



# 2015 Air Quality Annual Status Report (ASR)

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

June 2016

## Swindon Borough Council

|                          |  |
|--------------------------|--|
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## Executive Summary: Air Quality in Our Area

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, 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.

Generally, Swindon's air quality is good. The main pollutants of concern in Swindon Borough, as in most urban areas of the UK, are associated with road traffic, in particular nitrogen dioxide and particulate matter at locations close to busy, congested roads where people may live, work or shop. Swindon has an ongoing programme of air quality monitoring around the Borough, concentrating on nitrogen oxides and particulates (dust).

Monitoring for dust in Devizes Road has found that PM<sub>2.5</sub> and PM<sub>10</sub> concentrations were well within the annual mean and 24-hour objectives, and exceedances of these objectives were considered unlikely. As a result the Council has suspended monitoring of particulate matter there.

No new significant sources have been identified that could give rise to air quality issues in the Borough. Swindon Borough Council proposes to continue to monitor nitrogen dioxide within the Borough through the existing long-term diffusion tube survey and for 2016 has switched the location of its particulates monitoring to Kingshill Road.

This ASR (Annual Status Report) provides an update on local monitoring data acquired since the previous Updating and Screening Assessment and screens for various potential sources of pollution within the Borough's administrative area in accordance with the Local Air Quality Management Technical Guidance 2016 (LAQM.TG16).

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 April 2015 and March 2016.

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

1. Swindon 14 - Kingshill Rd/Clifton St
2. Swindon 18 – opposite 101 Kingshill Road/façade of 102 Kingshill Road
3. Swindon 23 - 37 Devizes Rd  
Swindon 23 - 37 Devizes Rd  
Swindon 23 - 37 Devizes Rd
4. Swindon 24, 30 Devizes Road

**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, except on location - 101 Kingshill Road. However, as the monitoring had, to March 2016, only been conducted for 5 months and a further 7 months across the road (where the traffic conditions are different), the decision has been made to continue monitoring at this location, allowing further data to be collected to verify whether AQMA should be declared.

Across the Borough, the overall decline in measured concentrations of Nitrogen Dioxide, as was previously predicted, has been confirmed.

No issues were identified regarding particulates PM<sub>10</sub> or PM<sub>2.5</sub>.

In December 2015 the tube at location 25 (68 Rodbourne Road) was relocated about 10m south to the nearest available lamppost when the old post was just about to be removed. Location 22 at Farrier Close was moved about 5 metres westwards along the fence towards the Surgery to avoid screening from the source (moving locomotives) created by the some storage cabins installed on the Network Rail land there.

The Council will compile a further Annual Status Report in 2017.

## Air Quality in the Borough of Swindon

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas<sup>1,2</sup>.

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

Swindon Borough Council assesses air quality in Swindon and surrounding areas against the requirements of the national Air Quality Strategy.

Our monitoring of air quality focuses on nitrogen dioxide and particulate matter (dust), identified as potential risks to health.

The Council is regularly monitoring Nitrogen Dioxide using passive devices (diffusion tubes). During the last 2 years monitoring of particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) has been carried out at Devizes Road for a limited period. This was performed using a Osiris Particulate Monitor.

The previous Updating and Screening Assessment identified four areas where measured concentrations of nitrogen dioxide came close to or exceeding screening levels. These areas were as following:

1. Swindon 12 – Manchester Road
2. Swindon 14 - Kingshill Rd/Clifton St (triplicate)  
Swindon 18 - Val. Sample – Kingshill Rd/Clifton St (triplicate)  
Swindon 19 - Val. Sample 2 Kingshill Rd/Clifton St (triplicate)
3. Swindon 23 - 37 Devizes Rd (triplicate)  
Swindon 23 - 37 Devizes Rd (triplicate)  
Swindon 23 - 37 Devizes Rd (triplicate)

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

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

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

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

However a detailed assessment was 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.

### Actions to Improve Air Quality

An attempt was made in 2014 to work with local bus services providers to address congestion on Devizes Road by moving a bus stop in order to improve the traffic flow in the area. Buses stopping there create short term traffic queues resulting in elevated readings of nitrogen dioxide (this has been verified by nearby locations along Devizes Road, indicating that within a few metres of the bus stop, the readings fall to within statutory AQ limits). However, no positive agreement has been achieved with the local bus companies and the bus stop remains at its current location causing elevated readings of NO<sub>2</sub> at 23 – 37 Devizes Road. **This proposal remains ongoing as no other measures have been identified to resolve the issue.**

### Local Priorities and Challenges

Over the coming months and years new developments and road improvements are expected to create traffic congestion and consequently additional burden into the air quality in the borough. There are a number of proposed or ongoing new developments and expansion of Swindon, such as the New Eastern Villages development (NEV), Tadpole Lane, North Star, renewable energy schemes at Keypoint and South Marston, as well as road junction improvements (including Greenbridge Roundabout and A419 and J16 improvements) and a number of railway bridge closures. These will inevitably affect traffic flow within Swindon. Having a number of monitoring stations within areas of concern will allow us to understand any trends in air quality.

At the same time large new developments have included detailed air quality assessments with the planning permission applications. The assessments for the majority of new developments indicated that the effect on air quality will not be significant. This is primarily because of their urban fringe locations. The report for the

proposed Renewable Energy Centre has not been submitted and reviewed yet due to an incomplete monitoring programme at the time of writing.

In Swindon Borough Local Plan 2026, Theme 4, which is transport focused, considers actions to minimise congestion and therefore journey time, noise and air quality. The Local Plan identifies key issues including section 4.176 which recognises how transport can affect local air quality:

“effective accessibility is important in all modes of transport, from walking and cycling to public transport to the private car and transportation of goods, to all ages and across all parts of the economy. Therefore, there remains a need to improve the transport network to improve accessibility and reduce journey times, but also to improve air quality and reduce transport emissions. Whilst maintaining and improving the existing network, being able to provide the opportunity for more people to take their shorter trips by foot or bicycle, and to do this safely, is still a key issue”.

In addition section 4.184 says that

“The attractiveness of walking and cycling in Swindon will be improved to support healthy lifestyle choices but also to address climate change, congestion and improve air quality”.

## **How to Get Involved**

Various Council initiatives promote healthy life choices by encouraging local residents walk and cycle whenever possible as well as reliability and use of public transport.

The Council encourages the reduction of private vehicles use, reducing the number of motor powered vehicles and sources of airborne emissions (oxides of nitrogen, particulate matter, VOC etc.), contributing consequently into improvements in air quality in the area.

One of the SBC council initiatives includes “free guided bike rides” around various areas of Swindon which introduces easy and comfortable routes connecting different locations and safe and pleasant journeys around the Borough. Use of pushbikes reduces the use of private motor powered vehicles and can positively affect local air

quality. Further information and schedule can be found on [www.goskyride.com/swindon](http://www.goskyride.com/swindon).

Some other measures and initiatives are listed below, described in section 2.2 and summarised in Table 2.1.

- Personalised Travel Planning (PTP) in growth areas (Wichelstowe Programme) <http://www.swindontravelchoices.co.uk/projects/ptp-in-growth-areas.aspx>,  
[http://www.swindon.gov.uk/download/downloads/id/947/infrastructure\\_presentation\\_4.pdf](http://www.swindon.gov.uk/download/downloads/id/947/infrastructure_presentation_4.pdf)
- Promoting Low Emission Transport
- Programme to construct solar arrays on Council-owned land  
<https://www.swindon.gov.uk/vision>,  
[http://www.solarpowerportal.co.uk/news/swindon\\_residents\\_could\\_fund\\_solar\\_farm\\_alongside\\_local\\_council\\_2815](http://www.solarpowerportal.co.uk/news/swindon_residents_could_fund_solar_farm_alongside_local_council_2815)
- Cycle To Work Scheme (SBC Staff) <http://www.swindonbug.co.uk/cycle-to-work> , <http://www.swindontravelchoices.co.uk/cycle.aspx>,  
[http://www.swindon.gov.uk/info/20033/job\\_career\\_and\\_training\\_advice/547/why\\_choose\\_us/4](http://www.swindon.gov.uk/info/20033/job_career_and_training_advice/547/why_choose_us/4)



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## 1 Local Air Quality Management

This report provides an overview of the quality of Swindon's air during 2015-2016 (April to March monitoring period). It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Swindon Borough Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England can be found in Table E.1 in Appendix E.

## 2 Actions to Improve Air Quality

### 2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of the objectives.

Swindon Borough Council currently does not have any AQMAs. However, the Council does propose to declare a new AQMA in the Kingshill Road area, pending the outcome of continued monitoring (see monitoring section).

### 2.2 Progress and Impact of Measures to address Air Quality in Swindon Borough Council

Swindon Borough Council has taken forward a number of measures during the current reporting year of 2015-2016 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.1.

The Borough has instigated a series of Low Carbon Development Orders (to generate 15% of its energy from renewable sources by 2021) throughout the Borough covering the following elements:

- Non-domestic air source heat pumps and district heating installations (this LDO applies Borough-wide)
- Hydrogen and electric car fuelling infrastructure (this LDO applies on multiple sites)
- Pre-identified sites for solar arrays and solar farms (this LDO applies on multiple sites)

An LDO grants planning permission for hydrogen fuel cell and electric car refuelling points at all existing petrol filling stations in Swindon Borough. The LDO also grants planning permission for electric car refuelling points at identified supermarket car parks in the Borough. This supplements existing hydrogen fuelling facilities at Honda in South Marston.

Much progress has been made on developing alternative energy generation via solar arrays and solar farms. Swindon Borough Council owns Public Power Solutions (PPS), a provider of innovative sustainable waste and power solutions. Its aims include development of large-scale solar power generation schemes which benefit the borough and reduce the impact of its power needs on the environment. Its major scheme, the large solar farm at the former Wroughton Airfield commissioned during March 2016, provides 41MW of renewable electricity to 12,000 residents of Swindon and is estimated to cut carbon emissions to atmosphere of around 20,000 tonnes per annum. Other major schemes are being actively developed around the Borough.

The Borough promotes various cycle schemes to reduce traffic congestion, as set out in Table 2.2.

Table 2.1 – Progress on Measures to Improve Air Quality

| Measure No. | Measure  | EU Category                            | EU Classification   | Lead Authority  | Planning Phase | Implementation Phase                      | Key Performance Indicator  | Target Pollution Reduction in the AQMA | Progress to Date                                     | Estimated Completion Date                | Comments                                       |
|-------------|--|--|---|---|----------------|---|--|--|--|--|--|
|             | Title  | Select from the categories in blue box | Select from the subcategories in blue box   |   | Date           | Date                                      |  |  |  | Date                                     |  |
| 1           | Personalised Travel Planning (PTP) in growth areas (Wichelstowe Programme) | Promoting Travel Alternatives          | Promotion of cycling and walking  | Swindon Borough Council                                 |                | April 2015 – March 2016                   |  | N/A                                    | A negative trend in monitoring at Devizes Road       |  |  |
| 2           | Promoting Low Emission Transport   | Promoting Low Emission Transport       | Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging | Swindon Borough Council                                 | 2014-2015      | Ongoing                                   | Establishment of LDO and alternative fuel fuelling schemes   | N/A                                    | Hydrogen fuelling plant (established outside of LDO) |  |  |
| 3           | Programme to construct solar arrays on Council-owned land                  | Promoting Low Emission Plant           | Low Emission Fuels for stationary and mobile sources in Public Procurement                      | Swindon Borough Council                                 |                | Wroughton Airfield Implemented March 2016 | Establishment of solar schemes at Braydon, Common Farm, Wroughton Airfield, Chapel farm and Shaw Farm. | N/A                                    | Wroughton Operational from 24 March 2016             | Wroughton Operational from 24 March 2016 | Estimated CO2 OFFSET (per annum) 20,000 tonnes |
| 4           | Cycle To Work Scheme (SBC Staff)   | Promoting Travel Alternatives          | Promotion of cycling and walking  | Swindon Borough Council in partnership with Cyclescheme |                | Oct 2014 - ongoing                        | Reduction in car journeys to/from Council workplaces   | N/A                                    |  |  |  |

## 2.3 PM<sub>2.5</sub> – Local Authority Approach to Reducing Emissions and or Concentrations

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of PM<sub>2.5</sub> (meaning particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM<sub>2.5</sub> has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Swindon Borough Council is not taking any measures to address PM<sub>2.5</sub> because monitoring has indicated only low levels of this pollutant have been recorded during 6 months of monitoring. Due to very low readings recorded by the equipment, data has not been rectified and averages for each monitoring week and the period is provided in Table 2.2.

**Table 2.2: Results of Indicative Monitoring for PM2.5**

| Measure No. | Date            | Average | Min  | Max  |
|-------------|-----------------|---------|------|------|
| 1           | 30.03-5.04.2015 | 0.39    | 0.02 | 1.7  |
| 2           | 06-13.04.2015   | 0.18    | 0.02 | 0.88 |
| 3           | 13-20.04.2015   | 0.13    | 0    | 0.59 |
| 4           | 20-27.04.2015   | 0.07    | 0    | 0.25 |
| 5           | 27.04-4.05.2015 | 0.13    | 0    | 0.55 |
| 6           | 4-11.05.2015    | 0.36    | 0.01 | 1.09 |
| 7           | 11-18.05.2015   | 0.30    | 0.04 | 0.87 |
| 8           | 18-29.05.2015   | 0.31    | 0.05 | 1.05 |
| 9           | 25.05-1.06.2015 | 0.26    | 0    | 0.9  |
| 10          | 1-8.06.2015     | 0.50    | 0.06 | 1.8  |
| 11          | 8-15.06.2015    | 0.24    | 0.01 | 0.81 |
| 12          | 15-22.06.2015   | 0.21    | 0.06 | 0.59 |
| 13          | 22-29.06.2015   | 0.19    | 0.02 | 0.86 |
| 14          | 29.06-6.07.2015 | 0.22    | 0.04 | 0.68 |
| 15          | 7-14.07.2015    | 0.13    |      | 1.14 |
| 16          | 13-20.07.2015   | 0.22    | 0.02 | 1.22 |
| 17          | 20-27.07.2015   | 0.19    | 0.03 | 0.71 |
| 18          | 27.07-3.08.2015 | 0.17    | 0.03 | 0.68 |
| 19          | 3-10.08.2015    | 0.21    | 0.05 | 0.66 |
| 20          | 10-17.08.2015   | 0.17    | 0.02 | 0.85 |
| 21          | 17-24.08.2015   | 0.09    |      | 0.46 |
| 22          | 24-30.08.2015   | 0.19    | 0.03 | 1.3  |
| 23          | 31.08-6.09.2015 | 0.10    | 0    | 0.71 |
| 24          | 7-14.09.2015    | 0.04    | 0    | 0.43 |

| Measure No. | Date            | Average      | Min          | Max          |
|-------------|-----------------|--------------|--------------|--------------|
| 25          | 14-21.09.2015   | 0.05         | 0            | 0.28         |
| 26          | 21-28.09.2015   | 0.15         | 0.01         | 0.62         |
| 27          | 28.09-5.10.2015 | 0.05         | 0            | 0.18         |
| 28          | 5-11.10.2015    | 0.09         | 0            | 0.42         |
| 29          | 12-19.10.2015   | 0.01         | 0            | 0.1          |
| 30          | 26.10-1.11.2015 | 0.15         | 0.02         | 0.6          |
| 31          | 2-9.11.2015     | 0.10         | 0            | 0.64         |
| <b>32</b>   | <b>Average</b>  | <b>0.181</b> | <b>0.019</b> | <b>0.762</b> |

## **3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance**

### **3.1 Summary of Monitoring Undertaken**

#### **3.1.1 Introduction**

This section sets out what monitoring has taken place and how it compares with objectives.

#### **3.1.2 Automatic Monitoring Sites**

Swindon Borough Council doesn't currently have automatic (continuous) monitoring in the Borough.



### 3.1.3 Non-Automatic Monitoring Sites

Swindon Borough Council undertook non- automatic (passive) monitoring of NO<sub>2</sub> at 24 sites during 2015-2016. Table A.1 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix D.

Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

## 3.2 Individual Pollutants

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

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

Table A.2 in Appendix A compares the ratified and adjusted monitored NO<sub>2</sub> annual mean concentrations for the past 5 years with the air quality objective of 40µg/m<sup>3</sup>.

For diffusion tubes, the full 2015-2016 dataset of monthly mean values is provided in Appendix B. Although calculations for periods variation adjustment as per para 7.188 of TG16 was performed, the difference was not significant, therefore in all calculations data was either presented as indicated.

Table 3 lists locations where bias adjusted concentrations of Nitrogen Dioxide exceeded Air Quality Objectives in England listed in Appendix E, however when these figures have been adjusted to estimate the concentration at the nearest receptor, in accordance to Technical Guidance LAQM.TG16, only two areas, opposite 102 Kingshill Road/the façade of 101 Kingshill Road and 30 Devizes Road are exceeding the objectives. Since the monitoring was only performed for 12 months at Devizes Road and 7/5 months at Kingshill Road we are proposing to continue monitoring for another 12 months before decision regarding declaration of AQMA (Air Quality Management Area) is made.

Also the general downward trend (Figure 1) in concentrations of Nitrogen Dioxide around the majority of monitoring locations suggests that air quality within the Borough is getting better.

**Table 3: Locations where concentrations of Nitrogen Dioxide exceeded**

| Location                             | Bias adjusted Mean | Concentration at the receptor, using bias adjusted annual concentration of NO <sup>2</sup> |
|--------------------------------------|--------------------|--|
| Swindon 14 - Kingshill Rd/Clifton St | <b>41.2</b>        | 35.3   |
| Swindon 18 - 102 Kingshill Road*     | <b>57.2</b>        | <b>56.9</b>  |
| Swindon 18 - 101 Kingshill Road      | <b>63.8</b>        | <b>63.1</b>  |
| Swindon 23 - 37 Devizes Rd**         | <b>44.4</b>        | 37.8   |
| Swindon 23 - 37 Devizes Rd***        | <b>46.7</b>        | 39.5   |
| Swindon 23 - 37 Devizes Rd           | <b>45.6</b>        | 38.7   |
| Swindon 24, 30 Devizes Road          | <b>43.3</b>        | <b>40.3</b>  |

\* Swindon 18 location, where monitoring has been shared between across the road from 102 Kingshill Road and at the façade of 101 Kingshill Road for the period 7 months and 5 months consequently.

\*\* Triplicate

\*\*\* The average of triplicate tubes is 38.7 µg/m<sup>3</sup>

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

Table A.3 in Appendix A compares the monitored PM<sub>10</sub> annual mean concentrations for the past 2 years with the air quality objective of 40µg/m<sup>3</sup>.

Table A.4 in Appendix A compares continuously monitored PM<sub>10</sub> daily mean concentrations for the past 2 years with the air quality objective of 50µg/m<sup>3</sup>, which is not to be exceeded more than 35 times per year.

There were no exceedances in annual daily mean concentrations of PM<sub>10</sub> over the last 2 years when indicative monitoring was undertaken during indicated periods.

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

Table A.5 in Appendix A presents the ratified and adjusted monitored PM<sub>2.5</sub> annual mean concentrations for the past 2 years.

The indicative monitoring results (period of monitoring in 2015-2016 – 31 weeks) raised no concern with regards to PM<sub>2.5</sub> as figures suggest that concentration of this pollutant at Devizes Road (marked as a red star on maps in Appendix D at 415567, 183570) lays well below Air Quality objectives listed in Appendix E.

## Appendix A: Monitoring Results

Table A.1 – Details of Non-Automatic Monitoring Sites

| Site ID | Site Name                               | Site Type    | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA? | Distance to Relevant Exposure (m) <sup>(1)</sup> | Distance to kerb of nearest road (m) <sup>(2)</sup> | Tube collocated with a Continuous Analyser? | Height (m) |
|---------|---|--------------|---------------|---------------|----------------------|----------|--|---|---|------------|
| SWIN1   | Swindon 1 - GWR Museum                  | Roadside     | 414,629       | 184,737       | NO <sub>2</sub>      | No       | 0.3  | 2.0   | No  | 2.6        |
| SWIN2   | Swindon 2 Bath Rd Car Park              | Roadside     | 415,290       | 183,790       | NO <sub>2</sub>      | No       | 8.6  | 5.3   | No  | 2.6        |
| SWIN3   | Swindon 4 - S4, 8 Okus Road             | Roadside     | 414,758       | 183,718       | NO <sub>2</sub>      | No       | 6.3  | 2.3   | No  | 2.5        |
| SWIN4   | Swindon 5 - 186 Kingshill Rd            | Roadside     | 414,258       | 183,972       | NO <sub>2</sub>      | No       | 2.3  | 2.0   | No  | 2.6        |
| SWIN5   | Swindon 6 - Chalet School, Queens Drive | Roadside     | 416,089       | 184,907       | NO <sub>2</sub>      | No       | 0.0  | 7.5   | No  | 2.5        |
| SWIN6   | Swindon 8 - 102 Bath Road               | Roadside     | 414,924       | 183,741       | NO <sub>2</sub>      | No       | 4.1  | 3.0   | No  | 2.5        |
| SWIN7   | Swindon 9 - 31 Sandgate                 | Railway side | 417,714       | 186,316       | NO <sub>2</sub>      | No       | 3.2  | 12.9  | No  | 1.1        |
| SWIN8   | Swindon 11 - Devizes Rd, Bridal shop    | Roadside     | 415,531       | 183,666       | NO <sub>2</sub>      | No       | 0.2  | 1.9   | No  | 2.5        |
| SWIN9   | Swindon 12 - Manchester Rd              | Roadside     | 415,157       | 185,101       | NO <sub>2</sub>      | No       | 0.2  | 2.6   | No  | 2.5        |

| Site ID | Site Name                             | Site Type    | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA? | Distance to Relevant Exposure (m) <sup>(1)</sup> | Distance to kerb of nearest road (m) <sup>(2)</sup> | Tube collocated with a Continuous Analyser? | Height (m) |
|---------|---------------------------------------|--------------|---------------|---------------|----------------------|----------|--|---|---|------------|
| SWIN10  | Swindon 13 - Meadow Way Badbury       | Roadside     | 419,346       | 180,979       | NO <sub>2</sub>      | No       | 3.7  | 3.0   | No  | 2.5        |
| SWIN11  | Swindon 14 - Kingshill Rd/Clifton St  | Roadside     | 414,733       | 183,783       | NO <sub>2</sub>      | No       | 12.5   | 1.3   | No  | 2.6        |
| SWIN12  | Swindon 15 - Westcott Place           | Roadside     | 414,076       | 184,041       | NO <sub>2</sub>      | No       | 12.8   | 1.2   | No  | 2.6        |
| SWIN13  | Swindon 16 - Cricklade Rd (Moonraker) | Roadside     | 415,677       | 187,336       | NO <sub>2</sub>      | No       | 2.7  | 3.0   | No  | 2.6        |
| SWIN14  | Swindon 17 - Bruce St Bridges         | Roadside     | 413,797       | 185,505       | NO <sub>2</sub>      | No       | 7.0  | 6.7   | No  | 2.8        |
| SWIN15  | Swindon 18 - 102 Kingshill Road       | Roadside     | 414,698       | 183,800       | NO <sub>2</sub>      | No       | 0.0  | 1.3   | No  | 2.5        |
| SWIN16  | Swindon 19 - 86 Clifton Road          | Roadside     | 414,756       | 183,789       | NO <sub>2</sub>      | No       | 11.6   | 1.7   | No  | 2.5        |
| SWIN17  | Swindon 20 - A420 South Marston       | Roadside     | 419,438       | 186,765       | NO <sub>2</sub>      | No       | 27.5   | 19.4  | No  | 2.4        |
| SWIN18  | Swindon 21 - 63 Kingshill Rd          | Roadside     | 414,552       | 183,885       | NO <sub>2</sub>      | No       | 6.0  | 2.0   | No  | 2.5        |
| SWIN19  | Swindon 22 - 38 Farriers Close        | Railway side | 416,153       | 185,673       | NO <sub>2</sub>      | No       | 7.6  | 21.0  | No  | 1.2        |
| SWIN20  | Swindon 23 - 37 Devizes Rd            | Roadside     | 415,547       | 183,552       | NO <sub>2</sub>      | No       | 4.3  | 1.8   | No  | 2.3        |
| SWIN21  | Swindon 23 - 37 Devizes Rd            | Roadside     | 415,547       | 183,552       | NO <sub>2</sub>      | No       | 4.3  | 1.8   | No  | 2.3        |

| Site ID | Site Name                                      | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA? | Distance to Relevant Exposure (m) <sup>(1)</sup> | Distance to kerb of nearest road (m) <sup>(2)</sup> | Tube collocated with a Continuous Analyser? | Height (m) |
|---------|--|-----------|---------------|---------------|----------------------|----------|--|---|---|------------|
| SWIN22  | Swindon 23 - 37 Devizes Rd                     | Roadside  | 415,547       | 183,552       | NO <sub>2</sub>      | No       | 4.3  | 1.8   | No  | 2.3        |
| SWIN23  | Swindon 24 - No 30 Devizes Road                | Roadside  | 415,555       | 183,495       | NO <sub>2</sub>      | No       | 3.4  | 1.8   | No  | 2.5        |
| SWIN24  | Swindon 25 - 68 Cheney Manor Rd (Rodbourne Rd) | Roadside  | 413,886       | 185,672       | NO <sub>2</sub>      | No       | 2.6  | 2.4   | No  | 2.8        |
| SWIN25  | Swindon 26 - Tadpole Lane                      | Roadside  | 411,973       | 189,625       | NO <sub>2</sub>      | No       | 16.7   | 0.7   | No  | 2.4        |
| SWIN26  | Swindon 27 - 66 Ermin St                       | Roadside  | 417,399       | 187,354       | NO <sub>2</sub>      | No       | 0.7  | 1.9   | No  | 2.6        |

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property).

(2) N/A if not applicable.

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

| Site ID                                 | Site Type    | Monitoring Type | Valid Data Capture for Monitoring Period (%) <sup>(1)</sup> | Valid Data Capture 2015 (%) <sup>(2)</sup> | NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup> |              |              |              |              |
|---|--------------|-----------------|---|--|---|--------------|--------------|--------------|--------------|
|   |              |                 |   |  | 2011  | 2012         | 2013         | 2014         | 2015         |
| Swindon 1 - GWR Museum                  | Roadside     | Diffusion Tube  | 100%  | 100%                                       | 39.7  | 35.95        | 26.73        | 37.19        | 35.16        |
| Swindon 2 Bath Rd Car Park              |              |                 | 100%  | 100%                                       | 28.07   | 26.16        | 23.26        | 25.39        | 25.45        |
| Swindon 4 - S4, 8 Okus Road             |              |                 | 100%  | 100%                                       | 29.56   | 22.36        | 24.00        | 26.73        | 19.59        |
| Swindon 5 - 186 Kingshill Rd            |              |                 | 100%  | 100%                                       | 34.74   | 32.17        | 33.09        | 31.11        | 28.44        |
| Swindon 6 - Chalet School, Queens Drive |              |                 | 100%  | 100%                                       | 37.16   | 29.27        | 32.44        | 32.87        | 32.09        |
| Swindon 8 - 102 Bath Road               |              |                 | 100%  | 100%                                       | 24.4  | 25.99        | 24.04        | 26.91        | 35.21        |
| Swindon 9 - 31 Sandgate                 | Railway side |                 | 100%  | 100%                                       |   | 21.6         | 22.79        | 21.68        | 18.00        |
| Swindon 11 - Devizes Rd, Bridal shop    | Roadside     |                 | 100%  | 100%                                       | 18.6  | 17.11        | 16.69        | 25.68        | 24.78        |
| Swindon 12 - Manchester Rd              |              |                 | 92%   | 92%  | <b>45.48</b>  | 38.46        | <b>41.77</b> | <b>39.33</b> | 37.39        |
| Swindon 13 - Meadow Way Badbury         |              |                 | 100%  | 100%                                       | 35.93   | 29.77        | 29.04        | 31.05        | 30.35        |
| Swindon 14 - Kingshill Rd/Clifton St    |              |                 | 100%  | 100%                                       | <b>45.4</b>   | <b>41.38</b> | 30.77        | <b>47.36</b> | <b>41.25</b> |
| Swindon 15 - Westcott Place             |              |                 | 100%  | 100%                                       | 35.79   | 31.44        | 29.89        | 32.25        | 30.21        |

| Site ID  | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) <sup>(1)</sup> | Valid Data Capture 2015 (%) <sup>(2)</sup> | NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup> |              |              |              |              |              |
|--|-----------|-----------------|---|--|---|--------------|--------------|--------------|--------------|--------------|
|  |           |                 |   |  |   |              |              |              |              |              |
| Swindon 16 - Cricklade Rd (Moonraker)          |           |                 | 100%  | 100%                                       | 34.73   | 31.44        | 27.45        | 36.16        | 35.77        |              |
| Swindon 17 - Bruce St Bridges                  |           |                 | 100%  | 100%                                       | 27.4  | 25.88        | 26.03        | 28.17        | 25.43        |              |
| S18, opp 101 Kingshill Road                    |           |                 | 100%  | 58%  |   |              |              |              | <u>75.52</u> |              |
| Swindon 18 - 102 Kingshill Road                |           |                 | 100%  | 42%  |   |              |              |              | <b>47.99</b> |              |
| Swindon 19 - 86 Clifton Road                   |           |                 | 100%  | 100%                                       | <b>43.9</b>   | <b>41.67</b> | 31.04        | <b>47.26</b> | 28.03        |              |
| Swindon 20 - A420 South Marston                |           |                 | 100%  | 100%                                       | 22.74   | 22.74        | 19.17        | 27.32        | 23.79        |              |
| Swindon 21 - 63 Kingshill Rd                   |           |                 | 100%  | 100%                                       | 38.95   | 31.46        | 28.74        | 34.78        | 30.06        |              |
| Swindon 22 - 38 Farriers Close                 |           |                 | Railway side  | 100%                                       | 100%  |              | 23.06        | 31.74        | 24.37        | 22.38        |
| Swindon 23 - 37 Devizes Rd                     |           |                 | Roadside  | 100%                                       | 100%  | <b>50.97</b> | <b>44.61</b> | <b>46.67</b> | <b>45.57</b> | <b>44.37</b> |
| Swindon 23 - 37 Devizes Rd                     |           |                 |   | 100%                                       | 100%  | <b>50.17</b> | <b>45.36</b> | <b>45.61</b> | <b>47.56</b> | <b>46.66</b> |
| Swindon 23 - 37 Devizes Rd                     |           |                 |   | 100%                                       | 100%  | <b>52.15</b> | <b>45.45</b> | <b>44.75</b> | <b>44.91</b> | <b>45.61</b> |
| Swindon 24, 30 Devizes Road                    |           |                 |   | 100%                                       | 100%  | 32.08        | 25.38        | 25.20        | 28.44        | <b>43.35</b> |
| Swindon 25 - 68 Cheney Manor Rd (Rodbourne Rd) |           |                 |   | 100%                                       | 100%  |              | <b>42.49</b> | <b>40.22</b> | <b>42.35</b> | 36.47        |
| Swindon 26 - Tadpole Lane                      | 100%      | 100%            |   | 20.31                                      | 17.88   | 14.11        | 17.66        | 15.30        |              |              |

| Site ID                  | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) <sup>(1)</sup> | Valid Data Capture 2015 (%) <sup>(2)</sup> | NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup> |      |       |       |       |
|--------------------------|-----------|-----------------|---|--|---|------|-------|-------|-------|
|                          |           |                 |   |  |   |      |       |       |       |
| Swindon 27 - 66 Ermin St |           |                 | 100%  | 100%                                       | 32.47   | 26.6 | 29.89 | 31.20 | 29.38 |

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

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 1-hour mean objective are shown in **bold and underlined**.

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per Technical Guidance LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

|   |   |
|---|---|
|    | Site relocated to Ermin St                                  |
|    | Site relocated to Manchester Road                           |
|    | Site relocated from Bath Road Car Park                      |
|    | Site relocated from Bath Road Car Park                      |
|   | Site relocated from Kingshill Rd/Clifton St                 |
|  | Site relocated from across the road from 102 Kingshill Road |
|  | Site relocated from South Street                            |
|  | Site relocated from Bus Station                             |
|  | Site relocated from 422 Cricklade Road                      |



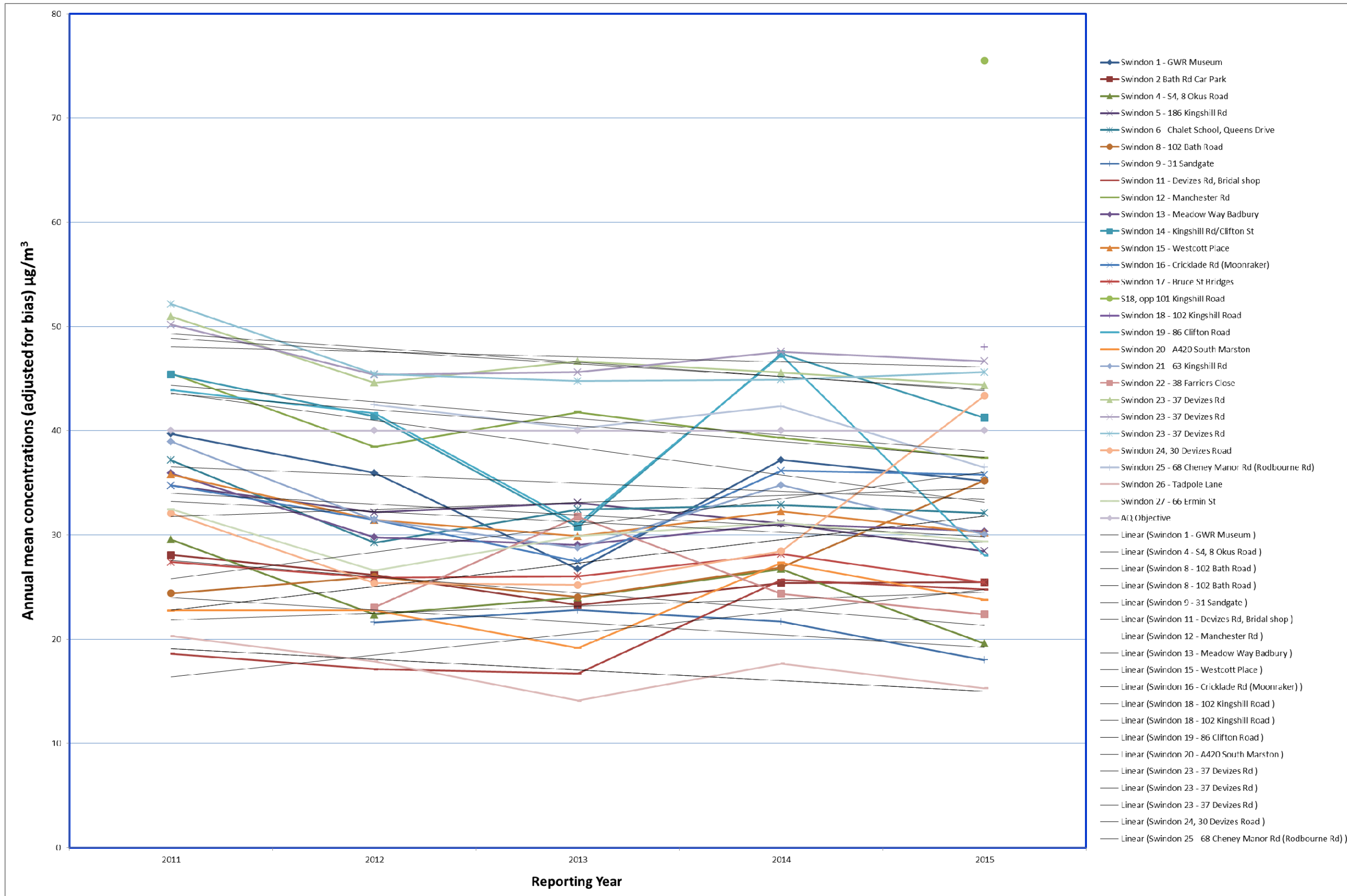


Figure 1: Trends in Annual Mean Nitrogen Dioxide Concentrations

Table A.3 – Annual Mean PM<sub>10</sub> Monitoring Results

| Site ID | Site Type | Valid Data Capture for Monitoring Period (%) <sup>(1)</sup> | Valid Data Capture 2015 (%) <sup>(2)</sup> | PM <sub>10</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup> |      |      |      |      |
|---------|-----------|---|--|--|------|------|------|------|
|         |           |   |  | 2011   | 2012 | 2013 | 2014 | 2015 |
| CM1     | Roadside  | 95  | 95   | NA   | NA   | NA   | 1.24 | 0.32 |
|         |           |   |  |  |      |      |      |      |

Notes: Exceedances of the PM<sub>10</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) All means have been “annualised” as per Technical Guidance LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Table A.4 – 24-Hour Mean PM<sub>10</sub> Monitoring Results

| Site ID | Site Type | Valid Data Capture for Monitoring Period (%)<br>(1) | Valid Data Capture 2015 (%)<br>(2) | PM <sub>10</sub> 24-Hour Means > 50µg/m <sup>3</sup> (3) |      |      |      |      |
|---------|-----------|---|------------------------------------|--|------|------|------|------|
|         |           |   |                                    | 2011   | 2012 | 2013 | 2014 | 2015 |
| CM1     | Roadside  | 94  | 33                                 | NA   | NA   | NA   | 0    | 0    |

Notes: Exceedances of the PM<sub>10</sub> 24-hour mean objective (50µg/m<sup>3</sup> not to be exceeded more than 35 times/year) are shown in **bold**.

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) If the period of valid data is less than 90%, the 90.4<sup>th</sup> percentile of 24-hour means is provided in brackets.

Table A.5 – PM<sub>2.5</sub> Monitoring Results

| Site ID | Site Type | Valid Data Capture for Monitoring Period (%) <sup>(1)</sup> | Valid Data Capture 2015 (%) <sup>(2)</sup> | PM <sub>2.5</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup> |      |      |      |      |
|---------|-----------|---|--|---|------|------|------|------|
|         |           |   |  | 2011  | 2012 | 2013 | 2014 | 2015 |
| CM1     | Roadside  | 100   | 33   | NA  | NA   | NA   | 0.72 | 0.23 |
|         |           |   |  |   |      |      |      |      |

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) All means have been “annualised” as per Technical Guidance LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

## Appendix B: Full Monthly Diffusion Tube Results for 2015-2016

Table B.1 – NO<sub>2</sub> Monthly Diffusion Tube Results – 2015-2016

| Site ID                                 | NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> ) |             |             |             |             |             |             |             |             |             |              |             |          |                              |       |
|---|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|-------------|----------|------------------------------|-------|
|   | 2015   |             |             |             |             |             |             |             |             |             | 16/12 -19/01 | 2016        |          | Annual Mean                  |       |
|   | 20/03-21/04  | 21/04-20/05 | 20/05-19/06 | 19/06-17/07 | 17/07-17/08 | 17/08-22/09 | 22/09-20/10 | 20/10-19/11 | 19/11-16/12 | 19/01-18/02 |              | 18/02-17/03 | Raw Data | Bias Adjusted <sup>(1)</sup> |       |
|   | Swindon 1 - GWR Museum                                   | 39.7        | 36.5        | 37.8        | 43.2        | 33.2        | 48.2        | 55.3        | 48.5        | 48.5        | 43.1         | 52.6        | 34.3     | 43.41                        | 35.16 |
| Swindon 2 Bath Rd Car Park              | 27.2   | 25.2        | 20.6        | 23.8        | 22.5        | 28.6        | 35          | 31.4        | 23.2        | 74.1        | 31.3         | 34.1        | 31.42    | 25.45                        |       |
| Swindon 4 - S4, 8 Okus Road             | 27   | 19          | 18.1        | 18          | 17.9        | 25.7        | 33.9        | 19.5        | 24.5        | 20.6        | 30.4         | 35.6        | 24.18    | 19.59                        |       |
| Swindon 5 - 186 Kingshill Rd            | 34.1   | 31.7        | 13.2        | 32.5        | 27.9        | 40.1        | 36.3        | 43.4        | 44.7        | 45.4        | 33.3         | 38.7        | 35.11    | 28.44                        |       |
| Swindon 6 - Chalet School, Queens Drive | 34.5   | 34.5        | 36          | 41.5        | 34          | 39.3        | 35.8        | 44.5        | 48.3        | 41.3        | 47.2         | 38.5        | 39.62    | 32.09                        |       |
| Swindon 8 - 102 Bath Road               | 43.1   | 43.4        | 37.5        | 43.4        | 38.3        | 44.8        | 52.3        | 47.6        | 48.6        | 23.8        | 50.1         | 48.8        | 43.48    | 35.21                        |       |
| Swindon 9 - 31 Sandgate                 | 24.5   | 21.6        | 17          | 19.6        | 22.1        | 22.8        | 30.1        | 23.3        | 5.1         | 22.2        | 29.4         | 29          | 22.23    | 18.00                        |       |
| Swindon 11 - Devizes Rd, Bridal shop    | 31.8   | 22.9        | 18.4        | 25.4        | 25.3        | 32.6        | 37          | 36.2        | 29.2        | 35          | 37.9         | 35.4        | 30.59    | 24.78                        |       |
| Swindon 12 - Manchester Rd              | 58.5   | 47.6        | 42.7        | 44.9        | 39.7        | 46.4        | 59.1        | 44.9        | 42          | 40.2        | 41.8         |             | 46.16    | 37.39                        |       |
| Swindon 13 - Meadow Way Badbury         | 36.8   | 37.5        | 28.9        | 43.2        | 39.8        | 36.7        | 27.8        | 40.5        | 41.1        | 36.2        | 43.9         | 37.2        | 37.47    | 30.35                        |       |
| Swindon 14 - Kingshill Rd/Clifton St    | 48.2   | 44.4        | 35.9        | 55.2        | 48.5        | 53.2        | 56.1        | 56.7        | 54.4        | 53          | 54           | 51.5        | 50.93    | <b>41.25</b>                 |       |
| Swindon 15 - Westcott Place             | 36.6   | 33.7        | 26.9        | 28.9        | 29.6        | 40.6        | 46.1        | 41.2        | 43          | 36.6        | 40.5         | 43.9        | 37.30    | 30.21                        |       |
| Swindon 16 - Cricklade Rd (Moonraker)   | 41.2   | 32.9        | 37.8        | 33.4        | 36.1        | 47.4        | 65.2        | 45.2        | 42.5        | 41.4        | 51.4         | 55.4        | 44.16    | 35.77                        |       |
| Swindon 17 - Bruce St                   | 37.4   | 31.6        | 38.1        | 35.5        | 37.5        | 27.7        | 38          | 26.4        | 23.9        | 21          | 30.5         | 29.1        | 31.39    | 25.43                        |       |

| Site ID  | NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> ) |             |             |             |             |             |             |             |             |             |              |             |          |                              |  |
|--|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|-------------|----------|------------------------------|--|
|  | 2015   |             |             |             |             |             |             |             |             |             | 16/12 -19/01 | 2016        |          | Annual Mean                  |  |
|  | 20/03-21/04  | 21/04-20/05 | 20/05-19/06 | 19/06-17/07 | 17/07-17/08 | 17/08-22/09 | 22/09-20/10 | 20/10-19/11 | 19/11-16/12 | 19/01-18/02 |              | 18/02-17/03 | Raw Data | Bias Adjusted <sup>(1)</sup> |  |
| Bridges  |  |             |             |             |             |             |             |             |             |             |              |             |          |                              |  |
| Swindon 18 - 102 Kingshill Road                |  |             |             |             |             |             |             | 75.5        | 72.7        | 66.8        | 69.5         | 68.7        | 70.64    | <b>70.6</b>                  |  |
| S18, opp 101 Kingshill Road                    | 82.6   | 60.3        | 63.6        | 75.6        | 70.8        | 80.1        | 118.7       |             |             |             |              |             |          | <b>78.8</b>                  |  |
| Swindon 19 - 86 Clifton Road                   | 32.5   | 33          | 28.5        | 38.7        | 33.2        | 41.5        | 40.5        | 34.9        | 26.7        | 30.9        | 35.4         | 39.4        | 34.60    | 28.03                        |  |
| Swindon 20 - A420 South Marston                | 32.6   | 27.7        | 28.8        | 26.8        | 24.3        | 31.4        | 45.2        | 23.8        | 19.8        | 19.4        | 31.9         | 40.7        | 29.37    | 23.79                        |  |
| Swindon 21 - 63 Kingshill Rd                   | 42.7   | 35.6        | 25.5        | 15.1        | 29.9        | 42.7        | 59.3        | 36.5        | 34          | 34.3        | 39.6         | 50.2        | 37.12    | 30.06                        |  |
| Swindon 22 - 38 Farriers Close                 | 25.7   | 22.2        | 21.8        | 24.3        | 23.5        | 28.6        | 32.4        | 29.4        | 30.4        | 25.5        | 34.4         | 33.3        | 27.63    | 22.38                        |  |
| Swindon 23 - 37 Devizes Rd                     | 54.9   | 53          | 51.2        | 55.8        | 52.6        | 57.5        | 53.2        | 57          | 56.9        | 46.6        | 63.5         | 55.1        | 54.78    | <b>44.37</b>                 |  |
| Swindon 23 - 37 Devizes Rd                     | 57.3   | 50.4        | 51.6        | 59.2        | 54.7        | 62.9        | 54.1        | 56.7        | 63.8        | 52.8        | 68.2         | 59.6        | 57.61    | <b>46.66</b>                 |  |
| Swindon 23 - 37 Devizes Rd                     | 57.1   | 50.9        | 48.6        | 58.9        | 54.2        | 57.4        | 54.1        | 54.3        | 63.2        | 57.5        | 63.4         | 56.1        | 56.31    | <b>45.61</b>                 |  |
| Swindon 24, 30 Devizes Road                    | 45   | 51.2        | 41.4        | 55.6        | 46.1        | 54.5        | 45.4        | 56.3        | 66.8        | 57.8        | 60.1         | 62          | 53.52    | <b>43.35</b>                 |  |
| Swindon 25 - 68 Cheney Manor Rd (Rodbourne Rd) | 51.6   | 42.6        | 28.2        | 23.1        | 19.8        | 53.3        | 65.2        | 57.1        | 50.7        | 51.1        | 44.9         | 52.7        | 45.03    | 36.47                        |  |
| Swindon 26 - Tadpole Lane                      | 21.4   | 16.2        | 13.9        | 19.3        | 11.8        | 15.6        | 22.4        | 21.4        | 20.8        | 20.4        | 17.9         | 25.6        | 18.89    | 15.30                        |  |
| Swindon 27 - 66 Ermin St                       | 38.7   | 31          | 31          | 30.3        | 30          | 38.3        | 41.5        | 39.8        | 39.5        | 34.3        | 38.7         | 42.1        | 36.27    | 29.38                        |  |

(1) See Appendix C for details on bias adjustment

## Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

Monitoring results provided in Appendix B, Table B.1 above suggest similar to previous assessments areas, where concentrations of Nitrogen Dioxide exceed AQ objective of  $40 \mu\text{g}/\text{m}^3$  for this pollutant. Therefore a DMRB model has been run to identify a road traffic component at 102 Kingshill Road, where monitoring indicated concentrations of Nitrogen Dioxide to be  $57.2 \mu\text{g}/\text{m}^3$ .

When the model was run, the  $\text{NO}_x$  road component was calculated as  $27.2 \mu\text{g}/\text{m}^3$ . Following [Guidance on Running the DMRB Screening Model](#) and  $\text{NO}_x$  to  $\text{NO}_2$  Calculator, a total  $\text{NO}_2$  for this location was calculated as  $31.98 \mu\text{g}/\text{m}^3$ . Following instructions in Box 2 of the Guidance, a street canyon on the top of the Kingshill was taken into account. In-canyon total  $\text{NO}_2$  was calculated as  $35.4 \mu\text{g}/\text{m}^3$ .

When the same calculator was run using measured by diffusion tubes concentration of  $\text{NO}_2$ , road  $\text{NO}_x$  were calculated as  $92.89 \mu\text{g}/\text{m}^3$ .

### 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 2015 were used.

### PM Monitoring Adjustment

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

### QA/QC of Diffusion Tube Monitoring

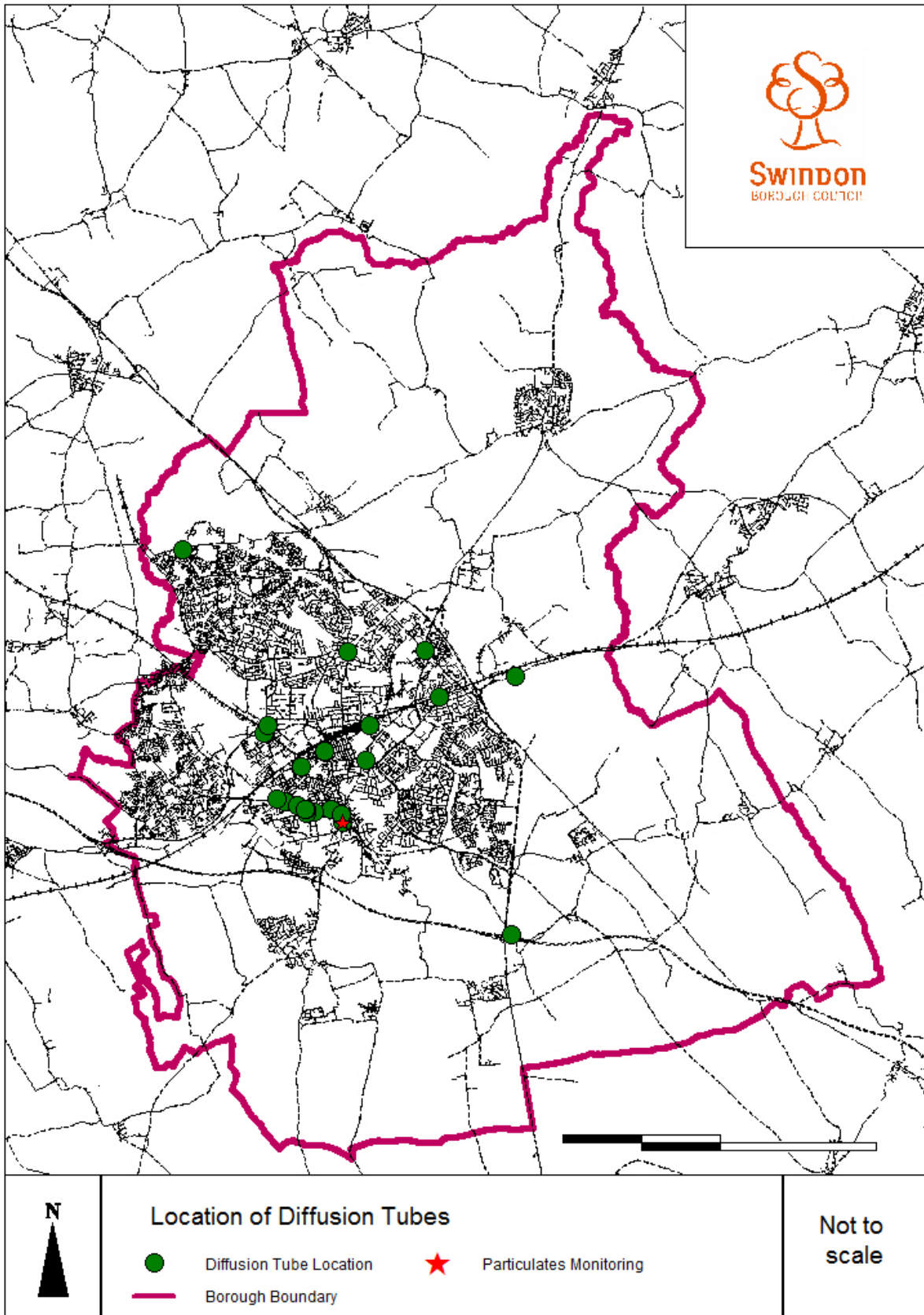
Environmental Scientifics Group has advised the following.

- The manufacture and analysis of NO<sub>2</sub> diffusion tubes is covered by ESG's UKAS accreditation
- The method meets the requirements laid out in DEFRA's "Diffusion Tubes for Ambient NO<sub>2</sub> 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 2015, 7000+ internal quality control samples were analysed in conjunction with the diffusion tubes, achieving an analytical repeatability of 2.3% (at 95% confidence).

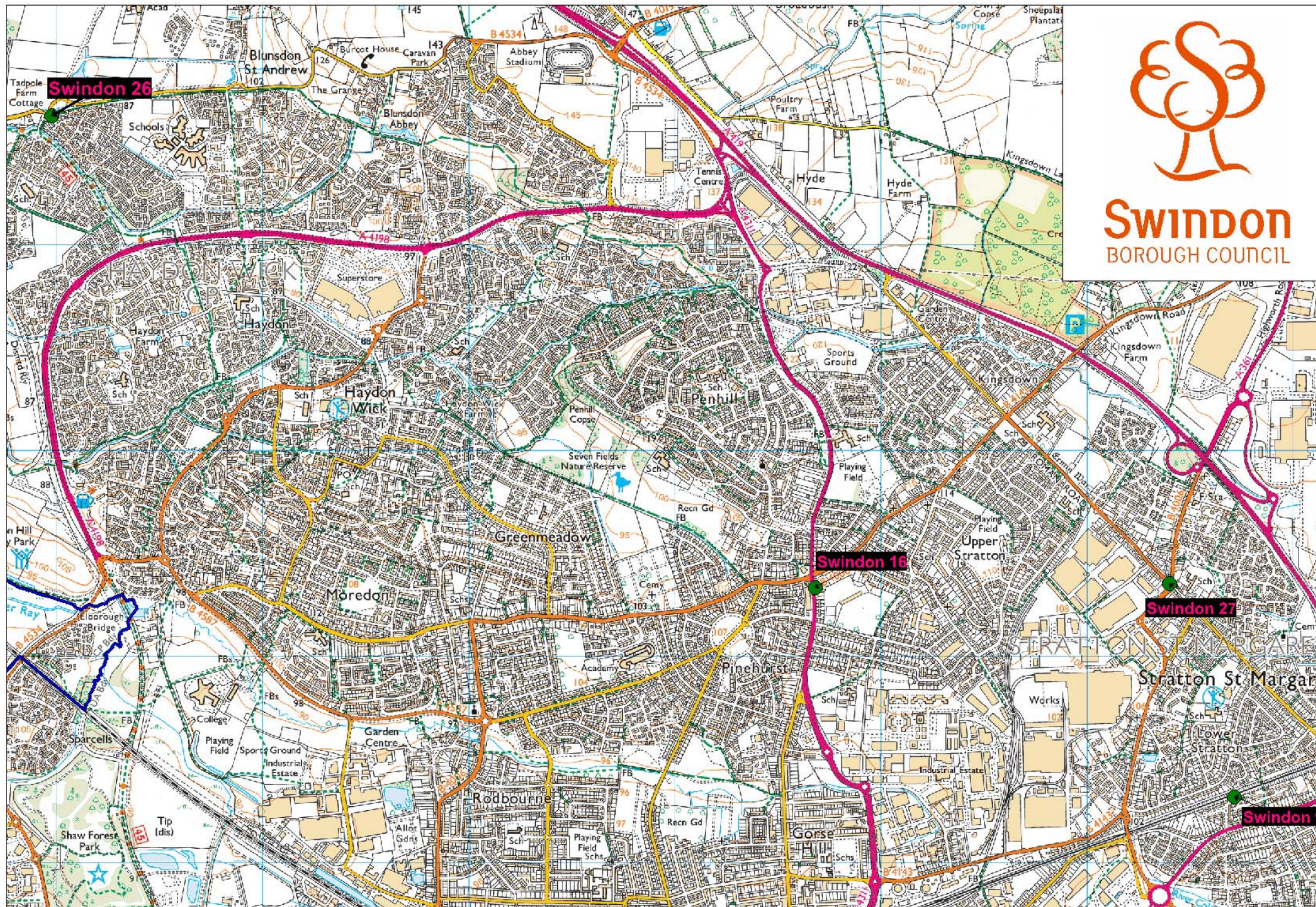
Please note that the WASP proficiency scheme has now been replaced with the IR PT scheme - new international PT scheme for laboratories involved in air quality analysis.



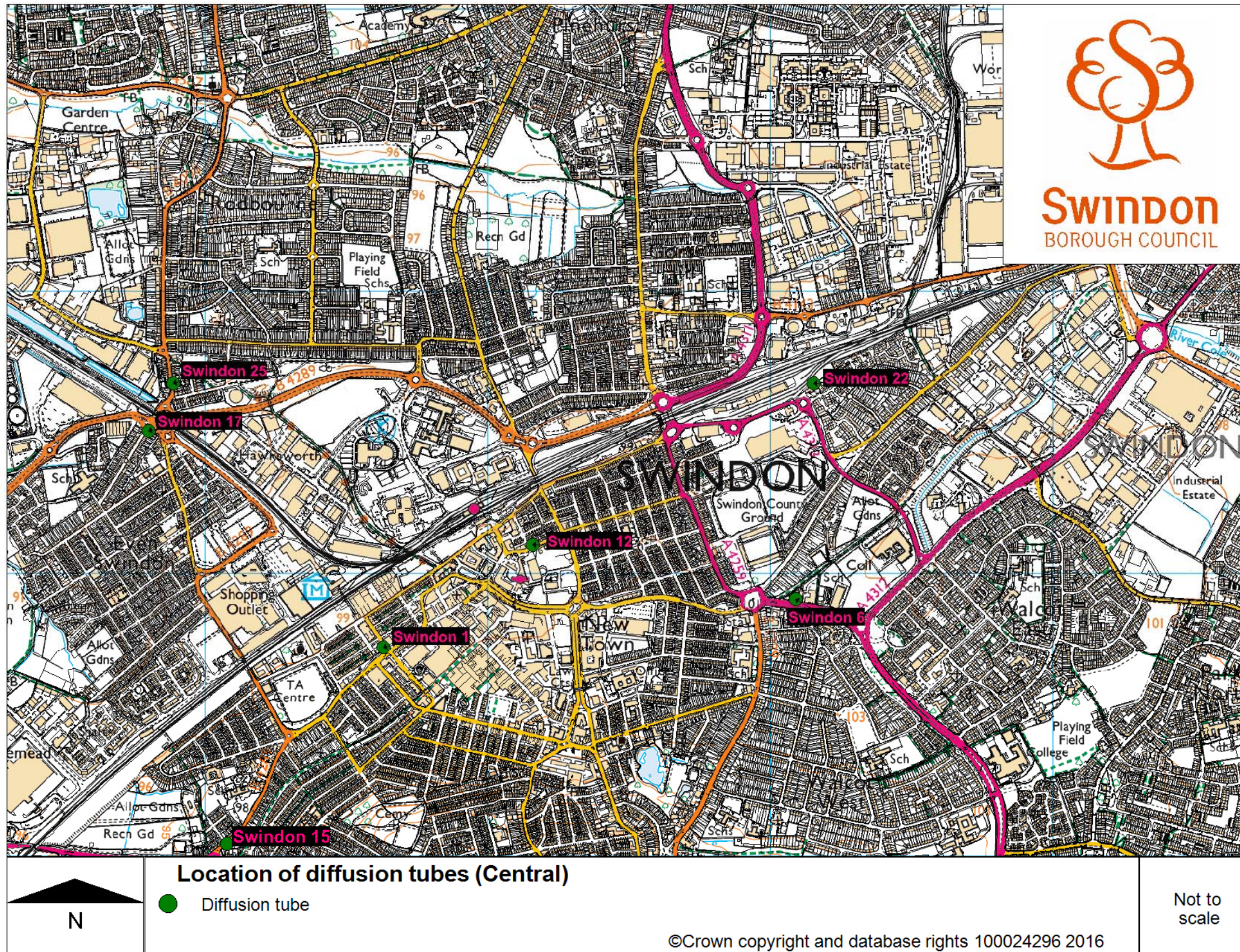
## Appendix D: Map(s) of Monitoring Locations



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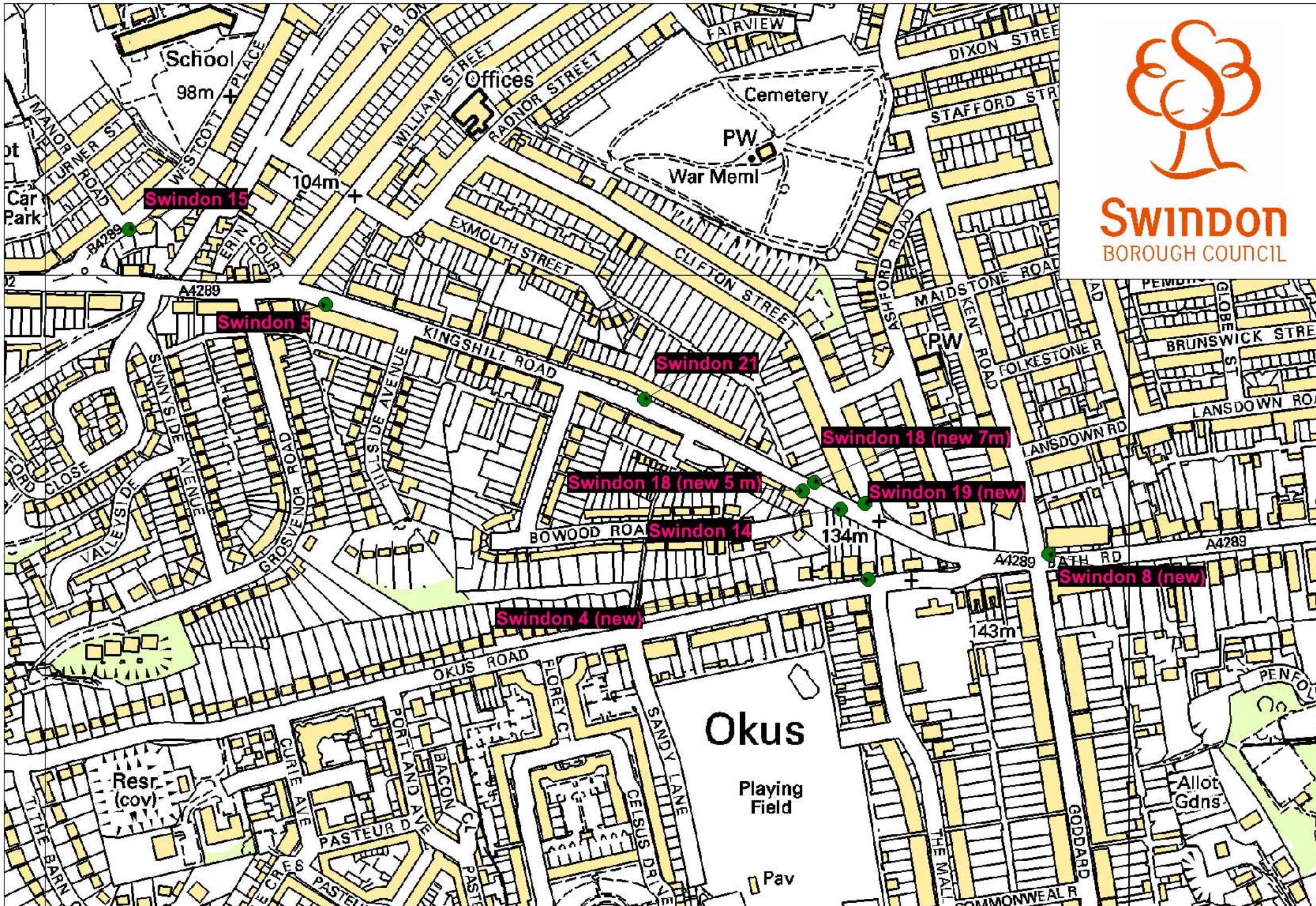


|  |  |                     |
|--|--|---------------------|
|  | <p><b>Location of diffusion tubes (North)</b></p> <p><span style="color: green;">●</span> Diffusion tube</p> | <p>Not to scale</p> |
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**SWINDON**  
BOROUGH COUNCIL



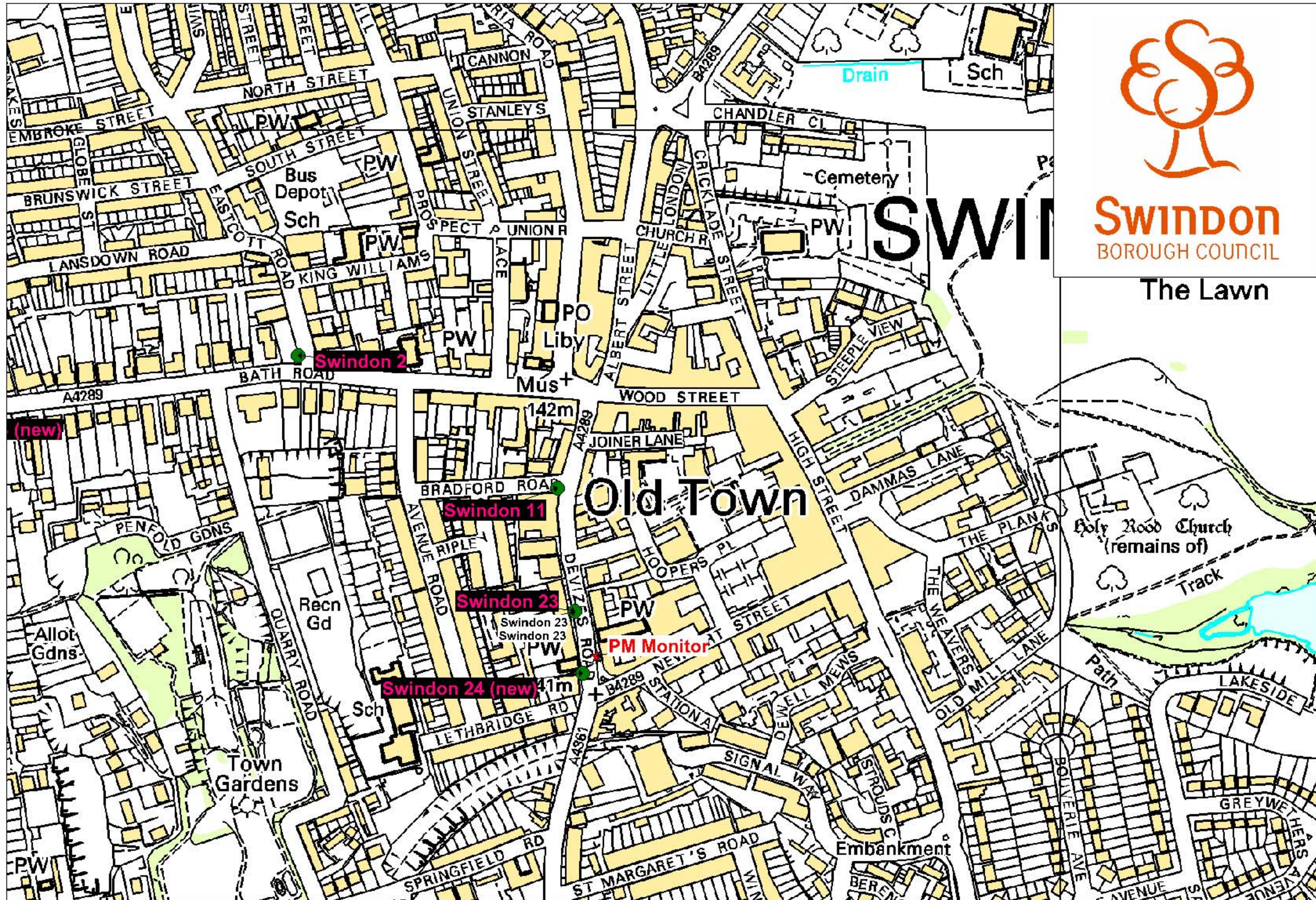
**Location of diffusion tubes (Kingshill Road area)**



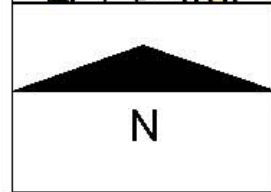
● Diffusion tube

Not to scale

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The Lawn



**Location of diffusion tubes (Old Town)**

- Diffusion tube
- ★ PM Monitor

Not to scale

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**Location of diffusion tubes (South, Badbury, M4, J15)**

● Diffusion tube

Not to scale

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

Table E.1 – Air Quality Objectives in England

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

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

## Glossary of Terms

| Abbreviation      | Description   |
|-------------------|---|
| AQAP              | Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'    |
| AQMA              | Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives |
| ASR               | Air quality Annual Status Report  |
| Defra             | Department for Environment, Food and Rural Affairs  |
| DMRB              | Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England   |
| EU                | European Union  |
| LAQM              | Local Air Quality Management  |
| NO <sub>2</sub>   | Nitrogen Dioxide  |
| NO <sub>x</sub>   | Nitrogen Oxides   |
| PM <sub>10</sub>  | Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less   |
| PM <sub>2.5</sub> | Airborne particulate matter with an aerodynamic diameter of 2.5µm or less   |
| QA/QC             | Quality Assurance and Quality Control   |
| LCDO              | Low Carbon Development Orders   |
| LDO               | Local Development Order   |
| SBC               | Swindon Borough Council   |
| TEA               | Triethanolamine   |
| ESG               | Environmental Scientific Group  |



## References

DEFRA (2016) Local Air Quality Management Technical Guidance, (LAQM .TG (16  
LAQM Helpdesk accessible from <http://laqm.defra.gov.uk/technical-guidance/>

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

Defra Nitrogen Dioxide fall off with distance calculator <http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>

Year Adjustment Factors <http://laqm.defra.gov.uk/tools-monitoring-data/year-adjustment-factors.html>

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Council April 2007, downloaded from [http://www.swindon.gov.uk/ep/ep-planning/planningpolicy/ep-planning-localdev/Documents/core\\_strategy\\_web\[1\].pdf](http://www.swindon.gov.uk/ep/ep-planning/planningpolicy/ep-planning-localdev/Documents/core_strategy_web[1].pdf)

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