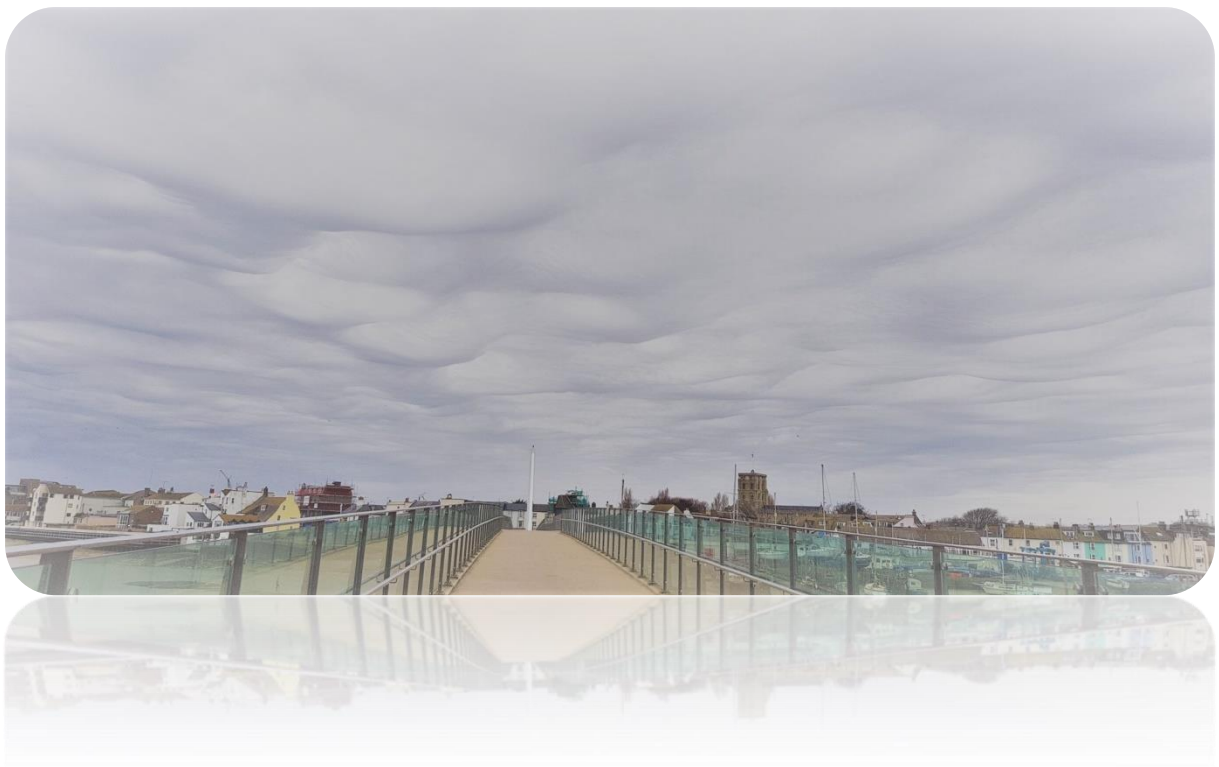




ADUR DISTRICT  
COUNCIL



## 2019 Air Quality Annual Status Report (ASR)

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

June 2019

Local Authority Officer	Nadeem Shad/Darren Gooch
Department	Public Health & Regulation
Address	Portland House, 44 Richmond Road, Worthing, West Sussex, BN11 1HS
Telephone	01273 263331
E-mail	<a href="mailto:publichealth.regulation@adur-worthing.gov.uk">publichealth.regulation@adur-worthing.gov.uk</a>
Report Reference number	ADC/ASR/19
Date	June 2019

## Executive Summary: Air Quality in Our Area

### Air Quality in Adur

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas<sup>1,2</sup>.

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion<sup>3</sup>.

This report covers monitoring and action taken during 2018. There are currently two Air Quality Management Areas (AQMA's) within Adur: AQMA 1 – High Street, Shoreham-by-Sea and AQMA 2 – Old Shoreham Road, Southwick.

No monitoring sites exceeded the annual mean objective of  $40\mu\text{g}/\text{m}^3$  during 2018.

During 2018 the Adur District Council automatic (continuous) Nitrogen Dioxide ( $\text{NO}_2$ ) and Particulate Matter ( $\text{PM}_{10}$ ) monitoring equipment located in Shoreham High Street was reinstated. It is too early to draw any conclusions from the data gathered by this as  $\text{NO}_2$  monitoring began in May 2018 and  $\text{PM}_{10}$  in September 2018. We will report more fully on the data in next year's ASR, once we have a full year's monitoring.

Adur District Council undertook passive monitoring of  $\text{NO}_2$  using 26 diffusion tubes during 2018. 5 new monitoring sites were added and 3 sites were removed, as previous results had shown levels well below the annual mean objective. 12 tubes recorded a reduction in annual means compared with 2017 levels and 8 recorded an increase.

Levels measured by the diffusion tubes co-located throughout 2018 within AQMA1 in the High Street Shoreham decreased again to  $33\mu\text{g}/\text{m}^3$ . This monitoring site is at the kerbside and when the measured level is predicted back to represent the nearest relevant exposure as required by Defra (and using standard prediction methods and

---

<sup>1</sup> Environmental equity, air quality, socioeconomic status and respiratory health, 2010

<sup>2</sup> Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

<sup>3</sup> Defra. Abatement cost guidance for valuing changes in air quality, May 2013

tools published by Defra), the level reduces to  $27.1\mu\text{g}/\text{m}^3$ , well below the annual mean objective. In order to more accurately measure façade levels, we installed a diffusion tube at the closest façade adjacent to the High Street monitoring site in September 2018 and will report on the annual mean result in the next ASR, once we have a full years' data.

The highest level recorded in the District was  $39\mu\text{g}/\text{m}^3$  at site S13 Upper Brighton Road, Lancing. This monitoring site is located adjacent to the eastbound A27 dual carriageway, with the nearest relevant exposure 8.6m away. When the measured annual mean is predicted back the level reduces to  $31.6\mu\text{g}/\text{m}^3$ , well below the annual mean objective of  $40\mu\text{g}/\text{m}^3$ .

Around the AQMA, West Street decreased to  $32.1\mu\text{g}/\text{m}^3$  and Victoria Road to  $26.6\mu\text{g}/\text{m}^3$ . Monitoring at Humphrey's Gap produced a level of  $32.6\mu\text{g}/\text{m}^3$ , but as this site was affected by adjacent construction works the tube had to be moved a few times, meaning the result is unreliable.

2018 had a very hot and dry summer and is likely to have assisted with increasing walking and cycling rates. Some minor adjustments have also been made to traffic signal timings in the High Street. Adur District Council will keep the measured levels in AQMA1 under review, especially with more reliable and accurate automatic monitoring data now being collated. With a number of major developments still planned for the Adur District (as detailed in section 2), we do not consider it pertinent to revoke the AQMA at this time.

Levels in AQMA2 have reduced slightly over 2017 levels. When the measured levels at the two monitoring sites are predicted back to residential receptor locations the levels drop to  $26\mu\text{g}/\text{m}^3$  and  $33\mu\text{g}/\text{m}^3$ , well below the annual mean objective. In previous ASR's we advised that we would consider revoking AQMA 2 in Southwick as measured levels had been below the annual mean objective for a number of years. We can confirm that AQMA 2 will be revoked during 2019.

Last year we said we would keep an eye on levels at Lancing Manor as they had been slowly increasing. Levels in 2018 showed a slight drop to  $35.1\mu\text{g}/\text{m}^3$ . This is a kerbside location and when projected back to the nearest receptor the level reduces significantly to  $24.8\mu\text{g}/\text{m}^3$ , well below the annual mean objective.

As part of our planning for a new Action Plan Adur District Council commissioned a Source Apportionment Study in Summer 2018. Due to the lack of a West Sussex County Council (WSCC) automatic traffic counter (ATC) in Shoreham High Street the Council commissioned a 7 day traffic count to inform the Source Apportionment Study. The study showed that diesel cars and LGVs account for most of the NOx emissions in the High Street. It also showed that PM<sub>10</sub> and PM<sub>2.5</sub> emissions are dominated by the car sectors. The full Source Apportionment study will be published with the Action Plan, which is to be drafted and published for consultation in 2019. Air quality action plans (AQAP) rely on partnership work with West Sussex County Council and other partners to deliver actions. We continue to engage with partners through an action plan working group.

More information is available on our website at <https://www.adur-worthing.gov.uk/environmental-health/pollution/air-quality-and-pollution/local-air-quality-management/#page-content>

## Actions to Improve Air Quality

Adur District Council took forward a number of measures during 2018 in pursuit of improved air quality. These included working in partnership with WSCC to produce a new joint air quality plan for the County, '*Breathing Better*', which aims to improve air quality working in partnership with the County Council; securing funding from Highways England (HE) to provide a rapid electric vehicle charge point at Lancing Manor on the A27; producing a revised staff travel action plan in late 2018, in association with Sustrans; embarking on work with Sustrans to draft a Local Cycling and Walking Infrastructure Plan, due for consultation during 2019; participating in a Sussex-air Defra funded schools intervention programme involving some of the Shoreham primary schools; continued use of the Sussex Air Quality Emissions Mitigation Planning Guidance to obtain air quality mitigation from major developments; and working with Sussex- air to successfully bid for Defra Air Quality Grant funding for a project focussed on burning of fuels for heat and particulate emissions during 2019.

In addition, our strategic focus and ambitions on Public Health and wellbeing (in our Public Health Policy) are enabling us to work in collaborative ways across our

communities to improve health and wellbeing and promote and encourage sustainable and healthy places, for example we have just launched a Beat the Streets project to encourage whole communities to walk and cycle in more sustainable ways.

## **Conclusions and Priorities**

Measured concentrations of NO<sub>2</sub> were below the annual mean objective at all monitoring sites (and therefore at all the nearest receptors). Levels measured within AQMA1 in Shoreham High Street decreased again whilst concentrations within AQMA2 in Southwick fell. As a result we will consider whether to revoke AQMA2 during 2019.

Specific priority actions for 2019 include a revised Adur Air Quality Action Plan – this is overdue and a key priority, devised in partnership with West Sussex County Council; conclusion of the Defra grant-funded school and business anti-idling/behaviour change project through Sussex-air including analysis of the outcomes and lessons learned; commencement of the Sussex-air Defra grant funded 'Clean Burn' project in Adur; production of a Local Cycling and Walking Infrastructure Plan; a Public Health information campaign, led by West Sussex County Council, via the West Sussex Inter Authority Air Quality Group; replacement of Council fleet vehicles with ULEV versions on a case by case basis, in line with our 'Platforms for Places' commitments; completion and operation of the rapid charger at Lancing Manor; continue to explore the provision of electric vehicle charge points – public charge points and private in new developments; provision of an Adur & Worthing Car Club; additional anti-idling signs at level crossings in Shoreham; continue to pursue the low emission mitigation approach to new developments by working in partnership with highway authorities.

There remain a number of large scale developments planned for the Adur District and balancing the demand for development with the need to improve (or not worsen) air quality will bring challenges. It is important to state that these developments also bring opportunities to improve infrastructure, especially for walking and cycling, and thus limit the impacts on existing AQMA's and avoid creating new hotspots. Planned developments are discussed in Section 2 of this report.

Identifying suitable sites and sufficient funding for the installation of electric vehicle charge points continues to be challenging and we will continue to explore funding opportunities as and when they arise.

## Local Engagement and How to get Involved

We engage with interested parties in the District, including community groups, elected members, transport planners, planning policy and development control. We are active members of the Sussex Air Quality Partnership (Sussex-air). The Partnership provides assistance to members and information to the public via their website with air quality data, news updates, educational resources, links and other services such as air Alert. See <http://www.sussex-air.net/> for more information.

With a large number of major developments planned across Adur, it is important that interested parties try to work together to achieve favourable outcomes.

The Council is always interested in hearing from residents who may have innovative ideas to reduce traffic congestion/air pollution in and around the District. You may contact us using our online form at <https://www.adur-worthing.gov.uk/environmental-health/pollution/air-quality-and-pollution/local-air-quality-management/#have-your-say>.

Road vehicles produce over 50 per cent of the emissions of nitrogen oxides in the UK.

### Before using your car, ask yourself:

- could I walk or cycle instead of taking the car?
- could I take a bus or train?
- are the levels of air pollution high today? (See our website for forecasts: <https://www.adur-worthing.gov.uk/environmental-health/pollution/air-quality-and-pollution/air-quality-monitoring/#airalert>)
- Using quieter streets when you're on a bike or on foot can lower your exposure to air pollution by up to 20%.

### If you must drive:

- drive smoothly and don't rev your engine unnecessarily. You'll save fuel, and your engine will also pollute less;

- maintain your car. Keep the engine properly tuned and the tyres at the right pressure; and
- turn off your engine when your car is stationary for prolonged periods, particularly at main junctions and level crossings. By not idling your engine you'll help to make the air cleaner for you, other drivers, pedestrians and cyclists.

### At home

- Buy water-based or low-solvent paints, varnishes, glues and wood preservatives.
- Half of all deliveries to workplaces are personal parcels for staff. By using pick-up points in corner shops or lockers in train stations you can help to reduce pollution from delivery vehicles.
- Open fires and wood-burning stoves have risen in popularity over recent years. This means we now see more smoke from chimneys, which has a negative effect on air quality. This can result in elevated particulate emissions and cause breathing problems, asthma attacks and contribute to other health conditions. Fuels such as wood and coal are permitted as long as the smoke from their combustion does not cause a statutory nuisance to neighbouring properties. However the use of inappropriate fuel can cause problems with local air quality.

The leaflet at the link below provides information and advice for those that use wood burning stoves or open fires, to reduce environmental and health impacts. By following its advice you can help to minimise the effect of your burning: <https://www.adur-worthing.gov.uk/media/media,149513,en.pdf>

- Try to avoid lighting bonfires. If you must have a bonfire only burn dry material and never burn household waste, particularly plastic, rubber, foam or paint. Levels of pollution can be quite high on bonfire night and other events/festivals with bonfires, and sensitive people, including people with respiratory conditions, may notice some effects. However exposure can be considerably reduced by remaining indoors and keeping windows closed. Further information is available on our website - <https://www.adur->



[worthing.gov.uk/environmental-health/pollution/air-quality-and-pollution/bonfires-and-smoke/](https://www.worthing.gov.uk/environmental-health/pollution/air-quality-and-pollution/bonfires-and-smoke/).

Information on Air Quality, including reports and monitoring results, is available on our website at <https://www.adur-worthing.gov.uk/environmental-health/pollution/air-quality-and-pollution/>. Information is also available at <http://www.sussex-air.net/>.

# Table of Contents

<b>Executive Summary: Air Quality in Our Area</b> .....	<b>1</b>
Air Quality in Adur .....	1
Actions to Improve Air Quality .....	3
Conclusions and Priorities .....	4
Local Engagement and How to get Involved .....	5
<b>1 Local Air Quality Management</b> .....	<b>10</b>
<b>2 Actions to Improve Air Quality</b> .....	<b>11</b>
2.1 Air Quality Management Areas.....	11
2.2 Progress and Impact of Measures to address Air Quality in Adur District Council .....	13
2.3 PM <sub>2.5</sub> – Local Authority Approach to Reducing Emissions and/or Concentrations.....	28
<b>3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance</b> .....	<b>30</b>
3.1 Summary of Monitoring Undertaken .....	30
3.1.1 Automatic Monitoring Sites .....	30
3.1.2 Non-Automatic Monitoring Sites.....	30
3.2 Individual Pollutants .....	31
3.2.1 Nitrogen Dioxide (NO <sub>2</sub> ).....	31
3.2.2 Particulate Matter (PM <sub>10</sub> ).....	34
<b>Appendix A: Monitoring Results</b> .....	<b>35</b>
<b>Appendix B: Full Monthly Diffusion Tube Results for 2018</b> .....	<b>47</b>
<b>Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC</b> .....	<b>49</b>
<b>Appendix D: Map(s) of Monitoring Locations and AQMAs</b> .....	<b>53</b>
<b>Appendix E: Summary of Air Quality Objectives in England</b> .....	<b>59</b>
<b>Appendix F: Summary of Shoreham High Street Source Apportionment Study 2018</b> .....	<b>60</b>
<b>Glossary of Terms</b> .....	<b>62</b>
<b>References</b> .....	<b>64</b>

## List of Tables

Table 2.1 – Declared Air Quality Management Areas.....	12
Table 2.2 – Progress on Measures to Improve Air Quality .....	22

Table A.1 – Details of Automatic Monitoring Sites .....	35
Table A.2 – Details of Non-Automatic Monitoring Sites .....	36
Table A.3 – Annual Mean NO <sub>2</sub> Monitoring Results .....	38
Table A.4 – 1-Hour Mean NO <sub>2</sub> Monitoring Results .....	44
Table A.6 – 24-Hour Mean PM <sub>10</sub> Monitoring Results.....	46
Table B.1 – NO <sub>2</sub> Monthly Diffusion Tube Results - 2018 .....	47
Table C.1 Annualisation data for NO <sub>2</sub> at S42 Shoreham High Street (façade)	
Table C.2 Annualisation data for NO <sub>2</sub> at AD1 Shoreham High Street	
Table C.3 Annualisation data for PM <sub>10</sub> at AD1 Shoreham High Street	
Table E.1 – Air Quality Objectives in England .....	59
Table F.1:Shoreham High Street source apportionment 2018	

### List of Figures

Figure A.1 – Trends in Annual Mean NO <sub>2</sub> Concentrations .....	40
Figure A.1.1 – Trend in average measured NO <sub>2</sub> at co-located sites S17/18/19 within AQMA 1 Shoreham High Street, 2014 – 2018.....	40
Figure A.1.2 - Trends in measured NO <sub>2</sub> at sites S8 and S9 within AQMA 2, 2014 – 2018.....	41
Figure A.1.3 - Trend in measured NO <sub>2</sub> at site S11 (Lancing Manor, Lancing), 2014 – 2018.....	42
Figure A.1.4 - Trend in measured NO <sub>2</sub> at site S13 (Upper Brighton Road Lancing), 2014 – 2018.....	43
Figure C.1 S8 Underdown Road, Southwick	
Figure C.2 S9 Old Shoreham Road, Southwick	
Figure C.3 S11 Lancing Manor, Lancing	
Figure C.4 S13 Upper Brighton Road, Lancing	
Figure C.5 S15 Western Road, Lancing	
Figure C.6 AD1 High Street, Shoreham	

## 1 Local Air Quality Management

This report provides an overview of air quality in Adur District 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 Adur District Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England can be found in **Error! Reference source not found.** in Appendix E.

## 2 Actions to Improve Air Quality

### 2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

A summary of AQMAs declared by Adur District Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at <https://www.adur-worthing.gov.uk/environmental-health/pollution/air-quality-and-pollution/local-air-quality-management/#local-aqma>.

There is also a full list of nationally declared AQMA's at <https://uk-air.defra.gov.uk/aqma/list>.

Alternatively, see Appendix D: Map(s) of Monitoring Locations and AQMAs, which provides for a map of air quality monitoring locations in relation to the AQMA(s).

We will consider revoking AQMA No.2 – Southwick during 2019 (see monitoring section for details).

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)		Action Plan		
						At Declaration	Now	Name	Date of Publication	Link
Adur District Council AQMA 1	2005	NO2 Annual Mean	High Street Shoreham-by-Sea	An area encompassing the A259 High Street, Shoreham-by-Sea between the Ropetackle Roundabout and Surry Street.	NO	42 µg/m3	28 µg/m3	Adur Air Quality Action Plan 2007	2007	<a href="https://www.adur-worthing.gov.uk/media/media,104971,en.pdf">https://www.adur-worthing.gov.uk/media/media,104971,en.pdf</a>
Adur District Council AQMA 2	2005	NO2 Annual Mean	Old Shoreham Road Southwick	An area encompassing the A270 Old Shoreham Road, Southwick between Kinston Lane and Lower Drive	NO	46 µg/m3	33 µg/m3	Adur Air Quality Action Plan 2007	2007	<a href="https://www.adur-worthing.gov.uk/media/media,104971,en.pdf">https://www.adur-worthing.gov.uk/media/media,104971,en.pdf</a>

Adur District Council confirm the information on UK-Air regarding their AQMA(s) is up to date

## 2.2 Progress and Impact of Measures to address Air Quality in Adur District Council

Defra's appraisal of last year's ASR concluded "The report is well structured, detailed and provides the information specified in the Guidance, following the latest reporting template."

The following comments were made.

1. *"Monitoring data presented within the report continues to demonstrate that there are no current exceedances of air quality objectives within the district after data corrections."*
2. *"Southwick AQMA has reported concentrations below 36 µg/m<sup>3</sup> for the past four years. It is noted that concentrations at S8 and S9 have increased slightly from 2016 to 2017, however the concentrations in the AQMA still remain well below objective levels, particularly after distance correction. It is recommended that the Council consider revocation of the Southwick AQMA (AQMA 2)." This will be completed during 2019.*
3. *"It is noted that the Local Authority want to keep the Shoreham AQMA under review until the automatic monitor is up and running again. The Local Authority is also concerned about major developments planned. This proposal is supported." Noted.*
4. *"The Council have not provided any details of the major developments planned for the district which may have an impact on air quality. These should be included in detail in next years' report." This is noted and included in this report.*
5. *"The Local Authority may wish to consider increasing monitoring in both AQMAs: in AQMA 1 to monitor concentrations as major development work takes place; and in AQMA 2 to provide more evidence to either support or oppose revoking the AQMA. Any new monitoring locations should be representative of relevant exposure." We have added monitoring in Shoreham High Street and at Humphries Gap, east of AQMA 1.*
6. *"A new AQAP is under development, and is expected to be completed in 2018. The Local Authority should submit a draft of their AQAP to Defra as part of the consultation process."*

7. *“The new AQAP should include measures which specifically target improvements within the AQMAs, and any other hotspot areas.”* These comments are noted and the Action Plan progress is discussed later.

8. *“It would be useful if smaller scale maps were provided in Appendix D in addition to the larger scale maps, to help demonstrate the locations of the monitoring site with regard to surrounding roads and buildings.”* Noted and included this year.

Adur District Council has taken forward a number of direct measures during the current reporting year of 2018 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

Key completed measures are:

- Adur District Council commissioned a Source Apportionment Study to inform the revised Air Quality Action Plan. Due to the lack of a WSCC automatic traffic counter (ATC) in Shoreham High Street the Council commissioned a 7 day traffic count to inform the Source Apportionment Study. The study showed that
  - Emissions from each vehicle category differ across the pollutants. NO<sub>x</sub> emissions are dominated by the diesel sector whereas particulates are predominately sourced from the car and LGV (Light Goods Vehicle) sectors;
  - Diesel cars and LGVs account for 43.5% and 31.4% respectively of NO<sub>x</sub> emissions. HGVs (Heavy Goods Vehicles) and Buses account for 11.6% and 6.8% of NO<sub>x</sub> emissions respectively;
  - PM<sub>10</sub> and PM<sub>2.5</sub> emissions are dominated by the car sectors at 62% with LGVs responsible for approx. 21 – 22% of the particulate emissions. HGVs and Buses account for approx. 9.5% and 3.9% of particulate emissions respectively.

This will help target our revised action plan which will contain the full Source Apportionment study. Appendix F contains tables and charts from the Study.



- At the West Sussex Joint Leaders' Board in November 2017, the County Council and District and Borough Councils agreed to develop a joint approach to action. A new joint air quality plan, '*Breathing Better*' ([https://www.westsussex.gov.uk/media/12062/air\\_quality\\_plan.pdf](https://www.westsussex.gov.uk/media/12062/air_quality_plan.pdf)) was developed in partnership with WSCC and the Districts and Boroughs. An 'Inter-Authority Member Group' has been established to oversee Governance of the plan and future developments. It first met on 22nd October 2018. Activity in 2018 included development of a public information campaign, review of the scoring mechanism for Traffic Regulation Orders and infrastructure schemes and feasibility study of adding air quality monitoring to on-street pay and display machines.
  
- Sussex-air was successful in securing Defra Air Quality funding in 2018 for a schools intervention programme. The project which commenced in April 2018 and continues into 2019, aims to provide an intensive and targeted intervention with 25 primary schools and 25 businesses in and around AQMAs across Sussex. The project employs Sustrans to deliver a six week programme in primary schools. The project aims to raise awareness of air quality issues with smaller groups of pupils who then present their findings to the wider school community. A Sustrans Air Quality officer is embedded locally, engaging with new schools and those already working with Sustrans to investigate the local air quality. This includes looking at the many factors that affect it and how active and sustainable travel can reduce air pollution. Living Streets are partners in this project, running one day anti-idling events outside the schools to tie in with the Sustrans work. At the time of writing Adur primary schools participating were Swiss Gardens, St Nicholas & St Mary's and Eastbrook. Local business partners engaged in the business intervention have yet to be confirmed.  
A final report is expected in the summer of 2019 and the outcomes will be reported in the next Annual Status Report.
  
- After several years without a continuous monitoring unit in Shoreham High Street Adur District Council secured the replacement of the faulty unit in Shoreham High Street. The cabinet was completely replaced and NO<sub>x</sub> and

PM<sub>10</sub> analyser's added. The NO<sub>x</sub> began operating in May 2018 and the PM<sub>10</sub> in September 2018. The data from these will assist with our air quality responsibilities.

- Adur District Council were successful in securing funding from Highways England (HE) to provide a rapid electric vehicle charge point adjacent to the A27. The funding of new rapid charge points by HE forms part of their Road Investment Strategy for the 2015/16 - 2019/20 Road Period, "of ensuring that 95% of the Strategic Road Network will have a charging point every 20 miles. Wherever possible, these will be rapid charging points that can charge a battery-powered electric vehicle in less than 30 minutes." The provision of new rapid charge points in proximity to the Strategic Road Network is intended to support the uptake of electric vehicles and reduce emissions (air pollutants and carbon). Feasibility surveys and studies confirmed that the site selected, the car park at Lancing Manor Leisure Centre, fulfilled the HE criteria for funding. Following a competitive procurement process Swarco were awarded the contract to provide the charge point. At the time of writing contracts were being finalised. The charge point is expected to be operational by the Autumn of 2019.
- The Council published a revised staff travel action plan in late 2018, with the transport charity, Sustrans having been commissioned to deliver the Plan. The key objectives of the Plan are to: (1) review current staff and councillor patterns for commuting and business travel, and identify barriers to travelling more sustainably; (2) reduce the environmental impacts of commuting and business travel associated with Adur & Worthing Councils' services and operations; (3) support the health and wellbeing of staff; (4) identify options to support staff given anticipated reductions in available on-site car parking at Worthing Civic Site as a result of the planned new Health Hub on part of the existing staff car park. In summer 2018 we undertook a staff travel survey completed by 1 in 2 staff and 1 in 3 councillors on how they travel to work and travel for business. This has now been analysed and incorporated into the Travel Action Plan. We are now working towards delivering the recommendations outlined in the plan - one of which is discounted travel via the *Easit* scheme.

- The Sussex Air quality partnership was successful in a bid to the Defra Air Quality Grant fund for a project focussed on burning of fuels for heat and particulate emissions. 'Clean Burn Sussex' will run across East and West Sussex and Brighton & Hove. It will include work to raise awareness of the health and environmental impact of burning solid fuels such as wood and coal and encourage people to choose cleaner, more efficient fuels. It will also look to assist those households whose only source of heating is wood or coal and try to source funding to switch to less polluting alternatives.
- We continued to use the Sussex Air Quality Emissions Mitigation Planning Guidance as part of the planning process. All 'major' planning applications are required to follow the guidance and produce an *Emissions Mitigation Assessment*, looking at transport emissions from a proposed development and determining the level (cost) of mitigation required to help reduce (offset) the potential effect on health and/or the local environment. The approach is quite novel and Sussex authorities are attempting to push for this approach as the norm. We have negotiated with developers to ensure appropriate mitigation is provided. The guidance is signposted within the Adur Local Plan. We were successful in negotiating significant sums of money via s.106 planning agreements to help fund mitigation. We also continued to work with planning colleagues at both District and County level to ensure air quality is highlighted during pre-application discussions with developers, with the aim of incorporating appropriate mitigation into the design of schemes.
- Sussex-air (with a representative from Adur & Worthing Councils on the project team) continued revising the Sussex Air Quality & Emissions Mitigation Guidance for Planning, with the intention of publishing it in the first half of 2019.
- Adur District Council embarked on work with Sustrans to draft a Local Cycling and Walking Infrastructure Plan. The draft is due for consultation in 2019.
- At the time of writing no decision had been made by Highways England following their 2017 public consultation on a "*proposal to improve the A27 junctions at Worthing and Lancing.*"

- West Sussex County Council commenced a review of their Parking Standards, to include provision for electric vehicles. The final version is due in 2019;

Adur District Council expects the following measures to be completed over the course of the next reporting year:

- Publish a new Adur Air Quality Action Plan – this is overdue and a key priority. It will be drafted in partnership with West Sussex County Council;
- Production of a Local Cycling and Walking Infrastructure Plan. This aims to identify new and improved walking and cycling routes and infrastructure that align with key Council policies and programmes and support local economic growth, improvements to health and well-being and the environment, together with the engagement of key local stakeholders;
- Completion of the Sussex-air schools intervention programme – a final report will summarise the project, the outcomes and lessons learned;
- Deliver the Sussex-air Defra grant funded ‘Clean Burn’ project in Adur;
- Publication of revised West Sussex County Council Parking Standards, promoting electric vehicle charge point provision;
- Publication of a revised Sussex Air Quality Planning Guidance, updated to assist with local development control and air quality mitigation;
- A Public Health information campaign, led by West Sussex County Council, via the West Sussex Inter Authority Air Quality Group;
- Completion and operation of the rapid charger at Lancing Manor, assisting the take-up of ULEV’s;
- Provision of an Adur & Worthing Car Club, to reduce single car ownership and facilitate new developments with reduced parking;
- Provision of additional anti-idling signs at level crossings in Shoreham, to try and persuade vehicle drivers to switch off whilst waiting;
- Evaluation of the West Sussex County Council trial of electric vehicle pool cars for staff.

Adur District Council's priorities for the coming year are

- A revised Adur Air Quality Action Plan – this is overdue and a key priority, devised in partnership with West Sussex County Council;
- Consider revocation of the Air Quality Management Area No.2 (Southwick);
- Production of a Local Cycling and Walking Infrastructure Plan;
- Completion of the Sussex-air schools intervention programme – analysing the outcomes and lessons learned;
- Replacement of Council fleet vehicles with ULEV versions on a case by case basis, in line with our 'Platforms for Places' commitments;
- A Public Health information campaign, led by West Sussex County Council, via the West Sussex Inter Authority Air Quality Group;
- Completion and operation of the rapid charger at Lancing Manor, to assist with the take-up of ULEV's;
- Continue to explore the provision of electric vehicle charge points – public charge points and private in new developments;
- Provision of an Adur & Worthing Car Club;
- Provision of additional anti-idling signs at level crossings in Shoreham;
- Continue to pursue the low emission mitigation approach to new developments by using the Sussex AQ Emissions Mitigation Guidance and working in partnership with highway authorities.

The principal challenges and barriers to implementation that Adur District Council anticipates facing are

- There remain development pressures in the Adur District. A large number of major developments have either been granted permission or are planned for the District. Balancing the demand for development with the need to improve (and not worsen) air quality brings challenges. It is important to state that these developments also bring opportunities to improve infrastructure, especially for walking and cycling, and thus limit the impacts on the existing AQMA's and avoid creating new hotspots.

The Adur Local Plan 2017 allocated the following sites:

- West Sompting - minimum of 480 homes and a range of open space allocated. Application due in 2019.
- New Monks Farm. The Adur Local Plan 2017 allocated this site for a maximum of 600 dwellings, country park, extension and relocation of traveller's site, new access onto A27 and a primary school. The site lies adjacent to the A27. Subsequent to the adoption of the plan, an application for full permission for 249 dwellings, outline for a further 351 dwellings and a non-food retail store (A1) (instead of the employment generating floor space) and other uses referred to above has been granted permission subject to signing of a legal agreement See planning ref.AWDM/0961/17.
- The New Monks Farm application is linked to planning ref. AWDM/1093/17 at Shoreham Airport due to a shared access to the A27. This site was allocated in the Adur Local Plan 2017 for 15,000 sqm of employment generating floorspace. Subsequent to this application planning ref. AWDM/1093/17 was granted consent for 25,000sqm of business floorspace (subject to legal agreement).
- Shoreham Harbour Regeneration Area: The Adur Local Plan allocated a 'broad allocation' of a minimum of 1100 dwellings and 16,000sqm of employment-generating floorspace. This area regeneration project is further defined in the emerging Shoreham Harbour Joint Area Action Plan. This has recently been subject to examination, and the Inspector's Report is awaited.
- Planning permission has been granted at Free Wharf, part of Shoreham Harbour, for residential development (see planning ref. AWDM/1497/17) including 540 dwellings, and 2,707sqm of commercial floorspace including A1 retail, A3 cafes and restaurants, B1 and D1. The development will also provide 596 cycle parking spaces, open space, and provision of a pedestrian and cycle riverside route.
- 
- The business anti-idling project has found recruiting businesses problematic, with a distinct lack of engagement. This is primarily as a result of the withdrawal of appropriate and relevant grants and business support programmes to enable improvements;

- Providing sufficient resources (financial and personnel) in order to progress and deliver effective air quality measures;
- Identifying suitable sites for the installation of electric vehicle charge points continues to be problematic. The sites need to be close to a sufficient electricity supply, sited to ensure they are likely to be frequently used (i.e. in the correct place) and be in a safe and secure setting;
- Identifying sufficient funding to install electric vehicle charge points. Sound business cases must be put forward before any commitments are made by elected Members;
- The provision of additional low emission vehicles into the Council's pool car fleet will depend on funding and suitable vehicles being available. At present electric vehicles are not part of the fleet due to the lack of ev charge points at Council sites.

Progress on the following measures has been slower than expected due to:

- We stated in our 2018 report that producing a revised air quality action plan was a priority, however resources has meant this has been delayed. Progress has been made and we anticipate a draft being made available for consultation during 2019;
- Improvement schemes for Norfolk Bridge and High Street Shoreham were delayed pending suitable funding. Funding through development contributions to WSCC has now been identified to progress these;
- The provision of additional low emission vehicles into the Council's pool car fleet has been delayed due to the lack of EV charge points at Council sites. We are seeking to address this;
- The EV cars in the WSCC pool car fleet are proving popular with staff. Analysis of their cost effectiveness against the conventional fleet cars is slightly delayed due to issues with tracking data.

Adur District Council anticipates that the measures stated above and in Table 2.2 will achieve compliance in AQMA No.1 Shoreham High Street.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Adur/Worthing Car Club	Alternatives to private vehicle use	Car Clubs	Adur DC/Worthing BC. Funding: Developer contributions/Adur DC	2014-19	2019 on	Number of people using the service/Number of vehicles available	1%	Discussions with WSCC and car club providers with view to roll out during 2019. Pool car providers also discussing directly with developers in Shoreham. Use of Adur & Worthing pool cars ruled out.	2019/20	V. small reduction, however principle of car sharing is key here. Also many car free/low parking developments planned.
2	LEZ/CAZ Feasibility	Promoting Low Emission Transport	Low Emission Zone (LEZ)	Adur DC Funding: unknown	2018/19	2019 on	Reduction in older Euro class HGV's/LGV's and buses within the AQMA	10-20%	No CAZ study planned	est. 2021 on	No CAZ planned. Acceptability, feasibility and enforcement questioned. For these reasons this is not seen as a priority at this stage. Any feasibility study would need to understand the benefits, costs, deliverability, enforceability, level of support and any unintended consequences.
3	Embed AQ Emissions Mitigation Planning Guidance for Sussex into the planning process	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Adur DC/Worthing BC. Funding: LA	2012	2014	LE mitigation secured in developments	1-5%	The guidance is signposted within the Adur Local Plan. Guidance and appropriate mitigation is flagged as a requirement at an early stage. Emission mitigation assessments required from major	2018/19	ADC will consider developing the Guidance into a Supplementary Planning Document.



## Adur District Council

									developments to ensure meaningful mitigation. Walking and cycling initiatives and eV charge points secured at development sites. Shoreham Harbour JAAP includes policies for sustainable travel and infrastructure improvements.		
4	Improve emissions from the Council's vehicle fleet	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	Adur DC/Worthing BC/WSCC Funding: LA/WSCC	2014/15	2015	No. of vehicles replaced with better Euro standard models	<1%	Revised 'Platforms for Places' (2018) commits Council to replacing its fleet with low emission/ev/hybrid vehicles as and when they are due for replacement	Ongoing	Council to demonstrate leadership. Anticipated low reduction within AQMA
5	Reduce AQ impact of ADC/WSCC staff travel	Promoting Travel Alternatives	Encourage / Facilitate home-working	Adur DC/Worthing BC/WSCC Funding: Adur DC/WSCC	2012/13	2013/14	Staff travel surveys reduced commuting and business travel by car	<1%	Adur & Worthing EASIT scheme for staff and local businesses was launched in December 2018. WSCC EASIT scheme already exists. Staff car allowances under review, further hybrids added to pool car fleet.	Ongoing	Focus on reducing staff car journeys for work and promoting sustainable travel for trips to and from work including alternatives to car travel.
6	HGV/LGV assessment	Vehicle Fleet Efficiency	Other	Adur DC	2018/19	2019/20	Data on Euro Classes	<5%	Successful Defra AQ grant funding bid (via Sussex-air) - part funding for business fleet advice - may include HGV/LGV's.	2020	Funding and time issues remain, effectiveness in reducing levels of NO2 in the AQMA is also questioned.
7	eV charging infrastructure	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV	Adur DC/Worthing BC/WSCC/Developer contributions	2016/17	2017-20	Number of charge points provided	1-5%	eV charge points were negotiated for new 'major' developments. Successful in securing funding from Highways England for	2020 on	Focus is to increase the number of eV's. WSCC ULEV strategy expected by the end of the financial year 2019/20. Discussions continued successfully

## Adur District Council

			recharging, Gas fuel recharging						a Rapid charge point at Lancing Manor.		with developers as part of AQ mitigation packages.
8	Bus fleet improvements	Transport Planning and Infrastructure	Bus route improvements	Adur DC/WSCC Funding: WSCC or OLEV grants	2009	2011 to date	Journey time and passenger number improvements	1-5%	No new progress to report. Bus operators continue to consider low emission fuel technologies in their fleets and WSCC are in dialogue with operators as plans develop, including consideration of any future funding opportunities	Ongoing	Improvement in journey times points towards improved traffic flow. Retrofitting or fleet replacement targeted next and should bring reductions in emissions; small in AQMA
9	Traffic light/pelican crossing optimisation/MOVA traffic control	Traffic Management	UTC, Congestion management, traffic reduction	WSCC Funding: WSCC	2007/09	Ongoing	Improvement in traffic flows	5-10%	Signals continue to be optimised as far as reasonably practicable.	Ongoing	Improved flow/decrease in stop start driving will have a significant beneficial impact on emissions. Anecdotal evidence to suggest Shoreham High St footbridge pedestrian crossing signal waiting times for pedestrians have lengthened and slightly improved flows.
10	Travel Plans secured through the planning process for all significant development sites in West Sussex	Promoting Travel Alternatives	Other	WSCC/Adur DC Funding: developer contributions	Process established	Ongoing	Number of plans delivered	1-5%	Plans continue to be secured as and when developments come forward. The Adur Local Plan adds weight to the requirement for travel plans; Shoreham Harbour JAAP submitted late 2017 includes policies for sustainable travel and infrastructure improvements.	Ongoing	Focus on increasing public transport, walking and cycling trips whilst minimising private car journeys. Discussions must include emissions mitigation considerations, can be protracted.

## Adur District Council

11	Promotion of walking and cycling	Promoting Travel Alternatives	Personalised Travel Planning	WSCC/Adur DC Funding: WSCC/developer contributions	2014/15	2015/16	Automatic cycle counters and travel surveys	1-5%	Living Streets and Sustrans promoting walking and cycling as part of the Sussex-air/Defra funded Schools project. Living Streets outreach worker project with schools continued. Adur Local Cycling and Walking Infrastructure Plan is being developed, due 2019.	WSCC Cycling Strategy published 2016	Focus on reducing traffic congestion and promoting sustainable travel for trips to and from work (see also item 12). Living Streets Outreach worker funding to 2019/20.
12	School Travel Plans.	Promoting Travel Alternatives	School Travel Plans	WSCC Funding: WSCC	Approach established	Ongoing	Hands-up travel mode surveys in schools	0.01	Schools are directed to Modeshift Stars for assistance with travel planning, which is a nationally recognised online travel planning tool.	Ongoing	Focus on promoting sustainable travel amongst young people and reducing peak time car traffic. WSCC Bikeability and WSFRS have been engaging the schools with cycle training (lots of work with primary and secondary schools across Adur to offer cycle training. We hope the Sussex-air/Defra funded project will influence school travel plans.
13	Promotion of LEV's	Public Information	via the Internet	Adur DC/Worthing BC Funding: LA/OLEV grants	2015	Ongoing	Number of LEV's	0.01	EV points being requested for new developments. Grant funding signposted on Council website. No new Council funded sites provided in 2018.	Ongoing	Developer contributions/installation of EV chargepoints continues to be sought at new developments.
14	Car Sharing	Public Information	via the Internet	WSCC Funding: WSCC	Webpage	Ongoing	Website hits/journeys planned/Number of registrants/take-up of initiatives	1-5%	Car share website now westsussexcarshare.com	Ongoing	Focus on promoting sustainable travel/car. Link to website to be placed onto Adur website.

## Adur District Council

15	Public Health Information Campaigns	Public Information	Via the Internet	Adur DC/Worthing BC/WSCC Funding: LA & WSCC	Ongoing	Ongoing	Number of promotional events, publications, social media. Annual increase in air alert subscribers	<1%	Liaison with WSCC Public Health/Sustainability Teams who have supported the promotion of air Alert through part funding the service and supporting publicity	Ongoing	Attempt to reduce car journeys/increase walking and cycling, particularly through the AQMA, promotion of air Alert. (Title changed from 'Health & Wellbeing Promotion')
16	Air Quality Monitoring and availability of AQ information	Public Information	via the Internet	Adur DC Funding: LA	2006	Ongoing	Reduction in levels of NO2	N/A	Air Quality Monitoring station in Shoreham High Street completely replaced in 2018 and became operational in phases - NO2 in May 2018, PM10 September 2018. AQ information updated on Council's website.	Ongoing	
17	Transport network infrastructure improvements for new development	Traffic Management	UTC, Congestion management, traffic reduction	WSCC Funding: WSCC/developer contributions	Approach established	Ongoing	Number of infrastructure improvements	<1%	Development funding contributions secured to deliver identified schemes for Shoreham High Street and Norfolk Bridge	Ongoing	Focus on minimising traffic congestion. Finding suitable funding had been an issue, hence delays.
18	Anti-idling promotion	Traffic Management	Anti-idling enforcement	WSCC/Adur DC Funding: WSCC/LA	2007	Ongoing	Localised air quality monitoring	N/A	Sussex-air Defra funded anti idling around schools campaign at various schools, ongoing into 2019. Discussions on additional anti idling signs at level crossings.	Ongoing	Campaigns to promote anti-idling more generally being considered e.g. anti-idling stickers, social media campaign.
19	New infrastructure for cyclists and pedestrians	Transport Planning and Infrastructure	Cycle network	WSCC Funding: WSCC/developer contributions	Ongoing	Ongoing	Length of new cycle routes provided	<1%	Adur DC developing a Local Cycling & Walking Infrastructure Plan which is due in 2019. Cycle route improvements across the Borough, mainly through contributions from developments. Schemes/routes	Ongoing	Minimising the impacts of traffic on local streets

## Adur District Council

									identified in West Sussex Walking and Cycling Strategy 2016		
20	Shoreham High Street and Norfolk Bridge infrastructure improvements to reduce traffic flow conflicts with car, bus and taxi bays, and improve access and public realm within the High Street	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	WSCC Funding: WSCC	Ongoing	Ongoing	Number of projects delivered	1-5%	Feasibility work undertaken through Shoreham Town Centre Study 2014. Schemes identified for preliminary design development in WSCC Annual Delivery Programme	Ongoing	Focus on smoothing traffic flow to reduce stop/star and improve air quality
21	Shoreham Area Sustainable Transport Package Feasibility Study	Transport Planning and Infrastructure	Other	WSCC Funding: WSCC/Local Enterprise Partnership	2018/19	First implementation year 2019-2023	Cycle counter flows, traffic counts, travel behaviour surveys		Feasibility Study completed for the development of high quality cycling facilities from Adur Ferry Bridge to Brighton and Hove on the A259.	Est. 2023	Focus on promoting sustainable transport and minimising car use and vehicle congestion
22	Taxi Fleet Emission Improvements	Promoting Low Emission Transport	Taxi Licensing conditions	Adur DC Funding: LA/OLEV grants	2017-19	2020	Number of taxi's replaced with better Euro standard models	0.01	Initial mentions to Adur Taxi trade on fleet improvements		Work to develop during 2019, implementation phase moved to 2020. District wide improvement will have some limited effect in High Street, particularly at taxi rank

## 2.3 PM<sub>2.5</sub> – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of PM<sub>2.5</sub> (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM<sub>2.5</sub> has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

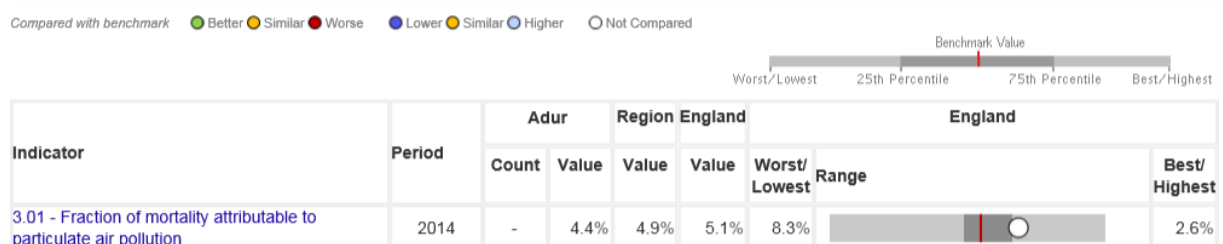
Adur District Council is taking the following measures to address PM<sub>2.5</sub>:

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 Adur District Council is 4.4 %. This information is available from the following web link:

<http://www.phoutcomes.info/search/air#page/1/gid/1/pat/6/par/E12000008/ati/101/are/E07000223/iid/30101/age/230/sex/4>

The figure below shows that the mortality calculated for Adur District Council is less than that calculated for south east England (4.9 %) and England (5.1 %) as a whole.

### Fraction of mortality attributed to particulate air pollution in Adur District Council



Adur District Council is currently developing its approach to address PM<sub>2.5</sub> in partnership with West Sussex Public Health and other Sussex local authority officers through Sussex-air. We have developed the Clean Burn campaign, funded through the Sussex-air Defra funding, in an attempt to reduce particulate emissions from domestic burning. The project runs through 2019 into 2020 and we hope to encourage best practice in relation to burning.

The District Council has considered Smoke Control Areas, however there are considerable barriers to this, most notably issues with enforcement relating to non-compliant stoves and fireplaces existing at the time of any declaration. This would

also require political and public support. We will update guidance on our website relating to domestic burning as part of the Clean Burn campaign.

Adur & Worthing Councils monitor levels of PM<sub>2.5</sub> through an AURN affiliated continuous monitoring station at Grove Lodge, Worthing (A27), which will help to show us the extent of any PM<sub>2.5</sub> issue in the area. The annual mean for PM<sub>2.5</sub> in Worthing in 2018 was 10µgm<sup>-3</sup>.

## 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.

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

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

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.

It is important to mention here that the national air quality objectives apply to sites where there is 'relevant exposure'. These are the facades of residential premises, schools etc. and do not cover scenarios such as passing pedestrians. Therefore measured levels are often predicted back to represent the nearest relevant exposure as required by Defra (and using standard prediction methods and tools published by Defra).

#### 3.1.2 Non-Automatic Monitoring Sites

Adur District Council undertook non- automatic (passive) monitoring of NO<sub>2</sub> at 26 sites during 2018. Table A.2 in Appendix A shows the details of the sites.

5 monitoring sites were added for 2018

- S38 The Ham, Eastern Avenue Shoreham. This is a skate park to the east of the High Street AQMA, but is close to a signal controlled junction and close to major development sites;
- S39 Brighton Road (A259), Kingston, adjacent to a planned development site;



- S40 St Mary's Close, Sompting, close to a major development site;
- S41 North Road, Lancing, by the level crossing adjacent to domestic properties;
- S42 High Street, Shoreham, a façade adjacent to the continuous monitoring site.

3 sites were removed for 2018, as previous results had shown levels were well below the annual mean objective. These sites were S20 Pond Road, Shoreham; S34 Winston Road, Lancing; and S35 Middle Road, Shoreham.

Maps showing the location of monitoring sites are provided in Appendix D. Scalable maps are also available at <https://www.adur-worthing.gov.uk/maps/general-map/> (tick the Air Quality Management Areas box to the left side of the map).

Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. "annualisation" and/or distance correction), are included in Appendix C.

## **3.2 Individual Pollutants**

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

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

Table A.3 in Appendix A compares the ratified and adjusted monitored NO<sub>2</sub> annual mean concentrations for the past 5 years with the air quality objective of 40µg/m<sup>3</sup>.

For diffusion tubes, the full 2018 dataset of monthly mean values is provided in Appendix B.

Continuous monitoring in Shoreham High Street resumed with NO<sub>x</sub> measurements in May 2018. The PM<sub>10</sub> monitoring device was delivered and commissioned in September 2018. Therefore there are only just under 7 months of NO<sub>2</sub> data and under 4 months of PM<sub>10</sub> data. This makes it very difficult to draw any meaningful conclusions on comparisons with annual mean objectives. It is anticipated that a full year of monitoring data will be reported in the next Annual Status Report.

The measured NO<sub>2</sub> annual mean for May - December 2018 was 26µg/m<sup>3</sup> with a 62% data capture rate. When annualised this figure changes to 29.2µg/m<sup>3</sup>.

Of the 26 diffusion tubes used in 2018,

- 12 recorded a reduction in annual means of NO<sub>2</sub> over 2017 levels (S1, S8, S9, S11, S12, S13, S16, S17, S18, S19, S27 and S37);
- 8 recorded an increase (S2, S3, S7, S10, S15, S25, S26 and S36); and
- one remained the same (S14).

The reductions ranged from 0.1µg/m<sup>3</sup> (King Road Lancing) to over 5µg/m<sup>3</sup> for the three tubes on Shoreham High Street, co-located with the continuous monitoring cabinet.

The increases ranged from 0.1µg/m<sup>3</sup> at West Street Sompting to 2.2µg/m<sup>3</sup> at Loose Lane Sompting.

No monitoring sites exceeded the annual mean objective of 40µg/m<sup>3</sup> during 2018.

The highest level recorded was 39µg/m<sup>3</sup> at site S13 Upper Brighton Road, Lancing. This monitoring site is located at the roadside (within 1-15m of a busy road) adjacent to the eastbound A27 dual carriageway. The nearest relevant exposure is 8.6m away and when the measured annual mean is predicted back to the nearest receptor, the levels reduce to 31.6µg/m<sup>3</sup>, well below the annual mean objective of 40µg/m<sup>3</sup>.

Levels measured by the co-located diffusion tubes within AQMA1 High Street Shoreham decreased again, by an average of 4.8µg/m<sup>3</sup> to 33µg/m<sup>3</sup>. This monitoring site is also at the kerbside with the nearest relevant exposure just under 5m away. When the measured annual mean is predicted back to the nearest receptor, the levels reduce to 27.1µg/m<sup>3</sup>, well below the annual mean objective of 40µg/m<sup>3</sup>. In order to try and more accurately measure levels at a site of relevant exposure here, we placed a tube on an adjacent façade. As measurements only began in September 2018 we cannot yet draw conclusions from the measurements. We will report on the annual mean result in the next ASR, once we have a full years' data. The annualised figure for 2018 was 33.1µg/m<sup>3</sup>.

Around the AQMA, West Street (S27) decreased by just under 2µg/m<sup>3</sup> to 32.1µg/m<sup>3</sup> and Victoria Road (S36) decreased by 0.5µg/m<sup>3</sup> to 26.6µg/m<sup>3</sup>. Monitoring at Humphrey's Gap (S37) produced a level of 32.6µg/m<sup>3</sup>, but this site was affected by

adjacent construction works so the tube had to be moved a few times, meaning the result is unreliable.

As yet we have no real evidence to demonstrate why the levels in and around the AQMA are decreasing. We would hope that the actions listed in section 2 are assisting alongside the national trend towards a cleaner vehicle fleet. We remain hopeful that increased awareness of air quality is resulting in more people changing their behaviour – cycling and walking more, eco-friendly driving, etc. It is also possible people are choosing alternative routes to avoid the AQMA as it suffers from congestion during many parts of the day, including weekends. Some minor adjustments have been made to traffic signal timings in the High Street. We are unable to compare annual average traffic levels through the High Street as there has been no West Sussex County Council (WSSCC) automatic traffic counter (ATC) in place since 2016. West Sussex County Council is currently reviewing the options for replacement.

As stated in previous reports we need to keep the measured levels in AQMA1 under review, especially with more reliable and accurate automatic monitoring data, before making decisions on the future of the AQMA. With a number of major developments still planned for the Adur District (as detailed in section 2), we do not consider revocation of the AQMA is an option at this time. This was a view endorsed in the review of last year's ASR.

Levels in AQMA2 have reduced slightly over 2017 levels. Site S8 recorded a level of  $30.4\mu\text{g}/\text{m}^3$  down just over  $2\mu\text{g}/\text{m}^3$  and site S9 reduced by  $0.8\mu\text{g}/\text{m}^3$  to  $35\mu\text{g}/\text{m}^3$ . Both are roadside locations and when predicted back to the nearest receptors, 4m and 2m away respectively, levels drop to  $26\mu\text{g}/\text{m}^3$  and  $33\mu\text{g}/\text{m}^3$  respectively, well below the annual mean objective. In previous ASR's we advised that we would consider revoking AQMA 2 in Southwick as measured levels had been below the annual mean objective for a number of years. We can therefore confirm that AQMA 2 will be revoked during 2019.

Last year we said we would keep an eye on levels at site S11 Lancing Manor as they had been slowly increasing, hovering just below the annual mean objective for a number of years. Levels in 2018 showed a slight drop, from  $36.3\mu\text{g}/\text{m}^3$  in 2017 to  $35.1\mu\text{g}/\text{m}^3$  in 2018. This is a kerbside location and when projected back to the

nearest receptor some 14m away, the level reduces significantly to  $24.8\mu\text{g}/\text{m}^3$ , well below the annual mean objective. With the number of developments planned in the area, we shall continue to keep this site under scrutiny.

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

As PM10 monitoring only resumed in September 2018 we do not have full results to present. The 'annualised' annual mean was  $24.2\mu\text{g}/\text{m}^3$ .

Full data based on results during the 2019 calendar year will be presented in next year's ASR.

## Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Inlet Height (m)
AD1	High Street Shoreham	Kerbside	521399	105039	NO <sub>2</sub> ; PM <sub>10</sub>	YES	Chemiluminescent; BAM	4.0	1.6	2.0

**Notes:**

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

(2) N/A if not applicable.

Table A.2 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube collocated with a Continuous Analyser?	Height (m)
S1	Albion Street Southwick	Kerbside	523773	104979	NO2	NO	4.9	1.0	NO	2.8
S2	Old Mill Close Fishersgate	Roadside	525330	105085	NO2	NO	3.5	1.5	NO	2.5
S3	St. Aubyns Crescent Fishersgate	Urban Background	525562	105313	NO2	NO	5.1	2.4	NO	2.5
S7	Queens Road Southwick	Urban Background	524139	106321	NO2	NO	3.0	2.5	NO	3.0
S8	Underdown Road Southwick	Roadside	524018	106070	NO2	YES	4.3	2.3	NO	2.5
S9	Old Shoreham Road Southwick	Roadside	523784	106081	NO2	YES	1.6	2.8	NO	2.3
S10	Holmbush Roundabout Shoreham	Roadside	523343	106111	NO2	NO	27.0	1.7	NO	2.7
S11	Lancing Manor Lancing	Kerbside	518820	105584	NO2	NO	14.8	2.0	NO	3.0
S12	Boundstone Lane Lancing	Kerbside	517731	105505	NO2	NO	N/A	1.8	NO	3.0
S13	Upper Brighton Road Lancing	Kerbside	517291	105550	NO2	NO	8.6	4.6	NO	2.5
S14	West Street Sompting	Urban Background	516021	105203	NO2	NO	14.5	2.5	NO	2.8
S15	Western Road Lancing	Roadside	517512	103367	NO2	NO	6.4	1.5	NO	2.7
S16	Kings Road Lancing	Urban Background	518754	103971	NO2	NO	5.5	1.8	NO	2.8
S17	High Street AQMS 1 Shoreham	Kerbside	521400	105040	NO2	YES	5.0	0.9	YES	2.6
S18	High Street AQMS 2 Shoreham	Kerbside	521400	105040	NO2	YES	5.0	0.9	YES	2.6

S19	High Street AQMS 3 Shoreham	Kerbside	521400	105040	NO2	YES	5.0	0.9	YES	2.6
S25	Mash Barn Lane Lancing	Roadside	519117	105710	NO2	NO	N/A	6.0	NO	2.5
S26	Loose Lane Sompting	Suburban	516536	104783	NO2	NO	12.0	0.8	NO	2.5
S27	West Street Shoreham	Kerbside	521371	105087	NO2	NO	0.2	1.4	NO	2.8
S36	Victoria Road Footpath Shoreham	Roadside	521282	105254	NO2	NO	5.8	1.9	NO	2.8
S37	Humphrey's Gap Shoreham	Roadside	522103	105126	NO2	NO	0.5	1.7	NO	3.0
S38	The Ham Eastern Avenue Shoreham	Roadside	522118	105166	NO2	NO	11.0	1.8	NO	3.0
S39	Brighton Road Kingston	Kerbside	523329	104960	NO2	NO	4.0	1.2	NO	3.0
S40	St. Mary's Close Sompting	Suburban	516466	105171	NO2	NO	4.7	0.8	NO	3.0
S41	North Road Lancing	Roadside	518238	104432	NO2	NO	0.2	2.0	NO	3.0
S42	High Street Shoreham	Roadside	521390	105039	NO2	YES	0.0	4.1	YES	2.6

**Notes:**

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO<sub>2</sub> Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2018 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
					2014	2015	2016	2017	2018
AD1	Kerbside	Automatic	99	62	<b>42.60</b>	<b>48.3 (45.2)</b>	N/A	N/A	29.2 <sup>4</sup>
S1	Kerbside	Diffusion Tube	100	100	32.6	30.9	32.2	33.0	31.0
S2	Roadside	Diffusion Tube	100	100	26.0	23.9	24.9	26.4	27.0
S3	Urban Background	Diffusion Tube	100	100	16.9	15.5	17.5	17.2	18.1
S7	Urban Background	Diffusion Tube	92	92	15.3	12.9	14.8	15.1	15.9
S8	Roadside	Diffusion Tube	100	100	31.7	27.8	30.4	32.8	30.4
S9	Roadside	Diffusion Tube	100	100	34.9	32.1	34.5	35.8	35.0
S10	Roadside	Diffusion Tube	100	100	24.7	22.2	25.2	24.6	27.0
S11	Kerbside	Diffusion Tube	100	100	34.4	33.0	35.6	36.3	35.1
S12	Kerbside	Diffusion Tube	100	100	34.1	30.1	31.1	31.4	30.2
S13	Kerbside	Diffusion Tube	92	92	<b>40.5</b>	35.5	38.3	<b>40.3</b>	39.0
S14	Urban Background	Diffusion Tube	100	100	20.4	18.8	20.4	19.5	19.5
S15	Roadside	Diffusion Tube	91	91	30.0	27.3	29.3	30.5	32.5
S16	Urban Background	Diffusion Tube	92	92	15.8	14.3	16.0	16.4	16.3
S17	Kerbside	Diffusion Tube	100	100	39.0	38.1	38.4	38.1	33.7



S18	Kerbside	Diffusion Tube	100	100	38.7	38.0	39.1	37.8	32.8
S19	Kerbside	Diffusion Tube	100	100	38.5	<b>40.1</b>	<b>40.9</b>	37.8	32.4
S25	Roadside	Diffusion Tube	92	92	29.2	27.2	28.8	28.9	30.4
S26	Suburban	Diffusion Tube	89	89	15.2	13.3	15.4	14.3	16.5
S27	Kerbside	Diffusion Tube	100	100	N/A	N/A	33.5	33.9	32.1
S36	Roadside	Diffusion Tube	100	100	N/A	N/A	N/A	26.1	26.6
S37	Roadside	Diffusion Tube	82	51	<u>N/A</u>	N/A	N/A	<b>41.0</b>	32.6
S38	Roadside	Diffusion Tube	100	100	<u>N/A</u>	N/A	N/A	N/A	22.9
S39	Kerbside	Diffusion Tube	100	100	<u>N/A</u>	N/A	N/A	N/A	26.1
S40	Suburban	Diffusion Tube	100	100	<u>N/A</u>	N/A	N/A	N/A	17.8
S41	Roadside	Diffusion Tube	100	100	<u>N/A</u>	N/A	N/A	N/A	23.2
S42	Roadside	Diffusion Tube	100	34	<u>N/A</u>	N/A	N/A	N/A	33.1 <sup>4</sup>

Diffusion tube data has been bias corrected

Annualisation has been conducted where data capture is <75%

**Notes:**

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 1-hour mean objective are shown in **bold and underlined**.

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

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

(3) Means for diffusion tubes have been corrected for bias.

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

Figure A.1 – Trends in Annual Mean NO<sub>2</sub> Concentrations, 2014 – 2018

Figure A.2.1 – Trend in average measured NO<sub>2</sub> at co-located sites S17/18/19 within AQMA 1 Shoreham High Street

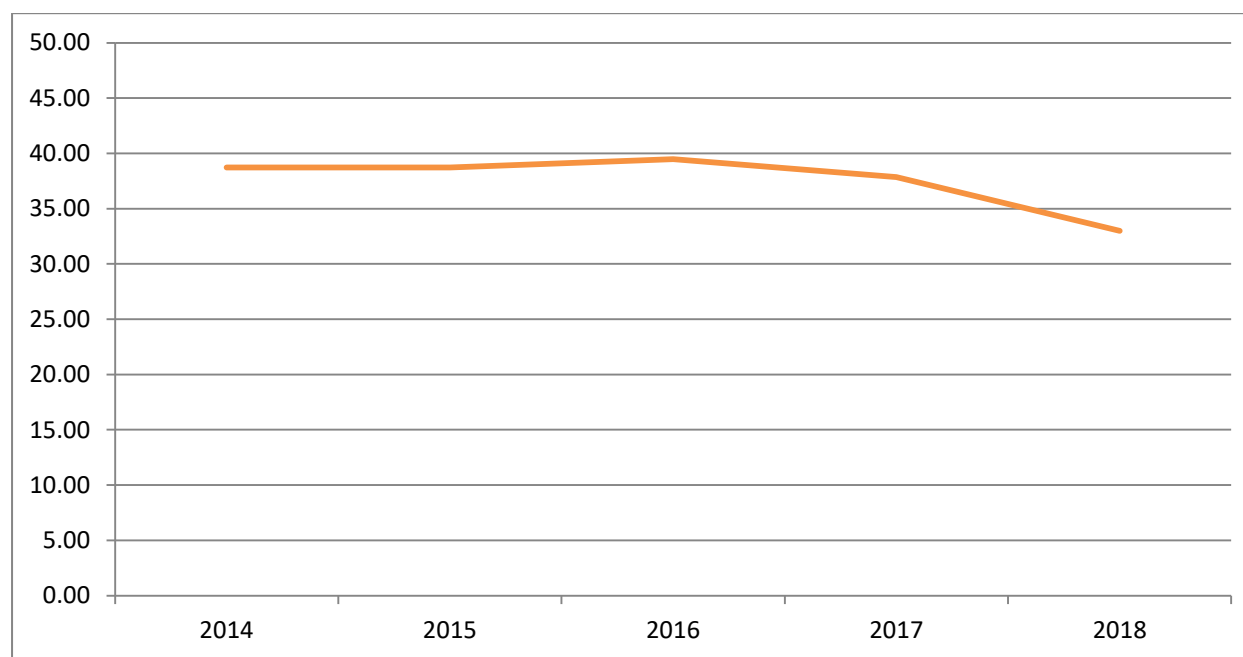


Figure A.3.2 - Trends in measured NO<sub>2</sub> at sites S8 and S9 within AQMA 2

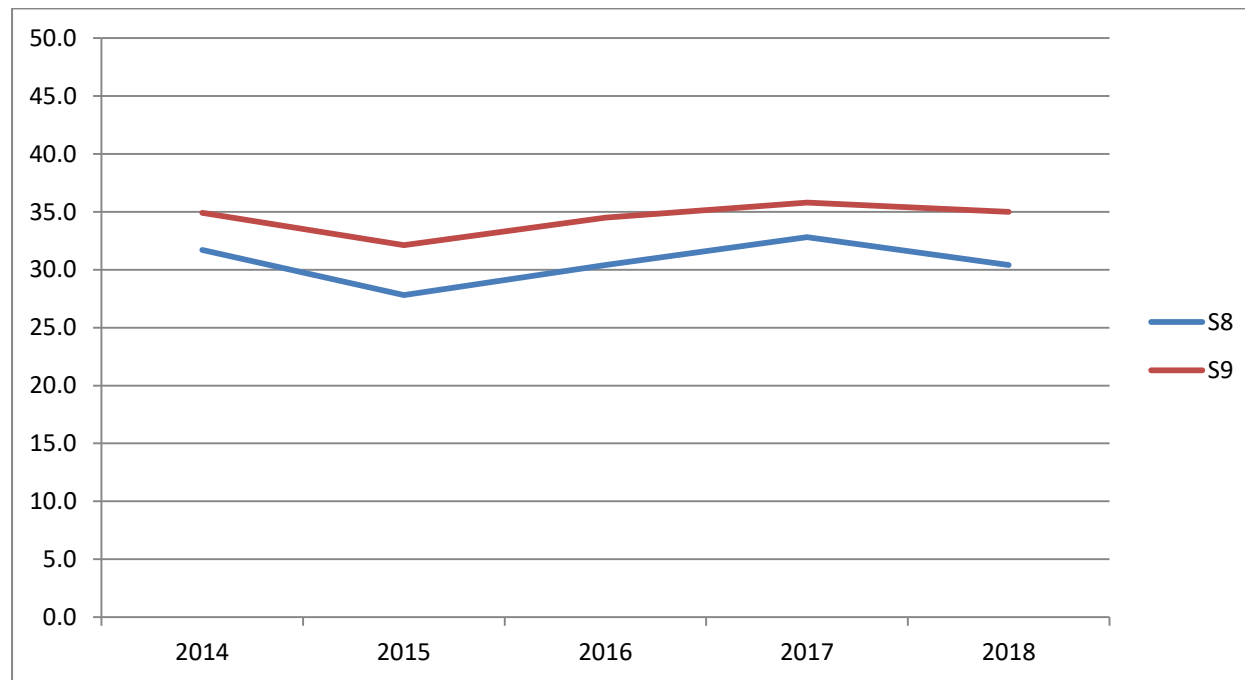


Figure A.4.3 - Trend in measured NO<sub>2</sub> at site S11 (Lancing Manor, Lancing)

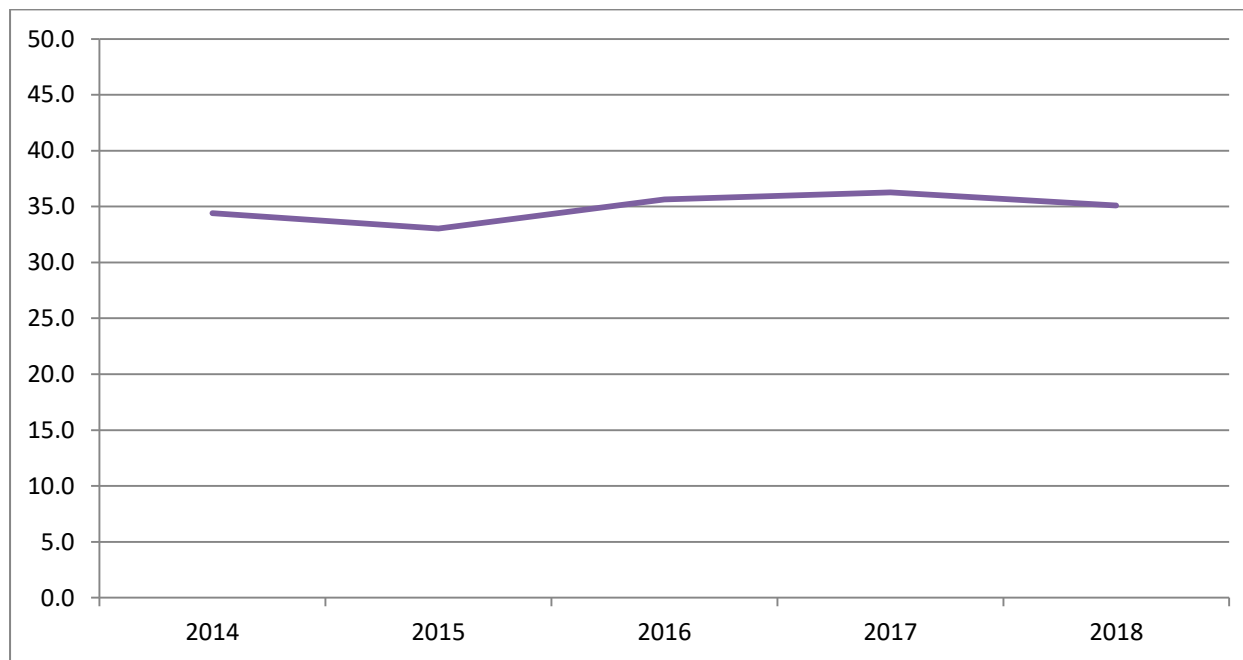


Figure A.5.4 - Trend in measured NO<sub>2</sub> at site S13 (Upper Brighton Road Lancing)

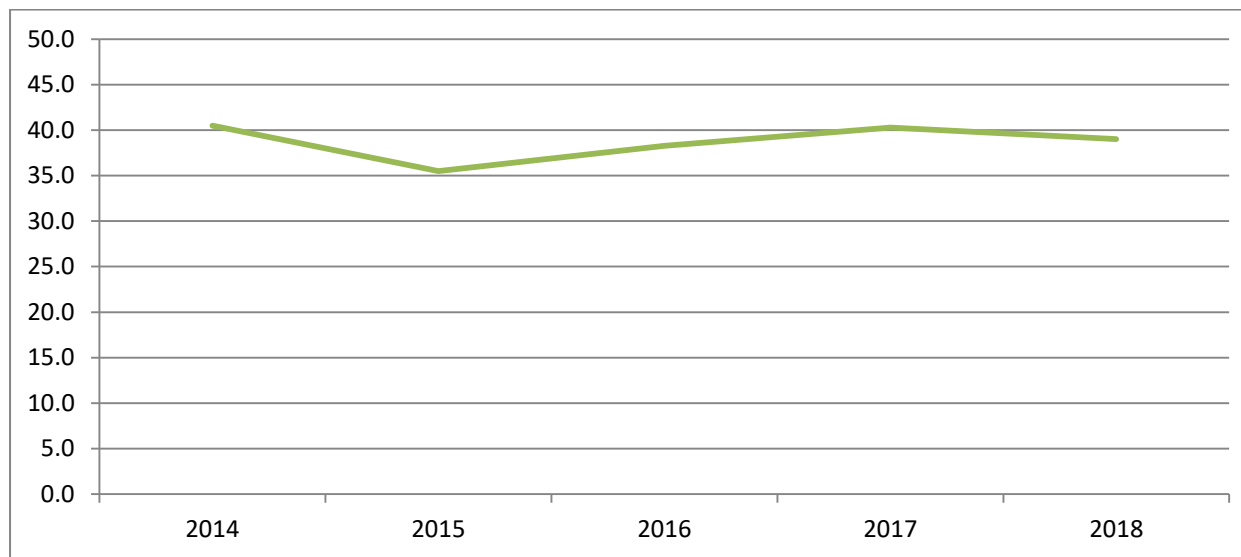


Table A.4 – 1-Hour Mean NO<sub>2</sub> Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2018 (%) <sup>(2)</sup>	NO <sub>2</sub> 1-Hour Means > 200µg/m <sup>3</sup> <sup>(3)</sup>				
					2014	2015	2016	2017	2018
AD1	Kerbside	Automatic	62	62	N/A	N/A	N/A	N/A	<b>0 (0)</b>

**Notes:**

Exceedances of the NO<sub>2</sub> 1-hour mean objective (200µg/m<sup>3</sup> not to be exceeded more than 18 times/year) are shown in **bold**.

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

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

(3) If the period of valid data is less than 85%, the 99.8<sup>th</sup> percentile of 1-hour means is provided in brackets.

Table A.5 – Annual Mean PM<sub>10</sub> Concentration Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2018 (%) <sup>(2)</sup>	PM <sub>10</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
				2014	2015	2016	2017	2018
AD1	Kerbside		23					24.2 <sup>3</sup>

Annualisation has been conducted where data capture is <75%

**Notes:**

Exceedances of the PM<sub>10</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

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

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

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

Table A.5 – 24-Hour Mean PM<sub>10</sub> Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2018 (%) <sup>(2)</sup>	PM <sub>10</sub> 24-Hour Means > 50µg/m <sup>3</sup> <sup>(3)</sup>				
				2014	2015	2016	2017	2018
AD1	Kerbside		23	N/A	N/A	N/A	N/A	0

**Notes:**

Exceedances of the PM<sub>10</sub> 24-hour mean objective (50µg/m<sup>3</sup> not to be exceeded more than 35 times/year) are shown in **bold**.

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

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

(3) If the period of valid data is less than 85%, the 90.4<sup>th</sup> percentile of 24-hour means is provided in brackets.



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

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

Site ID	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )												Annual Mean		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.92) and Annualised <sup>(1)</sup>	Distance Corrected to Nearest Exposure <sup>(2)</sup>
S1	38.8	32.3	36.7	33.3	33.1	25.9	33.8	33.8	35.5	39.1	27.9	33.8	33.7	31.0	23.9
S2	34.8	30.3	34.6	30.9	26.3	22.8	26.2	23.2	28.0	29.5	32.4	33.4	29.4	27.0	24.8
S3	22.8	23.6	20.1	21.1	16.9	15.3	16.3	13.8	16.4	21.2	25.8	22.5	19.6	18.1	17.7
S7	23.6	17.2	20.8	18.1	14.0	11.9	12.8	11.9	-	16.9	22.6	20.1	17.3	15.9	15.4
S8	<b>42.2</b>	31.7	35.8	33.0	30.8	21.6	29.4	29.2	34.1	37.2	34.5	37.7	33.1	30.4	26.0
S9	<b>41.0</b>	<b>41.5</b>	<b>42.5</b>	39.4	34.9	32.0	38.8	34.4	38.9	<b>41.1</b>	37.9	34.5	38.1	35.0	33.0
S10	32.6	35.3	28.7	28.6	31.2	21.9	23.3	23.8	28.7	35.3	30.8	32.4	29.4	27.0	19.8
S11	<b>43.2</b>	<b>46.6</b>	38.7	35.9	37.3	28.5	35.5	39.7	<b>42.1</b>	37.6	30.9	<b>41.7</b>	38.1	35.1	24.8
S12	<b>40.4</b>	<b>42.2</b>	34.4	28.6	33.0	25.0	28.2	27.4	28.9	33.8	36.1	35.5	32.8	30.2	24.7
S13	<b>45.1</b>	34.7	-	<b>48.5</b>	39.7	39.5	<b>50.3</b>	<b>41.7</b>	<b>42.4</b>	<b>40.7</b>	<b>40.3</b>	<b>43.7</b>	<b>42.4</b>	39.0	31.6
S14	22.5	21.8	22.2	19.7	19.8	18.4	18.9	19.6	20.6	26.2	21.6	22.3	21.1	19.5	17.4
S15	39.0	38.9	29.6	34.1	38.3	31.7	30.5	36.4	29.6	<b>43.2</b>	-	37.3	35.3	32.5	27.9
S16	20.8	21.9	21.2	15.9	14.6	13.4	14.4	13.5	15.7	-	20.5	22.7	17.7	16.3	14.7
S17	<b>45.6</b>	39.3	<b>43.0</b>	38.7	32.9	27.5	36.1	30.5	36.2	<b>40.0</b>	33.2	36.8	36.6	33.7	27.6
S18	<b>41.3</b>	<b>40.9</b>	38.5	37.7	32.2	25.0	38.7	33.9	36.6	36.1	32.2	34.7	35.6	32.8	27.0

## Adur District Council

S19	36.5	<b>40.3</b>	<b>40.4</b>	37.7	38.0	26.2	32.9	30.3	34.8	31.9	36.1	37.3	35.2	32.4	26.7
S25	35.5	<b>41.1</b>	-	28.0	37.0	29.2	31.4	30.4	35.1	35.2	26.1	34.6	33.0	30.4	28.3
S26	19.9	19.7	20.2	-	15.9	14.5	13.9	13.2	14.8	22.9	21.8	20.8	18.0	16.5	15.6
S27	<b>41.0</b>	34.9	36.1	35.1	29.0	22.8	39.7	33.3	37.4	39.6	33.4	36.1	34.9	32.1	31.6
S36	29.5	30.9	27.4	29.6	29.6	26.0	27.7	22.5	29.4	35.0	27.4	32.4	28.9	26.6	22.3
S37	-	-	-	-	-	-	<b>42.8</b>	33.0	31.9	32.5	-	37.0	35.4	32.6	31.3
S38	31.8	24.8	27.9	30.8	24.2	18.5	25.0	21.9	23.6	24.2	19.8	26.2	24.9	22.9	18.8
S39	39.0	33.9	30.8	29.0	27.2	19.2	21.8	21.9	27.1	32.6	28.1	29.9	28.4	26.1	21.7
S40	24.2	22.6	22.6	14.5	16.9	15.8	17.5	14.4	18.7	22.4	20.6	21.3	19.3	17.8	15.7
S41	29.8	25.1	29.2	25.8	24.5	21.1	23.6	22.0	22.6	26.0	27.8	24.7	25.2	23.2	23.0
S42	-	-	-	-	-	-	-	-	35.2	35.3	32.2	35.8	34.6	34.4	33.1

National bias adjustment factor used

Annualisation has been conducted where data capture is <75%

Where applicable, data has been distance corrected for relevant exposure

**Notes:**

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 1-hour mean objective are shown in **bold and underlined**.

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

(2) Distance corrected to nearest relevant public exposure.

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

### Automatic Monitoring Site

The automatic continuous monitoring site in Shoreham High Street is part of the Sussex-air monitoring network ([www.sussex-air.net/](http://www.sussex-air.net/)). The site is serviced every 6 months and Local Site Operator (LSO) routine calibrations are completed by Adur District Council every 2 weeks.

### Diffusion Tube Bias Adjustment Factors

NO<sub>2</sub> diffusion tubes are provided and analysed by Gradko laboratory. The NO<sub>2</sub> tube preparation method used is 50% triethanolamine (TEA) in Acetone.

Data from the NO<sub>2</sub> diffusion tubes has been compared and bias corrected to the factors produced from the UK co-location data-base available from Defra, <http://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html>

The bias adjustment factor used for 2018, obtained via tools at the aforementioned website, was **0.92**.

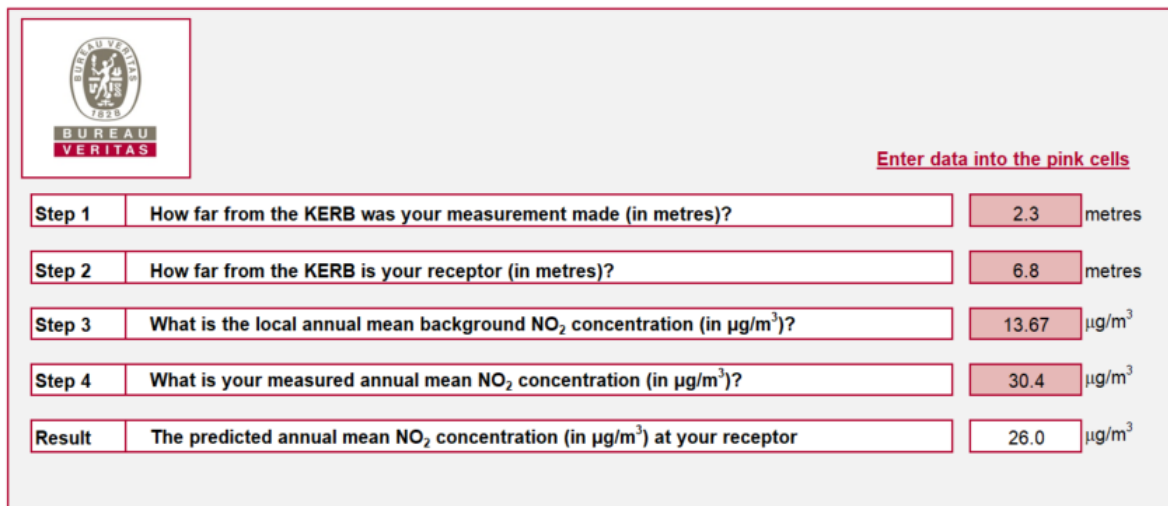
### QA/QC of diffusion tube monitoring


All diffusion monitoring data has been ratified following the methods described in LAQM.TG(16). A quality assurance / quality control (QA/QC) programme including field duplicates and blanks, and instrument calibration with standard gases has been followed (AEAT, 2000).

## Fall off with Distance Calculations

A screen shot of the falloff of NO<sub>2</sub> concentration with distance from kerb calculator spreadsheet (downloaded from the LAQM website) is shown below, with the calculation for site S11, Lancing Manor, S17 Shoreham High Street and S13 Upper Brighton Road Lancing.

Figure C.1 S8 Underdown Road, Southwick

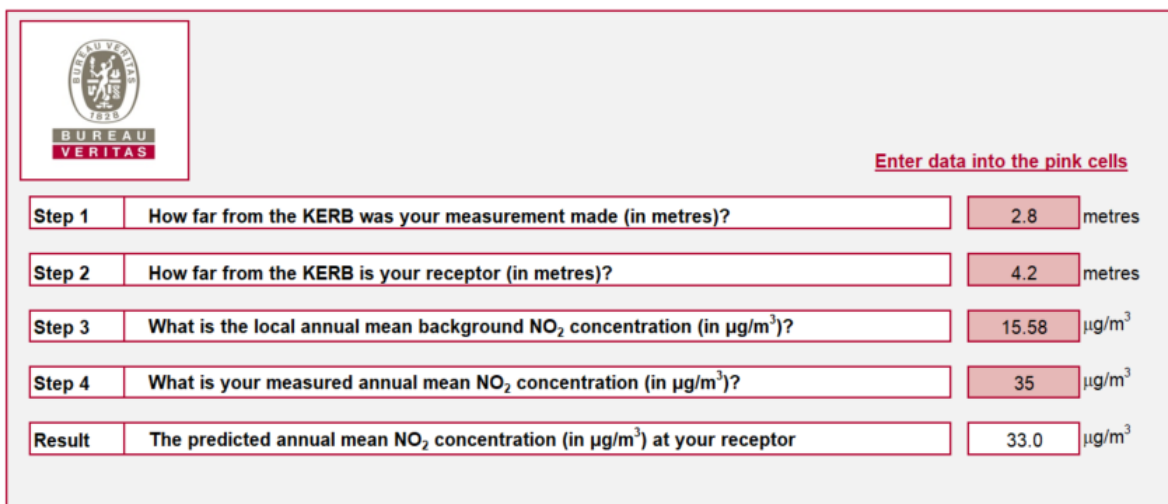



 **BUREAU VERITAS**

[Enter data into the pink cells](#)

Step 1	How far from the KERB was your measurement made (in metres)?	2.3	metres
Step 2	How far from the KERB is your receptor (in metres)?	6.8	metres
Step 3	What is the local annual mean background NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	13.67	µg/m <sup>3</sup>
Step 4	What is your measured annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	30.4	µg/m <sup>3</sup>
Result	The predicted annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> ) at your receptor	26.0	µg/m <sup>3</sup>

Figure C.2 S9 Old Shoreham Road, Southwick




 **BUREAU VERITAS**

[Enter data into the pink cells](#)

Step 1	How far from the KERB was your measurement made (in metres)?	2.8	metres
Step 2	How far from the KERB is your receptor (in metres)?	4.2	metres
Step 3	What is the local annual mean background NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	15.58	µg/m <sup>3</sup>
Step 4	What is your measured annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	35	µg/m <sup>3</sup>
Result	The predicted annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> ) at your receptor	33.0	µg/m <sup>3</sup>


Figure C.3 S11 Lancing Manor, Lancing



Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	2	metres
Step 2	How far from the KERB is your receptor (in metres)?	16.6	metres
Step 3	What is the local annual mean background NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	14.26	µg/m <sup>3</sup>
Step 4	What is your measured annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	35.1	µg/m <sup>3</sup>
Result	The predicted annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> ) at your receptor	24.8	µg/m <sup>3</sup>


Figure C.4 S13 Upper Brighton Road, Lancing



Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	4.6	metres
Step 2	How far from the KERB is your receptor (in metres)?	12.3	metres
Step 3	What is the local annual mean background NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	13.17	µg/m <sup>3</sup>
Step 4	What is your measured annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	39	µg/m <sup>3</sup>
Result	The predicted annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> ) at your receptor	31.6	µg/m <sup>3</sup>


Figure C.5 S15 Western Road, Lancing



Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	1.5	metres
Step 2	How far from the KERB is your receptor (in metres)?	4.8	metres
Step 3	What is the local annual mean background NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	14.52	µg/m <sup>3</sup>
Step 4	What is your measured annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	32.5	µg/m <sup>3</sup>
Result	The predicted annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> ) at your receptor	27.9	µg/m <sup>3</sup>

Figure C.6 AD1 High Street, Shoreham



Enter data into the pink cells

<b>Step 1</b>	How far from the KERB was your measurement made (in metres)?	1.6	metres
<b>Step 2</b>	How far from the KERB is your receptor (in metres)?	5.6	metres
<b>Step 3</b>	What is the local annual mean background NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	13.27	µg/m <sup>3</sup>
<b>Step 4</b>	What is your measured annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	29.2	µg/m <sup>3</sup>
<b>Result</b>	The predicted annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> ) at your receptor	24.8	µg/m <sup>3</sup>

Table C.1 Annualisation data for NO<sub>2</sub> at S42 Shoreham High Street (façade)

$R (A_m / P_m) = 0.96$

$R_a = 0.96$

So Annualised average of D1

$(M \times R_a) = \underline{\underline{33.1}}$

Data for Preston Park used, obtained from Sussex Air.

Table C.2 Annualisation data for NO<sub>2</sub> at AD1 Shoreham High Street

BG Site Name	A <sub>m</sub>	P <sub>m</sub>	Ratio A <sub>m</sub> /P <sub>m</sub>
Devonshire Pk E'bourne	14	12.7	1.10
Brighton – Preston Pk	16	15.2	1.05
Lullington Heath	8	6.6	1.21
Average			1.12

So Annualised mean =  $26 \times 1.12 = \underline{\underline{29.2}}$

Table C.3 Annualisation data for PM<sub>10</sub> at AD1 Shoreham High Street

BG Site Name	A <sub>m</sub>	P <sub>m</sub>	Ratio A <sub>m</sub> /P <sub>m</sub>
Devonshire Pk, E'bourne	19	18.4	1.03
Reigate-Horley	17	15.8	1.08
Average			1.05

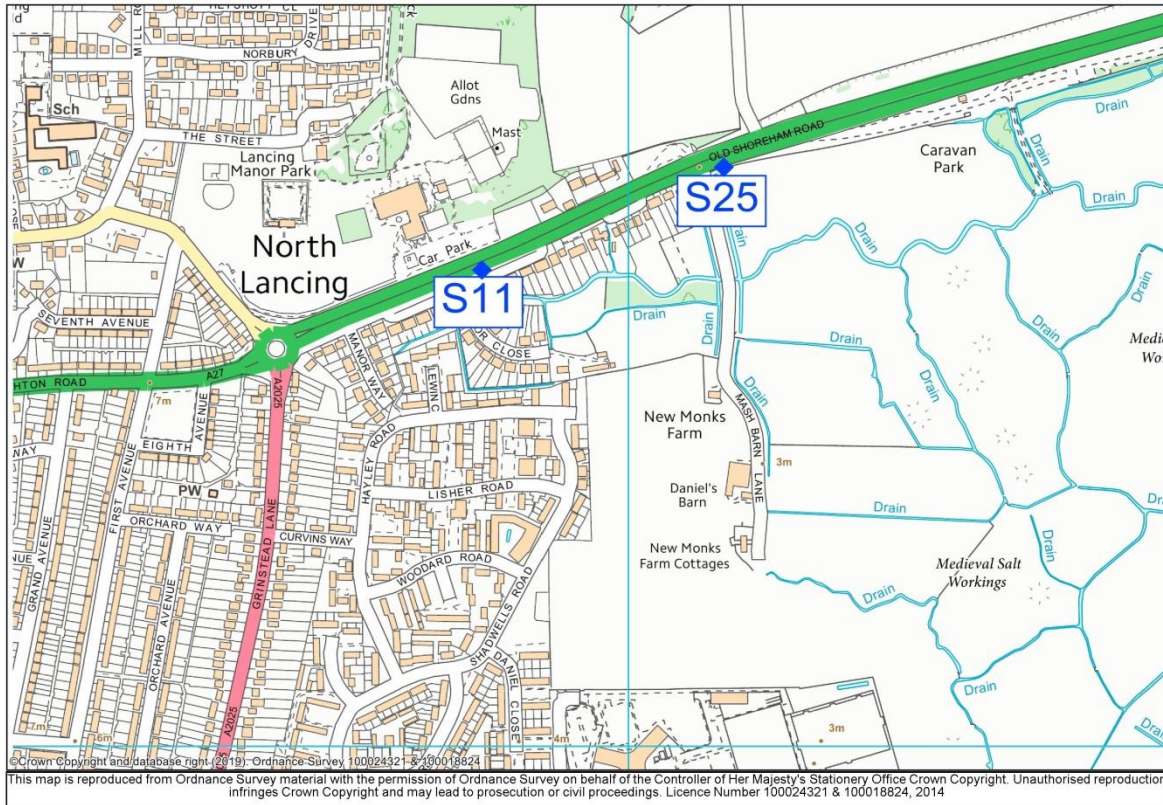
So Annualised mean =  $23 \times 1.05 = \underline{\underline{24.2}}$

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

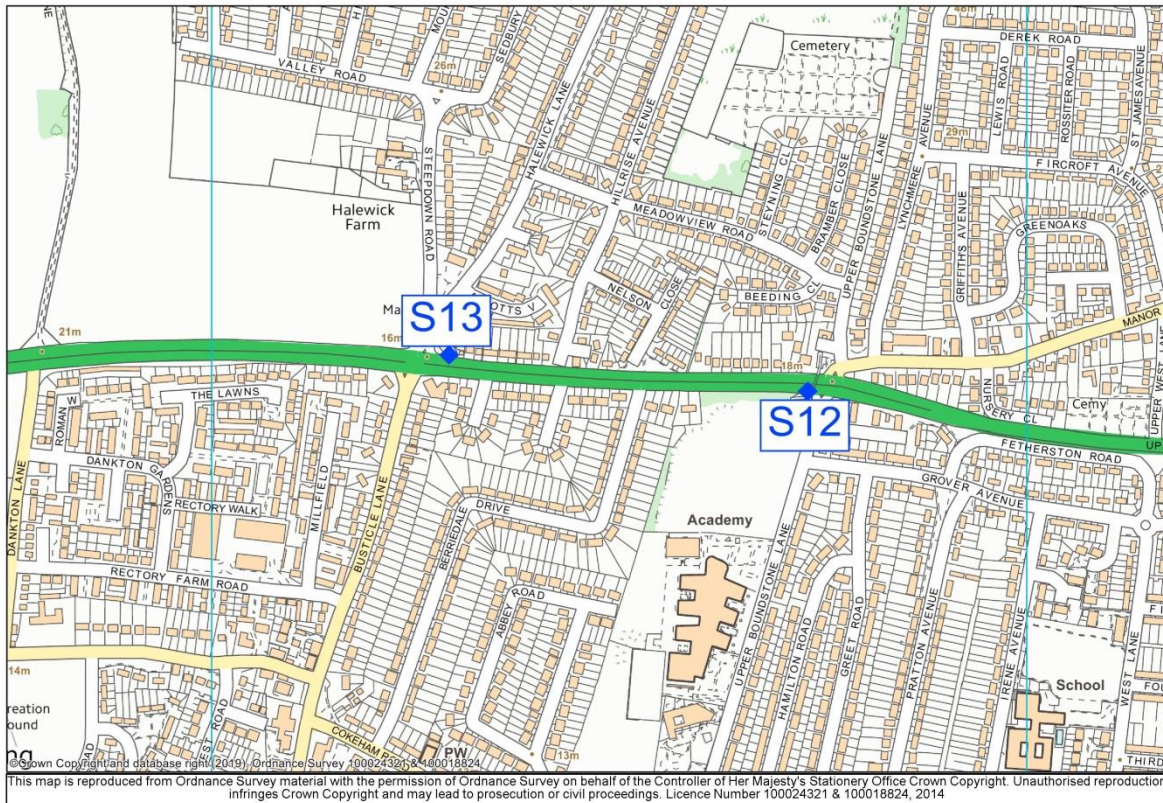
### Adur District



North Lancing

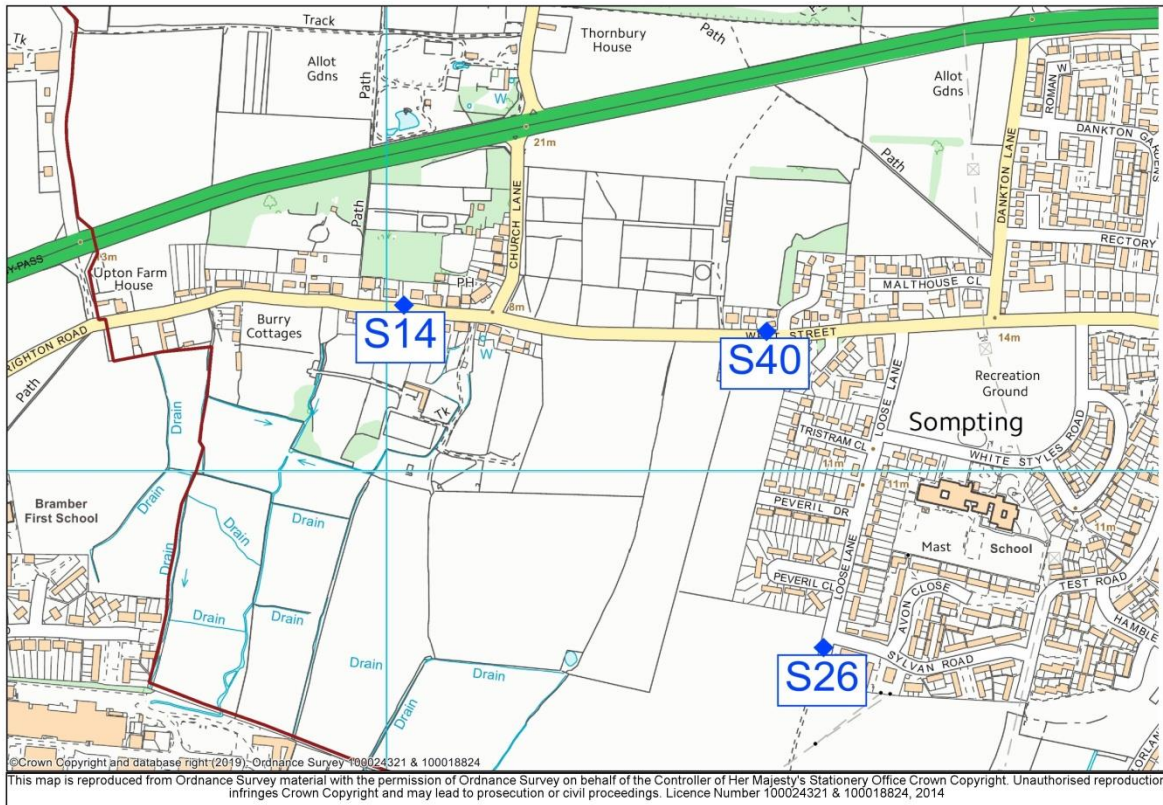


A27 Lancing

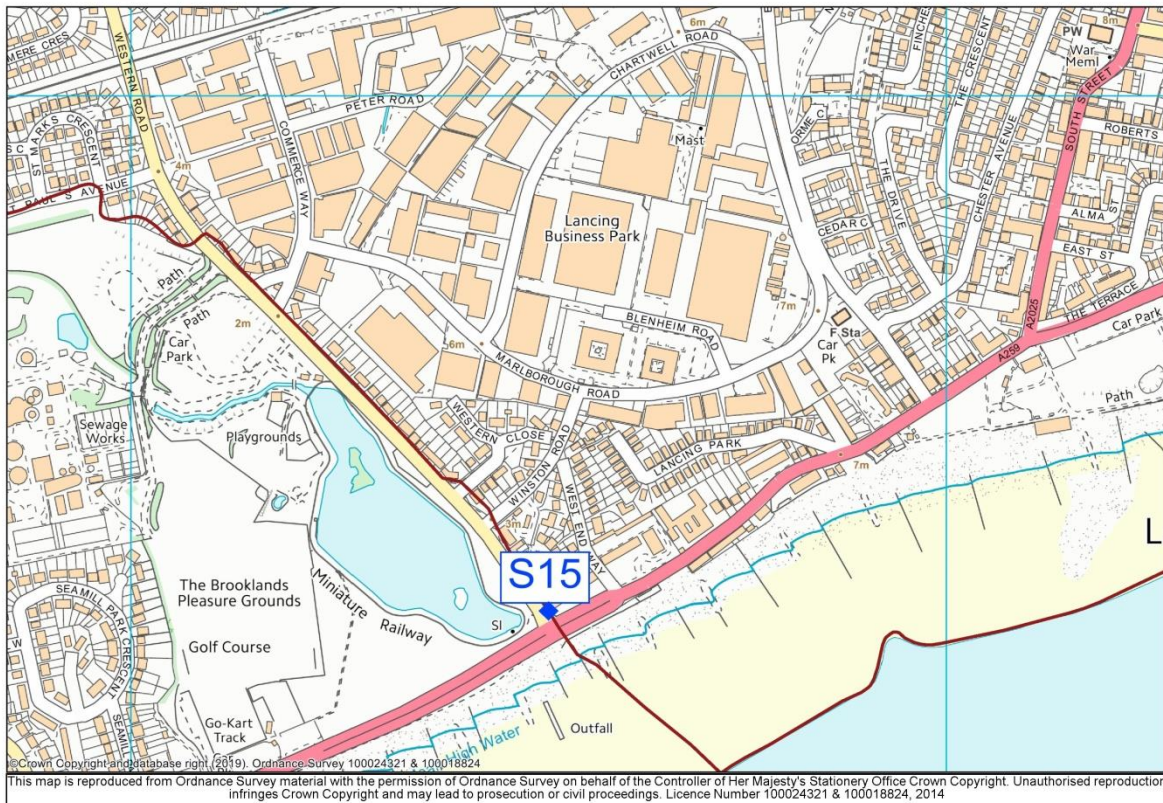




Sompting

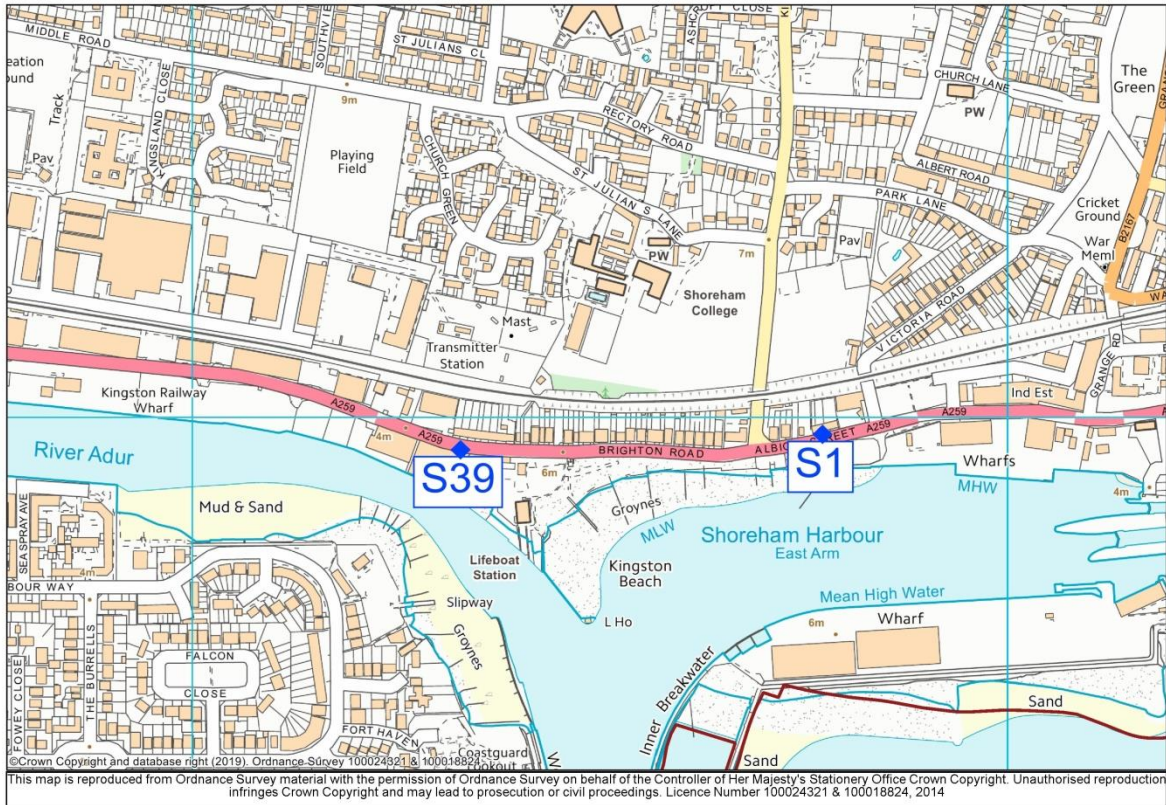


Brooklands

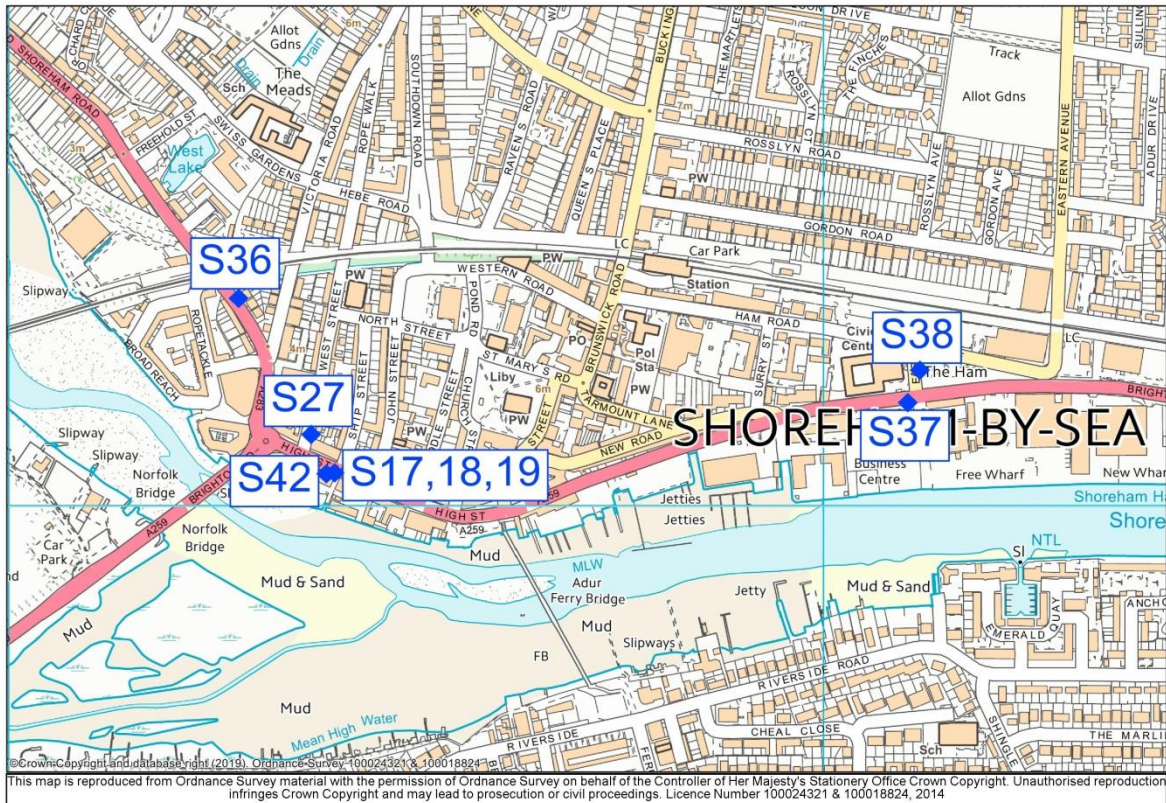




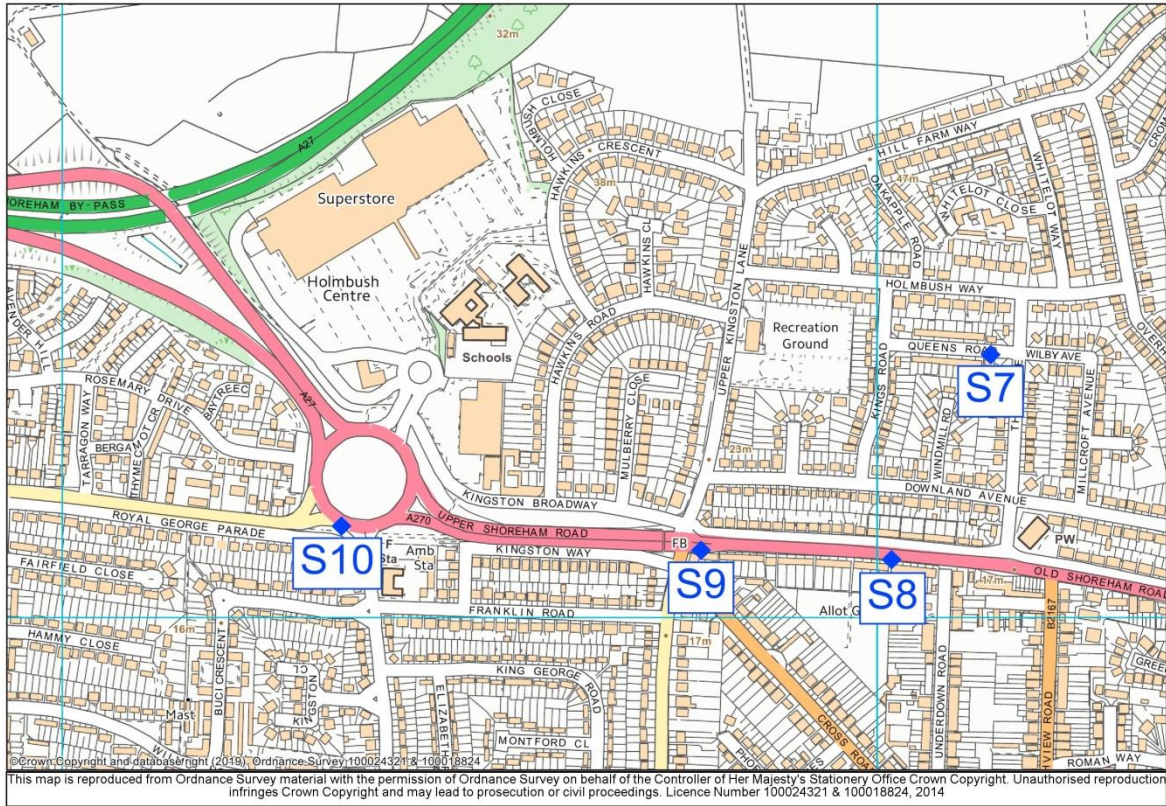
Southwick



Shoreham AQMA



Southwick AQMA



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

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective <sup>4</sup>	
	Concentration	Measured as
Nitrogen Dioxide (NO <sub>2</sub> )	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Particulate Matter (PM <sub>10</sub> )	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Sulphur Dioxide (SO <sub>2</sub> )	350 µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean

<sup>4</sup> The units are in microgrammes of pollutant per cubic metre of air (µg/m<sup>3</sup>).

## Appendix F: Summary of Shoreham High Street Source Apportionment Study 2018

Table F.1: Shoreham High Street source apportionment 2018

Vehicle Category	NOx	PM <sub>10</sub>	PM <sub>2.5</sub>
Petrol Cars	5.9%	27.8%	27.8%
Diesel Cars	43.5%	34.0%	34.0%
Full Hybrid Petrol Cars	0.1%	1.1%	1.1%
Plug-In Hybrid Petrol Cars	0.0%	0.6%	0.5%
Full Hybrid Diesel Cars	0.2%	0.2%	0.2%
Petrol LGVs	0.1%	0.5%	0.5%
Diesel LGVs	31.4%	20.8%	21.4%
Rigid HGVs	8.9%	6.7%	6.8%
Artic HGVs	2.7%	2.8%	2.8%
Buses/Coaches	6.8%	3.6%	3.9%
Motorcycles	0.4%	0.9%	0.9%

Figure F.1: Shoreham High Street NOx source apportionment 2018

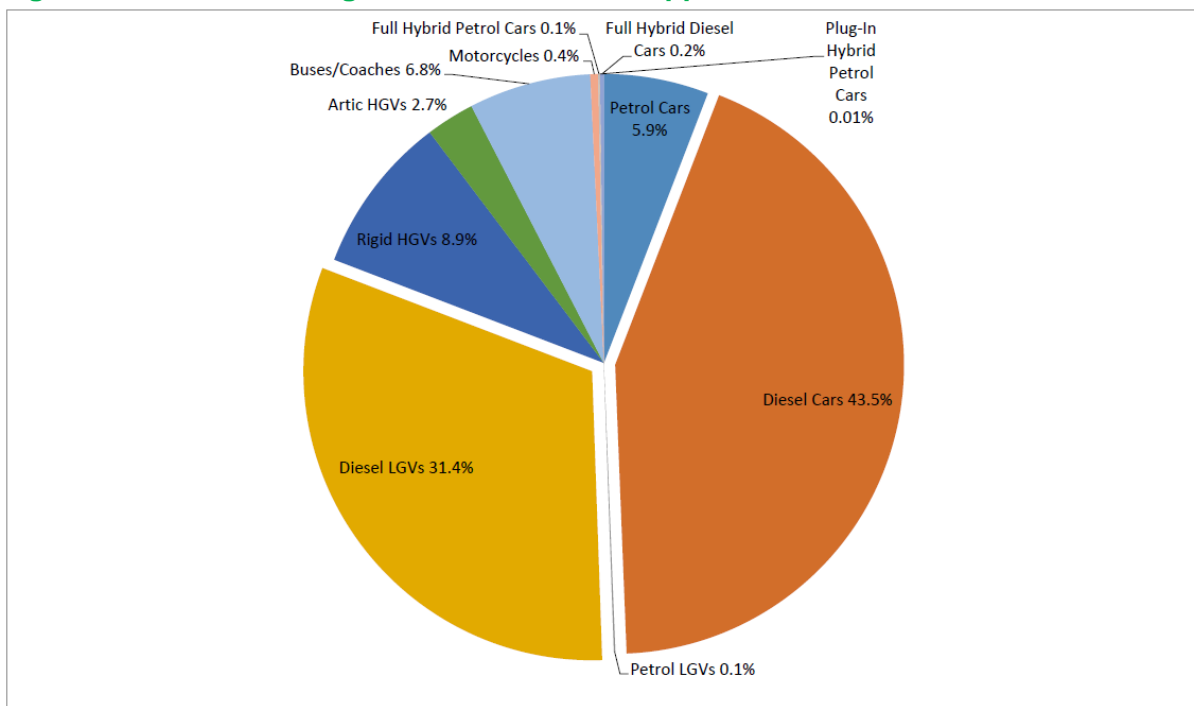


Fig F.2: Shoreham High Street PM<sub>10</sub> source apportionment 2018

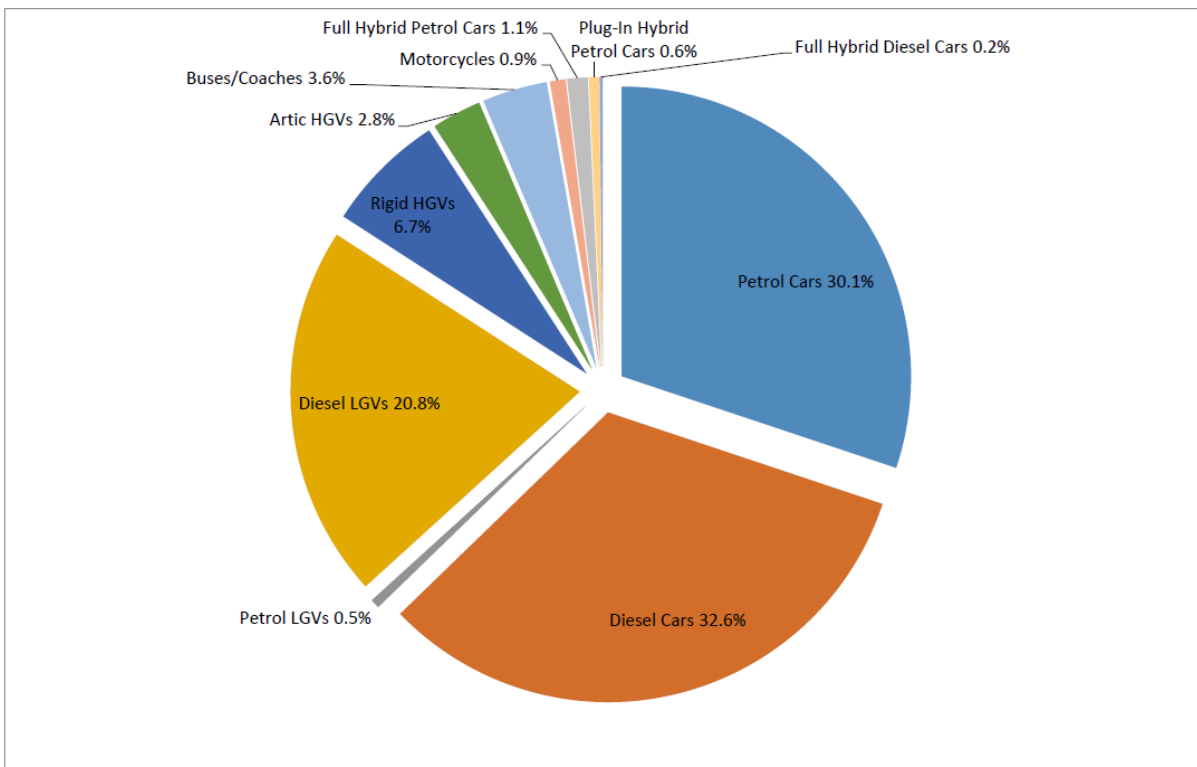
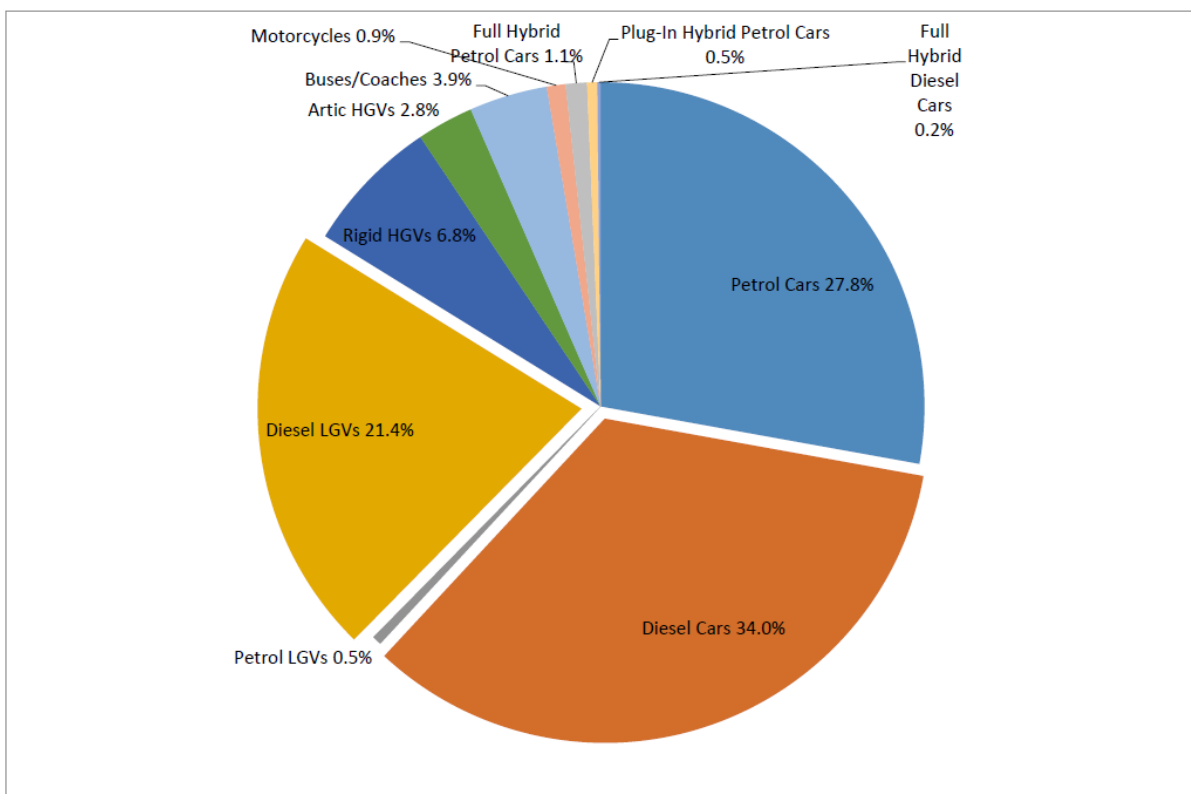


Fig F.3: Shoreham High Street PM<sub>2.5</sub> source apportionment 2018



## 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
EV	Electric Vehicle
FDMS	Filter Dynamics Measurement System
HE	Highways England
HGV	Heavy Goods Vehicle
LAQM	Local Air Quality Management
LGV	Light Goods Vehicle
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM <sub>2.5</sub>	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO <sub>2</sub>	Sulphur Dioxide
ULEV	Ultra-Low Emission Vehicles



WSSC	West Sussex County Council
------	----------------------------

## References

Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006, Defra, Report Number AEAT/ENV/R/2170. Available from UK-AIR [https://uk-air.defra.gov.uk/assets/documents/reports/cat09/0701110944\\_AQinequalitiesFNL\\_AEAT\\_0506.pdf](https://uk-air.defra.gov.uk/assets/documents/reports/cat09/0701110944_AQinequalitiesFNL_AEAT_0506.pdf)

Local Air Quality Management Technical Guidance (TG16), Defra  
Available from <https://laqm.defra.gov.uk/documents/LAQM-TG16-April-16-v1.pdf>

Local Air Quality Management Policy Guidance (PG16), Defra  
Available from  
[https://consult.defra.gov.uk/communications/laqm\\_changes/supporting\\_documents/LAQM%20Policy%20Guidance%202016.pdf](https://consult.defra.gov.uk/communications/laqm_changes/supporting_documents/LAQM%20Policy%20Guidance%202016.pdf)

Air Quality and Emission Mitigation Guidance for Sussex (2019)  
Available from <https://www.adur-worthing.gov.uk/environmental-health/pollution/air-quality-and-pollution/air-quality-and-planning/>

NO<sub>2</sub> Fall-Off with Distance Calculator available from:  
<http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>

Defra Background Maps for Adur  
<https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2017>