



# 2017 Air Quality Annual Status Report (ASR)

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

June 2017

## Stevenage Borough Council

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## Executive Summary: Air Quality in Our Area

### Air Quality in Stevenage

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>.

Air quality in Stevenage can be considered to be good. There are no AQMAs and no major point sources of emissions. Emissions have remained largely constant over the years. Monitoring takes place of nitrogen dioxide (NO<sub>2</sub>) and particulate matter less than 2.5 microns (PM<sub>2.5</sub>).

Additional monitoring of NO<sub>2</sub> using diffusion tubes is taking place in areas that have been developed for housing.

Regular meetings are held with colleagues in other authorities to share information on the gathering of air quality data, as part of the Herts and Beds Air Quality Network.

We are grateful for the funding provided by Hertfordshire County Council, which has gone toward the purchase of a new analyser for measuring PM<sub>2.5</sub>.

### Actions to Improve Air Quality

A pool bike scheme has been launched by the Council for employees to use. A car club using electric cars has also been put into place and is being used by staff and the public.

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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

## Conclusions and Priorities

The air quality in Stevenage can be considered to be good. The results this year showed three exceedances of the NO<sub>2</sub> annual mean. However, following correction of the data using the NO<sub>2</sub> fall off calculator, all figures fell within the required limit, at the location of the nearest receptor. Monitoring will continue at all of these locations, and be reported in the next ASR. However, the two tubes positioned at low level and responsible for the exceedances, have been moved to other locations in the borough. The new sites follow the Defra Diffusion Tubes for Ambient NO<sub>2</sub> Monitoring: Practical Guidance, siting all tubes in the monitoring programme at similar heights.

The (limited) results for PM<sub>2.5</sub> are encouraging, and a full year's capture is expected for 2017.

## Local Engagement and How to get Involved

The public can

- Use the excellent network of cycle paths laid out across the borough
- Ensure cars are serviced regularly
- Reduce the use of cars for short journeys
- When changing vehicles, consider a more efficient / cleaner one.

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## 1 Local Air Quality Management

This report provides an overview of air quality in Stevenage during 2016. 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 Stevenage 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.

Stevenage Borough Council has not declared any AQMAs.

## 2.2 Progress and Impact of Measures to address Air Quality in Stevenage

Defra's appraisal of last year's ASR concluded that distance correction was required for Tube 17, and the data for Tubes 30, 31 and 32 appeared to be mixed up. Distance correction has been applied and the calculated result chimes nicely with the actual measured concentration at site 19 where the Tube was placed to cater for this.

Stevenage Borough Council currently does not have any AQMAs. Stevenage has a green travel plan available here

<http://www.stevenage.gov.uk/content/15953/16118/33198/Green-Travel-Plan-2013-18.pdf>

Stevenage has an air quality strategy, available to view here

<http://www.stevenage.gov.uk/content/15953/19198/19217>

This document has been superseded by the Hertfordshire County Council strategic plan <http://www.hertfordshire.gov.uk/docs/pdf/a/airqualitystrategicplan.pdf>

Further general information on this subject is available at

<http://www.hertfordshire.gov.uk/services/healthsoc/healthherts/healthyplaces/>

Stevenage Borough Council has taken forward a number of direct measures during the current reporting year of 2017 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2..

More detail on these measures can be found in their respective Action Plans.



Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Local plan mobility strategy	Promoting travel alternatives	Promotion of cycling	Local Authority	Current	TBA	NK	Reduced vehicle emissions	Planning phase	NK	
2	Local plan mobility strategy	Promoting travel alternatives	Promotion of walking	Local Authority	Current	TBA	NK	Reduced vehicle emissions	Planning phase	NK	
3	Local plan mobility strategy	Transport planning and infrastructure	Cycle network	Local Authority	Current	TBA	NK	Reduced vehicle emissions	Planning phase	NK	
4	Local plan mobility strategy	Transport planning and infrastructure	Public cycle hire scheme	Local Authority	Current	TBA	NK	Reduced vehicle emissions	Planning phase	NK	
5	Electric car club	Alternatives to private vehicle use	Car club	Local Authority		In place	NK	Reduced vehicle emissions	In place	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> (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.

Stevenage Borough Council is taking the following measures to address PM<sub>2.5</sub>: The purchase of a BAM particulate analyser has allowed the Council to know the levels of this pollutant at a point in the Borough. The current figure has been annualised due to the limited duration of sampling, but once we have, this baseline data we will, together with other authorities across Hertfordshire and Bedfordshire, be better able to formulate an approach which could lead to projects which may help to reduce this figure.

The electric car club scheme, and the Council's bicycle fleet will both help to reduce emissions of particulates.

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

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

#### **3.1.1 Automatic Monitoring Sites**

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

Stevenage Borough Council undertook automatic (continuous) monitoring at one site during 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 how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

#### **3.1.2 Non-Automatic Monitoring Sites**

Stevenage Borough Council undertook non- automatic (passive) monitoring of NO<sub>2</sub> at thirty sites during 2016. Table A.2 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) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. “annualisation” and/or distance correction), are included in Appendix C.

### **3.2 Individual Pollutants**

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

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

Table A.3 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 2016 dataset of monthly mean values is provided in Appendix B.

Table A.4 in Appendix A compares the ratified continuous monitored NO<sub>2</sub> hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m<sup>3</sup>, not to be exceeded more than 18 times per year.

Tubes 17 and 32, and 23 and 33 were co-located, at just above head height and knee height, as an indicator of concentrations at pushchair/child height. For 2016, the results at the lower height, uncorrected for distance, showed concentrations 110% and 111% higher than those at the recommended height.

These tubes have now been deployed at other locations around the borough according to Diffusion Tubes for Ambient NO<sub>2</sub> Monitoring: Practical Guidance

“The selection of sites will of course depend on the objectives of the monitoring programme. However, for Local Air Quality Management (LAQM) purposes, sites should be located in areas where there is *relevant public exposure*. For other monitoring programmes, the reasons may vary (e.g. occupational health, highest concentration, investigation of background concentrations.) **Safety should be an important consideration when siting tubes at height or near to roads.**

The immediate area around the sampler location must be open, allowing free circulation of air around the tube. Ideally, samplers would be placed at breathing height, but in order to reduce theft of tubes, it is recommended that tubes are placed at a height of 2-4 m. Concentrations of NO<sub>2</sub> typically decrease with height above street level, so tubes placed some metres above street level may under-estimate the actual concentrations to which the public are exposed. As far as is practical, all tubes within any given monitoring programme should be placed at similar heights.”

The colocated tubes, 32 and 33, were placed to represent a worst case scenario.

However, their placement deviates from the Guidance referenced above and therefore loses relevance, and comparability with other tubes in this programme, and those in other districts. Therefore, the tubes were resited.

### 3.2.2 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 year.

The annualised reading of 11 indicates PM<sub>2.5</sub> at the Stevenage monitoring site to be low.

## Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Inlet Height (m)
SE16	Stevenage 1	Kerbside	523586	223967	NO <sub>2</sub>	NO	Chemiluminescent	110	3	2
SE16	Stevenage 1	Kerbside	523586	223967	PM <sub>2.5</sub>	NO	BAM	110	3	2

**Notes:**

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

(2) N/A if not applicable.

Table A.2 – 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)
1	Town Centre	Roadside	523771	224090	NO <sub>2</sub>	N	102	4.0	N	2.35
2	Ashdown Road	Roadside	525832	221495	NO <sub>2</sub>	N	14	1.7	N	2.7
3	Monks View	Urban background	524857	222756	NO <sub>2</sub>	N	9.5	0.20	N	2.9
4	Bedwell Crescent	Kerbside	524345	224468	NO <sub>2</sub>	N	20	0.8	N	2.5
5	Salisbury Road	Urban background	525373	226985	NO <sub>2</sub>	N	6.6	19.0	N	2.8
6	Letchmore Road	Roadside	523845	225386	NO <sub>2</sub>	N	14	1.3	N	2.6
7	High Street	Roadside	523278	225479	NO <sub>2</sub>	N	9	2.4	N	3.0
8	Fishers Green	Urban background	522259	226001	NO <sub>2</sub>	N	18	0.95	N	2.75
9	Magpie Crescent	Roadside	526652	223438	NO <sub>2</sub>	N	12.5	2.0	N	2.9
10	Shoreham Close	Urban background	522075	225568	NO <sub>2</sub>	N	8	2.05	N	2.5
11	Newlyn Close	Urban background	522126	224862	NO <sub>2</sub>	N	3.5	1.7	N	2.65
12	Chadwell Road	Suburban	522955	223335	NO <sub>2</sub>	N	25	0.4	N	2.6
13	Whitney Drive	Urban background	523070	226070	NO <sub>2</sub>	N	8	1.9	N	2.3
14	Lytton Way	Roadside	523586	223967	NO <sub>2</sub>	N	110	>5	Y	2.9
17	Hitchin Road	Roadside	522700	226550	NO <sub>2</sub>	N	14	2.4	N	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)
18	Fairlands Valley Park	Urban background	525425	224183	NO <sub>2</sub>	N	167	172.5	N	2.6
19	7 Tates Way	Roadside	522700	226570	NO <sub>2</sub>	N	0	9	N	2.25
21	13 Hitchin Road	Roadside	523128	225677	NO <sub>2</sub>	N	0	16	N	2.17
22	Townsend Mews	Roadside	523360	224786	NO <sub>2</sub>	N	0	7.8	N	2.65
23	Hitchin Road - Longfields	Roadside	523014	226029	NO <sub>2</sub>	N	7.4	2.45	N	2.10
24	Martins Way	Kerbside	525987	226368	NO <sub>2</sub>	N	8.0	0.8	N	2.15
25	Cherwell Drive	Roadside	525470	227287	NO <sub>2</sub>	N	8.7	1.3	N	2.8
26	Vardon Road	Roadside	524542	225654	NO <sub>2</sub>	N	10.2	7.7	N	2.6
27	Mildmay Road	Kerbside	525815	226061	NO <sub>2</sub>	N	8.0	0.4	N	2.9
28	Chells Way	Roadside	526078	224818	NO <sub>2</sub>	N	1.5	1.5	N	2.35
29	Edmonds Drive	Roadside	526964	223760	NO <sub>2</sub>	N	1.5	1.0	N	2.8
30	Shephall Way	Roadside	526094	223389	NO <sub>2</sub>	N	2.8	2.9	N	2.75
31	Hydean Way	Kerbside	522710	226550	NO <sub>2</sub>	N	0	6.0	N	2.6
32	Hitchin Road (collocated tube 17) - base	Roadside	522700	226550	NO <sub>2</sub>	N	14	2.4	N	0.60

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)
33	Hitchin Road – Longfields (collocated tube 23) - base	Roadside	523014	226029	NO <sub>2</sub>	N	7.4	2.45	N	0.86

**Notes:**

(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.3 – 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 2016 (%)	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) (3)				
					2012	2013	2014	2015	2016
1	Roadside	Diffusion tube		83.33	26.90	32.14	32.18	31.19	33.22
2	Roadside	Diffusion tube		100.00	18.70	18.54	17.55	16.25	17.97
3	Urban background	Diffusion tube		100.00	22.55	21.19	22.02	20.98	22.10
4	Kerbside	Diffusion tube		100.00	19.31	20.83	20.99	19.47	21.45
5	Urban background	Diffusion tube		91.67	15.68	15.69	15.00	13.89	13.83
6	Roadside	Diffusion tube		100.00	22.24	19.48	20.58	17.93	19.20
7	Roadside	Diffusion tube		91.67	24.62	14.59	31.75	30.92	31.51
8	Urban background	Diffusion tube		100.00	21.38	21.38	22.53	19.97	21.43
9	Roadside	Diffusion tube		100.00	25.28	23.96	25.71	24.45	26.60
10	Urban background	Diffusion tube		91.67	30.18	27.62	26.64	26.46	26.45
11	Urban background	Diffusion tube		100.00	18.74	16.44	21.88	20.23	20.80
12	Suburban	Diffusion tube		91.67	19.63	21.69	19.70	16.24	19.52
13	Urban background	Diffusion tube		100.00	27.14	22.73	23.88	21.80	22.44
14**	Roadside	Diffusion tube		100.00	30.57	30.10	32.88	30.01	33.03

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2016 (%)	NO2 Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
					2012	2013	2014	2015	2016
17***	Roadside	Diffusion tube		100.00	<b>43.32</b>	<b>47.84</b>	<b>47.59</b>	<b>46.88</b>	<b>44.43</b>
18	Urban background	Diffusion tube		100.00	16.96	15.25	16.68	13.70	16.29
19*	Roadside	Diffusion tube		100.00	39.69	35.27	33.51	35.03	36.98
21	Roadside	Diffusion tube		100.00	25.99	27.66	27.80	25.03	26.47
22	Roadside	Diffusion tube		100.00	25.16	26.61	25.08	23.59	26.98
23	Roadside	Diffusion tube		100.00	-	-	-	36.75	36.34
24	Kerbside	Diffusion tube		100.00	-	-	-	27.03	29.78
25	Roadside	Diffusion tube		91.67	-	-	-	17.76	17.80
26	Roadside	Diffusion tube		100.00	-	-	-	19.90	20.81
27	Kerbside	Diffusion tube		83.33	-	-	-	17.16	19.86
28	Roadside	Diffusion tube		100.00	-	-	-	21.88	24.16
29	Roadside	Diffusion tube		100.00	-	-	-	16.23	16.72
30	Roadside	Diffusion tube		100.00	-	-	-	16.99	19.33
31	Kerbside	Diffusion tube		100.00	-	-	-	21.11	23.32
32	Roadside	Diffusion tube		100.00	-	-	-	<b>48.12</b>	<b>48.86</b>
33	Roadside	Diffusion tube		100.00	-	-	-	39.68	<b>40.51</b>
SE16	Roadside	Chemiluminescent		51.51	-	-	-	-	25.87

- Diffusion tube data has been bias corrected
- Annualisation has been conducted where data capture is <75%
- If applicable, all data has been distance corrected for relevant exposure

**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 Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

\*Position changed throughout this year due to ongoing fence works – maximum movement 4 metres south east towards roundabout.

\*\*14/15/16 colocated up to 2015

15, 16 and 20 renumbered in 2015 to 31, 32 and 33.

\*\*\*This tube is not considered to represent relevant exposure. Tube 19 was positioned on the fence at the side of 7 Tates Way, facing Hitchin Road to reflect this and shows consistently lower concentrations. This position is more indicative of relevant exposure, being a back garden with the likelihood of more time being spent there than by the front door of the property on Hitchin Road.

Table A.4 – 1-Hour 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 2016 (%) <sup>(2)</sup>	NO <sub>2</sub> 1-Hour Means > 200µg/m <sup>3</sup> <sup>(3)</sup>				
					2012	2013	2014	2015	2016
SE16	Select	Automatic		51.51	0	9	2	0	1

**Notes:**

Exceedances of the NO<sub>2</sub> 1-hour mean objective (200µg/m<sup>3</sup> not to be exceeded more than 18 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 85%, the 99.8<sup>th</sup> percentile of 1-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 2016 (%) <sup>(2)</sup>	PM <sub>2.5</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>
				2016
SE 16	Kerbside		18.25	11

Annualisation has been conducted where data capture is <75%

**Notes:**

(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 Boxes 7.9 and 7.10 in 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 2016

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

Site ID	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )												Annual Mean		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (1.03) and Annualised <sup>(1)</sup>	Distance Corrected to Nearest Exposure <sup>(2)</sup>
1	33.69	34.53		31.76	30.95	33.37		28.86	27.48	26.92	37.82	37.11	32.25	33.22	n/a <sup>3</sup>
2	19.73	21.16	17.36	13.72	12.61	12.23	12.27	11.75	19.29	16.11	23.73	29.38	17.45	17.97	15.8
3	29.19	26.20	17.07	16.08	16.02	15.17	16.70	15.98	24.28	18.16	25.96	36.62	21.45	22.10	18.9
4	24.45	26.44	19.59	18.99	13.29	15.04	12.89	13.97	22.03	20.69	29.32	33.20	20.83	21.45	18.9
5		17.67	12.06	9.15	9.50	9.23	9.05	8.83	15.41	12.51	20.52	23.73	13.42	13.83	n/a <sup>4</sup>
6	25.14	21.98	15.65	16.07	11.91	13.71	12.67	11.67	19.83	16.45	24.84	33.73	18.64	19.20	18.5
7	34.61	35.79	29.61	26.59	27.30	26.09	21.48	22.86		32.32	37.09	42.76	30.59	31.51	26.3
8	25.76	23.35	19.30	15.87	16.02	15.97	16.14	15.74	21.96	18.83	27.07	33.69	20.81	21.43	19.5
9	28.51	27.19	24.22	23.30	22.46	23.18	20.67	21.30	29.23	22.78	30.13	36.88	25.82	26.60	20.7
10	33.50	31.41	29.01	21.99	20.41	20.08		14.71	26.29	20.83	24.25	40.04	25.68	26.45	23.0
11	25.26	24.81	18.89	16.79	14.71	13.26	15.15	16.12	22.42	18.69	25.93	30.33	20.20	20.80	20.4
12	18.79	22.41	21.19	17.32	16.18	16.74	9.14	11.44	19.25	25.46		30.50	18.95	19.52	16.9
13	27.20	24.50	19.47	17.40	15.12	15.61	18.15	16.21	25.30	18.71	28.66	35.10	21.79	22.44	19.6
14	31.40	32.44	27.44	47.82	22.65	22.54	26.34	26.53	38.98	27.95	36.13	44.65	32.07	33.03	n/a <sup>3</sup>
17	47.53	46.47	43.95	11.18	41.64	43.07	42.59	39.07	45.86	44.70	54.77	56.85	<b>43.14</b>	<b>44.43</b>	32.1

## Stevenage Borough Council

18	20.00	17.12	12.27	32.26	6.15	9.27	9.97	9.20	14.83	12.15	19.74	26.86	15.82	16.29	n/a <sup>3</sup>
19	39.88	36.17	35.49	20.08	32.58	38.29	32.69	32.30	41.67	35.98	40.26	45.48	35.91	36.98	37.0
21	25.95	26.88	25.32	22.96	22.76	22.57	22.26	21.56	26.82	25.16	29.88	36.26	25.70	26.47	26.5
22	25.05	28.40	24.69	35.75	21.56	22.78	17.98	17.45	28.33	25.04	30.87	36.38	26.19	26.98	27.0
23	33.11	42.88	33.28	27.17	33.77	31.09	22.45	23.51	38.58	43.03	42.62	51.85	35.28	36.34	29.0
24	33.14	30.96	28.77	16.08	26.33	28.70	29.88	23.85	29.74	30.40	26.35	42.76	28.91	29.78	23.1
25	21.30	18.97	15.47	16.67	11.69	11.13	10.86	11.59	17.12		22.99	32.36	17.29	17.80	16.7
26	27.13	23.90	16.41	13.94	15.40	13.97	15.01	13.24	22.35	17.01	28.23	35.84	20.20	20.81	19.3
27	24.65	22.24	15.76		13.19		12.41	10.82	18.43	15.60	25.25	34.48	19.28	19.86	17.5
28	26.58	25.29	24.86	19.31	18.91	19.09	19.04	17.32	25.72	20.96	28.38	35.98	23.45	24.16	22.5
29	22.39	18.60	13.75	13.04	11.94	10.24	11.87	9.65	16.79	12.52	21.92	32.03	16.23	16.72	16.2
30	24.29	21.90	18.77	16.65	14.22	13.68	12.37	11.32	18.24	16.07	23.91	33.82	18.77	19.33	18.4
31	25.12	23.49	19.41	22.74	18.25	18.43	16.49	14.48	24.98	22.40	29.42	36.50	22.64	23.32	23.3
32	59.46	53.08	56.27	38.73	45.66	50.07	44.17	45.32	42.43	50.98	18.14	64.91	<b>47.44</b>	<b>48.86</b>	34.4
33	36.68	43.67	34.70	38.79	35.61	38.56	26.52	29.30	39.55	54.56	37.92	56.11	39.33	<b>40.51</b>	31.8

Local bias adjustment factor used

National bias adjustment factor used

Annualisation has been conducted where data capture is <75%

### 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) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure.

(3) Greater than 50m to relevant exposure

(4) Tube at greater distance to road than receptor

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

### Air Quality Monitoring Data QA/QC

#### Diffusion Tube Bias Adjustment Factors

The diffusion tubes are supplied and analysed by Gradko International Ltd. Tubes are all 50% TEA in acetone. The bias factor used is the national figure of 1.01.

#### QA/QC of diffusion tube monitoring

The Stevenage nitrogen dioxide diffusion tube programme is operated through an approved laboratory (Gradko International Ltd) with formal accreditation to BS standards, and one that participates in the AIR-PT programme.

The national bias figure used this year increased the annual mean figures, in the worst case by  $1.42\mu\text{g}/\text{m}^3$ .

Following the NO<sub>2</sub> fall off procedure, using the prescribed calculator, 23 of the thirty tubes showed a reduction in levels, in some cases by as much as 30%. Three concentrations increased, by 0.02, 0.03 and  $0.02\mu\text{g}/\text{m}^3$ . Four tube locations fell outside the criteria of the calculator.

#### QA/QC of automatic monitoring

Automatic measurements of PM<sub>2.5</sub> were made using a BAM-1020, a beta attenuation mass monitor.

Measurements of NO<sub>x</sub> were made using an Enviro Technology Model 200E, a chemiluminescent method analyser.

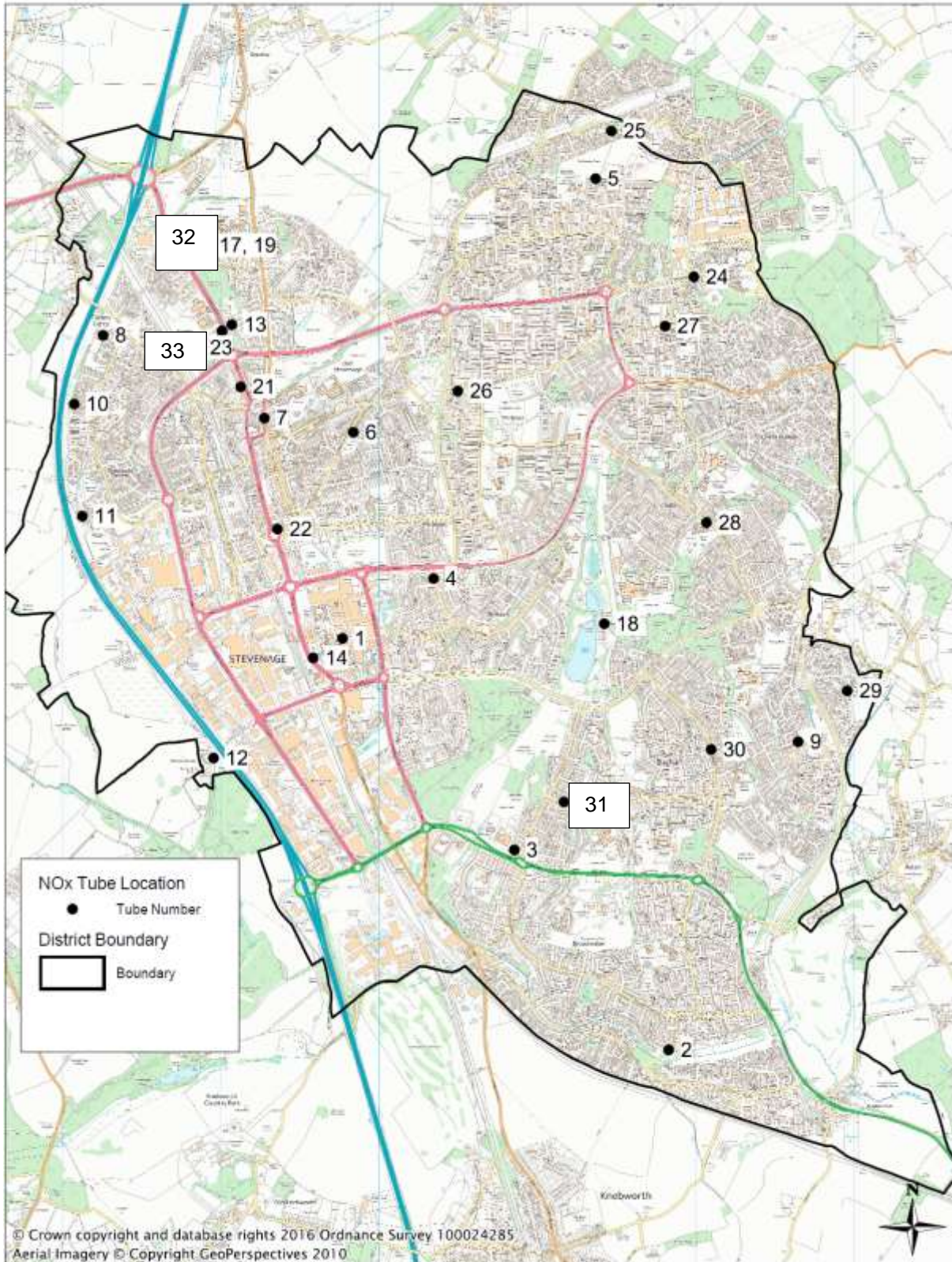
All measurements were logged by the instruments themselves and collected by Enviro Technology hourly. Measurements from the monitoring site were validated by Ricardo using the most up to date calibration factors and publicly disseminated in near real time on the HBAQN web page [http://www.airqualityengland.co.uk/local-authority/?la\\_id=408](http://www.airqualityengland.co.uk/local-authority/?la_id=408)



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

## NOx Tube Locations

July 2016



## 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>).

## Appendix F: Photo showing location of tubes 17, 19 and 20



Tube 19

Tube 17

Tube 20

Photo above shows the location of tube 17, responsible for the higher readings in Stevenage, the location of tube 19, which is considered representative, and the former location of tube 20.

## 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
FDMS	Filter Dynamics Measurement System
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
SO <sub>2</sub>	Sulphur Dioxide

## References

Stevenage Borough Council Green Travel Plan 2013 to 2018

Stevenage Air Quality Strategy

Local Plan Mobility Strategy

LAQM TG16

Diffusion Tubes for Ambient NO<sub>2</sub> Monitoring: Practical Guidance