2014 Air Quality Progress Report for Milton Keynes Council

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

April 2014

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Report Reference number	M14232
Date	April 2014

Executive Summary

1. This Progress Report contains a summary of new air quality monitoring data collected during the year 2013. Data from previous years have been included for comparison to enable any trends to be identified.

2. No new Detailed Assessments need to be undertaken.

3. With the exception of the Air Quality Management Area in Olney, air quality objectives are being achieved throughout the Borough of Milton Keynes.

4. New local developments have been listed that might affect local air quality. Environmental Impact Assessments (EIAs) for the developments have been appraised to ensure that air quality concerns have been properly considered and will not significantly affect air quality.

5. An Updating and Screening Assessment will be submitted to Defra by the end of April 2015.

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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 255,300 (2013 projection). 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 Progress Report

This report fulfils the requirements of the Local Air Quality Management (LAQM) 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.

Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment reports. Their purpose is to maintain continuity in the LAQM process.

They are not intended to be as detailed as Updating and Screening Assessment Reports, or to require as much effort. However, if the Progress Report identifies the risk of exceedence of an Air Quality Objective, the Local Authority (LA) should undertake a Detailed Assessment immediately, and not wait until the next round of Review and Assessment.

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) and the Air Quality (England) (Amendment) Regulations 2002 (SI 3043). They are shown in Table 1.1. This table shows the objectives in units of micrograms per cubic metre $\mu g/m^3$ (for carbon monoxide the units used are milligrammes per cubic metre, mg/m^3). Table 1.1 includes the number of permitted exceedences in any given year (where applicable).

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 µg/m^3	Running annual mean	31.12.2003
	5.00 µg/m^3	Annual mean	31.12.2010
1,3-Butadiene	2.25 µg/m^3	Running annual mean	31.12.2003
Carbon monoxide	10 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.50 µg/m^3	Annual mean	31.12.2004
	0.25 µg/m^3	Annual mean	31.12.2008
Nitrogen dioxide	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m^3	Annual mean	31.12.2005
Particulate Matter (PM_{10}) (gravimetric)	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 µg/m^3	Annual mean	31.12.2004
Sulphur dioxide	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/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_{10} 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_2 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_2 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.
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_2 within the AQMA in Olney.
Draft Action Plan	2012	This was appraised by Defra in March 2012
Final Action Plan	2012	This was submitted to Defra in December 2012
Progress Report	2013	Summary report of new monitoring data, new local developments and other air quality related information.

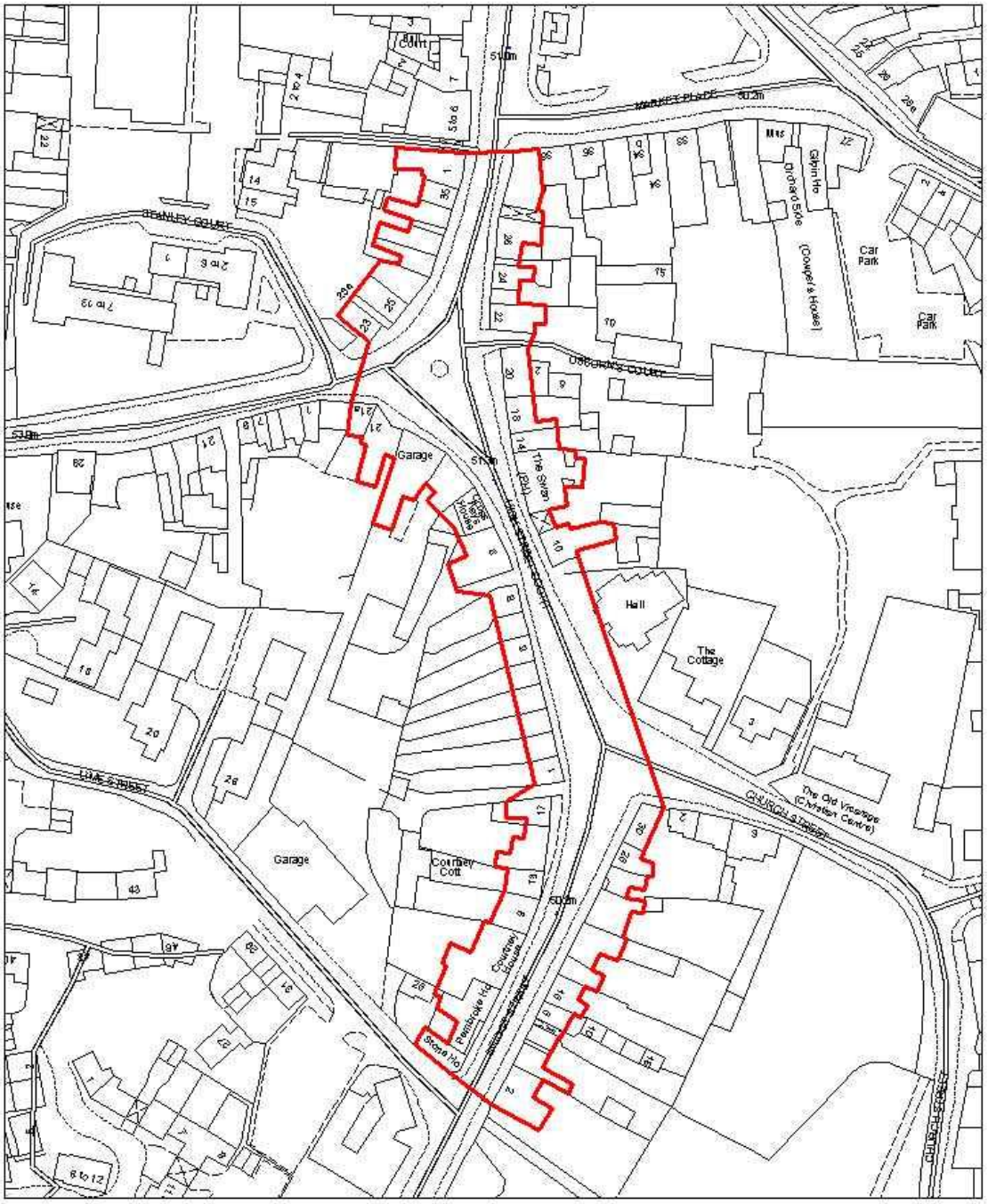
In the earlier review and assessments of air quality, heavily trafficked roads such as the M1 motorway were targeted as locations where exceedences of air quality objectives might be expected. This proved not to be the case as residential properties (and relevant public exposure) are usually at a sufficient 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 1st 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.

A draft Air Quality Action Plan (AQAP) was submitted to Defra in January 2012 and the appraisal report was received in March 2012. The minor comments listed in the appraisal were considered in preparing the final version of the Action Plan, which was submitted to Defra in December 2012. This contains the preferred options designed to bring about air quality improvements in the AQMA. An update on progress is contained in Section 9.

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

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



The designated area is edged in red

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

The Environment Team 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 check 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.

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

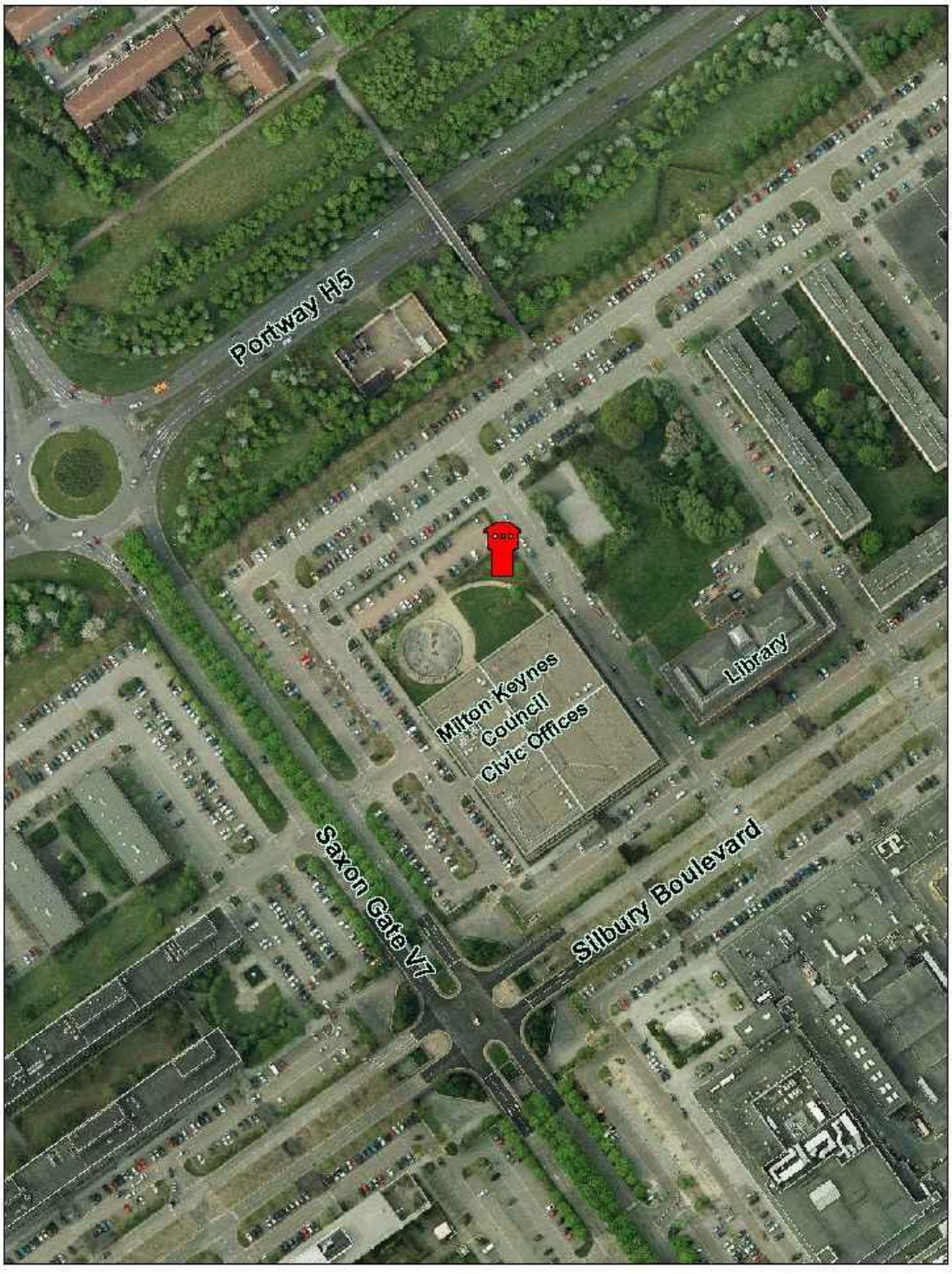
Table 2.1a Details of Automatic Monitoring Sites

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_{10}	TEOM 1400AB	N	N	4.8	N
			NO_2	Horiba APNA 360CE (chemiluminescence)				
			SO_2	Horiba APSA 360CE (uv-fluorescence)				
			O_3	Horiba APOA 360 (uv absorption)				
Wolverton Road, Newport Pagnell	Roadside	486290 243344	PM_{10}	Eberline ß-gauge	N	N	3.4 (150 to M1)	Y
			NO_2	Horiba APNA 360CE (chemiluminescence)				
High Street South, Olney	Roadside	488922 251157	PM_{10}	TEOM 1400AB	Y	Y	2	Y
			NO_2	Horiba APNA 360CE (chemiluminescence)				

Table 2.1b Previously Monitored Locations

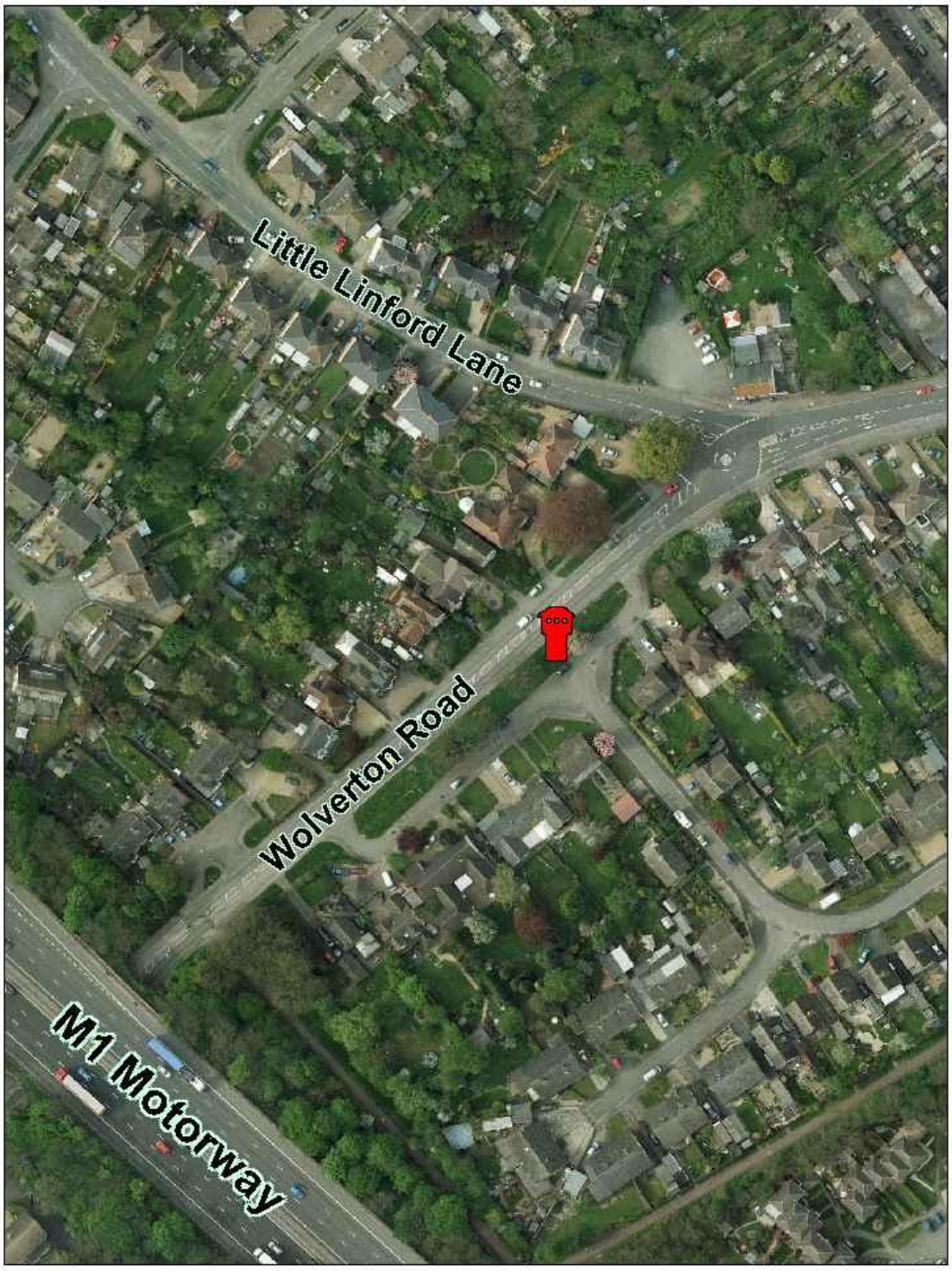
Location	Site type	Grid Reference	Monitoring dates	Comments
Sorrell Drive, Newport Pagnell	Other	485618 243916	16-Feb-10 18-Jul-11	38 m from edge of M1 motorway
Station Rd Car Park, Newport Pagnell	Roadside	487222 243733	30-Jun-08 16-Feb-10	5.5 m from junction of 2 main roads
Church Street Olney	Roadside	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



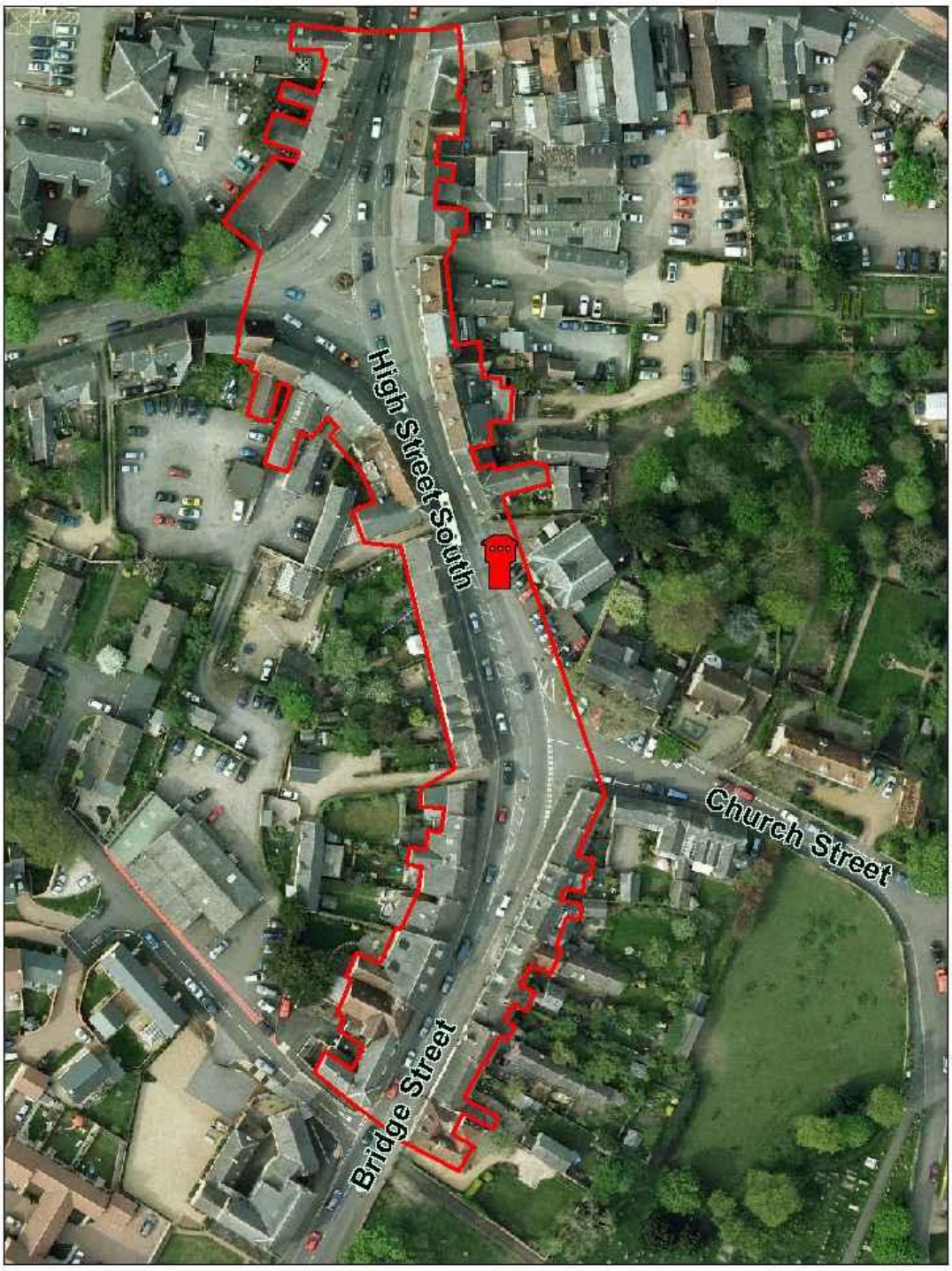
Air Quality Monitoring Station - Civic Offices, Central Milton Keynes

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



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)



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).

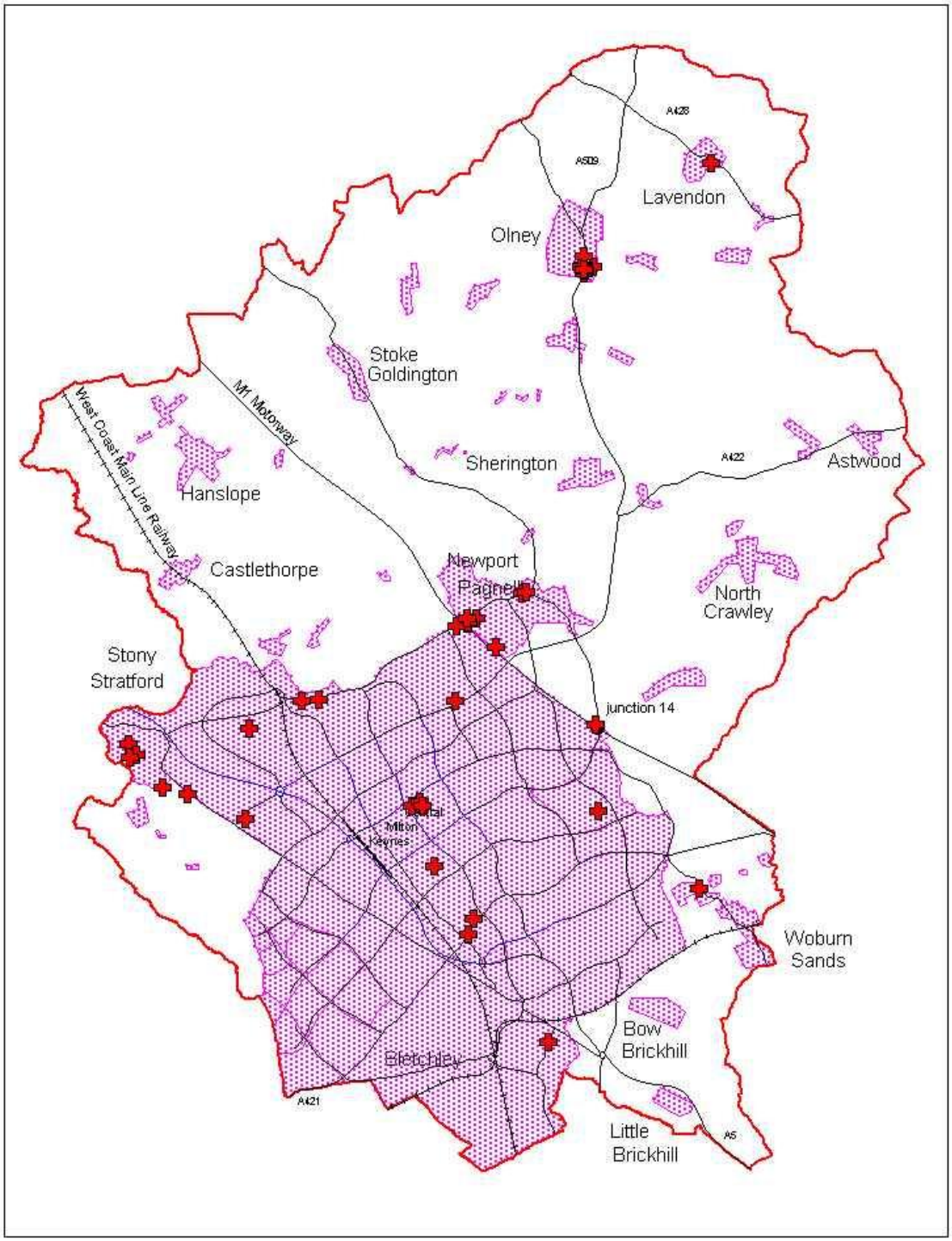
Roadbox 2 Monitoring Station
High Street, Olney
(Within Air Quality Management Area)

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 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. The Council participates in the WASP scheme for quality assurance of diffusion tube analysis and the monthly NO_2 Network Field Intercomparison Exercise.

The 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



Nitrogen Dioxide diffusion tube location

Table 2.2 Details of Non-Automatic Monitoring Sites

Site Name	Site type	OS grid ref	In AQMA?	Relevant exposure	Distance to kerb of nearest road	Worst-case location?
10 High St South, Olney (Cowper School House)	Urban Roadside	488914 251173	Y	Y	1.8	Y
9 High St South, Olney (Olney Wine Bar)	Urban Roadside	488904 251177	Y	Y	1.7	Y
20 High St, Olney	Urban Roadside	488926 251455	N	Y	7.6	N
17 High St, Olney (Opp. No.20 High St)	Urban Roadside	488905 251456	N	Y	7.2	N
76 High St, Newport Pagnell	Urban Roadside	487514 243901	N	Y	2.2	N
63 High St, Newport Pagnell	Urban Roadside	487588 243912	N	Y	0.4	Y
57 High St, Newport Pagnell (The Plough PH)	Urban Roadside	487620 243922	N	Y	0.4	Y
Corner of Coneygere and Palmers Rd, Olney	Urban Roadside	489108 251213	N	Y	1.7	Y
63 Windsor St, Wolverton	Urban Roadside	481412 240860	N	Y	1.1	Y
Stratford Road (bridge near McConnel Drive)	Urban Roadside	481967 241315	N	N	1.2	Y
Stratford Road (bridge near canal)	Urban Roadside	481995 241328	N	N	1.2	Y
222 Wolverton Rd, Blakelands	Urban Roadside	486069 243149	N	N	1.6	Y
Aylesbury St, Fenny Stratford (Bracknell House)	Urban Roadside	488118 233814	N	N	4.5	Y
Silbury Boulevard, CMK (corner of North Tenth St)	Urban Roadside	485298 239126	N	N	0.9	Y
52-100 North Tenth Street, Central Milton Keynes	Urban Roadside	485229 239223	N	Y	6.1	N
Silver Street, Stony Stratford	Urban Roadside	478740 240217	N	Y	0.9	Y
Horsefair Green, Stony Stratford	Urban Roadside	478882 240265	N	Y	2.6	Y
130 Newport Rd, New Bradwell	Urban Roadside	482965 241515	N	Y	1.6	Y
64 Nicholas Mead, Great Linford	Urban Roadside	486039 241484	N	Y	4.0	N
Cross Keys Office, High St South, Olney	Urban Roadside	488898 251186	Y	Y	1.6	Y
22 High St South, Olney	Urban Roadside	488901 251231	Y	Y	1.8	Y
33 High Street South, Olney (Art Mart)	Urban Roadside	488891 251248	Y	Y	2.0	Y
Opposite 9 Weston Road, Olney	Urban Roadside	488840 251212	N	N	1.6	Y
18/20 Bridge St, Olney	Urban Roadside	488917 251068	Y	Y	2.2	Y

Table 2.2 Continued

Site Name	Site Type	OS grid ref	In AQMA?	Relevant exposure	Distance to kerb of nearest road	Worst-case location?
Courtney House, Bridge St, Olney	Urban Roadside	488909 251077	Y	Y	1.7	Y
Watling Street, Fullers Slade	Urban Roadside	480015 239400	N	N	7.6	Y
Northampton Rd, Lavendon (Horseshoe PH)	Rural Roadside	491769 253542	N	Y	3.0	Y
14-16 Newport Rd, Wavendon	Rural Roadside	491498 237284	N	Y	7.2	N
Brook Farm, Broughton Rd, Middleton	Rural Roadside	489237 239016	N	Y	1.0	Y
16-17 Greenlands, Newport Pagnell	Urban Garden	486296 243208	N	Y	1.6	Y
5-7 Greenlands, Newport Pagnell	Urban Garden	486345 243230	N	Y	1.4	Y
42-44 Walnut Close, Newport Pagnell	Urban Garden	486495 243345	N	Y	1.5	Y
6 Atherstone Court, Two Mile Ash	Urban Garden	481331 238825	N	Y	0.4	Y
1 Tudor Gardens, Stony Stratford	Urban Garden	479459 239536	N	Y	2.3	Y
18 Wheatcroft Close, Beanhill	Urban Garden	486332 236228	N	Y	0.3	Y
Static Air Quality Station (Civic Offices)	Co-location	485070 239131	N	N	4.8	N
Roadbox 1 (Newport Pagnell)	Co-location	486290 243344	N	N	1.8	Y
Roadbox 2 (Olney)	Co-location	488922 251157	Y	Y	2.0	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide (NO_2)

Automatic Monitoring Data

There were no recorded exceedences of the annual objective at automatic monitoring locations in 2013 (Table 2.3a).

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

The trend is relatively flat at the fixed site at the Civic Offices in Central Milton Keynes over the last 13 years. The lowest recorded annual mean over this period was in 2011 and 2013 (20.9 µg/m^3) and the highest was in 2002 (24.6 µg/m^3). Milton Keynes has grown considerably and traffic flows have increased since monitoring began so it is encouraging that NO_2 levels have remained relatively stable.

The situation is less clear at the other long term monitoring station on Wolverton Road. As this is a roadside site the annual mean is much higher, peaking in 2006 (41.3 µg/m^3) and recording its lowest annual mean in 2007 (31.9 µg/m^3). The 2013 mean was (33.2 µg/m^3).

In Olney, after an initial fall in annual mean between 2009 and 2011, the last two years' results have been flat (approximately 27 µg/m^3).

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 µg/m^3 (Objective 40 µg/m^3)								
					2005	2006	2007	2008	2009	2010	2011	2012	2013
Fixed	Civic Offices, CMK	N	98.2	98.2	22.8	22.0	21.6	23.4	22.5	23.0	20.9	21.9	20.9
Roadbox 1	Wolverton Road, Newport Pagnell	N	98.6	98.6	38.4	41.3[#]	31.9	37.6	35.5	38.6	34.8	36.1	33.2
Roadbox 2	High Street South, Olney	Y	93.4	93.4	-	-	-	-	35.2*	34.2	26.9	27.0	26.7

** : Estimate of annual mean (Box 3.2 of LAQM.TG(09))*
[#]*:* Predicted concentration at nearest receptor is 32.1 µg/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 (Objective 200 µg/m^3 not to be exceeded more than 18 times a year)								
					2005	2006	2007	2008	2009	2010	2011	2012	2013
Fixed	Civic Offices, CMK	N	98.2	98.2	0	0	0	0	0	0	0	0	0 (96.1)
Roadbox 1	Wolverton Road, Newport Pagnell	N	98.6	98.6	0	0	0	0	2	0	0	0	0 (105.8)
Roadbox 2	High Street South, Olney	Y	93.4	93.4	-	-	-	-	0 (120.7)	0	0	0	0 (93.3)
Figures in brackets are 99.8th percentiles of hourly mean concentrations													

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

Location	Monitoring period	Annual mean											99.8th percentile of hourly means										
		Objective 40 µg/m^3											*Objective 200 µg/m^3 (18 exceedences allowed)*										
		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Civic Offices	21-May-98 31-Dec-11	24.6	24.0	21.3	22.8	22.0	21.6	23.4	22.5	23.0	20.9	21.9	104.2	94.1	74.2	83.9	140.2	101.4	87.7	101.6	94.9	86.1	98.4
Wolverton Road, Newport Pagnell	23-Aug-00 31-Dec-11	36.8	39.7	38.6	38.4	41.3	31.9	37.6	35.5	38.6	34.8	36.1	98.2	134.2	118	145.7	171.3	107.9	174.6	146.4	128.8	110.3	109.7
Burgess Gardens, Newport Pagnell	14-Nov-00 14-Aug-02	27.3	-	-	28.1*	26.2	27.9*	-	-	-	-	-	88.9	-	-	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-11	-	-	-	-	-	-	-	35.2*	34.2	26.9	27.0	-	-	-	-	-	-	-	120.7	120.2	101.9	92.7

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

Figure 2.3a Trends in Annual Mean NO_2 Concentrations Measured at Automatic Monitoring Sites 2000-2013

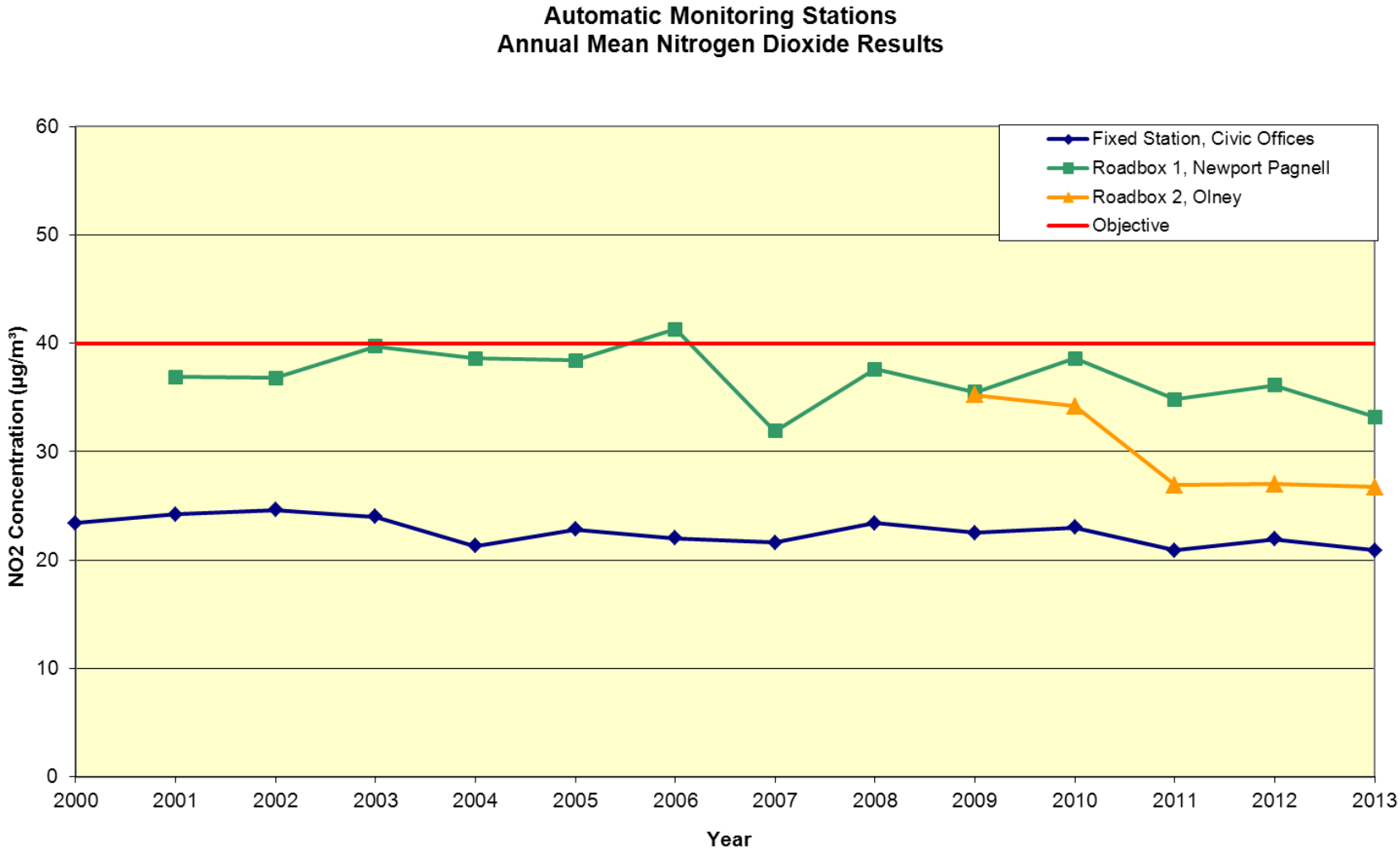
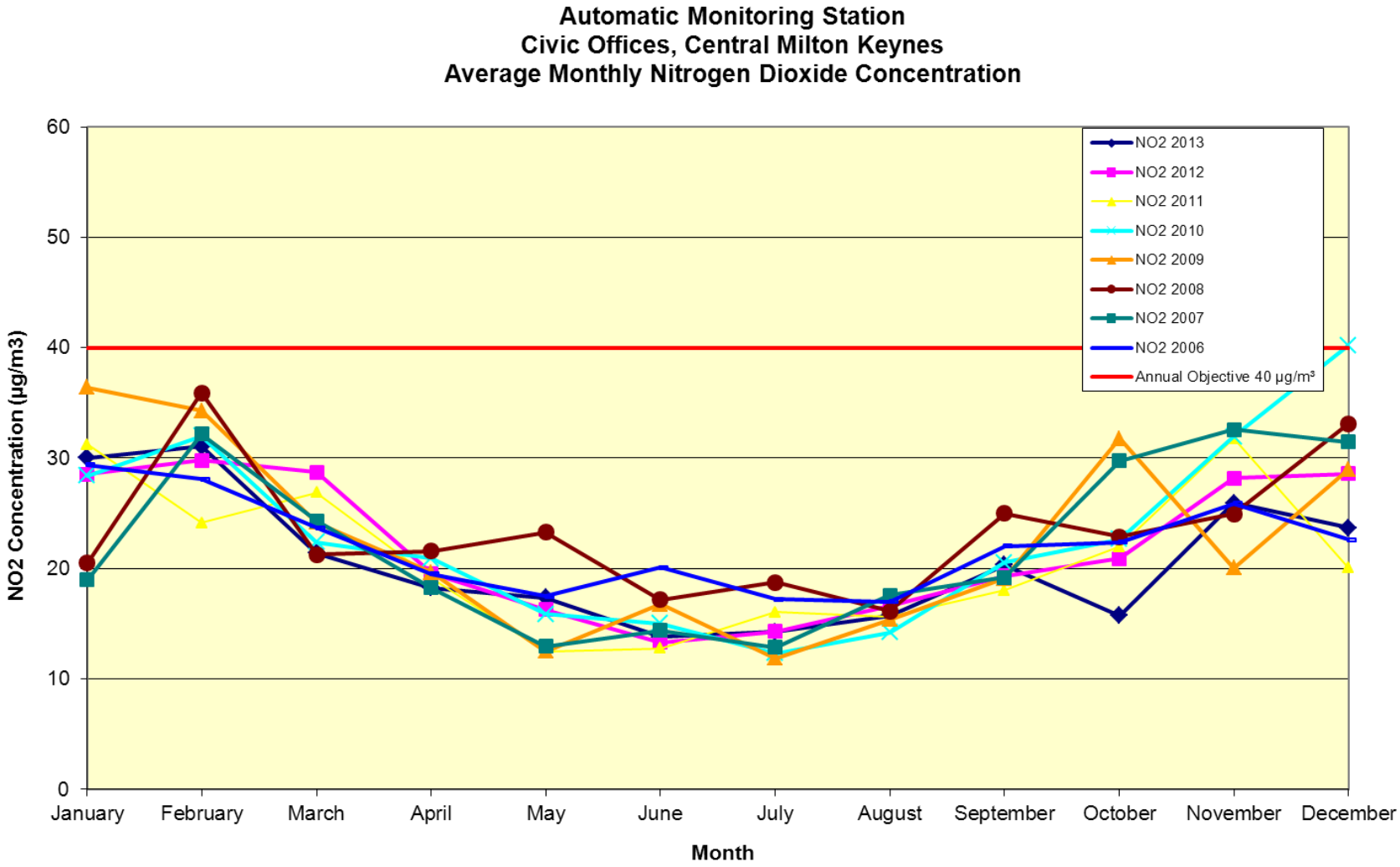


Figure 2.3b Trends in Monthly Mean Nitrogen Dioxide Concentration Measured at Civic Offices 2006-2013



Diffusion Tube Monitoring Data

Table 2.4 below lists all diffusion tube results in 2013. There were only two locations that recorded exceedences of the annual mean objective; 10, High Street South, Olney (44.0 µg/m^3) and 18/20 Bridge Street (40.2 µg/m^3) both within the AQMA. With regard to trends over the last 5 years, some locations show a slight downward trend, others a slight increase or remaining flat.

Table 2.4 Results of Nitrogen Dioxide Diffusion Tubes (2013)

Site ID	Location	Site type	Within AQMA?	Triplicate or Duplicate Tube	Full calendar year data capture 2013 (number of months)	2013 Annual mean concentration (µg/m^3) bias adjustment factor = 0.75
C001/3	10 High St South, Olney (Cowper School House)	Urban Roadside	Y	Triplicate	12	**44.0**
D001/3	9 High St South, Olney (Olney Wine Bar)	Urban Roadside	Y	Triplicate	11	36.6
E001/3	20 High St, Olney	Urban Roadside	N	Triplicate	12	24.3
F001/3	17 High St, Olney (Opp No.20 High St)	Urban Roadside	N	Triplicate	12	25.4
H001/2	76 High St, Newport Pagnell	Urban Roadside	N	Duplicate	11	28.3
I001/2	63 High St, Newport Pagnell	Urban Roadside	N	Duplicate	12	34.2
J001/2	High St, Newport Pagnell (Plough PH)	Urban Roadside	N	Duplicate	12	35.5
G001/3	Corner of Coneygere and Palmers Rd, Olney	Urban Roadside	N	Triplicate	12	13.2
V001/2	63 Windsor St, Wolverton	Urban Roadside	N	Duplicate	12	18.0

Site ID	Location	Site type	Within AQMA?	Triplicate or Duplicate Tube	Full calendar year data capture 2013 (number of months)	2013 Annual mean concentration (µg/m^3) bias adjustment factor = 0.75
N001/2	222 Wolverton Rd, Blakelands	Urban Roadside	N	Duplicate	12	29.3
DD001/2	Aylesbury St, Fenny Stratford (Bracknell House)	Urban Roadside	N	Duplicate	12	25.9
T001/2	Silbury Boulevard, CMK (corner of North Tenth St)	Urban Roadside	N	Duplicate	12	25.3
U001/2	52-100 North Tenth Street, Central Milton Keynes	Urban Roadside	N	Duplicate	12	19.7
QQ001/2	Silver Street, Stony Stratford	Urban Roadside	N	Duplicate	12	22.4
RR001/2	Horsefair Green, Stony Stratford	Urban Roadside	N	Duplicate	12	25.4
W001/2	130 Newport Rd, New Bradwell	Urban Roadside	N	Duplicate	12	23.0
O001/2	64 Nicholas Mead, Great Linford	Urban Roadside	N	Duplicate	12	18.4
FF001/3	Cross Keys Office, High St South, Olney	Urban Roadside	Y	Triplicate	11	36.2
HH001/3	Art Mart, 33 High Street South, Olney	Urban Roadside	Y	Triplicate	12	32.6
KK001/3	18/20 Bridge St, Olney	Urban Roadside	Y	Triplicate	12	**40.2**
LL001/3	Courtney House, Bridge St, Olney	Urban Roadside	Y	Triplicate	12	33.3
OO001/2	Watling Street, Fullers Slade	Urban Roadside	N	Duplicate	12	21.7
SS001/2	Stratford Road, Wolverton (bridge near McConnell Drive)	Rural Roadside	N	Duplicate	5**	27.1
SS003/4	Stratford Road, Wolverton (bridge near canal)	Rural Roadside	N	Duplicate	5**	34.6

Site ID	Location	Site type	Within AQMA?	Triplicate or Duplicate Tube	Full calendar year data capture 2013 (number of months)	2013 Annual mean concentration (µg/m^3) bias adjustment factor = 0.75
B001/2	Northampton Rd, Lavendon (Horseshoe PH)	Rural Roadside	N	Duplicate	12	20.3
BB001/2	14-16 Newport Rd, Wavendon	Rural Roadside	N	Duplicate	12	24.7
AA001/2	Brook Farm, Broughton Rd, Middleton	Rural Roadside	N	Duplicate	12	17.9
K001/2	16-17 Greenlands, Newport Pagnell	Urban Garden	N	Duplicate	12	26.0
L001/2	5-7 Greenlands, Newport Pagnell	Urban Garden	N	Duplicate	12	25.7
M001/2	42-44 Walnut Close, Newport Pagnell	Urban Garden	N	Duplicate	12	20.2
EE001/2	6 Atherstone Court, Two Mile Ash	Urban Garden	N	Duplicate	12	13.6
PP001/2	1 Tudor Gardens, Stony Stratford	Urban Garden	N	Duplicate	12	12.8
MM001/2	18 Wheatcroft Close, Beanhill	Urban Garden	N	Duplicate	12	23.7
R001/3	Static Air Quality Station (Civic Offices)	Co-location	N	Triplicate	12	20.4
S001/3	Roadbox (Newport Pagnell)	Co-location	N	Triplicate	12	32.2
JJ001/3	Roadbox 2 (Olney)	Co-location	N	Triplicate	12	26.4

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

Table 2.5 Results of NO_2 Diffusion Tubes (2008 to 2013)

Site ID	Location	Site type	Within AQMA ?	Annual mean concentrations adjusted for bias					
				2008 (bias adjustment factor = 0.78)	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)
C001/3	10 High St South, Olney (Cowper School House)	Urban Roadside	Y	**42.4**	**43.8**	**46.8**	**43.8**	**42.8**	**44.0**
D001/3	9 High St South, Olney (Olney Wine Bar)	Urban Roadside	Y	37.3	37.0	**41.8**	**40.4**	**39.6**	36.6
E001/3	20 High St, Olney	Urban Roadside	N	22.5	22.5	25.6	24.7	25.8	24.3
F001/3	17 High St, Olney (Opp No.20 High St)	Urban Roadside	N	29.1	28.7	30.7	29.0	27.8	25.4
H001/2	76 High St, Newport Pagnell	Urban Roadside	N	28.4	26.9	30.4	26.3	27.6	28.3
I001/2	63 High St, Newport Pagnell	Urban Roadside	N	36.3	36.0	33.6*	31.1	33.3	34.2
J001/2	High St, Newport Pagnell (Plough PH)	Urban Roadside	N	39.0	34.9	37.4	34.8	35.0	35.5
G001/3	Corner of Coneygere and Palmers Rd, Olney	Urban Roadside	N	14.2	12.4	13.7	14.1	14.5	13.2
V001/2	63 Windsor St, Wolverton	Urban Roadside	N	17.9	17.6	18.1	17.3	19.0	18.0
N001/2	222 Wolverton Rd, Blakelands	Urban Roadside	N	26.7	25.5	30.3	27.4	26.9	29.3
DD001/2	Aylesbury St, Fenny Stratford (Bracknell House)	Urban Roadside	N	21.9	23.5*	23.9	22.7	23.4	25.9
T001/2	Silbury Boulevard, CMK (corner of North Tenth St)	Urban Roadside	N	23.7	24.4	23.6	22.6	23.9	25.3
U001/2	52-100 North Tenth Street, Central Milton Keynes	Urban Roadside	N	20.2	21.2	21.6	20.1	21.5	19.7

Site ID	Location	Site type	Within AQMA ?	Annual mean concentrations adjusted for bias					
				2008 (bias adjustment factor = 0.78)	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)
QQ001/2	Silver Street, Stony Stratford	Urban Roadside	N	26.9	21.2	23.8	21.1	21.1	22.4
RR001/2	Horsefair Green, Stony Stratford	Urban Roadside	N	26.6	22.2	25.7	22.2	21.8	25.4
W001/2	130 Newport Rd, New Bradwell	Urban Roadside	N	23.4	21.6*	21.9	21.4	24.5	23.0
O001/2	64 Nicholas Mead, Great Linford	Urban Roadside	N	19.1	20.1	17.9	19.1	19.2	18.4
FF001/3	Cross Keys Office, High St South, Olney	Urban Roadside	Y	**40.1**	**42.8**	**44.4**	**42.2**	**41.0**	36.2
HH001/3	Art Mart, 33 High Street South, Olney	Urban Roadside	Y	34.6	35.8	38.9	35.1	37.9	32.6
II001/3	Opposite 9 Weston Road, Olney	Urban Roadside	N	21.1	23.2*	26.3*	25.2*	Removed	-
KK001/3	18/20 Bridge St, Olney	Urban Roadside	Y	**46.0**	**46.1**	**46.5**	**43.1**	**42.4**	**40.2**
LL001/3	Courtney House, Bridge St, Olney	Urban Roadside	Y	37.7	**40.0***	**39.6**	**39.6**	**40.1**	33.6
OO001/2	Watling Street, Fullers Slade	Urban Roadside	N	19.6	18.8	19.9	18.8	20.8	21.7
SS001/2	Stratford Road, Wolverton (bridge near McConnell Drive)	Urban Roadside	N						*27.1***
SS003/4	Stratford Road, Wolverton (bridge near canal)	Urban Roadside	N						*34.6***
B001/2	Northampton Rd, Lavendon (Horseshoe PH)	Rural Roadside	N	18.3	19.7	22.3	20.9	19.7	20.3
BB001/2	14-16 Newport Rd, Wavendon	Rural Roadside	N	20.4	21.4	22.8	24.4	24.9	24.7
AA001/2	Brook Farm, Broughton Rd, Middleton	Rural Roadside	N	17.6	17.2	18.3	17.8	18.5	17.9

Site ID	Location	Site type	Within AQMA ?	Annual mean concentrations adjusted for bias					
				2008 (bias adjustment factor = 0.78)	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)
K001/2	16-17 Greenlands, Newport Pagnell	Urban Garden	N	30.7	32.3	29.7	26.7	29.2	26.0
L001/2	5-7 Greenlands, Newport Pagnell	Urban Garden	N	28.6	29.2	27.9	24.3	27.2	25.7
M001/2	42-44 Walnut Close, Newport Pagnell	Urban Garden	N	23.8	23.6	21.5	19.7	22.8	20.2
EE001/2	6 Atherstone Court, Two Mile Ash	Urban Garden	N	13.7	13.2	13.8	12.6	13.8	13.6
PP001/2	1 Tudor Gardens, Stony Stratford	Urban Garden	N	13.3	11.6	13.0	12.3	13.4	12.8
MM001/2	18 Wheatcroft Close, Beanhill	Urban Garden	N	22.3	22.3	23.4	21.9	23.1	23.7
R001/3	Static Air Quality Station (Civic Offices)	Co-location	N	25.2	24.2	24.1	19.9	22.8	20.4
S001/3	Roadbox (Newport Pagnell)	Co-location	N	37.8	35.6	37.7	35.0	35.7	32.2
JJ001/3	Roadbox 2 (Olney)	Co-location	N	n/a	31.3	32.4	27.8	27.1	26.4
Q001/3	Mobile (Newport Pagnell)	Co-location	Y	n/a	n/a	32.6*	29.7*	n/a	n/a

** : 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_{10})

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 results are all well within the annual and 24-hour mean objectives. The highest annual mean recorded in 2013 was at Roadbox 2 on High Street South, Olney (20.8 $\mu g/m^3$). The fixed station at the Civic Offices recorded the lowest annual mean (15.7 $\mu g/m^3$) as was the case in all previous years, reflecting the difference between roadside and background locations.

Annual mean results over the period 2006-2013 are relatively flat at the Civic Offices site. On Wolverton Road (Roadbox 1) there was a downward trend between 2006 and 2010 before flattening out over the last three years (Figure 2.4). In Olney there was a slight increase in PM_{10} concentration and the annual means have ranged from 18.8 to 20.8 $\mu g/m^3$ over the last five years.

Table 2.5a Results of Automatic Monitoring of PM_{10}: Comparison with Annual Mean Objective

Site ID	Location	Site type	Within AQMA?	Valid data capture for monitoring period %	Valid data capture 2013 %	Confirm gravimetric equivalent	Annual mean concentration µg/m^3							
							2006	2007	2008	2009	2010	2011	2012	2013
Fixed	Civic Offices, CMK	Urban Centre	N	99.1	99.1	Yes	19.3	17.4	15.5	16.2	17.2	18.2	17.5	15.7
Roadbox 1[#]	Wolverton Road, Newport Pagnell	Roadside	N	97.3	97.3	n/a	27.0	24.9	21.1	19.0	17.7	19.5	18.4	19.2
Roadbox 2	High Street South, Olney	Roadside	N	66.8	66.8	Yes	-	-	-	20.8*	22.0	21.2	18.8	20.8*
Mobile	Sorrell Drive, Newport Pagnell	Other	N	-	-	Yes	-	-	-	-	18.4*	19.2*	-	-

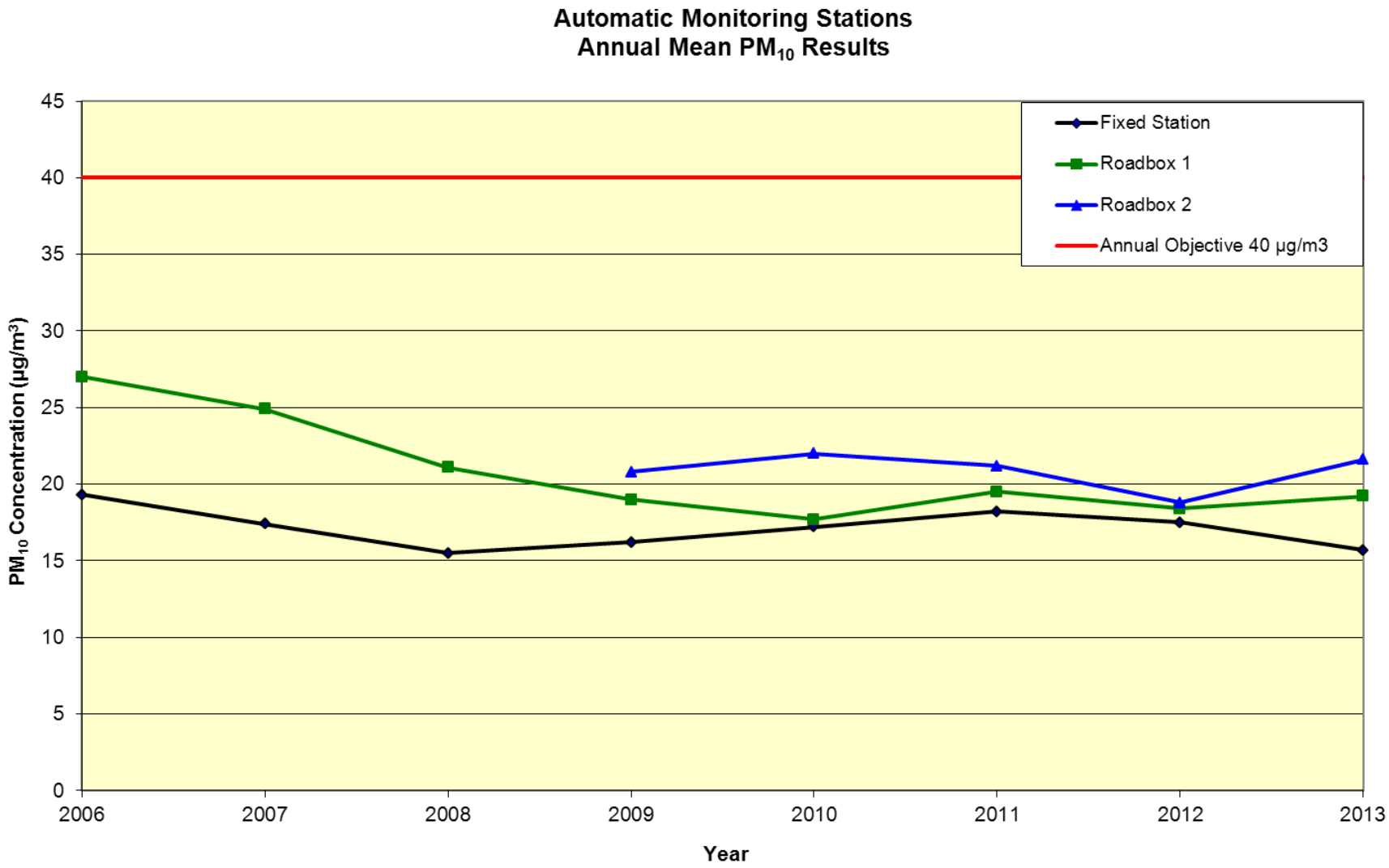
** : Estimate of annual mean (Box 3.2 of LAQM.TG(09))*
[#] : *Roadbox 1 has a heated inlet beta attenuation monitor therefore uses 1.3 correction factor*

Table 2.5b Results of Automatic Monitoring for PM_{10}: Comparison with 24-hour Mean Objective

Site ID	Location	Site type	Within AQMA?	Valid data capture for monitoring Period %	Valid data capture 2013 %	Confirm gravimetric equivalent	Number of exceedences of daily mean (50 µg/m^3)							
							2006	2007	2008	2009	2010	2011	2012	2013
Fixed	Civic Offices, CMK	Urban Centre	N	99.1	99.1	Yes	6	6	3	1	0	6	1	1
Roadbox 1[#]	Wolverton Road, Newport Pagnell	Roadside	N	97.3	97.3	n/a	17	19	13	1	1	5	9	4
Roadbox 2	High Street South, Olney	Roadside	N	66.8	66.8	Yes	-	-	-	4	1	13	1	3
Mobile	Sorrell Drive, Newport Pagnell	Other	N	-	-	Yes	-	-	0	2	0	7	-	-

[#] : The Roadbox Station has a heated inlet beta attenuation monitor therefore uses 1.3 correction

Figure 2.4 Trends in Annual Mean PM_{10} Concentrations 2006-2013



2.2.3 Sulphur Dioxide (SO_2)

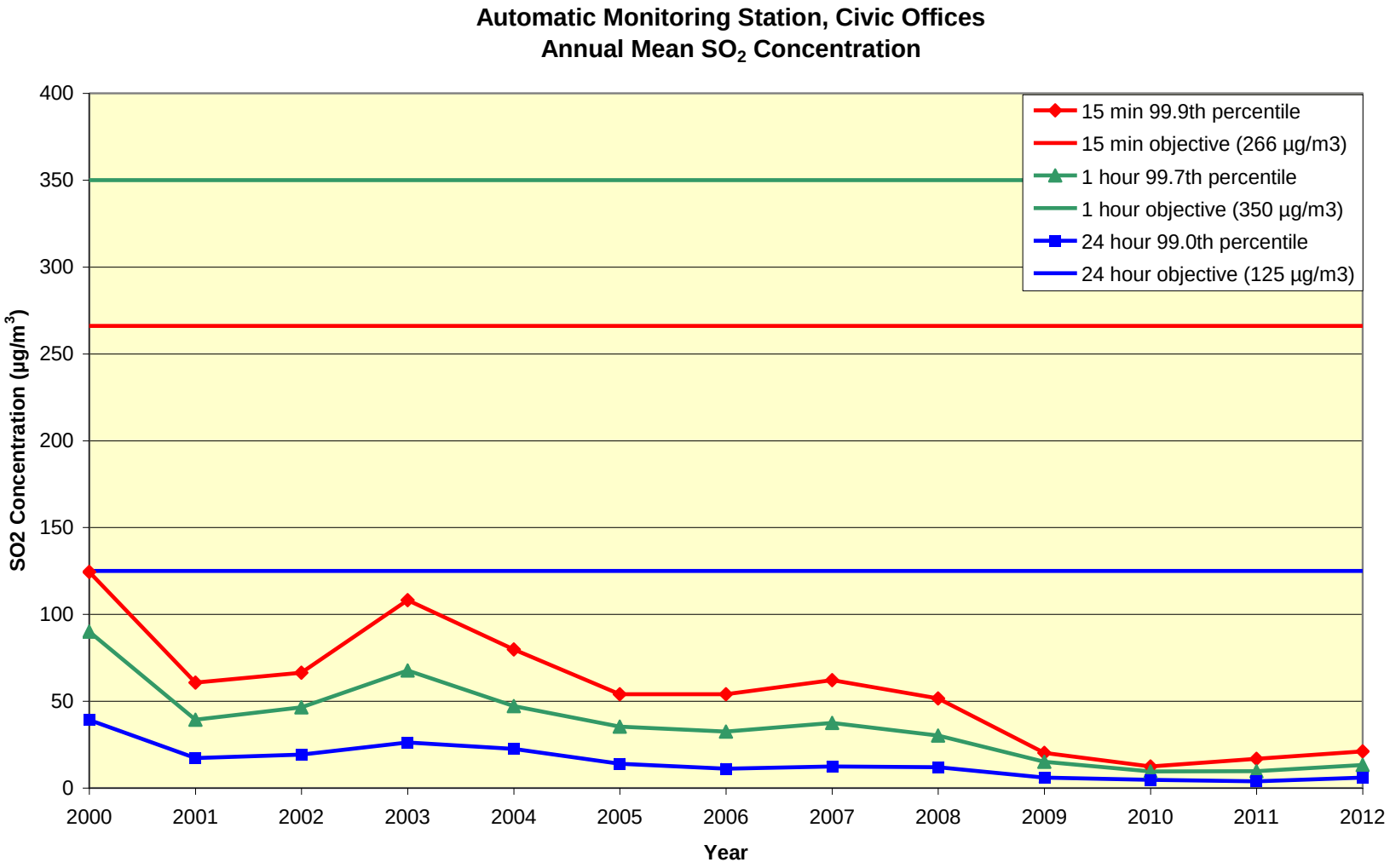
There have been no exceedences of the sulphur dioxide objectives at any of the monitored sites since automatic monitoring began in 1999. Closure of Stewartby brickworks in February 2008 has reduced local emission sources of sulphur dioxide (see Table 2.6 and Figure 2.5). Didcot A coal-fired power station was closed down in March 2013 after operating for 43 years, further reducing local SO_2 concentrations.

Since the mobile air quality station was decommissioned in July 2011, the SO_2 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_2: Comparison with Objectives

Site ID	Location	Site type	Within AQMA?	Valid data capture for monitoring period %	Valid data capture 2012 %	Objective	SO_2 concentration µg/m^3						
							2006	2007	2008	2009	2010	2011	2012
Fixed	Civic Offices, CMK	Urban Centre	N	93.6	93.6	15 min (99.9th %) (266 µg/m^3)	54.0	62.1	51.6	20.2	12.4	16.8	21.1
						1 hour (99.7th %) (350 µg/m^3)	32.5	37.5	30.2	15.1	9.5	9.7	13.2
						24 hour (99th %) (125 µg/m^3)	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 (99.9th %) (266 µg/m^3)	-	-	-	-	11.1	13.9	-
						1 hour (99.7th %) (350 µg/m^3)	-	-	-	-	8.4	8.6	-
						24 hour (99th %) (125 µg/m^3)	-	-	-	-	4.7	4.1	-

Figure 2.5 Trends in SO_2 Concentrations



2.2.4 Benzene

Benzene is not monitored at any location within the Borough.

2.2.5 Ozone

Ozone is monitored 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
		Objective 100 µg/m^3	*Max 10 exceedences*	*Objective 180 µg/m^3*
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
Note: * monitoring began August 1st 2003				

2.2.6 Summary of Compliance with AQS Objectives

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

3 New Local Developments

3.1 Road Traffic Sources

Milton Keynes Council confirms that there are no new or newly identified

- narrow congested streets with residential properties close to the kerb
- busy streets where people may spend one hour or more close to traffic
- roads with a high flow of buses and/or HGVs
- junctions
- new roads constructed or proposed since the last Updating and Screening Assessment
- roads with significantly changed traffic flows
- bus or coach stations

which may have an impact on air quality within the Local Authority area, or that have not been adequately considered in previous rounds of Review and Assessment.

3.2 Other Transport Sources

Milton Keynes Council confirms that there are no new or newly identified

- airports
- railways locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m
- locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m
- ports for shipping

which may have an impact on air quality within the Local Authority area, or that have not been adequately considered in previous rounds of Review an Assessment.

3.3 Industrial Sources

In 2013 there was only one new permit issued under the Environmental Permitting (England and Wales) Regulations 2010; Milton Keynes Kia was permitted to operate a waste oil burner for heating a garage workshop.

Operators must use Best Available Techniques (BAT) to minimise the environmental impact of their activities and comply with legally binding conditions written into the operating permit. New processes are listed in Table 3.1

Table 3.1 List of New LAPPC and IPPC Installations

Applicant	Description of activity	Date
Milton Keynes Kia	Part B Installation – Waste Oil Burner	Permitted on 06-Aug-2013

3.4 Commercial and Domestic Sources

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, Chicheley Hall, Leon School and other smaller installations have been assessed for air quality impact and the need for chimney height approval under the Clean Air Act 2003. Wolverton Swimming and Fitness Centre which opened in April 2013 is heated by both gas and biomass fuelled boilers.

Milton Keynes Council has assessed biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment. There are no areas of significant domestic solid fuel use in the Local Authority area.

3.5 New Developments with 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 new or newly identified potential sources of fugitive particulate matter emissions in the Local Authority area.

4 Local / Regional Air Quality Strategy

The Buckinghamshire and Milton Keynes Regional Air Quality Strategy was published in November 2006. The strategy was produced by the Bucks Air Quality Management Group (BAQMG), which consists of representatives from each of the District Councils, Milton Keynes Council, Bucks County Council and the Strategic Health Authority/Primary Care Trust.

The strategy can be downloaded from the council website http://www.milton-keynes.gov.uk/environmental-health-and-trading-standards/pollution/local-air-quality-management

Air quality data and other information for each of the Buckinghamshire districts can be found on the website www.bucksairquality.co.uk (currently being redeveloped). The site contains detailed information and also links to each individual council area.

The strategy document is divided into three main parts:
A. The framework document
B. Local air quality action reports for each participating Authority.
C. A summary of all the actions that will be undertaken as a result of the strategy.

The action reports and summary action table are updated and reviewed approximately every 2 years. A review of the framework document is currently underway to update legislation and to include some information on climate change.

Public Health - Milton Keynes Health and Wellbeing Board

The council's Joint Strategic Needs Assessment (JSNA) contains a section on the health impact of air pollution, http://www.milton-keynes.gov.uk/social-care-and-health/health-and-wellbeing-board/strategic-needs-assessment/jsna. The JSNA is an objective analysis of current and future health and wellbeing needs of the population encompassing a wide range of data. As such it is the primary process for identifying key health issues and the current and future impact of social, environmental, economic and lifestyle factors on health and wellbeing.

5 Planning Applications

The Environment Team receives a weekly planning application list from Development Control Division. Copies of planning applications are requested for developments that may have an impact on air quality. The application is assessed and comments and any recommended conditions are returned to Development Control to assist in the planning decision. The Environment Team is also formally consulted by Development Control on larger developments.

Where an Environmental Impact Statement (EIS) has to be provided by the developer, the content of any air quality assessment is normally discussed and agreed beforehand with planners and/or directly with the air quality consultant carrying out the assessment. This ensures the methodology is acceptable to the council and that specific issues are addressed. Local air quality monitoring data are normally provided by the Environment Team to assist with the assessment.

New developments that may affect air quality are listed in Table 5.1. All the developments listed now have planning permission.

Three main Expansion Areas have been allocated in Milton Keynes; large areas to the east and west of the City and a smaller area to the north. The Eastern Expansion Area is considered to be the best location for large footprint development, due to the proximity of the site to the motorway. There are specific policies in the Local Plan relevant to the Expansion Areas, requiring detailed Master Plans (Supplementary Planning Guidance (SPG)) that set out how the Local Plan policy requirements are to be met in each area.

All the listed planning applications have been assessed for any significant air quality impacts as part of the planning consultation process. An Environmental Impact Assessment (EIA) which considers impacts from both the construction and operation of the proposed development was provided for most of the above applications. An EIA is requested from developers for certain developments under the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999.

Some of the planning applications that are inside the defined Urban Development Area (UDA) are decided by the Milton Keynes Partnership Committee (MKPC) to accelerate decision making on major planning applications. The MKPC brings together Milton Keynes Council, Local Strategic Partnership, representatives from the health sector, community sector, Chamber of Commerce and the business community. In October 2012 Milton Keynes Council purchased land and assets from the Homes and Communities Agency (HCA) and transferred them to a new body, the Milton Keynes Development Partnership (MKDP). For the first time since the inception of the new city in 1967, all planning powers will now be held by the locally accountable body, Milton Keynes Council.

Table 5.1 New Developments with Planning Permission

Application type	Application no.	Location	Proposal	Date of Decision	Progress
Permitted development					
Sand & Gravel Extraction	12/01284/MIN	Caldecote Farm, Willen Road, Newport Pagnell	Extraction of sand & gravel and restoration to agriculture	15/04/2013	Site not yet started
Waste	10/01181/MIN	Land at Pineham, Milton Keynes	Organic Waste Treatment Facility including Anaerobic Digestion	12/10/2011	Site not yet started
Residential	03/01652/OUTEIS	Land north of, Childs Way, Oxley Park	583 dwellings	01/04/2004	Site under construction
Residential & Mixed Use	03/01653/OUTEIS	Land North of Childs Way, Oxley Park	720 dwellings, mixed use development	04/06/2004	Site under construction
Residential	04/00028/OUT	Sustainable Residential Quarter CMK, South of Avebury Boulevard, between Grafton Gate and Witan Gate	1960 dwellings, school and community uses	16/01/2008	Phase 1 Detailed Application given permission
Mixed Use	06/00856/MKPCO	Tattenhoe Park	Major Residential, School, Community and other Development	06/09/2006	Outline permission granted
Residential	06/00602/MKPCO	Kingsmead South	Residential, and community Development	14/08/2006	Detailed application permitted for parts of site
Residential & Mixed Use	04/01069/MKPCO	Newport Road, Broughton Gate	1400 dwellings	26/01/2005	Site under construction
Aggregates	03/00885/MIN	Land Adjacent to Railway, Old Wolverton Road, Old Wolverton	Aggregates depot and new ready mixed concrete plant	16/03/2006	Site not started
Residential & Mixed Use	04/00586/OUT	Campbell Park	Major mixed use development	26/03/2007	Site under construction
Mixed Use	02/01337/OUT	Newton Leys, Drayton Road, Bletchley	Up to 1650 dwellings, employment, commercial, & community development	28/06/2005	Site under construction

Application type	Application no.	Location	Proposal	Date of Decision	Progress
Residential & Mixed Use	05/00291/MKPCO	Western Expansion Areas 10.1-10.3	4300 dwellings, employment commercial and schools	05/10/2007	Site not yet started
Employment	04/01072/MKPCO	Fen Farm, Newport Road, Wavendon	Logistics/distribution facility	26/05/2006	Site under construction
Employment	06/00333/MKPCO	Fen Farm, Phase 2, Newport Road, Wavendon	Logistics/distribution facility	10/05/2010	Site under construction
Mixed Use	06/00220/MKPCO	Brooklands Farm, Newport Road, Eastern Expansion Area	Major Mixed Use Development	07/08/2007	Site under construction
Residential & Mixed Use	07/00554/OUT	Radcliffe School, Aylesbury Street west, Wolverton	Residential, Educational, Sports Facilities and Commercial Development	10/04/2008	Site under construction
Residential & Mixed Use	05/01429/OUT	Stantonbury Park	Mixed Use development including approximately 500 dwellings	22/12/2006	Site under construction
Waste	13/00861/FULEIS	Dickens Road, Old Wolverton	Waste treatment facility, including mechanical treatment, anaerobic digestion, composting and advanced thermal treatment.	12/7/2013	Site under construction

Table 5.2 New Developments not yet approved

Application type	Application no.	Location	Proposal	Date	Progress
Permitted development					
Residential	13/00266/OUT	National Badminton Centre, 96, Bradwell Road, Loughton Lodge	Demolition of National Badminton Centre;	June 2013	Pending issue of decision. Committee has resolved to

Application type	Application no.	Location	Proposal	Date	Progress
			replacement with housing (up to 104 units)		permit the application.
Sports centre	13/00267/FUL	Land adjacent to MK Bowl, Watling Street, Elfield Park	Construction of new National Badminton Centre, with indoor and outdoor tennis courts and overnight accommodation.	June 2013	Pending issue of decision. Committee has resolved to permit the application.
Mineral extraction	13/00148/MIN	Land to the east of Haversham Road, New Bradwell	Sand and gravel extraction	June 2013	Pending decision

6 Air Quality Planning Policies

Local Development Framework

The Local Plan is currently being replaced by the Local Development Framework (LDF). This is a folder of documents that sets out how the local area may change over the next few years. These documents must be consistent with national and regional policy.

There are several different types of document within the LDF, collectively the documents are known as Local Development Documents (LDDs). These set out the planning strategy, policies and proposals for an area. The documents that make up the LDF will be produced over a period of time, not all at once.

When complete, the LDF will contain:
A Local Development Scheme (LDS): Under this approach the Council will prepare the Site Allocations Plan to provide more detail to the Core Strategy and allocate non-strategic sites to achieve the requirements set by the Core Strategy. Alongside the preparation of the Site Allocations Plan a review of the Core Strategy and the extant policies in the 2005 Local Plan will be undertaken in a new local plan, Plan:MK.
Development Plan Documents (DPDs): Core Strategy, Minerals Plan, Waste DPD
Supplementary Planning Documents (SPDs): SPDs provide more detailed guidance to explain policies and proposals set out in DPDs and may or may not br site specific.
A Statement of Community Involvement (SCI): This sets out how the community can expect to be involved and consulted on the preparation of Local Development Documents and on major planning applications. The SCI was adopted on 12th March 2014.

The Framework can be viewed or downloaded from the following webpage:
http://www.milton-keynes.gov.uk/planning-and-building/planning-policy

A key document that underpins much of the preparation of the LDF is the MK Long Term Sustainable Growth Plan (June 2006)**.** The Council worked closely with the Milton Keynes Partnership to oversee the preparation of this document. This work assessed, amongst other things, the key infrastructure requirements to 2031 and the long term directions of the growth of MK.

Core Strategy

The Core Strategy is an important document which forms part of the Council's Local Development Framework. The document sets out the vision, objectives and strategy for the development of the Borough up to 2026. The Core Strategy forms the basis of all new planning policies that the Council will apply in the future.

It was submitted to the Secretary of State for examination by the Planning Inspectorate on 1 March 2011 and modifications were approved by the Inspector in January 2013. The final Inspector's report was received in May 2013 and the Core Strategy was adopted by the full council in July 2013.

The Core Strategy replaces the strategic policies in the 2005 Local Plan; however most of the Local Plan policies are saved.

Local Plan

The Local Plan from the old planning system provided the planning policy framework for development in the Borough, up to 2011 or until new documents in the LDF take over. The main policies in the plan, which have relevance to air quality, are contained within the following chapters;

<u>Chapter 7 - Transport:</u>
The transport related aims in the Local Plan are;

- To reduce the number, length and need to make trips
- To promote an integrated transport system that gives priority to walking, cycling, bus, rail and canals

- Site development at locations that are easily accessible by these priority transport modes
- To reduce pollution from non-transport sources

There are 17 transport-related policies in Chapter 7 of the Local Plan (Table 6.1). The policies and proposals have been developed in conjunction with the Council's Local Transport Plan (LTP).

Table 6.1 Local Plan - Transport Policies

Transport Policy Reference	Description
T1	The transport user hierarchy
T2	Access for those with impaired mobility
T3, T4	Pedestrians and cyclists
T5	Public transport
T6	Transport Interchanges
T7	Park and Ride
T8	Rail and canal freight
T9	The road hierarchy
T10	Traffic
T11	Transport assessments and travel plans
T12	Major transport schemes
T13	Transport reservations
T14	Roadside services
T15	Parking provision
T16	Lorry parks
T17	Traffic calming

Chapter 4 - Design Policies:

Policy D1 Impact of Development Proposals on Locality. The objective of this policy is to prevent development causing harm to the site and the surrounding areas.

Planning permission will be refused for development that would be harmful for the following reasons;
D1(i) Additional traffic generation which would overload the existing road network or cause undue disturbance, noise or fumes.
D1(iv) Unacceptable pollution by noise, smell, or other emissions to air, water or land.

Policy D4 - Sustainable Construction. The objective is to reduce the resource consumption of new development and to achieve zero carbon growth.

The policy seeks the use of sustainable design, and use of renewable materials and energy sources, including solar power. The policy is supported by a Supplementary Planning Document, adopted by the Council in April 2007, which can be viewed or downloaded from the following webpage: http://www.milton-keynes.gov.uk/planning-policy

Policy D5 - renewable energy. The objective is to encourage the development of renewable energy production.

Chapter 8 of the Local Plan contains specific policies relevant to City Expansion Areas and other key sites in the City.

Supplementary Planning Guidance (SPG) has been agreed with English Partnerships, developers and Milton Keynes Council detailing specific additional guidance that must be followed for expansion areas to the east and west of the city boundary.

7 Local Transport Plans and Strategies

The Local Transport Plan 2 (LTP2) covered the period up to 2011 and this has now been replaced by the third Local Transport Plan (LTP3). The Transport Vision and Strategy (TV&S) constitutes the council's LTP3 and considers the 20-year period 2011 to 2031. It sets out the council's policies and programme for delivering local, sub-regional and national policy objectives based on a world class transport vision. The Transport Vision and Strategy was published in April 2011 and can be accessed at: http://www.milton-keynes.gov.uk/streets-transport-and-parking/transport-policy. It was reviewed and updated in April 2012 specifically looking at three elements; evidence base (using the new MK Multi Modal Model), inclusion of the Bletchley Transport Strategy and an updated list of transport proposals.

There are five national transport goals or objectives that need to be addressed in the LTP3. The five goals replace the shared priorities of the LTP2 guidance and are as follows: support economic growth; reduce carbon emissions; promote equality of opportunity; contribute to better safety, security and health; improve quality of life and a healthy natural environment. The new LTP3 guidance emphasises the importance of coordinating air quality, climate change and public health priorities. The LTP includes both policies (i.e. the strategy and the type of measures which contribute to that strategy) and an implementation plan for those measures.

8 Climate Change Strategies

Milton Keynes Council and partners has developed a Low Carbon Living Strategy and Action Plan to help Milton Keynes citizens, communities and businesses to cut their carbon emissions.

The MK Low Carbon Living programme has been developed with the aim of making us more aware of how much fossil fuel energy (i.e. electricity, gas, petrol, diesel etc.) we are using in our day to day living; the impact this is having on our climate, locally and globally, and the many positive actions we can take to reduce energy consumption and carbon emissions to help tackle climate change.

Low Carbon Living Strategy and Low Carbon Action Plan

Milton Keynes Council has a Low Carbon Living Strategy and a Low Carbon Action Plan for the period 2010 to 2020, MK low carbon living. They show how the Milton Keynes community can reduce greenhouse gas emissions locally and thereby help tackle global climate change by:

- Integrating sustainability and carbon reduction into the planning and delivery of the Council's aims;
- Reducing the authority's carbon footprint;
- Demonstrating community leadership in tackling climate change and sustainability issues including reducing the overall carbon footprint of the borough.

The Council has already made a number of public commitments to demonstrate how seriously it takes the effects of climate change and the need to take local action. It is a signatory to the Nottingham Declaration on climate change and to the European Union (EU) Covenant of Mayors. The MK Low Carbon Living Strategy and Low Carbon Action Plan also forms the Sustainable Energy Action Plan required by the Covenant of Mayors.

Carbon emissions in Milton Keynes

Milton Keynes CO_2 emissions per person are higher than the South East England average due to the high emissions from industry and commerce. Domestic CO_2 emissions are relatively low due to the modern housing stock built to rising energy efficiency standards. The trend in emissions from 2005 to 2011 is a fall of 26%.

The Strategy:

- The overall target is to reduce carbon emissions per person by 40% by 2020;
- To place Milton Keynes at the forefront of low carbon living, nationally and internationally;
- The Council will be the community leader on this issue but it will need the support and involvement of all sections of the wider community.

9 Implementation of Action Plans

Olney Specific Options

HGV Routing and Restriction

A modelling study assessing the emissions impact of re-routing HGVs has been completed by AECOM.[1] Emissions of oxides of nitrogen (NOx), particulate matter (PM_{10}) and carbon dioxide (CO_2) were calculated for the Olney route and for two longer alternative routes. Journey times and fuel consumption figures were also calculated. The start point for the assessment was the junction between the A509 and A45 just to the south of Wellingborough and the end point was the Monkston roundabout (H7/V11), Milton Keynes.
The three route options considered were:

- The Olney (existing) route – following the A509 from the start point, passing through Olney to Junction 14 of the M1 motorway, then following the A4146 to the end point at Monkston Roundabout;
- Alternative route 1 – following the A45 westbound from the start point to Junction 15 of the M1 motorway, heading southbound on the M1 to Junction 14, then joining the A4146 to the end point at Monkston Roundabout; and
- Alternative route 2 – following the A509 from the start point before taking the A428 eastbound north of Olney, passing through Lavendon and Turvey, joining the A421 to the southeast of Bedford then heading southbound to Junction 13 of the M1 motorway then to the end point at Monkston Roundabout via Standing Way and Tongwell Street.

The Olney route is approximately 31 km in length, alternative route 1 is approximately 44 km and alternative route 2 is 50 km.

[1] http://www.miltonkeynes.gov.uk/environmental-health/displayarticle.asp?ID=17335

The results show that for alternative route 2, overall emissions of pollutants, journey time and fuel costs are predicted to increase when compared with the existing Olney route.

For alternative route 1 overall emissions of CO_2 are predicted to fall by 78 tonnes/year, NOx emissions by 6.6 tonnes/year and PM_{10} by 0.3 tonnes/year. However, journey times are estimated to increase by about 5 minutes and fuel costs (using national average fuel consumption figures) by about £7.

Of the two alternative routes, route 1 is a suitable alternative based on overall emissions. There are problems associated with using this route because emissions are merely being displaced onto Northamptonshire County Council roads and there is an existing AQMA on part of the A45 close to junction 15 of the M1. There would be an additional 33.7 tonnes/yr of NOx on route 1, 29.5 tonnes/yr displaced from the Olney route.

As discussed in the Olney Action Plan, there are no HGV peak flow periods (approximately 100 vehicles per hour (vph) between the times of 08:00 to 17:00), which means a peak hour ban would be ineffective in reducing annual mean NO_2 concentration. A previous study by TRL concluded that a total HGV ban would in any case reduce NO_2 concentration by a maximum of only **3.7** µg/m^3 and by **1.8** µg/m^3 if there was a ban specifically on articulated HGVs.

The Road Haulage Association (RHA) was contacted to see if any members were willing to obtain actual fuel consumption figures and journey times for both the existing Olney route and for alternative route 1. There were no positive responses and further individual company requests may be made.

Traffic Management

Modifications to the Weston Road / High Street South junction and access into Market Square scheduled for spring 2014 are still awaiting funding commitment and final consultation.

Low Emission Zones

This is not a viable option for Olney. Results of Defra supported feasibility studies undertaken in other local authority areas are not yet available and a national scheme has not been introduced.

Air Quality Monitoring

Automatic monitoring results (tables 2.3a and 2.3b) are relatively unchanged over the 3 year period 2011-2013; annual mean concentration is approx. 27 µg/m^3. There were only two locations that recorded exceedences of the annual mean objective in 2013; 10, High Street South, Olney (44.0 µg/m^3) and 18/20 Bridge Street (40.2 µg/m^3) both within the AQMA.

Traffic Monitoring

Traffic flows through Olney have fallen below 17,000 AADT since 2011 and are now at their lowest since 2006. When compared to 2010 flows, 2013 flows for all vehicles are reduced; cars by 4%, LGVs by 16%, HGVs by 26% and total flows by 6% (Table 9.1 and Figures 9.1a, 9.1b and 9.1c).

Table 9.1 Automatic Traffic Count Data 2006-2013: Annual Average Daily Traffic

Year	*Vehicle Class*							
	Motor bikes	**Cars**	**LGVs**	**Buses**	**Rigid HGV**	**Artic HGV**	**All HGVs**	**Total flow**
2006	116	14948	1566	67	587	295	882	17579
2007	143	14813	1462	103	613	294	907	17428
2008	139	14673	1287	97	596	293	889	17086
2009	151	14864	1368	95	617	327	944	17421
2010	127	14557	1413	145	620	292	912	17154
2011	129	14270	1223	115	514	271	785	16522
2012	123	14335	1241	121	490	240	730	16576
2013	108	13970	1216	116	461	211	672	16109
LGV = light goods vehicle HGV = heavy goods vehicle								

Figure 9.1a Annual Average Daily Traffic Counts Olney 2006-2013. All Vehicles

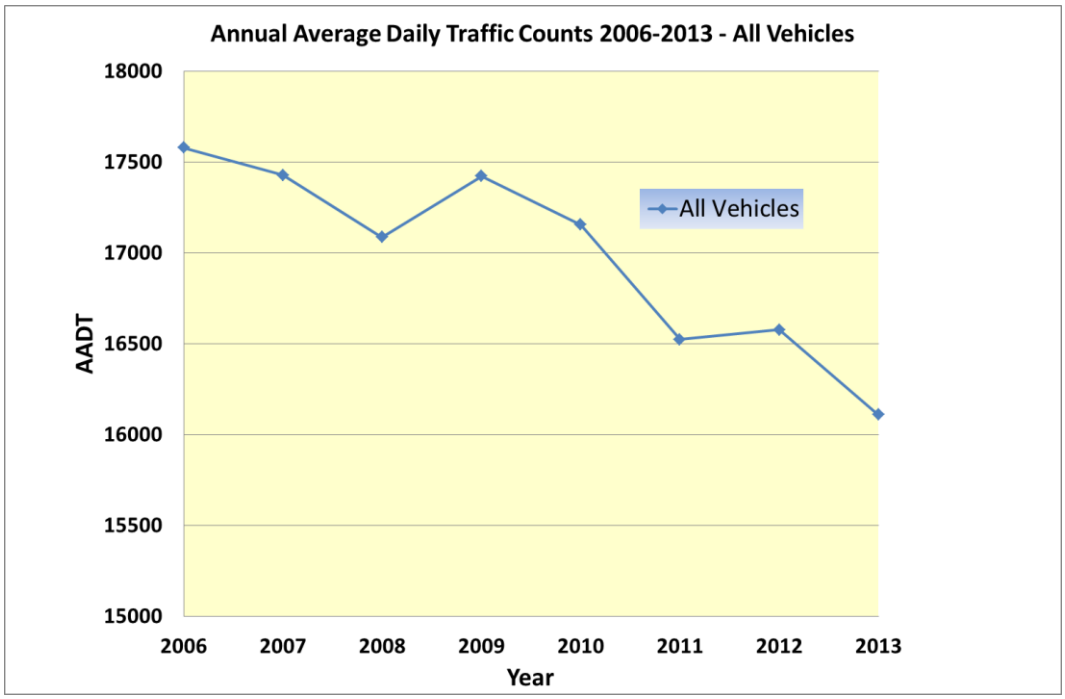


Figure 9.1b Annual Average Daily Traffic Counts Olney 2006-2013. Cars

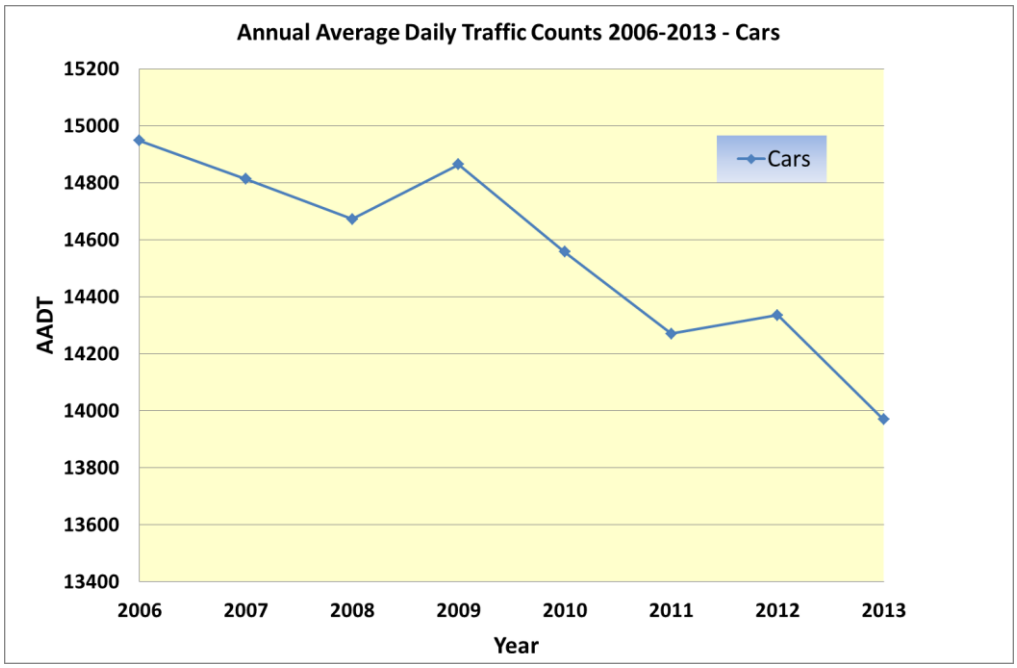
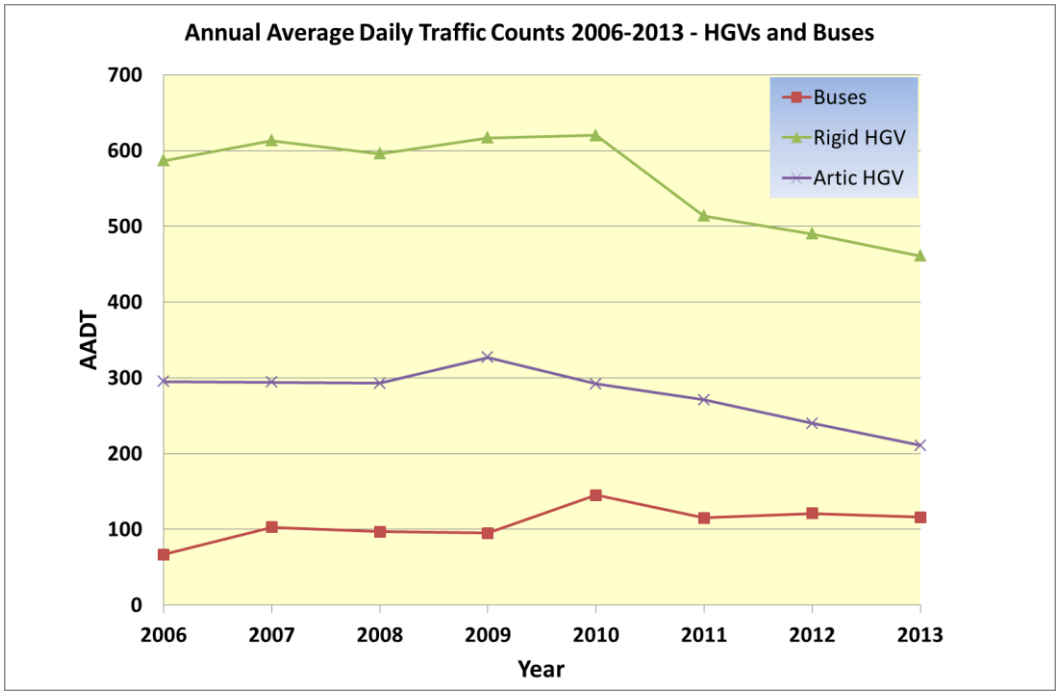


Figure 9.1c Annual Average Daily Traffic Counts Olney 2006-2013. HGVs and Buses



Dispersion Modelling of Nitrogen Oxides

Re-modelling of future year NO_2 concentrations using revised emission factors has not been undertaken; however the results are expected to be only slightly higher than in the original study.

Borough-wide Options of Benefit to Olney

Car share scheme

The resources have not been available to actively canvass for more members travelling via Olney. The website http://www.liftshare.com can be used to find a car share partner before joining the CARSHAREMK scheme. Revision of the Parking Strategy scheduled to begin in January 2014 will impact on the scheme and allow for changes to be made to the scheme. On line applications to join the scheme can be made on the Milton Keynes Council website.

School Travel Plans

School Travel Plans are in place for all schools in Olney and walking and cycling rates are very high.

Public Transport Provision

There has been a borough-wide increase in patronage of bus services, however funding cuts has not enabled the frequency of rural bus services to be improved. Real time passenger information (RTPI) screens are now provided in about 50 locations.

Cycling and Walking

A new Cycling Strategy was adopted by the council in April 2013. It outlines initiatives to encourage people to cycle and proposals to maintain, improve and increase cycling infrastructure such as the Redway network, cycle parking and changing facilities. The implementation plan provides details of the various interventions and an indication of timescale for delivery.

Low Emission Vehicles

Two parking bays in Market Place, Olney were fitted with electric vehicle charging points in July 2012. 170 charging points have now been installed throughout the Borough. There are two electric vehicle car club schemes operating in Wolverton and in Central Milton Keynes on a pay-per-use basis. After joining the Wolverton club, (approx. £50/year) members can hire the electric vehicles by the hour or day (approx. £6.50/hour or £50/day for a Nissan Leaf) and charging is free at collection points. The Milton Keynes club offers free membership and is a partnership with MK Council, Hertz and Chargemaster.

Charges now apply for use of the electric vehicle charge points throughout the Borough, however parking remains free for electric vehicles in these bays and a

“green” parking permit can be purchased which allows parking in any standard rate parking space.

In November 2013 eight electric buses replaced seven diesel buses on the number 7 bus route (Wolverton - Bletchley) running 7 days a week. The buses charge wirelessly at 3 specific locations en route when power transmitted from a primary coil buried in the road is picked up by a secondary coil on the bus. A 10 minute charge replenishes two thirds of the energy consumed by the bus’s route and the buses are completely recharged at the depot overnight.

Freight

MK Council is now part of the newly formed East of England Freight Quality Partnership, comprising representatives from local authorities, government agencies, transport operators and other interested groups. Preparation of a Freight Strategy for Milton Keynes is due to commence in April 2014.

Table 9.1 Action Plan Progress

No.	Measure	Focus	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
1	HGV re-routing	Emissions modelling of alternative routes	2012/13	Subject to results	No specific indicator	See Section 9 text	Modelling completed	Modelling undertaken	Completed	See Section 9 text
2	Traffic management	Weston Road junction / Market Square right turn	2012/3	Spring 2014	No specific indicator	Not quantifiable	Not yet started	Options decided	Spring 2015	New scheme will reduce queuing and emissions from stationary vehicles
3	Low Emission Zone	Not currently applicable	n/a	n/a	n/a	n/a	n/a	n/a	n/a	No national scheme
4	Air quality monitoring	Automatic NOx monitoring and NO_2 diffusion tube network	ongoing	ongoing	Data capture >90%	n/a	>90% data capture	>90 % data capture	n/a	2 locations within AQMA still exceeding annual mean objective
5	Traffic monitoring	DfT data from ATC site	ongoing	ongoing	n/a	n/a	Data analysed	Complete data set received from DfT	n/a	Further reduction in traffic flows during 2013
6	Dispersion modelling	New emission factors	n/a	n/a	n/a	n/a	Not undertaken	New factors available	2014	May lead to slight increase in predicted future NO_2 concentrations
7	Car share scheme	Increase membership	2013	2014	Number of members	Not quantifiable	New scheme 2011	Scheme functioning well	n/a	Scheme to be reviewed as part of Parking Strategy

No.	Measure	Focus	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
8	School travel plans	Maintain high walking and cycling rates	ongoing	ongoing	Number of walkers / cyclists	Not quantifiable	High rates achieved in Olney	High rates maintained	n/a	Lower and middle schools have higher proportion of walkers
9	Public transport	Increase bus use	2013	ongoing	Numbers using buses	Not quantifiable	Overall increase in bus patronage	Slight increase in patronage	n/a	
10	Cycling and walking	Investigate additional action for Olney	2013	ongoing		Not quantifiable	Cycling Strategy published	Preparation of strategy	2014	Further improvements will be minor
11	Low Emission Vehicles	Electric vehicle charging point provision	2012	2012-4	Number of charge points installed	Not quantifiable	170 electric vehicle charge points installed	6 rapid electric vehicle charge points installed	End 2014	Zero NO_2 emissions from electric vehicles at point of use
12	Freight	Freight Transport Strategy	2013	2014	n/a	Not quantifiable	In preparation	Freight Partnership set up	2015	More efficient use of freight transport systems will reduce emissions

10 Conclusions and Proposed Actions

10.1 Conclusions from New Monitoring Data

All new automatic monitoring data are within the relevant air quality objective. Diffusion tube data collected during 2013 confirmed that the annual mean nitrogen dioxide objective is still being exceeded at two locations within the AQMA in Olney. No new exceedences were identified outside of the AQMA in Olney.

10.2 Conclusions relating to New Local Developments

Milton Keynes Council confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area that have not been properly assessed since the last Updating and Screening Assessment was completed in 2012.

10.3 Other Conclusions

The Air Quality Action Plan (AQAP) for Olney was finalised in November 2012 and specific options are progressing according to the AQAP schedule. Annual mean NO_2 results recorded in 2013 at the automatic monitoring station in Olney were similar to those recorded in 2011 and 2012, approximately 27 µg/m^3, however, there were still exceedences recorded on the façades of buildings. Traffic flows, measured as Annual Average Daily Traffic counts are at their lowest level since 2006.

The Local Transport Plan 3 (LTP3) was updated in April 2012 and contains an implementation plan for the interventions addressing the five national transport goals.

The planning Core Strategy was adopted by the council in July 2013 and sets out the vision, objectives and strategy for the development of the Borough up to 2026.

10.4 Proposed Actions

This Progress Report 2014 has not identified the need to proceed to a Detailed Assessment for any pollutant.

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 implement the options in the Air Quality Action Plan and to submit an Updating and Screening Assessment to Defra in April 2015.

11 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 2009, 2010, 2011 and 2013.

6. Milton Keynes Council, Detailed Assessment of Nitrogen Dioxide in Olney, August 2008.

7. Milton Keynes Council Air Quality Action Plan for Olney. http://www.milton-keynes.gov.uk/environmental-health-and-trading-standards/pollution

8. Local Air Quality Management Tools, Department of the Environment, Food and Rural Affairs, available from web site: http://laqm.defra.gov.uk/review-and-assessment/tools/tools.html

9. Milton Keynes Council, Local Transport Plan 3, 2011-2031. http://www.milton-keynes.gov.uk/streets-transport-and-parking/transport-policy

10. Milton Keynes Council Local Development Framework http://www.milton-keynes.gov.uk/planning-and-building/planning-policy

11. Milton Keynes Joint Strategic Needs Assessment (JSNA) 2012/13 http://www.milton-keynes.gov.uk/social-care-and-health/health-and-wellbeing-board/strategic-needs-assessment/jsna

12 Appendices

Appendix A: Quality Assurance / Quality Control (QA/QC) 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_2 Diffusion Tubes that was released early in 2008. The Council participates in the WASP scheme for quality assurance of diffusion tube analysis and the monthly NO_2 Network Field Intercomparison Exercise.

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 2013 were 0.76, 0.74, and 0.74. The average for the three stations was 0.75.

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

Month	Start Date	End Date	Diffusion Tube µg/m^3				Auto Average µg/m^3	
			1	2	3	Average		
Jan	16-Jan-13	15-Feb-13	30.54	invalid	32.44	31.49	30.00	
Feb	15-Feb-13	08-Mar-13	36.98	36.42	32.05	35.15	31.03	
Mar	08-Mar-13	27-Mar-13	29.63	34.44	31.62	31.90	21.39	
Apr	27-Mar-13	24-Apr-13	26.15	27.71	24.60	26.15	18.24	
May	24-Apr-13	30-May-13	20.30	20.04	15.89	18.74	17.36	
Jun	30-May-13	27-Jun-13	19.90	20.20	17.70	19.27	13.80	
Jul	27-Jun-13	01-Aug-13		14.00	17.30	15.65	14.26	
Aug	01-Aug-13	04-Sep-13	16.10	38.30		27.20	15.75	
Sep	04-Sep-13	02-Oct-13	29.90	16.60	20.00	22.17	20.33	
Oct	02-Oct-13	30-Oct-13	30.80	30.70	29.40	30.30	15.73	
Nov	30-Oct-13	05-Dec-13	34.20	38.80	34.30	35.77	25.92	
Dec	05-Dec-13	08-Jan-14	31.90	34.30	30.90	32.37	23.66	**Adjustment Factor**
					Annual average:	**27.18**	**20.62**	**0.7588**

Table A1.2 Co-location Study at Roadbox Station, Wolverton Road

Month	Start Date	End Date	Diffusion Tube µg/m^3				Auto Average µg/m^3	
			1	2	3	Average		
Jan	16-Jan-13	15-Feb-13	45.81	54.16	50.22	50.06	37.76	
Feb	15-Feb-13	08-Mar-13	41.20	36.53	39.96	39.23	32.59	
Mar	08-Mar-13	27-Mar-13	45.49	45.33	43.86	44.89	21.67	
Apr	27-Mar-13	24-Apr-13	42.01	44.61	41.81	42.81	26.69	
May	24-Apr-13	30-May-13	split tube	47.73	37.88	42.80	32.60	
Jun	30-May-13	27-Jun-13	37.30	37.40	39.10	37.93	24.48	
Jul	27-Jun-13	01-Aug-13	32.20		36.50	34.35	28.26	
Aug	01-Aug-13	04-Sep-13	31.30		35.70	33.50	32.90	
Sep	04-Sep-13	02-Oct-13	36.60	32.70	34.50	34.60	34.65	
Oct	02-Oct-13	30-Oct-13	54.80	55.50	52.60	54.30	34.62	
Nov	30-Oct-13	05-Dec-13	53.00	50.70	51.90	51.87	45.21	
Dec	05-Dec-13	08-Jan-14	50.70	52.20	45.50	49.47	31.89	**Adjustment Factor**
					Annual average:	**42.98**	**31.94**	**0.7431**

Table A1.3 Co-location Study at Roadbox Station 2, Olney

Month	Start Date	End Date	Diffusion Tube µg/m^3				Auto Average µg/m^3	
			1	2	3	Average		
Jan	16-Jan-13	15-Feb-13	34.76	41.54	38.64	38.31	29.43	
Feb	15-Feb-13	08-Mar-13	44.94	41.33	44.39	43.55	30.02	
Mar	08-Mar-13	27-Mar-13	43.54	43.08	41.38	42.67	23.43	
Apr	27-Mar-13	24-Apr-13	leaked reagent	32.70	31.70	32.20	20.53	
May	24-Apr-13	30-May-13	37.16	37.09	missing	37.12	24.27	
Jun	30-May-13	27-Jun-13	28.20	29.10	30.70	29.33	20.73	
Jul	27-Jun-13	01-Aug-13	23.30	22.50	21.10	22.30	22.39	
Aug	01-Aug-13	04-Sep-13	27.00	30.20	23.60	26.93	24.09	
Sep	04-Sep-13	02-Oct-13	20.30	24.00	33.90	26.07	28.02	
Oct	02-Oct-13	30-Oct-13	38.20	41.90	42.70	40.93	25.31	
Nov	30-Oct-13	05-Dec-13	49.20	48.40	42.70	46.77	39.22	
Dec	05-Dec-13	08-Jan-14	34.00	39.10	35.50	36.20	26.37	**Adjustment Factor**
					Annual average:	**35.20**	**26.15**	**0.7429**

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	02/01/2013	30/01/2013	105.7	99.0	101.6	102	3.4	3	8.4	84	96.7	Good	Good
2	30/01/2013	27/02/2013	95.1	98.6	92.4	95	3.1	3	7.7	74	94.1	Good	Good
3	27/02/2013	27/03/2013	116.6	102.4	114.7	111	7.7	7	19.1	74	97.7	Good	Good
4	27/03/2013	01/05/2013	117.9	103.9	111.0	111	7.0	6	17.4	77	97.6	Good	Good
5	01/05/2013	30/05/2013	95.3	90.2	98.1	95	4.0	4	9.9	83	97.6	Good	Good
6	30/05/2013	26/06/2013	73.4	78.2	67.5	73	5.4	7	13.3	73	97.6	Good	Good
7	26/06/2013	31/07/2013	118.0		90.6	104	19.4	19	174.1	89	94.3	Good	Good
8	31/07/2013	04/09/2013	83.3	86.1	92.7	87	4.8	6	12.0	84	92.0	Good	Good
9	04/09/2013	02/10/2013	83.3		92.7	88	6.6	8	59.7	84	97.7	Good	Good
10	02/10/2013	30/10/2013	112.2	119.0	113.0	115	3.7	3	9.2	89	97.5	Good	Good
11	30/10/2013	04/12/2013	87.4	82.2	80.5	83	3.6	4	8.9	77	97.3	Good	Good
12	04/12/2013	08/01/2014	102.9	96.0	114.5	104	9.3	9	23.2	80	97.6	Good	Good
13													
												Good precision	Good Overall DC

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

Overall survey -->

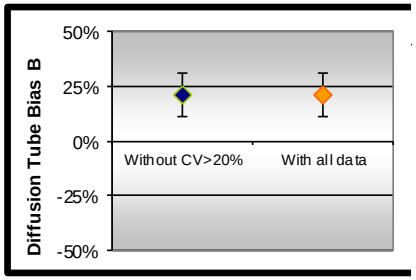
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Marylebone Road

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

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 12 periods of data	
Bias factor A	0.83 (0.76 - 0.9)
Bias B	21% (11% - 31%)
Diffusion Tubes Mean:	97 μgm^{-3}
Mean CV (Precision):	7
Automatic Mean:	81 μgm^{-3}
Data Capture for periods used:	96%
Adjusted Tubes Mean:	81 (74 - 88) μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 12 periods of data	
Bias factor A	0.83 (0.76 - 0.9)
Bias B	21% (11% - 31%)
Diffusion Tubes Mean:	97 μgm^{-3}
Mean CV (Precision):	7
Automatic Mean:	81 μgm^{-3}
Data Capture for periods used:	96%
Adjusted Tubes Mean:	81 (74 - 88) μgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Particulate Monitoring Adjustment

The Fixed Station and Roadbox 2 contain Tapered Element Oscillating Microbalance (TEOM) continuous PM_{10} 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_{10} 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.

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 check 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_2 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 WASP scheme for quality assurance of diffusion tube analysis and the monthly NO_2 Network Field Intercomparison Exercise administered by the National Physical Laboratory.