2014 Air Quality Progress Report for Central Bedfordshire Council

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

Date: April, 2014

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Executive Summary

Central Bedfordshire Council came into force on the 1st April 2009 comprising of the legacy authorities of Mid Bedfordshire District Council, South Bedfordshire District Council and sections of Bedfordshire County Council.

A mix of continuous analysers and diffusion tubes are utilised to collect data for a number of pollutants within the district.

There is currently one Air Quality Management Area (AQMA) within the district (in Dunstable), which was declared in 2004 in relation to the annual nitrogen dioxide(NO_2) air quality objective (40µg/m^3). Monitoring results continue to show exceedence of the NO_2 annual objective within the AQMA at sites 1 (44.80µg/m^3); 18 (43.73µg/m^3) and 37 (41.4µg/m^3). Therefore this AQMA needs to remain.

The two new NO_2 diffusion tube monitoring locations in Poynters Road, Dunstable introduced into the monitoring network late in 2012, have shown the annual NO_2 mean objective (40µg/m^3) to have been met. However, Poynters Road was closed to traffic between 8th July to 30th September 2013, resulting in less traffic and traffic borne pollution in this location during this time frame.

Results from diffusion tube monitoring continue to show exceedence of the NO_2 annual objective (40µg/m^3) at two of the Ampthill monitoring sites (N22 and N23) of 41.03µg/m^3 and 43.34µg/m^3 respectively. Work is continuing to complete a public consultation and declare an Air Quality Management Area in this location.

One monitoring site in Sandy continues to show exceedence of the NO_2 annual objective. Site N20, (sited on a façade of a cottage on the A1(M)), has an annual mean of 80.39µg/m^3 (an annual mean over 60µg/m^3 indicates that concentrations of nitrogen dioxide are likely to be exceeding the hourly air quality objective at this location). Work is continuing to complete a public consultation and declare an Air Quality Management Area in this location.

There are a number of monitoring sites that are considered to be borderline (having an annual mean above 36µg/m^3 but below 40µg/m^3). These are N17; 34; 36 and 41.

Defra agreed with the conclusion drawn in Central Bedfordshire Council's Progress Report 2013 which suspended work to declare an Air Quality Management Area in Chalton as this is the site of a proposed new road, work upon which is due to commence imminently, thereby removing relevant exposure at this location. However, monitoring at the façade of the existing cottages show that the annual mean objective was met in 2013.

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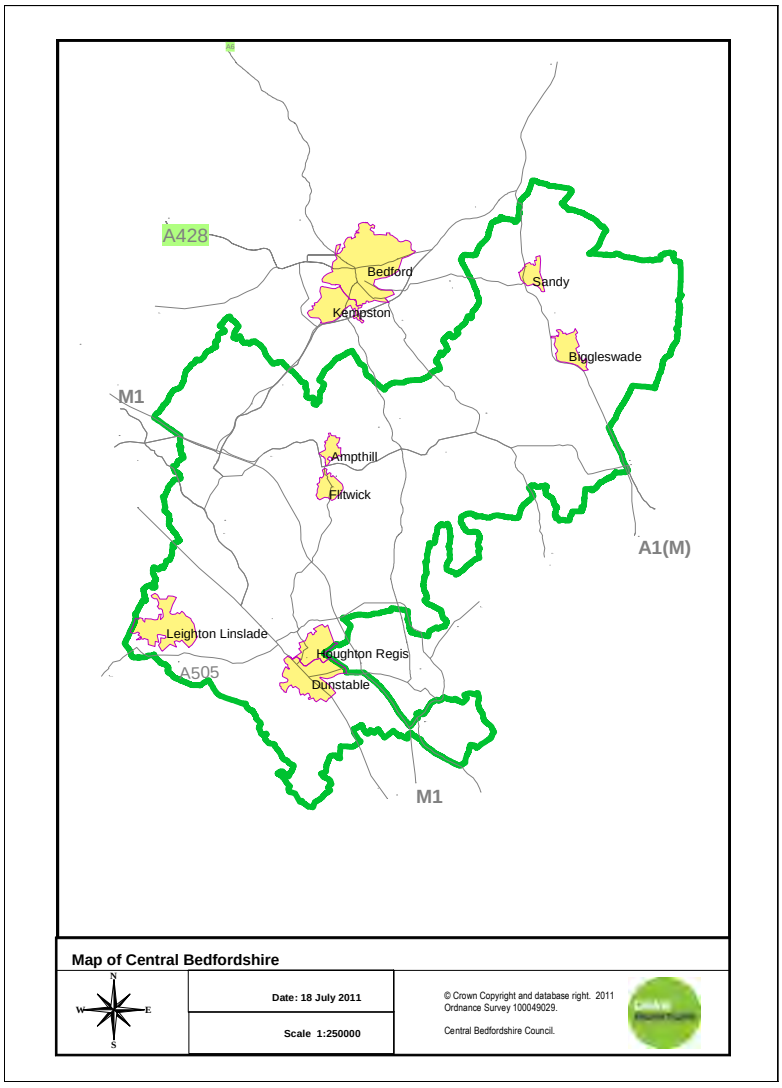
1 Introduction

1.1 Description of Local Authority Area

Central Bedfordshire Council came into force on the 1st April 2009. The legacy authorities were South Bedfordshire District Council, Mid Bedfordshire District Council and aspects of Bedfordshire County Council.

Central Bedfordshire covers an area of 716 square kilometres (see map below). The estimated population of is 254,400 (based on 2011 census figures). The area is mainly rural but has some market and larger towns distributed throughout.



Central Bedfordshire is situated some 30 miles to the north of London and has excellent links to the national motorway network having the M1, A1, A5 and the A6 running through the area and the ease of access to the M25, M11 and M40.

Rail links from Leighton Buzzard mean London Euston can be reached in forty minutes. Arlesey, Biggleswade and Sandy are served by the Peterborough to Kings Cross line whilst Harlington and Flitwick are served by the Bedford to St Pancras

International line. Rail freight services are also available from nearby Luton railway station.

Central Bedfordshire Council is a member of the Herts and Beds Air Quality Monitoring Network comprising of all the local authorities in the two counties, plus Luton Airport.

Data is collected by continuous analysers and nitrogen dioxide diffusion tubes

The major source of pollution in the district is from road transportation.

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), The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 1.1. This table shows the objectives in units of micrograms per cubic metre - $\mu g/m^3$; (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (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 Summary of previous reviews and assessments

Authority	Reports produced	Dates produced	Report conclusions
SBDC	1st stage air quality review	1999/2000	CO / 1,3 butadiene / SO_2 / Benzene unlikely to exceed objectives anywhere in district. NO_2 / PM_{10} to proceed to 2nd stage
SBDC	Air Quality review & assessment (2nd stage)	April 2000	Concluded 3rd stage review for NO_2 & PM_{10} not necessary as levels within objectives. Monitoring to continue.
MBDC	1st review & assessment	2000	This assessment concluded that the air quality objectives contained in the Air Quality Regulations 1997 would be achieved throughout the District.
SBDC	USA	April 2003	Concluded that due to a number of changes in circumstances, it was considered that nitrogen dioxide (NO_2) and particulate matter (PM_{10}) were in danger of being breached. However objectives for CO / SO_2 / benzene / 1, 3 – butadiene and lead would be met.
MBDC	USA	2003	Due to a number of changes in circumstances, although it was thought that the objectives for carbon monoxide, benzene, 1, 3 – butadiene and lead would be met, it was considered that the objectives for SO_2, NO_2 and PM_{10} were in danger of being breached.
SBDC	Detailed Assessment	2004	Concentrated on levels of NO_2 and particulate matter in Dunstable town centre as a result of traffic using the A5, A505 and B489. The conclusion of the report was that the annual mean nitrogen dioxide objective was likely to be breached at the facades of buildings along all roads at the town centre junction and recommended that an Air Quality Management Area (AQMA) be declared. The report also predicted that the 2004 annual mean and 24-hour objectives for PM_{10} are unlikely to be exceeded.
MBDC	Detailed Assessment	2004	Concentrated on ground level ambient concentrations of SO_2 as a result of emissions from Stewartby Brickworks and levels of NO_2 / PM_{10} as a result of traffic using the A1 Sandy roundabout. Conclusions resulted in the AQMA declaration for SO_2 levels around the brickworks and that more monitoring was required for the A1 Sandy roundabout junction to accurately assess current levels of NO_2.
SBDC	Declaration of AQMA in Dunstable	January 2005	AQMA officially declared by Council
SBDC	Progress Report	December 2005	Following the recent declaration of an

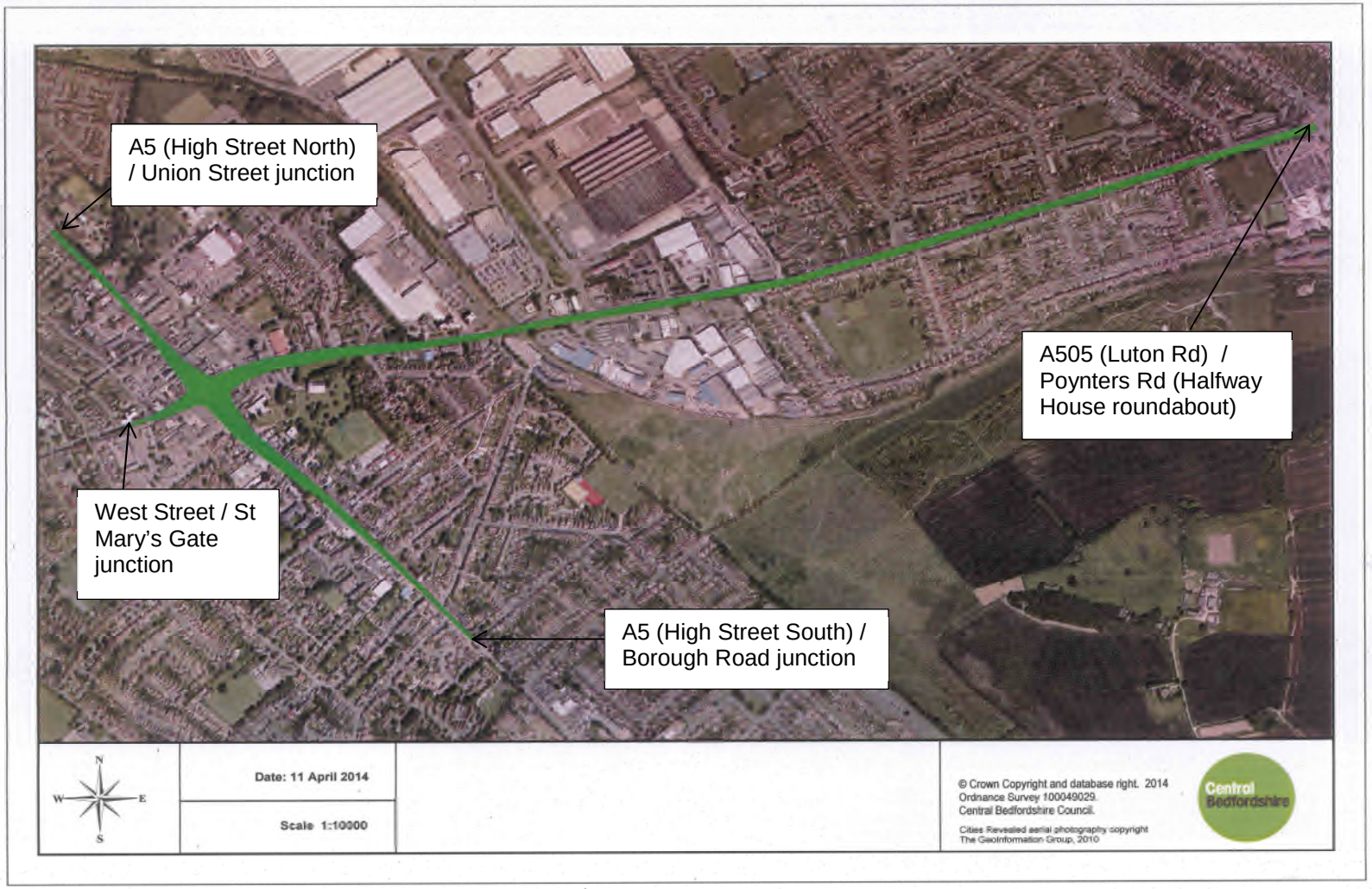
			Air Quality Management Area, the next phase of the process is the production of Stage 4 report (including source apportionment) and an Action Plan (to identify options to reduce concentrations of pollutant(s) in order to achieve the objective(s)).
SBDC	Stage 4 Report / source apportionment	2005	The source apportionment study indicated that background NO_X levels are generally the major contributor to ambient NO_X concentrations at the receptors included in the study. Emissions from taxis idling in ranks and vehicles in car parks are a minor source of NO_X. However, there are two large sources of NO_X over which the council has some control: Cars and HGVs travelling along the roads in question are major source of NO_X. In particular, HGVs are responsible for a large portion of these emissions despite their relatively small flows. ▪ Buses idling at stops contribute large amounts of NO_X to the immediate surroundings and create small areas of high concentrations that may affect nearby buildings. Reductions in NO_2 concentration of 22% and 5% respectively are required at the receptors near the High Street North and Church Street bus stops to reduce the ambient concentration to meet the 40 µg/m^3 objective.
MBDC	Progress Report	2005	Updating on changes since the last review and assessment report
MBDC	Declaration of AQMA in the vicinity of Stewartby	2005	AQMA officially declared by Council
SBDC	USA	2006	Identified Chalton as another possible area where Air Quality Objectives might be breached and further monitoring (via diffusion tubes) commenced.
MBDC	USA	2006	identified the risk of objectives being exceeded for CO, benzene, 1,3 – butadiene, lead, nitrogen dioxide and particulate matter (PM_{10}) is not significant. The Stewartby Brickworks will be subject to a Further Assessment.
SBDC	Progress Report	2007	Changes needed to AQAP after consultation
MBDC	Further Assessment	2007	Concluded that the AQMA remain in place as originally declared
MBDC	Air Quality Action Plan	2007	Identified actions to address the SO_2 levels – accepted by Defra
SBDC	Detailed Assessment	2008	Identified possibility of annual mean NO_2 objective likely to be exceeded at

			4 receptors out of six. NO_2 hourly objectives unlikely to be breached.
CBC	USA	2009	Following Detailed Assessments carried out in 2008 by both Mid and South Beds District Councils; it was recommended that AQMAs be declared in Sandy and Chalton, both in relation to the annual NO_2 Air Quality Objective. Consultations will be carried out, followed by declarations and Further Assessments by Central Bedfordshire Council. Two new narrow congested streets with a traffic flow of over 5000 vehicles per day identified. CBC will review these areas (Bedford Street and Dunstable Street, Ampthill) and carry out a Detailed Assessment if necessary. The major source of pollution in the district is from road transportation as Stewartby Brickworks have now closed.
CBC	Air Quality Revocation Order	2009	Since the closure of the Stewartby Brickworks (early 2008) the ambient levels of SO_2 have dropped off dramatically. The data from the Marston Vale Forest Centre indicates that the peaks do not rise above 40 mg/m^3 as a 15 minute average, clearly below the objective level. Additionally, both the 1hour mean and 24hour mean SO_2 objectives continue to be met across the Hertfordshire and Bedfordshire monitoring network. AMQA revoked due to closure of the Brickworks.
CBC	Detailed Assessment 2010 (Ampthill)	2011	Recommended to declare AQMA on basis of NO_2 diffusion tube monitoring along Bedford Street (by Park Street junction) and Dunstable Street (adj no 103); to clarify areas of relevant exposure and to continue monitoring.
CBC	Progress Report	2011	Updating on changes since last R&A report
CBC	USA	2012	Reported that a Public Inquiry for the M1 – A5 link road (Dunstable Northern bypass) would proceed.
CBC	Progress Report	2013	To work towards declaring two AQMAs in Ampthill (NO_2 annual) and Sandy (NO_2 annual and hourly). Work on AQMA declaration at Chalton ceased due as approved development is to proceed removing receptors.

SBDC – South Beds District Council; MBDC – Mid Beds District Council (pre April 2009); CBC - Central Bedfordshire Council (post 1st April 2009)

Figure 1.1 Map(s) of AQMA Boundaries (if applicable)

A map of the existing AQMA in Dunstable is shown below.



2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

This section provides a summary of the automatic air quality monitoring results available since the last air quality report (Progress Report 2013).

Central Bedfordshire Council had two realtime analysers sited in Sandy (monitoring NO_2, PM_{10} and $PM_{2.5}$) and in Marston Moretaine (Marston Vale) (monitoring Ozone (O_3)).

However in August 2013 the Marston Moretaine (Marston Vale) site was closed – this was due to equipment failure and budgetary cuts. The data capture rate during the period 1st January – 15th August 2013 was 99.5%

The ozone analysers at the Marston Vale were calibrated every 4 weeks by the local authority. The data from the Marston Vale site was ratified to the Hertfordshire and Bedfordshire Air Quality Network standard.

Details of the two continuous analysers can be found in Table 2.1

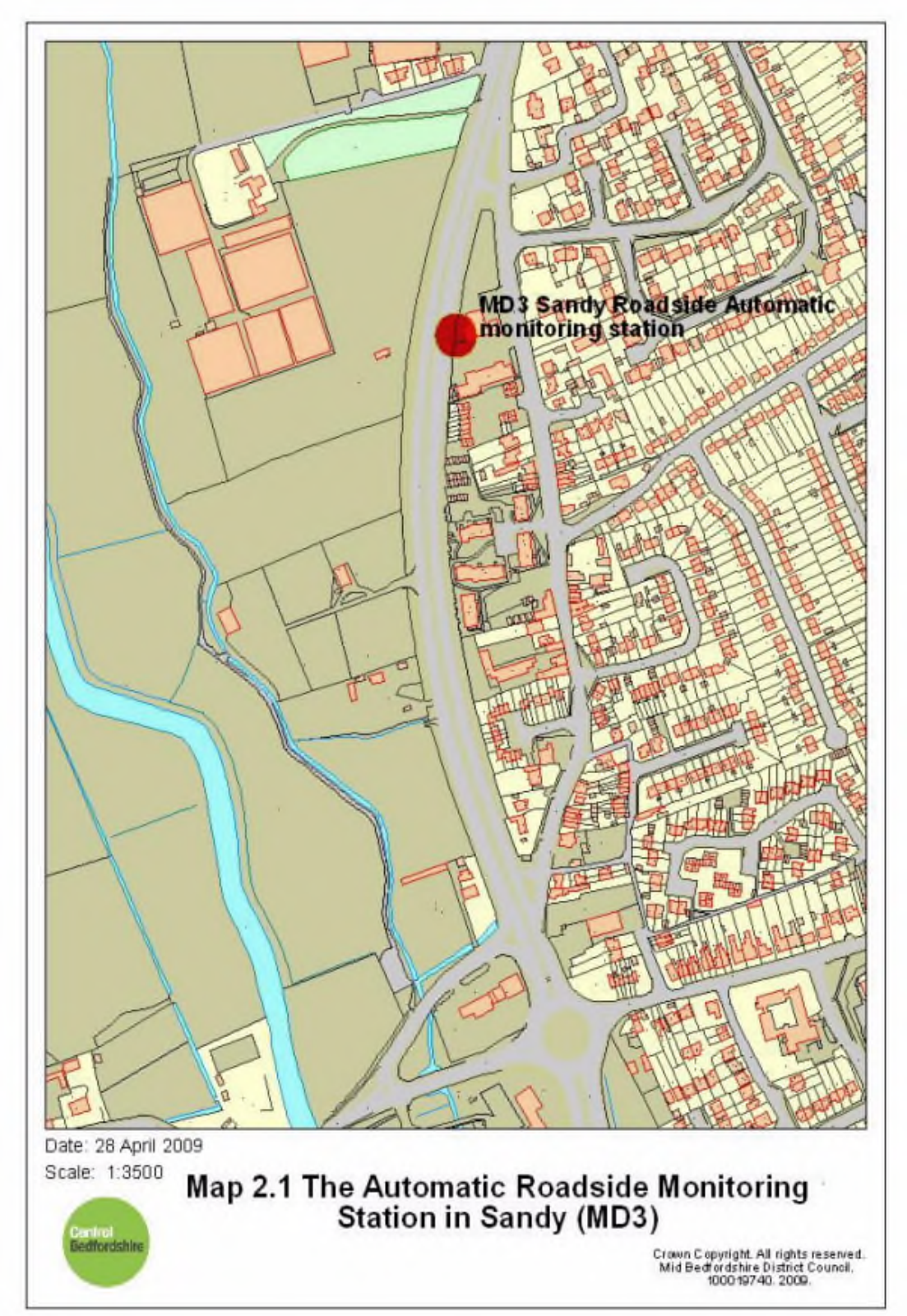
During 2013 data capture for the Sandy site for NO_2 was 98%, PM_{10} was 71% and $PM_{2.5}$ was 91%.

The Sandy site became an affiliated site in the AURN National Network in January 2009, which resulted in an FDMS upgrade to the PM_{10} TEOM and also the installation of a $PM_{2.5}$ FDMS TEOM.

NO_2 is measured using an API chemiluminescent NO_x analyser which is housed in an air conditioned cabin. Data is collected remotely using a GSM modem link. The analyser is serviced every six months by Casella and is visited every two weeks by a council officer who calibrates it using bottled gas of a known concentration and the results are logged. Since the affiliation of the Sandy site with Defra's national network, an audit is to be undertaken every 6 months.

The data from the AQMS site at Sandy roadside is ratified by ERG to the AURN standard and QA/QC visits are carried out by Casella on a regular basis.

Figure 2.1 Map(s) of Automatic Monitoring Sites (if applicable)



Automatic monitoring station at the
Marston Vale Forest Centre
Date: 28 April 2009
Scale: 1:4999
Map 2.2. The Site location of the AutomaticMonitoring Station at the Marston Vale Forest Centre, Marston Moretaine.
Central Bedfordshire
Crown Copyright. All rights reserved.
Mid Bedfordshire District Council.
100019740. 2009.

Table 2.1 Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Inlet Height (m)	Pollutants Monitored	In AQMA?	Monitoring Technique	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
MD4	Marston	Rural	500445	241670	3	O_3	N	ultra-violet fluorescence	N/A	N/A	N
MD3	Sandy	Roadside	516436	249600	3	NO_2 / PM_{10} / $PM_{2.5}$	N	Chemiluminescence / FDMS TEOM	N	4m	N

2.1.2 Non-Automatic Monitoring Sites

In addition to the continuous monitor, Central Bedfordshire Council measures nitrogen dioxide using 45 passive diffusion tubes at sites throughout the district. The locations of the monitoring sites can be seen in Appendix B.

The tubes are supplied and analysed by Gradko International Ltd and prepared using 20% TEA in water methodology. Gradko International is a UKAS accredited laboratory and the latest results from the laboratory precision and WASP scheme are in Appendix A.

Table 2.2 shows the details of Non-Automatic Monitoring Sites (NO_2) measured at sites in 2012. Three tubes have been co-located with the air quality monitoring station on the A1 Sandy since January 2003 to enable a local bias adjustment factor to be calculated.

The national bias adjustment factor is available for Gradko 20% TEA in water tubes from http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html

Central Bedfordshire Council used the national bias adjustment of 0.92 in 2010.

Central Bedfordshire used both the national bias adjustment (0.89) and the local bias adjustment factor (0.91) in 2011. Using the local factor in conjunction with the distance correction calculations provided a more conservative dataset, which showed exceedences of the annual objective at SB33 and SB37 in 2011. However these sites were below the objective level if the national bias adjustment factor was utilised in conjunction with distance correction calculations.

The national bias adjustment factor 2012 was 0.97 (as of April 2013). The local bias factor was calculated as being 0.96. The national figure was utilised in this report as provided a slightly more conservative scenario.

The national bias adjustment factor in 2013 was 0.95 (as of 31 March 2014) and the local bias adjustment factor was calculated as being 0.96 (see Appendix A). The national figure was utilised in this report as this figure has been utilised in previous Review and Assessment Reports and additionally best represented most of the NO_2 site locations within the district.

All national bias adjustment figures were obtained from http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html

Local bias adjustment were calculated using http://laqm.defra.gov.uk/bias-adjustment-factors/local-bias.html

Poynters Road was closed for 3 months between 8th July to 30th September 2013 during which time traffic was diverted along Boscombe Road and Luton Road, Dunstable or utilised alternative local routes.

This enabled data to be gathered highlighting the effect of the traffic flow on air quality concentrations. Unsurprisingly the NO_2 levels seemed to decrease at the Poynters Road monitoring sites, during this period (see Table 2.1.2 below). However if the road would have remained open to traffic, it is unlikely that the annual mean would have been exceeded in 2013.

Monitoring continues at these sites and will be reported in future Review and Assessment Reports.

Table 2.1.2 Monthly NO_2 diffusion tube monitoring from Poynters Road & Luton Road, Dunstable

		ug/m3													bias
		JAN	**FEB**	**MAR**	**APR**	**MAY**	**JUNE**	**JULY**	**AUG**	**SEPT**	**OCT**	**NOV**	**DEC**	**AVE**	0.95
48	185 Poynters Road (Katherine Drive)	**45.45**	**46.86**	**43.76**	33.78		37.11	25.98	16.53	23.68	34.65	31.52	36.23	34.14	32.43
49	Poynters Road - o/s 241 (Hadrian Ave)	**44.63**	**45.41**	**44.39**	37.47		37.22	23.99	18.68	23.77	35.66	28.45	36.39	34.19	32.48
27	Luton Rd o/s 89, D'ble	**46.41**	**55.14**	**47.60**	39.38		**41.47**	27.49	29.17	30.56	30.12	**43.28**	30.83	38.31	36.40
36	247 Luton Road, Dunstable	**48.87**	**47.66**	**64.71**	39.62		36.64	**40.37**	35.76	36.46	32.85	36.50		**41.94**	39.85
37	32 Luton Road, Dunstable	**49.91**	**52.30**	**50.02**	**43.21**		**49.04**	**59.48**	**61.07**	39.80	**41.24**	39.04	39.82	**47.72**	**45.33**

Table 2.2 Details of Non- Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
N1	A1 Sandy	Kerbside	516482	249212	2.5	NO_2	N	N	Y(3)	1	N
N2	Rose Lane, Biggleswade	Kerbside	519161	244651	3	NO_2	N	N	Y(4)	1	N
N3	High Street, Biggleswade	Kerbside	518991	244596	3	NO_2	N	N	N	1	N
N4	A1, Beeston	Kerbside	517162	248188	2.5	NO_2	N	N	Y(2)	1	Y
N6	Bedford Road, Sandy	Kerbside	516619	249100	3	NO_2	N	N	Y (6)	2	N
N7	Highfield Cres Brogborough	Kerbside	496330	238300	3	NO_2	N	N	Y (10)	4	N
N20	A1Sandy (Carters)	K	516529	249967	2.5	NO_2	N	N	Y	1	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
N9	Hunts Car Co 1, A1	Kerbside	516448	249685	2.5	NO_2	N	N	Y (4)	1	N
N10	Hunts Car Company 2, A1	Kerbside	516479	249704	2.5	NO_2	N	N	N	2	N
N24	Market Square	Kerbside	517310	249228	3	NO_2	N	N	Y(3)	1	N
N12	NO_x co-loc	Kerbside	516436	249599	3	NO_2	N	Y	N	4	N
N13	NO_x co-loc	Kerbside	516436	249599	3	NO_2	N	Y	N	4	N
N14	NO_x co-loc	Kerbside	516436	249599	3	NO_2	N	Y	N	4	N
N15	Battlesden	Kerbside	495944	229191	2.5	NO_2	N	N	N	1	N

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
N16	Bedford Rd, Sandy 1	Kerbside	516593	249083	2.5	NO_2	N	N	Y(12)	3	N
N17	Bedford Rd, Sandy 2	Kerbside	516569	249074	2.5	NO_2	N	N	Y(8)	2	Y
N18	Eddie's Cott	Kerbside	516579	249078	1.8	NO_2	N	N	Y(0)	11	Y
N19	Doorway	Kerbside	516582	249078	1.8	NO_2	N	N	Y(1)	3	Y
N21	Ampthill 1	Kerbside	503444	238197	2.5	NO_2	N	N	Y (0)	4m	N
N22	Ampthill 2	Kerbside	503466	238141	2.5	NO_2	N	N	N	1m	Y
N23	Ampthill 3	Kerbside	503458	283039	2.5	NO_2	N	N	N	1m	Y
01	High St South	Kerbside	501925	221829	3	NO_2	Y	N	N	1	N
03	Mardale	Kerbside	502023	220725	3	NO_2	N	N	Y(3)	1	Y
05	Rowley	Urban Rural	491014	225777	1.5	NO_2	N	N	Y(3)	1	Y
06	Barton	Kerbside	508064	230873	3	NO_2	N	N	Y(5)	1	Y
07	Slip End	Kerbside	507696	218374	3	NO_2	N	N	Y(3)	1	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
10	Houghton	Kerbside	501988	223954	3	NO_2	N	N	N	1	N
13	Tebworth	RuralBackgnd	499542	226940	1.5	NO_2	N	N	N	8	N
14	Sallowsprings	RuralBackgnd	500525	218839	1.5	NO_2	N	N	N	8	N
17	London/Mayfield	Kerbside	502848	220829	3	NO_2	N	N	Y(5)	2	Y
18	Argos	Kerbside	501705	222089	3	NO_2	Y	N	N	1	N
20	Court Drive	Kerbside	501797	222200	2	NO_2	N	N	Y(8)	1	Y
21	Frenchs Ave	Kerbside	500790	223047	3	NO_2	N	N	Y(5)	2	Y
26	West St	Kerbside	501571	221742	3	NO_2	N	N	N	1	N
27	Luton Rd (89)	Kerbside	503214	222123	3	NO_2	Y	N	Y(2)	2	Y
28	Chalton	Kerbside	503764	261024	1.5	NO_2	N	N	N	1	N
33	Church St	Kerbside	501961	218842	3	NO_2	Y	N	Y(2)	4	Y
34	High St South (5)	Kerbside	501910	218492	3	NO_2	Y	N	Y(5)	1	Y
35	Flint Court	Kerbside	501504	222784	1.5	NO_2	N	N	Y(0)	4	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
36	Luton Rd (247)	Kerbside	503848	222325	3	NO_2	Y	N	Y(2)	2	Y
37	Luton Rd (32)	Kerbside	502838	222071	3	NO_2	Y	N	Y(4)	2	Y
39	Houghton Rd	Kerbside	501151	222821	3	NO_2	N	N	Y(3)	1	Y
41	Chalton X	Kerbside	503922	225855	1.5	NO_2	N	N	Y(0)	8	Y
47	Clipstone	Rural Backgnd	493958	227012	1.5	NO_2	N	N	N	1	N
48	Poynters Rd (185)	Kerbside	503718	222932	1.5	NO_2	N	N	Y(6)	3	Y
49	Poynters Rd (241)	Kerbside	503569	223034	1.5	NO_2	N	N	Y(9)	1	Y
50	Luton Rd (24)	Kerbside	502813	222069	1	NO_2	Y	N	Y(10)	2	Y

During 2013 the following changes occurred:

Site 47 (Clipstone) closed – the last result for July 2013;

A new site - 50 (Luton Road, Dunstable) was introduced to the network the first results from August 2013

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide (NO_2)

A summary of the concentrations monitored are presented below:

Automatic Monitoring Data

As can be seen from Table 2.3 (Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with annual mean objective), the Sandy site recorded an annual mean concentration of NO_2 over the air quality objective level (44µg/m^3) in 2009. However there have been no exceedences in the years since.

Table 2.4 (Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour mean objective) also shows that concentrations were within the objective level.

The Marston Moretaine site did not monitor NO_2 and is now closed.

Table 2.3 Results of Automatic Monitoring for NO_2: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % [a]	Valid Data Capture 2013 % [b]	Annual Mean Concentration (µg/m^3)				
					2009* [c]	2010* [c]	2011* [c]	2012* [c]	2013 [c]
MD3	Roadside	N	N/A	98	**44**	38	35	35	31

In bold, exceedence of the NO_2 annual mean AQS objective of 40µg/m^3

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

[c] Means should be "annualised" as in Box 3.2 of TG(09) (http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=38), if valid data capture is less than 75%

* Annual mean concentrations for previous years are optional

Table 2.4 Results of Automatic Monitoring for NO_2: Comparison with 1-hour Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % [a]	Valid Data Capture 2013 % [b]	Number of Hourly Means > 200µg/m^3				
					2009* [c]	2010* [c]	2011* [c]	2012* [c]	2013 [c]
MD3	Roadside	N	N/A	98	1 (212)	1 (216)	0	0	0

In bold, exceedence of the NO_2 hourly mean AQS objective (200µg/m^3 – not to be exceeded more than 18 times per year)

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

[c] If the data capture for full calendar year is less than 90%, include the 99.8th percentile of hourly means in brackets

* Number of exceedences for previous years is optional

Diffusion Tube Monitoring Data

Table 2.5 below details the results of the diffusion tube monitoring carried out in 2013.

Two sites had data capture of less than 75% and thereby results were annualised in accordance with Defra guidance. Further details of the calculations can be seen in Appendix A.

Table 2.6 shows previous years monitoring results and the distance correction factors which were applied to sites with an annual mean greater than the annual objective. This calculation takes into account the fall off of NO_2 from the source to the receptor and was completed using Defra's online calculator which can be accessed from http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html.

Hourly objective

Following on from the review of diffusion tubes carried out in 2010 – monitoring continues at the façade of a row of terraced houses alongside the A1 in Sandy approximately 1 metre from the carriageway. The measured annual mean concentration has exceeded 60µg/m^3 each year, indicating a breach of the hourly objective at this location.

Table 2.5 Results of NO_2 Diffusion Tubes 2013

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2013 (Number of Months or %) [a]	2013 Annual Mean Concentration (µg/m^3) - Bias Adjustment factor = 0.95 [b]
N1	A1, Sandy	Kerbside	N	N	11 (92%)	39.28
N2	Rose Lane, Biggleswade	Kerbside	N	N	11 (92%)	25.60
N3	High St, Biggleswade	Kerbside	N	N	11 (92%)	37.10
N4	A1, Beeston	Kerbside	N	N	11 (92%)	36.64
N6	Bedford Rd, Sandy	Kerbside	N	N	11 (92%)	35.54
N7	Highfield Cres, Brogborough	Kerbside	N	N	11 (92%)	26.93
N20	A1 Sandy (Carters)	Kerbside	N	N	11 (92%)	**80.39**
N9	A1, Hunts Car Co, Sandy	Kerbside	N	N	11 (92%)	38.95
N10	A1, Hunts Car Co 2, Sandy	Kerbside	N	N	10 (83%)	27.78
N24	Market Sq, Sandy	Kerbside	N	N	9 (75%)	31.36
N12	NOx Box 1, Sandy	Kerbside	N	Y	10 (83%)	32.6
N13	NOx Box 2, Sandy	Kerbside	N	Y	11 (92%)	33.0
N14	NOx Box 3, Sandy	Kerbside	N	Y	10 (83%)	32.9
N15	Battlesden	Rural Background	N	N	11 (92%)	13.31

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2013 (Number of Months or %) [a]	2013 Annual Mean Concentration (µg/m^3) - Bias Adjustment factor = 0.95 [b]
N16	Bedford Rd South 1, Sandy	Kerbside	N	N	11 (92%)	35.49
N17	Bedford Rd South 2, Sandy	Kerbside	N	N	11 (92%)	**49.07**
N18	Eddie's Cottage,	Kerbside	N	N	11 (92%)	28.58
N19	Doorway	Kerbside	N	N	11 (92%)	24.67
N21	Ampthill 1	Kerbside	N	N	11 (92%)	27.14
N22	Ampthill 2	Kerbside	N	N	11 (92%)	**41.03**
N23	Ampthill 3	Kerbside	N	N	11 (92%)	**43.34**
1	High St South, Dunstable	Kerbside	Y	N	11 (92%)	**44.80**
3	Mardale, Dunstable	Kerbside	N	N	10 (83%)	15.14
5	Rowley Furrows, Linslade	Urban Backgrnd	N	N	9 (75%)	13.87
6	Barton	Kerbside	N	N	11 (92%)	24.28
7	Slip End	Kerbside	N	N	11 (92%)	18.62
10	Houghton Regis	Kerbside	N	N	9 (75%)	33.25
13	Tebworth	Rural Backgrnd	N	N	11 (92%)	12.76
14	Sallowsprings	Rural Backgrnd	N	N	9 (75%)	10.79
17	London/Mayfield, Dunstable	Kerbside	N	N	11 (92%)	32.13
18	Argos, Dunstable	Kerbside	Y	N	11 (92%)	**43.73**
20	Court Drive, Dunstable	Kerbside	N	N	10 (83%)	23.20
21	Frenchs/High St North, Dunstable	Kerbside	N	N	11 (92%)	27.68

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2013 (Number of Months or %) [a]	2013 Annual Mean Concentration (µg/m^3) - Bias Adjustment factor = 0.95 [b]
26	West St, Dunstable	Kerbside	N	N	11 (92%)	28.25
27	89 Luton Rd, Dunstable	Kerbside	Y	N	11 (92%)	36.40
28	Chalton	Kerbside	N	N	10 (83%)	**49.31**
33	Church St, Dunstable	Kerbside	Y	N	11 (92%)	35.01
34	5 High St South, Dunstable	Kerbside	Y	N	10 (83%)	**45.86**
35	Flint Court, Dunstable	Kerbside	N	N	11 (92%)	32.81
36	247 Luton Rd, Dunstable	Kerbside	Y	N	10 (83%)	39.85
37	32 Luton Rd, Dunstable	Kerbside	Y	N	11 (92%)	**45.33**
39	Houghton Rd, Dunstable	Kerbside	N	N	11 (92%)	36.83
41	Chalton Cross Cotts	Kerbside	N	N	11 (92%)	37.32
47	Clipstone	Rural Backgrnd	N	N	6 (50%)	16.55a
48	Poynters Rd (185)	Kerbside	N	N	11 (92%)	32.43
49	Poynters Rd (241)	Kerbside	N	N	11 (92%)	32.48
50	Luton Rd (24)	Kerbside	Y	N	3 (25%)	**43.01a**

In bold, exceedence of the NO_2 annual mean AQS objective of 40µg/m^3

Underlined, annual mean > 60µg/m^3, indicating a potential exceedence of the NO_2 hourly mean AQS objective

[a] Means should be “annualised” as in Box 3.2 of TG(09)(http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=38), if full calendar year data capture is less than 75%

[b] If an exceedence is measured at a monitoring site not representative of public exposure, NO_2 concentration at the nearest relevant exposure should be estimated based on the “NO_2 fall-off with distance” calculator (http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html), and results should be discussed in a specific section. The procedure is also explained in Box 2.3 of Technical Guidance LAQM.TG(09) (http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=30).

Table 2.6 Results of NO_2 Diffusion Tubes (2009 to 2013)

Site ID	Site Type	Within AQMA ?	Annual Mean Concentration (µg/m^3) - Adjusted for Bias [a]									
			2009 (Bias Adj = 0.90)	Distance correction	2010 (Bias Adj = 0.92)	Distance correction	2011 (Bias Adj = 0.89)	Distance correction	2012 (Bias Adj = 0.97)	Distance correction	2013 (Bias Adj = 0.95)	Distance correction
N1 - A1 Sandy	K	N	**45**	38	**47**	39.3	**45.09**	37.1	**43.39**	35.5	39.28	32.4
N2 - Rose Lane	K	N	37	-	27	-	27.09	-	29.78	-	25.60	-
N3 - High St Biggleswade	K	N	37	-	**42**	No exposure	37.50	No exposure	38.45	No exposure	37.10	No exposure
N4 - A1 Beeston	K	N	38	-	**42**	37.8	35.28	-	38.27	-	36.64	31.5
N6 - Bedford Rd Sandy	K	N	35	-	**41**	33.6	38.13	-	36.56	-	35.54	-
N7 - Highfield Cres	K	N	**40**	33.8	**42**	35	25.65	-	26.76	-	26.93	-
N20 - A1 Sandy (Carters)	K	N	-	-	-	-	**74.62**	**No drop off**	**80.45**	**No drop off**	**80.39**	**No drop off**
N9 - A1 London Rd 1	K	N	37	-	**46**	No exposure	39.7	-	**42.74**	33.8	38.95	31.1
N10 - A1 London Rd 2	K	N	26	-	30	-	26.9	-	27.10	-	27.78	-
N24 - Market Sq Sandy	K	N	28.98	-	35.42	-	28.4	-	35.08	-	31.36	-
N12 - NOx co loc 1	K	N	36	-	37	-	33.22	-	35.18	-	32.6	-
N13 - NOx co loc 2	K	N	36	-	39	-	32.91	-	33.44	-	33.0	-
N14 - NOx co loc 3	K	N	35	-	37	-	33.36	-	33.15	-	32.9	-
N15 - Battlesden	RB	N	13	-	15	-	12.75	-	13.47	-	13.31	-
N16 - Bedford Rd 1	K	N	37	-	**41**	30.7	33.73	-	34.40	-	35.49	-
N17 - Bedford Rd 2	K	N	**43**	33.3	**44**	33.7	**41.65**		**45.35**	35.6	**49.07**	36.1
N18 - Eddies	K	N	32	-	36	-	33.48	-	35.61	-	28.58	-

Site ID	Site Type	Within AQMA ?	Annual Mean Concentration (µg/m^3) - Adjusted for Bias [a]									
			2009 (Bias Adj = 0.90)	Distance correction	2010 (Bias Adj = 0.92)	Distance correction	2011 (Bias Adj = 0.89)	Distance correction	2012 (Bias Adj = 0.97)	Distance correction	2013 (Bias Adj = 0.95)	Distance correction
N19 - Doorway	K	N	39	-	**41**	38.9	**43.14**		**41.66**	39.7	24.67	-
N21 - Ampthill 1	K	N	27.15	-	30.73	-	24.45	-	26.57	-	27.14	-
N22 - Ampthill 2	K	N	**44.94**	**No drop off**	**50.99**	**No drop off**	39.84	-	**40.69**	**No drop off**	**41.03**	**No drop off**
N23 - Ampthill 3	K	N	**45.65**	**No drop off**	**53.32**	**No drop off**	**47.35**	**No drop off**	**47.07**	**No drop off**	**43.34**	**No drop off**
1	K	Y	37.82	-	**49.58**	**No exposure**	**45**	**No exposure**	**43.32**	**No exposure**	**44.80**	**No exposure**
3	K	N	15.46	-	20.53	-	13.70	-	14.87	-	15.14	-
5	UB	N	13.37	-	14.90	-	12.78	-	12.82	**-**	13.87	-
6	K	N	23.05	-	26.11	-	22.86	-	22.56	**-**	24.28	-
7	UB	N	18.76	-	22.29	-	17.84	-	16.38	**-**	18.62	-
10	K	N	33.26	-	32.01	-	31.66	-	33.38	**-**	33.25	-
13	RB	N	12.87	-	13.74	-	12.92	-	16.66a	**-**	12.76	-
14	RB	N	10.72	-	15.06	-	10.41	-	11.17	**-**	10.79	-
17	K	N	33.97	-	38.70	-	31.80	-	33.20	**-**	32.13	-
18	K	Y	**40.57**	**No exposure**	**46.19**	**No exposure**	**40.58**	**No exposure**	38.91	-	**43.73**	**No exposure**
20	K	N	27.10	-	30.15	-	29.01	-	26.58a	-	23.20	-
21	K	N	32.70	-	35.55	-	33.22	-	30.94	-	27.68	-
26	K	N	30.20	-	33.37	-	29.94	-	26.29	-	28.25	-
27	K	Y	32.89	-	39.29	-	31.98	-	32.84	-	36.40	33.5
28	K	N	**47.21**	**-**	**48.89**	**-**	**45.84**		**53.72**	-	**49.31**	**No exposure**
33	K	Y	**41.82**	39.1	**45.03**	**41.9**	**42.34**	39.4	**41.75**	39.2	35.01	-
34	K	Y	**49.22**	36.8	**49.84**	38.1	**45.98**	32	**48.51**	36.7	**45.86**	36.1
35	K	N	36.40	-	39.91	31.1-	35.24	-	34.97	-	32.81	-
36	K	Y	39.44	-	**41.95**	37.4	37.41	-	35.52	-	39.85	36.4
37	K	Y	**42.23**	35.9	**47.89**	**41.6**	**42.97**	36.7	**41.44**	38.3	**45.33**	**41.4**
39	K	N	36.26	-	**40.48**	35.1	35.76	-	38.33	-	36.83	31.3
41	K	N	**40.32**	**No drop off**	**43.46**	**No drop off**	**40.51**	**No drop off**	**40.80**	**No drop off**	37.32	No drop off

Site ID	Site Type	Within AQMA ?	Annual Mean Concentration (µg/m^3) - Adjusted for Bias [a]									
			2009 (Bias Adj = 0.90)	Distance correction	2010 (Bias Adj = 0.92)	Distance correction	2011 (Bias Adj = 0.89)	Distance correction	2012 (Bias Adj = 0.97)	Distance correction	2013 (Bias Adj = 0.95)	Distance correction
47	RB	N	**-**	**-**	16.04	-	14.17	-	13.28	-	16.55a	-
48	K	N	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	32.43	-
49	K	N	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	32.48	-
50	K	N	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**43.01a**	35.8

In bold, exceedence of the NO_2 annual mean AQS objective of 40µg/m^3 Underlined, annual mean > 60µg/m^3, indicating a potential exceedence of the NO_2 hourly mean AQS objective

[a] Means should be "annualised" as in Box 3.2 of TG(09) (http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=38), if full calendar year data capture is less than 75%

The results for the diffusion tubes which exceeded the Air Quality objective level were adjusted for the distance to the receptor (where possible) using: http://laqm.defra.gov.uk/documents/NO2withDistancefrom RoadsCalculator.xls

2.2.2 Particulate Matter (PM_{10})

As illustrated in the tables below, the monitoring results for the annual mean and 24hour mean objectives indicate that neither is in danger of being exceeded. The Sandy site is affiliated to the AURN network and therefore the data from the TEOM does not require adjustment in line with the VCM[1].

As with the NO_2 analyser the location is representative of public exposure at certain locations along the A1, however, some residential properties are closer to the road (although standing traffic doesn't occur as much at these locations) and some properties are more distant from the road. This section of the A1 was the subject of a Detailed Assessment in 2008 which included PM_{10}. It found that PM_{10} levels did not threaten either objective, a conclusion that has been confirmed by subsequent monitoring data.

[1] King's College ERG have developed a model to correct TEOM concentrations to "gravimetric equivalent" values, based on the purge concentrations measured by FDMS analysers. To assist local authorities with the Volatile Correction Model, ERG has developed a web portal that will allow the correction algorithms to be automatically applied.

Table 2.7 Results of Automatic Monitoring for PM_{10}: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % [a]	Valid Data Capture 2013 % [b]	Confirm Gravimetric Equivalent (Y or N/A)	Annual Mean Concentration (µg/m^3)				
						2009* [c]	2010* [c]	2011* [c]	2012* [c]	2013 [c]
MD3	Roadside	N	-	71	Y	20	21	17	19	20[c]

In bold, exceedence of the PM_{10} annual mean AQS objective of 40µg/m^3

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

[c] Means should be "annualised" as in Box 3.2 of TG(09) (http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=38), if valid data capture is less than 75%

* Annual mean concentrations for previous years are optional

As the data capture rate for 2013 was 71% the means have been annualised in accordance with guidance (referenced above). However no AURN background sites are within 50miles and so monitoring data from continuous analysers within the Hertfordshire & Bedfordshire monitoring network were utilised. Details of this process can be seen in Appendix A.

Table 2.8 Results of Automatic Monitoring for PM_{10}: Comparison with 24-hour Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % [a]	Valid Data Capture 2013 % [b]	Confirm Gravimetric Equivalent (Y or N/A)	Number of Daily Means > 50µg/m^3				
						2009* [c]	2010* [c]	2011* [c]	2012* [c]	2013 [c]
MD3	Roadside	N	-	71	Y	0	2 (32)	0	5 (31)	5 (34)c

In bold, exceedence of the PM_{10} daily mean AQS objective (50µg/m^3 – not to be exceeded more than 35 times per year)

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

[c] if data capture for full calendar year is less than 90%, include the 90.4th percentile of 24-hour means in brackets

* Number of exceedences for previous years is optional

2.2.3 Sulphur Dioxide (SO_2)

A Detailed Assessment conducted in 2004, along with monitoring results, indicated that sulphur dioxide levels were exceeding the 15minute mean objective. As a result an Air Quality Management Area was declared with regard to sulphur dioxide emissions from Stewartby Brickworks.

Production stopped at the brickworks from the 28th February 2008; although the process did continue for a few weeks after that date, due to the inherent nature of the production method (fires in the kilns continued after the input of the final batch of the green bricks until the process was complete and the fires went out).

Monitoring continued for a period of time after the closure of the brickworks and showed that SO_2 concentrations met the air quality objectives. The realtime analyser ceased monitoring for SO_2 in April 2009. Additionally the realtime monitor operated by Bedford Borough Council decommissioned their monitoring station in February 2009.

Subsequently the AQMAs relating to the emissions from the brickworks have been revoked.

Central Bedfordshire Council is currently carrying out no sulphur dioxide monitoring within the district.

2.2.4 Benzene

There are no continuous benzene analysers in Hertfordshire or Bedfordshire as previous rounds of review and assessment showed that the objective is likely to have been met in all locations.

2.2.5 Other Pollutants Monitored

2.2.5i Ozone (O_3)

The Government has set an air quality objective for ground level ozone but, as it is a national and international problem rather than a local one, it is not included in environmental legislation. This means that local authorities are not required to take action to specifically decrease ground level ozone levels.

The sun shining on polluted air, which contains nitrogen dioxide and volatile organic compounds, produces ozone. Given that strong sunshine is essential in the formation of ozone, the pollutant is, in the main, a summertime problem.

Ozone concentrations tend to be highest in rural locations. This is due to ozone being used by other pollutants in photochemical reactions and as such ozone levels will be decreased in urban situations where traffic or industrial pollutants tend to be higher.

Table 2.2.5 The National Air Quality Standards and Objectives for ground level ozone

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Ozone (O_3)	100 µg/m^3 (50 ppb)	Running 8 hour mean daily maximum of running 8hr mean not to be exceeded more than 10 times per year	**31/12/2005**

Monitoring results indicate that all parts of Hertfordshire and Bedfordshire will have failed to achieve this objective.

Unlike all of the other pollutants, ozone (0_3) concentrations across the network have seen a steady increase over the last nine years and this helps to indicate why the reduction in NO_x is not being directly translated into a similar reduction in NO_2. Ozone levels are highly dependent on the weather and a series of warm sunny summer periods can cause a sharp increase in mean levels. Furthermore, a large proportion of the ozone experienced in Hertfordshire and Bedfordshire is transported from continental Europe during easterly and southerly winds.

The realtime analyser in Marston Moretaine showed that the number of days where the running 8hour mean of 100µg/m^3 exceeded the objective level in both 2011 (36 days) and 2012 (23 days). In 2013 the monitor showed that there were 43 days which exceeded the running 8hour mean objective, before being decommissioned on 15th August.

'The pattern of rising ozone levels is common across the UK. There are a number of possible reasons why, despite falling NO_x concentrations. Climate change may be causing more hours of sunlight and higher temperatures helping to drive the reaction that forms ozone.

Ozone 'precursors', such as hydrocarbons and secondary particulate compounds emitted by both vehicles and industrial processes, may be increasing. It is even possible that emission control technologies such as particle traps fitted to diesel vehicles are upsetting the balance between NO and NO_x. As ozone is a transboundary pollutant, which can travel hundreds or even thousands of miles, the reasons and possible solutions, have to be sought within and outside of the borders of the UK.

2.2.6 Summary of Compliance with AQS Objectives

Central Bedfordshire Council has measured concentrations of NO_2 above the annual mean objective at relevant locations outside of the existing AQMA in Dunstable.

However Detailed Assessments have already been produced and submitted to Defra for Chalton and Sandy, which concluded that AQMAs be declared in relation to the NO_2 annual objective. A new NO_2 diffusion tube monitoring site on the façade of a house approximately 1metre from the carriageway of the A1 in Sandy shows the annual mean to be above 60µg/m^3, which indicates that the hourly NO_2 objective may be exceeded in this location. However the site falls within the boundary of the proposed Sandy AQMA. Monitoring will continue in this location.

In addition a Detailed Assessment was produced and submitted to Defra in respect of the narrow, congested streets in Ampthill identified in the 2009 USA. The Detailed Assessment concluded that an AQMA should be declared in respect of the annual NO_2 mean.

Works to declare the AQMAs are currently in progress.

Central Bedfordshire Council has examined the results from monitoring in the district. Concentrations within the Dunstable AQMA still exceed the annual objective for nitrogen dioxide (NO_2) and as such the AQMA should remain.

Central Bedfordshire Council has measured concentrations of nitrogen dioxide (NO_2) above the annual mean objective at relevant locations outside of the AQMA. Detailed Assessments have been produced which concluded that AQMAs should be declared in Ampthill and Sandy, work towards which is in progress.

In addition to the above, monitoring at a location in Sandy has shown that the annual mean is above 60µg/m^3, which indicates that it is likely that the hourly mean objective is being exceeded too. The proposed AQMA for Sandy includes this specific location.

3 New Local Developments

3.1 Road Traffic Sources

Within Central Bedfordshire there have been no changes to:

- 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 round of Review and Assessment
- Roads with significantly changed traffic flows
- Bus or coach stations

Two monitoring sites sited in Poynters Road, Dunstable were introduced to the network late in 2012 and the first annual results (2013) can be seen in section 2.1.2. However, Poynters Road was closed to traffic (8th July to 30th September 2013), for roadworks to be undertaken. During this period traffic was diverted along Luton Road/Boscombe Road, Dunstable; through Houghton Regis or utilised alternative local routes.

Monitoring has shown the effect of local road transport on nitrogen dioxide levels, as unsurprisingly NO_2 concentrations decreased in Poynters Road during the road closure, despite roadworks taking place.

3.2 Other Transport Sources

There are no new:

- Airports
- Locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15metres
- Locations with a large number of movements of diesel locomotives and potential long term exposure within 30metres
- Ports for shipping

All relevant sources above have been considered in previous review and assessments the findings of which were that no air quality objectives were likely to be breached in any such locations; this remains unchanged for this current review and assessment.

3.3 Industrial Sources

In a previous report (Progress Report 2011), it was reported that a proposal for a waste incinerator was being reviewed. No further progression has occurred relating to this.

There are no:

- Existing installations emissions have increased substantially or have been subject to new relevant exposure

- New or significantly changed installations with no previous air quality assessment.
- New major fuel storage depots storing petrol, petrol stations or poultry farms.

3.4 Commercial and Domestic Sources

Since the last review and assessment, there are no new:

- Biomass combustion plant – individual installations
- Areas where the combined impact of several biomass combustion sources may be relevant
- Areas where domestic solid fuel burning may be relevant

3.5 New Developments with Fugitive or Uncontrolled Sources

There are no new landfill sites, quarries, un-made haulage roads on industrial sites, waste transfer stations or other potential sources of fugitive particulate emissions since the last review and assessment.

Central Bedfordshire 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.

Central Bedfordshire Council confirms that all the following have been considered:

- **Road traffic sources**
- **Other transport sources**
- **Industrial sources**
- **Commercial and domestic sources**
- **New developments with fugitive or uncontrolled sources.**

4 Implementation of Action Plans

Previous rounds of Review and Assessment identified parts of Dunstable as needing to be declared as an AQMA in January 2005. An Air Quality Action Plan (AQAP) was drafted in December 2006 to identify and prioritise various actions that might be adopted in order to improve air quality in the AQMA.

Air Quality was not considered in isolation, the wider social, economic and environmental considerations of the proposed actions were addressed and where possible were integrated with wider plans/strategies (Local Transport Plans). At the time of producing the AQAP guidance dictated that proposed measures should be ranked and prioritised based on costs and overall benefit to local air quality. This proved difficult to do as many options had no clearly quantifiable costs/benefits.

The overall purpose of the key action points were assigned with regards to six main improvement areas:

- Transport planning
  - Reducing the need to travel
  - Encouraging walking/cycling and use of public transport
  - Reducing number of trips in the AQMA
  - Improving traffic management and reducing congestion
  - Reducing emissions from HGVs and busses
  - Encouraging use of alternative fuels and more efficient vehicles
- Land use planning
  - Reducing the need to travel
  - Encouraging walking/cycling and use of public transport
  - Reducing number of trips in the AQMA
  - Improving traffic management and reducing congestion
  - sustainability
- Energy management
  - Encouraging use of alternative fuels and more efficient vehicles
  - Encouraging better energy efficiency
- Local Air Quality Management
  - Monitoring
  - Partnership working
  - Review and Assessment process
- Pollution control
  - Reducing emissions from non-transport related sources
    industrial emissions and nuisance
- Environmental promotion
  - Environmental campaigns and information dissemination

Since 1st April 2009 Central Bedfordshire Council has continued the work commenced by South Bedfordshire District Council and Bedfordshire County Council alongside the Highways Agency, etc.

A number of the proposed actions have now been completed and have been reported in previous reports (Progress Report 2011) and so are not included in the update overleaf.

Table 9.1 Action Plan Progress

No	Measure	Focus	Lead authority	Indicator	Target AQMA annual emission reduction	Progress to date	Progress in last 12 months	Estimated completion date	Comments relating to emission reductions
1	Increased use of mixed developments	Improving sustainability by increasing public transport links, cycling and walking networks. Developments to provide facilities in locality to reduce the need to travel and the no of trips in AQMA	SBDC now Central Bedfordshire Council (CBC)	% of such developments	<1%	<1% of all planning applications relate to this type of development (but there has been an increase in the number of such developments)	The number of such developments is likely to increase as the Government has stated 26,000 new homes to be built in this area.	Ongoing	By locating facilities locally and improving public transport links and cycling/walking it is hoped that reliance on private cars will be reduced which will impact on levels of emissions.
3	Encourage adoption of Travel Plans	Measures to encourage staff / parents to reduce dependence / use of single occupancy cars	SBDC & BCC (schools) now CBC	No of new / existing travel plans	<1%	Council continuing it's work on the promotion of Green Travel initiatives across Central Bedfordshire	Green travel initiatives enhanced by Travel Choices programme promoting sustainable travel and reducing impact of journeys.	Ongoing	Travel choices/plans can offer real benefits not only to organisations and their employees, but also the community that surrounds it. It may help to relieve local parking or congestion problems or improve public transport connections across the area. It may also relieve stress on employees through reducing delays or providing the opportunity to cut their travel commitments by working from home on occasion.
4	CBC Green Travel Plan	To encourage staff to reduce dependence / use of single occupancy cars	SBDC now CBC	Changes to modes of staff travel	<1%	CBC encourages car sharing and introduced cycle to work scheme	Travel choices programme and Local Transport Plan	Ongoing	As above

No	Measure	Focus	Lead authority	Indicator	Target AQMA annual emission reduction	Progress to date	Progress in last 12 months	Estimated completion date	Comments relating to emission reductions
6	Encourage walking / cycling and use of public transport	To reduce dependence & use of cars	SBDC now CBC	passengers nos & travel survey / time comparison	<1%	Green travel initiatives enhanced by Travel Choices programme promoting sustainable travel and reducing impact of journeys	Joint bid with Luton Borough Council for funding from Local sustainable transport fund for use promoting sustainable transport	Ongoing	Publicising bus, walking and cycling routes has helped to raise the profile of these methods of transport
8	Improve/extend cycle path network	To reduce dependence & use of cars	SBDC/BCC now CBC	Additions to network / no of users / work done	<1%	Since AQAP there has been a 74% increase in on/off road cycle paths	Continuance to identify development of cycle paths & users	Ongoing	By providing dedicated cycle lanes (both on/off road) it improves the riders experience and safety. This is likely to encourage more users.
10	Encourage use & promote benefits of public transport	To reduce dependence & use of cars	SBDC/BCC now CBC	No of passengers & travel survey / time comparisons	<1%	Bus routes / services are good within towns and rural routes financially supported by CBC	Green travel initiatives enhanced by Travel Choices programme promoting sustainable travel and reducing impact of journeys.	Ongoing	DfT 2011/12 Transport Trends show that national bus usage has risen slightly in the last few years
12	Provision of incentives to use public transport	To reduce dependence & use of cars	SBDC/BCC now CBC	Passenger nos, trip time comparison	<0.5	Free bus passes for senior citizens	Rural, etc. bus routes are continued to be financially supported by CBC	Ongoing	Whilst its not financially viable to discount all travel on public transport. CBC continues to issue free bus passes to senior citizens and support rural evening and Sunday routes/services.

No	Measure	Focus	Lead authority	Indicator	Target AQMA annual emission reduction	Progress to date	Progress in last 12 months	Estimated completion date	Comments relating to emission reductions
13	Improvements in public transport infrastructure	To reduce dependence & use of cars	SBDC/BCC now CBC	Congestion data, journey time comparison, etc	<0.5	Guided busway open	Guided busway open	Ongoing	Guided busway and adjoining footpath/cyclepath open. The guided part of the route provides a direct link between Luton – Dunstable without use of public roads. Cutting travel times and congestion on the road network.
15	Encourage car sharing, walking/cycling, etc	To reduce dependence & use of cars	SBDC/BCC now CBC	Numbers of walkers/cyclists & travel survey	<0.5		Green travel initiatives enhanced by Travel Choices programme promoting sustainable travel and reducing impact of journeys.	Ongoing	DfT 2011 Transport Trends show that the number of walking trips has remained static (but there is under reporting of shorter trips). Cycling has remained static
16	Improvements to road network	Improving traffic management and reducing congestion	SBDC/BCC & HA now CBC & HA	Congestion / road capacity/density statistics	<1.0	M1 widening and hardshoulder running schemes complete.	Dunstable bypass and Woodside link construction to commence 2014/2015	Ongoing	The bypass & woodside link would remove traffic from the Dunstable town centre / AQMA thus improving congestion/pollution levels.
23	Promote use & availability of alternative fuels / more efficient vehicles	Encouraging use of alternative fuels and more efficient vehicles	SBDC now CBC	Availability and amount sold. % of these fuels in overall sales	<0.5	Availability of alternative fuels increasing with growing number of vehicles on road	Some further petrol station sites have alternative fuels available	Ongoing	Numbers of alternatively fuelled cars remain low. Electric charging points installed in CBC car parks.
24	Develop availability of alternative fuels	Encouraging use of alternative fuels	SBDC now CBC	Check local availability	<0.5	More availability of alternative fuels but sites remain limited in number	New petrol stations encouraged to make alternative fuels available	Ongoing	Number of alternative fuel locations remains low. CBC installed electric vehicle charging points at council offices

No	Measure	Focus	Lead authority	Indicator	Target AQMA annual emission reduction	Progress to date	Progress in last 12 months	Estimated completion date	Comments relating to emission reductions
28	Local Development Framework adopting policies improving AQ	Land-use Planning	SBDC now CBC	Review and implement changes as required	<0.5		CBC developed strategies	Complete	The strategies will shape the control of development in the district.
30	Develop/maintain partnerships to improve services / planning / access	To improve services, etc	SBDC/BCC Now CBC HA/LBC & bus operators	Inter agency communications	<0.5	Ongoing/ new partnerships to develop Local Transport Plans etc continue	Ongoing/ new partnerships to develop Local Transport Plans etc continue	Ongoing	Forging links with peers to ensure the development of future plans (ie LTP) to include air quality issues
31	Review provision of alternative transportation priority measures	To reduce dependence & use of cars	SBDC/BCC now CBC & HA	Road capacity/ journey times	-	No room to add dedicated bus lanes to the road network. New bus routes added to area	Guided busway with adjoining footpath/cycle path opened	Ongoing	Guided busway and adjoining footpath/cyclepath open. The guided part of the route provides a direct link between Luton – Dunstable without use of public roads. Cutting travel times and congestion on the road network.
32	Guided busway Introduction	To reduce dependence & use of cars Encouraging use of public transport Reducing number of trips within the AQMA	SBDC/BCC now CBC and LBC	Completion of scheme	<0.5	The guided busway is open	The guided busway is open	Completed	Guided busway linking Dunstable – Luton is now open. This provides a direct link between Luton/Dunstable off the road network. Buses then join the normal road network to extend the routes/service provided. A shared cycle/foot path extends usage of development.
33	road network improvements	Reducing number of trips within the AQMA	SBDC/BCC now CBC & HA	Congestion / traffic counts	<1.0	Work re Dunstable bypass and Woodside link ongoing	Construction of a Dunstable bypass given approval. Works likely to commence 2014/15	2014/15	M1-A5 link to form new M1 junction 11a due to start construction 2014/15. Woodside link to be constructed to provide a link to the new junction and the main industrial estate in Dunstable.This will result in less traffic travelling through the current road network & AQMA.

No	Measure	Focus	Lead authority	Indicator	Target AQMA annual emission reduction	Progress to date	Progress in last 12 months	Estimated completion date	Comments relating to emission reductions
41	AQ monitoring, reports, identifying/implementing options to improve aq	Local Air Quality Management	SBDC now CBC	Pollution levels, report deadlines, adoption of measures	Meeting objectives etc	All reports completed and submitted to defra as required. Monitoring carried out , etc	All reports completed and submitted to defra as required. Monitoring carried out , etc	Ongoing	Continued monitoring shows trends in AQ levels and assists in identifying areas requiring further investigations
42	LAPPC inspections	Reducing emissions from non-transport related sources	SBDC now CBC	Adhere to guidance / risk assessment	<0.5	All inspections carried out as per guidelines, new installations identified and permitted	All inspections carried out as per guidelines, new installations identified and permitted	Ongoing	National legislation ensures that emissions from certain industrial processes are controlled by either the local authority or the Environment Agency
44	Nuisance complaints	Reducing emissions from non-transport related sources, nuisance – bonfires, fugitive dust sources, construction sites	SBDC now CBC	Resolving such cases	<0.5	CBC investigated all such problems	CBC currently investigates all such problems	Ongoing	Investigating/stopping bonfires on trade premises, etc instigates educate greener ways of waste disposal and benefits air quality by minimising emissions.
45	Dissemination of AQ information & campaigns	Environmental Promotion Dissemination of AQ information – website, consultation, press Environmental campaigns	SBDC now CBC	No of such events	<0.5	press releases, herts & beds website, reports, attendance at local events and talks to clubs/schools	Talks to groups and provision of advice to public, peers and consultants.	Ongoing	Education and advice re AQ aims to change decisions to benefit the environment. (ie change travel choice behaviour).

5 Conclusions and Proposed Actions

5.1 Conclusions from New Monitoring Data

Monitoring continues to show that the annual nitrogen dioxide mean objective is being exceeded or is considered to be borderline (annual mean between 36 and 40µg/m^3) at a number of locations within the existing AQMA. Therefore the Dunstable AQMA will remain in place. Meanwhile monitoring will continue and the results reported in future Review and Assessment reports.

Monitoring indicates that in 2013 NO_2 levels continue to exceed the annual objective level in Ampthill. Whereas both the annual (and in one location) the hourly objective in Sandy is being exceeded. Work is progressing on the declaration of AQMAs in these locations.

5.2 Conclusions relating to New Local Developments

Proposals for a waste incinerator reported in the last review and assessment report – however there have been no further developments on this issue. Future reports will discuss this further if necessary.

Central Bedfordshire 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.

5.3 Proposed Actions

The new monitoring data has not identified a need to progress to a Detailed Assessment for either NO_2 or PM_{10} in any new locations not already identified in the district.

However, two new NO_2 diffusion tube monitoring locations were introduced into the monitoring network; this is to ascertain pollution levels in Poynters Road, Dunstable. This is a well used road nearby part of the existing AQMA (Luton Road, Dunstable). The first full year's data is reported in this report.

Central Bedfordshire Council will work to declare the AQMAs in Ampthill and Sandy as soon as practicable.

6 References

Reports produced for previous rounds of review and assessments – formerly Mid and South Beds District Councils and since 1st April 2009, Central Bedfordshire Council

Central Bedfordshire Council Local Transport Plan 3

Local Air Quality Management Technical Guidance (LAQM.TG(09)) – Defra

Defra website pages including:

- website NO_2 fall off with distance calculator accessed at http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html
- National bias adjustment factor spreadsheet (March 2014) accessed at http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html
- Background maps accessed at http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html

Hertfordshire and Bedfordshire Air Quality Monitoring Network accessed at www.HertsBedsAir.net

Appendices

Appendix A: QA:QC data

- diffusion tube bias adjustment factors (national & local)
- discussion of factor to use
- PM_{10} monitoring adjustment
- annualisation of data sets
    - NO_2 diffusion tubes
    - PM_{10} Sandy automatic monitor
- QA:QC automatic monitoring
- QA:QC diffusion tube monitoring (precision and WASP results)

Appendix B: Location plans of NO_2 diffusion tube sites

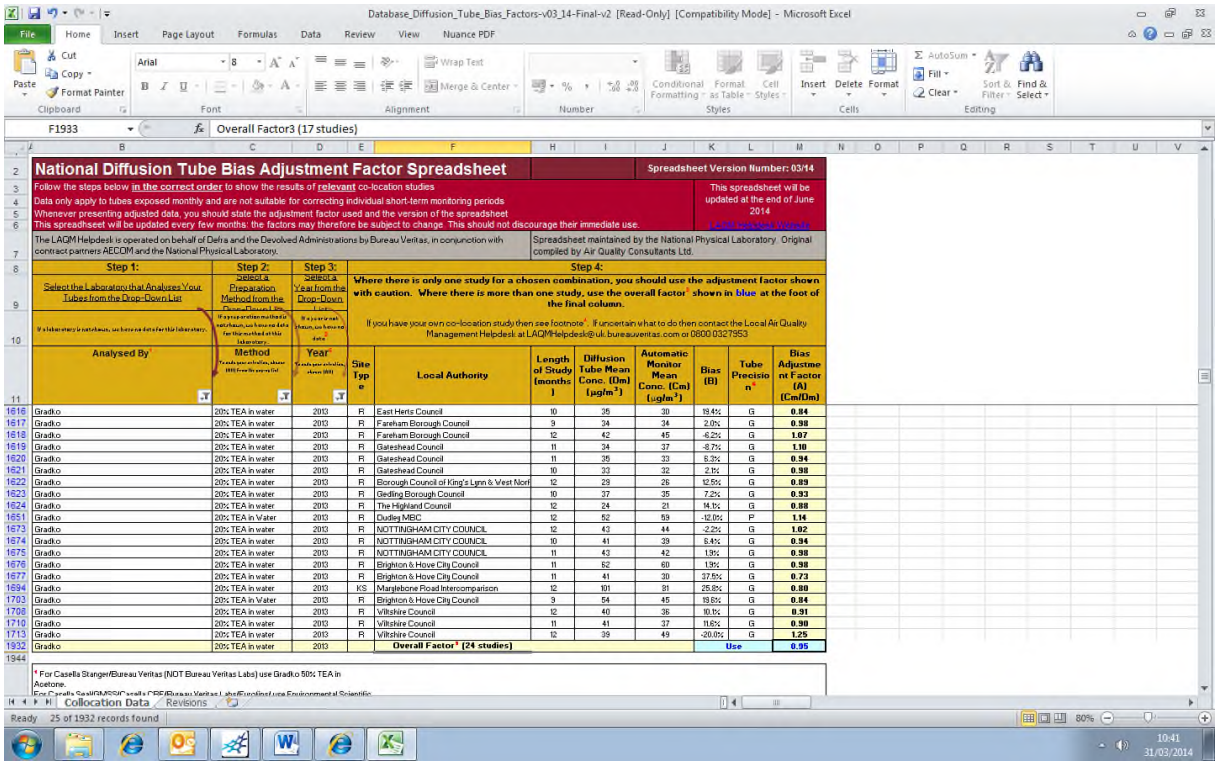
Appendix C: 2013 monthly NO_2 diffusion tube monitoring dataset

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

Gradko International provides the NO_2 diffusion tubes and their analysis. The tube preparation method is 20% TEA/Water.

The national bias adjustment factor was calculated using the National Diffusion Tube Bias Adjustment Factor Spreadsheet (version number 03/14) - available from the LAQM Support Website (http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html). The national bias adjustment factor for 2013 is 0.95.



National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 03/14

Follow the steps below in the correct order to show the results of relevant co-location studies
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet
This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.
This spreadsheet will be updated at the end of June 2014

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.
Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List
Step 2: Select a Preparation Method from the Drop-Down List
Step 3: Select a Year from the Drop-Down List
Step 4: Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor shown in blue at the foot of the final column.

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

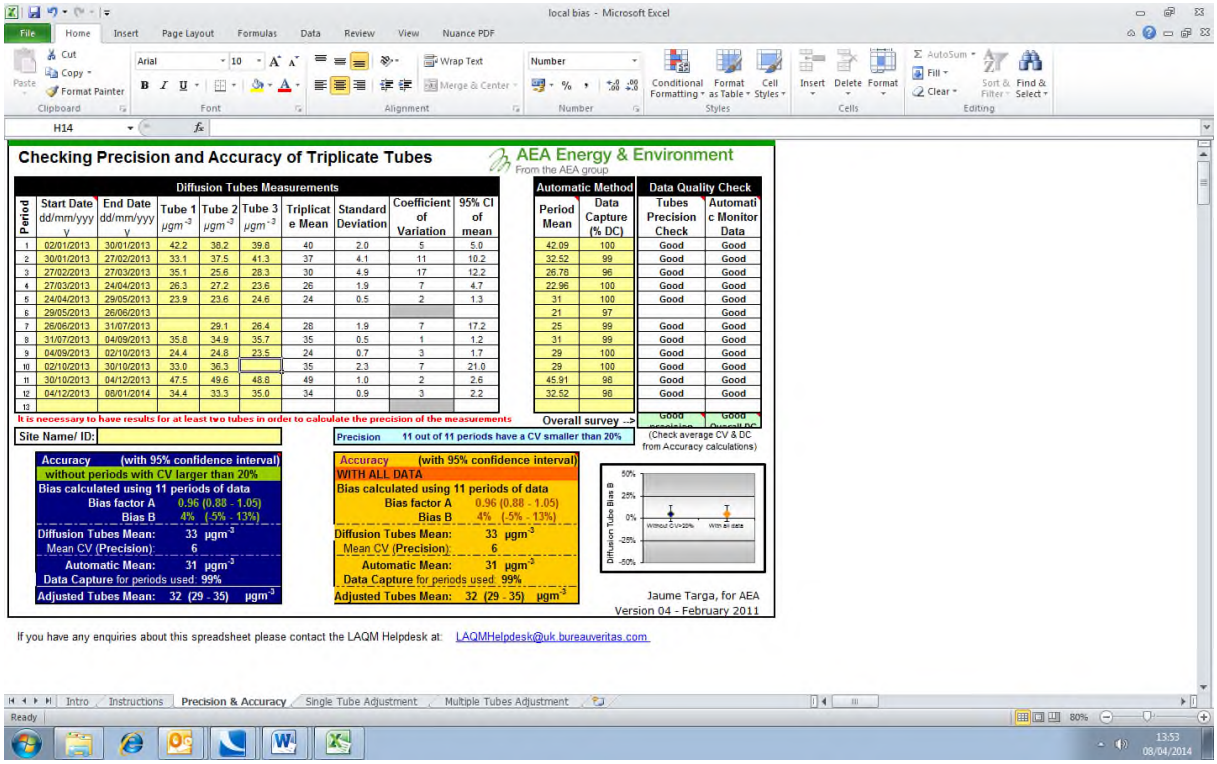
Analysed By	Method	Year	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in water	2013	R	East Herts Council	10	35	30	19.4%	G	0.84
Gradko	20% TEA in water	2013	R	Fareham Borough Council	9	34	34	2.0%	G	0.98
Gradko	20% TEA in water	2013	R	Fareham Borough Council	12	42	45	-6.2%	G	1.07
Gradko	20% TEA in water	2013	R	Gateshead Council	11	34	37	-8.7%	G	1.10
Gradko	20% TEA in water	2013	R	Gateshead Council	11	35	33	6.3%	G	0.94
Gradko	20% TEA in water	2013	R	Gateshead Council	10	33	32	2.1%	G	0.98
Gradko	20% TEA in water	2013	R	Borough Council of King's Lynn & West Norf	12	28	26	12.5%	G	0.89
Gradko	20% TEA in water	2013	R	Gedling Borough Council	10	37	35	7.2%	G	0.93
Gradko	20% TEA in water	2013	R	The Highland Council	12	24	21	14.1%	G	0.88
Gradko	20% TEA in water	2013	R	Dudley MBC	12	52	59	-12.0%	P	1.14
Gradko	20% TEA in water	2013	R	NOTTINGHAM CITY COUNCIL	12	43	44	-2.2%	G	1.02
Gradko	20% TEA in water	2013	R	NOTTINGHAM CITY COUNCIL	10	41	39	5.4%	G	0.94
Gradko	20% TEA in water	2013	R	NOTTINGHAM CITY COUNCIL	11	43	42	1.9%	G	0.98
Gradko	20% TEA in water	2013	R	Brighton & Hove City Council	11	52	60	13%	G	0.98
Gradko	20% TEA in water	2013	R	Brighton & Hove City Council	11	41	30	37.5%	G	0.73
Gradko	20% TEA in water	2013	KS	Marylebone Road Intercomparison	12	101	81	25.8%	G	0.80
Gradko	20% TEA in Water	2013	R	Brighton & Hove City Council	9	54	45	19.8%	G	0.84
Gradko	20% TEA in water	2013	R	Wiltshire Council	12	40	36	10.1%	G	0.91
Gradko	20% TEA in water	2013	R	Wiltshire Council	11	41	37	11.6%	G	0.90
Gradko	20% TEA in water	2013	R	Wiltshire Council	12	39	49	-20.0%	G	1.25
Gradko	20% TEA in water	2013		Overall Factor[3] (24 studies)				Use		0.95

* For Casella Stanger/Bureau Veritas (NOT Bureau Veritas Labs) use Gradko 50% TEA in Acetone.

Collocation Data | Revisions
Ready 25 of 1932 records found

Factor from Local Co-location Studies (if available)

Central Bedfordshire Council have three NO_2 diffusion tubes co-located with the Sandy (AURN) automatic monitor, enabling a local bias factor to be calculated. This spreadsheet is available from http://laqm.defra.gov.uk/bias-adjustment-factors/local-bias.html. The local bias adjustment factor for 2013 is 0.96.



Discussion of Choice of Factor to Use

Both the national and local Bias Adjustment Factors are available for 2013.

The local bias adjustment factor (0.96) provides a slightly more conservative outcome, although the difference between the two factors is small.

Previously the national bias adjustment factor has been utilised as this better reflects the sites in Central Bedfordshire Council as a whole and so the national bias adjustment factor (0.95) has been used for the purpose of this report.

PM Monitoring Adjustment

The Sandy site became an affiliated site in the AURN National Network in January 2009, which resulted in an FDMS upgrade to the PM_{10} TEOM and also the installation of a $PM_{2.5}$ FDMS TEOM. Therefore data from the TEOM at this site, does not require adjustment in line with the VCM

Short-term to Long-term Data adjustment

Two NO_2 diffusion sites had less than 75% data capture during 2013 – resulting in the need to "annualise" the data sets.

Additionally the Sandy AURN automatic monitoring station data capture was below 75% and so the 2013 PM_{10} data set has also been annualised

Two long term automatic monitoring sites from the Hertfordshire and Bedfordshire Monitoring Network were selected to provide data for this calculation. They were East Herts Sawbridgeworth and Luton Challney.

The calculation methodology can be seen below:

NO_2 diffusion tube method/calculation to annualise the 2013 dataset

2013 ppb data source H&B network														data capture%
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave	
East Herts Sawbridgeworth background	13	8	10	9	6	5	5	6	7	9	12	11	8	99
Luton Challney background	21	11	17	16	18	13	15	17	20	18	22	19	17	99
2013 converted to ug/m3 (ppb*1.913)														
East Herts Sawbridgeworth background	25	15	19	17	11	10	10	11	13	17	23	21	16	99
Luton Challney background	40	21	33	31	34	25	29	33	38	34	42	36	33	99
Period Mean	Jan-Apr		Jun-Jul											
East Herts Sawbridgeworth background	19		10											
Luton Challney background	31		27											
Ann mean : period mean (ratio)														
East Herts Sawbridgeworth background	0.84		1.68											
Luton Challney background	1.06		1.23											
Ave	**0.95**		**1.46**									**1.2**		
	AM	Ra												
	14.5	1.20												
Clipstone annualised tube ave AM*Ra			**17.42**											

NO_2 diffusion tube method/calculation to annualise the 2013 dataset

2013 ppb data source H&B network														data capture%
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave	
East Herts Sawbridgeworth background	13	8	10	9	6	5	5	6	7	9	12	11	8	99
Luton Challney background	21	11	17	16	18	13	15	17	20	18	22	19	17	99
2013 converted to ug/m3 (ppb*1.913)														
East Herts Sawbridgeworth background	25	15	19	17	11	10	10	11	13	17	23	21	16	99
Luton Challney background	40	21	33	31	34	25	29	33	38	34	42	36	33	99
Period Mean	Aug-Sep		Nov											
East Herts Sawbridgeworth background	12		23											
Luton Challney background	35		42											
Ann mean : period mean (ratio)														
East Herts Sawbridgeworth background	1.29		0.7											
Luton Challney background	0.93		0.79											
Ave	**1.11**		**0.74**									**0.93**		
	AM	Ra												
	48.7	0.93												
24 Luton Road, Dunstable annualised tube ave AM*Ra			**45.27**											

PM_{10} Sandy automatic monitor method/calculation to annualise the 2013 dataset

2013 Ug/m3 PM10 data (grav equivalent)						data capture%
	Ann ave					
East Herts Sawbridgeworth background	17					95
Luton Challney background	19					100
Period Mean	1/1/13-19/5/13		26/7/13-31/12/13			
East Herts Sawbridgeworth background	19		16			
Luton Challney background	23		17			
Ann mean : period mean (ratio)						
East Herts Sawbridgeworth background	0.894736842		1.0625			
Luton Challney background	0.826086957		1.117647059			
Ave	**0.860411899**		**1.090073529**	**0.975243**		
	AM	Ra				
	20.5	0.98				
Sandy annualised PM10 ave AM*Ra			**19.99**			

QA/QC of Automatic Monitoring

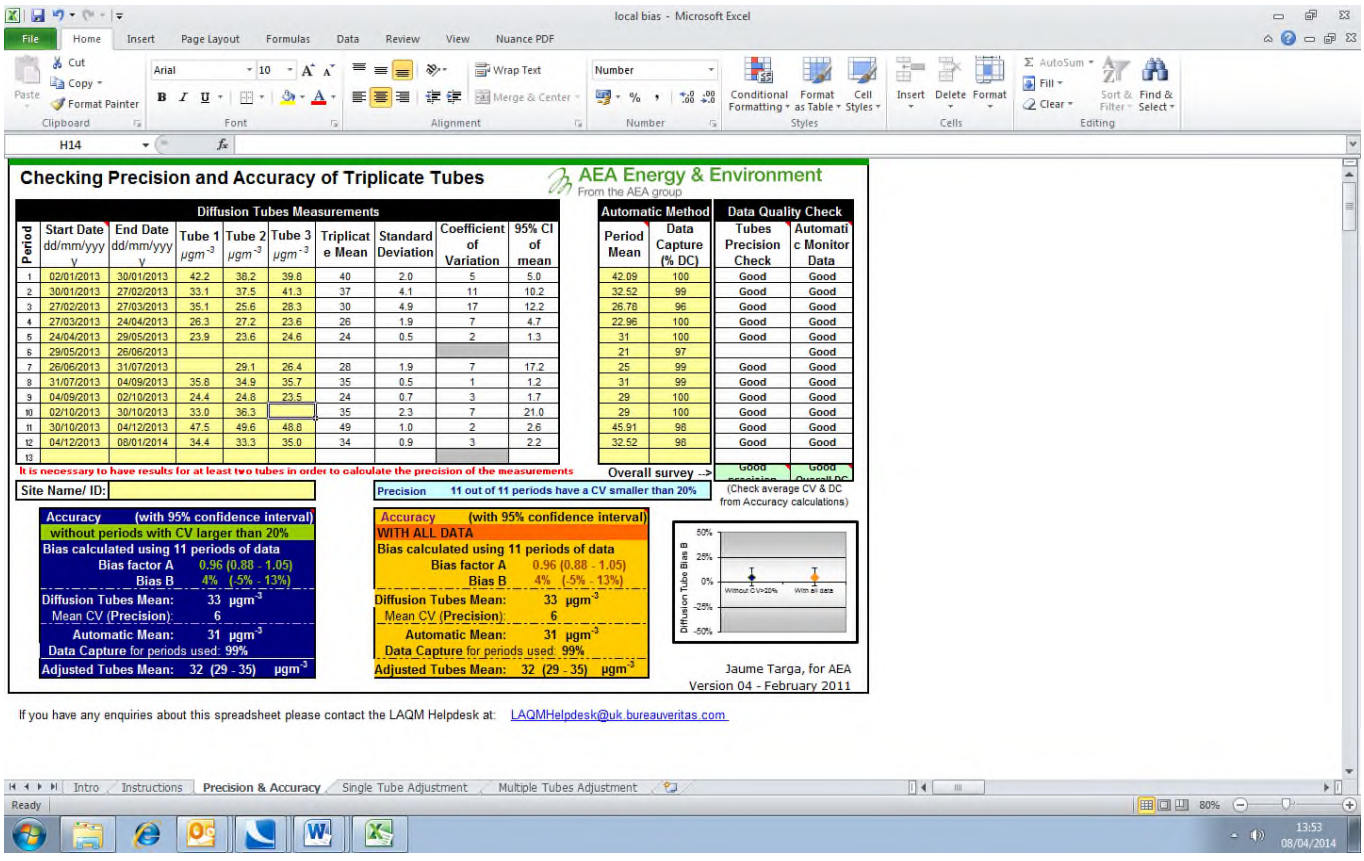
The Sandy site became an affiliated site in the AURN National Network in January 2009, which resulted in an FDMS upgrade to the PM_{10} TEOM and also the installation of a $PM_{2.5}$ FDMS TEOM.

NO_2 is measured using an API chemiluminescent NO_x analyser which is housed in an air conditioned cabin. Data is collected remotely using a GSM modem link. The analyser is serviced every six months by Casella and is visited every two weeks by a council officer who calibrates it using bottled gas of a known concentration and the results are logged. Since the affiliation of the Sandy site with Defra's national network, an audit is to be undertaken every 6 months.

The data from the AQMS site at Sandy roadside is ratified by ERG to the AURN standard and QA/QC visits are carried out by Casella on a regular basis.

QA/QC of Diffusion Tube Monitoring

The table below shows the precision and accuracy of the three NO_2 diffusion tubes which were co-located with the Sandy AURN automatic monitor. As can be seen – all results were "good".



The latest WASP (downloaded from http://laqm.defra.gov.uk/documents/LAQM-WASP-Rounds-117-124-(April-2012--March-2014)-NO2-report.pdf) results can be seen below:

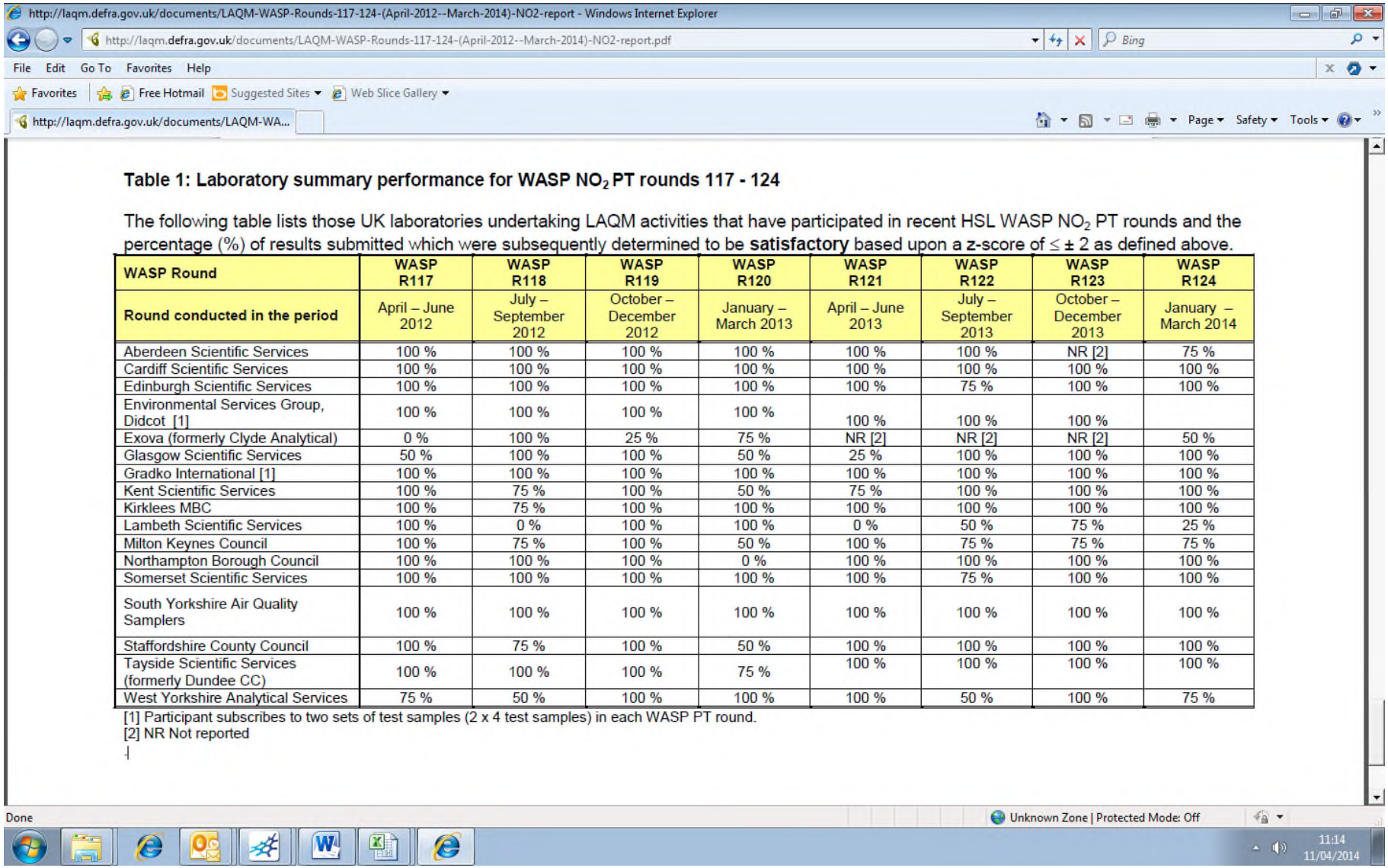


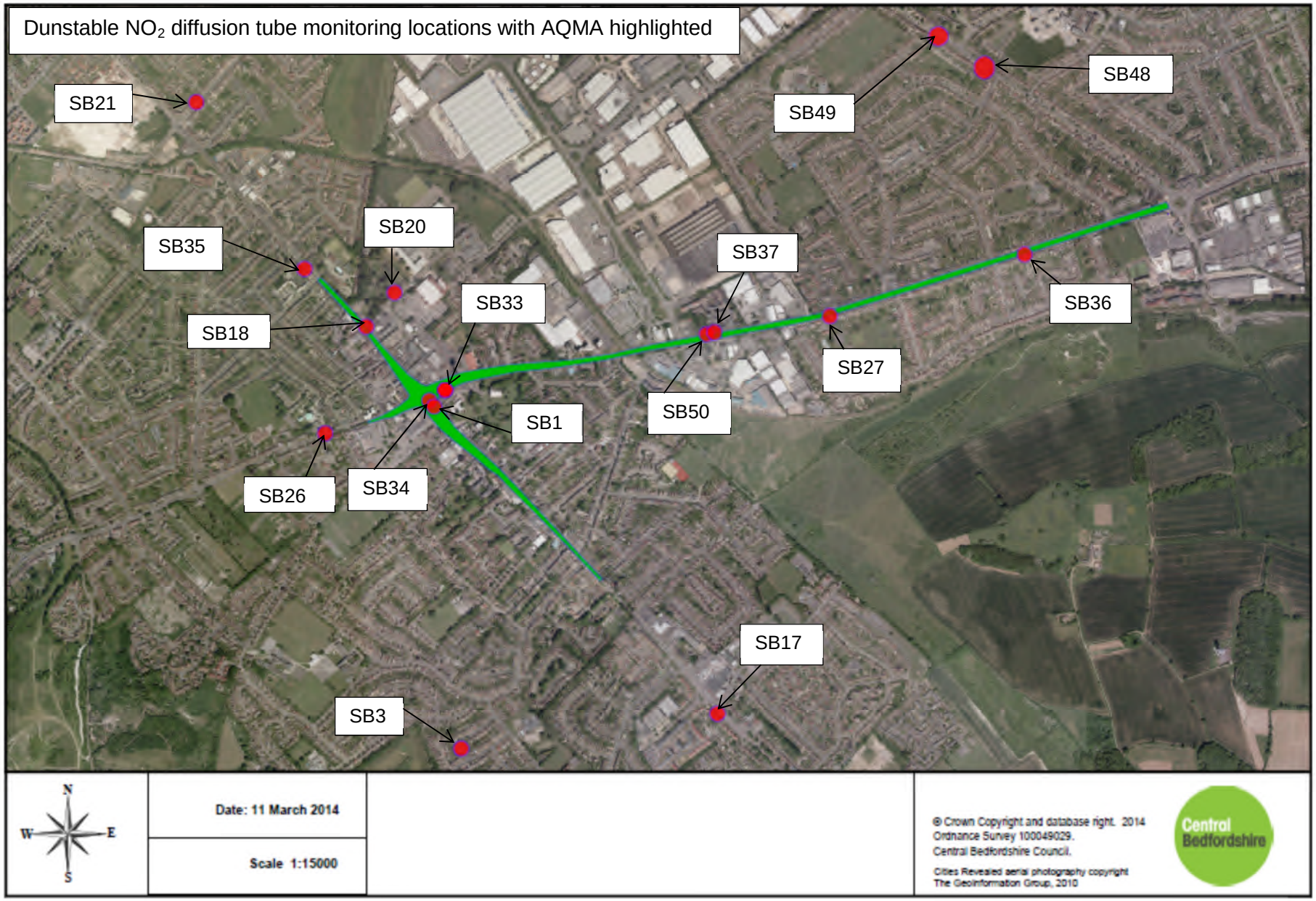
Table 1: Laboratory summary performance for WASP NO_2 PT rounds 117 - 124

The following table lists those UK laboratories undertaking LAQM activities that have participated in recent HSL WASP NO_2 PT rounds and the percentage (%) of results submitted which were subsequently determined to be **satisfactory** based upon a z-score of ≤ ± 2 as defined above.

WASP Round	WASP R117	WASP R118	WASP R119	WASP R120	WASP R121	WASP R122	WASP R123	WASP R124
Round conducted in the period	April – June 2012	July – September 2012	October – December 2012	January – March 2013	April – June 2013	July – September 2013	October – December 2013	January – March 2014
Aberdeen Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	NR [2]	75 %
Cardiff Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Edinburgh Scientific Services	100 %	100 %	100 %	100 %	100 %	75 %	100 %	100 %
Environmental Services Group, Didcot [1]	100 %	100 %	100 %	100 %	100 %	100 %	100 %	
Exova (formerly Clyde Analytical)	0 %	100 %	25 %	75 %	NR [2]	NR [2]	NR [2]	50 %
Glasgow Scientific Services	50 %	100 %	100 %	50 %	25 %	100 %	100 %	100 %
Gradko International [1]	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Kent Scientific Services	100 %	75 %	100 %	50 %	75 %	100 %	100 %	100 %
Kirklees MBC	100 %	75 %	100 %	100 %	100 %	100 %	100 %	100 %
Lambeth Scientific Services	100 %	0 %	100 %	100 %	0 %	50 %	75 %	25 %
Milton Keynes Council	100 %	75 %	100 %	50 %	100 %	75 %	75 %	75 %
Northampton Borough Council	100 %	100 %	100 %	0 %	100 %	100 %	100 %	100 %
Somerset Scientific Services	100 %	100 %	100 %	100 %	100 %	75 %	100 %	100 %
South Yorkshire Air Quality Samplers	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Staffordshire County Council	100 %	75 %	100 %	50 %	100 %	100 %	100 %	100 %
Tayside Scientific Services (formerly Dundee CC)	100 %	100 %	100 %	75 %	100 %	100 %	100 %	100 %
West Yorkshire Analytical Services	75 %	50 %	100 %	100 %	100 %	50 %	100 %	75 %

[1] Participant subscribes to two sets of test samples (2 x 4 test samples) in each WASP PT round.
[2] NR Not reported

Appendix B – Location plans of NO_2 diffusion tube monitoring sites.


Dunstable NO_2 diffusion tube monitoring locations with AQMA highlighted
SB21
SB48
SB49
SB20
SB35
SB37
SB33
SB36
SB18
SB27
SB1
SB50
SB26
SB34
SB17
SB3
N
W
E
S
Date: 11 March 2014
Scale 1:15000
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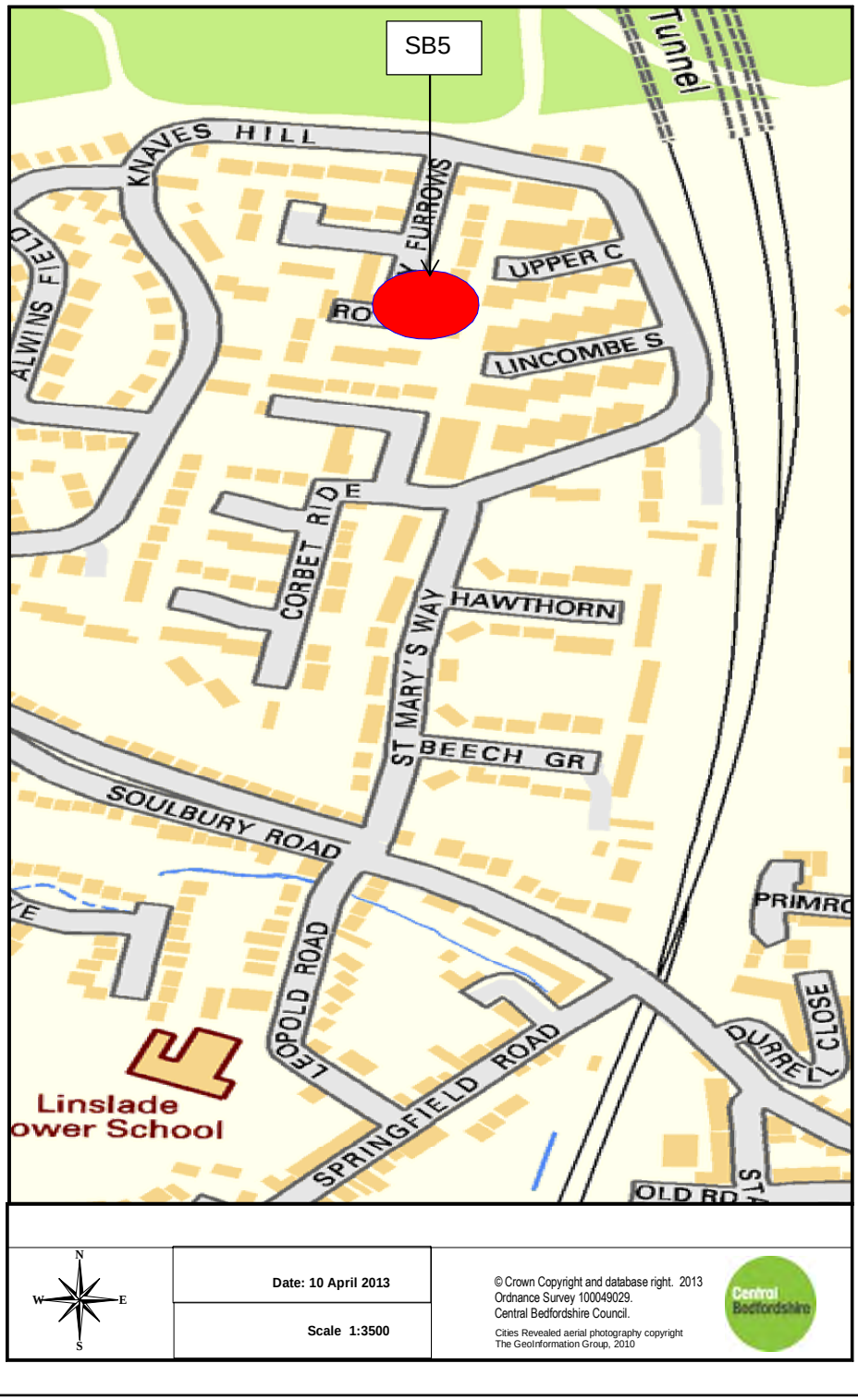
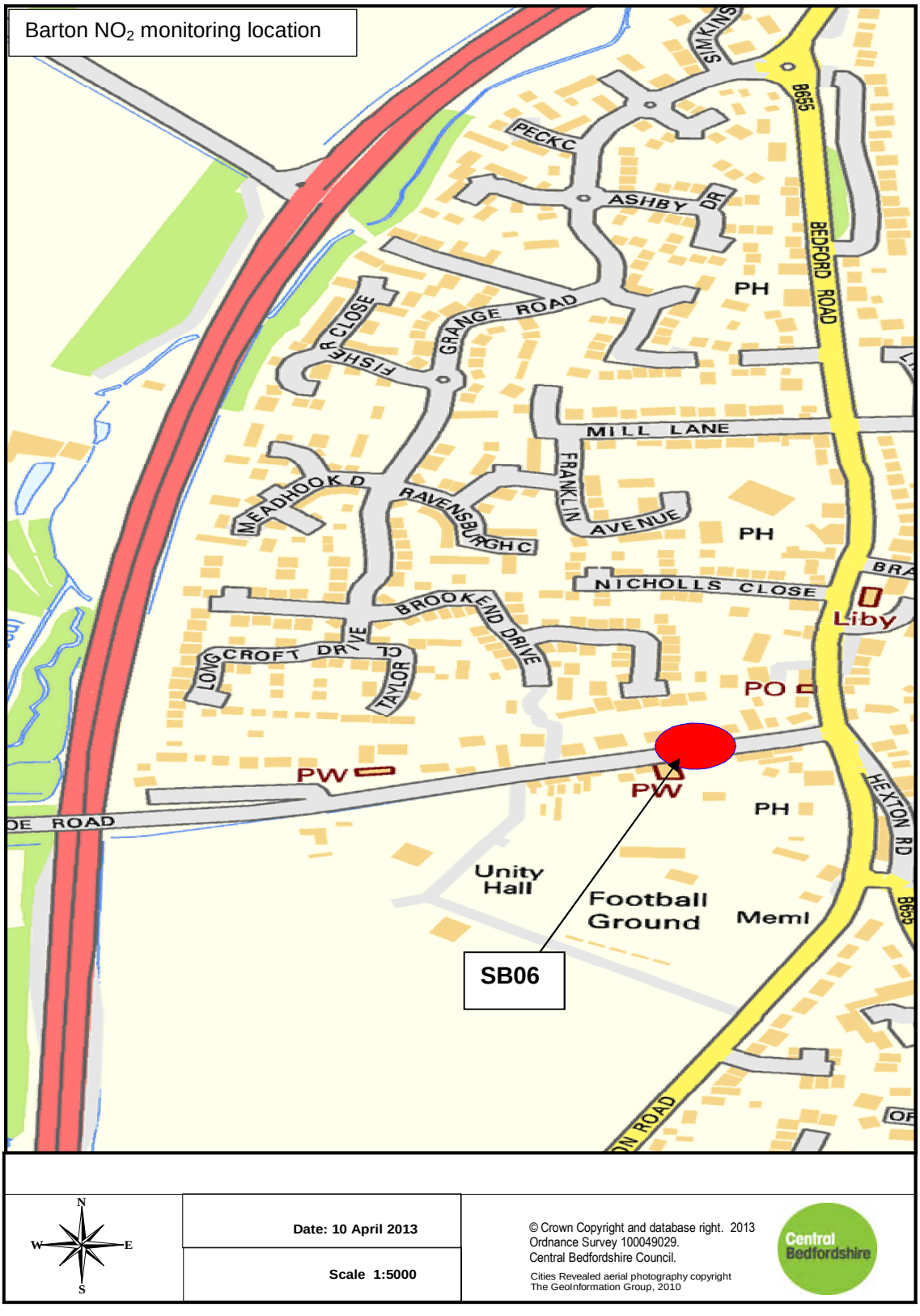
Leighton-Linslade NO_2 monitoring location




Barton NO_2 monitoring location
SIMKINS
B655
PECKC
ASHBY DR
BEDFORD ROAD
PH
GRANGE ROAD
FISHER CLOSE
MILL LANE
MEADHOOK D
RAVENSBURGHC
FRANKLIN AVENUE
PH
NICHOLLS CLOSE
Liby
BROOKEND DRIVE
LONGCROFT DRIVE
TAYLOR CL
PO
PW
PW
PH
HEXTON RD
Unity Hall
Football Ground
Meml
SB06
Date: 10 April 2013
Scale 1:5000
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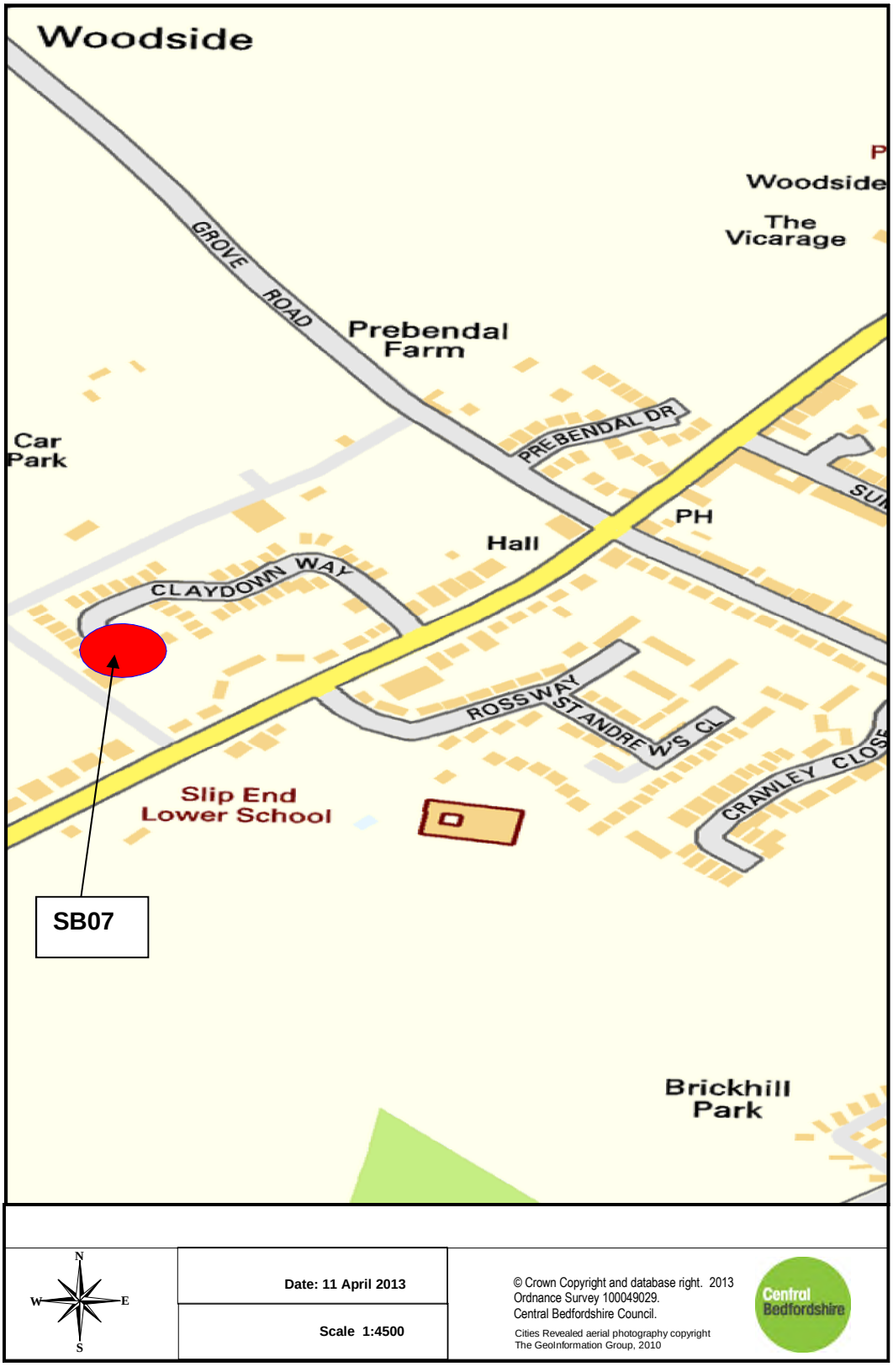
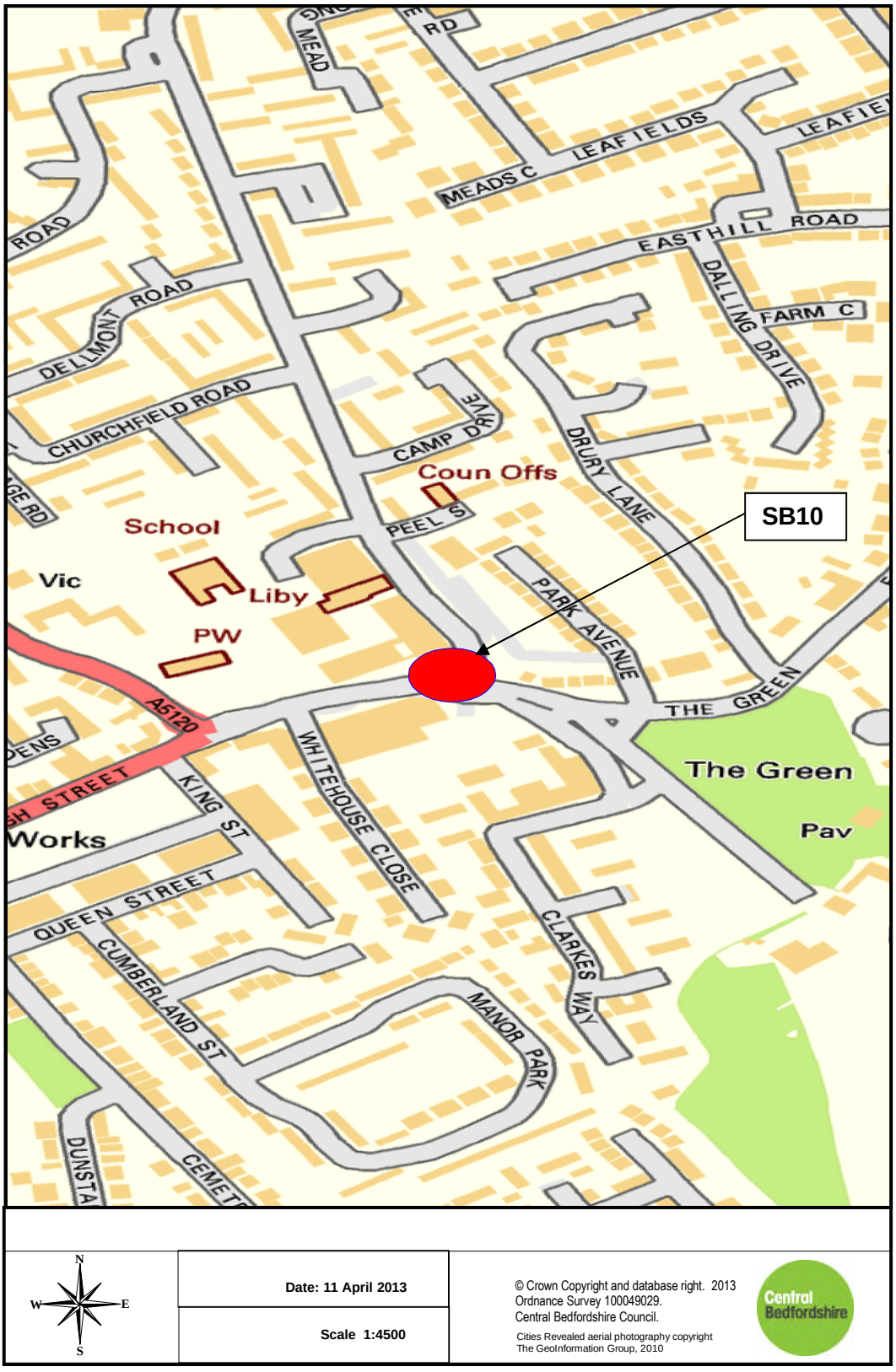
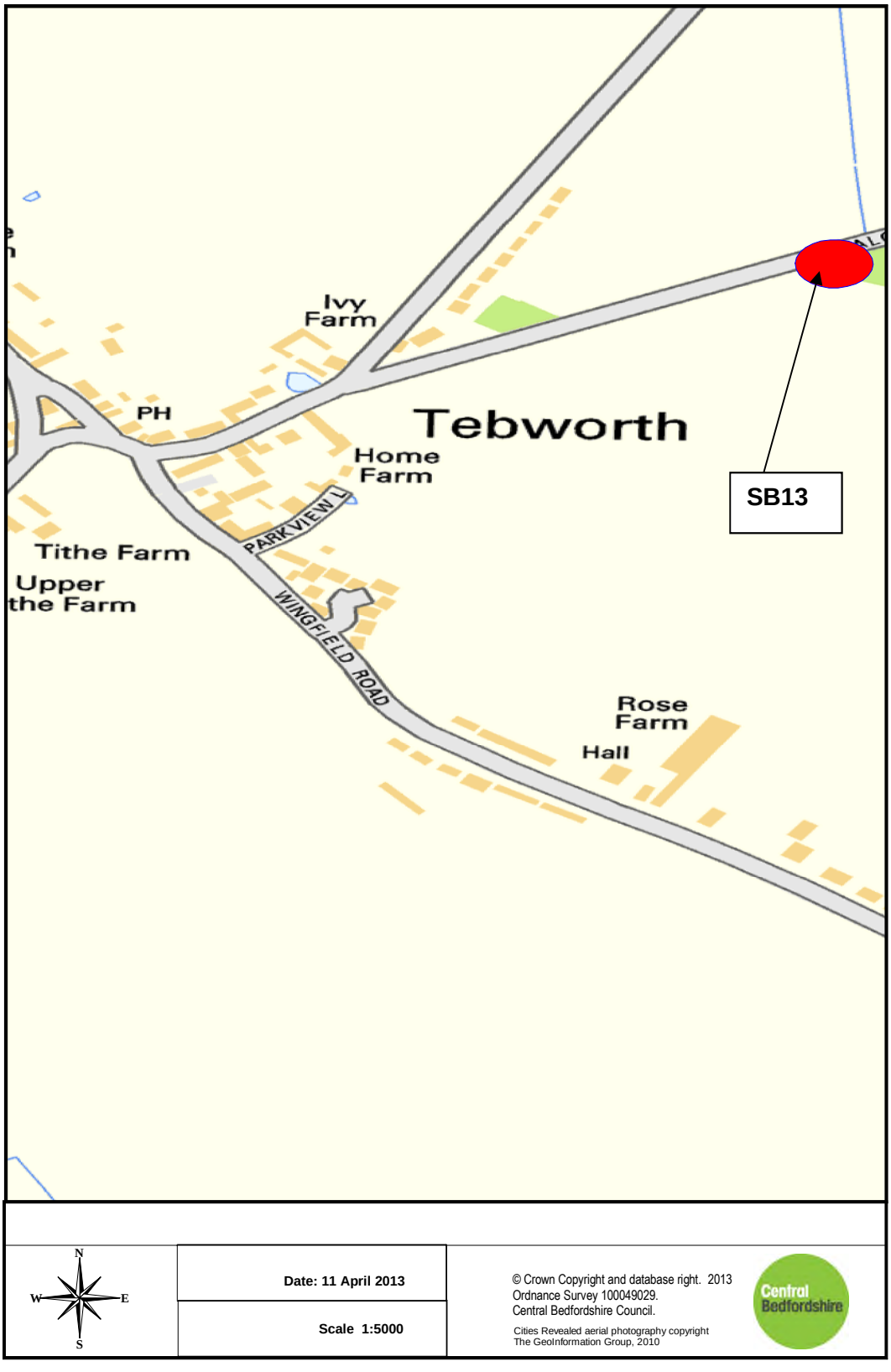
Slip End NO_2 monitoring location



Houghton Regis NO_2 monitoring location

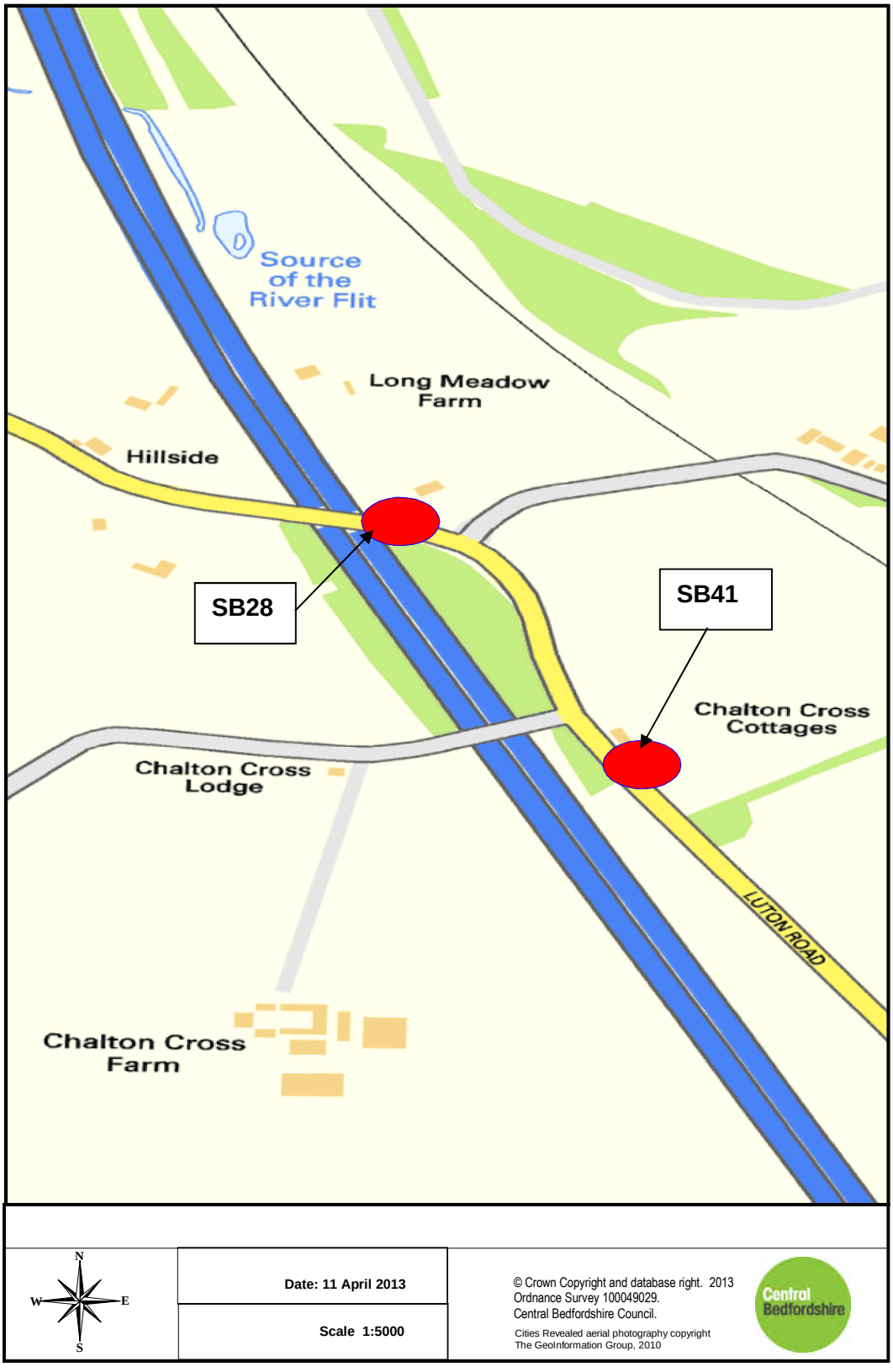


Tebworth NO_2 monitoring location

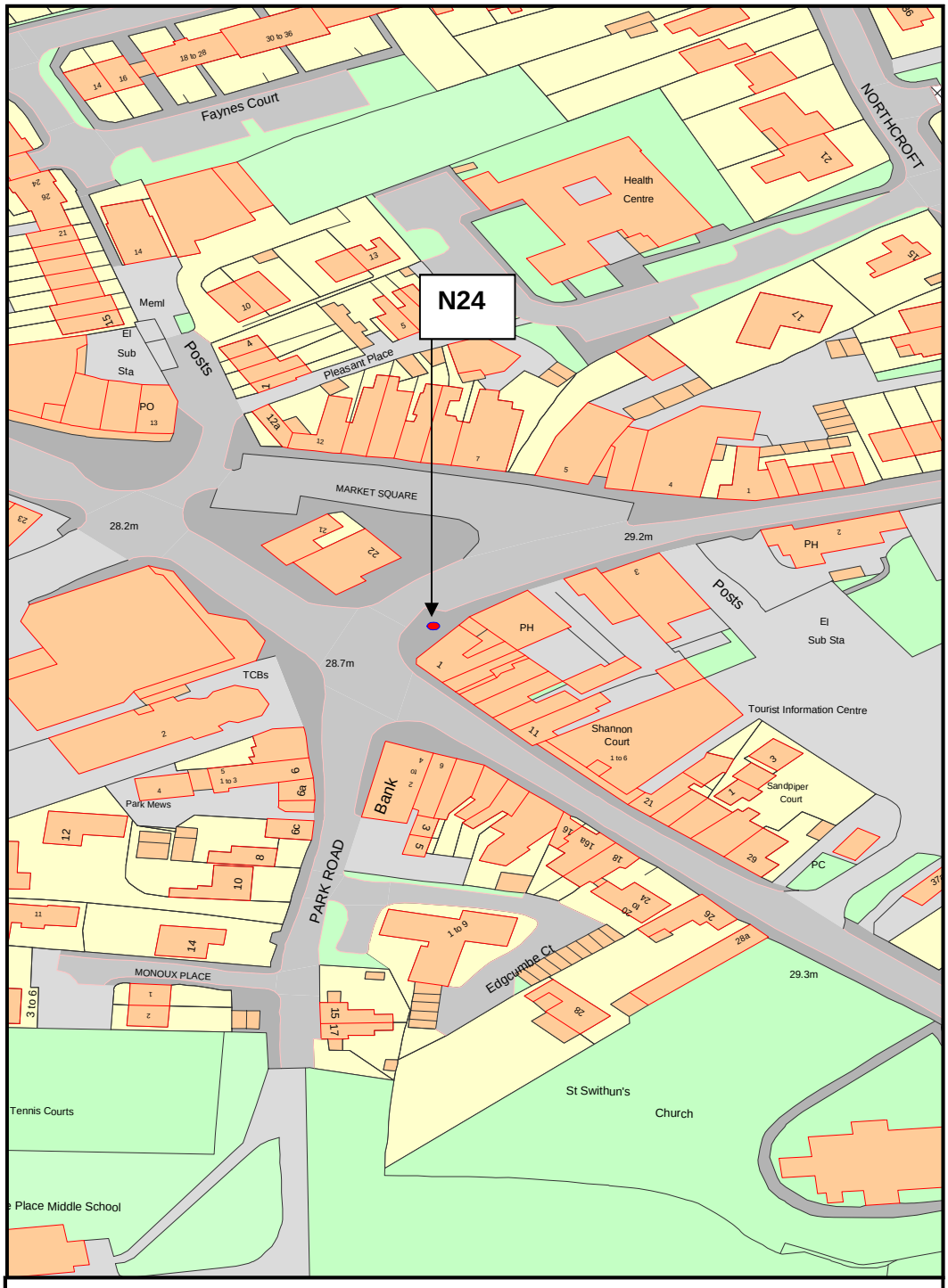


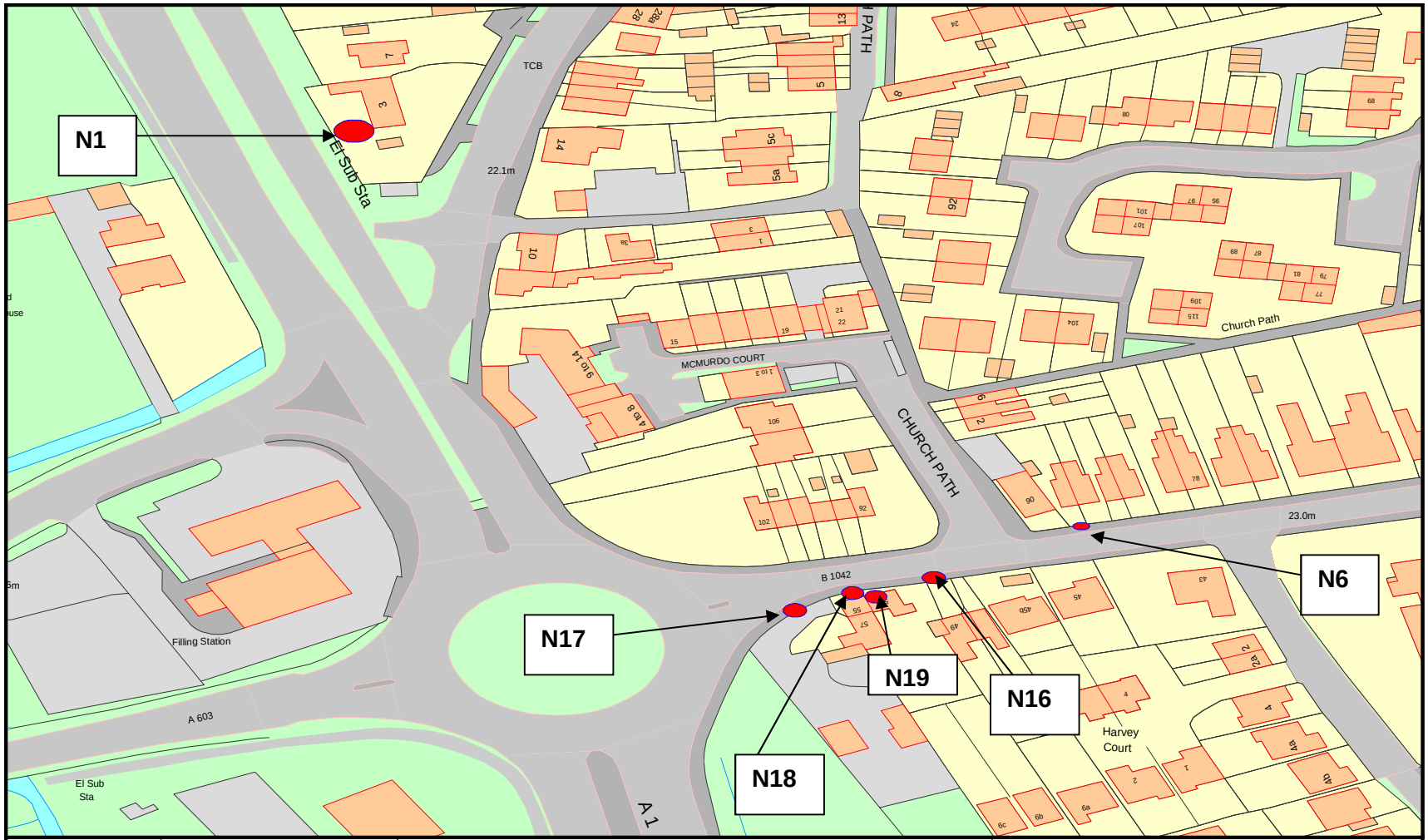
Sallowsprings NO_2 monitoring location

Chalton NO_2 monitoring location



Sandy NO_2 monitoring location – N24




N1
N17
N18
N19
N16
N6
El Sub Sta
TCB
22.1m
MCMURDO COURT
CHURCH PATH
Church Path
B 1042
23.0m
Filling Station
A 603
A 1
Harvey Court
El Sub Sta
Date: 11 April 2013
Scale 1:1500
Sandy NO_2 monitoring locations – N17 / N18 / N19 / N16 / N6/ N1
N
W
E
S
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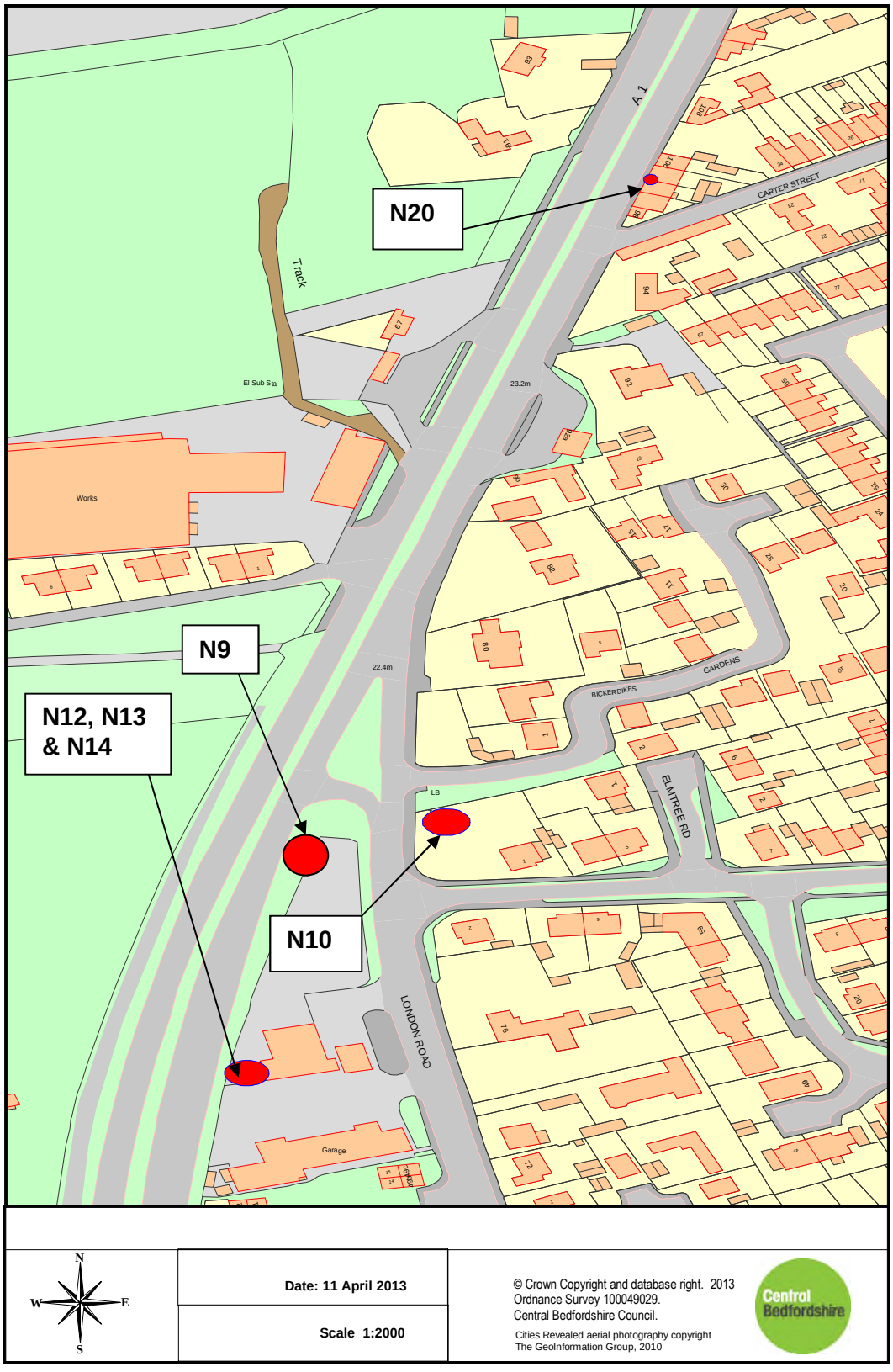
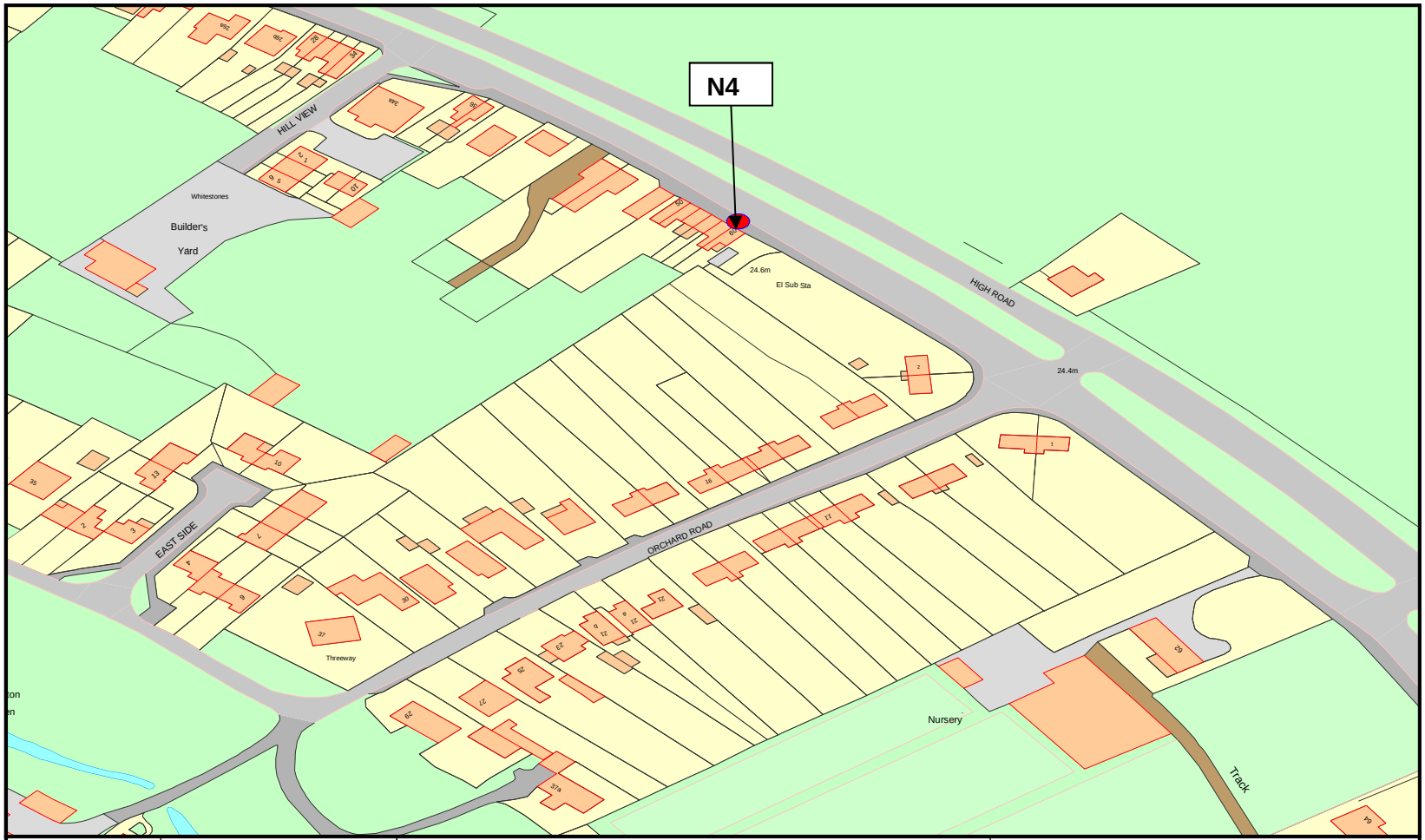
Sandy NO_2 monitoring locations – N9, N10, N12, N13, N14& N20




N4
HILL VIEW
Whitestones
Builder's
Yard
HIGH ROAD
24.6m
El Sub Sta
24.4m
EAST SIDE
ORCHARD ROAD
Threeway
Nursery
Track
N
W
E
S
Date: 11 April 2013
Scale 1:2000
Beeston NO_2 monitoring location
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Central Bedfordshire

N
W E
S

Date: 11 April 2013

Scale 1:1500

Biggleswade NO_2 monitoring locations

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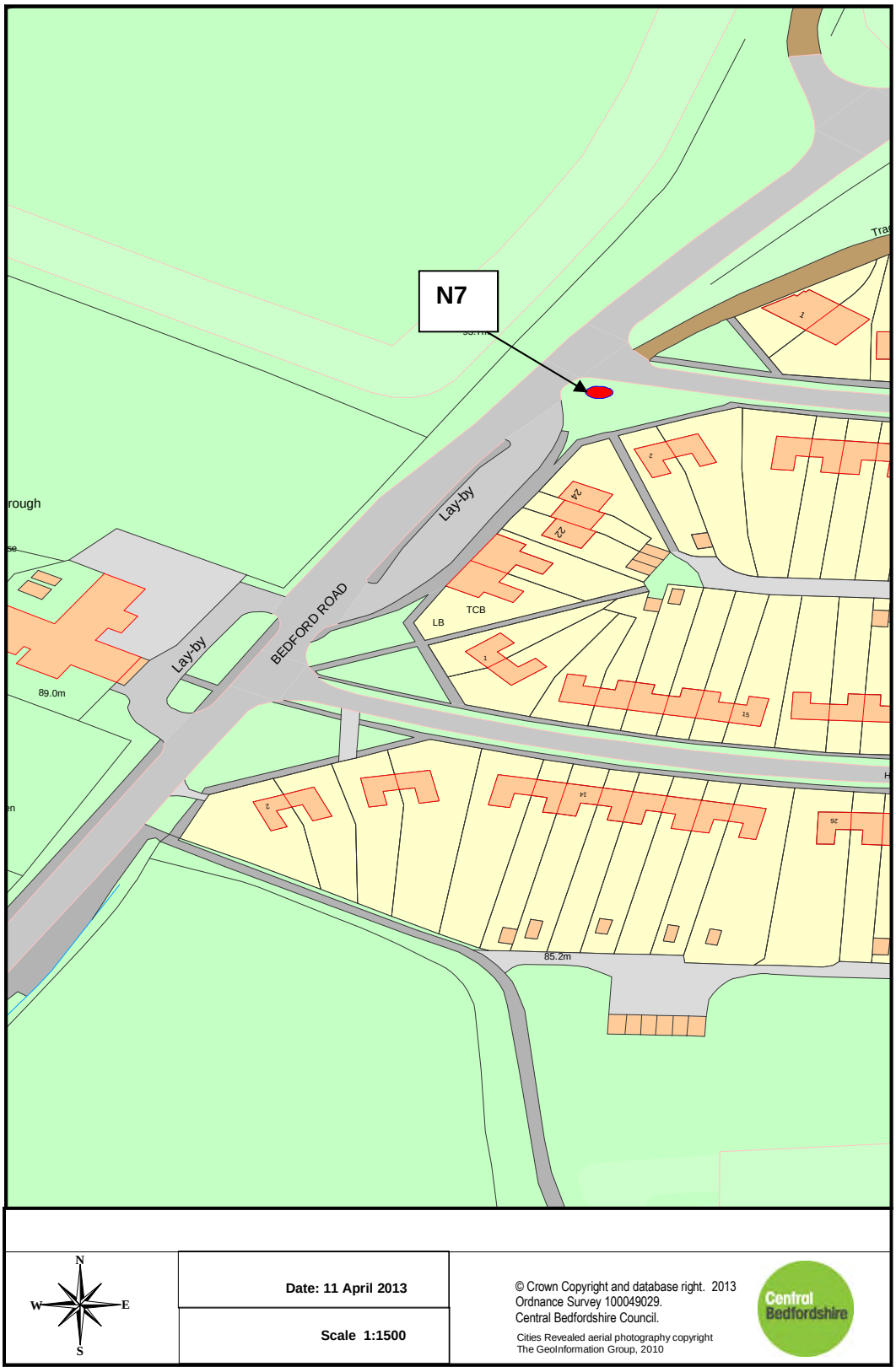
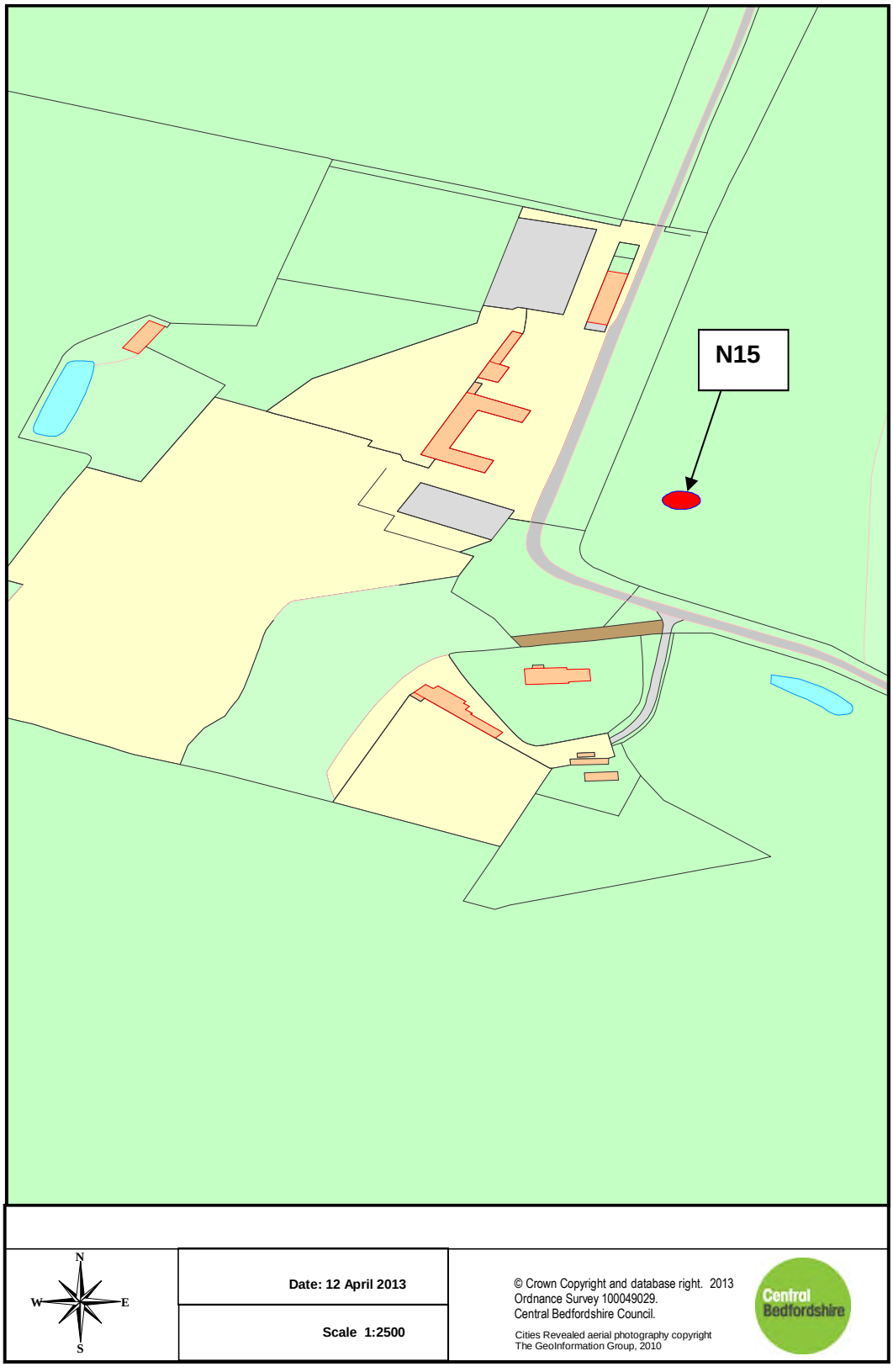
Brogborough NO_2 monitoring location



Battlesden NO_2 monitoring location



Monthly NO_2 results 2013 (ug/m^3)

		JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	AVE
1	High St South	51.60	66.06	70.36	50.45		59.03	45.99	38.69	32.65	34.15	35.16	34.64	47.16
3	Mardale	24.33	23.14	22.79			11.92	10.88	9.40	11.84	14.65	14.85	15.54	15.93
5	Rowley	23.62	11.79	20.24	9.45			9.75	8.55		11.92	20.86	15.25	14.60
6	Sharpenhoe Road Barton	31.97	35.24	33.05	24.11		20.67	21.04	19.63	21.00	25.01	24.17	25.25	25.56
7	Claydown	28.70	27.21	28.78	17.97		14.56	16.90	11.94	16.42	18.64	16.32	18.16	19.60
10	Houghton	43.24	45.87	37.28	32.45		31.60		29.66	26.49		24.51	43.94	35.00
13	Tebworth	22.47	20.02	18.87	12.01		9.21	8.54	7.57	8.71	12.47	14.76	13.17	13.44
14	Sallowspring	18.78	17.42	8.61	10.46		8.13	9.52	7.85	10.06			11.42	11.36
17	London/Mayfield Rd	39.06	39.81	42.37	32.90		34.06	32.30	31.33	26.19	31.78	31.40	30.86	33.82
18	Argos (High St North)	44.56	54.00	64.88	47.41		52.05	45.06	39.05	40.23	38.84	43.96	36.27	46.03
20	Asda (Court Drive)	7.78	37.59		26.60		26.94	24.31	23.88	19.00	29.29	15.01	33.80	24.42
21	High St North/Frenchs Ave	37.21	32.77	23.50	29.08		28.58	31.45	29.86	20.86	29.34	27.80	30.08	29.14
26	West St, Dunstable	38.62	40.70	36.81	25.99		29.44	25.78	25.84	21.30	24.93	31.61	26.04	29.73
27	Luton Rd o/s 89, D'ble	46.41	55.14	47.60	39.38		41.47	27.49	29.17	30.56	30.12	43.28	30.83	38.31
28	Luton Rd, Chalton	57.53	54.68	43.25			53.93	55.10	63.46	44.03	54.13	33.18	59.80	51.91
33	16 Church Street, Dunstable	43.16	48.50	38.60	34.37		34.98	38.81	37.55	25.18	30.64	32.25	41.38	36.86
34	5 High St South	50.13	61.85	48.06	48.86		55.62	47.42	44.85	46.02	43.48		36.40	48.27
35	6 Flint Court, High St North	40.29	44.25	31.42	29.30		32.51	31.33	33.37	37.92	34.75	31.49	33.24	34.53
36	247 Luton Road, Dunstable	48.87	47.66	64.71	39.62		36.64	40.37	35.76	36.46	32.85	36.50		41.94
37	32 Luton Road, Dunstable	49.91	52.30	50.02	43.21		49.04	59.48	61.07	39.80	41.24	39.04	39.82	47.72
39	15 Houghton Road	42.91	45.95	39.27	35.25		33.34	37.87	39.65	28.81	38.20	43.18	42.00	38.77
41	1 Chalton Cross Cottages	43.34	45.83	34.98	35.92		43.67	39.58	43.50	26.74	41.77	30.57	46.27	39.29
47	Clipstone (lorry street sign at Shenley Hill Rd end)	21.27	17.26	17.34	11.13		10.68	9.45						14.52
48	185 Poynters Road (Katherine Drive)	45.45	46.86	43.76	33.78		37.11	25.98	16.53	23.68	34.65	31.52	36.23	34.14
49	Poynters Road - o/s 241 (Hadrian Ave)	44.63	45.41	44.39	37.47		37.22	23.99	18.68	23.77	35.66	28.45	36.39	34.19
50	Luton Road D'ble (o/s 24)								60.42	39.38		46.25		48.68

Results from May were affected by an occasional delay in instrument output at a workstation during analytical process resulting in some anomalously low results in several sites data. Discounted all results from this month as not easy to establish which sites were affected.

Poynters Road closed from 8th July to 30th September 2013 – all traffic diverted through Boscombe Road/Luton Road or Houghton Regis (or alternative local routes).

Monthly NO_2 results 2013 (ug/m^3)

	Site Name		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
N1	A1	Sandy	**51.9**	**45.8**	37.5	34.3	35.0		**40.3**	29.6	30.7	45.8	**55.42**	**48.42**	**41.3**
N2	Rose Lane	Biggleswade	33.6	30.9	28.6	21.0	19.6		24.9	23.4	17.8	30.7	38.86	27.06	26.9
N3	High St	Biggleswade	**46.5**	**44.7**	**42.7**	39.9	36.9		39.0	37.1	31.7	35.2	**45.27**	30.61	39.0
N4	A1	Beeston	**44.8**	**43.9**	**43.6**	32.2	34.5		**44.4**	37.3	19.9	36.4	**51.26**	35.87	38.6
N6	Bedford Road	Sandy	**43.9**	35.5	34.2	35.3	29.0		36.8	34.8	34.4	38.7	**52.03**	36.90	37.4
N7	Highfield Crescent	Brogborough	34.0	35.2	28.1	20.4	22.6		27.7	26.0	17.6	27.9	**40.63**	31.68	28.3
N20	A1	Sandy	**91.2**	**106.9**	**92.8**	**81.5**	**83.1**		**112.9**	**85.0**	**64.7**	**66.4**	**77.45**	**68.79**	**84.6**
N9	A1	Hunts Car Company	**43.1**	**44.2**	34.7	31.6	32.7		**42.0**	**44.3**	32.9	**42.8**	**63.80**	38.78	**41.0**
N10	A1	Hunts Car Co 2		**70.6**	23.9	19.7	16.8		23.0	23.1	19.5	27.0	39.24	29.57	29.2
N24	Market Square	Sandy	38.4	35.8	35.1	27.4	27.7			29.8	27.3	31.3	**44.17**		33.0
N12	NOx Box 1	Sandy	**42.2**	33.1	25.6	26.3	23.9			35.8	24.4	33.0	**47.48**	34.43	32.6
N13	NOx Box 2	Sandy	38.2	37.5	28.3	27.2	23.6		29.1	34.9	24.8	36.3	**49.55**	33.25	33.0
N14	NOx Box 3	Sandy	39.8	**41.3**	27.7	26.4	24.6		26.4	35.7	23.5		**48.80**	34.97	32.9
N15	Rural Background	Battlesden	23.5	17.6	19.4	10.4	8.1		7.3	8.7	9.9	13.5	19.66	16.05	14.0
N16	Bedford Road South 1	Sandy	**42.6**	**44.6**	39.1	34.3	33.2		26.6	33.1	30.5	37.7	**51.63**	37.50	37.4
N17	Bedford Road South 2	Sandy	**51.9**	**47.0**	38.7	37.0	38.1		**47.2**	**60.1**	**49.5**	**54.0**	**78.51**	**66.09**	**51.6**
N18	Eddies Cottage	Sandy	37.7	35.7	28.9	27.1	25.2		28.9	27.6	9.1	32.8	**45.23**	32.80	30.1
N19	Doorway	Sandy	**43.3**	**41.8**	34.6	16.3	9.9		28.5	27.8	18.4	6.1	31.93	26.92	26.0
N21	Ampthill 1		32.7	32.7	36.4	24.9	23.7		26.5	21.5	22.3	27.8	38.94	26.79	28.6
N22	Ampthill 2		**50.2**	**49.3**	**40.1**	36.4	32.7		**44.3**	38.5	31.3	**44.7**	**58.11**	**49.48**	**43.2**
N23	Ampthill 3		**52.9**	**59.9**	**54.6**	32.3	3.4		**51.5**	39.7	35.0	**50.8**	**64.30**	**57.53**	**45.6**