



ADUR & WORTHING
COUNCILS



2021 Air Quality Annual Status Report (ASR)

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

Date: October, 2021

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Executive Summary: Air Quality in Our Area

Air Quality in Adur and Worthing

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, the elderly, and those with existing heart and lung conditions. There is also often a strong correlation with equalities issues because areas with poor air quality are also often less affluent areas^{1,2}.

The mortality burden of air pollution within the UK is equivalent to 28,000 to 36,000 deaths at typical ages³, with a total estimated healthcare cost to the NHS and social care of £157 million in 2017⁴.

It is acknowledged that prior to the lifting of national lockdowns resulting from coronavirus, traffic volumes were not considered to be normal, and that as a result any air quality monitoring data gathered during this time might not represent normal baseline concentrations of pollution.

In previous years we produced separate reports for both Adur District Council and Worthing Borough Council. This year we have, with authority from Defra, combined reporting for both Authorities into this single report. Data and actions for both Authorities are clearly labelled and referenced throughout.

Adur: There currently remain two Air Quality Management Areas (AQMAs) within the District: AQMA1 – High Street, Shoreham-by-Sea; and AQMA2 – Old Shoreham Road, Southwick. Both were declared for exceedances of the Nitrogen Dioxide annual mean

¹ Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

² Defra. Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

³ Defra. Air quality appraisal: damage cost guidance, July 2020

⁴ Public Health England. Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report, May 2018

objective. Levels in and around both AQMAs reduced during 2020 and remain below the annual mean objective.

Adur District Council undertook automatic (continuous) monitoring at one site in Shoreham High Street (A259) during 2020. The annual mean measured for 2020 was $20\mu\text{g}/\text{m}^3$. This is well below the objective of $40\mu\text{g}/\text{m}^3$. There were no recorded exceedances of the one hour mean objective of $200\mu\text{g}/\text{m}$.

Non-automatic (passive diffusion tube) monitoring of NO_2 also took place using 26 diffusion tubes across the Adur District. Measured levels have steadily fallen over recent years and this trend continued in 2020 (albeit with the caveat that the pandemic affected traffic volumes), with all monitoring sites recording a fall.

No monitoring sites exceeded the annual mean objective of $40\mu\text{g}/\text{m}^3$ during 2020.

As with previous years, we maintain that we must keep the measured levels in AQMA1 under review before making decisions on the future of the AQMA. The large number of approved major developments were delayed by Covid, so have yet to commence construction. Alongside other planned major developments for the Adur District (as detailed in section 2), we believe revocation of the AQMA is not a reasonable option at this time.

In our past Adur ASR's we advised that we would consider revoking AQMA2 as measured levels had been below the annual mean objective for a number of years. As previously mentioned the pandemic prevented much of our work on air quality, so revocation of AQMA2 Southwick was not considered in 2020. We hope to review this matter in 2021/22.

Measurements of Particulate Matter PM_{10} were again below the annual mean objective of $40\mu\text{g}/\text{m}^3$, at $22\mu\text{g}/\text{m}^3$. There were no recorded exceedances of an hourly mean of $50\mu\text{g}/\text{m}^3$. An estimate of Particulate Matter $\text{PM}_{2.5}$ levels was made from our PM_{10} measurement. This suggests $\text{PM}_{2.5}$ [concentrations of](#) $15.4\mu\text{g}/\text{m}^3$, down from the $17\mu\text{g}/\text{m}^3$ estimated in 2019 and below the permitted level of $25\mu\text{g}/\text{m}^3$ (but above WHO recommendations).

We have yet to complete our new Action Plan which was delayed as a result of the reallocation of Council resources during 2020. Current estimates are that the revised AQAP will be prepared in late 2021 with consultation thereafter (early 2022).

Worthing: There is one Air Quality Management Area (AQMA) within the Worthing Borough: Worthing AQMA No.2 on the A27/A24 in Worthing, declared for exceeding the annual mean objective for Nitrogen Dioxide (NO₂) of 40µg/m³.

Worthing Borough Council undertook automatic (continuous) monitoring of Nitrogen Dioxide (NO₂) and Particulate Matter PM_{2.5} at an AURN (Automatic Urban and Rural Network) affiliated site at Grove Lodge Worthing (A27) during 2020. Non-automatic (passive) monitoring of NO₂ also took place using 37 diffusion tubes across the Borough. Four tubes were also added for three months to monitor the effects of a temporary pop up cycle lane on the A24.

Monitoring shows all sites registered a decrease in measured levels of NO₂ in 2020 (with the caveat that the pandemic affected traffic volumes).

The continuous monitoring site at Grove Lodge recorded another decrease in the annual mean to 26µg/m³, a reduction of 7µg/m³ from 2019. The hourly mean objective of 200µg/m³ was not exceeded at any time during 2020.

Only one monitoring site exceeded the annual mean objective of 40µg/m³ during 2020; N30A Grove Lodge Cottages, which also exceeded in 2019.

The measured level of PM_{2.5} was 8µg/m³, below the Limit Value of 25µg/m³.

Both Adur District and Worthing Borough Councils work with external partners, particularly the highway authorities (West Sussex County Council and Highways England) and West Sussex Public Health. Much of our partnership work is achieved through the Sussex Air Quality partnership (<https://sussex-air.net/>).

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

Whilst air quality has improved significantly in recent decades, and will continue to improve due to national policy decisions, there are some areas where local action is needed to improve air quality further.

The 2019 Clean Air Strategy⁵ sets out the case for action, with goals even more ambitious than EU requirements to reduce exposure to harmful pollutants. The Road to Zero⁶ sets out the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

Unfortunately our ability to deliver the majority of planned actions during 2020 was severely restricted as a result of the reallocation of Council resources to deal with the Covid pandemic. The Council did however manage to take forward a limited number of measures in pursuit of improved air quality. These included completion of delivery of the Sussex-air Defra funded 'Clean Burn Sussex' project; continued delivery of the Sussex-air Defra funded intervention programme into primary and secondary schools; continued use of the Sussex Air Quality Emissions Mitigation Planning Guidance and we were part of the project team producing an update to the Guidance; West Sussex County Council installed temporary cycle lanes on the Upper Shoreham Road in Shoreham and on the A24 in Worthing, with funding from the first round of the Government Emergency Active Travel Fund; Adur DC commissioned the Highways England funded rapid charger at Lancing Manor; and both Councils continued work to develop an Adur & Worthing Car Club. As with 2019 there was still no decision or update from Highways England following their 2017 public consultation on a "proposal to improve the A27 junctions at Worthing and Lancing."

Conclusions and Priorities

Measured concentrations of NO₂ fell at monitoring sites across Adur & Worthing and all but one site was below the annual mean objective. That one site was within Worthing AQMA No.2 and even when predicted back to the nearest façade, exceeds the objective.

Levels of PM₁₀ and PM_{2.5} were also measured below the limit value.

⁵ Defra. Clean Air Strategy, 2019

⁶ DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

It is acknowledged that the coronavirus pandemic affected traffic volumes during 2020 and as a result air quality monitoring data gathered during this time will not represent normal baseline concentrations of pollution.

As in 2019, there remains development pressure in both Adur & Worthing. A large number of major developments have either been granted permission or are planned for both areas, particularly in and around Worthing town centre and Shoreham. Balancing the demand for development with the need to improve air quality brings challenges. These developments also bring opportunities to improve infrastructure, especially for walking and cycling, and thus limit the impacts on the existing AQMA and avoid creating new hotspots.

Specific priority actions for 2020 include:

A revised Adur Air Quality Action Plan; commencing a review of the Worthing Air Quality Action Plan; further consider revocation of the Southwick AQMA; publication of the final Local Cycling and Walking Infrastructure Plan (LCWIP); completion of work on a number of sustainability projects including 'Bikeshare'; continue to work with WSCC on a County-wide EV charging strategy and contract for the provision/roll out of charge points across Adur & Worthing; continue with the Sussex-air schools project; further embed the Sussex Air Quality Planning Guidance within the planning regime; further revise the Sussex Air Quality & Emissions Mitigation Guidance for Planning; provide an Adur & Worthing Car Club; erect anti-idling signs at traffic hotspots; and publication of a revised Adur & Worthing Staff Travel Plan.

Local Engagement and How to get Involved

We engage with interested parties in the area, 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 development pressures across the Adur and Worthing area, 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 Adur & Worthing. You may contact

us using our online form at <https://www.adur-worthing.gov.uk/eforms/aw-ext-environmental-health.ofml>.

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. Where this is not possible, grouping deliveries together can reduce the number of journeys made by delivery vans.
- 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 website 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://sussex-air.net/Cleanburn/clean-burning.aspx>.

- 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 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 at <https://www.adur-worthing.gov.uk/environmental-health/pollution/air-quality-and-pollution/bonfires-and-smoke/>.
- Consider signing up to our air alert service – airAlert is a service provided by the Sussex Air Quality Partnership, that sends free messages to you via text, voicemails to your home telephone, email or mobile app, informing you of episodes of poor air quality predicted in your area. See <https://sussex-air.net/>
- 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/>.

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1 Local Air Quality Management

This report provides an overview of air quality in Adur District and Worthing Borough Councils during 2020. 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 and Worthing Borough Councils to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England are presented in Table E.1.

2 Actions to Improve Air Quality

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 should prepare an Air Quality Action Plan (AQAP) within 12 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 and Worthing Borough Councils can be found in Table 2.1. The table presents a description of the three AQMAs that are currently designated within the Adur District and Worthing Borough areas. Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of AQMAs and also the air quality monitoring locations in relation to the AQMAs. The air quality objectives pertinent to the current AQMA designation(s) are as follows:

- NO₂ annual mean

In the last ASR we stated we would consider revoking Adur AQMA2 – Southwick during 2020. Due to the pandemic we have been unable to progress this. Therefore we aim to review this again during 2021.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
Adur District Council AQMA1	Declared 2005	NO2 Annual Mean	An area encompassing the A259 High Street, Shoreham-by-Sea between Ropetackle Roundabout and Surry Street	NO	42	24	Adur Air Quality Action Plan 2007	https://www.adur-worthing.gov.uk/media/media,104971,en.pdf
Adur District Council AQMA2	Declared 2005	NO2 Annual Mean	An area encompassing the A270 Old Shoreham Road, Southwick between Kingston Lane and Lower Drive	NO	46	26	Adur Air Quality Action Plan 2007	https://www.adur-worthing.gov.uk/media/media,104971,en.pdf

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
Worthing Borough Council AQMA No.2	Declared 13/07/2010, Amended 15/12/2014	NO2 Annual Mean	Crockhurst Hill, Offington Corner Roundabout, Warren Road, Grove Lodge Roundabout, Upper Brighton Road up to and including the Downlands Retail Centre and Lyons Way	YES	71.5	45.1	Worthing Air Quality Action Plan	https://www.adur-worthing.gov.uk/media/media,138133,en.pdf

Adur District and Worthing Borough Councils confirm the information on UK-Air regarding their AQMA(s) is up to date (confirm by selecting in box).

Adur District and Worthing Borough Councils confirm that all current AQAPs have been submitted to Defra (confirm by selecting in box).

Progress and Impact of Measures to address Air Quality in Adur District and Worthing Borough Councils

Defra's appraisal of last year's ASR's concluded

A. Adur District Council

1. *"The Council have stated they intend to revoke AQMA2 – Old Shoreham Road, Southwick. This decision is supported."*
2. *"The publication and adoption of a new Air Quality Action Plan (AQAP) should remain a priority for the next reporting year."* Discussed later in this report.
3. *"Table A.3 of the report has all annual mean concentrations bolded, even when below $40\mu\text{g}/\text{m}^3$. This is confusing as the notes below states exceedances of the objective are bolded, as is convention."* Noted and corrected this year.
4. *"Bias adjustment has been applied. However, it is not immediately clear whether a national or local bias adjustment factor has been utilised, and calculations are not shown in the appendix. In future ASRs, a screenshot of the tool used could be included; this would verify the latest version has been used. Additionally, the Council have diffusion tubes co-located with an automatic monitor, meaning a local bias adjustment can be calculated. A local factor is generally preferred over the national factor according to LAQM.TG16."* Due to the impacts on local traffic levels as a result of the pandemic in 2020, we have again used the national bias factor this year to ensure consistency.

B. Worthing Borough Council

1. *"The Council's decision to no longer amend the existing AQMA to incorporate exceedance of the 1-hour mean objective for NO_2 is supported. NO_2 concentrations from this year have demonstrated a downward trend and provide further evidence that a new AQMA declaration is not needed."* Noted
2. *"Comments from last year's appraisal have advised the Council to utilise their co-located tubes and calculate a local bias adjustment factor. The Council have continued to use the national bias adjustment factor, with no evidence of a local bias adjustment factor being calculated. Though not incorrect to use the national factor it is*

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recommended that the Council consider utilising their co-located tubes to calculate a local bias adjustment factor. The representativeness of a local factor can then be considered, and applied if appropriate, in future reporting.” Due to the impacts on local traffic levels as a result of the pandemic in 2020, we have again used the national bias factor this year to ensure consistency.

3. *“The Council have provided a good discussion of NO₂ trends within the borough and the inclusion of traffic data is welcomed. However, trend graphs presented in the report are relatively basic. It would be beneficial for the Council to include axis titles, units and a line highlighting the NO₂ AQOs threshold (40 µg/m³).”* Noted and corrected this year.

Adur District and Worthing Borough Councils have taken forward a number of direct measures during the current reporting year of 2020 in pursuit of improving local air quality. Details of all measures are included within Table 2.2, with the type of measure and the progress Adur District and Worthing Borough Councils have made during the reporting year of 2020 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

Clearly the Coronavirus pandemic restricted our ability to deliver the majority of planned actions during 2020, particularly as many of the Council’s resources were reallocated during 2020.

However the key completed measures were:

- Sussex-air were successful in a Defra Air Quality grant bid to expand the schools intervention programme into additional primary schools and this time include secondary schools. The project again employed Sustrans to deliver the programme, aiming to raise awareness of air quality issues. A Sustrans Air Quality officer engaged with new schools and those already working with Sustrans to investigate local air quality. Worthing High (Secondary) and Bohunt Worthing (Secondary) were actively engaged during 2020. The project had to evolve to take account of school closures and evolving Covid-19

arrangements. As such some lessons were delivered through video conferencing and pre-recorded video content.

- Completed delivery of the Sussex-air Defra funded 'Clean Burn Sussex' project, designed to raise awareness of the health and environmental impact of burning solid. We promoted the clean burn webpages on the Sussex-air website to raise awareness - <http://www.sussex-air.net/Cleanburn/clean-burning.aspx>. Despite communications to promote the clean burn survey, designed to gather information on wood burning in Sussex, the response rate was just 39 residents in Worthing and 37 in Adur. This compared to 100 in Arun, 28 in Crawley, 108 in Chichester and 857 in Rother & Wealden. Unsurprisingly response rates were higher in rural areas most likely to be off the gas grid. More information including maps and graphs are included in Appendix F. The full report is available at <https://sussex-air.net/Cleanburn/clean-burning.aspx>.
- West Sussex County Council installed temporary cycle lanes on the Upper Shoreham Road in Shoreham and on the A24 in Worthing, with funding from the first round of the Government Emergency Active Travel Fund. They were intended to support the re-opening of the economy following lockdown; to help lock-in some of the significant increase in active travel seen during the lockdown periods and to reduce pressures on public transport capacity following the introduction of social distancing measures. The cycle lane on Upper Shoreham Road used some of the existing single carriageways both east and westbound. The cycle lane on the A24 used one of the two lanes of the dual carriageway each way. This resulted in vehicles using a single lane causing queuing traffic. As a result we installed some diffusion tubes in the roads around these cycle lanes to monitor the effect of traffic that was avoiding the A24. The results are discussed later.

The lanes were subsequently removed during late 2020/early 2021.

- The Highways England funded rapid charger at Lancing Manor was finally commissioned in 2020. The 50kW charge point plugged a charging gap on the strategic road network between Portsmouth and Brighton (A27).
- Work on developing an Adur & Worthing Car Club continued, with positive discussions taking place between relevant partners. It was anticipated this would develop further during 2021.
- We continued to use the Sussex Air Quality Emissions Mitigation Planning Guidance, with all 'major' planning applications 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 guidance is signposted within the Adur Local Plan and draft Worthing Local Plan. 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, aiming for appropriate mitigation in the design of schemes.
- Worked as part of the project team to publish a revised version of the Sussex Air Quality & Emissions Mitigation Guidance for Planning. The revised version signposted new local parking standards and travel plan guidance and was published in early 2020.
- Erected anti-idling signs outside Glebe Primary School Shoreham in December 2020, in response to concerns about idling cars during the school run.

Adur District and Worthing Borough Councils expects the following measures to be completed over the course of the next reporting year:

- Produce a revised Adur Air Quality Action Plan. The pandemic meant staff were diverted to other duties so this was not completed. It remains overdue and is a key priority, drafted in partnership with West Sussex County Council.

- Commence a review of the Worthing Air Quality Action Plan.
- Further consider revocation of the Southwick AQMA. Again the pandemic meant staff were diverted to other duties so this was not completed.
- Publish the final Local Cycling and Walking Infrastructure Plan (LCWIP).
- Complete work on a number of sustainability projects including 'Bikeshare'.
- Continue to work with WSCC on a County-wide EV charge point strategy and contract for the provision/roll out of charge points across Adur & Worthing.
- Continue engagement with the Sussex-air Defra funded schools programme in Adur & Worthing schools.
- Further embed the Sussex Air Quality Planning Guidance within the planning regime in Adur.
- As part of the Sussex-air project team, further revise the Sussex Air Quality & Emissions Mitigation Guidance for Planning to take account of changes in local policy etc.
- Provision of an Adur & Worthing Car Club, to reduce single car ownership and facilitate new developments with reduced parking;
- Continue to erect anti-idling signs at traffic hotspots as and where deemed appropriate, to try and persuade vehicle drivers to switch off whilst waiting.
- Publication of a revised Adur & Worthing Staff Travel Plan.

The principal challenges and barriers to implementation that Adur District and Worthing Borough Councils anticipate facing are

- Development pressures in both Adur and Worthing. A large number of major developments have been granted permission and there are still a large number planned, particularly for the Adur District. Balancing the demand for development with good air quality is challenging. These developments do also bring opportunities to improve infrastructure, especially for walking and

cycling, and thus limit the impacts on the existing AQMAs and avoid creating new hotspots. Many developments in Worthing, either granted or planned, are in or close to the Town Centre.

- The **Adur** Local Plan 2017 allocated the following sites:
 - West Sompting – allocated in the Adur Local Plan for a minimum of 480 homes and a range of open space. (Post monitoring period update: Application AWDM/0323/19 was granted consent on 20th September 2021, for a total of 469 dwellings, subject to completion of a s106 agreement).
 - New Monks Farm. Application AWDM/0961/17 was determined on 4th February 2020 (following completion of the associated s106). Outline permission was granted for 249 dwellings and other matters including a country park and relocation and extension of a gypsy and traveller site, in addition to outline permission for 351 further dwellings, a primary school, and a non-food retail store (use class A1). This retail store was intended to replace the employment allocation originally sought by the Adur Local Plan 2017, creating a number of jobs, and contributing to the local economy.
 - 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 square metres of employment generating floorspace. (Subsequent to this, application planning ref. AWDM/1093/17 was granted consent for 25,000sqm of business floorspace in 2019).
 - The Shoreham Harbour Regeneration Area for a minimum of 1100 dwellings. Subsequently the Shoreham Harbour Joint Area Action Plan was adopted in 2019. Developments within this area in this particular monitoring period include the following:

- Albion Street, Southwick (ref.AWDM/0954/18) - a residential scheme of 55 dwellings gross (a net gain of 38 dwellings).
Granted permission 5th May 2020
 - Old Town Hall Albion Street (AWDM/0877/20) - conversion to provide 6 flats approved October 2020.
- The Submission Draft **Worthing** Local Plan was approved for consultation in January 2021. It included the following proposed allocations:
- Beeches Avenue - 90 dwellings
 - Caravan Club - 100 dwellings
 - Centenary House - 250 dwellings and employment uses
 - Civic Centre - integrated health hub
 - Decoy Farm - employment uses
 - Fulbeck Ave - 120 dwellings Grafton - 150 dwellings
 - HMRC offices - 250 dwellings and care home
 - Lyndhurst Road - 150 dwellings
 - Martlets Way - employment uses
 - Stagecoach site - 60 dwellings and mixed uses
 - Teville Gate - 250 dwellings and mixed uses
 - Titnore Lane - 60 dwellings
 - Union Place - 150 dwellings and mixed uses Upper Brighton Road - 123 dwellings
- The sites at Upper Brighton Road and Beeches Avenue are in close proximity to the AQMA.

It is expected that the Worthing Local Plan will be submitted for Examination later in 2021 and that Hearing Sessions will be held thereafter.

- Development pressures in either District could also have an effect on traffic volumes in the other District, particularly along the A27 and within the Worthing AQMA.

- Providing sufficient resources (financial and personnel) in order to progress and deliver effective air quality measures.
- Identifying suitable sites for the provision of car club spaces alongside sufficient funding, particularly in respect of on street spaces;
- Identifying suitable sites for the installation of electric vehicle charge points. We are working in partnership with WSCC to develop a County wide scheme;
- The provision electric vehicles into the Council's pool car fleet will depend on funding and suitable charging facilities being made available;
- Engagement with Highways England has continued to be rather intermittent, so we aim to continue to try to work with them in order to deliver the Action Plan.

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

The pandemic effectively halted the majority of our air quality work as staff resources were diverted to dealing with covid regulations enforcement alongside the many restrictions that were imposed relating to movement and meetings, etc. We did however prioritise our air quality monitoring work and as a result have excellent data capture for 2020.

Adur District Council anticipates that the measures stated above and in Table 2.2 will achieve compliance in *Adur AQMA1*.

Worthing Borough Council

Whilst the measures stated above and in Error! Reference source not found. will help to contribute towards compliance, Worthing Borough Council anticipates that further measures may be required in subsequent years to achieve compliance and therefore enable the revocation of *Worthing Borough Council AQMA No.2*.

Table 2.2 – Progress on Measures to Improve Air Quality

ADUR															
Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year ⁷	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure ⁸	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	Adur/Worthing Car Club	Alternatives to private vehicle use	Car Clubs	2014	2022	Adur DC/Worthing BC/WSCC	Funding: Developer contributions/Adur DC	NO	Partially Funded	£50k - £100k	Implementation	1%	Number of people using the service/Number of vehicles available	Discussions with WSCC and car club providers continued during 2020, despite the pandemic. Car club providers continued discussions with developers regarding specific development sites in Shoreham.	Principle of car clubs embedded in planned new developments. Barriers are finding suitable spaces, particularly on street and cost of seed funding clubs.
2	LEZ/CAZ Feasibility	Promoting Low Emission Transport	Low Emission Zone (LEZ)	2018		Adur DC/WSCC	Unknown	NO	Not Funded	£1 million - £10 million	Aborted		Reduction in older Euro class HGV's/LGV's and buses within the AQMA	No further discussions have taken place	As per 2019, 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	2012	2015	Adur DC/Worthing BC	LA	NO	Funded	< £10k	Implementation	1-5%	Low emission mitigation secured in local developments	Revised Guidance published January 2020. 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 developments to ensure meaningful mitigation. Shoreham Harbour JAAP includes policies for sustainable travel and infrastructure improvements.	Consider developing the Guidance into a Supplementary Planning Document if deemed necessary.
4	Improve emissions from the Council's vehicle fleet	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low	2012	2030	Adur DC/Worthing BC	LA	NO	Partially Funded	£1 million - £10 million	Implementation	<1%	No. of vehicles replaced with better Euro standard/Pure EV models	Programme of fleet replacement with ev/hybrid vehicles continued, as and when vehicles they are due for	Barrier: Suitable vehicles are affordable (e.g. HGV's/refuse vehicles).

⁷ If no year is stated then either *unknown* or *ongoing*⁸ If no figure is given then cost unknown at time of writing

			emission vehicles											replacement. All pool cars hybrids.	
5	Reduce AQ impact of ADC/WSCC staff travel	Promoting Travel Alternatives	Encourage / Facilitate home-working	2012	2022	Adur DC/Worthing BC/WSCC	LA	NO	Funded	£50k - £100k	Implementation	<1%	Staff travel surveys reduced commuting and business travel by car	During 2020 there has been a major shift in staff travel resulting from COVID-19 restrictions with many staff working from home on a full-time basis and most meetings taking place virtually. Adur & Worthing & WSCC EASIT scheme for staff and local businesses continues. Staff travel plan under review, pool car now exclusively hybrid, EV's being actively investigated.	Hybrid models for mixed working from home/office.
6	HGV/LGV assessment	Vehicle Fleet Efficiency	Other	2016	2024	Adur DC	LA	NO	Not Funded	£10k - 50k	Aborted	<5%	Data on Euro Classes	Source Apportionment study shows LGV's contribute more than HGV's, hence why this action has been aborted	LGV's would be prioritised over HGV's.
7	eV charging infrastructure	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2016	2023	Adur DC/Worthing BC/WSCC	Adur DC/Worthing BC/WSCC/Developer contributions	NO	Partially Funded	£500k - £1 million	Planning	1-5%	Number of charge points provided	The County Council is currently working in partnership with 6 of the 7 District/Borough Councils in the County, including Adur, 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. WSCC parking strategy sets increasing year on year targets for ev charge points at new developments; Highways England funded rapid charge point delivered at Lancing Manor.	
8	Bus Fleet Improvements	Alternatives to private vehicle use	Other	2010		Adur DC/WSCC	WSCC or DLEV grants	NO	Partially Funded	£1 million - £10 million	Planning	1-5%	Journey time and passenger number improvements	Adur & Worthing Councils and West Sussex County Council have supported Brighton & Hove City Council and other partners and Brighton and Hove Buses with a bid to retrofit buses in and around the city. Some of these routes pass through the Adur District.	Improvement in journey times points towards improved traffic flow. Retrofitting or fleet replacement should bring reductions in emissions; small in AQMA.
9	Traffic light/pelican crossing optimisation/MOVA traffic control	Traffic Management	UTC, Congestion management, traffic reduction	2010	2026	WSCC	WSCC	NO	Funded	£50k - £100k	Implementation	5-10%	Improvement in traffic flows	Signals continue to be optimised as far as reasonably practicable.	Improved flow/decrease in stop start driving will have a significant beneficial impact on emissions.
10	Travel Plans secured through the planning process for all significant development sites in West Sussex	Promoting Travel Alternatives	Other	2010	2026	Adur DC/WSCC	Developer Contribution	NO	Partially Funded	£500k - £1 million	Implementation	1-5%	Number of Plans Delivered	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 includes policies for sustainable travel and infrastructure improvements.	Focus on increasing public transport, walking and cycling trips whilst minimising private car journeys. Discussions must include emissions mitigation considerations, can be protracted.
11	Promotion of walking and cycling	Promoting Travel Alternatives	Personalised Travel Planning	2014	2023	Adur DC/WSCC	Adur DC/Worthing BC/WSCC/Developer contributions	NO	Partially Funded	£100k - £500k	Implementation	1-5%	Automatic cycle counters and travel surveys	The Living Streets 'Walk To' project continued in West Sussex in 2020 working with a number of schools, colleges and workplaces, along with the DEFRA funded Sussex-air schools project promoting	Focus on reducing traffic congestion and promoting sustainable travel for trips to and

													walking and cycling to schools including those in Adur.	from work (see also item 12).	
12	School Travel Plans	Promoting Travel Alternatives	School Travel Plans	2010	2021	WSCC	WSCC/Defra Grants	NO	Funded		Implementation	0.01	Hands-up travel mode surveys in schools	Schools are directed to Modeshift Stars for assistance with travel planning, which is a nationally recognised online travel planning tool. See entry 11 for information on Living Streets Walk To and Sussex-air schools project	Focus on promoting sustainable travel amongst young people and reducing peak time car traffic. WSCC Bikeability have been engaging the schools with cycle training (lots of work with primary and secondary schools across Adur to offer cycle training.
13	Promotion of LEV's	Public Information	Via the Internet	2015	2030	Adur DC/Worthing BC	LA/DLEV grants	NO	Funded	< £10k	Implementation	0.01	Number of LEV's	Information remains on website and updated as and when necessary	
14	Car Sharing	Public Information	Via the Internet	2015		WSCC	WSCC	NO	Funded		Implementation	1-5%	Website hits/journeys planned/Number of registrants/take-up of initiatives	Car share website now www.westsussexcarshare.com	Focus on promoting sustainable travel/car.
15	Public Health Information Campaign	Public Information	Via the Internet	2010		Adur DC/Worthing BC/WSCC	AdurDC/ Worthing DC/ WSCC	NO	Partially Funded	< £10k	Implementation	<1%	Number of promotional events, publications, social media. Annual increase in airAlert subscribers	Liaison with WSCC Public Health/Sustainability Teams who have supported the promotion of airAlert through part funding the service and supporting publicity. CleanBurn site promoted through Councils Social Media channels	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	2010		Adur DC	Adur DC	NO	Funded	< £10k	Completed	N/A	Reduction in levels of NO2	Air Quality Monitoring station in Shoreham High Street - results available via Sussex-air website, link on Council's website.	
17	Transport network infrastructure improvements for new development	Traffic Management	UTC, Congestion management, traffic reduction	2010		WSCC	WSCC/developer contributions	NO	Partially Funded		Implementation	<1%	Number of infrastructure improvements	Development funding contributions continue to be sought for identified schemes at Norfolk Bridge junction and A259 Shoreham Adur Ferry Bridge to Brighton & Hove cycle scheme	Focus on minimising traffic congestion. Funding continues to be an issue, hence delays.
18	Anti-idling promotion	Traffic Management	Anti-idling enforcement	2010		Adur DC/WSCC	WSCC/ Adur DC/ Sussex air	NO	Partially Funded		Implementation	N/A	Localised Air quality monitoring	Anti-idling signs continue to be placed at stationary traffic hotspots when deemed necessary and/or as requested by the public, funded by Adur DC.	Campaigns to promote anti-idling more generally still being considered e.g. social media campaign.
19	New infrastructure for cyclists and pedestrians	Transport Planning and Infrastructure	Cycle network	2010	2021	WSCC	WSCC/developer contributions	NO	Partially Funded		Implementation	<1%	Length of new cycle routes provided	The Adur and Working Local Cycling and Walking Infrastructure Plan (LCWIP) was adopted in summer 2020. This sets out a series of primary and secondary cycling and walking routes intended to be supported by contributions from strategic developments across the District	Minimising the impacts of traffic on local streets. Linked to Item 23
20	Shoreham High Street and Norfolk Bridge infrastructure improvements to reduce traffic flow conflicts with car,	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	2010		WSCC	WSCC	NO	Not Funded		Planning	1-5%	Number of Projects Delivered	Feasibility work undertaken through Shoreham Town Centre Study 2014. Schemes identified for preliminary design development in WSCC Annual Delivery Programme 2020-21; Options for these	Focus on reducing traffic congestion to improve air quality.

	bus and taxi bays, and improve access and public realm within the High Street														schemes being reviewed given challenges of limited highway space. Further discussion is required with Members and stakeholders regarding these schemes.	
21	Shoreham Area Sustainable Transport Package Feasibility Study	Transport Planning and Infrastructure	Other	2018		WSCC	WSCC/developer contributions	NO	Funded		Planning		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. Dialogue has continued with developers regarding safeguarding land for this scheme, and to secure funding contributions	Focus on promoting sustainable transport and minimising car use and vehicle congestion. Estimated completion TBC	
22	Taxi Fleet Emission Improvements	Promoting Low Emission Transport	Taxi Licensing conditions	2017		Adur DC	Adur DC/DLEV grants	NO	Not Funded		Planning	0.01	Number of taxis replaced with better Euro standard models	Discussions on fleet improvements through minimum standards. No further progress.	Work to develop during 2019, implementation phase delayed due to pandemic. District wide improvement will have some limited effect in High Street, particularly at taxi rank	
23	Active Travel Fund Schemes	Transport Planning and Infrastructure	Cycle network	2020		WSCC	DFT Emergency Active Travel Fund/Active Travel Fund	NO	Funded		Implementation		Length of new cycle routes provided	Temporary pop-up cycle route introduced on Upper Shoreham Road in summer 2020, but decision taken to remove scheme in autumn as lockdown restrictions eased. Active Travel Funding awarded to develop designs for permanent cycle scheme on Upper Shoreham Road.	NEW for 2020. Focus on promoting sustainable transport and minimising car use and vehicle congestion.	
WORTHING																
Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation	
1	A27 Highway Improvements	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2015	2026	HE	HE	NO	Partially Funded	> £10 million	Planning	High	Reduction in levels of NO2	Consultation by Highways England on one option ("to improve the A27 junctions at Worthing and Lancing") took place during Summer 2017. The scheme was reviewed in 2019 and was re-announced with revised objectives as part of the government's Road Investment Strategy 2 (RIS2): 2020 to 2025 in March 2020. Further option identification work is underway and further public consultation is expected in spring/summer 2022	Still awaiting outcome from Highways England. No AQ assessment included in 2017 consultation, so any AQ benefits remain unquantified by HE.	
2	Cut Engine, Cut Pollution Signs	Traffic Management	Anti-idling enforcement	2016	2020	HE/WSCC	Worthing BC/HE/WSCC	NO	Funded	< £10k	Implementation	Low/Medium	Local AQ monitoring/reduction in NO2	AQMA anti idling signs remain on exit road from Lyons Farm. Additional signs erected at known traffic hotspots.	Funded by Worthing BC. Sussex-air funded additional signs at level crossings. For A27 and feeder roads Highway 'clutter' is a concern.	
3	LEZ/CAZ Feasibility	Promoting Low Emission Transport	Low Emission Zone (LEZ)	2016		HE/ Worthing BC/ WSCC	HE	NO	Not Funded	£100k - £500k	Planning	High	Reduction in older Euro class HGV's/LGV's and buses within the AQMA	No progress. Outcome of A27 consultation delaying further discussion	As a HE road any CAZ/LEZ is an issue. Issues with displacement of vehicles onto	

														surrounding local roads, Finance, Enforcement - meaning this is not a current priority.	
4	Embed Air Quality Emissions Mitigation Planning Guidance for Sussex into the planning process/planning policies	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2014	2015	Worthing BC/WSCC	Worthing BC/WSCC	NO	Funded	< £10k	Implementation	Low	LE mitigation secured in developments	Revised Guidance due for publication January 2020. Guidance signposted within the draft Worthing Local Plan. Discussions to ensure Guidance and appropriate mitigation is flagged as a requirement at an early stage. Emission mitigation assessments being pursued with developers to ensure meaningful mitigation obtained. Walking and cycling initiatives and eV charge points secured at developments.	Consider developing the Guidance into a Supplementary Planning Document if deemed necessary.
6	EV vehicles and infrastructure	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2016	2025	Worthing BC/WSCC	Worthing BC/WSCC/HE	NO	Partially Funded		Implementation	Low/Medium	Number of charge points provided	EV charge points continue to be negotiated for new 'major' developments; new WSCC parking strategy sets minimum targets for ev charge points on new developments .The County Council is currently working in partnership with 6 of the 7 District/Borough Councils in the County, including Worthing, 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.	Focus is to increase the number of eV's. Discussions continued successfully with developers as part of AQ mitigation packages
7	Worthing Car Club	Alternatives to private vehicle use	Car Clubs	2015	2022	Worthing BC/ADC	Worthing BC/Developer Contributions	NO	Partially Funded	£50k - £100k	Implementation	Low	Number of people using the service/ Number of vehicles	Discussions with WSCC and car club providers continued during 2020, despite the pandemic. Car club providers continued discussions with developers regarding specific development sites in Worthing	V. small reduction in AQMA, however larger reductions can be anticipated elsewhere (e.g. town centre). Principle of car clubs embedded in planned new developments. Barriers are finding suitable spaces, particularly on street and cost of seed funding clubs.
8	Public transport improvement	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	2010		WSCC	WSCC/DFT/OLEV	NO	Partially Funded		Implementation	Low	Journey time and passenger number improvements	WSCC and WBC proposals for Worthing station Railway Approach are expected to benefit pedestrians, cyclists, and train, bus and taxi users with public consultation in spring 2021. Bus operators in West Sussex are considering low emission fuel technologies in their fleets and local authorities are in dialogue with operators as plans develop, including consideration of any future funding opportunities.	Subject to appropriate funding being made available.
9	WBC AND WSCC Staff Travel Planning	Promoting Travel Alternatives	Workplace Travel Planning	2018		Worthing BC/ ADC/ WSCC	Worthing BC/ ADC/ WSCC	NO	Partially Funded		Implementation	Low	Staff travel surveys reduced commuting and business travel by car	During 2020 there has been a major shift in staff travel resulting from COVID-19 restrictions with many staff working from home on a full-	Hybrid models for mixed working from home/office.

														time basis and most meetings taking place virtually. Adur & Worthing and WSCC EASIT schemes for staff and local businesses continue; Staff travel plan under review, pool car now exclusively hybrid, EV's being actively investigated.	
10	Improve Emissions from Council's Vehicle fleet	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	2015	2030	Worthing BC/ADC/WSCC	Worthing BC/ADC/WSCC	NO	Partially Funded	£1 million - £10 million	Implementation	Low	No. of vehicles replaced with better Euro standard models	Programme of fleet replacement with ev/hybrid vehicles continued, as and when vehicles they are due for replacement. All pool cars hybrids.	Barrier: Suitable vehicles are affordable (e.g. HGV's/refuse vehicles. Low reduction within AQMA
11	Increase availability of AQ information in relation to impacts on Public Health	Public Information	Via the Internet	2015		Worthing BC	Worthing BC	NO	Funded	< £10k	Implementation	Low	Reduction in levels of NO2/No. of hits on AQ pages	AQ information periodically updated on WBC and WSCC websites. CleanBurn site promoted through Councils Social Media channels.	Measure success of AQAP/levels in AQMA. Assist with PM2.5 strategy
12	Embedding AQ in Adur & Worthing Public Health Plan	Policy Guidance and Development Control	Other policy	2015	2020	Worthing BC	Worthing BC	NO	Not Funded	< £10k	Completed	Low	Inclusion in each revision of public Health Plan	Air Quality Action Plans embedded within Adur & Worthing Public Health Plan.	
13	Promotion of Air Alert	Public Information	Via the Internet	2014		Worthing BC	Worthing BC/ WSCC	NO	Partially Funded	£10k - 50k	Implementation	Low	Annual increase in subscriber numbers	Liaison with West Sussex County Council Public Health & Sustainability teams who have supported the promotion of airAlert - www.airalert.info - through financial backing and supporting publicity in West Sussex.	Attempt to reduce car journeys and increase walking and cycling through the AQMA, promotion of air Alert service.
14	Re-assess traffic light sequencing in AQMA	Traffic Management	UTC, Congestion management, traffic reduction	2010		HE/WSCC	HE/WSCC	NO	Funded		Implementation	Low	Reduction in levels of NO2	Ongoing optimisation by HE/WSCC.	
15	Safe Cycling and Walking Routes	Transport Planning and Infrastructure	Cycle network	2010	2030	HE/WSCC	HE/WSCC	NO	Funded	£1 million - £10 million	Implementation	Low	Length of new cycle routes provided	The Adur and Working Local Cycling and Walking Infrastructure Plan (LCWIP) was adopted in summer 2020. This sets out a series of primary and secondary cycling and walking routes intended to be supported by contributions from strategic developments across the Borough	There already exist cycle paths segregated from pedestrians in and around Grove Lodge.
16	Travel plans for significant/major developments	Promoting Travel Alternatives	Other	2015	2026	Worthing BC/WSCC	Developer Contribution	NO	Partially Funded	£500k - £1 million	Implementation	Low	Number of plans delivered	Plans continue to be secured as and when developments come forward. The Draft Local Plan adds weight to the requirement for travel plans.	Forthcoming Worthing Local Plan will add weight to need for travel plans and appropriate mitigation.
17	Car Sharing	Alternatives to private vehicle use	Car & lift sharing schemes	2015		WSCC	WSCC	NO	Funded		Implementation	Low	Website hits/ journeys planned/Number of registrants/take-up of initiatives	Car share website www.westsussexcarshare.com	Focus on promoting sustainable travel/car. Link on Worthing website.
18	Cycling & Walking promotion	Promoting Travel Alternatives	Promotion of cycling	2015		Worthing BC/WSCC	WSCC/Developer Contributions	NO	Partially Funded		Implementation	Low	Automatic cycle counters and travel surveys	The Living Streets 'Walk To' project continued in West Sussex in 2020 working with a number of schools, colleges and workplaces, along with the DEFRA funded Sussex-air schools project promoting walking and cycling to schools including those in Worthing.	Focus on reducing traffic congestion and promoting sustainable travel for trips to and from work. Subject to available funding.
20	WSCC staff travel planning	Promoting Travel Alternatives	Workplace Travel Planning	2014	2019	WSCC	WSCC	NO	Funded		Completed	Low		Pool cars provided for casual user staff including EV's.	Renault Zoe's added in 2018.
21	School Travel Plans	Promoting Travel Alternatives	School Travel Plans	2010		WSCC	WSCC	NO	Funded		Completed	Low		Schools are directed to Modeshift Stars for assistance with travel planning, which is a	Focus on promoting sustainable travel

														nationally recognised online travel planning tool. See entry 18 for information on Living Streets Walk To and Sussex-air schools project.	amongst young people and reducing peak time car traffic. WSCC Bikeability has been engaging with primary and secondary schools across Worthing to offer cycle training. The Sussex-air/Defra funded project is hoped to have influenced school travel plans.
22	Business Travel Plans	Promoting Travel Alternatives	Workplace Travel Planning	2017		Worthing BC	Worthing BC/ WSCC/Developer Contributions	YES	Partially Funded	< £10k	Aborted	Low	Number of plans devised/derived	Defra AQ grant project via Sussex-air for business fleet advice was unsuccessful. Uptake by businesses in Sussex was v poor, so project was shelved.	Resource issues remain; Questions over whether LGV's should be prioritised over HGV's? A Source Apportionment update will inform this.
23	Worthing College Travel Plan Review	Promoting Travel Alternatives	School Travel Plans	2015	2018	Worthing BC/ WSCC	Worthing College	NO	Funded		Completed	Low/Medium	Reduction in use of private cars for trips to/from College/ Increase in use of alternative modes of travel	Review completed 2018.	No further updates
24	HGV/LGV assessment	Transport Planning and Infrastructure	Route Mgt plans/Strategic routing for HGV's	2016	2020	Worthing BC	Worthing BC/WSCC	YES	Partially Funded	< £10k	Aborted	Low	Data on Euro Classes	Defra AQ grant project via Sussex-air for business fleet advice was unsuccessful. Uptake by businesses in Sussex was v poor, so project was shelved.	The next Source Apportionment Update will identify the proportion of HGV's/LGV's and the weighting to be applied to HGV/LGV actions.
25	Ecostars for Local Fleet Operators	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	2016	2022	Worthing BC	Worthing BC	NO	Not Funded		Planning	Low/Medium	Increase in new euro Class vehicles	No further developments	The Ecostars scheme remains an aspiration, but is subject to identification of suitable funding streams.
26	Increase and improve availability of WBC Air Quality Monitoring results	Public Information	Via the Internet	2015		Worthing BC	Worthing BC	NO	Funded	£10k - 50k	Implementation	Low	Reduction in levels of NO2/No. of hits on AQ pages	Link Worthing webpage to UK Air for Grove Lodge AURN monitoring.	Revision of webpages ongoing
27	Active Travel Fund Schemes	Transport Planning and Infrastructure		2020	2020	WSCC	DfT Emergency Active Travel Fund/Active Travel Fund	NO	Funded		Implementation	Low	Length of new cycle routes provided	Temporary pop-up cycle route introduced on A24 Broadwater Road corridor in summer 2020, but decision taken to remove scheme in autumn as lockdown restrictions eased. Active Travel Funding awarded to deliver A24 Findon Valley to Findon cycle scheme and consultation planned in 2021.	Focus on promoting sustainable transport and minimising car use and vehicle congestion

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.

Adur District and Worthing Borough Councils are taking the following measures to address PM_{2.5}:

Adur and Worthing Councils continue to develop approaches to address PM_{2.5} in partnership with West Sussex Public Health and other Sussex local authorities through Sussex-air. However progress stalled in 2020 due to the pandemic.

The Clean Burn campaign, funded through the Sussex-air Defra funding, ran into 2020 and attempted to highlight the issue of particulate emissions from domestic burning. The results have been discussed in a previous section of this report.

We have updated our domestic burning guidance on the website and linked to the Clean Burn campaign website. We will continue to highlight the particulate issues associated with burning, particularly during the winter months.

The Councils have considered the declaration of Smoke Control Areas. However there are considerable barriers to this, most notably associated with non-compliant stoves and fireplaces existing at the time of any declaration. This would also require political and public support. We will keep such an option open, particularly as legislation in this area is continually evolving and we will continue to regularly review our approach, especially with our pending reviews of AQAP's.

Adur & Worthing Councils monitor levels of PM_{2.5} through an AURN affiliated continuous monitoring station at Grove Lodge, Worthing (A27), which will assist us with assessing any PM_{2.5} issues in the area. The annual mean for PM_{2.5} in Worthing in 2020 was 8 µgm⁻³. As no PM_{2.5} monitoring was undertaken in Adur in 2020 we have estimated the fraction of PM_{2.5} from the measured PM₁₀ annual mean, as per the Technical Guidance LAQM TG16. The result was 15.4µg/m³, less than the 17 in 2019.

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 is 4.4 % and 4.3 % within Worthing Borough. 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 calculated mortality is less than that calculated for south east England (4.9 %) and England (5.1 %) as a whole.

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance

This section sets out the monitoring undertaken within 2020 by Adur District and Worthing Borough Councils and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2016 and 2020 to allow monitoring trends to be identified and discussed.

Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Adur District and Worthing Borough Councils undertook automatic (continuous) monitoring at two sites during 2020. Table A.1 in Appendix A shows the details of the automatic monitoring sites. NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem. The [Sussex-air](#) webpage presents automatic monitoring results for Adur District and Worthing Borough Councils, with automatic monitoring results also available through the UK-Air website.

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

3.1.2 Non-Automatic Monitoring Sites

Adur District and Worthing Borough Councils undertook non-automatic (i.e. passive) monitoring of NO₂ at 63 sites during 2020 - 26 in Adur and 37 in Worthing. Table A.2 in Appendix A presents the details of the non-automatic sites.

The following sites were removed for 2020 as previous measured levels were consistently below the 40µg/m³ threshold and/or the sites were very close to other monitoring locations.

Adur

- S27 West Street Shoreham was closed in favour of the creation of two nearby sites (S46 and S47)

- S40 St. Mary's Close Sompting
- S41 North Road Lancing
- S42 High Street Shoreham could no longer be positioned at its facade location and so was moved (to S49).

Worthing

- N45 11 Hill Barn Lane, Worthing
- N62 Steyne Gardens, Worthing.

The following tube sites were added for 2020:

Adur

- S43 Brunswick Road Shoreham was added to monitor idling traffic at a level crossing
- S46 and S47 West Street Shoreham were added in response to concerns from a residents group. The sites sit either side of the AQMA boundary.
- S48 Grinstead Lane, Lancing was located at a site of traffic queuing to access the A27
- S49 High Street Shoreham was fixed to the nearest facade from S42

Worthing

- N66 Sompting Lane, Worthing was located at a site of traffic queuing to access the A27
- N67 Glebe Road/Rectory Road, Worthing; N68 South Farm Road/St Lawrence Avenue, Worthing; N69 29 Broadwater Road, Worthing; and N70 Georgia Avenue/Broadwater Road – all three month only sites set up to monitor the effect of the temporary pop-up cycle lane on the A24.

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.

The Coronavirus pandemic clearly had an impact on traffic and resultant pollutant levels during 2020. During the initial national lockdown (from 23 March 2020), marked reductions in vehicle traffic were observed. It is estimated that this reduction in travel resulted in national reductions in NO₂ annual mean concentrations between 20 and 30% relative to pre-pandemic levels. This is discussed in more detail in Appendix F.

Despite this we prioritised our monitoring activities and they remained largely unaffected, with routine calibrations of continuous monitoring sites and regular diffusion tube changes continuing throughout 2020.

Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, annualisation (where the annual mean data capture is below 75% and greater than 25%), and distance correction. Further details on adjustments are provided in Appendix C.

3.1.3 Nitrogen Dioxide (NO₂)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO₂ annual mean concentrations for the past five years with the air quality objective of 40µg/m³. Note that the concentration data presented 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 2020 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.

Table A.5 in Appendix A compares the ratified continuous monitored NO₂ hourly mean concentrations for the past five years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year.

A. Adur

Automatic Monitoring

The 2020 annual mean measured at the continuous monitoring site in Shoreham High Street was 20µg/m³. This is comfortably below the objective of 40µg/m³. This is the second full year of data since the site re-commenced monitoring and was a drop of 6µg/m³ over 2019 levels.

There were no recorded exceedances of the one hour mean objective of 200µg/m³. Data capture was an excellent 96%.

Non-Automatic Monitoring

Of the 26 diffusion tubes used during 2020 all that existed in 2019 showed a decrease in measured annual means.

No monitoring sites in Adur exceeded the annual mean objective of 40µg/m³ during 2020.

The measured reductions ranged from 1.6µg/m³ at S26 Loose Lane, Sompting to 6.9µg/m³ at S44 Upper Brighton Road, Lancing.

In and around AQMA1, Shoreham High Street:

S17/18/19 are tubes collocated with the continuous analyser. These recorded an average of 24µg/m³, a reduction of 6.3µg/m³ over 2019 levels which is similar to the fall recorded by the continuous monitoring here.

West Street in Shoreham is regularly used by vehicles trying to avoid congestion along the High Street (A259). As a result, we replaced an older tube (S27) with two new tubes (S46 and S47) to gauge façade levels on either side of this street. These tubes are located either side of the former S27 site, as well as being either side of the AQMA1 boundary. Measured levels at S46 showed 18.3 µg/m³ (inside the AQMA) and S47 measured 16.3 µg/m³, both well below the 40 µg/m³ objective.

S37 Humphrey's Gap Shoreham showed a decrease of 5.7µg/m³ continuing a downward trend since monitoring began in 2017.

Site S49 is a facade mounted tube a few metres away from the continuous monitoring site. It was relocated from site S42 a few metres to the west as it could no longer be positioned at that facade location. This recorded a level of 14.3µg/m³, well below the 40µg/m³ objective, although it is acknowledged the prevailing coastal winds may have had a greater effect at this new more exposed location.

Site S36 Victoria Road Footpath Shoreham, just to the north of AQMA1 showed a reduction of 5.9 µg/m³ to 18.3 µg/m³.

We believe the actions listed in section 2 are assisting with year on year reductions alongside the national trend of a cleaner vehicle fleet. Increased awareness of air quality alongside the carbon reduction/climate change agenda is likely to be driving behaviour change, albeit small, with greater local cycling, walking, eco-friendly driving, etc. We remain 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 continue to review options for replacement which we hope will result in a new counter shortly.

As with previous years, we maintain that we must keep the measured levels in AQMA1 under review before making decisions on the future of the AQMA. The large number of approved major developments were delayed by Covid, so have yet to commence construction. Alongside other planned major developments for the Adur District (as detailed in section 2), we believe revocation of the AQMA is not a reasonable option at this time. This was a view endorsed in the review of last year's ASR.

Sites S8 and S9 in Southwick within AQMA2 continued the downward trend shown over recent years, dropping an average of $6\mu\text{g}/\text{m}^3$ to $21.1\mu\text{g}/\text{m}^3$ and $25.6\mu\text{g}/\text{m}^3$ respectively, below the annual mean objective. Both are roadside locations and levels drop further when predicted back to the nearest receptors, 4m and 2m away respectively. In our past Adur ASR's we advised that we would consider revoking AQMA2 as measured levels had been below the annual mean objective for a number of years. As previously mentioned the pandemic prevented much of our work on air quality, so revocation was not considered in 2020. We hope to review this matter in 2021/22.

Elsewhere S45 Dolphin Mews, Shoreham showed a decrease of $3.1\mu\text{g}/\text{m}^3$. This site is adjacent to a level crossing where vehicles often queue and idle for long periods.

Site S44 Upper Brighton Road, Lancing showed a decrease of $6.9\mu\text{g}/\text{m}^3$ to $31.4\mu\text{g}/\text{m}^3$. This site remains the highest level recorded in the District and one to keep an eye on. This site is located adjacent to the eastbound A27 dual carriageway, with the closest receptor just over 5m away.

The other new site for 2020, site S48 Grinstead Lane Lancing, recorded a level of $25.7\mu\text{g}/\text{m}^3$, below the objective.

B. Worthing

Automatic Monitoring

The annual mean recorded at the continuous monitoring site WT2 Grove Lodge was $26\mu\text{g}/\text{m}^3$, a decrease from $32.9\mu\text{g}/\text{m}^3$ in 2019. This is below the national objective of $40\mu\text{g}/\text{m}^3$ and continues a downward trend seen since 2017.

There were no recorded exceedances of the one hour mean objective of $200\mu\text{g}/\text{m}^3$. Data capture was 99%.

The automatic monitoring site is an AURN affiliated site located adjacent to the A27, a single lane strategic trunk route through Worthing with slow moving or stationary traffic for prolonged periods. Annual average NO₂ peaked at 51.4µg/m³ in 2014, decreased in 2015 and then increased again in 2016 to 48µg/m³. The nearest relevant receptor (a residential facade) is 18m away, meaning the level at the façade reduces further still.

It seems the increased level recorded in 2016 may have been an anomaly as it has not been repeated since.

Non-Automatic Monitoring

Of the 37 diffusion tubes used during 2020 all those that existed in 2019 showed a decrease in measured annual means. The reductions ranged from 1.4µg/m³ at N22 Falmer Close to 11.5µg/m³ at Site N30A Grove Lodge Cottages.

As in 2019 only one monitoring site exceeded the annual mean objective of 40µg/m³ – N30A Grove Lodge Cottages.

No site exceeded 60µg/m³, used as an indicator of a likely exceedance of the 1-hour mean objective at that site.

In and around AQMA No.2:

All of the monitoring locations within the AQMA measured reductions in the annual mean during 2020 and all but N30A were below the national objective.

Site N30A Grove Lodge Cottages has always recorded the highest levels from any of our monitoring sites. In 2019 and 2020 measured levels reduced but are still above the 40µg/m³ objective. The monitoring site is adjacent to the A27 westbound carriageway with the nearest residential façade just over 2m away, so the measured level will only decrease slightly when predicted back (44.5µg/m³).

The tubes N44A/B/C collocated with the continuous monitor again recorded a reduction in levels with the average of the three being 31.1µg/m³. Predicted back to the nearest façade levels drop to 24.7µg/m³.

Site 6N Gainsborough Avenue reduced again from 33.1µg/m³ in 2019 to 27.8 µg/m³. In 2016 this roadside site exceeded the annual mean objective by 0.7µg/m³. It has declined ever since. The closest receptor is 11m away, so this level falls further when predicted back.

Site N24 close to Lyons Farm on the A27 fell from 23.5µg/m³ in 2019 to 18.4µg/m³ in 2020. In 2018 this site recorded 34.5µg/m³ so has fallen by 16µg/m³ in two years.

Site N29 Downlands Parade, close to the Lyons Farm junction of the A27, showed a decrease of just over $4\mu\text{g}/\text{m}^3$ to $25.6\mu\text{g}/\text{m}^3$ after rising in 2019.

Elsewhere site N57 Lyndhurst Road continued to fall with a level of $20.1\mu\text{g}/\text{m}^3$, a fall of $3.3\mu\text{g}/\text{m}^3$ and well below the annual mean objective. There are a number of major developments planned close to this area so we shall continue to closely monitor any changes here.

Sites added in 2019 – N63, New Broadway Tarring Road, N64 South Street outside Starbucks and N65 Teville Road showed falls in measured levels.

The new site added for 2020, N66 Sompting Road, recorded a level of $25\mu\text{g}/\text{m}^3$, well below the annual objective.

5 year trend graphs are included in Appendix A.

In previous years we stated that the actions listed in Section 2 we hope are assisting the fall in measured levels, alongside the national trend towards a cleaner vehicle fleet. Clearly 2020 was an unusual year and as such, we cannot draw any conclusions on trends.

Increased awareness of air quality and the climate change agenda will still be driving some behaviour change – low emission vehicles, cycling and walking, eco-friendly driving, etc. In some cases, particularly with respect to the Worthing AQMA, local traffic is avoiding the AQMA as it suffers from severe congestion during large parts of the day, including weekends.

Four tubes were added for 3 months (October to December 2020) to monitor the effects of the A24 temporary cycle scheme, which occupied one lane of the dual carriageway in each direction between the town centre and Broadwater and caused regular queuing traffic. Two tubes were added along the A24 and two in locations identified by Worthing BC and West Sussex County Council on routes where it appeared traffic was using other minor roads to avoid the temporary cycle route, All the tubes showed levels well below the annual mean objective measuring, when annualised, between 19.5 and $25.4\mu\text{g}/\text{m}^3$.

3.1.4 Particulate Matter (PM₁₀)

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM₁₀ annual mean concentrations for the past five years with the air quality objective of $40\mu\text{g}/\text{m}^3$.

Table A.7 in Appendix A compares the ratified continuous monitored PM₁₀ daily mean concentrations for the past five years with the air quality objective of 50µg/m³, not to be exceeded more than 35 times per year.

The annual mean measured in Shoreham High Street (Adur) in 2020 was 22.0µg/m³ down from 2019's 24.3µg/m³ and below the objective of 40µg/m³ (data capture rate 100%). There were no recorded exceedances of an hourly mean of 50µg/m³.

No PM₁₀ monitoring is carried out in the Worthing Borough.

3.1.5 Particulate Matter (PM_{2.5})

Table A.8 in Appendix A presents the ratified and adjusted monitored PM_{2.5} annual mean concentrations for the past five years.

In Worthing 2020 is our third full year of PM_{2.5} monitoring at Grove Lodge (A27). The measured and ratified level for 2020 was 8µg/m³. This is comfortably within the EU Limit Value of 25µg/m³ and also below the World Health Organisation (WHO) annual mean guideline limit of 10µg/m³ (which is not a legal limit in the UK).

Adur District Council does not monitor levels of PM_{2.5}. Therefore an estimate of PM_{2.5} concentrations has been made following the guidance contained within Technical Guidance LAQM TG16. See Appendix C for the calculation. The estimate of PM_{2.5} concentrations is 15.4µg/m³, down from the 17µg/m³ estimated in 2019. This fall is not surprising as the measured PM₁₀ level fell in 2020. However as the level is an estimation, the result needs to be treated with caution.

Adur District Council will consider further options for monitoring PM_{2.5} in Shoreham High Street during 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? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
AD1	High Street Shoreham	Kerbside	521399	105039	NO ₂ ; PM ₁₀	YES AQMA1	Chemiluminescence; BAM	4.0	1.6	2.0
WT2	Grove Lodge	Roadside	514184	104963	NO ₂ ; PM _{2.5}	YES Worthing AQMA No.2	Chemiluminescence; BAM	18.3	2.9	1.8

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

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
1. Adur										
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	AQMA2	4.3	2.3	No	2.5
S9	Old Shoreham Road Southwick	Roadside	523784	106081	NO2	AQMA2	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	Roadside	518820	105584	NO2	No	14.8	2.0	No	3.0
S12	Boundstone Lane Lancing	Roadside	517731	105505	NO2	No	N/A	1.8	No	3.0
S13	Upper Brighton Road Sompting	Roadside	517291	105550	NO2	No	8.6	4.6	No	2.5
S14	West Street Sompting	Urban Background	516057	105190	NO2	No	3.6	1.2	No	2.0
S15	Western Road Lancing	Roadside	517512	103367	NO2	No	6.4	1.5	No	2.7

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
S17	High Street AQMS 1 Shoreham	Kerbside	521400	105040	NO2	AQMA1	5.0	0.9	Yes	2.6
S18	High Street AQMS 2 Shoreham	Kerbside	521400	105040	NO2	AQMA1	5.0	0.9	Yes	2.6
S19	High Street AQMS 3 Shoreham	Kerbside	521400	105040	NO2	AQMA1	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
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
S39	Brighton Road Kingston	Kerbside	523329	104960	NO2	No	4.0	1.2	No	3.0
S43	Brunswick Road Shoreham	Roadside	521733	105251	NO2	No	0.0	2.7	No	2.6
S44	Upper Brighton Road Lancing	Roadside	518494	105464	NO2	No	5.4	2.0	No	2.5
S45	Dolphin Mews Shoreham	Roadside	522300	105258	NO2	No	0.0	4.7	No	3.0
S46	West Street 1 Shoreham	Roadside	521363	105082	NO2	AQMA1	0.0	1.3	No	2.5
S47	West Street 2 Shoreham	Roadside	521375	105101	NO2	No	0.0	1.3	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
S48	Grinstead Lane Lancing	Roadside	518590	105463	NO2	No	4.0	3.3	No	2.5
S49	High Street Shoreham	Roadside	521405	105031	NO2	AQMA1	0.0	7.0	No	2.0
2. Worthing										
4N	Heene Way (UK02)	Urban Background	513609	102556	NO2	No	5.3	1.7	No	1.5
5N	Cleveland Road (UK01)	Urban Background	512701	105562	NO2	No	6.2	2.5	No	2.0
6N	Gainsborough Avenue (UK06)	Roadside	515190	105122	NO2	Worthing AQMA No.2	11.2	1.8	No	2.0
N1C	High Street East	Urban Centre	515114	102670	NO2	No	0.0	3.3	No	2.0
N5	First Avenue	Roadside	514495	105020	NO2	Worthing AQMA No.2	15.2	2.2	No	1.5
N8	Littlehampton Road	Roadside	513236	104651	NO2	No	14.1	1.5	No	3.5
N11	Dawes Close	Urban Background	515812	103309	NO2	No	8.4	1.4	No	1.5
N18A	Kinnall Court, Upper Brighton Road	Suburban	515315	105141	NO2	Worthing AQMA No.2	0.0	12.0	No	2.0
N21	Greenwood Cottage, A27	Roadside	509777	105696	NO2	No	7.3	6.5	No	3.0
N22	Falmer Close, C-Dust monitor	Urban Background	511010	102226	NO2	No	14.6	2.2	No	1.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
N24	152 Upper Brighton Road	Roadside	515151	105109	NO2	Worthing AQMA No.2	0.0	8.0	No	2.0
N25	Warren Court	Suburban	513845	105191	NO2	No	0.0	17.3	No	2.0
N27	Tarring Road, Crossing	Roadside	513380	103352	NO2	No	0.0	3.2	No	2.5
N28	Chapel Road / Teville Road	Roadside	514740	103173	NO2	No	1.6	3.0	No	2.5
N29	Downlands Parade	Roadside	515014	105099	NO2	Worthing AQMA No.2	0.5	6.5	No	3.5
N30A	Grove Lodge Cottages	Roadside	514183	104948	NO2	Worthing AQMA No.2	0.2	2.2	No	2.5
N31	South Farm Road, Roundabout	Kerbside	514317	103329	NO2	No	4.0	0.9	No	2.5
N35	30 Upper Brighton Road	Kerbside	514266	104961	NO2	Worthing AQMA No.2	0.0	11.2	No	2.0
N39	SW of Roundabout, Grove lodge	Roadside	514088	104906	NO2	Worthing AQMA No.2	47.8	2.2	No	3.5
N42	Norfolk House, 122 Chapel Road	Roadside	514742	103234	NO2	No	0.0	3.4	No	2.0
N43	23 Upper Brighton Road	Suburban	514199	104982	NO2	Worthing AQMA No.2	0.0	19.2	No	2.0
N44A, N44B, N44C	AQMS O/S 21 Upper Brighton Road	Roadside	514184	104963	NO2	Worthing AQMA No.2	18.4	2.8	Yes	2.0
N48	Shaftesbury Avenue	Roadside	512063	103385	NO2	No	14.8	2.2	No	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
N52	Newland Road, outside 63	Kerbside	514973	103335	NO2	No	4.5	0.4	No	2.0
N53	Offington Corner	Roadside	513278	105623	NO2	No	20.5	6.0	No	2.0
N54	Aquarena	Roadside	515595	102725	NO2	No	30.2	3.7	No	3.0
N56	Titnore Way	Suburban	510318	104506	NO2	No	11.2	1.2	No	3.0
N57	Lyndhurst Road	Roadside	515114	102975	NO2	No	0.0	3.5	No	2.5
N61	Cricketers Parade	Kerbside	514501	104531	NO2	No	4.0	1.2	No	2.0
N63	New Broadway, Tarring Road	Roadside	513437	103311	NO2	No	1.0	3.5	No	2.0
N64	South Street, outside Starbucks	Urban Centre	514946	102541	NO2	No	2.8	2.4	No	2.5
N65	Teville Road (opposite Unleashed)	Kerbside	514543	103220	NO2	No	4.7	0.8	No	2.5
N66	Sompting Road	Roadside	515067	105082	NO2	Worthing AQMA No.2	3.7	4.7	No	2.5
N67	Temp. cycle lane, Glebe Road/Rectory Road	Roadside	513383	104041	NO2	No	12.0	1.7	No	2.5
N68	Temp. cycle lane, South Farm Rd/St Lawrence Ave	Roadside	514226	103962	NO2	No	9.4	2.1	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
N69	Temp. cycle lane, 29 Broadwater Road	Roadside	514680	103827	NO2	No	3.2	2.1	No	2.5
N70	Temp. cycle lane, Georgia Ave/Broadwater Road	Roadside	514687	104003	NO2	No	8.1	1.9	No	2.5

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: Automatic Monitoring (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
AD1	521399	105039	Kerbside	96	96	n/a	n/a	29.2	26.0	20.0
WT2	514184	104963	Roadside	99	99	48.0	35.8	36.8	32.9	26.0

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM..

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

Notes:

The annual mean concentrations are presented as µg/m³.

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

All means have been “annualised” as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

(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%).

Table A.4 – Annual Mean NO₂ Monitoring Results: Non-Automatic Monitoring (µg/m³)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
Adur										
S2	525330	105085	Roadside	100	100.0	24.9	26.1	27.0	23.6	17.9
S3	525562	105313	Urban Background	100	100.0	17.5	17.0	18.1	16.7	13.9
S7	524139	106321	Urban Background	100	100.0	14.8	14.9	15.9	14.1	11.5
S8	524018	106070	Roadside	100	100.0	30.4	32.5	30.4	27.5	21.1
S9	523784	106081	Roadside	100	100.0	34.5	35.4	35.0	31.1	25.6
S10	523343	106111	Roadside	100	100.0	25.2	24.4	27.0	23.2	19.2
S11	518820	105584	Roadside	100	100.0	35.6	35.9	35.1	32.5	26.9
S12	517731	105505	Roadside	100	100.0	31.1	31.1	30.2	25.8	20.7
S13	517291	105550	Roadside	100	100.0	38.3	39.9	39.0	36.3	29.5
S14	516057	105190	Urban Background	100	100.0	20.4	19.3	19.5	23.7	19.1
S15	517512	103367	Roadside	100	100.0	29.3	30.2	32.5	27.7	23.2
S17	521400	105040	Kerbside	92.08	92.1	38.4	37.7	33.7	30.4	24.3

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
S18	521400	105040	Kerbside	92.08	92.1	39.1	37.4	32.8	30.9	24.2
S19	521400	105040	Kerbside	92.08	92.1	40.9	37.4	32.4	29.6	23.5
S25	519117	105710	Roadside	100	100.0	28.8	28.6	30.4	26.2	21.5
S26	516536	104783	Suburban	100	100.0	15.4	14.2	16.5	13.4	11.8
S36	521282	105254	Roadside	100	100.0		25.8	26.6	24.3	18.3
S37	522103	105126	Roadside	100	100.0		36.2	32.6	29.1	23.4
S39	523329	104960	Kerbside	90.4	90.4			26.1	21.9	17.4
S43	521733	105251	Roadside	100	100.0				22.5	16.6
S44	518494	105464	Roadside	100	100.0				38.4	31.4
S45	522300	105258	Roadside	100	100.0				19.1	15.9
S46	521363	105082	Roadside	92.62	92.6					18.3
S47	521375	105101	Roadside	100	100.0					16.3
S48	518590	105463	Roadside	100	100.0					25.7
S49	521405	105031	Roadside	100	69.7					14.8

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
Worthing										
4N	513609	102556	Urban Background	100	100.0	13.8	14.5	14.1	12.7	10.8
5N	512701	105562	Urban Background	100	100.0	16.0	15.9	16.9	15.7	11.8
6N	515190	105122	Roadside	100	100.0	40.7	38.1	35.1	33.1	27.8
N1C	515114	102670	Urban Centre	90.14	90.4	30.3	26.8	28.5	26.2	19.8
N5	514495	105020	Roadside	91.78	92.1	30.2	31.0	25.6	28.3	24.5
N8	513236	104651	Roadside	89.59	89.6	30.0	30.7	29.6	28.6	22.8
N11	515812	103309	Urban Background	100	100.0	15.5	15.6	15.7	13.4	11.8
N18A	515315	105141	Suburban	100	100.0	25.3	24.5	23.9	21.7	17.4
N21	509777	105696	Roadside	92.08	92.1	34.1	17.2	13.5	10.8	8.7
N22	511010	102226	Urban Background	100	100.0	13.3	13.3	12.8	11.6	10.2
N24	515151	105109	Roadside	100	100.0	25.8	25.9	34.5	23.5	18.4
N25	513845	105191	Suburban	100	100.0	22.2	20.7	20.3	17.8	14.8
N27	513380	103352	Roadside	100	100.0	25.7	24.7	26.2	22.7	19.7

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
N28	514740	103173	Roadside	91.51	92.1	21.5	36.0	33.4	27.2	17.3
N29	515014	105099	Roadside	100	100.0	34.6	32.4	23.6	29.9	25.6
N30A	514183	104948	Roadside	100	100.0	<u>64.1</u>	<u>68.2</u>	<u>60.1</u>	56.6	45.1
N31	514317	103329	Kerbside	99.18	100.0	27.5	26.8	27.1	25.8	20.8
N35	514266	104961	Kerbside	90.41	90.4	28.6	28.5	26.2	24.4	21.1
N39	514088	104906	Roadside	100	100.0	33.5	32.0	32.7	28.5	24.1
N42	514742	103234	Roadside	99.73	100.0	25.9	25.1	26.6	24.2	18.1
N43	514199	104982	Suburban	100	100.0	23.1	23.1	22.3	19.9	17.6
N44A, N44B, N44C	514184	104963	Roadside	92.33	92.3	41.6	41.2	40.8	36.3	31.1
N48	512063	103385	Roadside	100	100.0	30.1	27.0	27.7	25.8	18.9
N52	514973	103335	Kerbside	100	100.0	24.9	24.8	26.4	22.4	20.2
N53	513278	105623	Roadside	100	100.0	32.1	34.9	33.9	30.7	25.4
N54	515595	102725	Roadside	84.66	84.7	26.0	24.6	22.8	19.3	14.4
N56	510318	104506	Suburban	100	100.0	25.2	25.6	25.3	20.8	18.5

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
N57	515114	102975	Roadside	100	100.0	27.6	27.6	25.0	23.4	20.1
N61	514501	104531	Kerbside	92.33	92.3			36.8	34.8	28.2
N63	513437	103311	Roadside	82.79	82.7				29.2	23.5
N64	514946	102541	Urban Centre	99.73	100.0				27.9	20.0
N65	514543	103220	Kerbside	99.18	100.0				27.5	22.2
N66	515067	105082	Roadside	100	100.0					25.0
N67	513383	104041	Roadside	27.4	27.4					25.4
N68	514226	103962	Roadside	27.4	27.4					23.9
N69	514680	103827	Roadside	27.32	27.4					20.7
N70	514687	104003	Roadside	27.32	27.4					19.5

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16

Diffusion tube data has been bias adjusted

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 correction

Notes:

The annual mean concentrations are presented as $\mu\text{g}/\text{m}^3$.

Exceedances of the NO₂ annual mean objective of 40 $\mu\text{g}/\text{m}^3$ are shown in **bold**.

NO₂ annual means exceeding 60 $\mu\text{g}/\text{m}^3$, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

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

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

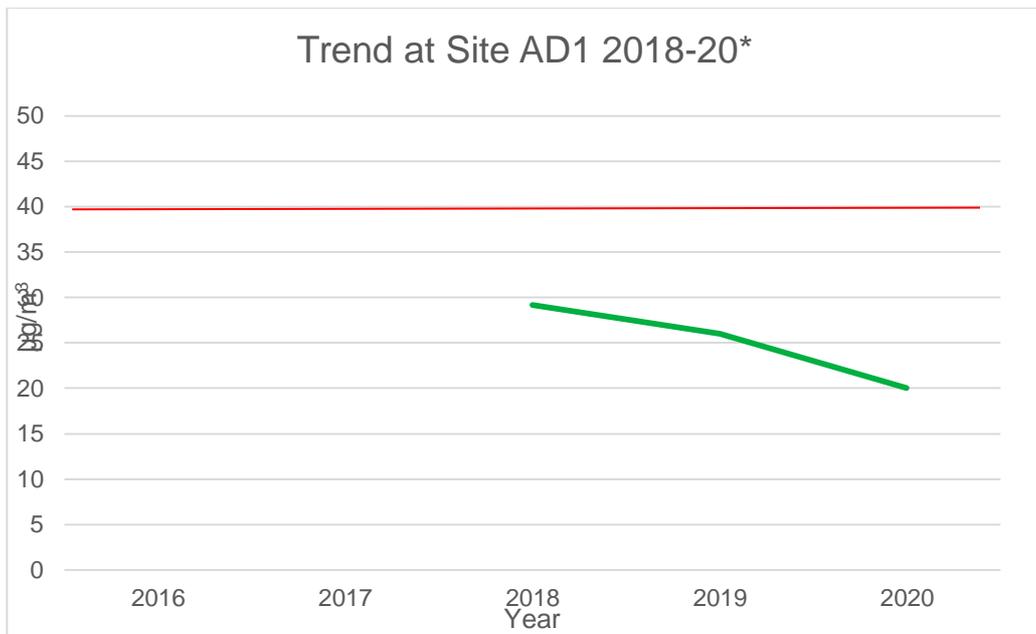
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(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%).

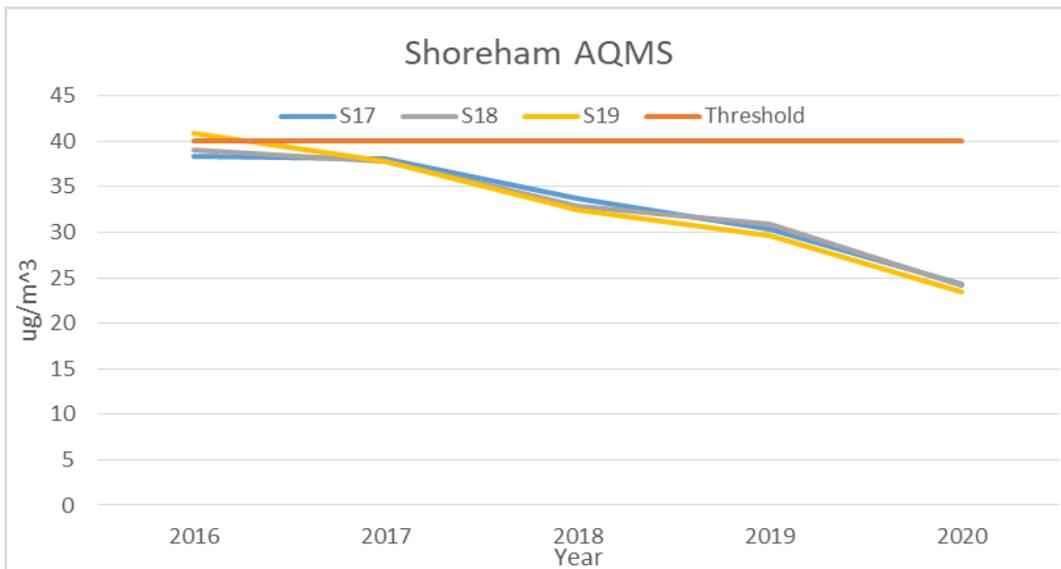
Figure A.1 – Trends in Annual Mean NO₂ Concentrations 2016-2020 (unless stated otherwise)

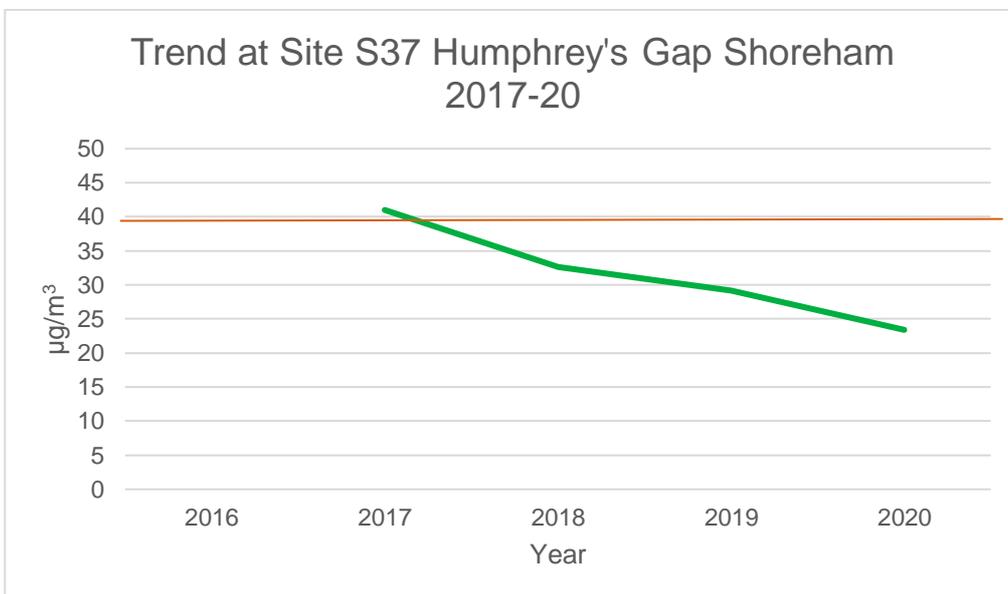
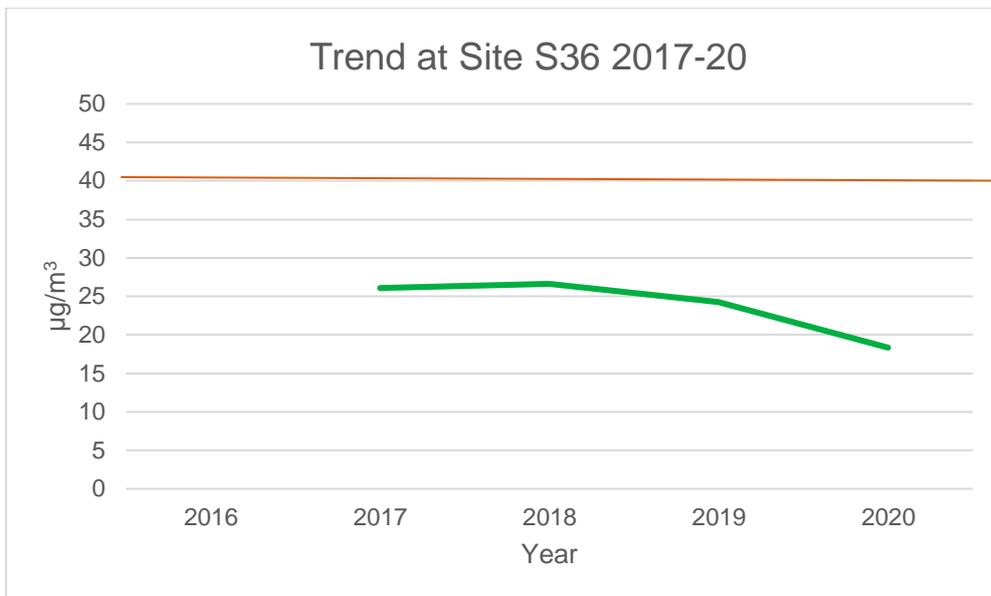
Red straight line indicates the Annual Mean Objective (threshold)

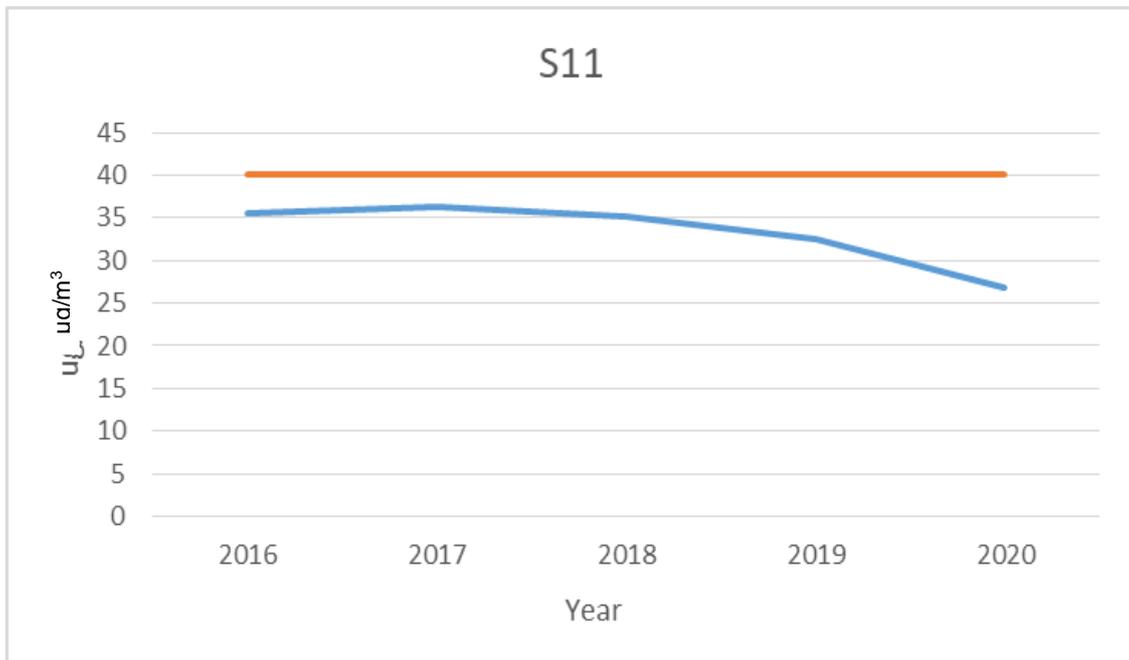
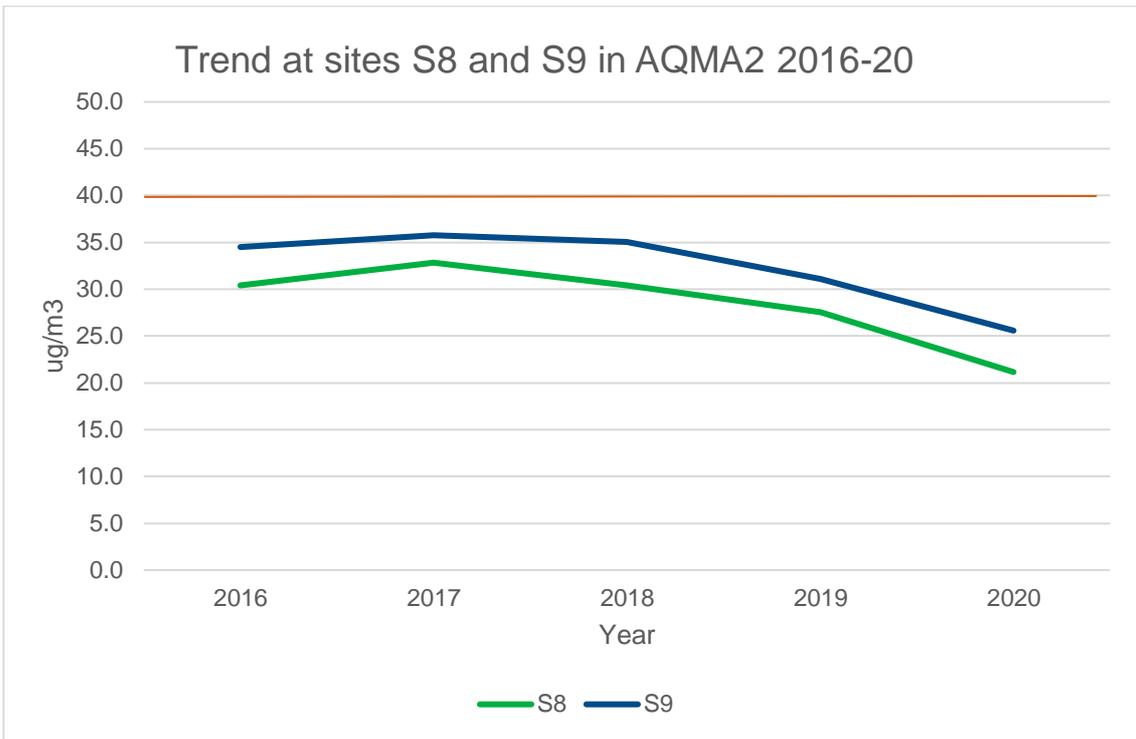
ADUR

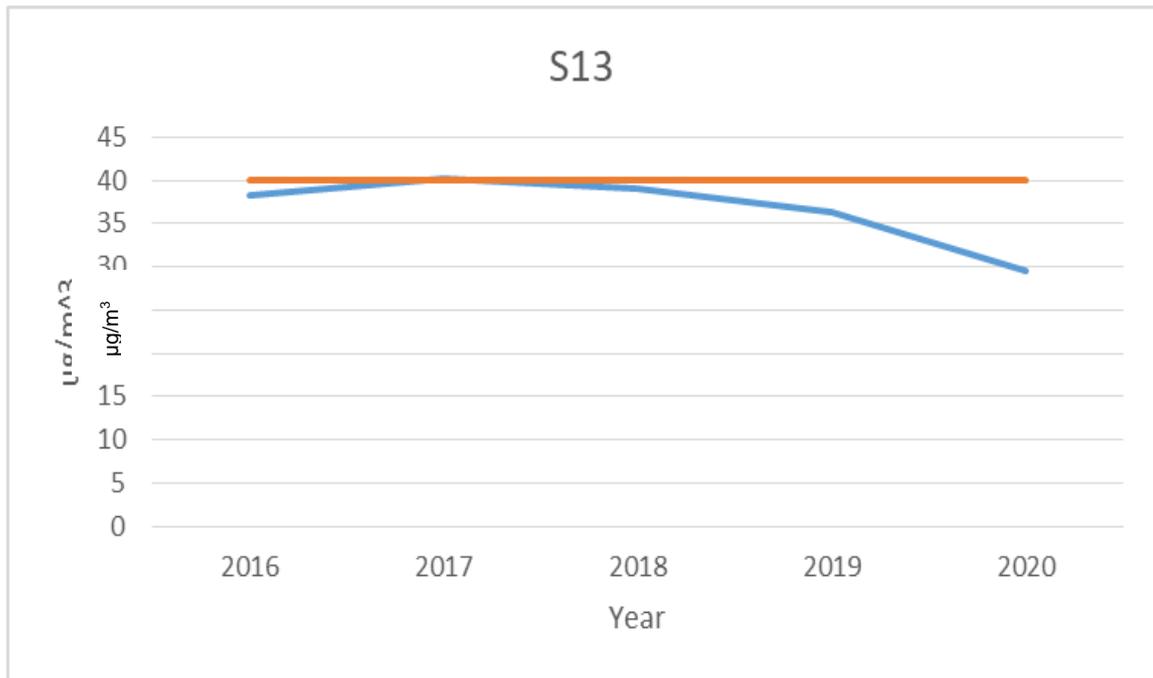


*no monitoring 2016 and 2017

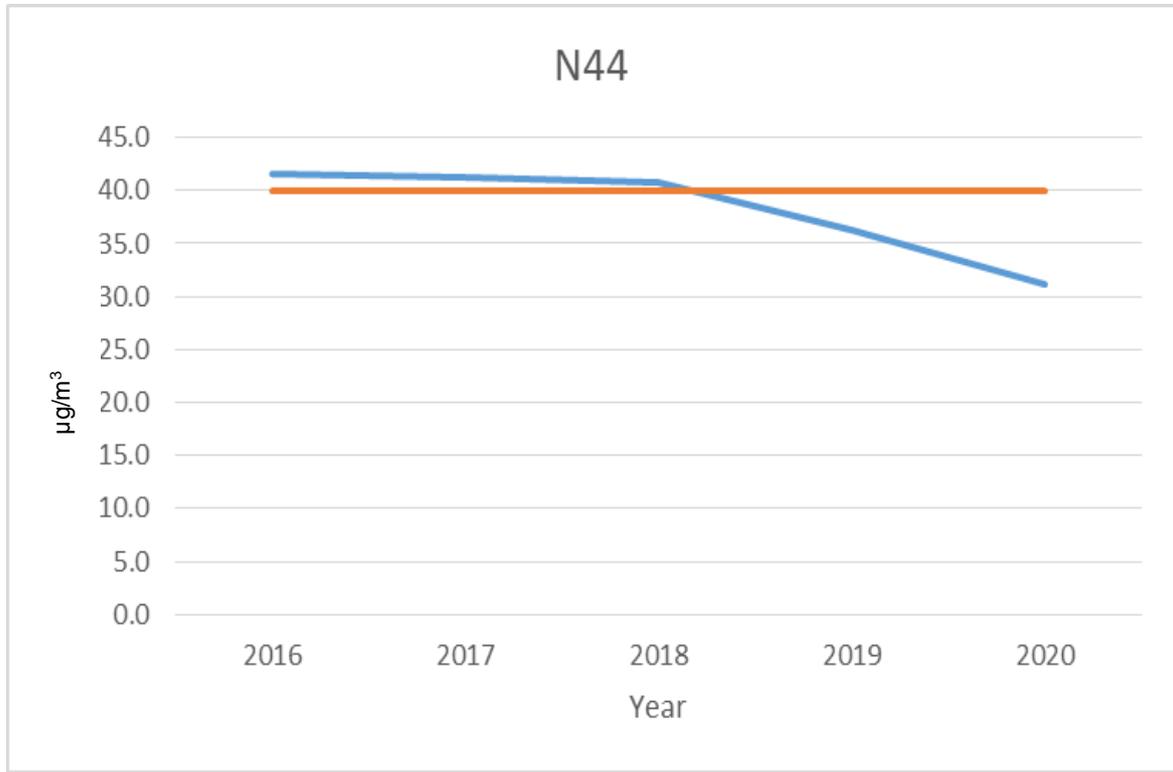
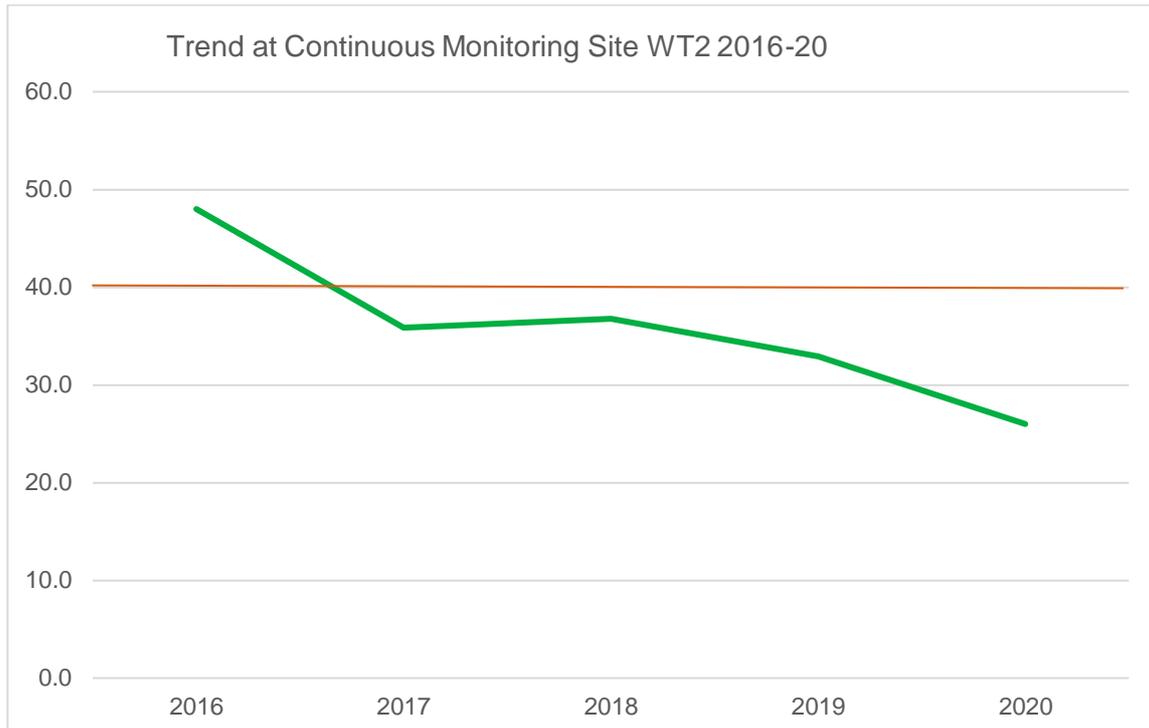


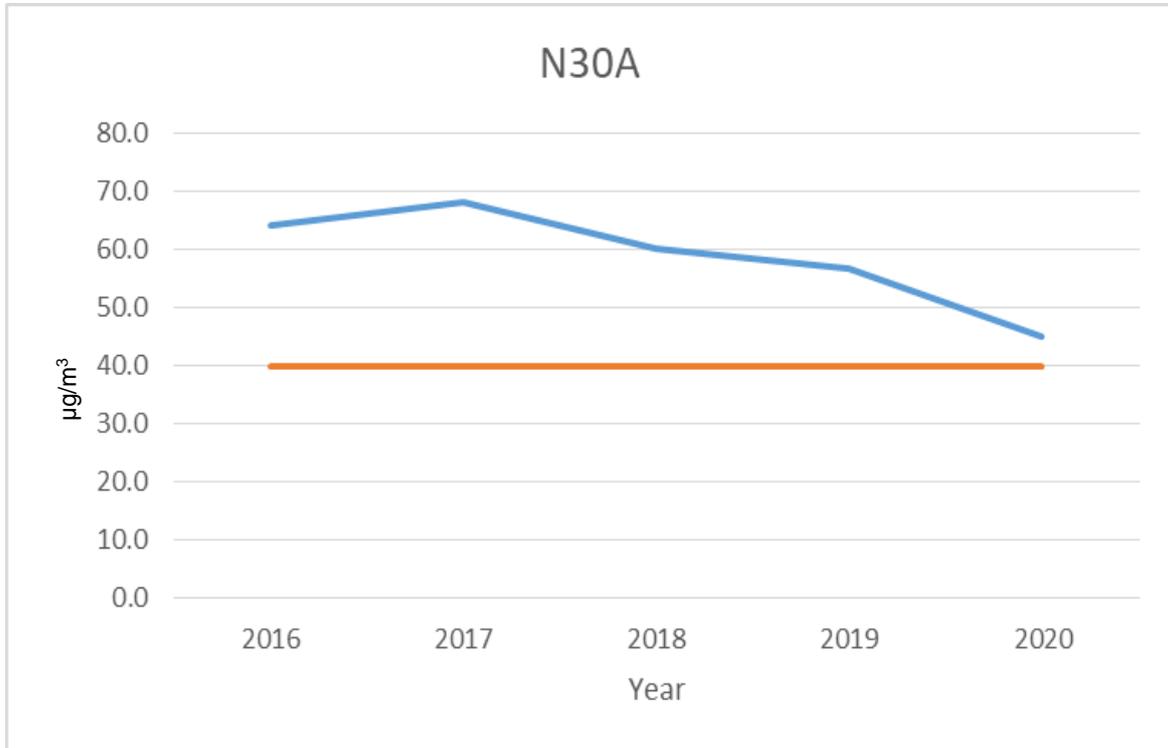


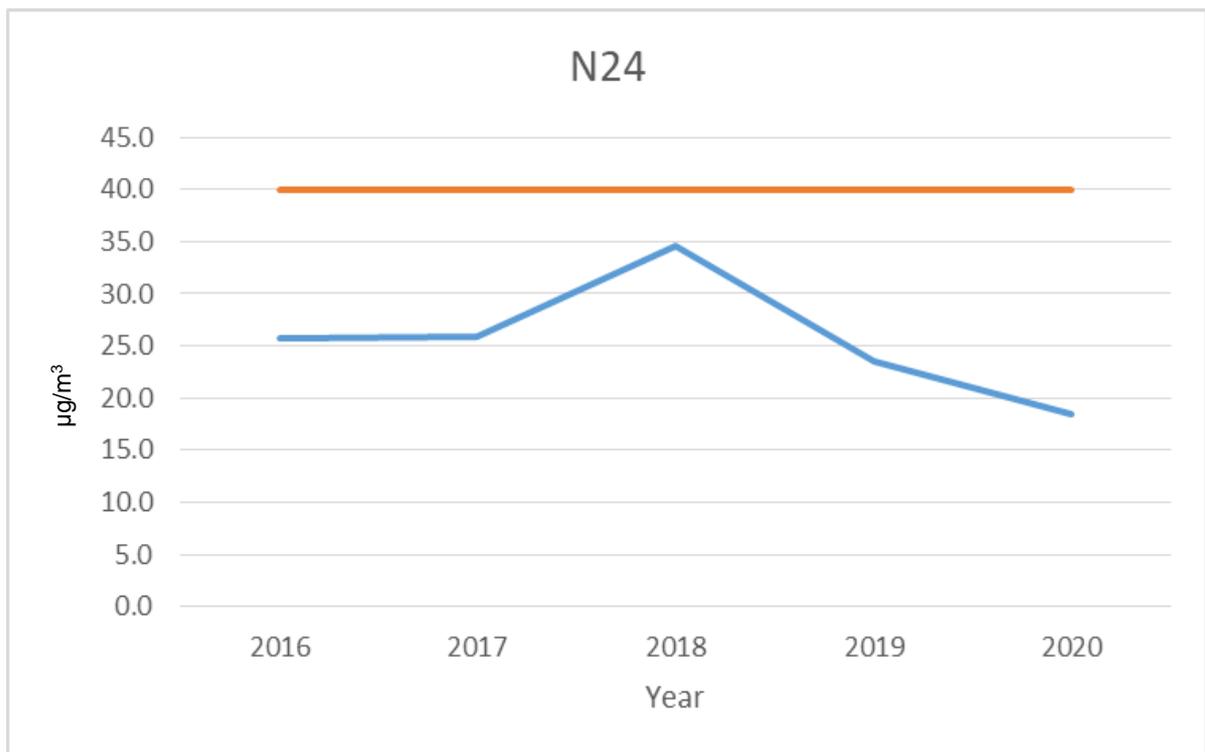
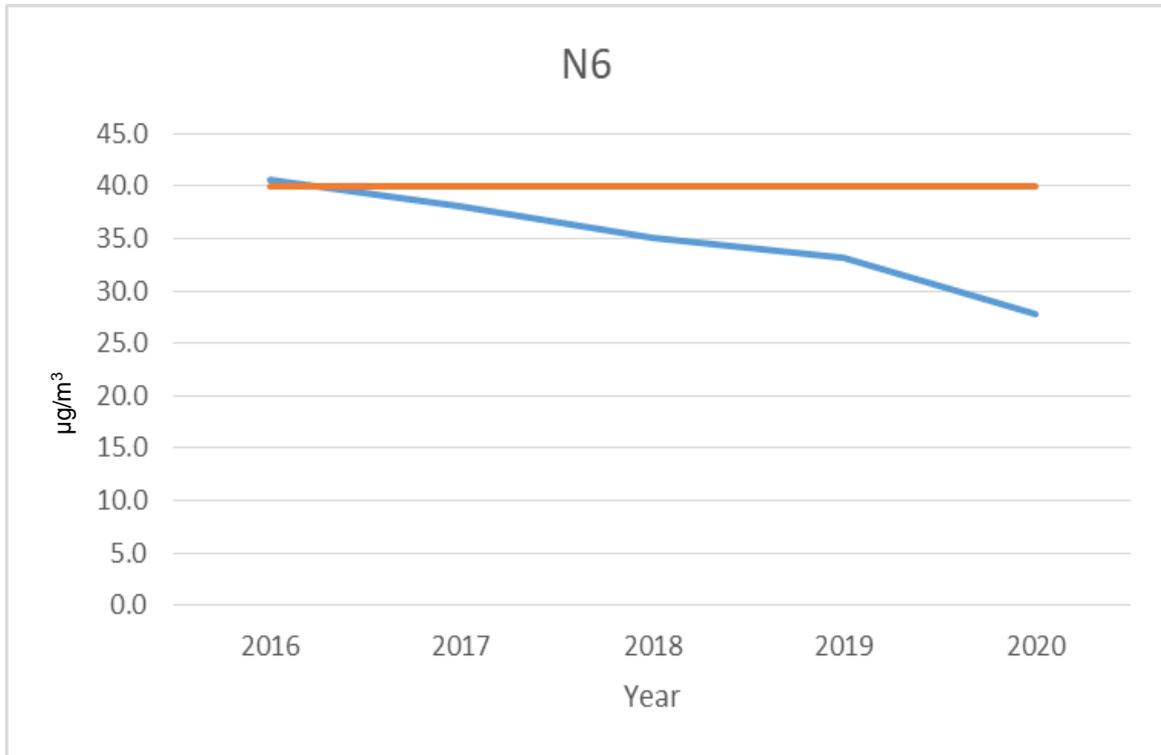




WORTHING







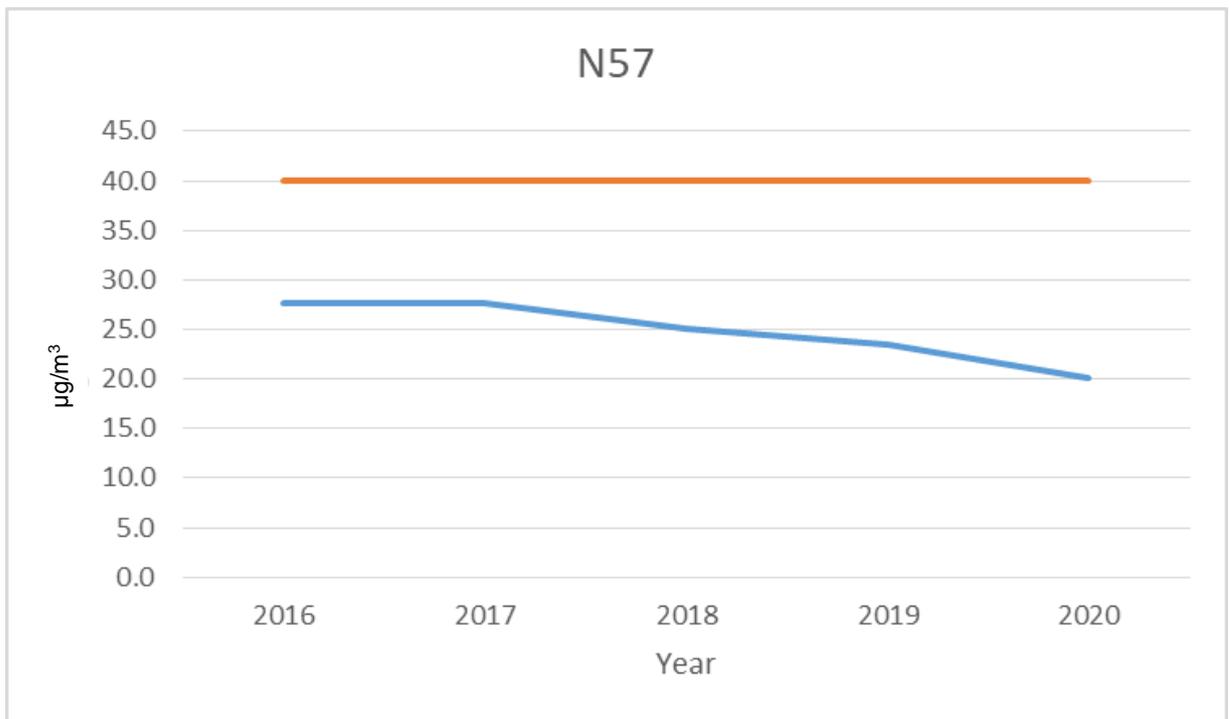
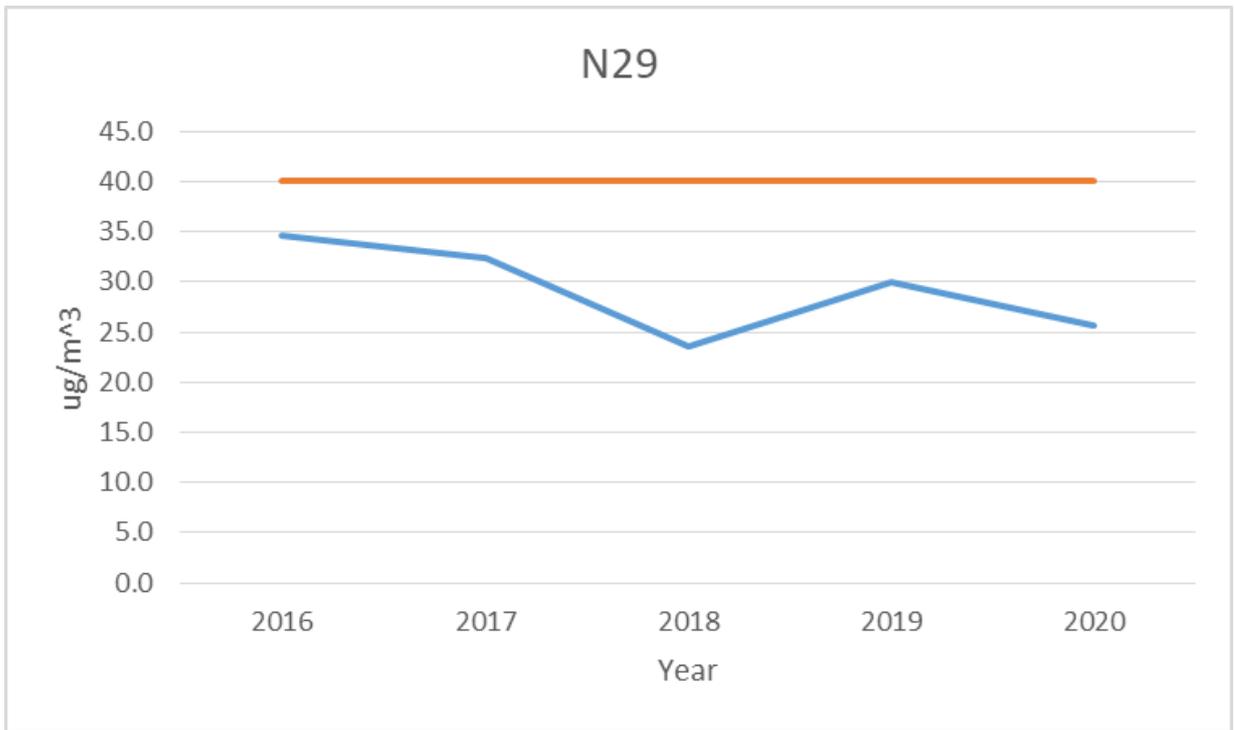


Table A.5 – 1-Hour Mean NO₂ Monitoring Results, Number of 1-Hour Means > 200µg/m³

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
AD1	521399	105039	Kerbside	96	96	N/A	N/A	0	0	0
WT2	514184	104963	Roadside	99	99	10	0	0	0	0

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m³ have been recorded.

Exceedances of the NO₂ 1-hour mean objective (200µg/m³ not to be exceeded more than 18 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

(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%).

Figure A.2 – Trends in Number of NO₂ 1-Hour Means > 200µg/m³

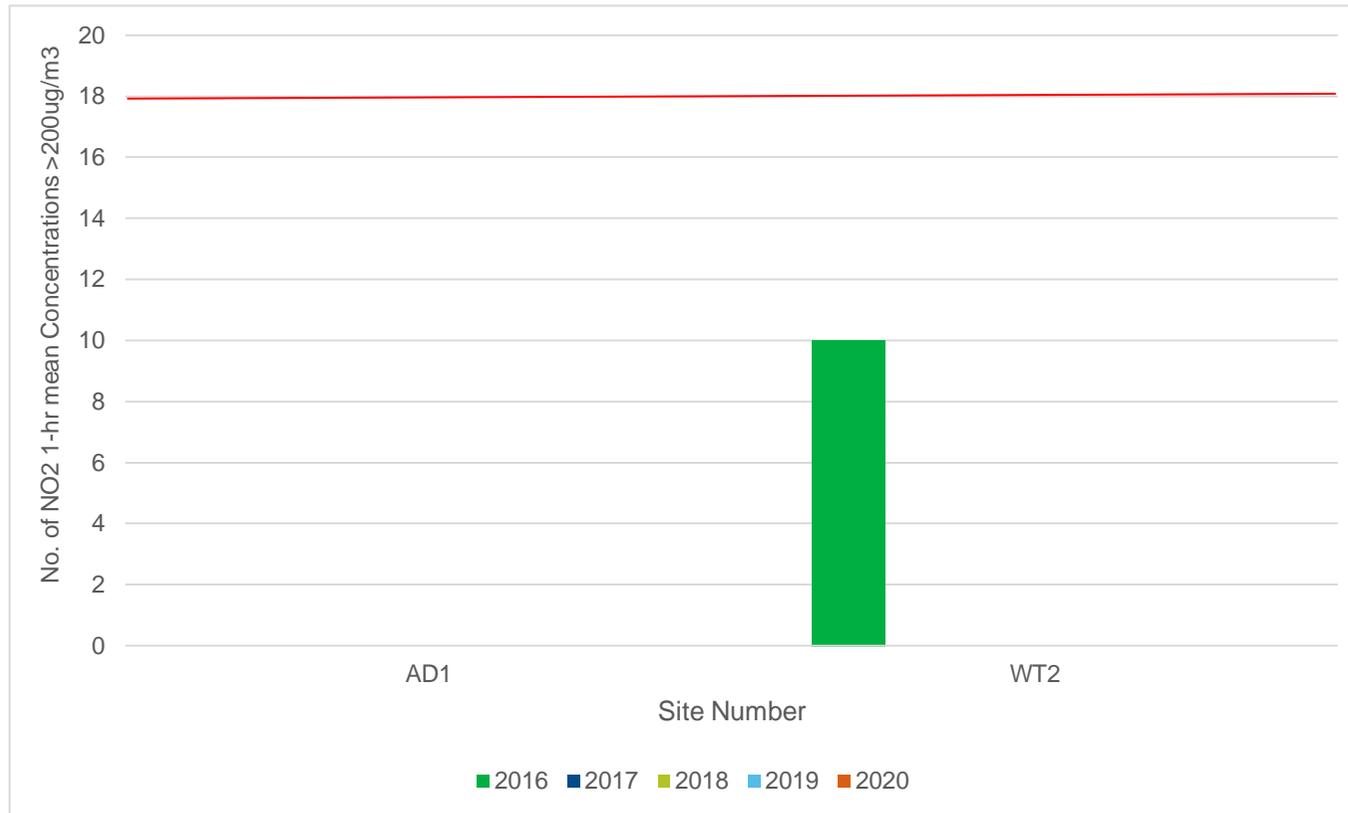


Table A.6 – Annual Mean PM₁₀ Monitoring Results (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
AD1	521399	105039	Kerbside	100	100	N/A	N/A	23	24.3	22.0

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.

Notes:

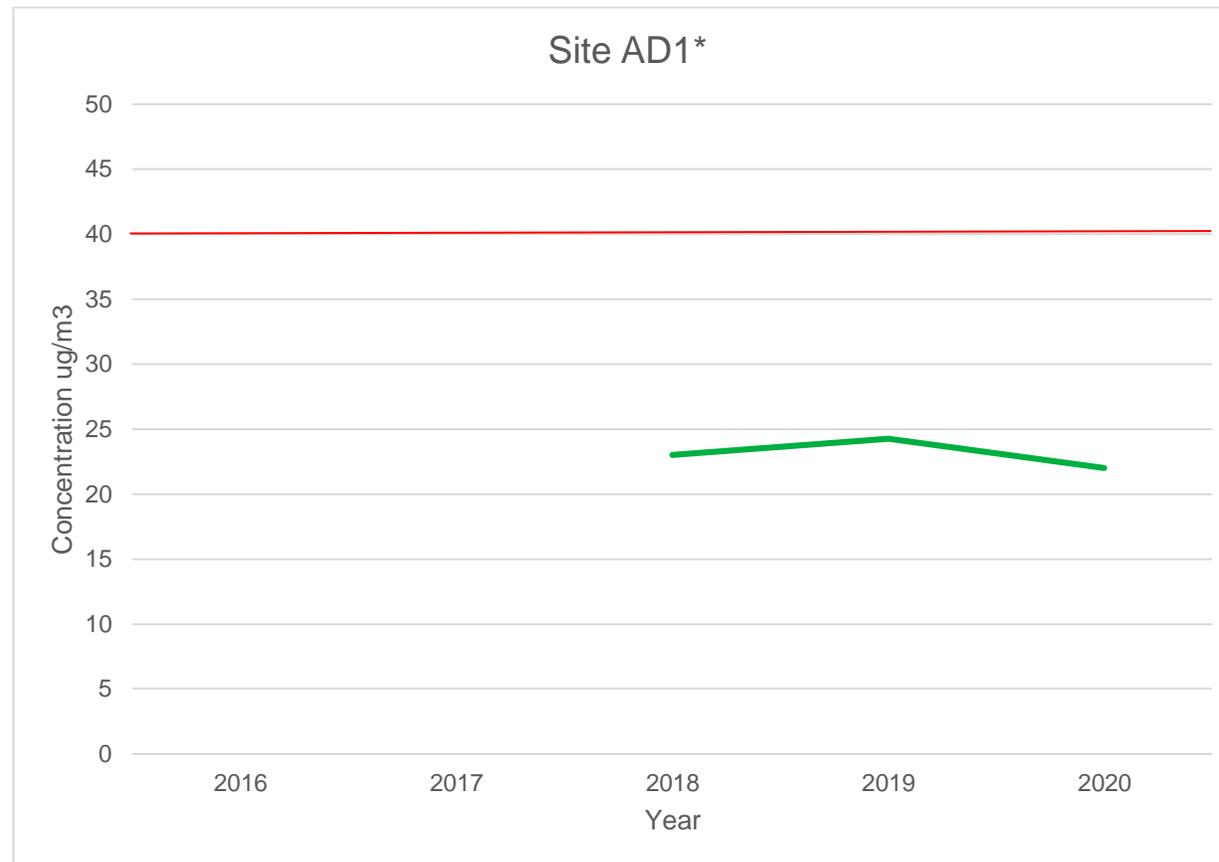
The annual mean concentrations are presented as µg/m³.

Exceedances of the PM₁₀ annual mean objective of 40µg/m³ are shown in **bold**.

All means have been “annualised” as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(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%).

Figure A.3 – Trends in Annual Mean PM₁₀ Concentrations**Adur**

* No monitoring in 2016 and 2017

Table A.7 – 24-Hour Mean PM₁₀ Monitoring Results, Number of PM₁₀ 24-Hour Means > 50µg/m³

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
AD1	521399	105039	Kerbside	100	100	N/A	N/A	0	8	0

Notes:

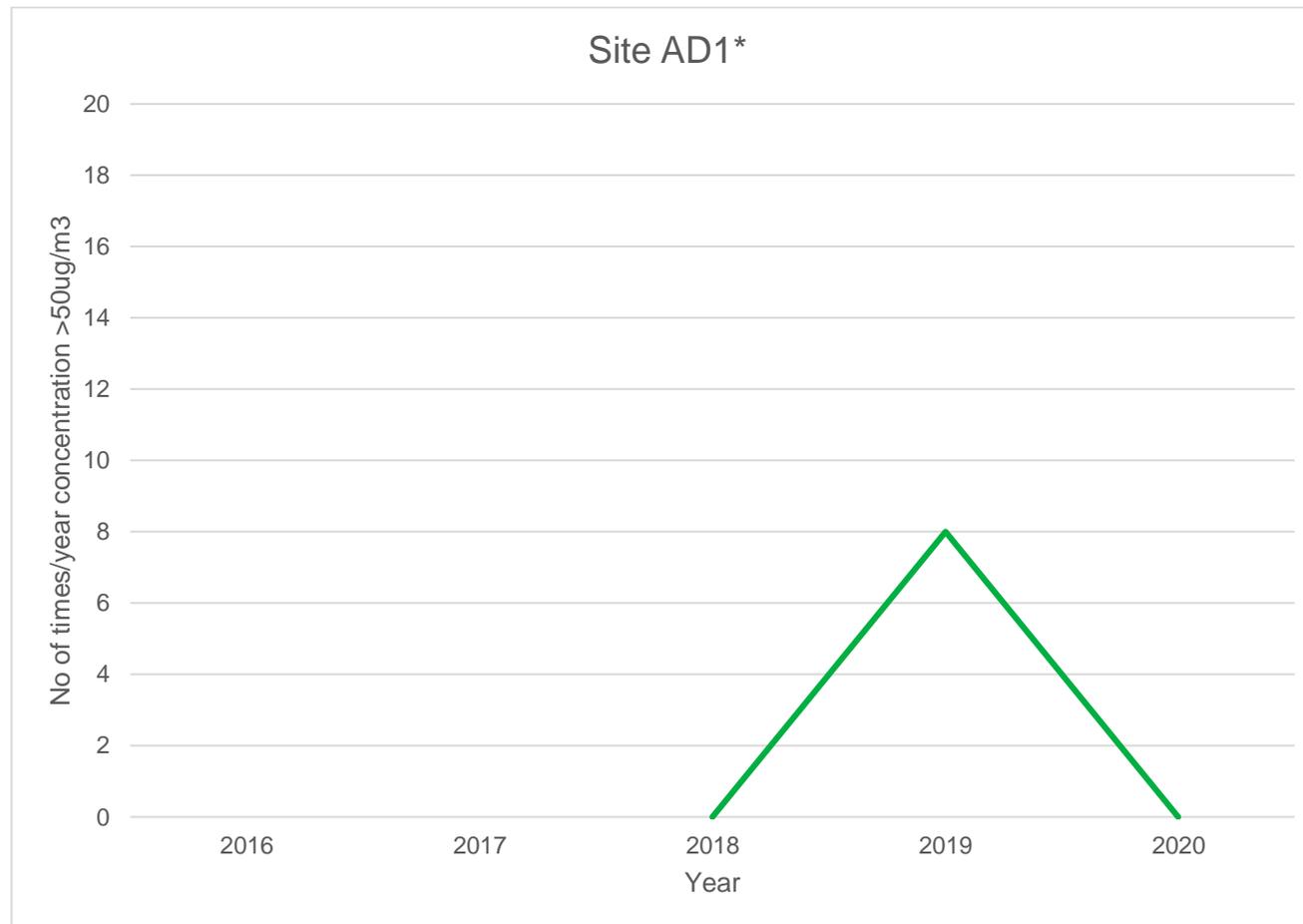
Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m³ have been recorded.

Exceedances of the PM₁₀ 24-hour mean objective (50µg/m³ not to be exceeded more than 35 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

(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%).

Figure A.4 – Trends in Number of 24-Hour Mean PM₁₀ Results > 50µg/m³**Adur**

* No monitoring in 2016 and 2017

Table A.8 – Annual Mean PM_{2.5} Monitoring Results (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
WT2	514184	104963	Roadside	98	98	n/a	n/a	10.6	9.9	8.0

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16

Notes:

The annual mean concentrations are presented as µg/m³.

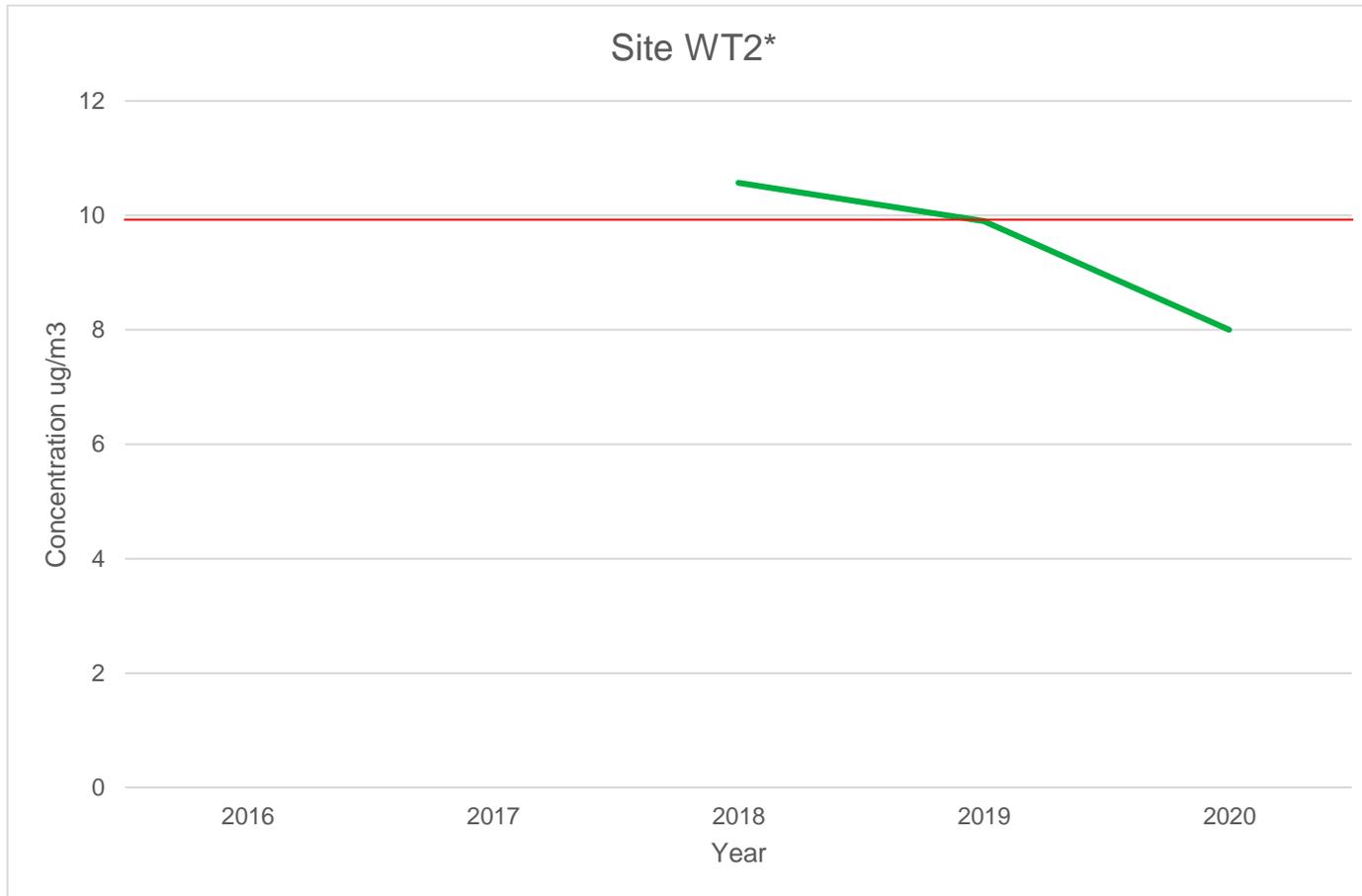
All means have been “annualised” as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(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%).

Figure A.5 – Trends in Annual Mean PM_{2.5} Concentrations

Worthing



* No PM_{2.5} monitoring in 2016 and 2017

Appendix B: Full Monthly Diffusion Tube Results for 2020

Table B.1 – NO₂ 2020 Diffusion Tube Results (µg/m³)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.84)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
Adur																		
S2	525330	105085	25.4	23.2	21.9	18.3	17.4	17.2	15.3	22.4	23.0	22.3	26.3	23.1	21.3	17.9	-	
S3	525562	105313	19.8	19.6	18.4	17.5	13.6	11.9	12.3	14.0	14.7	19.1	17.3	20.6	16.5	13.9	-	
S7	524139	106321	19.9	13.9	13.5	11.5	9.8	10.3	10.0	11.2	10.6	13.0	23.0	17.5	13.7	11.5	-	
S8	524018	106070	34.5	34.1	27.2	17.3	19.7	21.9	17.4	26.6	25.5	26.9	34.2	16.9	25.2	21.1	-	
S9	523784	106081	37.3	34.2	27.7	22.7	23.0	27.6	23.6	31.4	30.0	29.8	41.2	37.0	30.4	25.6	-	
S10	523343	106111	27.8	22.4	21.9	20.0	19.9	18.5	14.8	21.4	25.6	20.7	33.1	28.1	22.8	19.2	-	
S11	518820	105584	41.6	37.1	31.0	22.4	24.5	23.9	29.4	30.3	38.0	38.3	38.3	29.6	32.0	26.9	-	
S12	517731	105505	26.6	27.7	24.4	21.7	21.5	21.7	18.0	23.2	26.4	26.4	33.1	25.1	24.6	20.7	-	
S13	517291	105550	40.7	37.0	33.5	28.3	36.2	38.4	32.2	40.3	36.8	30.9	38.3	28.7	35.1	29.5	-	
S14	516057	105190	31.7	27.0	21.9	16.7	16.7	17.0	17.6	24.7	25.3	22.9	30.1	21.8	22.8	19.1	-	
S15	517512	103367	28.0	31.2	25.9	19.7	24.6	23.3	25.5	30.0	31.7	26.6	35.2	30.2	27.6	23.2	-	
S17	521400	105040	38.8	32.6	-	21.5	22.7	26.3	22.1	28.3	34.3	30.2	34.9	26.6	28.9	24.3	-	
S18	521400	105040	33.8	33.8	-	21.6	23.0	25.8	27.8	29.7	28.8	31.8	33.3	27.0	28.8	24.2	-	
S19	521400	105040	32.8	31.2	-	21.4	18.2	24.9	25.6	26.7	30.8	29.8	35.8	30.0	27.9	23.5	-	
S25	519117	105710	30.7	30.1	26.3	20.3	22.6	21.3	22.1	24.4	33.0	20.5	29.4	27.1	25.6	21.5	-	
S26	516536	104783	15.4	16.4	13.5	13.7	11.9	11.3	9.1	12.1	11.1	13.0	22.4	18.6	14.0	11.8	-	
S36	521282	105254	27.9	23.2	21.2	17.2	20.0	22.8	15.2	21.6	22.7	19.7	30.2	20.5	21.8	18.3	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.84)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
S37	522103	105126	34.8	27.0	24.9	20.6	22.5	29.0	22.1	30.6	28.2	29.2	33.5	32.1	27.9	23.4	-	
S39	523329	104960	28.1	18.9	21.0	19.3	17.7	18.3	14.6	-	23.0	21.4	25.5	20.4	20.7	17.4	-	
S43	521733	105251	27.9	23.2	19.0	13.7	14.7	16.3	14.8	18.6	20.0	18.8	26.1	24.9	19.8	16.6	-	
S44	518494	105464	41.2	44.5	33.5	27.8	34.9	36.1	33.8	42.5	41.5	37.8	43.5	32.2	37.4	31.4	-	
S45	522300	105258	24.5	18.6	18.6	16.6	15.7	16.2	11.4	17.2	20.6	20.4	25.5	22.3	19.0	15.9	-	
S46	521363	105082		26.0	21.6	16.3	16.2	18.2	18.8	23.4	23.3	24.2	27.7	24.7	21.8	18.3	-	
S47	521375	105101	26.1	20.3	18.9	17.7	16.5	15.7	15.6	19.9	19.6	17.1	22.5	23.0	19.4	16.3	-	
S48	518590	105463	37.6	35.5	28.4	20.3	21.3	24.3	25.4	30.9	37.9	37.3	34.7	33.4	30.6	25.7	-	
S49	521405	105031				14.9	15.0	14.0	14.4	16.5		18.7	22.9	19.5	17.0	14.8	-	
Worthing																		
4N	513609	102556	18.5	12.1	12.2	13.5	11.1	8.3	8.2	10.5	11.2	14.4	18.4	16.0	12.9	10.8	-	
5N	512701	105562	20.1	11.0	13.0	12.2	10.6	8.7	8.8	12.3	14.0	13.5	26.8	17.9	14.1	11.8	-	
6N	515190	105122	45.7	33.7	31.6	29.7	30.2	20.4	22.5	32.8	37.7	36.0	44.2	32.6	33.1	27.8	-	
N1C	515114	102670	29.2	17.0	22.2	21.9	23.0	21.3	16.2		28.7	23.5	29.3	26.6	23.5	19.8	-	
N5	514495	105020	34.7	33.4	27.0	20.9		25.7	25.3	28.8	30.7	28.2	35.0	31.6	29.2	24.5	-	
N8	513236	104651	37.3	30.4	28.5	21.1	22.6	22.9	20.5	27.6	31.3		30.8	25.8	27.2	22.8	-	
N11	515812	103309	20.3	15.2	14.1	14.4	11.4	10.4	8.5	12.2	11.7	13.2	19.0	17.7	14.0	11.8	-	
N18A	515315	105141	30.4	17.7	19.2	17.0	14.9	13.4	17.1	21.1	25.2	24.1	25.3	23.7	20.8	17.4	-	
N21	509777	105696	13.1	9.2	9.0	9.8		7.3	7.3	9.1	10.4	9.3	15.6	13.9	10.4	8.7	-	
N22	511010	102226	17.0	10.8	11.8	12.9	11.1	8.6	8.2	9.9	11.2	11.2	18.8	14.6	12.2	10.2	-	
N24	515151	105109	28.8	21.8	20.2	19.4	19.0	15.8	13.4	22.5	23.0	22.0	26.8	30.6	21.9	18.4	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.84)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
N25	513845	105191	25.4	18.6	18.6	12.9	12.6	14.2	13.6	16.1	17.5	18.7	21.3	22.0	17.6	14.8	-	
N27	513380	103352	29.1	17.8	24.8	21.4	20.8	19.8	14.5	24.8	22.0	24.6	33.1	28.6	23.4	19.7	-	
N28	514740	103173	24.8	17.4	19.2	17.3		19.4	24.5	19.2	19.2	16.5	23.9	25.1	20.6	17.3	-	
N29	515014	105099	39.6	32.8	28.8	26.2	26.7	29.1	24.4	32.1	28.5	28.7	37.6	31.1	30.5	25.6	-	
N30A	514183	104948	70.3	54.1	47.9	39.4	47.2	56.3	43.3	65.0	58.5	56.0	54.2	52.7	53.7	45.1	44.5	
N31	514317	103329	33.7	26.2	23.6	17.8	19.0	20.1	19.7	23.5	25.7	26.5	31.9	30.2	24.8	20.8	-	
N35	514266	104961	33.8	29.1	23.1	19.3	18.7	18.8	22.0		26.3	25.9	28.1	31.4	25.1	21.1	-	
N39	514088	104906	36.0	27.7	27.4	26.4	27.3	25.9	23.0	32.4	34.8	27.5	28.8	27.3	28.7	24.1	-	
N42	514742	103234	30.7	16.7	18.5	21.7	15.7	24.3	13.8	23.7	19.8	19.4	27.0	27.2	21.5	18.1	-	
N43	514199	104982	24.2	20.6	21.8	19.8	14.9	17.7	16.5	21.8	20.9	20.7	28.1	24.5	21.0	17.6	-	
N44A	514184	104963	43.7	39.0	37.9	28.3	31.7		33.5	40.6	41.7	38.6	41.2	35.8	-	-	-	Triplicate Site with N44A, N44B and N44C - Annual data provided for N44C only
N44B	514184	104963	47.3	35.5	35.5	29.9	33.2		29.8	39.3	41.3	36.1	42.9	38.1	-	-	-	Triplicate Site with N44A, N44B and N44C - Annual data provided for N44C only
N44C	514184	104963	39.9	38.3	36.8	28.4	30.7		30.8	40.4	40.4	39.7	42.0	35.1	37.1	31.1	-	Triplicate Site with N44A, N44B and N44C - Annual data provided for N44C only
N48	512063	103385	31.7	22.2	18.6	22.1	19.8	20.7	14.9	25.4	22.0	23.3	24.3	25.1	22.5	18.9	-	
N52	514973	103335	33.2	24.9	21.7	18.6	16.1	15.4	34.9	19.8	22.9	22.8	30.3	27.4	24.0	20.2	-	
N53	513278	105623	37.3	34.6	26.8	21.2	23.1	31.5	26.8	35.0	28.0	29.1	36.8	32.7	30.2	25.4	-	
N54	515595	102725			17.3	19.0	17.8	15.1	10.3	17.1	17.8	14.8	20.6	21.9	17.2	14.4	-	
N56	510318	104506	29.5	21.9	19.8	14.9	17.3	21.2	21.2	23.2	23.8	22.5	26.1	23.2	22.0	18.5	-	
N57	515114	102975	31.2	23.3	22.1	21.7	18.7	19.3	17.3	24.3	26.0	25.6	29.3	28.6	23.9	20.1	-	
N61	514501	104531	47.4	37.8	27.8	23.4	20.0	28.3		36.9	28.1	34.1	46.6	39.2	33.6	28.2	-	
N63	513437	103311	39.0	31.6	22.4	21.2	20.9	20.7			27.3	30.6	35.8	30.1	28.0	23.5	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.84)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
N64	514946	102541	32.8	23.0	25.1	22.3	19.5	20.1	14.6	25.4	25.9	22.8	29.8	24.5	23.8	20.0	-	
N65	514543	103220	36.7	30.4	24.7	22.4	20.6	17.0	19.9	27.6	29.6	25.3	31.3	32.2	26.5	22.2	-	
N66	515067	105082	40.5	31.7	28.0	23.8	22.1	22.4	24.0	31.5	32.2	35.1	41.7	24.4	29.8	25.0	-	
N67	513383	104041										28.2	35.9	32.8	32.3	25.4	-	Temp cycle scheme monitoring site (3 months)
N68	514226	103962										25.8	34.4	31.1	30.4	23.9	-	Temp cycle scheme monitoring site (3 months)
N69	514680	103827										21.0	28.4	29.5	26.3	20.7	-	Temp cycle scheme monitoring site (3 months)
N70	514687	104003										18.4	30.2	25.9	24.8	19.5	-	Temp cycle scheme monitoring site (3 months)

All erroneous data has been removed from the NO₂ diffusion tube dataset presented in Table B.1

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16

National bias adjustment factor used

Where applicable, data has been distance corrected for relevant exposure in the final column

Adur District and Worthing Borough Councils confirm that all 2020 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System

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**.

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within Adur District and Worthing Borough Councils During 2020

Adur District and Worthing Borough Councils have not identified any new sources relating to air quality within the reporting year of 2020.

Additional Air Quality Works Undertaken by Adur District and Worthing Borough Councils During 2020

Adur District and Worthing Borough Councils have not completed any additional works within the reporting year of 2020.

QA/QC of Diffusion Tube Monitoring

NO₂ diffusion tubes are provided and analysed by Gradko laboratory. The NO₂ tube preparation method used is 50% triethanolamine (TEA) in Acetone.

In order to ensure NO₂ concentrations are of a high quality, strict performance criteria need to be met through the execution of QA and QC procedures. A number of factors have been identified as influencing the performance of NO₂ diffusion tubes including the laboratory preparing and analysing the tubes, and the tube preparation method (AEA, 2008). QA and QC procedures ensure that uncertainties in the data are minimised and allow the best estimate of true concentrations to be determined. Gradko participate in several national quality schemes such as Air PT, LEAP and Field Intercomparison, giving confidence in analysis results. Since April 2014, Gradko has taken part in AIR PT, which combines two long running PT schemes: LGC Standards STACKS PT scheme and HSL WASP PT scheme.

Gradko International Ltd is a UKAS accredited laboratory and participates in laboratory performance and proficiency testing schemes. These provide strict performance criteria for participating laboratories to meet, ensuring NO₂ concentrations reported are of a high calibre.

Schedule of Accreditation
issued by
United Kingdom Accreditation Service
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

 2187 Accredited to ISO/IEC 17025:2017	Gradko International Ltd (Trading as Gradko Environmental) Issue No: 024 Issue date: 15 April 2020	
	St Martins House 77 Wales Street Winchester Hampshire SO23 0RH	Contact: Mr A Poole Tel: +44 (0)1962 860331 Fax: +44 (0)1962 841339 E-Mail: diffusion@gradko.co.uk Website: www.gradko.co.uk
Testing performed at the above address only		

DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
ATMOSPHERIC POLLUTANTS Collected on diffusion (sorbent) tubes and monitors	<u>Chemical Tests</u>	Documented In-House Methods
	Ammonia as ammonium (NH ₄ ⁺)	GLM 8 by Ion Chromatography
	Benzene Toluene Ethyl benzene Xylene	GLM 4 by Thermal Desorption/ FID Gas Chromatography
	Hydrogen chloride as chloride (Cl ⁻) Nitrogen dioxide as nitrite (NO ₂ ⁻) Sulphur dioxide as sulphate (SO ₄ ²⁻) Hydrogen fluoride as fluoride (F ⁻)	GLM 3 by Ion Chromatography
	Hydrogen sulphide	GLM 5 by Colorimetric determination (UV Spectrophotometry)
	Ozone as nitrate (NO ₃ ⁻)	GLM 2 by Ion Chromatography
	Nitrogen Dioxide as nitrite (NO ₂ ⁻)	GLM 7 by Colorimetric determination (UV Spectrophotometry)
	Sulphur dioxide as sulphate (SO ₄ ²⁻)	GLM 1 by Ion Chromatography
	Formaldehyde as formaldehyde-DNPH	GLM 18 by HPLC
	Volatile Organic Compounds including: Benzene Toluene Ethylbenzene p-Xylene o-Xylene	GLM 13 by Thermal Desorption GC-Mass Spectrometry

 2187 Accredited to ISO/IEC 17025:2017	Schedule of Accreditation issued by United Kingdom Accreditation Service 2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK	
	Gradko International Ltd (Trading as Gradko Environmental) Issue No: 024 Issue date: 15 April 2020	
Testing performed at main address only		
Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
ATMOSPHERIC POLLUTANTS Collected on diffusion (sorbent) tubes and monitors (cont'd)	<u>Chemical Tests</u> (cont'd) Qualitative Analysis and Estimation of Volatile Organic Compounds on diffusion (sorbent) tubes and monitors Naphthalene Tetrachloroethylene Trichloroethylene trans-1,2-Dichloroethene cis-1,2-Dichloroethene Indane Styrene 1,2,3-Trimethylbenzene 1,2,4-Trimethylbenzene 1,3,5-Trimethylbenzene 1,3-Butadiene Carbon Disulphide Vinyl Chloride Flexible scope for quantitative analysis of Volatile Organic Compounds on diffusion (sorbent) tubes and monitors in accordance with methods developed and validated by in-house procedure LWI 47	GLM 13 by Thermal Desorption GC-Mass Spectrometry with estimations in accordance with ISO standard 16000-6 GLM 13-1 by Thermal Desorption GC-Mass Spectrometry GLM 13-2 by Thermal Desorption GC-Mass Spectrometry GLM 13-3 by Thermal Desorption GC-Mass Spectrometry GLM 13-4 by Thermal Desorption GC-Mass Spectrometry GLM 13-5 by Thermal Desorption GC-Mass Spectrometry GLM 13-6 by Thermal Desorption GC-Mass Spectrometry GLM 13-7 by Thermal Desorption GC-Mass Spectrometry GLM 13-8 by Thermal Desorption GC-Mass Spectrometry LWI 47 by Thermal Desorption GC-Mass Spectrometry
END		

Gradko participate in the AIR PT NO₂ diffusion tube scheme, which uses artificially spiked diffusion tubes to test each participating laboratory's analytical performance on a quarterly basis. The scheme is designed to help laboratories meet the European Standard. Gradko demonstrated "good" laboratory performance in 2020 for 50% TEA in Acetone.

The laboratory follows the procedures set out in the Harmonisation Practical Guidance and participates in the AIR proficiency-testing (AIR-PT) scheme. Previously to the Air-PT

scheme, Gradko participated in the Workplace Analysis Scheme for Proficiency (WASP) for NO₂ diffusion tube analysis. Defra advise that diffusion tubes used for LAQM should be obtained from laboratories that have demonstrated satisfactory performance in the AIR-PT scheme.

Lab performance in the AIRPT is also assessed by the National Physical Laboratory (NPL), alongside laboratory data from the monthly NPL Comparison Exercise carried out at for Gradko at Marylebone Road, central London. A laboratory is assessed and given a 'z' score, a score of ± 2 or less indicates satisfactory laboratory performance. For 2020 Gradko's result were deemed to be good for 97 participating the local authorities and poor for 10 In 2020 participating local authorities based upon a z score of $\leq \pm 2$. In 2020, the tube precision for NO₂ Annual Field InterComparison for Gradko International using the 50% TEA in acetone method was 'good' for 11 participating local authorities and poor for 1 participating local authority.

Table 1: Laboratory summary performance for Air NO₂ PT rounds AR0030, 31, 33, 34, 36, 37, 39 and 40

The following table lists those UK laboratories undertaking LAQM activities that have participated in recent Air NO₂ PT rounds and the percentage (%) of results submitted which were subsequently determined to be **satisfactory** based upon a z-score of $\leq \pm 2$ as defined above.

AIR PT Round	AIR PT AR030	AIR PT AR031	AIR PT AR033	AIR PT AR034	AIR PT AR036	AIR PT AR037	AIR PT AR039	AIR PT AR040
Round conducted in the period	January – February 2019	April – May 2019	July – August 2019	September – November 2019	January – February 2020	May – June 2020	July – August 2020	September – October 2020
Aberdeen Scientific Services	75 %	100 %	100 %	100 %	100 %	NR [4]	NR [4]	100 %
Cardiff Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [4]	NR [4]	NR [3]
Edinburgh Scientific Services	100 %	NR [2]	100 %	25 %	50 %	NR [4]	NR [4]	100 %
SOCOTEC	87.5 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	NR [4]	NR [4]	100 % [1]
Exova (formerly Clyde Analytical)	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [4]	NR [4]	NR [3]
Glasgow Scientific Services	100 %	100 %	100 %	50 %	100 %	NR [4]	NR [4]	100 %
Gradko International	75 %	100 %	100 %	100 %	75 %	NR [4]	NR [4]	75 %
Kent Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [4]	NR [4]	NR [3]
Kirklees MBC	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [4]	NR [4]	NR [3]
Lambeth Scientific Services	50 %	100 %	50 %	100 %	100 %	NR [4]	NR [4]	100 %
Milton Keynes Council	100 %	100 %	50 %	100 %	100 %	NR [4]	NR [4]	25 %
Northampton Borough Council	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [4]	NR [4]	NR [3]
Somerset Scientific Services	100 %	100 %	100 %	100 %	100 %	NR [4]	NR [4]	100 %
South Yorkshire Air Quality Samplers	100 %	100 %	100 %	75 %	100 %	NR [4]	NR [4]	100 %
Staffordshire County Council	100 %	75 %	75 %	75 %	100 %	NR [4]	NR [4]	50 %
Tayside Scientific Services (formerly Dundee CC)	100 %	NR [2]	100 %	NR [2]	100 %	NR [4]	NR [4]	100 %
West Yorkshire Analytical Services	100 %	100 %	100 %	50 %	100 %	NR [4]	NR [4]	NR [2]

[1] Participant subscribed to two sets of test results (2 x 4 test samples) in each AIR PT round.

[2] NR, No results reported.

[3] Cardiff Scientific Services, Exova (formerly Clyde Analytical), Kent Scientific Services, Kirklees MBC and Northampton Borough Council; no longer carry out NO₂ diffusion tube monitoring and therefore did not submit results.

[4] Round was cancelled due to pandemic.

All monitoring was completed in adherence with the 2020 Diffusion Tube Monitoring Calendar.

Data from the NO₂ 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 2020, obtained via tools at the aforementioned website, was **0.84**.

Diffusion Tube Annualisation

Annualisation is required for any site with data capture less than 75% but greater than 25%.

All diffusion tube monitoring locations within Adur District and Worthing Borough Councils recorded data capture of 75%, except Adur Site S49 and the four temporary cycle lane sites in Worthing, N67-70. Data has been annualised, details are contained in Tables C2 and C3.

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2020 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG16 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO₂ continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Adur District and Worthing Borough Councils have applied a national bias adjustment factor of 0.84 to the 2020 monitoring data. A summary of bias adjustment factors used by Adur District and Worthing Borough Councils over the past five years is presented in Table C.1.

It was decided that as the Coronavirus pandemic had impacted on traffic volumes and patterns to such an extent that we should continue to use the national bias adjustment factor for 2020 data. We will look to use local bias adjustment factors next year, if traffic levels and patterns return to those seen prior to the pandemic. Version 09/21 of the national spreadsheet was used to calculate the factor.

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2020	National	09/21	0.84
2019	National	03/20	0.87
2018	National	03/19	0.92
2017	National	09/18	0.96
2016	National	03/17	1.03

NO₂ Fall-off with Distance from the Road

Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at the nearest location relevant for exposure should be estimated using the Diffusion Tube Data Processing Tool/NO₂ fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO₂ concentrations corrected for distance are presented in Table B.1.

The only site requiring a fall off distance calculation was N30A Grove Lodge Cottages in Worthing. The data is contained within Table C.4.

QA/QC of Automatic Monitoring

Adur: The automatic continuous monitoring site in Shoreham High Street (site AD1) is part of the Sussex-air monitoring network (www.sussex-air.net/). The site is serviced every 6 months and Local Site Operator (LSO) routine calibrations are completed by Adur District Council approximately every 2 weeks. Data ratification is carried out by Environmental research Group (ERG) at Imperial College, London as part of their contract for data management with Sussex-air.

Worthing: The automatic continuous monitoring site at Grove Lodge Worthing is part of the national Automatic Urban and Rural Network (AURN) and complies with the EU Directive on ambient air quality (2008/50/EC). The site is audited and serviced every 6 months and Local Site Operator (LSO) routine calibrations are completed by Worthing Borough Council every 2 weeks. For information on data ratification please visit <https://uk->

[air.defra.gov.uk/assets/documents/Data Validation and Ratification Process Apr 2017.pdf](https://air.defra.gov.uk/assets/documents/Data_Validation_and_Ratification_Process_Apr_2017.pdf).

Data for both sites is available via www.sussex-air.net/.

Worthing data is also available via the UKAir website - https://uk-air.defra.gov.uk/data/data_selector

PM₁₀ and PM_{2.5} Monitoring Adjustment

The type of PM₁₀/PM_{2.5} monitors utilised within Adur District and Worthing Borough Councils do not require the application of a correction factor.

Estimation of PM_{2.5} for Adur using the National Factor

Recorded annual mean concentration at roadside site in 2019 was 24.3µg/m³.

Step 1: Multiply the annual mean PM₁₀ concentration by the nationally derived correction factor: $22.0 \times 0.7 = 15.4$

Step 2: Estimated annual mean PM_{2.5} = 15.4µg/m³

Automatic Monitoring Annualisation

Annualisation is required for any site with data capture less than 75% but greater than 25%.

NO₂ monitoring site S49 within Adur District and sites N67-70 Worthing Borough Councils required annualisation corrections applied for 2020. These are presented in Tables C2 and C3.

NO₂ Fall-off with Distance from the Road

Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at the nearest location relevant for exposure should be estimated using the NO₂ fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO₂ concentrations corrected for distance are presented in Table B.1.

Distance correction should be considered at any monitoring site where the annual mean concentration is greater than $36\mu\text{g}/\text{m}^3$ and the monitoring site is not located at a point of relevant exposure (taking the limitations of the calculator into account). The only site that fulfilled this criteria is site N30A Grove Lodge Cottages, within the Worthing AQMA No.2. The calculation is contained within Table C4.

Table C.2 – Adur Annualisation Summary (concentrations presented in $\mu\text{g}/\text{m}^3$)

Site ID	Annualisation Factor AD1	Annualisation Factor WT2	Annualisation Factor Site 3 Name	Annualisation Factor Site 4 Name	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
S49	1.0381	1.0393			1.0387	17.0	17.6	

Table C.3 – Worthing Annualisation Summary (concentrations presented in $\mu\text{g}/\text{m}^3$)

Site ID	Annualisation Factor WT2	Annualisation Factor AD1	Annualisation Factor Site 3 Name	Annualisation Factor Site 4 Name	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
N67	0.9608	0.9099			0.9353	32.3	30.2	
N68	0.9608	0.9099			0.9353	30.4	28.5	
N69	0.9608	0.9099			0.9353	26.3	24.6	
N70	0.9608	0.9099			0.9353	24.8	23.2	

Table C.4 – NO₂ Fall off With Distance Calculations (concentrations presented in µg/m³)

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted)	Background Concentration	Concentration Predicted at Receptor	Comments
N30A	2.2	2.4	45.1	12.4	44.5	<i>Predicted concentration at Receptor above AQS objective.</i>

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

Figure D.1 – Map of Non-Automatic Monitoring Sites - Adur



Note: Blue triangles indicate approximate position of diffusion tube monitoring site

Figure D.3 – Map of Non-Automatic Monitoring Sites – Adur - Shoreham

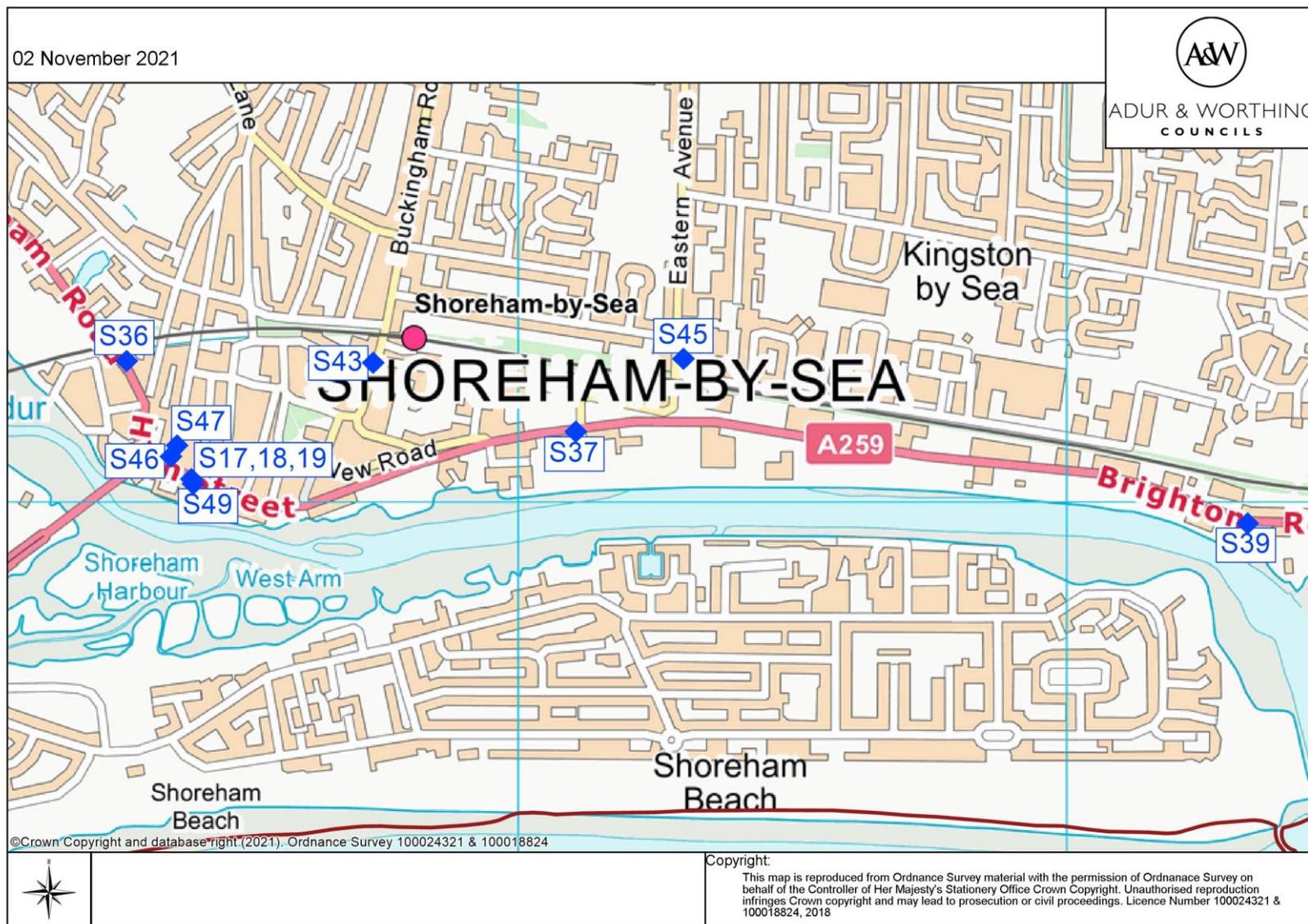


Figure D.4 – Map of Non-Automatic Monitoring Sites – Adur - Southwick & AQMA2

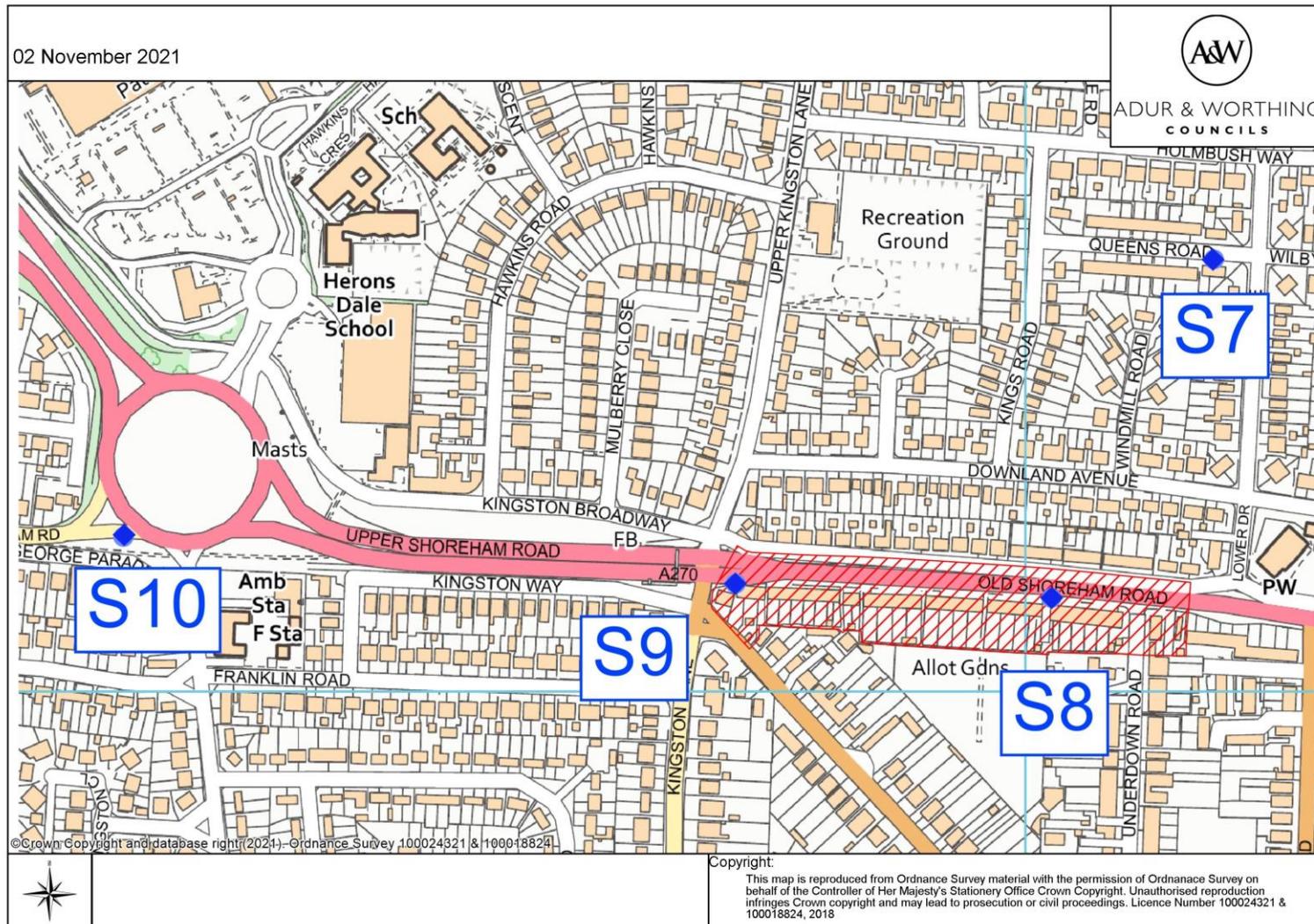


Figure D.5 – Map of Non-Automatic Monitoring Sites – Adur - North Lancing

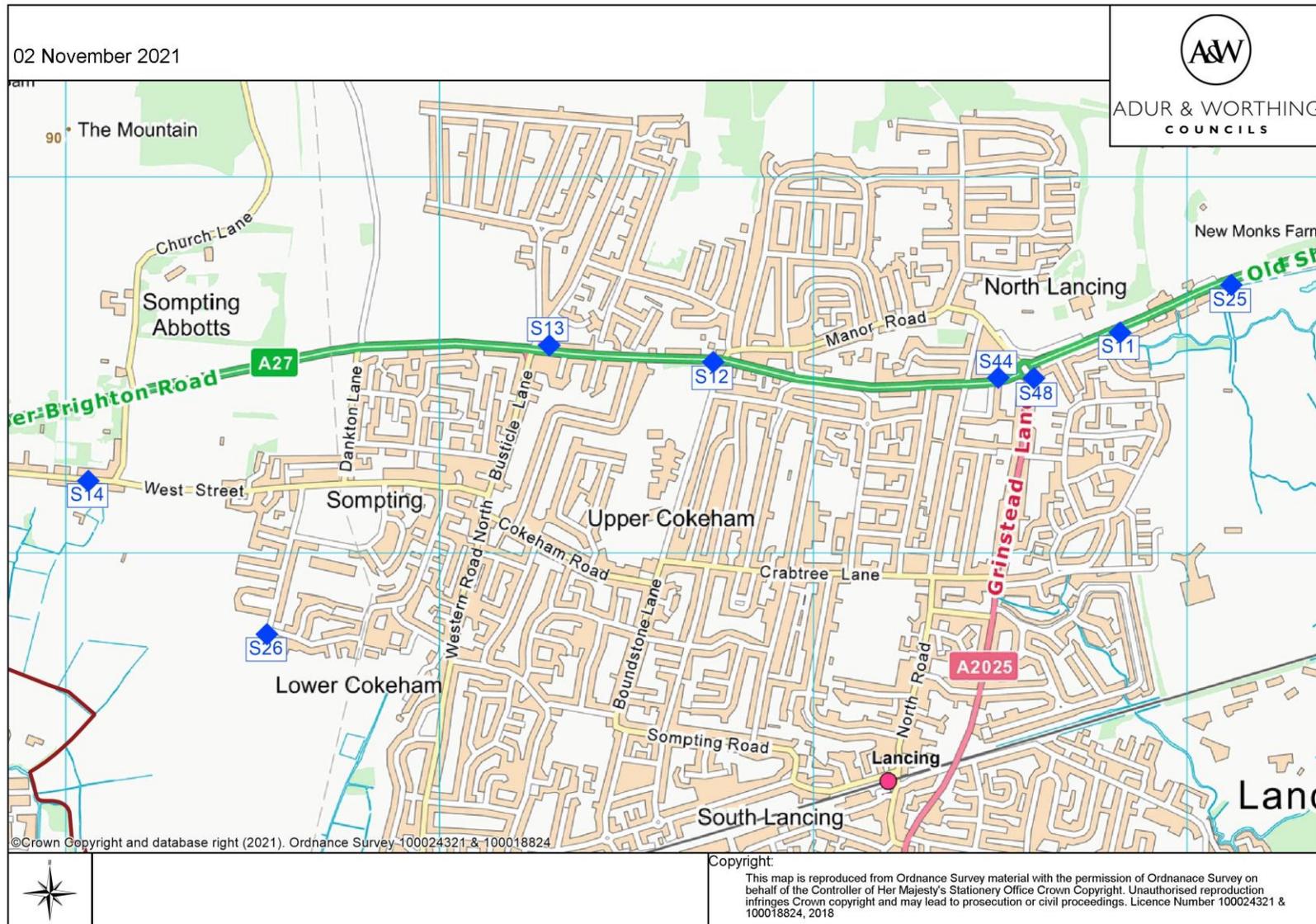


Figure D.6 – Map of Non-Automatic Monitoring Sites – Adur - South Lancing

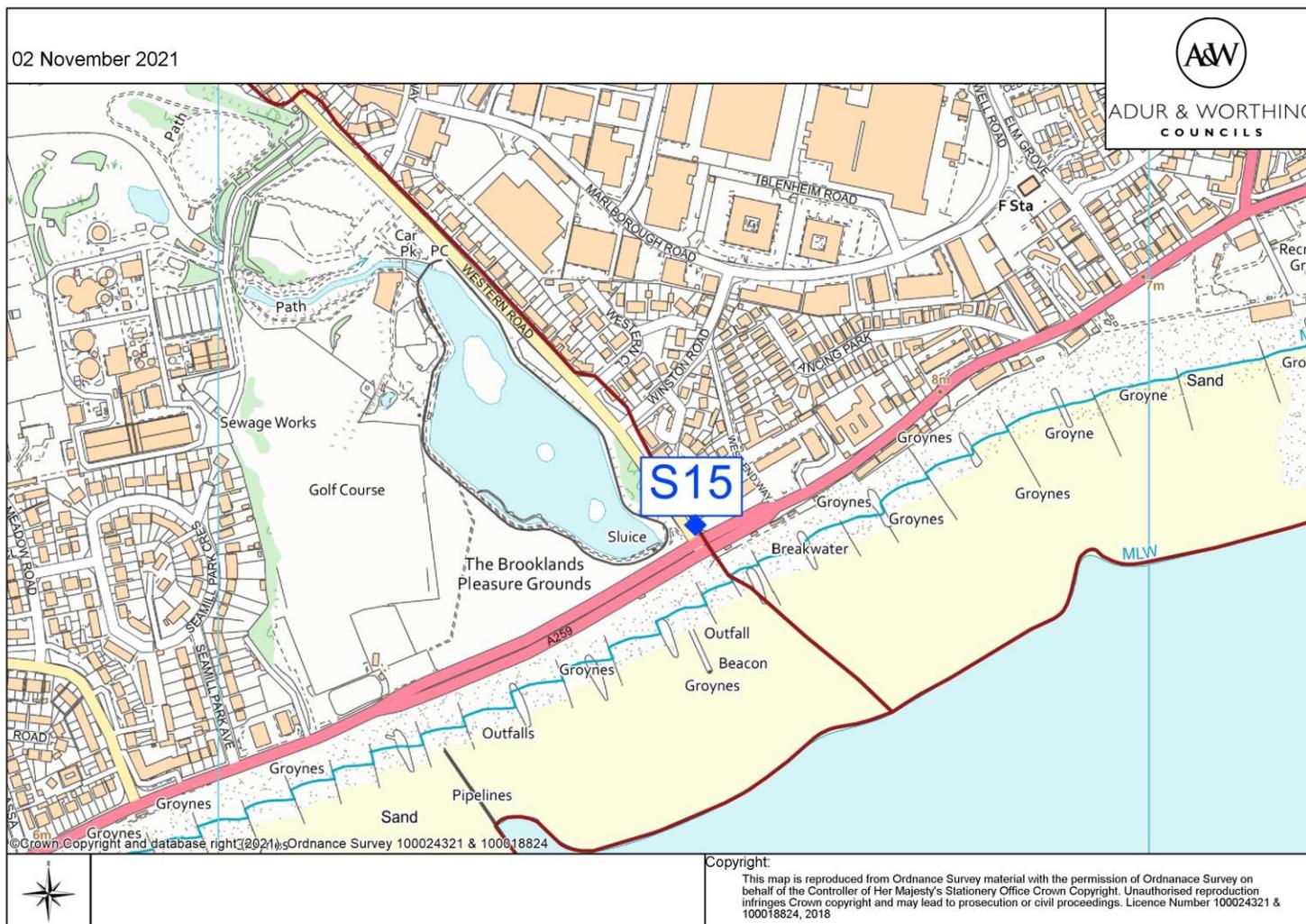
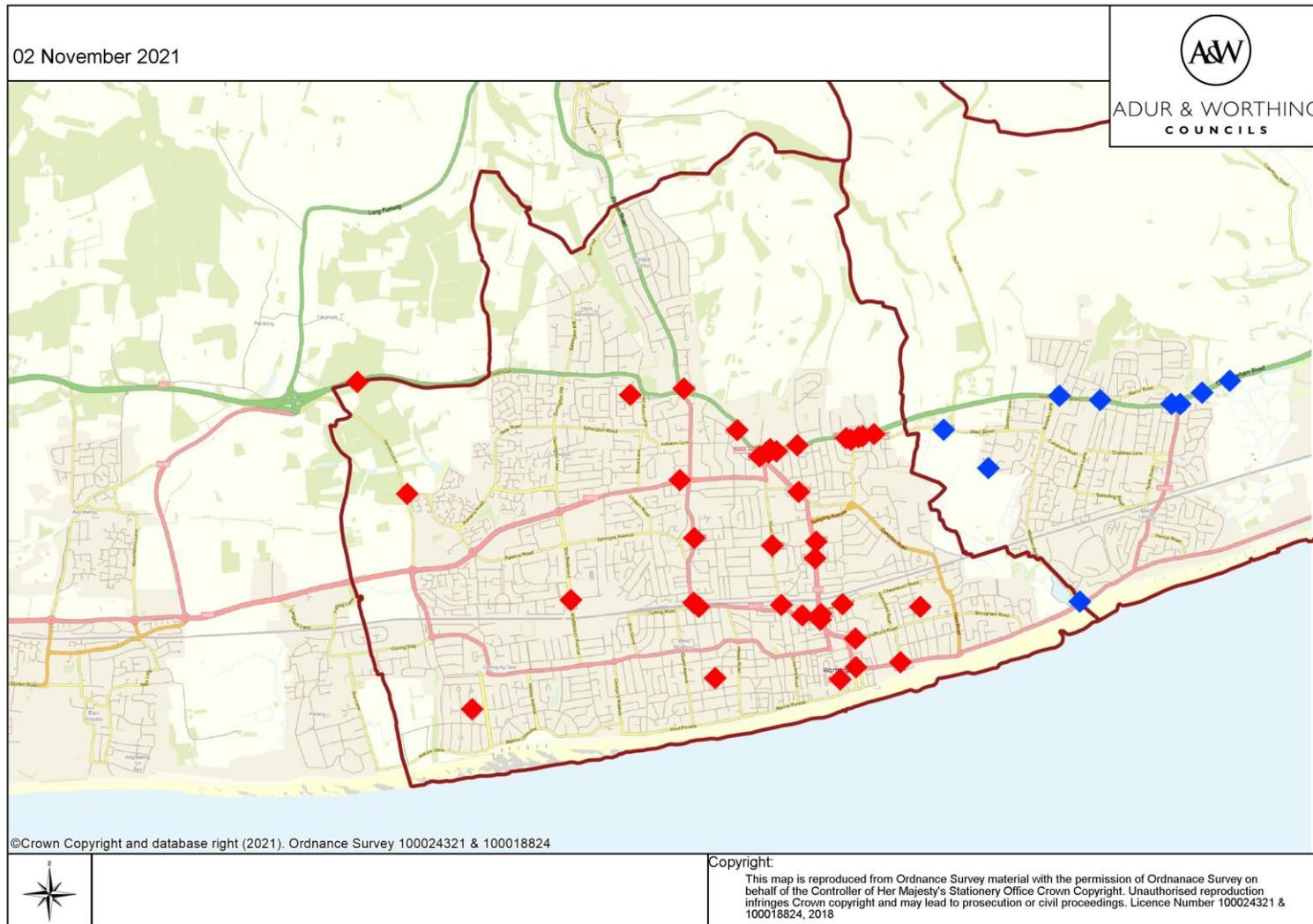


Figure D.8 – Map of Non-Automatic Monitoring Sites - Worthing



Note: Red triangles indicate approximate position of diffusion tube monitoring site

Figure D.9 – Map of Non-Automatic Monitoring Sites – Worthing AQMA No.2

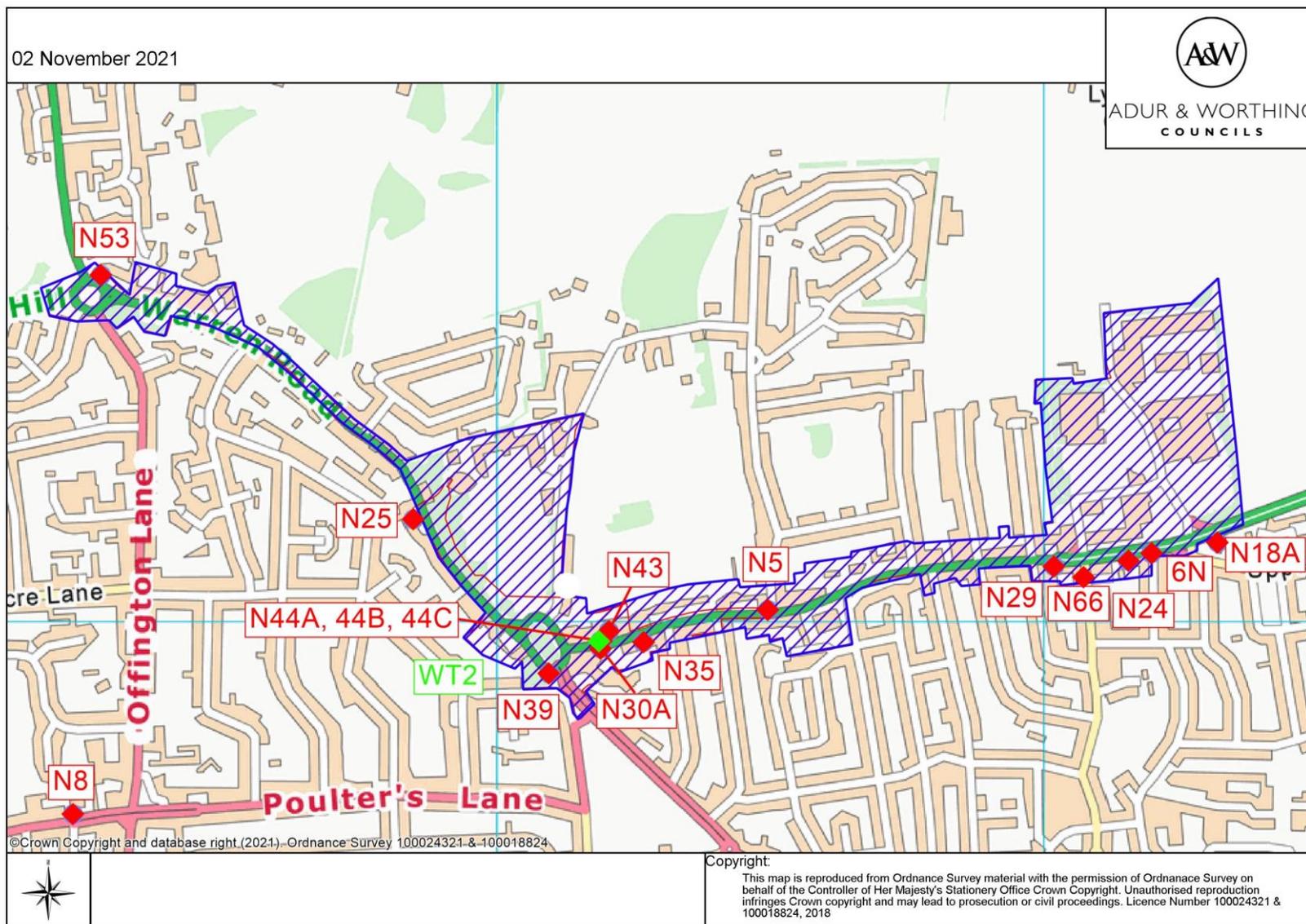


Figure D.11 – Map of Non-Automatic Monitoring Sites – Worthing A27

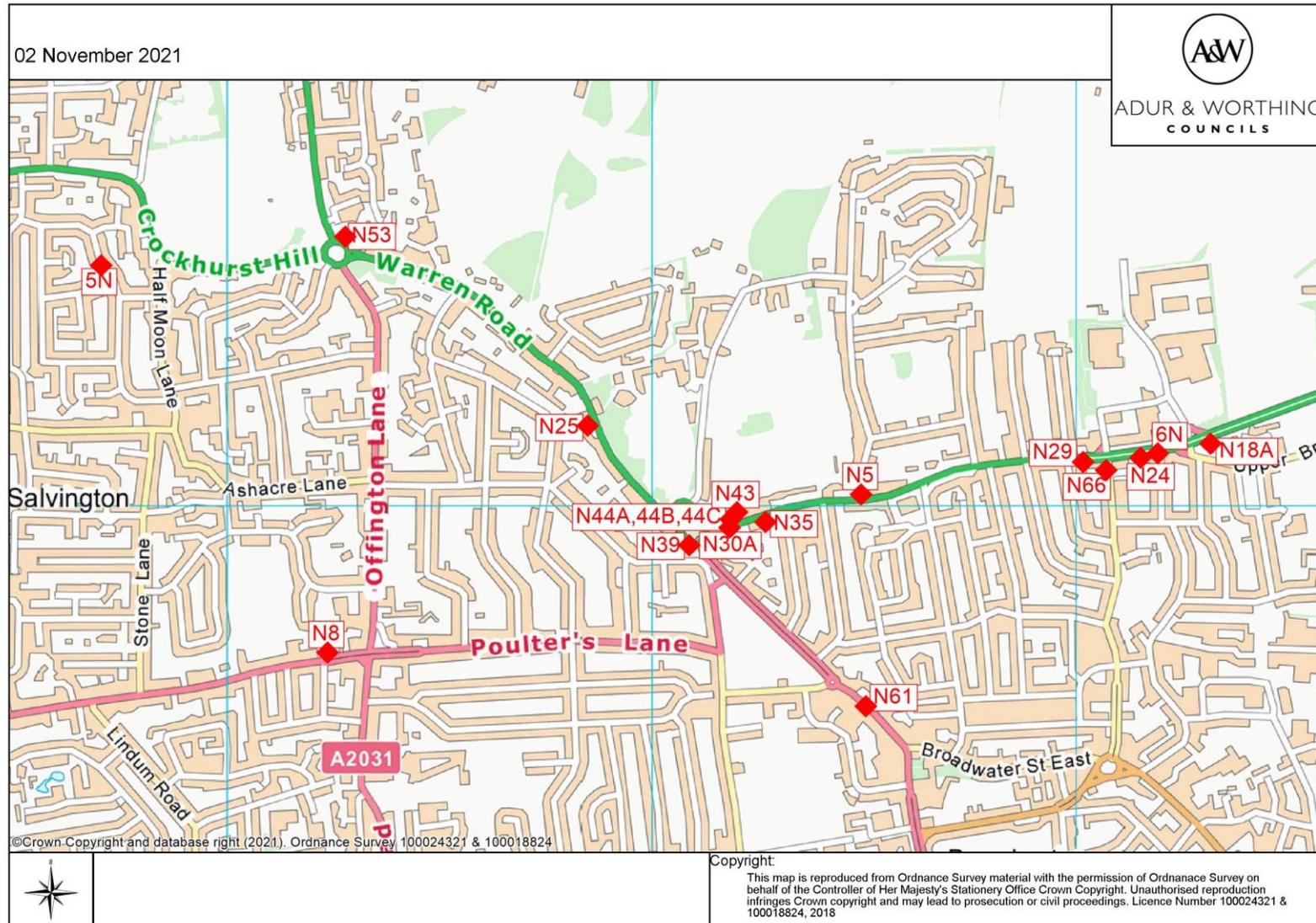


Figure D.12 – Map of Non-Automatic Monitoring Sites – Worthing West/Goring

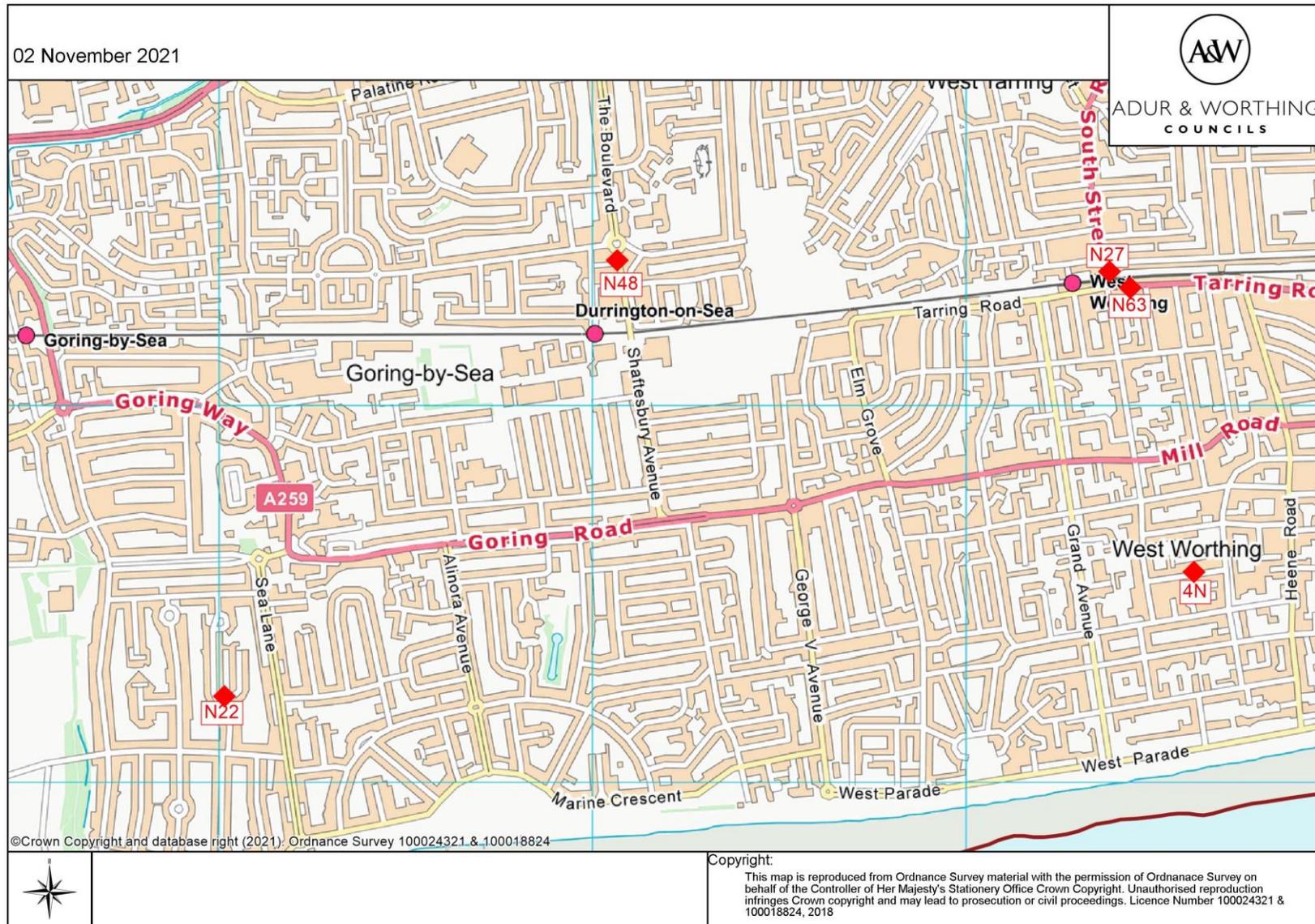


Figure D.13 – Map of Non-Automatic Monitoring Sites – Worthing – Durrington

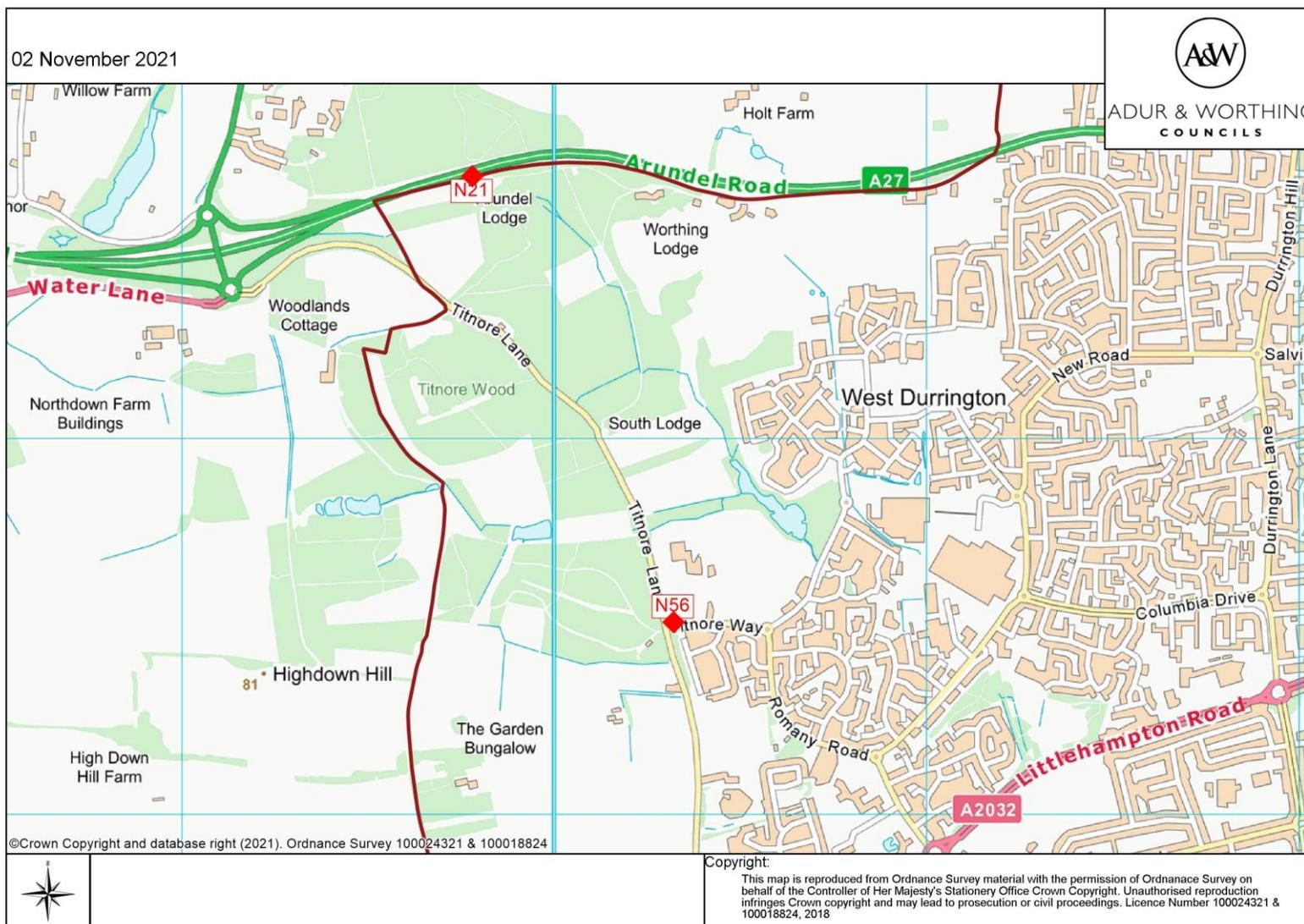
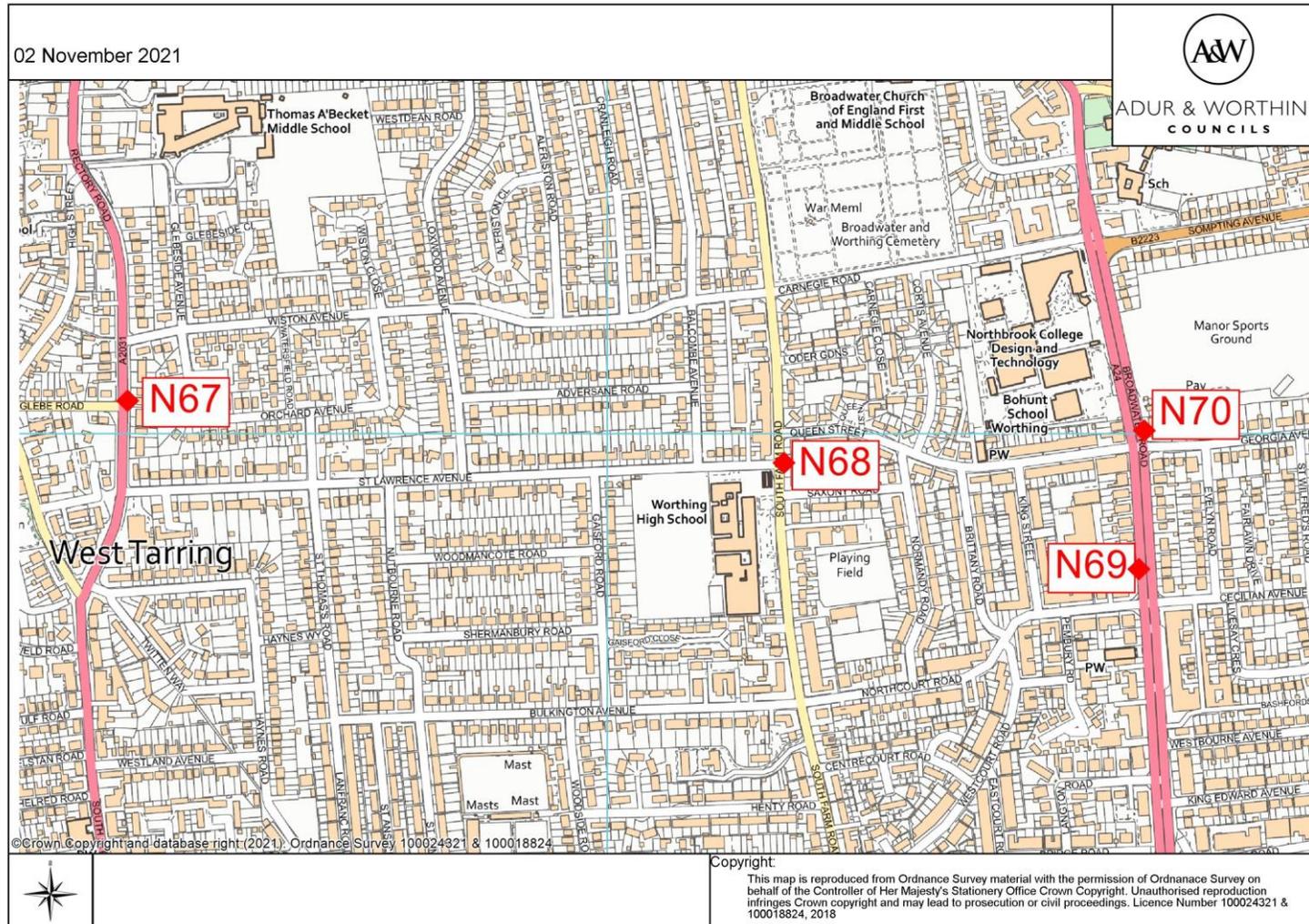


Figure D.14 – Map of Non-Automatic Monitoring Sites – Worthing – Temporary Cycle Lane Monitoring



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England⁹

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

⁹ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

Appendix F: Impact of COVID-19 upon LAQM

COVID-19 has had a significant impact on society. Inevitably, COVID-19 has also had an impact on the environment, with implications to air quality at local, regional and national scales.

COVID-19 has presented various challenges for Local Authorities with respect to undertaking their statutory LAQM duties in the 2021 reporting year. Recognising this, Defra provided various advice updates throughout 2020 to English authorities, particularly concerning the potential disruption to air quality monitoring programmes, implementation of Air Quality Action Plans (AQAPs) and LAQM statutory reporting requirements. Defra has also issued supplementary guidance for LAQM reporting in 2021 to assist local authorities in preparing their 2021 ASR. Where applicable, this advice has been followed.

Despite the challenges that the pandemic has given rise to, the events of 2020 have also provided Local Authorities with an opportunity to quantify the air quality impacts associated with wide-scale and extreme intervention, most notably in relation to emissions of air pollutants arising from road traffic. The vast majority (>95%) of AQMAs declared within the UK are related to road traffic emissions, where attainment of the annual mean objective for nitrogen dioxide (NO₂) is considered unlikely. On 23rd March 2020, the UK Government released official guidance advising all members of the public to stay at home, with work-related travel only permitted when absolutely necessary. During this initial national lockdown (and to a lesser extent other national and regional lockdowns that followed), marked reductions in vehicle traffic were observed; Department for Transport (DfT) data¹⁰ suggests reductions in vehicle traffic of up to 70% were experienced across the UK by mid-April, relative to pre COVID-19 levels.

This reduction in travel in turn gave rise to a change of air pollutant emissions associated with road traffic, i.e. nitrous oxides (NO_x), and exhaust and non-exhaust particulates (PM). The Air Quality Expert Group (AQEG)¹¹ has estimated that during the initial lockdown period in 2020, within urbanised areas of the UK reductions in NO₂ annual mean concentrations were between 20 and 30% relative to pre-pandemic levels, which

¹⁰ Prime Minister's Office, COVID-19 briefing on the 31st of May 2020

¹¹ Air Quality Expert Group, Estimation of changes in air pollution emissions, concentrations and exposure during the COVID-19 outbreak in the UK, June 2020

represents an absolute reduction of between 10 to 20µg/m³ if expressed relative to annual mean averages. During this period, changes in PM_{2.5} concentrations were less marked than those of NO₂. PM_{2.5} concentrations are affected by both local sources and the transport of pollution from wider regions, often from well beyond the UK. Through analysis of AURN monitoring data for 2018-2020, AQEG have detailed that PM_{2.5} concentrations during the initial lockdown period are of the order 2 to 5µg/m³ lower relative to those that would be expected under business-as-usual conditions.

As restrictions are gradually lifted, the challenge is to understand how these air quality improvements can benefit the long-term health of the population.

Impacts of COVID-19 on Air Quality within Adur and Worthing

- Between April and June 2020, reductions of NO₂ concentrations at roadside diffusion tube monitoring sites averaged 29% within Adur AQMA1 Shoreham High Street (ranging from 26 to 33%) and 24% in AQMA2 Southwick (ranging from 22 to 25%). This equated to an average 20% reduction in annual mean concentration relative to 2019 in both AQMAs.
- Reductions of NO₂ concentrations at roadside diffusion tube monitoring sites in Worthing AQMA No.2 averaged 21% (ranging from 18 to 33%). This equated to an average 16% reduction in annual mean concentrations relative to 2019 within the AQMA.
- Monitoring sites within all our AQMAs were showing a year on year reduction prior to the pandemic. However the effect of reduced traffic numbers during lockdowns obviously accelerated this reduction.
- Traffic data has been obtained from West Sussex County Council (WSCC) for three locations in Adur, allowing a comparison of traffic numbers for 2019 and 2020. The table below shows Annual Average Daily Traffic (AADT) data for 2019 and 2020 for these sites. Volumes decreased over 2019 levels by about 15%.
- Traffic data from WSCC suggests that when the weekly traffic volumes were at their lowest across the County (w/c 6 April 2020), they were 68% less than w/c 2 March 2020 and 67% less compared to the previous year.
- Traffic data has again been obtained from Highways England for the A27 through Worthing. The table below shows Annual Average Daily Traffic (AADT) data for

2016 - 2020 for both carriageways of the A27 near Grove Lodge. Traffic volumes decreased by an average of 12% over 2019 levels.

Shoreham Traffic Data

Site no.	Location	AADT					Difference	% Difference
		2016	2017	2018	2019	2020	2019-20	
5035	A270 Old Shoreham Road, west of Southview Road, Southwick	23,667	23,671	23,288	23,541	N/A	N/A	N/A
257	A259 east of New Salts Farm Roundabout, Shoreham	25,915	25,415	25,194	24,730	20,991	-3,739	-15.1
5037	A283 Old Shoreham Road, o/p no.138, Shoreham	13,665	13,659	13,775	12,087	10,324	-1,763	-14.6

Worthing Traffic Data

NTIS Link ID	NTIS Link Location Name	AADT 2016	AADT 2017	AADT 2018	AADT 2019	AADT 2020	Difference 2018-19	% Difference
103024103	A27 westbound between A2025 and A24 near Worthing (east)	15,334	14,511	14,994	16,354	14,350	-2,003	-12.2
125021201	A27 eastbound between A24 near Worthing (east) and A2025	18,454	15,849	15,527	16,642	14,622	-2,020	-12.1

Opportunities Presented by COVID-19 upon LAQM within Adur & Worthing

- Pop-up Cycle Lanes – A number of temporary cycle lanes were implemented by West Sussex County Council in both Adur & Worthing, funded by the DfT Active Travel Fund.
 - In Adur segregated lanes were installed on both carriageways of the A270 Upper Shoreham Road. These did not take away significant parts of the carriageway.
 - In Worthing one carriageway on the north and southbound A24 from Broadwater to Central Worthing was temporarily used for segregated cycle lanes.
- The cycle lanes were subsequently removed in late 2020, with WSCC stating that when the Government funding was awarded and the cycleways' construction started, the country was just emerging from the first national lockdown. Since then, the Government had continued to provide additional funding for local public transport and traffic had significantly increased, so the pop-up cycle lanes were no longer needed for their original purpose.
- The impact of the schemes was monitored by WSCC during their operation. WSCC stated that feedback showed a large number of people were opposed to the cycleways, citing increased congestion as a key issue. Automatic traffic counters also indicated relatively low usage by cyclists in comparison with other traffic.
- Notwithstanding this the A270 Shoreham cycle lane was subsequently being reconsidered with public consultation in 2021.
- As a result of lockdowns a large number of individuals changed their working patterns, which led to a reduction in the number of car journeys through the area, particularly at peak rush hour times. It is hoped some of this behavioural change is maintained through 2021 and beyond.
- With a large proportion of the Adur & Worthing Council workforce working from home during 2020, business mileage was reduced by 50%. It is expected the change in working practices will be made permanent.
- Public interest in local air quality (and climate change) increased, with an increase in enquiries from the public during 2020.

Challenges and Constraints Imposed by COVID-19 upon LAQM within Adur & Worthing

- A revised AQAP for Adur was proposed to be completed in 2020. Unfortunately as a result of the reallocation of Council resources during 2020, development and implementation of the AQAP was further delayed. Current estimates are that the revised AQAP will be prepared in late 2021 with consultation thereafter (early 2022). **Large Impact**
- In the last ASR we stated we would consider revoking Adur AQMA2 – Southwick during 2020. Due to the pandemic and the reallocation of Council resources during 2020, we have been unable to progress this. Therefore we aim to review this again in 2021/22. **Large Impact**

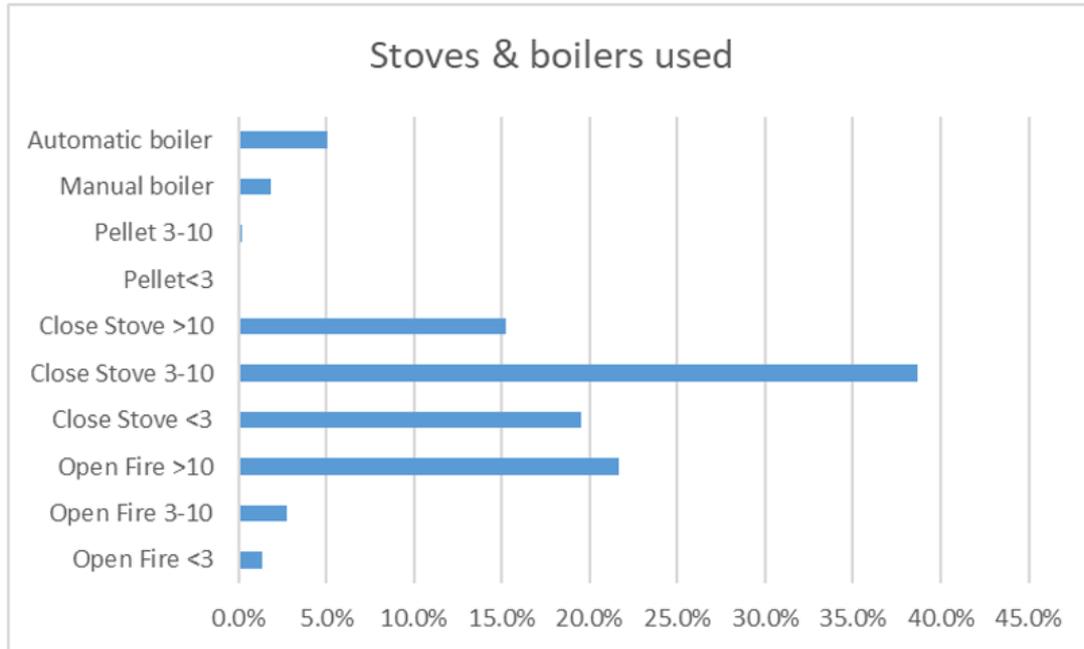
The impacts as presented above are aligned with the criteria as defined in Table F 1, with professional judgement considered as part of their application.

Table F 1 – Impact Matrix

Category	Impact Rating: None	Impact Rating: Small	Impact Rating: Medium	Impact Rating: Large
Automatic Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Automatic Monitoring – QA/QC Regime	Adherence to requirements as defined in LAQM.TG16	Routine calibrations taken place frequently but not to normal regime. Audits undertaken alongside service and maintenance programmes	Routine calibrations taken place infrequently and service and maintenance regimes adhered to. No audit achieved	Routine calibrations not undertaken within extended period (e.g. 3 to 4 months). Interruption to service and maintenance regime and no audit achieved
Passive Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Passive Monitoring – Bias Adjustment Factor	Bias adjustment undertaken as normal	<25% impact on normal number of available bias adjustment colocation studies (2020 vs 2019)	25-50% impact on normal number of available bias adjustment studies (2020 vs 2019)	>50% impact on normal number of available bias adjustment studies (2020 vs 2019) and/or applied bias adjustment factor studies not considered representative of local regime
Passive Monitoring – Adherence to Changeover Dates	Defra diffusion tube exposure calendar adhered to	Tubes left out for two exposure periods	Tubes left out for three exposure periods	Tubes left out for more than three exposure periods
Passive Monitoring – Storage of Tubes	Tubes stored in accordance with laboratory guidance and analysed promptly.	Tubes stored for longer than normal but adhering to laboratory guidance	Tubes unable to be stored according to be laboratory guidance but analysed prior to expiry date	Tubes stored for so long that they were unable to be analysed prior to expiry date. Data unable to be used
AQAP – Measure Implementation	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP
AQAP – New AQAP Development	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP

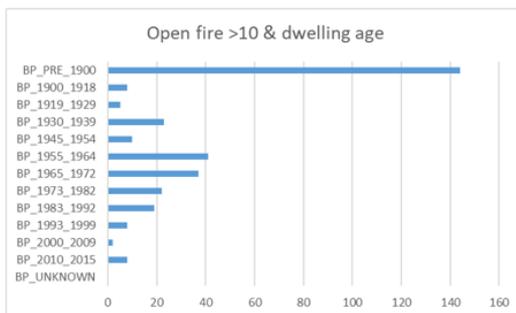
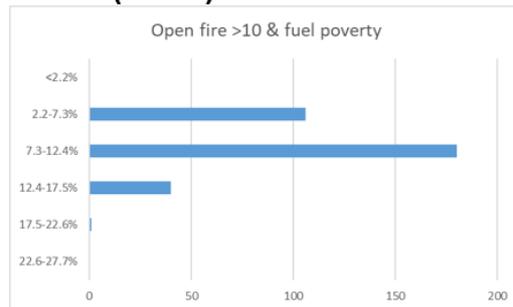
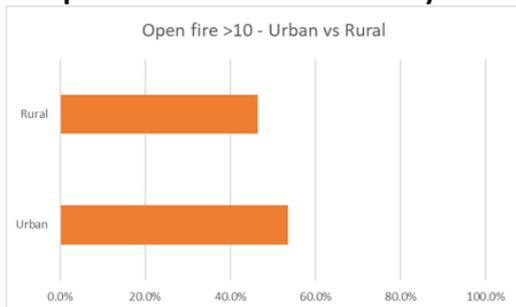
Appendix G: Summary of Clean Burn Sussex Survey Results (for all of Sussex)

Stove users – stove type (Q5)



This includes only those respondents able to answer this question. A "tick all that apply" type of question. Number of respondents: 1509.

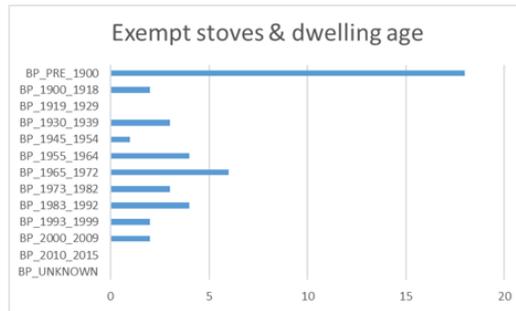
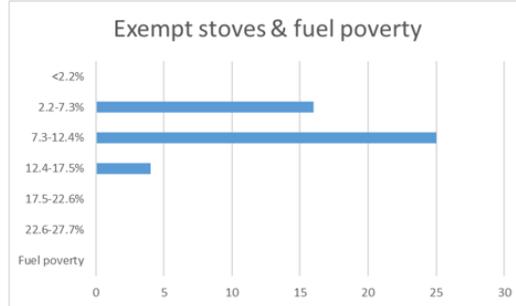
Open fires >10 years old (Q5)



This includes only those respondents able to answer this question. A "tick all that apply" type of question. Number of respondents: 1509.

Defra-exempt stoves (Q5)

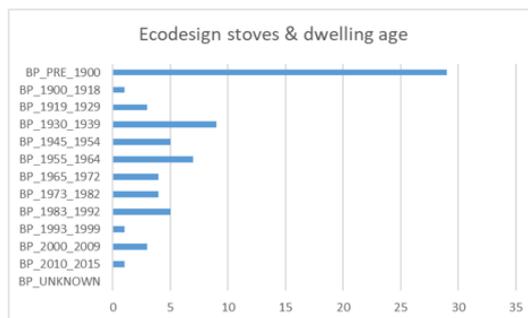
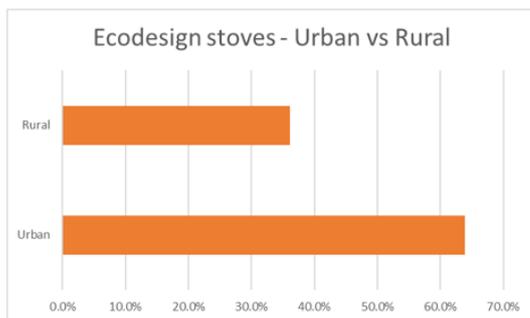
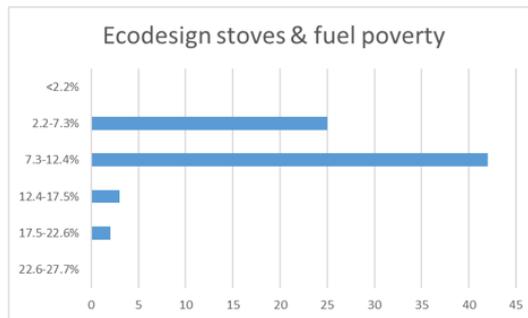
- Only 45 stoves out of 1500
- 0 in Brighton SCA, 2 in Crawley SCA



This includes only those respondents able to answer this question. A "tick all that apply" type of question. Number of respondents: 1509.

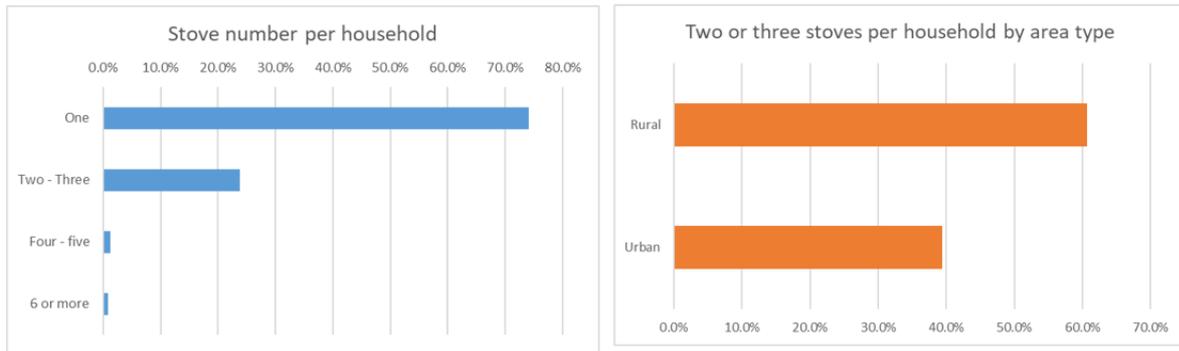
Ecodesign compliant stoves (Q5)

- Only 72 stoves out of 1500
- No such stoves declared in SCAs



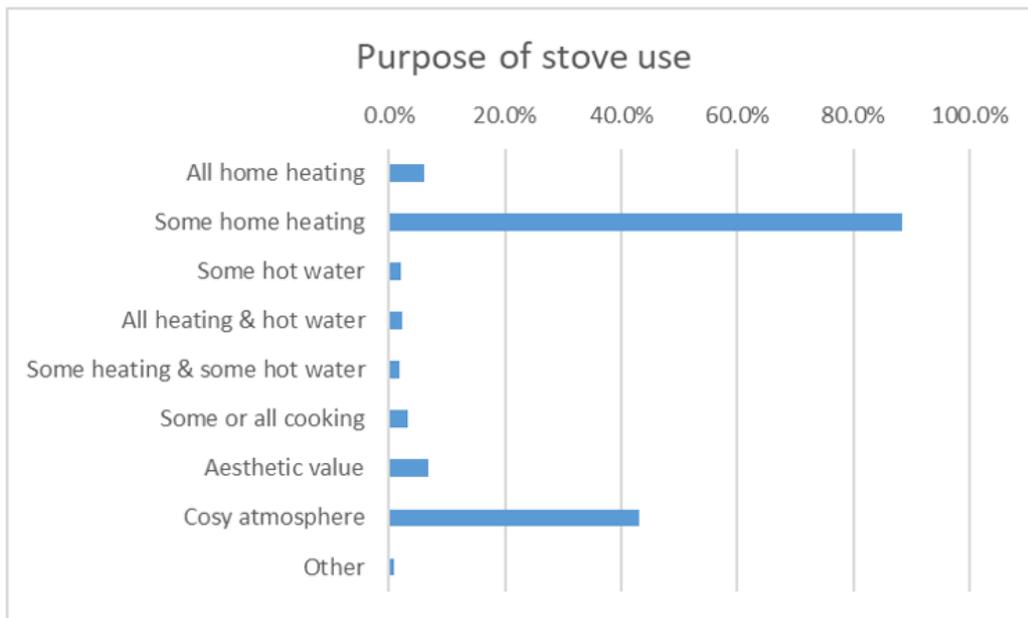
This includes only those respondents able to answer this question. A "tick all that apply" type of question. Number of respondents: 1509.

Number of stoves per household (Q6)



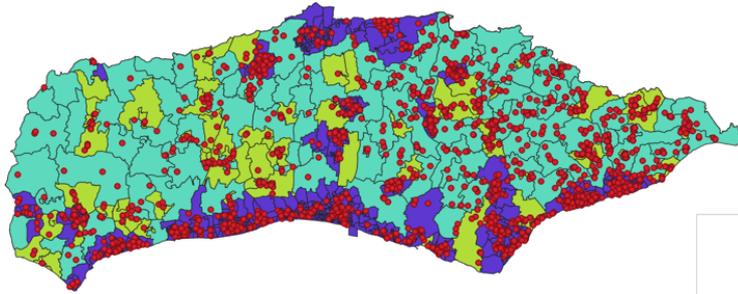
This includes only those respondents able to answer this question. Number of respondents: 1421.

Purpose of stove use (Q7)

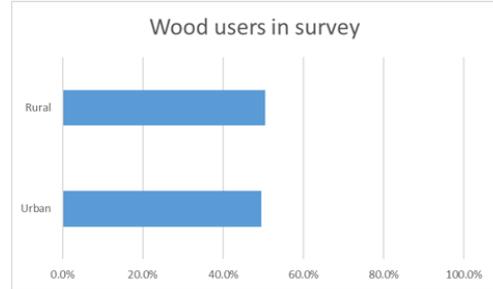


This includes only those respondents able to answer this question. A "tick all that apply" type of question. Number of respondents: 1451.

Wood users – Urban vs Rural (Q8)

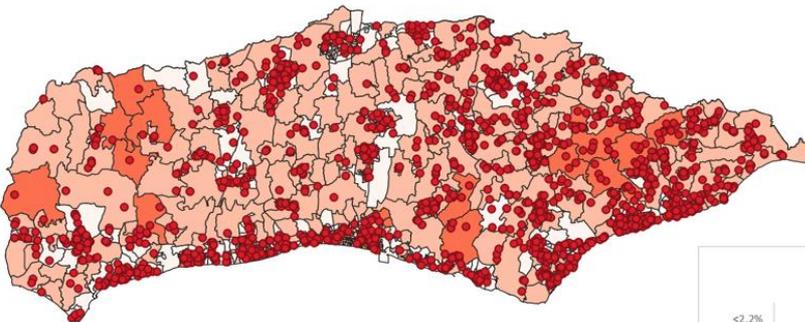


- WS_LSOA**
- Rural town and fringe
- Rural village and dispersed
- Urban city and town

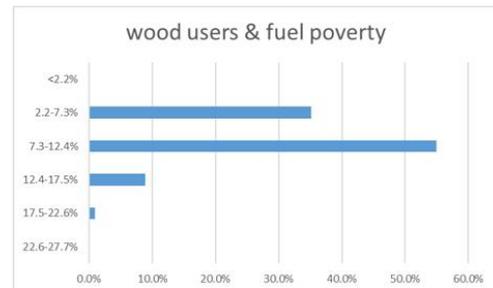


This includes only those respondents able to answer this question. A "tick all that apply" type of question. Number of respondents: 1505. Number of wood users: 1493

Wood users – Fuel Poverty (Q8)

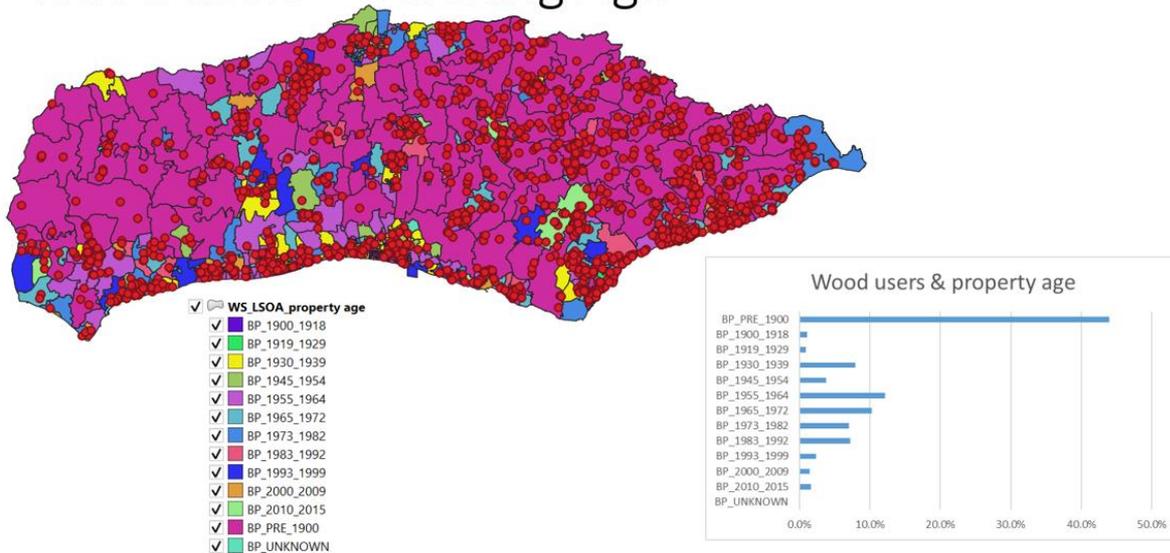


- WS_LSOA_Fuel Poverty**
- 2.2 - 7.3
- 7.3 - 12.4
- 12.4 - 17.5
- 17.5 - 22.6
- 22.6 - 27.7



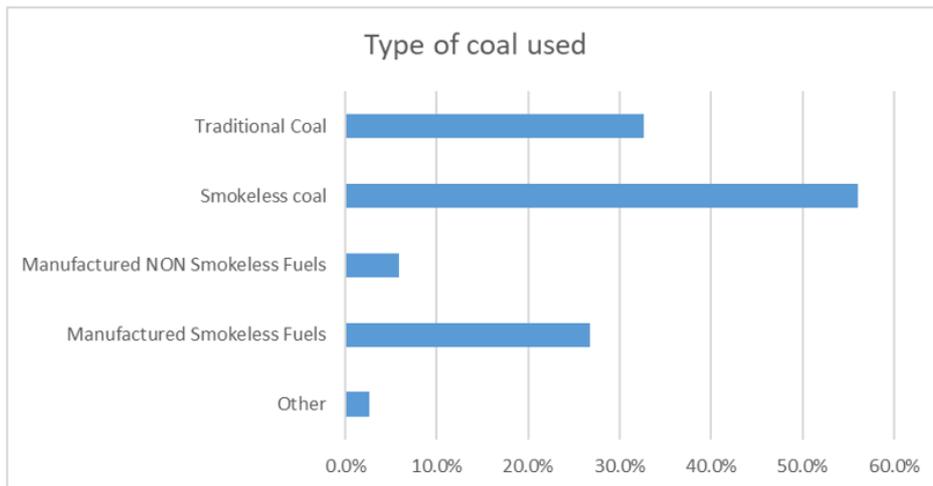
This includes only those respondents able to answer this question. A "tick all that apply" type of question. Number of respondents: 1505. Number of wood users: 1493

Wood users – Dwelling Age



This includes only those respondents able to answer this question. A "tick all that apply" type of question. Number of respondents: 1505. Number of wood users: 1493

Type of coal used (Q8)



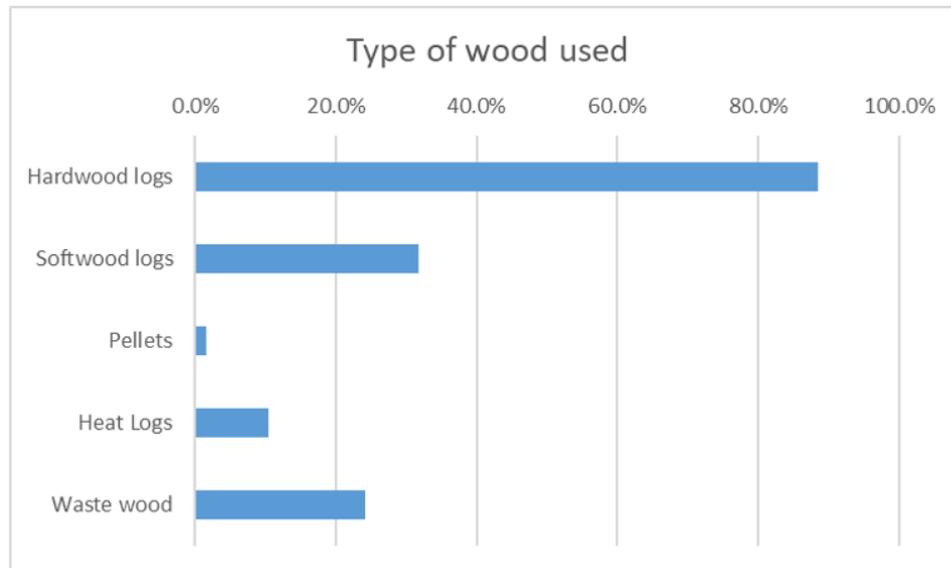
This includes only those respondents able to answer this question. A "tick all that apply" type of question. Number of respondents: 1505. Number of coal users: 423

When did you start burning wood? (Q9)



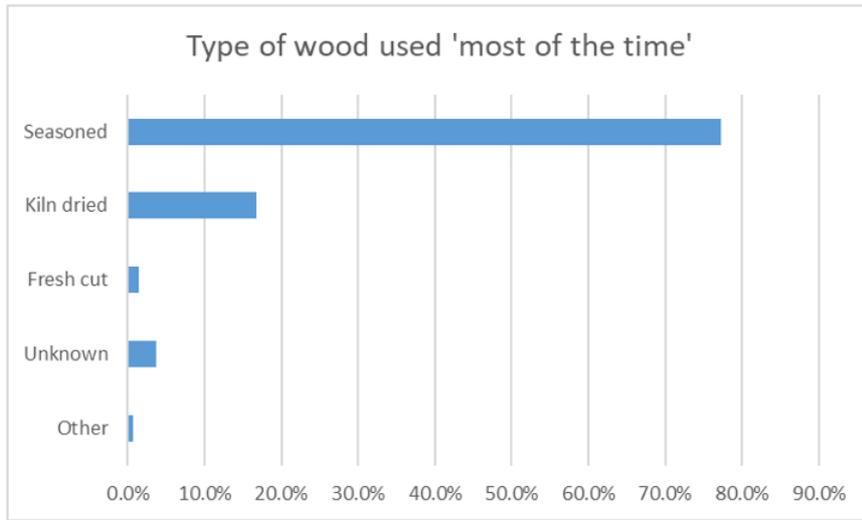
This includes only those respondents able to answer this question. Number of respondents: 1493.

Wood users – type of wood burned (Q10)



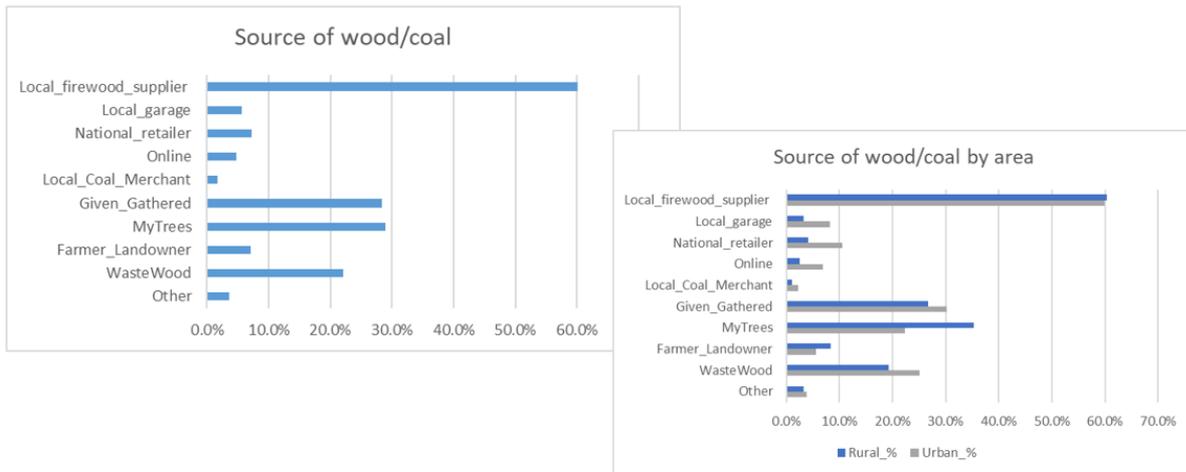
This includes only those respondents able to answer this question. A "tick all that apply" type of question. Number of respondents: 1489.

Type of wood used 'most of the time' (Q11)



This includes only those respondents able to answer this question. Number of respondents: 1331.

Source of wood (Q13)



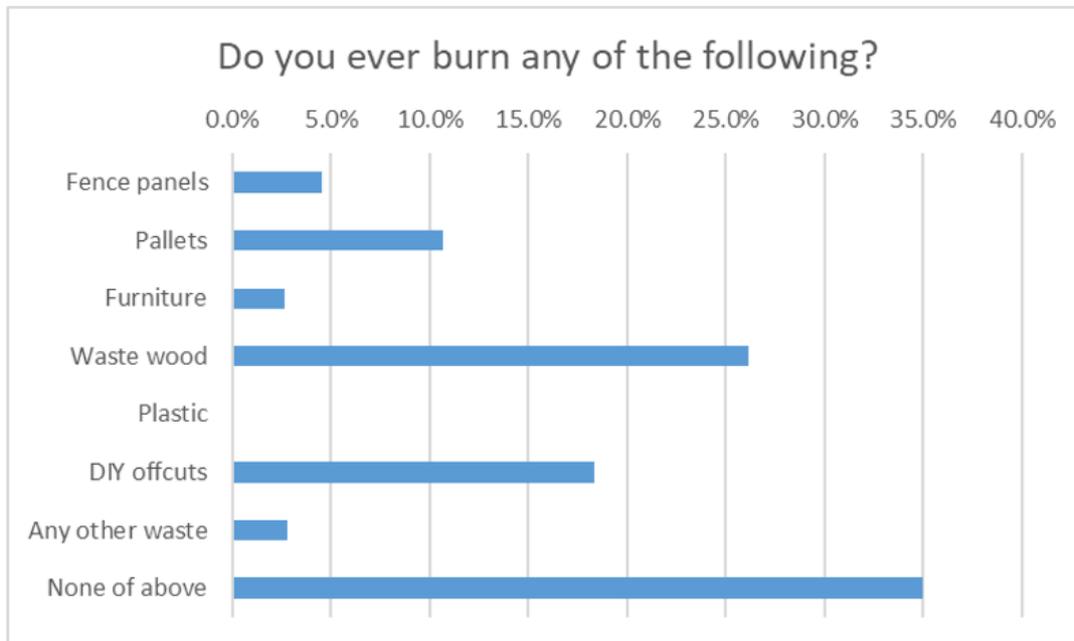
This includes only those respondents able to answer this question. A "tick all that apply" type of question. Number of respondents: 1405.

Where do you mainly store your wood? (Q14)



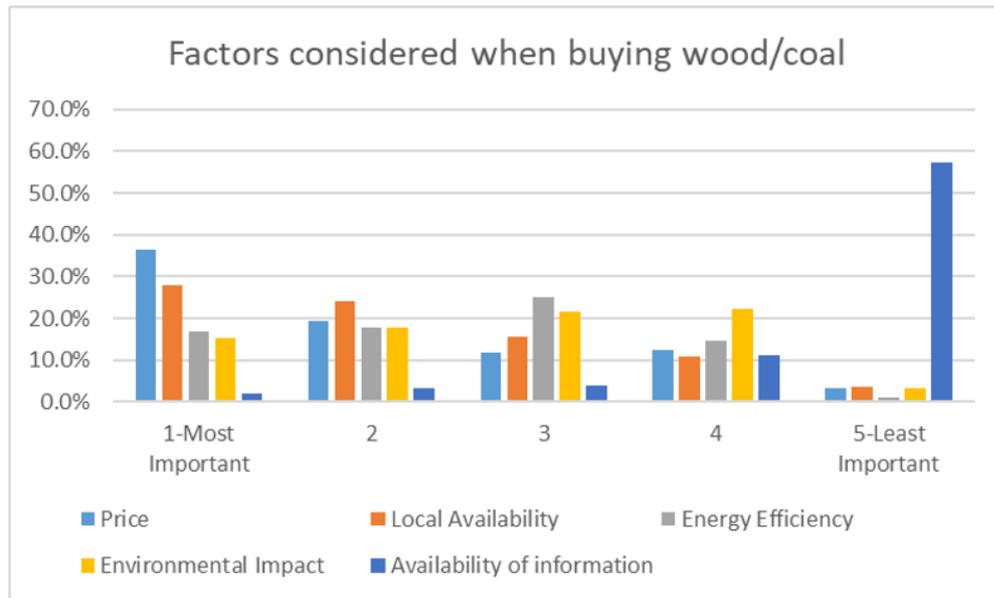
This includes only those respondents able to answer this question. A "tick all that apply" type of question. Number of respondents: 1406.

Do you ever burn waste? (Q16)



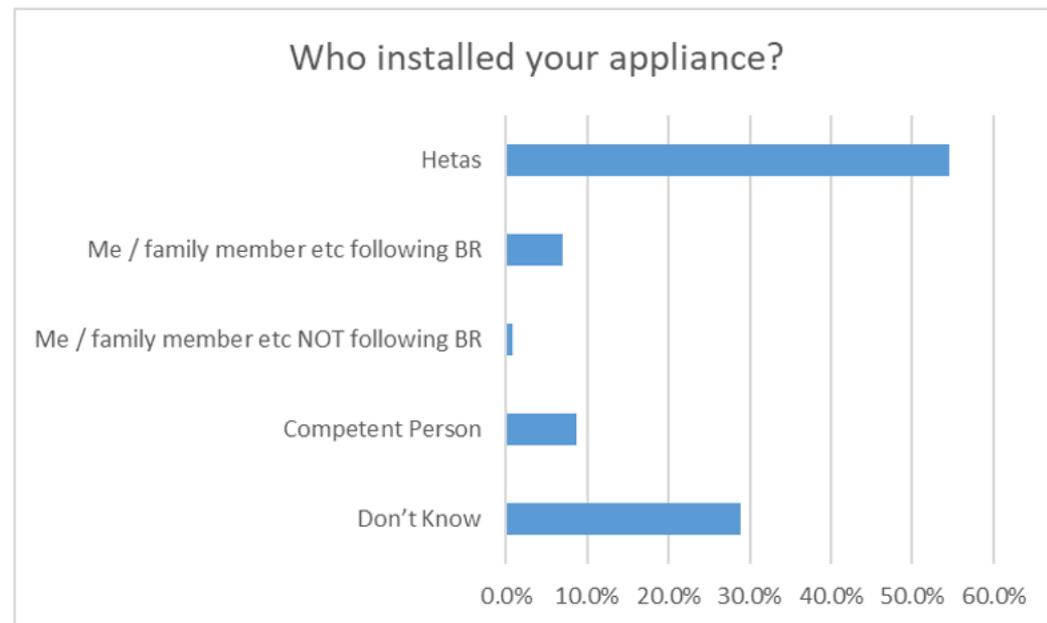
This includes only those respondents able to answer this question. A "tick all that apply" type of question. Number of respondents: 887.

Key factors for buying wood/coal (Q20)



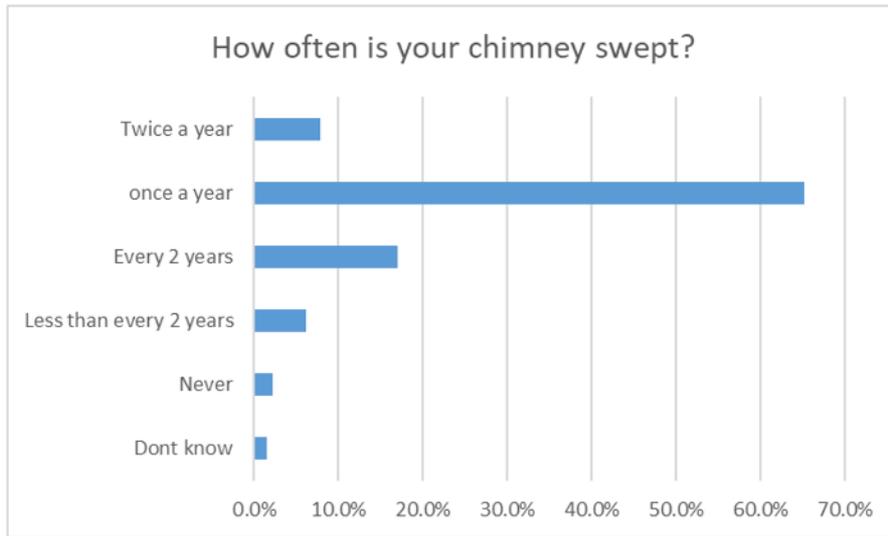
This includes only those respondents able to answer this question. Number of respondents: 845.

Who installed your appliance? (Q21)



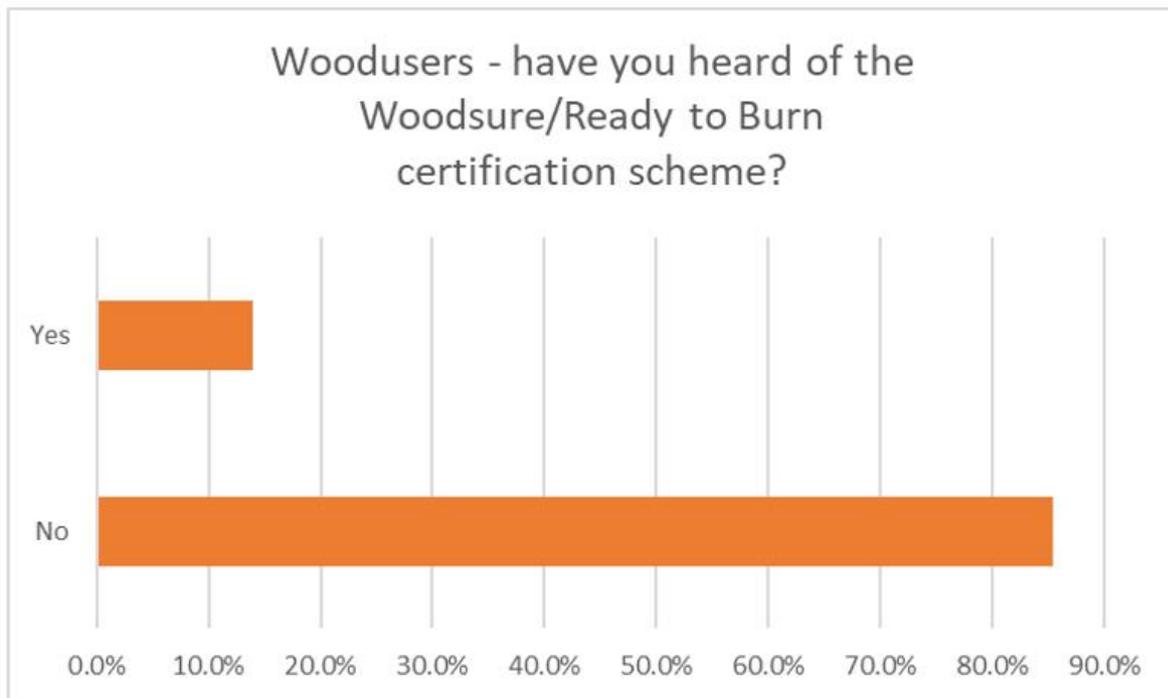
This includes only those respondents able to answer this question. Number of respondents: 910.

How often do you get your chimney/flue swept? (Q25)



This includes only those respondents able to answer this question. Number of respondents: 921.

Woodsure/Ready to Burn (Q30)



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	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
LAQM	Local Air Quality Management
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm 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
ULEV	Ultra-Low Emission Vehicles
WSCC	West Sussex County Council

References

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- Local Air Quality Management Policy Guidance LAQM.PG16. May 2016. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
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- Air Quality and Emission Mitigation Guidance for Sussex (2020) - Available from <https://www.sussex-air.net/>