2015 Updating and Screening Assessment for **Swindon Borough Council**

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

July 2015

Local Authority Officer	Oxana Waite, David Rudland
Department	Environmental Health
Address	Wat Tyler House, Beckhampton Street, Swindon, SN1 2JH
Telephone	01793 445501
e-mail	owaite@swindon.gov.uk
Report Reference number	SBC AQPR2015
Date	June 2015

Table of Contents

List of Tables

List of Figures

Appendices

Executive Summary

Under the Environment Act 1995, Part IV local authorities are required to review and assess local air quality on a regular basis. A review of air quality involves consideration of the levels of pollutants in the air for which objectives are prescribed in Regulation[1], and estimations of likely future levels. The assessment considers whether estimated concentrations for the relevant future period are likely to exceed the levels set in the objectives.

This Progress Report provides an update on local monitoring data acquired since the previous Progress Report and screens for various potential sources of pollution within the Borough's administrative area in accordance with the Local Air Quality Management Technical Guidance 2009 (LAQM.TG09).

Swindon Borough Council currently does not have any Air Quality Management Areas declared within its area.

This report provides an assessment of monitoring data collected between March 2014 and March 2015.

The report identifies four areas where measured concentrations of nitrogen dioxide close or exceeding screening levels. These areas are as following:

1. Swindon 12 – Manchester Road
2. Swindon 14 - Kingshill Rd/Clifton St
   Swindon 18 - Val. Sample – Kingshill Rd/Clifton St
   Swindon 19 - Val. Sample 2 Kingshill Rd/Clifton St
3. Swindon 23 - 37 Devizes Rd
   Swindon 23 - 37 Devizes Rd
   Swindon 23 - 37 Devizes Rd
4. Swindon 25 - F/O 68 Cheney Manor Rd (Rodbourne Rd)

However a detailed assessment is deemed not required for any of these areas. Although concentrations of nitrogen dioxide exceeded the Air Quality Standards when data is adjusted for distance to the receptor (the point of exposure) and averaged (Devizes Road), all sites remained within the objective level. The overall decline in measured concentrations of Nitrogen Dioxide, as was previously predicted, has been confirmed.

No issues were identified regarding PM_{10}.

After March 2015, a number of diffusion tubes were relocated to identify an extent of the areas of concern. This will be discussed in the next year Report.

Swindon Borough Council will produce a further LAQM Progress Report in 2016.

[1] The Air Quality Standards Regulations 2010

1 Introduction

1.1 Description of Local Authority Area

Swindon is a large town and unitary borough authority located within Wiltshire in south west England. It is midway between Bristol, approximately 40 miles to the west and Reading, approximately 40miles to the east. Swindon railway station is located on the main line from London Paddington to Bristol and South Wales. Swindon Borough Council has been a unitary authority independent of the rest of Wiltshire since 1997. Swindon was identified as one of the towns to be expanded for the reception of population and industry from the Greater London area under the Town Development Act 1952 and this led to a major increase in its population since the Second World War. Current population estimates show the population of the Swindon urban area as 174,000 with around 206,000 as the Borough wide estimate, which includes the satellite towns of Highworth and Wroughton and annexed villages of Bishopstone, Blunsdon St Andrew, Castle Eaton, Chiseldon, Hannington, Inglesham, South Marston, Stanton Fitzwarren and Wanborough.

As well as its main line rail connections, the town is located between two junctions (15 and 16) of the M4 motorway. Thamesdown and Stagecoach are the main bus operators in Swindon. Swindon Borough Council recognises its responsibility to the environment, realizing the impact it creates upon the planet, but is fully committed to minimise this whilst becoming as sustainable as possible. Swindon is one of the locations for innovative schemes including developing Low Carbon Local Development Orders to support the delivery of a low carbon Swindon by granting planning permission or permitted development rights for a range of renewable energy schemes.

Major employers in Swindon include the Honda car production plant in South Marston (where a hydrogen filling station is located); BMW/Mini (formerly Pressed Steel Fisher) in Stratton; B & Q South West Distribution Centre; Nationwide Building Society; WH Smith's distribution centre and headquarters. The computer company Intel has its European head office on the south side of the town and, Alcatel-Lucent Technologies main office is on the west side. Insurance and financial services companies such as Nationwide Building Society and Zurich Financial Services, the energy company RWE which includes the well-known retail brand nPower, the fuel card and fleet management company Arval, pharmaceutical companies such as Canada's Patheon and the United States-based Cardinal Health have their UK divisions headquartered in the town. Swindon also has the registered Head Office of the National Trust.

1.2 Purpose of Report

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. The LAQM process

places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedences are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

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

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM **in England** are set out in the Air Quality (England) Regulations 2000 (SI 928), The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre $\mu g/m^3$ (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 Concentration	Measured as	Date to be achieved by
Benzene	16.25 µg/m^3	Running annual mean	31.12.2003
	5.00 µg/m^3	Running annual mean	31.12.2010
1,3-Butadiene	2.25 µg/m^3	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 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
Particles (PM_{10}) (gravimetric)	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004

Pollutant	Air Quality Objective Concentration	Measured as	Date to be achieved by
	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

Swindon Borough Council has prepared Updating and Screening Assessment and Progress Reports as set out below. Swindon Borough Council currently has no Air Quality Management Areas (AQMA) within its administrative area.

Past reports include:

- Updating and Screening Assessment **(2003)** - No identified exceedance of objectives
- Local Air Quality Progress Report **(2004)** - Identified a risk of exceedance of the annual mean standard at Kingshill Road site (also recognised that a Detailed Assessment report is required to be submitted to the Department of Environment, Food & Rural Affairs (DEFRA) in April **2005**)
- Local Air Quality Progress Report / Detailed Assessment for Nitrogen Dioxide **(2005)** - It's been confirmed that there is no risk that the objective standard for Nitrogen Dioxide will be breached and there is no intention to declare an Air Quality Management Area in this locality. The average value at the location being 37.2 µg/m^3.
- Local Air Quality Updating & Screening Assessment **(2006)** [Round 3] - compiled April 2006 - although an average Annual Mean value of 39.5 µg/m^3 for the year 2005 was falling marginally beneath the objective standard for Nitrogen Dioxide, it was not intended to declare an Air Quality Management Area in the locality at the time.
- Updating and Screening Assessment, [Round 4] **(2009)** (& combined Progress Report 2008 - identified that a Detailed Assessment was required due to the nitrogen dioxide annual mean objective being exceeded at the following locations:

  Kingshill Road, including:

- 186 Kingshill Road.
- Kingshill Road / Clifton Street.
- Kingshill Road / Clifton Street Validation 2.

- Kingshill Road / Clifton Street Validation 3.
- F/O 63 Kingshill Road.
- 37 Devizes Road

• Air Quality Progress Report – **(2011)** (Combined Data 2009 & 2010) - A Detailed Assessment was required due to an exceedance of the nitrogen dioxide annual mean objective at the following locations:

Kingshill Road, including:

- 186 Kingshill Road.
- Kingshill Road / Clifton Street.
- Kingshill Road / Clifton Street Validation 2.
- Kingshill Road / Clifton Street Validation 3.
- F/O 63 Kingshill Road.

37 Devizes Road

A Detailed Assessment was required for nitrogen dioxide (annual mean) at four locations due to moving locomotives. The four locations are:

No. 2 Stratton Road, Stratton St Margaret;

No. 31 Sandgate, Stratton St Margaret;

No. 35 Sandgate, Stratton St Margaret; and Selina House, 192 Oxford Road, Stratton St Margaret.

• Air Quality Updating and Screening Assessment **(2012)** – a Detailed Assessment will be concluded following this report conducted due to an exceedance of the nitrogen dioxide annual mean objective at the following locations:

Kingshill Road, including:

- 186 Kingshill Road
- Kingshill Road / Clifton Street
- Kingshill Road / Clifton Street Validation 2
- Kingshill Road / Clifton Street Validation 3
- F/O 63 Kingshill Road

• 37 Devizes Road

A Detailed Assessment for nitrogen dioxide was required at two representative locations due to moving locomotives at:

- No. 2 Stratton Road, Stratton St Margaret;

• No. 31 Sandgate, Stratton St Margaret

• Detailed Assessment Report **(2013)** – Real-time and diffusion tube monitoring work undertaken in 2012 has indicated that concentrations of nitrogen dioxide exceeded annual mean objective at the point of measurement along the section of the A4289 between Kingshill, Bath Road and Devizes Road at Old Town, Swindon. Having corrected for receptor exposure the estimated concentrations at point of exposure are at

or below the annual mean objective value. Therefore it was not deemed necessary to declare an Air Quality Management Area (AQMA) along this section of the A4289. Meanwhile, measures that are likely to reduce traffic levels on this route are already in place and thus concentrations of nitrogen dioxide are expected to decrease over the subsequent years.

- Air Quality Progress Report **(2013)** – since the previous assessment the latest monitoring data suggests an overall decrease in Nitrogen Dioxide in the Borough. Previously it was suggested that detailed assessment should be carried out at a location near to the railway to assess the impact of locomotive movements, but this was not taken forward due to consistent compliance with AQ targets at this point. The relocation of 4 monitoring stations was suggested for implementation in the spring of 2014 as natural evolution and improvement of monitoring in the Borough.

- The report identifies four areas where measured concentrations of nitrogen dioxide exceeded screening levels. These areas are as following:

1. Swindon 12 - Swindon Bus Station

2. Swindon 14 - Kingshill Rd/Clifton St, Swindon 18 - Val. Sample – Kingshill Swindon 19 - Val. Sample 2 Kingshill Rd/Clifton St

3. Swindon 23 - 37 Devizes Rd, Swindon 23 - 37 Devizes Rd, Swindon 23 - 37 Devizes Rd

4. Swindon 25 - F/O 68 Cheney Manor Rd (Rodbourne Rd)

No AQMA was declared, see the report for details.

- Air Quality Progress Report **(2014)** - The report identifies four areas where measured concentrations of nitrogen dioxide exceeded screening levels. These areas are as following:

1. Swindon 12 - Swindon Bus Station

2. Swindon 14 - Kingshill Rd/Clifton St

Swindon 18 - Val. Sample - Kingshill

Swindon 19 - Val. Sample 2 Kingshill Rd/Clifton St

3. Swindon 23 - 37 Devizes Rd

Swindon 23 - 37 Devizes Rd

Swindon 23 - 37 Devizes Rd

4. Swindon 25 - F/O 68 Cheney Manor Rd (Rodbourne Rd)

However it was concluded that detailed assessment was not required for any of these areas.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

An Osiris Airborne Particulate Monitor for the measurement of particulates has been installed at lamppost 16 outside No 21 Devizes Road (Figure 2-1). Monitoring has been carried out there since 15 December 2014.

The monitor is MCERTS accredited. It gives continuous and simultaneous indication of the PM_1, $PM_{2.5}$, PM_{10} and TSP mass fractions. It uses a light scattering technique to determine the concentration of airborne dust in the particles size range from about 0.3 to 20 microns.

The air sample is constantly blown into the instrument by a pump with a flow rate set by a microprocessor. The incoming dusty air passes through a laser beam in a photometer and the through a filter to remove the particles before reaching the pump.

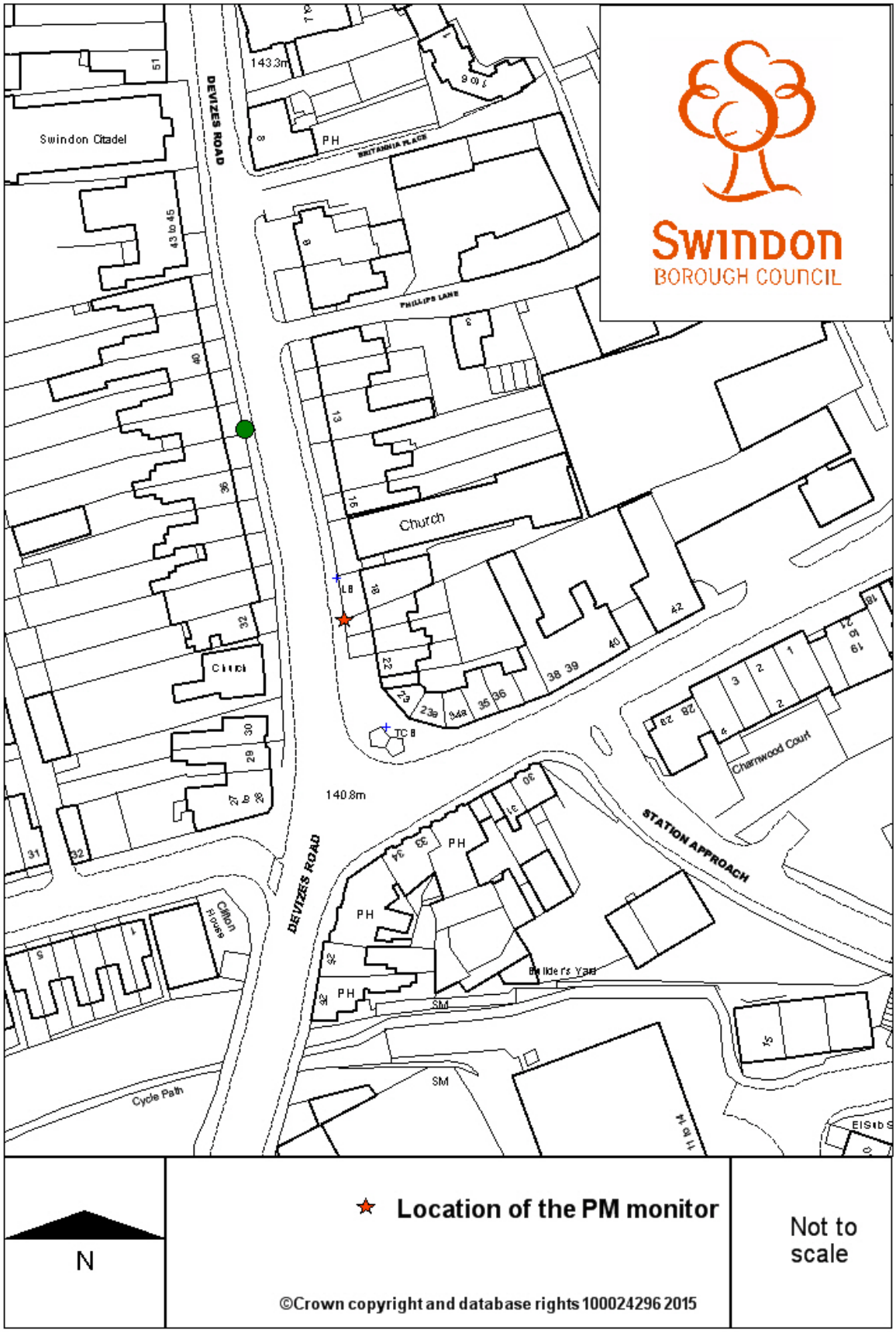
The instrument analyses the light scattered through 10 degrees or less, therefore only responds to the diffracted component and has a virtually constant response whether the particles are white or black.

The photometer count and size the individual particles allowing a microprocessor constantly determine the PM_1, $PM_{2.5}$, PM_{10} and TSP unit mass concentrations. The results are averaged and stored at weekly intervals, then emailed to be downloaded for analysis.

An internal reference filter can be used to confirm the gravimetric calibration of the instruments.

The location represents the worst case scenario and located at the busy canyon street where concentrations of nitrogen dioxide close to Air Quality objectives at receptors.

Figure 2-1: Map of PM Automatic Monitoring Sites



2.1.2 Non-Automatic Monitoring Sites

Swindon Borough Council measures nitrogen dioxide using 26 passive diffusion tubes at sites throughout the district. The locations of the monitoring sites can be seen in Figure 2.2.

The tubes are supplied and analysed by Environmental Scientifics Group (ESG) in Didcot prepared using 50% TEA in acetone nitrogen dioxide diffusion. The diffusion tubes are collected and analysed according to the published time table available on the LAQM pages. In the WASP intercomparison scheme for comparing spiked Nitrogen Dioxide diffusion tubes. ESG is currently ranked as a “Category Satisfactory” laboratory. Please see Appendix 1 for QA/QC Statement.

Table 2.2 provides details of Nitrogen Dioxide Non-Automatic Monitoring Sites. Since the previous assessment report, 5 monitoring stations have been relocated as per Table 2.1. This was carried out after March 2015 and thus the results of the analysis of tubes placed at this location will be reported in next year’s assessment report.

Table 2-1: New monitoring locations

Site ID	Old	New
S4	Bath Road Car Park	Outside No 8 Okus Road, Lamp post No 12
S8	Bath Road Car Park	Opposite 102 Bath Road, Lamp post No 37
S18	Val. Sample Kingshill Road	The opposite side of the road from 101 Kingshill Road
S19	Val. Sample Kingshill Road	Outside 86 Clifton Road, Lamppost No 16
S24	Swindon Road, Baptist Church	Outside No 30 Devizes Road, Lamp post No 17

No co-location studies were conducted. The diffusion tube bias adjustment factor is generated from the National Bias Adjustment Factor spread sheet and downloaded from the Review and Assessment website (v03/15). The following bias adjustment factor has been applied to the data presented in this report:

- 2014: 0.81

The period of exposure of all locations throughout Swindon have a monthly exposure period. All of the diffusion tube data has been annualised as required according to the guidance in LAQM.TG(09).

Figure 2-2: Map of Non-Automatic Monitoring Sites

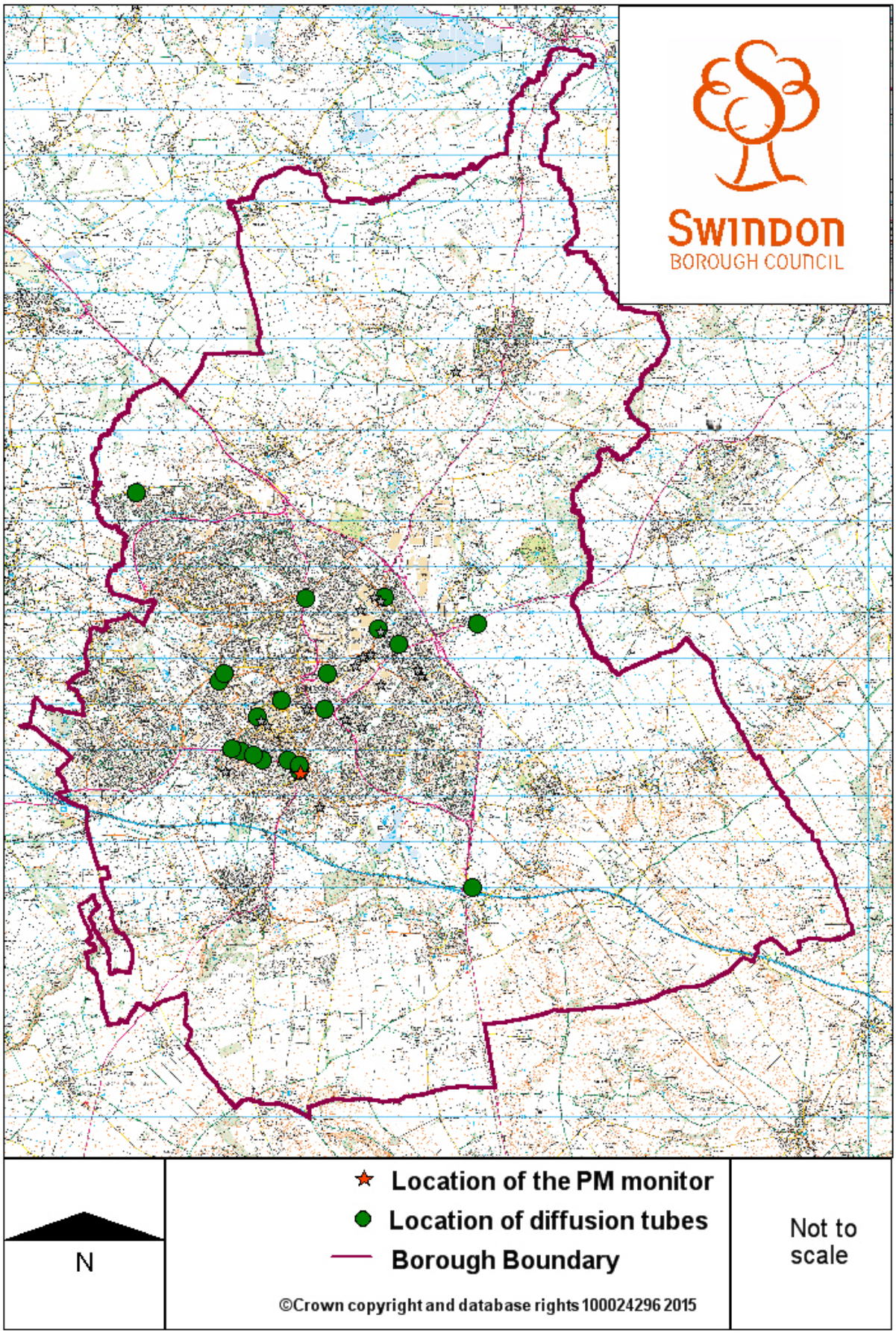


Table 2-2: Details of Non-Automatic Monitoring Sites

Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Is monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Does this location represent worst-case exposure?
Swindon 1- GWR Museum, Faringdon Rd	Roadside	414,629	184,737	N	Y (2.3)	2.0	Y
Swindon 2 - Bath Rd Car Park	Roadside	415,290	183,790	N	Y (8.6)	5.3	Y
Swindon 4 - Bath Road Car Park	Roadside	415,290	183,790	N	Y (8.6)	5.3	Y
Swindon 5 - 186 Kingshill Rd	Roadside	414,258	414,258	N	Y (4.3)	2.0	Y
Swindon 6 - Chalet School, Queens Drive	Roadside	416,089	184,907	N	Y (7.5)	7.5	Y
Swindon 8 - Bath Rd Car Park	Roadside	415,290	183,790	N	Y (8.6)	5.3	Y
Swindon 9 - S/O 31 Sandgate	Railway side	417,714	186,316	N	Y (15.3)	13.1	Y
Swindon 11 - Devizes Rd, Bridal shop	Roadside	415,532	183,666	N	Y (5.0)	4.8	Y
Swindon 12 - Manchester Rd	Roadside	415,157	415,157	N	Y (2.8)	2.6	Y
Swindon 13 - Meadow Way, Badbury Wick	Roadside	419,344	180,994	N	N (37.0)	48.0	Y
Swindon 14 - Kingshill Rd/Clifton St	Roadside	414,733	183,783	N	Y (4.5)	1.3	Y
Swindon 15 - Westcott Place	Roadside	414,076	184,041	N	Y (3)	1.2	Y
Swindon 16 - Cricklade Rd (Moonraker)	Roadside	415,677	187,335	N	Y (5.7)	3.0	Y

Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Is monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Does this location represent worst-case exposure?
Swindon 17 - Bruce St Bridges S/O 1 Bruce St	Roadside	413,797	185,505	N	Y (7.0)	6.7	Y
Swindon 18 - Val. Sample - Kingshill	Roadside	414,733	183,783	N	Y (4.5)	1.3	Y
Swindon 19 - Val. Sample 2 Kingshill Rd/Clifton St	Roadside	414,733	183,783	N	Y (4.5)	1.3	Y
Swindon 20 - Lock Farm, along A420	Roadside	419,437	186,764	N	Y (20.7)	12.5	Y
Swindon 21 - F/O 63 Kingshill Rd	Roadside	414,552	183,885	N	Y (8.0)	2.0	Y
Swindon 22 - 38 Farriers Close	Railway side	416,150	185,670	N	Y (24.0)	20.0	Y
Swindon 23 - 37 Devizes Rd	Roadside	415,547	183,552	N	Y (6.3)	1.8	Y
Swindon 23 - 37 Devizes Rd	Roadside	415,547	183,552	N	Y (6.3)	1.8	Y
Swindon 23 - 37 Devizes Rd	Roadside	415,547	183,552	N	Y (6.3)	1.8	Y
Swindon 24 - Swindon Rd, Stratton F/O Baptist Ch	Roadside	417,259	186,661	N	Y (14.0)	1.8	Y
Swindon 25 - F/O 68 Cheney Manor Rd (Rod'ne Rd)	Roadside	413,886	185,672	N	Y (5.0)	2.4	Y
Swindon 26 - Corner of Dorney Ave & Tadpole Ln	Roadside	411,973	189,625	N	Y (16.7)	0.7	Y
Swindon 27 - F/O 66 Ermin St	Roadside	417,399	187,354	N	Y (2.6)	1.9	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

Swindon Borough Council carries out automatic indicative monitoring of PMs only. Please see previous comparisons of NO_2 automatic monitoring in 2014 Air Quality Progress Report.

2.2.1 Nitrogen Dioxide

Diffusion Tube Monitoring Data

Our diffusion tube data are reported in Table 2.3 below. Monthly mean values for 2014-2015 and further information are included in Appendix 3 (Table 9.1-9.3). Monthly data in Table 9.2 **have not been** bias adjusted.

Annual means close or in excess of the 40 µg/m^3 annual mean NO_2 objective are highlighted in bold in Table 2.3.

The results for the diffusion tubes which exceeded the Air Quality Objective were then adjusted for the distance to the receptor (where possible). When triplicates at Devizes Road have been averaged, all sites remained within the objective level (Table 2.4, column 9).

No sites recorded levels of above 60 µg/m^3 and therefore none are likely to exceed the hourly objective level.

Please see Figure 2-2 for locations of NO_2 diffusion tube monitoring sites. Further description and the annual results of key areas are shown in Table 2-3.

See Figure 2-3 for the 5 year trend.

Table 2-3: Results of Nitrogen Dioxide Diffusion Tubes in 2014

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2014 (Number of Months or %)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.81) 2014 ($\mu g/m^3$)
S1	Swindon 1- GWR Museum, Faringdon Rd	Roadside	N	N	12 (100%)	Y	37.2
S2	Swindon 2 - Bath Rd Car Park	Roadside	N	Y	12 (100%)	Y	25.4
S3	Swindon 4 - Bath Road Car Park	Roadside	N	Y	12 (100%)	Y	26.7
S4	Swindon 5 - 186 Kingshill Rd	Roadside	N	N	12 (100%)	Y	31.1
S5	Swindon 6 - Chalet School, Queens Drive	Roadside	N	N	12 (100%)	Y	32.9
S6	Swindon 8 - Bath Rd Car Park	Roadside	N	Y	12 (100%)	Y	26.9
S7	Swindon 9 - S/O 31 Sandgate	Railway side	N	N	12 (100%)	Y	21.7
S8	Swindon 11 - Devizes Rd, Bridal shop	Roadside	N	N	12 (100%)	Y	25.7
S9	Swindon 12 - Manchester Rd	Roadside	N	N	11 (91.7%)	Y	**39.3**
S10	Swindon 13 - Meadow Way, Badbury Wick	Roadside	N	N	12 (100%)	Y	31.1
S11	Swindon 14 - Kingshill Rd/Clifton St	Roadside	N	Y	12 (100%)	Y	**47.4**
S12	Swindon 15 - Westcott Place	Roadside	N	N	12 (100%)	Y	32.3
S13	Swindon 16 - Cricklade Rd (Moonraker)	Roadside	N	N	10 (83.3%)	Y	36.2

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2014 (Number of Months or %)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.81) 2014 (μg/m^3)
S14	Swindon 17 - Bruce St Bridges S/O 1 Bruce St	Roadside	N	N	12 (100%)	Y	28.2
S15	Swindon 18 - Val. Sample - Kingshill	Roadside	N	Y	12 (100%)	Y	**46.4**
S16	Swindon 19 - Val. Sample 2 Kingshill Rd/Clifton St	Roadside	N	Y	12 (100%)	Y	**47.3**
S17	Swindon 20 - Lock Farm, along A420	Roadside	N	N	12 (100%)	Y	27.3
S18	Swindon 21 - F/O 63 Kingshill Rd	Roadside	N	N	12 (100%)	Y	34.8
S19	Swindon 22 - 38 Farriers Close	Railway side	N	N	11 (91.7%)	Y	24.4
S20	Swindon 23 - 37 Devizes Rd	Roadside	N	Y	12 (100%)	Y	**45.6**
S21	Swindon 23 - 37 Devizes Rd	Roadside	N	Y	12 (100%)	Y	**47.6**
S22	Swindon 23 - 37 Devizes Rd	Roadside	N	Y	12 (100%)	Y	**44.9**
S23	Swindon 24 - Swindon Rd, Stratton F/O Baptist Ch	Roadside	N	N	12 (100%)	Y	28.4
S24	Swindon 25 - F/O 68 Cheney Manor Rd (Rod'ne Rd)	Roadside	N	N	10 (83.3%)	Y	**42.4**
S25	Swindon 26 - Corner of Dorney Ave & Tadpole Ln	Roadside	N	N	10 (83.3%)	Y	17.7
S26	Swindon 27 - F/O 66 Ermin St	Roadside	N	N	12 (100%)	Y	31.2

Table 2-4: Results of Nitrogen Dioxide Diffusion Tubes (2010 to 2014)

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) µg/m^3					Concentration at the receptor, using bias adjasted annual concentration of NO_2 (Cz)
			2010* (Bias Adjustment Factor = 0.87)	2011* (Bias Adjustment Factor = 0.82)	2012* (Bias Adjustment Factor = 0.79)	2013* (Bias Adjustment Factor = 0.81)	2014 (Bias Adjustment Factor = 0.81)	
1	2	3	4	5	6	7	8	9
S12	Roadside	N	**48.8**	**45.48**	38.46	**41.77**	**47.4**	39.1
S14	Roadside	N	**45.6**	**45.4**	**41.38**	**44.79**	**39.3**	39.8
S18	Roadside	N	**46.2**	**42.57**	**42.14**	**45.85**	**46.4**	39.1
S19	Roadside	N	**45.6**	**43.9**	**41.67**	**45.38**	**47.3**	39.7
S23	Roadside	N	**54.9**	**50.97**	**44.61**	**46.67**	**45.6**	38.7
S23	Roadside	N	**57**	**50.17**	**45.36**	**45.61**	**47.6**	40.1
S23	Roadside	N	**55.6**	**52.15**	**45.45**	**44.75**	**44.9**	38.2
S25	Roadside	N		**44.47**	**42.49**	**44.79**	**42.4**	38.2

Site relocated to Manchester Road

Triplicate at Kingshill Rd/Clifton St

Site relocated to Ermin St

Triplicate at 37 Devizes Rd

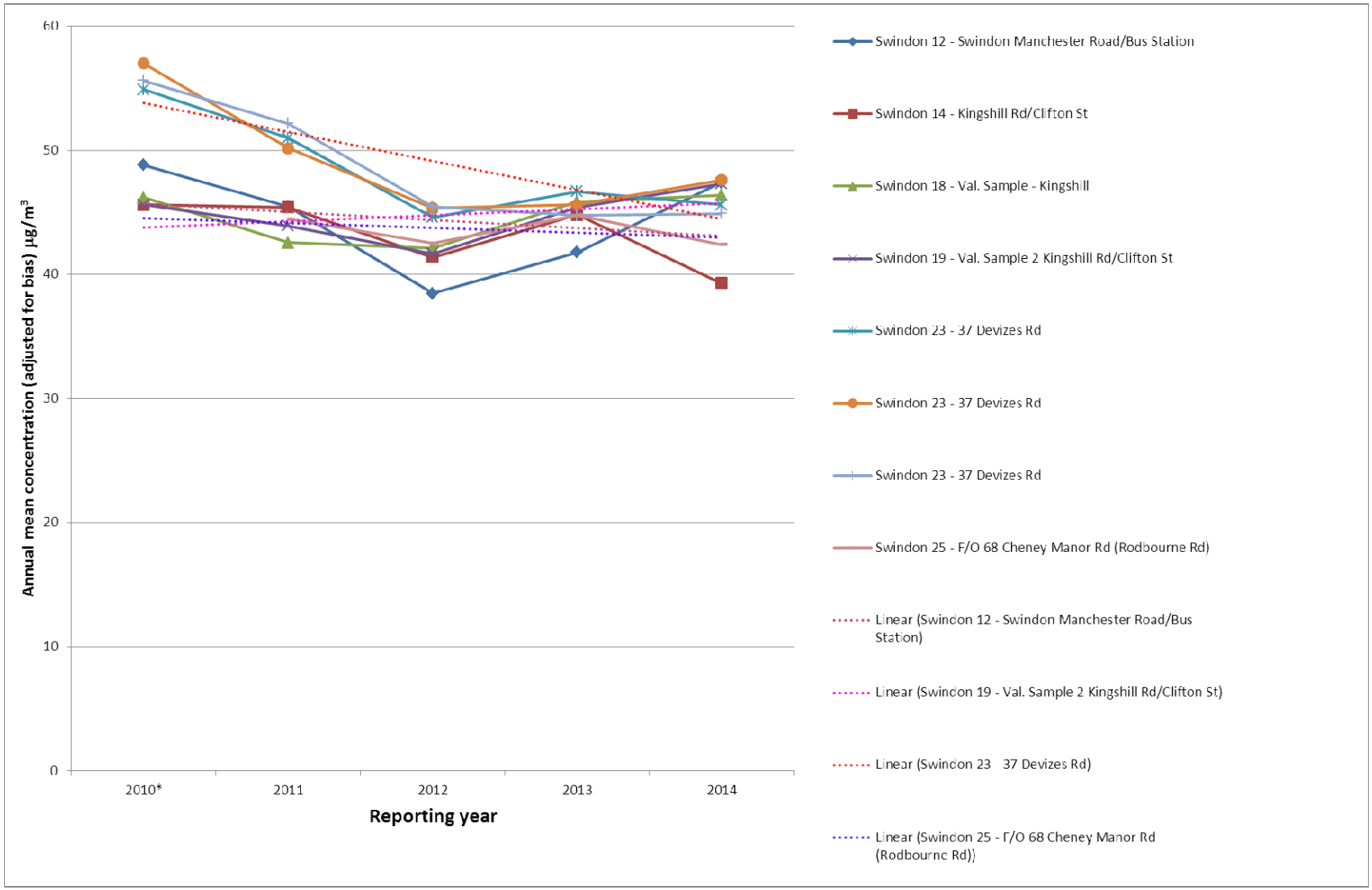


Figure 2-3:Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Diffusion Tube Monitoring Sites where estimated concentration of Nitrogen Dioxides exceeded Air Quality Objectives of 40 mg/m3

2.2.2 PM_{10}

As per suggestion made in Box 5.3 of TG09, where the risk of the objectives being exceeded exists, attention needs to be given to particulates (PM10), as well as Nitrogen Dioxide. During 2014 the Osiris Airborne Particle Monitor (Appendix 2) became available to Swindon Borough Council and it was installed opposite No 20 Devizes Road (grid ref. 415567, 183513, Figure 2.4) at Lamppost No 16. This enabled the Council to collect further information within one of the areas of the Borough which is subject to air quality concerns. The monitor became operational from 15 December 2014. The weekly average of PM_{10} is well below Air Quality objectives (Table 2.1). The maximum recorded value to date, 15.5 mg/m^3, was recorded in December 2014.

There was an attempt to annualise these data using methodology suggested in Box 3.2 of TG09, however the UK-AIR website was working offline during the preparation of this Report, so Table 2.1 represents the raw weekly average. The site is at a worst case location within 3 m from a busy junction. No further assessment of PM10 is required.

Table 2-5: 19 weeks Results of Automatic Monitoring of PM10

Date	**Average**	**Min**	**Max**
15-21.12.2014	2.01	0	15.5
22-28.12.2014	2.80	0	13.5
29.12.2014-04.01.2015	2.47	0	8.4
5-11.01.2015	2.95	0	8.6
12-18.01.2015	2.45	0.1	14.3
19-25.01.2015	1.64	0.1	4.5
26.01-01.02.2015	1.43	0.1	4.1
02-08.02.2015	0.57	0.1	1.6
09-15.02.2015	0.31	0	1.9
16-22.02.2015	0.51	0	2.5
23.02-01.03.2015	1.34	0	6.3
02-08.03.2015	1.33	0.1	2.7
09-15.03.2015	1.40	0.2	7.7
16-22.03.2015	0.26	0	0.9
30.03-05.04.2015	0.44	0	1.8
06-12.04.2015	0.18	0	1.2
13-20.04.2015	0.13	0	0.6
20-27.04.2015	0.04	0	0.2
20.04-04.05.2015	0.10	0	0.7
Max			15.5

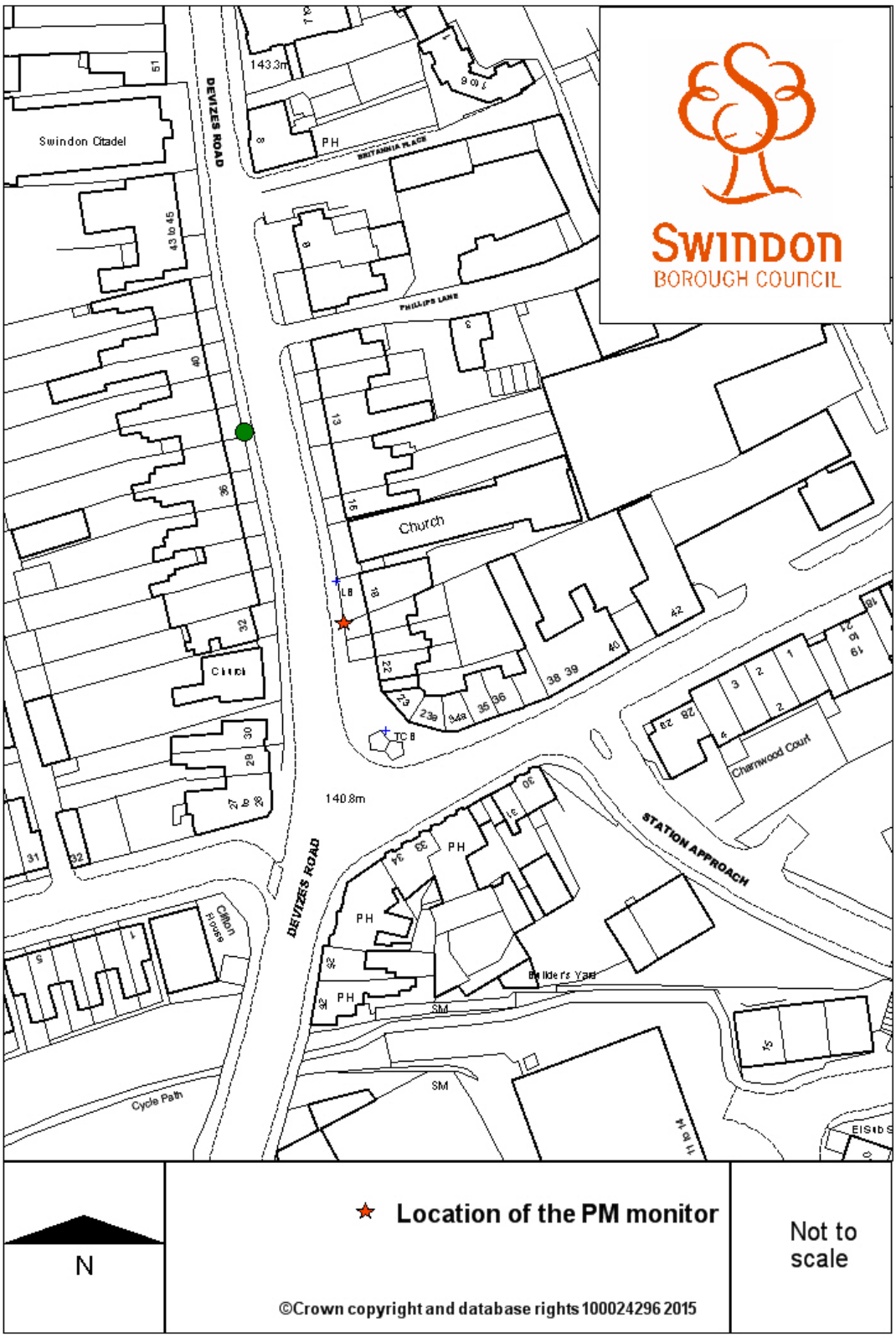


Figure 2-4: Location of PM Motitor

2.2.3 Sulphur Dioxide

Swindon Borough Council does not monitor for SO_2 within its administrative area.

The Council's previous Updating and Screening Assessment stated: "The Updating & Screening Assessment for Sulphur Dioxide" indicates that "no exceedances of the objective standards (previously specified), arising from either industrial or road traffic sources are predicted to occur within the Swindon Borough Council area." This has remained unchanged since the last round of review and assessment.

2.2.4 Benzene

Swindon Borough Council does not monitor for Benzene within its administrative area. The Council's previous Updating and Screening Assessment stated: "The Updating & Screening Assessment for Sulphur Dioxide indicates that no exceedances of the objective standards (previously specified), arising from either industrial or road traffic sources are predicted to occur within the Swindon Borough Council area." This has remained unchanged since the last round of review and assessment.

2.2.5 Other pollutants monitored

Swindon Borough Council does not monitor for Lead, Carbon Monoxide or 1,3 Butadiene within its administrative area. The Council's previous Updating and Screening Assessment stated: "The Updating & Screening Assessment for Sulphur Dioxide indicates that no exceedances of the objective standards (previously specified), arising from either industrial or road traffic sources are predicted to occur within the Swindon Borough Council area." This has remained unchanged since the last round of review and assessment.

2.2.6 Summary of Compliance with AQS Objectives

Swindon Borough Council has examined the results from monitoring in the Borough.

Although the bias adjusted mean for some areas is above the Air Quality Objective of 40 mg/m^3, when it was distance-adjusted to the receptor, it became apparent that those previously identified areas of concern are below the threshold. One of the mean results of triplicates at 37 Devizes Road indicated 40.1 µg/m^3, when adjusted to the receptor. However when the results of this triplicate was averaged this been brought to 39.02 µg/m^3.

Therefore there is no requirement to proceed to a detailed assessment.

3 Road Traffic Sources

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

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

3.2 Busy Streets Where People May Spend 1-hour or More Close to Traffic

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

3.3 Roads with a High Flow of Buses and/or HGVs.

Swindon Borough Council confirms that there are no new/newly identified roads with high flows of buses/HDVs.

3.4 Junctions

Following the procedure set out in Section A.4 of Box 5.3 of TG(09), Swindon Borough Council confirms that there are no new/newly identified busy junctions/busy roads.

3.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment

Swindon Borough Council confirms that there are no major new/proposed roads since the last assessment.

3.6 Roads with Significantly Changed Traffic Flows

Following the procedure set out in Section A.6 of Box 5.3 of TG(09), Swindon Borough Council confirms that there are no new/newly identified roads with significantly changed traffic flows.

3.7 Bus and Coach Stations

Swindon Borough Council has assessed new/newly identified bus stations, and concluded that it will not be necessary to proceed to a detailed assessment.

4 Other Transport Sources

4.1 Airports

There are two operational civilian airfields in the Borough, Draycott Aerodrome and Redlands. Both are within rural areas. Following the guidance set out in Box 5.4 TG(09), it has been determined that the use of these airfields falls significantly below the threshold levels requiring assessment. Swindon Borough Council has identified that these airfields have not been previously assessed. Redlands meets the specified criteria, however having reassessed the pattern of use of the airfield, this confirmed that a detailed assessment for nitrogen dioxide is not required.

4.2 Railways (Diesel and Steam Trains)

As it was previously discussed in the Council's report 2013 USA, a substantial scheme is underway to electrify the Great Western Main Line. This scheme is managed by Network Rail. The High Operations Output Base (HOOB), a base for the electrification scheme construction teams, is located in Swindon. There, some increase in stationary and moving trains is expected as the construction phase of the project progresses. New sidings have been built at Transfer Bridge Industrial Estate to accommodate construction trains. In order to verify possible changes in ambient conditions a decision been made to relocate one of the existing railway passive monitoring stations at S/O Stratton Road closer to the HOOB at the fence by 37 Farriers Close.

4.2.1 Stationary Trains

Based on our assessment Swindon Borough Council confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

4.2.2 Moving Trains

In accordance to Table 5.1 TG09 it was identified that the Great Western Main Line through Swindon Mainline as one with heavy traffic of diesel passenger trains with relevant exposure within 30m of the track side. However the measurements at railways locations suggest that there is no current exeedence show and that there is no need for a Detailed Assessment for nitrogen dioxide. Mentioned before a High Output Overhead Line Equipment Installation System (HOPS) and HOOB aim to reduce the number of diesel operating trains along the line, replacing them with electric trains which consequently reduce NO_2 emissions even further.

4.3 Ports (Shipping)

Swindon Borough Council confirms that there are no ports or shipping that meets the specified criteria within the Local Authority area.

5 Industrial Sources

5.1 Industrial Installations

5.1.1 New or Proposed Installations for which an Air Quality Assessment has been Carried Out

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

5.1.2 Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been Introduced

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

5.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment

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

5.2 Major Fuel (Petrol) Storage Depots

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

5.3 Petrol Stations

Swindon Borough Council confirms that there are no petrol stations meeting the specified in Section C.3 of Box 5.5 of TG(09) criteria.

5.4 Poultry Farms

Swindon Borough Council confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

Swindon Borough Council confirms that there are no biomass combustion plants meeting the criteria in the Local Authority area.

6.2 Biomass Combustion – Combined Impacts

Swindon Borough Council confirms that there are no biomass combustion plants meeting the criteria in the Local Authority area.

6.3 Domestic Solid-Fuel Burning

Swindon Borough Council confirms that there are no areas of significant domestic solid fuel use in the Local Authority area.

7 Fugitive or Uncontrolled Sources

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

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

This report has concluded the following:

- This assessment has indicated that there are measured exceedences of the Nitrogen Dioxide annual mean objective at 4 locations from March 2014 to March 2015 namely

o Manchester Road

o Kingshill Road

o Devizes Road

o Cheney Manor Road

The monitoring devices are placed close to the roads, however when the monitoring data was annualised, biased and distance adjusted, it is shown to lie within air quality objectives and therefore there is no need to proceed to a Detailed Assessment.

At the same time a previously anticipated negative trend in an area of concern (Kingshill Road, Devizes Road, Rodbourne Road) has been confirmed (Figure 2.3).

There are no issues regarding the 1-hour objective.

- PM_{10} monitoring was undertaken at the location, where the concentrations of Nitrogen Dioxide were close to the threshold, i.e. Devizes Road. All readings well below Air Quality objectives, therefore a detailed assessment is not required.
- No monitoring is undertaken for SO_2 in Swindon Borough Council's administrative area – a detailed assessment is not required.
- No monitoring is undertaken for Benzene in Swindon Borough Council's administrative area – a detailed assessment is not required.
- No monitoring is undertaken for Carbon Monoxide in Swindon Borough Council's administrative area – a detailed assessment is not required.
- No monitoring is undertaken for 1,3 Butadiene in Swindon Borough Council's administrative area – a detailed assessment is not required.
- No monitoring is undertaken for Lead in Swindon Borough Council's administrative area – a detailed assessment is not required.

8.2 Conclusions from Assessment of Sources

This report has not identified any significant changes in emissions sources within the Swindon Borough Council area. There have been no new

relevant industrial installations and no new or substantially altered roads within the Borough area. There are also no new significant commercial, domestic or fugitive sources of emissions.

8.3 Proposed Actions

There are currently no AQMA's within Swindon Borough Council's administrative area. The assessment did not identify the need to proceed to detailed assessment of any area. There are proposals currently being processed for development over the coming years in addition to those identified in the previous Progress Report 2014 which include the construction of several residential estates, commercial light industrial premises, a large scale recreational facility and biomass installations, the planning permissions for which have yet to be finalised. The impact of each proposal will be assessed prior to approval and considered in the next round of assessment following grant of planning permission and completion of the developments. Proposed sites also include new road layouts, an indoor ski centre, a waste to energy plant and the redevelopment of the Abbey Stadium (Speedway).

In order to establish the extent of the area, where the concentrations of nitrogen dioxide are close to the Air Quality objectives (and particularly around Kingshill Road and Devizes Road) a decision has been made to relocate a number of the diffusion tubes from existing areas, where concentrations of nitrogen dioxide appear to be consistently low, to areas as set out in Table 8.1. See Appendix 4 (Table 9-1 & 9-2) for further information. The results of these relocations will be discussed in 2016 Progress Report.

Table 8-1: Relocated monitoring locations

Site No	Site ID	Old	New	Comments
3	S4	Bath Road Car Park	No 8 Okus Road, Lamppost No 12	To identify extent of Kingshill/Clifton Road elevations of NO_2
6	S8	Bath Road Car Park	102 Bath Road, Lamppost No 37	To identify extent/area of Kingshill/Clifton Road elevations of NO_2
15	S18	Val. Sample Kingshill Road	The opposite side of the road from 101 Kingshill Road	To identify extent of Kingshill/Clifton Road elevations of NO_2
16	S19	Val. Sample Kingshill Road	86 Clifton Road, Lamppost No 16	To identify extent of Kingshill/Clifton Road elevations of NO_2
23	S24	Swindon Road, Baptist Church	No 30 Devizes Road, Lamppost No 17	To identify extent of elevated NO_2 vicinity 38 Devizes Road

9 References

DEFRA (2009) Local Air Quality Management Technical Guidance, (LAQM .TG (09 LAQM Helpdesk accessible from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69334/pb13081-tech-guidance-laqm-tg-09-090218.pdf

National Diffusion Tube Bias Adjustment Factor Spread Sheet accessible from http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html

Swindon Core Strategy and Generic Development Control Policies Swindon Borough Council April 2007, downloaded from http://www.swindon.gov.uk/ep/ep-planning/planningpolicy/ep-planning-localdev/Documents/core_strategy_web[1].pdf

Swindon Local Transport Plan 3: 2011-2026, Main Strategy, April 2011, Swindon Borough Council downloaded from http://www.swindon.gov.uk/cd/foi/cd-foi-publicationscheme/documents/localtransportplan3-2011-26-mainstrategy.pdf

on 10 June 2015

Environmental Enforcement Planning Procedures (Air Quality Impact Assessments) Swindon Borough Council

Swindon Borough Council (2013) Air Quality Detailed Assessment Report, 2013
Swindon Borough Council (2014) Air Quality Progress Report, 2013

Appendices

Appendix 1: QA/QC Data

Diffusion Tube Bias Adjustment Factors

The nitrogen dioxide diffusion tube data has been adjusted using factors generated by the National Bias Adjustment Factor Database (Version Number 03/15) which is available on the LAQM Helpdesk Website (http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html).

Swindon Borough Council's nitrogen dioxide diffusion tubes were supplied and analysed by ESG Group, Didcot and use 50% TEA in acetone.

The bias adjustment factor used 0.81

Discussion of Choice of Factor to Use

No co-location study was performed by Swindon Borough Council, therefore National bias adjustment factors based on 22 studies for ESG Didcot for 2014 used.

PM Monitoring Adjustment

No adjustments have been made to PM monitoring results as data only indicative.

QA/QC of Diffusion Tube Monitoring

Environmental Scientifics Group has advised the following.

- The manufacture and analysis of NO_2 diffusion tubes is covered by our UKAS accreditation
- The method meets the requirements laid out in DEFRA's "Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance."
- The laboratory has taken part in the WASP proficiency scheme since its inception, and carries the highest ranking of 'Satisfactory' for all rounds on the DEFRA LAQM summaries since the adoption of the harmonised method in 2009.
- In 2014, 6000+ internal quality control samples were analysed in conjunction with the diffusion tubes, achieving a analytical repeatability of 2.1% (at 95% confidence).

Please note that WASP proficiency scheme is now replaced with AIR PT scheme - new International PT scheme for laboratories involved in air quality analysis.

Appendix 2: Osiris Airborne Particulate Monitor

The Turkey Osiris instrument gives a continuous and simultaneous indication of PM_1, $PM_{2.5}$, PM_{10} and TSP mass fractions. It uses a light scattering technique to determine a concentration of airborne dust in the practical size range from about 0.3 to 20 microns (1 micron = 10^{-6} metre). The air sample is continuously drawn into the instrument by a pump with a flow rate set by a microprocessor. The incoming dusty air passes through a laser beam in a photometer and then through a filter to remove the particles before reaching the pump.

The light scattered by airborne particles can be thought of as consisting of three components. Light reflected from the surface of the particle, light refracted through the particle and light which is diffracted from its original path by the presence of the particle. The intensity of the light scattered by reflection or refraction strongly depends on the type of particle. Thus a white limestone particle will reflect much more light than a black diesel fume particle of the same size. On the other hand the diffracted component depends only on the size of the particle and is dependent of its material composition.

For irregularly shaped particles, light which is reflected and refracted tends to be scattered over all possible directions. The diffracted component, however, tends to be scattered only through very small angles. For example, for a 5 micron diameter particle, 90% of the diffracted light is scattered by less than 10 degrees from the original direction of the light beam.

The instrument analyses only the light scattered through 10 degrees or less. That is the respond only to the diffracted component and has a virtually constant response whether the particles are black or white. Other commercially available photometers detect light scattered through much wider angles or even at 90 degrees to the light beam.

The instrument employs a sensitive scattering volume of less than 0.14 micro-litres. Therefore they can analyse the intensity of the scattered by individual particles, even when there are many millions of them per litre. This allows the photometers to accurately count and size individual particles at concentrations of up to several mg/m3. Having counted and sized the individual particles a dedicated processor then continually averaged and scored at chosen intervals and can be downloaded for analysis.

MCERTS Certificate No: Sira MC090157/01, date of issue: 13.10.2009

Appendix 3: Diffusion Tubes further information

Table 9-1: Locations of diffusion tubes

Swindon 1	Opp former GWR Museum Faringdon Road	414,629	184,737
Swindon 5	186 Kingshill Road	414,258	414,258
Swindon 6	Former Chalet School	416,089	184,907
Swindon 13	Meadow Way, Badbury Wick	419,344	180,994
Swindon 14	Kingshill Road	414,733	183,783
Swindon 15	Westcott Place	414,076	184,041
Swindon 18	Kingshill Road (Validation Sample)	414,733	183,783
Swindon 19	Kingshill Road (Validation Sample)	414,733	183,783
Swindon 21	63 Kingshill Road	414,552	183,885
Swindon 23	37 Devizes Road	415,547	183,552
Swindon 23	37 Devizes Road	415,547	183,552
Swindon 23	37 Devizes Road	415,547	183,552
Swindon 24	Swindon Road, Stratton	417,259	186,661
Swindon 26	Corner of Dorney Road and Tadpole Lane	411,973	189,625
Swindon 2	Bath Road Car Park	415,290	183,790
Swindon 4	Bath Road Car Park	415,290	183,790
Swindon 9	31 Sandgate	417,714	186,316
Swindon 17	Bruce Street Bridges	413,797	185,505
Swindon 27	66 Ermin Street	417,399	187,354
Swindon 25	68 Rodbourne Road	413,886	185,672
Swindon 8	Bath Road Car Park	415,290	183,790
Swindon 22 (new)	37 Farrier Close	416,150	185,670
Swindon 16 (new)	496 Cricklade Road	415,677	187,335
Swindon 20 (new)	Lock Farm, along A420(for Eastern villages)	419,437	186,764
Swindon 11 (new)	Lock Farm, along A420(for Eastern villages)	415,532	183,666
Swindon 12 (new)	74 Manchester Road	415,157	415,157

Table 9-2: 12 Months Results of Nitrogen Dioxide Diffusion Tubes

Sample No	Site	20/03-17/04	17/04-16/05	16/05-18/06	18/06-18/07	18/07-22/08	22/08-25/09	25/09-27/10	27/10-25/11	25/11-16/12	16/12/2014-22/01/2015	22/01-19/02/15	19/02-19/03
		2014										2015	
		mg/m^3											
S1	Swindon 1- GWR Museum, Faringdon Rd	50.5	42.1	34.6	27.2	28.9	47.9	36.5	53.2	72.8	49.7	52.4	55.2
S2	Swindon 2 - Bath Rd Car Park	29.7	29.5	16	20.8	20.6	33.3	28.2	40.8	51.4	33.4	35.1	37.4
S3	Swindon 4 - Bath Road Car Park	34.9	29	21.9	18.2	19.8	34.1	28.9	41.9	56.1	33.8	42.4	35
S4	Swindon 5 - 186 Kingshill Rd	36.9	38.2	19.7	20.5	17.2	39.5	43.8	55.7	55.6	43.4	50.6	39.8
S5	Swindon 6 - Chalet School, Queens Drive	36.6	32.5	23.4	30.9	33.8	36.1	43.2	47.1	57.3	49.2	48.8	48
S6	Swindon 8 - Bath Rd Car Park	33.2	28.5	28.1	21	18.7	32.1	28.8	42.5	55.3	31.3	42.3	36.8
S7	Swindon 9 - S/O 31 Sandgate	30.8	22.9	18	17	19	28.4	22.6	29.1	41	28.2	37.1	27.1
S8	Swindon 11 - Devizes Rd, Bridal shop	35.4	26.2	17	19.7	16.6	32	33.1	45	50.3	29.3	40.4	35.5
S9	Swindon 12 - Manchester Rd	3.2	34	45.8	42.6	38.6	61.3	59.9	59.4	75.9	49.9	56.4	55.6
S10	Swindon 13 - Meadow Way, Badbury Wick	41.5	29.4	32	16.6	33.8	32.9	46.8	43.1	54.9	40.8	43.8	44.4
S11	Swindon 14 - Kingshill Rd/Clifton St	66.1	51.8	62.5	28.3	58.8	59.4	56.6	61.6	72.1	54.5	66.1	63.9
S12	Swindon 15 - Westcott Place	38.1	36.4	14	11.3	34.3	46.5	36.9	53.1	65.8	39.3	56.2	45.9
S13	Swindon 16 - Cricklade Rd (Moonraker)	48.1	36.7	28.8	15.1	30.8	54.3	46.2		72.5	39.6	64.5	54.4
S14	Swindon 17 - Bruce St Bridges S/O 1 Bruce St	32.2	36.7	26.4	15.5	28.1	41.9	29.8	40.7	49	30.9	45.1	41.1
S15	Swindon 18 - Val. Sample - Kingshill	56.7	53.5	57.4	29	50.8	62.6	51.8	73.5	71.9	56.1	64.2	59.5

Sample No	Site	20/03-17/04	17/04-16/05	16/05-18/06	18/06-18/07	18/07-22/08	22/08-25/09	25/09-27/10	27/10-25/11	25/11-16/12	16/12/2014-22/01/2015	22/01-19/02/15	19/02-19/03
S16	Swindon 19 - Val. Sample 2 Kingshill Rd/Clifton St	65.1	56.2	55.6	26.1	45.2	65.3	57.7	69	70.6	56.4	72.2	60.8
S17	Swindon 20 - Lock Farm, along A420	38.1	29.3	22.7	13.3	23.9	41.7	22.9	39.6	54.8	36.9	43.2	38.3
S18	Swindon 21 - F/O 63 Kingshill Rd	40.5	42.7	29	14.9	28.8	53.6	36.5	50.3	67.7	39.5	64.7	47.1
S19	Swindon 22 - 38 Farriers Close	30.1	28.5	17	10	23.2	29.9	26	32.6	54.3	37.2	38.6	33.6
S20	Swindon 23 - 37 Devizes Rd	59.7	55.9	40.5	26.4	54.6	52.9	61.8	61.1	66	65.8	66.9	63.5
S21	Swindon 23 - 37 Devizes Rd	60.2	54.9	42.6	22	62.1	53.5	64.6	59.3	77.1	67.7	72.2	68.4
S22	Swindon 23 - 37 Devizes Rd	57	55	47.4	23.9	61	50.9	63.1	58.9	68.7	57.8	55.3	66.3
S23	Swindon 24 - Swindon Rd, Stratton F/O Baptist Ch	39	30.7	24.7	13	25.2	35.5	32.5	46.6	47.5	34.7	50.6	41.4
S24	Swindon 25 - F/O 68 Cheney Manor Rd (Rod'ne Rd)	55.1	52	45.4	21.7	33.2	65.1			77.4	53.7	63.9	55.4
S25	Swindon 26 - Corner of Dorney Ave & Tadpole Ln		16.8	13.4	7.6	15.1	27.5	19.5	27	39.1	18.4	30.9	24.5
S26	Swindon 27 - F/O 66 Ermin St	43.1	33.9	20.5	12.1	24.9	39.1	40.5	51.5	61.2	38.8	49.9	46.7

Table 9-3: Bias adjusted mean and concentrations at receptor

Sample No	Site	Un-Adjusted Mean	Bias adjusted Mean (Cy)	Concentration at the receptor, using bias adjusted annual concentration of NO_2 (Cz)
		mg/m^3		
S1	Swindon 1- GWR Museum, Faringdon Rd	45.9	37.2	36.7
S2	Swindon 2 - Bath Rd Car Park	31.4	25.4	24.8
S3	Swindon 4 - Bath Road Car Park	33.0	26.7	26.0
S4	Swindon 5 - 186 Kingshill Rd	38.4	31.1	28.9
S5	Swindon 6 - Chalet School, Queens Drive	40.6	32.9	32.9
S6	Swindon 8 - Bath Rd Car Park	33.2	26.9	26.1
S7	Swindon 9 - S/O 31 Sandgate	26.8	21.7	21.7
S8	Swindon 11 - Devizes Rd, Bridal shop	31.7	25.7	25.6
S9	Swindon 12 - Manchester Rd	48.6	39.3	39.1
S10	Swindon 13 - Meadow Way, Badbury Wick	38.3	31.1	33.9
S11	Swindon 14 - Kingshill Rd/Clifton St	58.5	47.4	39.8
S12	Swindon 15 - Westcott Place	39.8	32.3	27.7
S13	Swindon 16 - Cricklade Rd (Moonraker)	44.6	36.2	33.4
S14	Swindon 17 - Bruce St Bridges S/O 1 Bruce St	34.8	28.2	28.0
S15	Swindon 18 - Val. Sample - Kingshill	57.3	46.4	39.1
S16	Swindon 19 - Val. Sample 2 Kingshill Rd/Clifton St	58.4	47.3	39.7
S17	Swindon 20 - Lock Farm, along A420	33.7	27.3	25.6
S18	Swindon 21 - F/O 63 Kingshill Rd	42.9	34.8	29.6
S19	Swindon 22 - 38 Farriers Close	30.1	24.4	24.7
S20	Swindon 23 - 37 Devizes Rd	56.3	45.6	38.7
S21	Swindon 23 - 37 Devizes Rd	58.7	47.6	40.1
S22	Swindon 23 - 37 Devizes Rd	55.4	44.9	38.2
S23	Swindon 24 - Swindon Rd, Stratton F/O Baptist Church	35.1	28.4	25.7
S24	Swindon 25 - F/O 68 Cheney Manor Rd (Rodborne Rd)	52.3	42.4	38.2
S25	Swindon 26 - Corner of Dorney Ave & Tadpole Ln	21.8	17.7	13.7
S26	Swindon 27 - F/O 66 Ermin St	38.5	31.2	30.5

Appendix 4: New Locations of the Diffusion Tubes

Figure 9-1: Kingshill Road monitoring stations

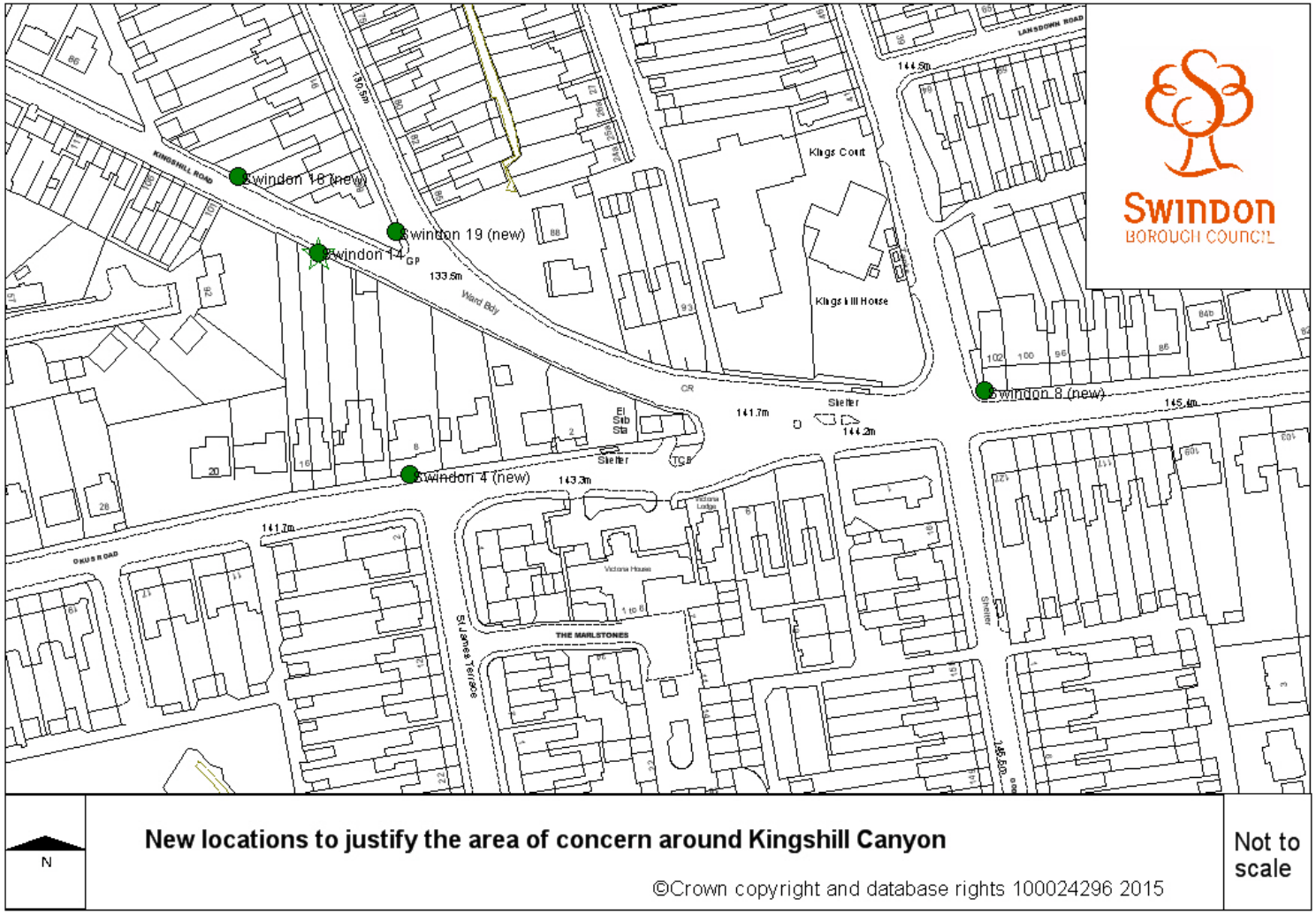


Figure 9-2: Devizes Road monitoring stations