2017 Air Quality Annual Status Report (ASR)

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

October 2017

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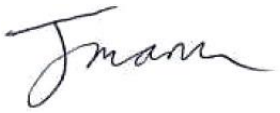
Prepared by:  ..... Checked by:  .....

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Executive Summary: Air Quality in Our Area

Air Quality in Rother

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[1,2].

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[3].

The District of Rother is the second-largest district in East Sussex, and one of the most rural districts in England. Road traffic is the dominant source of air pollution in the area, the major routes being the A21, the A28, the A265, the A258, the A27 and the A268. The main pollutants of concern with respect to road traffic are nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$). Currently, there are no areas in Rother where members of the public are exposed to levels of these pollutants in excess of the UK Air Quality Objectives.

Rother District Council manages local air quality in close collaboration with East Sussex County Council, which provided part of the monitoring until 2014, and with the Sussex Air Quality Partnership (Sussex Air). The partnership provides assistance to members and information to the public via its web-site with recent air quality data, news updates, educational resources, links and other services such as airAlert.

In recent years, local monitoring has identified elevated levels of NO_2 at three roadside locations (Rye South Undercliff, High Street Flimwell and A2100 Beauport Park). NO_2 levels at these locations in 2013 and 2014 exceeded, or were close to exceeding the UK Air Quality Objective for annual mean NO_2. In 2015, all monitoring locations in the District achieved the objective, with concentrations lower than

[1] Environmental equity, air quality, socioeconomic status and respiratory health, 2010
[2] Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006
[3] Defra. Abatement cost guidance for valuing changes in air quality, May 2013

40 µg/m^3. In 2016 however, concentrations exceeded the objective at A2100 Beauport Park and High Street Flimwell.

PM_{10} is monitored in Rother at De La Warr Road, Bexhill, and in recent years concentrations have been generally low (well below the UK annual mean objectives), with no significant increasing or decreasing tendency, although there is some year-on-year variability.

As in other suburban and rural areas of East Sussex, ozone (O_3) is of considerable concern. Ozone is monitored at Rye Harbour, where high levels have been monitored since 2011.

A large area of the countryside in the District is within the High Weald Area of Outstanding Natural Beauty (AONB). The impact of traffic-related air pollution on some of these areas has been assessed in past years. Current and future traffic flows are not expected to put the Pevensey Levels Special Area of Conservation (SAC) at risk from excessive nitrogen deposition.

Actions to Improve Air Quality

Rother District Council is helping the public to avoid the worst effects of ozone pollution by monitoring ozone levels at Rye Harbour, and informing the public of pollution events through the airAlert pollution warning service. This service is provided and maintained through the Sussex Air partnership. As of July 2017 the airAlert service had 921 registered subscribers in Sussex, 46 of which are from the Rother District. Rother, along with other Sussex Air partners, are in discussions relating to a potential upgrade of the Sussex Air website, which would further improve the quality of information accessible to the general public on air quality matters.

Rother District Council, together with Sussex Air, supports the Energise Network, an integrated network of electric charging points for vehicles. Charging points are now located across East and West Sussex, Kent, Surrey, Greater London and neighbouring counties.

Rother District Council contributes to the Air Quality and Emissions Mitigation Guidance for Sussex. The guidance supports the principles of the Sussex Air Quality Partnership to improve air quality across Sussex, encourage emissions reductions and improve the environment and health of the population. Other actions being implemented to improve public health include promoting active modes of

transportation like walking, cycling and using public transport, as well as car clubs and car sharing.

Conclusions and Priorities

Annual mean nitrogen dioxide concentrations recorded at continuous monitors and diffusion tubes in Rother District are generally well within the air quality objective of 40 µg/m^3, and there were no exceedances of the short term NO_2 objective. In this ASR, to take into account feedback from Defra of last years' ASR, all annual mean concentrations at diffusion tubes from 2012 to 2016 have been distance-corrected where a diffusion tube is not located at relevant exposure. This means that concentrations reported in the 2017 ASR are generally lower than in previous years, where concentrations were not distance-corrected.

There were also no exceedances of either the annual mean or daily mean PM_{10} objectives in 2016, or for the previous years from 2012.

In conclusion, monitoring has shown that air quality in Rother District continues to meet the air quality objectives at locations of relevant exposure, although Rother District is committed to taking action to nonetheless improve air quality, in particular through involvement with the Sussex Air Quality Partnership. Priority measures and actions for the District include the roll-out and expansion of electric charging points via the Energise Network, collaboration between departments on health improvement, climate change, environment and transport, and maintaining and updating the website, airAlert scheme and monitoring network.

The main challenge for air quality management in Rother District is likely to be the careful management of planning applications and developments through detailed and rigorous air quality assessments, particularly where multiple developments may occur close together, in order to help maintain the generally good levels of local air quality that are currently experienced across the District.

Local Engagement and How to get Involved

Everyone concerned about air quality in Rother and the rest of Sussex can find real-time information on pollution levels on the Sussex Air website sussex-air.net. People are encouraged to sign up for advance warnings with the airAlert service at airalert.info. Warnings are provided by text or voice message, email, or using an

Android or iOS app. The service is also available to schools and is a great way to get everyone engaged in thinking about the importance of air quality.

Drivers planning to replace their vehicles are encouraged to consider low and ultra-low emission vehicles, such as electric cars, plug-in hybrids and extended-range electric vehicles. The Energise Network provides members with access to more than 150 electric vehicle charging points across the South East. These include most local authority charge points in Kent, Surrey and Sussex, plus a number of Southern Rail fast chargers. For a map of the charging points and details on how to join, please visit energisenetwork.co.uk.

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1 Local Air Quality Management

This report provides an overview of air quality in Rother District Council 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 Rother District 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 compliance with the objectives.

Rother District Council currently does not have any AQMAs, because previous monitoring and modelling studies have not indicated any likelihood of the UK air quality objectives being exceeded.

Since Rother District Council has no AQMAs, no formal Air Quality Action Plan has been implemented for the District.

2.2 Progress and Impact of Measures to address Air Quality in Rother District

Defra's appraisal of last year's ASR concluded that the report was well structured and detailed, covering information specified in the LAQM.TG(16) guidance, and that while no formal Air Quality Action Plan has been produced, Rother District has demonstrated welcome evidence of significant projects influencing local traffic management and emissions reductions. Rother District is also acknowledged as an active member of the Sussex Air Quality Partnership, and the associated measures to improve local air quality are welcomed.

The appraisal also stated that Rother District may want to consider reviewing existing monitoring locations, on the basis that monitored concentrations at some current locations are much lower than the air quality objectives.

It also noted that many of the diffusion tube locations within Rother were not representative of relevant exposure. In response to this comment, distance-corrected NO_2 concentrations for all the relevant diffusion tube sites from 2012 to 2016 are presented in this ASR.

Rother District Council is a member of the Sussex Air Quality Partnership (Sussex Air), which produced an air quality strategic plan 2010 to 2015[4]. Rother District Council contributed to the development of this strategy, which aims to provide a consistent approach to air quality across a number of district councils.

This plan has 5 key objectives:

1. Provide advice and support and improve the expertise and knowledge base
2. Project development and implementation
3. Partnership working
4. Develop cross cutting work on health improvement, climate change, environment and transport
5. Communicate air quality issues and initiatives in Sussex.

Rother District Council has taken forward a number of measures during the current reporting year of 2016 in pursuit of improving local air quality and improving public awareness of air quality issues, in close collaboration with the Sussex Air Quality Partnership.

Key completed measures are:

1. Website

   Rother District Council supports the Sussex Air Quality website (http://www.sussex-air.net), which provides access to air quality statistics and relevant local information and improves public awareness of air quality.

2. airAlert

   Rother District Council supports the airAlert air pollution warning service, offered by the Sussex Air Quality Partnership to vulnerable people, schools, health professionals and general public in Sussex. The airAlert service provides warnings based on ozone levels monitored within the Rother District at Rye Harbour. As of July 2017 the service had 921 registered subscribers, 46 of which are from the Rother District.

[4] Sussex Air Quality Partnership Air Quality Strategic Plan 2010 http://www.sussex-air.net/Reports/SAQP_Vision_Strategy_2015.pdf

3. Local ozone monitoring

   High ozone levels can cause difficulty in breathing for vulnerable people with existing breathing or heart conditions. Rother District Council monitors ozone levels at the Rye Harbour rural monitoring station. Data from this station is available on the Sussex-Air website and feeds into the airAlert service.

4. Guidance

   Rother District Council contributed to the Air Quality and Emissions Mitigation Guidance for Sussex, first published in 2013 and updated in 2014. The guidance is helping to mitigate potential air quality impacts from developments across Sussex. It is also contributing to improving public health by promoting active modes of transportation like walking, cycling and using public transport, as well as car clubs and car sharing.

5. Energise Network.

   The Sussex Air Partnership manages the Energise Network, an integrated network of electric charging points for vehicles with regional coverage. Electric car charging points are now located across East and West Sussex, Kent, Surrey, Greater London and neighbouring counties.

6. Garden Bonfires

   Rother District Council, in partnership with Wealden District Council, published in 2013 public-facing material discouraging the practice of burning garden waste, and encouraging sustainable alternatives such as composting and recycling.

Together with neighbouring local authorities, Rother District Council has been assessing the air quality impacts of new traffic and development on protected natural habitats and designated sites in the District, in particular the Pevensey Levels (Special Area of Conservation (SAC) and Ramsar site), the Dungeness SAC and the Dungeness to Pett Level Special Protection Area (SPA).

Key completed measures regarding protected habitats are:

1. Pevensey Levels Assessment

Rother District Council commissioned in 2009 a study[5] to assess the potential air quality impact on the Pevensey Levels of increases in traffic on the A259 associated with planned population growth up to 2026. The conclusion was that an increase in nitrogen deposition and NOx concentrations is likely, but these will still be below the Critical Levels set by the Habitats Directive[6], therefore there is unlikely to be a significant effect on the Ramsar site.

2. Dungeness Sites Protection

Rother District Council currently screens all business development applications in the Port of Rye for their potential to have adverse effects on the integrity of the Dungeness internationally-designated sites. The main focus is on traffic and shipping emissions, and where necessary, makes recommendations for mitigation measures to be implemented[7].

Rother District Council is also a programme partner for East Sussex County Council's 'Active Access for Growth' programme to deliver cycling and walking initiatives in key areas, which include South Wealden and Bexhill/Hastings.

One of the 3 key objectives of the programme includes 'to demonstrate an alignment to health, air quality, and reduce vehicle emissions' via the following initiatives, which are new for 2017. Progress on these initiatives will be monitored in the 2018 ASR.

- East Sussex Wheels 2 Work – Moped/Motorcycle Loan scheme
- Discounted Public Transport travel
- Pedal Power – Cycle/Electric Cycle Loan Scheme (including associated research by Brighton University on type and duration of journeys/energy expenditure)
- East Sussex County Council – Community Grant Scheme: Active Access – supporting local walking and cycling initiatives (such as cycle refurbishment)

[5] Rother District Council, Hastings Borough Council. Wealden District Council and Eastbourne Borough Council (2009). Appropriate Assessment and Air Quality Local to the Pevensey Levels Ramsar Site. Available at: http://www.wealden.gov.uk/nmsruntime/saveasdialog.aspx?lID=14305&sID=5509

[6] EC Habitats Directive 1992, interpreted into British law by the Conservation (Natural Habitats &c) Regulations 1994 (as amended in 2007).

[7] Rother District Council (2014). Local Plan – Core Strategy. Adopted 29th September 2014.

- East Sussex Cycle Hubs – Bikeability Plus Services
- Living Streets 'Walk Doctors' – Journey planning
- Living Streets – Active Travel Maps
- Living Streets – Community Audit Scheme: to identify safer walking & cycling routes
- Walking & Cycling Leader Training
- Community Walking & Cycling Challenges / Pledges – 'Free your Feet'
- Student led Walking & Cycling Campaigns
- South Downs National Park – Led Walks/Rides
- Use of Sustainable Travel Apps & other technology
- Sustrans – Active steps scheme
- Independent Travel Training – Integrated Travel
- Transition travel activities – secondary

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	Air Quality and Emissions Mitigation Guidance for Sussex	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Sussex Air Quality Partnership		2014		N/A		Completed	
2	Air Quality Strategic Plan 2010	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	Sussex Air Quality Partnership		2010 - 2015		N/A		Ongoing	
3	Sussex Air website	Public Information	Via the Internet	Sussex Air Quality Partnership				N/A		Ongoing	
4	airAlert	Public Information	Via other mechanisms	Sussex Air Quality Partnership			921 registered subscribers, 46 from Rother District	N/A		Ongoing	
5	Energise Network	Promoting Low Emission Transport	Procuring alternative refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	Sussex Air Quality Partnership				N/A		Ongoing	
6	Garden Bonfires	Public Information	Via leaflets	Rother District Council		2013		N/A		Completed	

2.3 $PM_{2.5}$ – 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 $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5 µm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Rother District Council is taking the following measures to address $PM_{2.5}$:

- Continuing to support the Energise Network of electric vehicle charging points, together with the Sussex Air Quality Partnership;
- Requiring the assessment of $PM_{2.5}$ as part of Air Quality Assessments for planning applications to inform emission mitigation strategies.
- Publishing information discouraging the burning of garden waste and encouraging sustainable alternatives such as composting and recycling.

Further measures will be considered in future years.

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

3.1 Summary of Monitoring Undertaken

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

For reference, maps of Rother District's monitoring locations are provided in Appendix D.

3.1.1 Automatic Monitoring Sites

Rother District undertook automatic (continuous) monitoring at 2 sites during 2016: De La Warr Road, Bexhill (RY2, monitoring NO_2 and PM_{10}) and Rye Harbour (RY1, monitoring ozone (O_3)). Fine particulate matter ($PM_{2.5}$) is currently not monitored in the District. Table A.1 in Appendix A shows the details of the automatic monitoring sites.

Both stations are part of the Sussex Air Quality Monitoring Network (SAQMN), managed on behalf of Sussex Air by King's College London Environmental Research Group (KCL-ERG). Regional monitoring results are available at www.sussex-air.net.

Data capture for 2016 was the following:

- De La Warr Road, Bexhill: 89% for NO_2, 74% for PM_{10}; and
- Rye Harbour: 52% for O_3.

The Rye Harbour station was inoperative for the first 5 months of 2016 due to instrument faults. The monitoring station is the responsibility of Sussex Air and a new analyser was installed in June 2016. The purchase of the new analyser has been jointly funded by Sussex Air and Rother District Council, with the on-going costs covered by Sussex Air and Rother District Council providing Local Site Operator support.

Further details on how the monitors are calibrated and how the data has been annualised are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

Rother District Council undertook non-automatic (passive) monitoring of NO_2 at 18 sites during 2016, using diffusion tubes. Triplicate diffusion tubes are co-located with

the De La Warr Road automatic monitoring station for the derivation of a local bias adjustment factor.

Due to repeated tube theft at Rye Cinque Ports Street (DT19), it was decided to cease monitoring at this location after 2016. The diffusion tube at Rye South Undercliff (DT21) was relocated in September 2016 due to issues gaining access, and the location will be updated in the 2018 ASR.

Table A.2 in Appendix A shows the details of the diffusion tube monitoring sites. Fifteen of the sites are classified as kerbside, and three (Battle Wellington Gardens (DT13), Rye North Salts (DT17) and Rye Cinque Ports Street (DT19)) classified as urban background. Until 2014, both Rother District Council and East Sussex County Council (ESCC) jointly operated diffusion tubes in the District. All sites currently active are maintained by Rother District Council.

Data capture for 2016 was generally good with the majority of sites reporting between 83% and 100% data capture. Rye Cinque Ports Street (DT19) had very poor data capture in 2016 (2 months), which is insufficient to report upon – monitoring has now ceased at this site. Rye South Undercliff (DT21) required "annualisation", as fewer than 9 months of valid data was collected (7 months of data was available in total).

The full 2016 dataset of monthly mean values for each diffusion tube site is provided in Appendix B. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and "annualisation" calculations, are included in Appendix C. A map showing the locations of the monitoring sites is provided in Appendix D.

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 these adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 in Appendix A compares the ratified and adjusted monitored annual mean NO_2 concentrations for the past 5 years with the air quality objective of 40 µg/m^3. The results indicate that the annual mean NO_2 concentrations at the De La Warr

Road, Bexhill automatic monitoring site were well within the UK air quality objective (40 µg/m^3) in all years between 2012 and 2016.

All diffusion tube sites achieved the air quality objective in 2016, and also in previous years from 2012 onwards. Note that in this ASR, annual mean NO_2 concentrations at all diffusion tube locations from 2012 onwards have been distance-corrected to take into account the drop in NO_2 concentrations where receptors are located further away from the kerbside than the diffusion tubes.

The highest annual mean NO_2 concentrations in 2016 were 31.7 µg/m^3 recorded at DT22 (Bexhill on Sea Sackville Road) and 30.8 µg/m^3 at DT12 (High St Flimwell). These concentrations are both greater than those measured in 2015 but are well within the air quality objective of 40 µg/m^3.

It should be noted that in 2016 the bias adjustment factor applied was higher than in previous years, and was derived from the local co-location study at the De La Warr Road monitoring site in Bexhill. In earlier years the bias adjustment factor has been obtained from the national database of bias adjustment factors.

Table A.4 in Appendix A compares the ratified continuous monitored hourly mean NO_2 concentrations for the past 5 years with the 1-hour air quality objective of 200 µg/m^3, not to be exceeded more than 18 times per year. The De La Warr Road, Bexhill automatic monitoring site did not exceed the 200 µg/m^3 standard in any year in the 2012 to 2016 period.

Diffusion tubes cannot provide hourly measurements of NO_2; however, the Defra Technical Guidance states that where annual mean NO_2 concentrations measured by diffusion tubes exceed 60 µg/m^3 there is a likelihood that the 1-hour objective may be exceeded. All of the annual mean NO_2 concentrations at diffusion tube monitoring locations between 2012 and 2016, inclusive, were well below 60 µg/m^3 and so the 1-hour objective is very unlikely to have been exceeded. The results indicate that the 1-hour NO_2 air quality objective is unlikely to be exceeded at any location in the district.

3.2.2 Particulate Matter (PM_{10})

PM_{10} concentrations are monitored at the De La Warr Road, Bexhill site. Table A.5 in Appendix A compares the ratified and adjusted monitored annual mean PM_{10} concentrations for the past 5 years with the air quality objective of 40 µg/m^3. The

results indicate that annual mean PM_{10} concentrations were well below the UK air quality objective between 2012 and 2016. It should be noted that the PM_{10} data capture for 2016 was 74%, and so it was necessary to "annualise" the monitored PM_{10} concentration, details of which are given in Appendix C.

Table A.6 in Appendix A compares the ratified continuous monitored daily mean PM_{10} concentrations for the past 5 years with the air quality objective of 50 µg/m^3, not to be exceeded more than 35 times per year. These results show that the De La Warr Road site achieved the daily PM_{10} objective every year from 2012 to 2016. Due to data capture in 2016 being slightly less than 75%, the 90.4th percentile of daily mean PM_{10} concentrations was calculated, which for 2016 was 27 µg/m^3 – this is well below the objective level of 50 µg/m^3.

Based on the information gathered from the De La Warr Road site, it is expected that PM_{10} levels throughout the Rother district are likely to achieve the UK air quality objectives for annual and daily mean concentrations.

3.2.3 Particulate Matter ($PM_{2.5}$)

There is no $PM_{2.5}$ monitoring undertaken within Rother District. The annual mean PM_{10} concentrations measured at the De La Warr Road site have been used to estimate $PM_{2.5}$ annual average concentrations by using the nationally-derived correction ratio of 0.7 suggested in Defra's Technical Guidance. Based on this assumption, the estimated annual mean $PM_{2.5}$ concentrations during the 2012 to 2016 period were in the range of 13 µg/m^3 to 18 µg/m^3 (see Table A.7 in Appendix A).

3.2.4 Sulphur Dioxide (SO_2)

Monitoring of sulphur dioxide is not carried out at any location within the district. Therefore, no results are presented in this section.

3.2.5 Ozone (O_3)

Table A.8 in Appendix A presents the ratified continuous monitored O_3 concentrations for the past 5 years at the Rye Harbour rural site. Due to low data capture during 2015 there are no results presented for that year. Between 2012 and 2016, the annual mean O_3 concentrations ranged from 51 µg/m^3 to 57 µg/m^3. There is no annual mean objective or target value for O_3.

Table A.9 in Appendix A compares the ratified continuous monitored running 8-hour mean O_3 concentrations for the past 5 years with the UK Air Quality Objective of 100 µg/m^3, not to be exceeded on more than 10 days per year. The monitoring results show that the Rye Harbour monitoring site exceeded the O_3 running 8-hour mean objective in 2012, 2013 and 2016. The highest number of days above the standard was 24 days in 2012. In 2016 there were 17 days where the running 8-hour O_3 standard was exceeded.

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) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
RY1	Rye Harbour	Rural	594440	119150	O_3	N	UV Absorption	N/A	N/A	3.5
RY2	De La Warr Road	Roadside	575595	108054	NO_2, PM_{10}	N	Chemiluminiscence	N (2m)	1m	2.0

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) [1]	Distance to kerb of nearest road (m) [2]	Tube collocated with a Continuous Analyser?	Height (m)
DT2	North of Northam	Kerbside	583515	126517	NO_2	N	10	1	NO	1.9
DT3	A2100 Beauport Park	Kerbside	577608	114083	NO_2	N	>150	1	NO	1.8
DT4	A269 Battle Hospital	Kerbside	573071	115896	NO_2	N	40	1	NO	2.1
DT5	B2089 West of Rye	Kerbside	590753	119799	NO_2	N	50	1	NO	2.2
DT7	Holliers Hill, Bexhill	Kerbside	574296	108917	NO_2	N	10	1	NO	2.4
DT8	A259 New Winchelsea Road, Rye	Kerbside	592926	120868	NO_2	N	10	1	NO	1.8
DT9	A21 Robertsbridge	Kerbside	574057	124328	NO_2	N	40	1	NO	1.8
DT10	Catsfield Church	Kerbside	574775	115925	NO_2	N	15	1	NO	2.1
DT12	High St Flimwell	Kerbside	571431	131224	NO_2	N	5	1	NO	2.0
DT13	Battle Wellington Gardens	Urban Background	574357	116222	NO_2	N	30	N/A	NO	2.1
DT14	Battle A2100	Kerbside	574509	116846	NO_2	N	10	1	NO	2.2
DT16	Battle High Street	Kerbside	574775	115925	NO_2	N	0	1	NO	2.4
DT17	Rye North Salts	Urban Background	592339	120975	NO_2	N	15	1	NO	2.1

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
DT19	Rye Cinque Ports Street	Urban Background	592121	120543	NO_2	N	8	N/A	NO	2.1
DT21*	Rye South Undercliff	Kerbside	591255	120273	NO_2	N	2	1	NO	2.3
DT22	Bexhill-on-Sea Sackville Road	Kerbside	573985	107409	NO_2	N	2	1	NO	2.1
DT25	A259 Bexhill-on-Sea	Kerbside	573871	108033	NO_2	N	20	1	NO	2.1
DT27	Bexhill Triplicate 1	Kerbside	575595	108060	NO_2	N	15	1	YES	2.0
DT28	Bexhill Triplicate 2	Kerbside	575595	108060	NO_2	N	15	1	YES	2.0
DT29	Bexhill Triplicate 3	Kerbside	575595	108060	NO_2	N	15	1	YES	2.0

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.

* Location was changed in September 2016 due to accessibility issues (new location 592248, 120525). The site location will be updated in next ASR.

Table A.3 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2016 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2012	2013	2014	2015	2016
RY2	Kerbside	Automatic	89.4	89.4	27.5	26.0	22.5	19.8	25.2
2	Kerbside	Diffusion Tube	100	100	14.6	13.5	14.7	13.3	15.8
3	Kerbside	Diffusion Tube	83.3	83.3	16.3	11.8	15.0	14.2	17.3
4	Kerbside	Diffusion Tube	91.7	91.7	13.8	12.1	13.7	12.5	12.7
5	Kerbside	Diffusion Tube	83.3	83.3	12.1	10.2	10.8	10.2	11.5
7	Kerbside	Diffusion Tube	100	100	17.9	15.8	18.6	14.1	18.1
8	Kerbside	Diffusion Tube	91.7	91.7	18.1	16.0	-	-	17.6
9	Kerbside	Diffusion Tube	91.7	91.7	13.3	10.6	13.1	11.8	13.6
10	Kerbside	Diffusion Tube	100	100	12.6	12.8	12.5	10.4	11.7
12	Kerbside	Diffusion Tube	100	100	27.0	20.0	28.9	21.9	30.8
13	Urban Background	Diffusion Tube	91.7	91.7	14.2	15.4	12.8	13.1	14.5
14	Kerbside	Diffusion Tube	100	100	23.2	23.1	21.6	19.7	23.3
16	Kerbside	Diffusion Tube	91.7	91.7	20.1	18.3	18.8	17.0	20.2
17	Urban Background	Diffusion Tube	91.7	91.7	16.5	16.7	13.8	13.0	17.9
19	Urban Background	Diffusion Tube	8.3	8.3	28.3	30.4	-	-	-
21	Kerbside	Diffusion Tube	58.3	58.3	31.1	36.2	33.1	28.6	29.1 [3]
22	Kerbside	Diffusion Tube	100	100	28.0	26.8	27.7	23.8	31.7
25	Kerbside	Diffusion Tube	100	100	22.5	22.1	-	-	21.0
27	Kerbside	Diffusion Tube	91.7	91.7	18.3	20.1	17.0	17.1	17.7
28	Kerbside	Diffusion Tube	100	100	19.2	19.6	17.6	16.8	17.3
29	Kerbside	Diffusion Tube	100	100	19.1	19.5	18.5	16.5	17.5

☒ **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_2 annual mean objective of 40 µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60 µg/m^3, indicating a potential exceedance of the NO_2 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_2 Concentrations (continuous monitoring stations)

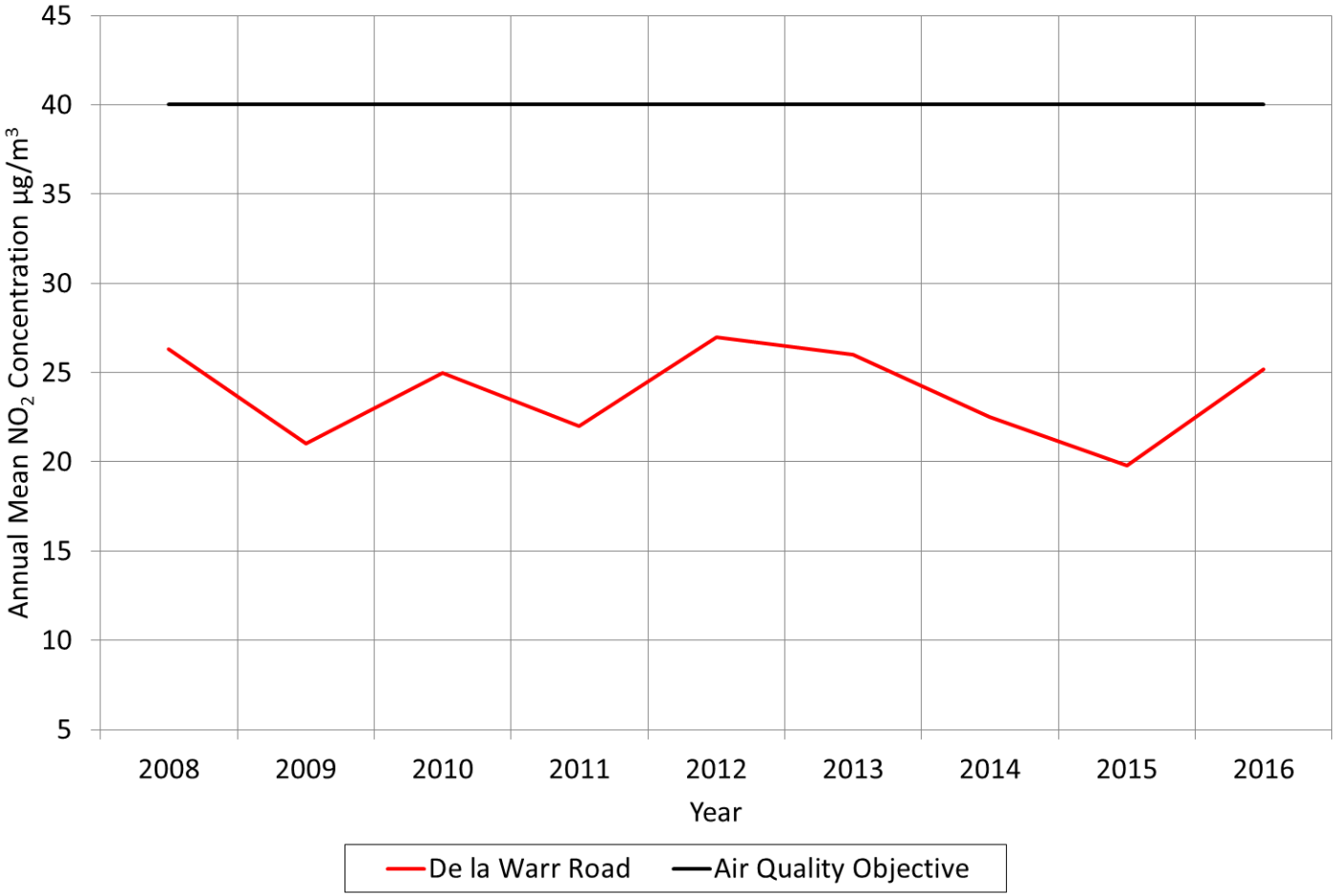


Figure A.2 – Trends in Annual Mean NO_2 Concentrations (Diffusion tube sites)

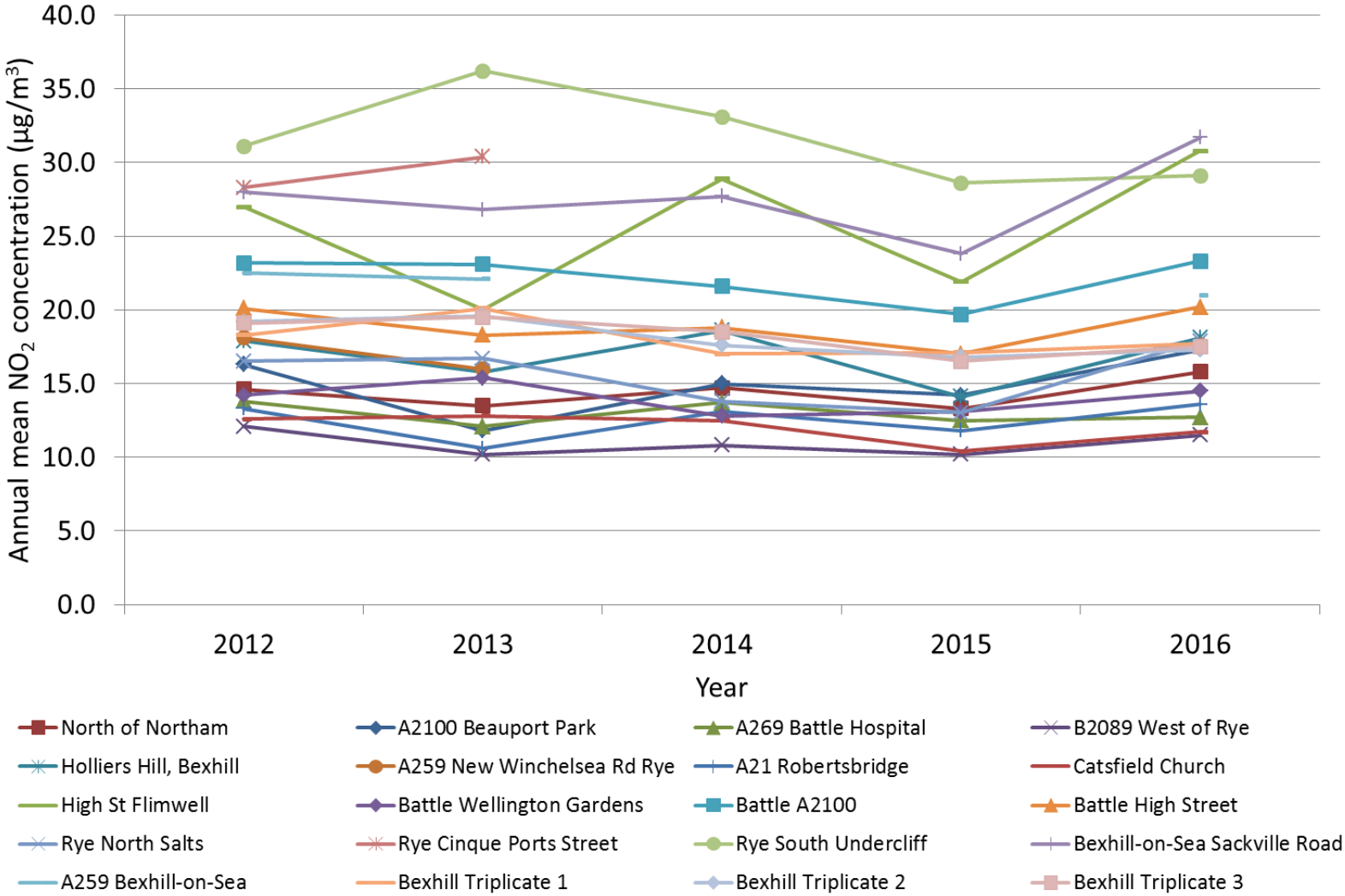


Table A.4 – 1-Hour Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	NO_2 1-Hour Means > 200 µg/m^3 (3)				
					2012	2013	2014	2015	2016
RY2	Kerbside	Automatic	89.4	89.4	0	0	0 (105) (3)	0 (100) (3)	0

Notes:

Exceedances of the NO_2 1-hour mean objective (200 µg/m^3 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 99.8th percentile of 1-hour means is provided in brackets.

Table A.5 – Annual Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	PM_{10} Annual Mean Concentration ($\mu g/m^3$) (3)				
				2012	2013	2014	2015	2016
RY2	Kerbside	73.7	73.7	20.8	25.2	19.0 (3)	24.3 (3)	18.1 (3)

☒ **Annualisation has been conducted where data capture is <75%**

Notes:

Exceedances of the PM_{10} annual mean objective of 40$\mu g/m^3$ 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.3 – Trends in Annual Mean PM_{10} Concentrations

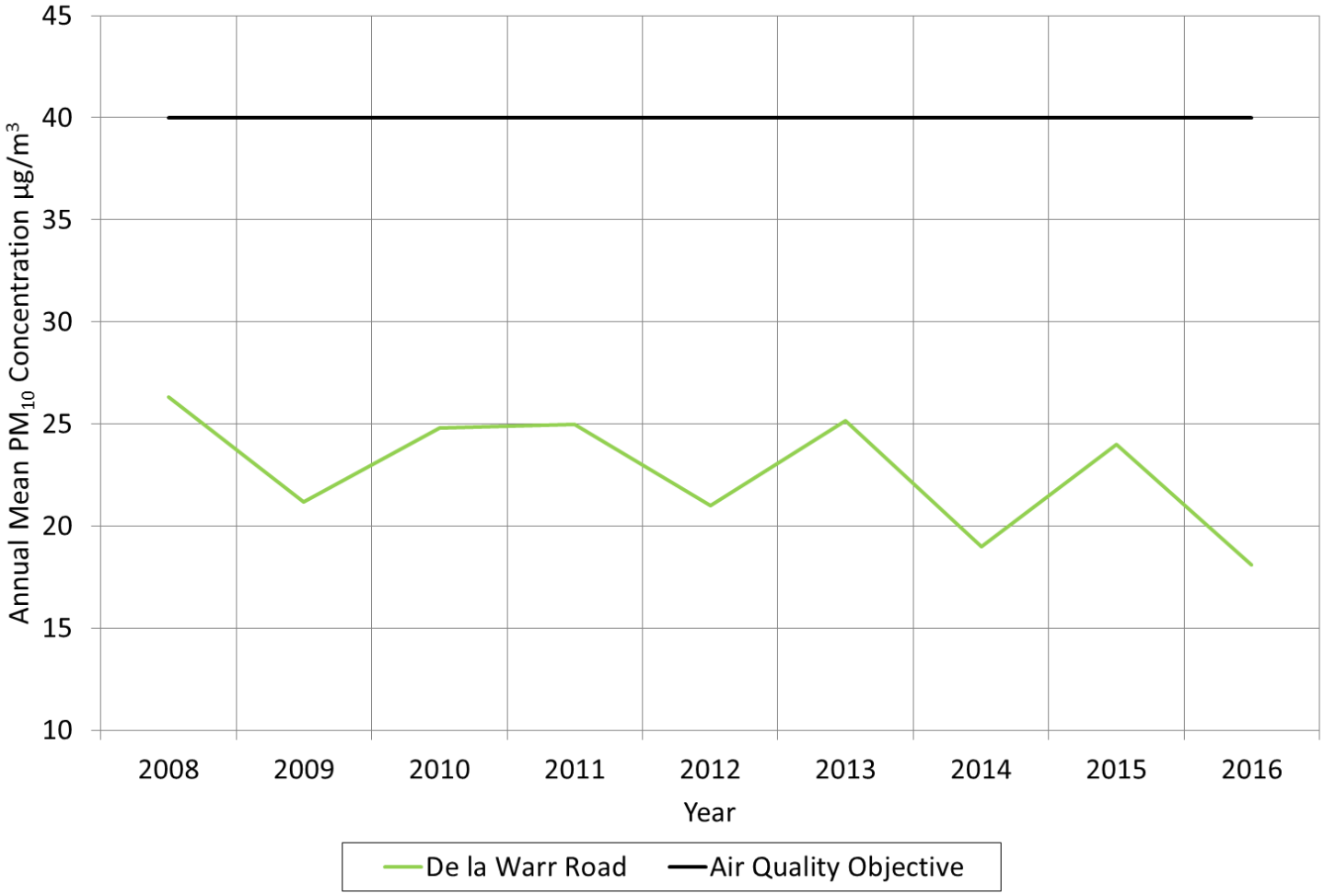


Table A.6 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	PM_{10} 24-Hour Means > 50 µg/m^3 (3)				
				2012	2013	2014	2015	2016
RY2	Kerbside	73.7	73.7	8 (37) (3)	7	0 (30) (3)	2 (33) (3)	0 (27) (3)

Notes:

Exceedances of the PM_{10} 24-hour mean objective (50 µg/m^3 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 90.4th percentile of 24-hour means is provided in brackets.

Table A.7 – $PM_{2.5}$ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	$PM_{2.5}$ Annual Mean Concentration ($\mu g/m^3$) (3)				
				2012	2013	2014	2015	2016
RY2	Kerbside	73.7	73.7	14.6	17.6	13.3	17.0	12.7

☒ **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.

Figure A.4 – Trends in Annual Mean $PM_{2.5}$ Concentrations

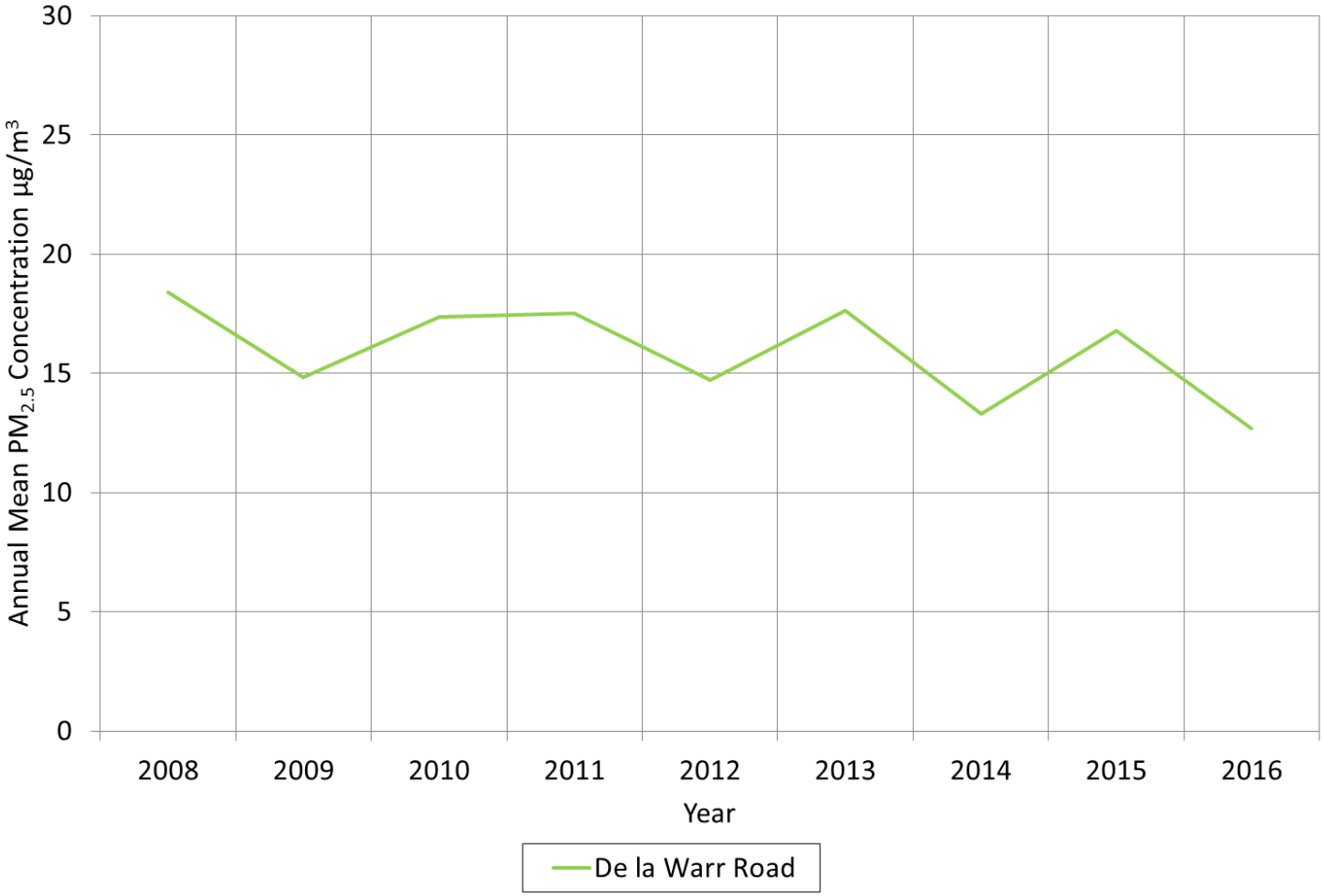


Table A.8 – Annual Mean O_3 Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	O_3 Annual Mean Concentration (µg/m^3) (3)				
				2012	2013	2014	2015	2016
RY1	Rural	99.8	52.2	56	51	57	-	55 (3)

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 Technical Guidance LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Table A.9 – Running 8-Hour Mean O_3 Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	Days With O_3 Running 8-Hour Means > 100 µg/m^3				
				2012	2013	2014	2015	2016
RY1	Rural	99.8	52.2	**24**	**12**	2	-	**17** (3)

Notes: Exceedances of the O_3 running 8-hour mean objective (100 µg/m^3 not to be exceeded more than 10 days/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) Note that number of days with running 8-hour means > 100 µg/m^3 was for a 6 month period (52% annual data capture rate).

Appendix B: Full Monthly Diffusion Tube Results for 2016

Table B.1 – NO_2 Monthly Diffusion Tube Results - 2016

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (1.15) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
DT2	21.7	21.7	19.8	22.0	19.4	17.6	19.0	15.9	18.9	21.2	22.8	25.2	20.4	23.5	15.8
DT3	48.9	36.0	41.7	42.3	49.5	31.9	58.1	48.2	66.4	23.9			44.7	51.4	17.3
DT4	29.2	24.4	20.3	27.9	24.8	20.5		23.7	20.8	18.0	22.0	25.6	23.4	26.9	12.7
DT5	21.6		21.0	20.7	17.9	13.7	22.9	25.4		28.4	30.9	33.9	23.6	27.1	11.5
DT7	21.3	22.2	20.1	21.2	20.9	13.1	17.1	16.4	22.3	22.1	28.5	31.7	21.4	24.6	18.1
DT8	21.0	19.4	25.4	20.7	23.6	12.0		16.6	24.7	27.9	27.6	28.7	22.5	25.9	17.6
DT9	20.9	23.9		20.5	27.8	23.5	21.6	21.2	32.2	32.5	33.5	34.6	26.6	30.6	13.6
DT10	14.6	14.4	12.7	10.7	13.1	10.0	12.3	10.7	14.1	15.6	17.6	20.8	13.9	16.0	11.7
DT12	34.6	30.9	40.6	35.3	36.8	31.2	27.3	28.9	46.8	43.4	42.5	52.0	37.5	43.1	30.8
DT13	16.6	13.4	10.8	14.3	11.5	8.3	10.5	9.3	12.4	15.0	16.9		12.6	14.5	14.5
DT14	35.1	29.4	28.2	34.6	29.8	24.0	31.2	28.5	38.6	31.3	34.2	41.3	32.2	37.0	23.3
DT16	21.4	14.7	14.9	16.7	15.7	13.9		14.0	20.8	17.6	19.3	24.5	17.6	20.2	20.2
DT17	16.3	14.8	13.9	13.7	13.6	10.4	12.4	10.3	24.0	17.2	17.0	23.8	15.6	17.9	17.9
DT19		21.3						23.4					N/A	N/A	N/A
DT21	32.9	33.3	40.9	32.6			19.6			27.6	33.1		31.4	34.6	29.1

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (1.15) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
DT22	34.7	30.6	33.1	34.1	34.4	26.8	24.8	23.1	37.3	34.8	39.0	39.5	32.7	37.6	31.7
DT25	31.7	31.5	34.3	37.1	34.5	22.8	26.4	25.8	36.4	35.5	40.7	39.8	33.0	38.0	21.0
DT27	23.2	23.3	21.7	20.3	24.4	18.8	17.7	16.8	20.3	29.8	30.2	31.2	23.1	26.6	17.7
DT28	26.0	22.4	20.0	24.2	24.2	12.6	17.4	19.0	19.0	28.3	31.5	22.9	22.3	25.6	17.3
DT29	23.9	24.1	18.6	21.8	22.9	14.7	18.0	17.3	20.6	28.9	30.5	31.4	22.7	26.1	17.5

☒ **Local bias adjustment factor used**

☒ **National bias adjustment factor used**

☒ **Annualisation has been conducted where data capture is <75%**

Notes:

Exceedances of the NO_2 annual mean objective of 40 µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60 µg/m^3, indicating a potential exceedance of the NO_2 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

Diffusion Tube Bias Adjustment Factors

Bias adjustment is effectively a calculated factor which shows whether diffusion tubes are over or under-reading ambient concentrations, thereby allowing a correction to be made.

Rother District Council has a co-location of triplicate diffusion tubes alongside the automatic continuous analyser at De La Warr Road, Bexhill. In 2016, data capture at the continuous monitoring site was sufficient to allow a valid local bias adjustment factor[8] to be derived. The local bias adjustment factor was calculated to be 1.15. Figure 1 shows the calculation for the local bias adjustment factor.

Figure 1: Local Diffusion Tube Bias Adjustment Factor for Rother District Council in 2016.

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	06/01/2016	03/02/2016	23.2	26.0	23.9	24	1.5	6	3.6		0.00	Good	or Data Capture
2	03/02/2016	02/03/2016	23.3	22.4	24.1	23	0.9	4	2.1	38.25	77.71	Good	Good
3	02/03/2016	30/03/2016	21.7	20.0	18.6	20	1.6	8	3.9	36.71	99.26	Good	Good
4	30/03/2016	27/04/2016	20.3	24.2	21.8	22	2.0	9	4.9	32.54	99.70	Good	Good
5	27/04/2016	25/05/2016		21.1	22.1	22	0.7	3	6.1	21.93	100.00	Good	Good
6	25/05/2016	29/06/2016	18.8	12.6	14.7	15	3.2	21	7.8	17.99	99.88	Poor Precision	Good
7	29/06/2016	27/07/2016	17.7	17.4	18.0	18	0.3	2	0.8	14.79	99.85	Good	Good
8	27/07/2016	24/08/2016	16.8	19.0	17.3	18	1.1	6	2.8	15.18	99.85	Good	Good
9	24/08/2016	28/09/2016	20.3	19.0	20.6	20	0.9	4	2.2	17.75	100.00	Good	Good
10	28/09/2016	26/10/2016	29.8	28.3	28.9	29	0.8	3	1.9	25.05	100.00	Good	Good
11	26/10/2016	30/11/2016	30.2	31.5	30.5	31	0.7	2	1.7	29.73	100.00	Good	Good
12	30/11/2016	05/01/2017	31.2	22.9	31.4	28	4.9	17	12.1	32.13	99.65	Good	Good
13													
											Overall survey -->	Good precision	Good Overall DC

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

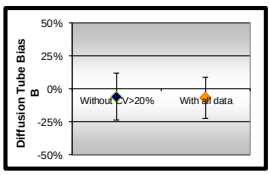
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:

Precision: 11 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 10 periods of data	
Bias factor A	1.15 (0.95 - 1.43)
Bias B	-13% (-30% - 5%)
Diffusion Tubes Mean:	23 µgm^{-3}
Mean CV (Precision):	6
Automatic Mean:	26 µgm^{-3}
Data Capture for periods used:	98%
Adjusted Tubes Mean:	27 (22 - 33) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 11 periods of data	
Bias factor A	1.15 (0.97 - 1.4)
Bias B	-13% (-29% - 3%)
Diffusion Tubes Mean:	22 µgm^{-3}
Mean CV (Precision):	7
Automatic Mean:	26 µgm^{-3}
Data Capture for periods used:	98%
Adjusted Tubes Mean:	26 (22 - 31) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

A national bias adjustment factor was also considered for use, obtained from the national database of bias adjustment factors (version 09/17)[9]. Figure 2 shows the

[8] Defra (2017), Local bias adjustment calculator, available at: https://laqm.defra.gov.uk/bias-adjustment-factors/local-bias.html
[9] Defra (2017), National bias adjustment factor database, available at: https://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html

national bias adjustment factor for the same laboratory (Gradko) and tube preparation method (20% TEA in water) used by Rother District Council. The national bias adjustment factor is 0.92.

Figure 2: National Diffusion Tube Bias Adjustment Factor for Rother District Council in 2016.

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 09/17

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

This spreadsheet will be updated at the end of March 2018

LAQM Helpdesk Website

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List. If a laboratory is not shown, we have no data for this laboratory.

Step 2: Select a Preparation Method from the Drop-Down List. If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down List. If a year is not shown, we have no data[2]

Step 4: Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in **blue** at the foot of the final column.

If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953

Analysed By[1]	Method (To undo your selection, choose (All) from the pop- up list)	Year[2] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision[6]	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in water	2016	R	Gateshead Council	12	29	26	10.5%	G	**0.90**
Gradko	20% TEA in water	2016	R	Gateshead Council	11	35	37	-6.0%	G	**1.06**
Gradko	20% TEA in water	2016	R	Gateshead Council	12	37	31	19.0%	G	**0.84**
Gradko	20% TEA in water	2016	R	Wokingham Borough Council	11	45	41	9.0%	G	**0.92**
Gradko	20% TEA in water	2016	R	Wokingham Borough Council	11	37	34	9.5%	G	**0.91**
Gradko	20% TEA in water	2016	R	Cheshire West and Chester	12	37	39	-5.3%	G	**1.06**
Gradko	20% TEA in water	2016	R	Thurrock Borough Council	12	29	26	11.0%	G	**0.90**
Gradko	20% TEA in water	2016	R	Borough Council of King's Lynn & West Norfolk	11	30	25	18.2%	G	**0.85**
Gradko	20% TEA in water	2016	UB	Eastleigh Borough Council	11	29	30	-4.7%	G	**1.05**
Gradko	20% TEA in water	2016	R	Eastleigh Borough Council	12	44	42	2.9%	G	**0.97**
Gradko	20% TEA in water	2016	R	Brighton & Hove City Council	12	52	48	8.8%	G	**0.92**
Gradko	20% TEA in water	2016	R	Eastleigh Borough Council	11	29	37	-22.0%	G	**1.28**
Gradko	20% TEA in water	2016	KS	Marylebone Road Intercomparison	12	99	79	25.2%	G	**0.80**
Gradko	20% TEA in water	2016	R	Monmouthshire County Council	11	39	34	16.6%	G	**0.86**
Gradko	20% TEA in Water	2016	R	Preston City Council	10	30	27	10.0%	G	**0.91**
Gradko	20% TEA in water	2016	R	Dudley MBC	12	37	34	11.0%	G	**0.90**
Gradko	20% TEA in water	2016	UB	Dudley MBC	12	26	22	18.6%	G	**0.84**
Gradko	20% TEA in water	2016	R	Dudley MBC	11	43	38	12.4%	G	**0.89**
Gradko	20% TEA in water	2016	R	Dudley MBC	12	51	54	-5.6%	G	**1.06**
Gradko	20% TEA in water	2016	B	LB Waltham Forest	12	31	30	2.3%	G	**0.98**
Gradko	20% TEA in water	2016	R	NOTTINGHAM CITY COUNCIL	12	37	39	-5.4%	G	**1.06**
Gradko	20% TEA in water	2016	R	LB Hounslow	9	75	58	28.0%	G	**0.78**
Gradko	20% TEA in water	2016	UB	LB Hounslow	9	33	33	0.1%	G	**1.00**
Gradko	20% TEA in water	2016	R	Lisburn & Castlereagh City Council	12	39	26	46.4%	G	**0.68**
Gradko	20% TEA in water	2016	B	Pembrokeshire Council	11	4	3	27.5%	G	**0.78**
Gradko	20% TEA in water	2016	R	Cheltenham Borough Council	11	32	32	-0.9%	G	**1.01**
Gradko	20% TEA in water	2016	R	Lancaster City Council	11	33	32	2.8%	G	**0.97**
Gradko	20% TEA in Water	2016	R	City of Lincoln Council	11	46	38	20.9%	G	**0.83**
Gradko	20% TEA in WATER	2016	R	Fareham Borough Council	12	33	26	27.0%	G	**0.79**
Gradko	20% TEA in WATER	2016	R	Fareham Borough Council	12	39	37	5.3%	G	**0.95**
Gradko	20% TEA in WATER	2016	R	Fareham Borough Council	9	27	32	-16.2%	G	**1.19**
GRADKO	20% TEA IN WATER	2016	R	NOTTINGHAM CITY COUNCIL	12	34	38	-10.0%	P	**1.11**
Gradko	20% TEA in water	2016		**Overall Factor[3] (32 studies)**				Use		**0.92**

Discussion of Choice of Factor to Use

In 2016, it was possible to derive a local bias adjustment factor as well as the national bias adjustment factor obtained from the national database. While the national bias adjustment factor of 0.92 is more similar to bias adjustment factors used in previous years, the local bias adjustment factor of 1.15 is the preferred choice of factor, given that it is more likely to take into account effects local to the District. The use of the higher local factor also produces a more conservative estimate of diffusion tube NO_2 concentrations. As such, the local bias adjustment factor of 1.15 was chosen to adjust 2016 diffusion tube concentrations for bias.

PM Monitoring Adjustment

The PM_{10} data from the TEOM continuous analyser at De La Warr Road (RY2) has been corrected using the volatile correction model[10] (VCM) to ensure gravimetric equivalence.

Short-term to Long-term Data Adjustment

As data capture for the De La Warr Road, Bexhill continuous PM_{10} analyser was 74% in 2016, period adjustment ("annualisation") was carried out using data from three continuous PM_{10} analysers at urban background sites within 75 miles of the site: Eastbourne – Holly Place (EB3), Rochester Stoke (ROCH), and Reading New Town (REA1). The data capture for the EB3 and REA1 analysers was 95%, and that for the ROCH analyser was 87% data capture.

The annualisation factor is the average ratio of the annual mean concentration to the period mean concentration. The periods used in the annualisation calculation were 03/02/16 – 03/06/16 and 04/08/16 – 31/12/16. The details of this adjustment calculation are presented in Table C.1.

Table C.1 – Period Adjustment of 2016 PM_{10} Data for De La Warr Road, Bexhill (RY2) automatic monitoring site.

Site ID	Annual Mean Concentration (µg/m^3)	Period Mean Concentration (µg/m^3)	Annual Mean to Period Mean Ratio
EB3	17.8	18.5	0.96
ROCH	15.8	16.8	0.94
REA1	13.4	14.6	0.92
Average Ratio			0.94

Data capture for the DT21 Rye South Undercliff diffusion tube site in 2016 was 58%, and so annualisation was carried out using data from three continuous NO_2 analysers in background sites within 50 miles: Eastbourne – Holly Place (EB3), Lullington Heath (LH), and Brighton Preston Park (BRT3), which had 99%, 96% and 89% data capture, respectively. The periods used in the annualisation calculation were January – April, June, October and November. The average ratio of the annual

[10] King's College London Volatile Correction Model. Information available at: http://www.volatile-correction-model.info/

mean to the period mean is the adjustment factor used. The details of this adjustment calculation are given in Table C.2.

Table C.2 – Period Adjustment of 2016 NO_2 Data for Rye South Undercliff (DT21) diffusion tube monitoring site.

Site ID	Annual Mean Concentration (µg/m^3)	Period Mean Concentration (µg/m^3)	Annual Mean to Period Mean Ratio
EB3	12.3	12.7	0.97
LH	7.9	8.2	0.96
BRT3	17.3	17.9	0.97
Average Ratio			0.96

Data capture for the Rye Harbour continuous ozone (O_3) analyser was 52% in 2016. Annualisation was carried out using data from three continuous O_3 analysers in background sites within 50 miles: Portsmouth (PMTH), Lullington Heath (LH), and Brighton Preston Park (BRT3), which had data capture rates of 100%, 97% and 98%, respectively. The period used in the annualisation calculation was 23/06/2016 - 31/12/2016. The average ratio of the annual mean to the period mean is the adjustment factor used. The details of this adjustment calculation are given in Table C.3.

Table C.3 – Period Adjustment of 2016 O_3 Data for Rye Harbour (RY1) automatic monitoring site.

Site ID	Annual Mean Concentration (µg/m^3)	Period Mean Concentration (µg/m^3)	Annual Mean to Period Mean Ratio
PMTH	43.4	34.7	1.25
LH	55.0	48.1	1.14
BRT3	46.1	37.8	1.22
Average Ratio			1.20

QA/QC of Automatic Monitoring

As previously described in Section 2.1, monitoring stations within East Sussex are part of the SAQMN and, therefore, measurements made at these sites are traceable to national standards and operational procedures defined for the regional network.

QA/QC of Diffusion Tube Monitoring

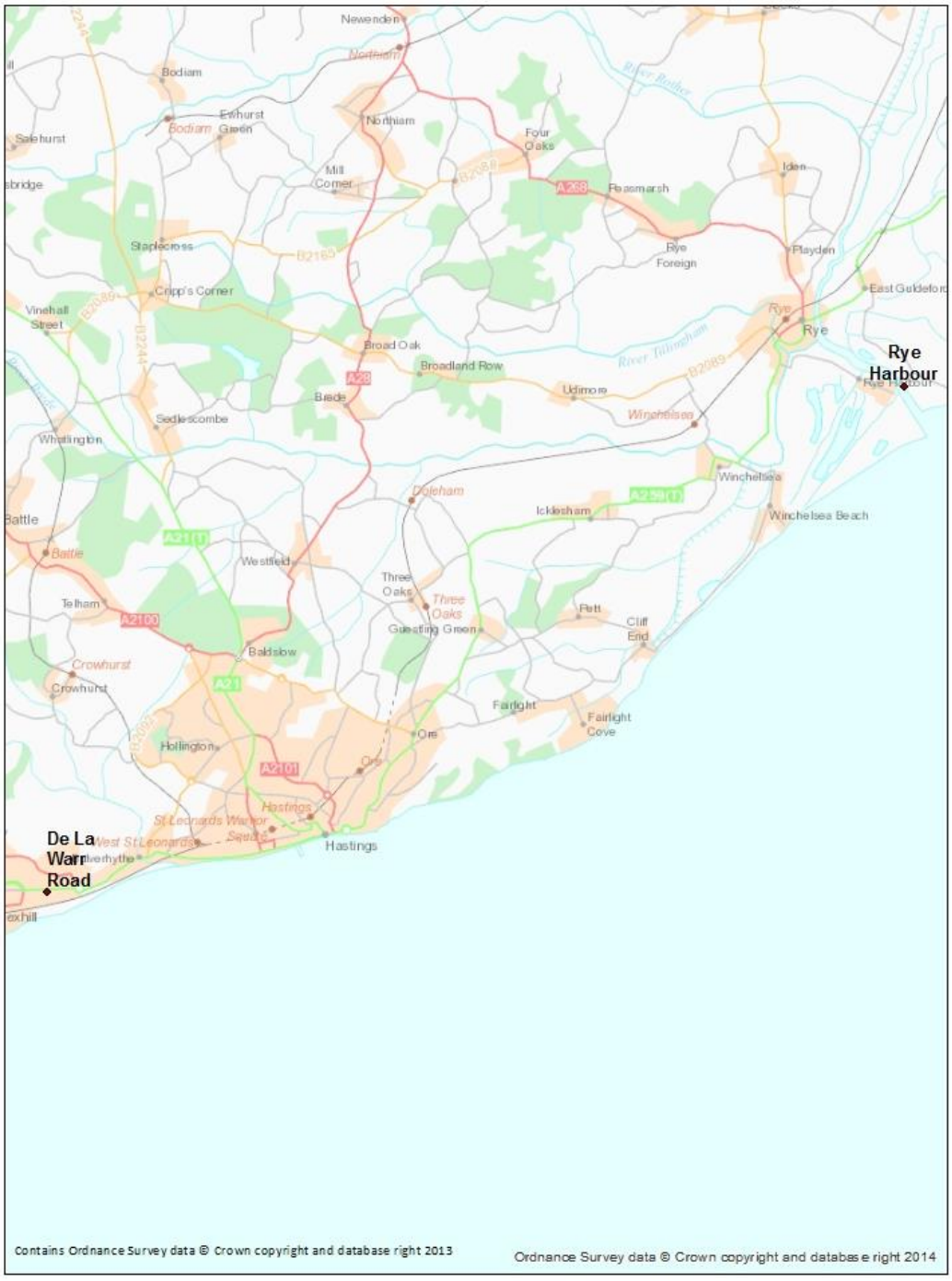
AIR is an independent analytical proficiency-testing (PT) scheme, operated by LGC Standards and supported by the Health and Safety Laboratory (HSL). AIR PT is a new scheme, started in April 2014, which combines two long running PT schemes: LGC Standards STACKS PT scheme and HSL Workplace Analysis Scheme for Proficiency (WASP) PT scheme.

Defra and the Devolved Administrations advise that diffusion tubes used for Local Air Quality Management should be obtained from laboratories that have demonstrated satisfactory performance in the AIR PT scheme.

Rother District Council used Gradko International for the supply and analysis of diffusion tubes, with a 20% triethanolamine (TEA) in water preparation. In all of the 8 most recent AIR PT testing rounds running from April 2015 until February 2017, Gradko achieved 100% satisfactory results, so there is high confidence in the accuracy of the diffusion tube results.

Appendix D: Maps of Monitoring Locations and AQMAs

Figure 3: Automatic Monitoring Locations



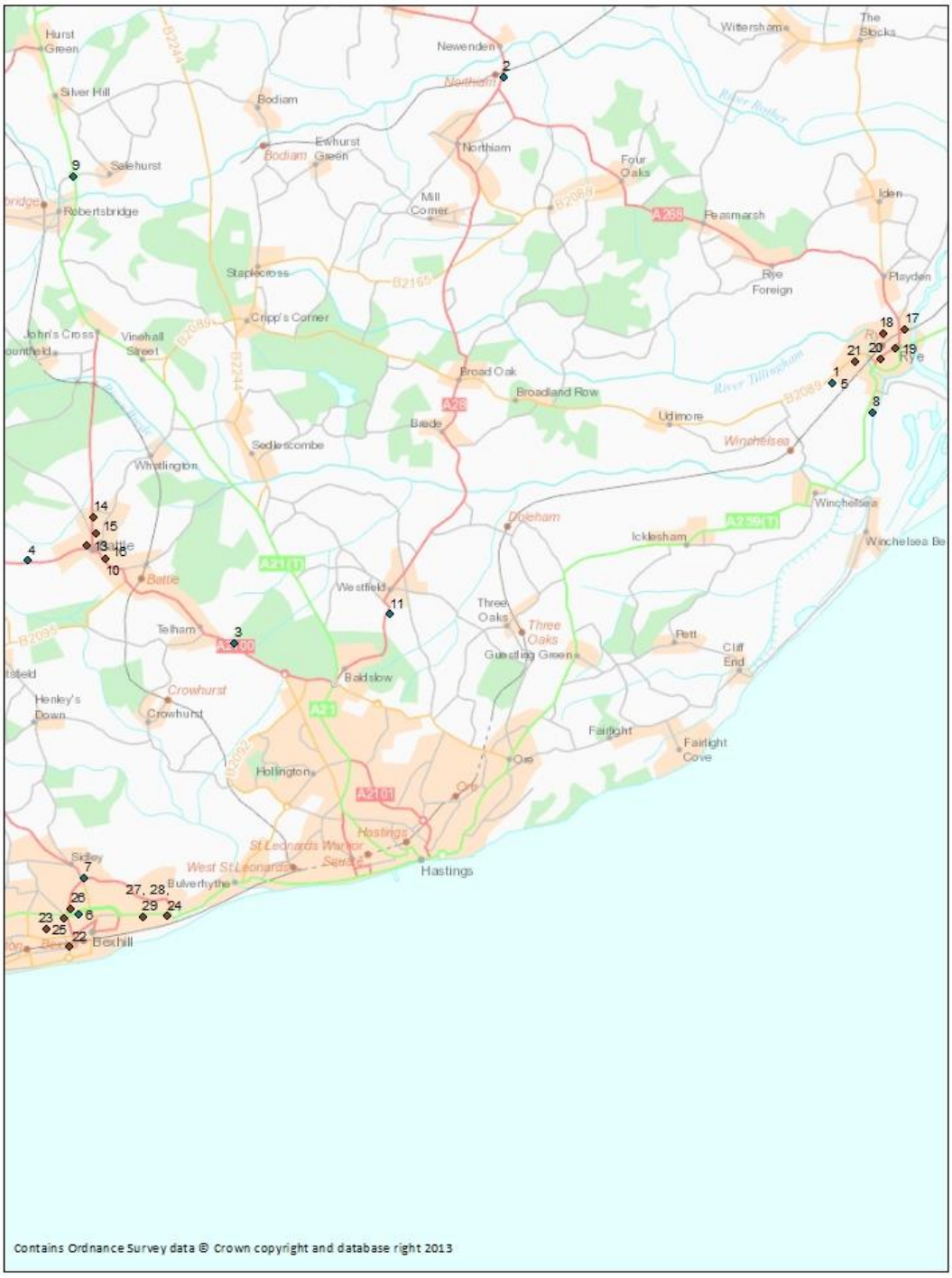
Automatic Air Quality Monitoring Locations in the Rother District

AECOM
Sunley House, 4 Bedford Park, Croydon, CR0 2AP
Tel: +44 (0)20 8639 3500, Fax: +44 (0)20 8663 6723
www.aecom.com

Legend

- Automatic Monitors

Figure 4: Non-Automatic Monitoring Locations



Air Quality Monitoring Locations in the Rother District

AECOM
Sunley House, 4 Bedford Park, Croydon, CR0 2AP
Tel: +44 (0)20 8639 3500, Fax: +44 (0)20 8663 6723
www.aecom.com

Legend

- Rother Diffusion Tubes
- ESCC Diffusion Tubes

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[11]	
	Concentration	Measured as
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

Table E.2 – Additional objectives from the UK Air Quality Strategy

Pollutant	Air Quality Objective[15]	
	Concentration	Measured as
Ozone (O_3)	100 µg/m^3, not to be exceeded more than 10 days a year	Running 8-hour mean

[11] The units are in microgrammes of pollutant per cubic metre of air (µg/m^3).

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_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
O_3	Ozone
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10 µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5 µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide
…	…

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