



Reading
Borough Council

Working better with you

2023 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995
Local Air Quality Management, as amended by the
Environment Act 2021

Date: June, 2023

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Executive Summary: Air Quality in Our Area

Air Quality in Reading Borough 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, the elderly, and those with existing heart and lung conditions. There is also often a strong correlation with equalities issues because areas with poor air quality are also often less affluent areas^{1,2}.

The mortality burden of air pollution within the UK is equivalent to 29,000 to 43,000 deaths at typical ages³, with a total estimated healthcare cost to the NHS and social care of £157 million in 2017⁴.

Reading is a heavily built-up area, in which the roads get congested during peak times. The main air quality issue identified in Reading are vehicle emissions. NO₂ is the only pollutant exceeding a national objective, but PM₁₀ and PM_{2.5} are also pollutants of concern due to their effects on health even at low concentrations.

Reading Borough Council's monitoring of these pollutants indicates that the levels are now falling. Levels of air pollution fell significantly in 2020 and 2021 because of less traffic being on the roads during the lockdown restrictions brought in to control the COVID-19 pandemic. Although levels have risen again in 2022, they have not quite returned to the levels seen previously. This is likely to be a combination of both changes to peoples working patterns since COVID-19 resulting in less traffic on the roads, and improvements in vehicle emissions.

There is currently 1 large AQMA in Reading covering all the major arterial roads in and out of the town as well as the central area. The majority of the AQMA does not exceed

¹ Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

² Defra. Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

³ Defra. Air quality appraisal: damage cost guidance, January 2023

⁴ Public Health England. Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report, May 2018

national objective levels, but there are hotspot locations that do. https://uk-air.defra.gov.uk/aqma/details?aqma_id=263

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades, there are some areas where local action is needed to protect people and the environment from the effects of air pollution.

The Environmental Improvement Plan⁵ sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term PM_{2.5} targets. The National Air Quality Strategy, due to be published in 2023, will provide more information on local authorities' responsibilities to work towards these new targets and reduce PM_{2.5} in their areas. The Road to Zero⁶ details the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

In the past twelve months a number of measures that will help to improve air quality have been completed. Green Park Train Station was opened on 27th May, this provides an additional high quality public transport option for people from new developments entering Reading from the South and will help relieve congestion along the A33. Reading Borough Council have developed a Local Cycling and Walking Infrastructure Plan (LCWIP) in partnership with Wokingham and West Berkshire Councils. This sub-strategy of Reading's emerging Local Transport Plan, which is out for consultation over the summer, sets out ambitious plans to transform our streets and encourage more people to choose cycling and walking for local journeys, or as part of longer multimodal journeys.

Other projects to help encourage active travel are being implemented via the Active Travel Fund. To date the majority of Tranche 1 cycle paths have been made permanent and the Tranche 2 Shinfield Road cycle scheme is under construction with some sections open for use. The Capability Fund has also enabled Reading Borough Council to offer free bicycle

⁵ Defra. Environmental Improvement Plan 2023, January 2023

⁶ DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

training and maintenance workshops and provide an active travel officer to promote active travel in schools until end of 2023.

Reading Local Plan is already delivering zero or reduced emission developments through use of heat pumps etc, and a planned update of this provides an opportunity to develop this further.

Conclusions and Priorities

In 2022 no continuous monitoring sites exceeded any objective for NO₂. Only one diffusion tube at Malcolm Place on the IDR (43.3 µg/m³) exceeded the objective for NO₂. Once distance corrected to the nearest receptor this reduced to 36.6µg/m³. Friar street is another location with diffusion tubes close to exceedance before bias and distance correction. PM₁₀ and PM_{2.5} are also pollutants of concern due to their effects on health even at low concentrations, although they do not exceed any objectives.

Priorities over the coming year are to complete measures listed in section 2.2, such as the EV strategy that is being developed and to start installing EV charge points in residential areas without off street parking to encourage the uptake of EVs. By replacing combustion engine vehicles with EVs we will eliminate tailpipe emissions and greatly reduce vehicle emissions.

We will also complete the review of our AQAP which is currently underway. This will introduce new actions and will help us to reprioritise actions to help improve air quality in future years.

Local Engagement and How to get Involved

Local interest in air quality has never been higher; this is reflected in the number of enquiries that the Council is getting from interested local community groups and Councillors trying to find out more on the subject.

Reading has a good bus service, as well as dedicated cycle and walking routes. These options reduce the amount of pollutants an individual is responsible for emitting and are cheaper and often quicker than driving. Walking and cycling have become an even more important way of getting around during the COVID-19 emergency. Reading Borough Council has introduced additional infrastructure to help make these even more attractive options, which it is hoped will encourage a permanent increase in the numbers using

sustainable transport. Anyone looking to reduce their own impact on air pollution is encouraged to use these options and help make Reading a healthier and more pleasant place to live.

If you are sensitive to the effects of air pollution, you may wish to take measures to minimise your exposure such as:

- Limiting the length of time spent in busy roadside locations where the highest pollution concentrations occur.
- Exercise in the morning when ozone levels are lower.

It is particularly important for those sensitive to pollution to take these actions on days when air pollution is forecast to be high. A five-day forecast can be found at: <https://uk-air.defra.gov.uk/>

Up to date local monitoring data can be found at:

https://www.airqualityengland.co.uk/local-authority/?la_id=278

More general up to date information on air quality can be found at:

<https://www.cleanairhub.org.uk/>


Local Responsibilities and Commitment

This ASR was prepared by the Environmental Health Department of Reading Borough Council with the support and agreement of the following officers and departments:

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This ASR has been approved by:

James Crosbie, ...  ..Assistant Director, Planning, Transport & Public Protection, Directorate of Economic Growth & Neighbourhood Services

This ASR has not been signed off by a Director of Public Health.

If you have any comments on this ASR please send them to Ross Jarvis at:

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1 Local Air Quality Management

This report provides an overview of air quality in Reading Borough Council during 2022. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), 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 order to achieve and maintain the objectives and the dates by which each measure will be carried out. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Reading Borough Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England are presented in Table E.1.

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 should prepare an Air Quality Action Plan (AQAP) within 18 months. The AQAP should specify how air quality targets will be achieved and maintained and provide dates by which measures will be carried out.

A summary of AQMAs declared by Reading Borough Council can be found in Table 2.1. The table presents a description of the AQMA that is currently designated within Reading Borough Council. Appendix D: Map of Monitoring Locations and AQMAs provides maps of AQMA and also the air quality monitoring locations in relation to the AQMA. The air quality objectives pertinent to the current AQMA designation are as follows:

- NO₂ annual mean

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance : Declaration	Level of Exceedance : Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
Reading AQMA	19/08/2009	NO2 Annual Mean	An area encompassing all the main arterial routes in and out of Reading and central area.	NO	?	None in 2022	2	Reading Borough Council AQAP 2016	http://www.reading.gov.uk/media/6389/Air-Quality-Action-Plan/pdf/AQAP_Update_2016.pdf

- Reading Borough Council confirm the information on UK-Air regarding their AQMA is up to date.
- Reading Borough Council confirm that all current AQAPs have been submitted to Defra.

2.2 Progress and Impact of Measures to address Air Quality in Reading Borough Council

Defra's appraisal of last year's ASR concluded:

- The Council has robust QA/QC procedures, which were applied appropriately and accurately to the 2021 monitoring data. The national bias adjustment factor (0.83) was selected, with justification based on consistency with previous years. It is suggested that the Council consider using the local factor, as this is higher (0.86), and would give the worst-case results.
- The Council state that they do not provide data for the AQMS diffusion tubes. It is advised that this data is included in future reports. It is not necessary to exclude them from the report.
- Comments from last year's ASR have been mentioned and largely addressed. This is welcomed and encouraged for future ASRs.
- In last year's ASR, the Council state two completed measures: the installation of further EV charging points for taxis in the town centre, and the development of an EV strategy for the town. However, these are also listed as two measures to be completed in the next reporting year, in this ASR. The Council is encouraged to implement these measures, as stated in this year's ASR.
- The Council have provided a clear map of the diffusion tube monitoring network, although, as highlighted in last year's ASR appraisal comments, the map would benefit from having the diffusion tube sites (as well as the automatic monitoring sites) labelled for future ASRs.
- The Public Health Outcomes Framework's fraction of mortality attributable to air pollution indicator for PM2.5 was referenced in the report as previously advised, which is welcomed. The Council also identify measures which could both indirectly and directly help to reduce PM2.5 emissions, directing the reader towards the specific measure numbers in the latter case.
- It is advised that a thorough check for formatting errors is carried out prior to submission of future ASRs. There were instances whereby subscripted numbers were missing (e.g. "NO₂", instead of "NO2"). The caption of Table A.1 was not formatted in the same way as the rest of the report. Although neither of these observations affect the readability of the report, consistent formatting throughout is encouraged.

- It is advised that a thorough check for typographical errors is also carried out prior to submission. In the “In AQMA? Which AQMA?” column of Table A.2, the text read “Reading AQMS” throughout. It is believed that this should have read “Reading AQMA”.
- Overall, the report is detailed, concise and satisfies the criteria of the relevant standards. The Council should continue their good work.

Reading Borough Council has taken forward a number of direct measures during the current reporting year of 2022 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. 32 measures are included within Table 2.2, with the type of measure and the progress Reading Borough Council have made during the reporting year of 2022 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

Key completed measures are:

- Green Park Train Station opened
- Local Cycling and Walking Infrastructure Plan (LCWIP) adopted - developed in partnership with Wokingham and West Berkshire Councils and a sub-strategy to our emerging Reading Transport Strategy 2036 it sets out ambitious plans to transform our streets and encourage more people to choose cycling and walking for local journeys, or as part of longer multimodal journeys.
- Capability Fund – free bicycle training and maintenance workshops and active travel officer promoting active travel in schools until end of 2023.

Reading Borough Council expects the following measures to be completed over the course of the next reporting year:

- Review of AQAP
- EV Infrastructure Strategy

Reading Borough Council’s priorities for the coming year are to complete the review of the AQAP and the EV Infrastructure Strategy. Reading Borough Council will also be implementing a School Air Quality Awareness Programme over the next two years. This programme is being funded using an Air Quality Grant from Defra.

The principal challenges and barriers to implementation that Reading Borough Council anticipates facing are the competing pressures on time and resources to carry out the work. Although the AQAP review and EV Infrastructure Strategy work are funded, work outside this is reliant on successfully being awarded funding, most likely from an external source.

Progress on the following measures has been slower than expected due to:

- Review AQAP – This was delayed due to the impact of COVID-19. Specifically, the adoption of the new LTP was delayed due to the impact caused on vehicle numbers and what the ‘new normal’ will look like. This had knock on implications for the completion of the AQAP as we had to ensure the strategies and actions of both align.
- EV Infrastructure Strategy – The lack of a specific resource delayed the completion of this strategy, but this is now nearing completion.
- Introduce EV charge points for taxis near to the town centre to encourage the uptake of EVs by the taxi fleet. – This was delayed to ensure alignment with the EV Infrastructure Strategy.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Reading Borough Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of the Reading AQMA.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
RDAQ1	Railway upgrade	Transport Planning and Infrastructure	Public transport improvements -interchanges stations and services	42979	ongoing	Network Rail	Network Rail	NO	Not Funded	> £10 million	Completed	modelled to reduce NO2 levels by 1µg/m3 on Chatham street.	Reduced congestion Improved journey times Improved air quality	Interchange works complete. Cow Lane opened to two-way traffic in March 2019 and further improvements to walking and cycling facilities have been completed. wayfinding and cycle parking security improvements have been installed at Reading Station interchange	
RDAQ1	Railway upgrade	Transport Planning and Infrastructure	Public transport improvements -interchanges stations and services	42979	ongoing	Network Rail	Network Rail	NO	Not Funded	> £10 million	Completed	modelled to reduce NO2 levels by 1µg/m3 on Chatham street.	Reduced congestion Improved journey times Improved air quality	Interchange works complete. Cow Lane opened to two-way traffic in March 2019 and further improvements to walking and cycling facilities have been completed. wayfinding and cycle parking security improvements have been installed at Reading Station interchange	
RDAQ2	Green Park Station	Transport Planning and Infrastructure	Public transport improvements -interchanges stations and services	43101	44166	RBC, GWR & Network Rail Funded by LEP	RBC, GWR & Network Rail Funded by LEP	NO	Not Funded	> £10 million	Completed	Provide alternative route into Reading from Green Park Village. Reduced vehicle emissions	Reduced congestion on A33	Green Park Station opened for services 27th May 2023	

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
RDAQ3	Southern Mass Rapid Transit (MRT)	Transport Planning and Infrastructure	Bus route improvements	Date	ongoing	RBC	RBC Funded by LEP	NO	Funded	£1 million - £10 million	Implementation	Reduced vehicle emissions	Improved journey times for public transport Increase in the number of people using public transport for local journeys	Phase 1 to 4 have been completed. Further phases continuing to be developed in accordance with LEP plan.	Detailed design for phases 5 and 6 completed and procurement exercise to commence shortly to appoint contractor. Construction to commence later 2023 and complete by Mar 2025
RDAQ4	Eastern MRT	Transport Planning and Infrastructure	Bus route improvements	-	N/A	RBC	RBC Funded by LEP	NO	Not Funded		Aborted		Improved journey times for public transport Increase in the number of people using public transport for local journeys Improved accessibility for pedestrians and cyclists	Planning consent refused by WBC and funding was subsequently reallocated by LEP.	Planning consent refused by WBC and funding was subsequently reallocated by LEP.
RDAQ5	Southern (Mere oak) Park & Ride	Transport Planning and Infrastructure	Public transport improvements -interchanges stations and services	Complete	complete	RBC	RBC, WBC	NO	Funded	£1 million - £10 million	Completed	Reduced vehicle emissions	Increased use of park and ride facilities	Car park opened August 2015, served by Greenwave buses as a pre-MRT service. Continued increased use of park and ride and Greenwave services pre-Covid.	BSIP funding awarded for development of site and consultant appointed to start work on designs. Works will include improvements to waiting and refuge facilities and enable all direction movements at the end of Mere oak Lane.
RDAQ6	Winnersh Park & Ride	Transport Planning and Infrastructure	Public transport improvements -interchanges stations and services	Complete	complete	RBC	RBC, WBC	NO	Funded	£1 million - £10 million	Completed	Reduced vehicle emissions	Increased use of park and ride facilities	Complete with full commercial operation October 2015. Due to scheme success plans in place and funding allocated by LEP for 'decking' of the car park to increase capacity and these works commenced 2020. The schedule completion of	Construction work on the addition of a 'dec' to the car park as well as interchange improvements completed. Park and Ride services have not yet resumed by Wokingham/Reading Buses.

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation	
															these works and reopening of expanded car park Spring 2023.	
RDAQ7	East (Thames Valley Park) Park & Ride	Transport Planning and Infrastructure	Public transport improvements -interchanges stations and services	Summer 2019	completed Oct 2019	RBC	WBC Funded by LEP	NO	Funded	£1 million - £10 million	Completed	potentially result in 554 less car journeys into town each day.Reduced vehicle emissions	Increased use of park and ride facilities	Construction commenced summer 2018 and complete 2020. Due to impact of covid on Park & Ride service patronage a service was provide with support from Wokingham BC but this has now terminated.	Site now used by NHS for hospital/university park and ride. Due to prohibitive parking costs not an attractive place for public access.	
RDAQ8	Traffic signal upgrading	Traffic Management	UTC, Congestion management, traffic reduction		N/A	RBC		NO	Not Funded		Aborted				not taken forward due to unexpected costs relocating services	
RDAQ9	A33 Congestionpinchpoint relief scheme	Transport Planning and Infrastructure	Other	Complete	complete	RBC	RBC Funded by DfT	NO	Funded	£500k - £1 million	Completed	Reduced vehicle emissions	Improved journey times	Complete		
RDAQ10	A4 Congestion relief pinchpoint scheme	Transport Planning and Infrastructure	Other		N/A	RBC		NO							not taken forward due to unexpected costs relocating services	
RDAQ11	Work towards electrification of vehicle fleet	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles		On-going. EV charge point scheme	RBC	RBC	NO	Partially Funded	£100k - £500k	Completed	Reduced vehicle emissions	procurement of electric charge points and vehicles	4 charge points installed at civic offices. 3 at Bennet Rd. 5 electric vans on RBC fleet. 2 EV pool cars. 15 lamp column charge points installed in residential locations without off street parking	In line with our Net Zero pledge RBC plans to swap out all fleet ICE vehicles for Evs by 2030	

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
RDAQ12	Expansion of Ready Bike cycle scheme	Promoting Travel Alternatives	Promotion of cycling	Ongoing	complete	RBC	RBC, Hourbike	NO	Partially Funded	£100k - £500k	Aborted	Providing a readily available alternative to cars, buses or taxis leading to a reduction in vehicle emissions. Potentially 193384g NO2 over lifetime of scheme	Increase in the number of journeys made by ReadyBike	ReadyBike monitoring data shows that 109,468 rentals and 19,229 subscriptions over an estimated 483,460 miles were made by ReadyBike since the scheme launch in June 2014 to April 2019.	Following market engagement any reintroduction of cycle hire scheme would require significant LA funding.
RDAQ13	Cross boundary cycle routes	Transport Planning and Infrastructure	Cycle network	Ongoing	complete	RBC	RBC, West Berks, Wokingham Council & Bracknell Forest Council Funded by LEP	NO	Funded	£500k - £1 million	Completed	Providing infrastructure to enable people to feel safe when riding to increase uptake in cycling rather than personal vehicle. Not quantified, but measure should lead to a reduction in vehicle emissions	Increase number of people cycling along cross-boundary routes	NCN Route 422 now fully completed both within and outside Reading.	
RDAQ14	Cycle route infrastructure improvements	Transport Planning and Infrastructure	Cycle network	Ongoing	44166	RBC	RBC	NO	Funded	£1 million - £10 million	Planning	Improve cycle routes to increase cycle usage.	Increase in the number of people cycling for local journeys	RBC has developed a Local Cycling and Walking Infrastructure Plan in partnership with Wokingham and West Berkshire. Recently Sustrans have been commissioned to update this LCWIP to ensure it is compliant with the new LTN1/20 requirements. RBC has been awarded	Delivery of improvements identified in LCWIP and other new schemes, subject to funding being secured from ATE.

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation	
															<p>funding and is delivering 2 Active Travel Schemes, one on the Shinfield Road and one on the Bath Road Castle Hill. will continue to bring forward more schemes in future Active Travel Funding rounds</p>	
RDAQ15	Thames pedestrian/cycle bridge	Transport Planning and Infrastructure	Cycle network	Complete	complete	RBC	RBC Funded by DfT	NO	Funded		Planning	Increased walking and cycling into town.	Increase in number of cycling & walking trips to/from Caversham	<p>Complete September 2015. Post-LSTF monitoring data shows an increase in the number of pedestrians and cyclists crossing the River Thames. The Council is now planning to expand the cycle network in the vicinity of the bridge by changing the legal status of the footpath to shared-use. Public consultation carried out in Summer 2017 resulted in 191 objections to the proposal, which will now be passed to the Secretary of State for determination.</p>		

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
RDAQ16	Minimising industrial emissions	Environmental Permits	Other measure through permit systems and economic instruments	ongoing		RBC	RBC	NO	Not Funded	< £10k	Implementation	Reduce industrial emissions to air	inspections of permitted installations carried out. EP Annual subscriptions and applications. Annual search for unpermitted processes		
RDAQ17	Through Reading Climate Change Partnership increase business participation in reducing emissions through measures such as cycle to work schemes, reducing building energy, low emission delivery vehicles.	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	ongoing	2020	RBC	RBC, Sustainability	NO					Reading climate change partnership		
RDAQ18	Through planning process ensuring that future development does not result in further deterioration of air quality and where possible results in an improvement	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	ongoing	43101	RBC	RBC	NO	Not Funded	< £10k	Completed		Air Quality assessments produced for new developments. Monitoring results	Strategic AQ assessment completed in 2017/18 to focus on cumulative impact of developments	
RDAQ19	Ensure that measures to address air quality do not conflict with climate change actions, by considering the interlinked causal factors and promoting mutually beneficial solutions	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Ongoing	ongoing	RBC	RBC	NO	Not Funded	< £10k	Implementation				

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
RDAQ20	Continue Reading Buses investment Programme to ensure the bus fleet has the lowest emissions it can.	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	Ongoing	44166	RBC	RBC, Reading Buses	YES	Funded	£1 million - £10 million	Completed	Retrofit to bring forward compliance with No2 target by upto 2 years. Predicted to reduce level of NO2 by 8µg/m3 on Friar Street		Bus fleet in June 2018 included 62 x CNG buses or 33%. The percentage of the fleet now Euro 5 or 6 emissions compliant is 81%. Following the 2018 Targeted Feasibility Study to Deliver Nitrogen Dioxide Concentration Compliance in the shortest possible time, funding awarded to retrofit all RTL fleet to Euro 6 compliance by December 2019- to 2021 - All but 3 buses re now retrofitted	Reading Buses continue to invest in fleet replacement with cleaner vehicles. Currently RB does not operate any Electric Vehicles but along with officers at RBC will review future opportunities of funding as they become available from DfT.
RDAQ21	Continue to explore and implement ways to improve emissions from Readings taxi fleet.	Vehicle Fleet Efficiency	Other	ongoing	2020	RBC	RBC	NO	Not Funded	< £10k	Implementation	Reduce taxi emissions	measures introduced to improve emissions from taxis	taxi emissions policy introduced to incrementally improve emissions standards of fleet to 2029 when all must be ULEV	
RDAQ21	Continue to explore and implement ways to improve emissions from Readings taxi fleet.	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	ongoing	2018	RBC	RBC	NO	Not Funded	< £10k	Completed	Reduce taxi emissions	measures introduced to improve emissions from taxis	telematics devices fitted to a number of taxis to investigate feasibility of converting to electric and identifying EV charge point locations	
RDAQ22	Reduce emissions from idling vehicles at hotspot locations within the AQMA.	Public Information	Via other mechanisms	ongoing	2018	RBC	RBC	YES	Funded	< £10k	Completed		reduction on emissions in idling hotspots	competition for children to design a sign to be put out at idling hotspots underway	to be followed up with officers talking to drivers and issuing FPNs where necessary

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
RDAQ22	Reduce emissions from idling vehicles at hotspot locations within the AQMA	Public Information	Via other mechanisms	ongoing	2018	RBC	RBC	YES	Funded	< £10k	Completed		reducion on emissions in idling hotspots	Idling action campaign days in town and at schools to increase awareness	
RDAQ22	Reduce emissions from idling vehicles at hotspot locations within the AQMA	Public Information	Via other mechanisms	ongoing	2019	RBC	RBC	YES	Funded	< £10k	Completed	aquired 39 pledges from drivers that they would not idle in the future	Raise awareness reduction of emissions in idling hortspots	Idling action campaign day in town for Clean Air Day	
RDAQ23	Continue to offer Bikeability cycle training to all schools across Reading	Promoting Travel Alternatives	Promotion of cycling	on-going	43891	RBC	RBC Funded by DfT	NO	Funded	£100k - £500k	Implementation		Increase the number of children cycling to school	Through RBC's Capability Fund allocation funding secured to deliver free adult and family bicycle training and maintenance workshops in 2023.	
RDAQ24	Continued funding for a Cycle development officer to help promote cycling and deliver the Cycling Strategy.	Promoting Travel Alternatives	Promotion of cycling	Complete	42430	RBC	RBC Funded by DfT	NO	Funded	£100k - £500k	Planning		Increase the number of people cycling for local journeys	Complete	RBC to investigate new funding opportunities to continue delivering a range of cycling initiatives in the future. Through the Capability Fund RBC have employed an Active Travel Officer from Sustrans until the end of 2023.
RDAQ25	Continue to inspire people to walk more via initiatives such as Beat the Street.	Promoting Travel Alternatives	Promotion of walking	Complete	42186	RBC	RBC Funded by DfT & CCG	NO	Partially Funded	£100k - £500k	Implementation		Increase the number of people walking for local journeys	Ongoing	Through the Capability Fund RBC have continued to employ an Active Travel Officer from Sustrans until the end of 2023 to promote active travel in schools in Reading.
RDAQ26	Continue to monitor air pollution at existing monitoring locations and make results available to view on RBC website.	Public Information	Other	Ongoing	2020	RBC	RBC	NO	Not Funded	£50k - £100k	Implementation	none	Monitoring data available on RBC website. Achieve a good level of data capture.	Ongoing	

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
RDAQ27	Investigate the feasibility of introducing locally based alert system to inform residents of forecasted pollution episodes.	Public Information	Other	Complete	2016	RBC	RBC	NO	Not Funded		Aborted	none	complete an assessment of the feasibility of such a system	Investigations show that uptake would be limited. Cost benefit indicates that it is not currently feasible.	Funding
RDAQ28	Bonfires - Provide advice to residents and take enforcement action where appropriate to discourage the use of bonfires when disposing of waste material.	Public Information	Via the Internet	Ongoing	ongoing	RBC	RBC	NO	Not Funded	< £10k	Implementation		number of enquiries		
RDAQ29	Solid Fuel Burning - The Smoke Control Survey 2014; Showed there was a relative lack of knowledge of smoke control areas, it is now proposed to inform people of the existence of smoke control areas, how to find out if you live in one and what you should or shouldn't do if you live in one. This will be done through an awareness raising campaign to promote best practice for people heating their homes using wood, coal and other solid fuels.	Public Information	Via other mechanisms	Complete	2016	RBC	RBC	YES	Funded	< £10k	Completed	unknown	responses to survey	of 4000 surveys sent our 720 responses were received. Press releases aware sent out and webpages were updated with information in an attempt to raise peoples awareness	
RDAQ29	Solid Fuel Burning – introduction of a boroughwide smoke control area	Public Information	Via other mechanisms	Ongoing	2023/24	RBC	RBC	No	Not Funded	< £10k	Implementation	unknown	Press release in run up to winter	Gained approval at committee. Will not follow formal consultation process before implementation	
RDAQ30	Provide advice, guidance and support to improve home energy efficiency through the private sector renewal scheme and winter watch.	Public Information	Via other mechanisms	Ongoing		RBC	RBC	NO	Not Funded		Implementation				

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
						RBC						unknown	Home energy conservation act report, EPC ratings of houses		
RDAQ31	Generate a larger proportion of energy from renewable sources.	Promoting Low Emission Plant	Other Policy			RBC		NO	Not Funded		Implementation	unknown	Government registration	8% by 2020	
RDAQ32	Railway and Interchange Upgrade - Reading West Station	Transport Planning and Infrastructure	Public transport improvements -interchanges stations and services	Ongoing	44256	RBC	RBC, GWR - Funded by LEP	NO	Funded	£1 million - £10 million	Implementation	Reduced vehicle emissions	Increase number of people using station, reduce congestion and improve air quality	RBC working with GWR and Network Rail on the delivery of this project. Construction due to complete on this project Summer 2023. New station facilities to then open on completion of the Network Rail certification requirements.	

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

As detailed in Policy Guidance LAQM.PG22 (Chapter 8), 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.

The indicator for PM_{2.5} on the Public Health Outcomes Framework (PHOF) is: D01 - Fraction of mortality attributable to particulate air pollution. The PHOF shows this to currently be 6% in Reading, compared to 5.3% nationally.

Reading Borough Council is taking the following measures to address PM_{2.5}:

In order to reduce the impact of particulates on health in Reading, it is proposed to continue to implement measures from the AQAP. The action plan targets anthropogenic emissions of pollution from vehicles, industry and other sources. Although the action plan was drawn up to address exceedances of NO₂ objectives, PM_{2.5} is a pollutant that is emitted from many of the same sources, so where an action reduces emissions of NO₂, PM_{2.5} will also be reduced. The following non transport related measures from table 2.2 above may more directly help to address mortality from anthropogenic PM_{2.5}:

Measure No. RDAQ16 (industrial emissions), RDAQ27 (bonfires) and RDAQ28 (solid wood burning).

Reading Borough Council currently has 21 Smoke Control Areas covering approximately 62% of the borough and is currently considering the feasibility of declaring a Borough Wide Smoke Control Area to help reduce harmful emissions of particulate pollution, including PM_{2.5}.

A major road resurfacing programme is currently being undertaken. As the breakdown of road surfaces contributes to the suspension of particulates in the air, this work will help to reduce PM_{2.5} from this source.

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

This section sets out the monitoring undertaken within 2022 by Reading Borough Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2018 and 2022 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Reading Borough Council undertook automatic (continuous) monitoring at 3 sites during 2022. Table A.1 in Appendix A shows the details of the automatic monitoring sites. NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem. The [Air Quality England](#) page presents automatic monitoring results for Reading Borough Council, with automatic monitoring results also available through the UK-Air website .

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

Reading Borough Council undertook non- automatic (i.e. passive) monitoring of NO₂ at 57 sites during 2022. Table A.2 in Appendix A presents the details of the non-automatic 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 (where the annual mean data capture is below 75% and greater than 25%), and distance correction. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO₂)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO₂ annual mean concentrations for the past five years with the air quality objective of 40µg/m³. Note that the concentration data presented 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 2022 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.5 in Appendix A compares the ratified continuous monitored NO₂ hourly mean concentrations for the past five years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year.

As can be seen from figure A.3 below, levels of nitrogen dioxide fell significantly in 2020 and 2021 due to COVID-19 restrictions. Data from 2022 shows that the levels have increased again but are still significantly lower than in 2019. This is likely to be due to a combination of the change to working patterns since COVID-19 resulting in lower numbers of vehicles on the roads and improving vehicle emissions standards. All three continuous monitoring stations were below the annual mean objective for NO₂. Concentrations at the Caversham Road AQMS increased marginally from 26µg/m³ to 27µg/m³ in 2022.

The Kings Road AQMS was moved to London Road to become DEFRA affiliated in 2016. This site has continued to monitor levels of NO₂ below the annual average NAQO for NO₂ (21µg/m³). NO₂ levels at Oxford Road (23µg/m³) our other roadside monitoring station is also below the annual mean NAQO for NO₂.

The diffusion tube monitoring results are similar in that they are generally higher than 2020 and 2021, but still below 2019 levels. There is only one exceedance in 2022, at Malcolm

Place ($43.3 \mu\text{g}/\text{m}^3$) although when distance corrected to the nearest exposure this reduces to a borderline exceedance ($36\text{-}40\mu\text{g}/\text{m}^3$).

None of the continuous monitoring stations or diffusion tube locations indicate an exceedance of the 1- hour mean objective.

3.2.2 Particulate Matter (PM₁₀)

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM₁₀ annual mean concentrations for the past five years with the air quality objective of $40\mu\text{g}/\text{m}^3$.

Table A.7 in Appendix A compares the ratified continuous monitored PM₁₀ daily mean concentrations for the past five years with the air quality objective of $50\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times per year.

The tables show that levels of PM₁₀ seem to have increased in 2022 on levels seen over the last couple of years. This could be due to the gradual increase in vehicle usage since coming out lockdown restrictions brought in over the COVID-19 pandemic. Levels of PM₁₀ at our roadside sites in 2022 resemble those in 2019 before the pandemic, but PM₁₀ levels at our urban background monitoring site have increased. There are no exceedances of any air quality objectives for PM₁₀.

3.2.3 Particulate Matter (PM_{2.5})

Table A.8 in Appendix A presents the ratified and adjusted monitored PM_{2.5} annual mean concentrations for the past five years.

PM_{2.5} was $8\mu\text{g}/\text{m}^3$ in 2022. Table A.8 shows that this was the same as measured in the previous three years. Before that levels fluctuated a little between $7\text{-}10\mu\text{g}/\text{m}^3$.

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? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
Reading AURN	AURN	Urban Background	473441	173198	NO ₂ ; PM ₁₀ ; PM _{2.5} ; O ₃	NO	Chemiluminescent; TEOM FDMS; UV Photometrics	N/A	100	2.5
RD1	Caversham Rd	Roadside	471153	174429	NO ₂ , PM ₁₀	YES	Chemiluminescent; Beta-Attenuation Mass	2	3	1.5
RD3	Oxford Rd	Roadside	468700	174126	NO ₂ , PM ₁₀	YES	Chemiluminescent; Beta-Attenuation Mass	9	6	1.5
RD4	London Rd	Roadside	473703	173409	NO ₂ , PM ₁₀	YES	Chemiluminescent; Beta-Attenuation Mass	16	3.5	1.5

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

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
King Oak Flats	King Oak Flats	Roadside	472015	173223	NO2	Reading AQMA	0.0	5.5m	No	2.3
181 Kings road	181 Kings road	Roadside	472513	173281	NO2	Reading AQMA	12.0	2m	No	2.3
Charles Place, 246 Kings Road	Charles Place, 246 Kings Road	Roadside	472592	173253	NO2	Reading AQMA	8.5	2.5m	No	2.3
Wycliffe Baptist Church	Wycliffe Baptist Church	Roadside	472071	173157	NO2	Reading AQMA	20.0	3.5	No	2.3
Amity Road	Amity Road	Kerbside	473233	173244	NO2	Reading AQMA	1.0	0.5m	No	2.3
34 Crescent Road	34 Crescent Road	Roadside	473833	172719	NO2	Reading AQMA	6.0	1.5	No	2.3
78 Crescent Road	78 Crescent Road	Roadside	473717	172677	NO2	Reading AQMA	7.0	1.5	No	2.3
17 Church Rd Earley	17 Church Rd Earley	Roadside	474421	172054	NO2	Reading AQMA	0.0	3m	No	1.5
419 London Rd	419 London Rd	Roadside	473729	173432	NO2	Reading AQMA	0.0	9m	No	2.3
276 Kings Road	276 Kings Road	Roadside	472716	173218	NO2	Reading AQMA	0.0	10m	No	2.3
Sidmouth Street - Trinity Hall	Sidmouth Street - Trinity Hall	Roadside	472071	173157	NO2	Reading AQMA	3.0	3.0	No	2.3

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
Shinfield Rd/Whitley Wood Rd	Shinfield Rd/Whitley Wood Rd	Roadside	473338	170269	NO2	Reading AQMA	10.0	5m	No	2.3
Shinfield Rd/Cedar Rd	Shinfield Rd/Cedar Rd	Roadside	473354	170482	NO2	Reading AQMA	5.0	1.0	No	2.3
42 Shinfield Rd (Opposite)	42 Shinfield Rd (Opposite)	Kerbside	472953	171764	NO2	Reading AQMA	20.0	0.0	No	2.3
Red Cow	Red Cow	Roadside	471685	172853	NO2	Reading AQMA	0.0	1.5m	No	2.3
44 Crown Street	44 Crown Street	Roadside	471717	172856	NO2	Reading AQMA	0.0	4.5m	No	2.3
Blenheim Terrace, Castle Hill	Blenheim Terrace, Castle Hill	Roadside	471061	173018	NO2	Reading AQMA	2.0	3m	No	2.3
128 Castle Hill	128 Castle Hill	Roadside	470987	173016	NO2	Reading AQMA	0.0	2.5m	No	2.3
162a Castle Hill	162a Castle Hill	Roadside	470835	172992	NO2	Reading AQMA	0.0	8m	No	2.3
15 Southcote Lane	15 Southcote Lane	Roadside	469899	172528	NO2	Reading AQMA	9.0	2.0	No	2.3
17a Southcote Lane	17a Southcote Lane	Roadside	469845	172462	NO2	Reading AQMA	5.0	2.0	No	2.3
689 Oxford Rd	689 Oxford Rd	Roadside	468978	173895	NO2	Reading AQMA	0.0	2.5m	No	2.3

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
744 Oxford Rd	744 Oxford Rd	Roadside	468967	173935	NO2	Reading AQMA	0.0	2.5m	No	1.5
Wilson Primary	Wilson Primary	Roadside	469368	173530	NO2	Reading AQMA	2.0	1.5	No	2.3
494 Oxford Rd	494 Oxford Rd	Roadside	469470	173715	NO2	Reading AQMA	0.0	5m	No	1.5
Cow Lane Bridges	Cow Lane Bridges	Roadside	470230	173818	NO2	Reading AQMA	20.0	1m	No	2.3
252 Oxford Rd	252 Oxford Rd	Roadside	470081	173517	NO2	Reading AQMA	0.0	3.5m	No	2.3
327 Oxford Rd	327 Oxford Rd	Roadside	470057	173489	NO2	Reading AQMA	0.0	7.5m	No	2.3
281 Oxford Rd	281 Oxford Rd	Roadside	470294	173445	NO2	Reading AQMA	0.0	6.5m	No	2.3
Malthouse Lane	Malthouse Lane	Roadside	470808	173512	NO2	Reading AQMA	0.0	2.5m	No	2.3
The Butler	The Butler	Roadside	470903	173518	NO2	Reading AQMA	5.0	3.5m	No	2.3
10 Trinity Place	10 Trinity Place	Roadside	470738	173433	NO2	Reading AQMA	0.0	7.5m	No	2.3
165 Oxford Rd	165 Oxford Rd	Roadside	470717	173373	NO2	Reading AQMA	0.0	4.0	No	2.3
Sackville Street	Sackville Street	Roadside	471177	173641	NO2	Reading AQMA	0.0	0.5	No	2.3
Friar St (Nandos)	Friar St (Nandos)	Kerbside	471437	173589	NO2	Reading AQMA	7.0	5.0	No	2.3

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
21A Friars Walk, Friars Street	21A Friars Walk, Friars Street	Roadside	471373	173584	NO2	Reading AQMA	3.0	1.0	No	2.3
Sainsburys 52-55 Friar Street	Sainsburys 52-55 Friar Street	Kerbside	471320	173577	NO2	Reading AQMA	3.0	1.0	No	2.3
Station Hill (Near Taxi Rank)	Station Hill (Near Taxi Rank)	Roadside	471413	173808	NO2	Reading AQMA	20.0	1.0	No	2.3
Station Hill (Near Bus stop WN)	Station Hill (Near Bus stop WN)	Roadside	471324	173820	NO2	Reading AQMA	25.0	1.0	No	2.3
Malmaison	Malmaison	Roadside	471509	173705	NO2	Reading AQMA	0.0	2.0	No	2.3
33 Caversham Rd	33 Caversham Rd	Roadside	471123	173734	NO2	Reading AQMA	0.0	3.0	No	2.3
Malcolm Place	Malcolm Place	Kerbside	471169	173869	NO2	Reading AQMA	6.0	2.5	No	2.3
131 Caversham Rd	131 Caversham Rd	Roadside	471261	174236	NO2	Reading AQMA	0.0	7.0	No	2.3
31a Vastern Rd	31a Vastern Rd	Roadside	471420	174129	NO2	Reading AQMA	3.0	3.0	No	2.3
108 Caversham Rd	108 Caversham Rd	Roadside	471293	174236	NO2	Reading AQMA	0.0	6.5	No	1.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
197 Caversham Rd	197 Caversham Rd	Roadside	471161	174379	NO2	Reading AQMA	0.0	7m	No	2.3
14 Church Road	14 Church Road	Roadside	471103	174774	NO2	Reading AQMA	0.0	2.5m	No	2.3
Cavesham Café	Cavesham Café	Roadside	471401	174790	NO2	Reading AQMA	0.0	2m	No	2.3
Baron Cadagon	Baron Cadagon	Roadside	471461	174840	NO2	Reading AQMA	0.0	5m	No	2.3
45 Prospect Street	45 Prospect Street	Roadside	471558	174919	NO2	Reading AQMA	0.0	1.5m	No	2.3
60 Prospect Street	60 Prospect Street	Roadside	471557	174944	NO2	Reading AQMA	0.0	3m	No	2.3
241 Gosbrook Road	241 Gosbrook Road	Roadside	471942	174600	NO2	Reading AQMA	0.0	6m	No	1.5
68 George Street	68 George Street	Roadside	471913	174490	NO2	Reading AQMA	0.0	3m	No	1.5
40 George Street	40 George Street	Roadside	471909	174543	NO2	Reading AQMA	0.0	3.5m	No	1.5

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.3 – Annual Mean NO₂ Monitoring Results: Automatic Monitoring (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
AURN	473441	173198	Urban Background	53	53	26	22	15	20	23
RD1	471153	174429	Roadside	99	99	40	35	25	26	27
RD3	468700	174126	Roadside	99	99	28	26	20	22	23
RD4	473703	173409	Roadside	96	96	30	27	18	21	21

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.

Reported concentrations are those at the location of the monitoring site (annualised, as required), i.e. prior to any fall-off with distance correction.

Notes:

The annual mean concentrations are presented as µg/m³.

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

(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%).

Table A.4 – Annual Mean NO₂ Monitoring Results: Non-Automatic Monitoring (µg/m³)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
King Oak Flats	472015	173223	Roadside	100	100.0	32.1	27.9	20.1	24.1	22.5
181 Kings road	472513	173281	Roadside	90.4	90.4		34.9	27.9	35.2	32.7
Charles Place, 246 Kings Road	472592	173253	Roadside	84.6	84.6		40.8	28.2	30.6	32.1
Wycliffe Baptist Church	472071	173157	Roadside	90.4	90.4	37.0	39.2	28.5	33.3	31.5
Amity Road	473233	173244	Kerbside	100	100.0		29.1	21.1	24.1	22.6
34 Crescent Road	473833	172719	Roadside	100	100.0				17.0	15.4
78 Crescent Road	473717	172677	Roadside	100	100.0				16.6	16.0
17 Church Rd Earley	474421	172054	Roadside	100	100.0	37.7	34.0	27.7	31.5	30.1
419 London Rd	473729	173432	Roadside	100	100.0	39.4	34.8	25.5	27.3	27.4
276 Kings Road	472716	173218	Roadside	100	100.0	29.5	26.5	18.7	21.4	22.0
Sidmouth Street - Trinity Hall	472071	173157	Roadside	100	100.0	37.0	34.0	23.2	25.2	25.2

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
Shinfield Rd/Whitley Wood Rd	473338	170269	Roadside	90.4	90.4	31.0	26.2	20.1	24.3	22.2
Shinfield Rd/Cedar Rd	473354	170482	Roadside	100	100.0	34.0	34.1	23.8	30.7	28.7
42 Shinfield Rd (Opposite)	472953	171764	Kerbside	65.4	65.4					20.0
Red Cow	471685	172853	Roadside	100	100.0	37.6	31.4	24.5	28.7	26.9
44 Crown Street	471717	172856	Roadside	100	100.0	34.0	29.4	22.3	26.8	24.2
Blenheim Terrace, Castle Hill	471061	173018	Roadside	100	100.0	33.0	34.1	26.8	29.8	27.6
128 Castle Hill	470987	173016	Roadside	100	100.0	42.4	38.6	26.0	32.2	30.3
162a Castle Hill	470835	172992	Roadside	100	100.0	35.3	33.7	25.3	29.6	26.3
15 Southcote Lane	469899	172528	Roadside	100	100.0			17.3	19.0	18.1
17a Southcote Lane	469845	172462	Roadside	100	100.0			18.2	21.1	19.9
689 Oxford Rd	468978	173895	Roadside	100	100.0	37.0	35.5	28.8	28.7	30.9
744 Oxford Rd	468967	173935	Roadside	100	100.0	46.7	39.1	32.6	33.1	32.3

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
Wilson Primary	469368	173530	Roadside	100	100.0				15.7	14.9
494 Oxford Rd	469470	173715	Roadside	100	100.0	34.8	29.2	22.9	27.5	24.5
Cow Lane Bridges	470230	173818	Roadside	100	100.0	29.0	34.0	27.4	30.1	30.3
252 Oxford Rd	470081	173517	Roadside	92.3	92.3	33.9	31.3	23.3	27.5	26.0
327 Oxford Rd	470057	173489	Roadside	100	100.0	39.0	33.7	28.5	31.1	31.0
281 Oxford Rd	470294	173445	Roadside	92.3	92.3	42.5	35.7	29.6	30.8	27.5
Malthouse Lane	470808	173512	Roadside	100	100.0		30.9	23.7	25.1	24.9
The Butler	470903	173518	Roadside	100	100.0		32.0	24.7	28.8	30.4
10 Trinity Place	470738	173433	Roadside	100	100.0	31.9	26.1	21.3	22.3	22.4
165 Oxford Rd	470717	173373	Roadside	100	100.0	42.3	36.5	28.2	30.5	29.9
Sackville Street	471177	173641	Roadside	100	100.0	37.7	32.0	23.6	27.3	26.8
Friar St (Nandos)	471437	173589	Kerbside	100	100.0	42.0	41.0	28.5	35.9	38.0
21A Friars Walk, Friars Street	471373	173584	Roadside	90.4	90.4		38.9	30.6	37.6	38.8

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
Sainsburys 52-55 Friar Street	471320	173577	Kerbside	100	100.0		40.3	30.0	38.2	37.6
Station Hill (Near Taxi Rank)	471413	173808	Roadside	84.6	84.6	33.0	35.4	26.9	29.1	27.4
Station Hill (Near Bus stop WN)	471324	173820	Roadside	100	100.0	35.0	38.0	31.3	32.6	29.0
Malmaison	471509	173705	Roadside	100	100.0			29.1	33.6	35.0
33 Caversham Rd	471123	173734	Roadside	90.4	90.4	44.2	35.5	27.0	32.4	30.1
Malcolm Place	471169	173869	Kerbside	100	100.0	39.2	52.4	40.0	42.1	43.3
131 Caversham Rd	471261	174236	Roadside	100	100.0	34.8	32.0	22.2	27.3	26.2
31a Vastern Rd	471420	174129	Roadside	100	100.0	33.0	27.9	23.7	25.4	24.8
108 Caversham Rd	471293	174236	Roadside	100	100.0	41.5	35.3	26.5	28.7	29.4
197 Caversham Rd	471161	174379	Roadside	100	100.0	33.5	30.5	25.0	29.7	29.3
14 Church Road	471103	174774	Roadside	92.3	92.3	37.1	32.6	24.0	26.1	25.3
Cavesham Café	471401	174790	Roadside	100	100.0	41.7	34.5	25.6	29.8	27.8

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
Baron Cadagon	471461	174840	Roadside	100	100.0	40.9	36.4	28.5	31.5	27.2
45 Prospect Street	471558	174919	Roadside	100	100.0	36.3	33.2	24.6	26.9	25.1
60 Prospect Street	471557	174944	Roadside	100	100.0	33.7	28.8	21.3	24.9	22.9
241 Gosbrook Road	471942	174600	Roadside	100	100.0	34.6	31.0	22.9	24.1	24.1
68 George Street	471913	174490	Roadside	100	100.0	32.9	27.1	18.5	21.9	23.3
40 George Street	471909	174543	Roadside	100	100.0	45.0	38.4	27.2	32.0	33.6

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.

Diffusion tube data has been bias adjusted.

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 correction.

Notes:

The annual mean concentrations are presented as $\mu\text{g}/\text{m}^3$.

Exceedances of the NO₂ annual mean objective of $40\mu\text{g}/\text{m}^3$ are shown in **bold**.

NO₂ annual means exceeding $60\mu\text{g}/\text{m}^3$, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

(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%).

Figure A.1 – Trends in Annual Mean NO₂ Concentrations

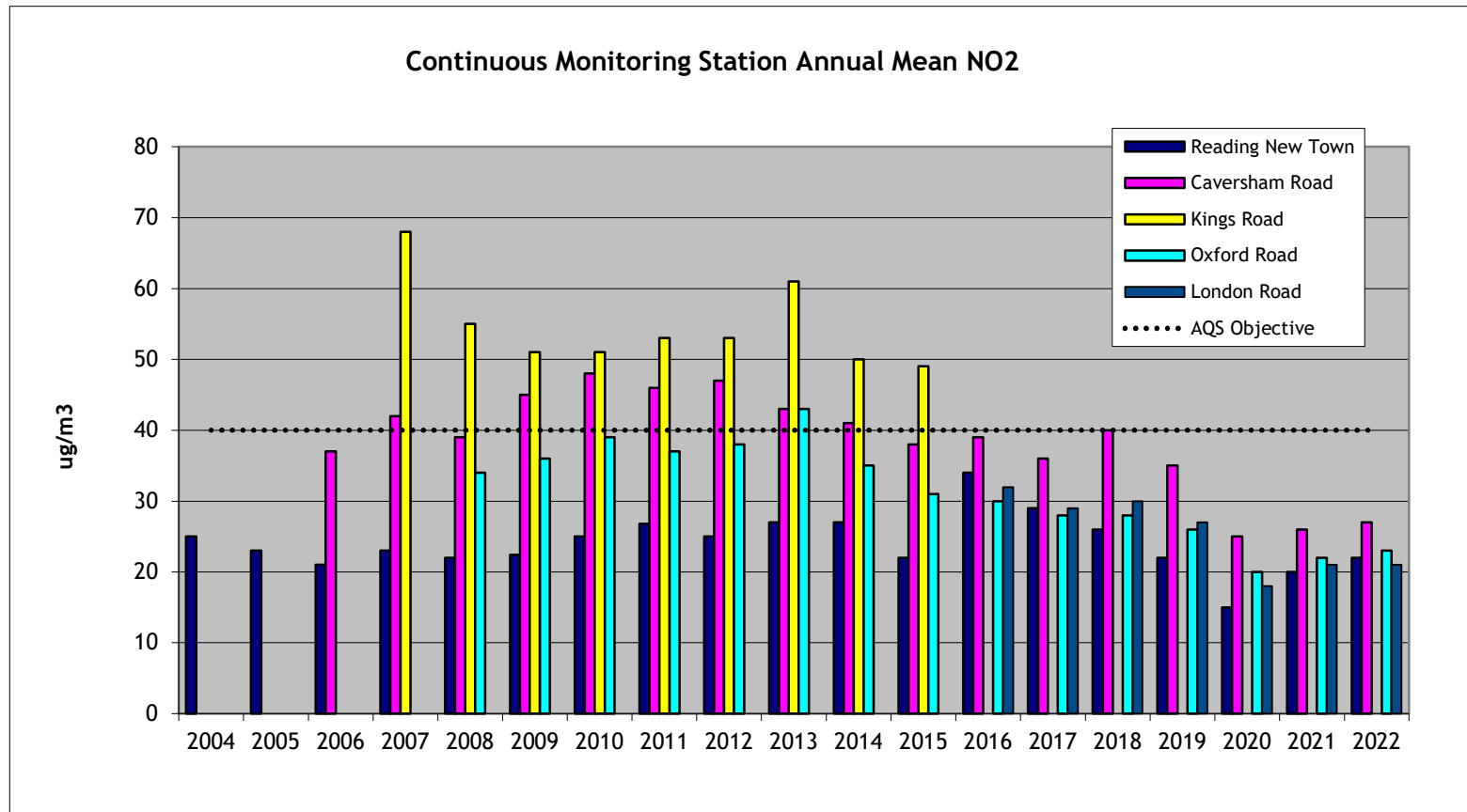


Table A.5 – 1-Hour Mean NO₂ Monitoring Results, Number of 1-Hour Means > 200µg/m³

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
AURN	473441	173198	Urban Background	53	53	0	0(84)	0	0	0(95)
RD1	471153	174429	Roadside	99	99	7	0	0	0	1
RD3	468700	174126	Roadside	99	99	0	0	0	0	0
RD4	473703	173409	Roadside	96	96	0	0	0	0	0

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m³ have been recorded.

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

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

(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%).

Table A.6 – Annual Mean PM₁₀ Monitoring Results (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
AURN	473441	173198	Urban Background	94	94	13	13	15	15	16
RD1	471153	174429	Roadside	91	91	24	24	20	20	25
RD3	468700	174126	Roadside	97	97	23	21	18	17	20
RD4	473703	173409	Roadside	98	98	17	17	19	17	18

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.

Notes:

The annual mean concentrations are presented as µg/m³.

Exceedances of the PM₁₀ annual mean objective of 40µg/m³ are shown in **bold**.

All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(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%).

Figure A.2 – Trends in Annual Mean PM₁₀ Concentrations

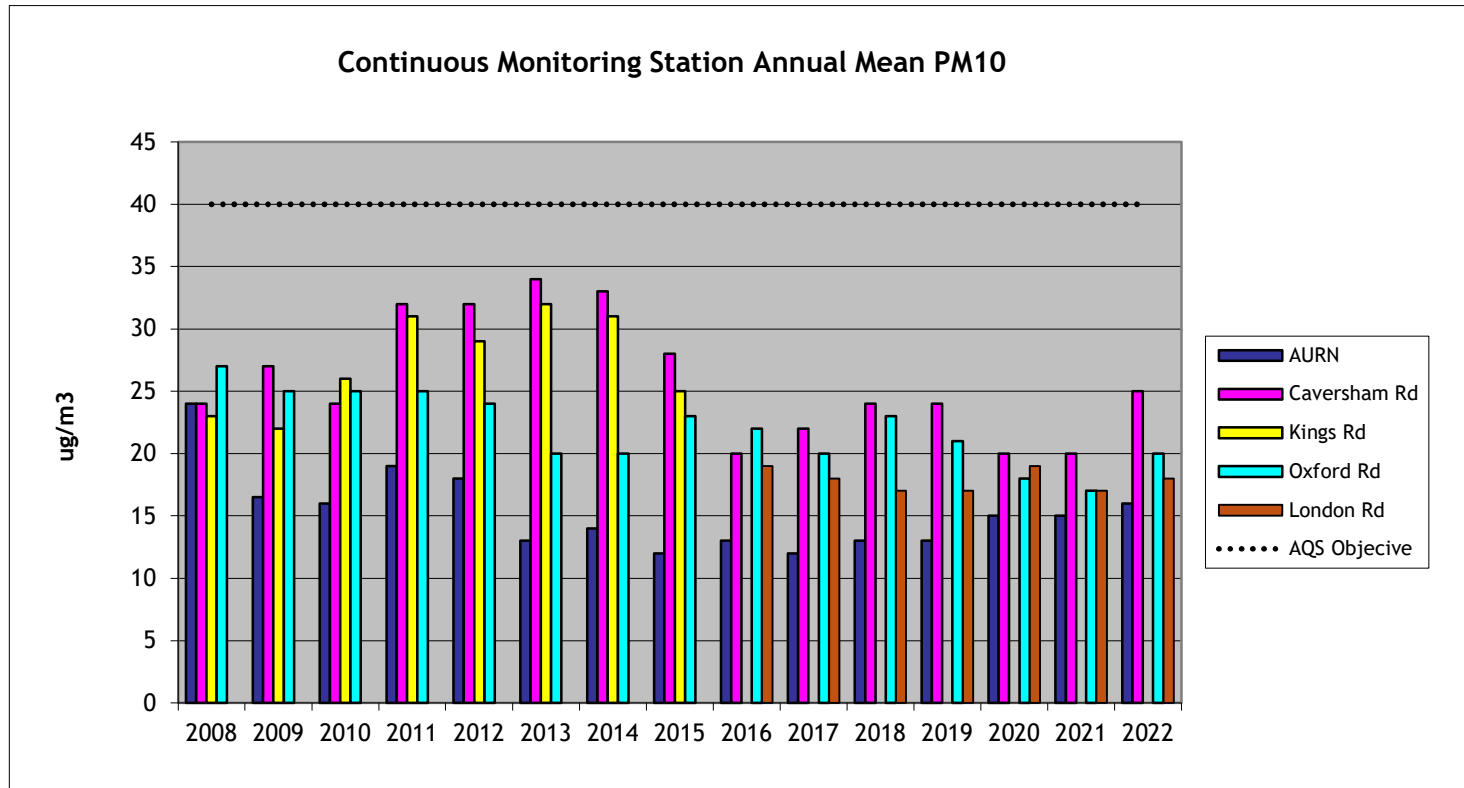


Table A.7 – 24-Hour Mean PM₁₀ Monitoring Results, Number of PM₁₀ 24-Hour Means > 50µg/m³

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
AURN	473441	173198	Urban Background	94	94	1(24)	0(20)	0	1	0
RD1	471153	174429	Roadside	91	91	3	11	5	2	6
RD3	468700	174126	Roadside	97	97	2	11	2	0	1
RD4	473703	173409	Roadside	98	98	1	4	3	2	0

Notes:

Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m³ have been recorded.

Exceedances of the PM₁₀ 24-hour mean objective (50µg/m³ not to be exceeded more than 35 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

(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%).

Table A.8 – Annual Mean PM_{2.5} Monitoring Results (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
AURN	473441	173198	Urban Background	96	96	7	8	8	8	8

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.

Notes:

The annual mean concentrations are presented as µg/m³.

All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(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%).

Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1 – NO₂ 2022 Diffusion Tube Results (µg/m³)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted <(x.x)>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
King Oak Flats	472015	173223	37.0	20.3	34.4	25.8	22.1	21.2	23.5	29.2	30.5	27.3	25.4	32.7	27.4	22.5	-	
181 Kings road	472513	173281	51.4	34.7	44.0	32.5	37.0	32.7	42.1	46.3	41.3	36.8	40.6		39.9	32.7	-	
Charles Place, 246 Kings Road	472592	173253		36.6	41.1	40.1	33.6		34.7	36.9	47.1	36.8	42.3	41.7	39.1	32.1	-	
Wycliffe Baptist Church	472071	173157	52.8	34.6	44.4	22.6	30.2	34.2	35.4	39.1	38.9		42.8	47.3	38.4	31.5	-	
Amity Road	473233	173244	39.0	25.6	1.1	36.4	25.6	24.6	28.5	27.2	25.6	32.9	35.3	29.5	27.6	22.6	-	
34 Crescent Road	473833	172719	31.2	19.1	23.6	18.3	13.2	13.0	12.7	16.7	17.1	17.2	19.9	23.0	18.7	15.4	-	
78 Crescent Road	473717	172677	31.2	15.9	28.2	17.8	14.1	13.5	13.3	17.0	17.0	19.4	20.0	27.3	19.6	16.0	-	
17 Church Rd Earley	474421	172054	52.8	33.3	39.1	32.9	33.2	31.1	34.1	34.9	39.6	31.8	34.5	43.3	36.7	30.1	-	
419 London Rd	473729	173432	39.7	29.9	37.7	30.8	31.8	31.0	32.5	36.5	35.1	31.4	33.7	30.8	33.4	27.4	-	
276 Kings Road	472716	173218	35.9	24.1	34.4	22.2	22.2	21.3	22.2	24.2	26.8	29.8	29.3	29.8	26.8	22.0	-	
Sidmouth Street - Trinity Hall	472071	173157	44.1	29.5	35.5	22.8	26.1	26.2	25.1	27.5	34.3	31.8	33.1	33.1	30.8	25.2	-	
Shinfield Rd/Whitley	473338	170269	39.7	23.2	36.3	22.0	22.9	22.2	22.9	28.3	26.4		24.6	29.6	27.1	22.2	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted <(x.x)>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
Wood Rd																		
Shinfield Rd/Cedar Rd	473354	170482	39.2	32.3	43.5	31.4	32.2	34.3	35.5	36.1	32.8	31.7	34.3	36.0	34.9	28.7	-	
42 Shinfield Rd (Opposite)	472953	171764	36.3	20.3	31.6	17.8	17.2		15.0	17.2	19.6				21.9	20.0	-	
Red Cow	471685	172853	44.8	23.9	42.3	34.3	28.4	26.1	30.8	37.6	35.8	28.5	28.6	33.0	32.8	26.9	-	
44 Crown Street	471717	172856	36.7	27.0	38.1	25.3	24.8	23.6	25.0	30.2	31.7	29.0	28.4	34.3	29.5	24.2	-	
Blenheim Terrace, Castle Hill	471061	173018	45.5	38.1	34.2	33.3	27.3	26.6	28.3	34.4	33.1	30.4	34.2	38.9	33.7	27.6	-	
128 Castle Hill	470987	173016	46.7	30.0	43.1	36.8	32.0	30.4	32.6	39.6	40.4	34.5	37.4	39.7	36.9	30.3	-	
162a Castle Hill	470835	172992	44.7	26.5	35.6	27.5	27.1	24.7	29.1	35.3	37.2	29.5	30.9	36.2	32.1	26.3	-	
15 Southcote Lane	469899	172528	33.8	18.2	32.1	21.1	15.3	14.8	16.1	20.2	22.0	21.2	24.0	26.5	22.1	18.1	-	
17a Southcote Lane	469845	172462	31.6	20.5	31.9	22.3	18.0	15.9	19.1	23.0	27.7	24.9	24.4	32.3	24.3	19.9	-	
689 Oxford Rd	468978	173895	41.2	34.5	43.5	40.8	31.8	30.5	34.4	35.8	37.2	40.2	44.1	38.3	37.7	30.9	-	
744 Oxford Rd	468967	173935	44.6	31.4	53.2	32.8	32.2	30.4	36.4	44.4	40.3	41.0	44.8	40.7	39.3	32.3	-	
Wilson Primary	469368	173530	24.3	14.1	26.2	18.0	11.5	10.8	12.8	17.0	16.8	20.5	20.4	25.5	18.2	14.9	-	
494 Oxford Rd	469470	173715	36.6	18.9	46.4	36.5	25.5	23.1	28.7	35.3	31.0	31.7	15.1	29.7	29.9	24.5	-	
Cow Lane Bridges	470230	173818	46.8	35.6	46.1	31.7	33.9	29.2	33.1	40.4	38.8	35.7	36.4	35.8	37.0	30.3	-	
252 Oxford Rd	470081	173517	40.2	21.0	42.2	30.9	25.4	25.9	27.7		32.6	33.0	34.3	35.8	31.7	26.0	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted <(x.x)>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
327 Oxford Rd	470057	173489	42.4	30.7	44.7	36.4	30.1	35.6	34.0	40.1	38.3	39.3	42.1	40.7	37.9	31.0	-	
281 Oxford Rd	470294	173445	41.2	30.1	41.5	29.9	28.5	27.9	30.8		31.3	35.6	38.1	34.0	33.5	27.5	-	
Malthouse Lane	470808	173512	39.5	27.6	39.4	25.1	27.0	24.7	25.1	29.7	29.2	31.8	30.4	34.5	30.3	24.9	-	
The Butler	470903	173518	46.9	28.2	52.5	42.0	34.1	30.0	29.4	42.6	35.8	34.6	35.5	32.9	37.0	30.4	-	
10 Trinity Place	470738	173433	32.6	22.5	37.2	26.5	22.7	20.4	31.3	28.3	24.3	27.6	26.0	28.0	27.3	22.4	-	
165 Oxford Rd	470717	173373	47.0	38.8	42.0	32.7	32.6	32.1	21.5	35.7	35.1	42.0	41.5	37.1	36.5	29.9	-	
Sackville Street	471177	173641	39.3	21.9	42.1	34.2	27.5	29.0	29.0	35.1	34.9	33.3	32.3	33.8	32.7	26.8	-	
Friar St (Nandos)	471437	173589	56.5	41.2	55.1	47.3	36.2	34.7	43.7	53.6	53.9	41.5	44.0	49.0	46.4	38.0	33.6	
21A Friars Walk, Friars Street	471373	173584	65.2	46.1	53.0	48.7	39.9	42.1	44.1	48.7	49.5		38.3	44.4	47.3	38.8	33.8	
Sainsbury's 52-55 Friar Street	471320	173577	59.5	37.7	52.2	52.4	40.9	36.4	45.4	55.0	47.8	38.3	40.8	44.3	45.9	37.6	33.0	
Station Hill (Near Taxi Rank)	471413	173808			39.5	37.4	34.3	30.3	30.1	32.5	31.5	28.7	31.7	38.4	33.4	27.4	-	
Station Hill (Near Bus stop WN)	471324	173820	42.8	32.9	1.1	52.5	34.6	30.5	33.0	45.0	38.0	35.7	37.3	40.7	35.3	29.0	-	
Malmaison	471509	173705	54.5	44.5	38.2	35.6	39.3	41.1	37.8	41.7	46.2	44.0	47.8	41.2	42.7	35.0	-	
33 Caversham Rd	471123	173734	44.3	39.4	45.0	36.1	36.4	37.8	36.1	35.8	27.8	28.3	36.3		36.7	30.1	-	
Malcolm Place	471169	173869	65.5	58.8	49.0	44.8	49.5	52.2	49.4	52.2	44.6	52.8	62.6	52.3	52.8	43.3	36.6	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted <(x.x)>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
131 Caversham Rd	471261	174236	40.9	33.1	30.4	25.7	26.9	26.8	27.3	30.4	32.5	35.2	35.9	37.8	31.9	26.2	-	
31a Vaster n Rd	471420	174129	44.0	33.4	31.7	21.7	26.3	27.3	22.1	23.4	25.5	36.1	35.7	35.5	30.2	24.8	-	
108 Caversham Rd	471293	174236	42.0	26.1	43.0	31.5	30.7	29.5	36.2	47.8	41.3	32.8	33.3	35.6	35.8	29.4	-	
Caversham AQMS	471156	174424	35.3	26.3	43.1	30.1	26.4	24.8	27.9	40.6	31.9	31.8	30.7	33.2	31.8	26.1	-	
Caversham AQMS	471156	174424	35.3	26.3	43.1	30.1	26.4	24.8	27.9	40.6	31.9	31.8	30.7	33.2	31.3	25.7	-	
Caversham AQMS	471156	174424	35.3	26.3	43.1	30.1	26.4	24.8	27.9	40.6	31.9	31.8	30.7	33.2	32.3	26.5	-	
197 Caversham Rd	471161	174379	44.5	36.7	36.2	30.5	31.7	34.1	30.8	30.9	32.9	36.2	42.9	41.0	35.7	29.3	-	
14 Church Road	471103	174774		30.7	39.1	24.6	27.0	28.3	28.2	31.5	30.5	32.5	36.2	31.1	30.9	25.3	-	
Caversham Café	471401	174790	40.4	29.9	39.6	32.5	27.6	28.2	32.1	38.4	37.9	33.2	32.1	35.6	33.9	27.8	-	
Baron Cadagon	471461	174840	47.6	37.3	35.4	33.4	34.6	33.6	34.8	30.8	18.3	36.3	16.7	39.2	33.2	27.2	-	
45 Prospect Street	471558	174919	39.5	31.0	33.2	26.4	26.2	30.0	26.8	30.3	30.0	34.9	36.7	22.6	30.6	25.1	-	
60 Prospect Street	471557	174944	37.3	23.9	29.6	27.9	24.7	24.5	25.0	29.7	29.1	26.1	26.1	31.5	27.9	22.9	-	
241 Gosbrook Road	471942	174600	35.4	31.5	34.2	23.7	27.4	27.2	24.2	24.7	26.5	33.7	33.6	30.4	29.4	24.1	-	
68 George Street	471913	174490	35.2	19.4	32.5	26.3	23.7	24.8	25.9	28.1	30.1	28.5	30.2	35.7	28.4	23.3	-	
40 George Street	471909	174543	51.6	40.4	38.4	37.5	37.2	41.2	34.3	40.4	38.8	42.6	44.3	44.6	40.9	33.6	-	

All erroneous data has been removed from the NO₂ diffusion tube dataset presented in Table B.1.

- Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG2.
- Local bias adjustment factor used.
- National bias adjustment factor used.
- Where applicable, data has been distance corrected for relevant exposure in the final column.
- Reading Borough Council confirm that all 2022 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

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

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within Reading Borough Council During 2022

Reading Borough Council has not identified any new sources relating to air quality within the reporting year of 2021.

Additional Air Quality Works Undertaken by Reading Borough Council During 2022

Reading Borough Council has not completed any additional works within the reporting year of 2022.

QA/QC of Diffusion Tube Monitoring

Reading Borough Council operate a network of NO₂ passive diffusion tubes, the tubes are supplied and analysed by Gradko International using the preparation method 50% TEA in acetone. The tubes are exposed for approximately one month following the standard exposure calendar, all sites use single tubes other than the co-location studies where triplicate tubes are deployed.

The Gradko laboratory is UKAS accredited, follows the procedures set out in the harmonisation practical guidance and participates in the AIR-PT NO₂ proficiency testing scheme.

Under the AIR-PT scheme AIR-PT round 42, (Jan 2021 – Mar 2021) Gradko tubes were found to have only 25% satisfactory results for samples tested using Z- score performance. Since then they have achieved 100% satisfactory results (AIR-PT rounds 43, 45, 46, 49 and 50 between May 2021 – June 2022).

Distance correction has been applied to NO₂ diffusion tube results where monitoring sites are not representative of public exposure using the NO₂ fall-off with distance calculator.

Diffusion Tube Annualisation

Annualisation is required for any site with data capture less than 75% but greater than 25%. Annualisation was required at one diffusion tube location in 2022. This was calculated in accordance with LAQM TG (22) using the diffusion Tube Data Processing Tool and is presented in Table C.1 below.

Table C.1 – Annualisation Summary (concentrations presented in µg/m³)

Site ID	Annualisation Factor <Site 1 Name>	Annualisation Factor <Site 2 Name>	Annualisation Factor <Site 3 Name>	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
42 Shinfield Rd (Opposite)	0.9922	1.4084	0.9436	1.1147	21.9	24.4
AURN	0.86	0.95	0.85	0.89	25.29	22.5

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2022 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG22 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO₂ continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Reading Borough Council have applied a national bias adjustment factor of 0.82 to the 2022 monitoring data. A summary of bias adjustment factors used by Reading Borough Council over the past five years is presented in Table C.2.

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	National	03/22	0.82

2021	National	03/21	0.83
2020	National	03/21	0.82
2019	National	03/20	0.87
2018	National	03/19	0.92

Table C.3 – Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1
Periods used to calculate bias	12
Bias Adjustment Factor A	0.84 (0.77 - 0.93)
Diffusion Tube Bias B	19% (8% - 30%)
Diffusion Tube Mean ($\mu\text{g}/\text{m}^3$)	31.8
Mean CV (Precision)	3.4%
Automatic Mean ($\mu\text{g}/\text{m}^3$)	26.8
Data Capture	99%
Adjusted Tube Mean ($\mu\text{g}/\text{m}^3$)	27 (24 - 30)

Notes:

Reading carried out one local co-location study at the RBC owned continuous roadside monitor on Caversham Road (combined adjustment factor 0.84). The average bias correction factor from the national dataset was 0.82. Although both came out similar this year, we have chosen the national figure as in the previous 15 years, in order to create a consistent approach, enabling trends in the historic data to be more easily identified.

NO₂ Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at the nearest location relevant for exposure has been estimated using the NO₂ fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO₂ concentrations corrected for distance are presented in Table B.1.

Table C.4 – NO₂ Fall off With Distance Calculations (concentrations presented in $\mu\text{g}/\text{m}^3$)

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted)	Background Concentration	Concentration Predicted at Receptor	Comments
Friar St (Nandos)	5.0	12.0	38.0	21.0	33.6	
21A Friars Walk, Friars Street	1.0	4.0	38.8	21.0	33.8	
Sainsburys 52-55 Friar Street	1.0	4.0	37.6	21.0	33.0	
Malcolm Place	2.5	8.5	43.3	21	36.6	<i>Predicted concentration at Receptor within 10% the AQS objective.</i>

QA/QC of Automatic Monitoring

The data management and Local Site Operator (LSO) duties for any automatic monitoring sites within Reading Borough Council are completed by Ricardo Energy and Environment. Calibrations, audits and servicing are all carried out in accordance with Defra best practice. The data ratification process is fully LAQM TG (22) compliant. All data presented in the report has been ratified. Live and historic data is available at the [Air Quality England](#) website.

PM₁₀ and PM_{2.5} Monitoring Adjustment

The type of PM₁₀/PM_{2.5} monitors utilised within Reading Borough Council do not require the application of a correction factor.

Automatic Monitoring Annualisation

The NO₂ data capture percentage at the Reading New Town AURN was below 75% therefore the NO₂ data from this site presented in this report has been annualised

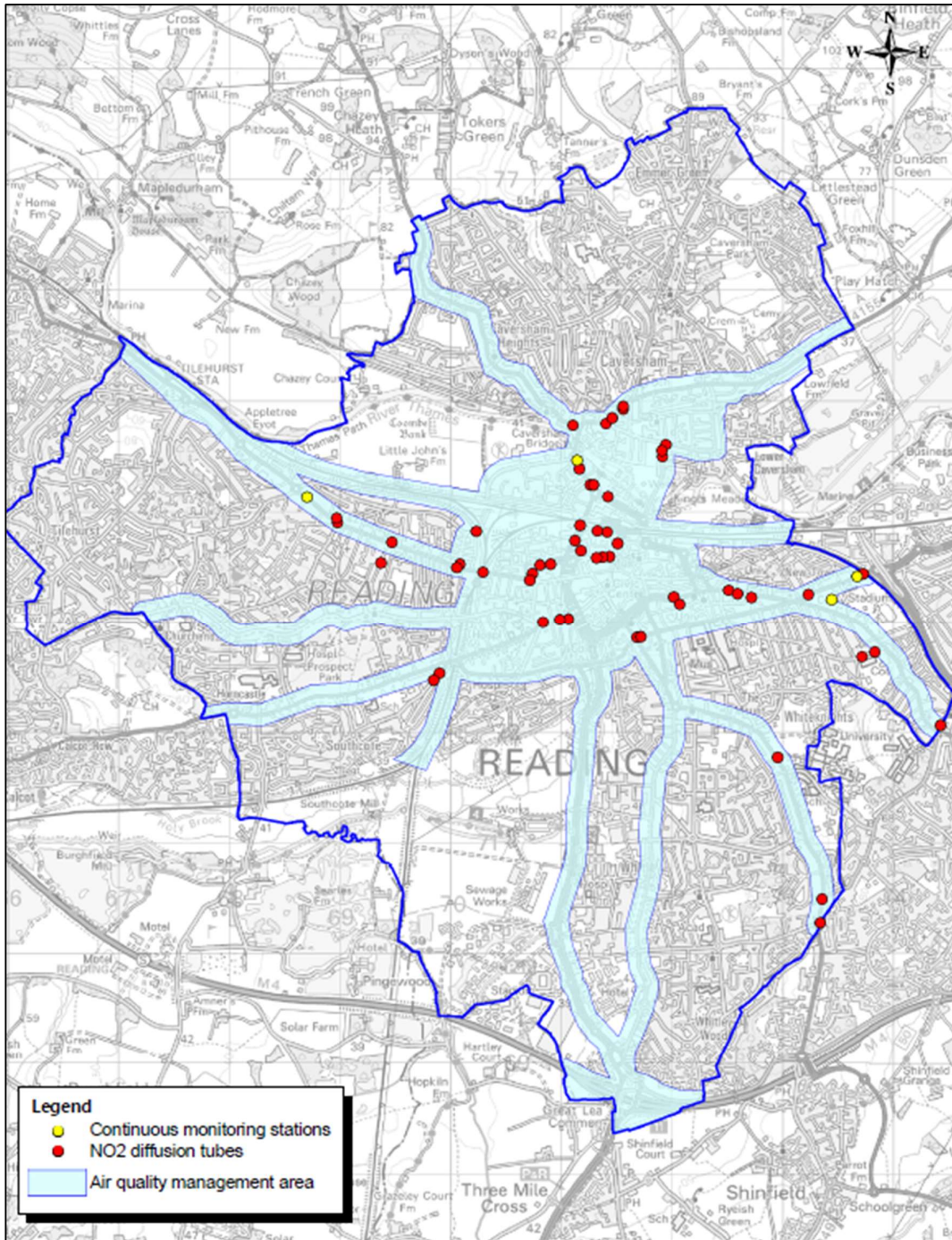
according to the process in LAQM TG (22). The annualisation data is presented in Table C.1.

NO₂ Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at the nearest location relevant for exposure has been estimated using the NO₂ fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO₂ concentrations corrected for distance are presented in Table B.1.

Appendix D: Map of Monitoring Locations and AQMAs

Figure D.1 – Map Automatic and of Non-Automatic Monitoring Sites



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England⁷

Pollutant	Air Quality Objective: Concentration	Air Quality Objective: Measured as
Nitrogen Dioxide (NO ₂)	200µg/m ³ not to be exceeded more than 18 times a year	1-hour mean
Nitrogen Dioxide (NO ₂)	40µg/m ³	Annual mean
Particulate Matter (PM ₁₀)	50µg/m ³ , not to be exceeded more than 35 times a year	24-hour mean
Particulate Matter (PM ₁₀)	40µg/m ³	Annual mean
Sulphur Dioxide (SO ₂)	350µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean
Sulphur Dioxide (SO ₂)	125µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean
Sulphur Dioxide (SO ₂)	266µg/m ³ , not to be exceeded more than 35 times a year	15-minute mean

⁷ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

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	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
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 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

- Local Air Quality Management Technical Guidance LAQM.TG22. August 2022.
Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG22. August 2022.
Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.