



2020 Air Quality Annual Status Report (ASR)

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

June, 2020

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Executive Summary: Air Quality in Our Area

Air Quality in Arun

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 billion³.

Sussex local authorities jointly review air quality across the region to identify any breaches of air quality standards (the Sussex Air Quality Partnership). This has resulted in the declaration of a number of Air Quality Management Areas (AQMAs) in other local authorities in Sussex.

Air quality monitoring carried out by the Council continues to indicate that there is good air quality within the District, and in particular the air quality objectives for Nitrogen Dioxide (NO₂) are being met. Thus it has not been necessary to declare an AQMA in Arun District.

Air quality is a material consideration when a development is planned. Using the Sussex Air Quality Partnership (SAQP) guidance, Arun District Council will require an air quality assessment where necessary. The Guidance was published in 2013 and a revised document was recently published in January 2020.

Despite pollution levels being generally low in the District, road traffic exhaust emissions are the major source and they have the potential to cause excessive levels of NO₂ when large volumes of road traffic are queuing. There were no new major sources of emissions in the District in 2019 and through joint-working, the Adopted Local Plan has paid specific attention to projected traffic loads and changes at high capacity junctions.

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

Data collection is through a diffusion tube network, in 2019 there were 17 diffusion tubes located across the district. Their location is regularly reviewed and altered where results or local knowledge indicate a new location should be investigated. The latest monitoring data shows that levels of NO₂ continue to be well beneath the Government objective and have decreased slightly since 2018.

In February 2018 West Sussex County Council, along with districts and boroughs, reviewed action plans across the county and have developed a joint air quality action plan 'Breathing Better; a partnership approach to improving air quality in West Sussex'. This was recently updated in 2020

https://www.westsussex.gov.uk/media/12062/air_quality_plan.pdf

In February 2019 an Inter Authority Air Quality Group of the relevant portfolio holder from each district, borough and county council was established to develop and monitor an annual action plan. This group continues to meet regularly.

Actions to Improve Air Quality

Through the SAQP, Arun District Council continues to help fund both Air Alert and the Energise Network. General measures to limit NO₂ pollution from road traffic and prevent the exceedance of the Air Quality Objective include:

- Working with the county Council to ensure traffic light sequencing operates at optimum efficiency.
- Road traffic calming and routing away from residential and other areas where the public may suffer significant exposure.
- Education and raising awareness - increasing the availability of air quality information and incentivising people to change their travel behaviour. A programme of initiatives took place over the last year (anti-idling, encouraging cycling and walking, etc.) via the SAQP. Initially aimed at businesses and schools in or near AQMAs, it is hoped that success here will lead to a roll-out across both East and West Sussex.
- "Cut Engine – Cut Pollution" signs where there are periodic stationary traffic queues at level crossings.

- “Travelwise” schemes to promote sustainable transport - to include more car share schemes and alternatives to the car. Promotion of school and work travel plans. Development and promotion of cycle routes.
- Working closely with Planners and other agencies to ensure appropriate mitigation measures are implemented for new developments and due consideration is given to Air Quality issues. The Sussex Air Quality Planning Guidance is used for major developments and a condition requiring a scheme for electric vehicle charging points is included for most new residential developments.
- Throughout 2019 Arun District Council has been investigating the possibility of applying for funding to provide electric vehicle charge points in Council car parks in areas where residents do not have access to charging facilities at home. The County Council have also been developing their electric vehicle strategy which Arun has now signed up to in order to increase the number of charge points across the county.

Conclusions and Priorities

Air Quality in Arun continues to be good; there remains no apparent need for the declaration of any Air Quality Management Areas. However, local housing and other developments planned or likely to take place in the short- to medium-term, have the potential to increase traffic flows and, if not carefully managed, congestion.

An assessment of the areas for potential development will inform the collection of future air quality data; a review of the sites for diffusion tubes took place in 2019 and has resulted in a number of monitoring tubes being deployed in new locations and others being removed from areas which do not indicate any air quality problems. These new monitoring locations were installed in January 2020 and data will be reported in the ASR published in June 2021.

Trends nationally are reassuring as awareness of NO₂ pollution sources increases – low emission vehicle purchases are increasing in number and technology has seen strides taken in emission controls at source. Local trends do not raise concern, nonetheless, Arun is participating in the new West Sussex EV Partnership – a group of relevant officers from the County, Districts and Boroughs, aiming to:

- Agree a strategic approach for the location of EV charge points across West Sussex; and possibly pan Sussex.
- Use the same network providers for delivering a cohesive EV network across the County but recognising that local timescales may not allow this.
- Share knowledge, information and learning to aid progress in achieving this.
- Use our collective voice to lobby for simplified and coherent approach to charging across all infrastructure providers.
- Develop a collective approach to support planners to maximise the significant development opportunities across the County
- Work with the private sector to increase the installation of EV charge points and awareness of the advantages of electric vehicles.

This is in addition to the JAQAP mentioned above.

Although there may be additional traffic in Arun in the years ahead, as the improvements through reduced vehicle emissions become embedded, these may well offset any anticipated increases in pollution. Continued monitoring will provide data for assessment.

The Council recognises that the recent challenge of Covid-19 has and will continue to affect air quality in the district in both positive and negative ways. The initial movement restrictions reduced road traffic in the area, however the subsequent recommendation to avoid public transport may have increased the use of the private car although the funding to improve walking and cycling options may make these more attractive. We recognise that there are likely to be both short and long term changes to commuting and other travel behaviour and it will be interesting to monitor the changes that this may cause to air quality in Arun over future years.

Local Engagement and How to get Involved

Arun District Council is a member of the Sussex Air Quality Partnership which benefits from the co-ordinated monitoring of air pollutants across the region, including the “airAlert” and heat and cold Alert services. We all need to play a part in reducing air pollution. Please consider whether you can do any of the following:

- Walk or cycle on shorter journeys

- Join a car-sharing scheme – see <https://westsussexcarshare.liftshare.com/>
- Turn your engine off when you're not moving
- If you know anyone with asthma or other breathing difficulties, let them know about "airAlert" <http://www.airalert.info/Sussex/airAlertInformation.aspx>
- Find out from your child's school about available travel options for getting to school
- Consider switching to a less polluting vehicle next time you change your car. For example: <http://www.nextgreencar.com/>
- Make use of the Energise network's electric vehicle charging points in the District <https://www.zap-map.com/live/>

If you have any questions or want more information please see the Council's website at <http://www.arun.gov.uk/air-quality-including-bonfires> .

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1 Local Air Quality Management

This report provides an overview of air quality in Arun during 2019. 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 Arun District Council to improve air quality and any progress that has been made.

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

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

Arun District Council currently does not have any AQMAs. Air quality is being addressed through existing Transport Plans and the new, West Sussex Joint Air Quality Action Plan, Breathing Better

https://www.westsussex.gov.uk/media/12062/air_quality_plan.pdf

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

2.2 Progress and Impact of Measures to address Air Quality in Arun

Defra's appraisal of last year's ASR concluded: *Overall the report is detailed, concise, satisfies the criteria of relevant standards and can be considered an example of good practice. The Council should continue their good work and submit an Annual Status Report in 2020.*

However, the appraisal also made the following comments;

- *It would be useful if Section 2.3 could make reference to the Public Health Outcomes Framework, and the local indicator for PM2.5 in the district. The Council may wish to consider comparing the '3.01 - Fraction of mortality attributable to particulate air pollution indicator' value for Arun to nearby LAs and National indicator values.*

This has been considered in Section 2.3 as suggested.

- *The Council state that NO₂ concentrations have increased slightly since the last reporting year. The Council may wish to consider including a short discussion on what may have caused this slight increase within the district.*

This comment has been noted and trends in this reporting year have been given more discussion in Section 3.2.1

- *The Council have provided distance corrected values though not incorrect, it is not required for the Council to perform a distance correction as no NO₂ concentrations were above the AQOs.*

Comment noted, data for 2019 has not been distance corrected.

Arun District Council has taken forward a number of direct measures during the current reporting year of 2019 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.1.

More detail on these measures can be found in;

- the County's Annual Delivery Programme - <https://www.westsussex.gov.uk/roads-and-travel/roadworks-and-projects/road-projects/annual-delivery-programme/>
- the ADC Local Plan 2011-2031, chapter on transport - <https://www.arun.gov.uk/adopted-local-plan/>
- the walking and cycling strategy for 2016 to 2026 – <https://www.westsussex.gov.uk/about-the-council/policies-and-reports/roads->

[and-travel-policy-and-reports/west-sussex-walking-and-cycling-strategy-2016-2026](#)

- and the current West Sussex Transport Plan -
<https://www.westsussex.gov.uk/about-the-council/strategies-plans-and-policies/roads-and-travel-plans-and-policies/transport-plan/>
- County wide air quality plan for West Sussex
https://www.westsussex.gov.uk/media/12062/air_quality_plan.pdf
- Continued participation in, and membership of, Sussex Air Quality Partnership
- Additional diffusion tube sites identified and underway (since start of 2020)
- Progress on the planning and consultation stages of the Lyminster By-pass and the A27 Arundel By-pass
- Development of, and membership of, the West Sussex Electric Vehicle Partnership

The county air quality plan contains detailed information from across the whole of West Sussex, including details of local strategies, plans and policies at both County and District level. The County's focus will be through:

- *The West Sussex Transport Plan 2011-26 (LTP3)* which sets the strategy for guiding future investment in highways and transport infrastructure. It also sets a framework for considering transport infrastructure requirements associated with future development across the county. Ensuring good air quality has a number of links to the four strategies that sit within the Transport Plan and has particular relevance to improving public health.
- *The West Sussex Walking and Cycling Strategy 2016-26* sets out the aims and objectives for walking and cycling in West Sussex. The strategy contains a prioritised list of over 300 potential walking and cycling improvements suggested by a range of stakeholders and partner organisations. The importance of increasing levels of walking and cycling in helping to tackle poor air quality is a key focus of this strategy.
- *The Rights of Way Management Plan 2018-28* sets out West Sussex County Council's approach to managing the Public Rights of Way (PRoW) network, as

well as signposting how improvements can be achieved over the next ten years. The Plan highlights the importance of green space in improving air quality.

- *The Bus Strategy 2018-2026* sets out West Sussex County Council's aims and objectives for local buses and community bus transport and how the County Council will do more with partners and bus operators to promote bus travel.
- *Guidance on Parking at New Developments 2019* – The parking guidance outlines the expected requirements for car and cycle parking and electric vehicle charging provision at new developments within the county.
- *Electric Vehicles strategy* – In December 2019, the County Council adopted an Electric Vehicle Strategy which sets out an ambitious vision for electric vehicle take up across the county. The Strategy sets out that the County Council wants to see one consistent, affordable, easy to use, reliable, widely accessible and recognisable charging network across the county, providing renewable energy charging. Chargepoints will be located on-street, in public sector car parks, and on community assets county wide, providing charging primarily for those residents who do not have access to off road parking, and would be unable to switch to EV without public charging. The County Council is currently working towards procuring a market based supplier that will be responsible for planning, funding, building, marketing and operating a publicly accessible chargepoint network across West Sussex, as well as providing an on-going 24/7 service (including the management of payments and support), maintenance and repair to ensure the network is fully operational at all times. The Council is currently working in partnership with district and borough councils in the county to write the tender documents and hope to have a supplier in place before the end of the year.

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

- The Government has announced initial funding of up to £784,000 for emergency, safe space cycling and walking measures in West Sussex in the wake of the Coronavirus outbreak. Schemes will largely be temporary, such as pop-up cycle lanes and some road closures, but may evolve into permanent changes. They will promote cycling and walking as a replacement

for journeys in areas which, until the Covid crisis, were heavily used by public transport, especially for short journeys, but would be more attractive to cyclists as routes if measures were taken. West Sussex County Council has applied for funding for the A259 in Bognor Regis. The plan involves widening the temporary surface where possible, cutting back overhanging vegetation and removing growth on the existing path, which has become narrow in places. Consideration would also be given to converting one lane of western dual carriageway to cycle/bus lane.

- Commencement of construction of A259 Littlehampton improvements, and progression of planning/feasibility studies for other highway schemes (A27 Arundel, A284 Lyminster Bypass, A29 realignment, A259 Bognor Regis-Littlehampton, and A24 Worthing to Horsham including A280 Long Furlong (congestion relief and sustainable travel benefits)).
- Agreement on the joint procurement and networking of on-street EVCPs – to encourage the take up of alternative, zero emission vehicle technologies

Arun District Council's priorities for the coming year are:

- To continue to encourage take-up and use of electric and other low-emission vehicles by working with West Sussex County Council on their Electric Vehicle Strategy
- To assist in progressing road schemes that will provide congestion relief and local reductions in air pollution
- To encourage and, where possible require, the adoption and use of recognised mitigation measures in the planning consultation process

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

- Difficulties in signing-off joint procurement methodologies due to the number of partners and different systems involved
- Availability of resources due to other demands and priorities

- The Coronavirus outbreak has affected resources such as staff time and availability to carry out monitoring in 2020 and may continue to do so over the coming months.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Congestion on A284 and at level crossing (Lyminster)	Traffic Management	UTC, Congestion management, traffic reduction	Construction to start 2022	WSCC & ADC. WSCC, C2CLEP and Developers	WSCC, C2CLEP and Developers	By-pass in use	Reduced vehicle emissions	Planning permission granted March 2019	Construction to start 2022	£17.8m cost funded by C2cLEP, WSCC and developer funds
2	Congestion on A29 and at level crossing (Woodgate)	Traffic Management	UTC, Congestion management, traffic reduction	Tba	WSCC & ADC. WSCC, C2CLEP and Developers	WSCC, C2CLEP and Developers	New A29 section	Reduced vehicle emissions	Planning application to be submitted in summer 2020	Construction programmed to start Spring 2021	£40m funding partly dependent on local housing S106 contribution
3	Congestion at peak hours - A27	Transport Planning and Infrastructure	Other	Tba	Highways England, WSCC, ADC & others	Highways England, WSCC	New A27 section and junction improvements	Reduced vehicle emissions	Review of 2019 further options consultation and 2020 further review period feedback	2022/23 estimated start of construction	Development Consent Order submission 2021
4	A259 Littlehampton improvements	Transport Planning and Infrastructure	Strategic highway improvements	Summer 2020-Summer 2022	WSCC, ADC,	Developer contributions & Coast to Capital LEP funding	Improvements to A259	Reduced vehicle emissions	Preparatory design work and permissions complete	Programmed for summer 2022	Programme subject to award of construction phase contract
5	A259 Bognor Regis to Littlehampton Corridor improvements	Transport Planning and Infrastructure	Strategic highway improvements	Tba	WSCC & ADC	DfT MRN and LLM funding	Improvements to A259	Reduced vehicle emissions	Feasibility study in progress	tba	Dependent on local housing S106 contribution and DfT MRN/LLM funding
6	A24 Worthing to Horsham Corridor improvements, including A280 Long Furlong	Transport Planning and Infrastructure	Strategic highway improvements	Tba	WSCC, ADC, WBC & HDC.	DfT MRN and LLM funding	Improvements to A280 and A24 Findon	Reduced vehicle emissions	Feasibility study in progress	tba	Dependent on local housing S106 contribution and DfT MRN/LLM funding
7	NCN2 Cyle route (Bognor to Littlehampton section)	Promoting Travel Alternatives	Promotion of cycling	Completed	ADC, WSCC, NCN	ADC, WSCC, NCN	New section open	Behavioural change	Completed 2018	2018	Weather
8	Membership of West Sussex Electric Vehicle Charging Partnership	Promoting Travel Alternatives	Other	Underway	WSCC and West Sussex LAs	WSCC and West Sussex LAs	Increased procurement of EVCPs	Reduced vehicle emissions	Investigations into joint procurement, etc. underway	Ongoing	LA budget cuts
9	Membership of SAQP	Public Information	Via the Internet	Completed	Sussex LAs, PHE, ESCC and WSCC	Sussex LAs, PHE, ESCC and WSCC	Delivery of data, Air Alert and other schemes	Behavioural change	Ongoing	Ongoing	LA budget cuts

10	Findon - walking and cycling scheme	Promoting Travel Alternatives	Promotion of cycling	Underway	WSCC	WSCC	Improvements to A24 and C110	Behavioural change	Ongoing	tba	Funding - scheme linked to A24 corridor feasibility study
11	Arundel traffic calming	Traffic Management	Reduction of speed limits, 20mph zones	Underway	WSCC	WSCC	Improvements to The Causeway	Behavioural change	Completed 2019	2019	Completed
12	Ferring traffic calming	Traffic Management	Reduction of speed limits, 20mph zones	Underway	WSCC	WSCC	Improvements to Sea Lane	Behavioural change	Completed 2018/19	2018-19	Completed
13	Slindon traffic calming	Traffic Management	Reduction of speed limits, 20mph zones	Underway	WSCC	WSCC	Improvements to A29	Behavioural change	Completed 2019	2019	Completed
15	Bognor traffic calming	Traffic Management	Additional traffic calming to support reduction of speed limits, 20mph zones	Underway	WSCC	WSCC	Improvements to Frith Road, by The Regis School	Behavioural change	£150k allocated in current budget	2019	Completed

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

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

Previous data monitoring decisions have ruled out current PM data collection in Arun. However, Arun District Council is taking the following measures to address PM_{2.5}:

- Requirement for dust control in Construction Management Plans for developments through the planning consultation process according to the merits of individual sites
- Publication of guidance document for small scale construction sites which includes dust control advice
<https://www.arun.gov.uk/download.cfm?doc=docm93jjm4n12193.pdf&ver=12201>
- Responding to complaints of dust nuisance using investigation and enforcement powers through Environmental Protection legislation
- Participation in the recent review of the *Air Quality and Emissions Mitigation Guidance for Sussex Authorities (2020)* to further encourage lower-emissions developments
- Continuing participation in, and funding for, the Sussex Air Quality Network which includes seven permanent automatic particulate monitoring sites measuring both PM₁₀ and PM_{2.5}. Currently, none of which are in the district.
- Encouraging electric vehicle take-up by participation in the West Sussex EV Partnership and increasing the availability of on-street EVCPs

- Arun District Council will work in partnership with Public Health to communicate the impacts of air pollution including PM_{2.5}. Additionally, Arun District Council will utilise the revised Air Quality and Emissions Mitigation Guidance for Sussex Authorities, to encourage lower emission developments with planning and transport authorities to assist in reducing PM_{2.5} emissions.
- A survey of stoves and solid fuel consumption across Sussex was carried out in partnership with Sussex-air over the winter of 2019/20 which had over 1700 responses. The survey provided useful information on the reason for stove use (more than 40% might be considered 'recreational users'), the type of fuel used, whether wood was seasoned and the type and age of stoves in Sussex. This data and its future uses for Sussex are still being analysed but it is likely that information on the Sussex-air website will be promoted again this winter.
- The local indicator for PM_{2.5} in the district under the Public Health Outcomes Framework, 'Fraction of mortality attributable to particulate air pollution indicator' value is 5.2 – this is the same as the National indicator for England, slightly less than the value for the South East (5.6) and between the value of our neighbouring authorities (Worthing 5.6 and Chichester 5.0). This figure has increased slightly since 2015 but is in line with the National figures for England.

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.

Arun District Council has no automatic (continuous) monitoring stations. However, the Council benefits from the co-ordinated monitoring of air pollutants across the region <http://www.sussex-air.net/>. The Sussex Air Quality Monitoring Network is managed and Co-ordinated by King's College London ERG, on behalf of the SAQP and they provide data calibration and ratification of results.

National monitoring results are available at <https://uk-air.defra.gov.uk/networks/>

3.1.2 Non-Automatic Monitoring Sites

Arun District Council undertook non-automatic (passive) monitoring of NO₂ at 17 sites during 2019. **Error! Reference source not found.** in Appendix A shows the details of the sites. There were no exceedances of the objectives at any of the sites and no need to declare any AQMA's.

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 bias⁴, "annualisation" (where the data capture falls below 75%), and distance correction⁵. Further details on adjustments are provided in Appendix C.

⁴ <https://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html>

⁵ Fall-off with distance correction criteria is provided in paragraph 7.77, LAQM.TG(16)
LAQM Annual Status Report 2018

3.2.1 Nitrogen Dioxide (NO₂)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³. Note that the concentration data presented in Table A.3 represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2019 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

The data shows a continued low level of NO₂ in the District with levels well below the objective with no areas of particular concern. No AQMAs are required within Arun District Council's area. NO₂ levels in the district have remained relatively stable over the last five years with only small fluctuations. This further supports our decision to cease monitoring at some locations in 2020 in order to monitor at other new sites where traffic is known to build up or where there have been or are planned to be changes to the roads or receptors.

It is proposed to keep monitoring sites within each of the major towns in the District although these may be moved to monitor other areas of the town. It is also proposed to monitor in new locations in the east of the District where there are plans to convert a single carriageway road to dual carriageway and where level crossings cause a build up of traffic close to residential properties on a regular basis. These new monitoring locations will be reported on fully in the next Annual Status Report to be submitted in 2021.

Appendix A: Monitoring Results

Table A.1 - Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)

NOTE: There are no Automatic Monitoring Sites in Arun

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 (Easting)	Y OS Grid Ref (Northing)	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	Litt01	Roadside	502564	102149	NO2	NO	3	2	NO	2
2	Litt02	Roadside	503439	103364	NO2	NO	6.95	2	NO	2.8
3	Litt 03	Urban Background	502559	102888	NO2	NO	10	1.3	NO	2
4	Litt04	Roadside	502730	101225	NO2	NO	13.7	1.6	NO	2.6
5	Arun05	Roadside	501825	107165	NO2	NO	14.2	1.7	NO	2.1
6	Arun06	Roadside	502337	106555	NO2	NO	4.9	2	NO	2.5
7	Arun 07	Urban Background	501478	107052	NO2	NO	1.8	1.5	NO	2
8	Ford08	Roadside	500301	104374	NO2	NO	7.45	1.45	NO	1.7
9	Bog09	Roadside	493778	99135	NO2	NO	1.3	2.3	NO	2.7
10	Bog10	Roadside	496168	100384	NO2	NO	13.6	1.8	NO	2.65
11	Bog11	Urban Background	493429	100381	NO2	NO	8.9	1.2	NO	2
12	Bog12	Roadside	493361	101225	NO2	NO	0.5	1.5	NO	2.8
13	Bog13	Roadside	493417	104374	NO2	NO	14.8	1.3	NO	2.3
14	Arun14	Roadside	501320	106901	NO2	NO	9.6	2	NO	3.35
16	Arun16	Roadside	502337	106555	NO2	NO	0	8.1	NO	2.5
17	Arun17	Kerbside	502862	105338	NO2	NO	4.7	1	NO	2.8
18	Bog18	Roadside	491815	101170	NO2	NO	0	11.5	NO	2

19	Yap19	Roadside	497607	103312	NO2	NO	8.7	1.3	NO	2
20	Barn20	Roadside	495975	104395	NO2	NO	0.3	1.5	NO	2
21	Bog21	Roadside	493367	101169	NO2	NO	7.7	1.2	NO	2

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.3 – Annual Mean NO₂ Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2019 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ^{(3) (4)}				
							2015	2016	2017	2018	2019
Litt01	502564	102149	Roadside	Diffusion Tube		100	22.4	22.6	24.5	23	20
Litt02	503439	103364	Roadside	Diffusion Tube		100	25.8	24.4	25.3	23	20
Litt03	502559	102888	Urban Background	Diffusion Tube			12.9	12.9			
Litt04	502730	101225	Roadside	Diffusion Tube		100	16.1	22.9	27.1	25	21
Arun05	501825	107165	Roadside	Diffusion Tube		100	17.1	16.2	18	16	13
Arun06	502337	106555	Roadside	Diffusion Tube		100	31.4	27.6	28.6	26	21
Arun07	501478	107052	Urban Background	Diffusion Tube			12.7	13.7			
Ford08	500301	104374	Roadside	Diffusion Tube		100	17.1	16.6	18.5	18	15
Bog09	493778	99135	Roadside	Diffusion Tube		92	23.6	19.4	23.1	24	20
Bog10	496168	100384	Roadside	Diffusion Tube		100	29.9	25.8	25.5	25	20
Bog11	493429	100381	Urban Background	Diffusion Tube			15.4	15.1			
Bog12	493361	101225	Roadside	Diffusion Tube		100	29.6	25.6	28.3	31	26
Bog13	493417	104374	Roadside	Diffusion Tube		100	21	25.8	25.7	28	24
Arun14	501320	106901	Roadside	Diffusion Tube		100	28.2	27.4	29	29	23

Arun16	502337	106555	Roadside	Diffusion Tube		100	18.1	17	17.6	19	13
Arun17	502862	105338	Kerbside	Diffusion Tube		100				35	31
Bog18	491815	101170	Roadside	Diffusion Tube		100				21	18
Yap19	497607	103312	Roadside	Diffusion Tube		100			16.9	17	15
Barn20	495975	104395	Roadside	Diffusion Tube		75			20.7	20	18
Bog21	493367	101169	Roadside	Diffusion Tube		100			26.5	29	26

☒ Diffusion tube data has been bias corrected

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

☒ Reported concentrations are those at the location of the monitoring site (bias adjusted and annualised, as required), i.e. prior to any fall-off with distance adjustment

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 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%).

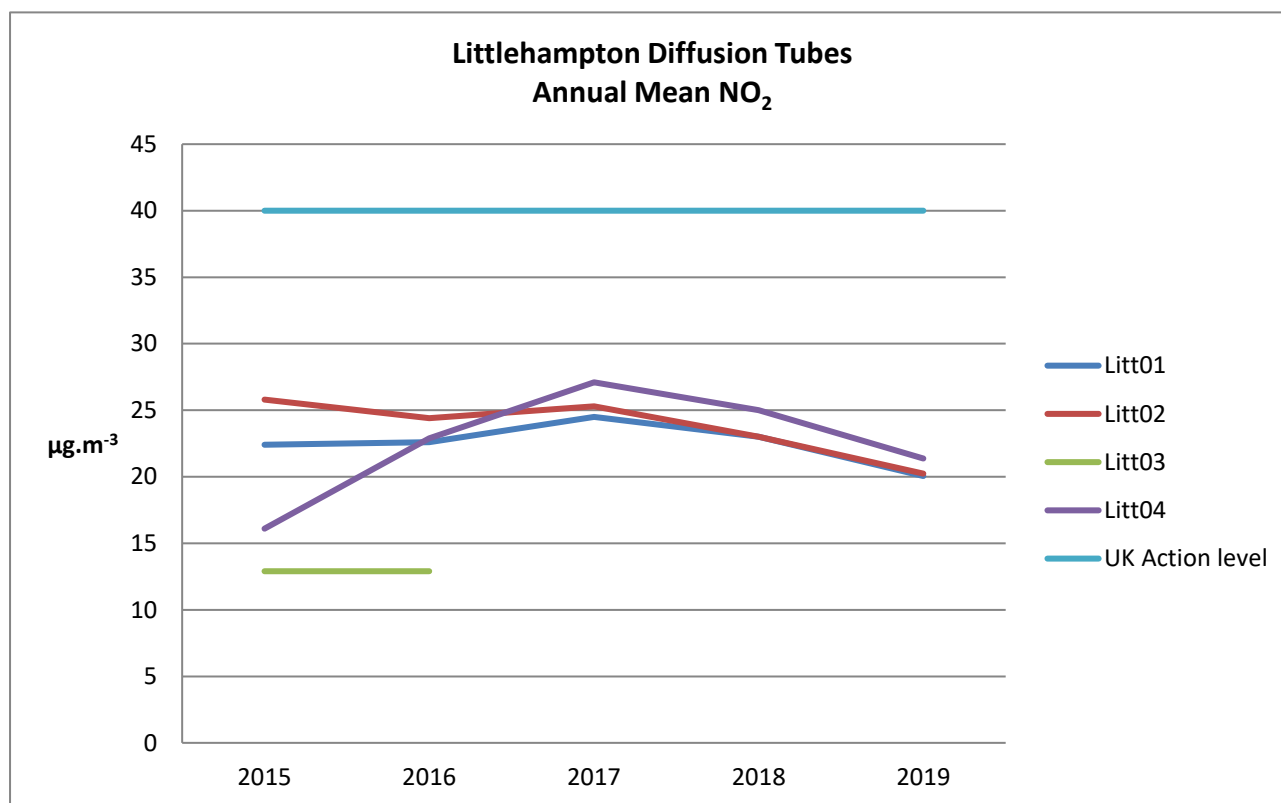
(3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

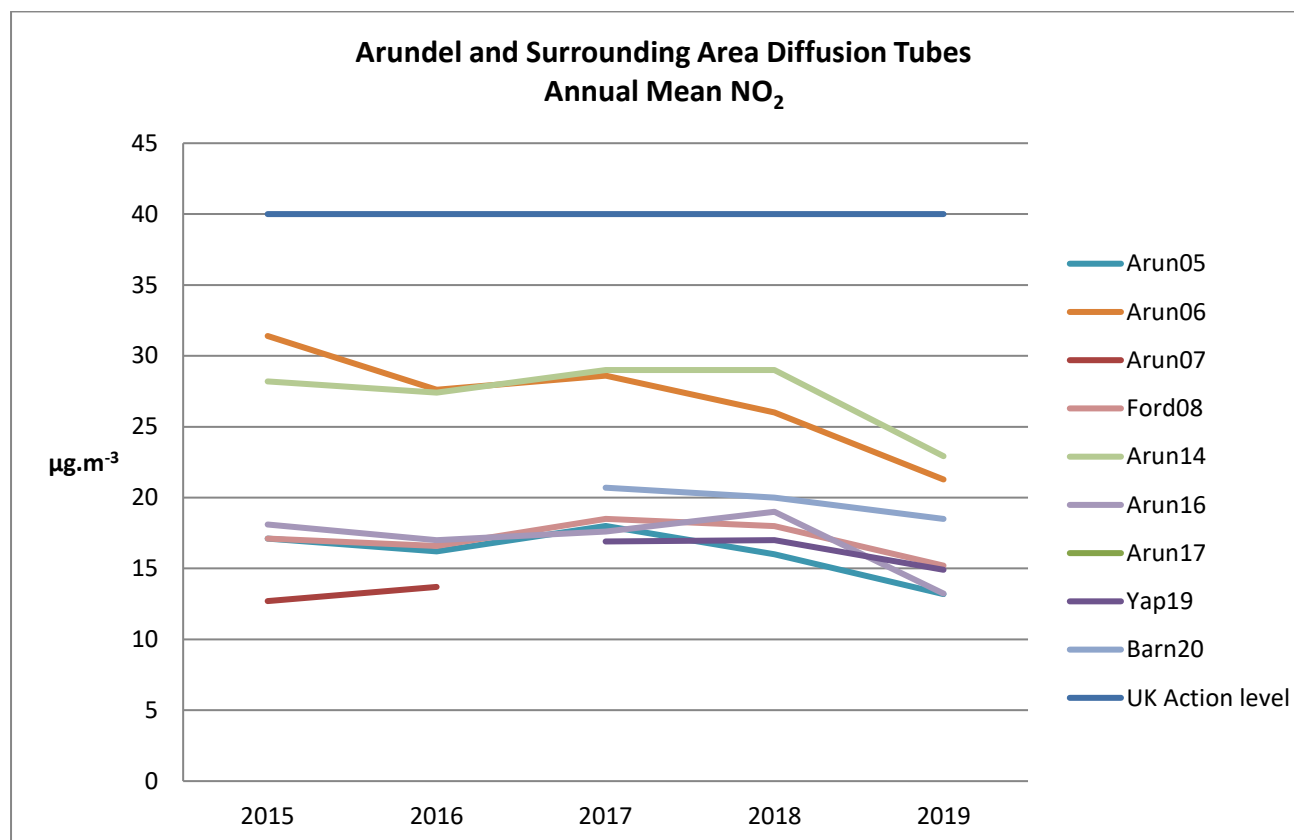
(4) Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

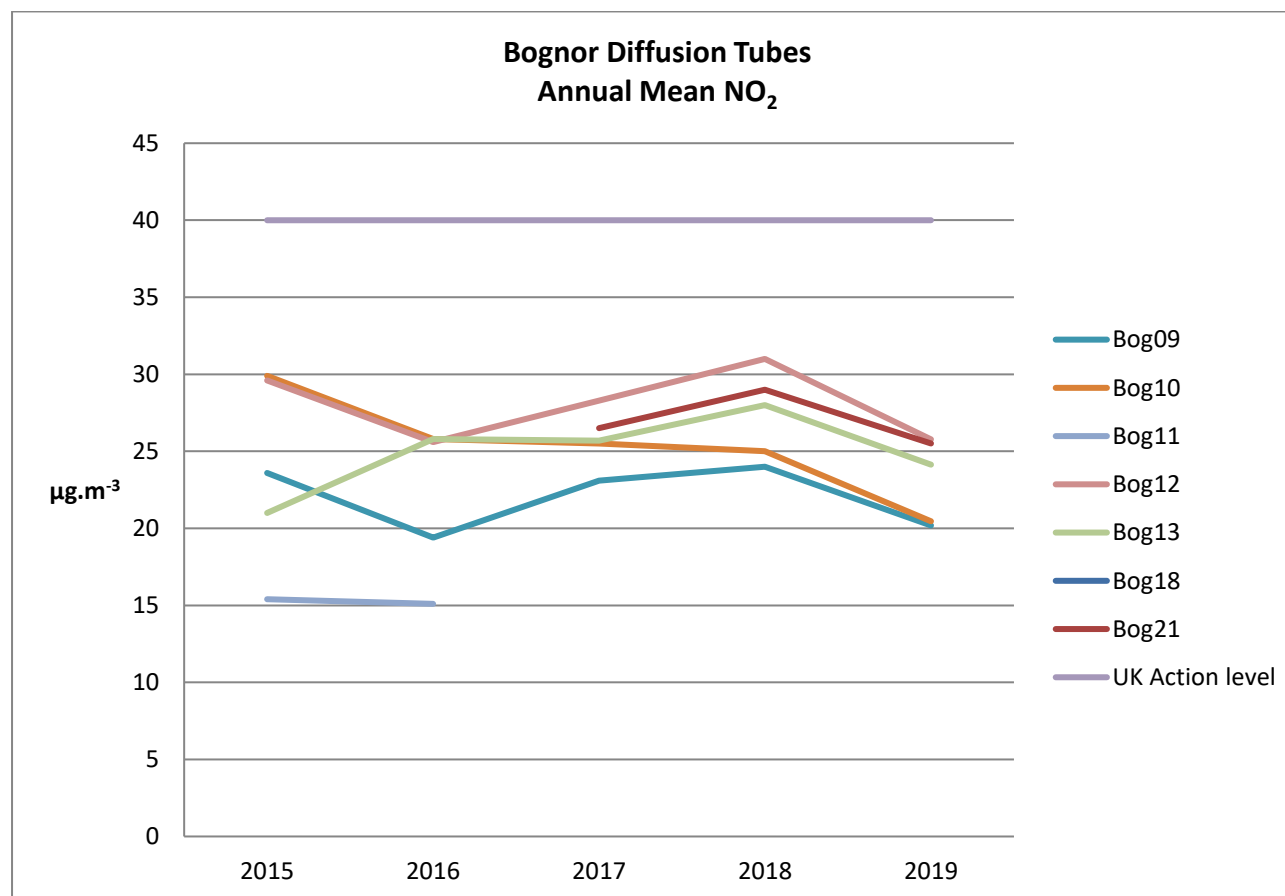
Please note that locations Litt03, Litt07, and Bog 11 were discontinued at the end of 2016, sites Arun17 and Bog18 were new sites in 2018 and Yap19, Barn20 and Bog21 were new sites in 2017. These sites are included in the data to show the full range of monitoring over the last five years.

Figure A.1 – Trends in Annual Mean NO₂ Concentrations

A.1.1 – Annual Mean NO₂ Concentrations: Littlehampton 2015-19



A.1.1 – Annual Mean NO₂ Concentrations: Arundel 2015-19

A.1.1 – Annual Mean NO₂ Concentrations: Bognor 2015-19

Appendix B: Full Monthly Diffusion Tube Results for 2019

Table B.1 - NO₂ Monthly Diffusion Tube Results - 2019

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	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 (0.78) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
1	502564	102149	43	26	28	22	24	16	18	20	22	27	35	28	26	20.1	
2	503439	103364	39	33	30	21	24	20	18	18	20	27	34	28	26	20.2	
4	502730	101225	37	37	28	26	27	19	21	22	22	26	34	29	27	21.4	
5	501825	107165	23	12	20	15	17	13	13	12	16	17	25	20	17	13.2	
6	502337	106555	35	36	30	28	31	24	23	24	26	27	16	28	27	21.3	
8	500301	104374	26	23	22	17	20	15	15	16	18	19	22	20	19	15.2	
9	493778	99135	34	30	31	22	23	19	17	NR	23	25	31	28	26	20.2	
10	496168	100384	41	25	29	22	28	20	22	19	23	30	30	27	26	20.5	
12	493361	101225	38	41	34	38	37	27	26	22	28	35	42	30	33	25.8	
13	493417	104374	44	33	34	34	32	24	25	21	28	30	35	30	31	24.1	
14	501320	106901	34	38	34	30	28	24	27	30	26	24	29	30	29	22.9	
16	502337	106555	23	19	20	20	19	12	13	12	14	16	20	16	17	13.2	
17	502862	105338	50	44	41	41	48	36	31	29	34	39	45	36	40	30.9	
18	491815	101170	31	31	23	19	23	19	18	18	18	21	26	23	23	17.6	
19	497607	103312	23	24	20	20	19	15	15	11	15	18	30	19	19	14.9	

20	495975	104395	32	30	23	21	NR	NR	< 1	12	21	26	25	24	24	18.5
21	493367	101169	41	39	38	28	35	25	25	29	28	33	35	37	33	25.5

- ☐ 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 in the final column

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 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

Arun District Council undertakes monitoring with non-automatic methods using nitrogen dioxide (NO₂) diffusion tubes in various locations across the district. There are no Air Quality Management Area's in Arun District.

Arun District Council sub-contracts the supply and analysis of the NO₂ diffusion tubes with South Yorkshire Air Quality Samplers (SYAQS) – previously South Yorkshire Laboratory. The NO₂ tube preparation method used is 50% triethanolamine (TEA) in acetone. The South Yorkshire Laboratory was on the working group and follows the procedures set out in the Harmonisation Practical Guidance.

No co-location study has been undertaken in the district. Arun District Council utilises the national bias adjustment figures for SYAQS in 2019 of 0.78. Data from NO₂ diffusion tubes has been compared and bias corrected to the factors produced from the UK co-location data-base as collated by DEFRA Local Air Quality Management Helpdesk. Spreadsheet Version Number: 03/20

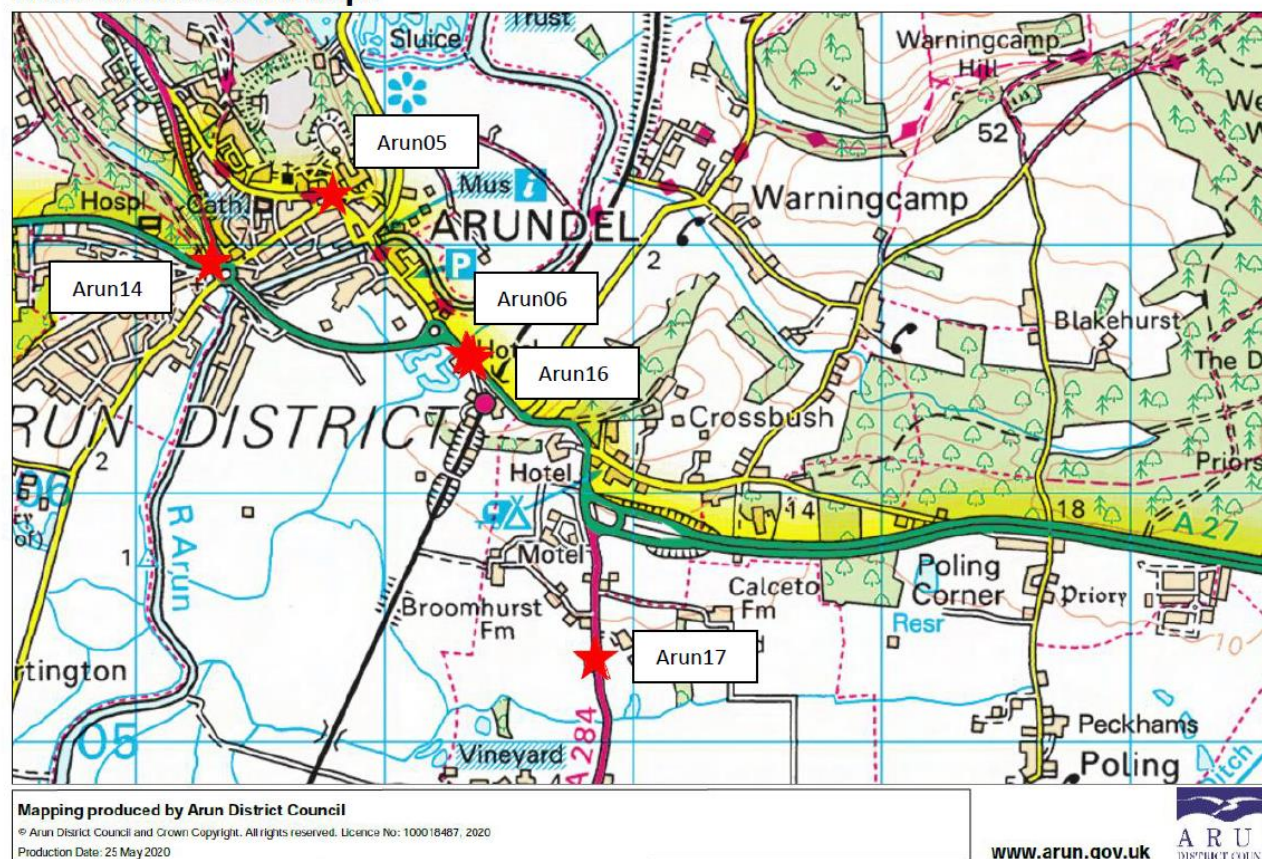
Annualisation was not required for any of the results. The minimum data collection was 75% over the year with most tubes having 100% data capture so annualisation was not required.

Distance correction has not been calculated for any of the data as none of the monitoring locations recorded an annual mean concentration that is above or within 10% of the NO₂ annual objective of 40µg/m³. This is in line with guidance in Paragraphs 7.77-7.79 of Technical Guidance LAQM.TG16.

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

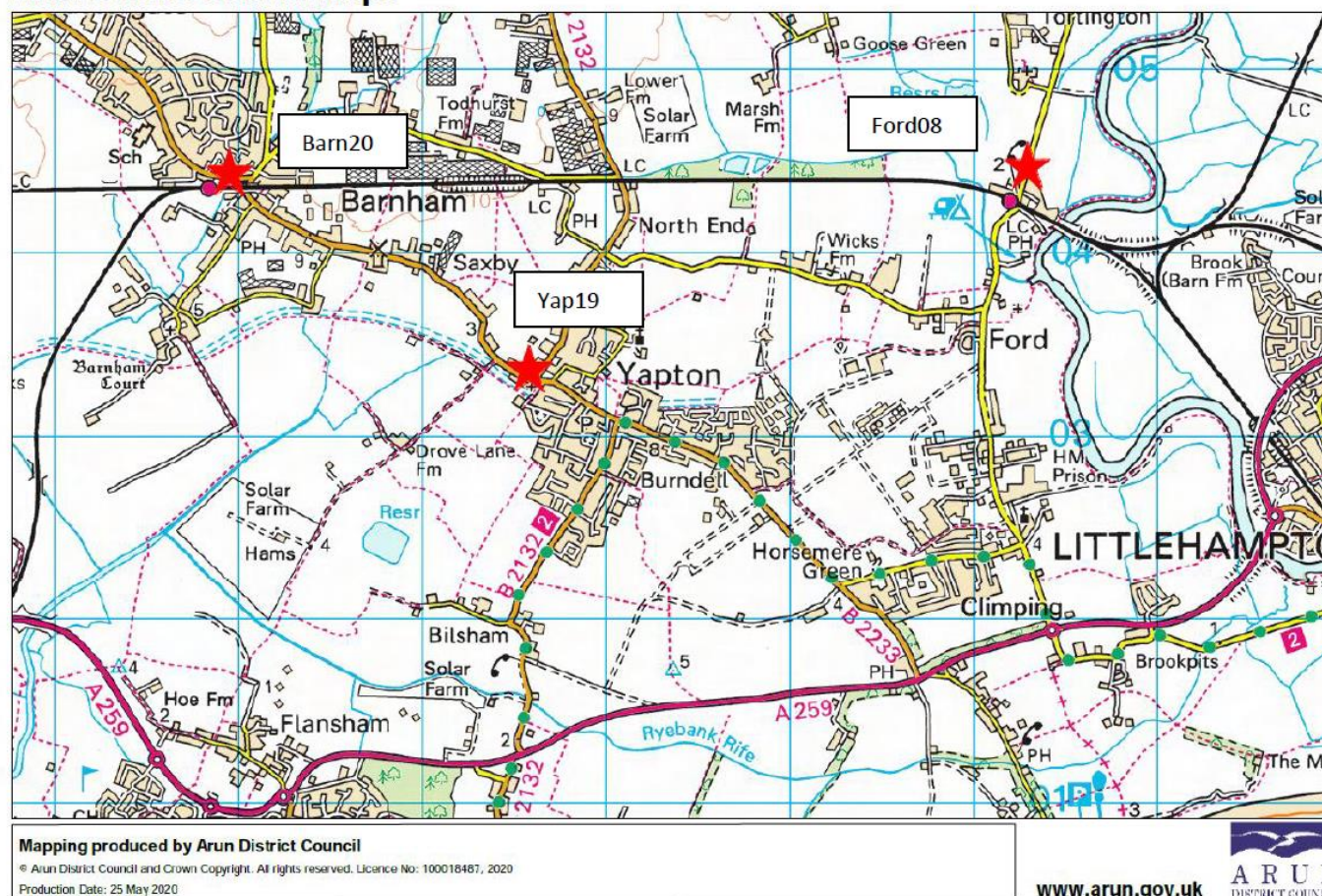
D1: Diffusion tube locations 2019, Arundel

Arun District Council Maps



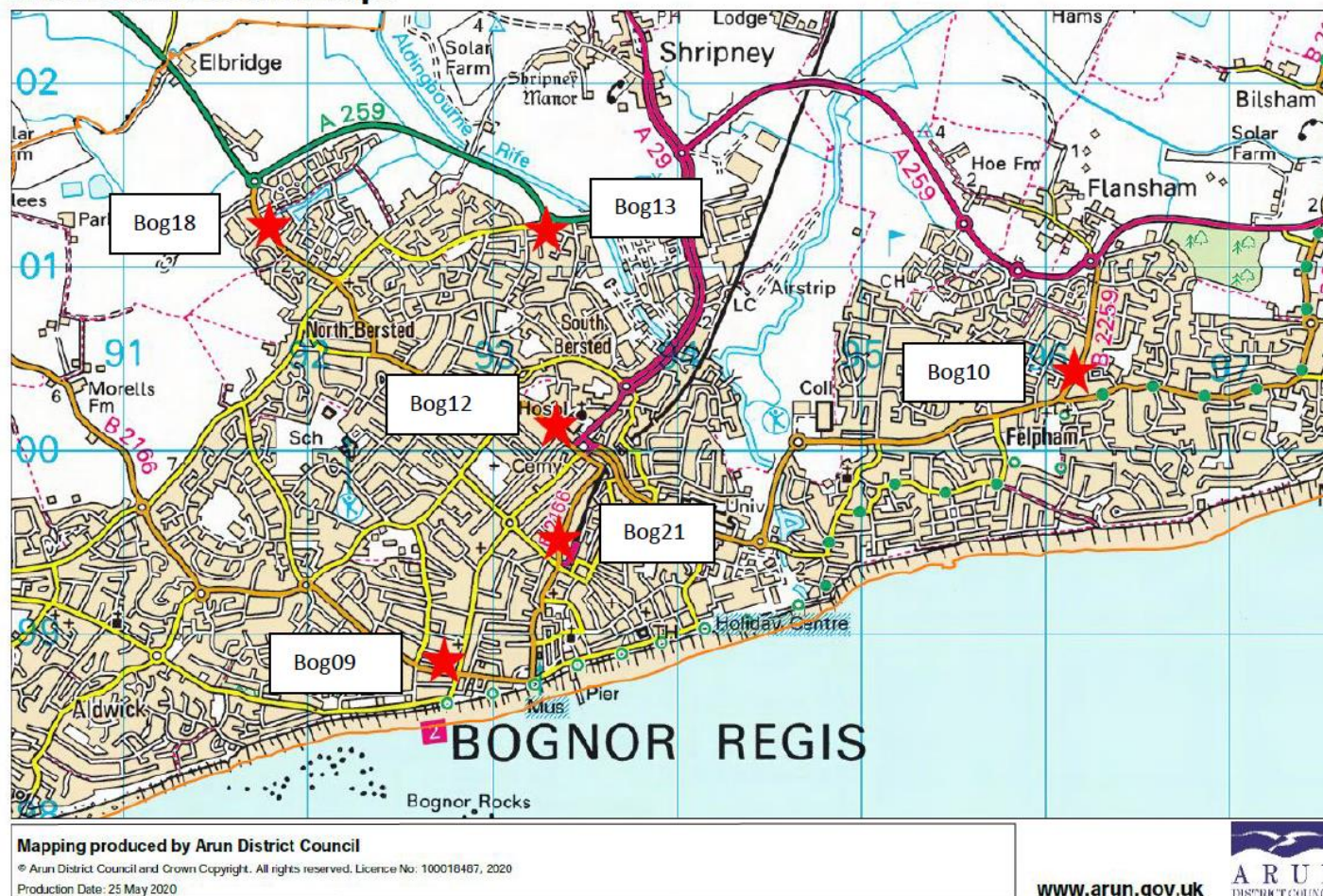
D2: Diffusion tube locations 2019, Barnham, Yapton, Ford

Arun District Council Maps



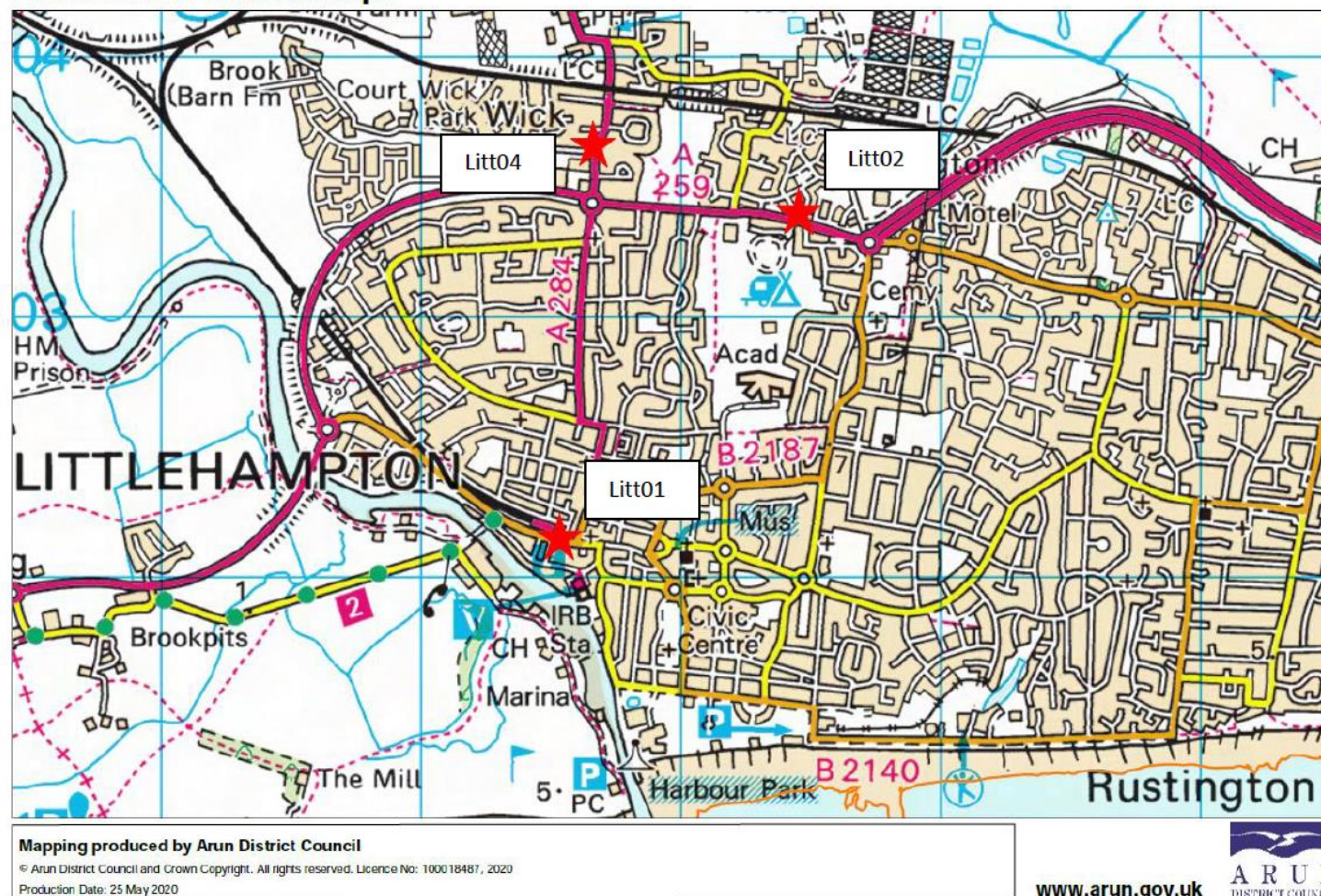
D3: Diffusion tube locations 2019, Bognor Regis

Arun District Council Maps



D4: Diffusion tube locations 2019, Littlehampton

Arun District Council Maps



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective ⁶	
	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

⁶ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

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