



# 2015 Air Quality Updating and Screening Assessment for Milton Keynes Council

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

April, 2015

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## Executive Summary

1. This Updating and Screening Assessment (USA) 2015 has looked at changes that have occurred since the last review and assessment was undertaken in 2012, which may have a significant effect on local air quality.
2. The USA contains a summary of new air quality monitoring data collected during the years 2012-2014. Data from previous years have been included for comparison to enable any trends to be identified.
3. There is no requirement to proceed to a Detailed Assessment for any of the pollutants investigated.
4. With the exception of the Air Quality Management Area in Olney, air quality objectives are being achieved throughout the Borough of Milton Keynes.
5. A Progress Report will be submitted to Defra by the end of April 2016.

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# **1 Introduction**

## **1.1 Description of Local Authority Area**

The Borough of Milton Keynes covers an area of 30,869 hectares in north Buckinghamshire. Its boundary forms the county boundary with Northamptonshire to the north and west and with Bedfordshire to the east. To the south of the Borough is the Aylesbury Vale District of Buckinghamshire.

The “new city” or Designated Area of Milton Keynes accounts for about one third of the Borough and contains about 80% of the total population of approximately 255,700 (2013 estimate). Outside the Designated Area the Borough is rural in character with a number of small towns and attractive villages. Milton Keynes is expanding rapidly particularly with major housing developments on the eastern and western flanks of the city.

The major pollution source is from road traffic emissions. The M1 motorway, A5 trunk road and the west coast mainline electrified railway from London Euston to Glasgow run through the Borough.

## **1.2 Purpose of Report**

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 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 exceedences are considered likely, the local authority must then 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.

The objective of this Updating and Screening Assessment is to identify any matters that have changed which may lead to risk of an air quality objective being exceeded. A checklist approach and screening tools are used to identify significant new sources or changes and whether there is a need for a Detailed Assessment. The USA report

should provide an update of any outstanding information requested previously in review and assessment reports.

### 1.3 Air Quality Objectives

The air quality objectives applicable to LAQM in England are set out in the Air Quality (England) Regulations 2000 (SI 928), The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre,  $\mu\text{g}/\text{m}^3$  with the number of exceedences in each year that are permitted (where applicable). For carbon monoxide the objective is in milligrammes per cubic metre,  $\text{mg}/\text{m}^3$ .

**Table 1.1 Air Quality Objectives Included in Regulations for the Purpose of LAQM in England**

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	5.00 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 $\text{mg}/\text{m}^3$	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	0.25 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2005
Particles (PM <sub>10</sub> ) (gravimetric)	50 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
Sulphur dioxide	350 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005



## 1.4 Summary of Previous Review and Assessments

Table 1.2 below summarises all previous local air quality management reports, which can be viewed and downloaded from the following web address;

<http://www.milton-keynes.gov.uk/environmental-health-and-trading-standards/pollution/local-air-quality-management>

**Table 1.2 Summary of Previous Review and Assessments**

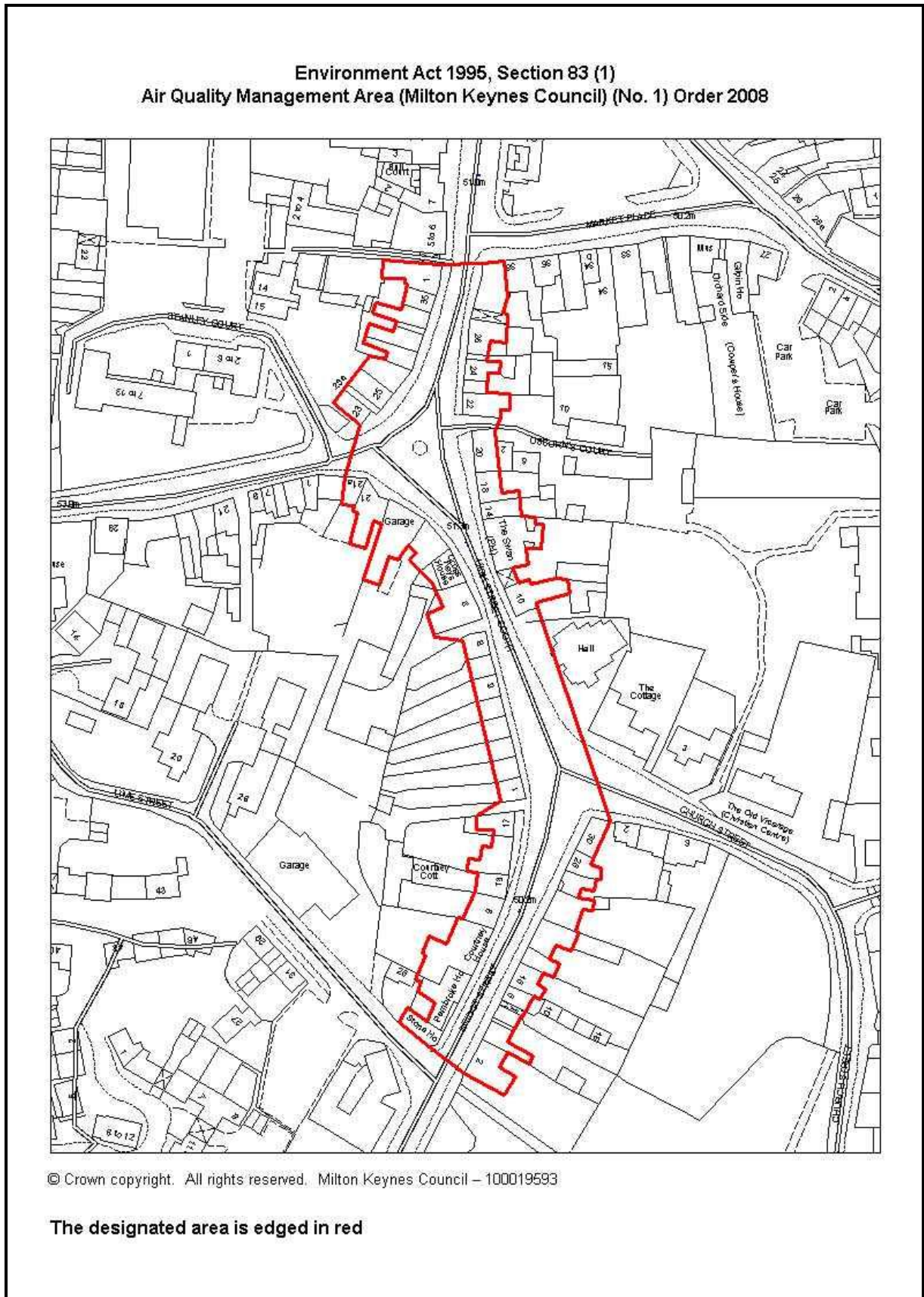
Report	Date	Description/Outcome
Review and Assessment	2000	The first round of review and assessment of air quality. A third stage assessment for nitrogen dioxide, PM <sub>10</sub> and carbon monoxide concluded that all objectives would be achieved by the relevant date.
Updating and Screening Assessment	2003	Second round of review and assessment. All objectives were predicted to be achieved by the relevant date.
Progress Report	2004	Summary report of new monitoring data, new local developments and other air quality related information.
Progress Report	2005	Summary report of new monitoring data, new local developments and other air quality related information.
Updating and Screening Assessment	2006	Third round of review and assessment. Concluded that a Detailed Assessment was not required for any pollutant.
Progress Report	2007	New monitoring data identified the need for a Detailed Assessment of NO <sub>2</sub> in Olney
Detailed Assessment	2008	A Detailed Assessment of nitrogen dioxide concentration in Olney. Concluded that an Air Quality Management Area (AQMA) should be declared.
Progress Report	2008	Additional report to complement the Detailed Assessment and provide Borough-wide air quality information.
Updating and Screening Assessment	2009	Fourth round of review and assessment. All objectives were predicted to be achieved by the relevant date with the exception of NO <sub>2</sub> within the AQMA in Olney.
Progress Report	2009	Additional report to complement the Updating and Screening Assessment and provide Borough-wide air quality information.
Further Assessment	2009	A Further Assessment of nitrogen dioxide concentration in Olney confirmed the exceedence and looked at source contributions.
Progress Report	2010	Summary report of new monitoring data, new local developments and other air quality related information.
Progress Report	2011	Summary report of new monitoring data, new local developments and other air quality related information.
Action Plan	2012	Includes options to reduce NO <sub>2</sub> levels
Updating and Screening Assessment	2012	Fifth round of review and assessment. All objectives were predicted to be achieved by the relevant date with the exception of NO <sub>2</sub> within the AQMA in Olney.
Progress Report	2013	Summary report of new monitoring data, new local developments and other air quality related information
Progress Report	2014	Summary report of new monitoring data, new local developments and other air quality related information

In the earlier review and assessments of air quality, heavily trafficked roads such as the M1 motorway were targeted as locations where exceedences of air quality objectives might be expected. This proved not to be the case as residential properties (and relevant public exposure) are usually at a sufficient distance from the major roads to allow dispersion and dilution of pollutants to a level below the objective. More recently monitoring has concentrated on narrow congested streets where people live in very close proximity to the roads.

In 2007, Milton Keynes Council identified the need for a Detailed Assessment of the nitrogen dioxide concentration in Olney, which is a busy market town with relatively high vehicle flows. Monitoring data showed that relevant locations on Bridge Street and High Street South were exceeding the annual nitrogen dioxide objective. An Air Quality Management Area was declared and came into force on 1<sup>st</sup> December 2008 (see Figure 1.1). A Further Assessment carried out by the Transport Research Laboratory on behalf of the Council looked at source contributions and modelled possible Action Plan measures including a total ban and restricted access of heavy goods vehicles.

The final Action Plan was published in October 2012 and contains the preferred options designed to bring about air quality improvements in the AQMA.

Figure 1.1 The Geographical boundary of the Air Quality Management Area (AQMA) in Olney



## **2 New Monitoring Data**

### **2.1 Summary of Monitoring Undertaken**

#### **2.1.1 Automatic Monitoring Sites**

Environment Health operates three continuous automatic air quality monitoring stations; a fixed monitoring station located within the walled garden at the rear of the Civic Offices and two small semi-permanent monitoring stations known as "roadboxes", located on Wolverton Road, Newport Pagnell near the M1 bridge and on High Street South, Olney within the Air Quality Management Area.

The automatic monitoring stations contain National Environmental Technology Centre (NETCEN) type-tested and approved analysers, as used in national networks, housed in secure air-conditioned containers to maintain the correct operating temperature range. Most functions of the air quality stations are automatic or can be operated by remote communication via modem, usually from the air quality monitoring computer at the Civic Offices. Data are downloaded daily, and gas analysers are checked calibrated automatically every 3 days using a gas mixture of known concentration to ensure accuracy of data.

A full service is undertaken every 6 months and the service includes a verification of the calibration gas concentration using a traceable standard. After correction has been made to the data set for any calibration errors, and other relevant factors, the data are usable for comparison with the objectives of the Strategy. The Site Operator's Manual for the Automatic Urban and Rural Network, produced by NETCEN is used as an operational guide for the automatic monitoring stations.

After many years of excellent service from Horiba Instruments (UK) Ltd. the service and maintenance contract was put out to tender in October 2012 and was won by SupportingU Ltd. The standard of service deteriorated and this was reflected in reduced data capture rates and unresolved problems with analysers. In November 2014 SupportingU Ltd. went into liquidation and Horiba were once again awarded the service contract. Unfortunately the Eberline beta attenuation monitor (BAM) in the

Wolverton Road station no longer functions and is beyond economic repair. The Teom PM<sub>10</sub> analyser in Olney has been offline for several months in 2014/15, however, it is hoped that this can be repaired.

Table 2.1a below shows the current monitoring locations, and Table 2.1b shows previously monitored locations.

Table 2.1a Details of Automatic Monitoring Sites

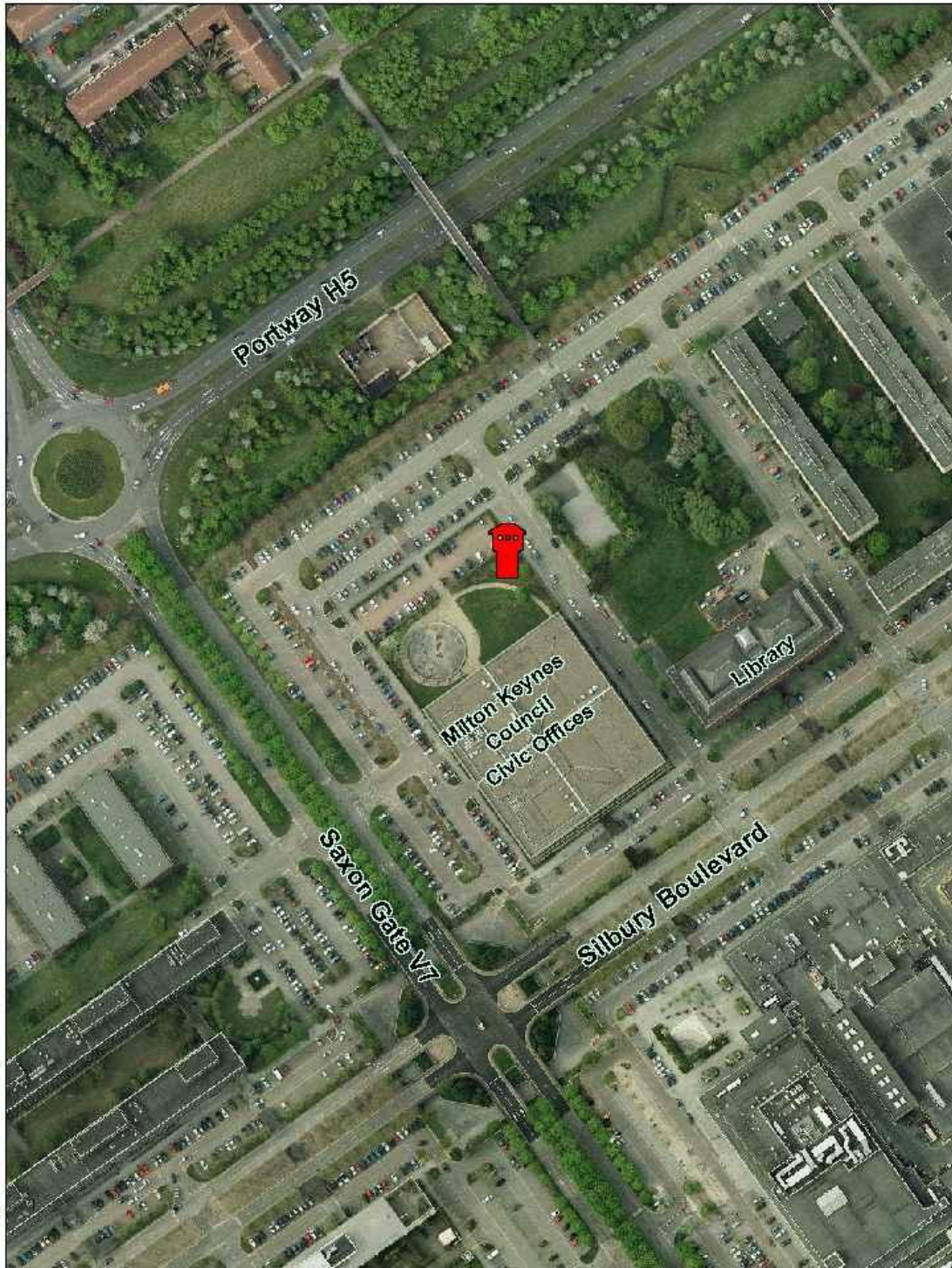
Site Name	Site Type	OS Grid Ref	Pollutants Monitored	Monitoring technique	In AQMA?	Relevant exposure?	Distance to kerb of nearest road (m)	Worst-case location?
Civic Offices, CMK	Urban Centre	485070 239131	PM <sub>10</sub>	TEOM 1400AB	N	N	4.8	N
			NO <sub>2</sub>	Horiba APNA 360CE (chemiluminescence)				
			SO <sub>2</sub>	Horiba APSA 360CE (uv-fluorescence)				
			O <sub>3</sub>	Horiba APOA 360 (uv absorption)				
Wolverton Road, Newport Pagnell	Roadside	486290 243344	PM <sub>10</sub>	Eberline β-gauge	N	N	3.4 (150 to M1)	Y
			NO <sub>2</sub>	Horiba APNA 360CE (chemiluminescence)				
High Street South, Olney	Roadside	488922 251157	PM <sub>10</sub>	TEOM 1400AB	Y	N	2	Y
			NO <sub>2</sub>	Horiba APNA 360CE (chemiluminescence)				

Table 2.1b Previously Monitored Locations

Location	Site Type	Grid Reference	Monitoring dates	Comments
Sorrell Drive, Newport Pagnell	Other	485618 243916	16-Feb-10 18-Jul-11	38 m from edge of M1 motorway
Station Rd Car Park, Newport Pagnell	Roadside	487222 243733	30-Jun-08 16-Feb-10	5.5 m from junction of 2 main roads
Church Street Olney	Roadside	488937 251128	22-May-07 18-Jun-08	5.9 m from High Street South, a narrow canyon effect road
Newport Road New Bradwell	Roadside	482579 241466	23-Aug-05 22-Dec-08	6 m from Newport Road. Houses 28 m from AQ station
Burgess Gardens Newport Pagnell	Suburban	486942 242677	14-Nov-00 14-Aug-02 24-Jun-05 15-May-07	Residential area 85 metres from edge of M1
Selbourne Avenue Bletchley	Urban Background	485722 232957	09-Oct-02 03-May-05	Mobile station in residential area. Landfill site 330m
Linceslade Grove Loughton	Suburban	483757 238140	18-Feb-04 26-Jul-05	Mobile station in residential area 56m from edge of A5
Western Road Bletchley	Urban Background	487360 234012	07-July-00 14-Nov-00	Residential area in Central Bletchley
High Street Olney	Kerbside	488919 251452	11-Nov-98* 11-Feb-99 14-Aug-02 11-Dec-03	Main street in busy market town *(monitored on 2 occasions)
Lovat School, Newport Pagnell	Urban Background	487996 243400	29-Nov-99 22-Mar-00	School in residential area
Miles Close, Blakelands	Suburban	486149 243127	11-Feb-99 05-May-99	Residential area 65 metres from edge of M1



Figure 2.1.1 Fixed Air Quality Station, Civic Offices, Central Milton Keynes



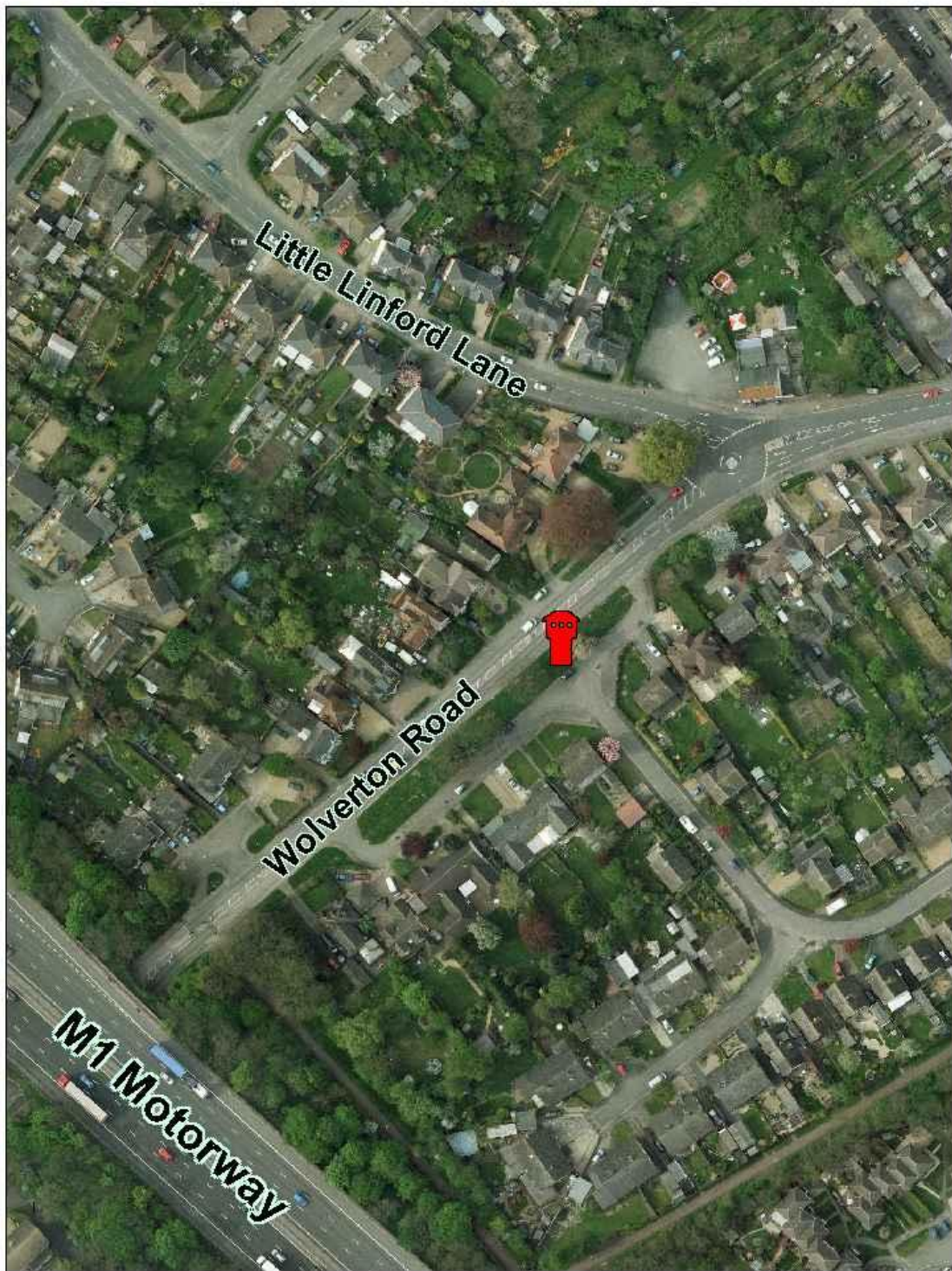
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Air Quality Monitoring Station - Civic Offices, Central Milton Keynes



Figure 2.1.2 Roadbox Air Quality Station, Wolverton Road, Newport Pagnell



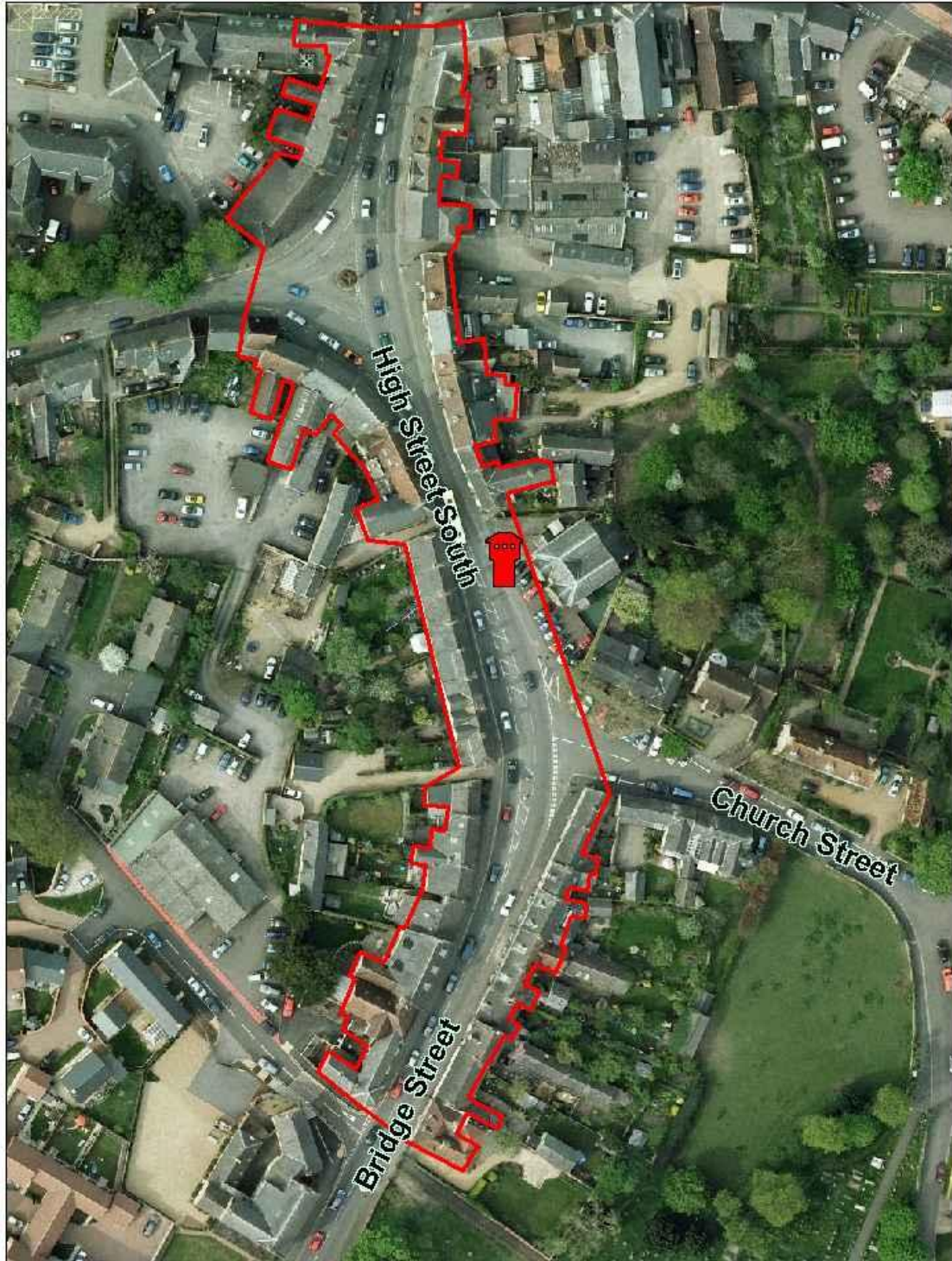
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Air Quality Monitoring Station - Roadbox 1, Wolverton Road, Newport Pagnell



Figure 2.1.3 Roadbox Air Quality Station, High Street South, Olney  
(Within designated Air Quality Management Area)



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

Figure 2.1.4 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)

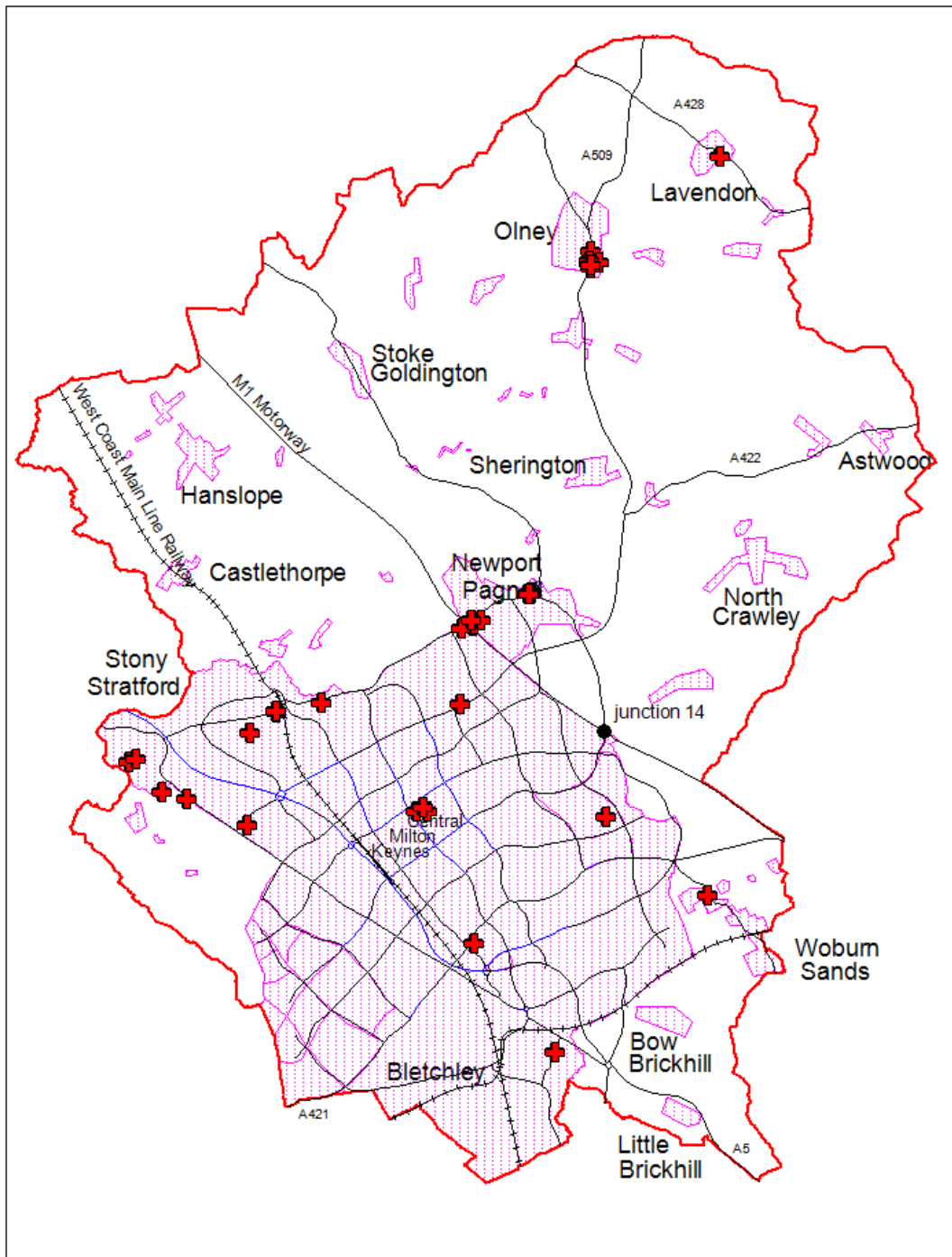


### 2.1.2 Non-Automatic Monitoring Sites

Nitrogen dioxide is the only pollutant that is routinely monitored using a non-automatic method. Milton Keynes Council (MKC) operates an extensive network of diffusion tubes as listed in Table 2.2. 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.

Figure 2.2 Map of Non-Automatic Monitoring Sites



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 Nitrogen Dioxide diffusion tube locations

Table 2.2 Details of Non-Automatic Monitoring Sites

Site Name	Tube No.	Site Type	OS Grid Ref	In AQMA?	Relevant exposure	Distance to kerb of nearest road (m)	Worst-case location?
10 High St South, Olney (Cowper School House)	C1 C2 C3	Urban Roadside	488914 251173	Y	Y	1.8	Y
9 High St South, Olney (Olney Wine Bar)	D1 D2 D3	Urban Roadside	488904 251177	Y	Y	1.7	Y
20 High St, Olney	E1 E2 E3	Urban Roadside	488926 251455	N	Y	7.6	N
17 High St, Olney (Opp. No.20 High St)	F1 F2 F3	Urban Roadside	488905 251456	N	Y	7.2	N
76 High St, Newport Pagnell	H1 H2	Urban Roadside	487514 243901	N	N	2.2	N
63 High St, Newport Pagnell	I1 I2	Urban Roadside	487588 243912	N	N	0.4	Y
57 High St, Newport Pagnell (The Plough PH)	J1 J2	Urban Roadside	487620 243922	N	N	0.4	Y
Corner of Coneygere and Palmers Rd, Olney	G1 G2 G3	Urban Roadside	489108 251213	N	N	1.7	Y
63 Windsor St, Wolverton	V1 V2	Urban Roadside	481412 240860	N	N	1.1	Y
222 Wolverton Rd, Blakelands	N1 N2	Urban Roadside	486069 243149	N	N	1.6	Y
Aylesbury St, Fenny Stratford (Bracknell House)	DD1 DD2	Urban Roadside	488118 233814	N	N	4.5	Y
Silbury Boulevard, CMK (corner of North Tenth St)	T1 T2	Urban Roadside	485298 239126	N	N	0.9	Y
52-100 North Tenth Street, Central Milton Keynes	U1 U2	Urban Roadside	485229 239223	N	N	6.1	N
Silver Street, Stony Stratford	QQ1 QQ2	Urban Roadside	478740 240217	N	N	0.9	Y
Horsefair Green, Stony Stratford	RR1 RR2	Urban Roadside	478882 240265	N	N	2.6	Y
130 Newport Rd, New Bradwell	W1 W2	Urban Roadside	482965 241515	N	N	1.6	Y
64 Nicholas Mead, Great Linford	O1 O2	Urban Roadside	486039 241484	N	N	4.0	N
Cross Keys Office, High St South, Olney	FF1 FF2 FF3	Urban Roadside	488898 251186	Y	Y	1.6	Y
33 High Street South, Olney (Art Mart)	HH1 HH2 HH3	Urban Roadside	488891 251248	Y	Y	2.0	Y
18/20 Bridge St, Olney	KK1 KK2 KK3	Urban Roadside	488917 251068	Y	Y	2.2	Y
Courtney House, Bridge St, Olney	LL1 LL2 LL3	Urban Roadside	488909 251077	Y	Y	1.7	Y
Watling Street, Fullers Slade	OO1 OO2	Urban Roadside	480015 239400	N	N	7.6	Y

Table 2.2 Continued

Site Name	Tube No.	Site Type	OS Grid Ref	In AQMA?	Relevant exposure	Distance to kerb of nearest road	Worst-case location?
Northampton Rd, Lavendon (Horseshoe PH)	B1 B2	Rural Roadside	491769 253542	N	N	3.0	Y
14-16 Newport Rd, Wavendon	BB1 BB2	Rural Roadside	491498 237284	N	N	7.2	N
Brook Farm, Broughton Rd, Middleton	AA1 AA2	Rural Roadside	489237 239016	N	N	1.0	Y
16-17 Greenlands, Newport Pagnell	K1 K2	Urban Garden	486296 243208	N	N	1.6	Y
5-7 Greenlands, Newport Pagnell	L1 L2	Urban Garden	486345 243230	N	N	1.4	Y
42-44 Walnut Close, Newport Pagnell	M1 M2	Urban Garden	486495 243345	N	N	1.5	Y
6 Atherstone Court, Two Mile Ash	EE1 EE2	Urban Garden	481331 238825	N	N	0.4	Y
1 Tudor Gardens, Stony Stratford	PP1 PP2	Urban Garden	479459 239536	N	N	2.3	Y
18 Wheatcroft Close, Beanhill	MM1 MM2	Urban Garden	486332 236228	N	N	0.3	Y
Static Air Quality Station (Civic Offices)	R1 R2 R3	Co-location	485070 239131	N	N	4.8	N
Roadbox 1 (Newport Pagnell)	S1 S2 S3	Co-location	486290 243344	N	N	1.8	Y
Roadbox 2 (Olney)	JJ1 JJ2 JJ3	Co-location	488922 251157	Y	N	2.0	Y
Stratford Road, Wolverton (Tesco End)	SS1 SS2	Urban Roadside	481966 241314	N	N	1.4	Y
Stratford Road, Wolverton (Station End)	SS3 SS4	Urban Roadside	481993 241328	N	N	1.4	Y
62 High Street, Newport Pagnell (Co-Op North)	TT1 TT2	Urban Roadside	487589 243923	N	Y	4.2	N
77 High Street, Newport Pagnell (Co-Op South)	TT3 TT4	Urban Roadside	243895 243895	N	Y	3.7	N

## 2.2 Comparison of Monitoring Results with AQ Objectives

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

#### Automatic Monitoring Data

There have been no recorded exceedences of the annual objective at automatic monitoring locations since data were reported in the USA 2012 (Table 2.3a).

There have been no recorded exceedences of the hourly objective at the automatic monitoring sites (Table 2.3b). Table 2.3c includes data from previously monitored locations.

There is a slight downward trend recorded at the fixed site at the Civic Offices in Central Milton Keynes over the last 12 years. The annual mean in 2014 (19.0 µg/m<sup>3</sup>) was the lowest recorded over this period and the highest was in 2002 (24.6 µg/m<sup>3</sup>). Milton Keynes has grown considerably and traffic flows have increased since monitoring began so it is encouraging that NO<sub>2</sub> levels have fallen slightly.

The long term roadside monitoring station on Wolverton Road recorded its lowest annual means in 2014 (29.6 µg/m<sup>3</sup>). In Olney the roadside monitoring station results have been stable over the last 4 years, approximately 27 µg/m<sup>3</sup>.



Table 2.3a Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with Annual Mean Objective

Site ID	Location	Within AQMA ?	Data Capture over monitoring period %	Data Capture for the full calendar year %	Annual mean concentrations $\mu\text{g}/\text{m}^3$								
					2006	2007	2008	2009	2010	2011	2012	2013	2014
Fixed	Civic Offices, CMK	N	88.8	88.8	22.0	21.6	23.4	22.5	23.0	20.9	21.9	20.9	19.0
Roadbox 1	Wolverton Road, Newport Pagnell	N	96.7	96.7	41.3 <sup>#</sup>	31.9	37.6	35.5	38.6	34.8	36.1	33.2	29.6
Roadbox 2	High Street South, Olney	Y	97.9	97.9	-	-	-	35.2 <sup>*</sup>	34.2	26.9	27.0	26.7	27.0
<sup>*</sup> : Estimate of annual mean (Box 3.2 of LAQM.TG(09)) <sup>#</sup> : Predicted concentration at nearest receptor is 32.1 $\mu\text{g}/\text{m}^3$													

Table 2.3b Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour Mean Objective

Site ID	Location	Within AQMA ?	Data Capture over monitoring period %	Data Capture for the full calendar year %	No. of exceedences of hourly mean objective								
					2006	2007	2008	2009	2010	2011	2012	2013	2014
Fixed	Civic Offices, CMK	N	88.8	88.8	0	0	0	0	0	0	0	0	0 (88.1)
Roadbox 1	Wolverton Road, Newport Pagnell	N	96.7	96.7	0	0	0	2	0	0	0	0	0
Roadbox 2	High Street South, Olney	Y	97.9	97.9	-	-	-	0 (120.7)	0	0	0	0	0

Figures in brackets are 99.8<sup>th</sup> percentiles of hourly mean concentrations, these are given when period of valid data is less than 90% of a full year

Table 2.3c Results of Automatic Monitoring for Nitrogen Dioxide: Previously Monitored Locations

Location	Monitoring Period	Annual mean											99.8 <sup>th</sup> percentile of hourly means										
		Objective 40 µg/m <sup>3</sup>											Objective 200 µg/m <sup>3</sup> (18 exceedences allowed)										
		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Civic Offices	21-May-98 31-Dec-13	24.0	21.3	22.8	22.0	21.6	23.4	22.5	23.0	20.9	21.9	20.9	94.1	74.2	83.9	140.2	101.4	87.7	101.6	94.9	86.1	98.4	96.1
Wolverton Road, Newport Pagnell	23-Aug-00 31-Dec-13	39.7	38.6	38.4	41.3	31.9	37.6	35.5	38.6	34.8	36.1	33.2	134.2	118	145.7	171.3	107.9	174.6	146.4	128.8	110.3	109.7	105.8
Burgess Gardens, Newport Pagnell	14-Nov-00 14-Aug-02	-	-	28.1*	26.2	27.9*	-	-	-	-	-	-	-	-	96.9	139.4	121.9	-	-	-	-	-	-
	12-Aug-05 15-May-07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selbourne Ave, Bletchley	09-Oct-02 3-May-05	18.4	17.3	15.4*	-	-	-	-	-	-	-	-	70.8	63.3	64.1	-	-	-	-	-	-	-	-
High Street, Olney	14-Aug-02 11-Dec-03	31.2	-	-	-	-	-	-	-	-	-	-	86.9	-	-	-	-	-	-	-	-	-	-
Linceslade Grove, Loughton	18-Feb-04 26-Jul-05	-	22.7	21.8*	-	-	-	-	-	-	-	-	-	90.7	86.7	-	-	-	-	-	-	-	-
Newport Road, New Bradwell	23-Aug-05 22-Dec-08	-	-	21.1*	21.9	22.5	22.0	-	-	-	-	-	-	-	74.5	121.5	103.4	85.6	-	-	-	-	-
Church Street, Olney	22-May-07 18-Jun-08	-	-	-	-	24.5*	23.6*	-	-	-	-	-	-	-	-	-	85.8	77.4	-	-	-	-	-
Station Rd Car Park, Newport Pagnell	30-Jun-08 31-Dec-09	-	-	-	-	-	24.8*	28.6*	-	-	-	-	-	-	-	-	-	97.4	96.1	-	-	-	-
Sorrell Dr, Newport P	16-Feb-10 18-Jul-11	-	-	-	-	-	-	-	31.8*	29.4*	-	-	-	-	-	-	-	-	-	103.2	102.2	-	-
High Street South, Olney	17-Mar-09 31-Dec-13	-	-	-	-	-	-	35.2*	34.2	26.9	27.0	26.7	-	-	-	-	-	-	120.7	120.2	101.9	92.7	93.3

\* : Estimate of annual mean (Box 3.2 of LA QM.TG(09))

Figure 2.3a Trends in Monthly Mean Nitrogen Dioxide Concentrations measures at Automatic Monitoring Sites

Automatic Monitoring Station  
 Civic Offices, Central Milton Keynes  
 Average Monthly Nitrogen Dioxide Concentration

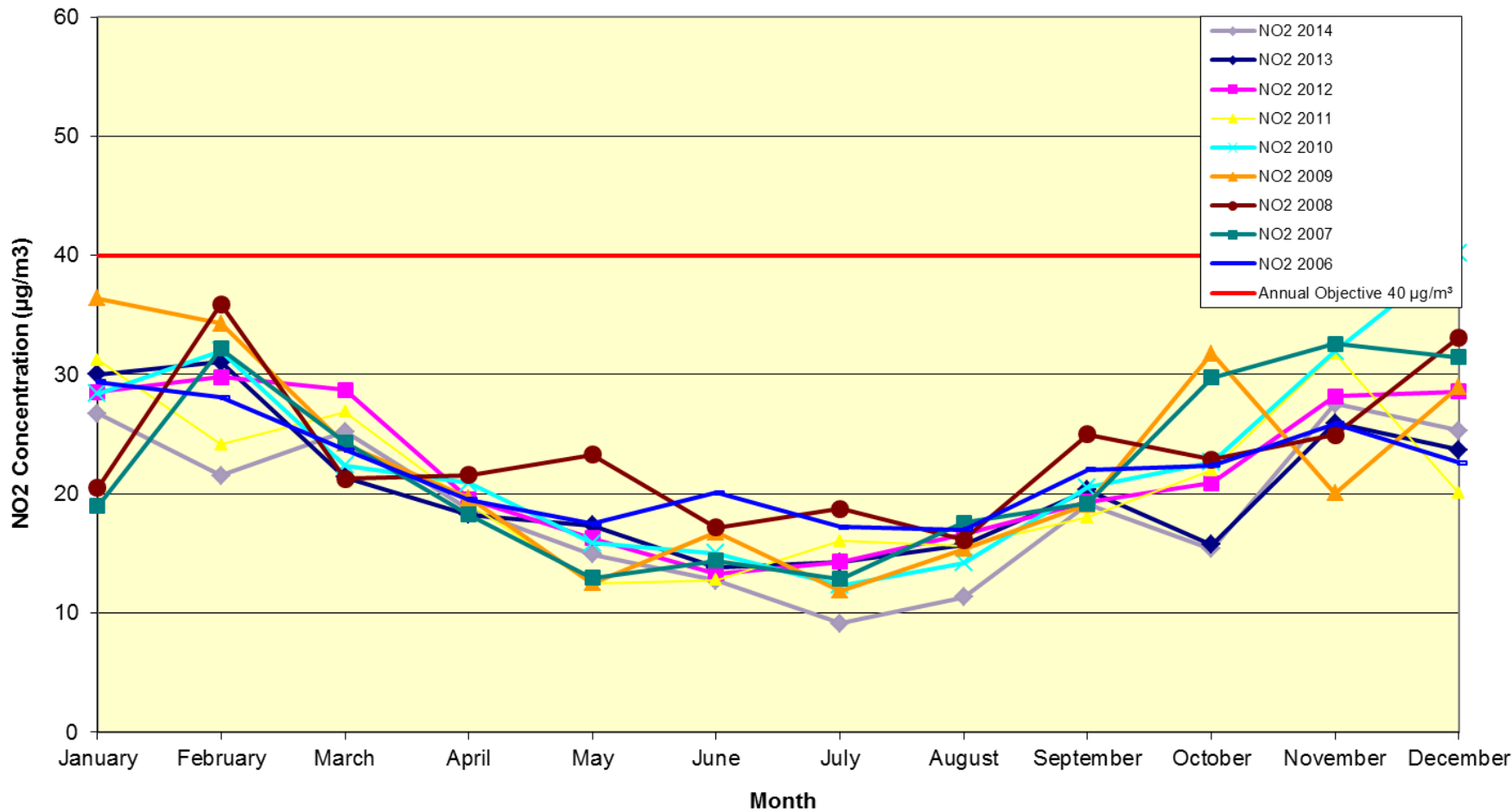
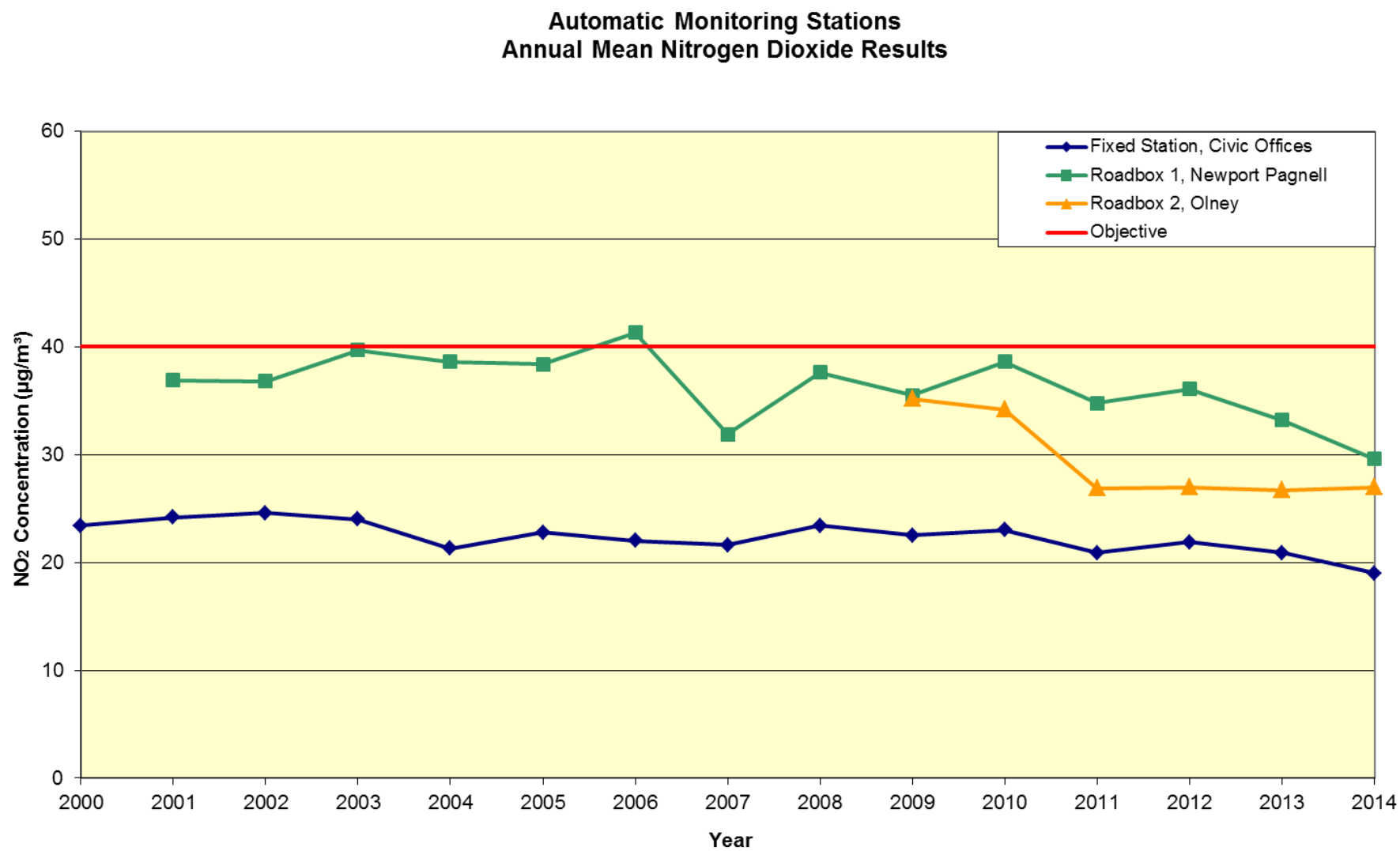


Figure 2.3b Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Civic Offices



### Non-Automatic Diffusion Tube Monitoring Data

Table 2.4 below lists all diffusion tube results. The only recorded exceedences of the annual mean objective were within the AQMA at High Street South and Bridge Street in Olney. The majority of tubes recorded lower annual means than in 2013.

**Table 2.4 Results of Nitrogen Dioxide Diffusion Tubes**

Site ID	Location	Site type	Within AQMA ?	Annual mean concentrations adjusted for bias					
				2009 (bias adjustment factor = 0.79)	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)
C001/3	10 High St South, Olney (Cowper School House)	Urban Roadside	Y	43.8	46.8	43.8	42.8	44.0	40.5
D001/3	9 High St South, Olney (Olney Wine Bar)	Urban Roadside	Y	37.0	41.8	40.4	39.6	36.6	34.1
E001/3	20 High St, Olney	Urban Roadside	N	22.5	25.6	24.7	25.8	24.3	21.9
F001/3	17 High St, Olney (Opp No.20 High St)	Urban Roadside	N	28.7	30.7	29.0	27.8	25.4	26.7
H001/2	76 High St, Newport Pagnell	Urban Roadside	N	26.9	30.4	26.3	27.6	28.3	26.4
I001/2	63 High St, Newport Pagnell	Urban Roadside	N	36.0	33.6*	31.1	33.3	34.2	31.1
J001/2	High St, Newport Pagnell (Plough PH)	Urban Roadside	N	34.9	37.4	34.8	35.0	35.5	34.2
TT001/2	62 High Street, Newport Pagnell (Co-Op North)	Urban Roadside	N	-	-	-	-	-	34.2
TT003/4	77 High Street, Newport Pagnell (Co-Op South)	Urban Roadside	N	-	-	-	-	-	27.4
G001/3	Corner of Coneygere and Palmers Rd, Olney	Urban Roadside	N	12.4	13.7	14.1	14.5	13.2	12.8
V001/2	63 Windsor St, Wolverton	Urban Roadside	N	17.6	18.1	17.3	19.0	18.0	15.2

Milton Keynes Council

Site ID	Location	Site type	Within AQMA ?	Annual mean concentrations adjusted for bias					
				2009 (bias adjustment factor = 0.79)	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)
N001/2	222 Wolverton Rd, Blakelands	Urban Roadside	N	25.5	30.3	27.4	26.9	29.3	24.7
DD001/2	Aylesbury St, Fenny Stratford (Bracknell House)	Urban Roadside	N	23.5*	23.9	22.7	23.4	25.9	24.2
T001/2	Silbury Boulevard, CMK (corner of North Tenth St)	Urban Roadside	N	24.4	23.6	22.6	23.9	25.3	23.7
U001/2	52-100 North Tenth Street, Central Milton Keynes	Urban Roadside	N	21.2	21.6	20.1	21.5	19.7	20.1
QQ001/2	Silver Street, Stony Stratford	Urban Roadside	N	21.2	23.8	21.1	21.1	22.4	19.8
RR001/2	Horsefair Green, Stony Stratford	Urban Roadside	N	22.2	25.7	22.2	21.8	25.4	22.3
W001/2	130 Newport Rd, New Bradwell	Urban Roadside	N	21.6*	21.9	21.4	24.5	23.0	20.1
O001/2	64 Nicholas Mead, Great Linford	Urban Roadside	N	20.1	17.9	19.1	19.2	18.4	17.7
FF001/3	Cross Keys Office, High St South, Olney	Urban Roadside	Y	<b>42.8</b>	<b>44.4</b>	<b>42.2</b>	<b>41.0</b>	36.2	37.3
HH001/3	Art Mart, 33 High Street South, Olney	Urban Roadside	Y	35.8	38.9	35.1	37.9	32.6	32.0
II001/3	Opposite 9 Weston Road, Olney	Urban Roadside	N	23.2*	26.3*	25.2*	-	-	-
KK001/3	18/20 Bridge St, Olney	Urban Roadside	Y	<b>46.1</b>	<b>46.5</b>	<b>43.1</b>	<b>42.4</b>	<b>40.2</b>	<b>41.3</b>
LL001/3	Courtney House, Bridge St, Olney	Urban Roadside	Y	<b>40.0*</b>	<b>39.6</b>	<b>39.6</b>	<b>40.1</b>	33.6	34.3
OO001/2	Watling Street, Fullers Slade	Urban Roadside	N	18.8	19.9	18.8	20.8	21.7	18.1
SS001/2	Stratford Road, Wolverton (bridge near McConnell Drive)	Urban Roadside	N	-	-	-	-	27.1**	27.3

Milton Keynes Council

Site ID	Location	Site type	Within AQMA ?	Annual mean concentrations adjusted for bias					
				2009 (bias adjustment factor = 0.79)	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)
SS003/4	Stratford Road, Wolverton (bridge near canal)	Urban Roadside	N	-	-	-	-	34.6**	31.9
B001/2	Northampton Rd, Lavendon (Horseshoe PH)	Rural Roadside	N	19.7	22.3	20.9	19.7	20.3	19.3
BB001/2	14-16 Newport Rd, Wavendon	Rural Roadside	N	21.4	22.8	24.4	24.9	24.7	23.7
AA001/2	Brook Farm, Broughton Rd, Middleton	Rural Roadside	N	17.2	18.3	17.8	18.5	17.9	15.8
K001/2	16-17 Greenlands, Newport Pagnell	Urban Garden	N	32.3	29.7	26.7	29.2	26.0	28.4
L001/2	5-7 Greenlands, Newport Pagnell	Urban Garden	N	29.2	27.9	24.3	27.2	25.7	25.0
M001/2	42-44 Walnut Close, Newport Pagnell	Urban Garden	N	23.6	21.5	19.7	22.8	20.2	19.9
EE001/2	6 Atherstone Court, Two Mile Ash	Urban Garden	N	13.2	13.8	12.6	13.8	13.6	12.6
PP001/2	1 Tudor Gardens, Stony Stratford	Urban Garden	N	11.6	13.0	12.3	13.4	12.8	10.6
MM001/2	18 Wheatcroft Close, Beanhill	Urban Garden	N	22.3	23.4	21.9	23.1	23.7	24.0
R001/3	Static Air Quality Station (Civic Offices)	Co-location	N	24.2	24.1	19.9	22.8	20.4	19.4
S001/3	Roadbox (Newport Pagnell)	Co-location	N	35.6	37.7	35.0	35.7	32.2	31.4
JJ001/3	Roadbox 2 (Olney)	Co-location	Y	31.3	32.4	27.8	27.1	26.4	26.2
Q001/3	Mobile (Newport Pagnell)	Co-location	N	-	32.6*	29.7*	-	-	-

\* : Estimate of annual mean (Box 3.2 of LAQM.TG(09))  
 \*\*: Monitoring on Stratford Road commenced in August 2013



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

Automatic monitoring results have been adjusted using the Volatile Correction Method (VCM) as developed by ERG at King's College, London for TEOM analysers (Tables 2.5a and 2.5b). Results from the beta attenuation monitor (BAM) used in Roadbox 1 monitoring station have been multiplied by the standard correction factor of 1.3. The BAM has a heated inlet at 45°C but was not tested in the equivalence study therefore the advice is that results should continue to be adjusted using this factor.

The BAM stopped working on 21<sup>st</sup> July 2014 and could not be repaired by the service contractor, SupportingU Ltd. therefore annual mean data have been estimated using the method in Box 3.2 of LAQM Technical Guidance Note TG(09). Data capture from the TEOM analyser on Wolverton Road was only 77% because of various problems that were not resolved quickly and Box 3.2 estimation method has also been applied.

The results are all well within the annual and 24-hour mean objectives.

The fixed site recorded the lowest annual mean concentration of 14.7 µg/m<sup>3</sup> since the VCM method was introduced in 2006 and there is a downward trend from 2011. There is also a slight downward trend at both roadside stations.

Table 2.5a Results of Automatic Monitoring of PM<sub>10</sub>: Comparison with Annual Mean Objective

Site ID	Location	Site type	Within AQMA?	Valid data capture for monitoring period %	Valid data capture 2014 %	Confirm gravimetric equivalent	Annual mean concentration $\mu\text{g}/\text{m}^3$							
							2007	2008	2009	2010	2011	2012	2013	2014
Fixed	Civic Offices, CMK	Urban Centre	N	98.13	98.13	Yes	17.4	15.5	16.2	17.2	18.2	17.5	15.7	14.7
Roadbox 1 <sup>#</sup>	Wolverton Road, Newport Pagnell	Roadside	N	52.74	52.74	n/a	24.9	21.1	19.0	17.7	19.5	18.4	19.2	18.0*
Roadbox 2	High Street South, Olney	Roadside	N	76.58	76.58	Yes	-	-	20.8*	22.0	21.2	18.8	20.8*	19.1*
Mobile	Sorrell Drive, Newport Pagnell	Other	N	-	-	Yes	-	-	-	18.4*	19.2*	-	-	-

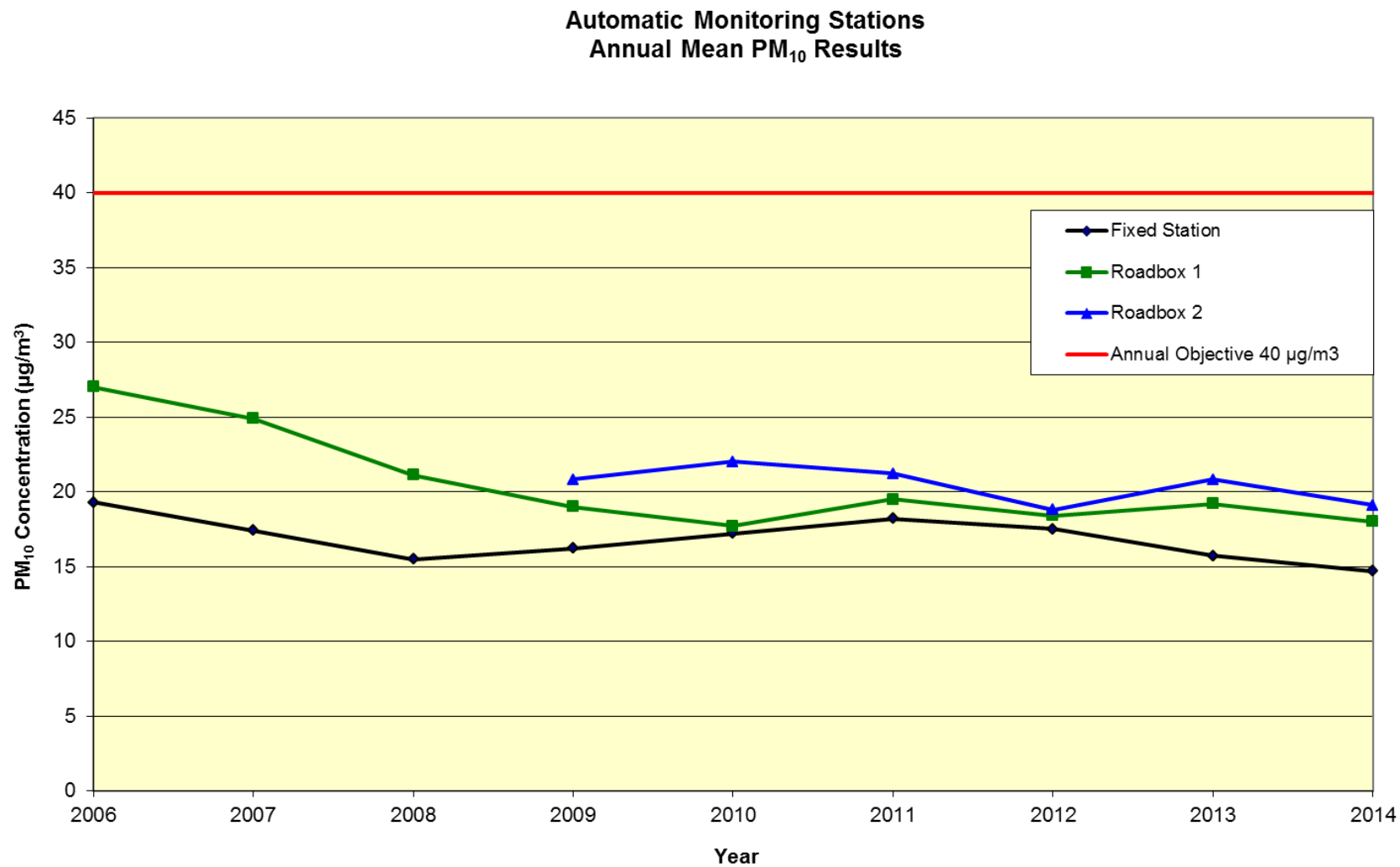
\* : Estimate of annual mean (Box 3.2 of LAQM.TG(09))  
# : Roadbox 1 has a heated inlet beta attenuation monitor therefore uses 1.3 correction factor

Table 2.5b Results of Automatic Monitoring for PM<sub>10</sub>: Comparison with 24-hour mean Objective

Site ID	Location	Site type	Within AQMA?	Valid data capture for monitoring Period %	Valid data capture 2014 %	Confirm gravimetric equivalent	Number of exceedences of daily mean (50 µg/m <sup>3</sup> )							
							2007	2008	2009	2010	2011	2012	2013	2014
Fixed	Civic Offices, CMK	Urban Centre	N	98.13	98.13	Yes	6	3	1	0	6	1	1	4
Roadbox 1 <sup>#</sup>	Wolverton Road, Newport Pagnell	Roadside	N	52.74	52.74	n/a	19	13	1	1	5	9	4	4
Roadbox 2	High Street South, Olney	Roadside	N	76.58	76.58	Yes	-	-	4	1	13	1	3	6
Mobile	Sorrell Drive, Newport Pagnell	Other	N	-	-	Yes	-	0	2	0	7	-	-	-

<sup>#</sup> : The Roadbox Station has a heated inlet beta attenuation monitor therefore uses 1.3 correction

Figure 2.4 Trends in Annual Mean PM<sub>10</sub> Concentrations



### 2.2.3 Sulphur Dioxide (SO<sub>2</sub>)

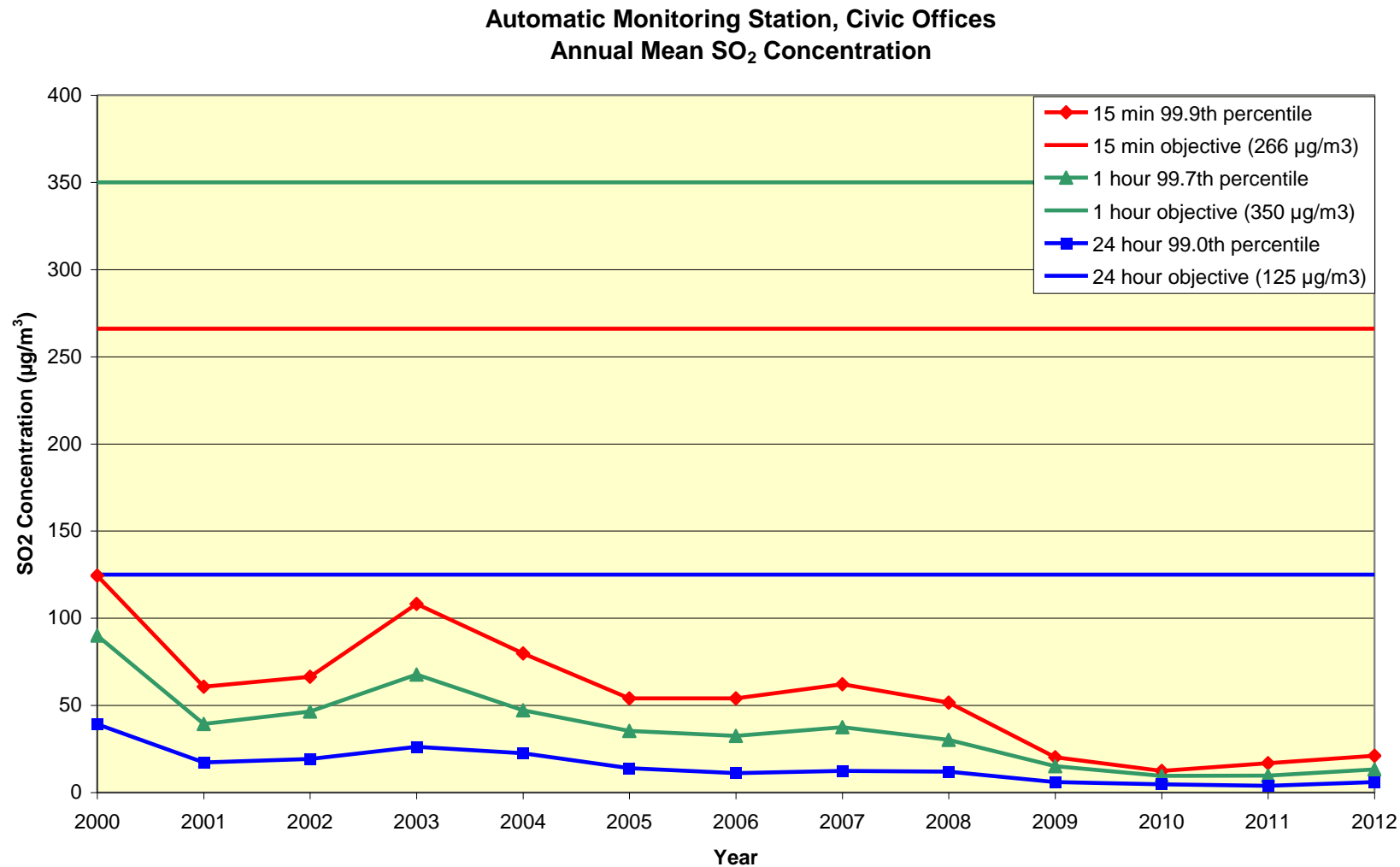
There have been no exceedences of the sulphur dioxide objectives at any of the monitored sites since automatic monitoring began in 1999. Closure of Stewartby brickworks in February 2008 has reduced local emission sources of sulphur dioxide (see Table 2.6 and Figure 2.5). Didcot A coal-fired power station was closed down in March 2013 after operating for 43 years, further reducing local SO<sub>2</sub> concentrations.

Since the mobile air quality station was decommissioned in July 2011, the SO<sub>2</sub> analyser housed in the fixed station at the Civic Offices remained operational until the end of 2012. It was then switched off to save money on servicing and running costs however, it can be brought back on line if needed in the future.

Table 2.6 Results of Automatic Monitoring of SO<sub>2</sub>: Comparison with Annual Mean Objective

Site ID	Location	Site type	Within AQMA?	Valid data capture for monitoring period %	Valid data capture 2012 %	Objective	SO <sub>2</sub> concentration µg/m <sup>3</sup>						
							2006	2007	2008	2009	2010	2011	2012
Fixed	Civic Offices, CMK	Urban Centre	N	93.6	93.6	15 min (99.9 <sup>th</sup> %) (266 µg/m <sup>3</sup> )	54.0	62.1	51.6	20.2	12.4	16.8	21.1
						1 hour (99.7 <sup>th</sup> %) (350 µg/m <sup>3</sup> )	32.5	37.5	30.2	15.1	9.5	9.7	13.2
						24 hour (99 <sup>th</sup> %) (125 µg/m <sup>3</sup> )	11.1	12.4	12.0	6.0	4.7	3.8	6.0
Mobile 2	Sorrell Drive, Newport Pagnell	Urban Roadside	N	n/a	n/a	15 min (99.9 <sup>th</sup> %) (266 µg/m <sup>3</sup> )	-	-	-	-	11.1	13.9	-
						1 hour (99.7 <sup>th</sup> %) (350 µg/m <sup>3</sup> )	-	-	-	-	8.4	8.6	-
						24 hour (99 <sup>th</sup> %) (125 µg/m <sup>3</sup> )	-	-	-	-	4.7	4.1	-

Figure 2.5 Trends in SO<sub>2</sub> Concentrations



## 2.2.4 Benzene

Benzene is not monitored at any location within the Borough.

## 2.2.5 Ozone

Ground level ozone is monitored in Milton Keynes at the automatic air quality station at the Civic Offices. Although it is included in the National Air Quality Strategy it is not included in the local air quality management regime due to its trans-boundary nature and its origin as a 'secondary pollutant'.

**Table 2.7 Results of Ozone Automatic Monitoring**

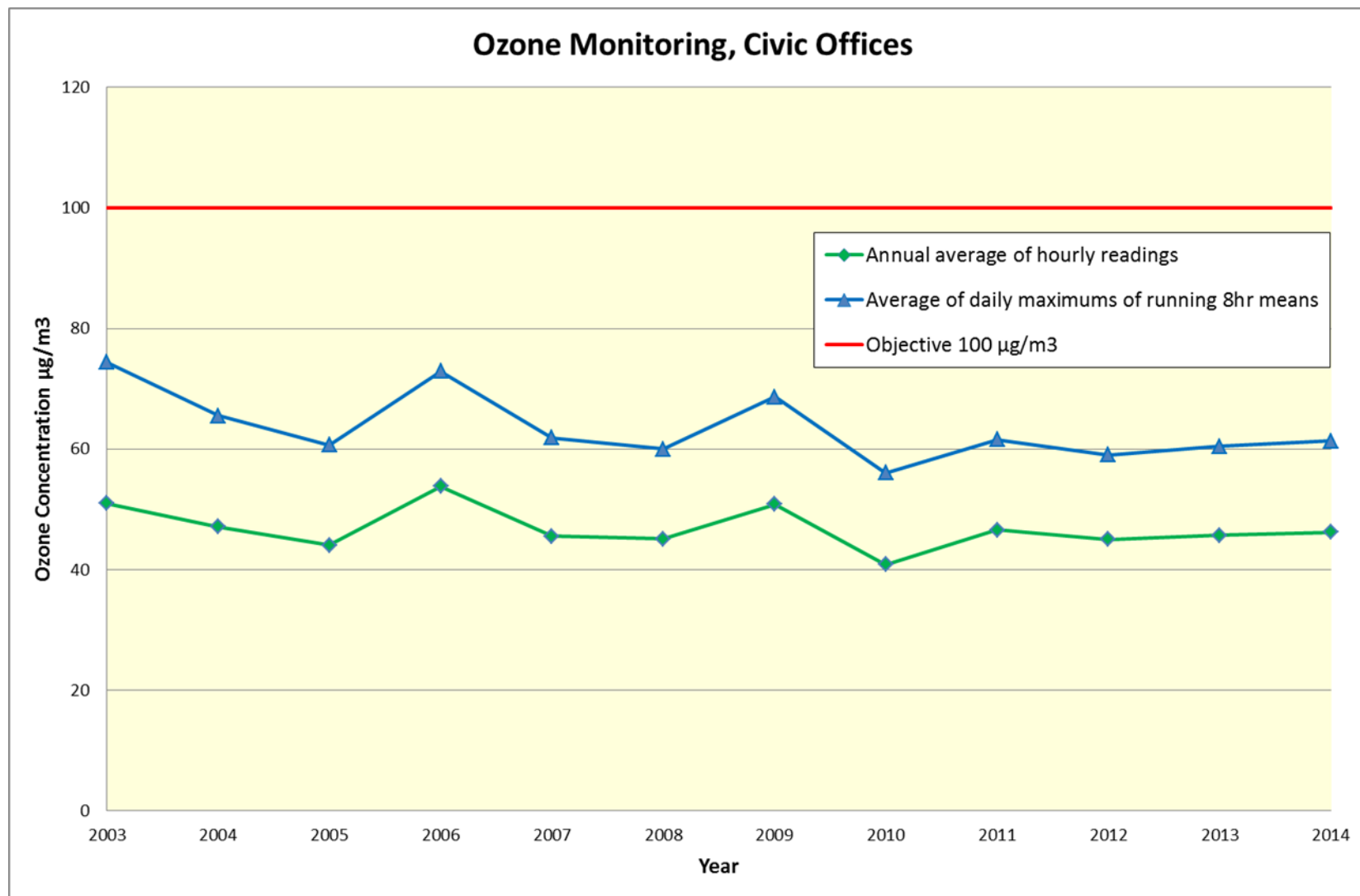
Year	Annual average of hourly readings	Average of daily maximums of running 8hr means	No. of exceedences of running 8hr mean	No. of exceedences of High Pollution Banding
		<i>Objective 100 <math>\mu\text{g}/\text{m}^3</math></i>	<i>Max 10 exceedences</i>	<i>Objective 180 <math>\mu\text{g}/\text{m}^3</math></i>
2003	50.96*	74.40*	21*	2*
2004	47.15	65.55	22	0
2005	44.05	60.66	13	0
2006	53.79	72.88	50	10
2007	45.54	61.90	34	0
2008	45.07	60.03	10	0
2009	50.83	68.66	40	0
2010	40.89	56.04	14	0
2011	46.59	61.55	9	0
2012	45.01	59.04	13	0
2013	45.69	60.46	11	0
2014	46.20	61.35	7	0

Note: \* monitoring began August 1st 2003

There appears to be a slight overall downward trend since 2003 although peaks were evident in 2006 and 2009 and relatively flat over the last 4 years (Figure 2.6).



Figure 2.6 Trends in Ozone Concentration



**2.2.6 Summary of Compliance with AQS Objectives**

Milton Keynes Council has examined the results from monitoring in the borough. Concentrations outside of the AQMA are all below the objectives at relevant locations, therefore there is no need to proceed to a Detailed Assessment.

## **3 Road Traffic Sources**

### **3.1 Narrow congested streets with residential properties close to the kerb**

Milton Keynes Council confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

### **3.2 Busy streets where people may spend 1-hour or more close to traffic**

Milton Keynes Council confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

### **3.3 Roads with a high flow of buses and/or HGVs.**

Milton Keynes Council confirms that there are no new/newly identified roads with high flows of buses/HGVs.

### **3.4 Junctions**

Milton Keynes Council confirms that there are no new/newly identified busy junctions/busy roads.

### **3.5 New roads constructed or proposed since the last round of review and assessment**

A 1 km section of the A421 from Fen roundabout to a new roundabout (Eagle Farm) at the end of the 1 km section near the border with Central Bedfordshire is currently being upgraded to dual carriageway to ease congestion. It is a regional priority to dual the remaining section (approx. 3 km) connecting the A421 to junction 13 of the M1. Kingston roundabout is also being enlarged and signalised and underpasses added including Fen and Eagle Farm roundabouts.

### **3.6 Roads with significantly changed traffic flows**

Milton Keynes Council confirms that there are no new/newly identified roads with significantly changed traffic flows.

### **3.7 Bus and coach stations**

Milton Keynes Council has assessed new/newly identified bus stations, and concluded that it will not be necessary to proceed to a Detailed Assessment.

The new Milton Keynes Coachway, located at junction 14 of the M1 motorway, was opened in December 2011. This replaced an outdated Coachway with a modern facility, increased parking provision and revised entrance and exit routes. There are approximately 600 vehicle movements per day. Further assessment is required if there are 2,500 or more bus/coach movements per day.

## 4 Other Transport Sources

### 4.1 Airports

Milton Keynes Council confirms that there are no airports in the Local Authority area.

### 4.2 Railways (Diesel and Steam Trains)

#### 4.2.1 Stationary trains

Milton Keynes Council confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

#### 4.2.2 Moving trains

Milton Keynes Council confirms that there are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

### 4.3 Ports (Shipping)

Milton Keynes Council confirms that there are no ports or shipping that meet the specified criteria within the Local Authority area.

## **5 Industrial Sources**

### **5.1 Industrial Installations**

#### **5.1.1 New or proposed installations for which an Air Quality Assessment has been carried out**

Milton Keynes Council has assessed new/proposed industrial installations, and concluded that it will not be necessary to proceed to a Detailed Assessment.

Milton Keynes Council has permitted 5 installations during the period April 2012 - March 2015; 2 car respraying activities, 1 small waste oil burner and 2 dry cleaning activities. There were no permits issued by the Environment Agency for Part A1 activities.

#### **5.1.2 Existing installations where emissions have increased substantially or new relevant exposure has been introduced**

Milton Keynes Council confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

#### **5.1.3 New or significantly changed installations with no previous Air Quality Assessment**

Milton Keynes Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

### **5.2 Major Fuel (Petrol) Storage Depots**

There are no major fuel (petrol) storage depots within the Local Authority area.

### **5.3 Petrol Stations**

Milton Keynes Council confirms that there are no petrol stations meeting the specified criteria.

### **5.4 Poultry Farms**

Milton Keynes Council confirms that there are no poultry farms meeting the specified criteria.



## **6 Commercial and Domestic Sources**

### **6.1 Biomass Combustion – Individual Installations**

Milton Keynes Council has assessed the biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment.

Biomass boilers burning wood as fuel are used for heating the Ikea store in Milton Keynes. This activity no longer requires a permit under the Environmental Permitting (England and Wales) Regulations 2010 because it falls below the permitting threshold. Wood fired biomass boilers operating at Bletchley Leisure Centre, Milton Keynes Academy and Chicheley Hall and other smaller installations have been assessed for air quality impact and the need for chimney height approval under the Clean Air Act 2003.

### **6.2 Biomass Combustion – Combined Impacts**

Milton Keynes Council has assessed the biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment.

### **6.3 Domestic Solid-Fuel Burning**

Milton Keynes Council confirms that there are no areas of significant domestic fuel use in the Local Authority area.

## 7 Fugitive or Uncontrolled Sources

All construction sites, mineral extraction quarries and waste management sites have been suitably assessed either through the planning system or permit application consultations from the Environment Agency.

Milton Keynes Council confirms that there are no potential sources of fugitive particulate matter emissions in the Local Authority area.

## **8 Conclusions and Proposed Actions**

### **8.1 Conclusions from New Monitoring Data**

All new automatic monitoring data are within the relevant air quality objective.

Diffusion tube data collected during 2012 - 2014 confirmed that the annual mean nitrogen dioxide objective is still being exceeded at some locations within the AQMA in Olney.

No new exceedences were identified outside of the AQMA in Olney and the majority of tube results were lower in 2014 than in previous years.

### **8.2 Conclusions from Assessment of Sources**

None of the pollution sources assessed has identified any potential exceedences of air quality objectives outside of the existing AQMA.

### **8.3 Proposed Actions**

This Updating and Screening Assessment 2015 (sixth round) has not identified the need to proceed to a Detailed Assessment for any pollutant at any location.

No additional monitoring or relocation of sites is necessary.

The AQMA in Olney is still required and the geographical boundary does not need to be changed.

The next course of action is to submit a Progress Report to Defra in April 2016.

## 9 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 LAQM.TG(09), DEFRA Publications.
3. Department for Environment, Food and Rural Affairs, Local Air Quality Management, Policy Guidance LAQM.PG(09), DEFRA Publications.
4. Milton Keynes Council, Updating and Screening Assessment 2012.
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/>

# Appendices

Appendix A: QA/QC Data

Appendix B: Road Traffic Count Data

## Appendix A: QA/QC Data

### Diffusion Tube Bias Adjustment Factors

The nitrogen dioxide diffusion 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 2014 were 0.67, 0.62, and 0.72. In addition we received a bias adjustment factor of 0.75 for the Marylebone Road, London, intercomparison tube study. The average for the four results was 0.69.

**Table A1.1 Co-location Study at Fixed Station, Civic Offices**

Month	Start Date	End Date	Diffusion Tube µg/m <sup>3</sup>				Auto Average µg/m <sup>3</sup>	Adjustment Factor
			1	2	3	Average		
Jan	08-Jan-14	05-Feb-14	32.61	42.42	44.88	39.97	26.74	
Feb	05-Feb-14	05-Mar-14	35.26	32.78	32.13	33.39	21.52	
Mar	05-Mar-14	02-Apr-14	36.43	34.99	35.96	35.79	25.22	
Apr	02-Apr-14	30-Apr-14	29.47	28.71	25.30	27.83	18.65	
May	30-Apr-14	28-May-14	22.01	23.45	21.77	22.41	14.91	
Jun	28-May-14	02-Jul-14	11.98	17.58	16.66	15.41	12.73	
Jul	02-Jul-14	30-Jul-14	17.30	14.27	18.97	16.85	9.12	
Aug	30-Jul-14	27-Aug-14	20.77	20.05	20.30	20.37	11.33	
Sep	27-Aug-14	01-Oct-14	29.52	29.27	27.35	28.71	19.08	
Oct	01-Oct-14	29-Oct-14	26.19	27.97	26.04	26.73	15.36	
Nov	29-Oct-14	03-Dec-14	37.21	41.65	37.68	38.84	27.53	
Dec	03-Dec-14	07-Jan-15	29.32	32.42	31.24	31.00	25.28	
<b>Annual average:</b>						<b>28.11</b>	<b>18.96</b>	<b>0.6744</b>

Table A1.2 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	08-Jan-14	05-Feb-14	64.52	66.81	62.03	64.45	38.94	
Feb	05-Feb-14	05-Mar-14	53.14	57.43	58.28	56.28	36.56	
Mar	05-Mar-14	02-Apr-14	51.12	49.76	57.36	52.75	35.43	
Apr	02-Apr-14	30-Apr-14	51.25	43.37	48.62	47.75	29.15	
May	30-Apr-14	28-May-14	48.04	50.44	48.04	48.84	28.33	
Jun	28-May-14	02-Jul-14	30.66	30.56	33.76	31.66	20.21	
Jul	02-Jul-14	30-Jul-14	38.12	38.25	39.71	38.70	23.10	
Aug	30-Jul-14	27-Aug-14	42.67	50.89	50.06	47.87	28.96	
Sep	27-Aug-14	01-Oct-14	45.72	43.55	40.50	43.26	28.81	
Oct	01-Oct-14	29-Oct-14	46.19	43.99	40.91	43.70	28.32	
Nov	29-Oct-14	03-Dec-14	52.04	52.16	54.60	52.93	27.99	
Dec	03-Dec-14	07-Jan-15	54.64	49.25	40.84	48.24	33.65	Adjustment Factor
Annual average:						48.04	29.95	0.6236

Table A1.3 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	08-Jan-14	05-Feb-14	48.89	48.05	51.24	49.39	38.09	
Feb	05-Feb-14	05-Mar-14	42.24	36.89	40.28	39.80	29.89	
Mar	05-Mar-14	02-Apr-14	39.32	34.69	41.10	38.37	32.03	
Apr	02-Apr-14	30-Apr-14	37.47	36.70	40.34	38.17	28.80	
May	30-Apr-14	28-May-14	35.59	36.92	34.97	35.83	27.81	
Jun	28-May-14	02-Jul-14	26.89	28.24	29.19	28.10	23.24	
Jul	02-Jul-14	30-Jul-14	32.38	41.58	36.56	36.84	22.69	
Aug	30-Jul-14	27-Aug-14	32.46	32.43	36.63	33.84	20.27	
Sep	27-Aug-14	01-Oct-14	34.37	34.81	35.91	35.03	23.61	
Oct	01-Oct-14	29-Oct-14	34.07	33.78	24.01	30.62	24.41	
Nov	29-Oct-14	03-Dec-14	42.78	48.06	45.53	45.46	29.21	
Dec	03-Dec-14	07-Jan-15	40.46	42.75	40.69	41.30	25.93	Adjustment Factor
Annual average:						37.73	27.16	0.7200



## Checking Precision and Accuracy of Triplicate Tubes



Diffusion Tubes Measurements									
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
1	08/01/2014	05/02/2014	113.9	106.2	115.0	112	4.8	4	11.9
2	05/02/2014	05/03/2014	119.5	113.6	110.6	115	4.5	4	11.2
3	05/03/2014	02/04/2014	97.7	93.7	96.3	96	2.0	2	5.0
4	02/04/2014	30/04/2014	77.8	75.7	80.6	78	2.5	3	6.1
5	30/04/2014	28/05/2014	123.9	128.7	126.3	126	2.4	2	6.0
6	28/05/2014	02/07/2014	116.6	104.1	108.6	110	6.3	6	15.7
7	02/07/2014	30/07/2014	93.2	91.6	94.7	93	1.6	2	3.9
8	30/07/2014	27/08/2014	TF	123.9	128.7	126	3.4	3	30.5
9	27/08/2014	01/10/2014	95.4	108.5	102.6	102	6.6	6	16.3
10	01/10/2014	29/10/2014	111.1	110.5	118.4	113	4.4	4	10.9
11	29/10/2014	03/12/2014	TF	104.1	103.2	104	0.6	1	5.7
12	03/12/2014	07/01/2015	116.2	107.6	108.8	111	4.7	4	11.6
13									

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
75	97.1	Good	Good
89	90.7	Good	Good
82	97.4	Good	Good
80	97.2	Good	Good
91	95.8	Good	Good
75	97.6	Good	Good
77	96.9	Good	Good
77	97.3	Good	Good
66	93.9	Good	Good
83	97.6	Good	Good
79	97.7	Good	Good
88	97.6	Good	Good

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

Overall survey -->

Good precision    Good Overall DC

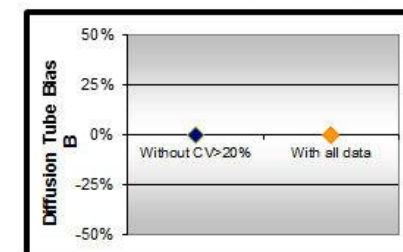
(Check average CV & DC from Accuracy calculations)

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	
Bias B	
Diffusion Tubes Mean:	107 $\mu\text{gm}^{-3}$
Mean CV (Precision):	3
Automatic Mean:	80 $\mu\text{gm}^{-3}$
Data Capture for periods used:	96%
Adjusted Tubes Mean:	$\mu\text{gm}^{-3}$

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 12 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	107 $\mu\text{gm}^{-3}$
Mean CV (Precision):	3
Automatic Mean:	80 $\mu\text{gm}^{-3}$
Data Capture for periods used:	96%
Adjusted Tubes Mean:	$\mu\text{gm}^{-3}$



Jaume Targa, for AEA  
Version 04 - February 2011

If you have any enquiries about this spreadsheet please contact the LAQM Helpdesk at:

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**PM Monitoring Adjustment**

The Fixed Station and Roadbox 2 monitoring station contain Tapered Element Oscillating Microbalance (TEOM) continuous PM<sub>10</sub> analysers. These instruments all have heated manifolds to prevent condensation of water vapour, but this may lead to a loss of volatile particles. The measured concentrations of these analysers have been corrected using the Volatile Correction Model (VCM).

Roadbox 1, Wolverton Road, contains a beta-attenuation monitor (BAM) continuous PM<sub>10</sub> analyser. It has a heated inlet at 45°C but these analysers were not tested in the equivalence tests so measured concentrations from this analyser are multiplied by the recommended factor of 1.3 for comparison with the European transfer reference sampler upon which the UK objectives are based.

**Short-term to Long-term Data adjustment**

Where only short-term periods of monitoring data are available, the results may be adjusted to estimate an annual mean concentration using Box 3.2 of Technical Guidance.

**Table A1.4 Roadbox 1, Newport Pagnell PM<sub>10</sub> 1<sup>st</sup> Jan 14 – 22<sup>nd</sup> Jul 14**

Long Term Site	Pollutant	Annual Mean 2014 (AM)	Period Mean 2014 (PM)	Ratio (AM/PM)
Fixed	PM <sub>10</sub>	14.69	14.80	0.99
<b>Average (Ra)</b>				<b>0.99</b>

Roadbox 1 estimated mean 18.13 x 0.99 = **18.00 µg/m<sup>3</sup>**

**Table A1.5 Roadbox 2, Olney PM<sub>10</sub> 6<sup>th</sup> Feb 14 – 5<sup>th</sup> Dec 14**

Long Term Site	Pollutant	Annual Mean 2014 (AM)	Period Mean 2014 (PM)	Ratio (AM/PM)
Fixed	PM <sub>10</sub>	14.69	15.40	0.95
<b>Average (Ra)</b>				<b>0.95</b>

Roadbox 2 estimated mean 20.00 x 0.95 = **19.08 µg/m<sup>3</sup>**

### **QA/QC of automatic monitoring**

The stations contain National Environmental Technology Centre (NETCEN) type-tested and approved analysers, as used in national networks, housed in secure air-conditioned containers to maintain the correct operating temperature range. Gas analysers are checked calibrated automatically every 3 days using a gas mixture of known concentration to ensure accuracy of data. A full service by Horiba Instruments Ltd, the manufacturer, is undertaken every 6 months and the service includes a verification of the calibration gas concentration using a traceable standard. After correction has been made to the data set for any calibration errors, and other relevant factors, the data are usable for comparison with the objectives of the Strategy.

### **QA/QC of diffusion tube monitoring**

Analysis of the nitrogen dioxide diffusion tubes is carried out according to the Practical Guidance document produced by the Defra Working Group on Harmonisation of NO<sub>2</sub> Diffusion Tubes. Several measures are taken to ensure tube precision including deploying multiple tubes, analysis of blanks and the use of quality control solution. 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).

## Appendix B: Road Traffic Count Data

Table B1.1 Traffic Flows above 10,000 Vehicles per Day and Close to Residential Properties

Location	Detail	Count date	AADT
<b>Bletchley</b>	JUNCTIONS		
Buckingham Rd	junction with Newton Rd	2008	10,500
Buckingham Rd	junction with Church Green Rd	2002	12,090
Buckingham Rd	junction with Sherwood Drive	2011	16,200
Victoria Rd	junction with Tavistock St	2008	8,000
Water Eaton Rd	junction with Manor Rd	2001	17,300
<b>Bletchley</b>	ROADS		
Aylesbury St	between Vicarage Rd & Sycamore Ave	2009	14,100
Buckingham Rd	between Shenley Rd & Sherwood Drive west of Shenley Road	2011 2010	13,300 8,300
Drayton Rd	south of Buttermere Close	2009	10,600
Manor Road	between Pinewood & Water Eaton Rd between Plough roundabouts	2003 2011	12,500 18,500
Watling St, V4	between Aylesbury St & Penn Rd	2004	11,560
Watling St, V4	SE of Penn Rd	2011	12,500
Shenley Rd	between Tweed St & A421	2002	10,400
Shenley Rd	NW of Humber Way	2008	8,500
<b>Giffard Park</b>			
Wolverton Rd	between Marsh Dr & V10	2011	8,400
<b>Newport Pagnell</b>			
Marsh End Road	south of Green Park Drive	2002	11,700
London Road	between Cranfield Rd & A422/A509	2010	11,500
Tickford St	between The Canons & Ivy Close	2007	10,800
Wolverton Road	between Manor Rd & Westbury Lane	2011	9,200
Wolverton Road	between Little Linford Lane & V10	2011	12,000
High St	between Union St & St Johns St	2002	8,800
High St	Between Station Rd & Bury Ave	2007	*15,400
St Johns St	between Priory St & Silver St	2002	10,050
<b>A509</b>	between A422 & M1 J14	2011	20,700

\*Data from a 5 day (weekday) survey

Appendix B continued

Location	Detail	Count date	AADT
<b>New Bradwell</b>			
Newport Road	between St Peters & Guest Gardens	2011	10,800
Newport Road	between St James & Clock Tower	2005	11,000
<b>Olney</b>			
A509	between Olney & Emberton	2012	15,300
	Bridge Street, Olney	2010	17,600
<b>Stony Stratford</b>			
London Rd	junction with Wolverton Rd	2000	9,800
	between Clarence Rd. & Horsefair Green	2010	6,800
	between Hale Ave & Queen Eleanor Street	2009	7,900
<b>Wolverton</b>			
Stratford Road	between Old Wolverton Rd & Anson Rd	2011	10,700
Stratford Road	between Creed St & Rail Station	2011	12,000