2021 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

June 2021

Information	Milton Keynes Council Details
Local Authority Officer	Megan Harrison
Department	Environmental Health
Address	Civic, 1 Saxon Gate East, Central Milton Keynes MK9 3EJ
Telephone	01908 252759
E-mail	megan.harrison@milton-keynes.gov.uk
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Executive Summary: Air Quality in Our Area

Air Quality in Milton Keynes

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

The mortality burden of air pollution within the UK is equivalent to 28,000 to 36,000 deaths at typical ages[3], with a total estimated healthcare cost to the NHS and social care of £157 million in 2017[4].

In Milton Keynes the pollutant of most concern is nitrogen dioxide (NO_2) a gas mainly produced during the combustion of fossil fuels, including petrol and diesel, along with nitric oxide (NO). Short term exposure to NO_2 can cause inflammation of the airways and increase susceptibility to respiratory infections and allergens. Breathing in high levels of NO_2 can exacerbate symptoms of pre-existing heart and lung conditions, such as chronic obstructive pulmonary disease (COPD) and asthma.

In Milton Keynes the main source of oxides of nitrogen, along with fines particles is from road traffic emissions. An Air Quality Management Area (AQMA) was declared in 2008 in High Street South and Bridge Street, Olney because the annual mean nitrogen dioxide objective was being exceeded. There is a slight downward trend in the annual mean nitrogen dioxide (NO_2) and particulate matter (PM_{10}) concentrations measured over the last 15 years at the Civic Offices automatic monitoring station. This improvement is mirrored at the two other automatic monitoring stations located in Newport Pagnell and in Olney. Since 2015

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

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

[3] Defra. Air quality appraisal: damage cost guidance, July 2020

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

the annual mean objective for NO_2 has not been exceeded at any monitoring location throughout the Borough, including within the AQMA.

In Milton Keynes Council (a unitary authority) air quality is managed jointly by Environmental Health, Transport Policy, Development Control, Public Health and Sustainability Departments. The Council also works in partnership with other local authorities in Buckinghamshire as a member of the Buckinghamshire Air Quality Management Group (BAQMG) and with the Environment Agency (East of England Region).

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades, and will continue to improve due to national policy decisions, there are some areas where local action is needed to improve air quality further.

The 2019 Clean Air Strategy[5] sets out the case for action, with goals even more ambitious than EU requirements to reduce exposure to harmful pollutants. The Road to Zero[6] sets out the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

Milton Keynes Strategy for 2050

The Milton Keynes Strategy for 2050 was published in draft for consultation in January 2020 and approved at a Cabinet meeting in December. It sets out a vision for the future of the city including 120,000 new jobs, affordable homes priced in line with local incomes, a high tech electric road tram system, and expanded green spaces. The new long term strategy is intended to inspire urban planners and investors to come up with more creative and well-planned ideas for MK – including innovations to help the city achieve its ambition to be carbon neutral by 2030 and carbon negative by 2050. One goal is to make it easier

[5] Defra. Clean Air Strategy, 2019

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

for everyone to travel around the city with less congestion, aided in part by a ‘Mass Rapid Transit System’ connecting key destinations via electric powered trams.

Electric Vehicles and Charging

Milton Keynes has over 400 public charge points, the largest electric vehicle charging point networks in the country; full statistics of UK charge points are provided by Zap-Map and show how provision has increased markedly in the last year. Electric vehicle drivers in Milton Keynes were invited to apply to trial domestic smart chargers, vehicle to grid (V2G) chargers and home battery storage, with the option to keep the equipment at the end of the project. The project is investigating ways to balance peaks of electricity use associated with charging electric vehicles at home. CrowdCharge is delivering the trial on behalf of Milton Keynes Council, with Flexitricity as the energy demand response partner.

The Domestic Energy Balancing EV Charging project aims to trial a range of charging technologies, using CrowdCharge’s digital charger and battery energy management platform. The ultimate aim is for these technologies to be available for EV owners to save money and reduce demand on electricity networks through balancing the load on the grid.

eCargo bikes

MK Council has introduced 21 eCargo bikes to its vehicle fleet to help make council business travel more sustainable.

The Council’s tree and highway inspectors will use the bikes as a greener way of getting around the borough for their investigations.

Highway and tree inspections clock up around 5,000 miles of council travel each year. The council intends to lead the way with sustainable transport solutions and will continue to explore alternative travel options to help meet its ambition for MK to become zero-carbon by 2030.

The Council secured funding from the Department for Transport to purchase the eCargo bikes, which can carry up to 630 litres providing a green transport solution for first and last mile deliveries.

Figure 1 MK Council's landscaping officer trialling the new eCargo bike

Electric scooter trial

Milton Keynes Council trialled e-scooters in June in a fast-tracked plan to explore alternatives to short car journeys. The plans were sped up in light of the COVID-19 pandemic so UK cities could understand how e-scooters might relieve pressure on public transport while passenger numbers are restricted.

The council was initially provided a 50-strong fleet of the innovative e-scooters to pilot among council employees. The success of the trial led to around 300 e-scooters becoming available for the public to use from August 2020.

Figure 2 Electric scooter being trialled

Solar powered bus stops

MK Council has installed two new innovative solar powered displays at bus stops in Central MK's Theatre District to help passengers find real time bus information and supplement printed schedules.

The displays are being trialed until next spring, and if they prove a success with passengers more could be rolled out across the whole borough.

More than 100 bus stops (of around 1,000 in total) in Milton Keynes and two large screens in the Central MK shopping centre already offer what's called Real Time Passenger Information (RTPI) technology, to display where a bus is located. The new e ink displays can show a variety of information, including maps.

MK Council is one of a handful of local authorities currently trialling the technology. It's part of the council's aim for MK to be carbon neutral by 2030, and to stimulate the local economy in more imaginative and environmentally sound ways as Milton Keynes recovers from the COVID-19 pandemic.

Funding for new greener transport initiatives

Councilors approved a fund of £500,000 towards sustainable and active transport in MK at a meeting on 6 October 2020.

Ambitious plans are in place to encourage more people in Milton Keynes to cycle, walk, scoot or use public transport, building on a rise of public participation in greener, people-powered journeys, with figures showing that since the start of the COVID-19 pandemic, there's been an increase of almost 60% people cycling in some areas of MK. To get the action plan moving swiftly, MK Council would commit to investing in the right infrastructure, supplementing existing schemes and working with local partners. New plans include:

- Providing small grants to workplaces to encourage staff to adopt sustainable transport;
- Access to bike schemes – providing access to bikes for people that are unemployed, on low incomes or whose circumstances make them vulnerable;
- More security cameras and activated flood lights at key transport interchanges such as Station Square, Bletchley Station and the Coachway to ensure people feel safe;
- Using our unique redway system for guided CMK walks and mobile film screenings, to open them up to people who may otherwise not use them;
- Improving the Get Smarter Travel website, journey planner and interactive map and developing an MK Transport App integrating all mobility providers in MK on to one platform.

Conclusions and Priorities

All air quality objectives have been achieved throughout the Borough even though the city continues to grow rapidly. Priorities for the coming year are to continue promoting the use of ultra-low emission vehicles (ULEVs) and the initiatives in the MK Go Ultra Low City scheme. The public will also be encouraged to use public transport and to cycle and walk making full use of the extensive (325 km) Milton Keynes Redway system. The H6 Super Redway Route has been completed and work is in progress on the V8 route. The Redway map, including other cycling routes in Milton Keynes, has been enhanced, updated and delivered to every household in the Borough.

Actions and initiatives detailed in the governments' Clean Air Strategy 2019 (published January 2019) are designed to reduce emissions and air pollution leading to improved health and quality of life.

The new Local Plan for Milton Keynes, Plan:MK, covering the period up to 2031 was adopted by Milton Keynes Council on 20 March 2019. Details of the council's major developments, including a location map of sites can be found on the Planning Hub.

All applications for new developments that may have an impact on air quality have been assessed against the guidance documents produced by the Institute of Air Quality Management (IAQM).

Local Engagement and How to get Involved

The public can get involved by reducing their car usage; signing up to the Car Share scheme, changing to a car with lower emissions, walking and cycling and by using public transport.

There are lots of biking opportunities for all abilities and ages in Milton Keynes, including guided cycle rides, training for children and adults and the widely available Santander and Lime-E hire bikes. A new initiative funded jointly by MK Council and the Arts Council England, the Pedalling Culture project, is designed to increase cultural tourism by providing new trails and routes for walkers, runners and cyclists to ensure sustainable access to our cultural venues. E-scooters are now available for use as an alternative to vehicles for short journeys.

Milton Keynes Council's Highways and Transport Hub website has links to all the services provided by the council in this area, including parking, public transport, road safety, maintenance, new roads and smarter travel.

More information on sustainable forms of travel can be found on the interactive Get Smarter Travel MK website; plan a journey, find a bus stop, track a bus, join a bike ride, discover upcoming events.

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1 Local Air Quality Management

This report provides an overview of air quality in Milton Keynes Council during 2020. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Milton Keynes Council to improve air quality and any progress that has been made.

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

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority should prepare an Air Quality Action Plan (AQAP) within 12 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

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

- NO_2 annual mean

We propose to revoke Olney AQMA (see Appendix G section).

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
Olney AQMA	Declared December 2008	NO2 Annual Mean	An area in Olney encompassing all properties fronting Bridge Street and High Street South, and also including part of Market Place.	NO	43.2 µg/m^3	28.7 µg/m^3	Olney Action Plan, 2012	https://www.milton-keynes.gov.uk/environmental-health-and-trading-standards/pollution/local-air-quality-management

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

☒ **Milton Keynes Council confirm that all current AQAPs have been submitted to Defra.**

2.2 Progress and Impact of Measures to address Air Quality in Milton Keynes Council

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

Defra comments	MKC comments
The report is well structured, detailed, and provides the information specified in the Guidance.	Noted
1. The following significant issues regarding the report structure were highlighted and rectified by the council: a. Annualisation of diffusion tube EEE1, EEE2 monitoring site has been carried out correctly b. Table A.3 now contains bias adjusted data which has not been distance correction. Distance correction data is displayed in Table B.1. c. Example calculations are shown for distance correction	These issues were rectified, and an updated version submitted
2. Minor adjustment is required to Table A.1 to update the list of pollutants monitored, $PM_{2.5}$ was not included for the fixed monitor.	Table updated to include $PM_{2.5}$
3. Good and accurate QA/QC procedures were applied. Calculations for bias adjustment were outlined in detail. 4. The Council has included discussion and review of its AQMAs and monitoring strategy, informed due to the extensive monitoring network and also the additional tubes in place to provide data. This demonstrates the Councils proactive	Noted

	and dedicated approach to improving air quality across the area.	
5.	Some comments from last year's ASR have been addressed. This is welcomed, however we encourage the council to explicitly state the comments from the previous appraisal in future.	All comments from last year's ASR are now included in the report
6.	The Public Health Outcomes Frameworks was mentioned. The Council have referred specifically to indicator D01, which is the fraction of mortality attributable to particulate air pollution, and this is encouraged.	Noted
7.	Council has sensibly delayed revocation of the AQMA once a full year data can be obtained from the automatic monitors. We agree with the council on this matter.	Noted. The Revocation Report is attached in Appendix G
8.	Council have provided a clear map of the diffusion tube monitoring network; trends are displayed and discussed in the report, this is welcomed.	Noted
9.	Overall, with the changes outlined in points 1 made, the report now satisfies the criteria of relevant standards.	Noted

Milton Keynes Council has taken forward a number of direct measures during the current reporting year of 2020 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. Twenty three measures are included within Table 2.2, with the type of measure and the progress Milton Keynes

Council have made during the reporting year of 2020 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

More detail on these measures can be found in their respective Action Plans, links to which are in the table. Key completed measures are:

- New air quality monitoring analysers and communication system, installed in February 2019, are now running smoothly after some initial problems.
- Section of A421 made into dual carriageway to M1 Junction 13
- E-cargo bikes now up and running.
- E-scooters trialled and scheme launched.

Milton Keynes Council expects the following measures to be completed over the course of the next reporting year:

- E-scooters fully used in Milton Keynes.
- ViaVan electric fleet vehicles operational.

Milton Keynes Council's priorities for the coming year are:

- Encouraging the continued uptake of ULEVs following the MK Go Ultra-Low City scheme and the expansion of the electric vehicle charging network.
- Promoting the Get Smarter Travel MK initiative.
- Progressing the measures in the Mobility Strategy, the First and Last Mile Strategy and the Transport Infrastructure Delivery Plan .
- Progressing the measures in the Sustainability Strategy.
- Progressing the measures in the Milton Keynes Future for 2050 strategy.

The principal challenges and barriers to implementation that Milton Keynes Council anticipates facing are any ongoing and further impacts from Covid-19.

The measures stated above and in Table 2.2 have already achieved compliance in Olney AQMA and Milton Keynes Council anticipates that they will achieve exposure reduction across the borough.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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	Go Ultra Low City Scheme	Promoting Low Emission Transport	Other	2017		MK Council	Office for Low Emission Vehicles (OLEV)	NO	Partially Funded		Implementation	n/a	ULEV ownership per capita	EV Centre opened in July 2017 and by June 2019 had welcomed 100,000 visitors and arraned 4000 test drives.	Trialling of driverless cars on highways and pods on shared footpaths https://www.gov.uk/government/news/40-million-to-drive-green-car-revolution-across-uk-cities
2	Expansion of Electric Vehicle charging network	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2015		MK Council	MK Council/OLEV	NO	Partially Funded		Implementation	n/a	Number of recharging events No of charge points	New charging hub at MK Coachway with 8 rapid and 4 ultra-rapid charge points. More than 400 public charge points installed.	15 min hub sites identified to act as multi charger sites to support residential charging
3	Vivacity - a sensor network providing real-time transport information; volume, classification, speed, turning counts, parking availability.	Traffic Management	UTC, Congestion management, traffic reduction	2017	2018	MK Council/Vivacity	MK Council/Vivacity	NO	Partially Funded		Completed	n/a		Approx 400 sensors on highways and 1300 on parking areas.	Parking data purchased by MyMK for use in parking app. Traffic junction sensors are currently turned off.
4	Urban Traffic Management Control (UTMC) system	Traffic Management	UTC, Congestion management, traffic reduction	2018	2022	MK Council/DfT	National Productivity Infrastructure Fund. Planning tariff/section 106 agreement	NO	Funded		Implementation			First tranche of CMK signals upgraded, more to follow. CCTV and more of system to be delivered in next 2 years.	Installing an urban traffic management control system, inc bus priority measures.
5	UK Auto Drive programme	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2015	2018	MK Council, Government, industries	MK Council, Government, industries £19.4M	NO	Partially Funded	£10k - 50k	Completed			Trialing of driverless pods on shared footpaths ongoing. Trialing of driverless cars on public highways in MK started March 2018	Research, development and integration of automated and connected vehicles http://www.ukautodrive.com/the-uk-autodrive-project/
6	Free ULEV green car parking permit. Cheaper permits for low emission vehicles	Promoting Low Emission Transport	Priority parking for LEV's	2016		MK Council	MK Council	NO	Not Funded		Implementation	n/a	Number of permits issued	Introduced July 2016	https://www.milton-keynes.gov.uk/highways-and-transport-hub/smarter-choices/electric-vehicle-charge-points

7	Smarter travel choices	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2012		MK Council	MK Council	NO	Not Funded		Implementation	n/a	Number of visits to website per month, currently 5000 per month	ongoing	New website developed https://www.getsmartertravelmk.org/
8	Love to Ride - website encouraging cycling – cycle September June bike week. Prizes	Promoting Travel Alternatives	Promotion of cycling	2017		MK Council	MK Council	NO	Not Funded		Implementation		Number of new rides and miles ridden per 12 months	All time participation stats up to April 2019: 134 organisations, 1858 people, 434 new riders, 1,147,712 miles 95,929 trips	Cycle incentives website https://www.lovetoride.net/miltonkeynes
9	Super Redway Routes	Transport Planning and Infrastructure	Cycle network	2017		MK Council	MK Council	NO	Not Funded		Implementation			H6 super route completed. Works have been undertaken on other Redway routes e.g. H8 Marlborough St.	Awaiting funding for further routes
10	Cycling information, events and opportunities	Public Information	Via the Internet	2011		MK Council	MK Council	NO	Not Funded		Implementation	n/a		ongoing	Pedalling Culture Website developed http://www.pedallingculture.com/
11	Santander bike hire	Transport Planning and Infrastructure	Public cycle hire scheme	2017	2020	Santander/Nextbike	Santander/Nextbike	NO	Funded		Completed	n/a	Number of hires	300 bikes 42 docking stations	Scheme relaunched in Dec 2019 with new cycle fleet and docking stations.
12	Lime-E Bikes	Transport Planning and Infrastructure	Public cycle hire scheme	2018		Lime	Lime	NO	Funded		Implementation	n/a	Number of hires	50 bikes supplied (dockless GPS tracked)	Bikes are unlocked using phone app
13	Public Health support for healthy schools	Promoting Travel Alternatives	Promotion of walking	2019	2024	MK Council	MK Council	NO	Not Funded		Implementation	n/a	No. of schools engaged	MoreLife UK commissioned to deliver- due to start schools element in Sept 2019	Working to improve the whole school environment to reduce childhood obesity- from physical activity policies to staff training and will include active travel
14	Modeshift STARS – national schools awards scheme	Promoting Travel Alternatives	School Travel Plans	2017		MK Council/DfT	DfT	NO	Partially Funded		Implementation		Number of schools registered	40 schools registered. 19% light green modes (bus, park&stride, car sharing) 41% green modes (walking, cycling, scooting) 40% car	Walk to school, bike school and scooter training https://modeshiftstars.org/#
15	East West Rail	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	2019	2024	East West Railway Company / Network Rail	EWR Consortium	NO	Funded		Implementation	n/a		Phase 1 complete. Phase 2 construction started early 2020	https://www.eastwestrail.org.uk/

16	A421 Dualling to M1 J13	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2018	2021	Central Beds Council/MK Council	DfT £28.5m project	NO	Funded	£10k - 50k	Completed			Road now dualled	http://www.centralbedfordshire.gov.uk/transport/a421/overview.aspx
17	Highways England All-Lane Running (ALR) Smart Motorway	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2018	2022	Highways England	Highways England £373m project	NO	Funded	£100k - £500k	Planning	Environmental report found NO2 emissions not significant and scheme will ease congestion		Works commenced June 2018	https://highwaysengland.co.uk/projects/m1-junction-13-to-junction-16-smart-motorway/
18	Real time passenger information (RTPI) – bus routes	Transport Planning and Infrastructure	Bus route improvements	2014		MK Council	MK Council	NO	Not Funded		Implementation	n/a		Most key routes now have RTPI	https://www.milton-keynes.gov.uk/highways-and-transport-hub/bus-and-taxi/real-time-passenger-information
19	E-cargo bikes project	Promoting Travel Alternatives	Promotion of cycling	2020	2021	MK Council	Govt grant £220K	NO	Funded	£100k - £500k	Implementation		Mileage undertaken using electric bikes	21 bikes ordered, expected Sep 2020	Level of take up for lease - will promote this for businesses
20	Milton Keynes Strategy for 2050	Other	Other	2020	2032	MK Council		NO	Not Funded		Planning			Long term strategy approved by Cabinet Dec 2020	https://www.mkfutures2050.com/
21	Electric Vehicle charging technologies trial	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2020	2021	MK Council CrowdCharge Flexitricity	CrowdCharge Flexitricity	NO	Funded		Implementation			Trial in progress	https://crowd-charge.com/
22	E-scooters	Alternatives to private vehicle use	Other	2020	2021	MK Council, Lime, Spin, Ginger	DfT	NO	Funded		Implementation		Number of hires	Initial trial of 50 completed, now 300 available for public use	https://getaroundmk.org.uk/get-connected/go-electric/e-scooter-trials
23	Solar powered bus stops	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	2020	2021	MK Council	MK Council	NO	Not Funded		Implementation			Two displays installed	

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

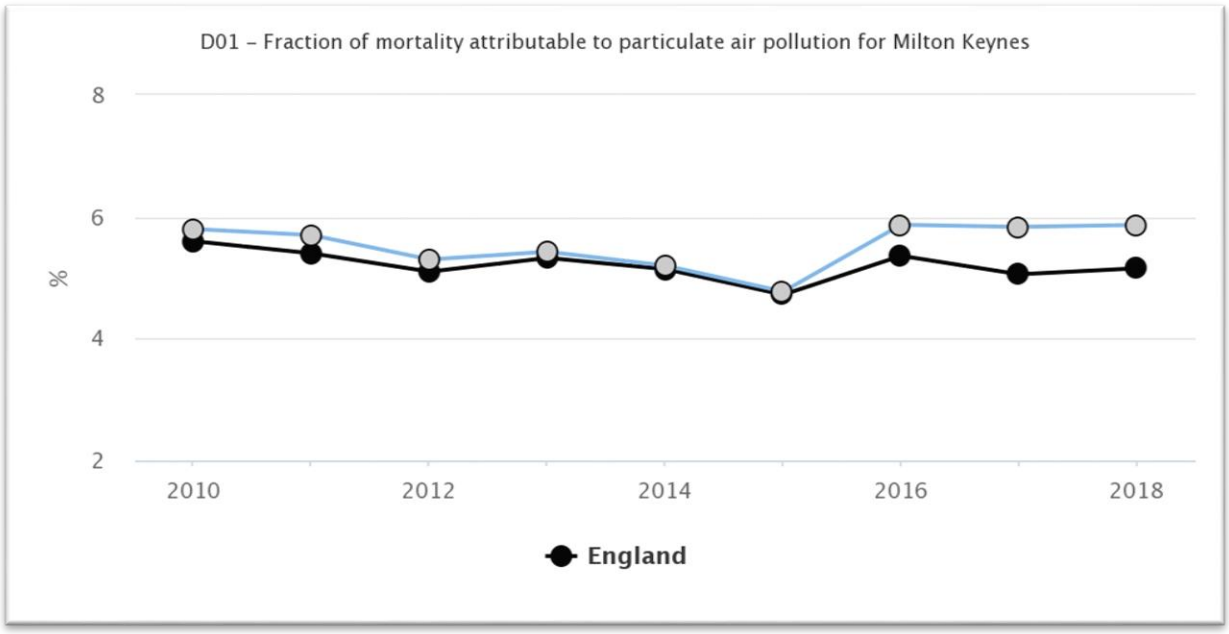
As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

The national air quality objective for $PM_{2.5}$ is an annual mean concentration of 25 µg/m^3, to be achieved by 31-Dec-2010. There is a target to reduce concentrations at urban background locations by 15%, to be achieved between 2010 and 2020.

The Public Health Outcomes Framework (PHOF) includes an indicator relating to anthropogenic particulate air pollution, measured as fine particulate matter, $PM_{2.5}$. The indicator is known as D01 (previously 3.01) and the latest value for Milton Keynes is 5.9%, calculated from modelled 2018 data. This is the fraction of annual all-cause adult mortality attributable to $PM_{2.5.}$ As a comparison, the value for Central Beds is 5.5%, Luton 6.1% and Northampton 5.6%. In general levels become lower heading west across England, however there is not much change over the last 10 years as can be seen in **Figure 3** below.

It is estimated that UK emissions contribute about 50% of total annual average $PM_{2.5}$, the rest is mainly from European countries, the proportion varying from year to year depending on meteorology; many episodes of high concentration occur on easterly winds. Emissions from diesel engines are a major source of fine particles. In January 2019 the government published the national Clean Air Strategy 2019. This identifies domestic wood and solid fuel burning as a major source of locally derived $PM_{2.5}$ emissions (up to 38%).

Figure 3 Fraction of Mortality Attributable to $PM_{2.5}$ for Milton Keynes



The health effects of $PM_{2.5}$ are recognised in Milton Keynes and the Joint Strategic Needs Assessment (JSNA) contains a section on this pollutant and its effect on the local population.

Milton Keynes Council is taking the following measures to address $PM_{2.5}$ primarily by reducing emissions from transport and by promoting a more active lifestyle:

- Partnership working to address pollution and health concerns takes place between Environmental Health, Transport Policy, Public Health and Sustainability Departments within the Council. Public health evidence will be implemented to prevent and minimise impacts of air pollution, including NICE Guideline NG70: Air pollution:outdoor air quality and health (2017) and the Public Health England: Review of interventions to improve outdoor air quality and public health (2019).
- By promoting active travel plans - the “Get Smarter Travel in MK” campaign encourages more sustainable forms of travel such as walking and cycling, moving away from single occupancy vehicles.
- Raising awareness of the effect of air pollution on public health and of the health benefits of more active travel.
- Promoting the use of electric and other low emission vehicles and providing charge points throughout the Borough.

- Improving bus services and providing real time bus passenger information to encourage the use of public transport; Get on Board is a promotional initiative funded by the Department of Transport's Better Bus Area (BBA) fund.
- Procuring electric buses for major routes through the city.
- By adopting a low carbon, more sustainable approach to living in Milton Keynes. By implementing the Sustainability Strategy 2019-2050
- Promoting the use of Ecodesign Ready domestic wood burning stoves and distributing leaflets advising how to operate and maintain stoves and the importance of using dry logs.

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

This section sets out the monitoring undertaken within 2020 by Milton Keynes Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2016 and 2020 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

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

3.1.1 Automatic Monitoring Sites

Milton Keynes Council undertook automatic (continuous) monitoring at 3 sites during 2020. Table A.1 in Appendix A shows the details of the automatic monitoring sites. NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem.

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

Milton Keynes Council undertook non-automatic (passive) monitoring of nitrogen dioxide (NO_2) at 40 sites during 2020. All tubes are deployed in duplicate or triplicate. Table A.2 in Appendix A presents the details of the sites. Diffusion tubes are prepared 'in-house' using 20% triethanolamine (TEA) in water and are analysed following the procedures set out in the AEA Practical Guidance document. MKC participates in the proficiency testing scheme, AIR PT, provided by LGC Standards for quality assurance of diffusion tube analysis. MKC also participates in the monthly NO_2 Network Field Inter-comparison Exercise managed by the National Physical Laboratory (NPL).

A map showing the location of the monitoring sites is provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments, are included in Appendix C. All the sites had data capture greater than 75% so no annualisation was required.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, annualisation (where the annual mean data capture is below 75% and greater than 25%), and distance correction. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 and Table A.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 presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2020 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

Table A.5 in Appendix A compares the ratified continuous monitored 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.

There were no exceedences of either the annual or hourly objectives at any monitored location throughout the Borough. For the sixth year running all diffusion tube locations within the Olney AQMA recorded annual means below the objective. The highest value was 28.7 µg/m^3 recorded at the telegraph pole outside 18/20 Bridge Street, Olney. The automatic analyser in Olney recorded an annual mean of 17.8 µg/m^3.

Figure A.1 shows a graph of the annual mean data from the automatic air quality stations. The slightly downward trend at all three monitoring stations since 2000 took an upward turn in 2019, which is most pronounced at the Civic Offices monitoring station. This may have been due to initial problems with the new analysers; diffusion tube raw data didn’t show the

same upward turn that year. Monitoring data from 2020 showed the NO_2 levels to be back on the slight downward trend.

3.2.2 Particulate Matter (PM_{10})

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of 40µg/m^3.

Table A.7 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past five years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

There were no exceedences of either the annual mean or daily mean objectives. The Civic Offices station recorded an annual mean concentration of 11.7 µg/m^3, a decrease of 4.36µg/m^3 over the 2019 mean, well within the objective. Figure A.2 shows there is a slight downward trend at the stations over the last 10 years that flattens out from 2014 rising again in 2019, with 10 exceedences of the 24-hour mean. As with NO_2 data, the 2020 dataset has reversed this apparent shift and there were no exceedences of the 24-hour mean.

3.2.3 Particulate Matter ($PM_{2.5}$)

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

The $PM_{2.5}$ annual mean concentration at the Civic Offices in 2020 was 7.56 µg/m^3.

3.2.4 Sulphur Dioxide (SO_2)

Automatic monitoring was undertaken between 1999 and 2012. Sulphur dioxide is no longer monitored in Milton Keynes because levels are very low and there are no risks of exceeding air quality objectives.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
Fixed	Civic Offices, CMK	Urban Centre	485070	239131	NO_2; PM_{10}; $PM_{2.5}$; O_3	NO	Chemiluminescence; Fidas 200E; UV absorption	113 (to residential)	4.8	3.2
Roadbox 1	Wolverton Road, Newport Pagnell	Roadside	486290	243344	NO_2	NO	Chemiluminescence	25 (to residential)	3.4	1.5
Roadbox 2	High Street South, Olney	Roadside	488922	251157	NO_2	YES	Chemiluminescence	11 (to residential)	2	1.5

Notes:

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

(2) N/A if not applicable

Table A.2 – Details of Non-Automatic Monitoring Sites

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
B1, B2	Northampton Rd, Lavendon (Horseshoe PH)	Roadside	491769	253542	NO2	No	0.6	3.0	No	2.1
C1, C2, C3	10 High St South, Olney (Cowper School House)	Roadside	488914	251173	NO2	Yes - Olney AQMA	0.0	2.0	No	2.3
D1, D2, D3	9 High St South, Olney (Olney Wine Bar)	Roadside	488904	251177	NO2	Yes - Olney AQMA	0.0	1.7	No	2.2
E1, E2, E3	20 High St, Olney	Roadside	488926	251455	NO2	No	3.3	7.6	No	2.2
F1, F2, F3	17 High St, Olney (Opp No.20 High St)	Roadside	488905	251456	NO2	No	0.0	7.2	No	2.1
G1, G2	Corner of Coneygere and Palmers Rd, Olney	Suburban	489108	251213	NO2	No	10.4	1.7	No	2.2
H1, H2	76 High St, Newport Pagnell	Roadside	487514	243901	NO2	No	2.3	2.2	No	2.4
I1, I2	63 High St, Newport Pagnell	Kerbside	487588	243912	NO2	No	2.0	0.4	No	2.4
J1, J2	High St, Newport Pagnell (HSBC Bank)	Kerbside	487620	243922	NO2	No	2.0	0.4	No	2.4
K1, K2	16-17 Greenlands, Newport Pagnell	Suburban	486296	243208	NO2	No	10.1	1.6	No	2.1

L1, L2	5-7 Greenlands, Newport Pagnell	Suburban	486345	243230	NO2	No	5.4	1.4	No	2.5
M1, M2	42-44 Walnut Close, Newport Pagnell	Suburban	486495	243345	NO2	No	7.6	1.5	No	2.0
N1, N2	222 Wolverton Rd, Blakelands	Suburban	486069	243148	NO2	No	25.0	1.6	No	2.2
O1, O2	64 Nicholas Mead, Great Linford	Urban Background	486039	241484	NO2	No	2.4	4.0	No	1.9
R1, R2, R3	Static Air Quality Station (Civic Offices)	Urban Centre	485070	239131	NO2	No	113.0	4.8	Yes	3.5
S1, S2, S3	Roadbox (Newport Pagnell)	Roadside	486290	243344	NO2	No	25.8	1.8	Yes	2.4
T1, T2	Silbury Boulevard, CMK (corner of North Tenth St)	Kerbside	485298	239126	NO2	No	28.2	0.9	No	2.5
V1, V2	63 Windsor St, Wolverton	Suburban	481412	240860	NO2	No	2.3	1.1	No	2.3
W1, W2	130 Newport Rd, New Bradwell	Roadside	482965	241515	NO2	No	6.1	1.6	No	2.4
AA1, AA2	Brook Farm, Broughton Rd, Middleton	Suburban	489237	239016	NO2	No	23.0	1.0	No	2.1
BB1, BB2	14-16 Newport Rd, Wavendon	Roadside	491498	237284	NO2	No	9.7	7.2	No	1.9
DD1, DD2	Aylesbury St, Fenny Stratford (Bracknell House)	Roadside	488118	233814	NO_2	No	11.1	4.5	No	2.4
EE1, EE2	6 Atherstone Court, Two Mile Ash	Suburban	481331	238825	NO_2	No	9.5	0.4	No	1.9

FF1, FF2, FF3	Cross Keys Office, High St South, Olney	Roadside	488898	251186	NO_2	Yes - Olney AQMA	0.2	1.6	No	2.0
HH1, HH2, HH3	Art Mart, 33 High Street South, Olney	Roadside	488891	251248	NO_2	Yes - Olney AQMA	0.6	2.0	No	2.1
JJ1, JJ2, JJ3	New Roadbox location (Olney)	Roadside	488922	251157	NO_2	Yes - Olney AQMA	10.1	2.0	Yes	2.1
KK1, KK2, KK3	18/20 Bridge St, Olney	Roadside	488917	251068	NO_2	Yes - Olney AQMA	0.4	2.2	No	2.2
LL1, LL2, LL3	Courtney House, Bridge St, Olney	Roadside	488909	251077	NO_2	Yes - Olney AQMA	0.4	1.7	No	2.1
MM1, MM2	18 Wheatcroft Close, Beanhill	Urban Background	486332	236228	NO_2	No	10.1	0.3	No	2.2
OO1, OO2	Watling Street, Fullers Slade	Roadside	480015	239400	NO_2	No	43.0	7.6	No	2.5
PP1, PP2	1 Tudor Gardens, Stony Stratford	Suburban	479459	239536	NO_2	No	17.0	2.3	No	2.2
QQ1, QQ2	Silver Street, Stony Stratford	Suburban	478740	240217	NO_2	No	3.0	0.9	No	2.0
RR1, RR2	Horsefair Green, Stony Stratford	Suburban	478882	240265	NO_2	No	3.5	2.6	No	2.0
TT1, TT2	Co-Op traffic sign, High St, NP (north side)	Roadside	487589	243923	NO_2	No	n/a	4.2	No	2.0
WER1, WER2	97 Water Eaton Road, Bletchley	Roadside	487395	233174	NO_2	No	12.0	2.5	No	2.4
AAA1, AAA2	4 Mary Rose, Brooklands	Suburban	489835	240351	NO_2	No	4.2	4.8	No	2.0
BBB1, BBB2	267 Fen Street, Brooklands	Roadside	490299	239695	NO_2	No	6.0	0.5	No	2.0

CCC1, CCC2	Grovesbrook, Station Road, Bow Brickhill	Roadside	490529	234611	NO_2	No	12.2	2.9	No	2.0
DDD1, DDD2	Chapel St/Station Rd, Woburn Sands	Roadside	492923	235716	NO_2	No	5.7	2.8	No	2.0
EEE1, EEE2	Miles Close, Blakelands	Suburban	486164	243168	NO_2	No	17.3	1.6	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.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 2020 (%) (2)	2016	2017	2018	2019	2020
Fixed	485070	239131	Urban Centre	94.3	94.3	18.1	17.0	16.2	23.5	16.4
Roadbox 1	486290	243344	Roadside	92.3	92.3	32.8	30.5	25.6	27.1	24.2
Roadbox 2	488922	251157	Roadside	94.1	94.1	22.8	22.4	19.9	23.9	17.8

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16**

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

Notes:

The annual mean concentrations are presented as µg/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.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

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

Table A.4 – Annual Mean 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 2020 (%) (2)	2016	2017	2018	2019	2020
B1, B2	491769	253542	Roadside	100	100	17.6	18.8	17.4	18.8	14.8
C1, C2, C3	488914	251173	Roadside	100	100	36.9	33.4	33.9	36.4	28.5
D1, D2, D3	488904	251177	Roadside	100	100	32.3	31.7	30.2	30.9	24.7
E1, E2, E3	488926	251455	Roadside	100	100	23.5	21.4	21.3	19.8	17.4
F1, F2, F3	488905	251456	Roadside	100	100	24.9	25.0	23.1	25.1	19.6
G1, G2	489108	251213	Suburban	100	100	11.5	11.5	10.8	11.1	8.8
H1, H2	487514	243901	Roadside	100	100	25.5	26.6	23.8	21.8	20.2
I1, I2	487588	243912	Kerbside	100	100	30.6	29.5	26.7	24.6	23.6
J1, J2	487620	243922	Kerbside	100	100	31.4	31.1	30.0	25.8	22.2
K1, K2	486296	243208	Suburban	100	100	23.4	24.8	22.2	20.5	19.3
L1, L2	486345	243230	Suburban	100	100	21.8	24.4	20.7	20.7	17.8
M1, M2	486495	243345	Suburban	100	100	18.1	19.2	16.9	14.7	13.9
N1, N2	486069	243148	Suburban	100	100	23.2	21.0	21.5	14.8	16.5

O1, O2	486039	241484	Urban Background	100	100	17.4	17.1	15.2	16.3	13.4
R1, R2, R3	485070	239131	Urban Centre	100	100	18.9	18.2	18.4	17.1	13.6
S1, S2, S3	486290	243344	Roadside	92.3	92.3	29.0	30.3	27.4	21.4	22.2
T1, T2	485298	239126	Kerbside	100	100	23.5	23.1	21.6	18.3	17.7
V1, V2	481412	240860	Suburban	100	100	15.8	14.3	15.0	15.0	11.8
W1, W2	482965	241515	Roadside	100	100	19.9	19.2	17.7	17.9	16.5
AA1, AA2	489237	239016	Suburban	100	100	15.9	14.9	14.4	13.7	12.7
BB1, BB2	491498	237284	Roadside	100	100	21.1	19.3	18.4	16.5	13.8
DD1, DD2	488118	233814	Roadside	100	100	22.6	20.7	22.8	19.8	20.1
EE1, EE2	481331	238825	Suburban	90.4	90.4	11.9	11.9	12.2	10.6	8.6
FF1, FF2, FF3	488898	251186	Roadside	100	100	34.0	34.5	30.6	34.0	27.5
HH1, HH2, HH3	488891	251248	Roadside	100	100	30.5	30.9	26.6	27.9	23.1
JJ1, JJ2, JJ3	488922	251157	Roadside	100	100	24.5	25.2	23.5	18.4	19.9
KK1, KK2, KK3	488917	251068	Roadside	90.4	90.4	36.3	36.1	32.9	34.7	28.7
LL1, LL2, LL3	488909	251077	Roadside	90.4	90.4	33.5	32.1	28.1	29.6	25.1

MM1, MM2	486332	236228	Urban Background	100	100	24.1	25.7	22.6	19.0	20.3
OO1, OO2	480015	239400	Roadside	100	100	20.8	18.6	19.9	12.1	11.7
PP1, PP2	479459	239536	Suburban	100	100	11.1	9.9	10.6	10.3	7.8
QQ1, QQ2	478740	240217	Suburban	90.4	90.4	18.0	16.9	17.7	14.9	13.3
RR1, RR2	478882	240265	Suburban	90.4	90.4	22.1	21.2	21.2	19.2	16.9
TT1, TT2	487589	243923	Roadside	100	100	27.1	27.5	26.8	25.3	22.9
WER1, WER2	487395	233174	Roadside	100	100		20.9	20.0	17.9	18.8
AAA1, AAA2	489835	240351	Suburban	100	100			19.4	17.8	15.9
BBB1, BBB2	490299	239695	Roadside	100	100			19.7	19.1	17.6
CCC1, CCC2	490529	234611	Roadside	100	100			14.5	13.4	12.7
DDD1, DDD2	492923	235716	Roadside	100	100			14.9	15.1	12.0
EEE1, EEE2	486164	243168	Suburban	100	100				14.8	17.5

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.**

☒ **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.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

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

Figure A.1 – Trends in Annual Mean NO_2 Concentrations

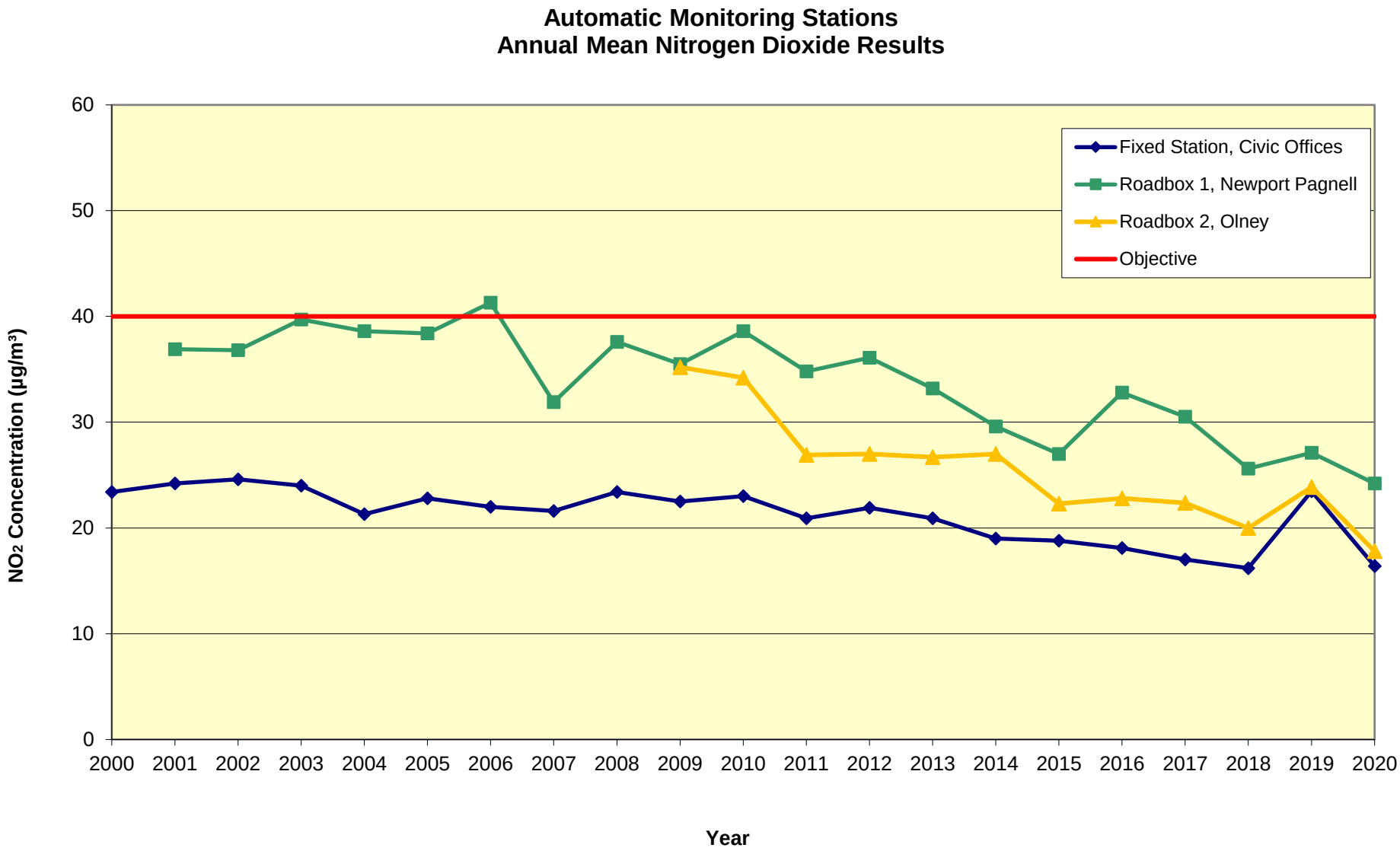


Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
Fixed	485070	239131	Urban Centre	94.3	94.3	0 (99.1)	0	0	0	0
Roadbox 1	486290	243344	Roadside	92.3	92.3	0 (110.3)	0	0	0	0
Roadbox 2	488922	251157	Roadside	94.1	94.1	0	0	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%).

Table A.6 – Annual Mean PM_{10} Monitoring Results (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 2020 (%) (2)	2016	2017	2018	2019	2020
Fixed	485070	239131	Urban Centre	97.8	97.8	14.2	14.5	14.7	16.06	11.7
Roadbox 1	486290	243344	Roadside	n/a	n/a	-	-	-	-	-
Roadbox 2	488922	251157	Roadside	n/a	n/a	17.4	16.5	-	-	-

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16**

Notes:

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

Exceedances of the PM_{10} annual mean objective of 40µg/m^3 are shown in **bold**.

All means have been "annualised" as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

Figure A.2 – Trends in Annual Mean PM_{10} Concentrations

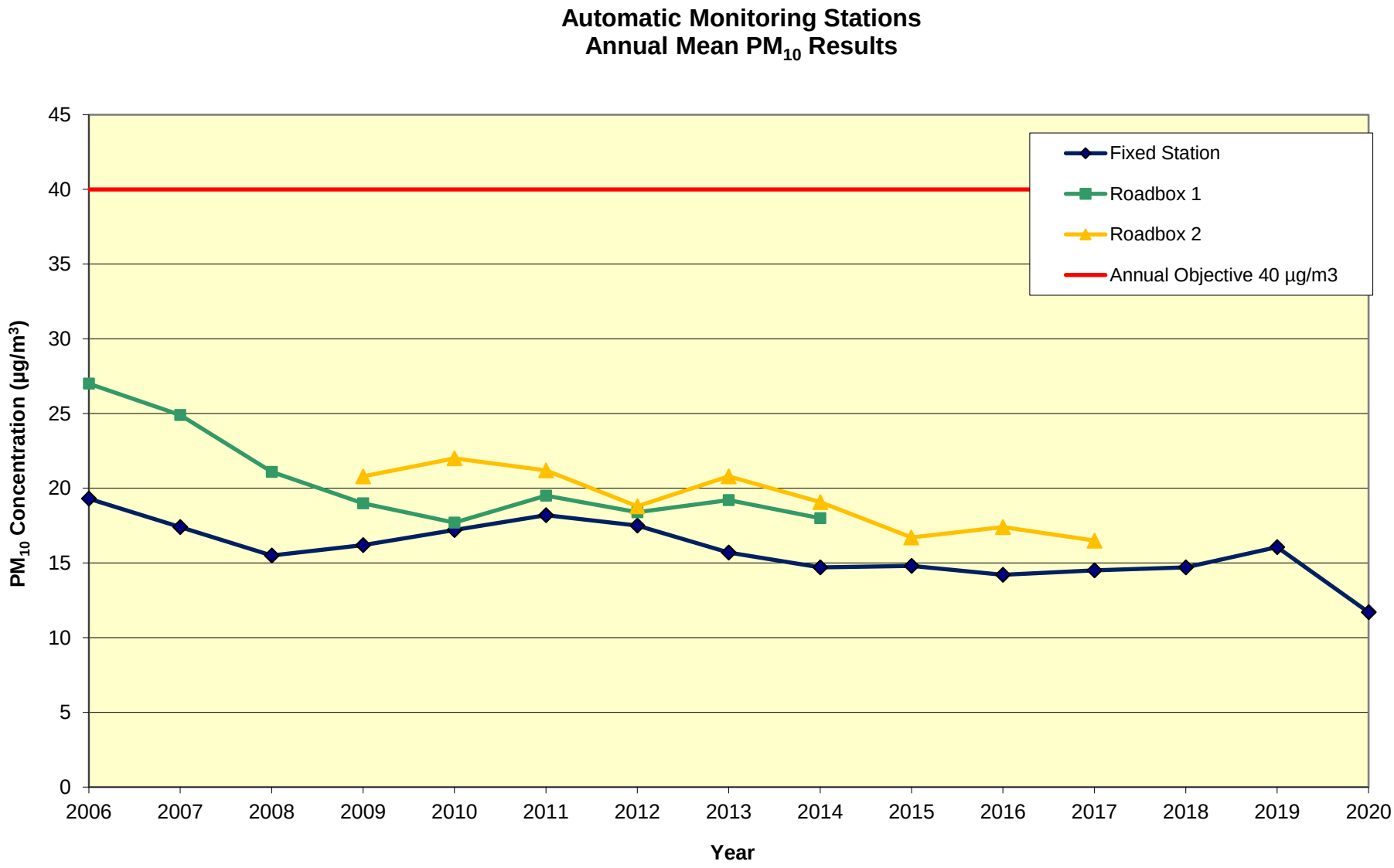


Table A.7 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
Fixed	485070	239131	Urban Centre	97.8	97.8	1	2	1	10	0
Roadbox 1	486290	243344	Roadside	n/a	n/a	-	-	**-**	-	-
Roadbox 2	488922	251157	Roadside	n/a	n/a	1	2 (29.3)	-	-	-

Notes:

Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m^3 have been recorded.

Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in **bold**.

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

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

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

Table A.8 – Annual Mean $PM_{2.5}$ Monitoring Results (µg/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 2020 (%) (2)	2016	2017	2018	2019	2020
Fixed	485070	239131	Urban Centre	97.8	97.8	-	-	-	11.2	7.56

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16**

Notes:

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

All means have been "annualised" as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2020

Table B.1 – NO_2 2020 Diffusion Tube Results (µg/m^3)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.83)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
B1	491769	253542	25.5	21.0	16.7	15.1	10.4	17.1	10.4	15.2	15.4	17.0	26.9	24.0	-	-		Duplicate Site with B1 and B2 - Annual data provided for B2 only
B2	491769	253542	24.0		17.8	14.6	9.8	13.9	13.2	16.6	16.0	16.0	27.7	21.9	17.8	14.8		Duplicate Site with B1 and B2 - Annual data provided for B2 only
C1	488914	251173	40.0	29.5	33.7	28.2	27.3	36.9	26.7	34.5	37.3	37.9	39.4	38.0	-	-		Triplicate Site with C1, C2 and C3 - Annual data provided for C3 only
C2	488914	251173	37.4	29.4	38.0	28.7	27.6	36.3	22.9	36.9	36.4	39.0	39.8	39.5	-	-		Triplicate Site with C1, C2 and C3 - Annual data provided for C3 only
C3	488914	251173	34.8	29.8	34.7	30.3	25.1	34.8	27.5	37.7	35.4	42.4	39.9	40.4	34.3	28.5		Triplicate Site with C1, C2 and C3 - Annual data provided for C3 only
D1	488904	251177	37.9	32.4	31.5	22.8	22.3	28.6	22.3	28.5	33.0	33.7	34.0	35.1	-	-		Triplicate Site with D1, D2 and D3 - Annual data provided for D3 only
D2	488904	251177	37.5	35.1	25.3	21.9	21.1	26.8	26.1	31.5	31.0	31.5	35.0	34.3	-	-		Triplicate Site with D1, D2 and D3 - Annual data provided for D3 only
D3	488904	251177	38.2	29.2	25.9	21.6	22.9	26.7	24.5	26.1	35.2	34.9	32.9	35.2	29.8	24.7		Triplicate Site with D1, D2 and D3 - Annual data provided for D3 only
E1	488926	251455	24.4	16.7	20.1	18.6	13.9	21.8	12.2	24.2	36.2	21.8	26.8	27.2	-	-		Triplicate Site with E1, E2 and E3 - Annual data provided for E3 only
E2	488926	251455	20.8	16.6	18.0	17.5	11.4	21.5	11.9	23.5	18.4	22.6	24.4	30.8	-	-		Triplicate Site with E1, E2 and E3 - Annual data provided for E3 only
E3	488926	251455	23.7	16.7	20.8	21.0	15.6	20.7	11.6	24.1	23.9	24.0	25.9	25.7	21.0	17.4		Triplicate Site with E1, E2 and E3 - Annual data provided for E3 only
F1	488905	251456	29.2	22.4	19.5	15.4	13.9	20.2	20.5	24.1	23.8	28.1	29.0	26.8	-	-		Triplicate Site with F1, F2 and F3 - Annual data provided for F3 only
F2	488905	251456	26.9	25.7	21.0	14.1	15.3	20.4	21.3	21.6	24.3	39.8	26.5	28.8	-	-		Triplicate Site with F1, F2 and F3 - Annual data provided for F3 only
F3	488905	251456	29.5	26.1	20.6	13.1	17.0	21.5		19.4	26.4	39.3	28.1	28.0	23.6	19.6		Triplicate Site with F1, F2 and F3 - Annual data provided for F3 only
G1	489108	251213	17.3	11.0	9.2	8.0	4.6	8.8	5.8	8.2	8.0	11.0	17.3	17.2	-	-		Duplicate Site with G1 and G2 - Annual data provided for G2 only
G2	489108	251213	14.1	10.3	11.6	7.9	3.0	7.7	8.3	7.3	10.3	12.5	19.5	16.8	10.7	8.8		Duplicate Site with G1 and G2 - Annual data provided for G2 only
H1	487514	243901	31.7		20.8	20.2	17.3	18.2	17.1	20.4	24.0	27.5	34.8	32.1	-	-		Duplicate Site with H1 and H2 - Annual data provided for H2 only
H2	487514	243901	29.3	33.7	19.4	18.8	16.9	17.9		22.0	25.4	25.7	30.2	29.5	24.3	20.2		Duplicate Site with H1 and H2 - Annual data provided for H2 only

I1	487588	243912	40.7	32.6	32.5	24.9	18.6	23.0	19.9	27.0	25.1	29.2	36.2	35.1	-	-		Duplicate Site with I1 and I2 - Annual data provided for I2 only
I2	487588	243912	41.8	37.5	29.8	22.4	16.9		20.9	25.2	25.5	27.7	34.4	31.2	28.4	23.6		Duplicate Site with I1 and I2 - Annual data provided for I2 only
J1	487620	243922	35.8	38.7	31.7	19.6	18.4	26.4	20.1	24.0	25.7	25.9	34.7	31.4	-	-		Duplicate Site with J1 and J2 - Annual data provided for J2 only
J2	487620	243922	33.7	32.2	26.9	21.2	14.9	25.4	20.6	26.1	24.8	28.7	25.4	30.4	26.8	22.2		Duplicate Site with J1 and J2 - Annual data provided for J2 only
K1	486296	243208	42.6	26.7	22.3	12.6	14.3	20.1	14.5	19.6	25.2	23.3	32.6	31.0	-	-		Duplicate Site with K1 and K2 - Annual data provided for K2 only
K2	486296	243208	38.3	22.8	22.7	14.6	8.9	18.7	19.7	19.1	21.8	24.2	33.7	28.5	23.2	19.3		Duplicate Site with K1 and K2 - Annual data provided for K2 only
L1	486345	243230	34.7	26.3	18.6	13.0	12.0	16.9	15.6	20.3	22.2	22.7	28.3	27.2	-	-		Duplicate Site with L1 and L2 - Annual data provided for L2 only
L2	486345	243230	35.0	23.7	22.6	10.9	10.1	16.5	17.4	16.5	20.5	24.1	28.5	30.1	21.4	17.8		Duplicate Site with L1 and L2 - Annual data provided for L2 only
M1	486495	243345	20.9	19.5	14.7	9.1	8.7	12.5	10.8	17.0	17.3	17.4	23.9	24.0	-	-		Duplicate Site with M1 and M2 - Annual data provided for M2 only
M2	486495	243345	22.9	19.2		11.1	7.5	14.1	12.9	21.1	17.0	19.3	23.2	24.4	16.8	13.9		Duplicate Site with M1 and M2 - Annual data provided for M2 only
N1	486069	243148	22.4	18.6	23.9	19.4	17.3	18.2	12.8	15.6	19.6	19.2	25.0	26.3	-	-		Duplicate Site with N1 and N2 - Annual data provided for N2 only
N2	486069	243148	22.8	15.1	24.6	20.1	16.4	18.7	14.7	19.6	19.7	16.9	25.9	24.9	19.9	16.5		Duplicate Site with N1 and N2 - Annual data provided for N2 only
O1	486039	241484	24.2	16.6	16.0	12.9	9.5	12.0	9.5	14.4	15.1	16.3	22.2	21.8	-	-		Duplicate Site with O1 and O2 - Annual data provided for O2 only
O2	486039	241484	20.4	18.1		12.9	8.4	12.7	11.4	16.1	15.5	17.8	24.6	23.3	16.2	13.4		Duplicate Site with O1 and O2 - Annual data provided for O2 only
R1	485070	239131	20.1	18.7	15.8	9.9	6.3	12.6	10.1	16.0	14.2	19.2	27.2	25.2	-	-		Triplicate Site with R1, R2 and R3 - Annual data provided for R3 only
R2	485070	239131	24.2	15.0	13.5	10.2	8.9	14.0	10.9	15.4	15.7	19.3	25.4	23.5	-	-		Triplicate Site with R1, R2 and R3 - Annual data provided for R3 only
R3	485070	239131	21.6	19.7		11.6	8.6	11.3	12.9	15.3		16.8	25.7	23.9	16.3	13.6		Triplicate Site with R1, R2 and R3 - Annual data provided for R3 only
S1	486290	243344	41.8	28.8	23.3	17.5	13.8	21.9	26.1	25.3		30.0	32.3	31.5	-	-		Triplicate Site with S1, S2 and S3 - Annual data provided for S3 only
S2	486290	243344	39.3	31.2	30.1	17.9	17.9	21.9	26.4	22.8		30.6	33.3	30.5	-	-		Triplicate Site with S1, S2 and S3 - Annual data provided for S3 only
S3	486290	243344	35.6	27.9	26.2	18.7	17.6	23.2	22.4	24.9		28.5	33.7	31.5	26.8	22.2		Triplicate Site with S1, S2 and S3 - Annual data provided for S3 only
T1	485298	239126	29.9	23.0	16.8	15.7	12.2	17.2	12.5	19.9		23.7	29.7	29.7	-	-		Duplicate Site with T1 and T2 - Annual data provided for T2 only
T2	485298	239126	26.8	19.0	24.3	12.0	12.5	17.7	10.0	19.3	26.6	21.3	32.9	31.5	21.3	17.7		Duplicate Site with T1 and T2 - Annual data provided for T2 only
V1	481412	240860	19.2	10.8	12.9	15.0	8.2	11.4	7.0	12.4	16.6	13.0	22.6	20.8	-	-		Duplicate Site with V1 and V2 - Annual data provided for V2 only

V2	481412	240860	14.6	11.4	16.5	14.0	8.5	13.9	7.1	14.5	16.6	11.2	23.2	20.6	14.3	11.8		Duplicate Site with V1 and V2 - Annual data provided for V2 only
W1	482965	241515	28.5	22.7	17.5	14.3	8.2	15.9	11.7	18.3	22.5	19.2	29.1	25.3	-	-		Duplicate Site with W1 and W2 - Annual data provided for W2 only
W2	482965	241515	30.8	24.8	16.2	15.1	12.2	18.3	12.2	17.1	20.2	21.8	29.0	27.0	19.9	16.5		Duplicate Site with W1 and W2 - Annual data provided for W2 only
AA1	489237	239016	18.0	12.8	18.1	12.6	7.8	11.8	9.6	13.7	14.7	18.2	24.7	22.7	-	-		Duplicate Site with AA1 and AA2 - Annual data provided for AA2 only
AA2	489237	239016		12.7	15.7	12.4	7.8	11.6	7.3	20.0	16.8	15.5	22.4	23.6	15.4	12.7		Duplicate Site with AA1 and AA2 - Annual data provided for AA2 only
BB1	491498	237284	24.1	16.1	18.4	13.2	10.1	13.8	11.5	14.3	18.7	17.2	23.6	20.8	-	-		Duplicate Site with BB1 and BB2 - Annual data provided for BB2 only
BB2	491498	237284	20.8	18.1	15.6	13.7	12.0	14.8	11.0	14.7	15.0	17.0	22.8	22.0	16.6	13.8		Duplicate Site with BB1 and BB2 - Annual data provided for BB2 only
DD1	488118	233814	29.1	18.8	22.8	21.1	13.3	21.3	15.1	19.3	26.5	25.7	35.1	35.0	-	-		Duplicate Site with DD1 and DD2 - Annual data provided for DD2 only
DD2	488118	233814	29.1	19.7	26.1	21.1	17.8	22.7	16.1	25.8	30.1	26.2	32.3	32.1	24.3	20.1		Duplicate Site with DD1 and DD2 - Annual data provided for DD2 only
EE1	481331	238825	14.5	8.2	11.7	8.6	6.8	8.1	5.9	9.3	9.1	11.5	18.9		-	-		Duplicate Site with EE1 and EE2 - Annual data provided for EE2 only
EE2	481331	238825	15.4	9.4	10.7	10.1	7.0	7.8	6.5	7.3	14.0	11.0	15.7		10.3	8.6		Duplicate Site with EE1 and EE2 - Annual data provided for EE2 only
FF1	488898	251186	46.4	39.6	33.6	18.7	21.5	28.9	28.0	33.4	36.2	41.9	33.1	37.4	-	-		Triplicate Site with FF1, FF2 and FF3 - Annual data provided for FF3 only
FF2	488898	251186	47.1	33.6	28.7	18.5	21.9	27.7	30.4	26.8	35.1	42.7	38.5	37.6	-	-		Triplicate Site with FF1, FF2 and FF3 - Annual data provided for FF3 only
FF3	488898	251186	49.8	38.8	27.1	19.3	23.5	30.2	29.0	33.5	36.5	41.0	40.5	37.3	33.2	27.5		Triplicate Site with FF1, FF2 and FF3 - Annual data provided for FF3 only
HH1	488891	251248	34.1	28.1	28.3	17.7	19.4	22.8	24.6	27.6	33.7	29.4	31.8	28.8	-	-		Triplicate Site with HH1, HH2 and HH3 - Annual data provided for HH3 only
HH2	488891	251248	40.5	28.0	27.6	19.0	20.1	23.8	24.8	28.1	35.4	33.2	34.9	33.7	-	-		Triplicate Site with HH1, HH2 and HH3 - Annual data provided for HH3 only
HH3	488891	251248	35.9	33.9	24.4	16.7	14.6	23.6	24.4	23.2	32.2	32.2	32.0	32.8	27.8	23.1		Triplicate Site with HH1, HH2 and HH3 - Annual data provided for HH3 only
JJ1	488922	251157	45.7	22.3	20.0	18.2	12.0	20.1	15.2	22.8	26.7	26.4	26.2	29.5	-	-		Triplicate Site with JJ1, JJ2 and JJ3 - Annual data provided for JJ3 only
JJ2	488922	251157	34.6	22.7	21.5	17.9	15.6	21.1	15.8	21.6	25.6	25.5	29.1	30.4	-	-		Triplicate Site with JJ1, JJ2 and JJ3 - Annual data provided for JJ3 only
JJ3	488922	251157	32.0	23.8	23.5	18.5	16.8	22.8	18.0	23.8	26.2	30.4	29.8	32.5	24.0	19.9		Triplicate Site with JJ1, JJ2 and JJ3 - Annual data provided for JJ3 only
KK1	488917	251068	46.4	35.4	31.7	25.4	21.1	35.8	22.9		36.5	43.2	36.0	39.8	-	-		Triplicate Site with KK1, KK2 and KK3 - Annual data provided for KK3 only
KK2	488917	251068	51.4	37.4	38.1	27.5	23.7	33.9	22.7		34.8	39.0	38.5	42.0	-	-		Triplicate Site with KK1, KK2 and KK3 - Annual data provided for KK3 only
KK3	488917	251068	46.1	34.6	31.0	26.7	24.5	37.8	25.0		32.1	38.8	39.3	40.2	34.5	28.7		Triplicate Site with KK1, KK2 and KK3 - Annual data provided for KK3 only

LL1	488909	251077	39.1	36.6	29.1	16.2	18.2	26.3	31.2		34.3	37.9	35.0	34.4	-	-		Triplicate Site with LL1, LL2 and LL3 - Annual data provided for LL3 only
LL2	488909	251077	38.2	37.6	27.8	15.0	19.0	24.4	29.0		33.6	35.4	30.8	34.1	-	-		Triplicate Site with LL1, LL2 and LL3 - Annual data provided for LL3 only
LL3	488909	251077	43.5	38.0	27.1	16.7	15.8		27.9		33.5	33.6	35.6	39.1	30.3	25.1		Triplicate Site with LL1, LL2 and LL3 - Annual data provided for LL3 only
MM1	486332	236228	30.2	23.1	25.0	18.5	18.0	18.2	21.3	23.0	26.9	28.4	31.1	29.9	-	-		Duplicate Site with MM1 and MM2 - Annual data provided for MM2 only
MM2	486332	236228	31.3	28.7	25.2	14.2	15.9	15.1	19.7	24.3	29.7	26.1	32.6	29.2	24.4	20.3		Duplicate Site with MM1 and MM2 - Annual data provided for MM2 only
OO1	480015	239400	15.1	7.6	17.0	14.6	10.5	14.9	8.2	14.6	10.4	12.8	22.6	18.1	-	-		Duplicate Site with OO1 and OO2 - Annual data provided for OO2 only
OO2	480015	239400	17.5	13.4	14.6	10.8	7.1	13.0	8.3	15.0	16.7			19.3	14.1	11.7		Duplicate Site with OO1 and OO2 - Annual data provided for OO2 only
PP1	479459	239536	13.4	7.9	8.8	9.3	6.0	7.3	6.1	4.9	9.9	7.7	16.9		-	-		Duplicate Site with PP1 and PP2 - Annual data provided for PP2 only
PP2	479459	239536	11.3	6.9	8.4	9.0	5.6	7.7	4.0	9.2	8.4	10.9	16.1	14.4	9.4	7.8		Duplicate Site with PP1 and PP2 - Annual data provided for PP2 only
QQ1	478740	240217	19.5	14.3	15.7	12.6		12.6	10.4	15.2	15.1	16.7	20.8	37.0	-	-		Duplicate Site with QQ1 and QQ2 - Annual data provided for QQ2 only
QQ2	478740	240217	18.2	13.1	16.6	13.8		13.5	9.6	14.0	11.7	13.5		19.1	16.1	13.3		Duplicate Site with QQ1 and QQ2 - Annual data provided for QQ2 only
RR1	478882	240265	24.9	15.3	23.8	19.0		18.1	13.5	19.5	20.0	19.0	25.2	25.9	-	-		Duplicate Site with RR1 and RR2 - Annual data provided for RR2 only
RR2	478882	240265	26.0	18.5	21.3	16.1		19.2	11.0	19.2	22.8	21.6	22.5	26.4	20.4	16.9		Duplicate Site with RR1 and RR2 - Annual data provided for RR2 only
TT1	487589	243923	35.0	29.5	26.3	22.0	16.5	20.8	21.4	26.7	32.9	26.1	33.2	30.9	-	-		Duplicate Site with TT1 and TT2 - Annual data provided for TT2 only
TT2	487589	243923	37.1	29.6	29.0	21.9	21.5	21.4	21.1	29.2	34.5	31.5	29.9	35.4	27.6	22.9		Duplicate Site with TT1 and TT2 - Annual data provided for TT2 only
WER 1	487395	233174	30.9	24.7	23.3	17.7	10.4	16.9	20.3	18.7	21.7	23.5	30.3	30.1	-	-		Duplicate Site with WER1 and WER2 - Annual data provided for WER2 only
WER 2	487395	233174	29.0	24.0	16.9	19.2	18.9	15.2	18.1	18.8	27.2	29.1	29.1	30.8	22.7	18.8		Duplicate Site with WER1 and WER2 - Annual data provided for WER2 only
AAA1	489835	240351	27.8	15.8	17.8	15.5	12.1	16.9	12.8	16.6	22.8	18.6	29.6	26.7	-	-		Duplicate Site with AAA1 and AAA2 - Annual data provided for AAA2 only
AAA2	489835	240351	27.6	15.1	18.2	15.5	11.9	12.9	12.9	16.2	22.6	18.7	28.3	26.1	19.1	15.9		Duplicate Site with AAA1 and AAA2 - Annual data provided for AAA2 only
BBB1	490299	239695	27.3	15.8	24.0	16.2	9.1	18.6	14.3	16.3	23.4	23.4	34.6	32.2	-	-		Duplicate Site with BBB1 and BBB2 - Annual data provided for BBB2 only
BBB2	490299	239695	26.7	18.6	20.4	17.1	13.4	16.0	12.2	14.4	24.7	23.4	31.6	35.9	21.2	17.6		Duplicate Site with BBB1 and BBB2 - Annual data provided for BBB2 only
CCC 1	490529	234611	20.0	16.6	16.9	13.2	6.7	13.8	10.8	11.4	16.6	15.3	23.8	19.3	-	-		Duplicate Site with CCC1 and CCC2 - Annual data provided for CCC2 only
CCC 2	490529	234611	20.9	16.0	14.1	10.0	8.7	11.1	11.9	11.4	17.3	16.3	21.4	22.7	15.3	12.7		Duplicate Site with CCC1 and CCC2 - Annual data provided for CCC2 only

DDD 1	492923	235716	18.2	11.4	11.4	13.3	10.2	11.5	9.5	15.5	15.1	14.0	21.8	20.3	-	**-**		Duplicate Site with DDD1 and DDD2 - Annual data provided for DDD2 only
DDD 2	492923	235716	19.9	13.3	15.7	11.8	8.7	12.0	8.0	12.1	17.5	12.6	22.1	22.3	14.5	12.0		Duplicate Site with DDD1 and DDD2 - Annual data provided for DDD2 only
EEE1	486164	243168	18.4	14.1	21.3	25.7	19.6	26.2	15.0	24.3	21.2	18.9	22.9	25.9	-	**-**		Duplicate Site with EEE1 and EEE2 - Annual data provided for EEE2 only
EEE2	486164	243168	19.9	14.6	21.1	23.9	19.6	21.7	15.5		22.4	21.4	23.5	25.2	21.1	17.5		Duplicate Site with EEE1 and EEE2 - Annual data provided for EEE2 only

☒ **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.TG16**

☒ **National bias adjustment factor used**

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

☒ **Milton Keynes Council confirm that all 2020 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 Milton Keynes Council During 2020

Milton Keynes Council has not identified any new sources relating to air quality within the reporting year of 2020.

Additional Air Quality Works Undertaken by Milton Keynes Council During 2020

An additional report was compiled in March 2020, as evidence to revoke the Olney AQMA, see Appendix G

QA/QC of Diffusion Tube Monitoring

Nitrogen dioxide diffusion tubes are prepared 'in-house' by Milton Keynes Council using 20% triethanolamine (TEA) in water and are analysed following the procedures set out in the AEA Practical Guidance document produced by the Defra Working Group on Harmonisation of NO_2 Diffusion Tubes that was released early in 2008. The Council participates in the proficiency testing scheme, AIR PT, provided by LGC Standards for quality assurance of diffusion tube analysis and the monthly NO_2 Network Field Intercomparison Exercise managed by the National Physical Laboratory (NPL).

Diffusion Tube Annualisation

All diffusion tube monitoring locations within Milton Keynes Council recorded data capture of 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2021 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under

or over-read relative to the reference chemiluminescence analyser. LAQM.TG16 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.

Milton Keynes Council have applied a national bias adjustment factor of 0.83 to the 2020 monitoring data. This factor is obtained from the national bias adjustment spreadsheet using 3 local co-location studies shown in Table C.3, and the Marylebone Road intercomparison tube study. Local co-location studies are carried out at all the automatic monitoring stations. Tubes are sited in triplicate near the air intake.

A summary of bias adjustment factors used by Milton Keynes Council over the past five years is presented in Table C.1.

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2020	National	06/21	0.83
2019	National	06/20	0.84
2018	Local	-	0.78
2017	Local	-	0.77
2016	Local	-	0.68

Table C.2 – Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3
Periods used to calculate bias	12	11	12
Bias Factor A	1 (0.89 - 1.13)	0.91 (0.83 - 1.01)	0.74 (0.68 - 0.8)
Bias Factor B	0% (-11% - 12%)	10% (-1% - 21%)	36% (25% - 46%)
Diffusion Tube Mean (µg/m^3)	16.4	26.8	24.0
Mean CV (Precision)	9.1%	6.3%	7.8%
Automatic Mean (µg/m^3)	16.3	24.3	17.7
Data Capture	94%	92%	94%
Adjusted Tube Mean (µg/m^3)	16 (15-18)	24 (22 - 27)	18 (16 - 19)

Notes:

A national bias adjustment factor of 0.83 has been used to bias adjust the 2020 diffusion tube results, using the above local co-location studies and the Marylebone Road intercomparison tube study factor (see Figure C.1).

Figure C.1 National Bias Adjustment Factor Spreadsheet

Bias Adjustment Factor Spreadsheet — **Spreadsheet Version Number: 06/21**

show the results of **relevant** co-location studies
are not suitable for correcting individual short-term monitoring periods
state the adjustment factor used and the version of the spreadsheet
nths: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of Sept 2021

LAQM Helpdesk Website

and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 2: Select a Preparation Method from the Drop-Down List

If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down List

If a year is not shown, we have no data[2]

Step 4:

Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.

If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953

Method (To undo your selection, choose (All) from the pop-up list)	Year[5] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m^3)	Automatic Monitor Mean Conc. (Cm) (µg/m^3)	Bias (B)	Tube Precision[6]	Bias Adjustment Factor (A) (Cm/Dm)
20% TEA in water	2020	UC	Milton Keynes Council	12	16	16	0.3%	G	**1.00**
20% TEA in water	2020	R	Milton Keynes Council	11	27	25	10.1%	G	**0.91**
20% TEA in water	2020	R	Milton Keynes Council	12	24	18	35.8%	G	**0.74**
20% TEA in water	2020	KS	Marylebone Road Intercomparison	12	59	43	38.2%	G	**0.72**
20% TEA in water	2020		**Overall Factor[3] (4 studies)**				**Use**		**0.83**

NO_2 Fall-off with Distance from the Road

Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure should be 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 Milton Keynes Council required distance correction during 2020.

QA/QC of Automatic Monitoring

PM_{10} and $PM_{2.5}$ Monitoring Adjustment

The type of PM_{10}/$PM_{2.5}$ monitor utilised within Milton Keynes Council does not required the application of a correction factor.

Automatic Monitoring Annualisation

All automatic monitoring locations within Milton Keynes Council recorded data capture of greater than 75% therefore it was not required 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

Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure should be estimated using the 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 passive or automatic NO_2 monitoring locations within Milton Keynes Council required distance correction during 2020.

Appendix D: Maps of Monitoring Locations and AQMAs

Automatic Monitoring Sites

Figure D.1 – Fixed Air Quality Station, Civic Offices, Central Milton Keynes

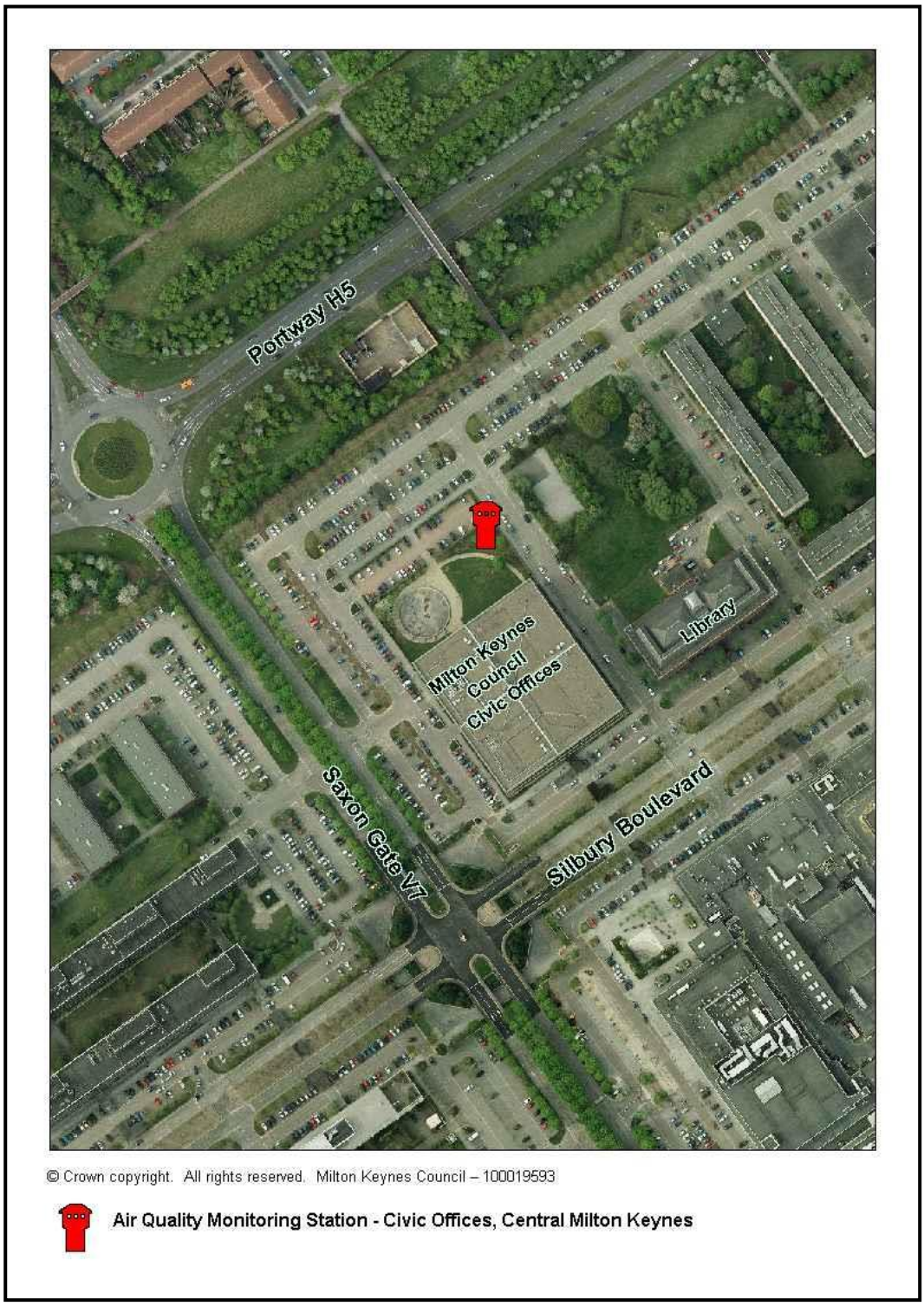
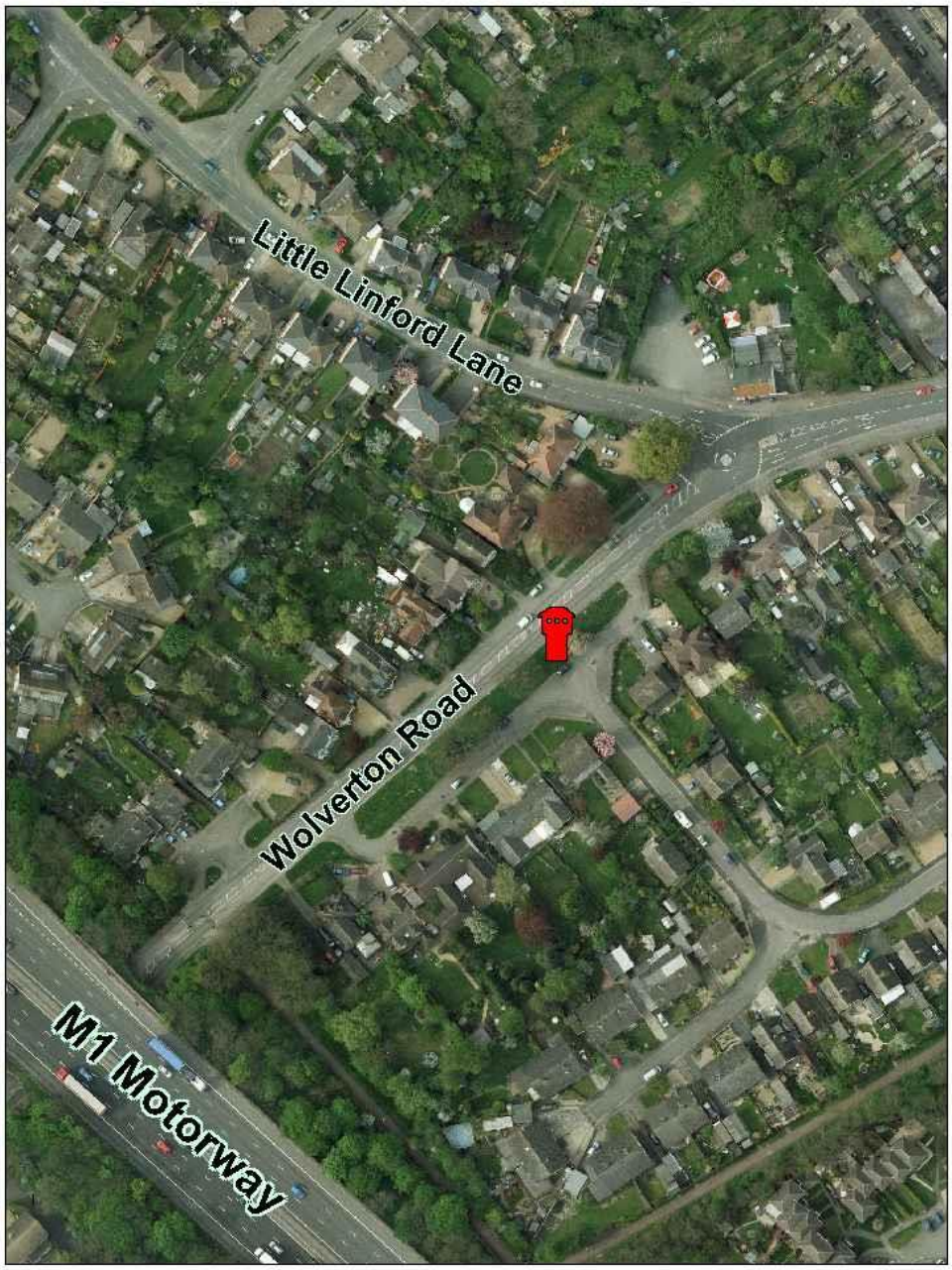
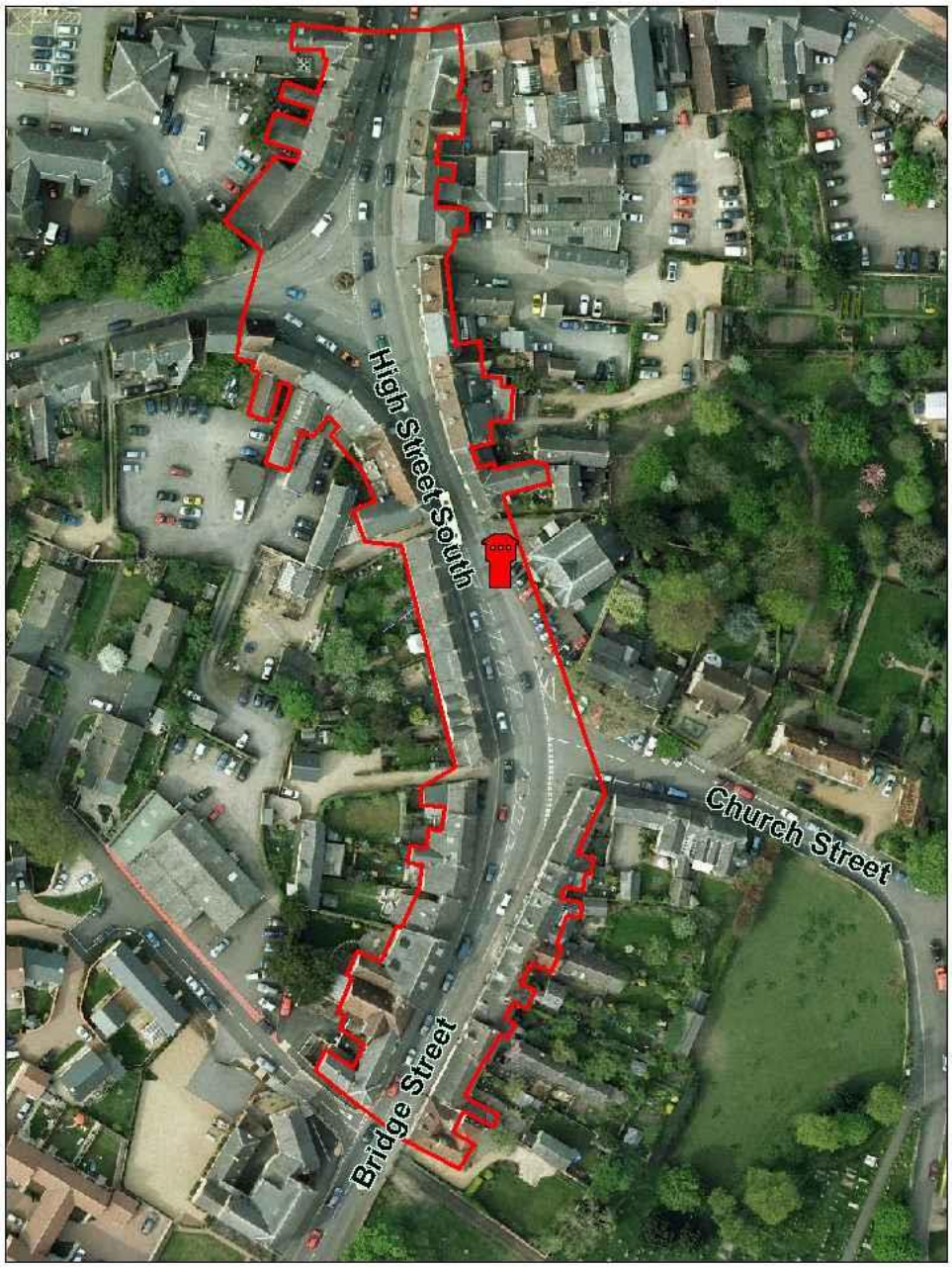


Figure D.2 – Roadbox 1 Air Quality Station, Wolverton Road, Newport Pagnell



Air Quality Monitoring Station - Roadbox 1, Wolverton Road, Newport Pagnell

Figure D.3 – Roadbox 2 Air Quality Station, High Street South, Olney (Within Designated Air Quality Management Area)



Air Quality Monitoring Station - Roadbox 2, High Street South, Olney
(Air Quality Management Area boundary in red)

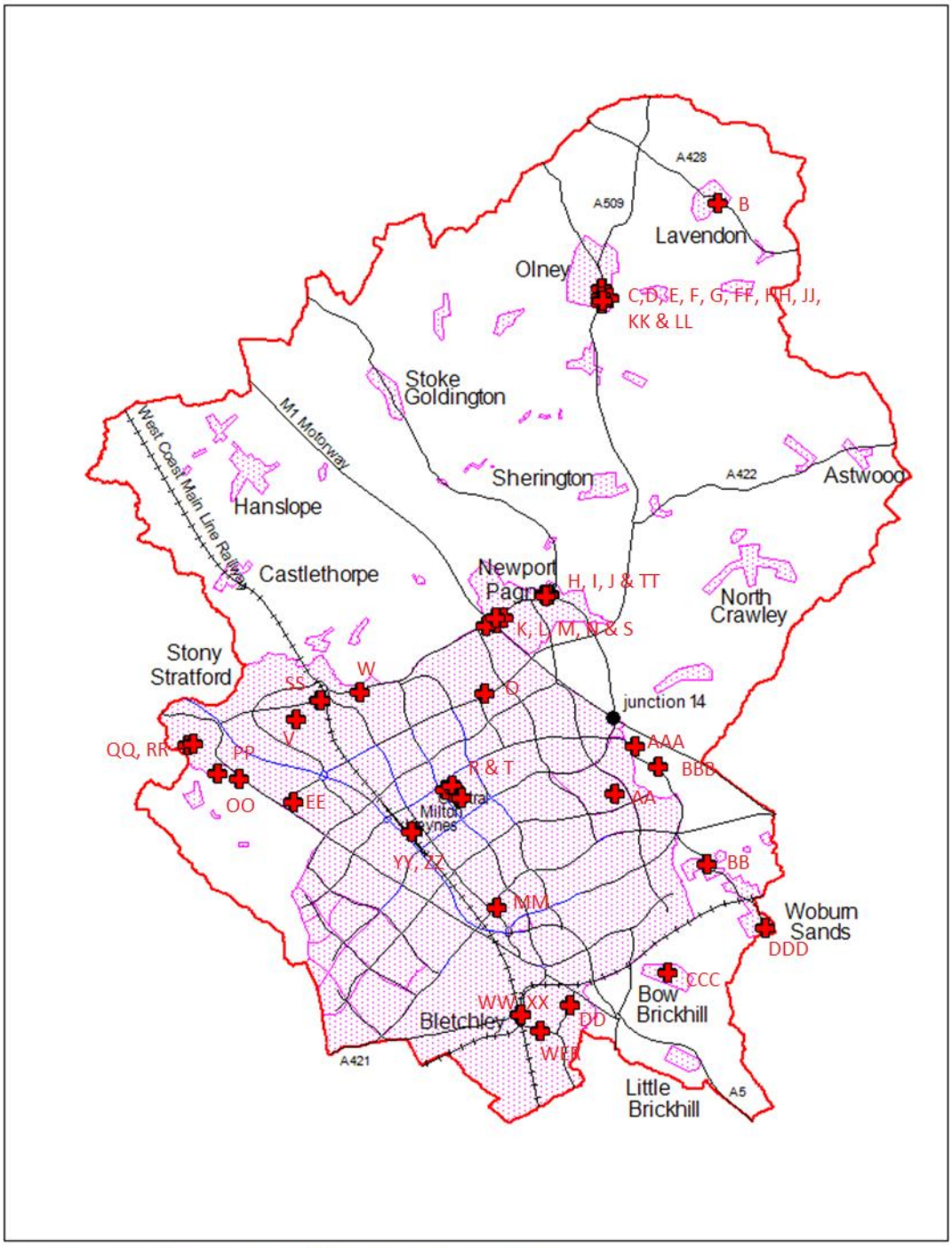
Figure D4 Automatic Air Quality Monitoring Station Photographs

Fixed Monitoring Station, Civic, CMK**.**

Roadbox 1 Monitoring Station Wolverton Road, Newport Pagnell (M1 bridge in background)

Roadbox 2 Monitoring Station High Street South, Olney

Figure D5 – Map of Non-Automatic Monitoring Sites



Nitrogen Dioxide diffusion tube location

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[7]

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

[7] The units are in microgrammes of pollutant per cubic metre of air (µg/m^3).

Appendix F: Impact of COVID-19 upon LAQM

COVID-19 has had a significant impact on society. Inevitably, COVID-19 has also had an impact on the environment, with implications to air quality at local, regional and national scales.

COVID-19 has presented various challenges for Local Authorities with respect to undertaking their statutory LAQM duties in the 2021 reporting year. Recognising this, Defra provided various advice updates throughout 2020 to English authorities, particularly concerning the potential disruption to air quality monitoring programmes, implementation of Air Quality Action Plans (AQAPs) and LAQM statutory reporting requirements. Defra has also issued supplementary guidance for LAQM reporting in 2021 to assist local authorities in preparing their 2021 ASR. Where applicable, this advice has been followed.

Despite the challenges that the pandemic has given rise to, the events of 2020 have also provided Local Authorities with an opportunity to quantify the air quality impacts associated with wide-scale and extreme intervention, most notably in relation to emissions of air pollutants arising from road traffic. The vast majority (>95%) of AQMAs declared within the UK are related to road traffic emissions, where attainment of the annual mean objective for nitrogen dioxide (NO_2) is considered unlikely. On 23rd March 2020, the UK Government released official guidance advising all members of public to stay at home, with work-related travel only permitted when absolutely necessary. During this initial national lockdown (and to a lesser extent other national and regional lockdowns that followed), marked reductions in vehicle traffic were observed; Department for Transport (DfT) data[8] suggests reductions in vehicle traffic of up to 70% were experienced across the UK by mid-April, relative to pre COVID-19 levels.

This reduction in travel in turn gave rise to a change of air pollutant emissions associated with road traffic, i.e. nitrous oxides (NO_x), and exhaust and non-exhaust particulates (PM). The Air Quality Expert Group (AQEG)[9] has estimated that during the initial lockdown period in 2020, within urbanised areas of the UK reductions in NO_2 annual mean concentrations were between 20 and 30% relative to pre-pandemic levels, which

[8] Prime Minister's Office, COVID-19 briefing on the 31st of May 2020

[9] Air Quality Expert Group, Estimation of changes in air pollution emissions, concentrations and exposure during the COVID-19 outbreak in the UK, June 2020

represents an absolute reduction of between 10 to 20µg/m^3 if expressed relative to annual mean averages. During this period, changes in $PM_{2.5}$ concentrations were less marked than those of NO_2. $PM_{2.5}$ concentrations are affected by both local sources and the transport of pollution from wider regions, often from well beyond the UK. Through analysis of AURN monitoring data for 2018-2020, AQEG have detailed that $PM_{2.5}$ concentrations during the initial lockdown period are of the order 2 to 5µg/m^3 lower relative to those that would be expected under business-as-usual conditions.

As restrictions are gradually lifted, the challenge is to understand how these air quality improvements can benefit the long-term health of the population.

Impacts of COVID-19 on Air Quality within Milton Keynes Council

In Milton Keynes the main source of oxides of nitrogen, along with fines particles is from road traffic emissions. With very few vehicles on the roads during the national lockdowns measurements in all monitoring locations were reduced from previous years. All monitoring sites within the borough complied with the annual mean objective.

Opportunities Presented by COVID-19 upon LAQM within Milton Keynes Council

A number of local businesses and companies, including Milton Keynes Council, have adopted a pattern of flexible working during lockdown and have set up the technologies and policies for this to continue. This will reduce the volume of commuter and rush hour traffic, and the associated emissions.

Milton Keynes Council trialled e-scooters in June in a fast-tracked plan to explore alternatives to short car journeys. The plans were sped up in light of the COVID-19 pandemic so UK cities could understand how e-scooters might relieve pressure on public transport while passenger numbers are restricted.

The council was initially provided a 50-strong fleet of the innovative e-scooters to pilot among council employees. The success of the trial led to around 300 e-scooters becoming available for the public to use from August 2020.

Challenges and Constraints Imposed by COVID-19 upon LAQM within Milton Keynes Council

Officers from Environmental Health were able to work remotely during the lockdown and were able to continue both the automatic and passive monitoring during 2020. Over 75% data capture was achieved across all monitoring sites. The Defra diffusion tube exposure calendar adhered to and tubes were stored in accordance with laboratory guidance and analysed promptly. Using the criteria defined in Table F 1, no challenges or constraints relating to LAQM have arisen in Milton Keynes during 2020 as a consequence of COVID-19.

Table F 1 – Impact Matrix

Category	Impact Rating: None	Impact Rating: Small	Impact Rating: Medium	Impact Rating: Large
Automatic Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Automatic Monitoring – QA/QC Regime	Adherence to requirements as defined in LAQM.TG16	Routine calibrations taken place frequently but not to normal regime. Audits undertaken alongside service and maintenance programmes	Routine calibrations taken place infrequently and service and maintenance regimes adhered to. No audit achieved	Routine calibrations not undertaken within extended period (e.g. 3 to 4 months). Interruption to service and maintenance regime and no audit achieved
Passive Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Passive Monitoring – Bias Adjustment Factor	Bias adjustment undertaken as normal	<25% impact on normal number of available bias adjustment colocation studies (2020 vs 2019)	25-50% impact on normal number of available bias adjustment studies (2020 vs 2019)	>50% impact on normal number of available bias adjustment studies (2020 vs 2019) and/or applied bias adjustment factor studies not considered representative of local regime
Passive Monitoring – Adherence to Changeover Dates	Defra diffusion tube exposure calendar adhered to	Tubes left out for two exposure periods	Tubes left out for three exposure periods	Tubes left out for more than three exposure periods
Passive Monitoring – Storage of Tubes	Tubes stored in accordance with laboratory guidance and analysed promptly.	Tubes stored for longer than normal but adhering to laboratory guidance	Tubes unable to be stored according to be laboratory guidance but analysed prior to expiry date	Tubes stored for so long that they were unable to be analysed prior to expiry date. Data unable to be used
AQAP – Measure Implementation	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP
AQAP – New AQAP Development	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP

Appendix G: AQMA Revocation

Milton Keynes Council

Local Air Quality Management

Revocation of the Air Quality Management Area (Milton Keynes Council) (No 1) Order 2008

March 2021

Environmental Health
Civic Offices
1 Saxon Gate East
Central Milton Keynes
MK9 3EJ

Tel (01908) 252100
International Tel +44 1908 252100

ehnorth@milton-keynes.gov.uk

David Parrish
Senior Practitioner – Environmental Health

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Appendix G: Olney AQMA Revocation

1 SUMMARY

1.1 The annual mean air quality objective (AQO) for nitrogen dioxide (NO_2) is 40 µg/m^3. In 2008 a small exceedence of this objective was identified at the façades of residential properties in Olney. Following a Detailed Assessment, an Air Quality Management Area (AQMA) was designated in part of Olney in December 2008 **(Figure 1**).

1.2 The annual mean objective has not been exceeded within the AQMA since 2014 and there is a downward trend in NO_2 levels, which is also reflected at the automatic air quality stations in Newport Pagnell and Central Milton Keynes.

1.3 Automatic monitoring at the current location on High Street South commenced in 2009 and is supplemented by 10 diffusion tube sites, 7 within the AQMA.

1.4 The measured annual mean concentration at the Olney automatic station, which is sited 2 metres from the roadside, was 17.8 µg/m^3 in 2020. The highest diffusion tube result at a building façade was 25.4 µg/m^3 recorded at 10 High Street South, Olney.

1.5 Revoking the AQMA has been considered for a few years and referred to in Annual Status Reports reviewed by Defra. New analysers were installed in all the automatic monitoring stations in February 2019 and so revocation was delayed until new data became available. Results now confirm that there is a downward trend at all monitoring locations and the future risk of exceeding the AQO is remote.

1.6 Although the Covid-19 pandemic will have affected emissions in 2020 there is very little possibility that future NO_2 levels will exceed the annual mean objective. National projections also show continued reductions in emissions, consequently, the AQMA will be revoked. A copy of the order is attached to this report.

2 INTRODUCTION

2.1 Background - Air Quality Management

2.1.1 A Detailed Assessment of nitrogen dioxide levels in Olney was published in August 2008. The Report identified small exceedences of the annual mean nitrogen dioxide air quality objective at the façades of residential properties (relevant locations in terms of public exposure), in Bridge Street and High Street South. This area forms a small street canyon where pollutants do not readily disperse. An Air Quality Management Area (AQMA) was designated by Order under Section 83 of the Environment Act 1995 on 1st December 2008 (see **Figure 1**).

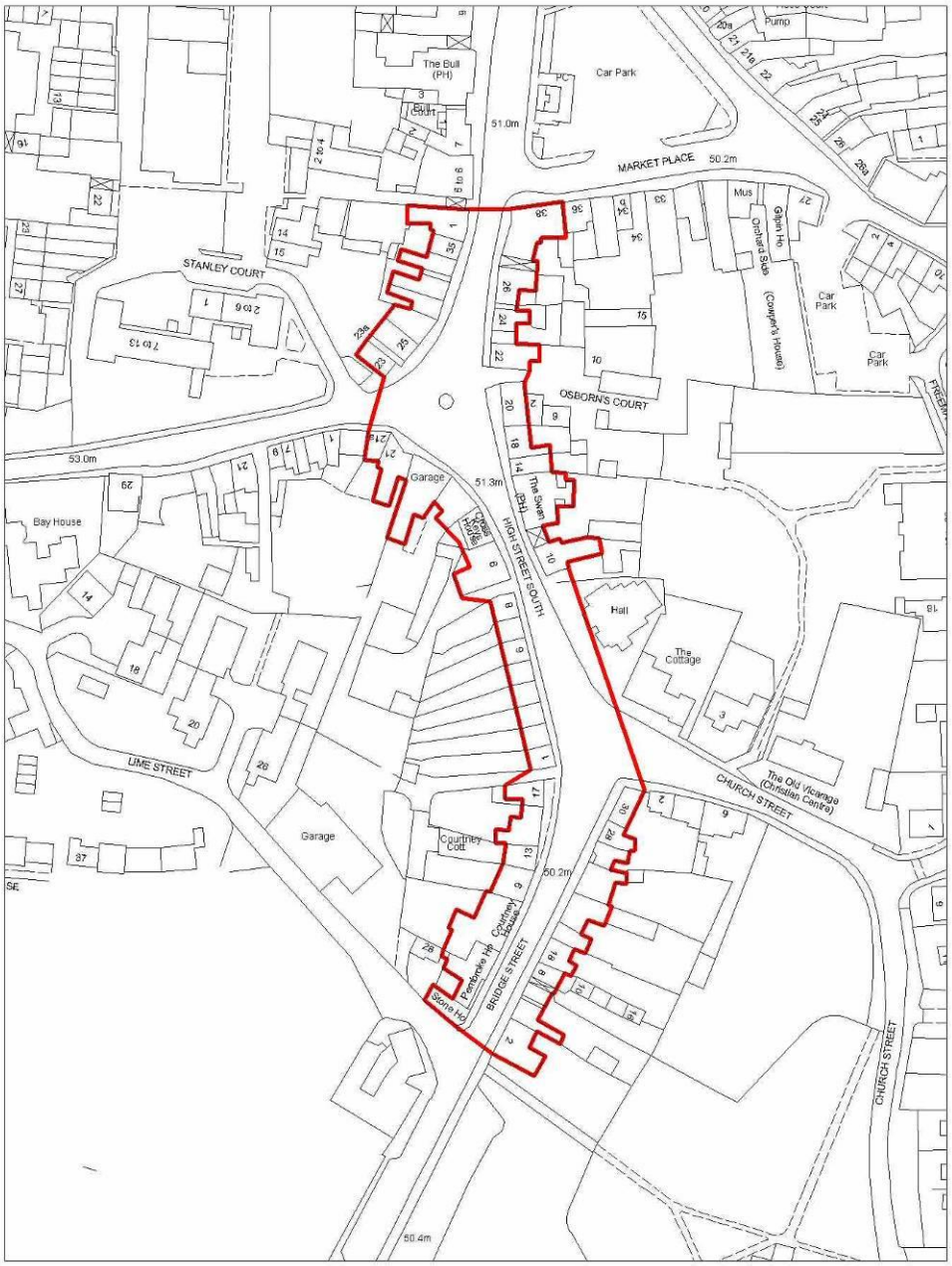
2.1.2 The extent of the AQMA is represented by the red line in **Figure 1** and includes 64 addresses. The source of the pollution is mostly derived from road traffic on the A509.

2.1.3 An Action Plan was prepared in November 2012 containing measures designed to improve air quality within the AQMA.

2.1.4 Milton Keynes Council air quality reports can be downloaded from the website: https://www.milton-keynes.gov.uk/environmental-health-and-trading-standards/pollution/local-air-quality-management

Figure 1 Olney Air Quality Management Area

Environment Act 1995, Section 83 (1)
Air Quality Management Area (Milton Keynes Council) (No. 1) Order 2008



The designated area is edged in red

3 MONITORING OF AIR QUALITY IN OLNEY

3.1 Automatic Monitoring

3.1.1 Nitrogen dioxide is monitored automatically in Olney using a chemiluminescent analyser housed within an air conditioned “roadbox” type of enclosure.

3.1.2 The roadbox monitoring station was installed in March 2009, located 2 metres from the roadside in front of the Church Hall on High Street South (**Figure 2**).

3.1.3 **Table 1** provides details of the council’s three air quality monitoring stations.

Figure 2 Olney Air Quality Monitoring Station

3.2 Diffusion Tube Monitoring

3.2.1 Nitrogen dioxide is extensively monitored in Olney using diffusion tubes attached to the façades of buildings and lamp posts.

3.2.2 There are currently 10 diffusion tube monitoring sites in Olney, seven of which are within the AQMA. Tubes are deployed in triplicate and are co-located on the automatic monitoring station. The tubes are mainly sited on the façades of buildings to measure exposure where people live.

3.2.3 Details of diffusion tube locations can be found in **Table 2**.

3.3 Nitrogen Dioxide Monitoring Data

3.3.1 Automatic monitoring data from MK Council's three monitoring stations and from the 10 diffusion tube locations in Olney are summarised in **Table 3.**

3.3.2 In February 2019 the analysers in all monitoring stations were replaced with new ones supplied by Air Monitors (now ACOEM). There were issues with the new analysers, relating to initial set up and calibration, as discussed in the Annual Status Report 2020. This resulted in higher than expected results in 2019, now rectified. Results for 2020 are back on track.

3.3.3 There is a downward trend for the annual mean NO_2 concentration at all monitoring locations (**Figure 3**). In Olney the automatic monitoring station mean has fallen from 27.0 µg/m^3 in 2012 to 17.8 µg/m^3 in 2020.

3.3.4 Diffusion tubes are co-located on the automatic monitoring stations. Bias adjustment factors are calculated using the Excel spreadsheet provided by the National Physical Laboratory (NPL). In **Table 3** results have been bias adjusted using the co-location factor calculated using the Olney automatic station site. As a comparison, results are also shown using a combined factor derived from all three co-location studies. The combined factor gives slightly higher results.

3.3.5 Bias adjustment calculations are shown in **Appendix A**.

3.3.6 Diffusion tubes located at 10, High Street South (C1,C2,C3) recorded an annual mean of 42.8 µg/m^3 in 2012 reducing to 25.4 µg/m^3 in 2020 (28.8 µg/m^3 using the combined factor).

3.3.7 The trend in annual mean NO_2 concentration at diffusion tube locations is represented in **Figure 4** and clearly shows the downward trend, significantly below the air quality objective.

Appendix G: Olney AQMA Revocation

Table 3 Details of Automatic Monitoring Stations

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
Fixed	Civic Offices, CMK	Urban Centre	485070	239131	NO_2; PM_{10}; $PM_{2.5}$; O_3	No	FIDAS 200E; Chemiluminescence; UV absorption	113 (to residential)	4.8	3.2
Roadbox 1	Wolverton Road, Newport Pagnell	Roadside	486290	243344	NO_2	No	Chemiluminescence	25 (to residential)	3.4	1.5
Roadbox 2	**High Street South, Olney**	**Roadside**	**488922**	**251157**	**NO_2**	**Yes**	**Chemiluminescence**	**11 (to residential)**	**2**	**1.5**

Notes:

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

(2) N/A if not applicable.

Appendix G: Olney AQMA Revocation

Table 4 Details of Non-Automatic Monitoring Sites in Olney

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube co-located with a Continuous Analyser?	Height (m)
C1 C2 C3	10 High St South, (Cowper School House)	Roadside	488914	251173	NO_2	Yes	0	2.0	No	2.3
D1 D2 D3	9 High St South, (Olney Wine Bar)	Roadside	488904	251177	NO_2	Yes	0	1.7	No	2.2
E1 E2 E3	20 High Street	Roadside	488926	251455	NO_2	No	3.3	7.6	No	2.2
F1 F2 F3	17 High Street (Opp. No.20 High St)	Roadside	488905	251456	NO_2	No	0	7.2	No	2.1
G1 G2 G3	Corner of Coneygere and Palmers Road	Suburban	489108	251213	NO_2	No	10.4	1.7	No	2.2
FF1 FF2 FF3	Cross Keys Office, High St South	Roadside	488898	251186	NO_2	Yes	0.2	1.6	No	2.0
HH1 HH2 HH3	33 High Street South (Art Mart)	Roadside	488891	251248	NO_2	Yes	0.6	2.0	No	2.1
JJ1 JJ2 JJ3	Roadbox 2, High Street South	Roadside	488922	251157	NO_2	Yes	10.1	2.0	Yes	2.1
KK1 KK2 KK3	18/20 Bridge Street	Roadside	488917	251068	NO_2	Yes	0.4	2.2	No	2.2
LL1 LL2 LL3	Courtney House, Bridge Street	Roadside	488909	251077	NO_2	Yes	0.4	1.7	No	2.1

Notes:

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

(2) N/A if not applicable.

Table 5 Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	NO_2 Annual Mean Concentration (µg/m^3)									
			2012	2013	2014	2015	2016	2017	2018	2019	2020(1)	2020(2)
Fixed	Urban Centre	Automatic	21.9	20.9	19.0	18.8	18.1	17.0	16.2	23.5	16.4	16.4
Roadbox 1	Roadside	Automatic	36.1	33.2	29.6	27.0	32.8	30.5	25.6	27.1	24.2	24.2
Roadbox 2	Roadside	Automatic	27.0	26.7	27.0	22.3	22.8	22.4	19.9	23.9	17.8	17.8
C1 C2 C3	Roadside	Diffusion Tube	**42.8**	**44.0**	**40.5**	32.9	36.9	33.4	33.9	36.4	25.4	28.8
D1 D2 D3	Roadside	Diffusion Tube	39.6	36.6	34.1	29.5	32.3	31.7	30.2	30.9	22.1	25.0
E1 E2 E3	Roadside	Diffusion Tube	25.8	24.3	21.9	21.6	23.5	21.4	21.3	21.3	15.5	17.6
F1 F2 F3	Roadside	Diffusion Tube	27.8	25.4	26.7	23.6	24.9	25.0	23.1	25.1	17.0	19.3
G1 G2 G3	Suburban	Diffusion Tube	14.5	13.2	12.8	10.5	11.5	11.5	10.8	12.3	7.9	9.0
FF1 FF2 FF3	Roadside	Diffusion Tube	**41.0**	36.2	37.3	32.9	34.0	34.5	30.6	34.6	24.5	27.9
HH1 HH2 HH3	Roadside	Diffusion Tube	37.9	32.6	32.0	28.5	30.5	30.9	26.6	29.1	20.6	23.4
JJ1 JJ2 JJ3	Roadside	Diffusion Tube	27.1	26.4	26.2	22.7	24.5	25.2	23.5	24.8	17.8	20.2
KK1 KK2 KK3	Roadside	Diffusion Tube	**42.4**	**40.2**	**41.3**	34.2	36.3	36.1	32.9	35.8	25.5	29.0
LL1 LL2 LL3	Roadside	Diffusion Tube	**40.1**	33.6	34.6	31.6	33.5	32.1	28.1	30.6	22.4	25.4

Diffusion tube data has been bias corrected: (1) using co-location factor for Roadbox 2 = 0.74, and (2) using combined co-location factor from 3 stations = 0.85

Figure 3 Trends in Annual Mean NO_2 Concentrations – Automatic Stations

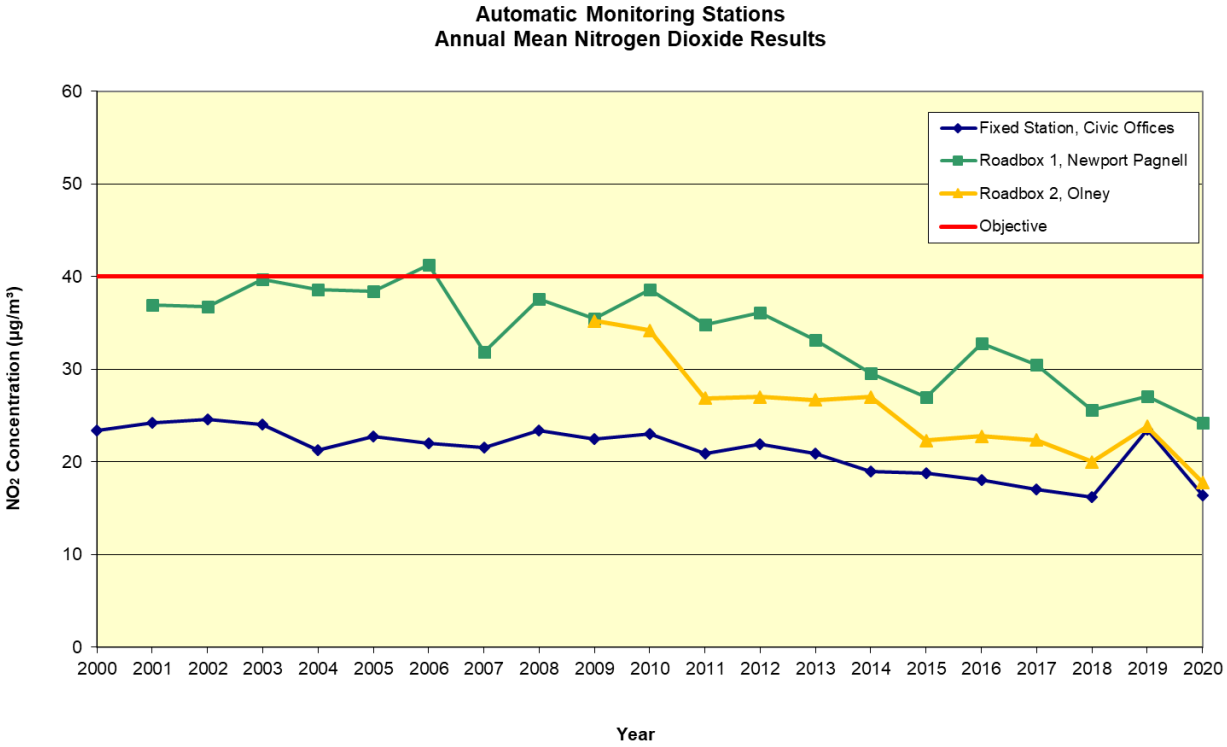
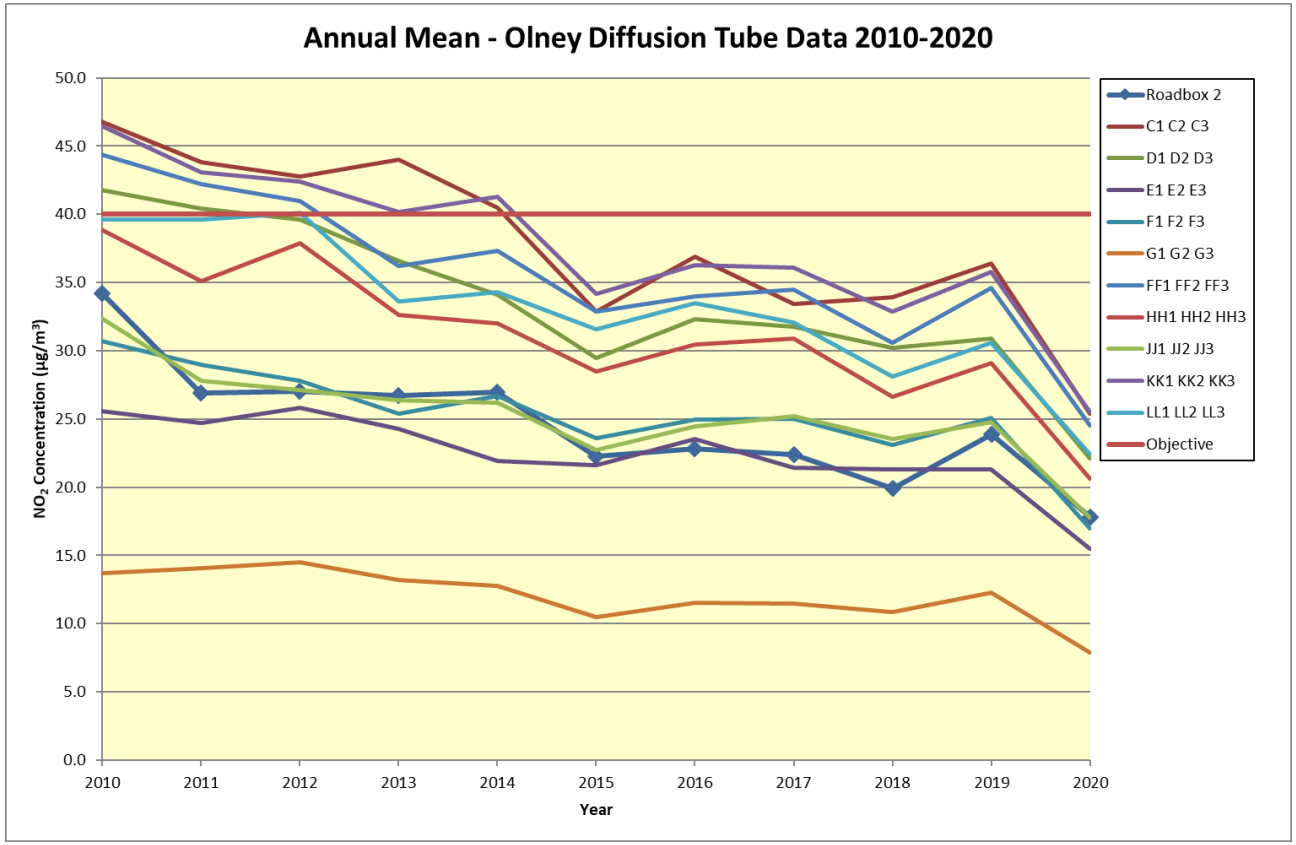


Figure 4 Trends in Annual Mean NO_2 Concentrations - Olney Diffusion Tube Data



4 CONCLUSIONS

4.1 Extensive monitoring of NO_2 levels in Olney has demonstrated that the annual mean objective is comfortably achieved at all locations and consequently the AQMA will be revoked.

4.2 The downward trend in NO_2 concentration is expected to continue in future years as cleaner vehicles replace older less efficient ones.

4.3 There are no plans to relocate the automatic monitoring station in 2021, however, the number of diffusion tube sites will be reviewed.

APPENDIX A – BIAS ADJUSTMENT

Diffusion Tube Bias Adjustment Factors

Nitrogen dioxide diffusion tubes are prepared 'in-house' by Milton Keynes Council using 20% triethanolamine (TEA) in water and are analysed following the procedures set out in the AEA Practical Guidance document produced by the Defra Working Group on Harmonisation of NO_2 Diffusion Tubes that was released early in 2008. The Council participates in the proficiency testing scheme, AIR PT, provided by LGC Standards for quality assurance of diffusion tube analysis and the monthly NO_2 Network Field Intercomparison Exercise managed by the National Physical Laboratory (NPL).

Factors from Local Co-location Studies

Local co-location studies are carried out at all the automatic monitoring stations. Tubes are sited in triplicate near the air intake. In 2020, 3 co-location studies were used to determine the bias adjustment factor; Civic Offices Central Milton Keynes, Olney High Street South and Wolverton Road, Newport Pagnell.

At the time of writing, the bias adjustment factor was not available for the co-location study at Marylebone Road in London or for the National bias adjustment spreadsheet provided by NPL. However, the same spreadsheet was used to calculate bias from local co-location studies as shown in in **Figures 5, 6 and 7** below.

The bias adjustment for Olney was calculated to be **0.74** and the combined factor for all 3 studies was **0.85**.

Figure 5 Co-location Study at Roadbox 2, High Street South, Olney

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	08/01/2020	05/02/2020	45.8	34.6	32.0	37	7.3	19	18.1
2	05/02/2020	04/03/2020	22.3	22.7	23.8	23	0.8	3	1.9
3	04/03/2020	01/04/2020	20.0	21.5	23.5	22	1.8	8	4.4
4	01/04/2020	29/04/2020	18.2	17.9	18.5	18	0.3	2	0.8
5	29/04/2020	03/06/2020	12.1	15.6	16.8	15	2.5	17	6.1
6	03/06/2020	01/07/2020	20.1	21.1	22.8	21	1.4	6	3.4
7	01/07/2020	29/07/2020	15.2	15.8	18.1	16	1.5	9	3.7
8	29/07/2020	02/09/2020	22.8	21.6	23.8	23	1.1	5	2.7
9	02/09/2020	30/09/2020	26.7	25.6	26.2	26	0.6	2	1.4
10	30/09/2020	04/11/2020	26.4	25.5	30.4	27	2.6	10	6.6
11	04/11/2020	02/12/2020	26.2	29.1	29.8	28	1.9	7	4.7
12	02/12/2020	06/01/2021	29.5	30.4	32.5	31	1.5	5	3.8
13									

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

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
25.658	95.01	Good	Good
19.359	94.34	Good	Good
16.873	95.24	Good	Good
12.564	96.13	Good	Good
12	96.19	Good	Good
12	90.48	Good	Good
12	93.45	Good	Good
16	90	Good	Good
17	93.45	Good	Good
20	94.64	Good	Good
25.227	95.09	Good	Good
23.96	96.31	Good	Good
Overall survey -->		Good precision	Good Overall DC

(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Roadbox 2

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

Accuracy (with 95% confidence interval) without periods with CV larger than 20%

Bias calculated using 12 periods of data
Bias factor A: 0.74 (0.68 - 0.8)
Bias B: 36% (25% - 47%)

Diffusion Tubes Mean: 24 µgm^{-3}
Mean CV (**Precision**): 8

Automatic Mean: 18 µgm^{-3}
Data Capture for periods used: 94%

Adjusted Tubes Mean: 18 (16 - 19) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA

Bias calculated using 12 periods of data
Bias factor A: 0.74 (0.68 - 0.8)
Bias B: 36% (25% - 47%)

Diffusion Tubes Mean: 24 µgm^{-3}
Mean CV (**Precision**): 8

Automatic Mean: 18 µgm^{-3}
Data Capture for periods used: 94%

Adjusted Tubes Mean: 18 (16 - 19) µgm^{-3}

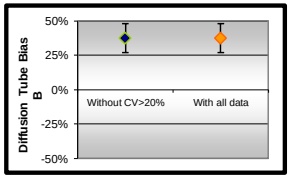


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Figure 6 Co-location Study at Roadbox 1, Wolverton Road, Newport Pagnell

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	08/01/2020	05/02/2020	41.8	39.3	35.6	39	3.1	8	7.8	33.34	92.41	Good	Good
2	05/02/2020	04/03/2020	28.8	31.2	27.9	29	1.7	6	4.3	27.58	90.48	Good	Good
3	04/03/2020	01/04/2020	23.3	30.1	26.2	27	3.4	13	8.6	26.12	85.86	Good	Good
4	01/04/2020	29/04/2020	17.5	17.9	18.7	18	0.6	3	1.5	17.11	83.78	Good	Good
5	29/04/2020	03/06/2020	13.8	17.9	17.6	16	2.3	14	5.7	17	94.29	Good	Good
6	03/06/2020	01/07/2020	21.9	21.9	23.2	22	0.8	3	1.9	16	94.5	Good	Good
7	01/07/2020	29/07/2020	26.1	26.4	22.4	25	2.2	9	5.6	19	94.2	Good	Good
8	29/07/2020	02/09/2020	25.3	22.8	24.9	24	1.3	5	3.3	20	94.4	Good	Good
9	02/09/2020	30/09/2020								22	93.3		Good
10	30/09/2020	04/11/2020	30.0	30.6	28.5	30	1.1	4	2.7	24	93.57	Good	Good
11	04/11/2020	02/12/2020	32.3	33.4	33.7	33	0.7	2	1.8	37.57	94.35	Good	Good
12	02/12/2020	06/01/2021	31.5	30.5	31.5	31	0.6	2	1.4	32.86	94.64	Good	Good
13													
											Overall survey -->	Good precision	Good Overall DC

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

(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Roadbox 1

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

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 11 periods of data	
Bias factor A	0.92 (0.83 - 1.02)
Bias B	9% (-2% - 20%)
Diffusion Tubes Mean:	27 μgm^{-3}
Mean CV (Precision):	6
Automatic Mean:	25 μgm^{-3}
Data Capture for periods used:	92%
Adjusted Tubes Mean:	25 (22 - 27) μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 11 periods of data	
Bias factor A	0.92 (0.83 - 1.02)
Bias B	9% (-2% - 20%)
Diffusion Tubes Mean:	27 μgm^{-3}
Mean CV (Precision):	6
Automatic Mean:	25 μgm^{-3}
Data Capture for periods used:	92%
Adjusted Tubes Mean:	25 (22 - 27) μgm^{-3}

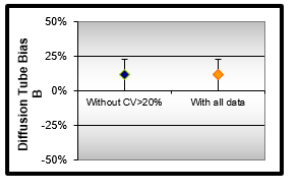

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Figure 7 Co-location Study at Civic Offices Central Milton Keynes

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	08/01/2020	05/02/2020	20.1	24.2	21.6	22	2.1	9	5.1	24.08	93.6	Good	Good
2	05/02/2020	04/03/2020	18.7	15.0	19.7	18	2.5	14	6.2	18.41	94.49	Good	Good
3	04/03/2020	01/04/2020	15.8	13.5		15	1.6	11	14.5	16.1	94.34	Good	Good
4	01/04/2020	29/04/2020	9.9	10.2	11.6	11	0.9	9	2.3	12.65	94.49	Good	Good
5	29/04/2020	03/06/2020	6.3	8.9	8.6	8	1.4	18	3.6	12	91.43	Good	Good
6	03/06/2020	01/07/2020	12.6	14.0	11.3	13	1.4	11	3.4	12	94.49	Good	Good
7	01/07/2020	29/07/2020	10.2	10.9	13.0	11	1.5	13	3.6	12	91.82	Good	Good
8	29/07/2020	02/09/2020	16.0	15.4	15.3	16	0.4	2	0.9	15	94.88	Good	Good
9	02/09/2020	30/09/2020	14.2	15.7		15	1.1	7	9.5	16	94.64	Good	Good
10	30/09/2020	04/11/2020	19.2	19.3	16.8	18	1.4	7	3.4	18	94.4	Good	Good
11	04/11/2020	02/12/2020	27.2	25.4	25.7	26	1.0	4	2.4	23.25	94.49	Good	Good
12	02/12/2020	06/01/2021	25.3	23.5	23.9	24	0.9	4	2.3	16.97	95.12	Good	Good
13													
											Overall survey -->	Good precision	Good Overall DC

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

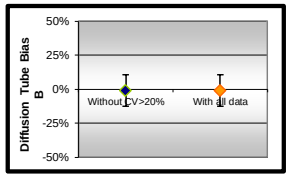
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Fixed Station

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

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 12 periods of data	
Bias factor A	1 (0.89 - 1.13)
Bias B	0% (-11% - 12%)
Diffusion Tubes Mean:	16 μgm^{-3}
Mean CV (Precision):	9
Automatic Mean:	16 μgm^{-3}
Data Capture for periods used:	94%
Adjusted Tubes Mean:	16 (15 - 18) μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 12 periods of data	
Bias factor A	1 (0.89 - 1.13)
Bias B	0% (-11% - 12%)
Diffusion Tubes Mean:	16 μgm^{-3}
Mean CV (Precision):	9
Automatic Mean:	16 μgm^{-3}
Data Capture for periods used:	94%
Adjusted Tubes Mean:	16 (15 - 18) μgm^{-3}



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4. Milton Keynes Council, Annual Status Report 2020.

5. Milton Keynes Council, Air Quality Action Plan 2012.

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 Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm 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

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