**	**0**
PRA2	Urban Background	Automatic	99	99	**0**	**0**	**0**	**0**	**0**

Notes:

Exceedances of the NO₂ 1-hour mean objective (200µg/m³ not to be exceeded more than 18 times/year) are shown in **bold.**

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

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

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

Table A.5 – PM₂.₅ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2018 (%) [2]	PM₂.₅ Annual Mean Concentration (μg/m³) [3]				
				2014	2015	2016	2017	2018
PRA2	Urban Background	96	96	12	10	10	9	9

☐ **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 2018

Table B.1 – NO₂ Monthly Diffusion Tube Results - 2018

| Site ID | NO$_2$ Mean Concentrations (µg/m^3) | | | | | | | | | | | | Annual Mean | | |
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.96) and Annualised [1]	Distance Corrected to Nearest Exposure [2]
PR1	32.3	41.7	35.8	31.5	33.4	25.9	35.1	33.5	40.3	37.0	46.8	45.5	36.6	35.1	
PR5	42.1	40.0	38.7	36.4	36.9	29.7	41.9	37.1	42.9	40.6	43.3	35.1	38.7	37.2	
PR6	38.53	40.73	36.42	29.62	33.74	20.96	33.31	32.48	33.61	34.39	40.33	42.69	34.7	33.3	
PR7	37.45	39	33.12	26.7	25.07	20.12	26.44	27.52	26.2	miss	35.72	miss	29.7	28.5	
PR8	39.13	46.5	37.9	28.49	37.03	23.49	28.33	25.49	25.57	36.4	47.55	44.05	35.0	33.6	
PR21	31.32	33.49	24.4	21.94	20.37	16.31	24.17	25.22	8.72	28.45	34.94	34.13	25.3	24.3	
PR22	30	32.58	25.62	22.09	20.31	16.55	23.11	25.2	25.85	27.04	29.93	34.48	26.1	25.0	
PR23	27.52	28.16	24.51	23.69	20.82	16.26	24.31	24.21	23.25	27.29	31.5	36.17	25.6	24.6	
PR24	40.05	37.54	29.58	31.14	36.81	27.64	42.21	36.16	39.62	31.76	32.61	40.77	35.5	34.1	
PR25	42.83	41.48	35.45	29.75	34.94	28.66	33.35	31.55	36.94	21.62	41.75	45.25	35.3	33.9	31.3
PR39	47	46.67	46.9	41.13	45.02	35.14	50.25	45.71	46.44	47.95	46.13	54.74	46.1	44.2	
PR40	41.49	46.86	34.18	32.8	38.32	29.14	40.74	36.21	36.58	36.55	41.1	49.12	38.6	37.0	
PR43	35.84	10.64	30.11	25.77	miss	23.39	miss	miss	miss	miss	miss	miss	25.2	22.2	
PR41	31.63	28.75	26.61	20.84	20.05	19.89	19.15	19.6	22.7	24.62	33.97	35.9	25.3	24.3	
PR42	40.22	37.93	31.94	31.69	25.07	23.07	32.07	32.85	34.39	32.66	miss	miss	32.2	30.9	

PR44	24.2	25.28	22.42	19.76	20.79	miss	miss	stopped					22.5	19.4		
PR45	25.35	26.71	20.8	19.24	18.37	15.42	17.71	15.9	15.38	20.08	23.14	29.98	20.7	19.8		
PR46	30.4	33.48	27.42	23.34	miss	21.62	21.22	16.79	16.79	22.11	26.48	27.76	24.3	23.3		
PR38	**43.38**	**47.9**	**40.08**	37.45	32.17	23.76	39.95	38.56	miss	38.75	**40.67**	**43.19**	38.7	37.2		
PR47	39.63	**45.66**	38.19	36.56	35.9	30.87	36.86	33.94	31.71	35.58	36.84	38.43	36.7	35.2		32.4
PR48	**42.09**	**45.78**	39.46	36.53	39.11	28.42	34.31	32.77	33.24	38.93	**44.09**	**52.39**	38.9	37.4		
PR49	28.12	27.22	29.2	18.25	25.03	20.18	23.09	19.93	18.4	26.49	26.59	34.3	24.7	23.7		
PR50	37.38	37.64	29.85	21.61	25.14	20.22	24.52	21.02	21.86	30.4	**42.07**	**46.1**	29.8	28.6		26.8
PR44A							21.38	21.09	27.31	**40.38**	32.88	28.6	25.4			26.7
PR51	31.49	35.34	32.79	23.34	28	21.27	24.13	21.56	23.69	26.87	30.95	31.8	27.6	26.5		
PR52	36.76	37.99	32.47	30.2	29.74	26.36	32.31	30.13	30.7	33.03	37.36	40.18	33.1	31.8		
PR53	33.16	40.24	33.97	27.83	28.93	24.77	25.05	23.12	23.41	28.29	39.16	34.46	30.2	29.0		
PR54	29.18	32.84	25.93	21.54	25.34	18.98	17.76	18.03	19.98	24.21	33.14	34.04	25.1	24.1		

CLICK HERE THEN PASTE COMPLETED DATA ROWS FROM EXCEL TEMPLATE

☒ **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

Diffusion Tube Supplier and Preparation

The NO2 diffusion tubes used for monitoring where supplied and analysed by Gradko. The preparation method is 20% TEA in water.

Diffusion Tube Bias Adjustment Factors

As the diffusion tube results were processed prior to the update of the national database, the bias used was based on the Council`s local measurements and was 0.96. (Tube precision and data quality was Good).

QA/QC of automatic monitoring

Bootle Street AURN – DEFRA through the use of its designated contractors carry out the QA/QC function for this air quality station. Preston City Council is the contracted Local Site Operative and carries out calibrations once a month.

Meadow Street – AQDM are contracted to carry out the QA/QC of the raw data and ET maintain the air quality station. Preston City Council carries out calibrations of the monitor once every 4 weeks.

QA/QC of diffusion tube monitoring

In the 2018 laboratory tests the Gradko tubes with a preparation method of 20% TEA in water had good precision.

Annualisation

In accordance with the DEFRA`s Technical Guidance TG16, any NO2 Diffusion tube data that has less than 75% data capture was annualised in accordance with Box 7.10 of this guidance.

The AURN sites used for this process were:

- For annualisation of PR44

Preston, with an annualisation factor (Ra) of 0.93
Blackpool, with an annualisation factor (Ra) of 0.87
Wigan, with an annualisation factor (Ra) of 0.89

This then gave an average Ra of 0.90, which was then used on the tubes that had less than 75% data capture (see below)

Diffusion Tube PR44 had 5 months of data, at a value of 22.49ug/m3 * 0.90 = 20.24ug/m3.

- For annualisation of PR44A

Preston, with an annualisation factor (Ra) of 0.95
Blackpool, with an annualisation factor (Ra) of 1.03
Wigan, with an annualisation factor (Ra) of 0.97

This then gave an average Ra of 0.98, which was then used on the tubes that had less than 75% data capture (see below)

Diffusion Tube PR44 had 5 months of data, at a value of 27ug/m3 * 0.98 = 26.46ug/m3.

- For annualisation of PR43

Preston, with an annualisation factor (Ra) of 0.95
Blackpool, with an annualisation factor (Ra) of 0.89
Wigan, with an annualisation factor (Ra) of 0.92

This then gave an average Ra of 0.92, which was then used on the tubes that had less than 75% data capture (see below)

Diffusion Tube PR44 had 5 months of data, at a value of 25.15ug/m3 * 0.92 = 23.14ug/m3.

Distance Correction

The diffusion tube results PR25, PR47, PR44A and PR50 were corrected for distance to the nearest sensitive receptor using the "DEFRA Nitrogen Dioxide fall off with distance calculator". See link below:

https://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html

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

The location of the monitoring sites and AQMA`s can be seen in the maps below.

Map 1, Meadow Street Automatic Air Quality Station

Map 2, Bootle Street Automatic Air Quality Station

Map 3, showing tube locations at AQMA`s 4 and 5 (plus others Ringway, Meadow Street. Tubes at AQMA 1 are historical and no longer used)
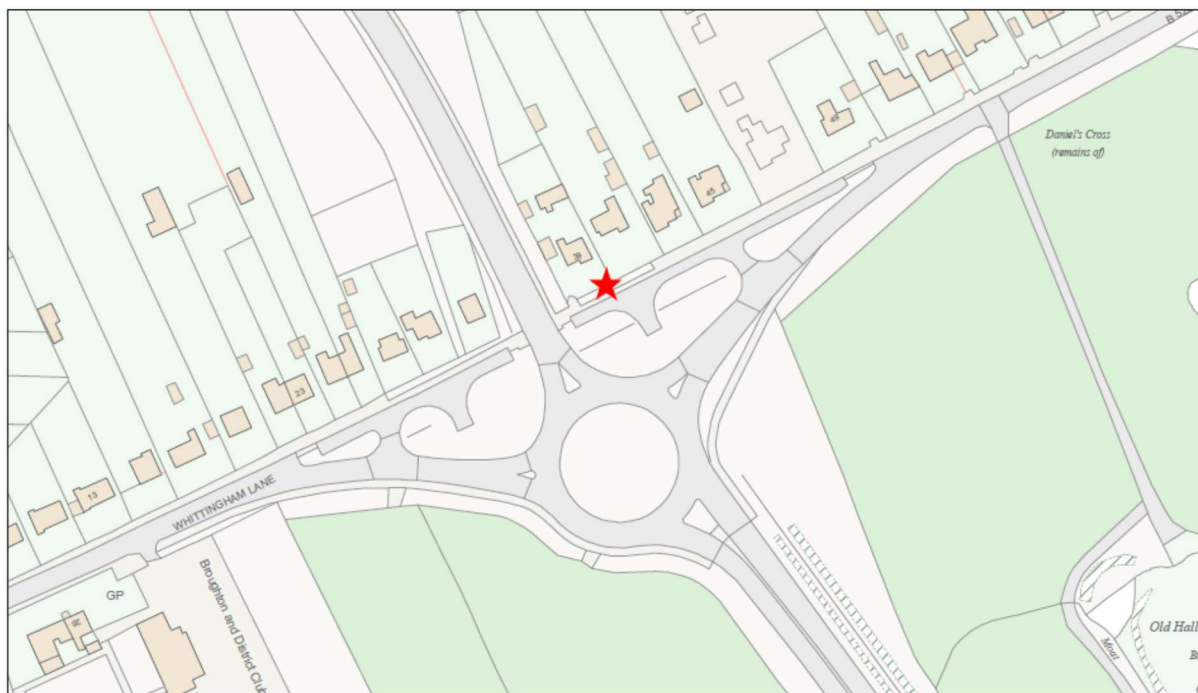

Map 4, showing tube locations at AQMA 2, (plus others Watling Street Road)

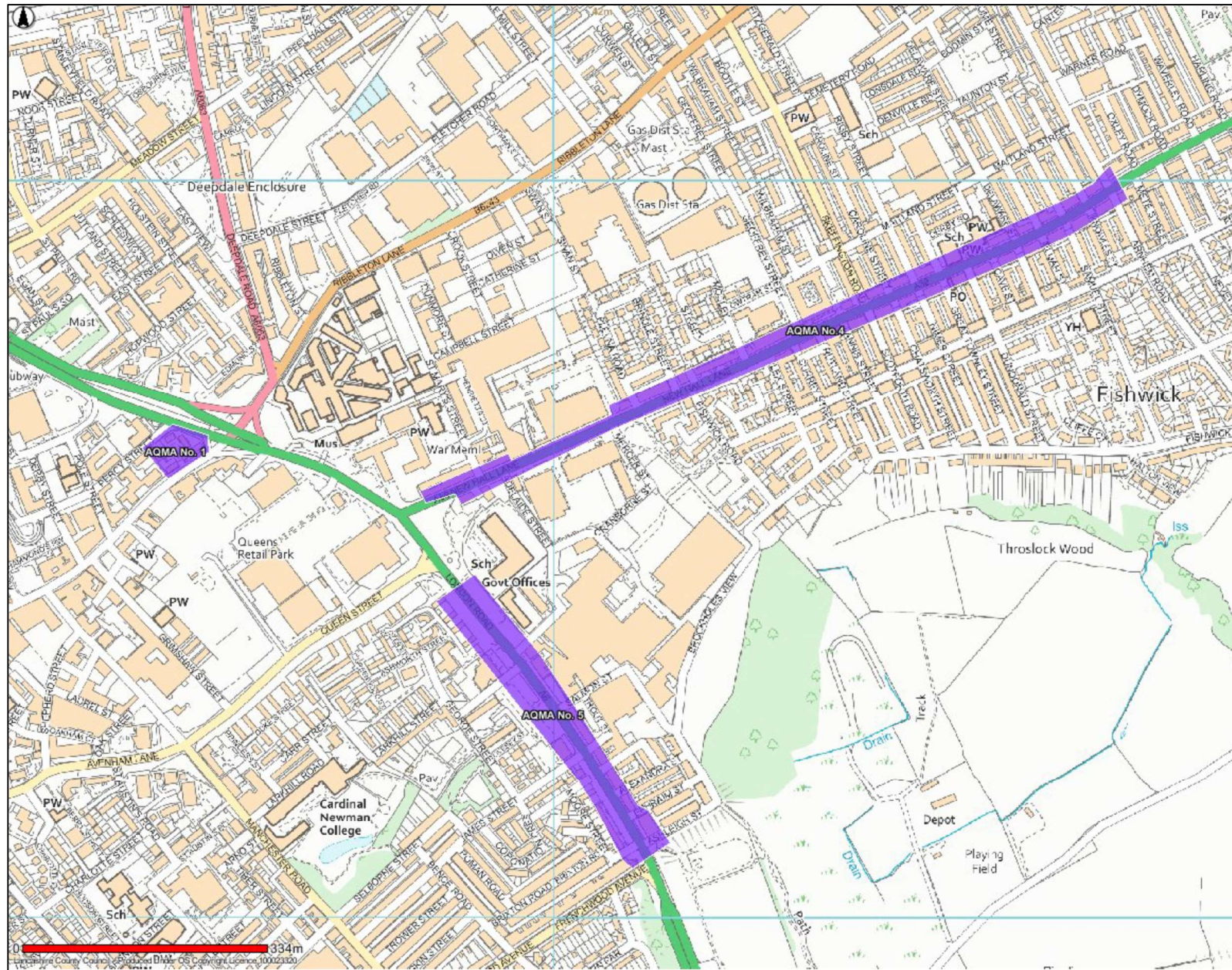Map 5, showing tube locations at AQMA 3

Map 6, showing tubes on Black Bull Lane and Sharoe Green Lane (Hospital Junction)

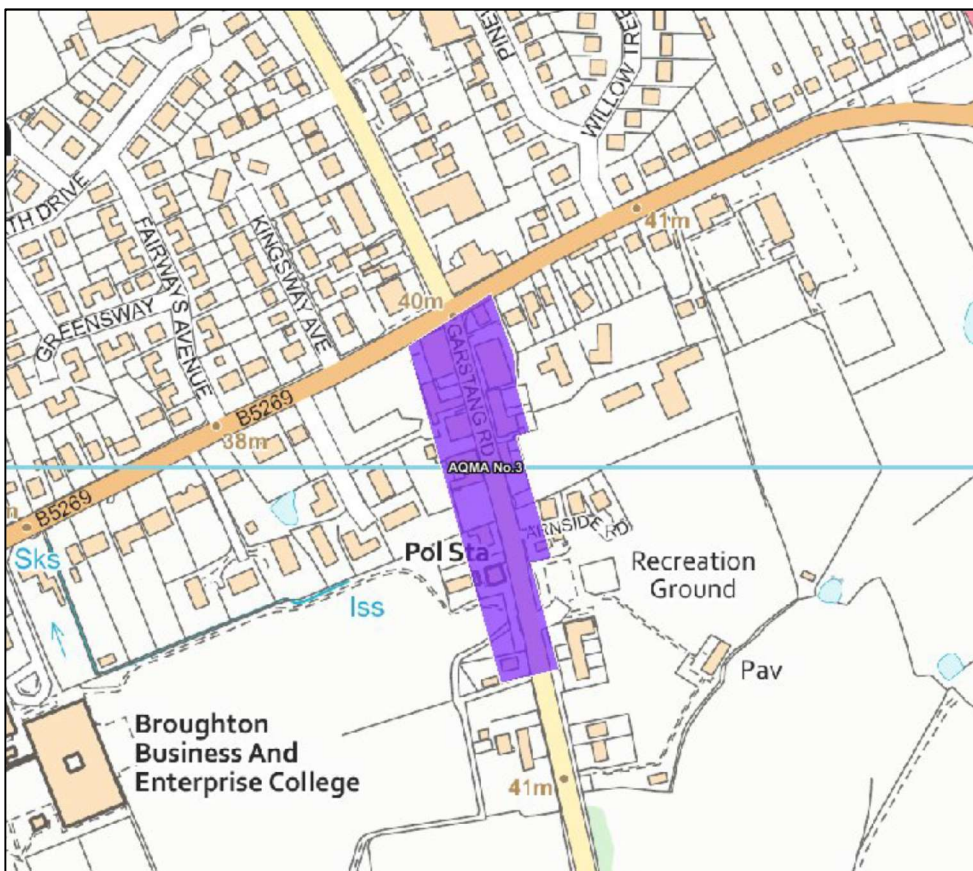Map 7, showing the tube monitoring the new Broughton Bypass

Air Quality Management Area Maps

Map 8, showing AQMA`s 1,4 and 5 can be seen on the next page.

Map 9, showing AQMA 2

Map 10, showing AQMA 3

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

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[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
…	…