2018 Air Quality Annual Status Report (ASR)

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

June 2018

Local Authority Officer	David Parrish, Megan Harrison
Department	Environmental Health
Address	Civic Offices, 1 Saxon Gate East, Milton Keynes, MK9 3EJ
Telephone	01908 252449
E-mail	david.parrish@milton-keynes.gov.uk
Report Reference number	M18053
Date	June 2018

Executive Summary: Air Quality in Our Area

Overview of Air Quality in Milton Keynes

The main findings and conclusions of this report are that in 2017, the 50th anniversary of Milton Keynes being designated a new town, air quality objectives were achieved at all monitoring locations throughout the Borough. In the Olney Air Quality Management Area (AQMA), the annual mean nitrogen dioxide objective has not been exceeded for the third year running; if it continues to be met during the next two years the AQMA will be revoked. This is very encouraging, however much depends on continued improvements of emissions from vehicles and on meteorology throughout the calendar year, which has a strong influence on air quality. The slight overall downward trend in monitored concentrations has continued in 2017 but is becoming less pronounced.

As part of MK Council's Go Ultra Low City programme, The Electric Vehicle Experience Centre opened in Milton Keynes Shopping Centre in summer 2017. It's the UK's first brand neutral showroom for electric vehicles (EVs) and plug-in hybrid electric vehicles (PHEVs) providing education and advice on choosing and using Ultra Low Emission Vehicles (ULEVs). There is a range of vehicles available to be booked for a 20-minute test drive and for four or seven day loan periods.

Milton Keynes now has over 300 public charge points, the largest electric vehicle charging point networks in the country. To make the switch to electric easier, if it's not possible to have a Homecharge unit installed directly at your home address; MK Council will install a charge point close to your home. For businesses, there is funding available from MK Council to have charge points installed at no cost, full details can be found on the EV Centre website.

Figure 1 The Electric Vehicle Experience Centre

Figure 2 Electric vehicles available to test drive from the EV Centre.

The council's "get cycling" program has a wealth of information on cycle routes and Redways, training (including adults), local groups and clubs, parking and changing facilities, cycle hire including adapted bikes.

The MK Futures 2050 Commission identified sustainable mobility, tackling congestion and improving accessibility as project four of its "Six Big Projects". The Mobility Strategy (Local Transport Plan 4 (LTP4)), covering the period 2018 to 2036, was adopted by MK Council Cabinet in March 2018. The First and Last Mile Strategy was submitted to the National Infrastructure Commission in November 2017 and forms part of a wider review of transport to support growth across the corridor between Oxford-Milton Keynes-Cambridge and address future congestion issues.

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 and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas[1,2].

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

The main source of oxides of nitrogen and 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 NO_2 and 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. In 2015,2016 and 2017, the annual mean objective for NO_2 was not exceeded at any monitoring location throughout the Borough, including within the AQMA.

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

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 Anglian Region).

Actions to Improve Air Quality

Funding has been obtained from the Department for Transport (DfT) to complete the conversion of the A421 into dual carriageway from Eagle Farm North to junction 13 of the M1 and ease congestion on this major route.

East West Rail is a scheme to re-establish a rail link between Cambridge and Oxford. The Western Section of the route (Oxford to Bedford and Milton Keynes to Princes Risborough) will be upgraded and disused sections reinstated. The scheme is being funded by the Department for Transport, with contributions from local councils. It is being delivered by Network Rail and could be operational in the early 2020s. Design work has started on an eastern entrance to Bletchley station and plans and environmental assessments for the route have been completed.

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.

Local Engagement 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 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.

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.

Figure 3 Smarter Travel in MK web page

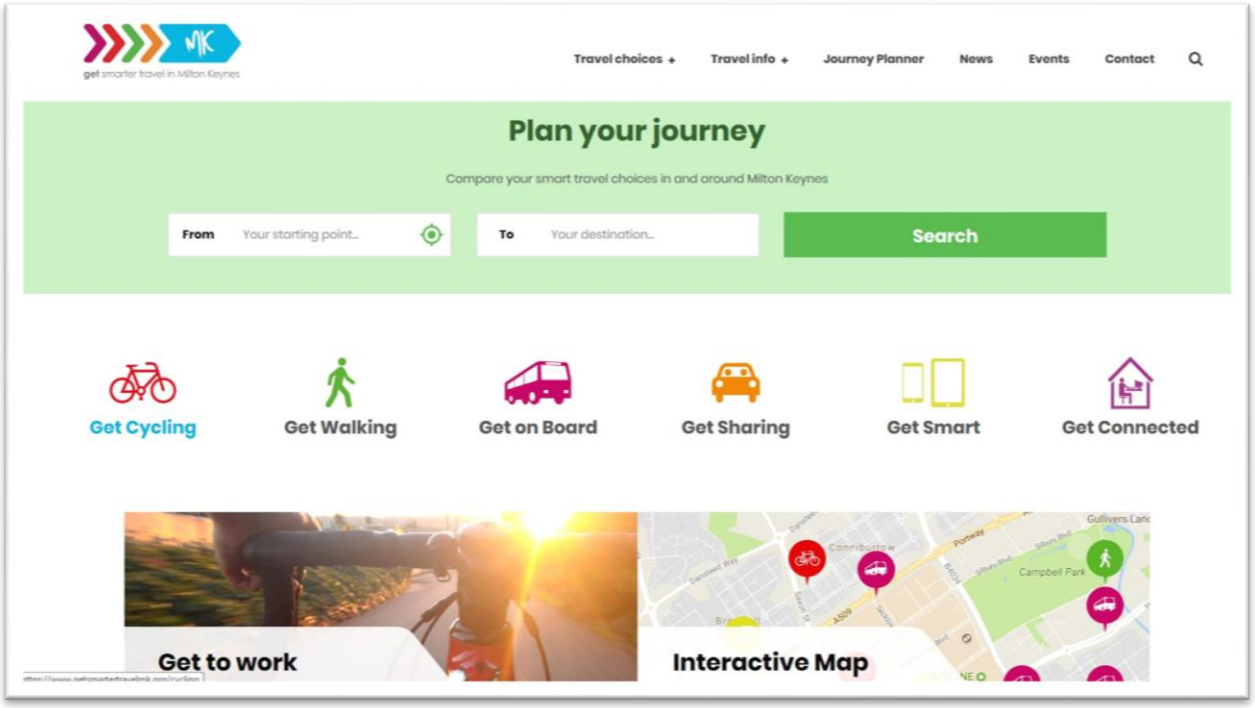


Table of Contents

List of Tables

List of Figures

1 Local Air Quality Management

This report provides an overview of air quality in the Borough of Milton Keynes during 2017. 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 can be found in Table E.1 in Appendix E.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of the objectives.

A summary of AQMAs declared by Milton Keynes Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=165.

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

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)				Action Plan		
						At Declaration		Now		Name	Date of Publication	Link
Olney AQMA	Declared December 2008	NO2 Annual Mean	Olney	An area in Olney encompassing all properties fronting Bridge Street and High Street South, and also including part of Market Place.	NO	43.20	µg/m^3	36.07	µg/m^3	Olney Action Plan	2012	http://www.milton-keynes.gov.uk/assets/attach/12676/Olney_Action_Plan_Oct12.pdf

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

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

Defra's appraisal of last year's ASR suggested that consideration should be given to the potential revocation of the Olney AQMA and that additional diffusion tube monitoring in the AQMA may provide further evidence. Monitoring was reviewed as a result of the comment; there are currently 7 diffusion tube sites within the AQMA and 3 sites just outside the AQMA, each location having 3 tubes (i.e. 30 tubes in total). No additional monitoring or changes to location were considered to be beneficial. With regard to bias adjustment factors, Marylebone Road co-location site is included to obtain an overall factor as it provides an additional test of the performance of our diffusion tubes measured against a different NOx analyser. As we are expecting to be able to procure new analysers late 2018, the results obtained from these will need to be assessed with historical data before any decisions are made in revoking the AQMA.

The appraisal recommended a review of monitoring to consider locations that have not previously been monitored and an extra seven sites were added to the network. These were at the railway station in Milton Keynes (2 sites), on Buckingham Road, Bletchley (2 sites), in CMK bus hub (2 sites) and on Water Eaton Road, Bletchley. Results at all these locations are below the annual mean objective.

The appraisal also asked about the Olney Air Quality Action Plan (AQAP). The Mobility Strategy adopted in March 2018 contains Borough-wide measures to reduce congestion and improve air quality and actions in Table 2.2 have superseded those within the AQAP 2012.

Milton Keynes Council has taken forward a number of measures during the current reporting year of 2017 in pursuit of improving local air quality both within the AQMA and throughout the Borough. Details of all measures completed, in progress or planned are set out in Table 2.2.

Key completed measures are:

- Expansion of the electric vehicle charging network, especially rapid charge points. Total number of charge points is now over 300.

- Go Ultra Low City Scheme - The Electric Vehicle Experience Centre opened in the main shopping centre.
- Smarter choices website became live.
- Get on Board *zwitch campaign promoting bus use with rewards.
- Love to Ride cycling promotion scheme introduced.
- A redway was upgraded into a “Super Redway”.
- Modeshift STARS scheme, 28 schools are registered.
- Bletchley “Fixing the Links” scheme was delivered.

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

- Upgrading a second Redway route into a “Super Redway”.
- A509/A422 Willen Road to Olney road upgrade.
- Procurement and commissioning of replacement air quality monitoring analysers and communication system.

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

- Encouraging the continued uptake of ULEVs following the MK Go Ultra-Low City scheme.
- Promoting the Get Smarter Travel MK initiative.
- Progressing the measures in the Mobility Strategy and the First and Last Mile Strategy.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations Involved and Funding source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to Implementation
1	Go Ultra Low City Scheme	Promoting Low Emission Transport	Other	MK Council	2015	2016-2020	ULEV ownership per capita	n/a	EV Centre opened in Centre:MK	2020	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	MK Council	Ongoing	Ongoing	Number of recharging events No of charge points	n/a	170 standard and 56 rapid charge points installed. CHECK ONLINE	Ongoing	Looking to install more in residential areas
3	Vivacity - a sensor network providing real-time transport information; volume, classification, speed, turning counts, parking availability.	Traffic Management	UTC, Congestion management, traffic reduction	MK Council/Vivacity	2016	2017/2018		n/a	Approx. 400 sensors on highway and 1300 on parking	2018	Funding discussions underway for continuation of project.
4	Urban Traffic Management Control (UTMC) system	Traffic Management	UTC, Congestion management, traffic reduction	MK Council, DfT, National Productivity Infracstructure Fund	2017	By 2020			Procurement of suppliers	2020	Installing an urban traffic management control system, inc bus prioriy measures.

Measure No.	Measure	EU Category	EU Classification	Organisations Involved and Funding source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to Implementation
5	UK Auto Drive programme	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	MK Council, Government, industries £19.4M	Nov-15	Nov-15			Trialing of driverless pods on shared footpaths ongoing. Trialing of driverless cars on public highways in MK started March 2018	Nov-18	Research, development and integration of automated and connected vehicles http://www.ukautodrive.com/the-uk-autodrive-project/
6	Free ULEV green car parking permit	Promoting Low Emission Transport	Priority parking for LEV's	MK Council	2016	2016	Number of permits issued	n/a	Introduced July 2016	ongoing	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	MK Council	2011	ongoing	various	n/a	ongoing	ongoing	New website developed https://www.getsmartertravelmk.org/
8	Get on Board - *zwitch campaign	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	MK Council / Empower EU Horizon 2020	2017	2017			completed		Winter campaign promoting bus use with rewards
9	Love to Ride - website encouraging cycling – cycle September June bike week. Prizes	Promoting Travel Alternatives	Promotion of cycling	MK Council / Empower EU Horizon 2020	2017	2017			ongoing	ongoing	Cycle incentives website https://www.lovetoride.net/miltonkeynes
10	Super Redway Routes	Transport Planning and Infrastructure	Cycle network	MK Council	2017	2017			H6 super route completed	ongoing	Work commenced on second Super Redway
11	Cycling information, events and opportunities	Public Information	Via the Internet	MK Council	2011	ongoing		n/a	ongoing	ongoing	Pedalling Culture Website developed http://www.pedallingculture.com/
12	Santander bike hire	Transport Planning and Infrastructure	Public cycle hire scheme	Santander /nextbike	2015	2016/17	Number of hires	n/a	300 bikes 42 docking stations	2017	Some stations closed due to vandalism

Measure No.	Measure	EU Category	EU Classification	Organisations Involved and Funding source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to Implementation
13	Modeshift STARS – national schools awards scheme	Promoting Travel Alternatives	School Travel Plans	DfT funding	2017	2017			28 schools registered to participate	ongoing	Walk to school, bike school and scooter training https://modeshiftstars.org/
14	First and Last Mile Strategy	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	MK Council	2017	2018-2050		n/a	Submitted to National Infrastructure Commission (NIC)	2050	https://www.nic.org.uk/wp-content/uploads/Milton-Keynes-First-Last-mile-strategy.pdf
15	East West Expressway	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	Highways England / MK Council and other LAs	2016	Approx. 2021				2030	
16	East West Rail	Promoting Travel Alternatives	Promote use of rail and inland waterways	East West Rail Consortium / Network Rail	Western section Phase 2	ongoing		n/a		2024 (estimated for western section)	Eastern entrance design work underway
17	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	Central Beds/Council/MK Council. Funding from DfT £22.5m		Mar-19			Design completed	Autumn/ winter 2020	

Measure No.	Measure	EU Category	EU Classification	Organisations Involved and Funding source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to Implementation
18	A421 Dualling	Traffic management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	MK Council	2008 - 15	2016		n/a	completed	completed	
19	A509/A422 Willen Road to Olney improvements	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	MK Council Dft £3.9M funding	Summer 2017	Summer 2017			Ongoing	Summer 2018	https://www.milton-keynes.gov.uk/pressreleases/2017/aug/council-awarded-3-9m-after-successful-bid-to-improve-highways
20	Highways England All Lane Running 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	Highways England	2016	May-18		Environmental report found NO2 emissions not significant and scheme will ease congestion	Complete the design phase December 2017 Works start May 2018	Mar-22	https://highwaysengland.co.uk/projects/m1-junction-13-to-junction-16-smart-motorway/
21	Bletchley – Fixing the Links	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	MK Council	2015	2016		n/a	completed	completed	
22	Real time passenger information (RTPI) – bus routes	Transport planning and infrastructure	Bus route improvements	MK Council	2012	2014 - ongoing		n/a	Most key routes now have RTPI	ongoing	

Measure No.	Measure	EU Category	EU Classification	Organisations Involved and Funding source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to Implementation
23	Living Streets Community Project	Other	Other	MK Council, Life EU funding £28K	2016	2017			completed	Jun-17	Project to temporarily transform streets to community areas. https://www.milton-keynes.gov.uk/environmental-health-and-trading-standards/mk-low-carbon-living/living-streets-community-project
24	Hot Maps - mapping tools to encourage district heating schemes	Policy Guidance and Development Control	Sustainable Procurement Guidance	MK Council, EU Horizon 2020 £50K	Dec-16	2020			assessment phase	2020	Encourage more district heating schemes, expanding the heat network in CMK https://www.milton-keynes.gov.uk/environmental-health-and-trading-standards/mk-low-carbon-living/hotmaps

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 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; https://www.milton-keynes.gov.uk/social-care-and-health/health-and-wellbeing-board/health-and-wellbeing-strategies-and-the-jsna

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. The government's draft Clean Air Strategy 2018 identifies domestic wood and solid fuel burning as a major source of locally derived $PM_{2.5}$ emissions (up to 38%).

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.
- 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.
- 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

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 2017. Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at http://uk-air.defra.gov.uk/data/

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 44 sites during 2017. All tubes are deployed in duplicate or triplicate. Table A.2 in Appendix A shows 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.

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 and any other adjustments applied (e.g. "annualisation" and/or distance correction), are included in Appendix C.

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40 µg/m^3.

For diffusion tubes, the full 2017 dataset of monthly mean values is provided in Appendix B.

Table A.4 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past 5 years with the air quality objective of 200 µg/m^3, not to be exceeded more than 18 times per year.

There are no exceedences of either the annual or hourly objectives at any monitored location throughout the Borough. For the third year running all diffusion tube locations within the Olney AQMA recorded annual means below the objective. The highest value was 36.1 µg/m^3 recorded at the façade of 18/20 Bridge Street, Olney. The automatic analyser in Olney recorded an annual mean of 22.4 µg/m^3.

Figure A.1 shows a graph of the annual mean data from the automatic air quality stations. There is a downward trend at all three monitoring stations.

3.2.2 Particulate Matter (PM_{10})

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of 40 µg/m^3.

Table A.6 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the air quality objective of 50 µg/m^3, not to be exceeded more than 35 times per year.

Automatic monitoring results have been adjusted using the Volatile Correction Method (VCM) as developed by ERG at King's College, London for TEOM analysers. Low data capture for PM_{10} at the Olney monitoring station has been annualised in line with the recommendations given in the LAQM TG (16); further details can be found in Appendix C.

An ongoing intermittent fault that could not be rectified on the Teom analyser in Olney (Roadbox 2) resulted in low data capture; final data capture for PM_{10} was reduced to 43.5%. The decision was taken to discontinue monitoring PM_{10} at this location on 8th November 2017. Details can be found in Appendix C.

There were no exceedences of either the annual mean or daily mean objectives. The Civic Offices station recorded an annual mean concentration of 14.5 µg/m^3, and the Olney station annual mean was 16.5 µg/m^3, both well within the objective. Figure A.2 shows there is a slight downward trend at both stations over the last 10 years that is less pronounced in 2016/2017.

3.2.3 Particulate Matter ($PM_{2.5}$)

No specific $PM_{2.5}$ monitoring is undertaken within the Borough of Milton Keynes, however, an analyser capable of measuring both $PM_{2.5}$ and PM_{10} may be specified as a future replacement. Estimates of local $PM_{2.5}$ concentrations can be made by referring to background maps, surrogate data from AURN sites and by using local PM_{10} data adjusted using the methodology in the technical guidance.

Based on the 2015 maps available on the Defra UK-Air website, the projected 2017 average background $PM_{2.5}$ concentration in Milton Keynes is 10.9 µg/m^3. An estimation of $PM_{2.5}$ concentration can be made from PM_{10} monitoring data by applying the nationally derived correction factor of 0.7, as described in Chapter 7 Section 1 paras 7.107 to 7.111 of the Technical Guidance. The estimated $PM_{2.5}$ annual mean concentration at the Civic Offices is 10.2 µg/m^3 and at the Olney station the estimated concentration is 11.5 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. An analyser has been retained at the Civic Offices air quality station and can be brought back on line if needed in the future.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
Fixed	Civic Offices, CMK	Urban Centre	485070	239131	NO_2; PM_{10}; O_3	NO	Chemiluminescence; Teom 1400AB; 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

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)
B1 B2	Northampton Rd, Lavendon (Horseshoe PH)	Roadside	491769	253542	NO_2	NO	0.6	3	NO	2.1
C1 C2 C3	10 High St South, Olney (Cowper School House)	Roadside	488914	251173	NO_2	YES	0	2	NO	2.3
D1 D2 D3	9 High St South, Olney (Olney Wine Bar)	Roadside	488904	251177	NO_2	YES	0	1.7	NO	2.2
E1 E2 E3	20 High St, Olney	Roadside	488926	251455	NO_2	NO	3.3	7.6	NO	2.2
F1 F2 F3	17 High St, Olney (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 Rd, Olney	Suburban	489108	251213	NO_2	NO	10.4	1.7	NO	2.2
H1 H2	76 High St, Newport Pagnell	Roadside	487514	243901	NO_2	NO	2.3	2.2	NO	2.4

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)
I1 I2	63 High St, Newport Pagnell	Kerbside	487588	243912	NO_2	NO	2	0.4	NO	2.4
J1 J2	57 High St, Newport Pagnell (The Plough PH)	Kerbside	487620	243922	NO_2	NO	2	0.4	NO	2.4
K1 K2	16-17 Greenlands, Newport Pagnell	Suburban	486296	243208	NO_2	NO	10.1	1.6	NO	2.1
L1 L2	5-7 Greenlands, Newport Pagnell	Suburban	486345	243230	NO_2	NO	5.4	1.4	NO	2.5
M1 M2	42-44 Walnut Close, Newport Pagnell	Suburban	486495	243345	NO_2	NO	7.6	1.5	NO	2.0
N1 N2	222 Wolverton Rd, Blakelands	Suburban	486069	243148	NO_2	NO	25	1.6	NO	2.2
O1 O2	64 Nicholas Mead, Great Linford	Urban Background	486039	241484	NO_2	NO	2.4	4	NO	1.9
R1 R2 R3	Static Air Quality Station (Civic Offices)	Urban Centre	485070	239131	NO_2	NO	113	4.8	YES	3.5
S1 S2 S3	Roadbox 1 (Newport Pagnell)	Roadside	486290	243344	NO_2	NO	25.8	1.8	YES	2.4

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)
T1 T2	Silbury Boulevard, CMK (corner of North Tenth St)	Kerbside	485298	239126	NO_2	NO	28.2	0.9	NO	2.5
V1 V2	63 Windsor St, Wolverton	Suburban	481412	240860	NO_2	NO	2.3	1.1	NO	2.3
W1 W2	130 Newport Rd, New Bradwell	Roadside	482965	241515	NO_2	NO	6.1	1.6	NO	2.4
AA1 AA2	Brook Farm, Broughton Rd, Middleton	Suburban	489237	239016	NO_2	NO	23	1	NO	2.1
BB1 BB2	14-16 Newport Rd, Wavendon	Roadside	491498	237284	NO_2	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	0.2	1.6	NO	2.0

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)
HH1 HH2 HH3	33 High Street South, Olney (Art Mart)	Roadside	488891	251248	NO_2	YES	0.6	2	NO	2.1
JJ1 JJ2 JJ3	Roadbox 2 (Olney)	Roadside	488922	251157	NO_2	YES	10.1	2	YES	2.1
KK1 KK2 KK3	18/20 Bridge St, Olney	Roadside	488917	251068	NO_2	YES	0.4	2.2	NO	2.2
LL1 LL2 LL3	Courtney House, Bridge St, Olney	Roadside	488909	251077	NO_2	YES	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	7.6	NO	2.5
PP1 PP2	1 Tudor Gardens, Stony Stratford	Suburban	479459	239536	NO_2	NO	17	2.3	NO	2.2
QQ1 QQ2	Silver Street, Stony Stratford	Suburban	478740	240217	NO_2	NO	3	0.9	NO	2.0
RR1 RR2	Horsefair Green, Stony Stratford	Suburban	478882	240265	NO_2	NO	3.5	2.6	NO	2.0

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)
SS1 SS2	Stratford Road, Wolverton (Tesco End)	Roadside	481966	241314	NO_2	NO	n/a	1.4	NO	2.5
SS3 SS4	Stratford Road, Wolverton (Station End)	Roadside	481993	241328	NO_2	NO	n/a	1.4	NO	2.5
TT1 TT2	62 High Street, Newport Pagnell (Co-Op North)	Roadside	487589	243923	NO_2	NO	n/a	4.2	NO	2.0
TT3 TT4	77 High Street, Newport Pagnell (Co-Op South)	Roadside	487585	243895	NO_2	NO	n/a	3.7	NO	2.3
UU	Buckingham Road, under bridge	Other	486891	233588	NO_2	NO	n/a	2.3	NO	2.6
VV	Buckingham Road, zebra crossing	Roadside	486938	233606	NO_2	NO	n/a	2.6	NO	2.7
WW	Bus stop outside MacDonalds CMK	Urban Centre	485390	238915	NO_2	NO	n/a	0.8	NO	2.2
XX	Bus stop near Point CMK	Urban Centre	485462	238935	NO_2	NO	n/a	1.4	NO	2.2

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)
YY	Railway station taxi rank near Z1	Other	484234	238088	NO_2	NO	n/a	1.4	NO	2.0
ZZ	Railway station bus stop Y4	Other	484262	238072	NO_2	NO	n/a	1.6	NO	2.0
WER	97 Water Eaton Road, Bletchley	Roadside	487395	233174	NO_2	NO	12	2.5	NO	2.4

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2017 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2013	2014	2015	2016	2017
Fixed	Urban Centre	Automatic	98	98	20.90	19.00	18.80	18.07	17.02
Roadbox 1	Roadside	Automatic	99.6	99.6	33.20	29.60	27.00	32.83	30.51
Roadbox 2	Roadside	Automatic	97.1	97.1	26.70	27.00	22.30	22.80	22.36
B1 B2	Roadside	Diffusion Tube	100	100	20.30	19.30	17.00	17.57	18.81
C1 C2 C3	Roadside	Diffusion Tube	100	100	44.00	40.50	32.90	36.91	33.41
D1 D2 D3	Roadside	Diffusion Tube	100	100	36.60	34.10	29.50	32.31	31.74
E1 E2 E3	Roadside	Diffusion Tube	91.7	91.7	24.30	21.90	21.60	23.53	21.43
F1 F2 F3	Roadside	Diffusion Tube	100	100	25.40	26.70	23.60	24.94	24.99
G1 G2 G3	Suburban	Diffusion Tube	100	100	13.20	12.80	10.50	11.54	11.50
H1 H2	Roadside	Diffusion Tube	100	100	28.30	26.40	22.80	25.49	26.58
I1 I2	Kerbside	Diffusion Tube	100	100	34.20	31.10	27.70	30.64	29.50
J1 J2	Kerbside	Diffusion Tube	100	100	35.50	34.20	30.10	31.43	31.05
K1 K2	Suburban	Diffusion Tube	100	100	26.00	28.40	25.60	23.40	24.76
L1 L2	Suburban	Diffusion Tube	100	100	25.70	25.00	22.30	21.77	24.42

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2017 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2013	2014	2015	2016	2017
M1 M2	Suburban	Diffusion Tube	100	100	20.20	19.90	18.00	18.13	19.18
N1 N2	Suburban	Diffusion Tube	100	100	29.30	24.70	20.10	23.19	20.96
O1 O2	Urban Background	Diffusion Tube	100	100	18.40	17.70	15.10	17.38	17.09
R1 R2 R3	Urban Centre	Diffusion Tube	100	100	20.40	19.40	17.10	18.92	18.23
S1 S2 S3	Roadside	Diffusion Tube	100	100	32.20	31.40	29.60	28.96	30.28
T1 T2	Kerbside	Diffusion Tube	100	100	25.30	23.70	21.10	23.45	23.13
V1 V2	Suburban	Diffusion Tube	100	100	18.00	15.20	14.70	15.81	14.25
W1 W2	Roadside	Diffusion Tube	100	100	23.00	20.10	17.80	19.90	19.15
AA1 AA2	Suburban	Diffusion Tube	100	100	17.90	15.80	13.30	15.91	14.94
BB1 BB2	Roadside	Diffusion Tube	100	100	24.70	23.70	19.40	21.12	19.29
DD1 DD2	Roadside	Diffusion Tube	100	100	25.90	24.20	20.10	22.55	20.69
EE1 EE2	Suburban	Diffusion Tube	100	100	13.60	12.60	10.80	11.87	11.88
FF1 FF2 FF3	Roadside	Diffusion Tube	100	100	36.20	37.30	32.90	33.99	34.48
HH1 HH2 HH3	Roadside	Diffusion Tube	75	75	32.60	32.00	28.50	30.45	30.89
JJ1 JJ2 JJ3	Roadside	Diffusion Tube	100	100	26.40	26.20	22.70	24.49	25.22
KK1 KK2 KK3	Roadside	Diffusion Tube	100	100	40.20	41.30	34.20	36.28	36.07

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2017 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2013	2014	2015	2016	2017
LL1 LL2 LL3	Roadside	Diffusion Tube	100	100	33.60	34.30	31.60	33.50	32.10
MM1 MM2	Urban Background	Diffusion Tube	100	100	23.70	24.00	22.00	24.11	25.69
OO1 OO2	Roadside	Diffusion Tube	91.7	91.7	21.70	18.10	17.60	20.79	18.61
PP1 PP2	Suburban	Diffusion Tube	100	100	12.80	10.60	9.20	11.12	9.85
QQ1 QQ2	Suburban	Diffusion Tube	100	100	22.40	19.80	18.60	17.95	16.91
RR1 RR2	Suburban	Diffusion Tube	100	100	25.40	22.30	20.20	22.13	21.16
SS1 SS2	Roadside	Diffusion Tube	100	100	27.10	27.30	23.00	25.31	24.99
SS3 SS4	Roadside	Diffusion Tube	91.7	91.7	34.60	31.90	27.60	33.28	32.58
TT1 TT2	Roadside	Diffusion Tube	100	100	_	34.20	27.60	27.12	27.53
TT3 TT4	Roadside	Diffusion Tube	100	100	_	27.40	23.10	24.62	24.04
UU	Other	Diffusion Tube	90.9	83.3	_	_	_	_	32.30
VV	Roadside	Diffusion Tube	100	91.7	_	_	_	_	20.83
WW	Urban Centre	Diffusion Tube	100	75	_	_	_	_	21.19
XX	Urban Centre	Diffusion Tube	100	75	_	_	_	_	25.11
YY	Other	Diffusion Tube	100	75	_	_	_	_	34.78
ZZ	Other	Diffusion Tube	100	75	_	_	_	_	30.71

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2013	2014	2015	2016	2017
WER	Roadside	Diffusion Tube	100	25	–	–	–	–	20.89

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

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

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

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

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

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

Figure A.1 – Trends in Annual Mean NO_2 Concentrations

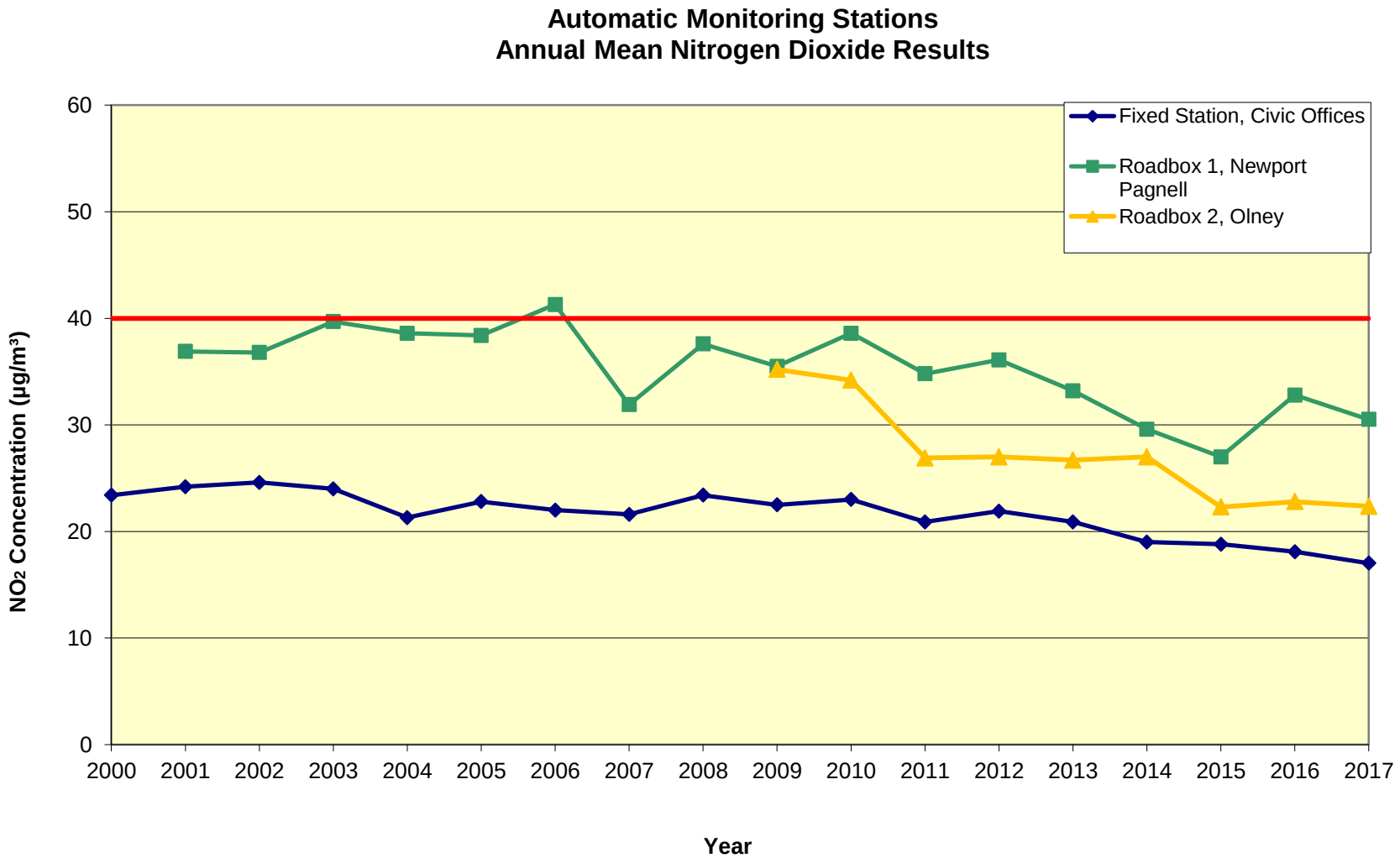


Table A.4 – 1-Hour Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2013	2014	2015	2016	2017
Fixed	Urban Centre	Automatic	98	98	0	0 (88.1)	0	0 (99.1)	0
Roadbox 1	Roadside	Automatic	99.6	99.6	0	0	0	0 (110.3)	0
Roadbox 2	Roadside	Automatic	97.1	97.1	0	0	0	0	0

Notes:

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

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

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

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

Table A.5 – Annual Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	PM_{10} Annual Mean Concentration ($\mu g/m^3$) (3)				
				2013	2014	2015	2016	2017
Fixed	Urban Centre	98.9	98.9	15.7	14.7	14.8	14.2	14.5
Roadbox 1	Roadside	n/a	n/a	19.2	18.0	n/a	n/a	n/a
Roadbox 2	Roadside	52.9	43.5	20.8	19.1	16.7	17.4	16.5

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

Notes:

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

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

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

(3) All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

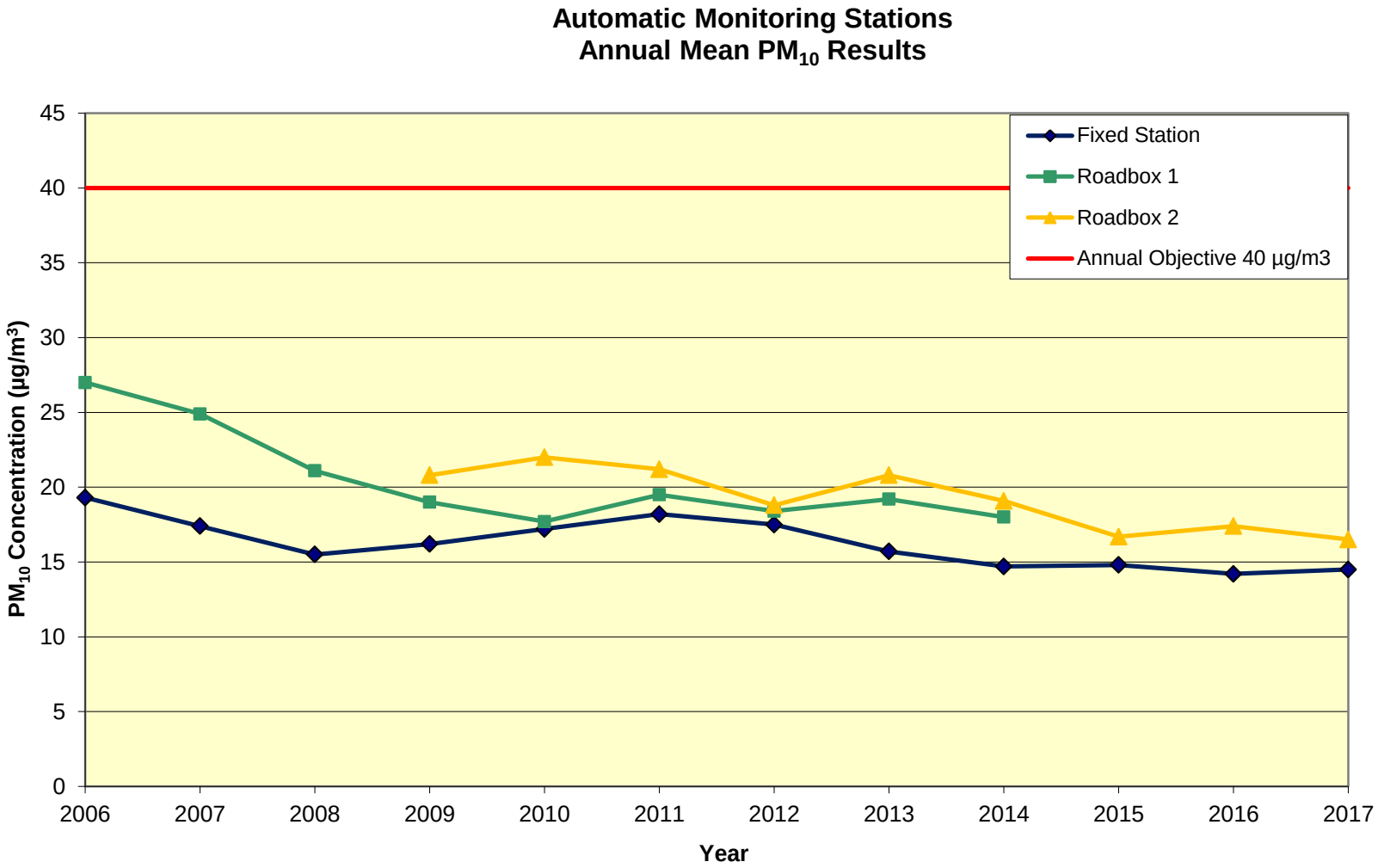


Table A.6 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
				2013	2014	2015	2016	2017
Fixed	Urban Centre	98.9	98.9	1	4	1	1	2
Roadbox 1	Roadside	n/a	n/a	4	4	-	-	-
Roadbox 2	Roadside	52.9	43.5	1	3	0	1	2 (29.3)

Notes:

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

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

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2017

Table B.1 – NO_2 Monthly Diffusion Tube Results - 2017

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.77) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
B1 B2	54.7	29.9	29.9	21.2	12.4	15.4	14.4	19.7	21.7	22.4	26.3	25.1	24.4	18.8	
C1 C2 C3	76.5	58	53.6	42.8	29	34.4	37.5	38.9	40.4	36.4	37.5	35.6	43.4	33.4	
D1 D2 D3	66.5	47.1	48.4	46.2	37.7	36.5	30.9	36	36.8	33.4	40	35.1	41.2	31.7	
E1 E2 E3	53.3	31.2	32.7	24.4	-	19.7	22.4	22.7	25.4	25.2	25.9	23.2	27.8	21.4	
F1 F2 F3	52.8	37.4	36	29.5	22.3	25.8	27.4	28.9	32.1	32.1	33.8	31.4	32.5	25.0	
G1 G2 G3	35.8	15.4	16.1	13.1	6.6	6.2	7.1	12.5	12.1	14.6	20.5	19.2	14.9	11.5	
H1 H2	54.3	40	47.8	29.2	25.2	27.3	28.6	28.4	28.8	30.3	38	36.3	34.5	26.6	
I1 I2	71.2	57.6	44.5	29.1	30.7	30.2	24.7	31.7	30.8	37.4	36.1	35.7	38.3	29.5	
J1 J2	67	54.7	48	32.8	32.7	37.8	30.3	32.2	35.7	33.9	40	38.8	40.3	31.1	
K1 K2	57.9	43	39.8	29.3	16.9	16.1	22.1	31	24.3	31.6	37.2	36.7	32.2	24.8	
L1 L2	55.5	40.2	37	36.9	17.3	16.3	21.4	28.8	28	29.8	36.9	32.5	31.7	24.4	
M1 M2	46.8	30.9	32.6	24.5	10.8	13.2	13.5	19.7	20.5	26.8	30	29.6	24.9	19.2	

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.77) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
N1 N2	54.7	33.2	33.2	27	22.8	15.6	19.8	23.8	25.1	19.8	27.7	24	27.2	21.0	
O1 O2	47.1	28.6	27.6	18	14.6	14.5	14	19.4	17.6	18.1	23	23.9	22.2	17.1	
R1 R2 R3	54.2	29.6	27.2	17.8	13.6	13.3	13.6	21.1	20.3	22.2	26.83662	24.4	23.7	18.2	
S1 S2 S3	64	47.1	47.1	42.6	22.9	34.1	28.5	35.4	35.3	32.9	42.7967	39.2	39.3	30.3	
T1 T2	60.4	35.3	32.2	18.8	27.5	24.2	18.9	24.7	25.9	27.7	27.8	37.1	30.0	23.1	
V1 V2	45.9	22.1	21.3	10.8	14.2	9.8	11	16.6	16.1	13.4	20.3	20.5	18.5	14.2	
W1 W2	53.6	31.1	32	21.4	15.8	13.7	16.5	18.1	20.3	24.3	26.2	25.5	24.9	19.2	
AA1 AA2	40.4	26.8	22.1	15.5	12.7	9.2	14.7	16.1	16.4	14.9	21.7	22.3	19.4	14.9	
BB1 BB2	54.5	28.6	23.6	22.4	21.3	15.2	19.4	17.8	22.8	20.3	27.8	27	25.1	19.3	
DD1 DD2	60.6	35.1	32.3	21.1	14.2	20.1	16	17	23.3	25.5	28.6	28.7	26.9	20.7	
EE1 EE2	35.6	18.7	17.9	12.2	10	9.2	8.1	13.3	13.7	12.6	16.7	17.1	15.4	11.9	
FF1 FF2 FF3	66.2	50.1	47	48	30.3	40.1	40.4	44.1	41.6	43.3	44.4	41.8	44.8	34.5	
HH1 HH2 HH3	66.1	41.8	42.3	43.5	27.4	28.7	missing	no blocks	no blocks	36.2	38.7	36.4	40.1	30.9	
JJ1 JJ2 JJ3	60.4	41.7	36.1	33.2	26.3	21.3	22.9	28	32.1	28.9	32.92453	29.2	32.8	25.2	
KK1 KK2 KK3	78.4	57.9	53.8	39.5	50.3	37.5	35.8	38.7	43.4	42.5	39.3	45.1	46.9	36.1	
LL1 LL2 LL3	66.2	49	45.6	44.5	30.9	30.3	34.1	42.1	36	34.4	46.9	40.2	41.7	32.1	
MM1 MM2	60.9	38.6	35.2	33.9	20.8	25.2	25.4	32.2	31.5	29.4	35.9	31.3	33.4	25.7	

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.77) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
OO1 OO2	57.2	28.1	22.4	16.8	22.7	19.4	missing	19.2	21.8	15.1	21.9	21.2	24.2	18.6	
PP1 PP2	35.3	14.3	13.8	9.2	10.7	5.8	9	10.7	9.5	10.9	12	12.3	12.8	9.8	
QQ1 QQ2	46.6	26.4	25.9	21.9	18.7	11.8	15.8	17.5	19.4	17.3	21.6	20.6	22.0	16.9	
RR1 RR2	54.5	36.2	31.1	25.1	24.4	15.5	21.4	23.1	24.6	25.2	23.6	25.1	27.5	21.2	
SS1 SS2	61.3	38.9	36.7	29.2	27	21.3	22.5	29.3	29.4	29.6	33.1	31.1	32.5	25.0	
SS3 SS4	74.8	46	44.1	44.8	36.4	22.4	missing	38.1	41.6	32.5	47.4	37.3	42.3	32.6	
TT1 TT2	59.2	42.3	38.6	38.5	27.9	24.4	29	31.8	33	30.9	37	36.5	35.8	27.5	
TT3 TT4	56.7	41.2	37.8	24.4	25.2	18.5	23.7	24.2	31.3	30.3	31.9	29.4	31.2	24.0	
UU		47.6	47.4	51.5	41.4	29.5	41.2	41.5	44.8	37.8	missing	36.8	42.0	32.3	
VV		34.7	33	32.1	23.4	17.8	23.5	27.5	29.5	22.9	27.1	26	27.0	20.8	
WW				30.1		14.5	24.9	29.6	31.5	28.7	32.1	28.8	27.5	21.2	
XX				41.2		19.6	31.9	37.1	30.2	31.2	35.7	34	32.6	25.1	
YY				55.1	51.8	29.8	48.2	44.4	46	40	49.5	41.7	45.2	34.8	
ZZ				42.1	38.3	34.1	37	38.4	45.4	42.6	45.6	35.4	39.9	30.7	
WER										21.5	29.8	27.5	26.3	20.9	

☒ **Local bias adjustment factor used**

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

☒ **Where applicable, data has been distance corrected for relevant exposure**

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

(1) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure.

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

Diffusion Tube 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. Data can only be included in the bias adjustment factor calculation if there are more than 9 months data at each of the locations.

The co-location bias adjustment results for 2017 were 0.72, 0.78, and 0.68 giving a combined adjustment factor of 0.73. In addition we received a bias adjustment factor of 0.89 for the Marylebone Road, London, intercomparison tube study. The average for the four results was 0.77.

Table C.1 – Co-location Study at Fixed Station, Civic Offices

Month	Start Date	End Date	Diffusion Tube µg/m^3				Auto Average µg/m^3	
			1	2	3	Average		
Jan	04-Jan-17	01-Feb-17	57.21	53.39	52.05	54.22	33.81	
Feb	01-Feb-17	01-Mar-17	27.36	28.55	32.87	29.59	17.97	
Mar	01-Mar-17	29-Mar-17	28.39	28.35	24.96	27.23	16.95	
Apr	29-Mar-17	26-Apr-17	15.94	16.54	20.78	17.75	14.37	
May	26-Apr-17	31-May-17	12.27	13.77	14.86	13.63	14.14	
Jun	31-May-17	28-Jun-17	16.13	12.90	10.83	13.28	9.96	
Jul	28-Jun-17	02-Aug-17	14.13	12.35	14.45	13.64	10.37	
Aug	02-Aug-17	30-Aug-17	19.14	22.12	22.06	21.11	12.49	
Sep	30-Aug-17	27-Sep-17	20.13	18.81	21.93	20.29	16.01	
Oct	27-Sep-17	01-Nov-17	22.16			22.16	15.72	
Nov	01-Nov-17	06-Dec-17	25.76	27.49	27.26	26.84	23.58	
Dec	06-Dec-17	03-Jan-18	25.22	24.47	23.64	24.44	18.82	**Adjustment Factor**
					Annual average:	**23.68**	**17.02**	**0.7185**

Table C.2 – Co-location Study at Roadbox Station, Wolverton Road

Month	Start Date	End Date	Diffusion Tube µg/m^3				Auto Average µg/m^3	
			1	2	3	Average		
Jan	04-Jan-17	01-Feb-17	66.13	66.18	59.70	64.00	48.24	
Feb	01-Feb-17	01-Mar-17	43.00	49.62	48.77	47.13	32.20	
Mar	01-Mar-17	29-Mar-17	44.87	49.25	47.25	47.12	31.08	
Apr	29-Mar-17	26-Apr-17	43.17	40.32	44.26	42.58	32.83	
May	26-Apr-17	31-May-17	24.99	24.19	19.49	22.89	22.33	
Jun	31-May-17	28-Jun-17	22.10	33.85	34.32	30.09	21.39	
Jul	28-Jun-17	02-Aug-17	26.47	24.14	34.80	28.47	22.29	
Aug	02-Aug-17	30-Aug-17	38.43	35.99	31.88	35.43	26.43	
Sep	30-Aug-17	27-Sep-17	36.06	39.14	30.64	35.28	29.17	
Oct	27-Sep-17	01-Nov-17	32.81	32.71	33.12	32.88	29.66	
Nov	01-Nov-17	06-Dec-17	43.40	43.01	41.98	42.80	39.61	
Dec	06-Dec-17	03-Jan-18	36.85	37.33	43.41	39.20	32.09	**Adjustment Factor**
					Annual average:	**38.99**	**30.61**	**0.7850**

Table C.3 – Co-location Study at Roadbox Station 2, Olney

Month	Start Date	End Date	Diffusion Tube µg/m^3				Auto Average µg/m^3	
			1	2	3	Average		
Jan	04-Jan-17	01-Feb-17	60.14	61.92	59.10	60.39	36.86	
Feb	01-Feb-17	01-Mar-17	43.77	44.49	36.73	41.66	24.50	
Mar	01-Mar-17	29-Mar-17	36.47	37.21	34.64	36.11	23.90	
Apr	29-Mar-17	26-Apr-17	37.33	29.96	32.22	33.17	23.66	
May	26-Apr-17	31-May-17	25.90	27.29	25.72	26.31	20.49	
Jun	31-May-17	28-Jun-17	21.60	24.65	17.59	21.28	13.78	
Jul	28-Jun-17	02-Aug-17		20.96	24.85	22.90	16.14	
Aug	02-Aug-17	30-Aug-17	25.50	30.87	27.73	28.03	17.93	
Sep	30-Aug-17	27-Sep-17	29.43	32.39	34.38	32.06	19.95	
Oct	27-Sep-17	01-Nov-17	30.06	26.65	29.85	28.85	18.70	
Nov	01-Nov-17	06-Dec-17	34.63	29.37	34.78	32.92	28.19	
Dec	06-Dec-17	03-Jan-18	28.07	28.23	31.44	29.25	23.12	**Adjustment Factor**
					Annual average:	**32.74**	**22.27**	**0.6800**

Figure 4 Co-location study at Marylebone Road London

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	04/01/2017	01/02/2017	106.0	111.8	115.0	111	4.6	4	11.3
2	01/02/2017	01/03/2017	114.3	115.6	116.4	115	1.1	1	2.6
3	01/03/2017	29/03/2017	91.2	90.5	86.4	89	2.6	3	6.4
4	29/03/2017	26/04/2017	82.9	87.7	80.5	84	3.7	4	9.1
5	26/04/2017	31/05/2017	89.4	85.8	89.4	88	2.1	2	5.2
6	31/05/2017	28/06/2017	94.1	93.3	86.4	91	4.2	5	10.5
7	28/06/2017	02/08/2017	93.1	99.1	89.6	94	4.8	5	11.9
8	02/08/2017	30/08/2017	72.6	75.2	74.2	74	1.3	2	3.3
9	30/08/2017	27/09/2017	74.1	72.9	73.9	74	0.6	1	1.6
10	27/09/2017	01/11/2017	84.6	86.2	86.2	86	0.9	1	2.3
11	01/11/2017	06/12/2017	74.8	81.4	75.3	77	3.7	5	9.1
12	06/12/2017	03/01/2017	72.2	82.0	70.5	75	6.2	8	15.4
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
87.4	96.5	Good	Good
78.9	96.8	Good	Good
81.1	97.5	Good	Good
67.7	96.9	Good	Good
72.6	95.8	Good	Good
82.3	97.5	Good	Good
74.0	97.0	Good	Good
73.8	95.8	Good	Good
81.2	97.7	Good	Good
88.1	96.9	Good	Good
79.6	97.3	Good	Good
77.6	97.7	Good	Good
Overall survey -->		Good precision	Good Overall DC

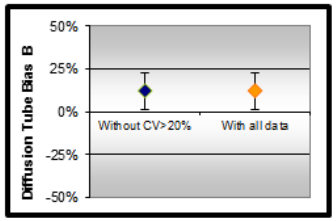
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Marylebone Road

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	0.89 (0.81 - 0.99)
Bias B	12% (1% - 23%)
Diffusion Tubes Mean:	88 μgm^{-3}
Mean CV (Precision):	3
Automatic Mean:	79 μgm^{-3}
Data Capture for periods used:	97%
Adjusted Tubes Mean:	78 (71 - 87) μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 12 periods of data	
Bias factor A	0.89 (0.81 - 0.99)
Bias B	12% (1% - 23%)
Diffusion Tubes Mean:	88 μgm^{-3}
Mean CV (Precision):	3
Automatic Mean:	79 μgm^{-3}
Data Capture for periods used:	97%
Adjusted Tubes Mean:	78 (71 - 87) μgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

If you have any enquiries about this spreadsheet please contact the LAQM Helpdesk at: LAQMHelpdesk@uk.bureauveritas.com

Figure 5 Marylebone Road London Air Quality Monitoring Site

Data Capture

An ongoing intermittent fault that could not be rectified on the Teom analyser in Olney resulted in low data capture; final data capture for PM_{10} was reduced to 43.5%. The decision was taken to discontinue monitoring PM_{10} at this location on 8th November 2017. Where data capture is below 75% Local Air Quality Management Technical Guidance (LAQM.TG (16)) Box 7.9 gives instructions for annualising the data. Particulate matter measured by Oxford City Council was selected to use, in addition to Milton Keynes Council's Fixed Station, as it lies within 50 miles and has a data capture of at least 85%. Annual (Am) and Period means (for the period the Olney station did have data, Pm) were obtained from the selected sites. A ratio (R) of Am to Pm was then calculated for each site. The average of these ratios was calculated (Ra) which was used as the annualisation factor to multiply with the measured period mean (M) to give the estimate of the annual mean for 2017.

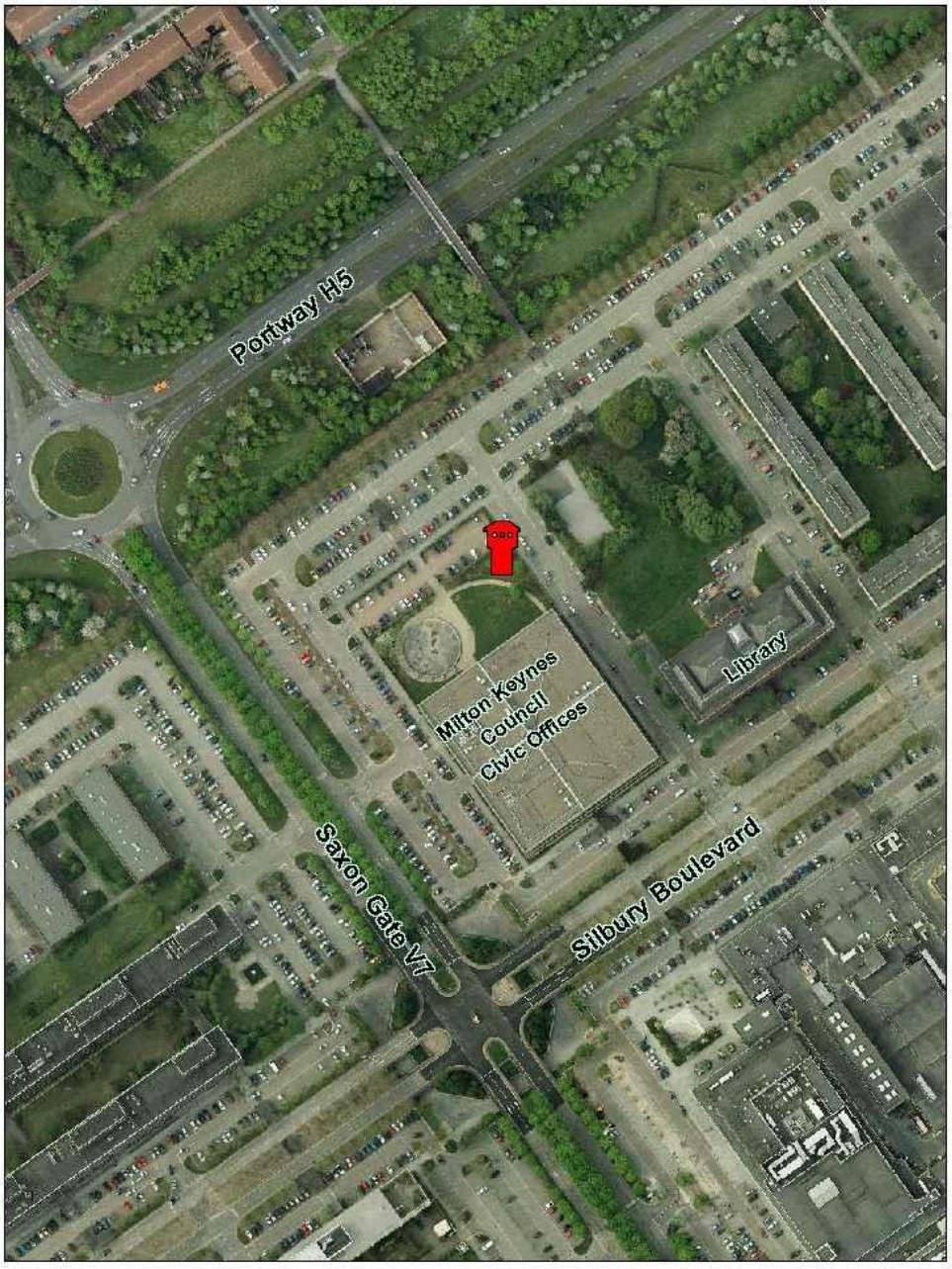
Background Site	**Annual Mean 2017 (Am)**	**Period Mean 2017 (Pm)**	**Ratio (Am/Pm)**
Fixed	14.525	15.154	0.958
Oxford	12.451	12.965	0.960
		Average (Ra)	**0.959**

M x Ra = 17.19 x 0.9594 = 16.49 µg/m^3

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

Automatic Monitoring Sites

Figure 6 Fixed Air Quality Station, Civic Offices, Central Milton Keynes



Air Quality Monitoring Station - Civic Offices, Central Milton Keynes

Figure 7 Roadbox Air Quality Station, Wolverton Road, Newport Pagnell

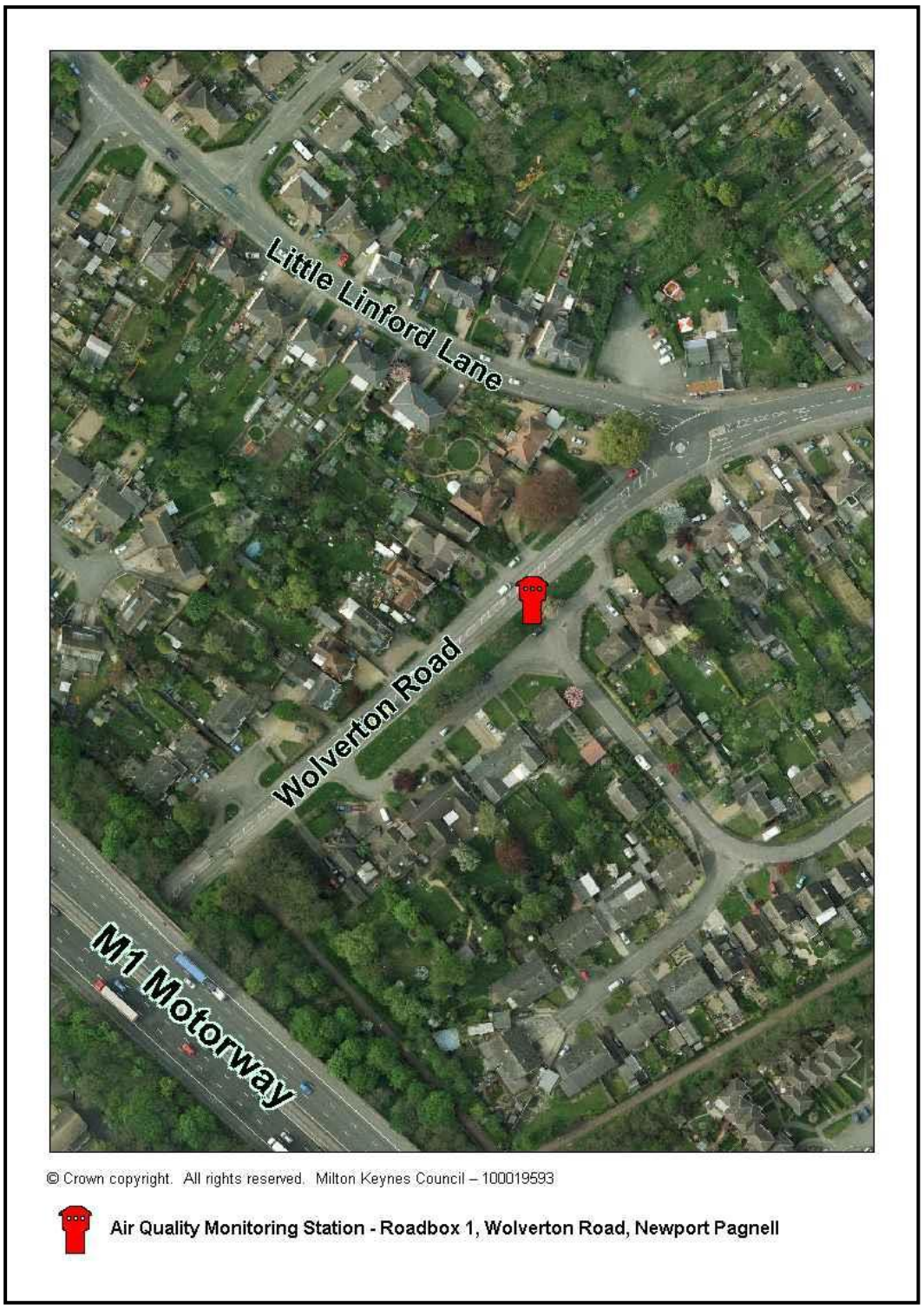
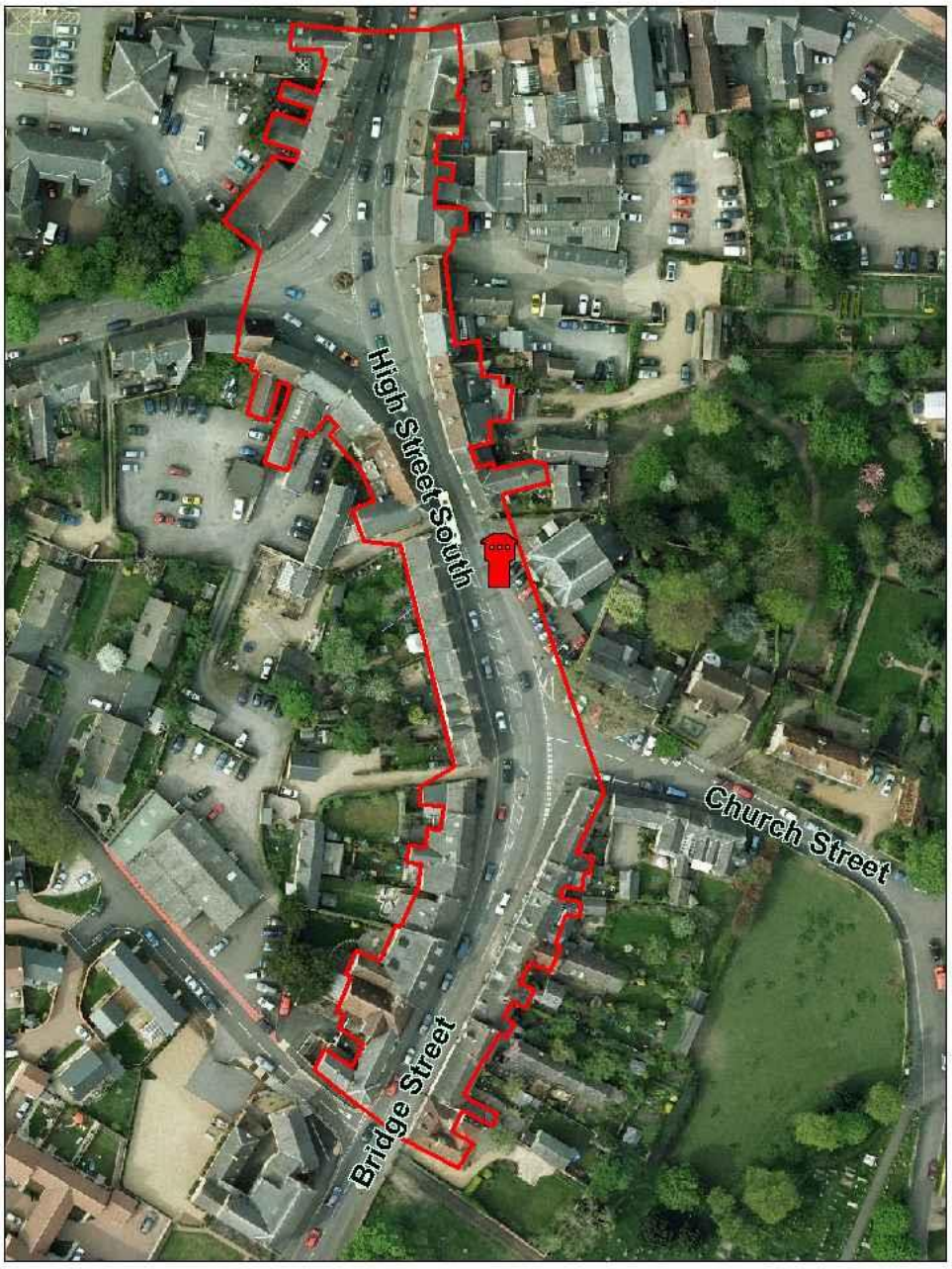


Figure 8 Roadbox Air Quality Station, High Street South, Olney (Within Designated Air Quality Management Area)



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

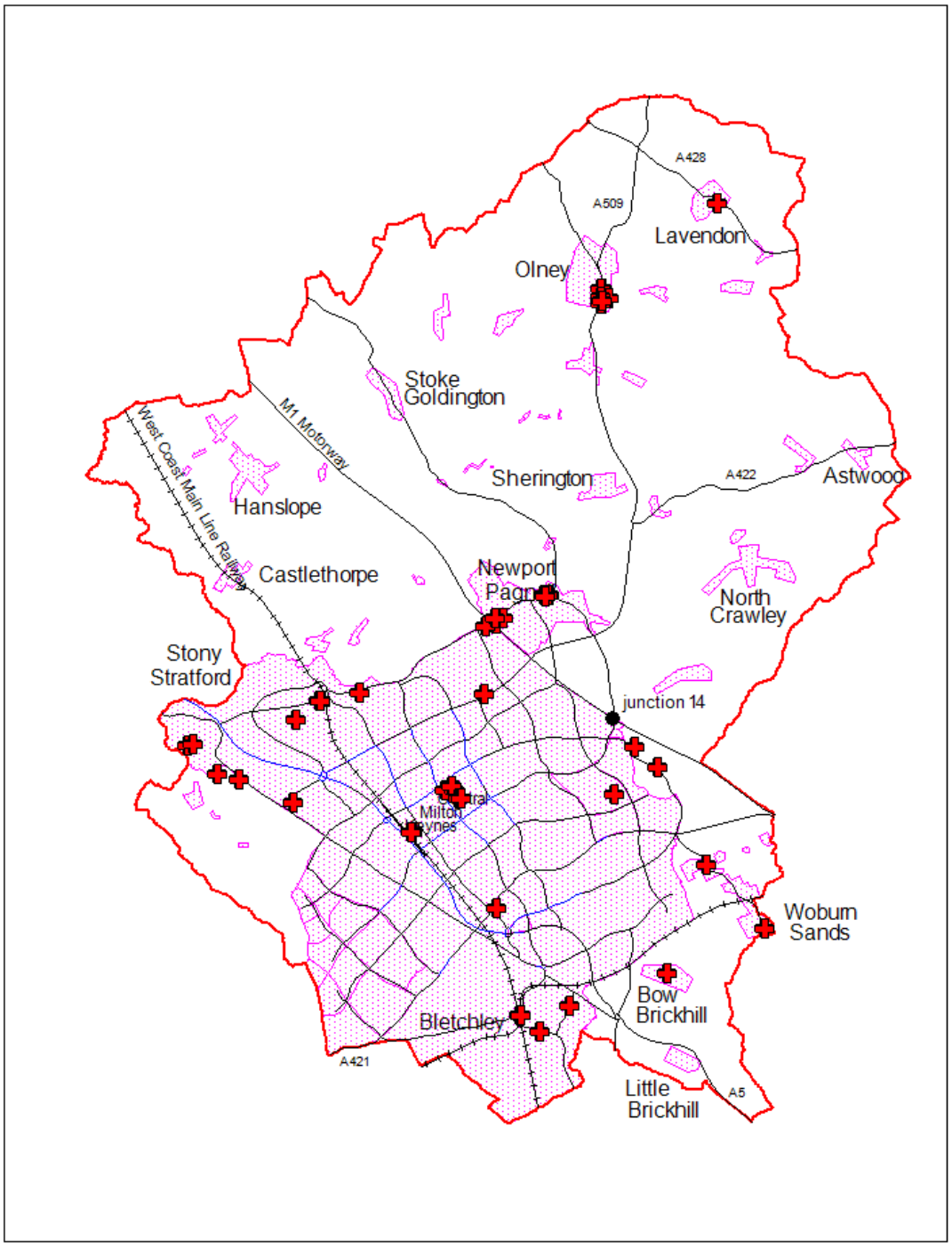
Figure 9 Automatic Air Quality Monitoring Station Photographs

Static Monitoring Station Civic Offices, CMK. (View from North Eighth Street towards Silbury Boulevard)

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

Roadbox 2 Monitoring Station High Street South, Olney (Within Air Quality Management Area)

Figure 10 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

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

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

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

References

1. Department of the Environment, Food and Rural Affairs, The Air Quality (England) Regulations 2000, The Stationery Office.

2. Department for Environment, Food and Rural Affairs, Local Air Quality Management, Technical Guidance TG16, DEFRA Publications.

3. Department for Environment, Food and Rural Affairs, Local Air Quality Management, Policy Guidance PG16, DEFRA Publications.

4. Milton Keynes Council, Annual Status Reports 2016 and 2017

5. Milton Keynes Council, Updating and Screening Assessment 2015.

6. Milton Keynes Council, Progress Reports 2013 and 2014.

7. Milton Keynes Council, Air Quality Action Plan, Jan 2012.

8. Local Air Quality Management Tools, NETCEN, on behalf of Department of the Environment, Food and Rural Affairs, available from web site: http://uk-air.defra.gov.uk/