



2019 Air Quality Annual Status Report (ASR)

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

July, 2019

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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 (AQMA) 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 published in June 2019.

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 2018 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 2018 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.

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'. 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.

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 will be taking place over the next 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 to be included for residential developments.

- Over the coming year (2019) Arun District Council is preparing to apply for funding from the Office for Low Emission Vehicles grant scheme to provide electric vehicle charge points in Council car parks in areas where residents do not have access to charging facilities at home.

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 further review of the sites for diffusion tubes is currently being undertaken (summer 2019) and will result 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 will be 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.

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> .

Table of Contents

Executive Summary: Air Quality in Our Area	i
Air Quality in Arun.....	i
Conclusions and Priorities	iii
Local Engagement and How to get Involved	iv
1 Local Air Quality Management	1
2 Actions to Improve Air Quality	2
2.1 Air Quality Management Areas.....	2
2.2 Progress and Impact of Measures to address Air Quality in Arun	3
2.3 PM _{2.5} – Local Authority Approach to Reducing Emissions and/or Concentrations.....	9
3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance	11
3.1 Summary of Monitoring Undertaken	11
3.1.1 Automatic Monitoring Sites	11
3.1.2 Non-Automatic Monitoring Sites.....	11
3.2 Individual Pollutants	11
3.2.1 Nitrogen Dioxide (NO ₂).....	12
Appendix A: Monitoring Results	13
Appendix B: Full Monthly Diffusion Tube Results for 2018	21
Table B.1 – NO₂ Monthly Diffusion Tube Results - 2018	22
Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC	24
Appendix D: Map(s) of Monitoring Locations and AQMAs	25
Appendix E: Summary of Air Quality Objectives in England	28
Glossary of Terms	29
List of Tables	
Table 2.1 – Progress on Measures to Improve Air Quality	7
Table A.1 – Details of Automatic Monitoring Sites.....	13
Table A.2 – Details of Non-Automatic Monitoring Sites	14
Table A.3 – Annual Mean NO ₂ Monitoring Results.....	16
Table B.1 – NO ₂ Monthly Diffusion Tube Results - 2018.....	22
Table E.1 – Air Quality Objectives in England	28
List of Figures	
Figure A.1 – Trends in Annual Mean NO ₂ Concentrations	18

1 Local Air Quality Management

This report provides an overview of air quality in Arun 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 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 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: *The report is well structured, detailed and provides the information specified in the Guidance following the latest reporting template.*

However the appraisal also highlighted that: *it is unclear which monitoring site locations were changed as part of the 2016/17 review. It is asked that future reports demonstrate changes to the monitoring programme more clearly.*

As a result of this, the 3 monitoring tubes which had previously moved location in the 2018 report (03, 07 and 11) have reverted to their original number and the new locations have been given new numbers 19, 20 and 21. This can be seen in tables A.2 and A.3.

Arun 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 2.1.

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

Key completed measures are:

- Final draft of the West Sussex air quality plan - breathing better.
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 2018)
- 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
- Completion of the NCN2 cycle route between Bognor Regis and Littlehampton.

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.
- *Parking Standards Review* – The parking standards outline the minimum and maximum requirements for car and cycle parking at new developments within the county. They are currently being reviewed and updated to ensure they comply with current guidance and are fit for purpose.
- *Electric Vehicles policy* – forthcoming 2019/20

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

- Completion of the Findon cycling scheme – again engendering behavioural change and the use of alternative transport methods, delayed from 2018 due to lack of funding
- 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
- 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

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Congestion at level crossings - A284 (Lyminster)	Traffic Management	UTC, Congestion management, traffic reduction	WSCC & ADC, WSCC, C2CLEP and Developers	Ongoing	Summer 2018	By-pass in use	Reduced vehicle emissions	Planning permission granted March 2019	Construction to start 2020	£9.3m funding partly dependent on local housing S106 contribution
2	Congestion at level crossings - A29 (Woodgate)	Traffic Management	UTC, Congestion management, traffic reduction	WSCC & ADC, WSCC, C2CLEP and Developers	Ongoing	tba	New A29 section	Reduced vehicle emissions	Planning application to be submitted in 2019	tba	£40m funding partly dependent on local housing S106 contribution
3	Congestion at peak hours - A27, A29 & A259	Transport Planning and Infrastructure	Other	Highways England, WSCC, ADC & others	Completed	Underway	New A27 section and junction improvements	Reduced vehicle emissions	Highways England carrying out modelling and consultation on all options as adoption of previously agreed option is on hold	tba	Development Consent Order submission 2021
4	NCN2 Cyle route (Bognor to Littlehampton section)	Promoting Travel Alternatives	Promotion of cycling	ADC, WSCC, NCN	Completed	Completed	New section open	Behavioural change	Completed 2018	2018	weather
5	Membership of SAQP	Public Information	Via the Internet	Sussex LAs, PHE, ESCC and WSCC	Completed	Completed	Delivery of data, Air Alert and other schemes	Behavioural change	Ongoing	Ongoing	LA budget cuts
6	Membership of West Sussex Electric Vehicle Charging Partnership	Promoting Travel Alternatives	Other	WSCC and West Sussex LAs	Completed	Underway	Increased procurement of EVCPs	Reduced vehicle emissions	Investigations into joint procurement, etc. underway	Ongoing	LA budget cuts
7	Findon - walking and cycling scheme	Promoting Travel Alternatives	Promotion of cycling	WSCC	Completed	Underway	Improvements to A24 and C110	Behavioural change	Delayed due to lack of funding	tbc	Funding

Arun District Council

8	Arundel traffic calming	Traffic Management	Reduction of speed limits, 20mph zones	WSCC	Completed	Underway	Improvements to The Causeway	Behavioural change	Completed 2019	2019	none expected
9	Ferring traffic calming	Traffic Management	Reduction of speed limits, 20mph zones	WSCC	Completed	Underway	Improvements to Sea Lane	Behavioural change	Completed 2018/19	2018-19	none expected
10	Slindon traffic calming	Traffic Management	Reduction of speed limits, 20mph zones	WSCC	Completed	Underway	Improvements to A29	Behavioural change	Completed 2019	2019	none expected
11	Bersted Safety scheme	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	WSCC	Completed	Underway	Improvements to A259	Behavioural change	£50k identified in current budget	Sept 2019	none expected
12	Bognor traffic calming	Traffic Management	Reduction of speed limits, 20mph zones	WSCC	Completed	Underway	Improvements to Frith Road	Behavioural change	£150k allocated in current budget	2019	none expected

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 (2019)* 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.

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 2018. Table A.2 in Appendix A shows the details of the sites. Two additional sites were added during a review in 2018. These new sites were chosen on the basis of concerns from a local resident (one tube is located on the façade of their property) and proposals for changes to a major road layout which may impact on air quality in several areas both positively and negatively. 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 bias, "annualisation" and distance correction. Further details on adjustments are provided in Appendix C.

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.

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

The trends show a continued low level of NO₂ in the District compared to the national trigger level and no AQMAs are required within Arun District Council's area. There appeared to be a slight rise in NO₂ from 2017 across the district but levels are still well below the objective with no areas of particular concern. It is for this reason that the monitoring locations will be reviewed in 2019 so that other areas can be investigated.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

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

NOTE: There are no Automatic Monitoring Sites in Arun

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

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
1	Litt01	Roadside	502564	102149	NO ₂	NO	3.00	2.00	NO	2.00
2	Litt02	Roadside	503439	103364	NO ₂	NO	6.95	2.00	NO	2.80
3	Litt 03	Urban Background	502559	102888	NO ₂	NO	10.0	1.3	NO	2.0
4	Litt04	Roadside	502730	101225	NO ₂	NO	13.70	1.60	NO	2.60
5	Arun05	Roadside	501825	107165	NO ₂	NO	14.20	1.70	NO	2.10
6	Arun06	Roadside	502337	106555	NO ₂	NO	4.90	2.00	NO	2.50
7	Arun 07	Urban Background	501478	107052	NO ₂	NO	1.8	1.5	NO	2.0
8	Ford08	Roadside	500301	104374	NO ₂	NO	7.45	1.45	NO	1.70
9	Bog09	Roadside	493778	099135	NO ₂	NO	1.30	2.30	NO	2.70
10	Bog10	Roadside	496168	100384	NO ₂	NO	13.60	1.80	NO	2.65
11	Bog11	Urban Background	493429	100381	NO ₂	NO	8.9	1.2	NO	2.0
12	Bog12	Roadside	493361	101225	NO ₂	NO	0.50	1.50	NO	2.80
13	Bog13	Roadside	493417	104374	NO ₂	NO	14.80	1.30	NO	2.30
14	Arun14	Roadside	501320	106901	NO ₂	NO	9.60	2.00	NO	3.35
16	Arun16	Roadside	502337	106555	NO ₂	NO	0.00	8.10	NO	2.50
17	Arun17	Kerbside	502862	105338	NO ₂	NO	4.7	1.0	NO	2.80
18	Bog18	Roadside	491815	101170	NO ₂	NO	0.00	11.5	NO	2.00
19	Yap19	Roadside	497607	103312	NO ₂	NO	8.70	1.30	NO	2.00

20	Barn20	Roadside	495975	104395	NO ₂	NO	0.30	1.50	NO	2.00
21	Bog21	Roadside	493367	101169	NO ₂	NO	7.70	1.20	NO	2.00

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.

Following feedback on the 2018 report and confusion over new tube locations the table above reverts back to original sites of Litt03, Arun07 and Bog11 with results shown up until 2016 below. Yap03, Barn07 and Bog11 have now become Yap19, Barn20 and Bog21.

Table A.3 – Annual Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2018 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2014	2015	2016	2017	2018
Litt01	Roadside	Diffusion Tube		100	18	22.4	22.6	24.5	23
Litt02	Roadside	Diffusion Tube		100	20	25.8	24.4	25.3	23
Litt03	Urban Background	Diffusion Tube			10.3	12.9	12.9		
Litt04	Roadside	Diffusion Tube		100	17	16.1	22.9	27.1	25
Arun05	Roadside	Diffusion Tube		100	14	17.1	16.2	18.0	16
Arun06	Roadside	Diffusion Tube		100	25	31.4	27.6	28.6	26
Arun07	Urban Background	Diffusion Tube			11.9	12.7	13.7		
Ford08	Roadside	Diffusion Tube		100	16	17.1	16.6	18.5	18
Bog09	Roadside	Diffusion Tube		100	23	23.6	19.4	23.1	24
Bog10	Roadside	Diffusion Tube		100	25	29.9	25.8	25.5	25
Bog11	Urban Background	Diffusion Tube			15.3	15.4	15.1		
Bog12	Roadside	Diffusion Tube		75	26	29.6	25.6	28.3	31
Bog13	Roadside	Diffusion Tube		100	13	21.0	25.8	25.7	28
Arun14	Roadside	Diffusion Tube		100	23	28.2	27.4	29.0	29
Arun16	Roadside	Diffusion		92	15	18.1	17.0	17.6	19

		Tube							
Arun17	Kerbside	Diffusion Tube	100	92					35
Bog18	Roadside	Diffusion Tube	82	75					21
Yap19	Roadside	Diffusion Tube		100				16.9	17
Barn20	Roadside	Diffusion Tube		100				20.7	20
Bog21	Roadside	Diffusion Tube		100				26.5	29

Diffusion tube data has been bias corrected

Annualisation has been conducted where data capture is <75% (not required this year)

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**.

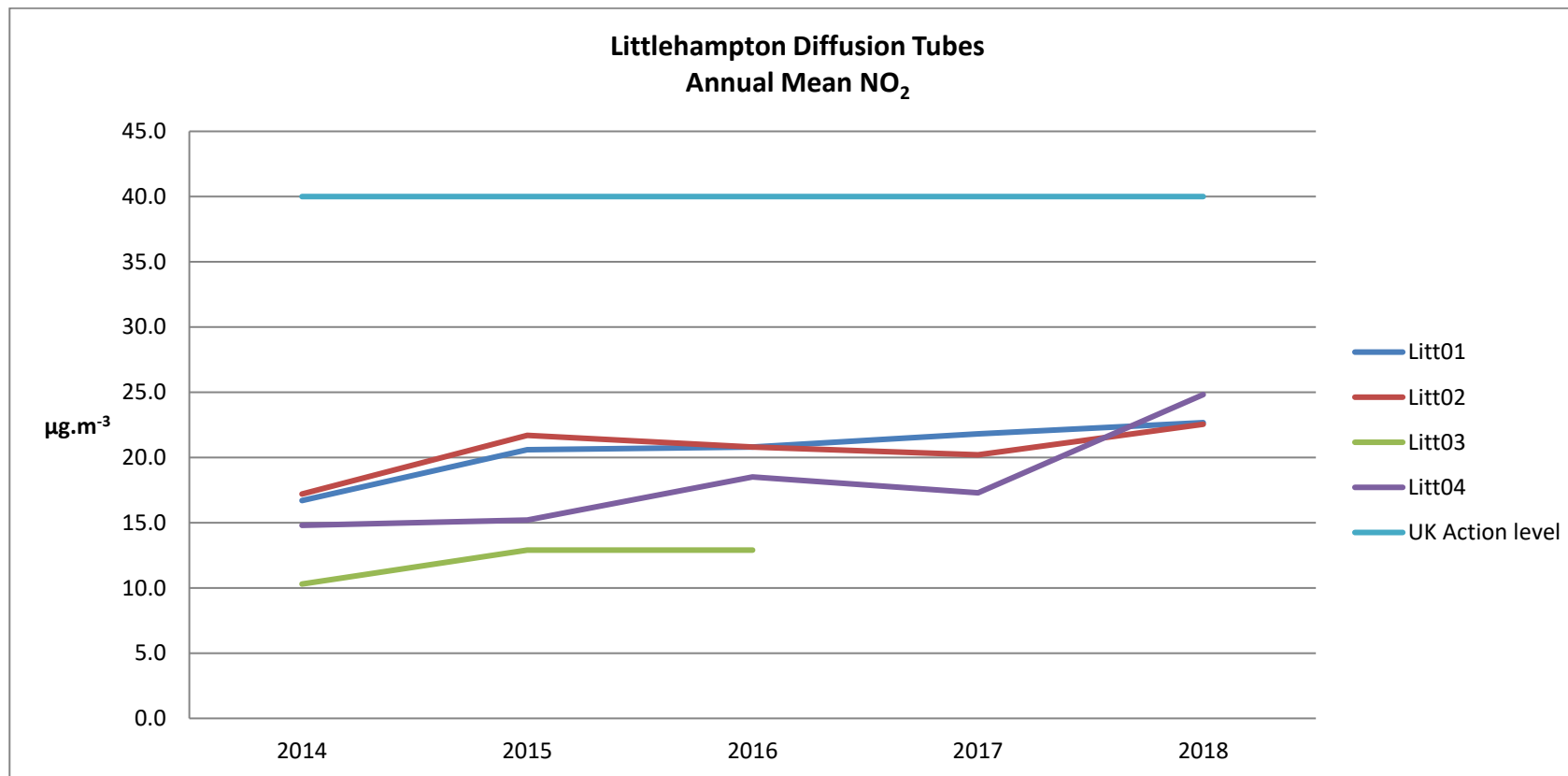
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(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%).

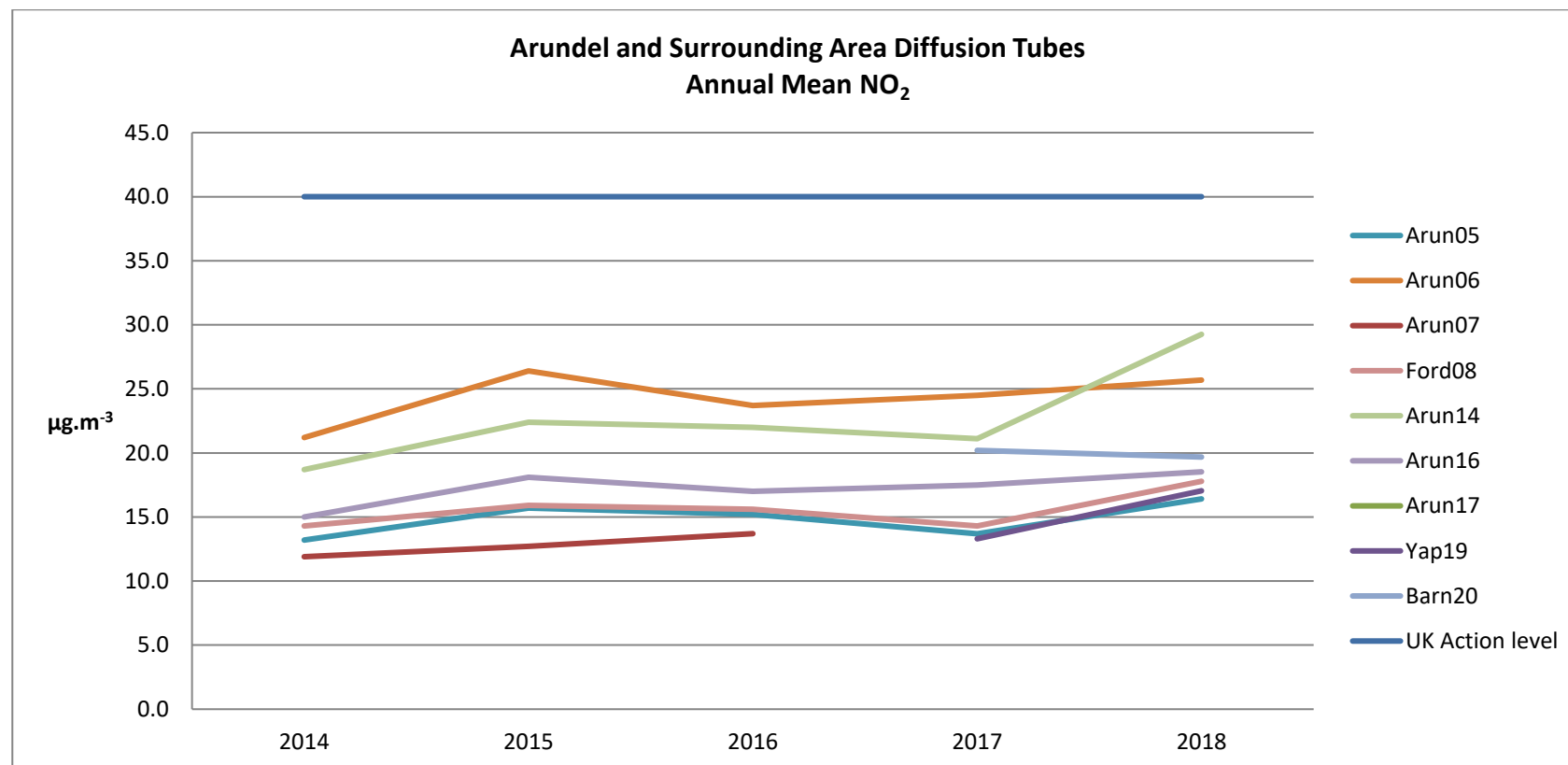
(3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure A.1 – Trends in Annual Mean NO₂ Concentrations

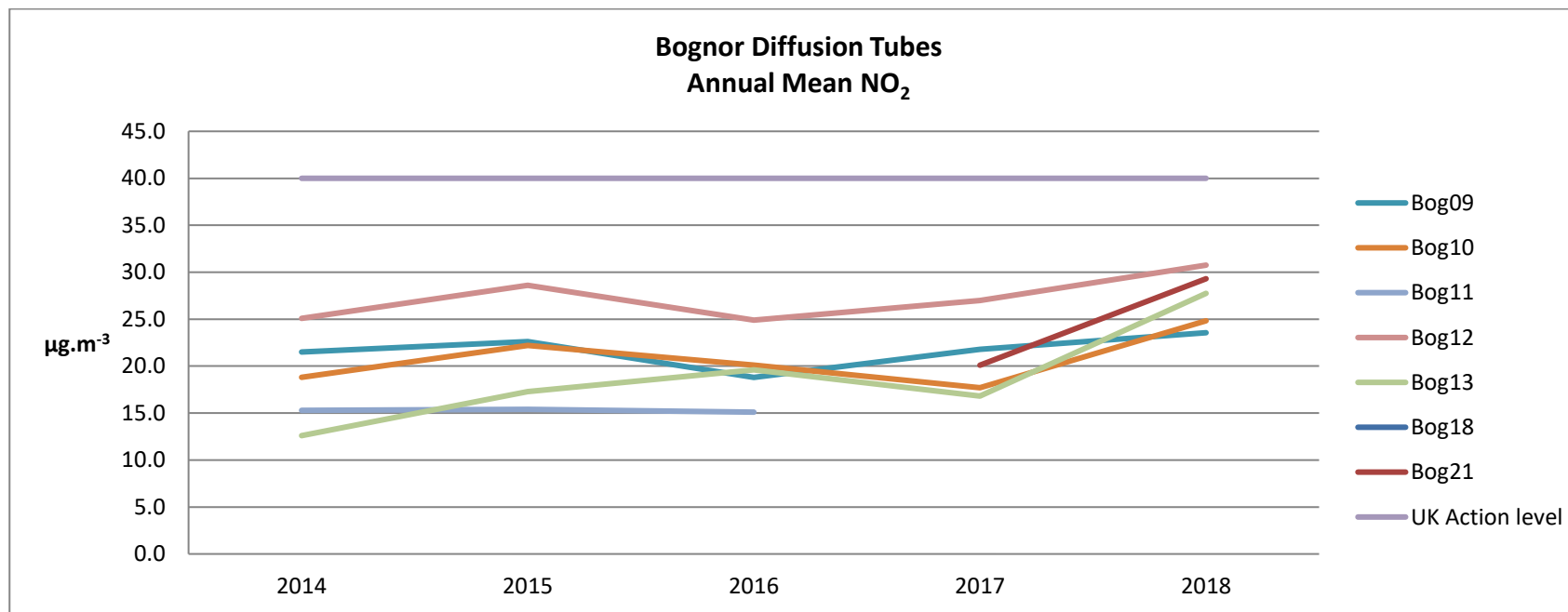
A.1.1 – Annual Mean NO₂ Concentrations: Littlehampton 2014-18



A.1.1 – Annual Mean NO₂ Concentrations: Arundel 2014-18



A.1.1 – Annual Mean NO₂ Concentrations: Bognor 2014-18



Appendix B: Full Monthly Diffusion Tube Results for 2018

Table B.1 – NO₂ Monthly Diffusion Tube Results - 2018

Site ID	NO ₂ Mean Concentrations (µg/m ³)												Annual Mean		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.95) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
1	28	25	26	24	22	17	18	21	22	30	23	30	24	23	20.5
2	28	24	27	25	9	25	19	23	22	29	25	27	24	23	18.7
4	22	23	31	29	21	22	23	25	22	36	27	32	26	25	16.5
5	18	13	22	20	14	14	16	14	14	21	20	20	17	16	13.3
6	28	27	32	29	24	20	27	29	25	30	27	28	27	26	20.9
8	17	19	19	19	16	17	20	18	16	22	21	21	19	18	14.1
9	28	23	26	28	18	23	25	21	24	29	25	27	25	24	22.3
10	26	27	28	27	22	20	25	23	25	32	29	29	26	25	18.1
12	32	40	39	NR	NR	NR	26	22	26	38	30	38	32	31	29.6
13	29	30	31	28	26	21	26	24	28	41	30	37	29	28	18.2
14	33	27	38	37	28	26	36	29	27	31	28	33	31	29	21.5
16	20	23	21	19	NR	29	13	11	17	22	19	22	19	19	18.5
17		38	36	34	34	33	37	29	37	54	35	40	37	35	23.9
18		20	23	NR	< 1	NR	24	17	20	24	20	25	22	21	21
19	18	19	22	21	17	14	12	15	14	22	20	22	18	17	13.8
20	25	21	24	23	17	15	19	20	19	19	21	26	21	20	19.3
21	29	30	31	36	29	26	36	26	27	36	28	37	31	29	22.2

- Local bias adjustment factor used
- National bias adjustment factor used
- Annualisation has been conducted where data capture is <75% Not required
- Where applicable, data has been distance corrected for relevant exposure.

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 2018 of 0.95. 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: 03/19

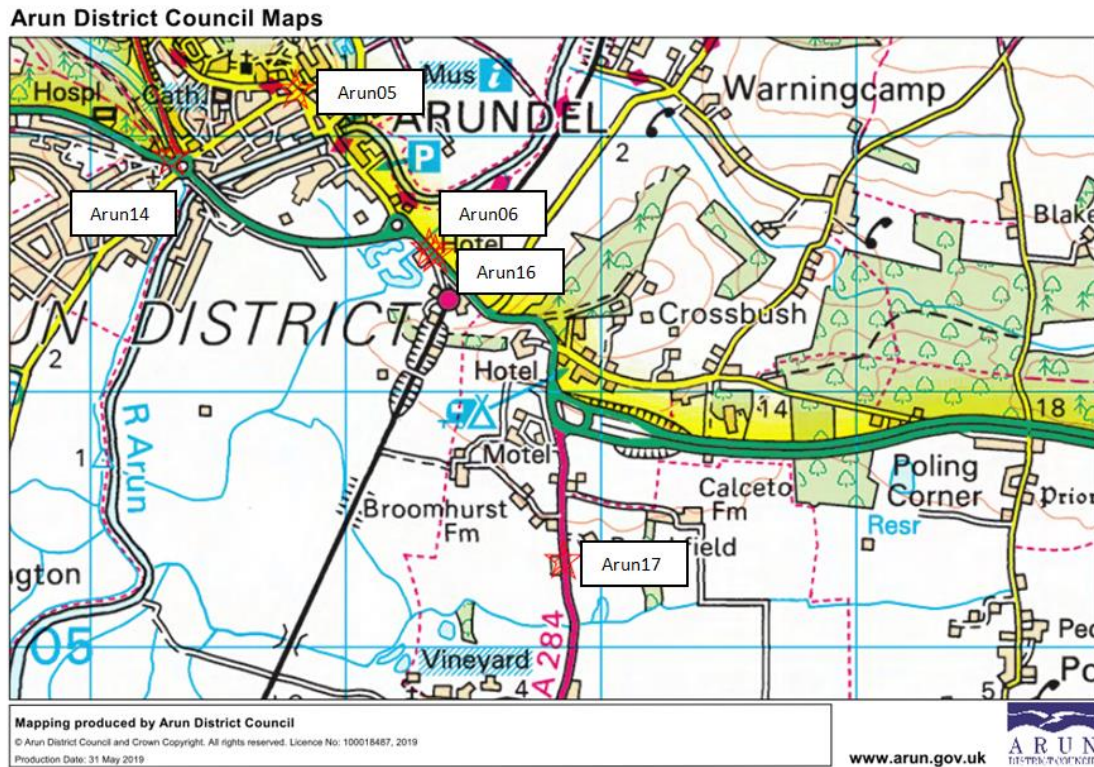
Annualisation was not required for any of the results. The minimum data collection was 75% over the year with most tubes having 100% data capture so annualisation was not required.

SYAQS participate in the AIR-PT scheme (formerly Workplace Analysis Scheme for Proficiency - WASP). The distance corrected results shown in table A.2 are achieved using the Defra tool: *NO₂ fall off with distance calculator*.

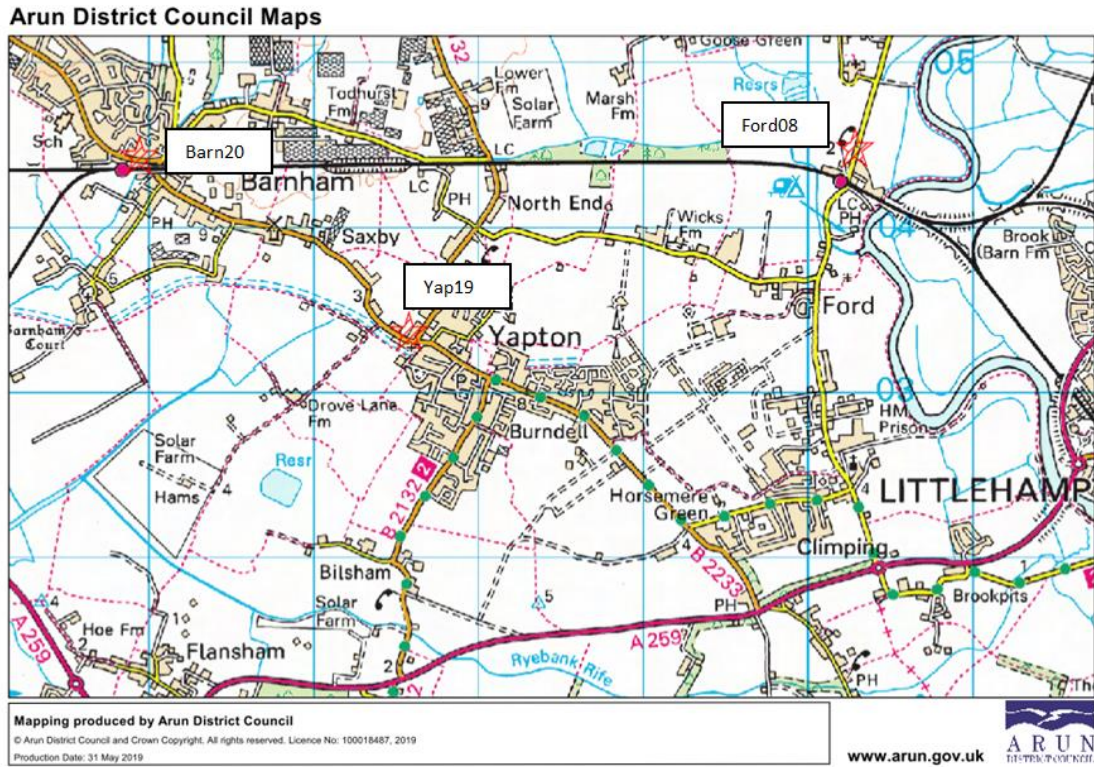
For example: Litt01 co-ordinates are X502564 Y102149 which correlates to row 178 of the Defra Background study giving a value of 12.325345. Litt01 is located 2.0m from the kerb, 5.0m to the nearest receptor (the tube height is 2.0m). The annual average figure of 23.9 was multiplied by the bias adjustment factor above of 0.95 – giving a value of 22.7 µg.m⁻³. These factors are used in the Defra fall-off with distance calculator giving a final result of 20.5 µg.m⁻³

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

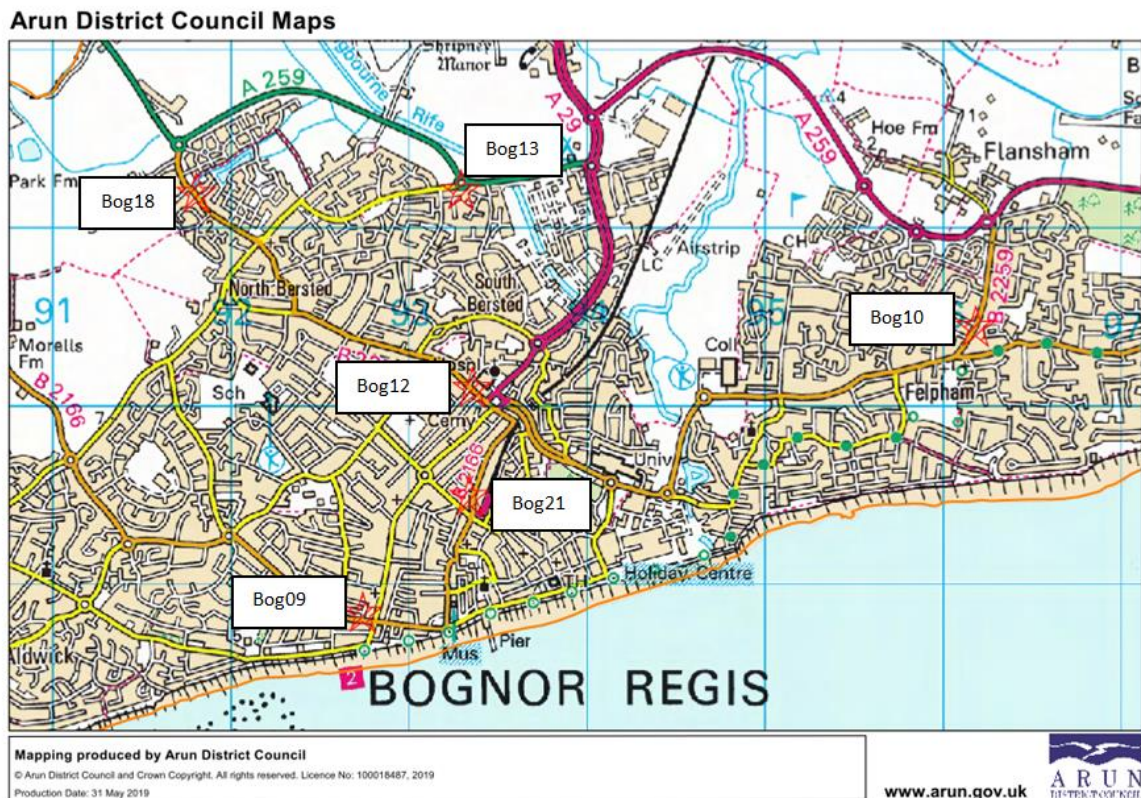
D1: Diffusion tube locations 2018, Arundel



D2: Diffusion tube locations 2018, Barnham, Yapton, Ford

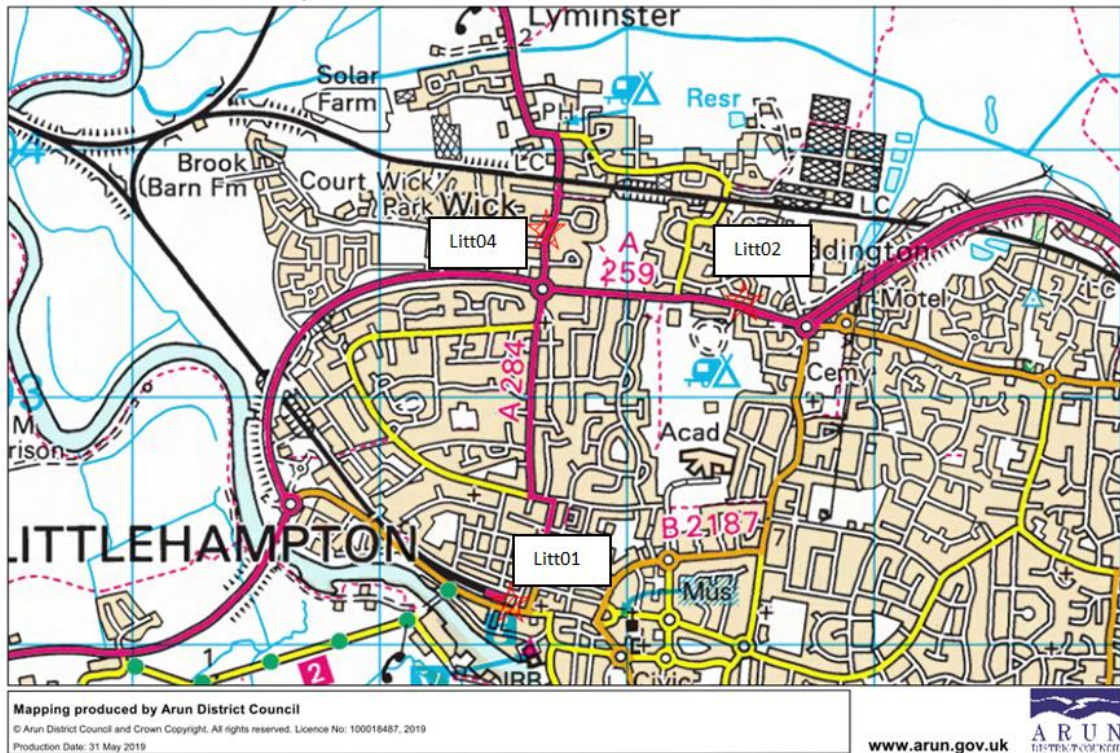


D3: Diffusion tube locations 2018, Bognor Regis



D4: Diffusion tube locations 2018, 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 ⁴	
	Concentration	Measured as
Nitrogen Dioxide (NO ₂)	200 µg/m ³ not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m ³	Annual mean
Particulate Matter (PM ₁₀)	50 µg/m ³ , not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m ³	Annual mean
Sulphur Dioxide (SO ₂)	350 µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m ³ , not to be exceeded more than 35 times a year	15-minute mean

⁴ The units are in microgrammes of pollutant per cubic metre of air (µg/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