
# 2018 Air Quality Annual Status Report (ASR)

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

June 2018

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# Executive Summary: Air Quality in Our Area

## Air Quality in Eastbourne

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 importance of improving air quality and what local actions we can take can be found on:

https://laqm.defra.gov.uk/documents/air_quality_note_v7a-(3).pdf

The air quality objectives were met by Eastbourne Borough Council in 2017 and there are currently no Air Quality Management Areas (AQMAs) declared within the local authority area. Road transport is the primary source of local air pollution with industrial sources only representing a small proportion of emissions of air pollutants. Air pollution can come from many different sources – Eastbourne (as well as much of the South East) can suffer from imported air pollution from the Continent, emissions from shipping, and domestic wood burning. There are also natural sources of air pollution too, such as dust from soils, ash and sea-spray.

In January 2017 there was a pollution episode (imported from the continent, coupled with very cold and foggy weather) which affected the South East region and all $NO_2$ diffusion tubes showed increased concentrations in January. There was another episode during February.

On the 27th August 2018, the Birling Gap area suffered from an ‘air pollution incident’ causing streaming eyes and respiratory problems. It is still unclear as to the exact cause of this although some sort of shipping activity out in the Channel is suspected.

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

In September the South East had imported industrial air pollution from Northern Scandinavia and in October received dust from the Sahara and fires in Spain and witnessed strange cloud colouring and winds from Hurricane Ophelia.

## Actions to Improve Air Quality

Eastbourne Borough Council has taken forward a number of initiatives during the current reporting year of 2017 in pursuit of improving local air quality. East Sussex County Council (ESCC) managed to secure £1.4 million funding from the Department for Transport to deliver a programme of active travel across East Sussex. The Active Access for Growth Programme will run from 2017 to 2020, focusing on a number of growth areas, one of these being Eastbourne (See Section 2.2)

## Conclusions and Priorities

Eastbourne Borough Council works closely and in collaboration with all its delivery partners, for example - East Sussex County Council, in order to deliver improvement initiatives (see Section 2.2).

## Local Engagement and How to get Involved

*Help improve your own environment:*

Can you cut down on the use of your vehicle?

- Use public transport
- Cycle
- Walk
- Use alternative routes to get from A to B. Instead of walking or cycling along a major road, use alternative quieter and less polluted routes.

Not only can you help in improving our environment but it gives you the added benefit of exercise and helps improve general health and well-being.

*Idling engines:*

Vehicle idling causes air pollution and engines should not be left running unnecessarily. Breathing polluted air is not only extremely unpleasant but is also detrimental to our health.

*Why it's good to turn off vehicle engines - Cut Engine Cut pollution*

- Exhaust emissions contain a range of air toxic pollutants such as carbon monoxide, benzene, formaldehyde, polyaromatic hydrocarbons, nitrogen dioxide and particulate matter.
- Every minute your car idles you could fill 150 balloons with harmful chemicals.
- Turning off your car engine and restarting it after one minute causes less pollution and uses less fuel than keeping the engine running.
- Modern batteries need less engine running time to stay charged.
- It takes up to an hour for an engine to cool down which means your car heating fan will work with your engine turned off.
- Idling does not keep a catalytic converter warm. They retain heat for approximately 25 minutes after the engine is switched off.

Air quality is as important as exercise and diet for health. Reducing air pollutants can help reduce respiratory problems, heart disease, lung cancer and asthma attacks.

*Changing your vehicle:*

- If you are considering buying a new or second hand vehicle/s consider the options of newer cleaner models – e.g. hybrids, electric.
- Have a good look at the vehicles emission credentials before buying.
- Consider alternatives – could you join a Car Club?

There are various organisations and clubs which offer help and advice on getting active, for example: Sustrans: http://www.sustrans.org.uk/what-you-can-do
Bikeability: http://bikeability.org.uk/ - programmes – involving schools and workplaces (cycling and walking activities).
Details, including local air quality monitoring data, annual air quality reports and the impact air quality may have on health can be found on the 'Sussex-air' website. Sussex-air also runs the airAlert service providing warnings to people with respiratory and cardiovascular conditions, health professionals and carers in Sussex. The service is FREE to register/subscribe to and anyone can join. Alerts are sent direct to the airAlert app, email, mobile phone via text message or home phone. Sussex-air also provides a free coldAlert service – providing extreme cold weather warnings and

information and also a heatAlert service. The apps, airAlert, coldAlert and heatAlert are provided as a free service by the Sussex Air Quality Partnership and supported by the Public Health Bodies (East Sussex & West Sussex County Council). Further information can be found: www.sussex-air.net or telephone 01273 484337.

*Business*

Businesses in East Sussex can obtain assistance from energy advisors LoCASE (Low Carbon Across The South East). Your business may be eligible for a free energy audit and funding for energy efficiency solutions identified with a grant. More information can be found on:

http://locase.co.uk/partners-and-services/

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# 1 Local Air Quality Management

This report provides an overview of air quality in Eastbourne during 2017. 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 Eastbourne Borough Council to improve air quality and any progress that has been made.

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

# 2 Actions to Improve Air Quality

## 2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of compliance with the objectives. As there is no exceedance or likely exceedance of an air quality objective within the borough council area, Eastbourne Borough Council is not required to have an Air Quality Management Area (AQMA).

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

Defra's appraisal of last year's ASR concluded that vandalism and equipment issues had affected the quantity of data collected since 2014. Eastbourne managed to secure funding to buy and install a replacement monitoring station and this was installed during 2017. Three new analysers (measuring nitrogen oxides (NO, $NO_2$, NOx), ozone ($O_3$) and particulates ($PM_{10}$)) were installed at the Devonshire Park site. However there has not been a full year's worth of data analysis (Jan 2017-Dec 2017) at this site as commissioning took place in April 2017 for the NOx and $O_3$ analysers and the $PM_{10}$ was installed in May 2017.
The Holly Place site now only monitors $PM_{2.5}$ and $NO_2$, the $PM_{10}$ analyser was withdrawn at the beginning of 2017.

Although air quality objectives are not exceeded in Eastbourne, we are required to report on strategies aimed at improving air quality during 2017. A collaborative approach has been taken in order to improve the environment as a whole – for example the East Sussex Strategic Partnership:

http://www.essp.org.uk/What-we-do/Pride-of-Place/Environment

http://www.essp.org.uk/East-Sussex-Strategic-Partnership-Media/East-Sussex-Strategic-Partnership-Document-Library/PoP%20documents/Eastbourne.pdf

One of the key tasks under the Environment and Climate Change theme is to reduce traffic by increasing alternative sustainable travel choices and to improve air quality.

Under Health and Social Care, one of the priorities is encouraging people to take more exercise, reduce obesity and improve diet and nutrition. Coupled with this under 'Environment Priorities', Eastbourne aim to improve the standard and quantity of public transport, improve facilities for walking and cycling and encouraging the production of green travel plans.

The Eastbourne/Hailsham Triangle is recognised as being a key strategic location along the coast offering potential for added sustainable and economic development. This area is identified in the South East Plan as a growth area and an Economic Blueprint was commissioned to set out an economic strategy for the area, including how it can make contributions to the sustainable growth of East Sussex, the coastal strip and broader region. It is recognised that in order to help provide high quality and sustainable economic infrastructure matters such as creating better public transport connectivity within and beyond the Blueprint area and to raise the profile for further A27 improvements is important.

Eastbourne Borough Council is also working in partnership with East Sussex County Council to improve local air quality. One of the main mechanisms to achieve this is through the Local Transport Plan (LTP3)[4]. An update on the Local Transport Plan is provided in the Second Implementation Plan (2016/2017 to 2020/2021) which can be found at:
https://www.eastsussex.gov.uk/roadsandtransport/localtransportplan/ltp3/downloadltp3

While air quality is not an explicit objective for the LTP, there will be co-benefits in terms of the measures designed to tackle climate change and improve quality of life.

A summary of the measures is provided below:

**Hailsham/Polegate/Eastbourne Sustainable Transport Corridor**

- Improvements to Hempstead Lane junction to alleviate traffic congestion on the A271 and Hailsham town centre
- Enhancements to Cuckoo trail cycle and pedestrian route to Eastbourne
- Improvements for all road users including public transport along the A2270 corridor into Eastbourne town centre

[4] https://www.eastsussex.gov.uk/roadsandtransport/localtransportplan/ltp3/downloadltp3

- Bus Corridor Improvements: A259, A2021

**Eastbourne Town Centre Movement and Access package**

The Town Centre Local Plan for Eastbourne aims to inform the transport measures to be prioritised and funding has been secured from the LEP to deliver improvements and access in and around the town. Further information can be found on this link:

http://www.lewes-eastbourne.gov.uk/_resources/assets/inline/full/0/223510.pdf

The Eastbourne Town Centre Improvement Scheme (ETCIS) is a joint project between East Sussex County Council and Eastbourne Borough Council. The objectives of this are:

- Modernise the town centre, creating a pedestrian friendly environment
- Create civic space along Terminus Road for cultural and social activities
- Support local economic growth by providing a step change in the quality of the environment for local residents and visitors to Eastbourne

Terminus Road is currently Eastbourne's main commercial corridor and has resulted in a dense congregation of buses in a busy pedestrian area. The ETCIS addresses these problems using imaginative design solutions to enhance the road and the environment. For more details see: http://www.eastsussexhighways.com/eastbourne-town-centre-improvement-scheme-etcis

For example: On Terminus Road – between Ashford Road and Cornfield Road the scheme creates a pedestrian dominated environment and the road will be reduced to one lane for buses only travelling toward Cornfield Road. This will dramatically reduce traffic and create a new pedestrian friendly environment.

Eastbourne buses will be primarily situated in Cornfield and Gildredge Road, therefore removing what was known as 'diesel alley'

East Sussex County Council (ESCC) managed to bid successfully from the *Active Access for Growth Programme,* obtaining a £1.4 million grant from the Department for Transport to deliver a programme of active travel across East Sussex. The Growth programme will run from 2017-2020, focusing on particular growth areas, one of them being Eastbourne.

The key objectives of this are:

- Improve access to jobs, skills, training and education
- Seek support local economic growth
- Demonstrate an alignment to health, air quality and reduced carbon emissions and improve air quality
- Increase walking and cycling by 2% per year and increase the proportion of people completing 30 minutes of physical activity/day

The programme is split into 3 strands and covers a wide range of audiences and has many partners to deliver the programmes:

1. Business and Workforce Development
2. Education and Training
3. Healthy Communities

The Community Grant Scheme (AAfG Community Fund) aims to assist community groups, voluntary organisations and educational establishments to actively promote increasing the number of people traveling to work/education/training to walk and cycle and actively promote increased physical activity and AAfG officers have built important links with workplaces and colleges in relation to the first two strands above.

Point 3, above works with public health colleagues tackling physical inactivity in the county.

During the 2016/17 period there have been various cycling and walking schemes in the design phase with design and construction planned for 2017/18. For example:

**Cycling**

- Horsey Cycleway Phase 1b and 2 - a shared pedestrian/cycle route in Ashford Rd (between Susans Rd, Cavendish Place, Ringwood Rd areas) as part of the wider Horsey Cycle route between the railway station and Langney
- Ashington Gardens Cycle route has been completed with shared pedestrian/cycle route linking Ashington Gardens to A259
- Langney cycle route – dedicated and signed on-road cycle route from Langney to Sovereign Harbour – still in design/construction phase

Under the Active Access for Growth – ESCC have launched Pedal Power wich gives people the opportunity to try cycling by offering bikes for rent for between 1 and 6 months. There are a range of bikes to try – for more information please see this link:

https://eastsussexpedalpower.com/

**Walking**

The Arndale Centre/The Beacon in Eastbourne's Town Centre has been undergoing an £85 million new extension development.

The proposals for the Town Centre have been designed around the concept of Shared Space which aims to improve pedestrian movement and comfort by reducing the dominance of motor vehicles and enable users to share the space.
Shared spaces encourage low vehicle speeds, create an environment in which pedestrians can walk, or stop and chat, without feeling intimidated by motor traffic. They also make it easier for people to move around and promote social interaction.

The key design objectives are to:

- Improve public realm and connections with wider town
- Reallocate road space to pedestrians and public realm
- Reduce conflict of buses and pedestrians
- Improve relationship and connection with railway station
- Retain accessibility and visibility of buses on Terminus Road
- Coordinate the design of street furniture and signage which will be finished to a high standard befitting a key gateway into the Town Centre.
- Future proof design to aid a potential expansion of the shared space concept

Measures will enable walking between key destinations, including residential areas, town centres, schools and employment.
There will be significant pedestrian and bus facility upgrades to Terminus Road and Cornfield Terrace area in association with the redevelopment of the Arndale Centre.

Other schemes in the design phase 2017 with potential construction 2017/18 are provision of road crossings (Victoria Drive near Green Street) and in construction

phase is the provision of a zebra crossing near St Andrews School, Darley Rd) and some pedestrian safety improvements near Ocklynge School (design/construction phase).

**Other – potential improvements mentioned in the Local Transport Plan**

- Improvements to bus infrastructure, waiting facilities and information distribution on key routes
- Improved access and presentation of real time information through all delivery channels
- Provision of secure cycle parking facilities at key locations across the area
- Electric vehicle charging points at town centre car parks, stations and key destinations
- ESCC will support and lobby for rail infrastructure and rail service improvements
- Bikeability cycle training
- Travel behaviour change initiatives

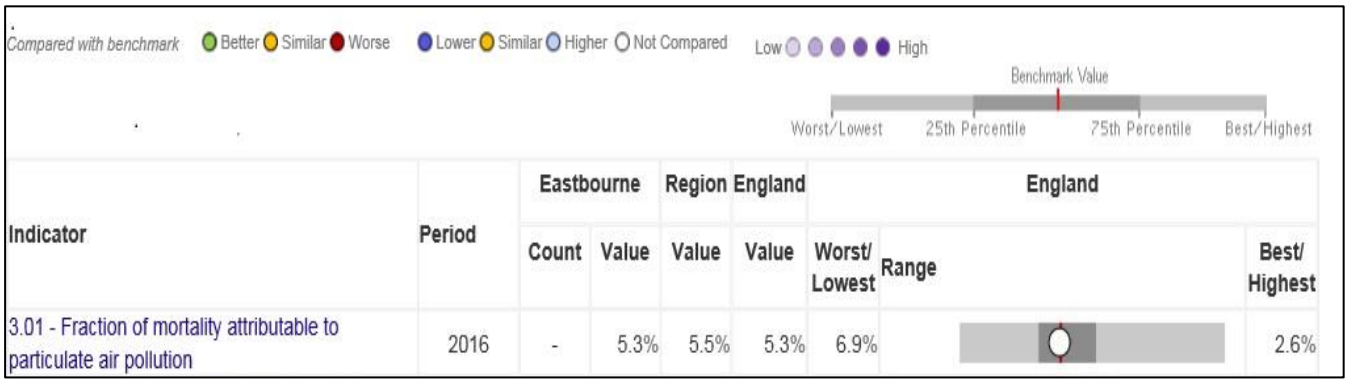
## 2.3 $PM_{2.5}$–Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in [5]Policy Guidance LAQM.PG16 (Chapter 7), and in [6]Technical Guidance TG16 Table 1.1 local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm 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.

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 Eastbourne Borough Council was 5.3% (2016 data) slightly lower than the South East region (5.5%) but the same as England as a whole. This shows a slight increase on last year's report (4.7%) as do all of the other values for the South East and England (4.7%) respectively. This information is available from the following web link:

https://fingertips.phe.org.uk/search/air%20pollution

Figure 1 showing the fraction of mortality attributable to particulate air pollution calculated for Eastbourne Borough Council in comparison to the South East region and England




| Indicator | Period | Eastbourne | | Region England | England | England | | |
|---|---|---|---|---|---|---|---|---|
| | | Count | Value | Value | Value | Worst/ Lowest | Range | Best/ Highest |
| 3.01 - Fraction of mortality attributable to particulate air pollution | 2016 | - | 5.3% | 5.5% | 5.3% | 6.9% | | 2.6% |

5 https://laqm.defra.gov.uk/documents/LAQM-PG16-April-16-v1.pdf

6 https://laqm.defra.gov.uk/documents/LAQM-TG16-April-16-v1.pdf

Site EB3 Holly Place has a continuous automatic monitor measuring $PM_{2.5}$. Data capture at this site during 2017 was 96%, giving an annual mean of 11µg/m$^3$. This figure is lower than last years (14.4µg/m$^3$) however in both years' 2015 and 2016, data had to be annualised as data capture was less than 75% - so the results for those years should be viewed with caution. In 2012 $PM_{2.5}$ had an annual reading of 16µg/m$^3$ and looking at the trend in Figure 6 - this suggests a gradual decline in concentrations which is positive.

The World Health Organisation (WHO) recommends a more stringent guideline of 10µg/m$^3$ and in DEFRA's recent draft consultation (opened 22 May 2018) [7]Clean Air Strategy 2018 the government have said:

*'We will progressively cut public exposure to particulate matter pollution as suggested by the World Health Organisation. We will halve the population living in areas with concentrations of fine particulate matter above WHO guideline levels (10 µg/m₃) by 2025.'*

7 Defra, May 2018, Clean Air Strategy 2018

# 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.

Eastbourne Borough Council undertook automatic (continuous) monitoring at two sites, EB1 Devonshire Park and EB3 Holly Place during 2017. Table A.1 in Appendix A shows the details of the sites. EB3 is part of the governments AURN (Automatic Urban and Rural Network) and continuously monitors $NO_2$ and $PM_{2.5}$. The $PM_{10}$ analyser was withdrawn on the 4th January 2017. EB1 Devonshire Park, as reported in the [8]Sussex Air Pollution Monitoring Network, Annual Report for 2015, the PM10 analyser was over-reading from October 2014 and throughout 2015. This site had no equipment service and maintenance cover so the fault could not be investigated or repaired. The NOx analyser suffered a fault during November 2014. As a result no automatic monitoring results were reported from this site in 2015. The site had continuing problems during 2016, with no relevant data collection. However, Eastbourne Borough Council has since managed to acquire funding and new analysers were installed in April and May 2017.
Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem. National monitoring results are available on the UK-AIR website: https://uk-air.defra.gov.uk/data/data_selector

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

8 Sussex Air Pollution Monitoring Network Annual Report, 2015, September 2016, Environmental Research Group, King's College London

### 3.1.2 Non-Automatic Monitoring Sites

Eastbourne Borough Council undertook non-automatic (passive) monitoring of $NO_2$ at 11 sites during 2017. 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 ($NO_2$)

Table A.3 in Appendix A compares the ratified and adjusted monitored $NO_2$ annual mean concentrations for the past 5 years with the air quality objective of 40µg/$m^3$ (shows data for both automatic and non-automatic monitoring sites).

Figure 2: Annual average $NO_2$ concentration measured at automatic monitoring sites in Eastbourne from 2013-2017

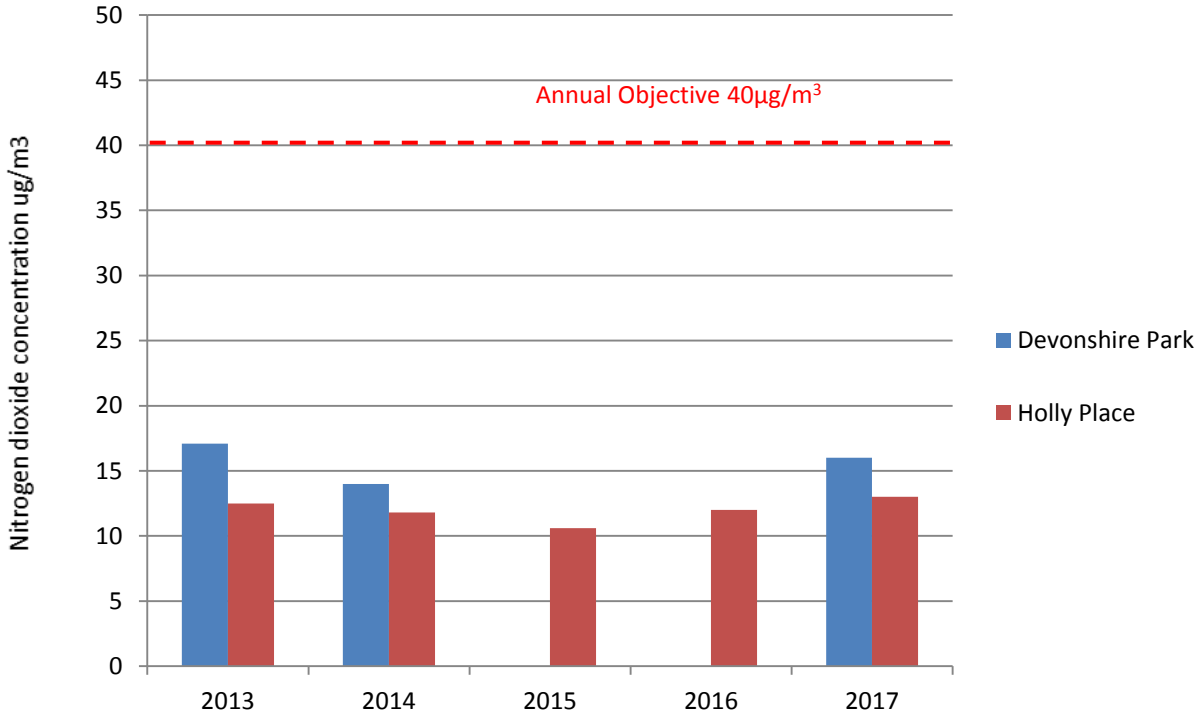


Figure 2 illustrates the annual average $NO_2$ concentrations measured at both Eastbourne automatic monitoring stations from 2013-2017. Devonshire Park data has been annualised (See Appendix C) as analysers have only been installed since April and May 2017 and therefore recorded less than 75% data capture. Annualisation gave an annual $NO_2$ mean concentration figure of 16µg/m$^3$ for Devonshire Park. Holly Place had an annual mean concentration of 13µg/m$^3$. During 2015 and 2016 Devonshire Park had no valid data for a variety of reasons. Annual results demonstrate concentrations well within the annual objective of 40µg/m$^3$

Figure 3: Annual average $NO_2$ concentrations measured at diffusion tube monitoring sites in Eastbourne 2013-2017

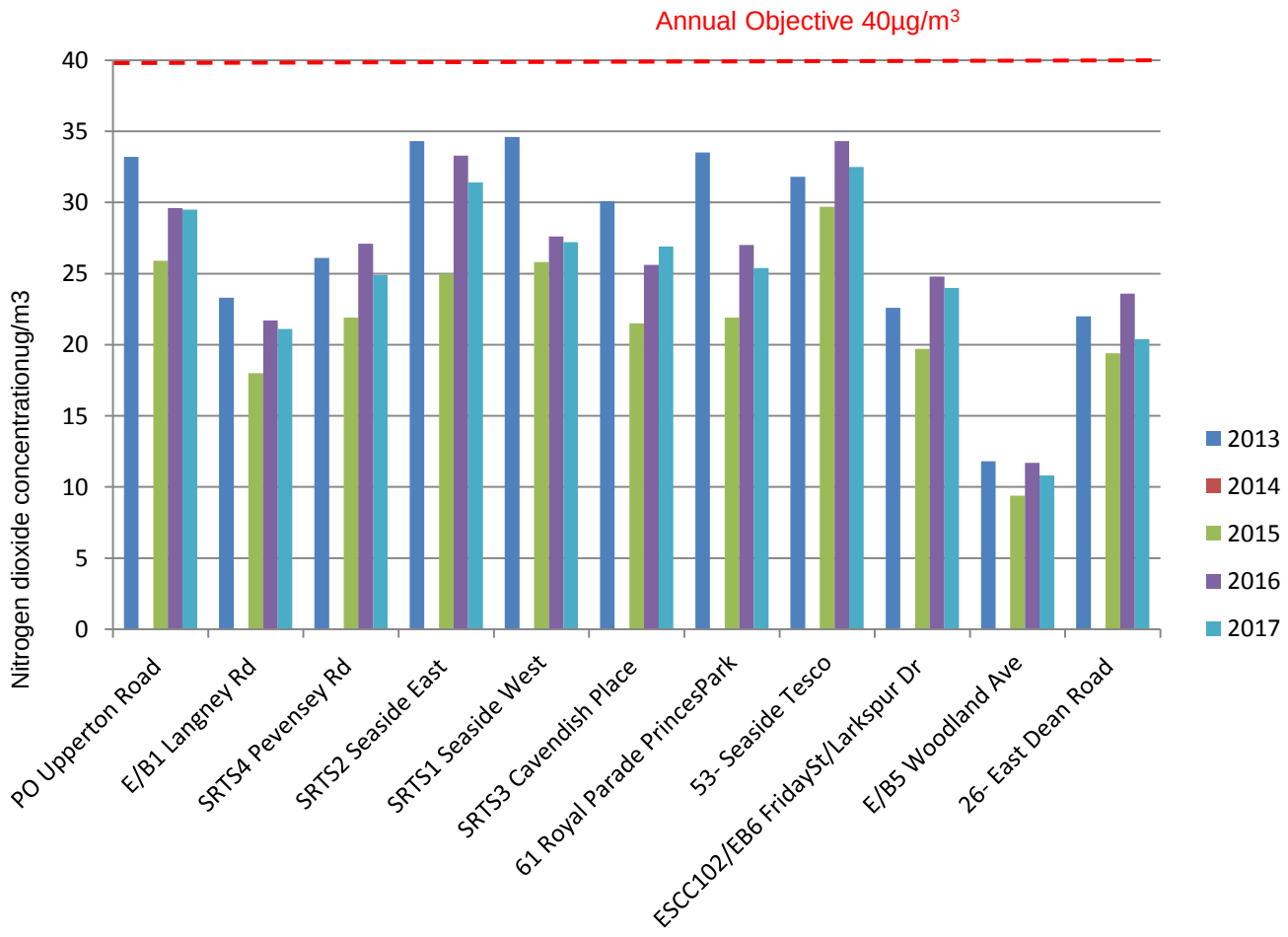


Figure 3 illustrates that at all 11 diffusion tube sites measuring nitrogen dioxide, concentrations comfortably met the annual objective. The highest average annual mean location was the 53 Seaside/Tesco location at 32.5µg/m$^3$. Most tubes (except Cavendish Place) have shown a slight decrease in $NO_2$ concentrations since 2016.

Note: there is no diffusion tube data for the year 2014 as the tubes kept being vandalised.

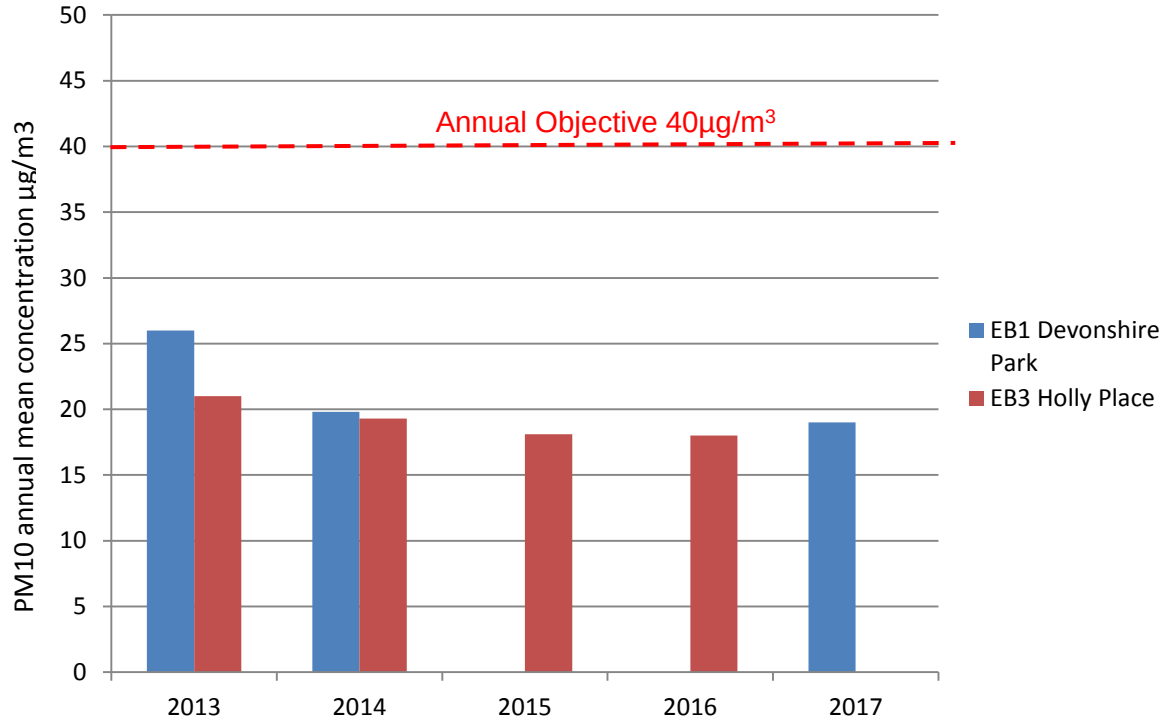
For diffusion tubes, the full 2017 dataset of monthly mean values is provided in Appendix B.

Table A.4 in Appendix A compares the ratified continuous monitored $NO_2$ hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m$^3$, not to be exceeded more than 18 times per year.

There have been no exceedances of the hourly objective of 200µg/m$^3$ since monitoring began at these sites

### 3.2.2 Particulate Matter ($PM_{10}$)

Figure 4: shows the annual mean concentration for $PM_{10}$ at both automatic monitoring sites

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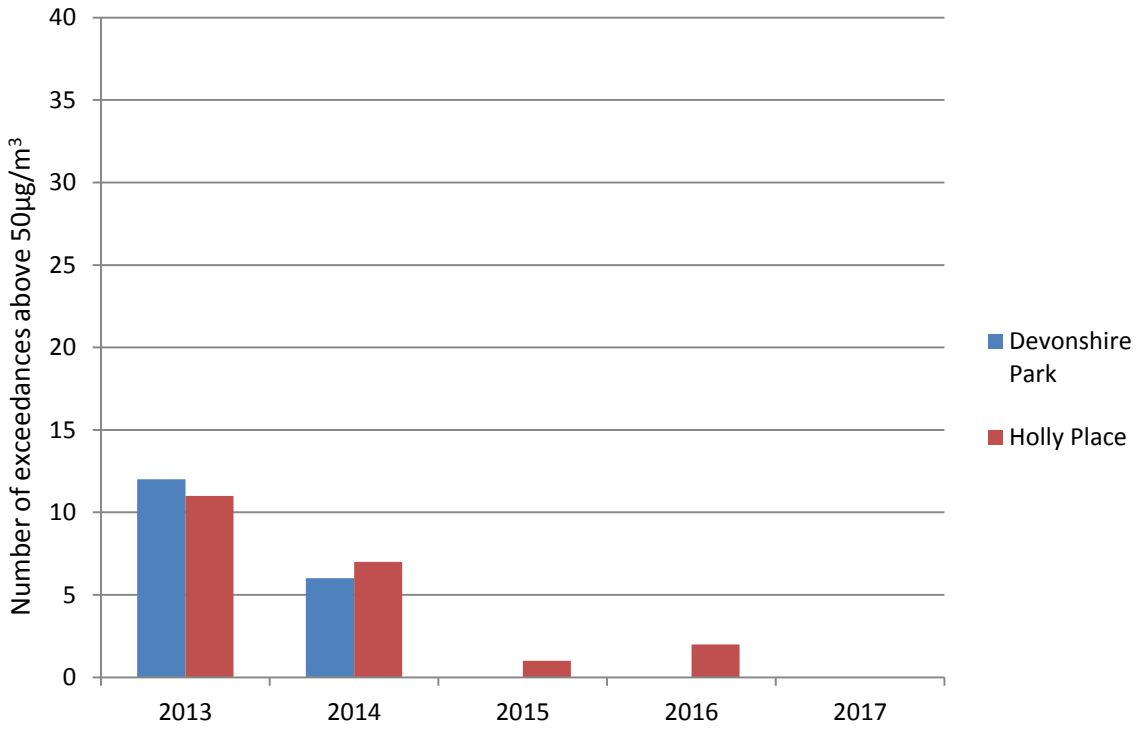
During 2015 and 2016 there was no $PM_{10}$ data reported for the Devonshire Park site as the analyser was not providing adequate data. Please note at the beginning of 2017 the $PM_{10}$ analyser at Holly Place was withdrawn and the Devonshire Park new analyser commenced in May 2017 (the figure for this had to be annualised (see Appendix C) as data capture was less than 75%). Annualisation gave an annual mean of 19µg/m$^3$ at Devonshire Park.
As clearly seen both stations have demonstrated readings well below the annual objective of 40µg/m$^3$ over the last 5 years.

Table A.5 in Appendix A compares the ratified and adjusted monitored $PM_{10}$ annual mean concentrations at the automatic monitoring stations for the past 5 years with the air quality objective of 40µg/m$^3$.

Table A.6 in Appendix A compares the ratified continuous monitored $PM_{10}$ daily mean concentrations for the last 5 years with the air quality objective of 50µg/m$^3$ not to be exceeded more than 35 times per year.

Figure 5: Number of exceedances of the 50µg/m$^3$ daily average at Devonshire Park and Holly Place automatic monitoring sites




As the Holly Place $PM_{10}$ analyser has now been withrawn there is no record for 2017 and Devonshire Park has shown no exceedances (however, it must be remembered

that there is only 60% data capture for this site, the 90.4% percentile of 24 hour means has been annualised – see Table A.6 and $PM_{10}$ annual estimated mean had to be carried out as per Appendix C).

However as seen in figure 5, there have been no exceedances of this over the last 5 years

### 3.2.3 Particulate Matter ($PM_{2.5}$)

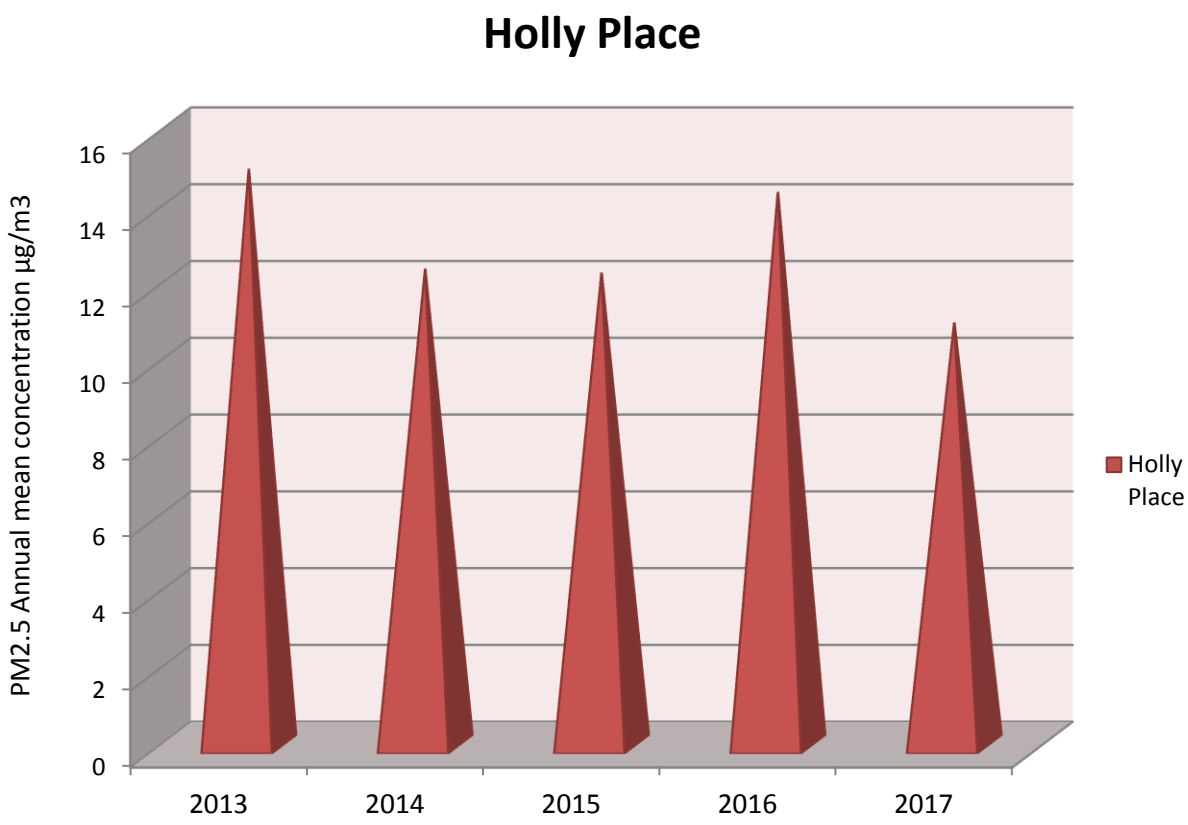
Table A.7 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years.

Holly Place is the only automatic monitoring station that monitors for $PM_{2.5}$ therefore there is no data from the Devonshire Park station.

Currently there is no annual objective in England for $PM_{2.5}$. The UK Air Quality Objectives and Pollutants in LAQM's Technical Guidance (TG16) Note is worded as: *working towards reducing emissions/concentrations of fine particulate matter ($PM_{2.5}$).*

However the Governments Draft Clean Air Strategy (mentioned in section 2.3) and proposals thereafter may change this.

Figure 6: illustrates the annual mean $PM_{2.5}$ concentrations at the automatic monitoring station site at Holly Place from 2013-2017




Note: 2015 and 2016 data was annualised so caution should be taken in these results.

The above figure shows the trend data for annual mean concentrations over the last 5 years. There appears to be a general trend of reduction in $PM_{2.5}$ concentration since 2013 (in 2012 the annual mean was 16µg/$m^3$ so concentrations were higher still)

# 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| EB1 | EB1 Devonshire Park | Urban Background | 561150 | 98341 | NO2; PM10, O3 | NO | Chemiluminescent BAM Beta-attenuation; UV absorption | | 5 | |
| EB3 | EB3 Holly Place | Urban Background | 560085 | 103118 | NO2, PM2.5 | NO | Chemiluminescent FDMS | | N/A | |

**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) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | PO Upperton Road | Kerbside | 560774 | 99163 | NO2 | N/A | 2 | 0 | N | |
| 2 | E/B1 Langney Rd | Kerbside | 561458 | 99116 | NO2 | N/A | 4 | 0 | N | |
| 3 | SRTS4 Pevensey Rd | Kerbside | 561568 | 99108 | NO2 | N/A | 3 | 0 | N | |
| 4 | SRTS2 Seaside East | Kerbside | 561717 | 99061 | NO2 | N/A | 3 | 0 | Y | |
| 5 | SRTS1 Seaside West | Kerbside | 561621 | 99004 | NO2 | N/A | 3 | 0 | N | |
| 6 | SRTS3 Cavendish Place | Kerbside | 561737 | 98948 | NO2 | N/A | 3 | 0 | N | |
| 7 | 61 Royal Parade PrincesPark | Kerbside | 562692 | 100149 | NO2 | N/A | 4 | 0 | N | |
| 8 | 53- Seaside (Tesco) | Kerbside | 562655 | 100970 | NO2 | N/A | 10 | 0 | N | |
| 9 | ESCC102/EB6 FridaySt/Larkspur Dr | Kerbside | 561885 | 103847 | NO2 | N/A | 8 | 1 | N | |
| 10 | E/B5 Woodland Ave | Urban Background | 559392 | 102006 | NO2 | N/A | N/A | 0 | N | |
| 11 | 26- East Dean Road | Roadside | 557829 | 98190 | NO2 | N/A | 200 | 3 | N | |

**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 $NO_2$ Monitoring Results

| Site ID | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2017 (%) (2) | $NO_2$ Annual Mean Concentration (µg/m$^3$) (3) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2013 | 2014 | 2015 | 2016 | 2017 |
| EB 1 Devonshire Park | Urban Background | Automatic | 74% | 74% | 17.1 | 14 | no valid data | no valid data | 16a |
| EB3 Holly Place | Urban Background | Automatic | 99% | 99% | 12.5 | 12.1(11.8)a | 10.6 | 12 | 13 |
| PO Upperton Road | Kerbside | Diffusion Tube | 92% | 92% | 33.2 | N/A | 25.9 | 29.6 | 29.5 |
| E/B1 Langney Rd | Kerbside | Diffusion Tube | 100% | 100% | 23.3 | N/A | 18 | 21.7 | 21.1 |
| SRTS4 Pevensey Rd | Kerbside | Diffusion Tube | 100% | 100% | 26.1 | N/A | 21.9 | 27.1 | 24.9 |
| SRTS2 Seaside East | Kerbside | Diffusion Tube | 100% | 100% | 34.3 | N/A | 25 | 33.3 | 31.4 |
| SRTS1 Seaside West | Kerbside | Diffusion Tube | 83% | 83% | 34.6 | N/A | 25.8 | 27.6 | 27.2 |
| SRTS3 Cavendish Place | Kerbside | Diffusion Tube | 92% | 92% | 30.1 | N/A | 21.5 | 25.6 | 26.9 |
| 61 Royal Parade PrincesPark | Kerbside | Diffusion Tube | 92% | 92% | 33.5 | N/A | 21.9 | 27 | 25.4 |
| 53- Seaside (Tesco) | Kerbside | Diffusion Tube | 100% | 100% | 31.8 | N/A | 29.7 | 34.3 | 32.5 |
| ESCC102/EB6 FridaySt/Larkspur Dr | Kerbside | Diffusion Tube | 100% | 100% | 22.6 | N/A | 19.7 | 24.8 | 24 |
| E/B5 Woodland Ave | Urban Background | Diffusion Tube | 100% | 100% | 11.8 | N/A | 9.4 | 11.7 | 10.8 |
| 26- East Dean Road | Kerbside | Diffusion Tube | 92% | 92% | 22 | N/A | 19.4 | 23.6 | 20.4 |

☒ **Diffusion tube data has been bias corrected**

☒ **Annualisation has been conducted where data capture is <75% (depicted with 'a')**

**Notes:**

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

$NO_2$ annual means exceeding 60µg/$m^3$, 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.

Data for 2017 is fully ratified

Invalid data for 2014 due to vandalism

## 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 2017 (%) (2) | $NO_2$ 1-Hour Means > 200µg/$m^3$ (3) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2013 | 2014 | 2015 | 2016 | 2017 |
| EB1 Devonshire Park | Urban Background | Automatic | 74 | 74 | 0 | 0 | No valid data | No valid data | 0 (42.5) |
| EB3 Holly Place | Urban Background | Automatic | 99 | 99 | 0 | 0(67.8) | 0(62) | 0 | 0 |

**Notes:**

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

Data for 2017 is fully ratified

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

| Site ID | Site Type | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2017 (%) (2) | $PM_{10}$ Annual Mean Concentration ($\mu g/m^3$) (3) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 2013 | 2014 | 2015 | 2016 | 2017 |
| EB1 Devonshire Park | Urban Background | 60 | 60 | 26b | 19.8b | No valid data | No valid data | 19b |
| EB3 Holly Place | Urban Background | N/A | N/A | 21b | 19.3b | 18.1 | 18 | Analyser withdrawn at this site |

☒ **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.

Data with a 'b' were annualised in previous USA's/Progress Reports/ASR's

Data for 2017 is fully ratified

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

| Site ID | Site Type | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2017 (%) (2) | $PM_{10}$ 24-Hour Means > 50µg/m$^3$ (3) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 2013 | 2014 | 2015 | 2016 | 2017 |
| EB1 Devonshire Park | Urban Background | 60 | 60 | 12 (42)a | 6 (32.9)a | No valid data | No Valid data | 0 (26.8) b |
| EB3 Holly Place | Urban Background | N/A | N/A | 11 (41)a | 7 (29.1)a | 1 (26) | 2 | Analyser withdrawn at this site |

**Notes:**

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

Data with an ‘a’ were annualised in previous USA’s/Progress Reports/ASR’s

Data with a ‘b’ denotes that data % capture was less than 75%

Data for 2017 has been ratified

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

| Site ID | Site Type | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2017 (%) (2) | $PM_{2.5}$ Annual Mean Concentration (µg/m$^3$) (3) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 2013 | 2014 | 2015 | 2016 | 2017 |
| EB3 Holly Place | Urban Background | 96 | 96 | 15 | 12.4 | 10.4 (12.3) | 12.7 (14.4) | 11 |

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

**Notes:**

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

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

(3) All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Data for 2017 has been ratified

# Appendix B: Full Monthly Diffusion Tube Results for 2017

## Table B.1 – $NO_2$ Monthly Diffusion Tube Results – 2017

| 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 (0.89) and Annualised (1) | Distance Corrected to Nearest Exposure (2) |
| EBC09 Upperton Rd | 45.83 | 31.38 | 28.09 | 33.52 | 33.92 | 32.51 | 29.02 | missing | 33.09 | 29.65 | 39.91 | 28.22 | 33.2 | 29.5 | |
| EB1 Langney Rd | 33.47 | 23.57 | 23.15 | 23.53 | 23.38 | 20.45 | 18.80 | 18.02 | 24.00 | 19.84 | 31.04 | 25.78 | 23.8 | 21.1 | |
| SRTS-4 Pevensey Rd | 40.75 | 29.70 | 29.20 | 24.32 | 26.96 | 25.39 | 25.09 | 22.91 | 26.52 | 26.42 | 30.73 | 27.36 | 27.9 | 24.9 | |
| SRTS-2 Seaside Rd East | 47.28 | 38.13 | 33.77 | 38.54 | 36.47 | 30.59 | 32.73 | 30.81 | 37.1 | 30.6 | 35.94 | 30.84 | 35.2 | 31.4 | |
| SRTS-1 Seaside Rd | missing | 30.59 | 30.20 | 31.88 | 31.19 | 27.03 | 25.90 | 26.74 | 28.79 | missing | 40.08 | 32.93 | 30.5 | 27.2 | |
| Cavendish Place | 39.81 | 29.04 | 19.51 | 29.41 | 28.94 | 24.65 | 23.51 | missing | 38.97 | 31.01 | 39.52 | 28.51 | 30.3 | 26.9 | |
| Royal Parade/Princes Park | missing | 31.86 | 28.58 | 31.51 | 29.48 | 25.47 | 25.28 | 25.13 | 28.45 | 27.15 | 34.67 | 26.55 | 28.6 | 25.4 | |
| Tesco/Seaside | 50.40 | 38.88 | 39.38 | 31.95 | 34.88 | 31.81 | 33.24 | 33.22 | 34.55 | 35.74 | 39.51 | 34.6 | 36.5 | 32.5 | |
| Friday St/Larks Park Drive | 40.58 | 29.52 | 26.95 | 26.94 | 25.95 | 22.33 | 21.99 | 19.56 | 24.48 | 26.71 | 31.42 | 27.72 | 27.0 | 24.0 | |
| EB-5 Woodland Ave | 22.63 | 13.60 | 13.47 | 8.09 | 11.05 | 10.18 | 8.56 | 7.59 | 11.29 | 9.30 | 16.14 | 13.85 | 12.1 | 10.8 | |

| 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 (0.89) and Annualised (1) | Distance Corrected to Nearest Exposure (2) |
| East Dean Rd | 43.79 | 29.53 | missing | 18.54 | 28.21 | 24.06 | 19.27 | 17.75 | 21.59 | 18.8 | 16.10 | 15.09 | 23.0 | 20.4 | |

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

$NO_2$ annual means exceeding 60µg/$m^3$, 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

## QC/QC of automatic monitoring

The continuous monitoring stations in Eastbourne Borough Council are managed by the Sussex Air Quality Partnership (https://www.sussex-air.net). All continuous monitoring activities are subject to the same quality assurance/quality control objectives set out in the AURN local site operator's manual. These procedures are:

- Overnight 24 hour IZS calibration checks (NOx analyser);
- Fortnightly manual zero/span calibration using certified cylinders (carried out by Council employees fully trained in LSO duties);
- Full data analysis and ratification by the Environmental Research Group at King's College London for Devonshire Park* and by Ricardo Energy & Environment for Holly Place;

Six monthly service visits and site audits

*Note: Devonshire Park had new analysers ($NO_2$ and $O_3$) installed in April 2017 and a new $PM_{10}$ particulate analyser in May 2017, therefore this station does not have a full years data for the year 2017. Holly Place did not have a $PM_{10}$ analyser during 2017, it was withdrawn from use.

## QA/QC of diffusion tube monitoring

The Ambient, Indoor, Workplace Air and Stack Emissions Proficiency Testing Scheme (AIR PT) is an independent analytical proficiency-testing scheme, operated by LGC Standards and supported by the Health and Safety Laboratory (HSL). Defra and the Devolved Administrations advise that diffusion tubes used for LAQM should be obtained from laboratories that have demonstrated satisfactory performance in the AIR PT scheme. AIR NO2 PT forms an integral part of the UK NO2 Network's QA/QC, and is a useful tool in assessing the analytical performance of those laboratories supplying diffusion tubes to Local Authorities for use in the context of Local Air Quality Management (LAQM).

During 2017 Gradko participated in the AIR PT programme, and obtained a 100% rating for the whole year (AIR PT rounds AR018, AR019, AR021 and AR022).

Further information can be found on this link:

https://laqm.defra.gov.uk/assets/AIR-PT-Rounds-13-to-24-Apr-2016-Feb-2018.pdf

## National bias adjustment factor spreadsheet.

The diffusion tubes are supplied and analysed by Gradko utilising the 20 % triethanolamine (TEA) in water preparation method. A bias adjustment of 0.89 for the year 2017 (based on 34 studies) has been derived from the national bias adjustment calculator. The spreadsheet is shown below in Figure 7:

Microsoft Excel - Copy of Database_Diffusion_Tube_Bias_Factors_v03_18 FINAL.xls [Compatibility Mode]

**National Diffusion Tube Bias Adjustment Factor Spreadsheet** — Spreadsheet Version Number: 03/18

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 June 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[5] (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) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2218 | Gradko | 20% TEA in water | 2017 | UB | Bracknell Forest Borough Council | 11 | 19 | 16 | 23.0% | G | **0.81** |
| 2219 | Gradko | 20% TEA in water | 2017 | R | Bracknell Forest Borough Council | 12 | 47 | 39 | 21.7% | G | **0.82** |
| 2220 | Gradko | 20% TEA in water | 2017 | R | Brighton & Hove City Council | 11 | 51 | 50 | 1.6% | G | **0.98** |
| 2230 | Gradko | 20% TEA in water | 2017 | R | Wokingham Borough Council | 11 | 39 | 37 | 4.6% | G | **0.96** |
| 2231 | Gradko | 20% TEA in water | 2017 | UC | Southampton City Council | 11 | 31 | 29 | 5.3% | G | **0.95** |
| 2232 | Gradko | 20% TEA in water | 2017 | R | Preston City Council | 12 | 31 | 26 | 23.3% | G | **0.81** |
| 2233 | Gradko | 20% TEA in water | 2017 | R | Monmouthshire County Council | 9 | 42 | 33 | 26.6% | G | **0.79** |
| 2234 | Gradko | 20% TEA in water | 2017 | R | Cheshire West and Chester | 11 | 36 | 36 | 1.4% | G | **0.99** |
| 2235 | Gradko | 20% TEA in water | 2017 | UI | Crawley Borough Council | 12 | 28 | 28 | -1.2% | G | **1.01** |
| 2236 | Gradko | 20% TEA in water | 2017 | R | Borough Council of King's Lynn & West Norfol | 12 | 29 | 25 | 16.0% | G | **0.86** |
| 2237 | Gradko | 20% TEA in water | 2017 | R | Bath & North East Somerset | 12 | 45 | 45 | -0.2% | G | **1.00** |
| 2238 | Gradko | 20% TEA in water | 2017 | R | NOTTINGHAM CITY COUNCIL | 12 | 38 | 41 | -6.6% | G | **1.07** |
| 2239 | Gradko | 20% TEA in water | 2017 | R | Lancaster City Council | 12 | 35 | 32 | 9.7% | G | **0.91** |
| 2252 | Gradko | 20% TEA in water | 2017 | R | Thurrock Borough Council | 12 | 54 | 52 | 3.3% | S | **0.97** |
| 2253 | Gradko | 20% TEA in water | 2017 | R | Thurrock Borough Council | 11 | 35 | 33 | 7.0% | G | **0.93** |
| 2254 | Gradko | 20% TEA in water | 2017 | R | Thurrock Borough Council | 9 | 33 | 29 | 14.3% | G | **0.87** |
| 2255 | Gradko | 20% TEA in water | 2017 | UB | Thurrock Borough Council | 11 | 30 | 28 | 8.0% | S | **0.93** |
| 2256 | Gradko | 20% TEA in water | 2017 | R | Dudley MBC | 12 | 50 | 50 | 0.8% | G | **0.99** |
| 2257 | Gradko | 20% TEA in water | 2017 | UB | Dudley MBC | 12 | 24 | 19 | 26.6% | G | **0.79** |
| 2258 | Gradko | 20% TEA in water | 2017 | R | City of Lincoln Council | 12 | 42 | 31 | 33.2% | G | **0.75** |
| 2259 | Gradko | 20% TEA in water | 2017 | R | Gedling Borough Council | 12 | 35 | 31 | 10.1% | G | **0.91** |
| 2302 | Gradko | 20% TEA in water | 2017 | R | Gateshead Council | 12 | 36 | 37 | -2.7% | G | **1.03** |
| 2303 | Gradko | 20% TEA in water | 2017 | R | Gateshead Council | 12 | 29 | 25 | 17.5% | G | **0.85** |
| 2304 | Gradko | 20% TEA in water | 2017 | R | Gateshead Council | 12 | 34 | 35 | -5.3% | G | **1.06** |
| 2309 | Gradko | 20% TEA in water | 2017 | R | LB Hounslow | 12 | 65 | 54 | 22.2% | G | **0.82** |
| 2310 | Gradko | 20% TEA in water | 2017 | R | LB Hounslow | 12 | 59 | 53 | 10.6% | G | **0.90** |
| 2311 | Gradko | 20% TEA in water | 2017 | B | LB Hounslow | 11 | 28 | 30 | -6.0% | G | **1.06** |
| 2312 | Gradko | 20% TEA in water | 2017 | R | LB Hounslow | 11 | 43 | 34 | 28.8% | G | **0.78** |
| 2313 | Gradko | 20% TEA in water | 2017 | B | LB Hounslow | 9 | 38 | 33 | 14.9% | G | **0.87** |
| 2314 | Gradko | 20% TEA in water | 2017 | R | LB Hounslow | 11 | 52 | 42 | 24.4% | G | **0.80** |
| 2320 | Gradko | 20% TEA in water | 2017 | UB | Liverpool | 11 | 20 | 17 | 15.2% | G | **0.87** |
| 2326 | Gradko | 20% TEA in water | 2017 | R | North Ayrshire Council | 12 | 26 | 21 | 23.2% | G | **0.81** |
| 2335 | Gradko | 20% TEA in water | 2017 | R | South Gloucestershire Council | 12 | 25 | 23 | 10.3% | G | **0.91** |
| 2342 | Gradko | 20% TEA in water | 2017 | KS | Marylebone Road Intercomparison | 12 | 101 | 79 | 28.6% | G | **0.78** |
| 2637 | Gradko | 20% TEA in water | 2017 | | **Overall Factor[3] (34 studies)** | | | | | **Use** | **0.89** |

Annualisation had to be carried out for pollutants $NO_2$ and $PM_{10}$ at Devonshire Park (this was required as data capture was less than 75% - and this was due to the fact the analysers were installed during April and May respectively). Data capture for $NO_2$ was 74% and $PM_{10}$ was 60%. A ratio has to be worked out from data and this factor was derived from using the monitoring stations below. These sites all have a data capture % of over 85% for 2017 data.

The annual mean and the associated period mean concentrations (corresponding to when Devonshire Park had validated data) were then calculated. The values are illustrated in Figure 8 below.

Figure 8: Nitrogen dioxide ($NO_2$) annualised mean for Devonshire Park site

| Site | $NO_2$ Annual Mean 2017 µg/m$^3$ ($A_m$) | $NO_2$Period Mean 2017 µg/m$^3$ ($P_m$) | Ratio ($A_m/P_m$) |
|---|---|---|---|
| Eastbourne Holly Place (AURN site - urban background) 99% data capture | 13 | 11.00 | 1.18 |
| Brighton Preston Park (AURN site - Urban Background) 98% data capture | 17 | 15.25 | 1.11 |
| Lullington Heath (AURN site – Rural) 98% data capture | 8 | 6.51 | 1.23 |
| | | Average Ratio factor = 1.17 | |

The annual mean for Devonshire Park was: 14µg/m$^3$ – therefore
14 x 1.17 = **16µg/m$^3$ (best estimate of annual mean for NO$^2$ at this site)**

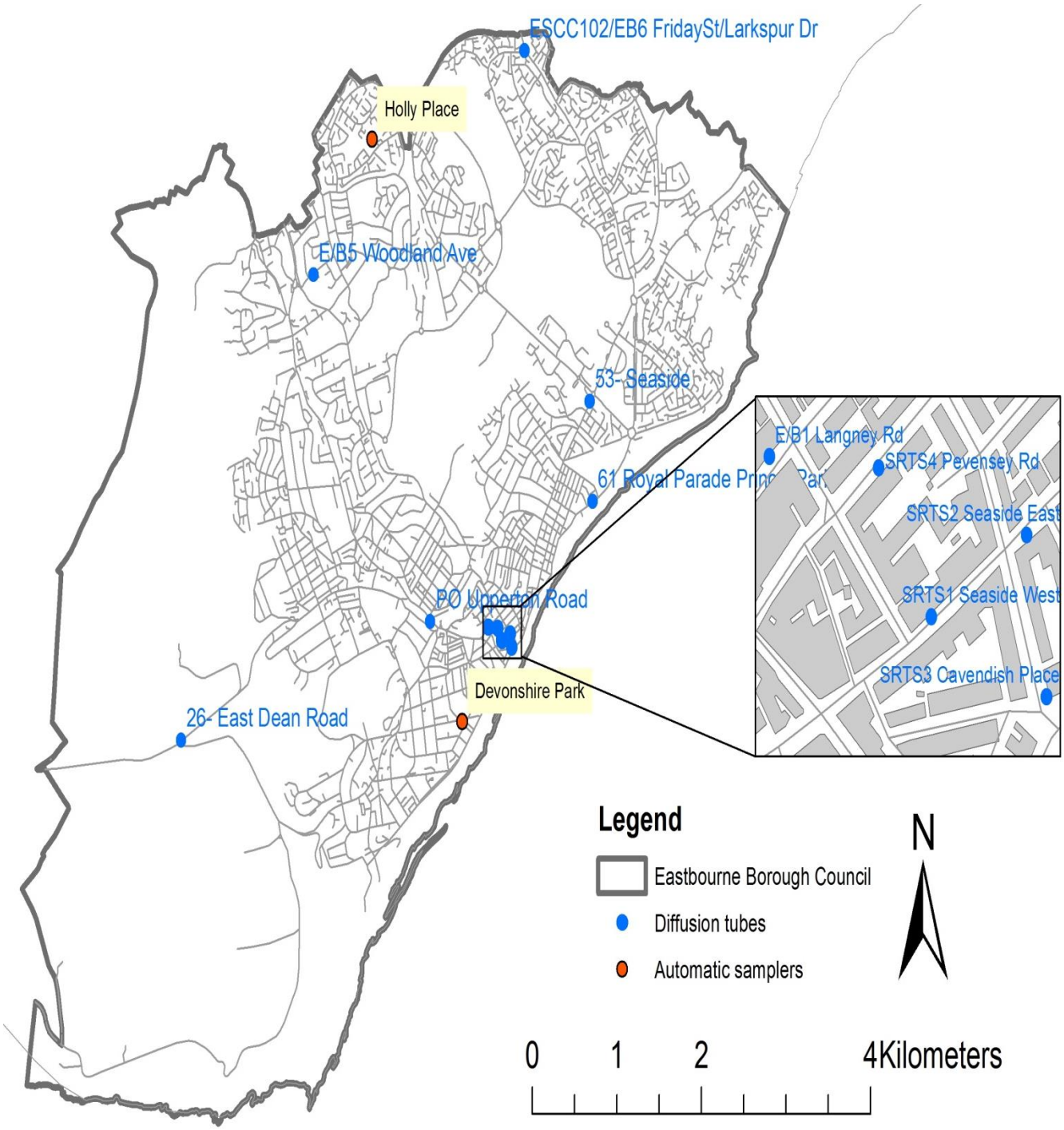
Figure 9: Particulate $PM_{10}$ annualised mean for Devonshire Park site

| Site | $PM_{10}$ Annual Mean 2017 µg/m$^3$ ($A_m$) | $PM_{10}$Period Mean 2017 µg/m$^3$ ($P_m$) | Ratio ($A_m/P_m$) |
|---|---|---|---|
| Canterbury (AURN site urban background) 94% data capture | 16.69 | 15.23 | 1.096 |
| Rochester Stoke (AURN site – rural background) 92% data capture | 16.65 | 14.52 | 1.147 |
| | | Average Ratio Factor = 1.12 | |

Canterbury 2017 – VCM corrected TEOM data

The annual mean for Devonshire Park was: 17µg/m$^3$ – therefore
17 x 1.121 = **19µg/m$^3$ (best estimate of annual mean for $PM_{10}$ at this site)**

# Appendix D: Map(s) of Monitoring Locations



# Appendix E: Summary of Air Quality Objectives in England

### Table E.1 – Air Quality Objectives in England

| Pollutant | Air Quality Objective[5] | |
|---|---|---|
| | 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 |

For all UK and EU Air Quality limits see this link:

https://uk-air.defra.gov.uk/air-pollution/uk-eu-limits

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

# References

[1] Environmental equity, air quality, socioeconomic status and respiratory health, 2010

[2] Defra. 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 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/197898/pb13912-airquality-abatement-cost-guide.pdf

[4] East Sussex Transport Plan (LTP 3) https://www.eastsussex.gov.uk/roadsandtransport/localtransportplan/ltp3/downloadltp3

[5] Policy Guidance 16 Note. Defra. https://laqm.defra.gov.uk/documents/LAQM-PG16-April-16-v1.pdf

[6] Technical Guidance 16 Note https://laqm.defra.gov.uk/documents/LAQM-TG16-April-16-v1.pdf

[7] Defra, May 2018, Draft Clean Air Strategy 2018

[8] Sussex Air Pollution Monitoring Network Annual Report, 2015, September 2016, Environmental Research Group, King's College London