



# 2019 Air Quality Annual Status Report (ASR)

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

June 2019

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## Executive Summary: Air Quality in Our Area

### Air Quality in Hastings Borough

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>.

More information about the health effects of air pollution can be found at:

[http://www.hastings.gov.uk/environmentalhealth/pollution/air/health\\_effects/](http://www.hastings.gov.uk/environmentalhealth/pollution/air/health_effects/)

Road traffic is the main source of pollution in the Borough; the main roads include: the A259, the A2102, the A2101 and the A21. The most significant pollutants of concern with respect to road traffic are nitrogen dioxide (NO<sub>2</sub>) and particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>)

Air quality in Hastings is monitored via an automatic air quality monitoring station (AQMS) in Bulverhythe and a network of 14 NO<sub>2</sub> diffusion tubes. Local monitoring shows that air quality in Hastings is good and there are no locations where pollution levels currently exceed the UK Air Quality Objectives. However, it should be noted that in 2018, local monitoring identified three locations along Bexhill Road where pollutant concentrations were close to exceeding the UK Air Quality Objective for NO<sub>2</sub> (i.e. within 10%).

Whilst concentrations of NO<sub>2</sub> and PM<sub>10</sub> have declined since 2014, the monitoring data from 2018 show no strong evidence of a continued decline when compared to 2017 data.

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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

The local monitoring network will need to be reviewed once the Queens Gateway new road becomes operational. However, a date is yet to be confirmed. The road is expected to change the distribution of vehicles across the Borough with associated impacts on air quality.

### Actions to Improve Air Quality

Hastings Borough Council, together with partners, has been involved in taking forward several initiatives during 2018 to improve local air quality. These include the continued operation of the Bexhill to Hastings link road, working with our partners at Sussex Air and utilising the “Air quality and emissions mitigation guidance for Sussex” document<sup>4</sup> (updated in June 2019). In addition, works to install a priority bus lane between the western side of the Borough through to Bexhill (Ravenside) continue to be developed.

### Conclusions and Priorities

The 2018 ASR has confirmed that levels of PM<sub>10</sub> and NO<sub>2</sub> continue to comply with the UK Air Quality Objectives. Whilst pollutant concentrations are shown to be below their relevant objectives, there is no strong evidence that pollutant concentrations are decreasing year on year.

Hastings Borough Council’s priorities for the coming year are:

- Continue to work with partners such as East Sussex County Council (ESCC) and bus operators to improve bus routes, traffic management systems and new road links to reduce congestion and pollution.
- Continued promotion of sustainable transport options, such as cycling, bus information and electric vehicle charge point information.
- Work with taxi licencing to introduce clean taxi operations across the Borough.

### Local Engagement and How to get Involved

Road vehicles are a major source of many pollutants in urban areas. They produce over 50 percent of the emissions of Nitrogen Oxides (NOx) in the UK.

Before using your car, ask yourself:

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<sup>4</sup> Sussex-air (June 2019) [http://www.sussex-air.net/Reports/Sussex\\_AQ\\_Guidance\\_2019.pdf](http://www.sussex-air.net/Reports/Sussex_AQ_Guidance_2019.pdf)

- Do I really need to make this journey?
- Could I walk or cycle instead of taking the car?
- Could I take a bus, or train or car pool?
- Are the levels of air pollution already too high today?

If you must drive:

- Drive smoothly. You'll save fuel, and your engine will also pollute less;
- Don't rev your engine unnecessarily;
- Maintain your car. Keep the engine properly tuned and the tyres at the right pressure; and
- Turn off the engine when your car is stationary.

At home:

- Buy water-based or low-solvent paints, varnishes, glues and wood preservatives.
- Avoid burning solid fuels, if possible.
- Avoid lighting bonfires, but if you must, don't light them when pollution levels are high or while the weather is still and cold. Only burn dry material and never burn household waste, especially plastic, rubber, foam or paint. Levels of pollution can be quite high on bonfire night and other events/festivals with bonfires, and sensitive people, including people with respiratory conditions, may notice some effects. However, exposure can be considerably reduced by remaining indoors and keeping windows closed.

Further information on how you can improve air quality is provided by Sussex Air:

<http://www.sussex-air.net/ImprovingAQ/Default.aspx>

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## 1 Local Air Quality Management

This report provides an overview of air quality in Hastings Borough Council during 2018. 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 Hastings 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 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 compliance with the objectives.

Hastings Borough Council does not currently have any AQMAs.

The Bulverhythe AQMA, which was declared for exceedances of the 24-Hour Mean PM<sub>10</sub> (35 exceedances of 50µg/m<sup>3</sup> per annum), was revoked in April 2017.

Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at:

<https://uk-air.defra.gov.uk/aqma/list>

Although reducing levels of pollution is no longer a formal requirement, Hastings Borough Council has developed an Air Quality Strategy, which sets out a number of actions that Hastings Borough Council & their partners can undertake to reduce levels further. The Air Quality Strategy can be found online at:

[https://www.hastings.gov.uk/content/env\\_health/pdfs/air\\_quality\\_strategy\\_2019](https://www.hastings.gov.uk/content/env_health/pdfs/air_quality_strategy_2019)

Hastings Borough Council continues to monitor air quality across the Borough to ensure that the local population is not exposed to levels of pollution that exceed national air quality objectives.

For reference, a map of Hastings Borough Council's monitoring locations is available in Appendix D.

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

Defra's appraisal of last year's ASR concluded that the report was well structured, detailed, and provided the information specified in the LAQM.TG (16) Guidance.

Furthermore, Defra were pleased to see, that despite the revocation of the AQMA that Hastings Borough Council were still pursuing a range of measures to improve air quality across the Borough. Hastings Borough Council have formalised these measures into an Air Quality Strategy, which was published online in January 2019.

The appraisal also stated that Hastings Borough Council may want to consider reviewing the current air quality monitoring strategy in the light of the revocation of the Bulverhythe AQMA. Hastings Borough Council is awaiting the Queensway Gateway new road to fully open before undertaking a review of the current monitoring strategy. The redistribution of traffic caused by this road may change the local pattern of air quality.

The appraisal also requested that the list of measures to improve air quality (Table 2.1) be reviewed and kept up to date.

Hastings Borough Council took forward a number of direct measures during the reporting year of 2018 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.1.

More detail on these measures can be found in the Hastings Air Quality Strategy:

[https://www.hastings.gov.uk/content/env\\_health/pdfs/air\\_quality\\_strategy\\_2019](https://www.hastings.gov.uk/content/env_health/pdfs/air_quality_strategy_2019)

Hastings Borough Council's priorities for the coming year are to:

- Continue to work with partners such as East Sussex County Council (ESCC) and bus operators to improve bus routes, traffic management systems and new road links to reduce congestion and pollution.
- Continue to promote of sustainable transport options, such as cycling, bus information and electric vehicle charge point information.
- Work with taxi licencing to introduce clean taxi operations across the Borough.
- Reviewing the air quality monitoring network.

Table 2.1 – 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	Proposed dedicated bus lane from Filsham Rd to Glyne Gap	Traffic Management		ESCC/Bus Companies		2017/18	TBC	Yes	Awaiting method statement and timetable of works from ESCC	Completed	
2	A feasibility design project to consider options to upgrade the current SCOOT traffic signal management system on the Glyne Gap to the junction of Filsham Road and seafront east to town centre at Pelham Place	Traffic Management		ESCC		TBC	TBC	Yes	TBC	TBC	The upgrade of the A259 SCOOT Traffic system is under review
3	Proposed Queensway Gateway Road	Traffic Management		ESCC		2016/17	Traffic volumes (reduction)	Yes	Build ongoing	Completed	Reduce congestion and re-direct traffic away from areas of concern.
4	The extension of Real Time bus information systems into Hastings	Promoting Travel Alternatives		Bus Companies		TBC	TBC	Yes	Ongoing	TBC	ESCC and the Hastings and Rother QBP are committed to this project, but implementation has slipped due to technical difficulties

## Hastings Borough Council

5	The implementation of travel choice measures to manage demand to travel by car.	Promoting Travel Alternatives		ESCC/HBC		2015 - on going	Increase cycle	Yes	Ongoing	On going	The Council has its own Staff Transport Plan including various initiatives to encourage alternative modes of transport to the car
6	Promote use of electric vehicles and charging network	Promoting Low Emission Transport		HBC/Sussex-air		2015 - on going	Increase charge point usage	Yes	Ongoing	On going	On-going promotion of EV charge point information available at <a href="http://www.chargeyourcar.org.uk">http://www.chargeyourcar.org.uk</a>
7	Actively seek alternative renewable solutions and avoid combustion plant in the revoked AQMA	Promoting Low Emission Plant		HBC via planning process /Clean Air Act		2005 onwards	Solid fuel burning prone to emission peaks on starting up. NOx and PM higher than for oil and coal	Yes	Ongoing	On going	
8	Taxi Licence Policy	Promoting Low Emission Transport		HBC taxi licencing		2016 onwards	Number of Euro 6 taxis	Yes	Ongoing	Any licensed Hackney carriages will be more environmentally friendly	On going
9	Encourage domestic solid fuel burning to use smokeless fuels and exempt appliances	Environmental Permits		Env. Protection Team duties relating to Statutory Nuisance and the Clean Air Act		2013 onwards	Less NOx, PM and smoke reduction of indoor CO	Yes	Ongoing		On going
10	Households and building trade to avoid fires to dispose of waste in the revoked AQMA	Environmental Permits		Env. protection team duties relating to complaints and nuisance		2005 onwards	Less NOx, PM and smoke targeted	Yes	Ongoing		On going
11	Anti-idling signage	Promoting Low Emission Transport		HBC		2017 onwards	Less NOx, PM	Yes	Ongoing	Permissions from ESSC highways and costs	On going

## 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.

Hastings Borough Council does not monitor for PM<sub>2.5</sub>. It does, however, monitor PM<sub>10</sub> concentrations which can be used to estimate PM<sub>2.5</sub> concentrations. A report by UK-AIR which compared the concentrations of PM<sub>10</sub> and PM<sub>2.5</sub> at numerous locations throughout the UK found that in urban areas, the ratio of PM<sub>2.5</sub>:PM<sub>10</sub> is, on average, 0.67. The highest annual mean concentration of PM<sub>10</sub> recorded in Hastings Borough in 2018 was 22.9µg/m<sup>3</sup> (recorded at Bulverhythe AQMS); using this ratio, it is possible to estimate that PM<sub>2.5</sub> concentrations at this location would be 15.3µg/m<sup>3</sup>.

Work carried out by Public Health England as part of the Public Health Outcomes Framework (PHOF) shows that the mortality associated with particulate air pollution within Hastings Borough Council for the year 2017 is 5.5%. This information is available from the following web link:

<https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/4/gid/1000043/pat/6/par/E12000008/ati/101/are/E07000062/iid/90366/age/1/sex/1>

The mortality calculated for Hastings Borough Council is slightly lower than that calculated for South East England (5.6 %) and higher for England (5.1%) as a whole.

Hastings Borough Council is developing processes to determine how it will approach measures to address PM<sub>2.5</sub> in partnership with Sussex Air and the ESCC Public Health team. Hastings Borough Council continues to work with Sussex Air and the ESCC Public Health team to address PM<sub>2.5</sub>. A number of the existing measures in Table 2.1 directly addresses PM<sub>2.5</sub> concentrations. For reference, there is no smoke control area in place within the Borough.

## 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.

Hastings Borough Council undertook automatic (continuous) monitoring at one site during 2018. Table A.1 in Appendix A shows the details of the site.

There are no Automatic Urban and Rural Network (AURN) national monitoring stations within Hastings Borough. The Hastings air quality monitoring station located at Bulverhythe, forms part of the Sussex Air Quality Partnership (Sussex-air) network which provides data at the following web-site:

<http://www.sussex-air.net/AQNearMe/Default.aspx> (Site Name = Hastings – Bulverhythe (HT1)).

Maps showing the location of the monitoring site are provided in Appendix D. Further details on how the monitor has been calibrated and how the data has been adjusted are included in Appendix C.

#### 3.1.2 Non-Automatic Monitoring Sites

Hastings Borough Council undertook non- automatic (passive) monitoring of NO<sub>2</sub> at 14 sites during 2018. 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 bias 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 2018 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.

There were no exceedances of the hourly mean objective in 2018 at this monitoring station (HT1).

This objective has been consistently met between 2014 and 2018.

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

Table A.5 in Appendix A compares the ratified and adjusted monitored PM<sub>10</sub> annual mean concentrations for the past 5 years with the air quality objective of 40µg/m<sup>3</sup>.

Table A.6 in Appendix A compares the ratified continuous monitored PM<sub>10</sub> daily mean concentrations for the past 5 years with the air quality objective of 50µg/m<sup>3</sup>, not to be exceeded more than 35 times per year.

The daily mean PM<sub>10</sub> air quality objective was met in 2018, with just four days experiencing a mean concentration in exceedance of 50µg/m<sup>3</sup>. This objective has been consistently met between 2014 and 2018.



## 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)
HT1	Hastings-Bulverhythe	Roadside	577633	108726	NO <sub>2</sub> /PM <sub>10</sub>	No	Chemiluminescent/TEOM	5	3	1.7

**Notes:**

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

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	St Luke's / Alma Terrace	Roadside	580037	110902	NO <sub>2</sub>	No	1	1	No	2
2	Carlisle Parade	Roadside	581496	109288	NO <sub>2</sub>	No	5	1	No	2.5
3	Manor Road	Roadside	582223	110361	NO <sub>2</sub>	No	0	10	No	2.5
4	Ore Chur/Old London Rd	Roadside	583610	111325	NO <sub>2</sub>	No	0	2	No	2.5
5	Harley Shute	Roadside	578382	109601	NO <sub>2</sub>	No	10	1	No	2
6	Bexhill Road 'Boat'	Roadside	576770	108101	NO <sub>2</sub>	No	15	1.5	No	2.5
7	81 Bexhill Road	Roadside	578500	108771	NO <sub>2</sub>	No	0.2	1.5	No	2.5
8	45 Bexhill Road	Roadside	578637	108798	NO <sub>2</sub>	No	1.5	2.8	No	2
9	71 Bexhill Road	Roadside	578532	108776	NO <sub>2</sub>	No	0.5	0.45	No	2.5
10	138 Bexhill Rd	Roadside	578290	108819	NO <sub>2</sub>	No	1.5	2	No	2
11	Railway Bridge Bexhill Rd	Roadside	578447	108794	NO <sub>2</sub>	No	10	3	No	2.5
12	West Marina Gardens	Roadside	578946	108746	NO <sub>2</sub>	No	10	0.5	No	2.5
13	104 Bohemia Rd	Roadside	580252	110058	NO <sub>2</sub>	No	0.5	1.5	No	2

14	116 Bohemia Rd	Roadside	580246	110064	NO <sub>2</sub>	No	0.5	1.5	No	2
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**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 2018 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
					2014	2015	2016	2017	2018
HT1	Automatic	Automatic	93%	93%	22	18.8	18.4	18	16.4
1	Diffusion Tube	Diffusion Tube	100%	100%	24.2	19.7	21.1	22.6	21.9
2	Diffusion Tube	Diffusion Tube	100%	100%	29.9	23.3	21.5	24.5	24.6
3	Diffusion Tube	Diffusion Tube	100%	100%	15.2	13.7	17.6	15.5	15.3
4	Diffusion Tube	Diffusion Tube	100%	100%	25.9	24.6	24.9	24.8	25.9
5	Diffusion Tube	Diffusion Tube	100%	100%	<b>40.4</b>	31.9	19.5	28.6	27.3
6	Diffusion Tube	Diffusion Tube	100%	100%	<b>54.9</b>	37.1	22.7	36.4	37.4
7	Diffusion Tube	Diffusion Tube	92%	92%	<b>44.6</b>	30.6	35.4	36.5	36.0
8	Diffusion Tube	Diffusion Tube	100%	100%	33.1	25.6	26.2	28.2	30.2
9	Diffusion Tube	Diffusion Tube	75%	75%	<b>44.5</b>	33.2	34.2	35	36.6
10	Diffusion Tube	Diffusion Tube	75%	75%	32.2	25.9	25.3	27.3	25.7
11	Diffusion Tube	Diffusion Tube	67%	67%	27.9	23.6	18.7	24.3	27.7
12	Diffusion Tube	Diffusion Tube	100%	100%	28.4	20.8	15.9	24.2	23.2
13	Diffusion Tube	Diffusion Tube	100%	100%	39.1	31.8	31.7	36.8	35.6
14	Diffusion Tube	Diffusion Tube	100%	100%	39.5	28.3	26.5	30.4	30.6

Diffusion tube data has been bias corrected

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) 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.

Figure A.1 – Trends in Annual Mean NO<sub>2</sub> Concentrations

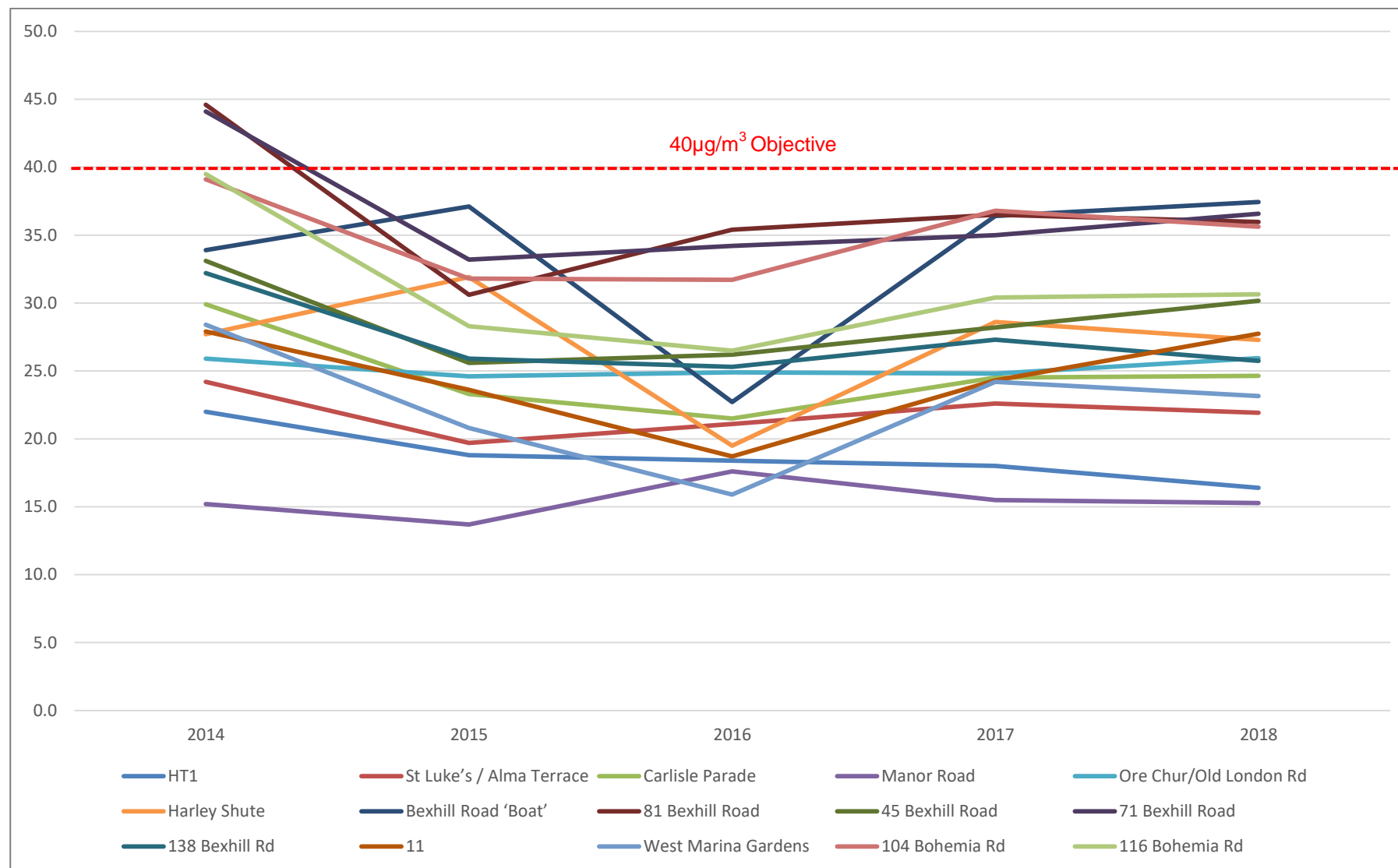


Table A.4 – 1-Hour Mean NO<sub>2</sub> Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2018 (%) <sup>(2)</sup>	NO <sub>2</sub> 1-Hour Means > 200µg/m <sup>3</sup> <sup>(3)</sup>				
					2014	2015	2016	2017	2018
HT1	Roadside	Automatic	93%	93%	0	0	0	0	0

**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 – Annual Mean PM<sub>10</sub> Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2018 (%) <sup>(2)</sup>	PM <sub>10</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
				2014	2015	2016	2017	2018
HT1	Roadside	Automatic	96%	21.6	23.3	19.3	22	22.9

Annualisation has been conducted where data capture is <75%

**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 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.

Figure A.2 – Trends in Annual Mean PM<sub>10</sub> Concentrations

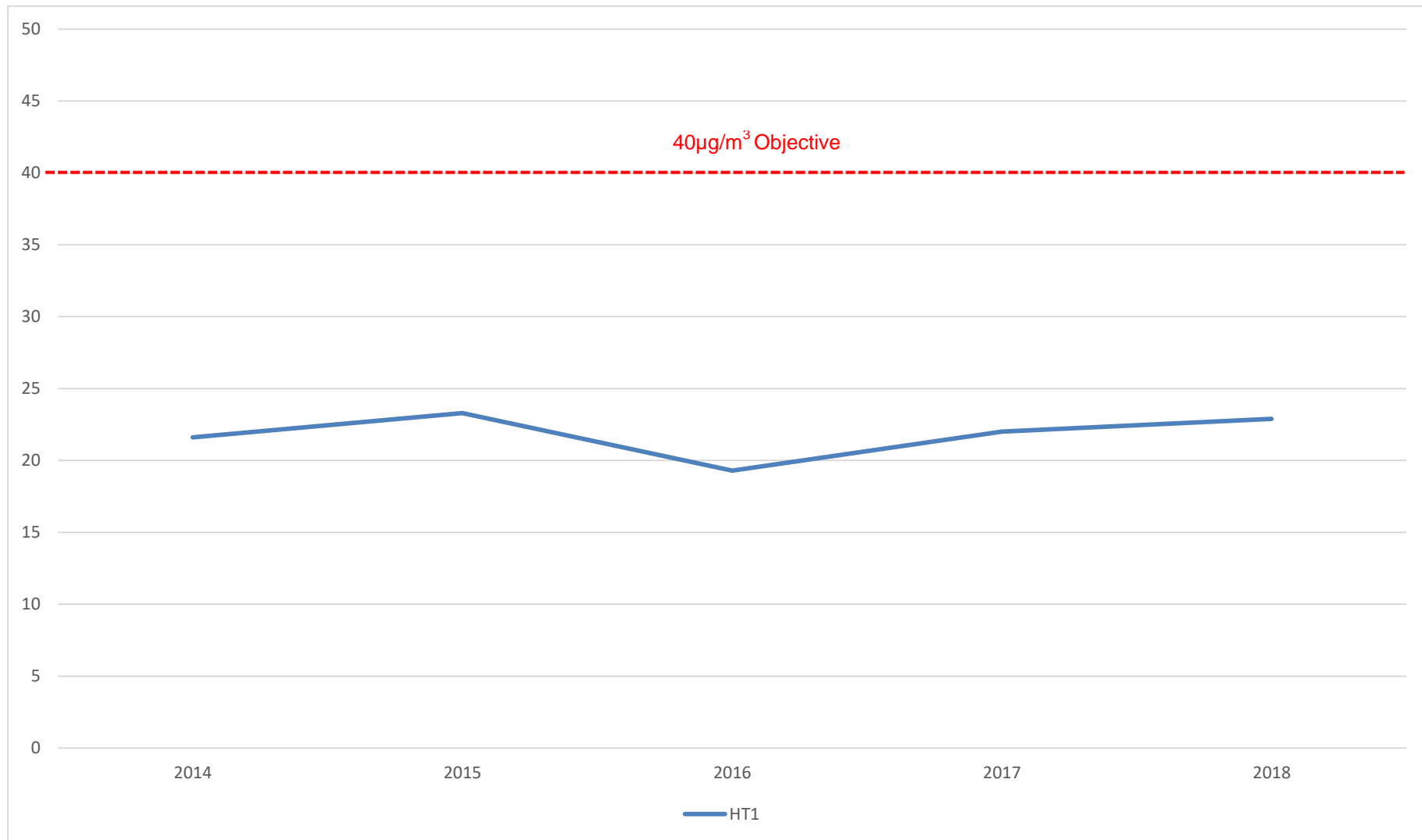




Table A.6 – 24-Hour Mean PM<sub>10</sub> Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2018 (%) <sup>(2)</sup>	PM <sub>10</sub> 24-Hour Means > 50µg/m <sup>3</sup> <sup>(3)</sup>				
				2014	2015	2016	2017	2018
HT1	Roadside	Automatic	96%	0	3	3	4	4

**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 85%, the 90.4<sup>th</sup> percentile of 24-hour means is provided in brackets. PM<sub>10</sub>m<sup>3</sup>m<sup>3</sup>m<sup>3</sup>m<sup>3</sup>

## Appendix B: Full Monthly Diffusion Tube Results for 2018

Table B.1 – NO<sub>2</sub> Monthly Diffusion Tube Results - 2018

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 (0.93) and Annualised <sup>(1)</sup>	Distance Corrected to Nearest Exposure <sup>(2)</sup>
1	30.9	24.2	27.1	20.7	16.4	18.0	22.4	21.1	23.5	27.6	24.5	26.5	23.6	21.9	20.5
2	27.4	30.8	31.4	23.5	23.0	25.9	27.1	22.2	23.1	29.1	26.3	28.1	26.5	24.6	20.2
3	20.1	19.3	18.7	15.4	12.4	14.2	15.4	13.6	14.2	18.3	16.4	19.4	16.4	15.3	15.3
4	31.5	28.5	31.8	23.2	24.0	30.0	30.8	25.4	26.2	30.6	26.7	26.0	27.9	25.9	25.9
5	34.8	32.2	37.2	25.9	25.3	25.0	30.8	28.8	30.4	28.3	25.7	27.7	29.3	27.3	18.8
6	39.0	<b>42.9</b>	<b>47.7</b>	37.4	37.7	<b>45.4</b>	<b>49.1</b>	<b>42.9</b>	<b>42.2</b>	34.7	34.5	29.7	<b>40.3</b>	37.4	23.7
7	<b>40.5</b>	<b>40.5</b>	<b>46.0</b>	MISSING	32.3	34.6	<b>45.0</b>	36.8	36.0	38.9	37.2	37.6	38.7	36.0	35.2
8	33.7	31.8	36.0	28.4	29.8	35.4	<b>40.5</b>	31.5	27.3	32.5	31.7	30.7	32.4	30.2	27.8
9	<b>41.6</b>	<b>40.0</b>	<b>41.1</b>	35.7	MISSING	MISSING	42.8	MISSING	38.7	<b>40.5</b>	35.0	38.6	39.3	36.6	32.7
10	29.7	29.7	34.2	MISSING	23.3	27.1	29.8	25.4	26.1	23.8	MISSING	MISSING	27.7	25.7	23.5
11	MISSING	29.3	35.4	MISSING	MISSING	22.2	MISSING	24.0	25.8	26.7	27.7	24.0	26.9	27.7	20.6
12	27.6	30.9	30.9	22.2	19.5	22.7	25.0	20.9	22.5	25.9	25.2	25.2	24.9	23.2	15.5
13	<b>40.3</b>	<b>40.8</b>	<b>46.8</b>	34.4	29.9	34.5	<b>46.2</b>	34.6	<b>40.1</b>	<b>40.7</b>	37.0	34.4	38.3	35.6	34.1
14	38.7	35.2	<b>41.6</b>	27.7	25.1	26.2	36.9	31.9	33.0	37.1	32.2	29.8	32.9	30.6	29.4

- Local bias adjustment factor used
- National bias adjustment factor used
- Annualisation has been conducted where data capture is <75%
- Where applicable, 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) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure.

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

### QA/QC of automatic monitoring data

The automatic monitoring site at Bulverhythe is part of the Sussex Air Quality Network; hence the standards of QA/QC are similar to those of the government's Automatic Urban and Rural Network (AURN) sites. The calibrations and filter change data are sent to the Environmental Research Group (ERG) at Kings College, London on a fortnightly basis.

The ERG collect data from the instruments on a daily basis, verifying the data against other monitoring stations in the south-east and ratifying it using the calibration information supplied. The Local Site Operations (LSO) duties are carried out by trained officers from the Council.

### Diffusion Tube Bias Adjustment Factors

Diffusion tubes may systematically under or over-read NO<sub>2</sub> concentrations when compared to the reference chemiluminescence analyser. This is described as bias and can be corrected to improve the accuracy of the diffusion tube results, using a suitable bias adjustment factor. Hastings Borough Council's diffusion tubes are prepared and analysed by Gradko using the 20% TEA in water method. This laboratory takes part in the QA/QC Field Intercomparison, operated on behalf of Defra.

The diffusion tube national adjustment factor spreadsheet<sup>5</sup> is shown in Figure C.1 below. The national adjustment factor derived from the spreadsheet was 0.93 for 2018.

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<sup>5</sup> Defra (2019 *National bias adjustment factors*): <https://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html>

Figure C.1– The diffusion tube national adjustment factor spreadsheet (2018) (Version 03/2019)

National Diffusion Tube Bias Adjustment Factor Spreadsheet						Spreadsheet Version Number: 03/19					
Follow the steps below in the correct order to show the results of relevant co-location studies						This spreadsheet will be updated at the end of June 2019					
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods. Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet. This spreadsheet will be updated every few months, the factors may therefore be subject to change. This should not discourage their immediate use.						The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory. Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.					
Step 1:	Step 2:	Step 3:	Step 4:								
Select the Laboratory that Analyzes Your Tubes from the Data Query List	Select a Pre-validated Method from the Data Query List	Select a Year from the Data Query List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor* shown in blue at the foot of the final column.								
If a laboratory is not shown, we have no data for this laboratory	If a pre-validated method is shown, we have no data for this method at this laboratory	If a year is not shown, we have no data for this year	If you have your own co-location study then see footnote <sup>6</sup> . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMhelpdesk@uk.bureauveritas.com or 0800 8327953								
Analyzed By	Method	Year	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (ppm)	Automatic Monitor Mean Conc. (Cm) (ppm)	Bias (B)	Tube Precision	Bias Adjustment Factor (A) (Cm/Dm)	
Gradio	20% TEA/volat	2018	R	Cheshire West and Chester	12	36	37	-2.5%	G	1.03	
Gradio	20% TEA/volat	2018	R	Cheshire West and Chester	12	43	40	8.1%	G	0.94	
Gradio	20% TEA/volat	2018	R	Fareham Borough Council	12	28	34	-17.5%	G	1.21	
Gradio	20% TEA/volat	2018	R	Fareham Borough Council	12	37	34	6.9%	G	0.92	
Gradio	20% TEA/volat	2018	R	Fareham Borough Council	12	32	29	12.6%	G	0.89	
Gradio	20% TEA/volat	2018	R	NOTTINGHAM CITY COUNCIL	12	38	34	9.3%	G	1.00	
Gradio	20% TEA/volat	2018	R	Bradwell Forest Borough Council	12	44	37	19.4%	G	0.84	
Gradio	20% TEA/volat	2018	R	Brighton & Hove City Council	9	48	50	-3.7%	G	1.04	
Gradio	20% TEA/volat	2018	R	Earlegh Borough Council	11	28	32	-12.0%	G	1.14	
Gradio	20% TEA/volat	2018	R	Earlegh Borough Council	12	42	38	10.2%	G	0.91	
Gradio	20% TEA/volat	2018	UB	Earlegh Borough Council	12	27	28	-4.4%	G	1.05	
Gradio	20% TEA/volat	2018	R	Gosport Council	12	29	25	13.9%	G	0.88	
Gradio	20% TEA/volat	2018	R	Gosport Council	12	32	29	10.0%	G	0.90	
Gradio	20% TEA/volat	2018	R	Gosport Council	9	40	41	-1.0%	G	1.02	
Gradio	20% TEA/volat	2018	R	Wokingham Borough Council	12	38	33	13.2%	G	0.88	
Gradio	20% TEA/volat	2018	R	Bath & North East Somerset	12	40	39	4.0%	G	0.96	
Gradio	20% TEA/volat	2018	R	Bedford Borough Council	10	30	27	9.0%	G	0.92	
Gradio	20% TEA/volat	2018	K3	Manorbion Road Intercomparison	11	93	85	9.3%	G	0.91	
Gradio	20% TEA/volat	2018	R	South Gloucestershire Council	12	23	20	6.3%	G	0.94	
Gradio	20% TEA/volat	2018	R	Thursock Borough Council	12	53	52	2.3%	S	0.98	
Gradio	20% TEA/volat	2018	R	Thursock Borough Council	12	34	30	15.1%	G	0.87	
Gradio	20% TEA/volat	2018	R	Thursock Borough Council	12	31	24	28.0%	G	0.78	
Gradio	20% TEA/volat	2018	UB	Thursock Borough Council	12	27	25	9.2%	S	0.92	
Gradio	20% TEA/volat	2018		<b>Overall Factor* (30 studies)</b>						<b>Use</b>	<b>0.93</b>

Annualisation of measurements

Diffusion Tube 11 (Railway Bridge) had data capture of less than 75%; as such annualisation was required.

Annualisation was undertaken in accordance with LAQM.TG.(16) (Boxes 7.9 and 7.10). Three background AURN stations were used for annualisation; these included Brighton Preston Park, Lillington Heath & Canterbury.

An annualisation factor of 1.11 was derived and was applied to the results of DT11.

Distance correction for NO<sub>2</sub> measurements

Distance correction of NO<sub>2</sub> diffusion tube measurements used the NO<sub>2</sub> fall-off with distance calculator<sup>6</sup> available on the LAQM website, as discussed in Paragraphs 7.77-7.79 of LAQM.TG16. The spreadsheet is shown in Figure C.1 below. Background concentration concentrations were sourced from Defra’s background 1km x 1km maps<sup>7</sup>.

<sup>6</sup>Defra (2019) Nitrogen Dioxide fall off with distance :https://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html

<sup>7</sup> Defra (2019) UK-Air Information Resource: https://uk-air.defra.gov.uk/data/laqm-background-home

Figure C.1 presents the 2018 NO<sub>2</sub> diffusion tube measurements as distance corrected to the nearest exposure

**Figure C.1- The NO<sub>2</sub> fall off with distance from roads calculator (Version 4.2)**

Site		Distance (m)		NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> )		
Name	ID	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor
St Luke's / Alma Terrace	1	1.0	2.0	11.8	21.9	20.5
Carlisle Parade	2	1.0	6.0	12.3	24.6	20.2
Manor Road	3	10.0	10.0	11.3	15.3	15.3
Ore Chur/Old London Rd	4	2.0	2.0	10.9	25.9	25.9
Harley Shute	5	1.0	11.0	9.7	27.3	18.8
Bexhill Road 'Boat'	6	1.5	16.5	11.3	37.4	23.7
81 Bexhill Road	7	1.5	1.7	8.9	36.0	35.2
45 Bexhill Road	8	2.8	4.3	8.9	30.2	27.8
71 Bexhill Road	9	0.5	1.0	8.9	36.6	32.7
138 Bexhill Rd	10	2.0	3.5	8.9	25.7	23.5
Railway Bridge Bexhill Rd	11	3.0	13.0	8.9	27.7	20.6
West Marina Gardens	12	0.5	10.5	8.9	23.2	15.5
104 Bohemia Rd	13	1.5	2.0	11.4	35.6	34.1
116 Bohemia Rd	14	1.5	2.0	11.4	30.6	29.4

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

Figure D.2 – Monitoring locations in Hastings Borough





Figure D.2 – Monitoring locations along Bexhill Road & Harley Shute Road in Hastings.





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

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective <sup>8</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>8</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
AQMS	Air quality monitoring station
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
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
SO <sub>2</sub>	Sulphur Dioxide