2019 Air Quality Annual Status Report (ASR)

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

June 2019

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Executive Summary: Air Quality in Our Area

Air Quality in Eastbourne Borough Council

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

Background & episodes

Air pollution can come from many different sources – traffic, imported air pollution from the Continent, air 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. Burning wood and coal in open fires and stoves makes up 38% of the UK's primary emissions of fine particulate matter (PM2.5). Particulates are not a single pollutant; they are made up from a huge variety of chemical compounds and materials. Around 15% of UK PM comes from naturally occurring sources, up to a third from other European countries and around half from UK human-made sources. (Clean Air Strategy 2019, Defra[4]).

Unfortunately there is no 'quick fix' in regards to air quality. The air is a constantly changing and evolving environment. We may get days when air pollution is higher than others, due to a number of meteorological conditions and chemical reactions occurring in the air. We can receive 'imported' pollution from the Continent and also from sources such as domestic wood burning and shipping. Wind speed, wind direction and the topography of the land mass plays an important part in where air

[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
[4] Defra. Clean Air Strategy 2019

pollution ends up. Particles or particulate matter are extremely small bits of liquid or solid suspended in the air. They can originate from engine emissions, brake and tyre wear, industry and natural sources as previously mentioned. Very fine particulates ($PM_{2.5}$) can therefore remain in the air for weeks and travel great distances (e.g. from the continent).

Ground level ozone is normally formed when other pollutants including nitrous oxides react in sunlight to form ozone (sometimes leading to a haze/smog); ozone levels are highly dependent on the weather and warm sunny periods can cause a sharp increase in mean levels. Ozone concentrations in the summer months tend to be higher in the south-east because it is closer to European pollution sources. The Sussex Air Pollution Monitoring Network[5] Annual Report 2019, records there were many days of moderate ozone recorded at all (those sites monitoring ozone in Sussex) network sites during the summer of 2018. Ozone concentrations across the network showed a general increase during 2018. First widespread incident occurred in April and the last in September. As quoted in the Air Quality Bulletin[6] (May 2019) for both rural and urban background sites, 2018 had the greatest number of hours of moderate or higher ozone pollution since 2008 (from government statistics, not just for Sussex). Eastbourne monitors ozone (O_3) at the Devonshire Park site. The monitor had a % data capture rate of 89% (90% is classed as adequate data capture and therefore not requiring annualisation). The days of moderate ozone was 31 days, which demonstrates that it did not meet '100 µg/m3 as an 8 hour mean, not to be exceeded more than 10 times a year'. This ties in with the general increase in ozone seen across the monitoring network.

The end of February – early March saw the 'Beast from the East' arrive. February was extremely cold with snow and fog. A particulate episode was seen during this period where moderate and high particle pollution was measured across large parts of the UK and Western Europe. Winds arriving from east Europe caused increased sulphate particles indicative of coal burning.

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[5] Sussex Air Pollution Monitoring Network Annual Report (May 2019) King's College London
[6] Air Quality Bulletin (May 2019). Environmental Management Publishing Ltd

Thereafter air arriving from North Western Europe demonstrated contributions from traffic, gas combustion, wood burning and farming[5]. Kings College found that analysis of an April (21st) episode suggested a contribution from long range imported air from continental Europe together with poor dispersion of local emissions[5]. $PM_{2.5}$ (particulates) were only measured at one Sussex site during 2018 – Eastbourne Holly Place. Moderate pollution was recorded on 4 days in March, May and high levels on 21st April[5].

The air quality objectives for PM_{10} and NO_2 were met by Eastbourne Borough Council in 2018 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.

Data capture for nitrogen dioxide (NO_2) at EB3 Holly Place site was 55% so had to be annualised (see Table 4). This meant that the best estimate for the annual mean was 11.55µg/m^3 rather then 11µg/m^3. Unfortunately due to sickness and staffing issues, diffusion tubes had low data capture during 2018 and data has not been annualised due to uncertainty with dates and times. Provision has now been put in place so that this problem does not reoccur. Diffusion tube numbers have also been increased (as of May 2019) from 11 to 22 within the Eastbourne borough.

Actions to Improve Air Quality

Eastbourne Borough Council has taken forward a number of initiatives during the current reporting year of 2018 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).

Temporary anti-idling signs have been deployed in a few areas e.g. routes leading towards the hospital roundabout and around the Ashford Road/Susans Road where cars often queue for the car park to the shopping centre. We are continuing this anti-idling initiative – in March 2019 we launched an anti-idling education campaign aimed at schools over both Lewes and Eastbourne councils. We will be continuing this anti-idling message into schools over the next few years.

The Sussex-air Quality Partnership led by Horsham District Council were successful in bidding for a DEFRA grant (for period 2019/2020). This project is an educational campaign on solid fuel burning, promoting cleaner fuels, low smoke appliances and the correct way of installing and maintaining them. We plan to gather information and data on the type of appliance and solid fuels that house-holders use in the region, to heat their home. We aim to promote cleaner burning choices. We would like to try and ascertain why householders use particular appliances and fuels and understand their decision making process when considering energy efficiency improvements. Advice and information to householders will be provided online via a dedicated website. In addition, leaflets will be posted or be available to download from the website. Each questionnaire respondent will be either directed or referred to energy improvement programmes. There will be an update of this initiative in next year's ASR.

We are always keen to work with our neighbouring authorities via Sussex-air, with our county council and increasingly with our public health colleagues. For example, the schools anti-idling campaign – part of the information we send out includes '*Health Matters by Public Health England*'.[7] The link:
https://www.gov.uk/government/publications/health-matters-air-pollution/health-matters-air-pollution

We recognise the importance of joint working and the successful award of this year's grant demonstrates the importance and success that combining forces can create.

[7] Health Matters – Public Health England (2018)

We also recognise that joint working provides the public with a greater understanding of how air quality and health are intrinsically linked.

More exercise – less obesity – less vehicles on the road – improved air quality - = increased general health

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. The air inside the vehicle can be worse than outside!

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, walking: https://www.livingstreets.org.uk/walk-to-school, Bikeability: http://bikeability.org.uk/ - programmes – involving schools and workplaces (cycling and walking activities). Public Health England published a very informative document on air pollution and health. This can be found on this link: https://www.gov.uk/government/publications/health-matters-air-pollution/health-matters-air-pollution. Public Health England[7] says: '*Epidemiological studies have shown that long-term exposure to air pollution (over years or lifetimes) reduces life expectancy, mainly due to cardiovascular and respiratory diseases and lung cancer. Short-term exposure (over hours or days) to elevated levels of air pollution can also cause a range of health impacts, including effects on lung function, exacerbation of asthma, increases in respiratory and cardiovascular hospital admissions and mortality.'*

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 Borough Council during 2018. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by 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 the borough demonstrates continued compliance with air quality objectives thus no requirement to declare an AQMA. It also suggested reviewing current diffusion tube locations as they consistently demonstrate concentrations below objective levels. This has been implemented during 2019, with an extra 11 tubes being put out in various locations within the borough (concentrating in areas that may demonstrate NO_2 increased levels). As the Devonshire Park automatic monitoring station also monitors ozone it was pointed out that some comments should be included on any findings highlighted by readings - this has been done (see section Air Quality in Eastbourne at the beginning of the report).

It was suggested that further comment should be made on any specific measures to address $PM_{2.5}$ on the borough. $PM_{2.5}$ automatic monitoring readings for 2017 were 11µg/m^3 (annual mean) however readings for 2018 demonstrated an increase to 13µg/m^3. (See section 2.3). It is difficult to comment on why there is an increase due to the myriad of factors which may cause increases (discussed in the air quality in Eastbourne section).

Although air quality objectives are not exceeded in Eastbourne, we are required to report on strategies aimed at improving air quality during 2018. 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.

Eastbourne Borough Council works 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, 2011-2021). 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

It identifies the importance of various improvements to key walking and cycling corridors (e.g. improving signs for cycle Regional Route 90), focussing on improvements to public transport corridors, better use of technology e.g. Real Time Bus Information and charging points for electric vehicles. Further information can be found on: https://www.eastsussex.gov.uk/roadsandtransport/localtransportplan

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. Measures will indirectly aid reductions in pollutant levels by encouraging more people to walk and cycle instead of using vehicles.

Tables 1 and 2 illustrate some of the measures being taken forward by ESCC Local Transport Capital Programme. Table 1 shows plans for the 2018-2019 period and Table 2 for 2019-2020. The measures also link in well with ESCC's Active Access for Growth programme.

Table 1: Summary of ESCC Local Transport Capital Programme 2018/19 – Supporting Cycling/Walking/Public Transport for Eastbourne

Location	Measure	Scheme Phase
Eastbourne		
Walking & Cycle Network – Horsey Way Phase 3 (Lottbridge Drove to Sovereign Harbour)	Cycle Route	Construction completed May 2018
Walking & Cycle Network – Horsey Way Phase 1b (Cavendish Place to Ringwood Road)	Cycle Route	Completed detailed design March 2019
Walking & Cycle Network – Meads area Pedestrian & safety improvements	Pedestrian Improvements	Construction completed March 2019
Walking & Cycle Network – Willingdon Drove cycle route	Cycle Route	Completed preliminary design by March 2019
Eastbourne/South Wealden Cycling & Walking improvements (following BC approval)	Cycling & Walking routes/measures	Approval of business case by SE LEP by March 2019
Hailsham/Polegate/Eastbourne Sustainable Transport Corridor	Multi Modal	Completed detailed design by March 2019
Eastbourne Walking and Cycle Network - Town centre to hospital cycle route route	Cycle Route	Feasibilty design completed by March 2019
Victoria Drive - Pedestrian Improvements study	Pedestrian Improvements	Completion of study March 2019
Eastbourne Town centre improvement scheme Phase 2 (complete transport model and designs)	Traffic Management/Pedestrian/Public Transport Improvements	Commenced transport modelling and preliminary design work by March 2019
Friday Street Pedestrian Improvement study - Oak Tree Lane pedestrian crossing	Pedestrian Improvements	Completed detailed design by March 2019
Ocklynge School Safety Zone	Pedestrian Improvements	Construction completed by March 2019

Table 2: Summary of ESCC Local Transport Capital Programme 2019/20 – Supporting Cycling/Walking/Public Transport for Eastbourne

Eastbourne		
Eastbourne Walking and Cycle Network - Horsey Way Phase 1B (Cavendish Place to Ringwood Road)	Cycle Route	Construction by March 2020
Eastbourne Walking and Cycle Network: Stone Cross to Langney walking and cycling corridor - Oak Tree Lane/Friday Street	Pedestrian Crossing	Construction by March 2020
Eastbourne Walking and Cycle Network - Langney to Sovereign Harbour	Cycle Route	Construction by March 2020
Eastbourne Walking and Cycle Network - Town centre to hospital	Cycle Route	Complete detailed design by March 2020
Eastbourne Walking and Cycle Network - Willingdon Drove	Cycle Route	Construction by March 2020
Eastbourne / South Wealden Walking and Cycling Network Phase 2: Eastbourne town centre	Cycle Route	Completed detailed design by March 2020
Eastbourne / South Wealden Walking and Cycling Network Phase 2: Eastbourne town centre	Wayfinding	Construction by March 2020
Eastbourne / South Wealden Walking and Cycling Network Phase 2: Eastbourne town centre	Cycle Parking	Construction by March 2020
Eastbourne / South Wealden Walking and Cycling Network Phase 2: Stone Cross to Langney walking and cycling corridor	Cycling/Walking Route	Completed detailed design by March 2020
Hailsham/Polegate/Eastbourne Sustainable Transport Corridor (inc. Victoria Drive - Pedestrian Improvements study	Cycling/Walking/Public Transport	Elements constructed by March 2020 and finalising detailed design
Eastbourne Town centre improvement scheme Phase 2a -Terminus Road complete transport model and designs	Traffic Management	Construction commence by March 2020
Eastbourne Town centre improvement scheme Phase 2b other design elements	Traffic Management	Completed preliminary design by March 2020

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 News updates on scheme developments can be found on:

http://community.mildrenconstruction.co.uk/projects/eastbourne-town-centre/news/

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 – 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

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.

See link:
https://www.eastsussex.gov.uk/roadsandtransport/localtransportplan/funding/active-access-for-growth/active-access-for-growth/

Under point 1: *Sustrans Active Steps, Living Streets, Sustrans Active Travel and Pedal Power have all delivered activities aimed at enabling employees to travel more actively for every day journeys.*

Under point 2*: In surveyed Sustrans schools, cycling more than tripled after 1 year of engagement*

Point 3 works with public health colleagues tackling physical inactivity in the county. It aims to integrate a number of cycling and walking initiatives into existing community development plans to promote increased levels of exercise into people's daily lives.

During the 2018/19 period there have been various cycling and walking schemes in the design phase with design and construction planned for 2019/20 in ESCC's Local Transport Capital Programme -see Tables 1 and 2

Cycling

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

Under the ESCC Active Access for Growth not only is cycling encouraged but also walking opportunities: using active travel maps, journey planning and giving people walking challenges and pledges. There are also opportunities to explore the South Downs by walking and or cycling.

There are other plans in development, e.g. looking towards 2019/20, ESCC are looking to propose a Local Cycling & Walking Infrastructure Plan later in 2019, where integrated travel behaviour programmes and road safety initiatives will be a key element of the plan.

The principal challenges to implementation of air quality improvements that Eastbourne Borough Council face is funding and staffing.

[4]DEFRA's, Clean Air Strategy (Jan 2019) states:

'New legislation will create a stronger and more coherent framework for action to tackle air pollution. This will be underpinned by new England-wide powers to control major sources of air pollution, in line with the risk they pose to public health and the environment, plus new local powers to take action in areas with an air pollution problem. These will support the creation of Clean Air Zones to lower emissions from all sources of air pollution, backed up with clear enforcement mechanisms.'

If local authorities are going to be given ‘new powers’ to ‘take action’ the government will need to consider how they will support and fund resources for this. Staff resourcing and funding is already an issue for many local authorities. Other challenges range from: changing people’s behaviour on their travel choices, getting people to recognise the polluting effect of engine idling (and turn off!), linking of cycle routes to encourage and make cycling safer (particularly if trying to encourage more children to cycle – the safety aspect of this can make parents very anxious), the increased popularity of domestic wood burning stoves in homes and how quickly can/will company vehicle fleets change to cleaner vehicles?

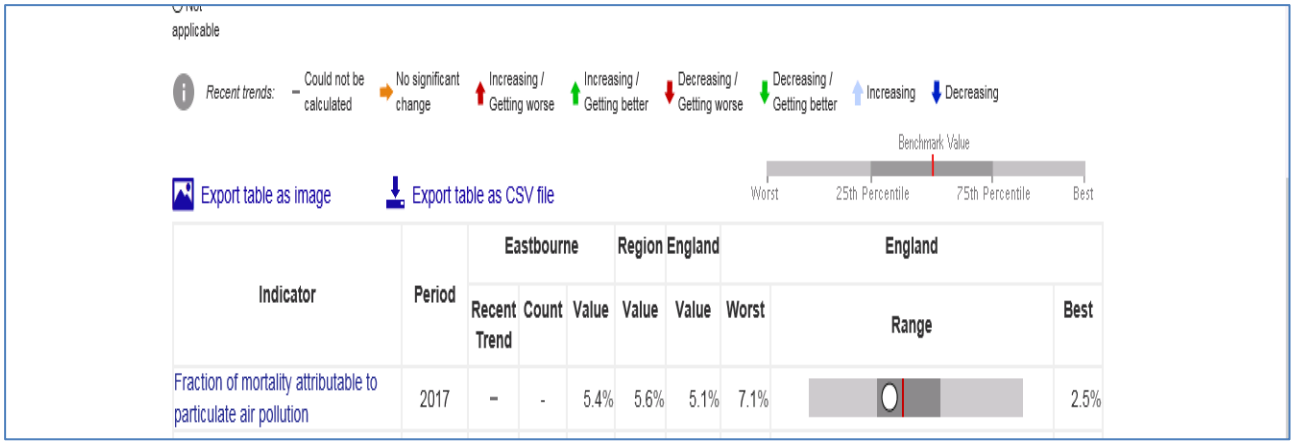
There are lots of pressures placed upon local authorities – on one hand they must improve air quality but on the other they must find suitable locations for development. Careful planning measures will be required.

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 2.5µm 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 the Eastbourne Borough is 5.4% (2017 data), a very slight increase on the previous year (2016 data) which was 5.3 %. Figure 1 shows that the mortality calculated for Eastbourne in 2017 is less than that calculated for south east England (5.6 %) and slightly above the England value at 5.1%.as a whole. This information is available from the following web link: https://fingertips.phe.org.uk/search/air%20pollution#page/1/gid/1/pat/6/par/E12000008/ati/101/are/E07000061

Figure 1: Fraction of mortality attributed to particulate air pollution in Eastbourne in comparison with the South East region and England



Indicator	Period	Eastbourne			Region England	England			
		Recent Trend	Count	Value	Value	Value	Worst	Range	Best
Fraction of mortality attributable to particulate air pollution	2017	-	-	5.4%	5.6%	5.1%	7.1%		2.5%

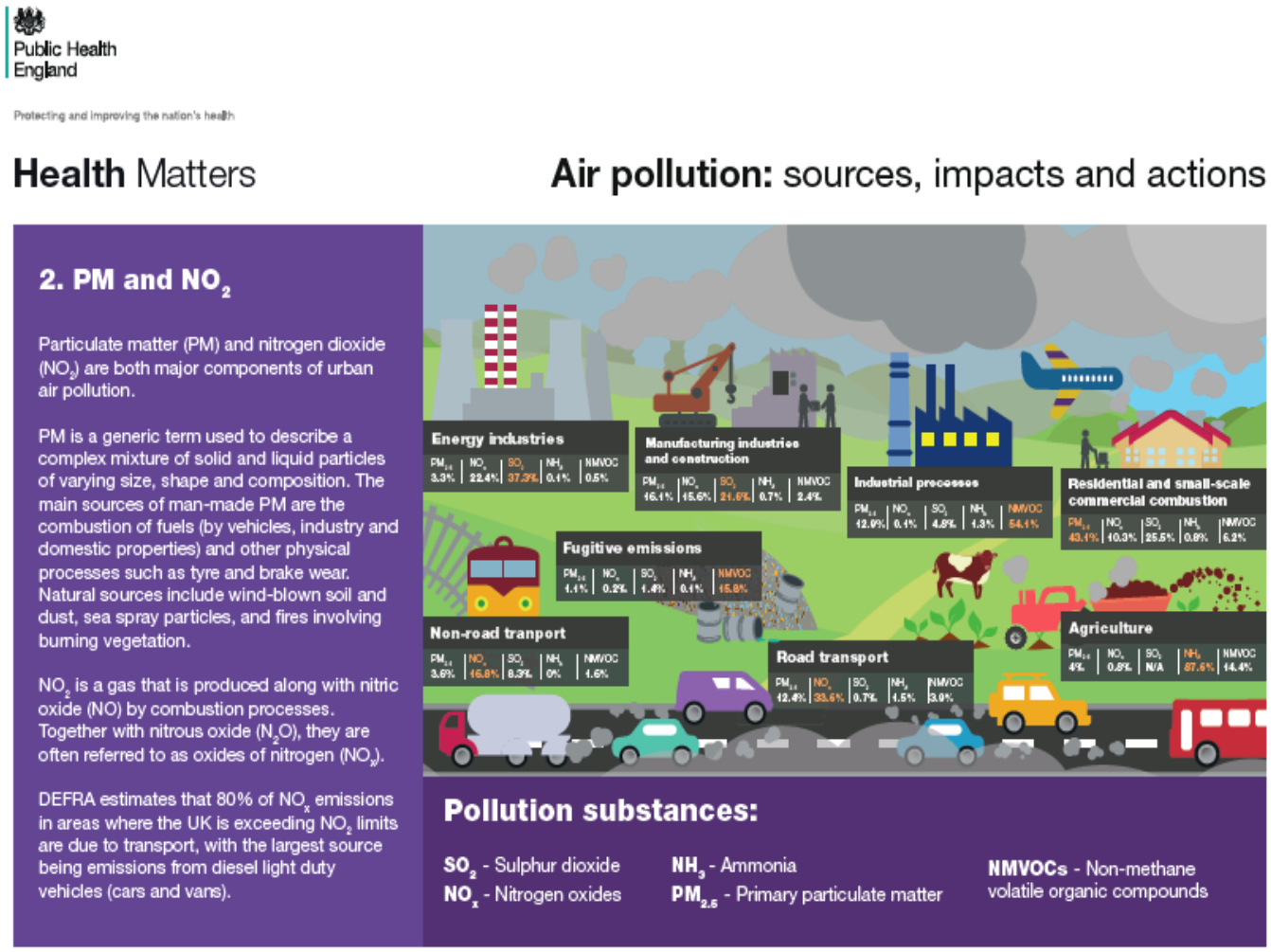
Site EB3 Holly Place has a continuous automatic monitor measuring $PM_{2.5}$. Data capture at this site during 2018 was 98%, giving an annual mean of 13µg/m^3. This figure is higher than last years (11µg/m^3). In both 2015 and 2016, data had to be annualised as data capture was less than 75% - so the results for those years should be viewed with caution. In 2012 $PM_{2.5}$ had an annual reading of 16µg/m^3. Figure 6 – shows the annual mean concentration of $PM_{2.5}$ over the last 5 years.

In DEFRA's recently published [4]Clean Air Strategy 2018 the government want to cut $PM_{2.5}$ levels to those recommended by the World Health Organisation:

'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/m^3) by 2025.'

Public Health England published a very informative 'Health Matters'[7] of which an example page is reproduced below. The document demonstrates the causes and effects of pollutants and links the problems of air pollution and health. This connects well with the schools anti-idling campaign the council are running, anti-idling signage installed in a few heavily trafficked/problematic areas and the new Clean Burn Sussex education campaign which will be taking place 2019-2020.

Figure 2: Air Pollution: Sources, impacts and actions



Whilst the measures stated in this section are not necessarily aimed directly at one pollutant such as $PM_{2.5}$, they will indirectly aid reductions in all pollutant levels, including particulates such as $PM_{2.5}$ by encouraging more people to walk and cycle and make use of public transport rather then private vehicles.

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 2018. 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 at EB3 was withdrawn on the 4th January 2017. Table A.1 in Appendix A shows the details of the sites. 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 at http://www.sussex-air.net

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

3.1.2 Non-Automatic Monitoring Sites

Eastbourne Borough Council usually undertake non- automatic (passive) monitoring of NO_2 at 11 sites during every year. However due to staff sickness and resourcing data capture was low. Some data was recorded (raw data is shown in Appendix B). 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.

Figure 3: Annual average NO_2 concentration in µg/m^3 measured at automatic monitoring sites in Eastbourne from 2014-2018

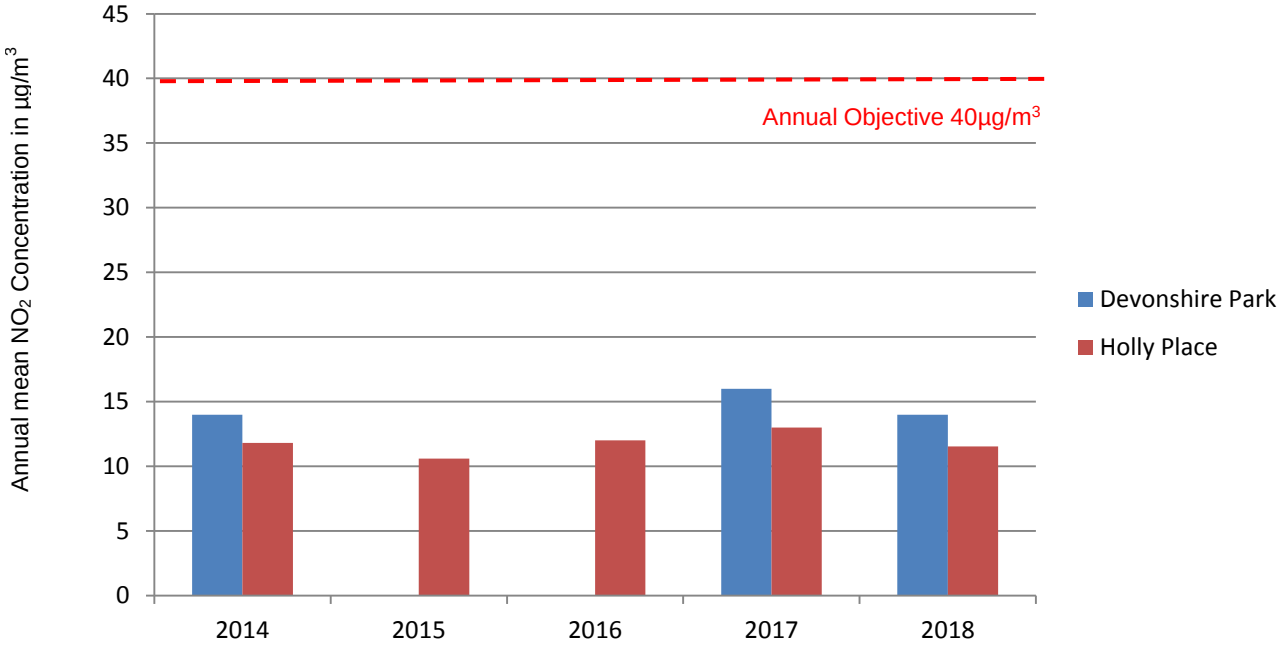


Figure 3 illustrates the annual average NO_2 concentrations measured at both Eastbourne automatic monitoring stations from 2014-2018. Holly Place data has been annualised (See Appendix C) as the analyser only had 55% data capture during 2018. Annualisation gave an annual NO_2 mean concentration figure of 11.55µg/m^3 for Devonshire Park. Holly Place had an annual mean concentration of 11µg/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.

Unfortunately data capture for diffusion tubes in the borough was low and dates out of synch during 2018 and therefore has not been included in this report. Raw data has been included in Appendix B but has not had any adjustments made.

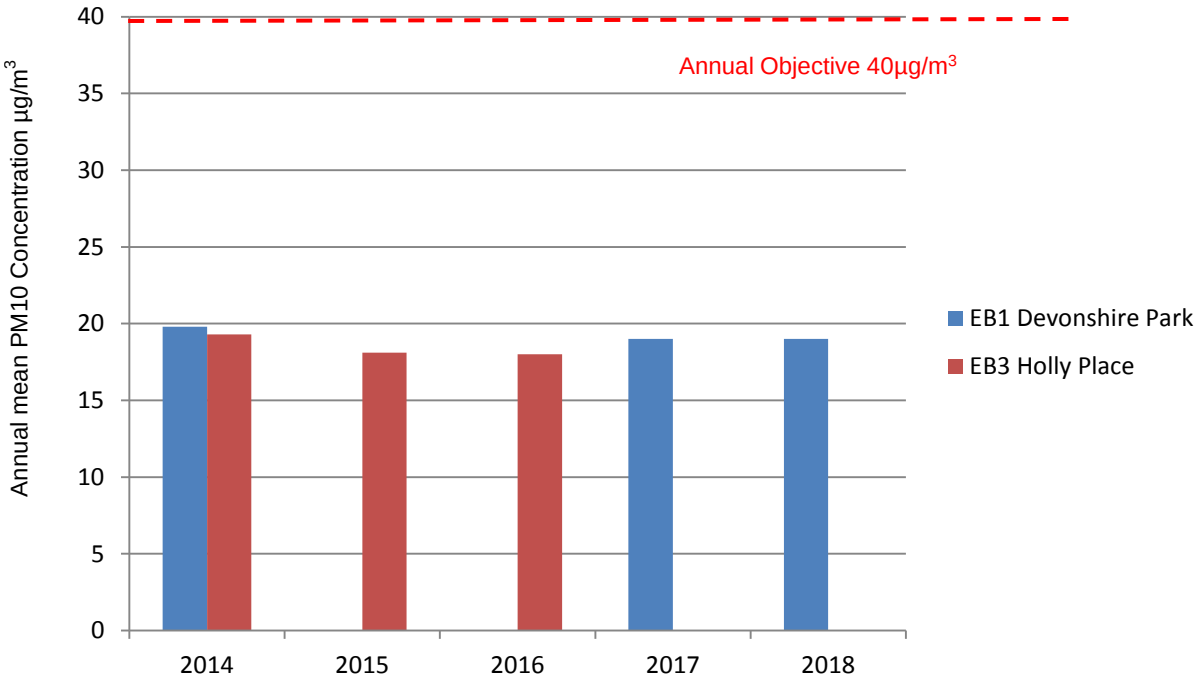
Table A.4 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

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})

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

Figure 4: Annual mean concentration for PM_{10} at automatic monitoring stations 2014-2018

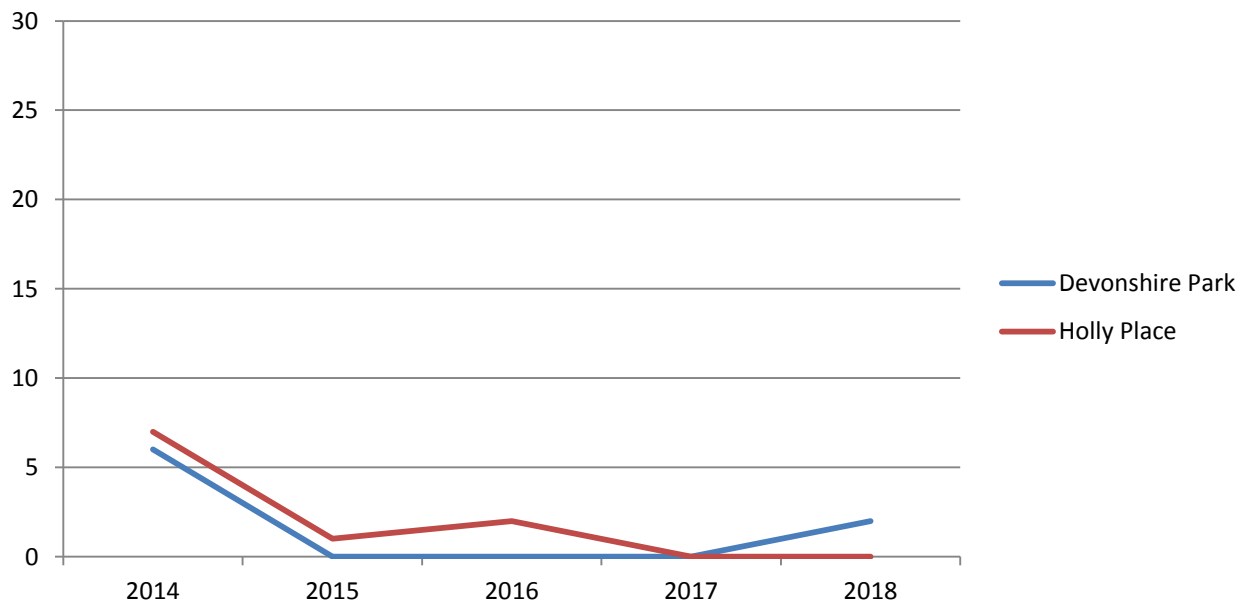


It should be noted from the above figure that Holly Place no longer monitors PM_{10} – but the data for that site has been included as Devonshire Park had 2 years where data was missing/invalid, so it just gives an indication of readings over this time period. During 2015 and 2016 there was no PM_{10} 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%
As clearly seen both stations have demonstrated readings well below the annual objective of 40µg/m^3 over the last 5 years.

Table A.6 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 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 (50µg/m^3 as a 24 hour mean not to be exceeded more than 35 times a year)



As the Holly Place PM_{10} analyser has now been withrawn there is no record as of 2017, it is only included in this years report as an indicator of trends. Neither site has shown any exceedances. Devonshire Park had 2 days where the daily mean exceeded 50µg/m^3. This site had only 60% data capture for the year 2017 and had to be annualised.

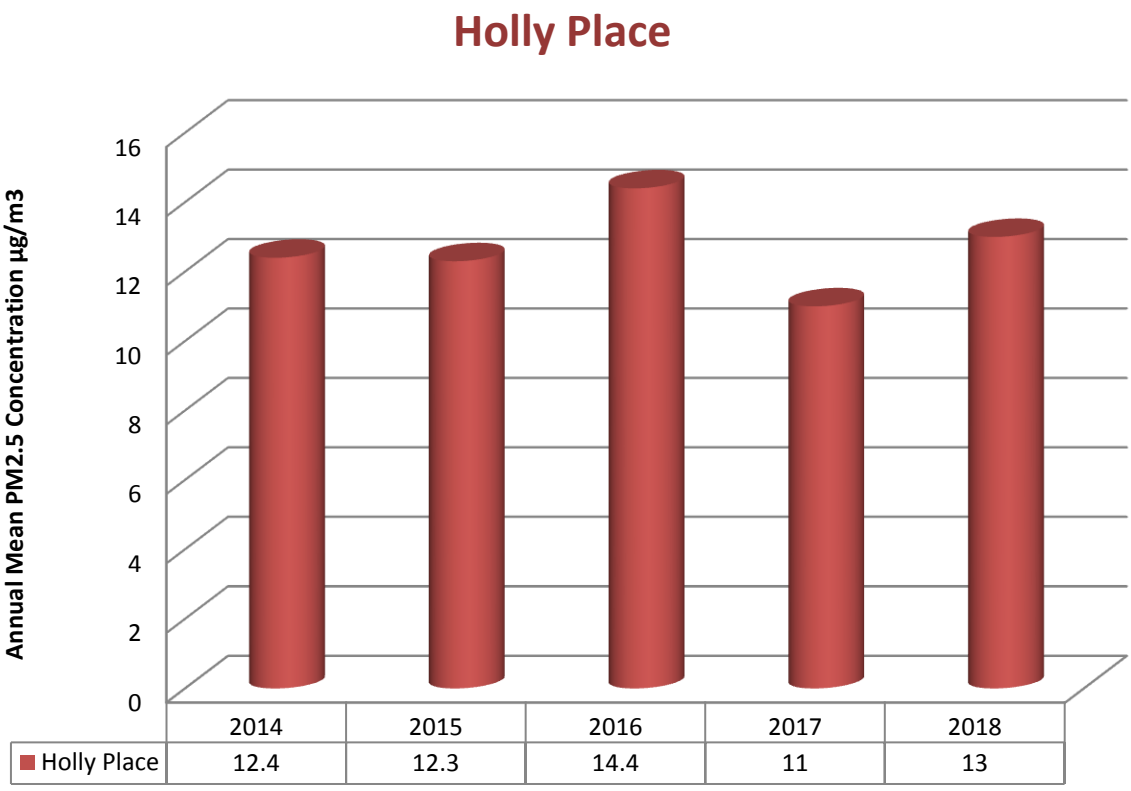
3.2.3 Particulate Matter ($PM_{2.5}$)

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 Clean Air Strategy (2019)[4] proposes to change this. – See Section 2.2

Figure 6: Annual Mean Concentration for $PM_{2.5}$ at Holly Place (automatic monitoring station) from 2014-2018



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

Figure 6 shows the trend data for annual mean concentrations over the last 5 years. It is difficult to assume any trend here as the data does tend to fluctuate.

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 2018 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2014	2015	2016	2017	2018
EB 1 Devonshire Park	Urban Background	Automatic	98	98	**14**	**no valid data**	**no valid data**	**16a**	**14**
EB3 Holly Place	Urban Background	Automatic	55	55	**12.1(11.8)a**	**10.6**	**12**	**13**	**12(3)**
PO Upperton Road	Kerbside	Diffusion Tube	data capture too low	data capture too low	**N/A**	**25.9**	**29.6**	**29.5**	**N/A**
E/B1 Langney Rd	Kerbside	Diffusion Tube	data capture too low	data capture too low	**N/A**	**18**	**21.7**	**21.1**	**N/A**
SRTS4 Pevensey Rd	Kerbside	Diffusion Tube	data capture too low	data capture too low	**N/A**	**21.9**	**27.1**	**24.9**	**N/A**
SRTS2 Seaside East	Kerbside	Diffusion Tube	data capture too low	data capture too low	**N/A**	**25**	**33.3**	**31.4**	**N/A**
SRTS1 Seaside West	Kerbside	Diffusion Tube	data capture too low	data capture too low	**N/A**	**25.8**	**27.6**	**27.2**	**N/A**
SRTS3 Cavendish Place	Kerbside	Diffusion Tube	data capture too low	data capture too low	**N/A**	**21.5**	**25.6**	**26.9**	**N/A**
61 Royal Parade PrincesPark	Kerbside	Diffusion Tube	data capture too low	data capture too low	**N/A**	**21.9**	**27**	**25.4**	**N/A**
53- Seaside (Tesco)	Kerbside	Diffusion Tube	data capture too low	data capture too low	**N/A**	**29.7**	**34.3**	**32.5**	**N/A**
ESCC102/EB6 FridaySt/Larkspur	Kerbside	Diffusion Tube	data capture too low	data capture too	**N/A**	**19.7**	**24.8**	**24**	**N/A**

Dr				low					
E/B5 Woodland Ave	Urban Background	Diffusion Tube	data capture too low	data capture too low	**N/A**	**9.4**	**11.7**	**10.8**	**N/A**
26- East Dean Road	Kerbside	Diffusion Tube	data capture too low	data capture too low	**N/A**	**19.4**	**23.6**	**20.4**	**N/A**

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

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

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.

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 2018 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2014	2015	2016	2017	2018
EB1 Devonshire Park	Urban Background	Automatic	98	98	0	No valid data	No valid data	0 (42.5)	0
EB3 Holly Place	Urban Background	Automatic	55	55	0(67.8)	0(62)	0	0	0(33)

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 99.8th percentile of 1-hour means is provided in brackets.

Table A.5 – Annual Mean PM10 Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	PM_{10} Annual Mean Concentration ($\mu g/m^3$) (3)				
				2014	2015	2016	2017	2018
EB1 Devonshire Park	Urban Background	93	93	19.8b	No valid data	No valid data	19b	19
EB3 Holly Place	Urban Background	N/A	N/A	19.3b	18.1	18	Analyser withdrawn at this site	N/A

☒ **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.

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

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
				2014	2015	2016	2017	2018
EB1 Devonshire Park	Urban Background	93	93	6 (32.9)a	No valid data	No Valid data	0 (26.8) b	2
EB3 Holly Place	Urban Background	N/A	N/A	7 (29.1)a	1 (26)	2	Analyser withdrawn at this site	N/A

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 90.4th 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 2018 (%) (2)	$PM_{2.5}$ Annual Mean Concentration (µg/m^3) (3)				
				2014	2015	2016	2017	2018
EB3 Holly Place	Urban Background	98	98	12.4	10.4 (12.3)[3]	12.7 (14.4)[3]	11	13

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

Notes:

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

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2018 –RAW DATA ONLY

Table B.1 – NO_2 Monthly Diffusion Tube Results - 2018

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 (0.93) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
EBC09 Upperton Rd		32.86	34.08						33.77	32.06	33.51	30.31			
EB1 Langney Rd		20.23	25.13						25.53	25.28	22.07	17.49			
SRTS-4 Pevensey Rd		24.57	28.98						28.61	28.6	28.18	27.28			
SRTS-2 Seaside Rd East		31.78	38.40						37.87	37.32	28.8	35.32			
SRTS-1 Seaside Rd		27.21	32.49						33.81	35.08	27.74	33.60			
Cavendish Place		31.80	40.15							36.43		27.33			
Royal Parade/Princes Park		23.88	26.37						26.04	27.25	27.49	26.32			

Tesco/Seaside		31.12	38.35						35.17	38.82	26.40	33.2
Friday St/Larks Park Drive		24.75	28.14						33.07	32.18	32.27	26.23
EB-5 Woodland Ave		14.08	11.43						10.74	12.01	12.11	10.36
East Dean Rd			19.27						19.74	21.98	30.73	18.16

Dates in red – tubes not changed over on correct dates and out of synch

RAW DATA ONLY – NO ADJUSTMENTS MADE

☐ **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**

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

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 NO_2 PT forms an integral part of the UK NO_2 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 2018 Gradko participated in the AIR PT programme, and obtained a 100% rating for the whole year (AIR PT rounds AR024, AR025, AR027, AR028 and AR030). Further information can be found on this link:

https://laqm.defra.gov.uk/assets/laqmno2performancedatauptofebruary2019v1.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 0.93 for the year 2018 (based on 30 studies) has been derived from the national bias adjustment calculator. The spreadsheet is shown below in Table 3: National Bias Adjustment Factor Spreadsheet 2018

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 03/19

Follow the steps below **in the correct order** to show the results of **relevant** co-location studies
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 2019

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/m^3)	Automatic Monitor Mean Conc. (Cm) (µg/m^3)	Bias (B)	Tube Precision[5]	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in water	2018	R	Ards and North Down Borough Council	11	36	29	27.4%	G	**0.78**
Gradko	20% TEA in water	2018	R	Gedling Borough Council	12	33	32	5.6%	G	**0.95**
Gradko	20% TEA in water	2018	R	Lisburn & Castlereagh City Council	12	32	24	32.1%	G	**0.76**
Gradko	20% TEA in water	2018	R	Monmouthshire County Council	12	38	36	4.7%	G	**0.96**
Gradko	20% TEA in water	2018	UB	Northampton Borough Council	12	16	13	26.8%	G	**0.79**
Gradko	20% TEA in water	2018	R	Bedford Borough Council	11	32	29	9.2%	G	**0.92**
Gradko	20% TEA in water	2018	R	Borough Council of King's Lynn and West Norfolk	12	26	24	6.0%	G	**0.94**
Gradko	20% TEA in water	2018	R	Cheshire West and Chester	12	36	37	-2.5%	G	**1.03**
Gradko	20% TEA in water	2018	R	Cheshire West and Chester	12	43	40	6.1%	G	**0.94**
Gradko	20% TEA in water	2018	R	Fareham Borough Council	12	28	34	-17.5%	G	**1.21**
Gradko	20% TEA in water	2018	R	Fareham Borough Council	12	37	34	8.9%	G	**0.92**
Gradko	20% TEA in water	2018	R	Fareham Borough Council	12	32	28	12.6%	G	**0.89**
Gradko	20% TEA in water	2018	R	NOTTINGHAM CITY COUNCIL	12	35	34	0.3%	G	**1.00**
Gradko	20% TEA in water	2018	R	Bracknell Forest Borough Council	12	44	37	19.4%	G	**0.84**
Gradko	20% TEA in water	2018	R	Brighton & Hove City Council	9	48	50	-3.7%	G	**1.04**
Gradko	20% TEA in water	2018	R	Eastleigh Borough Council	11	28	32	-12.0%	G	**1.14**
Gradko	20% TEA in water	2018	R	Eastleigh Borough Council	12	42	38	10.2%	G	**0.91**
Gradko	20% TEA in water	2018	UB	Eastleigh Borough Council	12	27	28	-4.4%	G	**1.05**
Gradko	20% TEA in water	2018	R	Gateshead Council	12	29	25	13.9%	G	**0.88**
Gradko	20% TEA in water	2018	R	Gateshead Council	12	32	29	10.8%	G	**0.90**
Gradko	20% TEA in water	2018	R	Gateshead Council	9	40	41	-1.8%	G	**1.02**
Gradko	20% TEA in water	2018	R	Wokingham Borough Council	12	38	33	13.2%	G	**0.88**
Gradko	20% TEA in water	2018	R	Bath & North East Somerset	12	40	39	4.0%	G	**0.96**
Gradko	20% TEA in water	2018	R	Bedford Borough Council	10	30	27	8.8%	G	**0.92**
Gradko	20% TEA in water	2018	KS	Marylebone Road Intercomparison	11	93	85	9.3%	G	**0.91**
Gradko	20% TEA in water	2018	R	South Gloucestershire Council	12	21	20	6.3%	G	**0.94**
Gradko	20% TEA in water	2018	R	Thurrock Borough Council	12	53	52	2.3%	S	**0.98**
Gradko	20% TEA in water	2018	R	Thurrock Borough Council	12	34	30	15.1%	G	**0.87**
Gradko	20% TEA in water	2018	R	Thurrock Borough Council	12	31	24	28.8%	G	**0.78**
Gradko	20% TEA in water	2018	UB	Thurrock Borough Council	12	27	25	9.2%	S	**0.92**
Gradko	20% TEA in water	2018		**Overall Factor[3] (30 studies)**				Use		**0.93**

For 2018 the bias adjustment figure is 0.93

Annualisation had to be carried out for pollutant NO_2 at Holly Place (this was required as data capture was less than 75%). Data capture for NO_2 was 55%. 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 2018 data.

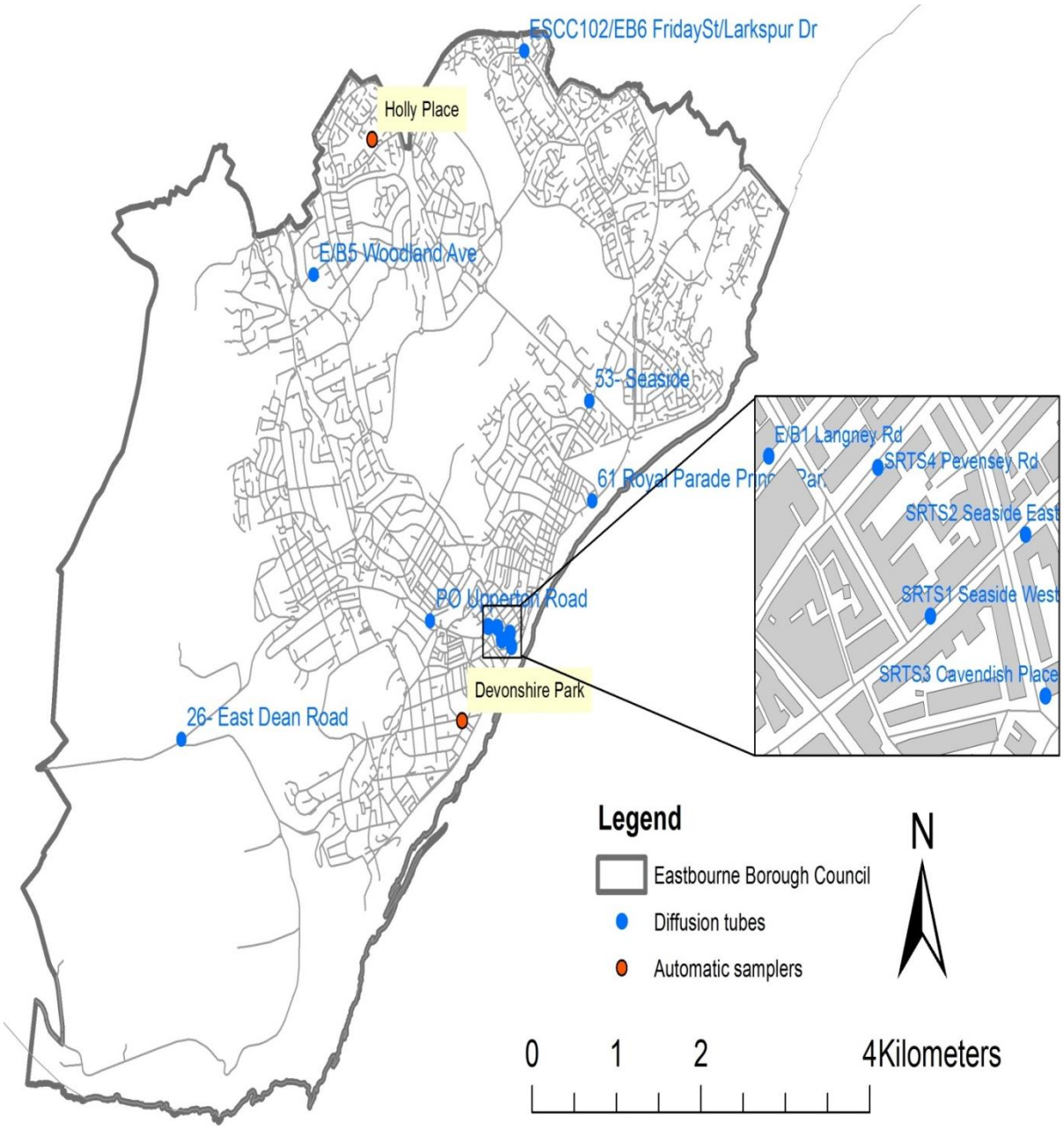
The annual mean and the associated period mean concentrations (corresponding to when Holly Place had validated data) were then calculated. The values are illustrated in Table 4 below.

Table 4: Nitrogen dioxide (NO_2) annualised mean for Holly Place site 2018

Site	NO_2 Annual Mean 2018 µg/m^3 (A_m)	NO_2Period Mean 2018 µg/m^3 (P_m)	Ratio (A_m/P_m)
Eastbourne Devonshire Park site - urban background) 98% data capture	14	13	1.08
Brighton Preston Park (AURN site - Urban Background) 99% data capture	16	17	0.94
Lullington Heath (AURN site – Rural) 99% data capture	8	7	1.14
Average Ratio factor = 1.05			

The annual mean for Holly Place was: 11µg/m^3 – therefore
11 x 1.05 = **11.55µg/m^3 (best estimate of annual mean for NO^2 at this site)**

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



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[4]	
	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

[4] 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] 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

[4] Defra. Clean Air Strategy (2019)

[5] Kings College London. Sussex Air Pollution Monitoring Network Annual Report (May 2019)

[6] Air Quality Bulletin (May 2019) Environmental Management Publishing Ltd

[7] Health Matters (2018) Public Health England