2024 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 2024

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Executive Summary: Air Quality in Our Area

Air Quality in West Berkshire

Breathing in polluted air affects our health and costs the NHS and our society billions of pounds each year. Air pollution is recognised as a contributing factor in the onset of heart disease and cancer and can cause a range of health impacts, including effects on lung function, exacerbation of asthma, increases in hospital admissions and mortality. In the UK, it is estimated that the reduction in healthy life expectancy caused by air pollution is equivalent to 29,000 to 43,000 deaths a year[1].

Air pollution particularly affects the most vulnerable in society, children, the elderly and those with existing heart and lung conditions. Additionally, people living in less affluent areas are most exposed to dangerous levels of air pollution[2].

Table S 1 provides a brief explanation of the key pollutants relevant to Local Air Quality Management and the type of activities from which they might arise.

Table S.0.1 Description of Key Pollutants

Pollutant	Description
Nitrogen Dioxide (NO_2)	Nitrogen dioxide is a gas which is generally emitted from high-temperature combustion processes such as road transport or energy generation.
Sulphur Dioxide (SO_2)	Sulphur dioxide (SO_2) is a corrosive gas which is predominantly produced from the combustion of coal or crude oil.
Particulate Matter (PM_{10} and $PM_{2.5}$)	Particulate matter is everything in the air that is not a gas. Particles can come from natural sources such as pollen, as well as human made sources such as smoke from fires, emissions from industry and dust from tyres and brakes. PM_{10} refers to particles under 10 micrometres. Fine particulate matter or $PM_{2.5}$ are particles under 2.5 micrometres.

[1] UK Health Security Agency. Chemical Hazards and Poisons Report, Issue 28, 2022.

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

The major source of air quality pollutants in West Berkshire are road transport and in particular the contribution from the A339 and A4 has been identified. The main pollutant is nitrogen dioxide (NO_2) in Newbury & Thatcham and as a consequence, two Air Quality Management Areas (AQMAs) were declared in 2009. The Newbury AQMA was declared for exceedances of both the one-hour and Annual Mean NO_2 objective. The Thatcham AQMA was declared for the Annual Mean NO_2 Objective. Details can be found at: https://uk-air.defra.gov.uk/aqma/list?view=W and maps are in Appendix D.

The Nitrogen dioxide (NO_2) levels in 2023 have showed a decrease on the pre pandemic levels of 2019. During 2023, twelve of the 34 monitoring sites have increased levels and 22 have decreased levels, in comparison with 2022. None of the monitoring locations within West Berkshire exceeded the Annual Objective (40µg/m^3), with the maximum level being at 1 Winchester Court (26.7µg/m^3) which is 40% below the objective level. The 1 Hourly NO_2 objective was not exceeded in 2022 either (permitted level of 18 exceedances of 200µg/m^3 per year). These decreases are likely to be due to the new traffic patterns which are emerging across the area, where peak hours are dispersing, creating a better traffic flow and less congestion.

The two AQMA's within the District are maintaining an NO_2 level well below the Air Quality Objectives for the past five years. Consequently, in 2023 we obtained permission from DEFRA to revoke them both. A report was prepared for the Joint Public Protection Committee (JPPC) meeting held on the 11th December 2023 followed by a public consultation from 14th December 2023 to 19th January 2024. The final decision was due by JPPC on 11th March 2024. The revocation orders will be submitted to DEFRA in 2024. Passive monitoring will continue in both these locations to ensure that the levels remain below the objectives. The continuous monitor located within the Newbury AQMA showed that the Annual Mean Objective was met, measuring 26.7µg/m^3 of NO_2 in 2023, which is a marginal increase from 26.1µg/m^3 in 2022. These continuing low levels may be the result of people's behaviour with more of us working from home, upgrading to 'greener' cars and perhaps, the realisation that cars are detrimental to the environment.

Over the past five years there has been a general decrease of NO_2 at a number of sites both within, close too and away from the existing AQMA's.

Revocation of the AQMAs is now required and no new AQMAs need to be declared**.**

In 2020 and 2021 during the Pandemic, we saw a greater reduction in NO_2, and an even greater reduction during the national lock downs. Regardless of the lock downs the overall the average levels in West Berkshire have been reducing over the five years up to 2023.

As a unitary authority, Environmental Health has continued to work in conjunction with the Transport Policy Team over the implementation of Local Transport Plan 3 (2011 – 2026). The Plan includes a Transport Vision setting out the long-term transport Strategy for each of the four main geographical areas of the District, as identified in the Local Development Framework Core Strategy. These Visions take into account a "Mixed Strategy" approach of looking to provide people in the District with more sustainable travel choices. The Plan acknowledges the link with the existing AQAP and any future AQAP's and there is a specific Policy on Air Quality (Policy LTP K6) which states that:

The Council will fulfil its responsibilities for Local Air Quality Management and focus on the following:

i. Highlighting ways in which air quality can be protected through the Development Management process
ii. Identifying areas where the Air Quality Objective values are being, or are likely to be, exceeded
iii. Establishing a framework for air quality improvements
iv. Investigating the feasibility of using mobile alerts to highlight periods of higher pollution levels
v. LTP Strategies continue to be reviewed; no new strategies were implemented in 2020
vi. Working on the link between air quality, particularly from $PM_{2.5}$ and public health in West Berkshire continues. There has been closer working with the Public Health Portal.

The major source of air quality pollutants in West Berkshire is road transport and in particular the contribution from the A339 and A4. The main pollutant is nitrogen dioxide (NO_2) in Newbury & Thatcham and as a consequence, two Air Quality Management Areas (AQMAs) have been declared.

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 Plan[3] sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term targets for fine particulate matter ($PM_{2.5}$), the pollutant most harmful to human health. The Air Quality Strategy[4] provides more information on local authorities' responsibilities to work towards these new targets and reduce fine particulate matter in their areas.

The Road to Zero[5] details the Government's approach to reducing exhaust emissions from road transport through a number of mechanisms, balanced with the needs of the local community. This is extremely important given that cars are the most popular mode of personal travel and the majority of Air Quality Management Areas (AQMAs), are designated due to elevated concentrations heavily influenced by transport emissions.

- Environmental Health reviews development control applications for air quality impact. Air quality assessments have been provided where necessary for a variety of applications and appropriate mitigation requested. Applications included significant housing development sites, STOR power generation plant, traffic flow changes to a road scheme, and any applications which may have an impact to the AQMAs.
- West Berkshire Council has completed all Pollution Prevention and Control inspections for 2022/23 as required, for the control of emission to air from industrial processes.
- In 2019 the Bear Lane, A339 (Sainsbury's roundabout) improvement works to enable improved traffic flow were completed but traffic lights were decided against, following the modelling impact results. The data from the diffusion tubes has shown a decrease in this area.
- There are now fifty eight on-street Electric vehicle (EV) charging points available in West Berkshire, and eight car parking charge points. The EV chargers are all plotted on the council's web page https://info.westberks.gov.uk/onstreetev

[3] Defra. Environmental Improvement Plan 2023, January 2023

[4] Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

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

- The Ultra Low Emission strategy was published in 2019 and will be reviewed in 2030. Ultra Low Emission Vehicle Strategy - West Berkshire Council
- Our Policy Guidance Planning for Air Quality document, the joint Public Health and Air Quality website and the Public Protection Partnership website (Air Quality - PPP (publicprotectionpartnership.org.uk)) all contain information for residents, businesses and consultants, regarding air quality and air pollution matters. This is reviewed regularly and updated as necessary.
- The Newbury bus station has Bio-Gas Buses passing through enroute to Reading, which has strict air quality standards, West Berkshire then benefits from Readings bus policy.
- From 1 January to 31 October 2023, bus passengers were able to get on the bus for £2 (£4 return) as part of the Government Single Fare Cap Scheme. The Government has now announced that this scheme is extended to 31 December 2024. The intention is to provide affordable bus travel for everyone across England at any time of the day. Even more incentive to use the bus to get to work, go shopping, attend an appointment, go for a bite to eat in the local eateries, take in some of the outstanding scenery, or meet friends and family. The list of participating operators can be found here.

  The following services enhancements have been introduced:

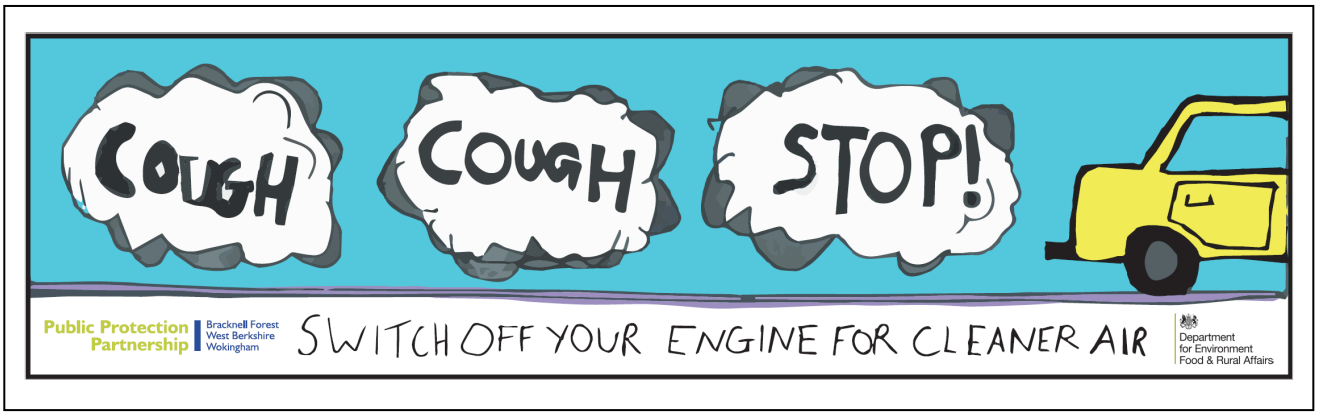
  - A new late evening service, the 1e, operated by Newbury & District, runs between Newbury and Thatcham on Fridays and Saturdays.
  - Reading Buses' Lime 2a, service has been extended to serve Mortimer every two hours on Sundays.
  - Thames Travel's X34 service now operates between Newbury and Harwell Campus/Didcot, providing a link to employment and retail opportunities.
  - These service enhancements have been made possible by funding from HM Government, awarded to West Berkshire Council after submission of a Bus Service Improvement Plan (BSIP) in October 2021.

  The following tickets have been introduced:

  - An early bird concessionary fare ticket has been introduced, allowing those with a valid concessionary bus pass to travel for discounted rates before 09.30 Monday to Friday.
  - A Connect Group Day ticket is available allowing unlimited use for up to four people, on valid routes.

- More information can be found on our dedicated local transport options page.
- The Active Group (Internal stakeholders) constantly look ahead and there are a considerable number of road initiatives to be carried out, electric vehicle charging points to be installed, further developments to be made to cycle routes, plus improvements to the cycle lesson and bike storage facilities at schools.
- West Berkshire Council also continues to support and recognise the softer Education, Training and Publicity (ETP) elements provided by the Road Safety Team as well as being active members of the Cycle Forum and wider Berkshire Safer Roads group (other partners include Wokingham, Bracknell, Slough and Windsor and Maidenhead). The collaborative work under Berkshire Safer Roads ensures we maintain a wider and more consistent message across borders. The Road Safety Team's aims and objectives are to find opportunities to change behaviour in relation to Active Travel and to encourage more walking and cycling.
- A joint application was made to the Air Quality Grant Scheme 2020, by the Public Protection Partnership (PPP) with West Berkshire, Bracknell Forest and Wokingham Councils. We were successful in securing funding for a project relating to a behaviour change anti-idling campaign, localised $PM_{2.5}$ monitoring and action planning at schools located close to the AQMAs. As a result of this funding, we were able to appoint an Air Quality Officer and launch our "Bumper Sticker" competition to all Primary Schools within West Berkshire, Bracknell Forest & Wokingham Boroughs.
- The winning design was made into a rear bumper sticker. The idea is to remind the driver behind to turn off their engine in stationary traffic. These stickers are available to members of the public and can be found in our libraries or ordered online at https://publicprotectionpartnership.org.uk/environmental-health/air-quality/anti-idling-bumper-sticker-schools-competition/

Figure S.0.1 The Bumper Sticker.



- In 2022, the $PM_{2.5}$ School Monitoring and Behaviour Change project began and the results for the $PM_{2.5}$ project can be seen in Appendix C. The levels of $PM_{2.5}$ at those locations were below the Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 for $PM_{2.5}$ (i.e., the annual mean should not exceed 25 µg/m³ and the interim target of 12 µg/m³ to be met by end 2027 and long-term target of 10 µg/m³ by 2040.)

- In 2022/23, we ran the next phase of the anti-idling behaviours change project (The Biggest NO_2 Loser) outside twelve schools close to the AQMAs. Throughout 2022 and 2023, we measured the monthly NO_2 outside each school, using diffusion tubes. We established an average base line in 2022 and in 2023 we launched the anti-idling campaign. For 3 to 4 months, we hung posters (see Figure S:0.1) on street furniture by the school gates where children were dropped off/collected in vehicles. We also sent literature to the schools including posters, an Air Quality assembly/lesson plan tool kit, put adverts on social media (Figure S.0.3) and gave the opportunity for consultants to visit schools and run air quality workshops. This project was successful, as nearly all twelve schools showed an annual NO_2 reduction. The NO_2 annual averages were also well below the air quality objectives. The winning school received a certificate, anti-idling reusable water bottles (as it's thirsty work scooting, cycling, and walking to school) air quality bookmarks and the car bumper stickers.

- During Clean Air Day in 2023, all the schools in West Berkshire were sent Air Quality Toolkits in order to run their own assembly/lessons on anti-idling. They were also asked to encourage parents to sign up to anti-idling by emailing information back to home.

- The Traffic Safety Team run grant funded Cycle Training though Bikeability, for beginners, children and adults to advanced cycling (Cycle Training - West Berkshire Council). As you can see from Table S.0.2. This year 2023/24 has been very successful with 2391 participants using the Bikeability programme. The Traffic and Road Safety Team have also been working with the SEND schools, (Castle, Brookfields, Mary Hare School for the Deaf and Newbury College) to ensure the fun had from cycling is accessible to all. https://www.newburytoday.co.uk/news/pupils-pedal-power-9306455/

Figure S:0.2 Examples of Behaviour Change poster displayed outside schools and at level crossings.

Table S.2 Show the amount of people using the Bikeability programme

Bikeability Programme	2016-2017	2017-2018	2018-2019	2019-2020	2020 - 2021	2021-2022	2022-2023	2023-2024
Level 1	17	0	163	0	33	863	1827	1222
Level 1 & 2	1311	1284	1170	1120	982	823	234	141
Level 2	0	0	0	0	0	800	1011	0
Level 3	53	71	81	67	65	90	78	12
Balance	65	0	145	153	75	120	369	218
Bikeability Fix	33	0	43	0	45	0	1855	775
Learn to Ride	0	0	25	55	25	86	29	3
Total	1479	1355	1627	1395	1225	2696	5403	2391

- In West Berkshire, **schools** play an active part in encouraging children to walk and cycle to school, through School Travel Plans (STP). Every school in our district has an STP which they use to set targets and encourage more walking, cycling and scooting to school. The STP also states how they aim to reduce the number of children arriving by car. Within the plan, the schools identify schemes that will help them achieve these goals. To help encourage schools to continue their efforts, we are changing the way we monitor STPs. Using an interactive website from **Modeshift**, we are helping schools to monitor and update their STP continually and we reward those schools who achieve excellence in school travel.

- A School Street scheme has been set up at Calcot Infant & Junior School by the Traffic Safety Team under the Road Traffic Regulation Act 1984 (Figure S.0.4). This prohibits driving on Royal Avenue, Curtis Road and Gatcombe Close from Monday to Friday between 08:15-09:15 and 14:30 - 15:30. Only those with resident permits will have access. Since the ANPR cameras were installed, there has been a 62% reduction in vehicles in the restricted zone thereby significantly improving safety. So far, 1,132 warning notices and 133 penalties for repeat offenders have been issued, demonstrating effective compliance. The initiative includes a six-month educational

- period. Offenders can reduce their penalty by completing an online awareness course, which explains the importance of the School Streets initiative. https://schoolstreets.wbcroadsafety.co.uk/ .

Figure S.0.3 The School Street Sign

- The success of the School Streets program is supported by several additional measures:
  - Bikeability cycle training and scooter training to encourage safe cycling and scooting.
  - Increased cycle and scooter storage at the school.
  - Park & Stride schemes at The Calcot Centre and Linear Park, to promote safe walking routes.
  - A new zebra crossing on Royal Avenue (coming summer 2024) to ensure safe pedestrian access.
  - Pedestrian railings and parking restriction reviews on nearby roads to improve safety and traffic flow.
- The School Streets initiative at Calcot Schools has significantly improved child safety by reducing traffic during critical times (see Figures S.0.3 & S.0.4). Supported by educational measures and complementary programs, this initiative has created a safer, more pleasant environment for everyone. Continued efforts and community support are key to sustaining

and expanding these benefits. Encouraged by the success at Calcot Schools, a second School Streets initiative has been introduced at Francis Baily School in Thatcham, aiming to replicate these positive outcomes.

Figure S.0.4 Before (1st) and After (2nd) photos of Schools Streets

Conclusions and Priorities

The main focus for West Berkshire in terms of improving air quality, is to reduce NO_x emissions, particularly NO_2 concentrations, by focusing actions within the two declared

AQMAs. The Council also recognises that wider improvements in air quality across the Borough can also improve concentrations within these AQMAs.

The following local priorities continue to be:

- Nationally exploring the link between public health and $PM_{2.5}$
- Joint working between Public Health and Environmental Health teams and links within the Berkshire Public Health Shared Team and Traffic Safety.
- Continuing to work within the unitary authority with Transport Policy and Highways Teams. There are some localised areas of congestion at peak times which require managing and investment, where improvements are needed to increase capacity at key junctions or effectively manage traffic flow. New development is planned through the Local Development Framework Core Strategy. Additional transport and highway measures are planned alongside these new developments which will help to address the impact and manage the additional trips, associated with new developments.
- Carry on with the continuous and passive air quality monitoring programmes in 2024.
- The EV chargers continue to be plotted on the interactive map on the intranet, or the council's web page https://info.westberks.gov.uk/onstreetev to help promote the use of the vehicles in the borough.
- Continue the School Streets projects and the promotion of alternative travel to school.

West Berkshire will be revoking both of the AQMA's in 2024 as there is evidence to show that NO_2 has been 10% below (36µg/m^3) the National Air Quality Objectives (40µg/m^3) for the past five years.

Stakeholders meetings have been carried out in 2023, and the Revocation report (see Appendix A, was approved by JPPC.

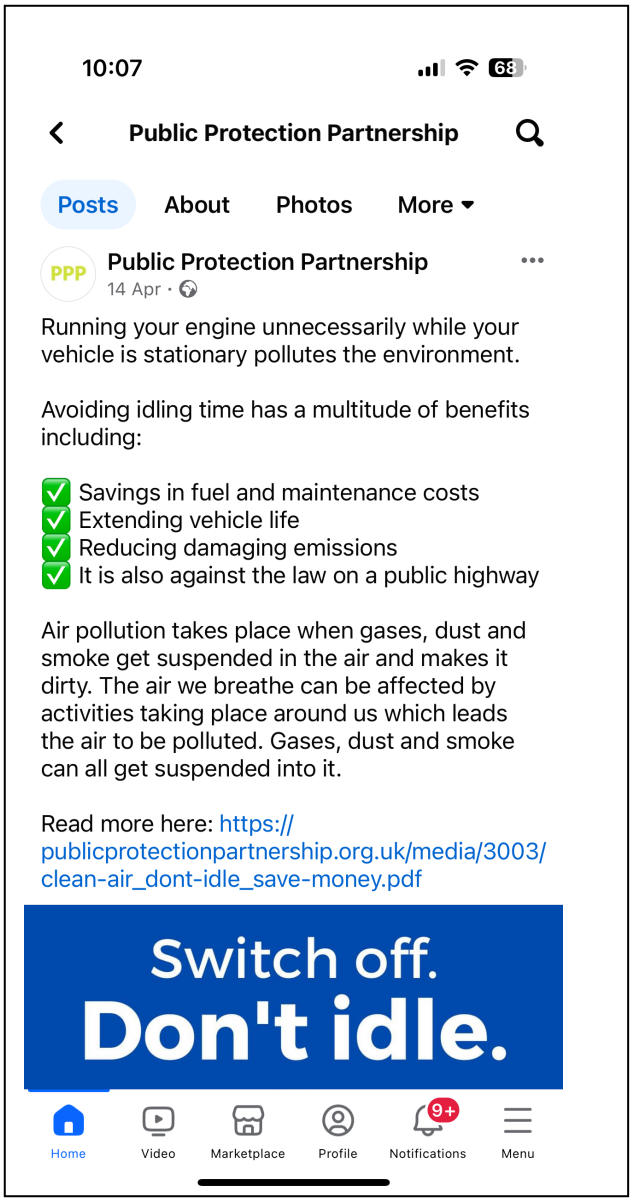
Local Engagement and How to get Involved

There are several ways the public can help to improve local air quality:

- Public Protection Partnership https://publicprotectionpartnership.org.uk/environmental-health/air-quality/vehicle-idling/
- Domestic Fuel information https://publicprotectionpartnership.org.uk/environmental-health/air-quality/air-quality-domestic-solid-fuels-standards-england-regulations-2020/
- Walk or cycle short distances of less than one or two miles rather than driving (see http://info.westberks.gov.uk/index.aspx?articleid=27868 for routes in West Berkshire).
- Search for car sharing opportunities using Lift share (see https://liftshare.com/uk) or Faxi (https://faxi.co.uk/) to share journeys with work colleagues
- Newbury Car Club (see http://www.co-wheels.org.uk/newbury)
- Use the bus or train regularly and keep up to date with the latest bus route timetables (see http://info.westberks.gov.uk/index.aspx?articleid=27888)
- Urban Limits http://urbanlimits.org/
- Safer Steps http://safersteps.co.uk/
- Road Rangers http://theroadrangers.co.uk/
- Travel Planning (Get Your Coat App) https://getyourcoat.app/
- Independent Travel (RouteGuard App) www.routeguard.co.uk

We are also on Social Media including Twitter and **Facebook** click here**, Twitter** click here**)**

Figure S.0.5 Social media post from PPPs Facebook



Local Responsibilities and Commitment

This ASR was prepared by the Environmental Quality Team of Public Protection Partnership for Wokingham Borough Council with the support and agreement of the following officers and departments:

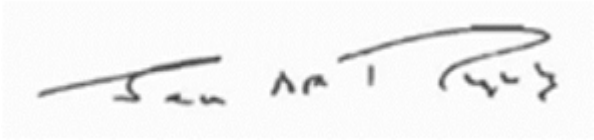
Highways Authority,

Planning Authority,

Environmental Health & Public Health,

This ASR has been approved by: Sean Murphy

This ASR has been signed off by the manager of Public Protection Partnership.



Sean Murphy
Service Lead – Public Protection Partnership

This ASR has been approved by: John Ashton

This ASR has been signed off by the Head of Public Health.

John Ashton
Head of Public Health

If you have any comments on this ASR please send them to Environmental Health at:

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Table of Contents

Figures

Tables

1 Local Air Quality Management

This report provides an overview of air quality in West Berkshire during 2023. 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 a requirement showing the strategies employed by West Berkshire to improve air quality and any progress 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 West Berkshire can be found in Table 2.2. The table presents a description of the 2 AQMAs that are currently designated within West Berkshire Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of AQMAs and also the air quality monitoring locations in relation to the AQMAs. The air quality objectives pertinent to the current AQMA designations are as follows:

- NO_2 annual mean
- NO_2 1 hourly mean

Revocation of the AQMAs

West Berkshire Council on advice from DEFRA, proposes to revoke the Newbury and Thatcham Area AQMAs in 2024, as both sites have been compliant for 5 years. The guidance LAQM.TG22 states *"The revocation of an AQMA should be considered following three consecutive years of compliance with the relevant objective as evidenced through monitoring. Where* NO_2 *monitoring is completed using diffusion tubes, to account for the inherent uncertainty associated with the monitoring method, it is recommended that revocation of an AQMA should be considered following three consecutive years of annual mean* NO_2 *concentrations being lower than 36µg/m*^{3} *(i.e., within 10% of the annual mean* NO_2 *objective). There should not be any declared AQMAs for which compliance with the relevant objective has been achieved for a consecutive five-year period."*. See Table 2.1 for the successful years of compliance.

Table 2.1 Maximum NO_2 level reached in each AQMA ($\mu g/m^3$)

AQMA	2019	*2020*	*2021*	2022	2023	Total consecutive years below 36 ($\mu g/m^3$)
Thatcham	31.6	29.5	26.5	25.6	23.4	5
Newbury	26.7	26.7	26.7	26.7	26.7	5

Table 2.2 – 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
Newbury AQMA	Declared 2009	NO_2 1 Hour Mean	An area encompassing a very small number of properties at the roundabout junction of A339, A343 St Johns Road and Greenham Road. (CM data)	NO	61	26.7	5 years (2019 to 2023)	Newbury AQAP (2011)	Local Authority Details - Defra, UK
Newbury AQMA	Declared 2009	NO_2 Annual Mean	An area encompassing a very small number of properties at the roundabout junction of A339, A343 St Johns Road and Greenham Road.	NO	54.4	26.7	5 years (2019 to 2023)	Newbury AQAP (2011)	Local Authority Details - Defra, UK

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
Thatcham AQMA	Declared 2009	NO_2 Annual Mean	An area encompassing a very small number of properties along the A4	NO	53.3	23.4	5 years (2019 to 2023)	Newbury AQAP (2011)	Local Authority Details - Defra, UK

☒ **West Berkshire Council confirm the information on UK-Air regarding their AQMA(s) is up to date.**

☒ **West Berkshire Council confirm that all current AQAPs have been submitted to Defra.**

2.2 Progress and Impact of Measures to address Air Quality in West Berkshire Council

Defra's appraisal of last year's ASR concluded that the report was well structured, detailed, and provides some information specified in the Guidance. The following comments are designed to help inform future reports.

1. The council have used the latest reporting template in production of their 2022 ASR.
2. The report includes detailed discussion of the measures the council are taking to address $PM_{2.5}$. The council set out that, within the next reporting year, they intend to establish the feasibility of monitoring $PM_{2.5}$ (particularly at schools within the vicinity of AQMAs) within their jurisdiction, which is commended. Links are provided and discussed regarding the Public Health Outcomes Framework and fraction of mortality attributable to $PM_{2.5}$ emissions, which is welcomed. Comparisons to the regional and national average would be beneficial to include in future reports.

   The comparisons as requested are in Table 2.4
3. Reference is also made to the $PM_{2.5}$ Defra Background Maps, which is welcomed, however these have been referenced incorrectly. The 2018 base year is the latest available (rather than 2017, as stated in the ASR) and these can be used to determine the maximum modelled background concentrations of $PM_{2.5}$ for the current year, which is not clear in the report. This should be amended in future ASRs.

   See Section 2.3 for this information.
4. Sufficient detail is included in the QA/QC procedures for both the automatic analyser and the NO_2 diffusion tubes. Calculations for local bias adjustment and annualisation are outlined in detail. Distance correction was not required. Data showing the choice of bias adjustment factors for previous years, and discussion around the choice to apply the local factor this year, has been included. Derivation of and a direct comparison against the national factor has not been demonstrated. It would be beneficial to include this in future reports. A figure showing the national bias adjustment factor determination would be welcomed.

   See Appendix C for this information.

5. The laboratory and analysis method for the 2022 diffusion tubes is not specified in the report and the council have not discussed whether the diffusion tubes were deployed in line with the Defra calendar dates during 2022. This information should be included within all future reports.

   West Berkshire Council always follows the Defra calendar published on the LAQM website and this is referred to in Appendix C.

6. The Council have provided mapping of their automatic and diffusion tube monitoring network in relation to their AQMAs; however, this is labelled with site IDs that do not correlate with those in the results tables. This should be amended in future reports.

   These IDs were for the report maps to locate the diffusion tubes.

7. The council have included detailed trend graphs, which is commendable. However, graphs appear to only be included for monitoring sites that are within the AQMAs. In future years, it is recommended that the Council also include another graph to present trends at the monitoring locations outside of the AQMAs.

   See Appendix A for trend graphs for every location monitored

8. The Council has taken forward a number of important measures during 2021 and the progress being made on other measures is detailed, which is commendable. However, some information for certain measures is missing within Table 2.2. This should be provided, where possible, in future reports.

   Please see Table 2.2 for the updates.

9. The continual collaborative approach that West Berkshire Council is taking with the Public Protection Partnership is commended.

10. Table 2.1 does not state the year the most recent Air Quality Action Plan (AQAP) was published, nor is this discussed anywhere else in the report. It is noted that the latest AQAP for both AQMAs appears to have been published on the council's website in 2011. The Environment Act requires that a local authority must, for the purpose of achieving AQOs in an AQMA designated by that authority, prepare an action plan in relation to that area. The Act also requires that Action Plans be periodically reviewed. While no time limit is explicitly set within the Act, ideally this is expected to occur no later than every five years. It is recommended that the Council follow this guidance.

The comments were noted and understood, and all AQMA's are to be revoked in 2024, therefore West Berkshire Council will not be submitting a new Action Plan but will start work on an Air Quality Strategy in 2024.

Measures to Improve the Air Quality in West Berkshire

West Berkshire Council has taken a number of direct measures during the current reporting year of 2023, in pursuit of improving local air quality. Details of all measures completed, in progress or planned, are set out in Table 2.3. Fifteen measures are included in Table 2.3, with the type of measure and the progress West Berkshire Council have made during the reporting year of 2023 presented. Where there are or have been, barriers restricting the implementation of a measure, these are also presented within Table 2.3. More detail on these measures can be found in the respective Action Plan.

- On A339 Bear Lane (Sainsbury's roundabout) improvement works to improve traffic flow have been completed. Traffic lights were decided against at the nearby St Johns Road roundabout following the modelling impact results.
- Bio-Gas Buses pass through the district as they run from Newbury from Reading where they have strict Air Quality standards, this in turn benefits West Berkshire.
- From 1 January to 31 October 2023, bus passengers were able to use the bus for £2 (£4 return) due to the Government Single Fare Cap Scheme. This Government has now announced that this scheme is extended to 31 December 2024.
- The Car Club is run by Enterprise cars, with booking via this link. Hire a Pay-as-you-go Car in Newbury (Car Club) - West Berkshire Council
- Many electric trains now run through the district and in December 2019 there was a timetable change. As a result, the Thatcham Level crossing is now monitored by the Transport Policy Team to investigate the knock-on effect of those changes. this will continue throughout 2024.
- Work on the reducing HGVs passing through Newbury by using Positive Signage in 2019/20 encouraged freight vehicles to use the bypass.
- Further walking, running and cycling groups such as Let's Ride, Run Together and Walking for Health (led walks across West Berkshire) have been set up to provide activities for beginners, mental health groups and other interested parties.

- National Cycle Network 422 expansion – A4 Newbury to Thatcham and on to Calcot was completed in 2019 and continues to be popular, particularly since lockdown. This provision of improved cycle ways through the Thatcham AQMA, https://osmaps.ordnancesurvey.co.uk/51.40608,-1.41302,10,
- Pedestrian and cyclist directional signage project commenced in 2018/19 and continued throughout 2023 to promote and improve walking and cycling facilities.
- Cycle parking – improvements to existing facilities and introduction of new ones began and continued in schools during 2023. All secondary schools were offered improved cycle parking which was installed at schools upon request.
- Our social media pages are also very active with AQ hints an tips on anti-idling, monitoring and competitions.

West Berkshire Council expects the following measures to be completed over the course of the next reporting year:

Newbury

- New station/Council offices car park at Market Street.
- Improvements to the capacity of Robin Hood Roundabout (subject to external funding). Still on hold
- A4 cycle track, further improvements. Slow progress due to funding and resource issues
- A339 Sandleford, create junction for new school and future housing development. Complete
- Start construction of Kings Road Link Road (completed 2023). Complete but not open to traffic until 2024.
- More on-street EV charge points throughout the district. We have secured funding to continue the roll out of on-street charge points.
- New EV charge points in car parks, locations to be confirmed.
- Investment in cycle parking at schools. Complete, see above.

Thatcham

- Further development of A4 cycle route.
- Optimisation of traffic signal timings on A4.
- On-street electric vehicle charge points.

Theale

- On-street electric vehicle charge points.

Pangbourne

- On-street electric vehicle charge points.

District wide

- Clean Air Day in June 2023 to increase awareness and promote health, and anti-idling. We have asked all schools in West Berkshire to sign up to an air quality pledge that will share the anti-idling information with the children and their parents/carers who transport them to school.

West Berkshire's priorities for the coming year are

- Continue to review the impact of planning applications and implement Air Quality conditions on major planning applications where relevant.
- Joint working between Public Health England and the Public Protection Partnership (https://publicprotectionpartnership.org.uk/) and links within the Berkshire Public Health Shared Team.
- Continuing to work within the unitary authority with Transport Policy and Highways Teams as well as Development Control.
- Carry on the continuous and passive air quality monitoring programmes.
- Establish the feasibility of monitoring $PM_{2.5}$, as required through the Environment Act 2021.
- Bikeability classes for year 5 in Primary Schools to encourage safe cycling and build confidence.
- Continue the School Street Programme, which will continue to:
  - Cut down on traffic and parking pressures outside schools.
  - Discourage car journeys to school by encouraging walking and cycling.
  - Make the street outside schools safer, at the start and end of the day.
  - Improve air quality and create a more pleasant environment for everyone.
  - https://info.westberks.gov.uk/school-streets

West Berkshire Council expects the following measures and priorities to be completed over the course of the next reporting year:

- Nationally exploring the link between public health and $PM_{2.5}$

- Joint working between Public Health and Environmental Health teams and links within the Berkshire Public Health Shared Team and Traffic Safety.
- Continuing to work within the unitary authority with Transport Policy and Highways Teams. There are some localised areas of congestion at peak times which require managing and investment, where improvements are needed to increase capacity at key junctions or effectively manage traffic flow. New development is planned through the Local Development Framework Core Strategy and additional transport and highway measures are planned alongside these new developments which will assist in addressing the impact and manage the additional trips associated with new developments.
- Carry on with the continuous and passive air quality monitoring programmes in 2024.
- The EV chargers continue to be plotted on the interactive map on the intranet, or the council's web page https://info.westberks.gov.uk/onstreetev to help promote the use of the vehicles in the borough.
- Continue the School Streets projects and the promotion of alternative travel to school

The principal challenges and barriers to implementation that West Berkshire Council anticipates facing are lack of funding and resources.

- Budget allocation for progressing measures and actions. Funding applications will be applied for where possible/appropriate.

West Berkshire Council anticipates that the measures stated above and in Table 2.3 are achieving compliance in both the Newbury and Thatcham AQMA that the AQMA's can now be revoked.

Table 2.3 – Progress on Measures to Improve Air Quality

The top three measures to be focused on in 2024 have been highted in yellow.

Measure No.	Measure Title	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
1	Variable message Signing (VMS) linked to Newbury car Park System	Traffic Management	Other	2011	2011-14	WBC	WBC	NO	Funded	£500k - £1 million	Completed	Negligible	Car park usage	Installed as part of Parkway opening spring 2012	Car Parks team feedback that the signs are invaluable at directing traffic to available parking especially at busy times. Queuing has reduced at entrances. They also note that there are an increased number of parking spaces available so this may have helped reduce queuing also.
2	Study into signalising junction at Burger King Roundabout	Traffic Management	UTC, Congestion management, traffic reduction	2019	Summer 2019	WBC	WBC	NO	Funded	< £10k	Completed	15 ug/m3 (Based on 2008 data)	Reduction in queuing time and congestion within AQMA and reduction in NO_2 and emission levels	Surveys ordered March 2017 and model to be completed late 2017. Model indicates some benefit to replacing the roundabout with a traffic signal-controlled crossroads. No budget is currently in place to deliver such a project but could be delivered in conjunction with the Sandleford development if funding becomes available.	Decision has been made not to take any further action at this time.
3	Amendments to Bear Lane (Sainsbury's) Junction of A339, as this junction can impact on A343 Greenham Road Junction	Traffic Management	UTC, Congestion management, traffic reduction	2012	2019	WBC	WBC	NO	Funded	£1 million - £10 million	Completed	15 ug/m3 (based on 2008 data)	Queuing time and congestion close to AQMA and reduction in NO_2 levels	Complete. Changes to roundabout being looked at along with Bear Lane by WBC consultants - see new action. Sainsbury's roundabout, Cheap Street and	Results regarding the AQ impact will not be available until 2025report, due to traffic data issues.

Measure No.	Measure Title	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
														Market Street have been redesigned to re-route traffic and improve flow. Work to begin January 2019.	
4	Improved local bus services to reduce short car journeys	Transport Planning and Infrastructure	Bus route improvements	2015	2016	WBC	WBC	NO	Funded	£1 million - £10 million	Implementation	Negligible	Increase in no. of passenger journeys	Capital works - Complete. New developer-funded bus service - starting May 2016	Ongoing monitoring of passenger journeys. Also, improvements to Reading Buses fleet to alternative fuels (gas). We are on the Reading buses network, and they require strict standards. Free buses and reduce cost buses have been made available in 2023 and will continue into 2024.
5	Smarter Choices (1) Investigate the feasibility of a district wide car share scheme	Alternatives to private vehicle use	Car Clubs	2012	2015	WBC	WBC	NO	Not Funded	£500k - £1 million	Completed	Negligible	No. of car share cars and their usage	Works commenced	Complete: District wide car sharing isn't feasible - a focus on location journeys instead- see (3).
6	Smarter Choices (2) Investigate the feasibility of a car club for Newbury and Thatcham area (Racecourse)	Alternatives to private vehicle use	Car Clubs	2012	2016	WBC	WBC	NO	Not Funded	>£10K	Implementation	Negligible	No. of car share cars and their usage	5 Car Newbury scheme was launched in 2016 in partnership with Co-wheels. One of the vehicles is electric. Usage is growing year on year.	2016/17 Public launch, promoting & monitoring uptake. Data will be available on number of members, vehicle usage, number of miles, trips etc. Greater promotion is desired but in 2019 the car club use continued to increase. There is promotion with a short film focused on using the electric car. As at the end of 2019, the car club had 103 Members. The car with the highest use had 374 bookings in 2019. Changed to Enterprise Car Club

Measure No.	Measure Title	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
															Hire a Pay-as-you-go Car in Newbury (Car Club) - West Berkshire Council
7	Smarter Choices (3) Promote Car sharing opportunities within the district	Alternatives to private vehicle use	Car Clubs	2012	2032	WBC	WBC	NO	Partially Funded	>£10k	Implementation	Negligible	No. of car share cars and their usage	West Berkshire Council FAXI car share/cycling & walking partner website being promoted (44 registered as of 9/3/16) and dedicated Council Car share bays (24 registered users). Car sharing within locally situated schools had been explored but wasn't a great deal of interest. AWE had invested heavily in car sharing and have their own internal system.	Number of people registered and their locations and journey type. FAXI car sharing focused around Newbury Town Centre. Opportunity for greater up take. AWE car share still on going.
8	Electrification of Newbury to Reading railway line	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	2017	2018	Network Rail	Network Rail	NO	Not Funded	Network Rail	Completed	Negligible. Some air pollution reductions in and around major urban train stations along route as diesel trains are replaced.	Increased reliability of services and increase passenger usage	Boundary Road bridge over railway line due be carried out in 13/14, NR required to raise bridge due to electrification but there are issues re-sighting. Works have completed on many bridges. Boundary Road Bridge work began in 2015, due for completion Jan 17.). Electric trains started running on Newbury to Reading local services in Jan 2019. London to Bedwyn and London to West Country Services will run on electric power as far as Newbury and	Hendy Review is likely to result in any decision to electrify the Berks and Hants line to the west of Newbury being delayed beyond the end of Network Rail Control Period 6 (2019-2024). Electric trains are all running. In December 2019 there was a change to the time table. Thatcham level crossing has been monitored in terms of the knock-on impact of the new timetable on congestion around the station.

Measure No.	Measure Title	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
														then switch to diesel.	
9	Supplementary Planning Document for AQ	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2019	2022	WBC	WBC	NO	Not Funded	<£10K	Implementation	negligible	Reduce reliance of car in new development. Us of s106 funds	Planning and Air quality document drafted and due to be launched in 2019. No current Supplementary Planning Document.	Proposed emissions from large scale developments more quantifiable than from small scale.
10	Reduction of HDVs using A339 through Newbury	Freight and Delivery Management	Route Management Plans/ Strategic routing strategy for HGV's	2017	2018	WBC	WBC	NO	Not Funded	< £10k	Implementation	links with 15 ug/m3(based on 2008 data)	Reduction in HDV journeys along this section of road network and decrease in NO_2 levels measured.	Freight Strategy review commenced 2013. Discussions by WBC with HCC held. Options paper to TPTG Jan 15, recommending positive signage at a cost of £15-20k on the local network and £20-30k per sign on the A34. WBC can only really influence northbound traffic from the Swan Roundabout. Freight Route Network Maps had recently been updated- purely advisory. Direction signs now in place northbound to encourage greater use of the bypass by HGVs.	Completed signs are up.
11	Electric charging points	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel	2015	2023	WbC	WBC	NO	Not Funded	>£500K	Implementation	negligible	Use of charging points. Increase in EV ownership and use of/demand for (public) charge points	(1) Successful OLEV grant to install charge points on WBC land 2013-15. (2) Ecotricity Rapid charge points installed at motorway service stations. (3)	(1) Council charge points installed for WBC use at Kennet Centre (Mar 13) and Ampere Road, Newbury (Mar 14) under OLEV Public Sector charging scheme. (2) Run by Ecotricity, data on use not readily available. (3) Once installed, unlikely to have

Measure No.	Measure Title	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
														Agreement by FGW to install at Aldermaston and Theale stations. (4) EV Residential Guidance included in the WBC Residential Parking Guidance (5) ULEV Readiness Programme (6) ULEV Strategy proposed (7) Promoting EV Vehicles. A contract has been let to install charge points on the highway in residential areas. Funded by OLEV grant. EV charge points in car parks: Electric Vehicle Charging Points in Car Parks - West Berkshire Council On street charge points: On-street Residents Electric Car Charge Points - West Berkshire Council	readily available data on use. (4). EVCP to be considered at all residential developments, as a minimum infrastructure enabling installation of EVCP at a later date. (5) Successful Bid for OLEV funding (Aug 15). For 2 further charge points, installed at Kennet Centre Newbury and 1 at Wokingham for the Joint EH&L Service use (Mar 16). 3 EV vans and 2 EV Cars have been procured, awaiting delivery Mar 16. (6) ULEV Strategy began by TP, for Transport Vision and revised LTP. (7) Support of EV-ENT held by WB Green Exchange in May 2016. 2 electric cars provided with Public Protection Service for work use.
12	Health Education	Public Information	Other	2012	2032	WBC/PH	WBC/PH	NO	Not Funded	< £10k	Implementation	Decrease in hospital admissions from asthma. Increase in walking and cycling.	Healthier residents	Completed: The specific project mentioned affecting 5,000 households is complete. The survey of results indicated a shift towards more sustainable travel journeys, with 24% of respondents walking more often, and 10%	**Business and school travel planning**. Travel Planning activity is supported at schools close to AQMA and a review of success of various initiatives will help to refocus and deliver more targeted interventions going forward. Businesses are encouraged to engage with Travel

Measure No.	Measure Title	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
														using the bus more regularly, and an 8% increase in cycling. More importantly, 15% of respondents stated that they now made fewer single occupancy car journeys. DEFRA funding to discuss Idling and health links in 2022.	Planning and will be able to link in with the Liftshare scheme once it is rolled out to AQMA areas during 2023.
13	National Cycle Route (Newbury to Legoland)	Promoting Travel Alternatives	Promotion of cycling	2017	2019	WBC	WBC	NO	Not Funded	£1 million - £10 million	Completed	Negligible	Cycleway usage	WSP commissioned to undertake a wider feasibility into the proposal. Business Case submitted to the TV LEP. The LEP awarded the funds to the scheme in December 2015. The proposed funding for the scheme is £5.5million, with £4.2m from the LEP. West Berkshire has committed a further £100,000 via funds from the annual Capital budget. Other funds and monies will be combined to further support the route, such as developer contributions. Cycle facilities have been improved on the A4 between Newbury and Thatcham. Further improvements planned during 2019-2020.	2016/17 Survey & Planning, 2017/18 & 2018/19 .On-site works NCN Route 422 is the indicative route title for a National Cycle Route potentially linking Newbury through to Ascot and Windsor 2020 objectives have been delivered.

Measure No.	Measure Title	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
14	Park and Ride	Alternatives to private vehicle use	Bus based Park & Ride	2011	2011	WBC	WBC	NO	Not Funded	n/a	Aborted	Negligible	Reduce emissions within the town centre by reducing the number of cars and congestion.	P&R proposal rejected by TPTG July 2011 due to cost and unsuitability of Newbury.	Closed – not to be carried out.
15	Cycle lane on A343 St Johns Road between Burger King Roundabout and St Johns Roundabout	Transport Planning and Infrastructure	Cycle network	2012	2015	WBC	WBC	NO	Not Funded	£1 million - £10 million	Completed	Negligible	Reduction in car journeys along this section of road network and decrease in NO_2 levels measured	Implemented	Completed. Part of Cycle way improvement programme for 2011/12. Approx £100k per annum (£50k capital grant & £50k Developer Contributions (S106)

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

As detailed in Policy Guidance LAQM.PG22 (Chapter 8) and the Air Quality Strategy[6], local authorities are expected to work towards reducing emissions and/or concentrations of fine particulate matter ($PM_{2.5}$)). There is clear evidence that $PM_{2.5}$ (particulate matter smaller than 2.5 micrometres) has a significant impact on human health, including premature mortality, allergic reactions and cardiovascular diseases.

The latest $PM_{2.5}$ data available (2018) from DEFRA, was used to model the 2023 levels of $PM_{2.5}$ which show that West Berkshire Council has a maximum level of 10.64 µg/m^3 (co-ordinates x 487500 y167500), and the average level of 8.40 µg/m^3. Background Mapping data for local authorities - 2018 - Defra, UK). Figure 2.1 below shows that 0.81% of $PM_{2.5}$ is produced by Road & Transport, the other 99.19% is from other factors.

The fraction of mortality attributable to particulate air pollution indicator' value for West Berkshire and other Local Authorities within Berkshire, can be seen in Table 2.4. Further information about other areas in the UK can be found using the link below.

Table 2.4 Fraction of mortality attributable to particulate air (new method) 2022 within Berkshire, 2021.

National England Average	West Berkshire	Reading	Wokingham	West Berkshire	Windsor & Maidenhead	Slough
5.8%	5.8%	6.6%	5.9%	**6.5%**	6.6%	**7.1%**

(Public health profiles - OHID (phe.org.uk))

West Berkshire is taking the following measures to address PM2.5:

- The link of the Health and Wellbeing Strategy, Public Health Service Plan and the Public Health Action Plan include many actions to increase walking and cycling in

[6] Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

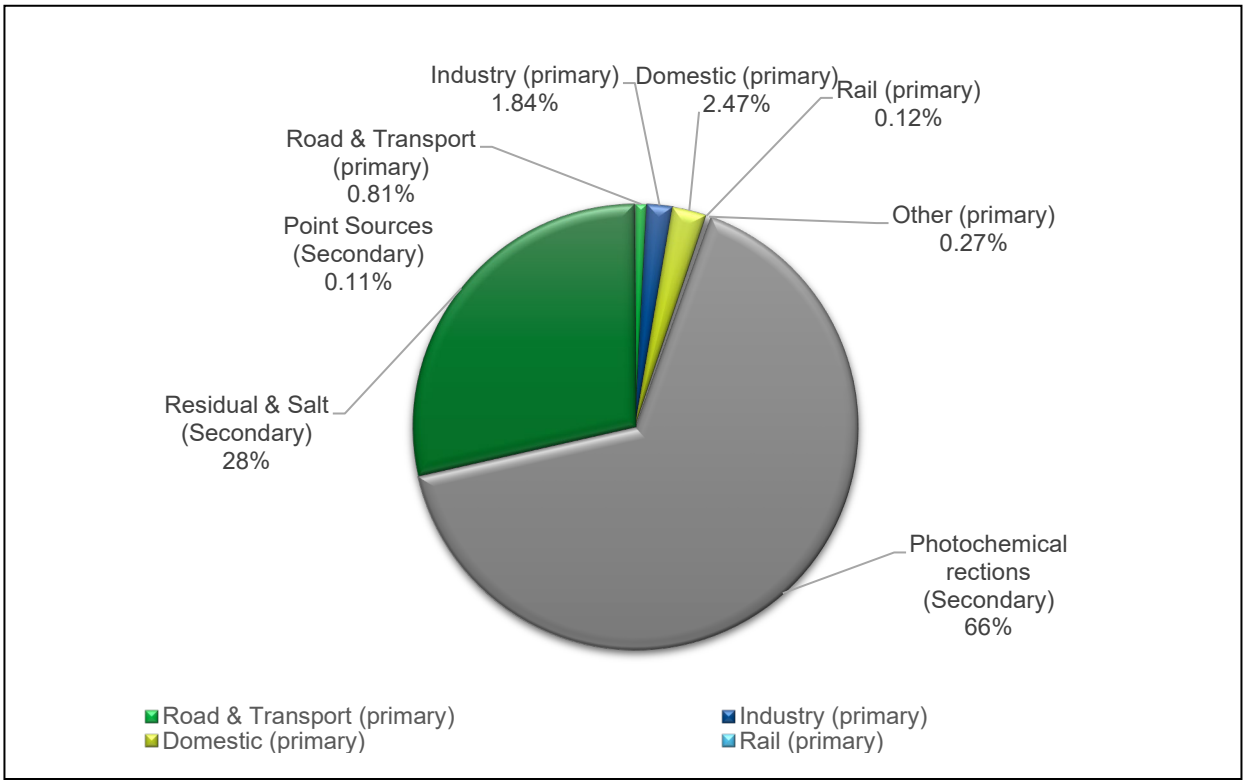
order to encourage and increase active travel, to reduce obesity and inactivity. Berkshire West Health and Wellbeing Strategy 2021-2030 - West Berkshire Council

- Joint working between Public Health and Environmental Health teams for air quality will consider in detail how West Berkshire will explore the impact on PM2.5 throughout the district and how it may be reduced. The results will be linked to the Public Health Outcomes Framework. It is likely that a marketing plan will be set up to raise awareness of how air quality can be improved by active travel and the uptake of electric vehicles.
- Work on implementing the actions in the Local Transport Plan and the Local Development Framework Core Strategy. For example, a new housing development might contribute to alterations to nearby junctions to increase capacity, whilst improving cycle and pedestrian links, provision of electric vehicle charging infrastructure, contributing to bus services so that the site is served by public transport and linking many other measures together in a site travel plan to encourage people to choose sustainable travel.
- A fresh policy is being used to assess residential developments in West Berkshire. The policy has been in use since 2016 when it was at an advanced stage of development and has since been formally adopted (9th May 2017) so it will continue to be used into the future.
- The new policy 'Policy P1: Residential Parking for New Development' has the following advantages for addressing sustainable travel, therefore less traffic. It brings down the threshold for when residential travel plans will be required from 50 dwellings, for more urban areas and 80 dwellings, for areas with more rural characteristics. This means there is more emphasis on encouraging walking, cycling, public transport and car sharing / car clubs for forthcoming developments, than previously across the District.
- There is a requirement for new residential developments to install electric charging points, or at least the basic infrastructure to enable them to be fitted at a later date. Before, this was simply encouraged by officers on larger developments but now it is part of the policy against which applications are assessed. In 2019, thirty one Electric vehicle (EV) charging points were installed in West Berkshire, the EV chargers are all plotted on the council's web page Electric Vehicles - West Berkshire Council
- The Council's 'Cycling and Motorcycling Advice and Standards for New Development' is also now embedded within the policy so that appropriate cycle parking provision is included in the plans for new residential developments.

This aims to encourage more cycling across the district. [Walking and Cycling Maps and Routes - West Berkshire Council]

- Cycle parking – improvements to existing facilities and introduction of new ones began and continues in schools into 2023.
- Clean Air Day 2023 in June to help raise awareness and asking Schools to forward information to parents about idling and how to stop it! Participating schools are sent a recognition certificate.
- The Public Protection Partnership has been awarded the DEFRA AQ Grant (£259k) to measure into the PM2.5 of the schools located near the AQMA, and to ascertain what mitigation measures can be taken at each site to help them achieve the National AQ Objectives. We will also be carrying out behaviour change anti-idling campaigns throughout the borough in 2023. We will be looking at site specific signage for different areas e.g. taxi ranks, school areas, commuter traffic, day trippers and more.

Figure 2.1 A pie chart showing both the Primary and Secondary sources of PM2.5 [4]



[4] (https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2017

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

This section sets out the monitoring undertaken within 2023 by West Berkshire Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2019 and 2023 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

West Berkshire Council undertook automatic (continuous) monitoring at 1 site during 2023. Table A.0.1 in Appendix A shows the details of the automatic monitoring site. 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.

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

West Berkshire Council undertook non-automatic (i.e., passive) monitoring of NO_2 at 35 sites during 2023. Table A.0.2 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 necessary, 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 (NO_2)

Table A.0.3 and Table A.0.4 in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. Note that the concentration data 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 2023 dataset of monthly mean values is in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

Table A.0.5 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past five years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

Continuous Monitoring Newbury

The annual data capture at a rate was 82.5%, the instrument has run relatively reliably during 2023 with 82.5% data capture. There were multiple instrument failures due to environmental conditions inside the cabin, resulting in the exclusion of a number of readings from the analysis.

Monthly average NO_2 level was lower during Q1 and December and higher in May, February, July and October.

For 2023 there were no exceedance of the annual 1 Hourly Objective (200µg/m^3 not to be exceeded more than 18 times per year).

The ratified continuous monitored NO_2 annual mean did not exceed the objective, with a marginal increase of NO_2 of 26.7 µg/m^3 in 2023 compared to 26.2 µg/m^3 in 2022. The continuing low concentrations confirm our theories that new ways of hybrid working may be aiding the reduction on NO_2 and older cars being replaced with greener electric vehicles.

Figure 3.1 shows the 5 year trends in annual mean concentrations at the automatic monitoring unit. The concentrations at the roadside site have remained consistently below the objective level from 2019 to 2023. As we have seen the NO_2 maintain a level below 36 µg/m^3 for at least 3 consecutive years since 2019, the revocation of the AQMA for Newbury has begun and will be completed in 2024.

Figure 3.1 Trends in annual mean NO_2 concentrations from the Newbury Continuous monitor

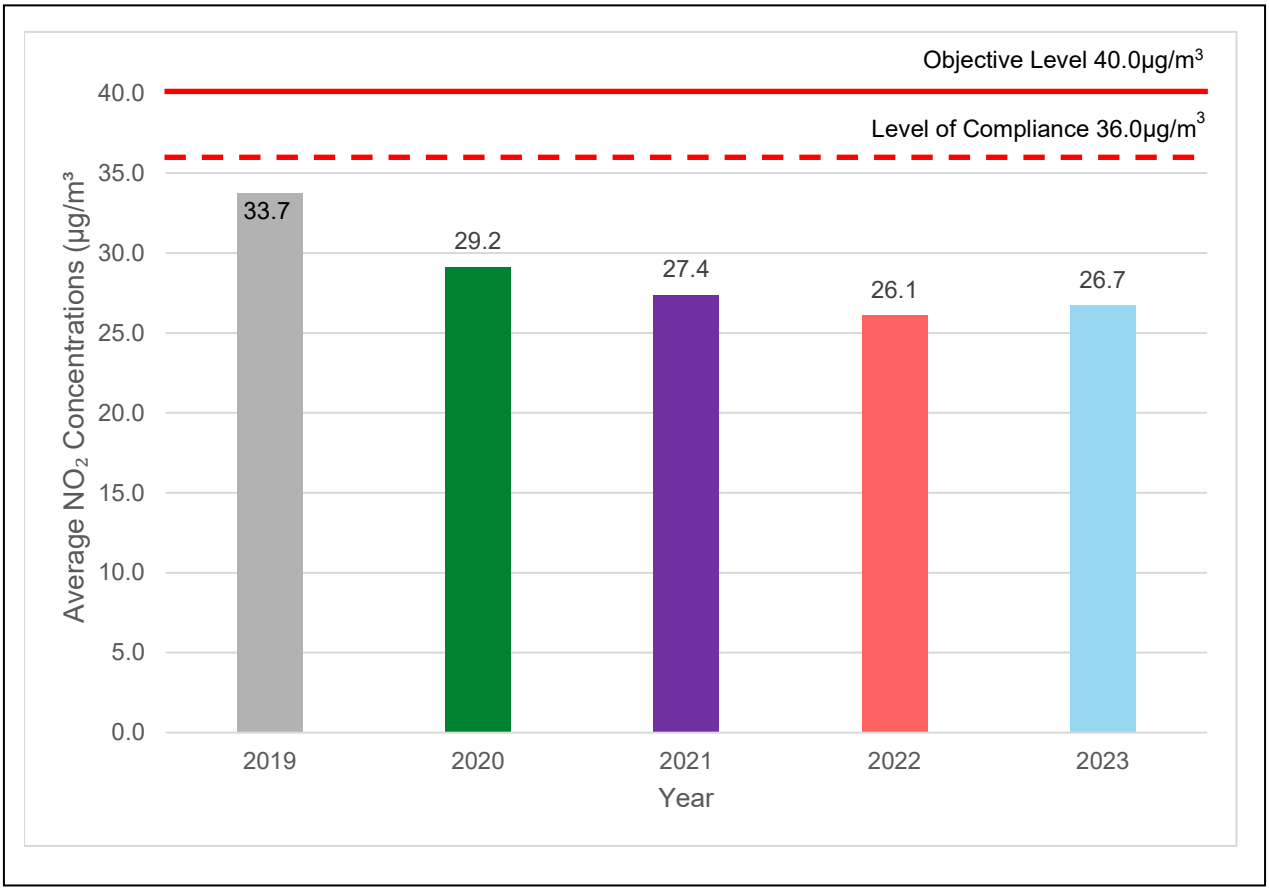
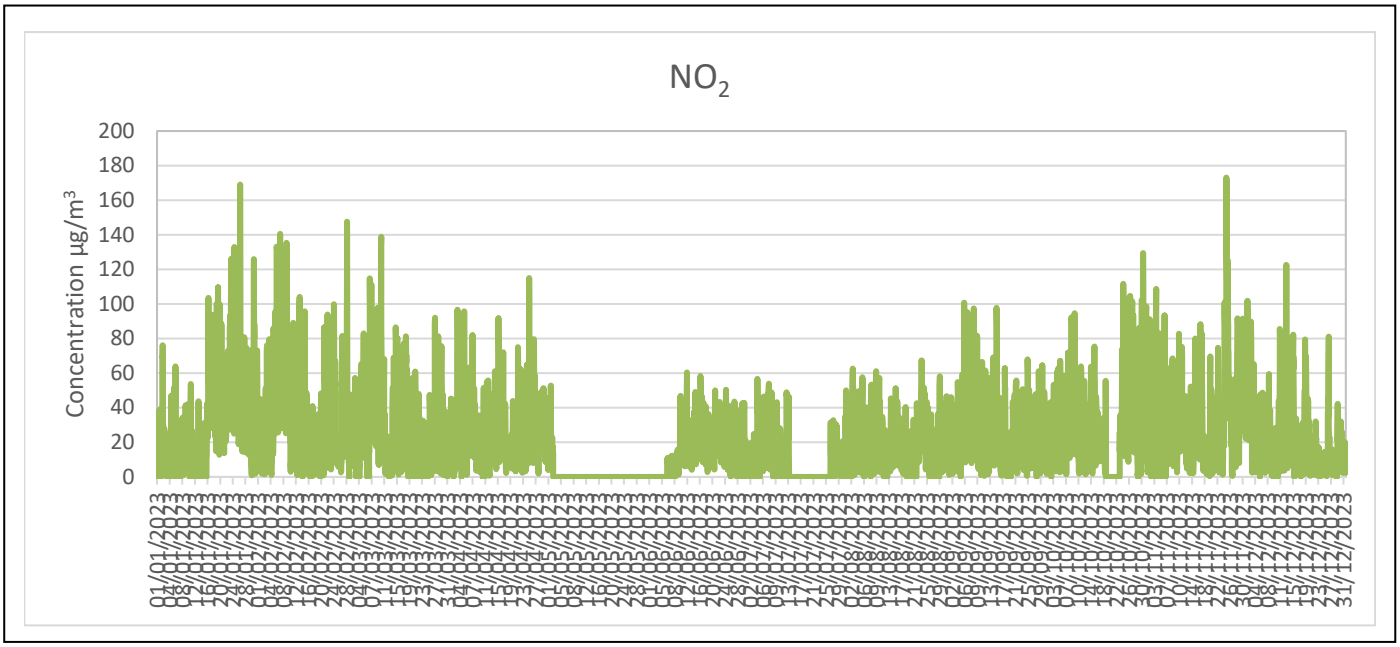


Figure 3.2 A graph showing the Newbury Continuous Monitor Daily NO_2 2023.



NO2 Diffusion Tube Data

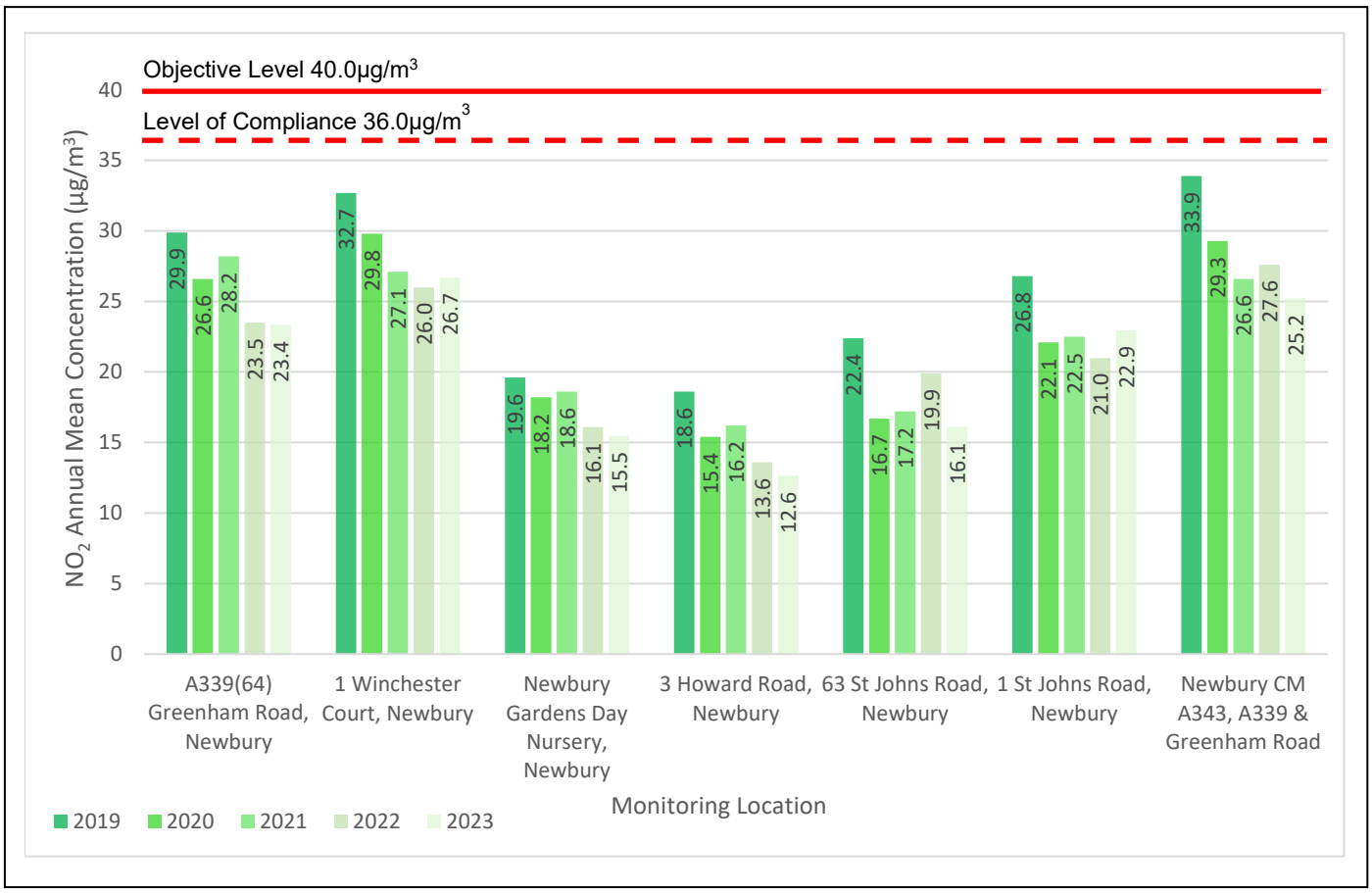
3.2.2 Newbury AQMA

There are five diffusion tube sites within the Newbury AQMA and three within close proximity (see Map Figure D.0.3). There were no exceedances of the Air Quality Objectives (40.0µg/m^3) for the diffusion tubes within the AQMA. In 2023 five of the locations decreased in NO_2 compared to that of 2022. These locations were A339(64) Greenham Road decreased from 23.5µg/m^3 in 2022 to 23.4µg/m^3 in 2023, 3 Howard Road (decreased from 13.6µg/m^3 in 2022 to 12.6µg/m^3 in 2023), 63 St Johns Road (decreased from 16.1µg/m^3 in 2022 to 15.5/m^3 in 2023). The Newbury Gardens Day Nursery (decreased from 18.6µg/m^3 in 2021 to 16.1µg/m^3 in 2022). Only two sites have increased, 1 St John's Road, from 21.0µg/m^3 in 2022 to 22.9µg/m^3 in 2023, and 1 Winchester Court (increased from 26.0µg/m^3 in 2022 from 26.7µg/m^3 in 2023)..

The highest levels of NO_2 in this AQMA were recorded at the continuous monitor (see Map D.3) and the Annual Mean Objective was met, measuring 26.7µg/m^3 NO_2, which has decreased continually over the past five years from 33.7µg/m^3 in 2019. (See Figure 3.1) the 2023 co-located study (diffusion tubes) measured 25.2µg/m^3 in 2023.

As there continues to be no exceedances in the Newbury AQMA, West Berkshire Council has recommend to DEFRA that the Newbury AQMA be revoked. We have continual evidence that the NO_2 is below the Annual Mean Objective of 40.0µg/m^3 since 2019. Monitoring within and outside this AQMA will be continuing in 2024 and beyond.

Figure 3.3 Showing the diffusion tube trends in annual mean NO_2 concentrations within Newbury AQMA.



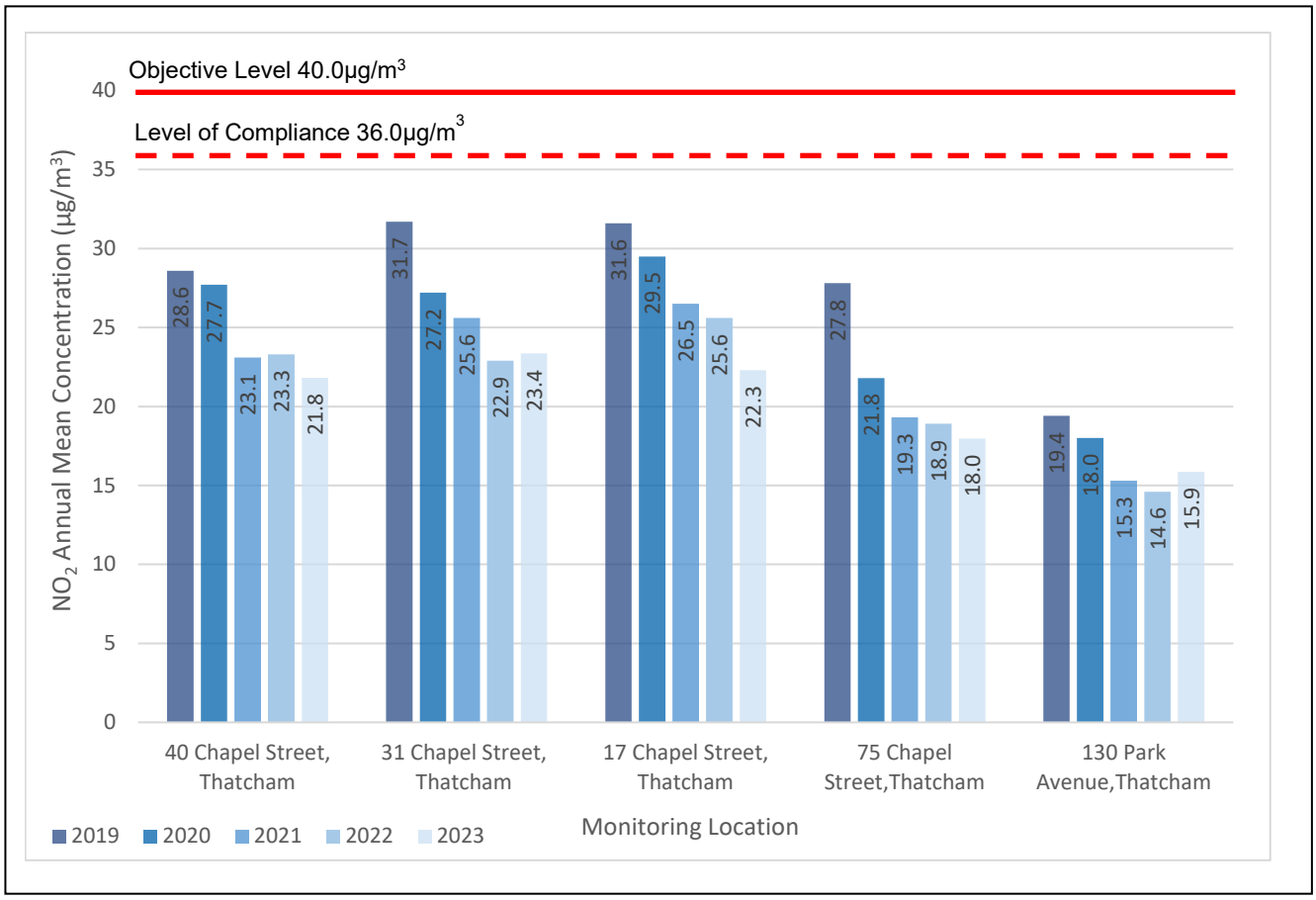
3.2.3 Thatcham AQMA

There are five diffusion tube sites within the Thatcham AQMA and two within close proximity. For the last five years the results have shown a decreasing trend of the NO_2 Annual Mean Objective within the AQMA. Only two sites increased in NO_2 in that time, whilst the remaining three decreased.

The highest levels of NO_2 in this AQMA were recorded at 31 Chapel Street with 23.4µg/m^3 but the levels did not exceed the Annual Mean Objective. This site has shown a decrease from 31.0µg/m^3 in 2019 to 23.4µg/m^3 in 2023. However, the site has increased marginally from 22.9µg/m^3 in 2022 to 23.4µg/m^3 in 2023 (Figure A.2). The only other site to have increased in NO_2 during 2023 was 130 Park Street (2022 in 14.6µg/m^3 to 15.9µg/m^3 in 2023). The three remaining sites have all decreased in NO_2, 40 Chapel Street, (21.8µg/m^3 2023 from 23.3µg/m^3 2022), 75 Chapel Street (18.0µg/m^3 2023 from 18.9µg/m^3 2022) and 75 Chapel Street (22.3µg/m^3 2023 from 25.6µg/m^3 2022).

As there continues to be no exceedances in the Thatcham AQMA, West Berkshire Council has recommend to DEFRA, that the Thatcham AQMA be revoked, as we will have continual evidence that the NO_2 is below the Annual Mean Objective of 40.0µg/m^3 since 2019. Monitoring within and without this AQMA, will continue until revocation.

Figure 3.4 Showing the Thatcham AQMA NO_2 diffusion tube results.



Outside of the AQMAs

Overall, throughout the district, only eight of the 2023 sites showed an increase in NO_2 levels compared with 2022 whilst twenty-two sites showed a decrease. All of the 2023 increased levels remain below the Annual Mean Objective (40µg/m^3).

The eight sites outside the AQMA which increased in NO_2 are:

- 132 London Road, Newbury (increased from 23.6µg/m^3 in 2022 to 25.2µg/m^3 in 2023),
- Old Bakery, Tidmarsh (increased from 21.1µg/m^3 in 2022 to 21.4µg/m^3 in 2023),

- 7a Bridge Street, Hungerford (increased from 17.4µg/m^3 in 2022 to 17.6µg/m^3 in 2023),
- 31 Shaw Road (increased from 20.0µg/m^3 in 2022 to 20.4µg/m^3 in 2023).
- 374 London Road, Newbury (increased from 16.8µg/m^3 in 2022 to 17.0µg/m^3 in 2023).
- 42 Kings Road (increased from 15.7µg/m^3 in 2022 to 16.5µg/m^3 in 2023).
- 20 Deadmans Lane (increased from 15.2µg/m^3 in 2022 to 16.1µg/m^3 in 2023).
- 55 Station Road/near Canal, Woolhampton (increased from 8.8µg/m^3 in 2022 to 9.2µg/m^3 in 2023).

In 2023 we introduced a new site near a busy road junction, at Station Road, Speen, the results show a low reading for its first year at 19.4 µg/m^3.

The traffic counter on the A340 Tidmarsh has shown that the daily traffic average traffic in 2023 has shown an increase from 2022. With 13,173 vehicles in 2023 and 11,882 in 2022, showing that the traffic has now recovered back to pre-pandemic volumes. Therefore, the slight increase of NO_2 at the Old Bakery, Tidmarsh is probably due to the increase of road traffic as well as other factors such as road works creating queues, or vehicles parking and idling next to the tube locations.

There were no results greater than 60µg/m^3, which indicates no exceedance of the 1-hour Mean Objective.

3.2.4 Particulate Matter (PM_{10})

There is currently no reference data being collected for PM_{10}, options are being looked into for the future.

3.2.5 Particulate Matter ($PM_{2.5}$)

There is currently no reference data being collected for $PM_{2.5}$, options are being looked into for the future.

3.2.6 Sulphur Dioxide (SO_2)

No sulphur dioxide monitoring is undertaken, as DEFRA do not required BFBC to do so.

Appendix A: Monitoring Results

Table A.0.1 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)
CM1 Newbury	Roadside	Continuous Monitor	477407	166560	NO_2	YES Newbury AQMA	Chemiluminescent	1	1.8	2

Notes:

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

(2) N/A if not applicable

Table A.0.2 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)
40 Chapel Street Thatcham	40 Chapel Street Thatcham	Kerbside	451926	167460	NO_2	Thatcham AQMA	0.0	3.5	No	2.2
31 Chapel Street Thatcham	31 Chapel Street Thatcham	Roadside	451906	167441	NO_2	Thatcham AQMA	0.0	1.6	No	2.1
17 Chapel Street Thatcham 1	17 Chapel Street Thatcham 1	Roadside	451870	167438	NO_2	Thatcham AQMA	0.0	3.5	No	2.4
44 Hambridge Road Newbury	44 Hambridge Road Newbury	Urban Background	448129	166909	NO_2		0.0	4.3	No	2.4
A339(64) Greenham Road Newbury	A339(64) Greenham Road Newbury	Roadside	447448	166454	NO_2	Newbury AQMA	12.0	2.0	No	2.5
1 Winchester Court Newbury	1 Winchester Court Newbury	Roadside	447411	166562	NO_2	Newbury AQMA	0.0	5.0	No	2.2
Newbury Gardens Day Nursery	Newbury Gardens Day Nursery	Suburban	447352	166619	NO_2	Newbury AQMA	0.0	7.0	No	3.0
20 Deadmans Lane Greenham	20 Deadmans Lane Greenham	Suburban	447515	164720	NO_2		0.0	10.5	No	2.0

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)
A343 Andover Rd(Parkhouse School)	A343 Andover Rd(Parkhouse School)	Kerbside	445899	164705	NO_2		18.1	0.8	No	2.1
Abbeydale Monks Lane Newbury	Abbeydale Monks Lane Newbury	Kerbside	446921	165303	NO_2		21.0	2.0	No	2.3
3 Howard Road Newbury	3 Howard Road Newbury	Roadside	447406	166445	NO_2	Newbury AQMA	0.0	11.0	No	2.5
63 St Johns Road Newbury	63 St Johns Road Newbury	Urban Background	447380	166533	NO_2	Newbury AQMA	0.0	6.2	No	2.6
1 St Johns Road Newbury	1 St Johns Road Newbury	Roadside	447036	166436	NO_2	Newbury AQMA	0.0	4.8	No	2.2
7a Bridge Street Hungerford	7a Bridge Street Hungerford	Roadside	433909	168815	NO_2		0.0	1.5	No	2.3
43 Hawthorn Road Newbury	43 Hawthorn Road Newbury	Urban Background	447478	167868	NO_2		0.0	13.0	No	2.7
6 Market Place Newbury	6 Market Place Newbury	Urban Centre	447202	167020	NO_2		9.5	1.3	No	2.2
42 Kings Road Newbury	42 Kings Road Newbury	Roadside	447434	166993	NO_2		0.0	11.3	No	2.1
40 Bartholomew	40 Bartholomew	Roadside	446939	166848	NO_2		0.0	2.7	No	1.9

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)
Street Newbury	Street Newbury									
31 Shaw Road Newbury	31 Shaw Road Newbury	Kerbside	447693	167820	NO_2		0.0	0.6	No	2.2
13 Shaw Road Newbury	13 Shaw Road Newbury	Urban Background	447632	167774	NO_2		0.0	7.0	No	1.7
132 London Road Newbury	132 London Road Newbury	Roadside	447720	167678	NO_2		0.0	3.0	No	2.4
A339 Newbury Central	A339 Newbury Central	Kerbside	447454	167296	NO_2		204.0	4.0	No	2.6
374 London Road Newbury	374 London Road Newbury	Urban Background	449034	167520	NO_2		0.0	12.5	No	2.3
Old Bakery Tidmarsh	Old Bakery Tidmarsh	Roadside	463504	174864	NO_2		0.0	2.2	No	2.1
The Cross Key Inn Pangbourne	The Cross Key Inn Pangbourne	Roadside	463468	176433	NO_2		0.0	4.0	No	1.9
4 Willows Court Pangbourne	4 Willows Court Pangbourne	Roadside	463441	176522	NO_2		0.0	3.0	No	2.6
Calcot Hotel	Calcot Hotel	Kerbside	466293	171863	NO_2		16.0	2.0	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)
Elizabeth Court Theale	Elizabeth Court Theale	Urban Background	464574	171294	NO_2		0.0	32.0	No	2.3
75 Chapel Street Thatcham	75 Chapel Street Thatcham	Roadside	452288	167445	NO_2	Thatcham AQMA	0.0	3.4	No	2.0
130 Park Avenue Thatcham	130 Park Avenue Thatcham	Roadside	451965	167498	NO_2	Thatcham AQMA	7.0	2.0	No	2.2
Continuous Monitor 1, Continuous Monitor 2, Continuous Monitor 3	Continuous Monitor 3	Roadside	447410	166561	NO_2		1.0	4.7	Yes	2.0
Streatley	Streatley	Roadside	459202	180749	NO_2		0	1.5	No	2.1
Near Canal / 55 Station Road	Near Canal / 55 Station Road	Kerbside	457291	166573	NO_2		0	0.5	No	2.2
1 Kingfisher Court Pangbourne	1 Kingfisher Court Pangbourne	Receptor	463551	176623	NO_2		2.0	2.0	No	2.2
Station Road, Speen	Station Road, Speen	Roadside	459193	180764	NO_2		4.0	1.0	No	2.0

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.0.3 Annual Mean NO_2 Monitoring Results: Automatic Monitoring (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
CM1	477407	166560	Roadside	100	82.5	35.9	29.2	27.5	26.2	26.7

☒ **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**

☒ **Where exceedances of the NO_2 annual mean objective occur at locations not representative of relevant exposure, the fall-off with distance concentration has been calculated and reported concentration provided in brackets for 2023**

Notes:

The annual mean concentrations are presented as µg/m^3.

Exceedances of the NO_2 annual mean objective of 40µg/m^3 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.0.4 Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^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 2023 (%) (2)	2019	2020	2021	2022	2023
40 Chapel Street Thatcham 3	451926	167460	Kerbside	100.0	100.0	28.6	27.7	23.1	23.3	21.8
31 Chapel Street Thatcham	451906	167441	Roadside	100.0	100.0	31.7	27.2	25.6	22.9	23.4
17 Chapel Street Thatcham 1	451870	167438	Roadside	84.6	100.0	31.6	29.5	26.5	25.6	22.3
44 Hambridge Road Newbury	448129	166909	Urban Background	92.3	100.0	24.1	22.3	20.1	19.1	17.1
A339(64) Greenham Road Newbury	447448	166454	Roadside	90.4	100.0	29.9	26.6	28.2	23.5	23.4
1 Winchester Court Newbury	447411	166562	Roadside	67.3	100.0	32.7	29.8	27.1	26.0	26.7
Newbury Gardens Day Nursery	447352	166619	Suburban	100.0	100.0	19.6	18.2	18.6	16.1	15.5
20 Deadmans Lane Greenham	447515	164720	Suburban	92.3	100.0	20.2	19.4	15.7	15.2	16.1
A343 Andover Rd(Parkhouse School)	445899	164705	Kerbside	100.0	100.0	15.5	13.1	13.0	11.0	10.5

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 2023 (%) [2]	2019	2020	2021	2022	2023
Abbeydale Monks Lane Newbury	446921	165303	Kerbside	92.3	100.0	19.9	15.2	14.7	14.4	14.3
3 Howard Road Newbury	447406	166445	Roadside	50.0	100.0	18.6	15.4	16.2	13.6	12.6
63 St Johns Road Newbury	447380	166533	Urban Background	92.3	100.0	22.4	16.7	17.2	19.9	16.1
1 St Johns Road Newbury	447036	166436	Roadside	92.3	100.0	26.8	22.1	22.5	21.0	22.9
7a Bridge Street Hungerford	433909	168815	Roadside	90.4	100.0	23.1	21.0	18.5	17.4	17.6
43 Hawthorn Road Newbury	447478	167868	Urban Background	92.3	100.0	18.5	16.3	15.1	14.3	13.1
6 Market Place Newbury	447202	167020	Urban Centre	100.0	100.0	26.0	20.8	19.0	18.7	18.2
42 Kings Road Newbury	447434	166993	Roadside	100.0	100.0	20.3	18.9	16.3	15.7	16.5
40 Bartholomew Street Newbury	446939	166848	Roadside	100.0	100.0	27.4	23.3	22.8	21.8	21.1
31 Shaw Road Newbury	447693	167820	Kerbside	100.0	100.0	25.6	25.6	21.9	20.0	20.4

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 2023 (%) [2]	2019	2020	2021	2022	2023
13 Shaw Road Newbury	447632	167774	Urban Background	100.0	100.0	26.5	25.6	21.9	21.7	20.7
132 London Road Newbury	447720	167678	Roadside	84.6	100.0	28.1	25.1	25.6	23.6	25.2
A339 Newbury Central	447454	167296	Kerbside	92.3	100.0	29.9	30.6	27.6	27.9	25.5
374 London Road Newbury	449034	167520	Urban Background	100.0	100.0	22.1	18.1	16.7	16.8	17.0
Old Bakery Tidmarsh	463504	174864	Roadside	76.9	100.0	29.5	20.9	20.6	21.1	21.4
The Cross Key Inn Pangbourne	463468	176433	Roadside	100.0	100.0	29.6	26.2	22.5	25.9	21.5
4 Willows Court Pangbourne	463441	176522	Roadside	100.0	100.0	24.8	20.5	18.7	18.4	16.9
Calcot Hotel	466293	171863	Kerbside	100.0	100.0	28.4	25.6	24.5	24.0	21.5
Elizabeth Court Theale	464574	171294	Urban Background	100.0	100.0	20.3	18.3	14.6	16.5	13.8
75 Chapel Street Thatcham	452288	167445	Roadside	100.0	100.0	27.8	21.8	19.3	18.9	18.0
130 Park Avenue Thatcham	451965	167498	Roadside	84.6	100.0	19.4	18.0	15.3	14.6	15.9

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 2023 (%) (2)	2019	2020	2021	2022	2023
Continuous Monitor 1, Continuous Monitor 2, Continuous Monitor 3	447410	166561	Roadside	92.3	100.0	33.9	29.3	26.6	27.6	25.2
Streatley	459202	180749	Roadside	92.3	100.0	n/a	n/a	20.1	20.5	16.5
Near Canal / 55 Station Road	457291	166573	Kerbside	92.3	100.0	n/a	n/a	8.2	8.8	9.2
1 Kingfisher Court Pangbourne	463551	176623	Roadside	50.0	100.0	n/a	n/a	20.0	20.0	19.4
Station Road, Speen	459193	180764	Roadside	100.0	100.0	n/a	n/a	n/a	n/a	19.4

☒ **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 µg/m^3.

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**.

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.0.1 Trends in Annual Mean NO_2 Concentrations within the Newbury AQMA

Figure A.0.1 presents NO_2 annual mean concentrations for sites within the Newbury AQMA from 2019 to 2023. There are no exceedances of the annual mean objective in 2023 and there is a general trend of reduction across the sites since 2019.

Figure A.0.2 Trends in Annual Mean NO_2 Concentrations within the Thatcham AQMA

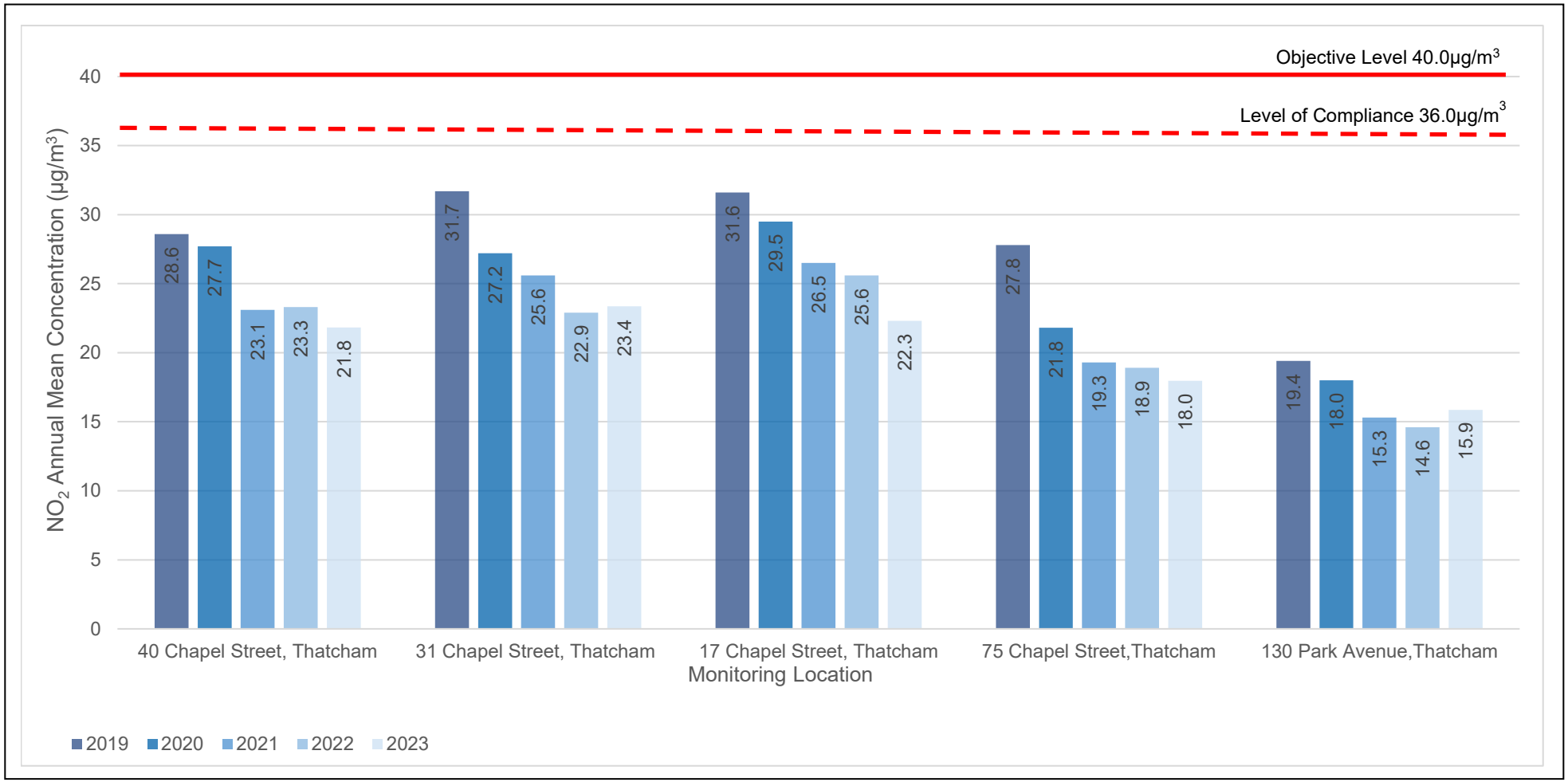


Figure A.0.2 presents NO_2 annual mean concentrations for sites within the Thatcham AQMA from 2019 to 2023. There are no exceedances of the annual mean objective in 2023 and there is a general trend of reduction across the sites since 2019.

Figure A.0.3 Trends in Annual Mean NO_2 Concentrations within Newbury (outside AQMA's)

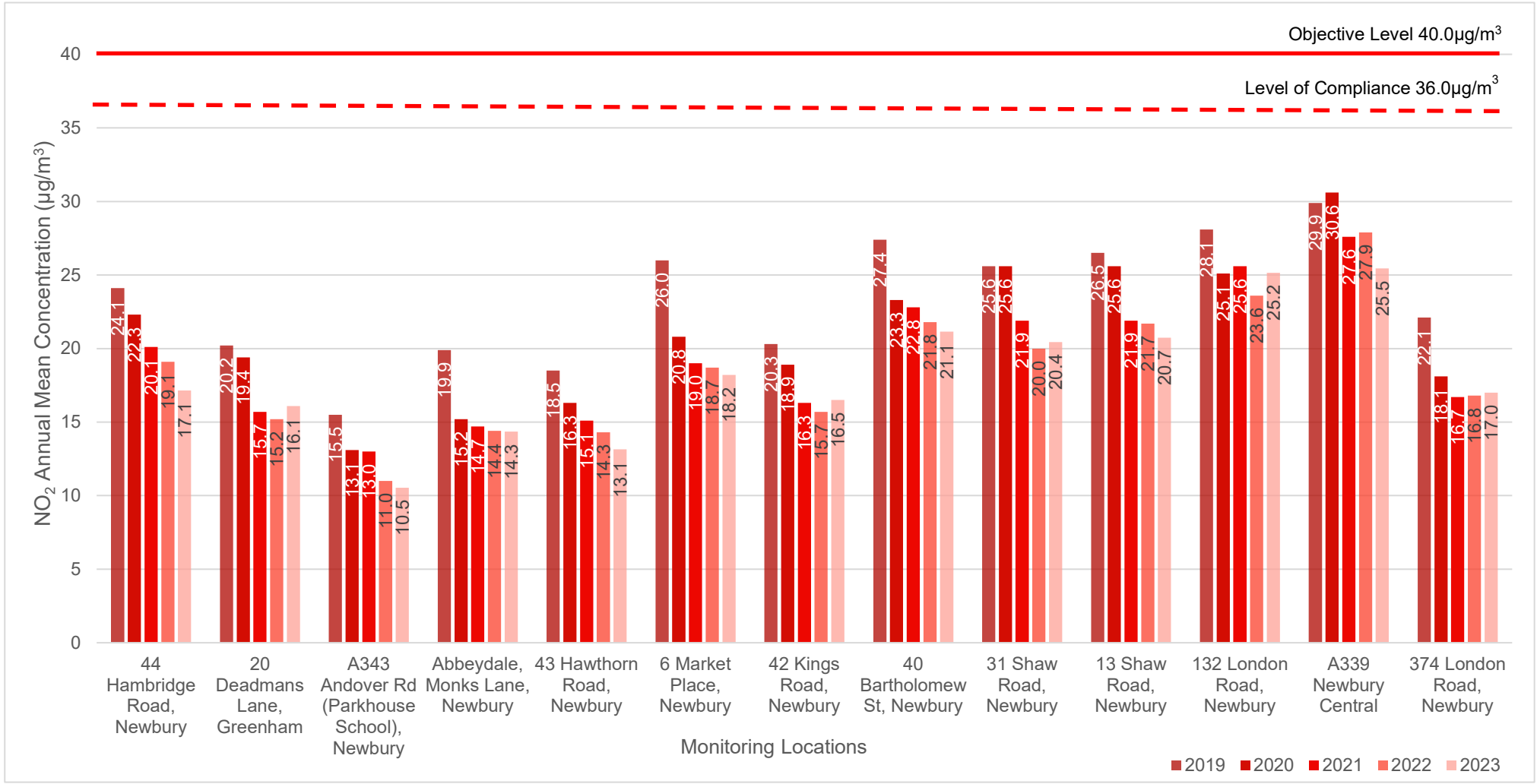


Figure A.0.3 presents NO_2 annual mean concentrations for sites within Newbury (outside AQMA) from 2019 to 2023. There are no exceedances of the annual mean objective in 2023 and there is a mixed trend of reduction and minor increases across the sites since 2019.

Figure A.0.4 Trends in Annual Mean NO_2 Concentrations within the Wider West Berkshire district (outside AQMAs)

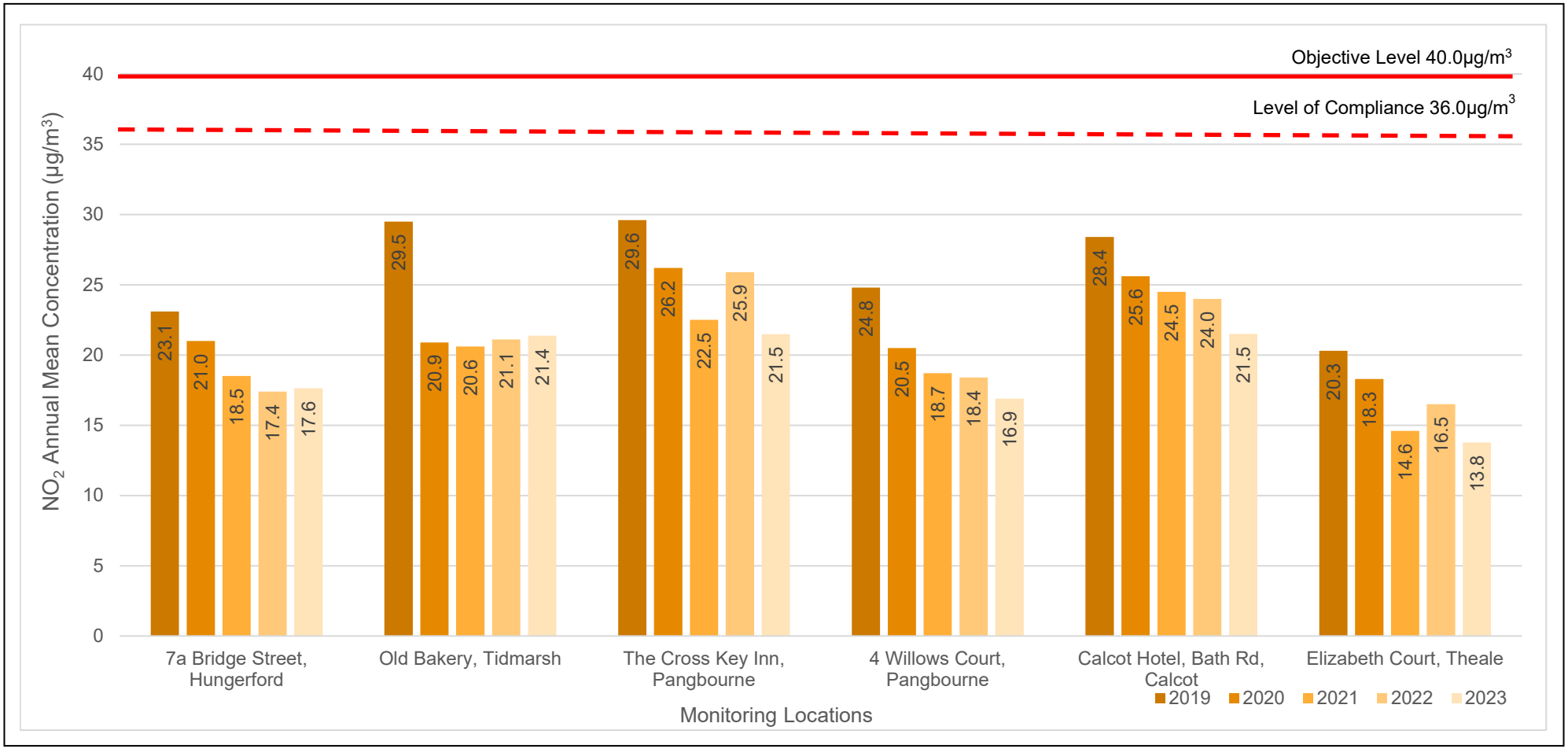


Figure A.0.4 presents NO_2 annual mean concentrations for sites within the Wider West Berkshire (outside AQMA) from 2019 to 2023. There are no exceedances of the annual mean objective in 2023 and there is a trend of reduction across the sites since 2019.

Figure A.0.5 Trends in Annual Mean NO_2 Concentrations within the Wider West Berkshire district (outside AQMAs)

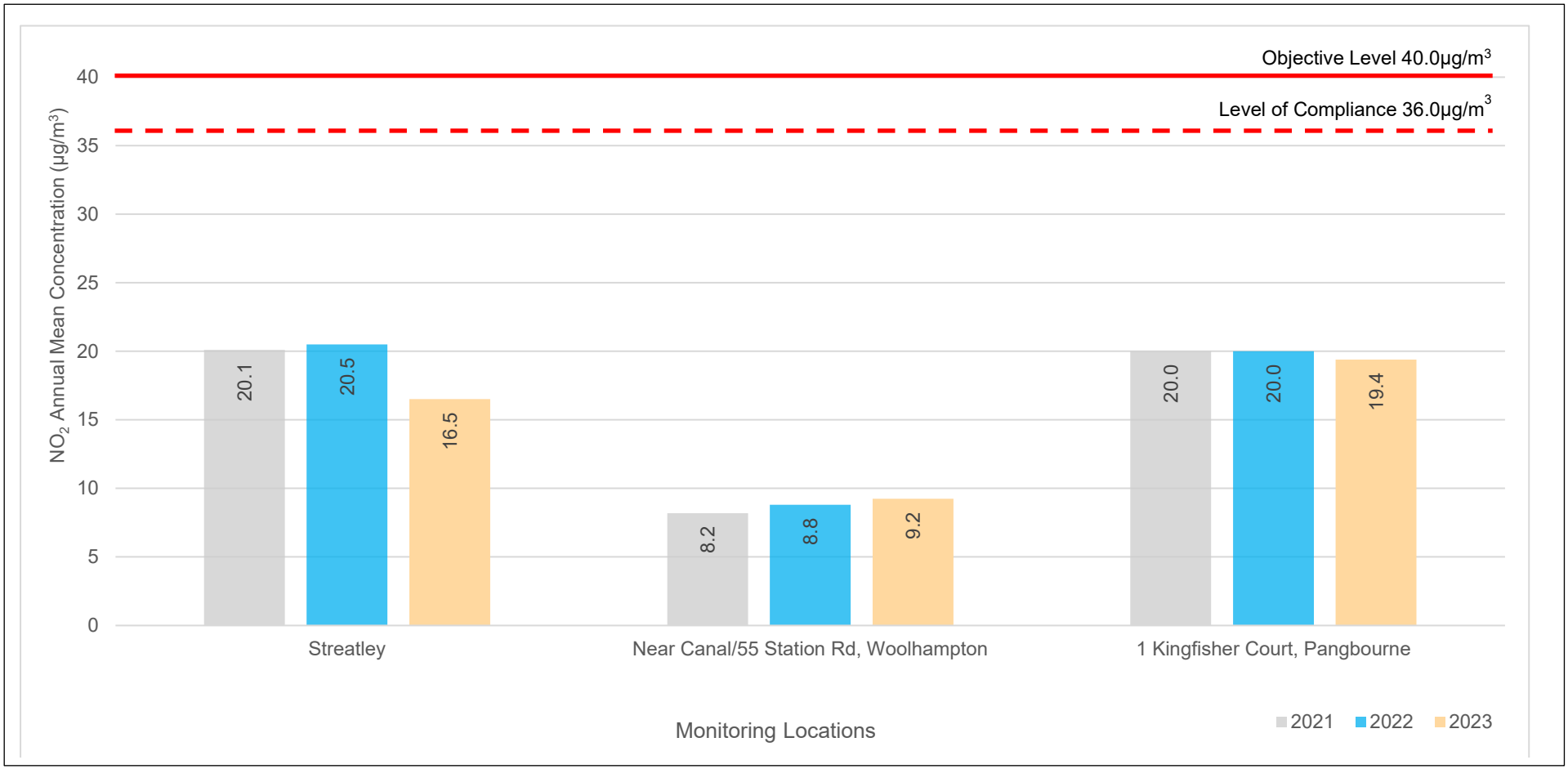


Figure A.0.5 presents NO_2 annual mean concentrations for sites within the Wider West Berkshire (outside AQMA) from 2019 to 2023. There have been no exceedances of the annual mean objective over the past 5 years and there is a trend of reduction in NO_2 since 2019.

Figure A.0.6 Trends in Annual Mean NO_2 Concentrations for the Newbury AQMA Continuous monitor

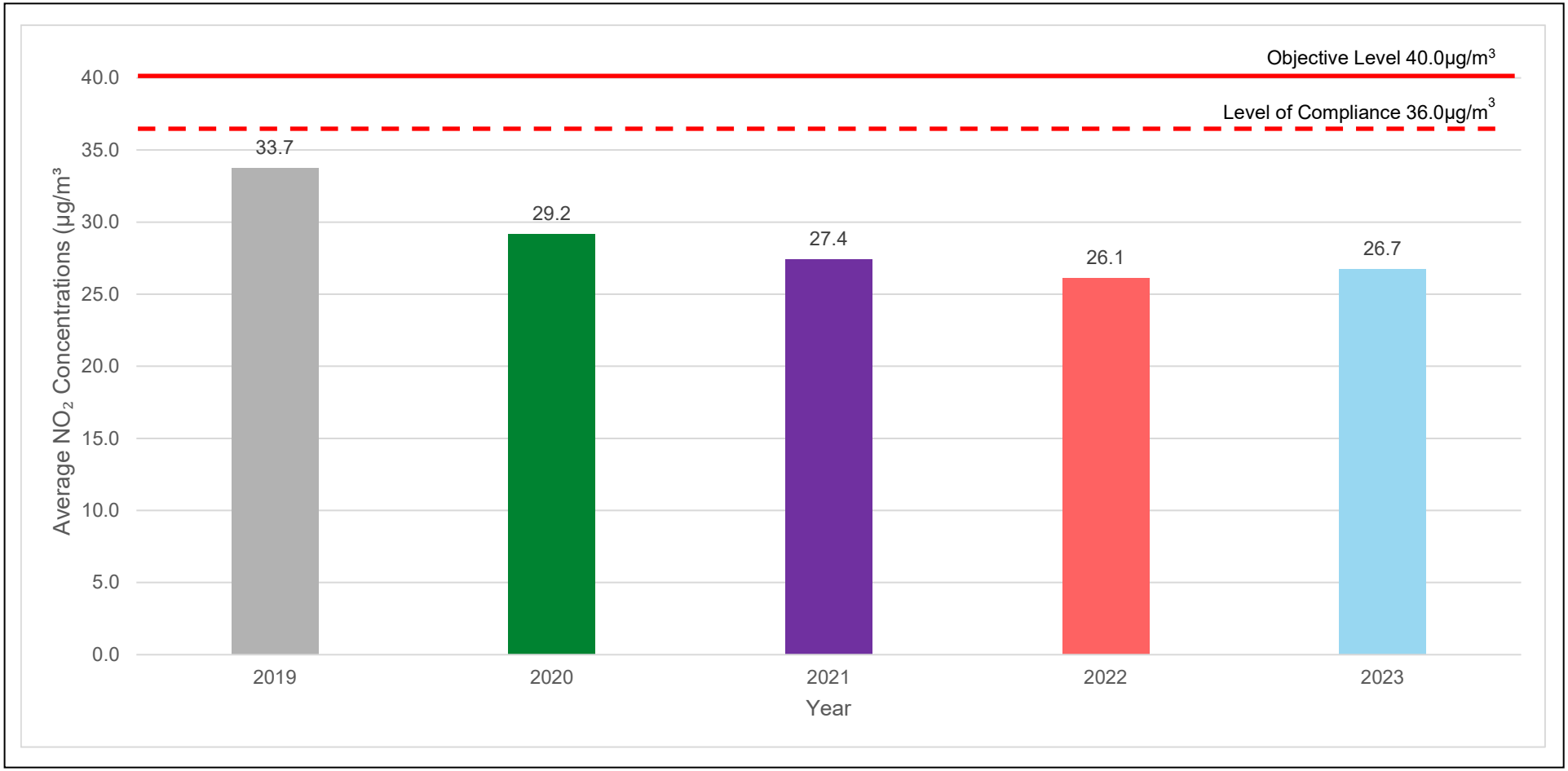


Figure A.0.6 presents NO_2 annual mean concentrations from the Newbury AQMA Continuous Monitor from 2019 to 2023. There have been no exceedances of the annual mean objective over the past 5 years and there is a trend of reduction in NO_2 since 2019.

Table A.0.5 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
CM1	477407	166560	Roadside	82.5	100	2	1	0	0	0

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m^3 have been recorded.

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

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%).

Appendix B: Full Monthly Diffusion Tube Results for 2023

Table B.0.1 NO_2 2023 Diffusion Tube Results ($\mu g/m^3$)

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 0.85	Annual Mean: Distance Corrected to Nearest Exposure	Comment
40 Chapel Street Thatcham 3	451926	167460	30.3	27.1	24.9	26.7	24.9	24.6	17.7	23.8	28.9	29.2	28.2	21.8	25.7	21.8		
31 Chapel Street Thatcham	451906	167441	33.8	32.1	29.0	28.2	21.4	23.3	18.3	26.0	31.1	33.2	28.9	24.4	27.5	23.4		
17 Chapel Street Thatcham 1	451870	167438			27.8	32.8	23.1	27.2	10.5	27.3	27.3	31.7	30.6	24.2	26.2	22.3		
44 Hambridge Road Newbury	448129	166909	24.2	27.2	19.7	21.9	19.5	19.0		15.6	17.2	21.2	22.7	13.7	20.2	17.1		
A339(64) Greenham Road Newbury	447448	166454	28.0	35.0	28.7	28.1	32.5		21.6	26.6	27.4	28.6	27.1	18.7	27.5	23.4		
1 Winchester Court Newbury	447411	166562		34.1			23.1	25.2	24.9	29.6	32.6	31.1	33.1		29.2	26.7		
Newbury Gardens Day Nursery	447352	166619	19.0	23.0	17.5	21.7	20.4	21.6	9.6	16.8	19.1	20.6	19.4	10.1	18.2	15.5		
20 Deadmans Lane Greenham	447515	164720	23.2	22.9	16.1	16.0	13.4	14.8	16.5	16.3		39.7	19.4	10.1	18.9	16.1		
A343 Andover Rd(Parkhouse School)	445899	164705	18.7	18.8	12.6	12.5	12.5	10.6	7.3	8.9	11.1	10.9	16.2	8.9	12.4	10.5		
Abbeydale Monks Lane Newbury	446921	165303	23.0	20.0	17.0	16.6	14.8	15.4	10.5	14.0	17.3	19.1	18.2		16.9	14.3		
3 Howard Road Newbury	447406	166445	18.8	21.2	16.1	17.9	16.9								18.2	12.6		
63 St Johns Road Newbury	447380	166533	20.9	24.7	17.8	20.0	19.3	17.4		21.4	15.8	18.3	23.2	9.8	19.0	16.1		
1 St Johns Road Newbury	447036	166436	26.2	30.0	25.4	29.1	26.9	27.5		31.2	27.8	28.5	29.4	14.9	27.0	22.9		
7a Bridge Street Hungerford	433909	168815	24.4	26.8		19.3	19.3	18.7	15.6	17.5	21.0	22.6	25.7	17.2	20.7	17.6		
43 Hawthorn Road Newbury	447478	167868	18.5	20.8	14.5	17.0	16.3	15.4	8.5	13.1	16.4		19.8	9.9	15.5	13.1		
6 Market Place Newbury	447202	167020	25.3	28.0	20.4	22.8	17.2	18.5	14.7	17.9	22.9	26.9	27.1	15.5	21.4	18.2		
42 Kings Road Newbury	447434	166993	24.7	23.9	33.3	17.0	13.1	13.5	14.5	15.1	17.1	20.8	24.0	16.0	19.4	16.5		
40 Bartholomew Street Newbury	446939	166848	26.9	31.2	25.4	25.4	22.4	22.5	18.9	21.9	27.1	28.6	28.7	19.7	24.9	21.1		

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 0.85	Annual Mean: Distance Corrected to Nearest Exposure	Comment
31 Shaw Road Newbury	447693	167820	30.2	26.6	23.2	28.2	17.3	19.7	18.3	21.2	25.5	33.2	25.3	20.0	24.1	20.4		
13 Shaw Road Newbury	447632	167774	25.4	24.9	27.0	30.1	36.1	22.0	17.8	24.5	28.0	28.3	27.3	1.5	24.4	20.7		
132 London Road Newbury	447720	167678	32.1	36.0	27.9		27.1	27.9	20.4	26.5		56.2	18.5	23.3	29.6	25.2		
A339 Newbury Central	447454	167296	**40.3**	37.3	18.9	28.5	28.6	28.0	21.6	31.8		28.6	36.3	29.5	29.9	25.5		
374 London Road Newbury	449034	167520	17.8	21.7	18.0	17.8	10.8	17.1	13.7	48.7	23.2	21.8	16.4	13.1	20.0	17.0		
Old Bakery Tidmarsh	463504	174864			**53.5**	17.9		33.0	15.6	20.3	23.1	24.1	23.5	15.3	25.1	21.4		
The Cross Key Inn Pangbourne	463468	176433	27.1	26.1	21.8	32.9	30.0	29.0	17.7	25.2	14.6	29.2	29.3	20.5	25.3	21.5		
4 Willows Court Pangbourne	463441	176522	22.1	26.6	20.5	23.2	17.6	18.9	14.1	19.6	10.2	25.0	26.3	14.7	19.9	16.9		
Calcot Hotel	466293	171863	24.3	29.2	27.3	30.5	21.3	28.0	21.0	24.9	14.4	34.3	28.6	19.6	25.3	21.5		
Elizabeth Court Theale	464574	171294	21.2	19.7	18.2	15.8	12.9	14.7	13.4	15.5	8.9	21.1	19.0	14.2	16.2	13.8		
75 Chapel Street Thatcham	452288	167445	24.3	26.1	22.6	19.5	15.3	17.1	17.8	19.7	21.8	23.3	25.7	20.5	21.1	18.0		
130 Park Avenue Thatcham	451965	167498	22.5		14.6	16.5	9.8	25.7	22.4	12.8	17.6		30.7	14.0	18.7	15.9		
Continuous Monitor 1	447410	166561		31.1	32.9	30.3	25.1	25.1	26.1	29.8	33.7	34.9	33.5	25.0	-	-		Triplicate Site with Continuous Monitor 1, Continuous Monitor 2 and Continuous Monitor 3 - Annual data provided for Continuous Monitor 3 only
Continuous Monitor 2	447410	166561		34.1	31.3	29.8	24.3	26.9	26.5	28.3	34.7	34.4	34.0	23.2	-	-		Triplicate Site with Continuous Monitor 1, Continuous Monitor 2 and Continuous Monitor 3 - Annual data provided for Continuous Monitor 3 only
Continuous Monitor 3	447410	166561		32.2	29.3	32.1	24.9	25.2	23.6	28.2	34.7	34.6	33.8	25.4	29.7	25.2		Triplicate Site with Continuous Monitor 1, Continuous Monitor 2 and Continuous Monitor 3 - Annual data provided for Continuous Monitor 3 only
Streatley	459202	180749		30.2	23.5	24.5	17.6	22.3	17.7	18.6	11.6		25.5	20.5	21.2	18.0		
Near Canal / 55 Station Road	457291	166573	12.8	13.4	9.4	10.0		17.0	6.4	8.9	8.9	12.0	13.8	7.1	10.9	9.2		
1 Kingfisher Court Pangbourne	463551	176623	25.5	33.4	27.4	22.5	19.9	24.0							25.4	19.4		

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 0.85	Annual Mean: Distance Corrected to Nearest Exposure	Comment
Station Road, Speen	459193	180764	27.7	28.4	21.1	24.6	14.5	19.1	17.7	20.0	22.9	26.7	29.2	21.8	22.8	19.4		

☒ **All erroneous data has been removed from the NO_2 diffusion tube dataset presented in Table B.1**.

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

☒ **Local bias adjustment factor used.**

☐ **National bias adjustment factor used.**

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

☒ **West Berkshire Council confirm that all 2023 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System**.

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**.

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 West Berkshire During 2023

West Berkshire Council has not identified any new sources relating to air quality within the reporting year of 2022.

Additional Air Quality Works Undertaken by West Berkshire During 2023

DEFRA Air Quality Grant 2020/21

The combined grant awarded to three local authorities (West Berkshire, Bracknell Forest and Wokingham) was £259,000 for creating an anti-idling campaign, measuring $PM_{2.5}$ and NO_2 at schools located near/within the AQMAs and looking at behaviour change (anti-idling) of our residents, with the aim of reducing exposure of children at school and raising awareness of parents /carers and children and the wider community.

$PM_{2.5}$ Monitoring

AECOM, air quality consultants, were appointed to monitor $PM_{2.5}$ and PM_{10} and weather, at or close to, fourteen selected schools within, or close to, the AQMAs. Monitoring at the schools, took place between February 2022 and February 2023 for a minimum of 3 months, to include term-time and holiday periods. This provided a snapshot of the levels around schools using a low-cost air quality sensor unit (Vortex) providing real-time measurements at five-minute intervals. As the data was not ratified nor calibrated against a reference equivalent monitor, the data only provides an indicative measurement. The monitors were paired with weather sensors to continuously measure parameters including wind speed and direction, temperature and rainfall. The air quality monitoring equipment was attached to a

lamp post or streetlight and the weather stations were close by on different lamp post or streetlight.

The data has not been annualised to represent an annual mean and the results are indicative only. However, the 'period means' were all below the relevant air quality objectives. All the schools were within the Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 for $PM_{2.5}$ (i.e., the annual mean should not exceed 25 µg/m³ and the interim target of 12 µg/m³ to be met by end 2027 and long-term target of 10 µg/m³ by 2040.)

Hourly, daily and weekly results were analysed for temporal distribution and plotted to compare the difference between school term-time and holidays. Lower concentrations seen in the daytime were due to warmer temperature allowing PM to disperse; the nighttime cooler temperatures reduce the atmospheric boundary layer and increase stability acting to trap PM closer to the ground. The concentrations did vary, weather clearly influenced concentrations i.e., rainfall acts to disperse and deplete pollution more readily. During the winter, higher concentrations from the continent were seen, as opposed to the cleaner maritime air from the Atlantic. However, patterns in road traffic flow effects were not as significant as weather conditions. The morning rush hour increase in concentration was evident, as were higher concentrations recorded around 09.00 and 16.00, coinciding with the beginning and end of the school day. Concentrations were higher in the middle of the week and then at the end of the week and weekends, due to changes in road traffic and commercial/industrial activity in the post-covid hybrid working pattern. Overall, lower concentrations were noted in holiday periods.

The schools have been sent their site-specific Particulate Monitoring Report and Action Plan. These detail the monitoring, results, analysis and a number of actions to further investigate the sources of pollution and target air quality improvements for children at the school and the surrounding area. It is recommended that an audit of sources around the school is carried out before considering the most appropriate actions to take. The audit could include, looking at the age of boilers and where their flues are positioned, the location of the playground adjacent to busy roads and whether any screening exists, school travel plans and accessibility for cycling/scooting to school and a review of vehicle engine idling or traffic queuing outside the school. In addition, a number of mitigation measures were identified, divided into generic, (which could be applicable across the district/borough) and more specific, to each school. For each measure an approximate timescale and cost was given

based on the following criteria: potential air quality benefits, cost, deliverability and wider benefits (e.g., improved safety, child health and promotion of sustainable transport).

While the study did not identify any significant health risks associated with exposure to $PM_{2.5}$, recommendations have been made to reduce the levels of $PM_{2.5}$ in the air, wherever possible. See Table C.0.1 Full the school results.

Table C.0.1 showing the $PM_{2.5}$ measured at schools using Vortex sensors during the DEFRA project.

School	Data capture	Average concentration $PM_{2.5}$ (µg/m³)	Below annual mean objective (25 µg/m³)	Monitoring Dates
Francis Baily Primary School	70	3.8	Y	23/02/2022 to 19/05/2022
Kennet School	83.3	5	Y	14/11/2022 to 12/02/2023
Spurcroft Primary School	98.5	1.3	Y	01/06/2022 to 30/08/2022
St Bartholomew's School	93.9	2.4	Y	25/03/2022 to 28/06/2022
St John the Evangelist C.E. Nursery and Infant Sch	98.7	5.2	Y	25/03/2022 to 28/06/2022
St Nicolas C.E. Junior School	99.8	2.1	Y	17/08/2022 to 15/11/2022
Thatcham Park CofE Primary	99.5	1.6	Y	01/06/2022 to 30/08/2022
The Willows Primary School	99.4	1.8	Y	17/08/2022 to 15/11/2022
Whitelands Park Primary School	96.5	5.3	Y	25/02/2022 to 16/05/2022
Parsons Down Infant & Junior School	92.4	3.3	Y	25/02/2022 to 30/05/2022
Fir Tree Primary School	100	4.6	Y	14/11/2022 to 12/02/2023
St Joseph's Catholic Primary School	99.9	2.3	Y	23/02/2022 to 19/05/2022

The Winchcombe School	99.3	1.2	Y	28/06/2022 to 26/09/2022
Speenhamland School	99.6	2.2	Y	02/03/2022 to 30/05/2022

Biggest NO_2 Loser

During 2022, the Biggest NO_2 Loser section of the DEFRA Grant award began, this involved using diffusion tubes to measure the NO_2 outside twelve Schools within West Berkshire Council located closest to the three AQMA's. The 2022 results were compared with the 2023 results to see if the Behaviour Change experiment (educating children and carers by posting anti-idling signs and asking the schools to send out information on idling, to the guardians who drop off the children) actually made a difference outside schools.

The results were excellent with all schools reducing the NO_2 from 2022 to 2023. The school with the greatest reduction won a certificate, reusable water bottles for each child, air quality bookmarks and posters to go up in the school. Plus a leaflet to accompany the school newsletter and another copy of the School Air Quality Tool Kit and educational lesson plan air-quality-school-toolkit-final-version-1-003.pdf (publicprotectionpartnership.org.uk)). See Table C.0.2 for the NO_2 data for each school monitored.

The results show that the greatest reduction occurred at The Willows Primary School, with an incredible reduction of 19.3%, St Josphes Catholic Primary School NO_2 by the smallest amount at 2.3% but this is still a positive. Unfortunately, two of the schools saw a slight increase in NO_2, so West Berkshire Council has asked these schools to send more reminders to the carers about engine idling and the health problems it can cause. The majority of these results prove that the Behaviour Change Project is working in West Berkshire and that people are driving more mindfully and in environmentally friendly manner.

Table C.0.2 Showing the raw NO_2 results for 2022 and 2023, plus the percentage reduction for the bigger NO_2 loser competition

School	2022 NO_2 ($\mu g/m^3$)	2023 NO_2 ($\mu g/m^3$)	Percentage Difference (%)
The Willows Primary School	13.01	10.50	-19.3
Parsons Down Junior School	11.57	9.85	-14.9
Speenhamland Primary School	15.30	13.07	-14.6
Francis Baily Primary School	12.39	10.70	-13.6
St Nicolas C.E. Junior School	15.66	13.63	-13.0
Spurcroft Primary School	10.97	9.85	-10.2
The Winchcombe School	13.32	12.00	-9.9
Thatcham Park CofE Primary	11.27	10.42	-7.5
St Bartholomew's School	13.62	13.24	-2.8
St Joseph's Catholic Primary School	15.98	15.61	-2.3
Whitelands Park Primary School	11.01	11.62	5.5
Kennet School Average	12.80	13.37	4.4

The Revocation of the Thatcham AQMA and Newbury AQMA

The Thatcham AQMA

The Thatcham AQMA was declared for the NO_2 annual mean in 2011, which includes part of the A4 in Thatcham from the Harts Hill Road junction to the junction with the Broadway (See Appendix D for Map Figure D.0.2).

The Nitrogen Dioxide Levels

The nitrogen dioxide levels for the Thatcham AQMA, have been monitored using diffusion

tubes since 2001 at five locations (see Map 5) within or near the AQMA:

- 40 Chapel Street
- 31 Chapel Street
- 17 Chapel Street
- 75 Chapel Street
- 130 Park Avenue

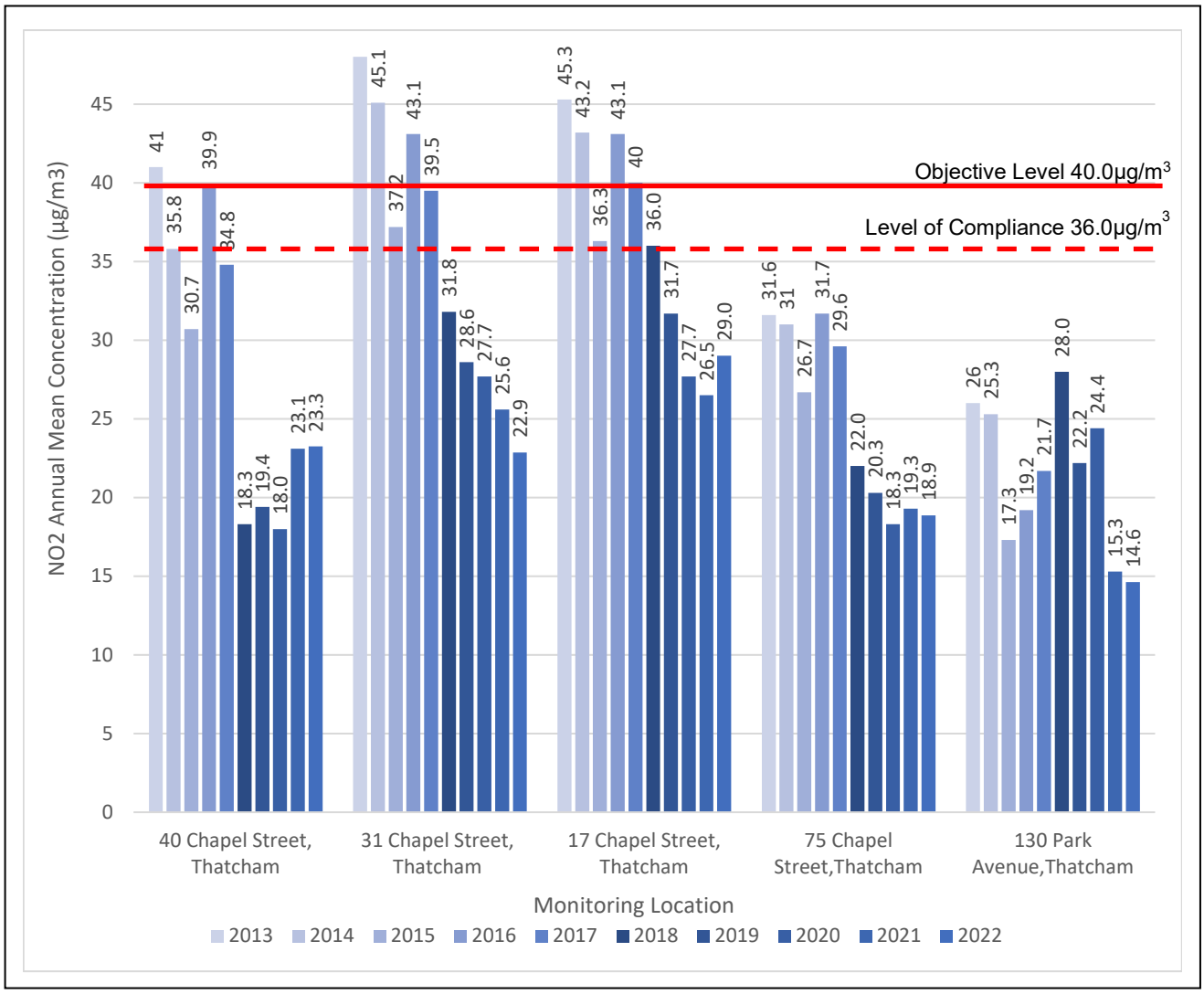
The results have been 36.0 µg/m^3 or below for the past five years at four locations and 36.0 µg/m^3 or below for four years at 17 Chapel Street, with the highest level reaching 36.0 µg/m^3 in 2018. Whilst the levels have started to rise slightly since 2020-2021 in two locations, 40 Chapel Street and 17 Chapel Street, they are still below 30.0 µg/m^3 (See Figure 1). From Figure 1 it can be seen that NO_2 levels at 75 Chapel Street and 130 Park Avenue have been below 36µg/m^3 since 2013. 40 Chapel Street has been below since 2017 with 17 and 31 Chapel Street below since 2018. Therefore, NO_2 began reducing before the COVID lock downs (2020 and 2021), changing traffic volumes and working patterns.

Several factors may contribute to these reduced levels such as increased use of electric vehicles, more people working from home “hybrid working”, increase in public transport use and reduction in vehicle idling.

Future Monitoring in Thatcham

Monitoring will continue at the five sites using diffusion tubes as advised in LAQM.TG (22) to ensure that the levels remain at 36.0 µg/m^3 or below, unless directed otherwise from DEFRA.

Figure C.0.1 Diffusion Tube NO_2 Levels in the Thatcham AQMA from 2013 to 2022



The Newbury AQMA

The Newbury AQMA was declared for the NO_2 in 2009. An area including the roundabout junction of the A339, A343 and Greenham Road in Newbury (See Appendix A Map 2).

The Nitrogen Dioxide Levels

The nitrogen dioxide levels for the Newbury AQMA, have been monitored using diffusion tubes (7 sites, 1 of which is triplicate) and a reference continuous monitor (see Map 3). The tubes are located at:

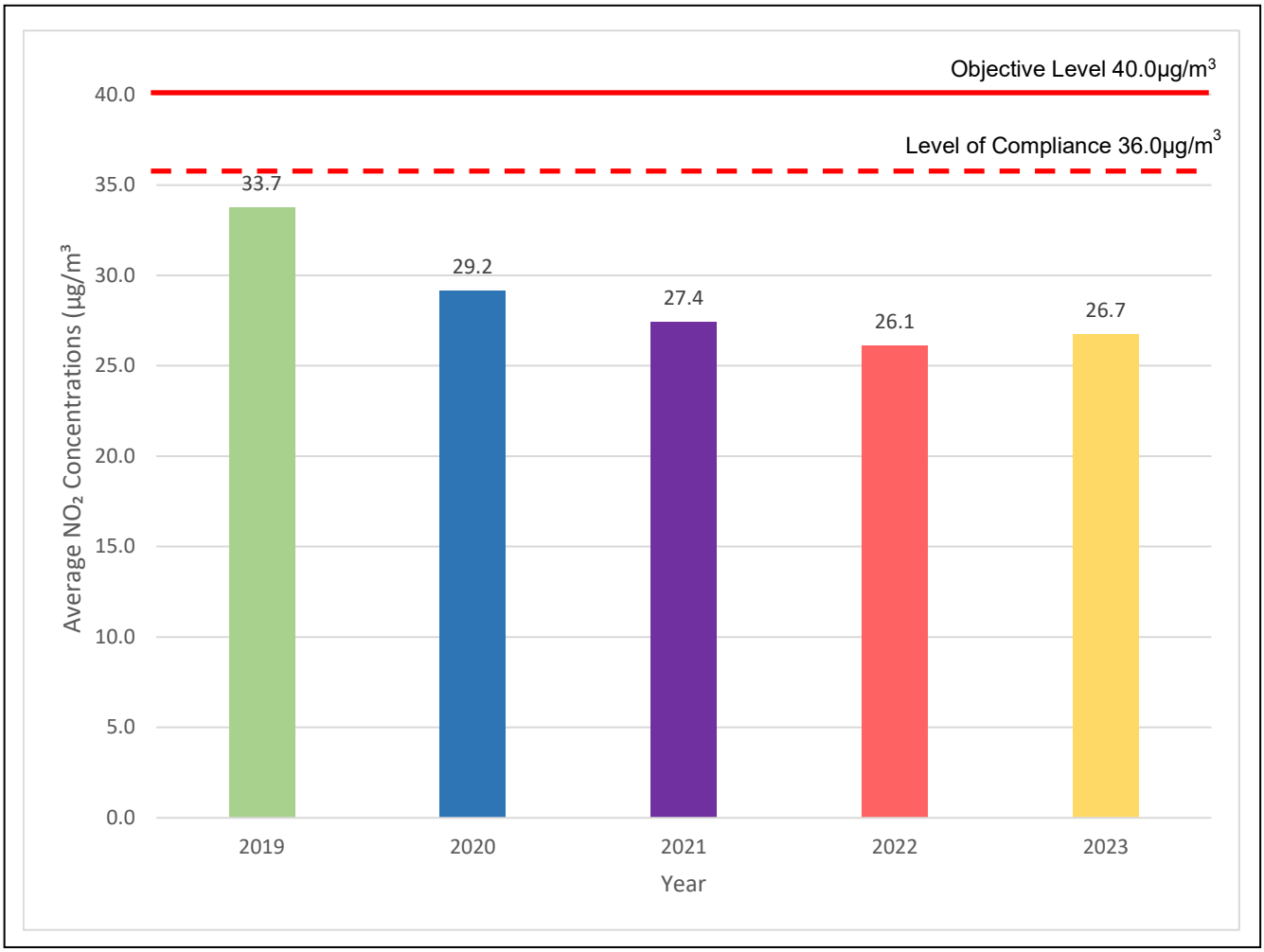
- 64 Greenham Road
- 1 Winchester Court

- Newbury Gardens Day Nursery
- 3 Howard Road
- 63 St Johns Road
- 1 St Johns Road
- Newbury Continuous Monitor

The Annual Mean results for NO_2 have been 36.0 µg/m^3 or below for the past five years, at all the diffusion tube locations (Figure D.0.2). The continuous monitor has remained below 36.0 µg/m^3 since 2019, and NO_2 has continued to decrease (Figure 3). There have not been any exceedances of the 1-hour objective in the last five years, where 18 are permitted per year.

Figure C.0.2 Diffusion Tube NO2 Levels in the Newbury AQMA from 2018 to 2022

Figure C.0.3 Continuous monitor NO_2 Levels in the Newbury AQMA from 2019 to 2023



Future Monitoring

Monitoring will continue at the seven diffusion tubes sites in Newbury as advised in LAQM.TG (22) to ensure that the levels remain at 36.0 µg/m^3 or below, unless directed otherwise by DEFRA.

Table C.3 A table showing the 2023 Continuous monitoring data for the Newbury AQMA.

Month	Average NO concentration (µg/m^3)		Monthly comparison (%)
	2022	2023	
January	38.9	24.0	-62
February	23.9	21.9	-9
March	33.3	25.6	-30
April	22.3	28.6	22
May	17.0	26.7	36
June	21.7	31.1	30
July	24.7	30.5	19
August	25.7	32.0	20
September	offline	28.7	
October	23.4	25.5	8
November	26.9	29.1	8
December	29.4	21.3	-38
Annual Average	**26.1**	**26.7**	**2**

QA/QC of Diffusion Tube Monitoring

The Workplace Analysis Scheme for Proficiency (WASP) is an independent analytical performance testing scheme, operated by the Health and Safety Laboratory (HSL). WASP formed a key part of the former UK NO_2 Network's QA/QC and remains an important QA/QC exercise for laboratories supplying diffusion tubes to Local Authorities for use in the context of Local Air Quality Management. The laboratory participants analyse four spiked tubes and report the results to HSL. HSL assign a performance score to each laboratory's result, based on their deviation from the known mass of nitrite in the analyte.

The Performance criteria are due to be changed, as at present the criteria are based on the z-score method, and equates to the following:

GOOD: Results obtained by the participating laboratory are on average within 13% of the assigned value. This equates to a Rolling Performance Index (RPI) of 169 or less.

ACCEPTABLE: Results obtained by the participating laboratory are on average within 13-26% of the assigned value. This equates to an RPI of 169 - 676.

WARNING: Results obtained by the participating laboratory are on average within 26 – 39% of the assigned value. This equates to an RPI of 676 - 1521.

FAILURE: Results obtained by the participating laboratory differ by more than 39% of the assigned value. This equates to an RPI of greater than 1521.

However, from April 2009, the criteria have been based upon the Rolling Performance Index (RPI) statistic and will be tightened to the following:

GOOD: Results obtained by the participating laboratory are on average within 7.5% of the assigned value. This equates to an RPI of 56.25 or less.

ACCEPTABLE: Results obtained by the participating laboratory are on average within 15% of the assigned value. This equates to an RPI of 225 or less.

UNACCEPTABLE: Results obtained by the participating laboratory differ by more than 15% of the assigned value. This equates to an RPI of greater than 225.

West Berkshire Council use Gradko International for the supply and analysis of the nitrogen dioxide diffusion tubes for their non-automatic monitoring programme and they are changed in-line with DEFRA monitoring calendar.

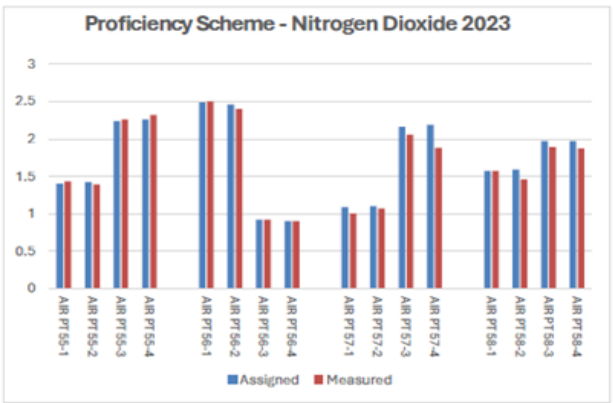
The diffusion tube is designed for passively monitoring gaseous airborne Nitrogen dioxide. It is an acrylic tube fitted with coloured and white thermoplastic rubber caps. The coloured cap contains the absorbent. The concentrations of Nitrite ions and hence NO_2 chemically adsorbed are quantitatively determined by UV/ Visible Spectrophotometry with reference to a calibration curve derived from the analysis of standard nitrite solutions (UKAS Accredited Methods). They are suitable for carrying out spatial or localized assessments for NO_2 ambient air or workplace monitoring. It can be used for co-location projects alongside an automatic analyser to obtain bias correction factors. The tube Dimensions: 71.0mm length x 11.0mm internal diameter. West Berkshire uses the absorbent preparations of Triethanolamine (TEA) absorbent are available: 20% Triethanolamine / De-ionised Water. Gradko's proficiency scheme results for 2023s AIR PT please see Figure C.0.4. Nitrogen Dioxide AIR PT 2023.

Figure C.0.4 Gradko's performance for AIR PT 2023

AIR PT Nitrogen Dioxide Proficiency Scheme Results 2023

Methods: GLM 7 – CARY 60 Spectrophotometer

AIR PT Proficiency Scheme - Nitrogen Dioxide 2023					
			Procedure GLM 7		
Date	Round	Assigned value	Measured concentration	z-Score	% Bias
Feb-23	AIR PT 55-1	1.4	1.43	0.29	2.1%
Feb-23	AIR PT 55-2	1.42	1.39	-0.28	-2.1%
Feb-23	AIR PT 55-3	2.24	2.26	0.11	0.9%
Feb-23	AIR PT 55-4	2.26	2.32	0.34	2.7%
Jun-23	AIR PT 56-1	2.49	2.5	0.05	0.4%
Jun-23	AIR PT 56-2	2.46	2.4	-0.33	-2.4%
Jun-23	AIR PT 56-3	0.92	0.92	0	0.0%
Jun-23	AIR PT 56-4	0.9	0.9	0	0.0%
Aug-23	AIR PT 57-1	1.09	1.00	-1.1	-8.3%
Aug-23	AIR PT 57-2	1.10	1.07	-0.36	-2.7%
Aug-23	AIR PT 57-3	2.16	2.06	-0.62	-4.6%
Aug-23	AIR PT 57-4	2.19	1.88	-1.89	-14.2%
Oct-23	AIR PT 58-1	1.57	1.57	0	0.0%
Oct-23	AIR PT 58-2	1.59	1.46	-1.09	-8.2%
Oct-23	AIR PT 58-3	1.97	1.89	-0.54	-4.1%
Oct-23	AIR PT 58-4	1.97	1.87	-0.68	-5.1%



Diffusion Tube Annualisation

Three sites 1 Winchester Court (single), 3 Howard Road (single) and 1 Kingfisher Court (single) required annualisation as the data capture was less than 75% but greater than 25%. Details of the calculation method undertaken provided in Table C.1. and details of the capture rate and missing months can be seen in Table C.2. If all of the sites had continued to have data missing, then they would have been relocated. (3 Howard Road was having building works and the downpipe had been removed and 1 Kingfisher Court kept being vandalised/removed and has now been relocated to a nearby lamppost).

Table C.0.4 Annualisation Summary (concentrations presented in µg/m^3)

Site ID	Annualisation Factor Swindon Walcot	Annualisation Factor Oxford St Ebbes	Annualisation Factor Reading New Town	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
1 Winchester Court Newbury	1.0815	1.0458	1.0979	1.0751	29.2	31.4
3 Howard Road Newbury	0.7979	0.8955	0.7628	0.8187	18.2	14.9
1 Kingfisher Court Pangbourne	0.8771	0.9721	0.8423	0.8972	25.4	22.8

Table C.0.5 Showing the capture rate and months missing for the annualised tubes

Tube	Data Capture (%)	Months missing
1 Winchester Court Newbury	67.3	January, February, March, and December
3 Howard Road Newbury	50.0	June to December
1 Kingfisher Court Pangbourne	50.0	June to December

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2023 ASR has 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/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

West Berkshire Council have applied a local bias adjustment factor of 0.85 to the 2023 monitoring data (as shown in Table C.0.7). A summary of bias adjustment factors used by West Berkshire Council over the past five years is presented in Table C.0.6. **West Berkshire Council have also followed the DEFRA timetable for tube collection 2023 as published on the LAQM website** (NO2 Diffusion Tube Monitoring Calendar | LAQM (defra.gov.uk).

Table C.0.6 Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2023	Local	-	0.85
2022	Local	-	0.87
2021	Local	-	0.83
2020	National	-	0.81
2019	National	09/20	0.88

Table C.0.7 Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1
Periods used to calculate bias	10
Bias Factor A	0.85 (0.76 - 0.96)
Bias Factor B	18% (4% - 31%)
Diffusion Tube Mean (µg/m^3)	30.1
Mean CV (Precision)	3.5%
Automatic Mean (µg/m^3)	25.6
Data Capture	99%
Adjusted Tube Mean (µg/m^3)	26 (23 - 29)

Notes:

A single local bias adjustment factor has been used to adjust the 2023 diffusion tube results.

The local co-located sites combined are used as bias adjustment, so factor 0.85 was applied. A copy of the co-location spreadsheet used is provided below.

In determining the bias adjustment factor for the 2023 data, the following were taken into account:

Cases where the locally obtained bias adjustment factor may be more representative:

- Where the diffusion tube exposure periods are weekly or fortnightly – *Newbury the co-location study sites are 28-day exposures.*
- For co-location sites with "good" precision on diffusion tubes and with high quality chemiluminescence results – *It can be seen from Table C.0.7 above that the co-location study achieved "good" precision and "good Data Capture" at 92.3%. The chemiluminescence monitor results (automatic monitoring) are high quality (see the QA/QC of Automatic Monitoring section above).*

Cases where the combined (national) bias adjustment factor may be more representative:

- Where the survey consists of tubes exposed over a range of settings, which differ from the co-location site – *this is not the case for West Berkshire.*
- Where the co-location study is for less than nine months, although the diffusion tube monitoring is for a longer period - *The Newbury co-location study and diffusion tube surveys take place over a full calendar year.*
- Where the automatic analyser has been operated using local, rather than national, QA/QC procedures. *The Newbury chemiluminescence results (automatic monitoring) are high quality, see the QA/QC of Automatic Monitoring section above.*
- Where data capture from the automatic analyser is less than 90%, or there have been problems with data quality. *Data capture from the Newbury automatic monitor was 99% in 2023 (Figure C.0.7).*
- For co-location sites with "poor" precision or laboratories with predominately "poor" precision, as set out on the Review & Assessment Helpdesk website - *It can be seen from the table above that the Newbury co-location study achieved "good" precision and the laboratory precision was also "good". See the QA/QC of Diffusion Tube Monitoring section above.*

In conclusion, it can be seen from the discussion above that due to the high data capture rate from the automatic analyser in The Newbury AQMA (99%) that the Local Bias Adjustment Factor was of 0.85 was appropriate, therefore the national bias (0.81) was not used.

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1. No diffusion tube NO_2 monitoring locations within West Berkshire required distance correction during 2023.

QA/QC of Automatic Monitoring

TRL carry out the QA/QC on behalf of West Berkshire Council, below is their QA/QC procedure.

Site Operation

Routine instrument calibrations are conducted approximately once per month, which involve zero and span checks, a written record of the gas analyser diagnostics and a general visual inspection of all equipment is undertaken. There is a written operating procedure, and a calibration record sheet is completed at every site visit.

Data retrieval and daily data checking

Data from the monitoring station is retrieved and processed on a Campbell CR10x data logger as 15-minute mean data. The logger was interrogated via a Siemens TC35i GSM modem at 8-hourly intervals by the Envista ARM 2000 software hosted at TRL. This was used to retrieve, check and archive data. TRL's internal QA/QC procedures require all data to be backed up on a secure server and all documentation associated with each site to be uniquely identified and securely stored to provide an audit trail. Daily data inspections are undertaken during office hours using the facilities of the Data Management System. Initial observations of the Management System indicate whether the site has been contacted during its nominated ‘poll time’ overnight. If this has not been successful a manual poll of the site may be required. If this is not successful further investigation of the communications integrity will be required to establish contact with the site modem and data logger. Three-day plots of recorded data are viewed for the requested site, and these are inspected and

assessed for continuity, validity, minimum and maximum values, date and time, power failures and general integrity. All anomalies are recorded on the Daily Check sheet, as required. Any anomalies or queries arising from daily inspection of data, or system operation, are brought to the attention of the Project Manager who will evaluate the situation and initialise any necessary action. In the event that the PM is not available, contact will be made with the next available senior person within the monitoring team. Any issues identified with equipment operation will be referred to the client for attention within 24 hours (excluding weekends). On a weekly basis, data are examined using summary statistics and outlier analysis to establish data validity. If unusual data episodes are recorded, these would be routinely examined over longer data periods to establish their impact on trends but would also be cross referenced with data peaks and troughs recorded at other national monitoring stations. In addition, integrity and validity of data logger clock times are checked, and any significant errors recorded in the Data Management System logbook. All site data recorded through the Data Management System is archived on TRL's Network. The data is backed up daily, and the TRL IT Department maintains these data within their long-term and secure archives. This secures all data in the event of any system failure.

Data calibration and ratification

Data is ratified as per AURN recommended procedures. The calibration and ratification process for automatic gas analysers corrects the raw dataset for any drift in the zero baseline and the upper range of the instrument. This is done using a Evista-based calibration and ratification file which incorporates the zero and span check information from the calibration visits. The zero-reading recorded during the calibration visits is used to adjust any offset of the baseline of the data. The difference between the span value obtained between one calibration visit and the next visit is used to calculate a factor. This change is assumed to occur at the same rate over the period between calibrations and as such the factor is used as a linear data scaler. This effectively results in the start of the period having no factor applied and the end of the period being scaled with the full factor with a sliding scale of the factor in-between. After applying the calibration factors, it is essential to screen the data, by visual examination, to see if they contain any unusual measurements or outliers. Errors in the data may occur as a result of equipment failure, human error, power failures, interference or other disturbances. Data validation and ratification is an important step in the monitoring process. Ratification involves considerable knowledge of pollutant behaviour and

dispersion, instrumentation characteristics, field experience and judgement. On completion of this data correction procedure, these data were converted to hourly means and a summary of these data were provided to West Berkshire Council at quarterly intervals and a calendar year annual report is prepared.

Independent Site Audits

In addition to these checks an independent site audit is carried out every 12 months to ensure the nitrogen dioxide analyser is operating correctly. The audits that are carried out utilise procedures that are applied within DEFRA's National Automatic Air Monitoring Networks Quality Control Programme. The efficiency of the analyser's convertor is checked, and the analyser is also leak tested. The gas bottle used for calibrations on site is also checked against the auditor's gas bottle to ensure the stability of the gas concentration.

The site audit for the West Berkshire, Newbury automatic monitoring unit was carried out on 13th December 2023.

Oxides of Nitrogen Analysers

major factor governing the analyser's performance is the NOx analyser's converter and its ability to reduce the nitrogen dioxide to nitric oxide. The recommended range for instrumentation in the national automatic air monitoring network is in the range of 98% - 102% efficient. Our tests show the converter in the West Berkshire, Newbury analyser to be 97.5% efficient at an NO_2 concentration of 247 ppb and 96.6% at an NO_2 concentration of 174ppb. This does not meet the required standard and should be carefully considered when processing data.

To ensure that the analysers are sampling only ambient air the instruments were leak checked. The results were satisfactory, indicating that the analyser sampling systems were free of significant leaks. The analyser exhibited some instability with its responses to both zero and span (calibration) gases with increased levels of variation (noise), this should be investigated at the next routine service.

The NOx analyser flow rate was measured using a calibrated flow meter and compared against the analyser's flow rate sensor to evaluate its accuracy. The measured flow rate result was marginally outside the (±10%) recommended limit and it was advised the underlying reason be investigated at the next service.

Based on the Newbury NOx analyser's response to the audit standard and audit zero, the concentrations of the stations NO cylinder have been reassessed. This provides an

indication of the site standards stability. For the purpose of these stability checks, the criteria adopted within the national network, and used here, is that the recalculated concentration should lie within 10% of the stated concentrations.

The results of the recalculations are presented in Table C.0.8.

The site cylinder 113914 was tested at three of the four TRL air quality monitoring stations and at each station the cylinder recalculation results were all within 4%.

All the recommendations of the audit have been investigated accordingly by TRL engineers.

Table C.0.8 West Berkshire Council, NO Cylinder.

TRL Bracknell, Downshire Way – NO cylinder 113914				
	NOx (ppb)	**% change from stated**	**NO (ppb)**	**% change from stated**
Manufacturers Stated Concentration	540	---	538	---
Recalculated concentration (26/01/23)	547	1.3	542	0.7

Certificate of Calibration

Calibration factors and zeros have been produced on the basis of the audit calibrations conducted. All of these calibrations were conducted with transfer standards traceable to national metrology standards. The Certificate of Calibration provides the calibration and zero response factors for the oxides of nitrogen analysers under test on the day of the audits. It is available upon request from TRL.

Data Management

The following recommendations and comments can be made as a result of these audits:

- Compare the TRL database scaling factors for the day of the audit with the factors and zeros on the Certificate of Calibration. If a deviation greater than the uncertainty associated with the calibration factor on the certificate is found, investigate the underlying reason and implement suitable data management actions.

- Consider the impact of the outlying NOX converter efficiency result. NOx datasets where converter results are less than 98% efficient can be rescaled, provided any impact on data quality is accounted for in the rescaling process. It is the responsibility of the data ratification team to critically assess all evidence including calibrations, audits and engineer reports to quantify this impact.

Automatic Monitoring Annualisation

All automatic monitoring locations within West Berkshire recorded data capture of greater than 75% therefore no need to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

NO_2 Fall-off with Distance from the Road

No automatic NO_2 monitoring locations within West Berkshire Council required distance correction during 2023.

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

Figure D.1 Map of the Newbury AQMA

Figure D.0.2 Map of the Thatcham AQMA

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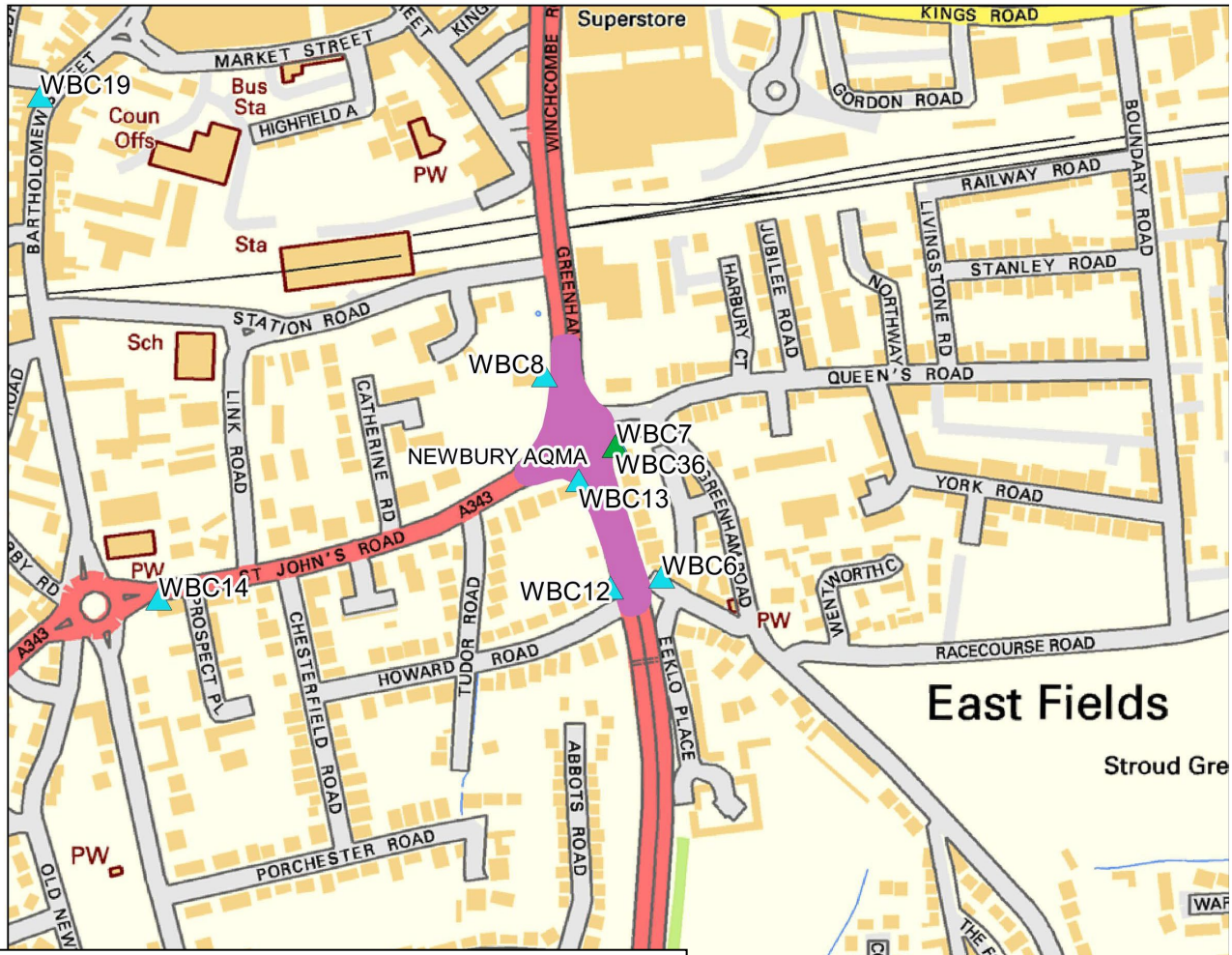
Figure D.0.3 Map of the Newbury AQMA Air Quality Monitoring Locations

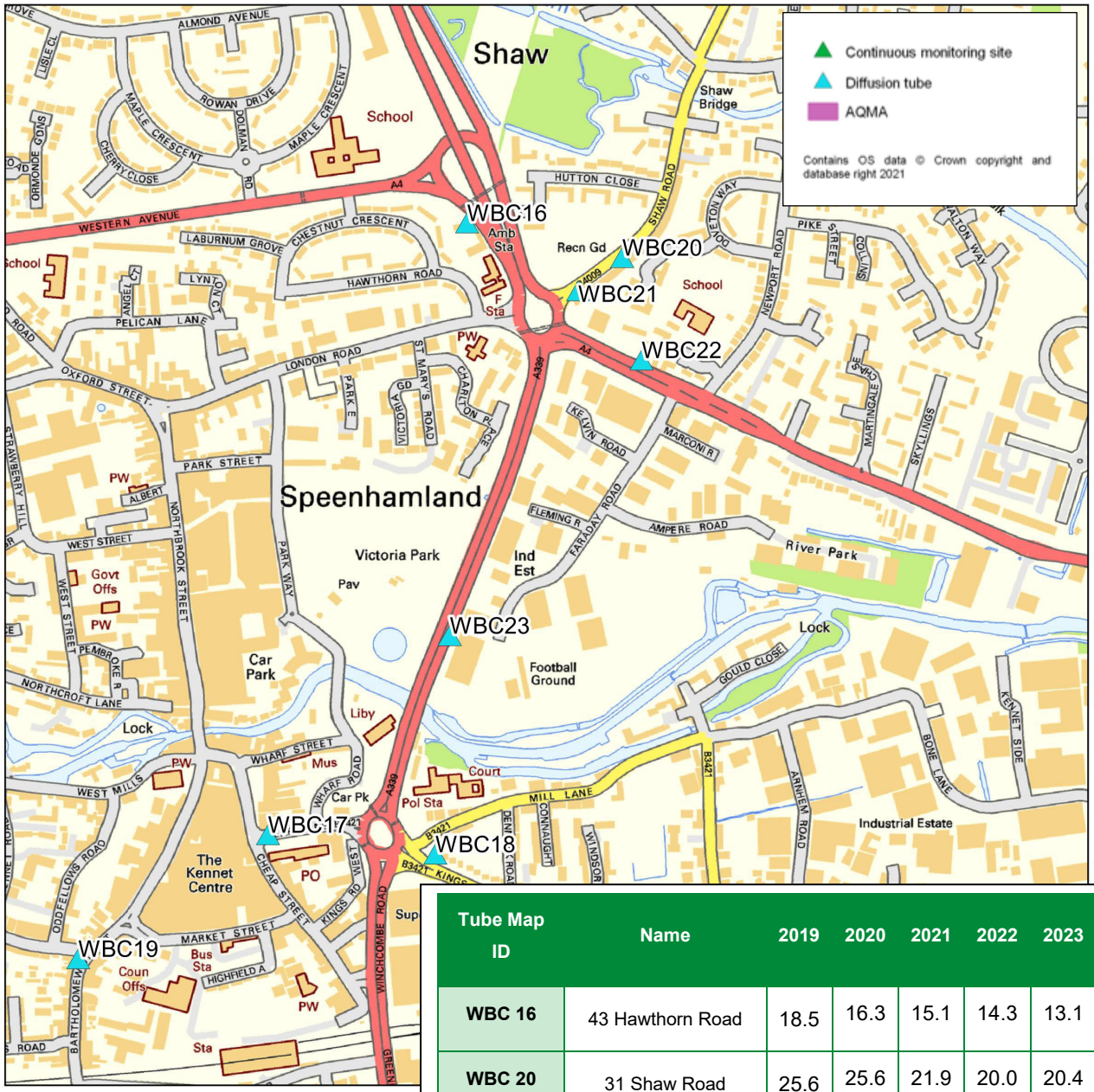


Tube Map ID	Name	2019	2020	2021	2022	2023
WBC36	Continuous Monitor					
WBC14	1 St Johns Road	26.8	22.1	22.5	21.0	22.9
WBC 8	Newbury Gardens Day Nursery	19.6	18.2	18.6	16.1	15.5
WBC12	3 Howard Road	18.6	15.4	16.2	13.6	12.6
WBC13	63 St Johns Road	22.4	16.7	17.2	19.9	16.1
WBC 7	1 Winchester Court	32.7	29.8	27.1	26.0	26.7
WBC36	Continuous Monitor 1,2, & 3	33.9	29.3	26.6	27.6	25.2
WBC 6	A339(64) Greenham Road	29.9	26.6	28.2	23.5	23.4

Figure D.0.4 Map of the Thatcham AQMA Air Quality Monitoring Locations

Tube Map ID	Name	2019	2020	2021	2022	2023
WBC4	31 Chapel Street	31.7	27.2	25.6	22.9	23.4
WBC2	17 Chapel Street	31.6	29.5	26.5	25.6	22.3
WBC1	40 Chapel Street	28.6	27.7	23.1	23.3	21.8
WBC32	130 Park Avenue	19.4	18.0	15.3	14.6	15.9
WBC30	75 Chapel Street	27.8	21.8	19.3	18.9	18.0

Figure D.5 Map of Newbury (North) Air Quality Monitoring Sites



Tube Map ID	Name	2019	2020	2021	2022	2023
WBC 16	43 Hawthorn Road	18.5	16.3	15.1	14.3	13.1
WBC 20	31 Shaw Road	25.6	25.6	21.9	20.0	20.4
WBC 21	13 Shaw Road	26.5	25.6	21.9	21.7	20.7
WBC 22	132 London Road	28.1	25.1	25.6	23.6	25.2
WBC 23	A339 Newbury Central	29.9	30.6	27.6	27.9	25.5
WBC 17	6 Market Place	26.0	20.8	19.0	18.7	18.2
WBC 18	42 Kings Road	20.3	18.9	16.3	15.7	16.5
WBC 19	40 Bartholomew Street	27.4	23.3	22.8	21.8	21.1

Figure D.0.6 Map of Newbury (South) Air Quality Monitoring Sites

Tube Map ID	Name	2019	2020	2021	2022	2023
WBC 9	20 Deadmans Lane	20.2	19.4	15.7	15.2	16.1
WBC 10	A343 Andover Rd (Parkhouse School)	15.5	13.1	13.0	11.0	10.5
WBC 11	Abbeydale Monks Lane	19.9	15.2	14.7	14.4	14.3

Continuous monitoring site

Diffusion tube

AQMA

Figure D.0.7 Map of Pangbourne Monitoring Site

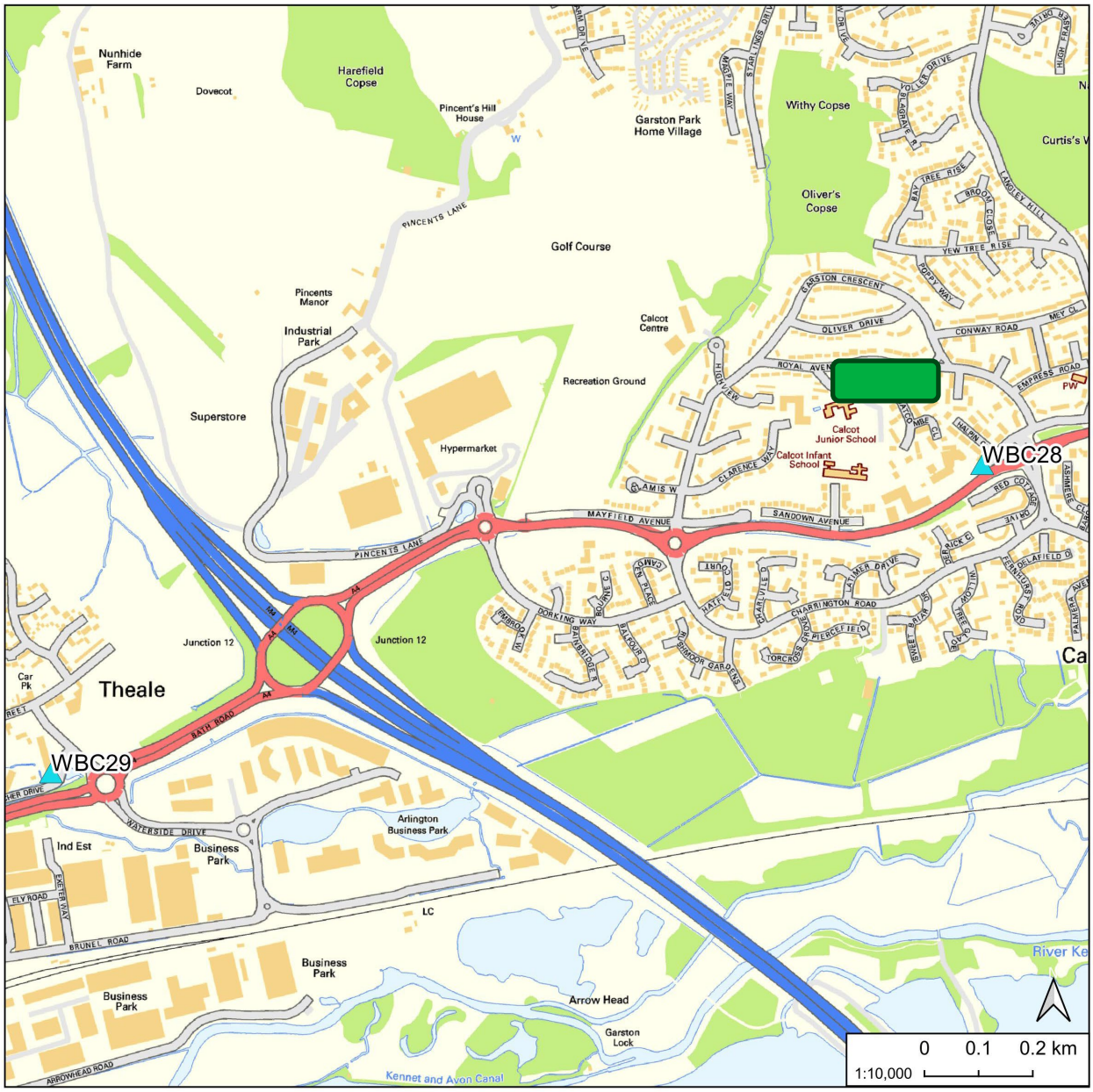
Tube	Name	2019	2020	2021	2022	2023
WBC 42	1 Kingfisher Court	n/a	n/a	20.0	20.0	19.4
WBC 27	4 Willows Court	24.8	20.5	18.7	18.4	16.9
WBC 26	The Cross Key Inn	29.6	26.2	22.5	25.9	21.5

Continuous monitoring site

Diffusion tube

AQMA

Figure D.0.8 Map of Theale & Calcot Air Quality Monitoring Site



Tube Map ID	Name	2019	2020	2021	2022	2023
WBC 29	Elizabeth Court Theale	20.3	18.3	14.6	16.5	13.8
WBC 28	Calcot Hotel	28.4	25.6	24.5	24.0	21.5

Continuous monitoring site

Diffusion tube

AQMA

Figure D.0.9 Map of (41) 55 Station Road Monitoring Site

Tube Map ID	Name	2019	2020	2021	2022	2023
WBC 41	Near Canal / 55 Station Road	n/a	n/a	8.2	8.8	9.2

Figure D.0.10 Map of (40) Streatley Monitoring Site

Tube Map ID	Map ID Name	2019	2020	2021	2022	2023
WBC	Streatley	n/a	n/a	n/a	20.5	16.5

Figure D.0.11 Map of (24) 374 London Road, Newbury Monitoring Site

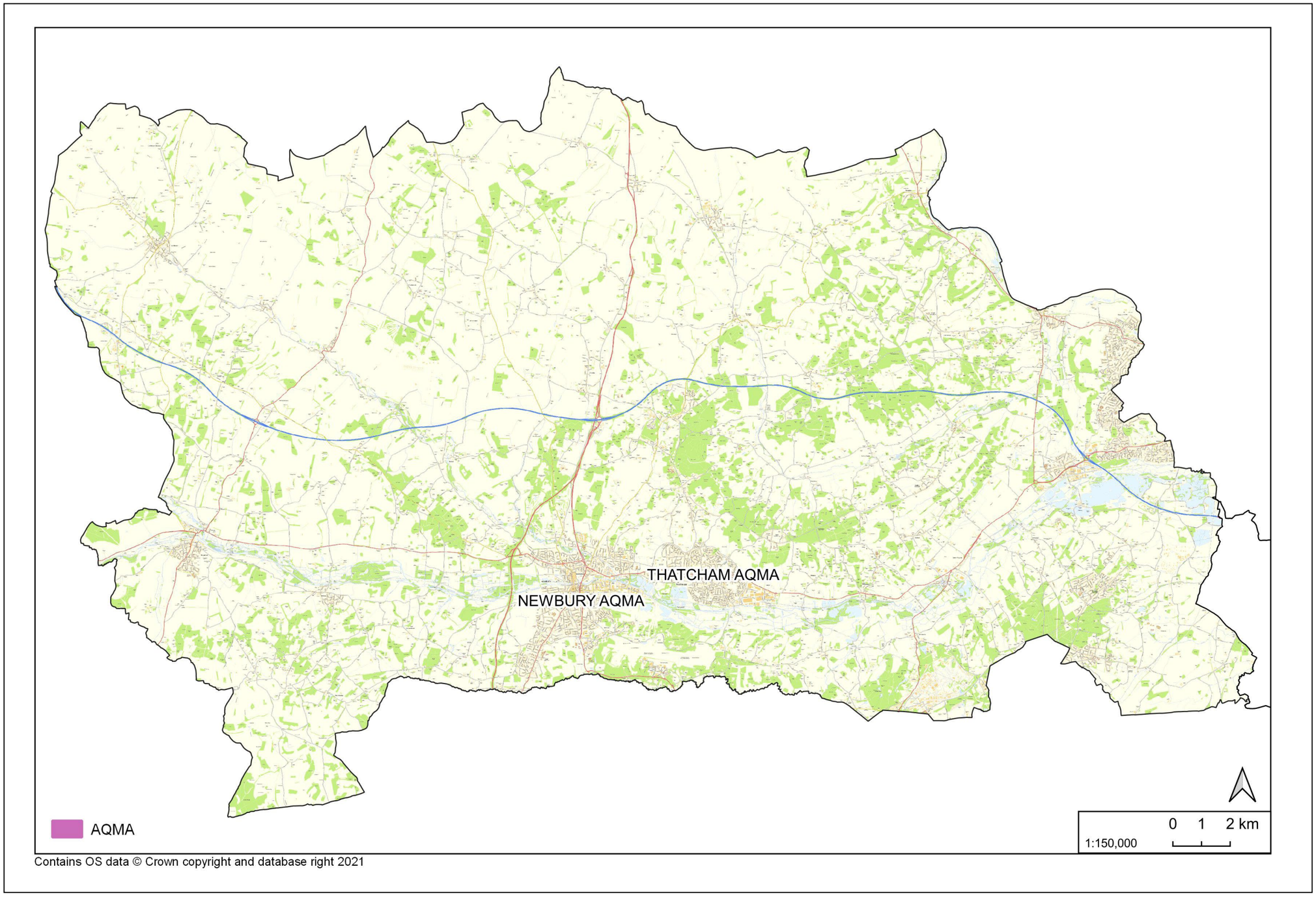
Tube Map ID	Name	2018	2019	2020	2021	2022
WBC 24	374 London Road Newbury	22.1	18.1	16.7	16.8	17.0

Figure D.0.12 Map of (15) 7a Bridge Street Hungerford Monitoring Site

Tube Map ID	Name	2019	2020	2021	2022	2023
WBC 15	7a Bridge Street Hungerford	23.1	21.0	18.5	17.4	17.6

Continuous monitoring site
Diffusion tube
AQMA

Figure D.0.13 Map of West Berkshire



Appendix E: Summary of Air Quality Objectives in England

Table E.0.1 Air Quality Objectives in England

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

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.
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- Air Quality Strategy – Framework for Local Authority Delivery. August 2023. Published by Defra.