



milton keynes council



## 2016 Air Quality Annual Status Report (ASR)

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

June 2016

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## 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 2015, air quality objectives were achieved at all monitoring locations throughout the Borough, including those within the Olney Air Quality Management Area (AQMA), for the first time since the AQMA was declared in 2008. If the annual mean objective for nitrogen dioxide continues to be met in future years the process of revocation of the AQMA can be considered. 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.

Milton Keynes was one of four local authorities successful in its bid for funding from the Go Ultra Low Cities programme run by the Department for Transport (DfT) and the Office for Low Emission Vehicles (OLEV). The council will receive £9 million and will use the money to achieve its goal of “having the highest uptake of ultra-low emission vehicles (ULEVs) per capita for any city in the world by 2020”. More details about the bid proposals can be found on the website <http://www.mkgoultralowcity.com/>.

Milton Keynes already has one of the largest electric vehicle charging point networks in the country and this has expanded and improvements made in 2015 to add more rapid charging points.

The No 7 bus route (Wolverton – Bletchley) uses wirelessly charged electric buses and has proved very successful. A grant of £1.75 million has been awarded to the council from OLEV’s Low Emission Bus Scheme for the procurement of a further 11 buses. The new buses will also be charged wirelessly and advances in technology will mean that fewer charge points will be required on the chosen bus route.

Santander Cycles MK is the new public bicycle sharing scheme in Milton Keynes and is operated by nextbike UK Ltd. in collaboration with Santander, Milton Keynes Council (MKC) and Milton Keynes City Centre Management. There are currently 300 non-electric bikes available at 42 docking stations with plans for a total of 500 bikes and 60 docking stations. The bikes can be hired by phone or by using the bike’s on-

board computer located above the rear wheel; see the website for more details and to sign up; <https://santandercyclesmk.co.uk/how-it-works/>

The future of Milton Keynes and its importance in the development of the UK economy is now being guided by a new commission of nine independent specialists. The [MK Futures 2050 Commission](#) is exploring what makes a great city greater, leading to a strategy for 2050 and initially concentrating on “six big projects”. Chairman Sir Peter Gregson has identified that Milton Keynes must offer sustainable mobility for all, tackling congestion and improving accessibility.

**Figure 1 Electric Bus on Route 7.**



Figure 2 Santander Hire Bikes



## 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<sup>1,2</sup>.

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion<sup>3</sup>.

<sup>1</sup> Environmental equity, air quality, socioeconomic status and respiratory health, 2010

<sup>2</sup> Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

<sup>3</sup> Defra. Abatement cost guidance for valuing changes in air quality, May 2013



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<sub>2</sub> and PM<sub>10</sub> 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, the annual mean objective for NO<sub>2</sub> was not 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 Anglian Region).

### Actions to Improve Air Quality

Congestion has been eased along the A421 (Standing Way H8) at Kingston towards junction 13 of the M1. Using funding from the Government's Local Pinch Point Fund, the road has been widened into a dual carriageway from Fen Farm roundabout to Eagle Farm North roundabout. At the same time Kingston roundabout was improved with new underpasses and signalling. Works were completed in summer 2015.

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.

The Oxford to Bedford line runs through Bletchley and the "Fixing the Links" project aims to maximise the benefits of East West Rail by improving the quality of the pedestrian links between the station and town centre and creating a more efficient transport interchange. The project is well under way and is expected to be completed by early 2017.

## Local Priorities and Challenges

Priorities for the coming year are to continue promoting the use of ultra low emission vehicles (ULEVs). Encouraging cycling and walking making full use of the extensive (325 km) Milton Keynes Redway system. Upgrades are planned for 13 cross city routes to provide Super Routes linking principle destinations.

## 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 and training and the availability of the new Santander hire bikes.

More information on sustainable forms of travel can be found on the council's [Smarter Choices](#) web pages including the "Get Smarter Travel in Milton Keynes" campaign.



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# 1 Local Air Quality Management

This report provides an overview of air quality in the Borough of Milton Keynes during 2015. 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](https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=165).

**Table 2.1 – Declared Air Quality Management Areas**

AQMA Name	Pollutants and Air Quality Objectives	City / Town	One Line Description	Action Plan
Olney AQMA	<ul style="list-style-type: none"> <li>NO<sub>2</sub> annual mean</li> </ul>	Olney	An area in Olney encompassing all properties fronting Bridge Street and High Street South, and also including part of Market Place.	<a href="http://www.milton-keynes.gov.uk/assets/attach/12676/Olney_Action_Plan_Oct12.pdf">http://www.milton-keynes.gov.uk/assets/attach/12676/Olney_Action_Plan_Oct12.pdf</a>

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

Milton Keynes Council has taken forward a number of measures during the current reporting year of 2015 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. More detail on AQMA measures can be found in the Olney Action Plan.

Key completed measures are:

- Expansion of the electric vehicle charging network, especially rapid charge points.
- Securing £9m funding from the Office for Low Emission Vehicles (OLEV) for Milton Keynes Council's Go Ultra Low City Scheme.
- Successfully bidding for a grant of £1.8m from the OLEV Low Emission Bus Scheme for 11 wirelessly charged electric buses and supporting infrastructure.
- Dualling of the A421 and improvements to Kingston roundabout.

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

- The installation of Santander hire bikes at 60 docking stations.
- Bletchley "Fixing the Links" scheme.

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

- Encouraging the continued uptake of ULEVs.
- Promoting the Get Smarter Travel Campaign, part of the Smarter Choices initiative.
- Procurement of 11 electric buses, which are larger and more energy efficient than those already operating successfully on the No. 7 bus route. Finalising the bus route and installing the required infrastructure.
- Keeping the air quality monitoring network operational

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
1	Expansion of EV charging network	Promoting low emission transport	Procuring alternative refuelling infrastructure to promote low emission vehicles. Electric vehicle recharging	MK Council	Ongoing	Ongoing	Number of recharging events No of charge points	n/a	170 standard and 56 rapid charge points installed	Ongoing	
2	Go Ultra Low City Scheme	Promoting low emission transport	Promoting uptake of low emission vehicles	MK Council	2015	2016-2020	ULEV ownership per capita	n/a	Funding confirmed 25/1/16	2020	
3	Low Emission Bus Scheme – grant awarded for a further 11 buses	Promoting low emission transport	Public vehicle procurement – prioritising uptake of low emission vehicles	MK Council/Arriva	2015	2016/7		n/a	Successful bid	2018	
4	Santander bike hire	Promoting low emission transport	Promoting uptake of low emission vehicles	Santander /nextbike	2015	2016/17	Number of hires	n/a	300 bikes 42 docking stations	2017	Total 500 bikes and 60 docking stations planned
5	Real time passenger information (RTPI) – bus routes	Transport planning and infrastructure	Bus route improvements	MK Council	2012	2014 - ongoing		n/a	Most routes now have RTPI	ongoing	
6	Bletchley – Fixing the Links	Traffic management	Strategic highway improvements	MK Council	2015	2016		n/a	ongoing	Early 2017	

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Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
7	A421 Dualling	Traffic management	Strategic highway improvements	MK Council	2008 - 15	2016		n/a	completed	completed	
8	Smarter travel choices	Promoting travel alternatives	Promotion of cycling and walking	MK Council	2011	ongoing	various	n/a	ongoing	ongoing	
9	Sustainable Modes of Travel Strategy (SMOTS)	Promoting travel alternatives	School travel plans	MK Council	2015	2015		n/a	completed	Annual requirement	
10	East West Rail	Promoting travel alternatives	Promote use of rail	East West Rail Consortium / Network Rail	Western section Phase 2	ongoing		n/a		2024 (estimated for western section)	
11	Cycling information, events and opportunities	Public Information	Via leaflets and internet	MK Council	2011	ongoing		n/a	ongoing	ongoing	
12	Sustainability – promotion of alternative energy generation / energy efficient technology			MK Council				n/a			Low carbon living initiative



## 2.3 PM<sub>2.5</sub> – 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<sub>2.5</sub> (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM<sub>2.5</sub> has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

The national air quality objective for PM<sub>2.5</sub> is an annual mean concentration of 25 µg/m<sup>3</sup>, 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<sub>2.5</sub>.

The health effects of PM<sub>2.5</sub> 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; <http://www.milton-keynes.gov.uk/social-care-and-health/draft-2015-16-jsna/draft-2015-16-jsna-life-in-milton-keynes>

It is estimated that UK emissions contribute about 50% of total annual average PM<sub>2.5</sub>, 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.

Milton Keynes Council is taking the following measures to address PM<sub>2.5</sub> 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.

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- 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. Solar photo-voltaic panels were installed on the roof of the Civic Offices in 2015, financed by using the Carbon Offset Fund. A business case is being prepared for a 750 kW installation at the Coachway interchange near junction 14 of the M1.

## 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 2015. 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<sub>2</sub>) at 38 sites during 2015. 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<sub>2</sub> Network Field Inter-comparison Exercise managed by the National Physical Laboratory.

Diffusion tube results are corrected by applying a bias correction factor. This factor is derived using data from local co-location sites. Appendix A has details of all Quality Assurance/Quality Control (QA/QC) for diffusion tubes including bias adjustment factors.

A map showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

## 3.2 Individual Pollutants

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

### 3.2.1 Nitrogen Dioxide (NO<sub>2</sub>)

Table A3 in Appendix A compares the ratified and adjusted monitored NO<sub>2</sub> annual mean concentrations for the past 9 years with the air quality objective of 40µg/m<sup>3</sup>.

For diffusion tubes, the full 2015 dataset of monthly mean values is provided in Appendix B.

Table A.5 in Appendix A compares the ratified continuous monitored NO<sub>2</sub> hourly mean concentrations for the past 9 years with the air quality objective of 200µg/m<sup>3</sup>, 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 first time since the Olney AQMA was declared in 2008, all diffusion tube locations within the AQMA recorded annual means below the objective. The highest value was 34.2 µg/m<sup>3</sup> recorded at the façade of 18/20 Bridge Street, Olney. The automatic analyser in Olney recorded an annual mean of 22.3 µg/m<sup>3</sup>.

Figure 3 shows a graph of the annual mean data from the automatic air quality stations. There is a downward trend at all three monitoring stations that is more pronounced at the two roadside sites.

### 3.2.2 Particulate Matter (PM<sub>10</sub>)

Table A.6 in Appendix A compares the ratified and adjusted monitored PM<sub>10</sub> annual mean concentrations for the past 5 years with the air quality objective of 40 µg/m<sup>3</sup>.

Table A.7 in Appendix A compares the ratified continuous monitored PM<sub>10</sub> daily mean concentrations for the past 5 years with the air quality objective of 50 µg/m<sup>3</sup>, 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.

PM<sub>10</sub> monitoring came to an end at the Wolverton Road station in July 2014 when the analyser stopped working and was found to be beyond economic repair. There was an undiagnosed problem with the Teom analyser in Olney that was not resolved until 23-Jun-2015 when Horiba Instruments UK Ltd were contracted to service the air quality stations after SupportingU Ltd. went into liquidation.

There were no exceedences of either the annual or daily mean objectives. The Civic Offices station recorded an annual mean concentration of 14.8 µg/m<sup>3</sup>, and the Wolverton Road annual mean was 16.7 µg/m<sup>3</sup> (data from 23-Jun-2015), both well within the objective. Figure 4 shows there is a slightly downward trend at both stations over the last 5 years, flattening out at the Civic Offices site.

### **3.2.3 Particulate Matter (PM<sub>2.5</sub>)**

No specific PM<sub>2.5</sub> monitoring is undertaken within the Borough of Milton Keynes. Estimates of local PM<sub>2.5</sub> concentrations can be made by referring to background maps, surrogate data from AURN sites and by using local PM<sub>10</sub> data adjusted using the methodology in the technical guidance.

Based on the 2013 maps available on the Defra UK-Air website, the projected 2015 average background PM<sub>2.5</sub> concentration in Milton Keynes is 11.0 µg/m<sup>3</sup>. An estimation of PM<sub>2.5</sub> concentration can be made from PM<sub>10</sub> 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<sub>2.5</sub> annual mean concentration at the Civic Offices is 10.4 µg/m<sup>3</sup> and at the Olney station 11.7 µg/m<sup>3</sup>.

### **3.2.4 Sulphur Dioxide (SO<sub>2</sub>)**

Automatic monitoring was undertaken between 1999 and 2012. It 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 Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Monitoring Technique	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Inlet Height (m)
Civic Offices, CMK	Urban centre	485070	239131	NO <sub>2</sub> ; PM <sub>10</sub> ; O <sub>3</sub>	N	Chemiluminescence; Teom 1400AB; UV absorption	113 (to residential)	4.8	3.2
Wolverton Road, Newport Pagnell	Roadside	486290	243344	NO <sub>2</sub>	N	Chemiluminescence	25 (to residential)	3.4	1.5
High Street South, Olney	Roadside	488922	251157	NO <sub>2</sub> ; PM <sub>10</sub>	Y	Chemiluminescence; Teom 1400AB	11 (to residential)	2.0	1.5

(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 Nitrogen Dioxide Monitoring Sites

Site Name	Site ID	Site Type	OS Grid Ref	In AQMA?	Distance to relevant exposure (m)*	Distance to kerb of nearest road (m)	Height
10 High St South, Olney (Cowper School House)	C001 C002 C003	Urban Roadside	488914 251173	Y	0	2.0	2.26
9 High St South, Olney (Olney Wine Bar)	D001 D002 D003	Urban Roadside	488904 251177	Y	0	1.7	2.24
20 High St, Olney	E001 E002 E003	Urban Roadside	488926 251455	N	3.3	7.6	2.15
17 High St, Olney (Opp. No.20 High St)	F001 F002 F003	Urban Roadside	488905 251456	N	0	7.2	2.12
76 High St, Newport Pagnell	H001 H002	Urban Roadside	487514 243901	N	2.3	2.2	2.38
63 High St, Newport Pagnell	I001 I002	Urban Roadside	487588 243912	N	2.0	0.4	2.36
57 High St, Newport Pagnell (The Plough PH)	J001 J002	Urban Roadside	487620 243922	N	2.0	0.4	2.40
Corner of Coneygere and Palmers Rd, Olney	G001 G002 G003	Urban Roadside	489108 251213	N	10.4	1.7	2.19
63 Windsor St, Wolverton	V001 V002	Urban Roadside	481412 240860	N	2.3	1.1	2.30
222 Wolverton Rd, Blakelands	N001 N002	Urban Roadside	486069 243149	N	25.0	1.6	2.22
Aylesbury St, Fenny Stratford (Bracknell House)	DD001 DD002	Urban Roadside	488118 233814	N	11.1	4.5	2.4
Silbury Boulevard, CMK (corner of North Tenth St)	T001 T002	Urban Roadside	485298 239126	N	28.2	0.9	2.5

Site Name	Site ID	Site Type	OS Grid Ref	In AQMA?	Distance to relevant exposure (m)*	Distance to kerb of nearest road (m)	Height
52-100 North Tenth Street, Central Milton Keynes	U001 U002	Urban Roadside	485229 239223	N	4.5	6.1	2.3
Silver Street, Stony Stratford	QQ001 QQ002	Urban Roadside	478740 240217	N	3.0	0.9	2.02
Horsefair Green, Stony Stratford	RR001 RR002	Urban Roadside	478882 240265	N	3.5	2.6	2.01
130 Newport Rd, New Bradwell	W001 W002	Urban Roadside	482965 241515	N	6.1	1.6	2.35
64 Nicholas Mead, Great Linford	O001 O002	Urban Roadside	486039 241484	N	2.4	4.0	1.9
Cross Keys Office, High St South, Olney	FF001 FF002 FF003	Urban Roadside	488898 251186	Y	0.2	1.6	2.03
33 High Street South, Olney (Art Mart)	HH001 HH002 HH003	Urban Roadside	488891 251248	Y	0.6	2.0	2.05
18/20 Bridge St, Olney	KK001 KK002 KK003	Urban Roadside	488917 251068	Y	0.4	2.2	2.22
Courtney House, Bridge St, Olney	LL001 LL002 LL003	Urban Roadside	488909 251077	Y	0.4	1.7	2.05
Watling Street, Fullers Slade	OO001 OO002	Urban Roadside	480015 239400	N	43.0	7.6	2.49
Northampton Rd, Lavendon (Horseshoe PH)	B001 B002	Rural Roadside	491769 253542	N	0.6	3.0	2.08
14-16 Newport Rd, Wavendon	BB001 BB002	Rural Roadside	491498 237284	N	9.7	7.2	1.9
Brook Farm, Broughton Rd, Middleton	AA001 AA002	Rural Roadside	489237 239016	N	23.0	1.0	2.1
16-17 Greenlands, Newport Pagnell	K001 K002	Urban Garden	486296 243208	N	10.1	1.6	2.08

Site Name	Site ID	Site Type	OS Grid Ref	In AQMA?	Distance to relevant exposure (m)*	Distance to kerb of nearest road (m)	Height
5-7 Greenlands, Newport Pagnell	L001 L002	Urban Garden	486345 243230	N	5.4	1.4	2.52
42-44 Walnut Close, Newport Pagnell	M001 M002	Urban Garden	486495 243345	N	7.6	1.5	2.0
6 Atherstone Court, Two Mile Ash	EE001 EE002	Urban Garden	481331 238825	N	9.5	0.4	1.88
1 Tudor Gardens, Stony Stratford	PP001 PP002	Urban Garden	479459 239536	N	17.0	2.3	2.18
18 Wheatcroft Close, Beanhill	MM001 MM002	Urban Garden	486332 236228	N	10.1	0.3	2.2
Static Air Quality Station (Civic Offices)	R001 R002 R003	Co-location	485070 239131	N	113.0	4.8	3.5
Roadbox 1 (Newport Pagnell)	S001 S002 S003	Co-location	486290 243344	N	25.8	1.8	2.4
Roadbox 2 (Olney)	JJ001 JJ002 JJ003	Co-location	488922 251157	Y	10.1	2.0	2.14
Stratford Road, Wolverton (Tesco End)	SS001 SS002	Urban Roadside	481966 241314	N	N	1.4	2.52
Stratford Road, Wolverton (Station End)	SS003 SS004	Urban Roadside	481993 241328	N	N	1.4	2.52
62 High Street, Newport Pagnell (Co-Op North)	TT001 TT002	Urban Roadside	487589 243923	N	0	4.2	2.01
77 High Street, Newport Pagnell (Co-Op South)	TT003 TT004	Urban Roadside	243895 243895	N	0	3.7	2.31
*Distance to residential property							

Table A.3 – Annual Mean NO<sub>2</sub> Automatic Monitoring Results

Site ID	Location	Within AQMA ?	Valid data capture over monitoring period %	Valid data capture for the full calendar year %	Annual mean concentrations µg/m <sup>3</sup>								
					2007	2008	2009	2010	2011	2012	2013	2014	2015
Fixed	Civic Offices, CMK	N	99.8	99.8	21.6	23.4	22.5	23.0	20.9	21.9	20.9	19.0	18.8
Roadbox 1	Wolverton Road, Newport Pagnell	N	95.0	95.0	31.9	37.6	35.5	38.6	34.8	36.1	33.2	29.6	27.0
Roadbox 2	High Street South, Olney	Y	99.4	99.4	-	-	35.2*	34.2	26.9	27.0	26.7	27.0	22.3

Notes: Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 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 Technical Guidance LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Table A.4 – Annual Mean NO<sub>2</sub> Non-Automatic Monitoring Results

Site ID	Location	Site type	Within AQMA ?	Annual mean concentrations adjusted for bias					
				2010 (bias adjustment factor = 0.84)	2011 (bias adjustment factor = 0.85)	2012 (bias adjustment factor = 0.79)	2013 (bias adjustment factor = 0.75)	2014 (bias adjustment factor = 0.69)	2015 (bias adjustment factor = 0.64)
C001/2/3	10 High St South, Olney (Cowper School House)	Urban Roadside	Y	46.8	43.8	42.8	44.0	40.5	32.9
D001/2/3	9 High St South, Olney (Olney Wine Bar)	Urban Roadside	Y	41.8	40.4	39.6	36.6	34.1	29.5
E001/2/3	20 High St, Olney	Urban Roadside	N	25.6	24.7	25.8	24.3	21.9	21.6
F001/2/3	17 High St, Olney (Opp No.20 High St)	Urban Roadside	N	30.7	29.0	27.8	25.4	26.7	23.6
H001/2	76 High St, Newport Pagnell	Urban Roadside	N	30.4	26.3	27.6	28.3	26.4	22.8
I001/2	63 High St, Newport Pagnell	Urban Roadside	N	33.6*	31.1	33.3	34.2	31.1	27.7
J001/2	High St, Newport Pagnell (Plough PH)	Urban Roadside	N	37.4	34.8	35.0	35.5	34.2	30.1
TT001/2	62 High Street, Newport Pagnell (Co-Op North)	Urban Roadside	N	-	-	-	-	34.2	27.6
TT003/4	77 High Street, Newport Pagnell (Co-Op South)	Urban Roadside	N	-	-	-	-	27.4	23.1
G001/2/3	Corner of Coneygere and Palmers Rd, Olney	Urban Roadside	N	13.7	14.1	14.5	13.2	12.8	10.5
V001/2	63 Windsor St, Wolverton	Urban Roadside	N	18.1	17.3	19.0	18.0	15.2	14.7
N001/2	222 Wolverton Rd, Blakelands	Urban Roadside	N	30.3	27.4	26.9	29.3	24.7	20.1
DD001/2	Aylesbury St, Fenny Stratford (Bracknell House) MK2 2BE	Urban Roadside	N	23.9	22.7	23.4	25.9	24.2	20.1
T001/2	Silbury Boulevard, CMK (corner of North Tenth St)	Urban Roadside	N	23.6	22.6	23.9	25.3	23.7	21.1
U001/2	52-100 North Tenth Street, Central Milton Keynes	Urban Roadside	N	21.6	20.1	21.5	19.7	20.1	16.9

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Site ID	Location	Site type	Within AQMA ?	Annual mean concentrations adjusted for bias					
				2010 (bias adjustment factor = 0.84)	2011 (bias adjustment factor = 0.85)	2012 (bias adjustment factor = 0.79)	2013 (bias adjustment factor = 0.75)	2014 (bias adjustment factor = 0.69)	2015 (bias adjustment factor = 0.64)
QQ001/2	Silver Street, Stony Stratford	Urban Roadside	N	23.8	21.1	21.1	22.4	19.8	18.6
RR001/2	Horsefair Green, Stony Stratford	Urban Roadside	N	25.7	22.2	21.8	25.4	22.3	20.2
W001/2	130 Newport Rd, New Bradwell	Urban Roadside	N	21.9	21.4	24.5	23.0	20.1	17.8
O001/2	64 Nicholas Mead, Great Linford	Urban Roadside	N	17.9	19.1	19.2	18.4	17.7	15.1
FF001/2/3	Cross Keys Office, High St South, Olney	Urban Roadside	Y	<b>44.4</b>	<b>42.2</b>	<b>41.0</b>	36.2	37.3	32.9
HH001/2/3	Art Mart, 33 High Street South, Olney	Urban Roadside	Y	38.9	35.1	37.9	32.6	32.0	28.5
II001/2/3	Opposite 9 Weston Road, Olney	Urban Roadside	N	26.3*	25.2*	-	-	-	-
KK001/2/3	18/20 Bridge St, Olney	Urban Roadside	Y	<b>46.5</b>	<b>43.1</b>	<b>42.4</b>	<b>40.2</b>	<b>41.3</b>	34.2
LL001/2/3	Courtney House, Bridge St, Olney	Urban Roadside	Y	<b>39.6</b>	<b>39.6</b>	<b>40.1</b>	33.6	34.3	31.6
OO001/2	Watling Street, Fullers Slade	Urban Roadside	N	19.9	18.8	20.8	21.7	18.1	17.6
SS001/2	Stratford Road, Wolverton (bridge near McConnell Drive)	Urban Roadside	N	-	-	-	27.1**	27.3	23.0
SS003/4	Stratford Road, Wolverton (bridge near canal)	Urban Roadside	N	-	-	-	34.6**	31.9	27.6
B001/2	Northampton Rd, Lavendon (Horseshoe PH)	Rural Roadside	N	22.3	20.9	19.7	20.3	19.3	17.0
BB001/2	14-16 Newport Rd, Wavendon	Rural Roadside	N	22.8	24.4	24.9	24.7	23.7	19.4
AA001/2	Brook Farm, Broughton Rd, Middleton	Rural Roadside	N	18.3	17.8	18.5	17.9	15.8	13.3
K001/2	16-17 Greenlands, Newport Pagnell	Urban Garden	N	29.7	26.7	29.2	26.0	28.4	25.6



Site ID	Location	Site type	Within AQMA ?	Annual mean concentrations adjusted for bias					
				2010 (bias adjustment factor = 0.84)	2011 (bias adjustment factor = 0.85)	2012 (bias adjustment factor = 0.79)	2013 (bias adjustment factor = 0.75)	2014 (bias adjustment factor = 0.69)	2015 (bias adjustment factor = 0.64)
L001/2	5-7 Greenlands, Newport Pagnell	Urban Garden	N	27.9	24.3	27.2	25.7	25.0	22.3
M001/2	42-44 Walnut Close, Newport Pagnell	Urban Garden	N	21.5	19.7	22.8	20.2	19.9	18.0
EE001/2	6 Atherstone Court, Two Mile Ash	Urban Garden	N	13.8	12.6	13.8	13.6	12.6	10.8
PP001/2	1 Tudor Gardens, Stony Stratford	Urban Garden	N	13.0	12.3	13.4	12.8	10.6	9.2
MM001/2	18 Wheatcroft Close, Beanhill. MK6 4NJ	Urban Garden	N	23.4	21.9	23.1	23.7	24.0	22.0
R001/2/3	Static Air Quality Station (Civic Offices)	Co-location	N	24.1	19.9	22.8	20.4	19.4	17.1
S001/2/3	Roadbox (Newport Pagnell)	Co-location	N	37.7	35.0	35.7	32.2	31.4	29.6
JJ001/2/3	Roadbox 2 (Olney)	Co-location	Y	32.4	27.8	27.1	26.4	26.2	22.7
* : Estimate of annual mean (Box 3.2 of LAQM.TG(09))									
** : Monitoring on Stratford Road commenced in August 2013									

Table A.5 – 1-Hour Mean Automatic NO<sub>2</sub> Monitoring Results

Site ID	Location	Within AQMA ?	Valid data capture over monitoring period %	Valid data capture for the full calendar year %	No. of exceedences of hourly mean objective								
					2007	2008	2009	2010	2011	2012	2013	2014	2015
Fixed	Civic Offices, CMK	N	99.8	99.8	0	0	0	0	0	0	0	0	0
Roadbox 1	Wolverton Road, Newport Pagnell	N	95.0	95.0	0	0	2	0	0	0	0	0	0
Roadbox 2	High Street South, Olney	Y	99.4	99.4	-	-	0 (120.7)	0	0	0	0	0	0

Notes: Exceedances of the NO<sub>2</sub> 1-hour mean objective (200µg/m<sup>3</sup> 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 90%, the 99.8<sup>th</sup> percentile of 1-hour means is provided in brackets.

Figure 3 Trends in Annual Mean NO<sub>2</sub> Concentrations

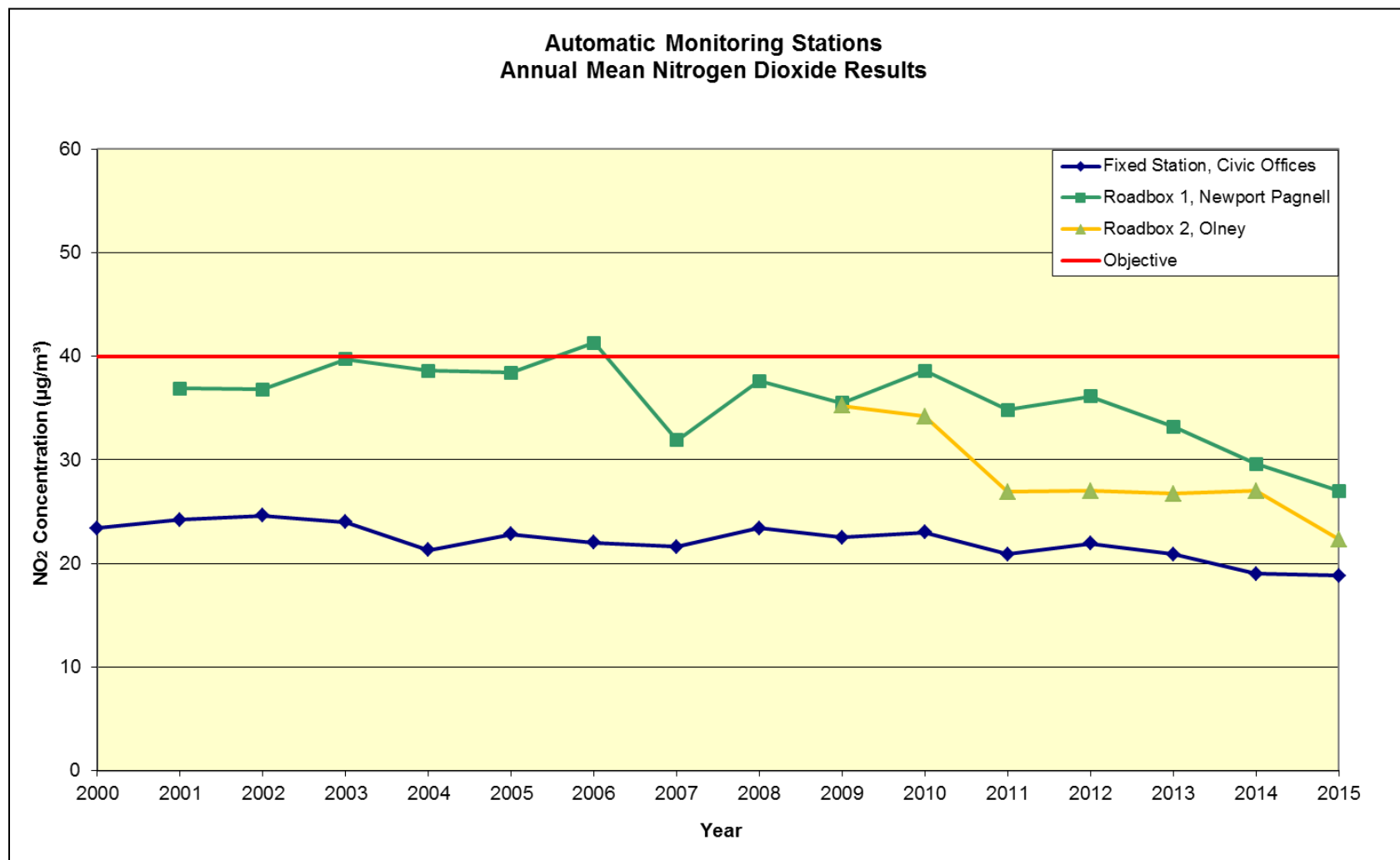


Table A.6 – Annual Mean PM10 Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2015 (%) <sup>(2)</sup>	PM <sub>10</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
				2011	2012	2013	2014	2015
Fixed	Civic Offices, CMK	98	98	18.2	17.5	15.7	14.7	14.8
Roadbox 1	Wolverton Road, Newport Pagnell	n/a	n/a	19.5	18.4	19.2	18.0	n/a*
Roadbox 2	High Street South, Olney	94	46	21.2	18.8	20.8	19.1	16.7**
* Monitoring discontinued/analyser beyond economic repair **Monitoring commenced 23-Jun-15 following breakdown								

Notes: Exceedances of the PM<sub>10</sub> annual mean objective of 40µg/m<sup>3</sup> 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 Technical Guidance LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure 4 Trends in Annual PM<sub>10</sub> Concentrations

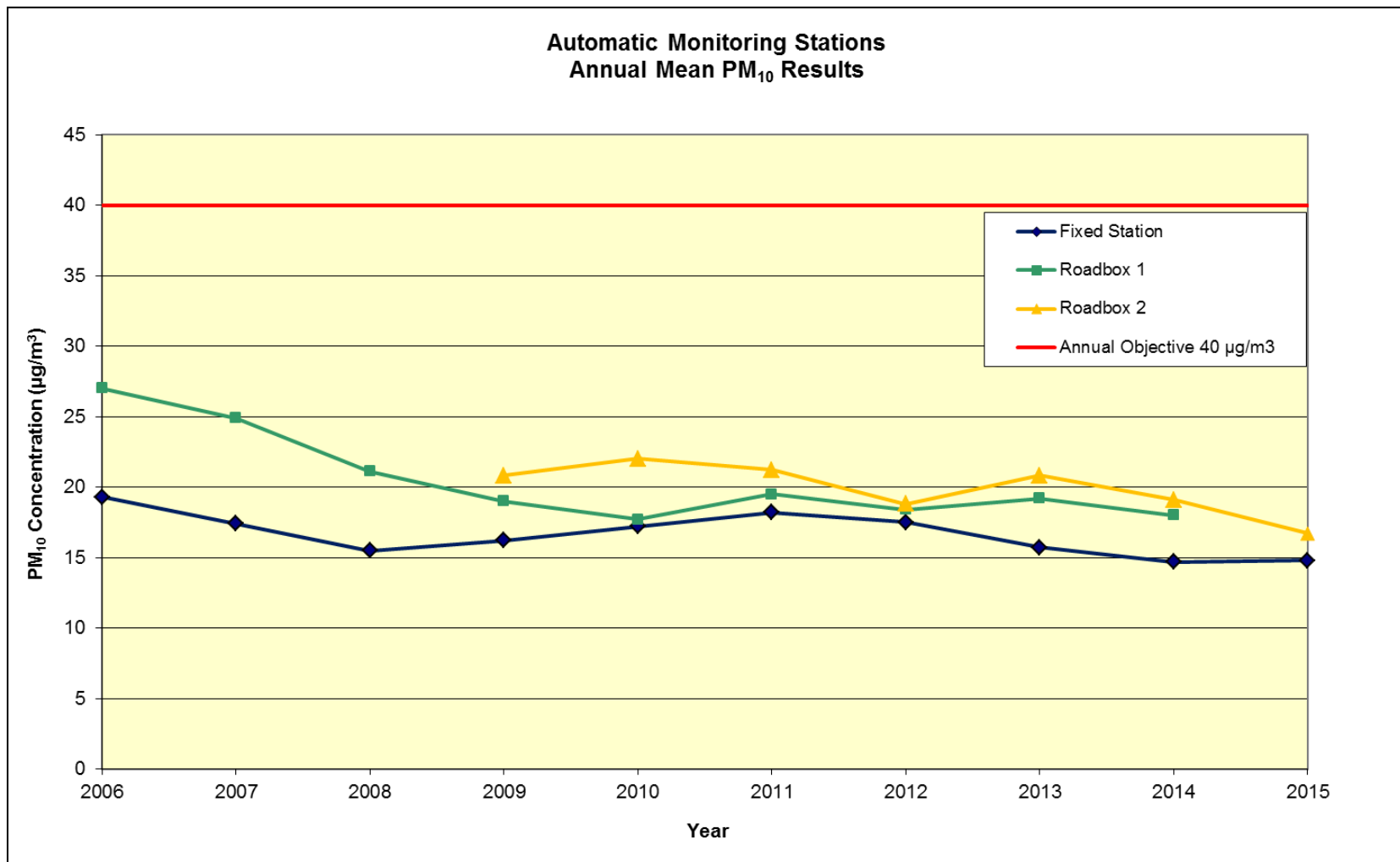


Table A.7 – 24-Hour Mean PM<sub>10</sub> Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2015 (%) <sup>(2)</sup>	PM <sub>10</sub> 24-Hour Means > 50µg/m <sup>3</sup> <sup>(3)</sup>				
				2011	2012	2013	2014	2015
Fixed	Civic Offices, CMK	98	98	6	1	1	4	1
Roadbox 1	Wolverton Road, Newport Pagnell	n/a	n/a	5	9	4	4	n/a
Roadbox 2	High Street South, Olney	94	46	1	13	1	3	0

Notes: Exceedances of the PM<sub>10</sub> 24-hour mean objective (50µg/m<sup>3</sup> 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 90%, the 90.4<sup>th</sup> percentile of 24-hour means is provided in brackets.

## Appendix B: Full Monthly Diffusion Tube Results for 2015

Table B.1 – NO<sub>2</sub> Monthly Diffusion Tube Results - 2015

Site ID	Location	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )													
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
														Raw Data	Bias Adjusted <sup>(1)</sup>
C001/2/3	10 High St South, Olney (Cowper School House)	55.2	64.9	61.8	58.3	29.2	43.9	46.2	43.8	43.7	69.7	48.5	51.9	51.4	32.9
D001/2/3	9 High St South, Olney (Olney Wine Bar)	56.4	64.5	55.0	48.3	34.6	39.9	41.2	34.0	39.8	53.4	45.2	40.1	46.0	29.5
E001/2/3	20 High St, Olney	33.9	37.4	37.5	n/a	missing	missing	26.2	26.1	31.7	44.2	33.3	33.4	33.7	21.6
F001/2/3	17 High St, Olney (Opp No.20 High St)	44.9	48.6	42.0	47.0	13.5	29.5	33.2	29.3	32.9	41.5	41.2	38.4	36.8	23.6
H001/2	76 High St, Newport Pagnell	42.7	48.3	42.7	31.5	31.1	26.7	28.6	28.0	35.6	41.5	35.6	35.9	35.7	22.8
I001/2	63 High St, Newport Pagnell	47.0	53.7	49.0	43.4	37.7	35.0	39.9	31.8	37.9	48.4	49.5	45.8	43.3	27.7
J001/2	High St, Newport Pagnell (Plough PH)	50.3	59.2	53.6	47.6	40.9	37.2	42.3	33.9	41.5	52.2	50.7	54.2	47.0	30.1
G001/2/3	Corner of Coneygere and Palmers Rd, Olney	27.2	24.7	21.9	19.5	4.6	10.3	10.5	8.2	11.9	20.1	19.5	19.3	16.5	10.5
V001/2	63 Windsor St, Wolverton	29.9	30.6	27.7	21.1	14.7	13.5	13.7	14.4	22.1	31.0	34.0	invalid	23.0	14.7
N001/2	222 Wolverton Rd, Blakelands	35.4	40.7	41.3	39.2	27.3	28.3	23.2	22.6	21.1	44.0	25.7	28.5	31.4	20.1
DD001/2	Aylesbury St, Fenny Stratford (Bracknell House) MK2 2BE	missing	40.9	42.1	32.7	22.4	16.8	24.6	24.1	26.5	46.6	34.9	33.5	31.4	20.1
T001/2	Silbury Boulevard, CMK (corner of North Tenth St)	missing	44.9	40.1	30.3	25.0	23.7	24.5	24.3	25.9	42.9	40.7	41.1	33.0	21.1

Site ID	Location	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )													
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
														Raw Data	Bias Adjusted <sup>(1)</sup>
U001/2	52-100 North Tenth Street, Central Milton Keynes	30.7	37.0	32.4	25.7	21.1	16.1	17.8	19.7	16.5	35.4	31.5	33.8	26.5	16.9
QQ001/2	Silver Street, Stony Stratford	35.9	35.5	32.2	30.1	23.5	20.8	21.7	15.8	27.8	37.0	39.1	invalid	29.0	18.6
RR001/2	Horsefair Green, Stony Stratford	36.2	36.0	33.6	30.4	28.0	23.4	26.5	25.1	34.2	42.6	30.7	32.8	31.6	20.2
W001/2	130 Newport Rd, New Bradwell	36.6	37.6	33.4	26.2	25.3	18.2	20.6	19.8	23.1	32.9	29.6	29.9	27.8	17.8
O001/2	64 Nicholas Mead, Great Linford	29.4	32.2	27.2	21.7	16.2	13.9	16.3	17.7	19.7	28.4	28.8	31.9	23.6	15.1
FF001/2/3	Cross Keys Office, High St South, Olney	61.4	65.4	53.6	47.5	32.4	42.2	49.6	43.9	48.9	56.1	59.6	56.2	51.4	32.9
HH001/2/3	Art Mart, 33 High Street South, Olney	55.0	57.0	50.6	39.3	31.2	38.0	38.6	37.2	44.5	58.2	46.4	38.4	44.5	28.5
KK001/2/3	18/20 Bridge St, Olney	60.7	68.9	55.7	56.0	26.9	32.3	46.4	51.2	51.2	66.1	60.3	65.6	53.4	34.2
LL001/2/3	Courtney House, Bridge St, Olney	62.3	61.8	53.8	48.6	33.2	42.9	43.2	41.2	46.4	50.9	55.9	51.6	49.3	31.6
OO001/2	Watling Street, Fullers Slade	29.1	34.5	18.6	15.3	missing	missing	18.2	24.5	28.8	46.2	30.6	29.8	27.6	17.6
SS001/2	Stratford Road, Wolverton (bridge near McConnell Drive)	47.9	42.1	41.7	38.1	29.5	27.2	30.8	28.9	35.9	42.3	34.5	33.0	36.0	23.0
SS003/4	Stratford Road, Wolverton (bridge near canal)	50.1	52.1	missing	45.9	39.5	35.9	39.3	29.3	48.4	56.7	43.6	34.2	43.2	27.6
TT001/2	62 High Street, Newport Pagnell (Co-Op North)	54.3	57.2	51.3	41.7	40.6	41.0	33.6	29.0	44.3	46.7	41.5	36.3	43.1	27.6
TT003/4	77 High Street, Newport Pagnell (Co-Op South)	43.2	45.9	38.5	37.2	31.9	26.6	31.5	28.3	29.1	38.4	41.4	41.8	36.2	23.1



Site ID	Location	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )													
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
														Raw Data	Bias Adjusted <sup>(1)</sup>
B001/2	Northampton Rd, Lavendon (Horseshoe PH)	32.8	38.8	31.3	20.2	20.9	16.9	18.6	18.8	23.4	32.4	32.0	33.3	26.6	17.0
BB001/2	14-16 Newport Rd, Wavendon	36.3	39.6	34.3	30.4	25.2	21.8	22.3	21.6	34.4	39.0	31.6	26.8	30.3	19.4
AA001/2	Brook Farm, Broughton Rd, Middleton	28.6	31.3	26.2	21.1	15.1	11.9	13.1	14.1	14.5	33.2	21.5	18.0	20.7	13.3
K001/2	16-17 Greenlands, Newport Pagnell	51.3	56.8	41.8	28.6	35.7	25.6	34.8	32.4	invalid	33.6	49.2	50.3	40.0	25.6
L001/2	5-7 Greenlands, Newport Pagnell	45.9	51.4	38.4	27.2	29.5	22.1	25.9	27.2	31.0	31.3	41.9	45.6	34.8	22.3
M001/2	42-44 Walnut Close, Newport Pagnell	39.1	39.1	31.7	18.4	23.5	16.5	21.4	23.3	23.2	28.8	36.2	36.8	28.2	18.0
EE001/2	6 Atherstone Court, Two Mile Ash	24.9	27.6	14.0	missing	11.4	8.2	9.9	11.1	17.1	24.5	18.8	18.1	16.9	10.8
PP001/2	1 Tudor Gardens, Stony Stratford	20.8	22.4	11.3	15.4	10.3	8.4	7.7	9.9	15.8	23.1	13.3	14.9	14.4	9.2
MM001/2	18 Wheatcroft Close, Beanhill. MK6 4NJ	44.7	44.3	39.3	30.5	29.2	25.5	30.1	23.6	30.4	40.5	40.0	33.6	34.3	22.0
R001/2/3	Static Air Quality Station (Civic Offices)	31.8	34.1	30.4	24.8	19.4	16.8	16.8	17.9	26.3	39.8	30.9	31.8	26.7	17.1
S001/2/3	Roadbox (Newport Pagnell)	60.5	60.0	50.0	35.5	46.9	32.5	41.9	35.9	41.6	50.8	51.0	47.6	46.2	29.6
JJ001/2/3	Roadbox 2 (Olney)	43.7	49.4	42.5	28.9	20.2	26.7	32.5	26.9	32.7	46.1	38.2	37.0	35.4	22.7

(1) See Appendix C for details on bias adjustment

## 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<sub>2</sub> 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<sub>2</sub> 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 2015 were 0.71, 0.58, and 0.63 giving a combined adjustment factor of 0.64. In addition we received a bias adjustment factor of 0.76 for the Marylebone Road, London, intercomparison tube study. The average for the four results was 0.67.

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

Month	Start Date	End Date	Diffusion Tube $\mu\text{g}/\text{m}^3$				Auto Average $\mu\text{g}/\text{m}^3$	
			1	2	3	Average		
Jan	07-Jan-15	04-Feb-15	34.36	32.45	28.70	31.84	26.28	
Feb	04-Feb-15	04-Mar-15	33.72	32.50	36.15	34.12	28.52	
Mar	04-Mar-15	01-Apr-15	28.99	31.87		30.43	24.44	
Apr	01-Apr-15	29-Apr-15	22.76	25.85	25.85	24.82	22.58	
May	29-Apr-15	27-May-15	19.20	18.01	21.09	19.43	12.24	
Jun	27-May-15	01-Jul-15	18.13	17.43	14.87	16.81	10.96	
Jul	01-Jul-15	29-Jul-15	19.03	15.70	15.60	16.77	11.44	
Aug	29-Jul-15	26-Aug-15	19.10	15.41	19.32	17.94	14.80	
Sep	26-Aug-15	30-Sep-15	25.15	26.48	27.20	26.27	18.30	
Oct	30-Sep-15	28-Oct-15	41.36	40.41	37.72	39.83	23.87	
Nov	28-Oct-15	02-Dec-15	28.59	32.17	31.98	30.91	18.42	
Dec	02-Dec-15	06-Jan-16	29.07	34.14	32.16	31.79	16.14	<b>Adjustment Factor</b>
<b>Annual average:</b>						<b>26.75</b>	<b>19.00</b>	

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

Month	Start Date	End Date	Diffusion Tube $\mu\text{g}/\text{m}^3$				Auto Average $\mu\text{g}/\text{m}^3$	
			1	2	3	Average		
Jan	07-Jan-15	04-Feb-15	54.69	62.79	63.94	60.47	28.81	
Feb	04-Feb-15	04-Mar-15	58.43	61.34	60.12	59.97	25.02	
Mar	04-Mar-15	01-Apr-15	52.10	46.83	51.02	49.98	23.99	
Apr	01-Apr-15	29-Apr-15	34.45	36.42	35.51	35.46	17.38	
May	29-Apr-15	27-May-15	51.55	45.44	43.71	46.90	19.22	
Jun	27-May-15	01-Jul-15	35.03	32.48	30.01	32.51	22.79	
Jul	01-Jul-15	29-Jul-15	42.79	46.46	36.51	41.92	27.09	
Aug	29-Jul-15	26-Aug-15	35.04	34.81	37.84	35.90	28.92	
Sep	26-Aug-15	30-Sep-15	41.61			41.61	31.08	
Oct	30-Sep-15	28-Oct-15	50.58	51.29	50.51	50.79	34.21	
Nov	28-Oct-15	02-Dec-15	48.21	53.75	50.91	50.96	33.31	
Dec	02-Dec-15	06-Jan-16	46.80	50.09	45.77	47.55	28.47	<b>Adjustment Factor</b>
<b>Annual average:</b>						<b>46.17</b>	<b>26.69</b>	

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

Month	Start Date	End Date	Diffusion Tube $\mu\text{g}/\text{m}^3$				Auto Average $\mu\text{g}/\text{m}^3$	
			1	2	3	Average		
Jan	07-Jan-15	04-Feb-15	41.94	42.68	46.59	43.74	25.30	
Feb	04-Feb-15	04-Mar-15	49.24	50.80	48.18	49.41	28.43	
Mar	04-Mar-15	01-Apr-15	46.28	41.19	40.04	42.50	24.92	
Apr	01-Apr-15	29-Apr-15	30.29	29.14	27.36	28.93	23.37	
May	29-Apr-15	27-May-15	22.08	19.77	18.85	20.23	17.48	
Jun	27-May-15	01-Jul-15	28.07	25.28	26.63	26.66	17.75	
Jul	01-Jul-15	29-Jul-15	32.04	34.24	31.27	32.52	18.50	
Aug	29-Jul-15	26-Aug-15	30.17	25.56	24.88	26.87	20.01	
Sep	26-Aug-15	30-Sep-15	31.51	34.78	31.85	32.71	23.36	
Oct	30-Sep-15	28-Oct-15	45.82	47.90	44.57	46.10	27.82	
Nov	28-Oct-15	02-Dec-15	38.17	38.75	37.76	38.23	23.21	
Dec	02-Dec-15	06-Jan-16	38.18	36.66	36.28	37.04	17.75	<b>Adjustment Factor</b>
<b>Annual average:</b>						<b>35.41</b>	<b>22.33</b>	

Table C.4 – Co-location study at Marylebone Road London

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 $\mu\text{gm}^{-3}$	Tube 2 $\mu\text{gm}^{-3}$	Tube 3 $\mu\text{gm}^{-3}$	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	07/01/2015	04/02/2015	135.8	127.0	116.5	126	9.7	8	24.0	82.2417	96.50427668	Good	Good
2	04/02/2015	04/03/2015	121.9	114.9	117.2	118	3.6	3	8.9	77.81356	96.28114541	Good	Good
3	04/03/2015	01/04/2015	98.5	95.8	99.2	98	1.8	2	4.5	73.42986	97.65712161	Good	Good
4	01/04/2015	29/04/2015	117.7	118.7	123.9	120	3.3	3	8.3	78.93535	94.16139829	Good	Good
5	29/04/2015	27/05/2015	118.8	126.9	115.6	120	5.8	5	14.5	73	95.57456303	Good	Good
6	27/05/2015	01/07/2015	109.6	109.6	95.6	105	8.1	8	20.1	88	97.53049688	Good	Good
7	01/07/2015	29/07/2015	122.8	115.1	109.1	116	6.9	6	17.1	97	96.39271104	Good	Good
8	29/07/2015	26/08/2015	75.3	78.4	63.3	72	8.0	11	19.8	79	93.97545556	Good	Good
9	26/08/2015	30/09/2015	81.2	90.3	74.2	82	8.1	10	20.1	84	97.70901517	Good	Good
10	30/09/2015	28/10/2015	94.9	89.9	90.3	92	2.8	3	6.9	72	97.61993306	Good	Good
11	28/10/2015	02/12/2015	116.1	111.4	125.6	118	7.2	6	18.0	84.70537	97.61762954	Good	Good
12	02/12/2015	06/01/2016	101.5	116.5	114.1	111	8.1	7	20.0	82.58764	97.26190476	Good	Good
13													

**AE Energy & Environment**  
From the AEA group

**Overall survey -->**  

Good precision	Good Overall DC
----------------	-----------------

 (Check average CV & DC from Accuracy calculations)

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

<b>Site Name/ ID:</b>	<b>Marylebone Road</b>
-----------------------	------------------------

<b>Precision</b>	<b>12 out of 12 periods have a CV smaller than 20%</b>
------------------	--

<b>Accuracy (with 95% confidence interval)</b>	<b>without periods with CV larger than 20%</b>
<b>Bias calculated using 12 periods of data</b>	
Bias factor A	0.76 (0.69 - 0.85)
Bias B	31% (17% - 46%)
Diffusion Tubes Mean:	106 $\mu\text{gm}^{-3}$
Mean CV (Precision):	6
Automatic Mean:	81 $\mu\text{gm}^{-3}$
Data Capture for periods used:	97%
Adjusted Tubes Mean:	81 (73 - 91) $\mu\text{gm}^{-3}$

<b>Accuracy (with 95% confidence interval)</b>	<b>WITH ALL DATA</b>
<b>Bias calculated using 12 periods of data</b>	
Bias factor A	0.76 (0.69 - 0.85)
Bias B	31% (17% - 46%)
Diffusion Tubes Mean:	106 $\mu\text{gm}^{-3}$
Mean CV (Precision):	6
Automatic Mean:	81 $\mu\text{gm}^{-3}$
Data Capture for periods used:	97%
Adjusted Tubes Mean:	81 (73 - 91) $\mu\text{gm}^{-3}$

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](mailto:LAQMHelpdesk@uk.bureauveritas.com)



## Appendix D: Map(s) of Monitoring Locations

### Automatic Monitoring Sites

Figure 5 Fixed Air Quality Station, Civic Offices, Central Milton Keynes

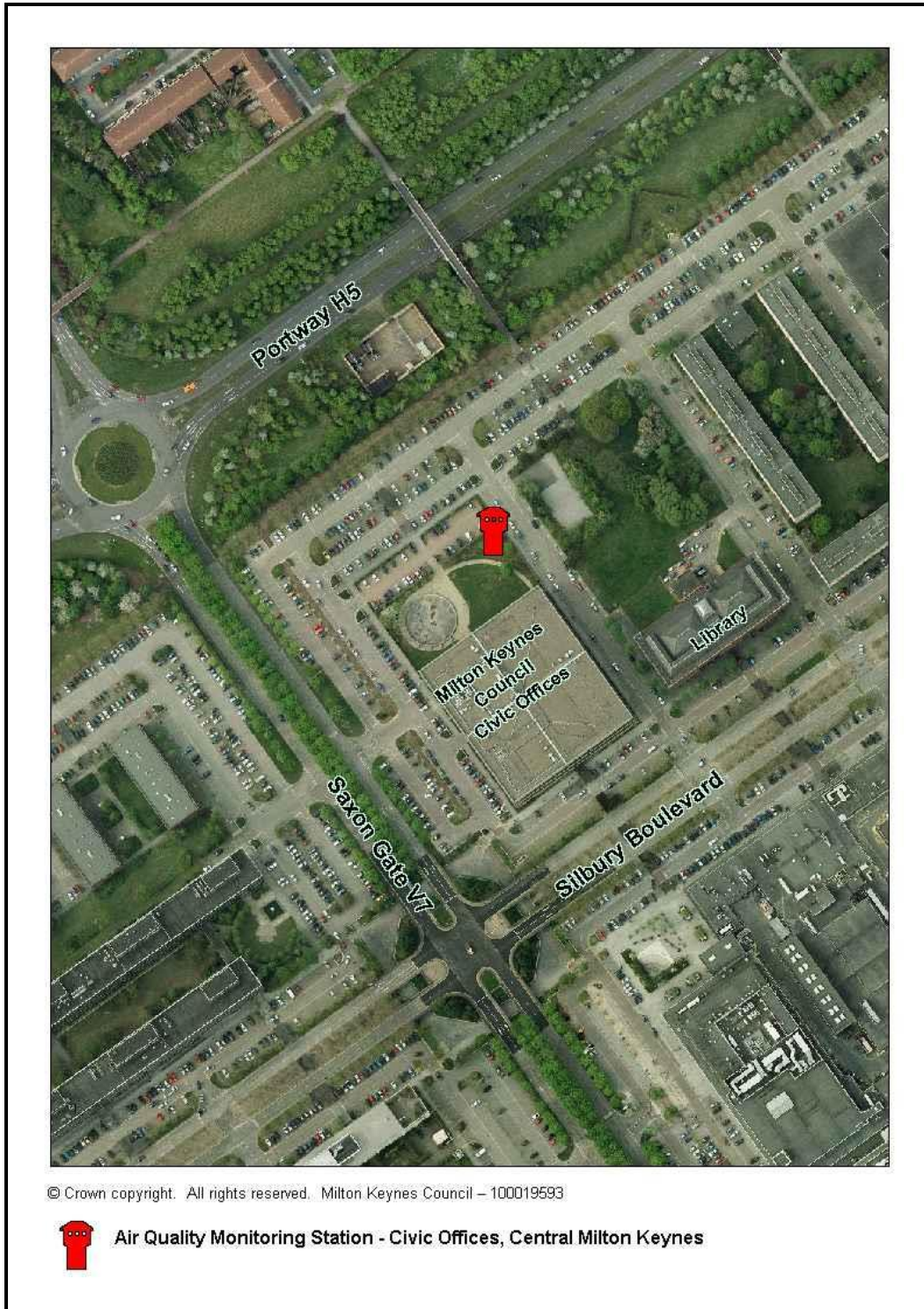




Figure 6 Roadbox Air Quality Station, Wolverton Road, Newport Pagnell

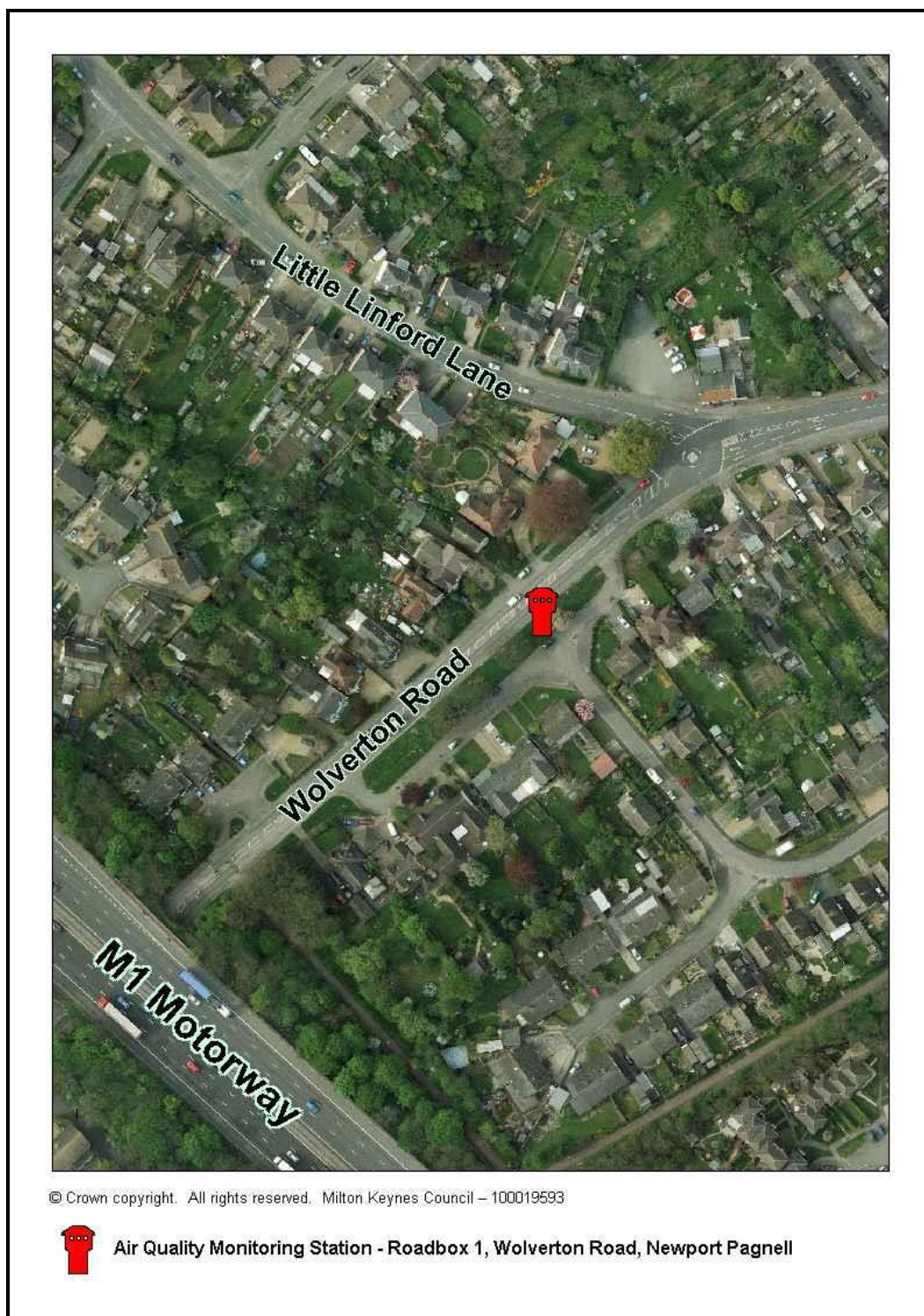




Figure 7 Roadbox Air Quality Station, High Street South, Olney (Within Designated Air Quality Management Area)

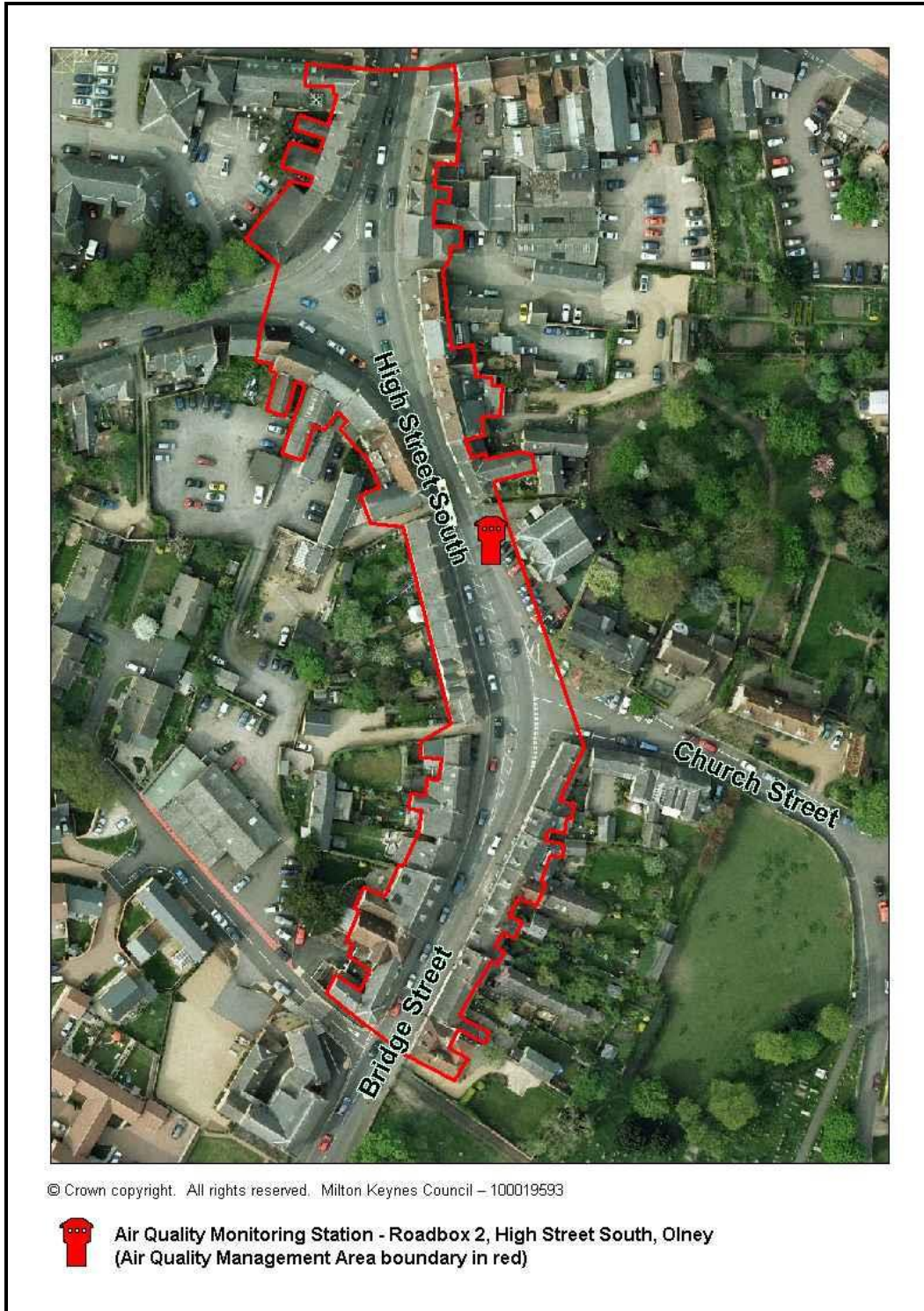




Figure 8 Automatic Air Quality Monitoring Station Photographs



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

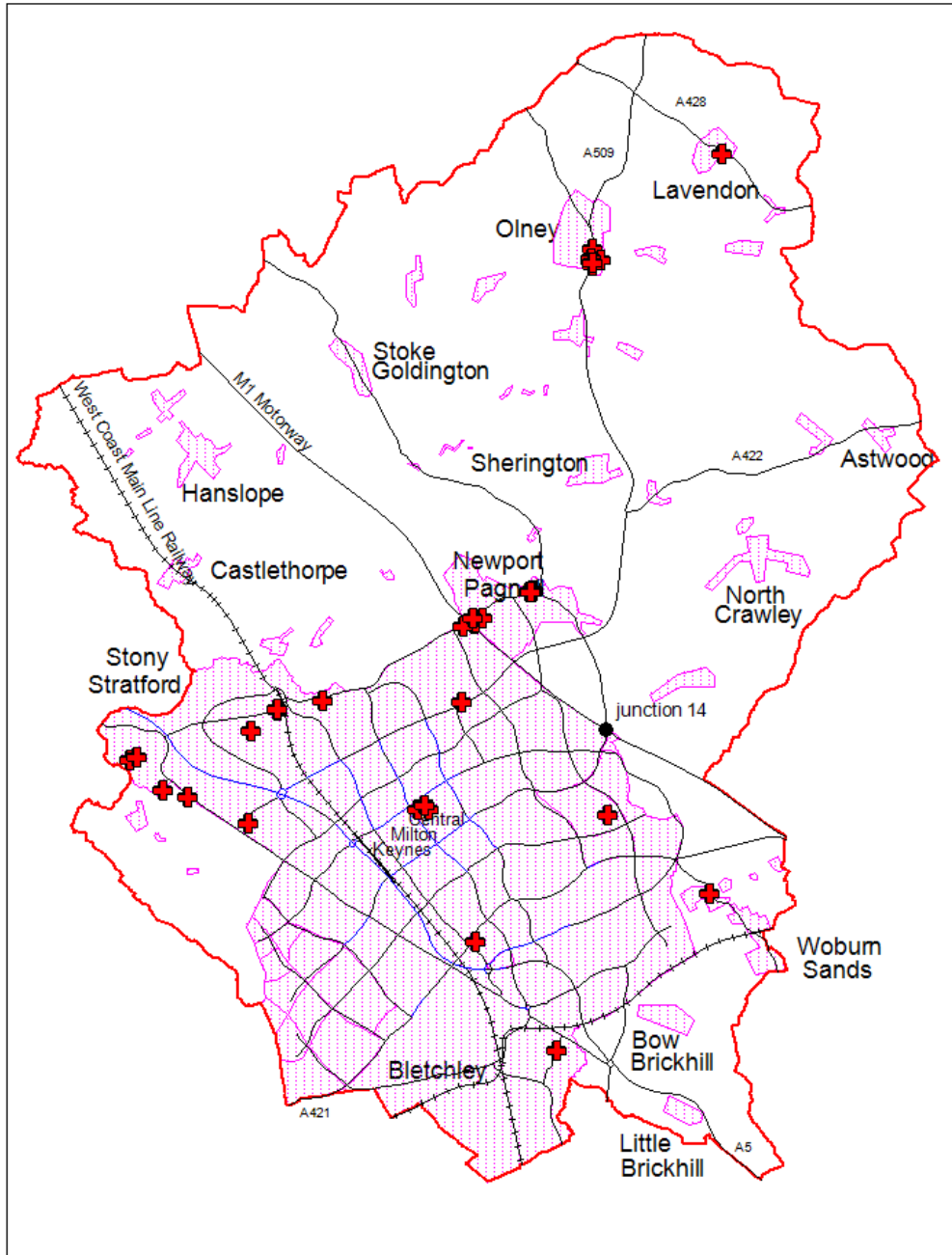


Roadbox 1 Monitoring Station Wolverton Road, Newport Pagnell (M1 bridge in background)




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

Figure 9 Map of Non-Automatic Monitoring Sites



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 Nitrogen Dioxide diffusion tube locations

## Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective <sup>4</sup>	
	Concentration	Measured as
Nitrogen Dioxide (NO <sub>2</sub> )	200 µg/m <sup>3</sup> , not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Particulate Matter (PM <sub>10</sub> )	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Sulphur Dioxide (SO <sub>2</sub> )	350 µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean

<sup>4</sup> The units are in microgrammes of pollutant per cubic metre of air (µg/m<sup>3</sup>).

## 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
DsPH	Directors of Public Health
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
JSNA	Joint Strategic Needs Assessment
LAQM	Local Air Quality Management
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM <sub>2.5</sub>	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
PHOF	Public Health Outcomes Framework
QA/QC	Quality Assurance and Quality Control
SO <sub>2</sub>	Sulphur Dioxide

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1. Department of the Environment, Food and Rural Affairs, The Air Quality (England) Regulations 2000, The Stationery Office.
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5. Milton Keynes Council, Progress Reports 2013 and 2014.
6. Milton Keynes Council, Air Quality Action Plan, Jan 2012.
7. 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/>