2020 Annual Status Report (ASR) for

Horsham District Council

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

June 2020

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Executive Summary of Air Quality in Our Area

This report details the results of air quality monitoring undertaken in 2019 across Horsham District and is prepared in accordance with the guidance issue by the Department for Environment, Food and Rural Affairs (Defra).

Local Authorities across the United Kingdom are required to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives set by the Government are likely to be achieved. Where exceedances are considered likely, the local authority must then 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.

Air Quality in Horsham District

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas[1,2]. The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[3]. Improving air quality is essential for making sure we live in a healthy environment and breathe clean air.

This report considers new monitoring data and actions taken to improve air quality during 2019.

Horsham district is primarily agricultural in character and does not incorporate a significant heavy industrial base or major transport hubs. The main source of air pollution locally are road traffic emissions from major roads, notably the A24, which intersects the district north – south; A264 to the north of Horsham; A272 and A281 at Cowfold; and A283 at Storrington. Two Air Quality Management Areas (AQMAs) have been declared in the district in the village of Cowfold and town centre of Storrington, both for the exceedances of the annual mean objective for nitrogen dioxide (NO_2). Air Quality Action Plans (AQAP) were prepared for both AQMAs; the Storrington AQAP was submitted to Defra in 2012 and the Cowfold AQAP in 2013.

Although the work under the Local Air Quality Management (LAQM) is the legal obligation of district councils, actions aimed at improving air quality most of the time require the cooperation of other departments and organisations. Horsham District Council (HDC) works in cooperation with other stakeholders, such as planning, Public Health England, West Sussex County Council (WSCC) highways, neighbouring districts, Sussex-Air Partnership and the Environment Agency. The assessment and

[1] Environmental equity, air quality, socioeconomic status and respiratory health, 2010
[2] Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006
[3] Defra. Abatement cost guidance for valuing changes in air quality, May 2013

implementation of the identified traffic management schemes is done in cooperation with WSCC as they are the authority responsible for roads and transport management. Steering groups were set up for each of the AQMAs. The steering groups have contributed to the development of the Action Plans and are the decision making body for the action plan measures to be taken forward. The Council is consulted on planning applications for HDC Development Management and WSCC minerals and waste.

Actions to Improve Air Quality

Horsham District Council has taken forward a number of measures during the current reporting year of 2019 in pursuit of improving local air quality. The key actions completed in 2019 are:

- Progression of a scheme for prohibition of goods vehicles over 7.5 tonnes on School Hill between the A283 and the Mill Lane car park access road. This included advance warning and lorry routing signs installed on the access routes into Storrington including A283 Washington Road, A283 High Street and B2139 Thakeham Road (completed May 2019);

- Promotion of a prohibition of loading and unloading at any time on sections of North Street and prohibition of waiting on sections of The Square and West Street Storrington (completed summer 2019);

- Progression of the Clean Burn Sussex project aimed at the promotion of least polluting fuels and stoves;

- Integration of the *Air Quality and Emissions Mitigation Guidance for Sussex* (2019) with HDC environmental (air quality) policy;

- Approval of the Electric Vehicle (EV) Charge Point Strategy in March 2020.

The achievement of congestion improvement measures in Storrington and Cowfold has been challenging as there are no easy solutions, and many of the solutions fall outside the power of HDC to implement. Horsham District Council continues to work with WSCC to explore traffic management measures to reduce congestion and improve air quality. This has included revisiting and reviewing the evidence from all previous measures identified to understand what impacts these would be likely to have in terms of improving air quality, and whether the measures would be deliverable and provide value for money. A number of these measures are continuing to be explored. Funding remains the principal challenge for progressing the measures identified as the most effective to improve air quality.

Conclusions and Priorities

The monitoring results for 2019 indicate that one monitoring location exceeded the annual mean objective for nitrogen dioxide (NO_2) in 2019: Storrington 19n (jct of Manley's Hill and School Hill), recording 47.7µg/m^3; this is lower than the last exceedance in 2018 of 50.6µg/m^3. The site is located within the Storrington AQMA. Two other diffusion tube monitoring sites measured concentrations within 10% of the

annual mean objective, one of those being Storrington 1 (Manleys Hill), located within the Storrington AQMA. The monitoring results for Storrington demonstrate that the Storrington AQMA is still required.

The other site which measured concentrations within 10% of the annual mean objective was Cowfold 7. Until 2019 the concentrations of NO_2 at Cowfold 7 had been above the objective for all the years of monitoring, however in 2019 the site has shown a decrease to 36.1µg/m³. When a distance correction has been applied to estimate the concentration at the nearest relevant exposure the result was 30.6µg/m^3, which demonstrates compliance with the objective. A decision on the future revocation of the Cowfold AQMA will depend on the monitoring results in the next few years. At the present time the boundaries of the Storrington and Cowfold AQMAs can remain unchanged.

No other monitoring sites within the district exceeded the air quality objectives for NO_2 in 2019. Most of the diffusion tube monitoring sites have shown a decrease in 2019 on the previous year. Long-term sites have shown a continuing overall downward trend over the monitoring period, indicative of a gradual improvement in fleet emissions.

Regarding PM_{10}, automatic monitoring at the Horsham Park Way site indicates that both the annual mean and 24-hour UK objective for PM_{10} were complied with in 2019 and all the previous years of monitoring. Monitoring results collated from three other permanent monitoring sites in the South East region show that both the annual mean and 24-hour UK objective for PM_{10} were complied with in 2019 and all the previous years.

Regional monitoring for $PM_{2.5}$ has shown that the selected sites complied with the national annual mean limit value in 2019 and all the previous years. All sites have shown a decreasing trend throughout the monitoring period.

The Council's priorities for the coming year are:

- Working with planning policy and development control to secure air quality mitigation from new development;
- Completion of the Defra-funded Clean Burn Sussex project;
- Installation of CCTV equipment at the mini-roundabout of School Hill and Manley's Hill to enforce breaches of the weight restriction for HGVs using School Hill;
- Progression of a Freight Delivery Partnership / Fleet Operator Recognition Scheme Standard: Encourage use of WSCC advisory lorry route rather than A283 through Storrington AQMA for longer distance lorry movements;
- Progressing delivery of traffic management / congestion improvement schemes for Storrington and Cowfold as identified in sections below.

Local Engagement and How to Get Involved

Two air quality Steering Groups have regular meetings in the district: Storrington Steering Group and Cowfold Steering group. Their objective is to progress the work on the Storrington and Cowfold Action Plans. Each group is a partnership of Councillors and officers from Horsham District Council and West Sussex County Council and includes representatives from the Parish Council. If you would like to obtain further information on the work being done please visit the Horsham District Council website or contact:

- Environmental Health: tel. 01403 215609; email: publichealth.licensing@horsham.gov.uk
- https://www.horsham.gov.uk/environmentalhealth/environmental-health/air-quality

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1 Local Air Quality Management

This report provides an overview of air quality in Horsham District during 2019. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on 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 Horsham District Council to improve air quality and the progress that has been made.

The statutory air quality objectives applicable to LAQM in England can be found in Table F1 in Appendix F.

Horsham District is a predominantly rural area with a population of 126 000. The total area is 205 square miles. Horsham is the main town and the principal administrative and commercial centre within the district with a population of around 40 000.

Horsham District is well served by transport links to London, Gatwick Airport, the M25 and the coast. A network of subsidiary routes connects the villages and small centres of population. Emissions from road transport remains the main source of air pollution in the district.

A large proportion of the district is composed of countryside with a varied landscape of woodland, heathland, downland, river valleys and meadows being represented. Areas of Outstanding Natural Beauty, Sites of Special Scientific Interest, and Sites of Nature Conservation Importance overlap the area. At the southern end of the district is the South Downs National Park. Agriculture remains a major user of land within the district. Significant industrial premises include a mechanical biological waste treatment facility and landfill site to the north of Horsham town and two brickworks.

The main source of air pollution in the district is road traffic emissions from major roads, notably the A24, A272 and A283, A281 and A264. Two Air Quality Management Areas (AQMAs) have been declared in the district, both for the exceedances of the annual mean nitrogen dioxide (NO_2) objective: Storrington AQMA was declared in December 2010 in the town centre of Storrington along the A283 and Cowfold AQMA was declared in September 2011 in the village centre of Cowfold along the A272/A281.

Steering groups were set up in the community for each of the AQMAs. The work of the steering groups contributed largely to the development of Action Plans for the AQMAs.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

A summary of AQMAs declared by Horsham District Council can be found in Table 2.1. Figure 2.1 and Figure 2.2 show the boundaries of the declared AQMAs. Further information related to declared or revoked AQMAs, is available online at http://uk-air.defra.gov.uk/aqma/list?la=H. A draft AQAP was prepared for both AQMAs; the Storrington AQAP was submitted to Defra in 2012 and the Cowfold AQAP in 2013 (Table 2.1).

2.1.1 Summary of Previous Review and Assessments

Under the Environment Act 1995, local authorities are required to Review and Assess (R&A) air quality on a regular basis. A review of air quality means a consideration of the levels of pollutants in the air for which objectives are prescribed in Regulations[4], and estimations of likely future levels. An assessment of air quality is the consideration of whether estimated levels for the relevant future period are likely to exceed the levels set in the objectives. A table of reports published is presented in Table 2.2 below.

The first review and assessment round was completed in 2000. The main conclusion was that the national air quality objectives were not likely to be exceeded at any locations in the district.

This first round of R&A constituted a benchmark against which Horsham District Council (the Council) measure progress in making improvements to the local air quality. Subsequent progress reports were completed in 2004 and 2005. In 2006 an Updating and Screening Assessment was completed. In all these reports no exceedance of air quality objectives was identified or predicted, which were the conclusions based on the results from the monitoring locations in operation at that time.

The Progress Reports submitted in 2007 and 2008 identified an exceedance of the air quality annual mean objective for NO_2 in Storrington and Cowfold and the need for Detailed Assessments for both locations was acknowledged. Steps were taken to install continuous monitoring equipment at both locations in order to proceed to the detailed assessment stage.

The Updating and Screening Assessment submitted in 2009 confirmed continued exceedances of the air quality objective for NO_2 at Storrington and Cowfold on the basis of diffusion tube monitoring results and the detailed assessment study of these areas begun.

[4] Air Quality Regulations for England (2000; Amendment Regulations 2002)

The 2010 Progress Report provided an update on air quality within the district and confirmed a continued exceedance of the air quality objective for NO_2 at Storrington and Cowfold. In accordance with the requirements of the LAQM framework the Council submitted the Detailed Assessments of air quality for these villages.

Following recommendations from the Detailed Assessments reports, the Council declared two Air Quality Management Areas (AQMAs), Storrington in December 2010 and Cowfold in October 2011. Maps showing the AQMA boundaries for both locations are provided in Figure 2.1 and Figure 2.2 overleaf.

The Further Assessment report for Storrington, submitted in March 2012, confirmed the findings of the Detailed Assessment and the AQMA in Storrington remained as originally declared. The Further Assessment report for Cowfold village was submitted to Defra in October 2012.

The declaration of AQMAs committed the Council to taking actions towards achieving the air quality objectives in the AQMA. In October 2012 Horsham District Council produced a draft AQAP for Storrington AQMA which was subject to public consultation during February/March 2013. The Action Plan for Cowfold was submitted to Defra in September 2013.

The Progress Reports produced in 2013 and 2014 confirmed continued exceedances of the annual mean air quality objective for NO_2 within the existing two AQMAs and updated the Action Plans for both Cowfold and Storrington.

The Updating and Screening Assessment completed in 2015 confirmed that the annual mean NO_2 concentrations continued to exceed or be close to exceeding the objective in the AQMAs in Cowfold and Storrington; as such, the AQMAs remain valid. The USA report included the Action Plan Progress Report for the Storrington and Cowfold AQMAs. The assessment of sources identified relevant exposure close to the Gatwick airport boundary that had not been previously assessed. It was recommended that a decision on a requirement to proceed to a Detailed Assessment in respect of this area is taken after the Airport Commission has given its recommendation on the airport expansion.

The decision on Gatwick expansion was taken in 2015 and Gatwick had not been considered the best option for the national airport capacity expansion. Still, diffusion tube monitoring was undertaken in 2016 at a receptor in Bonnetts Lane, Crawley, near the airport boundary, in order to determine the NO_2 concentrations in this area, as the current total equivalent passenger throughput exceeds the threshold defined by the TG(16) guidance. The results from the site showed that annual mean NO_2 concentrations were well below 40µg/m^3, which indicates that exceedances of the objective in that area are unlikely. This has been reported in the 2017 Annual Status Report (ASR).

Table 2.1 - Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)		Action Plan		
						At Declaration	Now	Name	Date of Publication	Link
Storrington	December 2010	NO_2 – annual mean	Storrington	Storrington town centre incorporating West Street, the High Street, and part of School Hill and Manleys Hill.	No - WSCC	50.2µg/m^3 (Storrington 1,2) 39.3µg/m^3* (Storrington 11n)	38.9µg/m^3 (Storrington 1) 29.8µg/m^3 (Storrington 11n) 47.7µg/m^3 (Storrington 19n)	AQAP for Storrington	October 2012	HDC website[1]
Cowfold	October 2011	NO_2 – annual mean	Cowfold	Cowfold town centre incorporating The Street, part of Station Road and Bolney Road.	No - WSCC	40.5µg/m^3 (Cowfold 1,2) 45.9µg/m^3 (Cowfold 7n)	31.6µg/m^3 (Cowfold 1,2) 36.1µg/m^3 (Cowfold 7n)	AQAP for Cowfold	September 2013	HDC website[2]

* Annual mean concentration in 2011

[1] https://www.horsham.gov.uk/environmentalhealth/environmental-health/air-quality/storrington-air-quality

[2] https://www.horsham.gov.uk/environmentalhealth/environmental-health/air-quality/cowfold-air-quality

Table 2.2 - Summary of Air Quality Review and Assessment Reports and Conclusions for Horsham District Council

Year	Report	Conclusions
2000	Review and Assessment	No exceedance of air quality objectives identified or predicted
2003	Review and Assessment	No exceedance of air quality objectives identified or predicted
2004	Progress Report	No exceedance of air quality objectives identified or predicted
2005	Progress Report	No exceedance of air quality objectives identified or predicted
2006	Update and Screening Assessment	No exceedance of air quality objectives identified or predicted
2007	Progress Report	Detailed assessment required for NO_2 in Cowfold and Storrington
2008	Progress Report	Detailed assessment for NO_2 required in Cowfold and Storrington
2009	Update and Screening Assessment	Detailed assessment for NO_2 required in Cowfold and Storrington
2010	Progress Report	Detailed assessment for NO_2 required in Cowfold and Storrington.
2010	Detailed Assessment for Storrington	Declaration of AQMA
2011	Detailed Assessment for Cowfold	Declaration of AQMA under consultation.
2012	Further Assessment Storrington	Report confirmed findings of Detailed Assessment 2010
2012	Action Plan Storrington	Submitted to Defra October 2012
2012	Further Assessment Cowfold	Report confirmed findings of Detailed Assessment 2011.
2012	Updating and Screening Assessment	Report confirmed AQMAs justified in Storrington and Cowfold.
2013	Progress Report	Report confirmed AQMAs justified in Storrington and Cowfold. Action Plans updated.
2013	Action Plan Cowfold	Submitted to Defra September 2013
2014	Progress Report	Report confirmed AQMAs justified in Storrington and Cowfold. Action Plans updated.
2015	Updating and Screening Assessment (USA)	Monitoring data for 2014 confirmed that annual mean NO_2 concentrations continued to exceed or be close to exceeding the objective in the AQMAs at Cowfold and Storrington; as such, the AQMAs remain valid. The assessment of sources identified relevant exposure within 1000m of the Gatwick airport boundary that has not been previously assessed. The USA report recommended that a decision on a requirement to proceed to a Detailed Assessment in respect of this area be taken after the Airport Commission has given its recommendation on the airport expansion.
2016 2017 2018	Annual Status Report	Report confirmed AQMAs justified in Storrington and Cowfold. There were no monitoring sites exceeding the objectives for NO_2 outside the AQMAs from 2016 through to 2018. Action Plans updated. The results from a site near Gatwick Airport showed annual mean NO_2 concentrations well below the objective.

2019	Annual Status Report	Report confirmed AQMAs were still justified in Storrington and Cowfold. There were no monitoring sites exceeding the objectives for NO_2 outside the AQMAs in 2019. It was the first year where no monitoring site within the Cowfold AQMA exceeded the NO_2 objectives. Action Plans updated.

Figure 2.1 - Map of Storrington AQMA Boundary

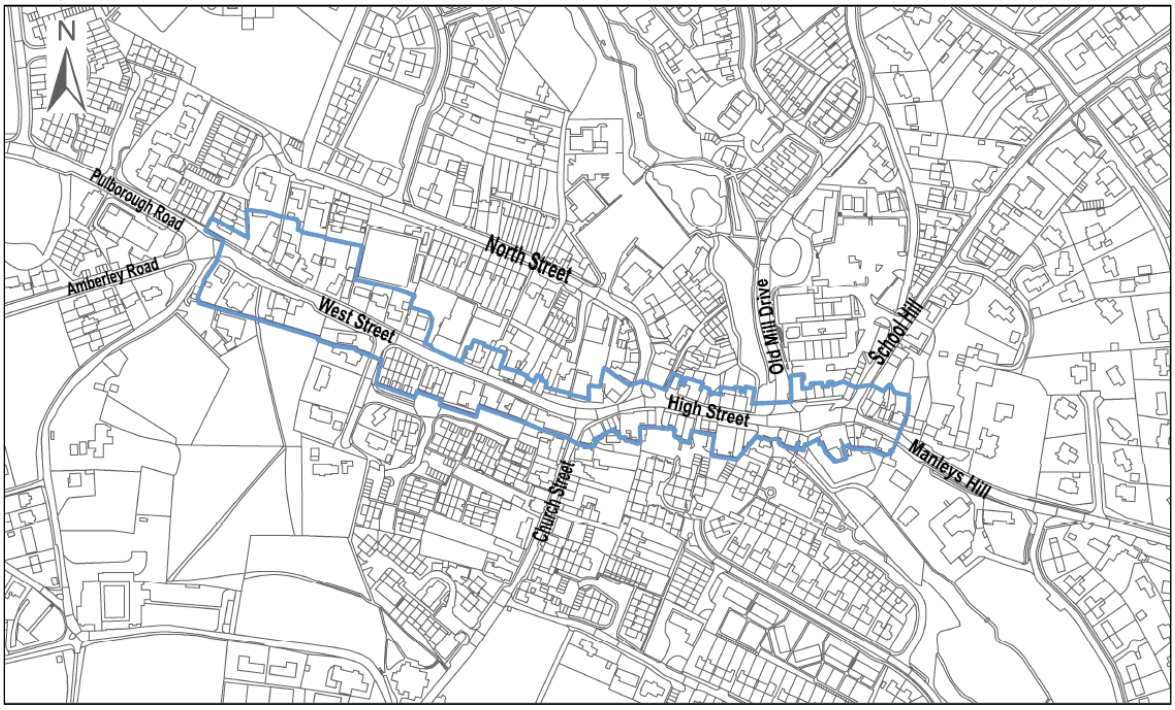
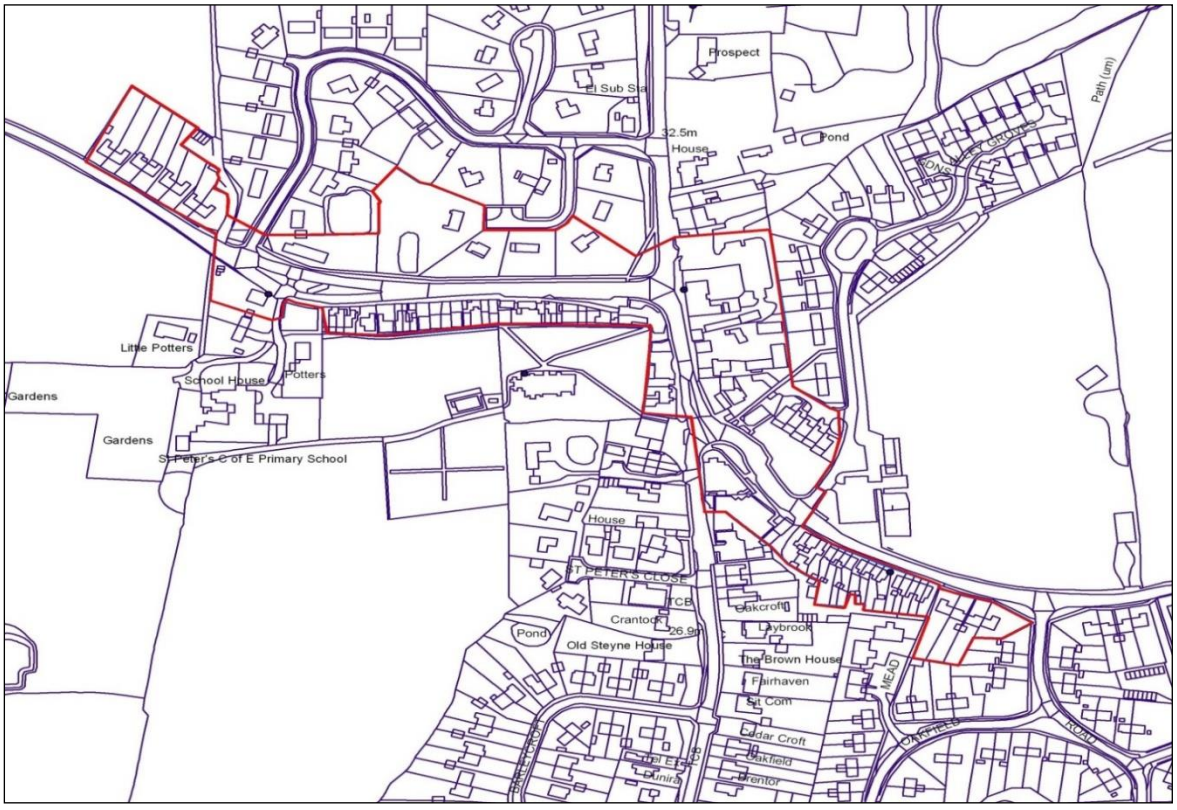


Figure 2.2 - Map of Cowfold AQMA Boundary



2.2 Progress and Impact of Measures to Address Air Quality in Horsham District

Horsham District Council (HDC) and West Sussex County Council have taken forward a number of measures during the current reporting year of 2019 in pursuit of improving local air quality. Details of all measures completed, in train or planned are set out in Table 2.3. More detail on these measures can be found in their respective Action Plans: AQAP for Storrington[5] and AQAP for Cowfold[6].

The key actions completed in 2019 are:

- Progression of a scheme for prohibition of goods vehicles over 7.5 tonnes on School Hill between the A283 and the Mill Lane car park access road. This included advance warning and lorry routing signs installed on the access routes into Storrington including A283 Washington Road, A283 High Street and B2139 Thakeham Road (completed May 2019);
- Promotion of a prohibition of loading and unloading at any time on sections of North Street and prohibition of waiting on sections of The Square and West Street Storrington (completed summer 2019);
- Progression of the Clean Burn Sussex project aimed at the promotion of least polluting fuels and stoves;
- Integration of the *Air Quality and Emissions Mitigation Guidance for Sussex* (2019) with HDC environmental (air quality) policy;
- Final version of the Electric Vehicle Strategy for West Sussex 2019-2030 got published in December 2019. HDC approved its Electric Vehicle (EV) Charge Point Strategy in March 2020.

The measures proposed to address air quality issues in Storrington and Cowfold AQMA are subject to periodic review in respect of their deliverability. The most recent review highlighted a number of measures which have been considered further and which are described in more detail below; these being:

- Advisory lorry route signage improvements within the Storrington AQMA;
- Linking of two pedestrian crossings along the High Street/West Street;
- Installation of advisory signs for lorries deterring HGV traffic from taking the route through Cowfold AQMA; and

[5] https://www.horsham.gov.uk/__data/assets/pdf_file/0013/5431/Storrington-AQ-ActionPlan-draft.pdf

[6] https://www.horsham.gov.uk/__data/assets/pdf_file/0004/14494/Cowfold-AQ-Action-Plan-draftfinal..pdf

- Re-alignment of the A272 Bolney Road away from Huntscroft Cottages.

The Council's priorities for the coming year are:

- Working with planning policy and development control to secure air quality mitigation from new development;
- Completion of the Defra-funded Clean Burn Sussex project;
- Installation of CCTV equipment at the mini-roundabout of School Hill and Manley's Hill to enforce breaches of the weight restriction for HGVs using School Hill;
- Progression of a Freight Delivery Partnership / Fleet Operator Recognition Scheme Standard: Encourage use of WSCC advisory lorry route rather than A283 through Storrington AQMA for longer distance lorry movements;
- Progressing delivery of traffic management / congestion improvement schemes for Storrington and Cowfold as identified in sections below.

The achievement of congestion improvement measures in Storrington and Cowfold has been challenging as there are no easy solutions and because Horsham District Council is not the highways authority. Horsham District Council continues to work with WSCC to explore traffic management measures to reduce congestion and improve air quality. This has included revisiting and reviewing the evidence from all previous measures identified to understand what impacts these would be likely to have in terms of improving air quality, and whether the measures would be deliverable and provide value for money. A number of these measures are continuing to be investigated. Promotional initiatives that encourage people to consider walking, cycling and public transport use as alternatives to the car across the District also continue to be explored in line with the West Sussex Transport Plan 2011-2026.

Funding remains a key challenge for progressing the measures identified as the most effective to improve air quality. One example is the LEZ trial in Storrington. Based on the findings of the 'Storrington Traffic Management Options Appraisal' study (2013)[7] and following further analysis of the feedback from the exhibition where the outcomes of the study were presented, a Low Emission Zone (LEZ) was identified as the most viable traffic management option to reduce NO_2 concentrations in the Storrington AQMA. Regrettably, the trial scheme did not achieve the expected results due to poor data capture and conformity caused by poor strength of the mobile signal. However, the camera system can achieve results with wired communication, or with the use of local storage and regular collection of data (costs to be compared). Subsequently, funding from Defra's Air Quality Grant was sought in order to undertake a feasibility study into the costs of using either a wired camera connection or local storage and regular collection of data. The application was unsuccessful, therefore the project cannot be progressed unless an alternative source of

[7] https://www.horsham.gov.uk/__data/assets/pdf_file/0015/5433/StorringtonTrafficMgt.pdf

funding is found. Funds for a feasibility study would also be required to consider in further detail the traffic management implications of such a Low Emission Zone.

District Wide Action Plan Measures

In the 12 months since submission of the 2018 Annual Status Report, work continued on the update of the air quality planning guidance. A decision was taken to consolidate the HDC and Sussex guidance documents to facilitate its adoption and implementation by the planning department. The updated guidance, ***Air Quality and Emissions Mitigation Guidance for Sussex*** **(2019)** has now been published and its application is being tested in HDC and neighbouring districts within Sussex. As the Council's Local Plan is currently under review, this presents an opportunity to strengthen the wording of HDC's air quality policy. The Council is also looking to adopt the Air Quality and Emission Mitigation Guidance as a Supplementary Planning Document (SPD).

Development of the Emission Reduction Strategy has progressed with a number of key projects being developed in collaboration with partners. HDC approved its **Electric Vehicle (EV) Charge Point Strategy** in March 2020. In light of the Strategy the Council has worked with West Sussex County Council to procure a contractor via a concession contract. This is a collaborative approach involving most of the District and Borough Councils across the County (it excludes Chichester District Council). The intention is for the contractor to work collaboratively with Councils and other public sector organisations to install charge points on publicly owned land over the next 10 years. This is an ambitious programme to install 1000's of charge points across the County. The principle focus will be to provide charge points for residents that do not have access to off street parking, so they cannot charge at home. This is a barrier for EV take up for these residents. The cohesive and comprehensive network will also include some destination and rapid charge points; again to support the take up of EV by residents as well as businesses.

In 2014 Horsham became host to its first **car club**. With the recently added car, three cars (one eV/petrol hybrid) are currently available in Horsham. A scoping assessment is in progress to establish the viability of extending the car club scheme to Cowfold, Storrington, Billingshurst and Henfield. The car clubs in Horsham and in neighbouring Chichester District Council were originally funded by the Department for Transport's Local Sustainable Transport Fund (LSTF).

Horsham District Council has successfully bid for support from the Department for Transport (DfT) under Phase Two of the **ULEV Readiness Project**. The grant covered 75% of the cost of eV vehicle leases for three vehicles: two Nissan e-NV200 vans and one Nissan Leaf car, as well as the costs of the installation and maintenance of one charge point per vehicle - located at Swan Walk car park, Chesworth Depot HDC and Hop Oast Depot HDC. Each vehicle was procured with a telematics system enabling an automatic data connection. The vehicles were delivered in May 2016 and have been used by the parking and leisure services. The grant period stretched over two years, and as the lease has been set for 4 years, HDC is now eligible for these costs. It remains to be seen if Parking and Leisure services find value in extending the lease contract further.

In 2018 HDC has secured grant funding towards a cleaner burning project, which has been branded as "Clean Burn Sussex". The project is a collaboration of 15 authorities in Sussex to raise awareness about domestic burning and promote better burning methods and choices. A survey questionnaire to gather information on solid fuel burning in the region, and on the factors influencing this choice of fuel, has achieved a good response rate, and the collected data is currently (June 2020) being analysed. Each resident who has completed the survey (and given their consent) was emailed information on how to reduce emissions from burning through using cleaner stoves and fuels. A dedicated website has been added to the Sussex Air domain and running from November 2019:

http://www.sussex-air.net/Cleanburn/clean-burning.aspx

Storrington Air Quality Action Plan

The Action Plan for Storrington was submitted to DEFRA and published on the Council's website in October 2012. The action plan appraisal report was received from DEFRA in November 2012 with the draft plan accepted as fulfilling the requirements of the Local Air Quality Management policy guidance (LAQM PG (16)). Most of the actions set out in the 2012 Plan have either been completed or retracted due to low effectiveness or low feasibility. The most recent review of the identified measures took place in June 2017. The review note, produced by the officers of HDC and the County Council can be downloaded from the Council's website[8].

The review identified a number of schemes for further consideration. Following further evaluation a decision was taken by the Storrington Air Quality Steering Group to prioritise the progression of three schemes:

- Prohibition of lorries turning right into School Hill from Manley's Hill within the Storrington AQMA;
- Advisory lorry route signage improvements within the Storrington AQMA; and
- Time restrictions for goods vehicle loading/delivery within the AQMA during peak periods around the North Street/A283 High Street junction.

Prohibition of lorries turning right into School Hill from Manley's Hill within the Storrington AQMA

The scheme sought the prohibition of lorries turning into or out of B2139 School Hill and A283 Manley's Hill. Lorries turning into School Hill block traffic on Manley's Hill, which exacerbates congestion on Manley's Hill and the High Street. Furthermore, the mini-roundabout of School Hill and Manley's Hill lacks the space for lorries turning so a turning ban was believed to have a positive impact on safety in addition to reducing congestion. However, there were complications in the way in which such a prohibition could be legally worded as there are no permitted variants of signs that relate specifically to banning certain classes of vehicles from making specific movements. Subsequently, a wider scheme to ban all goods vehicles over 7.5 tonnes movements from B2139 School Hill between the A283 High Street/Manleys Hill and the access

[8] https://www.horsham.gov.uk/__data/assets/pdf_file/0003/51996/Storrington-AQMA-traffic-scheme-proposals-review_updatedJune2019_draftv2.pdf

to Hill Lane Car Park (except for access) has been progressed. The scheme included the provision of prohibitory signs at the junctions and advance lorry routing signs on the access roads into Storrington, including A283 Washington Road and B2139 Thakeham Road. The scheme was completed in May 2019.

Enforcement of breaches of the weight restriction for HGVs accessing School Hill

HDC in conjunction with Storrington Parish Council is looking to install CCTV equipment at the mini-roundabout of School Hill and Manley's Hill to enforce the weight restriction for lorries using School Hill. It follows the Neighbourhood Wardens having witnessed several breaches of the restrictions since the prohibitory signs were installed.

Advisory lorry route signage improvements within the Storrington AQMA

In terms of advisory lorry route signage, there is a current voluntary agreement in place with Waitrose for delivery lorries coming from the A24 to use Water Lane to access the village centre. In addition local signage directs lorries to the Water Lane Trading Estate to use Water Lane. The goods vehicle prohibition above included additional HGV lorry routing signs so it is not certain what further improvements can be made, but any further suggestions from the Steering Group will be monitored and addressed as appropriate.

Time restrictions for goods vehicle loading/delivery within the AQMA during peak periods

Parking on double yellow lines remains an issue in the town centre. The most affected area is North Street near the junction with the A283 West Street. It was envisaged that prohibition of loading/unloading in that area would reduce congestion and have a positive impact on safety. The installation works to implement double yellow lines and road signs prohibiting waiting, loading and unloading, took place in summer 2019. The scheme is now fully implemented and has shown to have a positive impact on air quality. The monitoring site Storrington 11 has shown a significant decrease in NO_2 concentrations in 2019 on the previous year.

Other Measures

There are a number of other schemes considered potentially viable, which may be progressed at a later date, depending on funding and scheme feasibility; these include:

- Review of on-street car parking and loading bay provision;
- Review of two pedestrian crossings along the High Street/West Street;
- Working with local businesses – to encourage alternative refuelling options; encourage home deliveries; investigate opportunities for local and shared deliveries; improve local bus service; promote transport plans; encourage the use of LEVs for deliveries within AQMA;

- Smarter Choices – encourage walking and cycling.

Review on-street car parking and loading bay provision

Parking issues within the village which have been identified as contributing to congestion within the AQMA. Two parking areas have been identified as causing congestion on a regular basis. Further detailed evaluation could be considered to understand the causes of congestion through the High St/West St related to the interactions of the pedestrian crossings, junctions, parking and deliveries. The scheme could entail re-designation of on-street car parking spaces as dedicated loading bays, to better manage arrangements for goods vehicles stopping on the carriageway. West Sussex County Council has a programme of Road Space Audits it is undertaking across larger towns across West Sussex and a light touch version of this could be an avenue through which to progress this evaluation further. The purpose of this would be to consider the longer-term strategy for parking management within the village, evaluate both the current and future demands for parking space provision and investigate optimised use of available spaces and look at options for improvement. Progression of a Road Space Audit for Storrington would be dependent on the availability of a local funding resource, as the county's current programme resources (and hence funding resources) are already allocated elsewhere.

Review two pedestrian crossings along the High Street/West Street

Both crossings have previously been upgraded to Puffin crossings (they use kerbside detectors to cancel demands on the crossing no longer required). The crossings use 'vehicle actuation' technology and were linked in 2017 during peak traffic flow times in attempt to smooth vehicle flow. The crossings do not include microprocessor technology (Microprocessor Optimised Vehicle Actuation - MOVA). This technology has the potential to enable green/red phase timings to react to periods of high air quality sensitivity and to prioritise traffic movement at peak times. To progress the scheme, a site study is needed to explore if MOVA technology is technically feasible to be delivered. However, there are doubts about how much any further benefits could be realised because of blocking back caused by the other mini-roundabout and traffic interactions along the High Street.

Working with local businesses

- Alternative Refuelling Options: Encourage provision of electric vehicle charging points at local business and public car parking spaces. Ensure compatibility of EV charging points to enable link to "Charge your Car" pay as you go network. Encourage development of Compressed Natural Gas (CNG) refuelling network across the district via private companies and as part of a district alternative fuel strategy (See District-wide AP measures).

- Home delivery scheme: Encourage through businesses use of low emission delivery vehicles with possible link to district Compressed Natural Gas (CNG) refuelling strategy.

- Community minibus – enhance existing Storrington minibus service by replacing existing diesel fleet with Low /Zero emission vehicles. Funded by local businesses or new developments via planning contributions, possible link to CNG refuelling strategy.

- Improve local bus service – Liaise with local PSV operators to restrict vehicles entering AQMA to Euro IV/V standard. Consider subsidising strategic bus services to village schools via grant funding/Section 106 contributions to address 'school-run' traffic peaks. Investigate provision of local real-time bus information at bus stops to promote use.

- Transport Plans/ Travel Plans: Promote to existing businesses and new developments innovative solutions: e.g. low emission incentives; driver training; car share schemes; car clubs.

- Freight Delivery Partnership / Fleet Operator Recognition Scheme Standard: Encourage use of WSCC advisory lorry route rather than A283 through Storrington AQMA for longer distance lorry movements; investigate opportunities for local and shared deliveries; Encourage use of low emission delivery vehicles to local stores within AQMA, provide links to CNG refuelling strategy.

These schemes are being investigated through various delivery avenues, and are subject to different feasibility and value for money considerations.

Smarter Choices – encourage walking and cycling; work with schools

Sussex-air have been successful in the 2020/21 bid to Defra for funding to work with primary and secondary schools to tackle school travel emissions. The project will involve air quality monitoring and may include school street closures. This a continuation of the programme that was delivered in 2018-19 to work with primary schools in or near Sussex AQMAs.

A number of Local Transport Investment Programme (LTIP) schemes to improve walking paths and pedestrian crossings around schools have been considered by WSCC. These include:

- Pedestrian safety improvements to Water Lane roundabout to allow safe crossing. This scheme was completed in March 2020.

- Improvements (hard surfacing) for the Riverside route from Water Lane (West Wantley Farm) to Storrington Primary School / Leisure Centre. Monitoring undertaken during 2018 at school times found that there was no use of this path by pupils at school times, so this is not being progressed further at this stage. If future development shows a use of this path, this scheme can be revisited in future.

In addition, work continues on school travel plans, the below are examples of measures being investigated by Storrington Primary School:

- Crossing for the Leisure Centre on Spierbridge Road / Hormare Crescent. A school crossing patrol (SCP) count was carried out at this location and it did not meet the criteria for a paid SCP position. The location of a formal crossing here would not be on the desire line for pupils crossing the road here. The school has been encouraged to find a volunteer to carry out the SCP role to meet the needs of pupils crossing here.

- Cycling racks for Storrington Primary School.

- Rear access to Storrington Primary School including improvements to Love Lane path. This land is not owned by WSCC or HDC, the level of local resident support for the scheme is unclear, while there are flooding/drainage issues with this scheme, with the scheme awaiting more engagement from the school community.

- New School Keep Clear Markings were put in pace in 2018 to ensure the markings meet the schools needs.

The final measure that should be discussed in this section is the A27 Improvements Scheme (Arundel bypass). This is not a scheme that the Council is directly involved in (as it is managed by Highways England), however HDC supported the proposals in their response to the 2017 consultation.

A27 Improvements (Arundel bypass)

The Road Investment Strategy produced by DfT in March 2015 allocated a budget for the A27 schemes including the A27 Arundel bypass and A27 Worthing and Lancing improvements. This is expected to reduce traffic flows through Storrington where longer distance traffic is avoiding the A27 due to congestion. Following consultation in late summer 2017, Highways England made a preferred route announcement for a modified Option 5A for the Arundel bypass which was HDC's preferred option, also supported by WSCC and the majority of local authorities and business groups who responded. The modified Option 5A involved a new dual carriageway between Crossbush junction and Ford Road. It would then continue to intersect the fringes of the South Downs National Park and Binsted Woods, before re-joining the existing A27 near Yapton Lane. This Option was modelled to bring a reduction in the total vehicle numbers on the A283 route through Storrington - which is currently used by drivers wanting to avoid traffic on the A27.

Following further development of the scheme and the discovery of new information about the decision, a further options consultation took place in 2019 as well as a further review period in early 2020. A new Preferred Route Announcement is expected later in 2020.

Whilst the measures stated above and in Table 2.3 will help to contribute towards achievement of the AQOs, Horsham District Council anticipates that further additional measures at the national level not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of the Storrington AQMA. This conclusion is drawn on the basis of current monitoring results from Storrington 19 - the worst-case monitoring location in the Storrington AQMA.

Cowfold Air Quality Action Plan

Horsham District Council produced a draft Air Quality Action Plan for Cowfold in September 2013. The draft was accepted by DEFRA in December 2013. Similar to the Storrington Plan, most of the actions set out in the Cowfold Action Plan have either been completed or retracted due to low effectiveness or low feasibility. The most recent review of the identified measures has taken place in September 2017. The review note, produced by the officers of HDC and the WSCC can be downloaded from the Council's website[9].

The review highlighted a number of measures for further consideration. Following further evaluation, the Cowfold Air Quality Steering Group supported progression of two main schemes that have been considered further and which are described in further detail below:

- Improved signage on strategic routes to discourage longer distance lorry traffic from using the A272 through Cowfold;
- Realignment of A272 Bolney Road adjacent to Huntscroft Cottages.

The Cowfold Action Plan also includes a Smarter Choices scheme, which involves work with WSCC to enhance school travel plans, identify safety improvements to encourage walking, cycling, walking buses, and contribute to air quality awareness education programmes.

Improved signage on strategic routes to discourage longer distance lorry traffic using the A272 through Cowfold

The following data is based on the maximum possible theoretical impact of installation of advisory signs for lorries on 4 route options on the A24, A272 and A23 deterring HGV traffic from taking the route through the Cowfold AQMA. An assessment of the movement of vehicles (particularly HGVs) through Cowfold was carried out in Spring 2019, based on 12-hour 0700-1900 traffic flows. Within the 12 hour flow on the A281 Cowfold High Street there was 6% HGVs of which 23% could be considered transferable movements to other routes. The conclusions were that only a small number of HGVs could potentially be re-routed away from Cowfold village centre. The survey data did not include details of the specific origins or destinations of these flows beyond the survey cordons located at the junctions of the A23 and A24, so not all of these candidate flows would be suitable for transfer. Further consideration of whether this level of candidate transferrable movement is significant in air quality terms is needed before a decision is taken to explore this measure further. It should also be noted there may not be sufficient controls available to agencies to enforce removal of this traffic.

Realignment of A272 Bolney Road adjacent to Huntscroft Cottages

The Council has been liaising with WSCC to consider a proposed A272 road realignment project in the centre of Cowfold village. The proposed scheme, whilst initiated originally on highway safety grounds,

[9] https://www.horsham.gov.uk/__data/assets/pdf_file/0004/51997/Cowfold-Air-Quality-Management-Area-scheme-proposals-review-Sept-2019.pdf

would have the effect of moving the road further from the worst affected receptors within the AQMA. Dispersion modelling showed a significant reduction in NO2 concentrations at receptors currently exceeding the annual mean objective. The cost of the scheme is like to be significant due to underground utilities present under the road, which adds to the traffic management costs. Due to the expected high costs, the only route to progress the scheme is through the WSCC Strategic Transport Investment Programme (STIP). The Council applied for Defra's air quality grant to provide partial funding for the scheme but was unsuccessful as, should it be implemented, while the scheme will have a positive impact on NO2 concentrations at relevant receptors, overall emissions will remain unchanged. Regarding the review of the STIP programme, there is a lot of pressure on this programme, and this scheme was not prioritised in the most recent April 2019 review decision. This scheme is therefore not being considered for further progression at this time but could still be considered in the future.

Smarter Choices – encourage walking and cycling; work with schools

This scheme involves work with WSCC to enhance school travel plans, identify safety improvements to encourage walking, cycling, walking buses, and contribute to air quality awareness education programmes.

Sussex-air have been successful in the 2020/21 bid to Defra for funding to work with primary and secondary schools to tackle school travel emissions. The project will involve air quality monitoring and may include school street closures. This a continuation of the programme that was delivered in 2018-19 to work with primary schools in or near Sussex AQMAs.

Other Measures

There are a number of other schemes which could be considered, which may be progressed at a later date, depending on funding and scheme feasibility; those include:

- Review on-street car parking and loading bay provision;
- Promotion of alternative travel options; and
- Low Emission Zone / CAZ.

Review on-street car parking and loading bay provision

This would entail potential changes to onstreet parking and to delivery arrangements for businesses in the centre of Cowfold. This measure was originally identified in the Action Plan in relation to delivery arrangements to the Coop before it moved to the former Old Coach House pub site. At present, there are not known to be significant on-street car parking or loading issues within Cowfold affecting air quality receptor hotspot locations through the village. Therefore no specific action is proposed at this point in time. However, any planning applications coming forward for use of the former Coop building, as well as any continuing or emerging community concerns about onstreet parking or loading issues should be monitored in relation to air quality impacts.

Promotion of alternative travel options

This includes a number of measures focusing on working with local businesses, promoting electric vehicles, improving public transport, promoting travel plans, encouraging walking and cycling, and working with schools. These schemes are being investigated through various delivery avenues, and are subject to different feasibility and value for money considerations.

Low Emission Zone / CAZ

Given the experience from the Storrington LEZ trial, and the questions of practical enforceability of any LEZ restrictions it can be expected that there would be reservations about the feasibility and effectiveness of progressing a separate LEZ in Cowfold. However, a grant bid was submitted to Defra in 2019 for a feasibility study into the setting up a voluntary Clean Air Zone (CAZ), which would entail implementing a number of actions aimed at promoting and improving air quality, such as a car club and a rapid ev charging point. Regrettably, the bid was unsuccessful so alternative source of funding needs to be found were the scheme to be progressed.

A27 Improvements (Arundel bypass)

In addition to the schemes detailed above, for which progression lies within the remit of HDC/WSCC, consultation took place in late summer 2017 in respect of the A27 Improvements (Arundel bypass) scheme. Following the consultation, a decision was announced to progress a modified version of Option 5a of the scheme. The details of the scheme are set up in the paragraphs above (under the heading Storrington Air Quality Action Plan). Following further development of the scheme and the discovery of new information about the decision, a further options consultation took place in 2019 as well as a further review period in early 2020. A new Preferred Route Announcement is expected later in 2020.. This scheme is expected to reduce traffic flows through Cowfold where longer distance traffic is avoiding the A27 due to congestion (for example longer distance journeys between Haywards Heath and Chichester).

Horsham District Council anticipates that the measures stated above and in Table 2.3 will achieve compliance in the Cowfold AQMA within the next few years.

Table 2.3 – Progress and Impact of AQAP Measures (2019)

Measure No.	Measure	EU Category / EU Classification	Focus	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments / Barriers so Implementation
DISTRICT WIDE MEASURES 1	Planning Advice Document: Air Quality & Emissions Reduction Guidance	Policy Guidance and Development Control / Air Quality Planning and Policy Guidance	Mitigation of air quality impact of development based on principle of Horsham district as an 'Emission Reduction Area'	HDC	2013-14	May 2014	Reduction in emissions from transport associated with new development through mitigation and compensation. Assessment of emissions from development required with application. Scheme of mitigation required.	1%	Planning Advice Document produced by HDC Environmental Health Dept. in collaboration with Strategic Planning Dept. The guidance provides advice to developers on how to address local air quality when making a planning application in Horsham District.	The updated guidance, Air Quality And Emissions Mitigation Guidance for Sussex (2019) has been published on HDC website and its application is tested in HDC and neighbouring districts within Sussex.	Ongoing	As the Local Plan is currently under review, this presents an opportunity to strengthen the wording of HDC's air quality policy. The Council is also looking to adopt the Air Quality and Emission Mitigation Guidance as a Supplementary Planning Document (SPD).
2	District Emission Reduction Strategy	Promoting Low Emission Transport / Procuring alternative refuelling infrastructure to promote Low Emission Vehicles, EV recharging, gas fuel recharging Promoting Low Emission Transport / Company Vehicle Procurement – Prioritising uptake of low emission vehicles	Development of alternative fuel strategy	HDC	2013	2014 – ongoing	At least one alternative refuelling option in all new/refurbished filling stations. One public EV charging point in each village in Horsham district. EV rapid charge points for Energise network. Work with local businesses to develop CNG refuelling infrastructure for local commercial fleet operators.	1%	One new refuelling station application received to date – recommendation made to DPO by EH Dept. – Four existing standard EV charging points in HDC (Horsham x2 & Storrington x2). Rapid chargers for one additional location (Billingshurst) and replacement of two existing standard EV chargers being quoted.	Final version of the Electric Vehicle Strategy for West Sussex 2019-2030 got published in December 2019. HDC approved an Electric Vehicle (EV) Charge Point Strategy in March 2020.	Ongoing	Small initial impact on emissions but aim to facilitate the uptake of more LE vehicles. Planning guidance requires EV charging points for all developments as mitigation measure. Review of potential LE fuel assets within district e.g. biomethane from existing landfill/anaerobic digestion plant ongoing as part of strategic planning.

Measure No.	Measure	EU Category / EU Classification	Focus	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments / Barriers so Implementation
2 cont/		Promoting Low Emission Transport / Public Vehicle Procurement – Prioritising uptake of low emission vehicles Promoting Low Emission Transport / Taxi licensing conditions Promoting Low Emission Transport / Low Emission Zone	Public /commercial vehicle fleet improvement	HDC Funding for ULEV vehicle leases: HDC & OLEV	2013/14	2014/15	Introduction & increase % of ULEV's into Council's vehicle fleet. -Condition requiring latest Euro standard for all new taxis through licensing condition. -buses entering AQMAs to be best available Euro standard vehicle within the company fleet. Achieved via negotiation/LEZ	1%	ULEV Readiness Grant was secured in 2015. Three ultra-low emission vehicle have been delivered to the HDC fleet. Most of the cost of vehicle leases is to be reimbursed by OLEV for 24 months. Taxi/private hire vehicle licence conditions under review. Current vehicles comply with latest Euro standard. Ongoing liaison with bus companies serving routes through AQMAs to reduce engine idling at bus stops. Brighton Bus LEZ introduced in Jan 2015.	Three ultra-low emission vehicles (two vans and one car) have been delivered in May 2016 and are being used by the parking and leisure services. The 3 vehicles have been leased for 4 years. The OLEV grant covered 75% of the cost of the 24 month vehicle leases and charging infrastructure for the first 2 years of use. The final report on the vehicle usage submitted to OLEV in April 2018.	2015 – ongoing	Small initial impact on emissions but aim to facilitate the uptake of more LE vehicles. Benefits of Brighton LEZ vehicle emission improvements will extend to areas outside Brighton.
3	AirAlert	Public Information/ Via other mechanisms	Promote AQ health warning system for individuals with respiratory /cardiac conditions.	Sussex-Air/HDC	Service operational	Service operational	Increase in subscriptions to pollution alert service within Horsham district.	No reduction in emissions.	Project started in 2006. Health based study	Health study continuing. Increase in subscriptions. Cold and heat alerts added to service over the recent years.	Ongoing service	No direct impact on emission reductions but optimising use of monitoring network data for health associated benefits.
4	Clean Burn Sussex	Public Information/ Via other mechanisms	Promote the least polluting fuels and stoves. Raise awareness about domestic burning and promote better burning methods and choices.	Sussex-Air/HDC	2018	2018/20	Number of survey forms returned. Number of visitors to the website. Number of suppliers participating in the project.	<1%	Grant funding application accepted in April 2019.	Data collected in survey is currently being analysed. Participants in survey were sent information on how to reduce emissions from burning through using cleaner stoves and fuels. A dedicated website has been added to the Sussex Air	09/2020	Community participation is crucial to the project's success.

Measure No.	Measure	EU Category / EU Classification	Focus	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments / Barriers so Implementation
										domain and running from November 2019		
STORRINGTON-SPECIFIC MEASURES 1	Prohibition of lorries turning right into School Hill from Manley's Hill and turning left into Manley's Hill from School Hill. Advisory lorry route signage improvements within the Storrington AQMA	Traffic Management/ Strategic highway improvements	Improvement to existing highway through Storrington to reduce traffic congestion	HDC / WSCC	2013-17	2019	Reduction in nitrogen dioxide concentrations in Storrington. Improved traffic flow / reduction in traffic congestion.	1%	Meetings with Steering Group & Storrington business representatives identified broad support for the scheme which was implemented in May 2019.	A variant of this scheme successfully passed through the design stage and has been completed in May 2019. Road signs prohibiting all goods vehicles over 7.5t from using School Hill between the A283 and the Mill Lane car park access road were installed on the access routes into Storrington, Manleys Hill and School Hill.	Completed in May 2019	There have been incidences of large lorries making turning movements between School Hill and Manley's Hill and vice versa causing congestion at the mini-roundabout due to the constrained junction. Emission reductions anticipated as a result of reduced congestion caused by blockages on High Street / West Street.
2	Time restrictions for goods vehicle loading/delivery within the AQMA during peak periods.	Traffic Management/ Strategic highway improvements	Improvement to existing highway through Storrington to reduce traffic congestion	HDC / WSCC	2013-17	2019	Reduction in nitrogen dioxide concentrations in Storrington. Improved traffic flow / reduction in traffic congestion.	1%	Meetings with Steering Group & Storrington business representatives identified broad support for the scheme.	A Traffic Regulation Order was progressed to prohibit waiting, loading and unloading at any time on sections of North Street, The Square and West Street in Storrington.	Completed in summer 2019	Parking on double yellow lines remains an issue in the town centre. The most affected area is North Street near the junction with the A283 West Street.

Measure No.	Measure	EU Category / EU Classification	Focus	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments / Barriers so Implementation
3	Review on-street car parking and loading bay provision	Traffic Management/ UTC, Congestion management, traffic reduction	Improvement to existing highway through Storrington to reduce traffic congestion	HDC / WSCC	2013-17	2020	Reduction in nitrogen dioxide concentrations in Storrington. Improved traffic flow / reduction in traffic congestion.	1%	Meetings with Steering Group & Storrington business representatives identified broad support for the review.	The steering group would like to prioritise other schemes ahead of this one as parking in bays is not as much of an issue in terms of increased congestion as e.g. lorry turning into School Hill or vehicle parking on double yellow lines.	2020/21	A more detailed air quality assessment of changes to and re-designation of parking-bays and loading bays could be investigated further. This could be a combined assessment of some of the other measures discussed in this document, including a review of the pedestrian crossings and junctions.
4	Installation of CCTV equipment at the mini-roundabout of School Hill and Manley's Hill to enforce the weight restriction for HGVs accessing School Hill.	Traffic Management/ Workplace Parking Levy, Parking Enforcement on highway	Improvement to existing highway through Storrington to reduce traffic congestion	HDC/Storrington & Sullington Parish Council	2019	2020/21	Reduction in nitrogen dioxide concentrations in Storrington. Improved traffic flow / reduction in traffic congestion.	1%	Quotations sought	Requests for quotations were sent to suppliers before the coronavirus lockdown in March 2020.	2021	
5	Review two pedestrian crossings along the High Street/West Street.	Traffic Management/ UTC, Congestion management, traffic reduction	Improvement to existing highway through Storrington to reduce traffic congestion	HDC / WSCC	2013-17	2019/19	Reduction in nitrogen dioxide concentrations in Storrington. Improved traffic flow / reduction in traffic congestion.	1%	Meetings with Steering Group identified broad support for this scheme.	- A site study needed to explore if MOVA technology is technically feasible to deliver will cost ££1000-£1500 to assess site specific circumstances including speed of traffic, detection points, visibility, interactions to side roads, etc. Such assessment will provide a view on the likely benefit of the scheme as well as recommendations on changes to the operation of the	2020/21	There are doubts about how much any further benefits from MOVA could be realised because of blocking back caused by the other mini-roundabout and traffic interactions along the High Street.

Measure No.	Measure	EU Category / EU Classification	Focus	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments / Barriers so Implementation
										crossings (e.g. timings) under the current technology to promote smoother traffic flow. A more detailed study giving more certainty about the degree of benefit from MOVA is likely to cost in the region of £5000 due to the high survey costs in on-ground operatives trying to manually recreate the operational benefits of the technology by controlling the current crossings. The overall expected cost of the MOVA technology is not known.		
6	Promotion of Alternative Transport / Fuelling options	Promoting Low Emission Transport/ Procuring alternative refuelling infrastructure to promote Low Emission Vehicles, EV recharging, gas fuel recharging	Local initiatives to incentivise the uptake of low emission vehicles / sustainable transport.	HDC / WSCC	2013/14	2014/15	Standard eV charging points to be upgraded to rapid charge. Review car parking charging to encourage LE vehicles as part of Energise network. Review transport links/car parking facilities associated with Pulborough main-line station.	1%	Preliminary assessment of existing arrangements.	Measure incorporated into Planning Advice Document. Review undertaken of HDC vehicles at Storrington transport depot to establish opportunities for upgrading/ replacing with low emission vehicles. Rapid EV charger installed in Storrington in 2015.	2013 – ongoing	Emission reductions anticipated as a result of reduction in local car journeys and increase in LE vehicles & improved sustainable transport options.

Measure No.	Measure	EU Category / EU Classification	Focus	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments / Barriers so Implementation
7	Public/commercial vehicle fleet improvement	Promoting Low Emission Transport/ Public Vehicle Procurement – Prioritising uptake of low emission vehicles	Working with local businesses	HDC / WSCC	2013/14	2014/15	Encourage use of LE home delivery vehicles Incentivise use of LE vehicles by Community minibus service. Work with local bus service to utilise best available Euro standard vehicles for AQMA routes. Promote use of transport /travel plans to increase use of sustainable transport.	1%	Preliminary meeting with local Business Club representatives Low Emission Strategy negotiated with Waitrose as part of planning condition for extended store incorporating use of LE delivery vehicles.	Review of Council Depot vehicles underway by EST to establish Euro standard, replacement schedule and opportunities for upgrading to low emission fuels.	2013 – ongoing	Emission reductions sought through partnership working with local businesses to minimise impact of deliveries etc. on the village.
8	Promotion of Alternative Lorry delivery Routes	Promoting Low Emission Transport/ Public Vehicle Procurement – Prioritising uptake of low emission vehicles	Freight delivery partnerships e.g. Fleet Operator Recognition Scheme Standard	HDC / WSCC	2013/14	2015/16	Encourage use of WSCC preferred lorry routes. Facilitate links for local shared deliveries. Encourage use of LE delivery vehicles in AQMAs. Provide links to EV/CNG refuelling facilities.	1%	Freight delivery partnership group previously established by WSCC to be reviewed to assess merit of re-establishing group. May be valid should LEZ option be adopted.	LEZ trial initiated in December 2014. Waitrose agreed for delivery lorries coming from the A24 to use Water Lane to access the village centre. Local signage directs lorries to the Water Lane Trading Estate to use Water Lane. The options for further advisory signage for lorries are considered by Storrington AQAP Steering Group.	2013 – ongoing	Emission reductions sought through partnership working with local businesses to minimise impact of deliveries etc. on the village.

Measure No.	Measure	EU Category / EU Classification	Focus	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments / Barriers so Implementation
9	Smart Choices	Transport Planning and Infrastructure/ Other Alternatives to private vehicle use/ Car Clubs	Encouraging local walking /cycling by improving access & safety of routes. Introduction of local car club.	HDC / WSCC	2013/14	2015/20	Promote bike rental scheme with local supplier. Investigate funding streams for improvements to local walking & riding paths. – Improve signage -Investigate funding for secure bike storage at local car parks. Undertake feasibility study for introduction of car club in Storrington following success of initiative in Horsham town.	1%	Preliminary review of current facilities. Further meeting with Parish Council to be arranged. Feasibility study to be considered to assess suitability of car club in Storrington by looking at demographics etc.	Measures incorporated into Planning Advice Document for new developments. Scoping report in progress for provision of car club to village. A number of LTIP schemes to improve walking paths and pedestrian crossings around schools being currently progressed by WSCC, more details in the main text.	2013 – ongoing	Emission reductions sought through encouraging the use of sustainable transport options within the village.
10	School Travel Plans	Promoting Travel Alternatives/ School Travel Plans	Working with local schools	WSCC/ HDC	Ongoing	Ongoing	Work with WSCC to enhance school travel plans. Identify safety improvements to encourage walking/cycling Contribute to air quality awareness education programmes.	1%	Preliminary meeting with WSCC School Travel Advisor June 2013 to review issues and identify options.	School travel improvements considered as part of planning applications for new residential developments in Storrington. Work continues on school travel plans. Storrington Primary School and WSCC have been working to investigate options for pedestrian crossing and cycling improvements in and around the school (see main text)	2013 – ongoing	Emission reductions sought through working with schools, parents and pupils to encourage the use of safe and sustainable transport to and from schools, and reduce the number of local car trips.
11	A27 Improve-ments (Arundel Bypass)	Traffic Management/ Strategic highway improvements	Campaign to improve A27 on air quality grounds at Chichester, Worthing & Arundel to reduce use of 'alternative' routes such as A283 through	Highways England/ WSCC	2013 – ongoing	Dependant on Highways England	Improvements to A27 now programmed by Highways England. Key indicator of AP measure will be for HE to agree scheme and implement.	2.5%	WSCC A27 Action campaign launched to seek improvement to A27.	The Road Investment Strategy produced by DfT in March 2015 allocates a budget for the A27 schemes including the A27 Arundel bypass and A27 Worthing and Lancing improvements.	Construction start estimated at 2022.	Improvements to the A27 are one of the key priorities of the current West Sussex Transport Plan (LTP3).

Measure No.	Measure	EU Category / EU Classification	Focus	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments / Barriers so Implementation
			Storrington.							Consultation took place in late summer 2017. Following this , a preferred route announcement was made to progress a modified version of Option 5a. Further public consultation took place in 2019 and 2020 and a new Preferred Route Announcement is expected later in 2020.		
12	A27 Improve-ments (Worthing & Lancing)	Traffic Management/ Strategic highway improvements	Campaign to improve A27 on air quality grounds at Chichester, Worthing & Arundel to reduce use of 'alternative' routes such as A283 through Storrington.	Highways England/ WSCC	2015 – ongoing	Dependant on Highways England	Key indicator of AP measure will be for HE to agree scheme and implement.	2.5%	WSCC A27 Action campaign launched to seek improvement to A27.	The Road Investment Strategy produced by DfT in March 2015 allocates a budget for the A27 schemes including the A27 Arundel bypass and A27 Worthing and Lancing improvements. Following consultation in late summer 2017, the scheme is currently under review by Highways England	—Unknown	Improvements to the A27 are one of the key priorities of the current West Sussex Transport Plan (LTP3).
COWFOLD Specific Action Plan Measures 1	Improved signage on strategic routes or restrictions on longer distance lorry traffic	Traffic Management/ Strategic highway improvements	Improvement to existing highway through Cowfold to reduce traffic congestion	HDC / WSCC	2013-17	2020	Reduction in NO_2 concentrations in Cowfold. Improved traffic flow / reduction in traffic congestion.	1%	A traffic survey assessment was carried out in March 2019.	Scheme has been endorsed by Cowfold Parish Council. An assessment of the movement of vehicles (particularly HGVs) through Cowfold was carried out in Spring 2019, based on a 12-hour traffic survey. Further consideration of whether this level of candidate transferrable movement is significant in air quality terms is needed.	2020/21	Changes to road signs might encourage longer distance lorry traffic to use other strategic routes such as the A23/A264/A24 to the north or the A23/A27/A24 to the south to avoid the Cowfold AQMA. Variable Message Signs (VMS) might also be considered to encourage drivers to use alternative routes at peak times when air quality problems are worse.

Measure No.	Measure	EU Category / EU Classification	Focus	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments / Barriers so Implementation
												The conclusions of the feasibility study are that only a small number of HGVs could potentially be re-routed away from Cowfold village centre in peak hours. There are also concerns that there are insufficient controls available to the highway authorities (WSCC and Highways England) to encourage this traffic to use suitable alternative routes.
2	Smart Choices – encourage walking and cycling; work with schools	Transport Planning and Infrastructure/ Other Alternatives to private vehicle use/ Car Clubs	Encouraging local walking /cycling by improving access & safety of routes. Introduction of local car club.	HDC / WSCC	2013/14	2015/20	Promote bike rental scheme with local supplier. Investigate funding streams for improvements to local walking & riding paths. – Improve signage -Investigate funding for secure bike storage at local car parks. Undertake feasibility study for introduction of car club in Cowfold following success of initiative in Horsham town.	1%	Preliminary review of current facilities. Further meeting with Parish Council to be arranged. Feasibility study to be considered to assess suitability of car club in Storrington by looking at demographics etc. Measures incorporated into Planning Advice Document for new developments. , Scoping report in progress for provision of car club to village.	A bid led by East Sussex County Council has secured funding through the air quality grant scheme 2020/21 towards developing an action plan for schools and businesses in AQMAs, this includes Cowfold and Storrington Primary schools.	2013 – ongoing	Emission reductions sought through encouraging the use of sustainable transport options within the village.

Measure No.	Measure	EU Category / EU Classification	Focus	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments / Barriers so Implementation
3	Review on-street car parking provision and possible re-designation of spaces as dedicated loading bays, to reduce number of vehicles stopping on the carriageway	Traffic Management/ UTC, Congestion management, traffic reduction	Potential changes to on-street parking and to delivery arrangements for businesses in the centre of Cowfold.	HDC / WSCC	2015/20	2020	Reduce emissions from traffic in Cowfold	1%	It is believed that this measure was originally identified in the Action Plan in relation to delivery arrangements to the Coop before it moved to the former Old Coach House pub site.	There are not known to be significant on-street car parking or loading issues within Cowfold affecting air quality receptor hotspot locations through the village. Close monitoring of any proposals for new uses of the former Coop building will need to be made to ensure any potential impacts on air quality will be appropriately mitigated.	2015 – ongoing	Any planning applications coming forward for use of the former coop building, as well as any continuing or emerging community concerns about on-street parking or loading issues should be monitored in relation to air quality impacts.
4	Promotion of Alternative Transport Options	Promoting Low Emission Transport / Public Vehicle Procurement - Prioritising uptake of low emission vehicles Alternatives to private vehicle use/ Car Clubs Promoting Low Emission Transport / Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	Local initiatives to incentivise the uptake of low emission vehicles / sustainable transport.	HDC / WSCC	2013/14	2014/20	Reduce emissions from traffic in Cowfold	1%	Planning Advice Document incorporates local mitigation measures. Current planning applications will be required to provide incentives to encourage low emission vehicles. This includes a number of measures focusing on working with local businesses, promoting electric vehicles, improving public transport, promoting travel plans, encouraging walking and cycling, and working with schools.	Cowfold village serves a local population of approximately 1800 residents. Public transport options are limited and private car use is the primary mode of transport. Although expected to be a low proportion of the overall volume of vehicle trips, engagement with Cowfold Primary School should continue in order to ensure as many local trips are made by other means to single child occupancy car use as possible.	2015 – ongoing	These schemes are being investigated through various delivery routes. Their direct impact on Cowfold air quality issues in the short to medium are not likely to be significant, however they form part of a wider approach of promoting a culture of using alternative travel options to single occupancy car use.

Measure No.	Measure	EU Category / EU Classification	Focus	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments / Barriers so Implementation
5	A272 Road Realignment (Realignment of A272 Bolney Road adjacent to Huntscroft Cottages)	Traffic Management/ Strategic highway improvements	Assessment of vehicle restrictions /measures to reduce traffic volume and improve flow through Cowfold AQMA	HDC / WSCC	2014/15	2019/20	Reduction in nitrogen dioxide concentrations in Cowfold. Improved traffic flow / reduction in traffic congestion.	10%	A272 road realignment scheme identified by WSCC County Local Committee. Project would move carriageway further from receptors at Huntscroft Cottages.	Road realignment scheme – proposed primarily on pedestrian safety grounds because of the narrow footpath adjacent to Huntscroft cottages. Dispersion modelling showed a significant reduction in NO_2 concentrations at receptors currently exceeding the annual mean objective. Due to existing pressures no new schemes have been incorporated into the Strategic Transport Investment Programme in 2019. This scheme is therefore not being considered for further progression at this time but could still be considered in the future.	Unknown	Road realignment will move A272 further from Huntscroft Cottages which experience the highest NO_2 concentrations within the Cowfold AQMA. NO_2 concentrations will be significantly reduced at receptor locations. Feasibility of the scheme is unclear due to potential impacts on character of village and business case. The cost of the scheme is significant due to underground utilities present under the road and with the traffic management costs required. An estimate of the scheme cost is £600,000.

Measure No.	Measure	EU Category / EU Classification	Focus	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments / Barriers so Implementation
6	Clean Air Zone / LEZ	Promoting Low Emission Transport/ Low Emission Zone	Assessment of vehicle restrictions /measures to reduce traffic volume and improve flow through Cowfold AQMA	HDC / WSCC	2019/18	2025	Reduction in nitrogen dioxide concentrations in Cowfold. Improved traffic flow / reduction in traffic congestion.	10%	Any LEZ might restrict all HGV's of pre Euro V classification from entering the village. A LEZ trial was undertaken in Storrington AQMA in partnership with Siemans. The scheme could not go ahead due to the Greenzone system not functioning affectively. Signal reception problems affecting the system resulted in significant loss of data, whilst there were also problems with the categorisation of vehicles into Euro standard categories.	Given the experience from the Storrington LEZ trial, and the questions of practical enforceability of any LEZ restrictions it can be expected that there would be significant reservations about the feasibility and effectiveness of progressing a separate LEZ in Cowfold. A grant bid was submitted to Defra in 2019 for a feasibility study into the setting up a voluntary Clean Air Zone (CAZ), which would entail implementing a number of actions aimed at promoting and improving air quality, such as a car club and a rapid ev charging point. Regrettably, the bid was unsuccessful so alternative source of funding needs to be found were the scheme to be progressed.	2025	The zone would limit access to the village for specific vehicle types not meeting specified emission standards (e.g. Euro V or above). The set up cost and operational costs of the scheme are significant. Additional considerations are needed to be given to the practical enforceability of any restrictions, whether exemptions are needed for local access, and the impacts of the zone on local businesses and the local community.
7	A27 Improve-ments (Arundel Bypass)	Traffic Management/ Strategic highway improvements	Campaign to improve A27 on air quality grounds at Chichester, Worthing & Arundel to reduce use of 'alternative' routes through villages such as Storrington& Cowfold.	Highways England/ WSCC	2013 – ongoing	Dependant on Highways England	Improvements to A27 now programmed by Highways England. Key indicator of AP measure will be for HE to agree scheme and implement.	Unknown	WSCC A27 Action campaign launched to seek improvement to A27.	The Road Investment Strategy produced by DfT in March 2015 allocates a budget for the A27 schemes including the A27 Arundel bypass and A27 Worthing and Lancing improvements. Consultation took place in late summer 2017. Following this, a preferred route announcement was made to progress a	Construction start estimated at 2022.	Improvements to the A27 are one of the key priorities of the current West Sussex Transport Plan (LTP3).

Measure No.	Measure	EU Category / EU Classification	Focus	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments / Barriers so Implementation
										modified version of Option 5a. Further public consultation took place in 2019 and 2020 and a new Preferred Route Announcement is expected later in 2020.		
8	A27 Improve-ments (Worthing & Lancing)	Traffic Management/ Strategic highway improvements	Campaign to improve A27 on air quality grounds at Chichester, Worthing & Arundel to reduce use of 'alternative' routes through villages such as Storrington& Cowfold.	Highways England/ WSCC	2015 – ongoing	Dependant on Highways England	Key indicator of AP measure will be for HE to agree scheme and implement.	Unknown	WSCC A27 Action campaign launched to seek improvement to A27.	The Road Investment Strategy produced by DfT in March 2015 allocates a budget for the A27 schemes including the A27 Arundel bypass and A27 Worthing and Lancing improvements. Following consultation in late summer 2017, the scheme is currently under review by Highways England.	—Unknown	Improvements to the A27 are one of the key priorities of the current West Sussex Transport Plan (LTP3).

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

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$. There is clear evidence that particulate matter ($PM_{2.5}$) has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

The major sources of primary $PM_{2.5}$ are industrial combustion, road transport, off-road transport, residential sources and small-scale waste burning[10]. Road transport sources of $PM_{2.5}$ include mainly exhaust emissions from diesel vehicles, together with non-exhaust emissions from tyre wear, brake wear and road surface abrasion. Chemically, a large proportion of the total mass of $PM_{2.5}$ consists of nitrates, sulphates and organic and elemental/black carbon[11]. The carbon(aceous) particles are associated with a variety of combustion sources including diesel powered engines, residential burning and power stations. There is evidence of adverse health effects of black carbon particles linked with cardiovascular conditions and premature mortality[12].

$PM_{2.5}$ levels are used to calculate an indicator in the Public Health Outcomes Framework (PHOF) – Fraction of Mortality Attributable to Particulate Matter Pollution. This indicator is calculated for each local authority in England and it intended to enable Directors of Public Health to prioritise action on air quality in their local area. The estimated fraction of mortality attributable to long-term exposure to current (2018) levels of anthropogenic $PM_{2.5}$ was 5.2% in the Horsham district[13]. This places the district mid-way between the areas with the lowest estimated mortality burden in England (the fraction of around 3%) and very urbanised areas which show the highest rates of mortality attributable to anthropogenic $PM_{2.5}$ (around 7%)[14].

Horsham District Council is working to address $PM_{2.5}$ through measures aimed at reducing emissions from road transport, in particular, measures increasing the uptake of low emission vehicles.

Although $PM_{2.5}$ is no longer monitored in the district, a review of data from three South East sites monitoring $PM_{2.5}$: Eastbourne AURN, Chatham AURN and Rochester Stoke AURN has

[10] Air Quality Expert Group (2012) *Fine Particulate Matter (PM2.5) in the United Kingdom*
[11] Elemental carbon and black carbon are terms often used interchangeably, however they are defined by the measurement method applied - John G. Watson, Judith C. Chow, and L.-W. Antony Chen (2005) *Summary of Organic and Elemental Carbon/Black Carbon Analysis Methods and Intercomparisons*
[12] WHO (2013) *Review of evidence on health aspects of air pollution – REVIHAAP Project*
[13] PHE (2018) Public Health Profiles.
https://fingertips.phe.org.uk/search/air%20pollution#page/0/gid/1/pat/6/par/E12000008/ati/101/are/E07000210
[14] As above

been undertaken in this report. The results from those sites (discussed in Section 3.2.3) show that concentrations have remained well below the national target value of 25µg/m^3 for all the years of monitoring. However, Eastbourne and Chatham sites have exceeded 10µg/m^3 recommended by WHO.

Research has shown that wood burning is a large contributor to primary emissions of $PM_{2.5.}$ unsurprisingly, solid fuel burning has contributed to the concentrations of $PM_{2.5}$ in the South Eastregion; this is shown in Figure B15 in Appendix B, which shows elevated levels of $PM_{2.5}$ on Saturday evenings in the winter months. That contribution has been quantified by King's College at 6 to 9% annually, averaged across urban areas[15]. In 2018 HDC was successful in securing Defra's funding towards the Clean Burn Sussex project, aimed at the promotion of least polluting fuels and stoves. The project is a collaboration of 15 authorities in Sussex to raise awareness about domestic burning and promote better burning methods and choices. A dedicated website for clean burning (http://www.sussex-air.net/Cleanburn/clean-burning.aspx) has been in operation from November 2019.

In agreement with the principles of the *Air Quality and Emissions Mitigation Guidance for Sussex* (2019) all new developments are required to implement mitigation/offsetting measures commensurate with their size/predicted emissions of NO_2 and $PM_{2.5}$.

In cooperation with Sussex-Air Partnership, Horsham DC has supported the development and maintenance of the "Energise" eV charge point network. Funding for Energise and the eV South East Network Partnership project has ceased in 2017 so the priority was to form a new partnership to continue with the project and the expansion of the regional ev charging network (previously known as the Energise network). In March 2020 HDC approved its Electric Vehicle (EV) Charge Point Strategy which aims to enable the provision of ev infrastructure. In light of the Strategy the Council has worked with West Sussex County Council to procure a contractor via a concession contract to install 1000's of charge points across the County. The principle focus will be to provide charge points for residents that do not have access to off street parking.

The Council previously secured funding from the Office for Low Emission Vehicles and Department for Transport's Local Sustainable Transport Fund (LSTF) to set up of a car club in Horsham. It is anticipated that the scheme can be extended to other towns in the district.

[15] Environmental Research Group - King's College London (2019) Airborne particles from wood burning in UK cities

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Currently Horsham District Council has three automatic monitoring stations located in:

- **Park Way, Horsham** town centre, housing NO_x and PM_{10} analysers;
- **Storrington** village, housing a NO_x analyser. This station is affiliated to the Automatic Urban and Rural Network (AURN).
- **Cowfold** village, housing a NO_x analyser.

All stations are roadside sites with relevant public exposure[16]. Further details of these monitoring stations are provided in Table A1 in Appendix A. The location of the automatic monitoring stations are shown in Figures D1 - D3, Appendix D. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

All monitoring stations are collocated with triplicate NO_2 diffusion tubes.

Horsham District Council is a member of the Sussex Air Quality Partnership (Sussex Air) which benefits from the co-ordinated monitoring of air pollutants across the region. The Sussex Air Quality Monitoring Network is managed and co-ordinated by the Environmental Research Group based at King's College London, on behalf of Sussex-air and they provide data calibration and ratification of results. All data from the network is published at www.sussex-air.net.

3.1.2 Non-Automatic Monitoring Sites

The nitrogen dioxide monitoring network in 2019 included 41 sites across the district. The total number of diffusion tubes was 49. Details of the monitoring sites are shown in Table A2 in Appendix A. The site locations are shown in Figures D4-D11 in Appendix D.

[16] NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem. National monitoring results are available at https://uk-air.defra.gov.uk/data/

Monitoring locations remained unchanged from those reported in the previous year.

All diffusion tubes have relevant exposure within 10m of the kerbside, except tubes:

- Horsham 6N – receptor at Rusper Road located a distance of 11m from kerbside;
- Horsham 7N – receptor at Warnham Road located a distance of 12m from kerbside; and
- Storrington 14 – receptor at Washington Road located a distance of 19m from kerbside.

Triplicate tubes have been maintained at all three automatic analyser sites:

- HO2 Horsham Park Way (junction of Park Street and Park Way in Horsham);
- HO4 Storrington AURN (junction of Manley's Hill and Meadowside in Storrigton; and
- HO5 Cowfold (Bolney Road/The Street, Cowfold).

There was one duplicate site in 2019: Cowfold 1,2 (Olde House, The Street, Cowfold). In 2019, Storrington 2 of the duplicate site Storrington 1,2 (Manleys Hill) was removed and relocated to Horsham 11 (East Street, Horsham).

3.2 Individual Pollutants

The following sections provide results from the automatic monitoring stations and diffusion tube network hosted by Horsham District Council and additional data for particulate matter from the Reigate and Banstead RG1 site in Surrey, as well as Eastbourne AURN in East Sussex and Chatham AURN and Rochester Stoke AURN in Kent. The air quality monitoring results presented in this section are, where relevant, adjusted for "annualisation" and bias. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Automatic Monitoring Data

The Council monitored NO_2 at three locations during 2019: HO2 Horsham Park Way, HO4 Storrington AURN and HO5 Cowfold. Table A3 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for all the years where monitoring was undertaken with the air quality objective of 40µg/m^3. Table A4 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for all the monitoring years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

Data capture was good (above 75%) during 2019 at all three sites and, as such, no annualisation has been required.

The results at the three monitoring stations indicate that the NO_2 objectives for 2019 were not exceeded, with annual mean concentrations well below the annual mean objective level of 40µg/m^3 and no measured exceedances of the 1-hour objective.

The annual mean NO_2 concentration for Park Way, Horsham for 2019 was 25.4µg/m^3; this showed a small decrease on the previous year. There were no exceedances of the 1-hour objective at the Park Way site. The highest concentrations in the year were recorded in January (average mean concentration of 39.0µg/m^3) and April (average mean concentration of 34.3µg/m^3); this is shown in Figures B1 and B3, Appendix B. From the analysis of weekly hourly mean concentrations it can be seen that the highest concentrations (exceeding 30µg/m^3) were recorded in the morning and afternoon traffic peaks from Monday through to Friday, with markedly high traffic peak concentrations recorded in the winter months (Figure B7, Appendix B).

For the Storrington AURN site, the annual mean NO_2 concentration for 2019 was 22.0µg/m^3, showing a small decrease on 2018. There were no exceedances of the 1-hour objective. The

highest concentrations in the year were recorded in January (average mean concentration of 31.1µg/m^3), followed by April (29.7µg/m^3); the period of the lowest concentrations was over the summer months June-September (Figures B1 and B3, Appendix B). From the analysis of hourly mean concentrations it can be seen that the highest hourly mean concentrations (exceeding 30µg/m^3) were recorded in the morning traffic peaks from Monday through to Friday (Figure B9, Appendix B).

The measured annual mean NO_2 concentration at the Cowfold station in 2019 was 23.6µg/m^3, a significant decrease on the previous year. There were no exceedances of the 1-hour objective at the site. The highest concentrations in the year were recorded in the winter months –January (average mean concentration of 27.3µg/m^3), February (33.3µg/m^3) and November (29.3µg/m^3) (Figures B1 and B3, Appendix B). The analysis of hourly mean concentrations by day of the week indicates that the highest concentrations were recorded during afternoon traffic peaks throughout the working week from Monday to Friday, with hourly mean results reaching the concentrations of 40µg/m^3 (Figure B10, Appendix B).

Figure A1 in Appendix A shows the trend in NO_2 concentrations at the monitoring locations for all the years of monitoring. For Horsham Park Way and Storrington AURN, the annual mean concentrations have decreased slightly in 2019 on the previous year whereas the decrease at the Cowfold site was more pronounced. Decreasing concentrations at roadside sites are in agreement with the national trend for roadside NO_2. The Horsham Park Way and Storrington sites show an overall decreasing trend over the monitoring period. The trend for the Cowfold site is not clear due to the recent peaks in 2016, 2017 and 2018, before the decrease in 2019.

Diffusion Tube Monitoring Data

Nitrogen dioxide diffusion tube monitoring was undertaken at 42 locations throughout Horsham District during 2019.

Data capture for the survey in 2019 was good (75% or greater) at all sites, therefore no sites required short to long term adjustment (annualisation).

The results for 2019 (shown in Table A8 and Table A9) have been corrected using a local bias correction factor of 0.74, as obtained from three co-location studies at HO2 Horsham Parkway, HO2 Storrington and HO5 Cowfold. Full details of the bias adjustment and QA/QC procedure are provided in Appendix C.

In 2019 there was one site where the annual mean NO_2 objective was exceeded:

- Storrington 19n (jct of Manley's Hill and School Hill) – located within the Storrington AQMA.

There were two other monitoring sites with measured concentrations within 10% of the annual mean objective (i.e. 36µg/m³ or more):

- Storrington 1 (Manleys Hill) – located within the Storrington AQMA; and
- Cowfold 7n (3 Huntscroft Gardens, Bolney Road) – located within the Cowfold AQMA.

As the site that exceeded the annual mean objective and those that were within 10% of the objective are located within the existing AQMAs, this demonstrates that the Storrington and Cowfold AQMAs are still required.

Horsham Town Sites

There was an overall decreasing trend for diffusion tube results in Horsham Town in 2019 when compared to the previous year. The highest annual mean concentrations were recorded at the Horsham 1 monitoring site on Park Way (26.4µg/m³), Horsham 9n at the roundabout of North Street and Harwood Road (26.5µg/m³) and the new monitoring site Horsham 11 on East Street (26.6µg/m³). Horsham 1n is located at the intersection of major roads in the town centre and Horsham 9n at a busy junction of North Street and Harwood Road.

Storrington Sites

For the Storrington monitoring sites, 2019 NO_2 concentrations have largely shown a small decrease on 2018. The majority of long-term sites show a continuing overall downward trend over the monitoring period.

the duplicate site Storrington 1,2 in the Storrington AQMA has been reduced to a single monitoring tube in 2019. The site has shown a decrease in 2019 on the previous year. The site is located approximately 2.5m from a residential property. A distance correction to estimate concentration at the façade was not carried out as the nearest receptors are located on ground floor whereas the measurement was taken at the height of 3m. Therefore, it is assumed that the concentrations at the façade of the property immediately behind the site and the properties nearest the site, are close in value to the concentration recorded at the site.

Near to Storrington 1,2, on the opposite side of the road, is the relocated site Storrington 19n. The Storrington 19n site is located at the same distance from the road as the façade of

the nearest residential property, and as such no correction was required. Storrington 19n recorded the highest concentration in the monitoring survey for 2019, with the annual mean result of 47.7µg/m³, a decrease on 2017.

The monitoring site Storrington 14n on the main A283 Washington Road (Manleys Hill) in Storrington has exceeded the annual mean objective throughout the monitoring period to 2017, however the concentrations at the nearest relevant exposure have remained well below the objective. Storrington 14n is a kerbside site located at a distance of approximately 20m from the nearest residential property. The site recorded an annual mean concentration of 33.4µg/m³ in 2019, a significant decrease on the previous years. A distance correction using Defra's Distance from Roads Calculator[17] has given an estimated result of 18.4µg/m³ at the nearest residential façade.

Cowfold Sites

The measured annual mean NO_2 concentrations in Cowfold for 2019 have shown a decrease on the previous year.

The Cowfold 7n site, located on the A272 to the east of the town, has been the only monitoring site in the Cowfold AQMA, which exceeded the annual mean objective in the recent years. The trend for this site is a protracted decrease. The concentrations peaked in 2011 and 2012, followed by a decrease in 2013 and 2014, before increasing again in 2015 and 2016. In the past three years the site decreased to 42.4µg/m³ in 2018, to go below the objective levels in 2019 with a concentration of 36.1µg/m³.

As Cowfold 7n is located approximately 2m from a residential receptor, a distance correction has been applied to estimate the concentration at the nearest relevant exposure (details of the correction are shown in Figure C2, Appendix C). The distance corrected result of 30.6µg/m³ indicates compliance with the annual mean concentration for NO_2.

Remaining Sites

The monitoring sites in the towns of Billingshurst, Pulborough and Steyning have remained below the objective throughout the monitoring period.

The concentrations measured in Billinghurst have remained relatively stable at approximately 30µg/m³ over the monitoring period from 2013 to 2017, to reduce to 26 µg/m³ over the past two years.

[17] https://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html

The Pulborough sites have shown a continuous downward trend over the monitoring period.

The concentration at the Steyning monitoring site have remained below 25µg/m³ since 2015.

The new sites Henfield 2 (A281 High Street) and Southwater 1 (Opp. Southwater Infant Academy, Worthing Rd) measured wellbelow the objective for 2019. Southwater 1 was set up to monitor the impacts of new developments in Southwater, including a residential development of 600 dwellings which has now mostly been completed, located opposite Soutwater Infant Academy. The Southwater site registered an increase of about just below 3µg/m³ since the previous year when the development was still under construction, however it has decreased to 23.5µg/m³ in 2019.

Figures A4 to A7 in Appendix A show the trends in annual mean NO_2 concentrations measured at the diffusion tube sites over the monitoring period 2008-2019. The results of diffusion tube monitoring overall indicate a small decrease in NO_2 concentrations in 2019 as compared to the previous years. The majority of sites show a distinct overall downward trend in measured concentrations of NO_2 over the monitoring period, which applies both to roadside and background locations. This can be attributed to decreasing background concentrations and is also indicative of a gradual improvement in fleet emissions.

3.2.2 Particulate Matter (PM_{10})

The Council monitored PM_{10} at one location during 2019: HO2 Horsham Park Way. In addition to Horsham Park Way, PM_{10} used to be monitored at Storrington AURN, however, this had ceased in 2017 when Defra re-located the PM_{10} and $PM_{2.5}$ analysers at the end of 2017 to an area of lower coverage.

An automatic TEOM particulate monitor has been permanently located at Park Way in Horsham town centre for the past twenty years, giving 15 minute measurements of particulate matter concentrations. Data collection and ratification is undertaken by the Environmental Research Group through their contract with the Sussex Air Quality Partnership. The data obtained from the Park Way analyser has been corrected using the Volatile Correction Model developed by the Environmental Research Group. Further information on the correction applied to the TEOM results is presented in Appendix C. Data capture was above 75% in 2019 and as such no annualisation has been required.

In this report, the results from Horsham Park Way are compared against three other permanent monitoring sites in the South East region: Reigate and Banstead RG1 in Horley, Chatham AURN and Rochester Stoke AURN in Medway. Table A5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for all the years where

monitoring was undertaken, with the air quality objective of 40µg/m^3. Table A6 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for all the monitoring years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

Automatic monitoring of PM_{10} at the Horsham Park Way site indicated that both the annual mean and 24-hour UK objective for PM_{10} were complied with in 2019 and all the previous years of monitoring. The annual mean PM_{10} concentration recorded in 2019 was 19.6µg/m^3, which is close to the WHO-recommended guideline value of 20µg/m^3, and shows a marginal decrease on the previous year. To compare, the roadside site in Chatham was above the WHO-recommended guideline value of 20µg/m^3, taken as an annual mean for most of the monitoring period, including the last three years.

Peaks in concentrations of PM_{10} at Horsham Park Way and the comparison sites were observed during regional episodes from January through to May. Horsham Park Way recorded 5 exceedances of the daily mean concentration objective in 2019, over February and April (Figure B2, Appendix B). The highest average monthly concentrations at Horsham Park Way and the comparison sites were also recorded in February and April; both months exceeded 25µg/m^3 at Horsham Park Way (Figures B3 and B4, Appendix B). From the analysis of weakly hourly mean concentrations it is found that the highest concentrations at Horsham Park Way were generally recorded in in the evening hours during the working week (Figure B8, Appendix B).

Figure A2 shows the trend in PM_{10} concentrations at Horsham Park Way for all the years of monitoring, as compared to the three South East sites. Horsham Park Way remained well below both the long term and short term air quality objectives for PM_{10} throughout the monitoring period. Results from the Horsham Park Way analyser show an overall gradual reduction in measured concentrations since monitoring at this location begun in 2007. To compare, Chatham AURN is a roadside site and shows a trend typical for a roadside site - decreasing to 2015, followed by a small increase in the recent years. Reigate and Banstead monitor is situated in a suburban location. The site shows a decreasing trend, typical for an urban background site.

3.2.3 Particulate Matter ($PM_{2.5}$)

$PM_{2.5}$ objectives have been set out in the UK Air Quality Regulations. Although there is no requirement for local authorities in England to review and assess $PM_{2.5}$ against these objectives as part of the LAQM regime, results have been reported as recommended by Technical Guidance LAQM.TG(16).

$PM_{2.5}$ had been monitored at the Storrington AURN site, however monitoring ceased at the end of 2016 when Defra re-located the analyser to an area of lower coverage. As PM_{10} is still monitored at the Horsham Park Way site, the annual mean concentrations of $PM_{2.5}$ were estimated from the PM_{10} measurements using a local ratio of $PM_{2.5}$ to $PM_{10,}$ as per method described in Box 7.7 of Technical Guidance TG(16). The estimated concentrations of $PM_{2.5}$ presented in Table A7 indicate that concentrations have been well below the national target value of 25µg/m^3 in 2019, and previous years at the Horsham Park Way site[18]. However, the results have remained above the WHO-recommended guideline value of 10µg/m^3 taken as annual mean.

Table A7 also presents data from three South East sites monitoring $PM_{2.5}$: Eastbourne AURN, Chatham AUR and Rochester Stoke AURN. Results from those sites indicate that concentrations have remained well below the limit value of 25µg/m^3 in 2019 and all the years of monitoring. However, the guideline value of 10µg/m^3 recommended by WHO has largely been exceeded throughout the monitoring period at all those sites.

Regarding 2019 concentrations, peaks were recorded during regional episodes from January through to May, as shown in Figures B5 and B6 in Appendix B. The highest average monthly concentrations we recorded in April (Figure B6, Appendix B). Figure B11 shows the times of the highest hourly mean concentrations at Chatham AURN by day of the week, which were generally Saturday evenings, with markedly higher concentrations recorded over the winter months at those times.

Figure A3 shows the trend in $PM_{2.5}$ concentrations at Horsham Parkway (values plotted for the Horsham Parkway sites are estimated values) and the three comparison sites. This overall shows a slow reduction in the $PM_{2.5}$ concentrations over the recent years at Horsham Parkway. Eastbourne AURN and Rochester AURN are both background sites; both showed a gradual reduction in concentrations until 2015. Since 2015 the concentrations increased slightly at both sites. The roadside site in Chatham AURN has shown a continuous decrease over the monitoring years but has increased in 2018, which may have been caused by the change of analyser.

3.2.4 Sulphur Dioxide (SO_2)

There is currently no sulphur dioxide monitoring undertaken by Horsham District Council. However, results of automatic monitoring was undertaken at a permanent station Lullington Heath in Sussex have shown compliance with the LAQM objectives for SO_2.

[18] National target value as per *The Air Quality Standards Regulations 2010*

Given that no large scale industrial combustion processes or significant areas of domestic solid-fuel burning have been identified within Horsham District it is unlikely that the objectives for sulphur dioxide would have been exceeded within the district during 2019.

Appendices

Appendix A: Monitoring Results for 2019

Appendix B: Full Monitoring Results for 2019

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

Appendix D: Maps of Monitoring Locations and AQMAs

Appendix E: Industrial Processes

Appendix F: Summary of Air Quality Objectives in England

Appendix A: Monitoring Results for 2019

Table A1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS GridRef	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Inlet Height	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Does this location represent worst-case exposure?
HO2	**Horsham Park Way**	Roadside	517485	130590	NO_2; PM_{10}	N	Chemiluminescence (APNA-370); TEOM	3.0m	Y (7.0m)	1.5m	Y
HO4	**Storrington AURN**	Roadside	509083	114198	NO_2	N	Chemiluminescence (Thermo 32i)	3.3m	Y (9.6m)	4.6m	N
HO5	**Cowfold**	Roadside	521356	122553	NO_2	Y	Chemiluminescence (ML9841B)	2.0m	Y (4.0m)	6.5m	N

Table A2 – Details of Non-Automatic Monitoring Sites

Lab Ref.	Site Name	Site Location	Site Type	Triplicate or Co-located Tube?	OS Grid Ref X	OS Grid Ref Y	In AQMA?	Diffusion Tube Height	Relevant Exposure? *(Y/N with distance to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*
Billingshurst Sites										
28	Billingshurst 1	96 High Street	Roadside	N	508623	125834	N	2.2m	Y (1.0m)	1.5m
Cowfold Sites										
12,20	Cowfold 1,2	Olde House, The Street, Cowfold	Roadside	Duplicate	521324	122610	Y	2.7m	Y (2.5m)	1.7m
21	Cowfold 3	6 Margaret Cotts, A272, Cowfold	Roadside	N	521267	122677	Y	2.7m	Y (9.7m)	2.0m
22	Cowfold 4	Trelawny House, A281, Cowfold	Roadside	N	521311	122704	N	2.4m	Y (9.3m)	2.0m
35	Cowfold 5n	Junction Station Road/Thorndon, Station Road, Cowfold	Roadside	N	521070	122706	Y	2.5m	Y (23.0m)	3.6m
36	Cowfold 6n	Millers Cott. Henfield Road, Cowfold	Roadside	N	521309	122248	N	2.2m	Y (3.0m)	1.8m
37	Cowfold 7n	3 Huntscroft Gardens, Bolney Road, Cowfold	Roadside	N	521460	122473	Y	2.2m	Y (2.0m)	1.1m
43	Cowfold 8n	5-6 Fairfield Cottages, Cowfold	Urban Background	N	521411	122667	N	2.0m	Y (7.0m)	0.3m
44,45,46	Cowfold AU A/B/C	Bolney Road/The Street, Cowfold	Roadside	Triplicate, co-located with HO5 Cowfold	521356	122552	Y	2.0m	Y (20.0m)	6.5m
Henfield Sites										
1	Henfield 2n	Jct of A281 High Street & Cagefoot Ln	Roadside	N	521492	115907	N	2.0m	Y (0m)	2.0m
Horsham Sites										
1	Horsham 1	Park Way, Horsham	Roadside	N	517489	130580	N	2.2m	Y (3.5m)	2.0m
3	Horsham 3	69 Hillside, Horsham	Urban Background	N	516000	130600	N	2.9m	Y (7.6m)	1.5m
4	Horsham 4	45 Gorings Mead, Horsham	Urban Background	N	517600	130100	N	2.5m	Y (9.8m)	1.2m
8	Horsham 5	Harwood Rd, Horsham	Roadside	N	518230	131140	N	2.4m	Y (9.6m)	1.4m
9	Horsham 6	130 Rusper Rd, Horsham	Roadside	N	518650	132490	N	2.6m	Y (11.2m)	1.5m
10	Horsham 7	30 Mill House, Warnham Rd, Horsham	Roadside	N	516952	132215	N	2.2m	Y (12.0m)	2.0m
11	Horsham 8	54 Worthing Rd, Horsham	Roadside	N	516650	130220	N	3.0m	Y (8.0m)	1.6m
5,6,7	Park Way	AQMS Horsham	Roadside	Triplicate, co-located	517489	130580	N	2.8m	Y (8.9m)	2.1m

Lab Ref.	Site Name	Site Location	Site Type	Triplicate or Co-located Tube?	OS Grid Ref X	OS Grid Ref Y	In AQMA?	Diffusion Tube Height	Relevant Exposure? *(Y/N with distance to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*
				with HO2 Horsham Park Way						
23	N. Horsham 1N	Home Fm, Langhurstwd Rd, Horsham	Roadside	N	517702	133570	N	2.4m	Y (4.9m)	1.9m
24	N. Horsham 2N	Graylands Fm Cotts, Horsham	Roadside	N	517476	134013	N	2.8m	Y (5.5m)	1.0m
48	Horsham 9N	North St/Foundry Ln	Roadside	N	518074	131164	N	2.0m	Y (1.0m)	1.5m
14	Horsham 11n	Old Queen's Head, East Street	Roadside	N	517672	130322	N	2.0m	Y (0.5m)	1.0m
Pulborough Sites										
26	Pulborough 1	Swan Corner, Station Road, Pulborough	Kerbside	N	504584	118568	N	2.0m	Y (1.7m)	0.4m
27	Pulborough 2	42A Lower Street, Pulborough	Roadside	N	505185	118623	N	3.0m	Y (1.8m)	1.5m
Southwater Sites										
48	Southwater 1	Opp. Southwater Infant Academy, Worthing Rd, Southwater	Roadside	N	515639	126599	N	2.0m	Y (1.0m)	1.5m
Steyning Sites										
25	Steyning 4N	Church St, Steyning	Kerbside	N	517732	111198	N	2.7m	Y (1.5m)	0.9m
Storrington Sites										
13	Storrington 1	Manleys Hill, Storr duplicate	Roadside	N	508960	114270	Y	3.0m	Y (2.5m)	1.1m
15	Storrington 3	3 School Hill, Storrington	Roadside	N	508935	114297	Y	2.0m	Y (0m)	1.2m
16	Storrington 4	22 High Street, Storrington	Roadside	N	508832	114272	Y	3.0m	Y (2.8m)	2.2m
17	Storrington 5	2 West Street, Storrington (Post Office)	Roadside	N	508742	114288	Y	3.5m	Y (1.9m)	1.9m
18	Storrington 6	1-4 Holly Court, Pulborough Rd Storrington	Roadside	N	508396	114449	N	2.4m	Y (7.7m)	1.9m
19	Storrington 7	The Willows, Amberley Rd, Storrington	Roadside	N	508338	114374	N	3.0m	Y (6.7m)	1.6m
29,30,31	Storrington 8/9/10 AURN	Manleys Hill AURN co-located	Roadside	Triplicate, co-located with HO4 Storrington AURN	509083	114198	N	3.3m	Y (9.6m)	4.6m
34	Storrington 11n	53 West Street, Storrington	Roadside	N	508511	114365	Y	3.0m	Y (1.0m)	3.0m
33	Storrington 12n	3 Rectory Cottage Storrington	Roadside	N	508598	114323	Y	2.6m	Y (7.0m)	2.3m
32	Storrington 13n	18 West Street, Storrington	Roadside	N	508675	114306	Y	2.2m	Y (0.5m)	3.0m
38	Storrington 14n	Cobden, Manleys Hill, Storrington	Roadside	N	509319	114160	N	2.6m	Y (20.0m)	0.9m

Lab Ref.	Site Name	Site Location	Site Type	Triplicate or Co-located Tube?	OS Grid Ref X	OS Grid Ref Y	In AQMA?	Diffusion Tube Height	Relevant Exposure? *(Y/N with distance to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*
40	Storrington 15n	Fryern Road, Storrington	Roadside	N	509103	114532	N	2.2m	Y (12.0m)	1.7m
39	Storrington 16n	Mill Parade, Waitrose car park, Storrington	Roadside	N	508966	114356	N	2.6m	Y (0m)	1.3m
41	Storrington 17n	33 Church Street, Storrington	Urban Background	N	508677	114149	N	2.2m	Y (1.0m)	1.5m
42	Storrington 18n	20 Amberley Road, Storrington (Barges End)	Roadside	N	508215	114348	N	2.2m	Y (5.0m)	1.9m
47	Storrington 19n	jct of A283 Manley's Hill and School Hill	Roadside	N	508945	114268	Y	2.0m	Y (0m)	1.0m

Table A3 – Results of Automatic Monitoring of NO_2: Comparison with Annual Mean Objective 2006 – 2019

Site ID/Name	Site Type	Within AQMA ?	Relevant public exposure? Y/N	Valid Data Capture 2019 % (1)	Annual Mean Concentration µg/m³													
					2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
HO2 Horsham Park Way	Roadside	N	Y	98.5	26	30	29	31	30.4	27.0	28.6	29.9	25.4	26.5[a]	28.6	26.2	25.4	24.4
HO4 Storrington AURN	Roadside	N	Y	96.5	-	-	-	21*	27.6	23.4	24.8	26.9	22.4[a]	21.3	25.1	22.7	23.0	22.0
HO5 Cowfold	Roadside	Y	Y	96.3	-	-	-	-	-	27.0	29.1	24.7	27.9[a]	25.5	27.2	29.5	28.4	23.6

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

☐ **If applicable, all data has been distance corrected for relevant exposure**

* Indicative value only. The NO_2 annual mean has been estimated from unratified data for period 21.10.09 – 31.12.2009.
[a] Annual mean concentration "annualised" as per Box 7.9 of TG(16) as data capture less than 75%.
(1) Data capture for the full calendar year.

Table A4 – Results of Automatic Monitoring of NO_2: Comparison with 1-hour Mean Objective 2006 – 2019

Site ID/Name	Site Type	Within AQMA ?	Relevant public exposure? Y/N	Valid Data Capture 2019 % (1)	Number of Exceedances of Hourly Mean (200 µg/m³) (2)													
					2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
HO2 Horsham Park Way	Roadside	N	Y	98.5	0	0	0	0	0	0	0	0	0	0 (102.9)	0	0	0	0
HO4 Storrington AURN	Roadside	N	Y	96.5	-	-	-	n/a	0	0	0	0	0 (78.7)	0 (85.1)	0 (102.7)	0	0	0
HO5 Cowfold	Roadside	Y	Y	96.3	-	-	-	n/a	n/a	0	0	0	0 (120)	0 (98.7)	0	0	0	0

(1) Data capture for the full calendar year.
(2) If the period of valid data is less than 85%, the 99.8th percentile of hourly means is included in brackets.

Figure A1 – Trends in Annual Mean NO_2 Concentrations Measured at Automatic Monitoring Sites 2006 – 2019

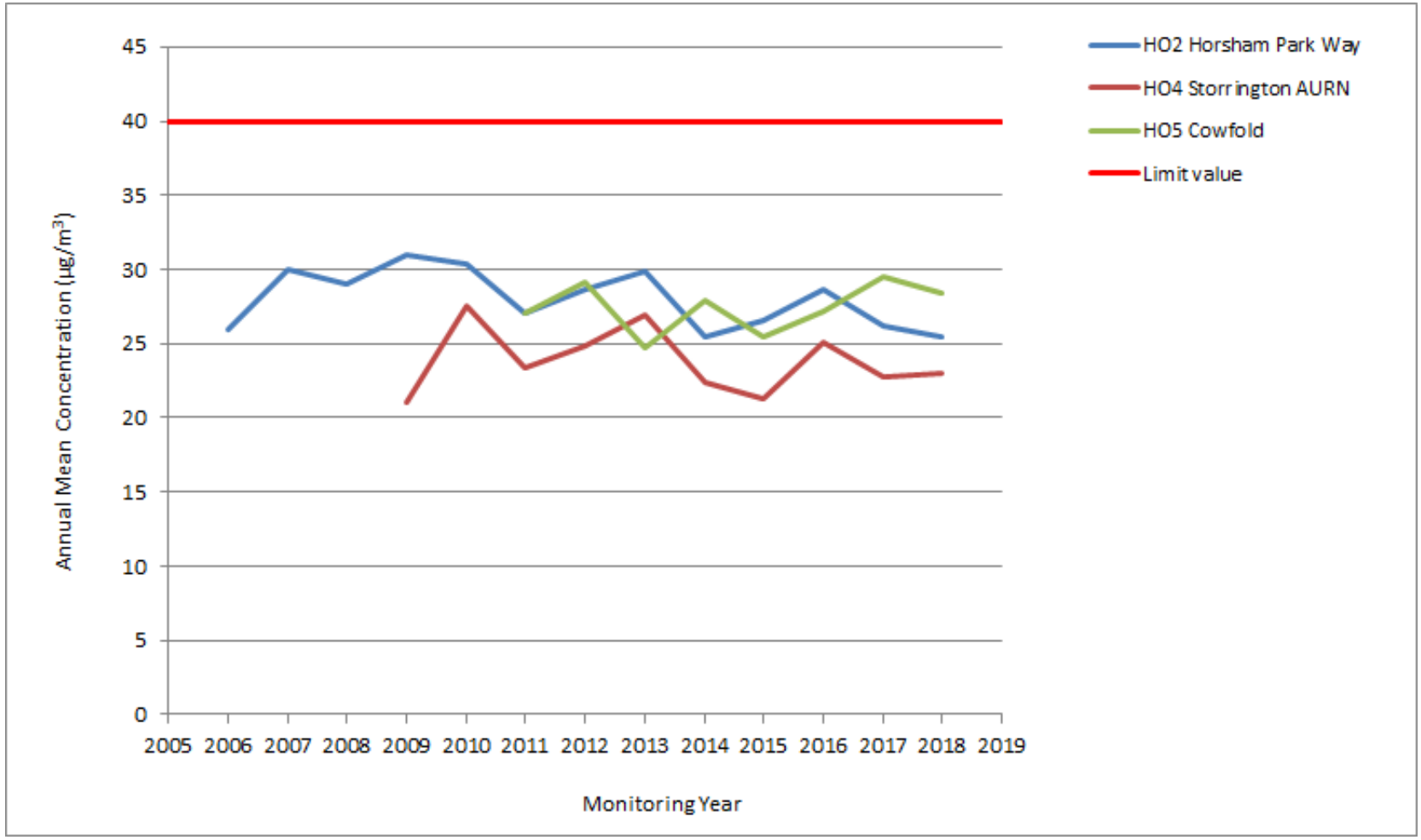


Table A5 – Results of Automatic Monitoring of PM_{10}: Comparison with Annual Mean Objective 2007 – 2019

Site ID	Site Type	Within AQMA ?	Relevant public exposure? Y/N	Valid Data Capture 2019 % (1)	Confirm Gravimetric Equivalent (Y or NA)	Annual Mean Concentration µg/m³												
						2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
HO2 Horsham Park Way	R	N	Y	89.3	Y	24.9	23.8	23.9	18.3	24.0	23.2	22.3	20.9	18.6[a]	18.0	18.2	19.6	19.3
Reigate & Banstead RG1 – Michael Crescent, Horley (Comparison Site)	S	N	Y (NO_2)	98.1	Y	23.3*	19.7	18.8	18.7**	21.7	19.4	20.1	18.7	19.2	16.6	16.2	17.1	15.7
Chatham AURN (Comparison Site)	R	Y (NO_2)	Y	95.9	Y	-	-	-	-	24.1	20.8	23.1	21.4	18.5	19.2	21.6	23.8	22.9
Rochester Stoke AURN (Comparison Site)	S	N	N/A	99.5	Y	22.8*	19.8	-	-	-	15.9	17.9	17.6	14.6	15.8	16.6	17.4	15.0

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

* TEOM data has been corrected using the default 1.3 correction factor to estimate gravimetric concentrations.

** Data not fully ratified.

[a] Annual mean concentration "annualised" as per Box 7.9 of TG(16) as data capture less than 75%.

(1) Data capture for the full calendar year.

R – Roadside; S – Suburban

TEOM, TEOM FDMS (changed to FIDAS in Aug 2018), BAM

Table A6 – Results of Automatic Monitoring of PM_{10}: Comparison with 24-hour Mean Objective 2007 – 2019

Site ID	Site Type	Within AQMA ?	Relevant public exposure? Y/N	Valid Data Capture 2019 % [1]	Confirm Gravimetric Equivalent (Y or NA)	Number of Exceedances of 24-Hour Mean (50 µg/m^3 not to be exceeded more than 35 times a year) [2]												
						2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
HO2 Horsham Park Way	R	N	Y	89.3	Y	17	9	3	0	11 (39)	9 (38)	2 (33)	4 (32)	2 (29.3)	4	2	0	5
Reigate & Banstead RG1 – Michael Crescent, Horley (Comparison Site)	S	Y (NO_2)	N/A	98.1	Y	9*	5	4	1**	9	7	2	4	3 (28.9)	3	2	0	1
Chatham AURN (Comparison Site)	R	Y (NO_2)	Y	95.9	Y	-	-	-	-	20	14	11	15	4	3	7	11	15
Rochester Stoke AURN (Comparison Site)	S	N	N/A	99.5	Y	8*	2	-	-	-	4	3	8	2 (24)	4 (32)	4	5	11

* TEOM data has been corrected using the default 1.3 correction factor to estimate gravimetric concentrations.

** Data not fully ratified.

(1) Data capture for the full calendar year.

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

R - Roadside; S – Suburban

TEOM, TEOM FDMS (changed to FIDAS in Aug 2018), BAM

Figure A2 – Trends in Annual Mean PM_{10} Concentrations Measured at Automatic Monitoring Sites 2007 – 2019

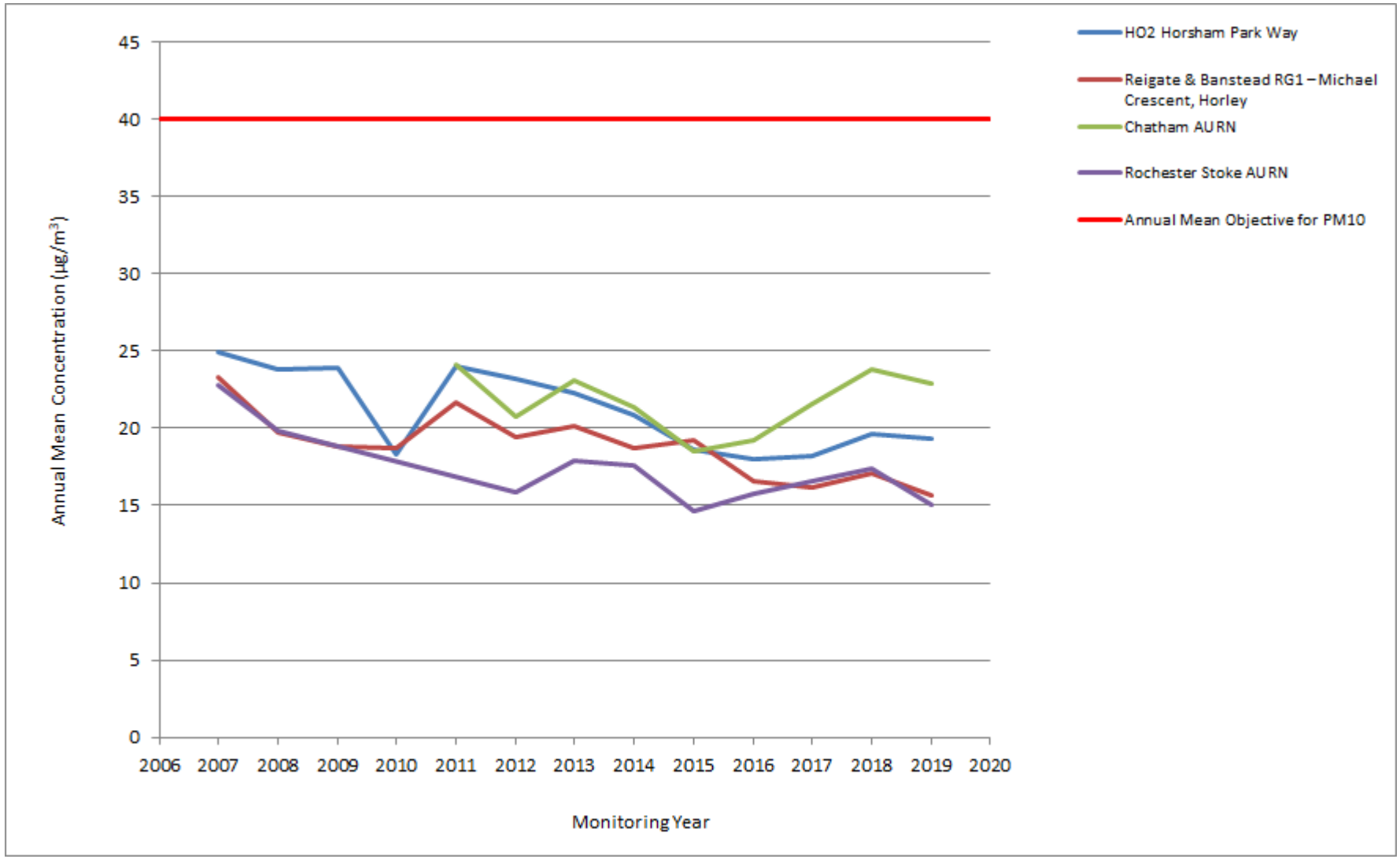


Table A7 – Results of Automatic Monitoring of $PM_{2.5}$: Comparison with Annual Mean Objective 2010 – 2019

Site ID	Site Type	Within AQMA?	$PM_{2.5}$ Annual Mean (µg/m^3)* / (Valid Data Capture)									
			2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
HO2 Horsham Park Way	Roadside	N	13.0[e] (98.9)	16.8[e] (89.1)	18.3[e] (86.2)	16.1[e] (88)	14.6[e] (84)	13.2[e] (60.8)	12.6[e] (81.1)	12.7[e] (86.6)	13.7[e] (92.6)	13.5[e] (89.3)
Eastbourne AURN (Comparison Site)	Urban Background	N/A	13.4 (93.5)	16.4 (98.2)	15.7 (95.2)	15.3 (98.7)	12.2 (75.8)	12.3[a] (67.4)	14.4[a] (73.8)	11.3 (96.3)	12.7 (97.8)	10.5 (98.8)
Chatham AURN (Comparison Site)	Roadside	Y (NO_2)	-	17.0 (99.4)	16.8 (98.5)	13.4 (94.2)	13.5 (96.1)	11.8 (90.3)	11.5 (75.5)	14.1 (95.2)	15.2 (96.1)	13.9 (90.0)
Rochester Stoke AURN (Comparison Site)	Suburban	N/A	-	14.1 (84.1)	14.3 (91.7)	16.3 (88.8)	15.0 (79.6)	8.7 (94.8)	11.3 (87.3)	9.7 (89.9)	9.9 (97.1)	10.8 (99.6)

* As a comparison, the UK Air Quality Standard objective for $PM_{2.5}$ is 25µg/m^3 (target value) for England

[a] Annual mean concentration "annualised" as per Box 7.9 of TG(16) as data capture less than 75%. Annualised results obtained from Eastbourne 2016 Air Quality Annual Status Report

[e] $PM_{2.5}$ values for HO2 Horsham Park Way were estimated from the PM_{10} data using Storrington AURN ratio of $PM_{2.5}/PM_{10}$ as per method described in Box 7.7 of TG(16). UK average ratio of 0.7 was used where local data was not available (in 2014 and from 2017 onwards)

Figure A3 – Trends in Annual Mean $PM_{2.5}$ Concentrations Measured at Automatic Monitoring Sites 2010 – 2019

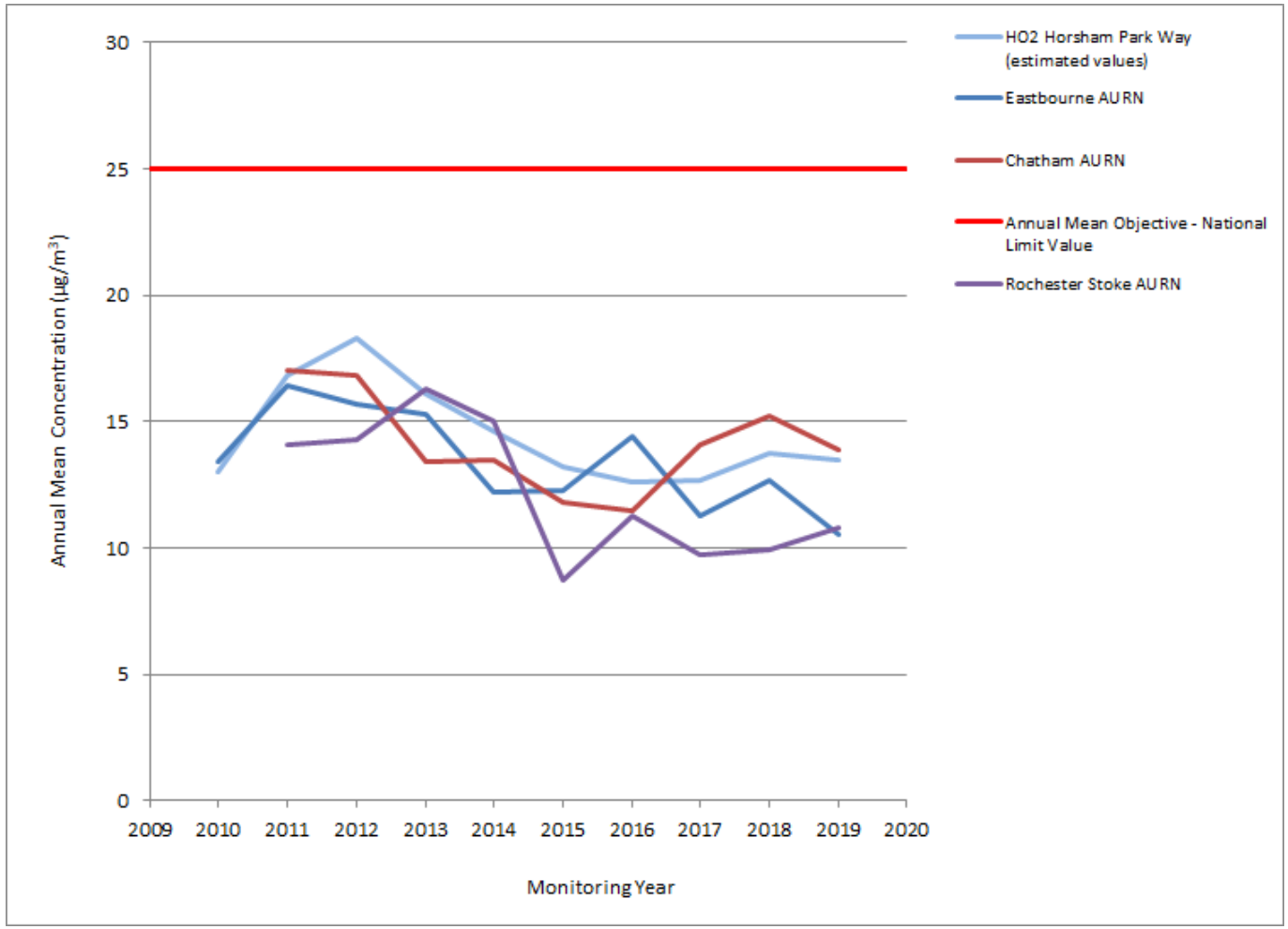


Table A8 – Results of Nitrogen Dioxide Diffusion Tubes in 2019

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3) (4)
							2019 (µg/m^3)
Billingshurst Sites							
Billingshurst 1	96 High Street	Roadside	N	N	100.0	100.0	26.2
Cowfold Sites							
Cowfold 1,2	Olde House, The Street, Cowfold	Roadside	N	Duplicate	100.0	100.0	31.6
Cowfold 3	6 Margaret Cotts, A272, Cowfold	Roadside	N	N	100.0	100.0	30.7
Cowfold 4	Trelawny House, A281, Cowfold	Roadside	N	N	100.0	100.0	26.8
Cowfold 5n	Junction Station Road/Thornden. Station Road, Cowfold	Roadside	Y	N	100.0	100.0	22.5
Cowfold 6n	Millers Cott. Henfield Road, Cowfold	Roadside	N	N	100.0	100.0	23.5
Cowfold 7n	3 Huntscroft Gardens, Bolney Road, Cowfold	Roadside	Y	N	100.0	100.0	36.1
Cowfold 8n	5-6 Fairfield Cottages, Cowfold	Urban Background	Y	N	75.0	75.0	11.6
Cowfold AU A,B,C	Bolney Road/The Street, Cowfold	Roadside	Y	triplicate	100.0	100.0	23.6
Henfield Sites							
Henfield 2n	Jct of A281 High Street & Cagefoot Ln	Roadside	N	N	100.0	100.0	22.2
Horsham Sites							
Horsham 1N	Park Street, Horsham	Roadside	N	N	100.0	100.0	26.4
Horsham 3N	69 Hillside, Horsham	Urban Background	N	N	100.0	100.0	12.5

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3) (4)
							2019 (µg/m^3)
Horsham 4N	45 Gorings Mead, Horsham	Urban Background	N	N	100.0	100.0	10.2
Horsham 5N	Harwood Rd, Horsham	Roadside	N	N	100.0	100.0	25.2
Horsham 6N	130 Rusper Rd, Horsham	Roadside	N	N	100.0	100.0	21.5
Horsham 7N	30 Warnham Rd, Horsham	Roadside	N	N	100.0	100.0	23.0
Horsham 8N	54 Worthing Rd, Horsham	Roadside	N	N	91.7	91.7	21.9
Park Way	AQMS Horsham	Roadside	N	Triplicate & co-located	100.0	100.0	22.1
N. Horsham 1N	Home Fm, Langhurstwd Rd, Horsham	Roadside	N	N	100.0	100.0	19.3
N. Horsham 2N	Graylands Fm Cotts, Horsham	Roadside	N	N	100.0	100.0	17.3
Horsham 9N	North St/Foundry Ln	Roadside	N	N	91.7	91.7	26.5
Horsham 11n	Old Queen's Head, East Street	Roadside	N	N	100.0	100.0	26.6
Pulborough Sites							
Pulborough 1	Swan Corner Station Road, Pulborough	Kerbside	N	N	100.0	100.0	28.3
Pulborough 2	42A Lower Street, Pulborough	Roadside	N	N	91.7	91.7	17.9
Southwater Sites							
Southwater 1	Opp. Southwater Infant Academy, Worthing Rd, Southwater	Roadside	N	N	100.0	100.0	23.5
Steyning Sites							

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2019 (%) [2]	NO_2 Annual Mean Concentration (µg/m^3) [3] [4]
							2019 (µg/m^3)
Steyning 4N	Church St Steyning	Kerbside	N	N	100.0	100.0	20.1
Storrington Sites							
Storrington 1	Manleys Hill, Storr duplicate	Roadside	Y	N	100.0	100.0	38.9
Storrington 3	3 School Hill, Storrington	Roadside	N	N	100.0	100.0	28.3
Storrington 4	22 High Street, Storrington	Roadside	Y	N	100.0	100.0	29.7
Storrington 5	2 West Street, Storrington	Roadside	N	N	100.0	100.0	23.3
Storrington 6	1-4 Holly Court, Pulborough Rd Storrington	Roadside	N	N	100.0	100.0	18.8
Storrington 7	The Willows, Amberley Rd, Storrington	Roadside	N	N	100.0	100.0	18.4
Storrington 8,9,10 AURN	Manleys Hill AURN co-located	Roadside	N	Triplicate & co-located	100.0	100.0	22.9
Storrington 11n	53 West Street, Storrington	Roadside	Y	N	100.0	100.0	29.8
Storrington 12n	3 Rectory Cottage Storrington	Roadside	Y	N	100.0	100.0	26.0
Storrington 13n	18 West Street, Storrington	Roadside	Y	N	100.0	100.0	25.6
Storrington 14n	Cobden, Washington Rd	Roadside	N	N	100.0	100.0	18.4
Storrington 15n	Fryern Road, Storrington	Roadside	N	N	100.0	100.0	16.9
Storrington 16n	Mill Parade, Waitrose car park, Storrington	Roadside	N	N	91.7	91.7	21.6

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3) (4)
							2019 ($\mu g/m^3$)
Storrington 17n	33 Church Street, Storrington	Urban Background	N	N	100.0	100.0	11.2
Storrington 18n	20 Amberley Road, Storrington	Roadside	N	N	100.0	100.0	16.0
Storrington 19n	jct of A283 Manley's Hill and School Hill	Roadside	Y	N	100.0	100.0	**47.7**

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

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

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

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

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

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

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

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

Table A9 – Results of Nitrogen Dioxide Diffusion Tubes (2010 to 2019)

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) µg/m^3											
			2008 (NBF = 0.93)	2009 (NBF = 0.81)	2010 (LBF = 0.81)	2011 (LBF=0.78 & 0.8)	2012 (NBF=0.79 & LBF=0.89, 0.77 & 0.82)	2013 (NBF=0.8 & LBF=0.92, 0.82 & 0.71)	2014 (NBF = 0.81)	2015 (LBF = 0.81)	2016 (LBF = 0.78)	2017 (LBF = 0.78)	2018 (LBF = 0.81)	2019 (LBF = 0.74)
Billingshurst Sites														
Billingshurst 1	R	N	-	-	-	-	-	30.8	28.8	30.0	30.1	30.6	27.0	26.2
Cowfold Sites														
Cowfold 1,2 (duplicate)	R	N	**46.3**	**45.4**	**43.4**	**40.5** (39.5)	39.2 **(40.6)**	37.5 (33.3)	37.8	36.0	39.6	37.6	35.4	31.6
Cowfold 3	R	N	**41.2**	39.1	36.4	35.2 (34.4)	32.5(33.7)	33.8 (30.0)	31.6	31.8	34.6	33.1	31.8	30.7
Cowfold 4	R	N	34.7	35.4	33.3	29.4 (28.7)	29.5(30.6)	28.7 (25.5)	29.7	24.6	30.9	29.5	31.4	26.8
Cowfold 5n	R	Y	-	-	30.5*	27.4 (26.8)	28.7(29.8)	25.7 (22.8)	23.9	29.9	26.7	29.7	24.9	22.5
Cowfold 6n	R	N	-	-	32.4*	27.4 (26.7)	28.9(30.0)	26.0 (23.1)	26.6	24.6	26.9	26.4	25.1	23.5
Cowfold 7n	R	Y	-	-	**47.8***	**45.9** (44.8)	**43.8(45.4)**	**41.0** (36.4)	**40.7**	**42.9**	**46.5**	**43.8**	**42.4**	36.1
Cowfold 8n	UB	Y	-	-	-	16.0 (15.6)	15.0(15.5)	14.3 (12.7)	11.8	12.4	14.4	13.9	13.5	11.6
Cowfold AU A,B,C (triplicate)	R	Y	-	-	-	26.7 (26.1)	28.2 (29.3)	27.0 (25.0)	27.2	25.4	27.5	27.0	26.6	23.6
Henfield Sites														
Henfield 2n	R	N	-	-	-	-	-	-	-	-	-	26.3[a]	25.2	22.2
Horsham Sites														
Horsham 1N	R	N	38.2	37.1	36.0	33.7 (32.0)	33.2 (37.4)	25.6 (29.5)	32.3	32.4	32.1	31.6	31.2	26.4
Horsham 3N	UB	N	16.2	14.0	15.5	12.8 (12.2)	12.4(14.0)	13.6 (15.7)	11.6	10.3	13.0	11.4	12.2	12.5
Horsham 4N	UB	N	15.2	13.2	15.3	12.9 (12.3)	12.4(14.0)	12.9 (14.8)	9.4	11.0	12.9	11.0	11.6	10.2
Horsham 5N	R	N	36.9	32.1	33.2	27.8 (26.5)	27.4 (30.8)	28.0 (32.2)	23.8	30.4[a]	31.4	27.8	28.5	25.2
Horsham 6N	R	N	30.9	27.7	28.8	25.0 (23.7)	26.6 (30.0)	23.8 (27.4)	21.8	21.2	25.7	23.8	23.2	21.5
Horsham 7N	R	N	32.2	28.9	29.3	26.6 (25.3)	26.0 (29.3)	26.3 (30.2)	26.8	26.6	28.9	27.2	27.4	23.0
Horsham 8N	R	N	30.0	29.5	29.5	23.8 (22.6)	22.5 (25.3)	23.8 (27.3)	22.5	21.1	25.2	23.6	24.8	21.9

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) µg/m^3											
			2008 (NBF = 0.93)	2009 (NBF = 0.81)	2010 (LBF = 0.81)	2011 (LBF=0.78 & 0.8)	2012 (NBF=0.79 & LBF=0.89, 0.77 & 0.82)	2013 (NBF=0.8 & LBF=0.92, 0.82 & 0.71)	2014 (NBF = 0.81)	2015 (LBF = 0.81)	2016 (LBF = 0.78)	2017 (LBF = 0.78)	2018 (LBF = 0.81)	2019 (LBF = 0.74)
Park Way (triplicate)	R	N	30.8	28.7	30.3	26.0 (24.7)	25.0 (28.2)	25.9 (29.8)	24.0	23.5	25.3	24.4	24.3	22.1
N. Horsham 1N	R	N	29.6	27.9	23.7	24.2 (23.0)	25.8 (29.1)	21.9 (25.2)	23.0	22.9	23.1	24.6	21.8	19.3
N. Horsham 2N	R	N	24.2	22.1	19.4	18.8 (17.9)	19.9 (22.5)	19.2 (22.0)	18.9	17.4	20.5	19.4	18.3	17.3
Horsham 9N	R	N	-	-	-	-	-	-	-	-	-	31.0	31.3	26.5
Horsham 11N			-	-	-	-	-	-	-	-	-	-	-	26.6
Pulborough Sites														
Pulborough 1	K	N	37.2	**39.2**	**40.2**	33.1 (31.5)	31.7	**40.5** (41.5) 32.5[b]	31.1	31.3	35.4	32.9	34.2	28.3
Pulborough 2	R	N	**52.1***	26.3	28.0	22.3 (21.2)	24.7	39.1 (31.3)[a]	21.5	20.1	23.5	21.1	20.7	17.9
Southwater Sites														
Southwater 1	R	N	-	-	-	-	-	-	-	-	-	24.5[a]	27.3	23.5
Steyning Sites														
Steyning 4N	K	N	27.4	26.2	26.8	28.4 (27.1)	22.3	24.4	20.1	29.2	22.7	20.0	21.3	20.1
Storrington Sites														
Storrington 1	R	N	**49.8**	**50.7**	**50.2**	**45.1 (42.9)**	**42.7 (41.6)**	**41.0 (42.0)**	37.3	39.2	**42.1**	**40.7**	**44.7**	38.9
Storrington 3	R	N	**39.7**	38.0	37.5	33.4 (31.8)	35.1 (34.2)	31.9 (32.7)	28.8	27.7	30.4	31.6	32.9	28.3
Storrington 4	R	N	39.8	**43.4**	**42.0**	**42.0** (40.0)	**40.9** (39.9)	38.2 (39.2)	35.1	36.1	37.5	37.5	35.8	29.7
Storrington 5	R	N	32.2	27.9	32.4	25.8 (24.6)	26.9(26.2)	27.0 (27.6)	23.3	23.5	26.9	27.4	26.4	23.3
Storrington 6	R	N	27.6	28.1	27.4	21.0 (19.9)	23.9(23.3)	24.5 (25.2)	24.2	21.7	23.7	24.3	22.3	18.8
Storrington 7	R	N	27.1	25.2	21.6	24.6 (23.4)	22.4(21.8)	23.1 (23.7)	18.7	20.5	23.4	21.5	20.9	18.4
Storrington 8,9,10 AURN (triplicate)	R	N	-	29.2*	27.4	24.5 (23.3)	25.6 (25.0)	25.8 (24.2)	22.4	24.1	26.5	25.5	26.6	22.9
Storrington 11n	R	Y	-	-	35.8*	39.3 (37.4)	38.4(37.4)	39.0 **(40.0)**	36.2	37.8	38.3	37.5	37.8	29.8
Storrington 12n	R	Y	-	-	31.6*	32.8 (31.2)	31.2(30.4)	30.5 (31.3)	28.0	25.8	29.3	29.0	28.6	26.0
Storrington 13n	R	Y	-	-	35.3*	30.5 (29.0)	32.1(31.3)	33.7 (34.5)	28.2	27.5	31.7	31.1	29.9	25.6
Storrington 14n	R	N	-	-	-	**45.8 (43.6)**	22.6[b]	22.9[b]	22.2[b]	23.2[b]	22.8[b]	21.6[b]	19.7[b]	18.4[b]

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) µg/m^3											
			2008 (NBF = 0.93)	2009 (NBF = 0.81)	2010 (LBF = 0.81)	2011 (LBF=0.78 & 0.8)	2012 (NBF=0.79 & LBF=0.89, 0.77 & 0.82)	2013 (NBF=0.8 & LBF=0.92, 0.82 & 0.71)	2014 (NBF = 0.81)	2015 (LBF = 0.81)	2016 (LBF = 0.78)	2017 (LBF = 0.78)	2018 (LBF = 0.81)	2019 (LBF = 0.74)
Storrington 15n	R	N	-	-	-	20.5 (19.5)	19.1(18.6)	20.8 (21.3)	19.7	18.3	20.3	20.3	18.9	16.9
Storrington 16n	R	N	-	-	-	25.5 (24.3)	24.0(23.4)	25.6 (26.3)	26.3	23.1	24.2	23.5	24.0	21.6
Storrington 17n	UB	N	-	-	-	15.4 (14.6)	16.1(15.7)	15.8 (16.2)	12.9	11.8	14.8	12.9	13.3	11.2
Storrington 18n	R	N	-	-	-	21.4 (20.4)	19.7(19.2)	21.0 (21.5)	17.2	16.4	21.9	20.4	19.1	16.0
Storrington 19n	R	N	-	-	-	-	-	-	-	-	**59.8**[a]	**56.4**	**50.6**	**47.7**

[a] Annual mean concentration "annualised" as per Box 7.10 of TG(16) as data capture less than 75%. Appendix C gives details of 'annualisation' for 2019.

[b] Tubes adjusted using the Defra's 'Distance from Roads Calculator' to calculate exposure at the facade of the nearest residential property.

* Denotes diffusion tubes that have not been in position for a sufficient period to give a reliable annual mean.

K – Kerbside; R-Roadside; UB – Urban background

In **red bold**, exceedance of the NO_2 annual mean objective of 40µg/m^3.

In red, concentrations equal or above 36µg/m^3 (within 10% of the NO_2 annual mean objective of 40µg/m^3).

Figure A4 – Trends in Annual Mean NO_2 Concentrations measured at Diffusion Tube Monitoring Sites 2008 – 2019: Horsham

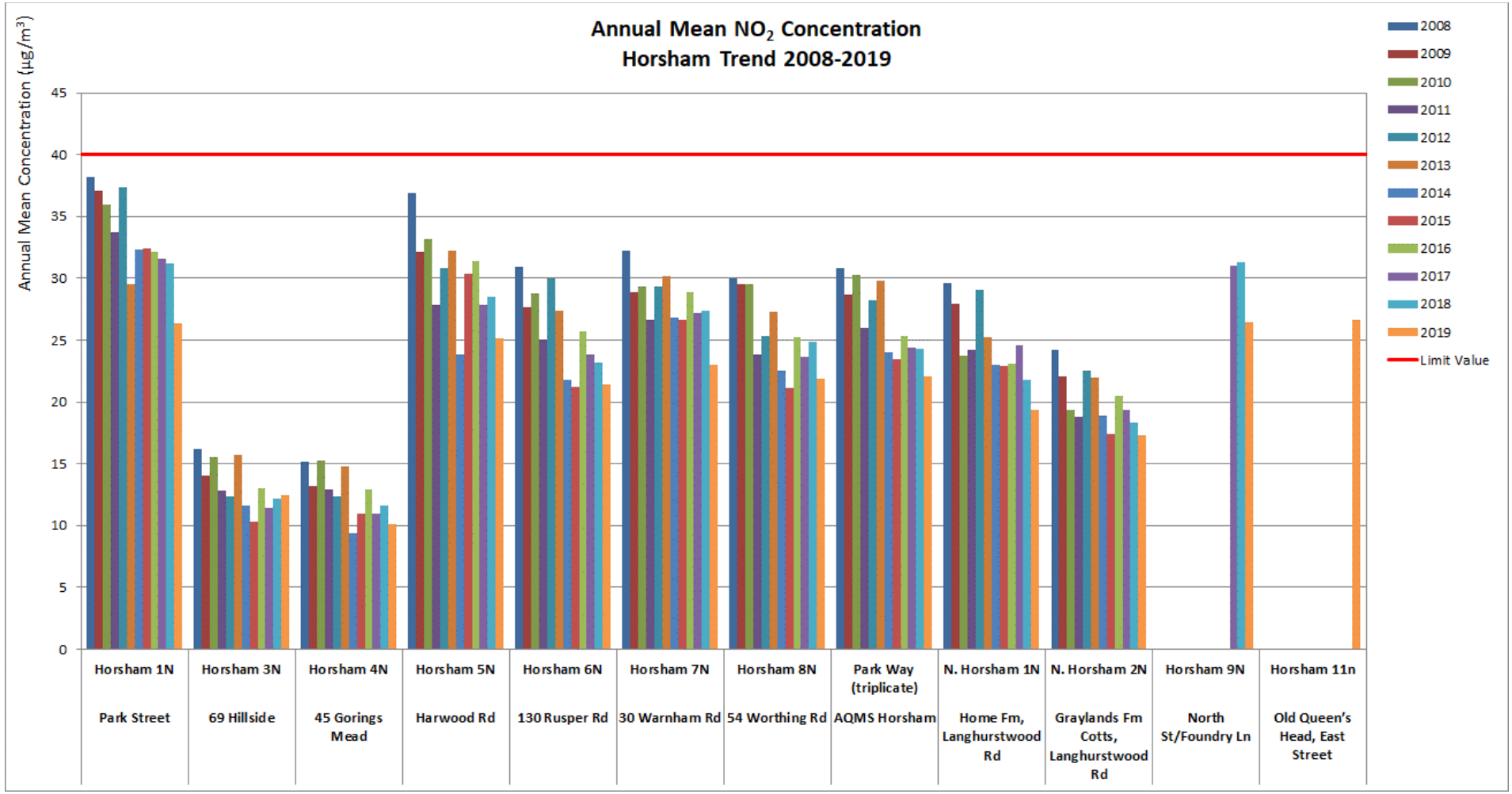


Figure A5 – Trends in Annual Mean NO_2 Concentrations measured at Diffusion Tube Monitoring Sites 2008 – 2019: Storrington

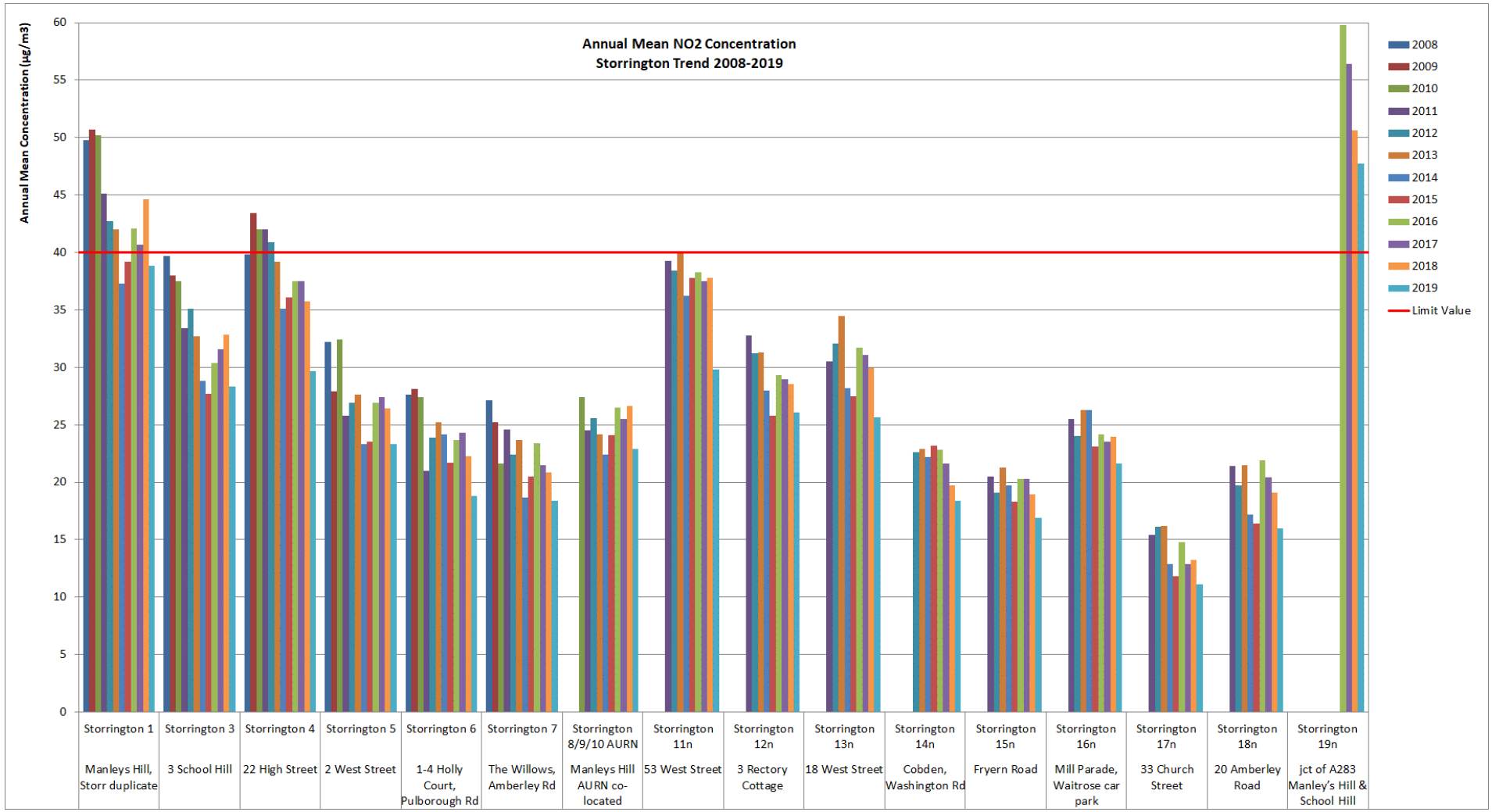


Figure A6 – Trends in Annual Mean NO_2 Concentrations measured at Diffusion Tube Monitoring Sites 2008 – 2019: Cowfold

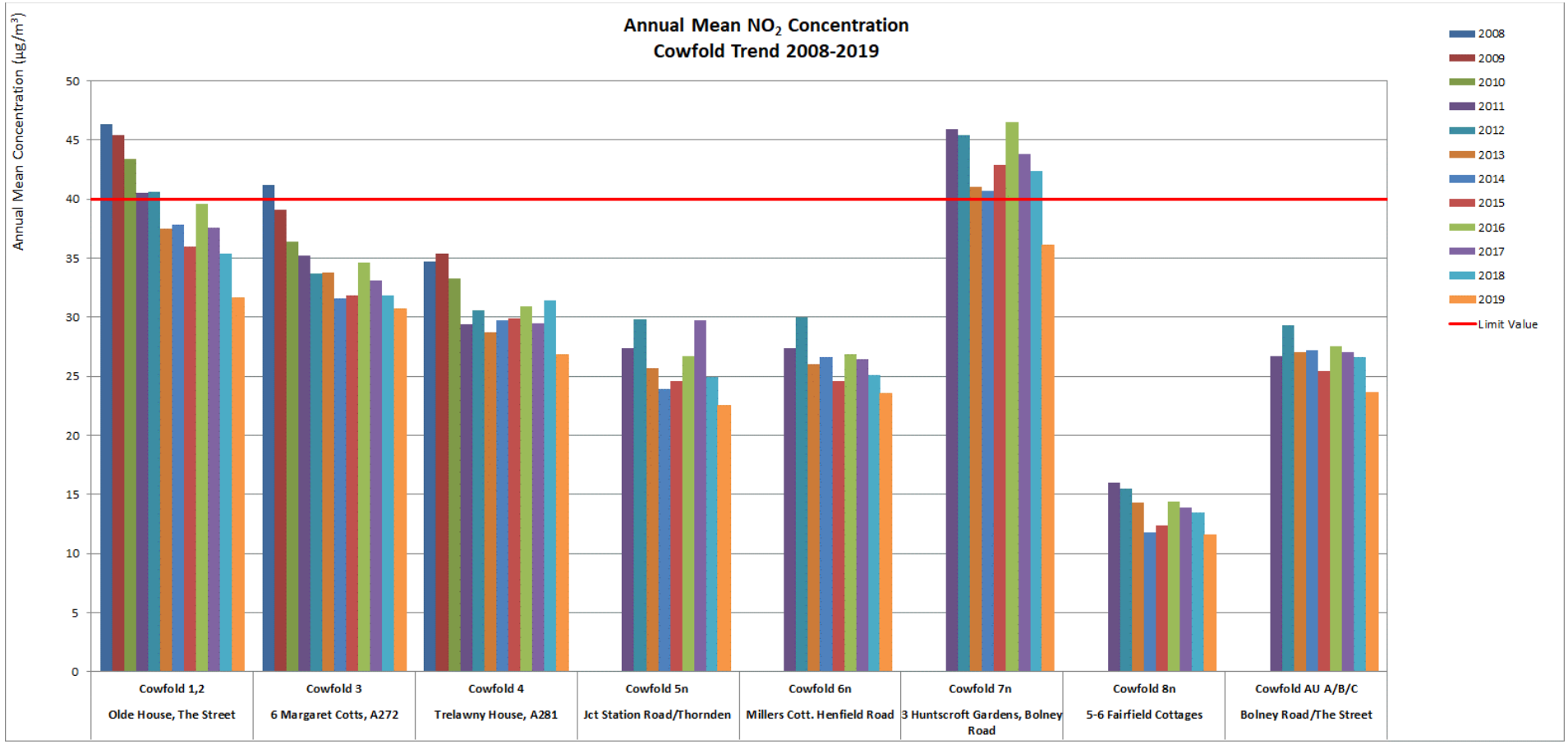
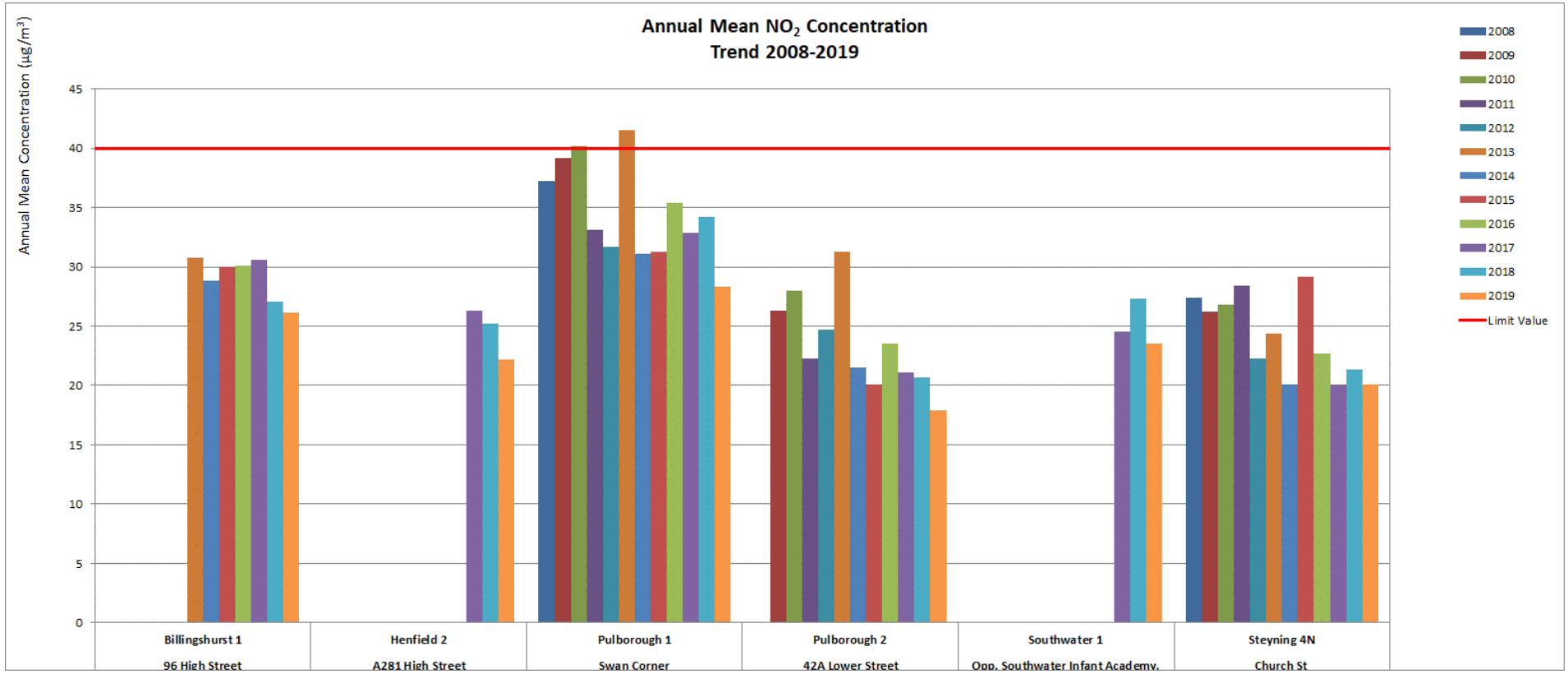


Figure A7 – Trends in Annual Mean NO_2 Concentrations measured at Diffusion Tube Monitoring Sites 2008 – 2019: Billingshurst; Henfield; Pulborough, Southwater & Steyning



Appendix B: Full Monitoring Results for 2019

Table B1 – Full Monthly Diffusion Tube Results for 2019

Lab Ref.	Site Name	X OS Grid Ref	Y OS Grid Ref	NO_2 Monthly Mean Concentrations µg/m^3												NO_2 Annual Mean Concentrations µg/m^3			
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Data capture Count	Raw data average	Bias Adjusted (factor) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
1	Horsham 1N	517489	130580	44.4	39.9	38.0	38.2	29.2	31.6	29.8	28.5	29.2	31.1	46.4	41.6	12.0	35.7	26.4	23.3
2	Henfield 2n	521492	115907	39.1	34.8	29.6	30.7	26.8	27.1	25.7	23.1	24.8	24.7	33.1	40.6	12.0	30.0	22.2	22.2
3	Horsham 3N	516000	130600	25.6	16.2	17.5	17.8	18.4	15.6	9.1	9.0	13.4	14.7	30.2	14.8	12.0	16.9	12.5	12.5
4	Horsham 4N	517600	130100	20.5	14.5	13.6	16.8	10.9	11.7	9.6	7.8	11.3	13.3	22.4	12.5	12.0	13.7	10.2	10.2
5	Park Way	517489	130580	34.5	33.6	30.3	31.8	28.1	28.0	28.0	26.3	26.7	24.8	34.2	34.3	12.0	30.1	22.2	18.7
6	Park Way	517489	130580	36.2	26.5	32.5	30.8	31.5	26.7	26.6	26.3	26.9	26.7	33.7	29.4	12.0	29.5	21.8	18.7
7	Park Way	517489	130580	31.8	32.4	31.9	31.8	28.7	27.4	28.1	27.2	25.8	25.8	34.9	35.2	12.0	30.1	22.3	18.7
8	Horsham 5N	518230	131140	37.3	33.3	36.4	44.8	31.9	31.1	26.2	23.1	30.8	36.9	45.4	31.0	12.0	34.0	25.2	19.8
9	Horsham 6N	518650	132490	34.2	33.5	28.8	29.9	24.7	25.1	22.5	24.2	26.4	29.4	36.1	33.1	12.0	29.0	21.5	16.9
10	Horsham 7N	516952	132215	40.9	26.2	33.0	31.7	27.5	28.3	23.4	24.3	26.4	33.7	43.1	34.0	12.0	31.0	23.0	17.9
11	Horsham 8N	516650	130220	40.7	30.2	30.3	29.6	26.5	31.0	24.3	23.1	27.5		33.3	29.1	11.0	29.6	21.9	17.9
12	Cowfold 1	521324	122610	45.9	42.8	39.8	44.4	40.1	40.5	42.2	40.6	40.2	41.1	47.4	45.5	12.0	42.5	31.5	27.3
13	Storrington 1	508960	114270	55.8	44.7	50.9	58.8	50.5	57.4	52.7	47.0	46.4	49.5	66.1	50.4	12.0	52.5	38.9	31.8
14	Horsham 11n	517672	130322	42.6	37.6	37.1	35.1	34.9	30.7	29.7	31.0	31.8	36.8	42.0	41.8	12.0	35.9	26.6	25.5
15	Storrington 3	508935	114297	42.5	38.3	40.8	41.9	35.6	37.9	34.2	33.6	34.9	33.9	49.0	36.6	12.0	38.3	28.3	28.3
16	Storrington 4	508832	114272	37.5	45.2	41.2	38.9	40.6	41.6	41.8	38.2	37.5	39.2	40.9	38.7	12.0	40.1	29.7	25.7
17	Storrington 5	508742	114288	35.5	30.1	34.3	36.4	29.9	33.8	28.7	24.2	31.0	29.1	39.1	25.8	12.0	31.5	23.3	21.1
18	Storrington 6	508396	114449	29.3	30.7	27.9	28.4	23.5	22.2	24.7	23.4	22.9	22.5	28.4	20.6	12.0	25.4	18.8	15.4
19	Storrington 7	508338	114374	26.0	27.5	24.7	26.0	23.5	24.7	22.3	20.6	26.7	24.9	31.2	20.2	12.0	24.9	18.4	15.2
20	Cowfold 2	521324	122610	51.9	54.5	39.4	41.6	43.1	41.5	42.4	41.8	41.5	37.4	34.1	46.4	12.0	43.0	31.8	27.3
21	Cowfold 3	521267	122677	45.3	42.2	41.5	44.5	39.4	41.6	38.3	35.4	38.0	36.9	48.6	46.0	12.0	41.5	30.7	22.2
22	Cowfold 4	521311	122704	30.9	47.0	42.3	37.5	33.0	32.7	33.7	32.1	28.6	31.0	37.8	47.4	12.0	36.2	26.8	17.8
23	N. Horsham 1N	517702	133570	37.3	24.3	24.9	23.0	19.0	18.3	19.0	24.7	25.9	26.7	34.9	35.3	12.0	26.1	19.3	17.0
24	N. Horsham 2N	517476	134013	36.4	24.5	24.2	24.7	19.2	18.9	18.4	19.7	19.8	22.8	29.3	23.0	12.0	23.4	17.3	15.2
25	Steyning 4N	517732	111198	31.8	32.3	27.3	27.7	25.6	28.5	21.8	19.9	23.7	24.5	38.2	24.6	12.0	27.2	20.1	18.0
26	Pulborough 1	504584	118568	34.6	36.0	37.6	49.6	40.6	42.7	36.1	32.1	39.2	39.7	42.0	28.4	12.0	38.2	28.3	22.7
27	Pulborough 2	505185	118623	28.8	23.7	26.3	29.5	20.9	21.9	16.8	16.7	22.5	24.5	35.0		11.0	24.2	17.9	16.2
28	Billingshurst 1	508623	125834	41.8	43.5	36.2	34.7	30.7	31.8	30.7	30.6	34.2	34.8	38.1	37.0	12.0	35.3	26.2	24.3
29	Storrington 8 AURN	509083	114198	33.8	30.6	31.6	38.7	29.4	34.4	29.4	27.0	30.0	28.3	36.0	20.6	12.0	30.8	22.8	18.4
30	Storrington 9	509083	114198	31.9	32.5	30.6	36.5	29.6	34.2	30.6	26.3	31.0	26.6	34.9	23.9	12.0	30.7	22.7	18.4

	AURN																	
31	**Storrington 10n AURN**	509083	114198	35.3	30.8	31.7	40.0	33.3	35.4	31.3	24.1	30.3	28.8	26.5	26.8	12.0	31.2	23.1	18.4
32	**Storrington 13n**	508675	114306	36.6	39.2	37.5	43.8	33.9	38.5	31.0	26.5	34.1	33.3	34.4	27.0	12.0	34.7	25.6	25.0
33	**Storrington 12n**	508598	114323	42.3	42.9	35.7	45.9	30.0	33.3	26.9	25.1	30.5	32.2	46.4	31.2	12.0	35.2	26.0	20.5
34	**Storrington 11n**	508511	114365	42.1	42.9	44.6	43.1	41.8	42.7	38.5	35.6	36.5	39.7	40.3	35.6	12.0	40.3	29.8	28.3
35	**Cowfold 5**	521070	122706	32.7	30.2	30.8	26.8	28.4	28.5	30.2	28.6	30.8	27.8	26.4	43.0	12.0	30.4	22.5	17.5
36	**Cowfold 6n**	521309	122248	40.8	27.8	30.0	31.9	30.2	29.0	28.3	27.5	30.2	31.5	34.9	38.2	12.0	31.7	23.5	20.5
37	**Cowfold 7n**	521460	122473	43.0	46.6	41.8	51.3	54.0	48.3	48.8	42.4	43.5	49.3	57.3	59.7	12.0	48.8	36.1	30.6
38	**Storrington 14n**	509319	114160	46.8	49.2	45.7	50.6	46.9	45.9	41.6	42.1	41.2	38.1	54.7	38.1	12.0	45.1	33.4	18.4
39	**Storrington 16n**	508905	114325	30.1	31.5	28.9	33.2	30.7	26.8	6.5	25.7	26.0	27.0	35.6	26.3	11.0	29.3	21.6	21.6
40	**Storrington 15n**	509103	114532	25.2	28.1	21.8	20.7	20.3	20.1	18.7	19.6	20.4	24.0	29.9	25.1	12.0	22.8	16.9	13.3
41	**Storrington 17n**	508677	114149	18.2	19.7	14.4	18.8	13.1	13.1	12.0	9.7	12.8	15.5	20.9	12.7	12.0	15.1	11.2	11.2
42	**Storrington 18n**	508215	114348	28.0	25.1	23.5	27.8	16.2	23.2	17.9	17.3	21.7	22.7	18.3	17.6	12.0	21.6	16.0	14.1
43	**Cowfold 8n**	521411	122667	23.5			16.3	11.4	13.0	11.5	12.2	13.4		18.1	21.4	9.0	15.6	11.6	11.6
44	**Cowfold AU A**	521356	122552	34.3	32.4	27.2	30.6	27.2	29.9	29.0	29.3	28.9	30.1	39.2	38.9	12.0	31.4	23.2	17.5
45	**Cowfold AU B**	521356	122552	36.4	36.2	28.4	28.6	27.8	29.1	30.1	29.8	28.7	31.8	36.5	38.5	12.0	31.8	23.6	17.5
46	**Cowfold AU C**	521356	122552	33.6	40.2	28.7	31.4	29.6	28.7	29.5	28.4	28.7	32.4	36.0	40.5	12.0	32.3	23.9	17.5
47	**Storrington 19n**	508945	114268	64.7	65.1	60.5	65.5	62.1	63.7	71.9	69.2	60.5	58.7	79.1	52.9	12.0	64.5	**47.7**	**47.7**
48	**Horsham 9N**	518074	131164	40.5	39.0	41.1		35.7	33.4	31.1	30.4	32.8	36.5	37.7	35.5	11.0	35.8	26.5	25.0
49	**Southwater 1**	515639	126599	27.5	37.7	34.1	33.1	30.9	29.9	28.1	26.5	29.6	33.3	35.9	34.7	12.0	31.8	23.5	21.9

Value = Value removed from the dataset prior to processing. Storrington 16 – grid fallen out of tube.

Value = Hanging baskets. Results should be treated with caution

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☒ **Local bias adjustment factor used**

☐ **National bias adjustment factor used**

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

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

Notes:

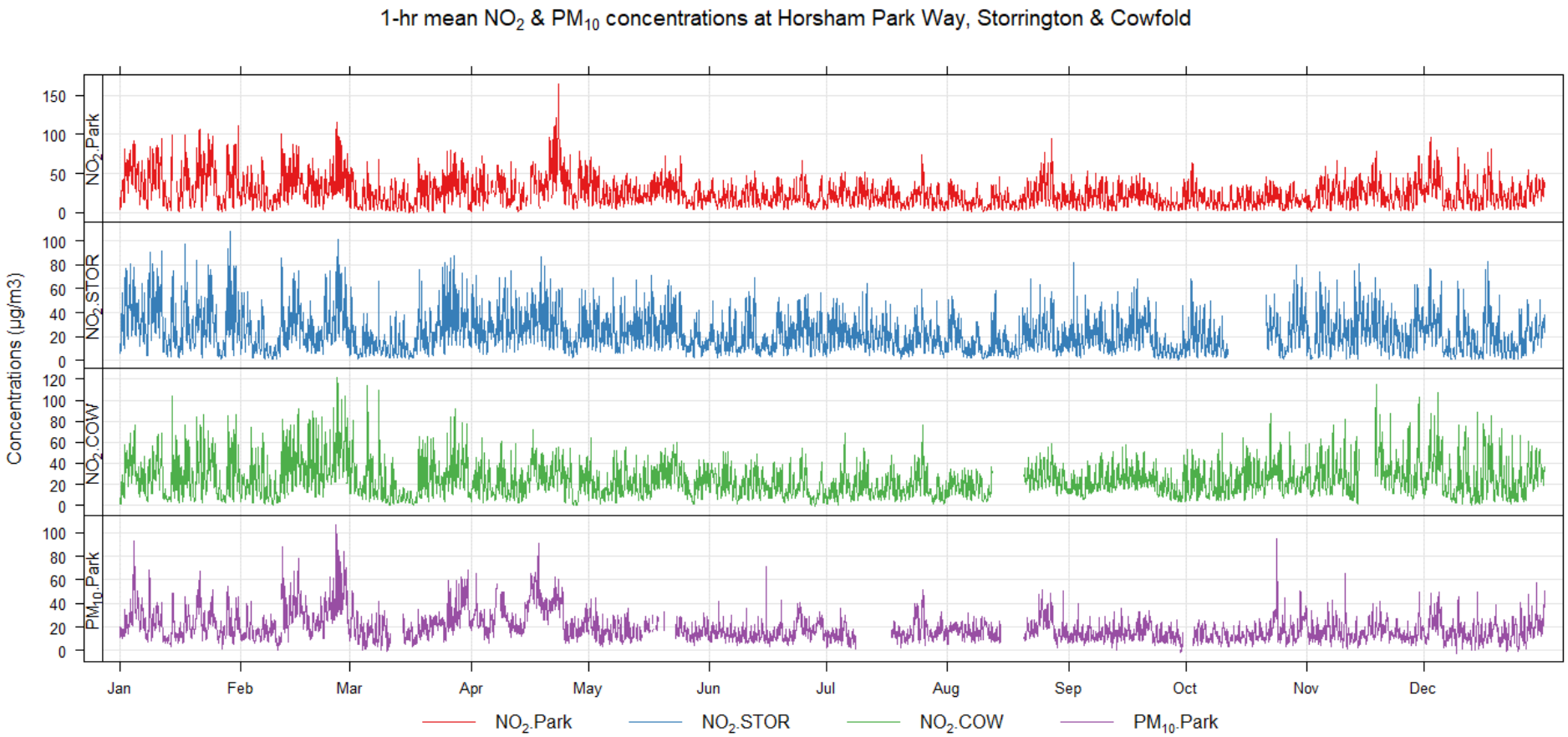
Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

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

(2) Distance corrected to nearest relevant public exposure

Figure B1 – Continuous Monitoring Results: 1-hr mean NO_2 & PM_{10} Concentrations at HO2 Horsham Park Way, HO4 Storrington AURN & HO5 Cowfold in 2019

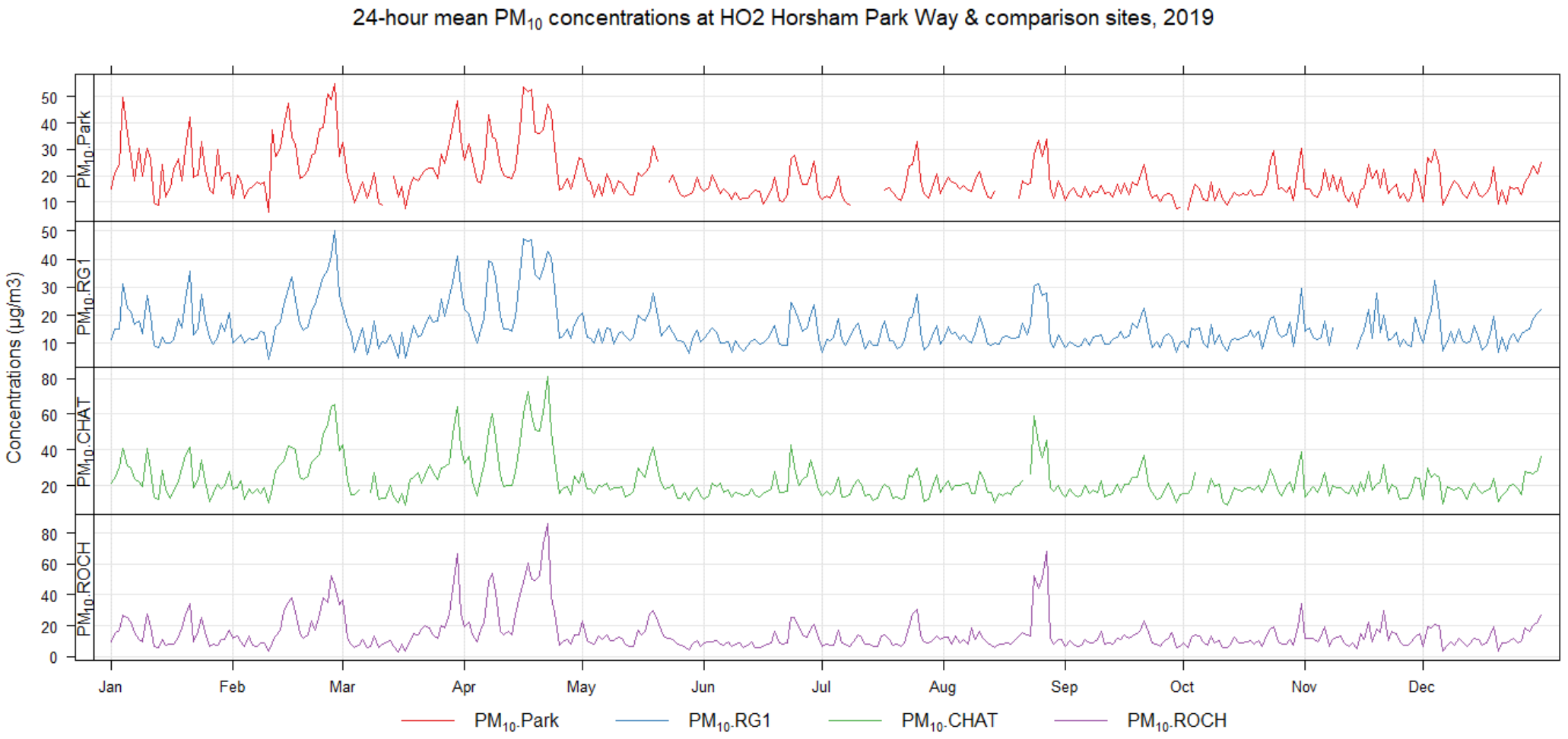


NO2.Park		PM10.Park		NO2.STOR		NO2.COW	
Min.	: -0.191	Min.	: -2.20	Min.	: 0.7215	Min.	: -0.955
1st Qu.	: 11.842	1st Qu.	: 11.50	1st Qu.	: 10.5098	1st Qu.	: 11.651
Median	: 20.819	Median	: 16.30	Median	: 18.7517	Median	: 20.437
Mean	: 24.376	Mean	: 19.24	Mean	: 21.9918	Mean	: 23.553
3rd Qu.	: 32.661	3rd Qu.	: 23.60	3rd Qu.	: 30.0609	3rd Qu.	: 31.706
Max.	:164.451	Max.	:107.00	Max.	:108.3700	Max.	:121.476
NA's	:135	NA's	:727	NA's	:307	NA's	:324

Min = minimum; Max = maximum, mean, 1st Qu. = First quantile; 3rd Qu. = Third quantile; NA's = missing data

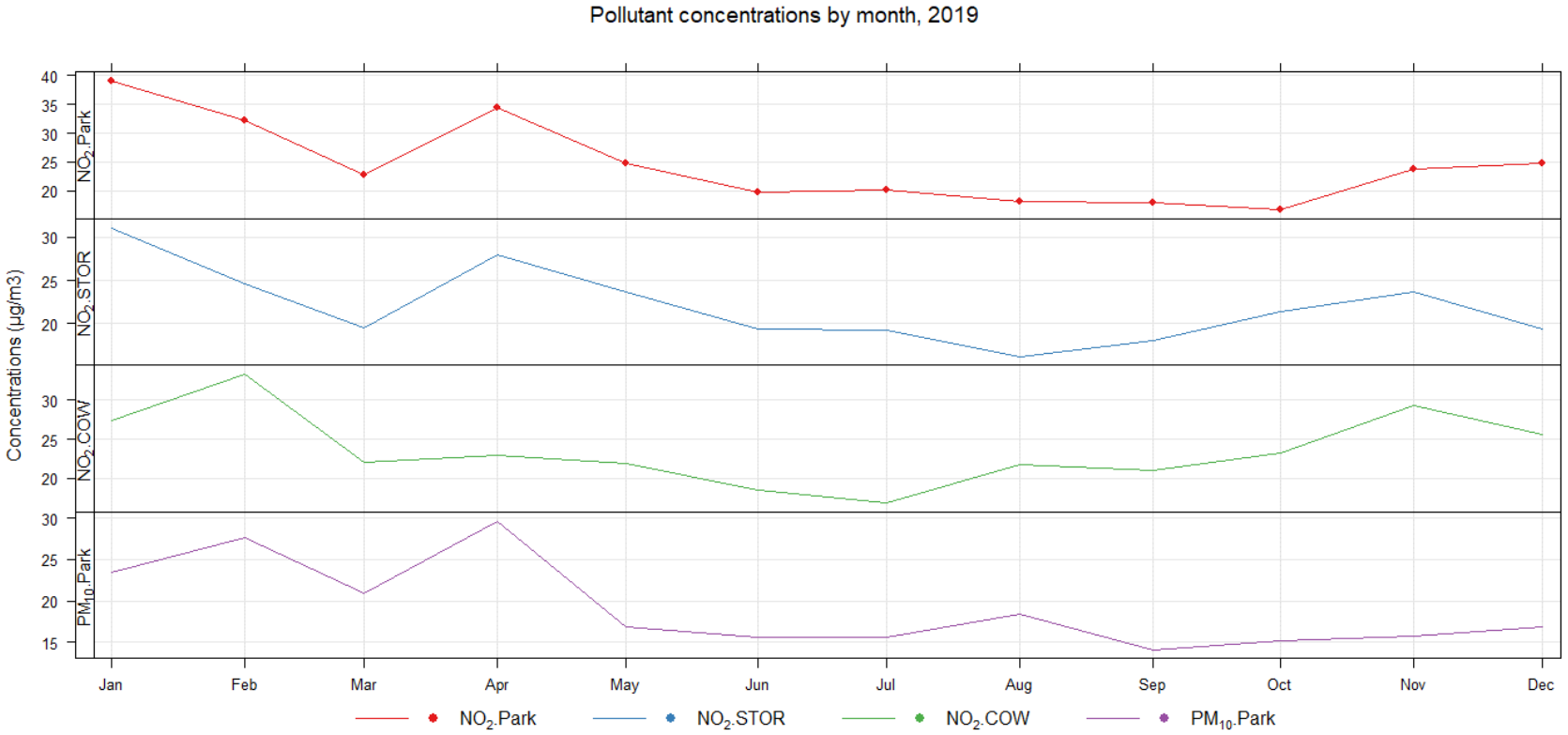
Data plotted using openair.

Figure B2 – Continuous Monitoring Results: 24-hr mean PM_{10} Concentrations, HO2 Horsham Park Way & Comparison Sites, 2019



Data plotted using openair.

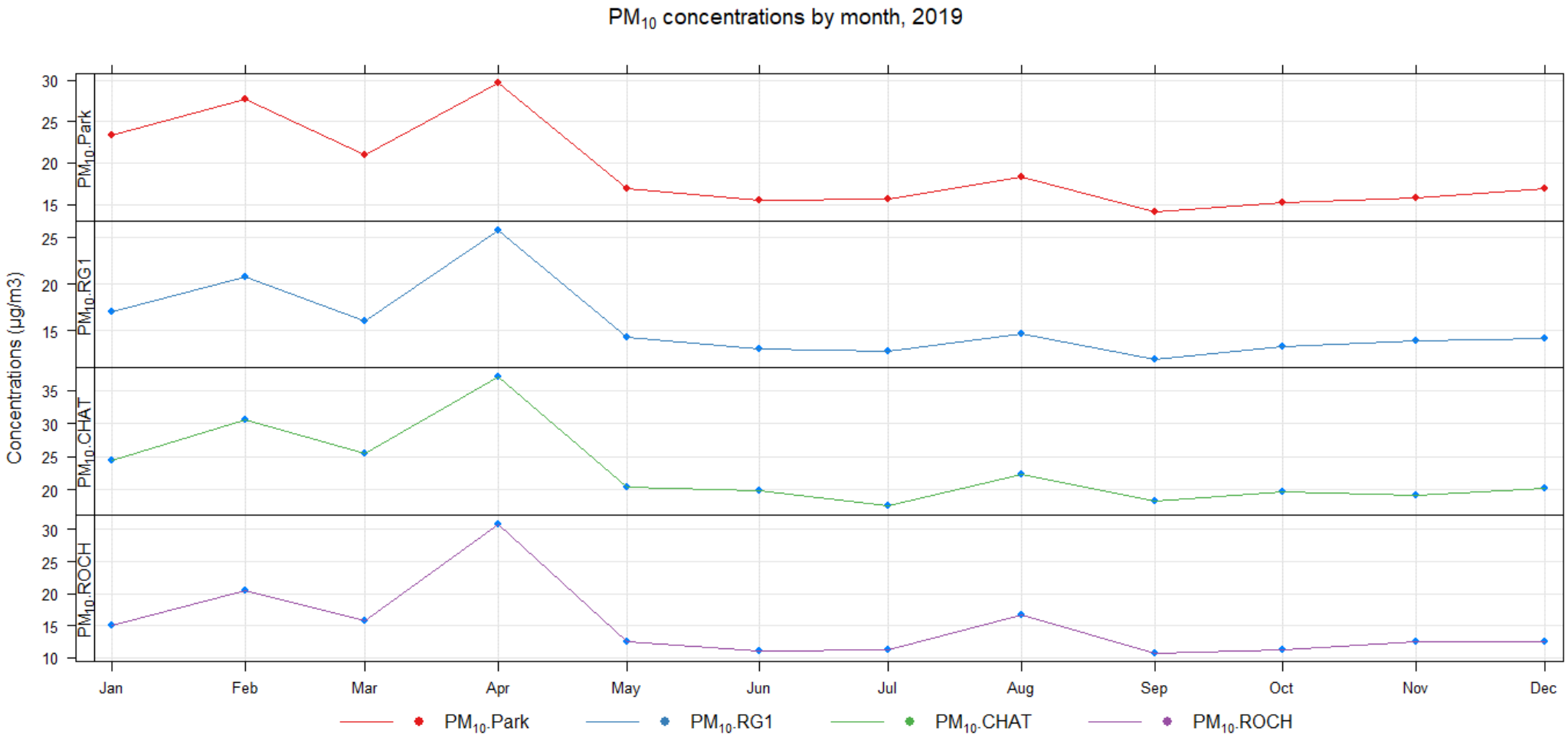
Figure B3 – Continuous Monitoring Results: Monthly Concentrations for NO_2 and PM_{10} at HO2 Horsham Park Way, HO4 Storrington AURN & HO5 Cowfold in 2019



	date	NO2.Park	PM10.Park	NO2.STOR	NO2.COW
1	2019-01	39.0	23.4	31.1	27.3
2	2019-02	32.3	27.7	24.6	33.3
3	2019-03	22.8	21.0	19.5	22.0
4	2019-04	34.3	29.7	28.0	23.0
5	2019-05	24.8	16.9	23.6	21.9
6	2019-06	19.8	15.5	19.3	18.5
7	2019-07	20.2	15.6	19.2	16.8
8	2019-08	18.3	18.3	16.2	21.7
9	2019-09	17.9	14.1	18.0	21.0
10	2019-10	16.8	15.2	21.3	23.2
11	2019-11	23.9	15.7	23.7	29.3
12	2019-12	24.9	16.9	19.4	25.7

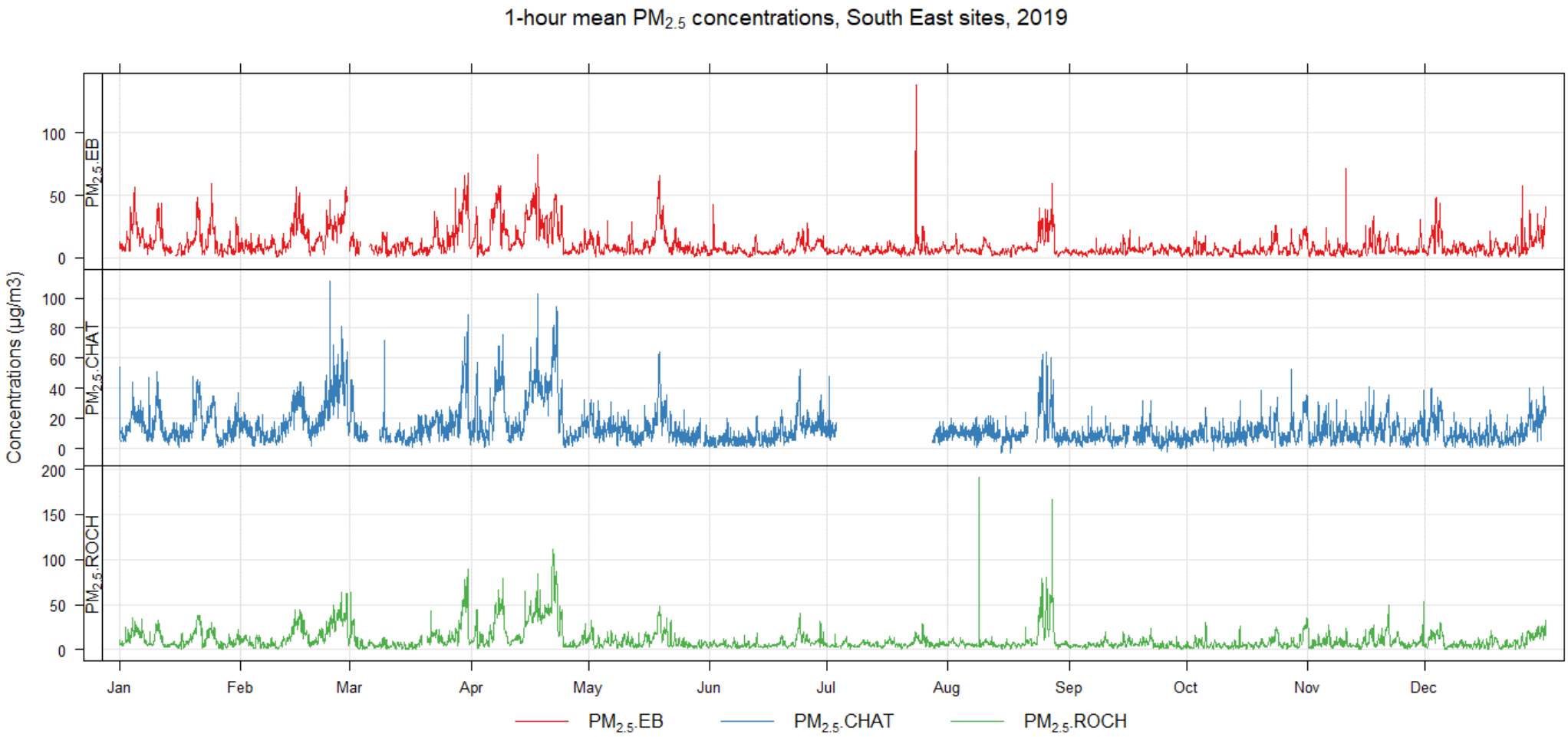
Data plotted using openair.

Figure B4 – Continuous Monitoring Results: Monthly Concentrations for PM_{10} at HO2 Horsham Park Way & Comparison Sites, 2019



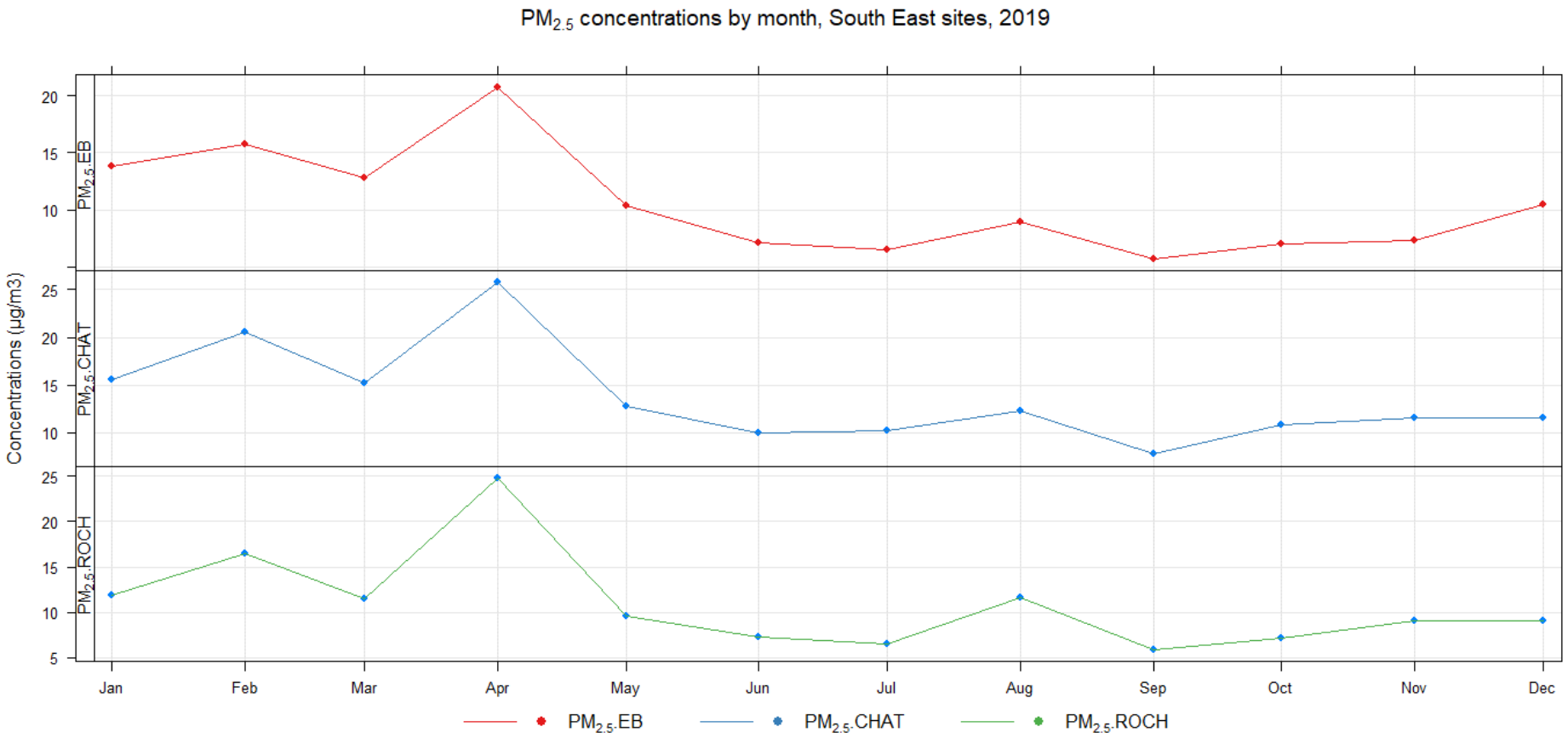
Data plotted using openair

Figure B5 – Continuous Monitoring Results: 1-hr mean $PM_{2.5}$ Concentrations: Comparison Sites, 2019



Data plotted using openair

Figure B6 – Continuous Monitoring Results: Monthly Concentrations for PM2.5: Comparison Sites, 2019



Data plotted using openair

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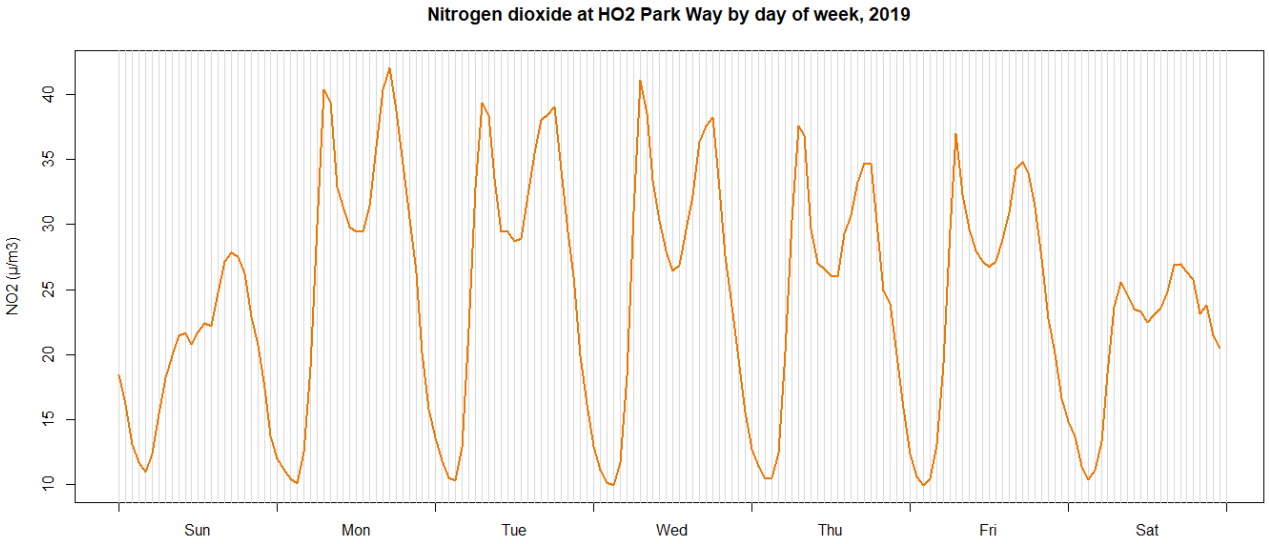
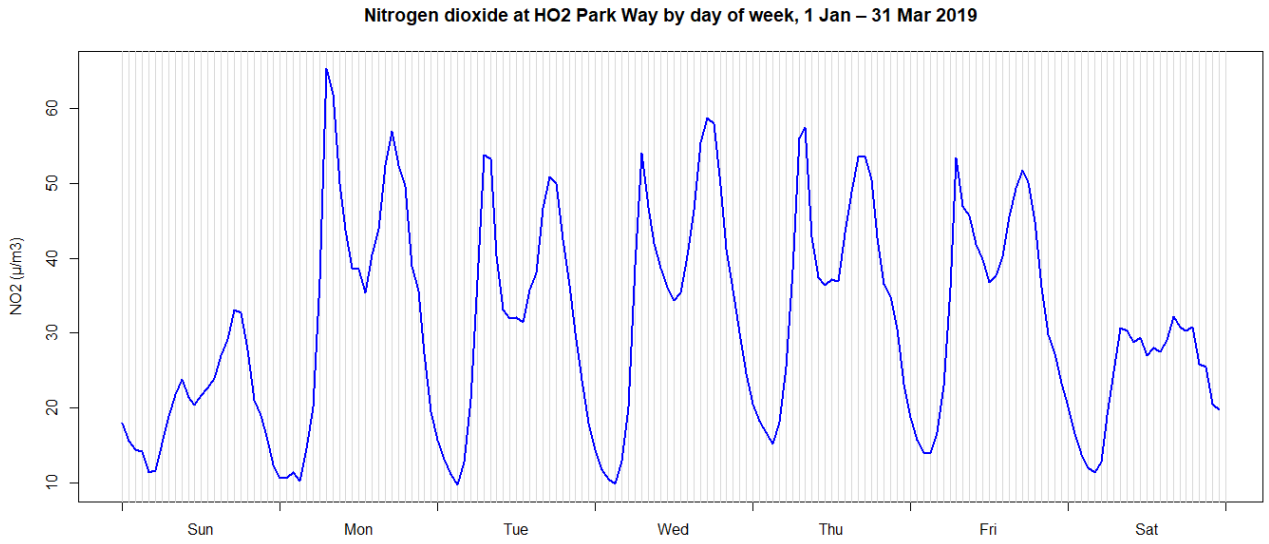
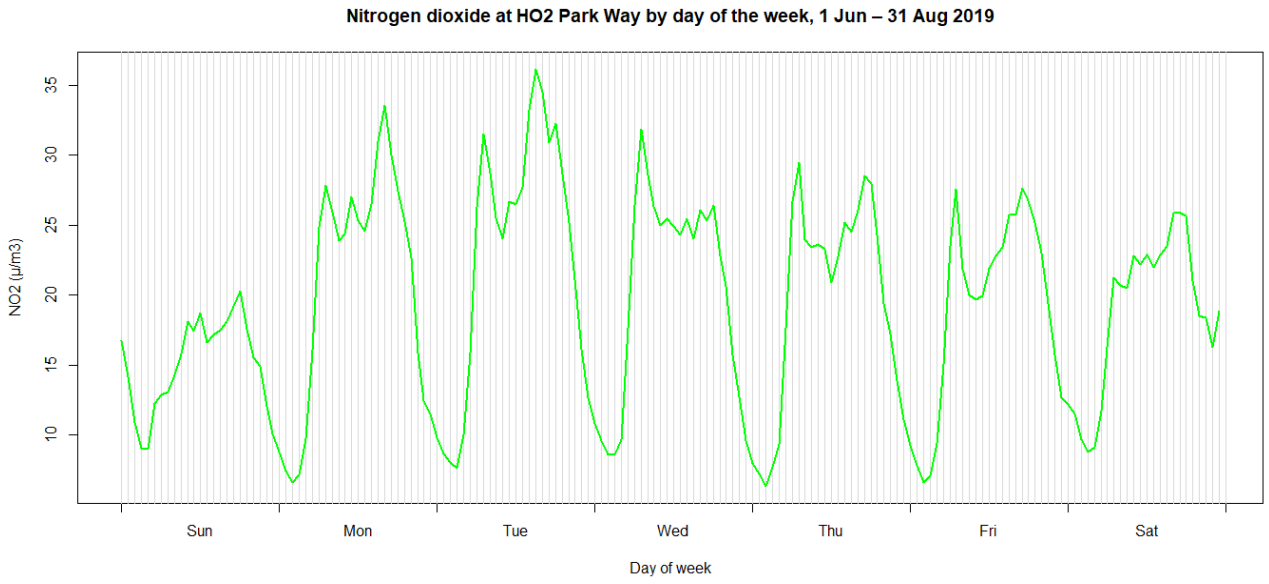
Figure B7 – Continuous Monitoring Results: Day of Week Concentrations for NO_2 at HO2 Horsham Park Way, 2019

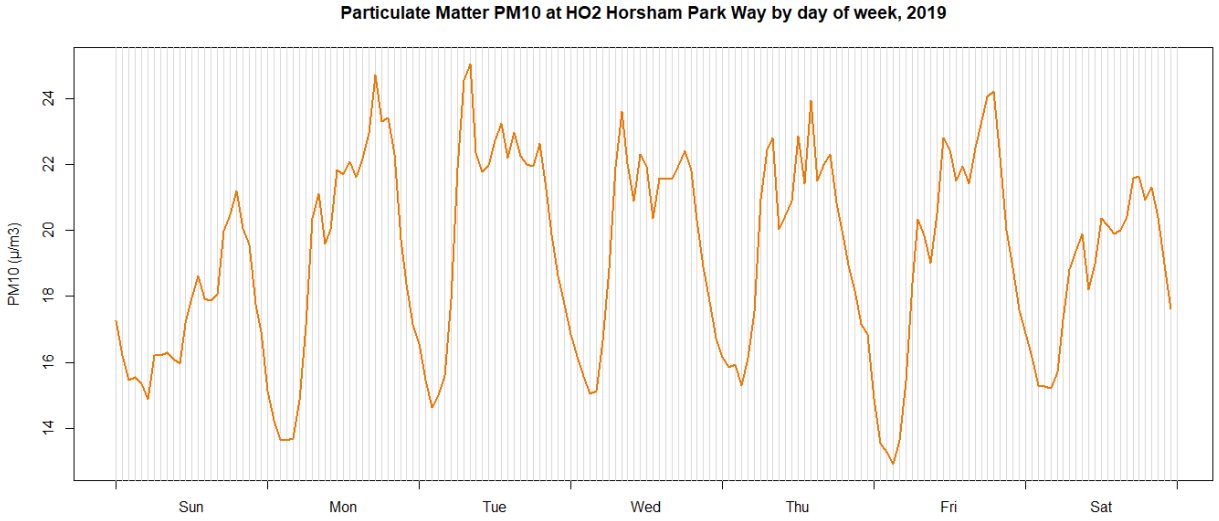


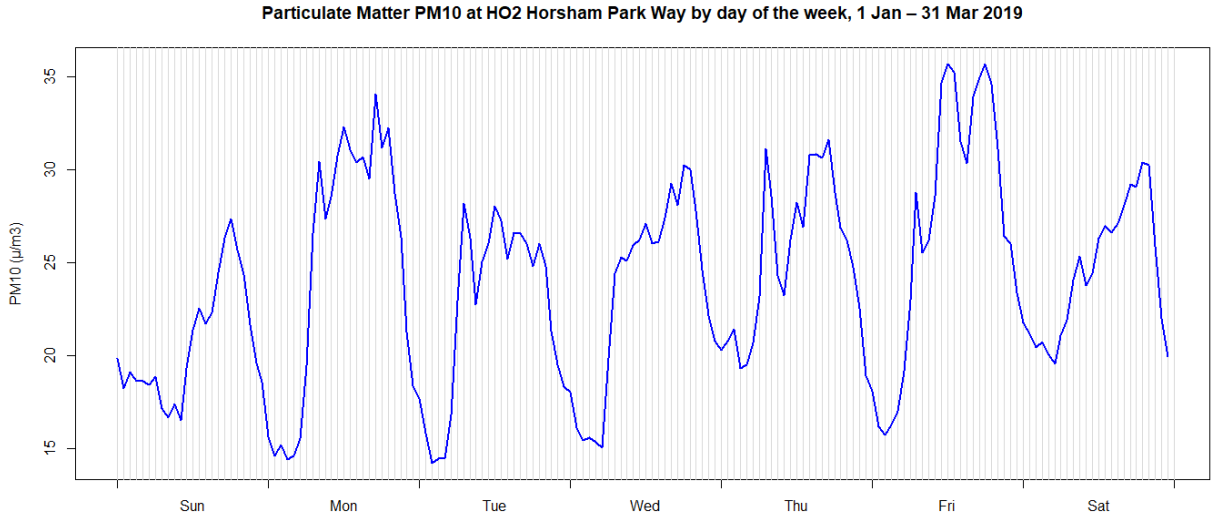


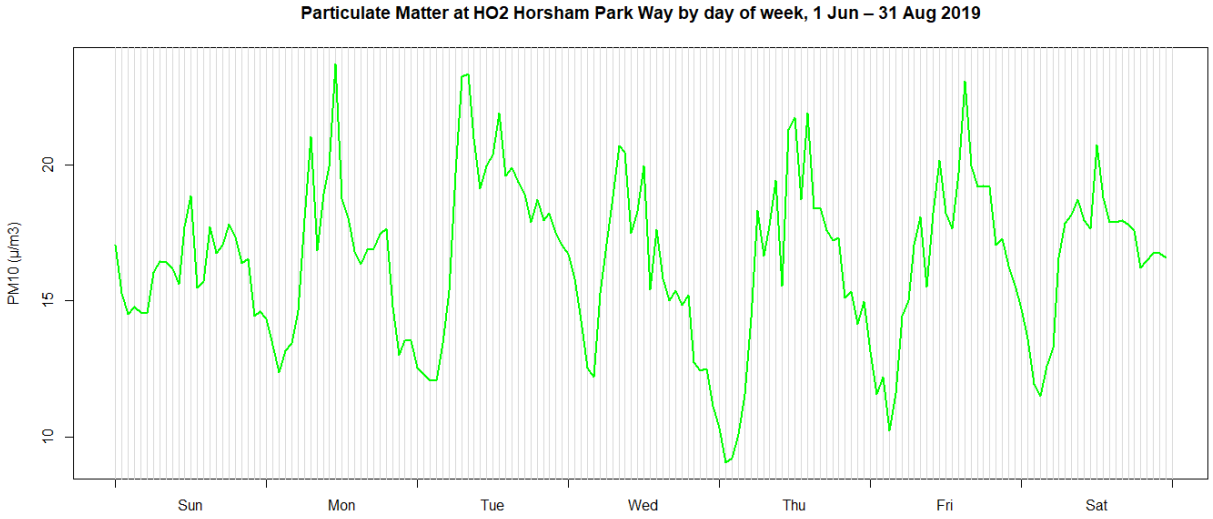


Data plotted using openair.

Figure B8 – Continuous Monitoring Results: Day of Week Concentrations for PM_{10} at HO2 Horsham Park Way, 2019

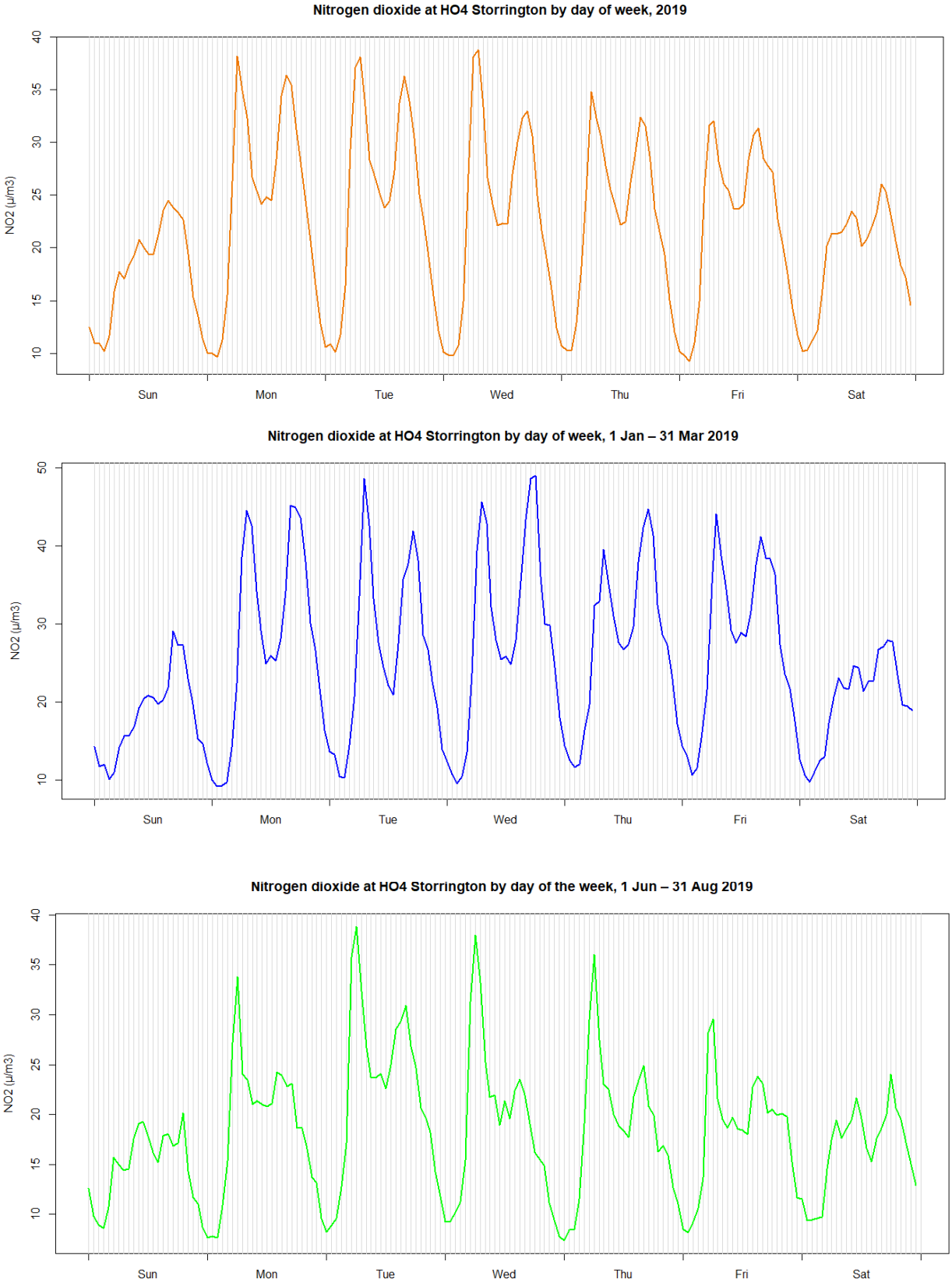






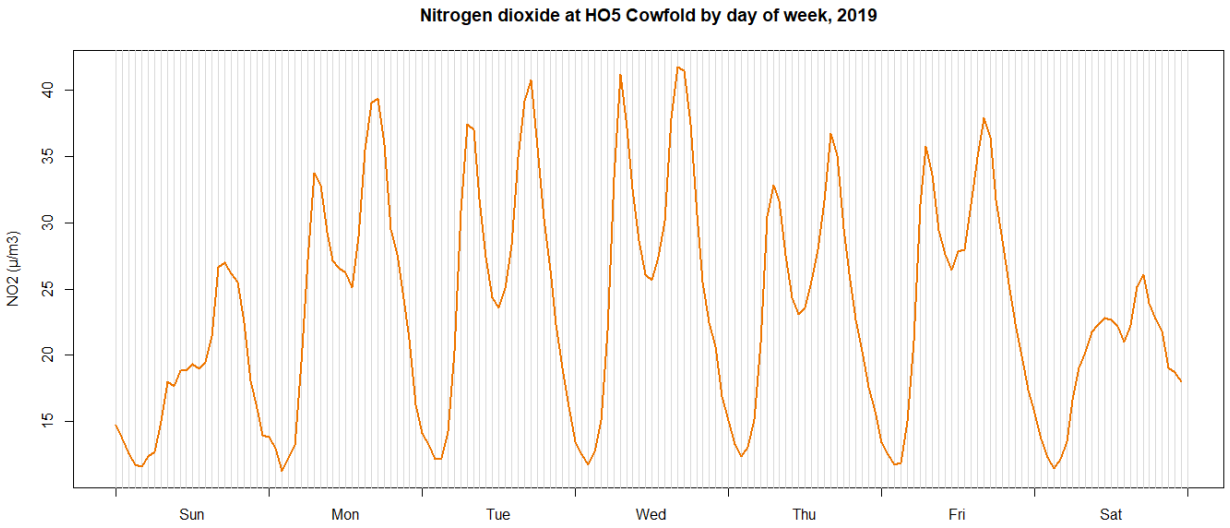
Data plotted using openair.

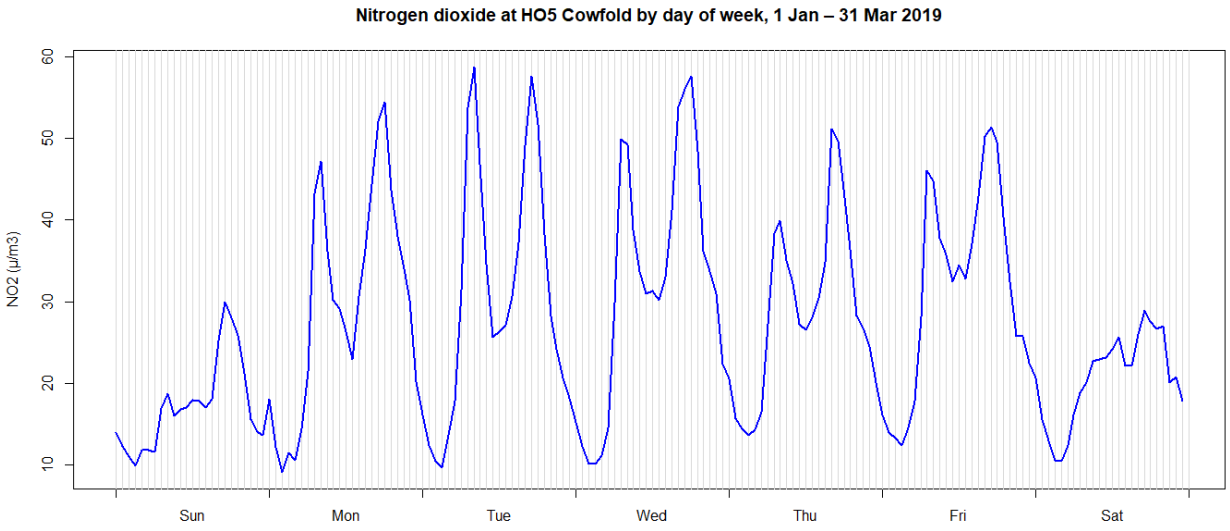
Figure B9 – Continuous Monitoring Results: Day of Week Concentrations for NO_2 at HO4 Storrington AURN, 2019

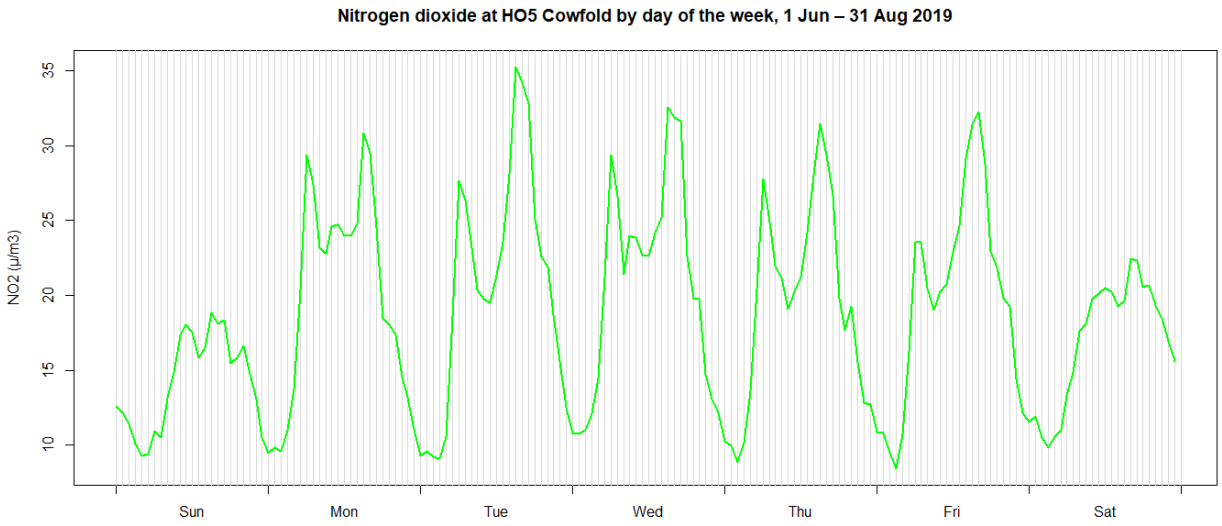


Data plotted using openair.

Figure B10 – Continuous Monitoring Results: Day of Week Concentrations for NO_2 at HO5 Cowfold, 2019







Data plotted using openair.

Figure B11 – Continuous Monitoring Results: Day of Week Concentrations for PM2.5 at Chatham AURN, 2019

Data plotted using openair.

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

Diffusion Tube Bias Adjustment Factors

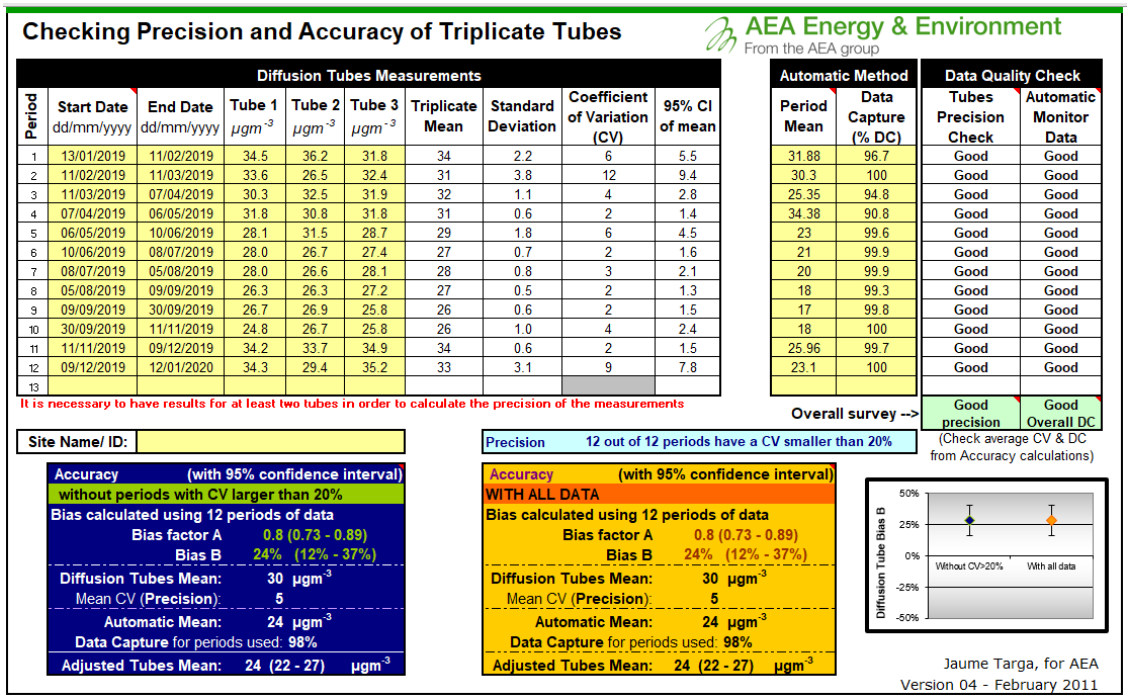
The diffusion tubes are sourced from Sototec (previously Environmental Scientifics Group (ESG)) in Didcot using the 50% TEA in acetone preparation method. The national bias adjustment factor was obtained from Defra national bias adjustment factor database (spreadsheet version number 03/20 published in March 2020) based on 21 co-location studies. The bias adjustment factor given for this methodology was 0.75.

Factor from Local Co-location Studies

Co-location studies are undertaken at three automatic analyser sites in Park Way Horsham, Cowfold and Storrington AURN. All three stations represent roadside sites. Using the AEA Precision and Accuracy spreadsheet tool a local bias adjustment factor of 0.8 for Park Way, 0.69 for Storrington and 0.74 for Cowfold site has been calculated. The three factors were combined using orthogonal regression to give the overall local bias adjustment factor of 0.74. Results of the 2019 co-location studies are given in Table C1, Table C2 and Table C3 below.

Table C1 – Co-location Study Data for HO2 Horsham Park Way, 2019

Location	Diffusion Tube Data Capture for Periods Used (site Park Way)	Continuous Monitor Data Capture for Periods Used	Diffusion Tube Annual Mean (µg/m^3)	Continuous Monitor Annual Mean (µg/m^3)	Ratio
HO2 Horsham Park Way	100%	98%	30	24	0.8



Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	13/01/2019	11/02/2019	34.5	36.2	31.8	34	2.2	6	5.5
2	11/02/2019	11/03/2019	33.6	26.5	32.4	31	3.8	12	9.4
3	11/03/2019	07/04/2019	30.3	32.5	31.9	32	1.1	4	2.8
4	07/04/2019	06/05/2019	31.8	30.8	31.8	31	0.6	2	1.4
5	06/05/2019	10/06/2019	28.1	31.5	28.7	29	1.8	6	4.5
6	10/06/2019	08/07/2019	28.0	26.7	27.4	27	0.7	2	1.6
7	08/07/2019	05/08/2019	28.0	26.6	28.1	28	0.8	3	2.1
8	05/08/2019	09/09/2019	26.3	26.3	27.2	27	0.5	2	1.3
9	09/09/2019	30/09/2019	26.7	26.9	25.8	26	0.6	2	1.5
10	30/09/2019	11/11/2019	24.8	26.7	25.8	26	1.0	4	2.4
11	11/11/2019	09/12/2019	34.2	33.7	34.9	34	0.6	2	1.5
12	09/12/2019	12/01/2020	34.3	29.4	35.2	33	3.1	9	7.8
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
31.88	96.7	Good	Good
30.3	100	Good	Good
25.35	94.8	Good	Good
34.38	90.8	Good	Good
23	99.6	Good	Good
21	99.9	Good	Good
20	99.9	Good	Good
18	99.3	Good	Good
17	99.8	Good	Good
18	100	Good	Good
25.96	99.7	Good	Good
23.1	100	Good	Good
Overall survey -->		Good precision	Good Overall DC

(Check average CV & DC from Accuracy calculations)

Site Name/ ID:

Precision 12 out of 12 periods have a CV smaller than 20%

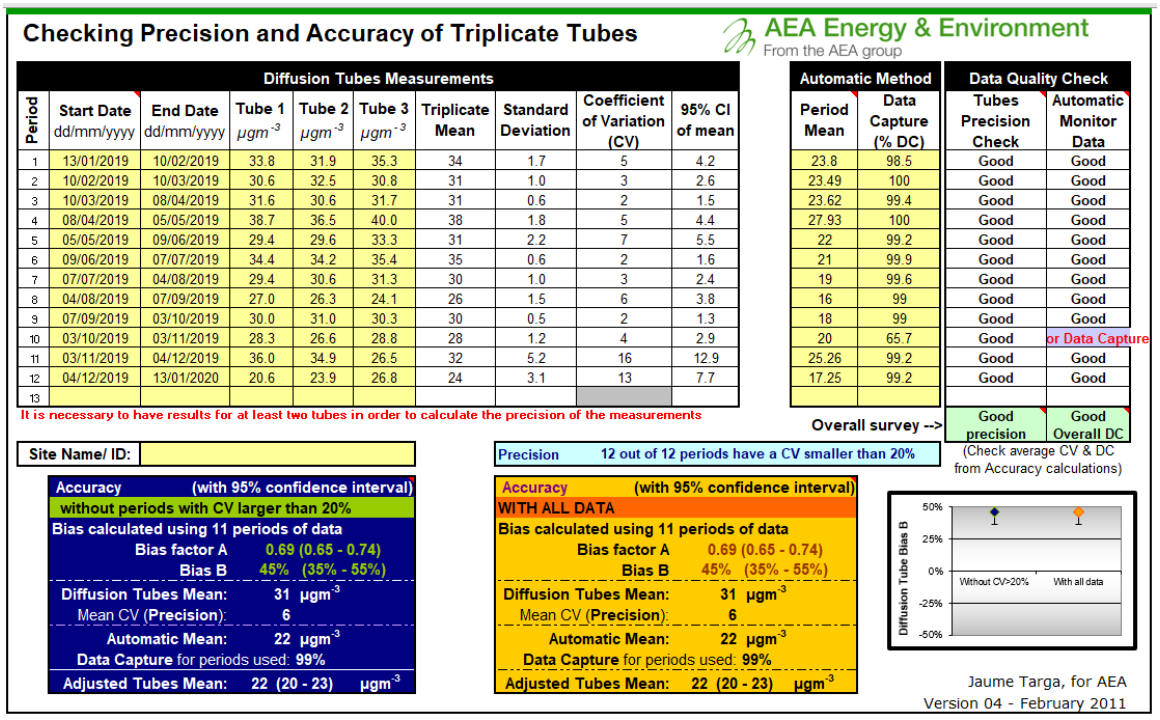
Accuracy (with 95% confidence interval) without periods with CV larger than 20%
Bias calculated using 12 periods of data
Bias factor A 0.8 (0.73 - 0.89)
Bias B 24% (12% - 37%)
Diffusion Tubes Mean: 30 µgm^{-3}
Mean CV (Precision): 5
Automatic Mean: 24 µgm^{-3}
Data Capture for periods used: 98%
Adjusted Tubes Mean: 24 (22 - 27) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA
Bias calculated using 12 periods of data
Bias factor A 0.8 (0.73 - 0.89)
Bias B 24% (12% - 37%)
Diffusion Tubes Mean: 30 µgm^{-3}
Mean CV (Precision): 5
Automatic Mean: 24 µgm^{-3}
Data Capture for periods used: 98%
Adjusted Tubes Mean: 24 (22 - 27) µgm^{-3}

Jaume Targa, for AEA
Version 04 - February 2011

Table C2 – Co-location Study Data for HO4 Storrington AURN, 2019

Location	Diffusion Tube Data Capture for Periods Used (site Storrington 8,9,10 AURN)	Continuous Monitor Data Capture for Periods Used	Diffusion Tube Annual Mean (µg/m^3)	Continuous Monitor Annual Mean (µg/m^3)	Ratio
HO4 Storrington AURN	100%	99%	31	22	0.69



Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	13/01/2019	10/02/2019	33.8	31.9	35.3	34	1.7	5	4.2
2	10/02/2019	10/03/2019	30.6	32.5	30.8	31	1.0	3	2.6
3	10/03/2019	08/04/2019	31.6	30.6	31.7	31	0.6	2	1.5
4	08/04/2019	05/05/2019	38.7	36.5	40.0	38	1.8	5	4.4
5	05/05/2019	09/06/2019	29.4	29.6	33.3	31	2.2	7	5.5
6	09/06/2019	07/07/2019	34.4	34.2	35.4	35	0.6	2	1.6
7	07/07/2019	04/08/2019	29.4	30.6	31.3	30	1.0	3	2.4
8	04/08/2019	07/09/2019	27.0	26.3	24.1	26	1.5	6	3.8
9	07/09/2019	03/10/2019	30.0	31.0	30.3	30	0.5	2	1.3
10	03/10/2019	03/11/2019	28.3	26.6	28.8	28	1.2	4	2.9
11	03/11/2019	04/12/2019	36.0	34.9	26.5	32	5.2	16	12.9
12	04/12/2019	13/01/2020	20.6	23.9	26.8	24	3.1	13	7.7
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
23.8	98.5	Good	Good
23.49	100	Good	Good
23.62	99.4	Good	Good
27.93	100	Good	Good
22	99.2	Good	Good
21	99.9	Good	Good
19	99.6	Good	Good
16	99	Good	Good
18	99	Good	Good
20	65.7	Good	or Data Capture
25.26	99.2	Good	Good
17.25	99.2	Good	Good
	Overall survey -->	Good precision	Good Overall DC

(Check average CV & DC from Accuracy calculations)

Site Name/ ID:

Precision: 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%
Bias calculated using 11 periods of data
Bias factor A: 0.69 (0.65 - 0.74)
Bias B: 45% (35% - 55%)
Diffusion Tubes Mean: 31 µgm^{-3}
Mean CV (Precision): 6
Automatic Mean: 22 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 22 (20 - 23) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA
Bias calculated using 11 periods of data
Bias factor A: 0.69 (0.65 - 0.74)
Bias B: 45% (35% - 55%)
Diffusion Tubes Mean: 31 µgm^{-3}
Mean CV (Precision): 6
Automatic Mean: 22 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 22 (20 - 23) µgm^{-3}

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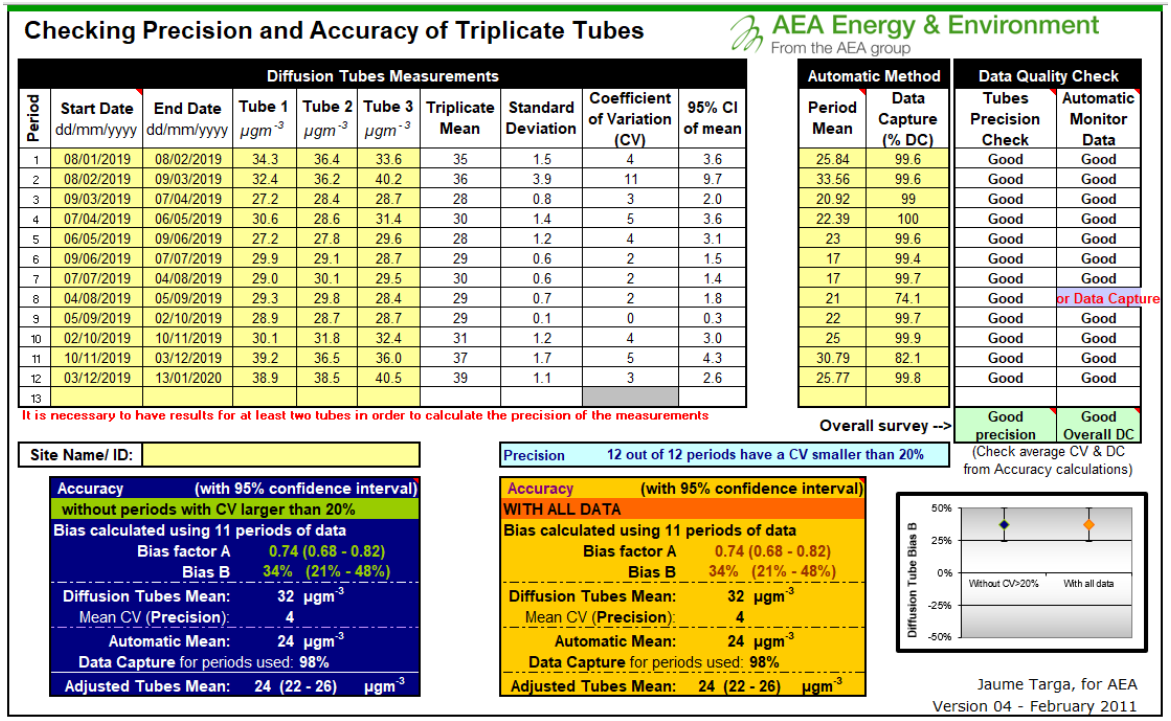
Version 04 - February 2011

Table C3 – Co-location Study Data for HO5 Cowfold, 2019

Location	Diffusion Tube Data Capture for Periods Used (site Cowfold A,B,C)	Continuous Monitor Data Capture for Periods Used	Diffusion Tube Annual Mean (µg/m^3)	Continuous Monitor Annual Mean (µg/m^3)	Ratio
HO5 Cowfold	100%	98%	32	24	0.74



Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	08/01/2019	08/02/2019	34.3	36.4	33.6	35	1.5	4	3.6
2	08/02/2019	09/03/2019	32.4	36.2	40.2	36	3.9	11	9.7
3	09/03/2019	07/04/2019	27.2	28.4	28.7	28	0.8	3	2.0
4	07/04/2019	06/05/2019	30.6	28.6	31.4	30	1.4	5	3.6
5	06/05/2019	09/06/2019	27.2	27.8	29.6	28	1.2	4	3.1
6	09/06/2019	07/07/2019	29.9	29.1	28.7	29	0.6	2	1.5
7	07/07/2019	04/08/2019	29.0	30.1	29.5	30	0.6	2	1.4
8	04/08/2019	05/09/2019	29.3	29.8	28.4	29	0.7	2	1.8
9	05/09/2019	02/10/2019	28.9	28.7	28.7	29	0.1	0	0.3
10	02/10/2019	10/11/2019	30.1	31.8	32.4	31	1.2	4	3.0
11	10/11/2019	03/12/2019	39.2	36.5	36.0	37	1.7	5	4.3
12	03/12/2019	13/01/2020	38.9	38.5	40.5	39	1.1	3	2.6
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
25.84	99.6	Good	Good
33.56	99.6	Good	Good
20.92	99	Good	Good
22.39	100	Good	Good
23	99.6	Good	Good
17	99.4	Good	Good
17	99.7	Good	Good
21	74.1	Good	or Data Capture
22	99.7	Good	Good
25	99.9	Good	Good
30.79	82.1	Good	Good
25.77	99.8	Good	Good
	Overall survey -->	Good precision	Good Overall DC

(Check average CV & DC from Accuracy calculations)

Site Name/ ID:

Precision: 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%
Bias calculated using 11 periods of data
Bias factor A: 0.74 (0.68 - 0.82)
Bias B: 34% (21% - 48%)
Diffusion Tubes Mean: 32 µgm^{-3}
Mean CV (Precision): 4
Automatic Mean: 24 µgm^{-3}
Data Capture for periods used: 98%
Adjusted Tubes Mean: 24 (22 - 26) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA
Bias calculated using 11 periods of data
Bias factor A: 0.74 (0.68 - 0.82)
Bias B: 34% (21% - 48%)
Diffusion Tubes Mean: 32 µgm^{-3}
Mean CV (Precision): 4
Automatic Mean: 24 µgm^{-3}
Data Capture for periods used: 98%
Adjusted Tubes Mean: 24 (22 - 26) µgm^{-3}

Jaume Targa, for AEA
Version 04 - February 2011

Discussion of Choice of Factor to Use

The local bias adjustment factor of 0.74 for 2019 monitoring data was derived from three separate co-location sites within Horsham district: HO2 Horsham Park Way (0.8, obtained using 12 periods of data), HO4 Storrington AURN (0.69, obtained using 11 periods of data) and HO5 Cowfold (0.74, obtained using 11 periods of data). The national bias adjustment factor for 2019 is 0.75 (in March 2020).

Regarding the choice between the local and national factor, the technical guidance LAQM.TG (16) recommends the use of a local bias adjustment factor where concentrations measured in a co-location study are similar to those in the wider survey, where a co-location study had good precision and data capture for diffusion tubes and where the continuous monitoring results used in a co-location study were of high quality.

Data capture for the co-location surveys in 2019 was good with all three analysers reaching above a 90% rate. Data capture for the co-location tubes was between 100%.

The three co-location studies are carried out at roadside locations and majority of diffusion tube sites in the monitoring survey (37 out of 41) are roadside sites.

All three co-location studies had good data capture and tube precision.

Therefore, the local bias adjustment factor has been used in preference to a factor obtained from the national database. Should the national bias adjustment factor be used to adjust the results for 2019 that would not change the conclusions of the report with regards to compliance with the objectives.

The use of bias adjustment factors over the past few years has varied but generally oscillated around 0.8. A summary of factors used since 2007 is provided below in Table C4.

Table C4 – Co-location Study Data 2007 – 2019

Year	Local or National Bias Adjustment Factor?	Value of Bias Adjustment Factor Used	Comments
2007	Local	0.9	Local bias was calculated from the HO2 Horsham Park Way co-location study. Diffusion tubes were prepared to the 10% TEA in water method and analysed by Bureau Veritas Laboratories.
2008	National	0.93	The national bias was considered more representative for the diffusion tube survey as a whole. The locally-derived bias from the HO2 Horsham Park Way co-location study was 0.9 based on 10 periods of data. Diffusion tubes were prepared using 50% TEA in acetone method and analysed by Bureau Veritas in Glasgow.

Year	Local or National Bias Adjustment Factor?	Value of Bias Adjustment Factor Used	Comments
2009	National	0.81	The national bias was considered more representative for the diffusion tube survey as a whole. The locally-derived bias from the HO2 Horsham Park Way co-location study was 0.88 based on 10 periods of data. Diffusion tubes were prepared using 20% TEA in water method and analysed by Environmental Scientifics Group (formerly Bureau Veritas) in Glasgow.
2010	Local	0.81	The local bias was considered more representative for the diffusion tube survey as a whole. There was close agreement between the national and local bias adjustment factors at 0.84 and 0.81 respectively. The local bias adjustment factor was derived from two separate co-location sites: HO2 Horsham Park Way (based on 11 periods of data) and HO4 Storrington AURN (based on 10 periods of data); both studies produced the same bias factors. Diffusion tubes were prepared using 20% TEA in water method and analysed by Environmental Scientifics Group (formerly Bureau Veritas) in Glasgow.
2011	Local	0.78 & 0.8	The local bias was considered more representative for the diffusion tube survey as a whole. There was close agreement between the national and local bias adjustment factors. The national bias factor was 0.82 based on 5 studies. Three local bias adjustment factors were obtained: 0.78 for HO2 Horsham Park Way (based on 11 periods of data), 0.78 for HO4 Storrington AURN (based on 11 periods of data) and 0.8 for HO5 Cowfold (based on 9 periods of data). Diffusion tubes were prepared using 20% TEA in water method and analysed by Environmental Scientifics Group (formerly Bureau Veritas) in Glasgow.
2012	National and Local	0.79 (national); 0.89, 0.77 & 0.82 (local)	As there was limited agreement between the national and local bias adjustment factors the results have been corrected using both factors. The national bias factor was 0.79 based on 26 studies. Three local bias adjustment factors were obtained: 0.89 for HO2 Horsham Park Way (based on 11 periods of data), 0.77 for HO4 Storrington AURN (based on 12 periods of data) and 0.82 for HO5 Cowfold (based on 12 periods of data). Diffusion tubes were prepared using 50% TEA in acetone method and analysed by Environmental Scientifics Group in Didcot.

Year	Local or National Bias Adjustment Factor?	Value of Bias Adjustment Factor Used	Comments
2013	National and Local	0.8 (national); 0.92, 0.82 & 0.71 (local)	As there was limited agreement between the national and local bias adjustment factors the results have been corrected using both factors. The national bias factor was 0.8 based on 28 studies. Three local bias adjustment factors were obtained: 0.92 for HO2 Horsham Park Way (based on 12 periods of data), 0.82 for HO4 Storrington AURN (based on 12 periods of data) and 0.71 for HO5 Cowfold (based on 11 periods of data). Diffusion tubes were prepared using 50% TEA in acetone method and analysed by Environmental Scientifics Group in Didcot.
2014	National	0.81	The national bias was considered more representative for the diffusion tube survey as a whole. There was close agreement between the national and local bias adjustment factors. The national bias factor was 0.81 based on 30 studies. Two local bias adjustment factors were obtained: 0.85 for HO2 Horsham Park Way (based on 11 periods of data), 0.78 for HO4 Storrington AURN (based on 5 periods of data) and 0.78 for HO5 Cowfold (based on 6 periods of data). The factors for Storrington and Cowfold co-location studies were excluded due to poor data capture for both studies. Diffusion tubes were prepared using 50% TEA in acetone method and analysed by Environmental Scientifics Group in Didcot.
2015	Local	0.81	Diffusion tubes were exposed for 9-10 months in 2015 so a local bias factor derived from the Cowfold co-location study was considered better matched than using an annual (national database) factor. The value of the national database factor was similar to that of the local factor (0.81 based on 21 studies available at the time the report was written and 0.79 based on 29 studies available later in the year).
2016	Local	0.78	The local bias factor, derived from the three co-location studies, was considered to be more representative for the diffusion tube survey. All three co-location studies are carried out at roadside locations and majority of the diffusion tube sites in the survey are roadside sites. All three co-location studies had good data capture and tube precision in 2016. The national bias factor was 0.77, based on 30 studies.
2017	Local	0.78	The local bias factor, derived from the three co-location studies, was considered to be more representative for the diffusion tube survey. The value of the national database factor was similar (0.77 based on 27 studies available at the time the report was written).
2018	Local	0.81	The local bias factor, derived from the three co-location studies, was considered to be more representative for the diffusion tube survey. The use of a local bias factor represented a conservative approach as its value was higher than that of a national bias factor.

Year	Local or National Bias Adjustment Factor?	Value of Bias Adjustment Factor Used	Comments
2019	Local	0.74	The local bias factor, derived from the three co-location studies, was considered to be more representative for the diffusion tube survey.

Short-term to Long-term Data Adjustment

Data capture for 2019 was good (above 75%) at all monitoring sites, both diffusion tube and continuous; as such, annualisation (short to long term data adjustment) was not required.

PM10 Monitoring Adjustment

The PM_{10} monitoring data from the HO2 Horsham Parkway analyser has been corrected by King's College London in accordance with the Volatile Correction Model (VCM)[19].

QA/QC of Automatic Monitoring

Data collection and ratification for the Park Way and Cowfold monitoring stations is undertaken by the Environmental Research Group, Kings College, through a contract with the Sussex Air Partnership. For more information, please visit the Sussex Air Quality Partnership website at http://www.sussex-air.net. The operation and data management for both stations is carried out to the AURN standards, however, the data quality could be further improved if independent inter calibrations site audits were carried out (these are a requirement for AURN sites).

The Storrington monitoring station is an AURN affiliated site managed primarily by AEA Technology in accordance with the 'QA/QC Procedures for the UK Automatic Urban and Rural Air Quality Monitoring Network (AURN)'.

Calibrations and checks at all stations are undertaken every four weeks by an in-house Local Site Operator and the analysers are maintained under contract with instrument suppliers/manufacturers for all three stations.

QA/QC of Diffusion Tube Monitoring

Laboratories participate in two QA/QC schemes. The new AIR-PT Scheme (a continuation of the Workplace Analysis Scheme for Proficiency (WASP)) is run by LGC and supported by the Health & Safety Laboratory. The other scheme is a monthly field intercomparison exercise managed by the AEA. Defra advises that local authorities should use diffusion tubes supplied by laboratories that have demonstrated satisfactory performance under the QA/QC schemes.

[19] http://www.volatile-correction-model.info/Default.aspx

Socotec Didcot is a UKAS accredited laboratory and participates in both QA/QC schemes described above. The list of those laboratories which have performed satisfactorily in the AIR-PT scheme is provided to local authorities on the LAQM Support website[20]. In the latest available AIR-PT results, rounds AR030 (January to February 2019), AR031 (April to May 2019), AR033 (July to August 2019) and AR034 (September to November 2019) Socotec has scored 87.5% in AR030 and 100% for all subsequent rounds. The percentage score reflects the results deemed to be satisfactory based upon the z-score of < ± 2. Of 24 co-location studies with triplicate tubes analysed by Socotec by utilising 50% TEA, 22 studies were rated as 'good' in 2019 (tubes are considered to have "good" precision where the coefficient of variation of duplicate or triplicate diffusion tubes for eight or more periods during the year is less than 20%).

Regarding the inter-comparison co-location study, the study from Marylebone Road from the national database in 2019 was rated as 'good' (tubes are considered to have "good" precision where the coefficient of variation of duplicate or triplicate diffusion tubes for eight or more periods during the year is less than 20%).

[20] https://laqm.defra.gov.uk/assets/laqmno2performancedatauptonovember2019v1.pdf

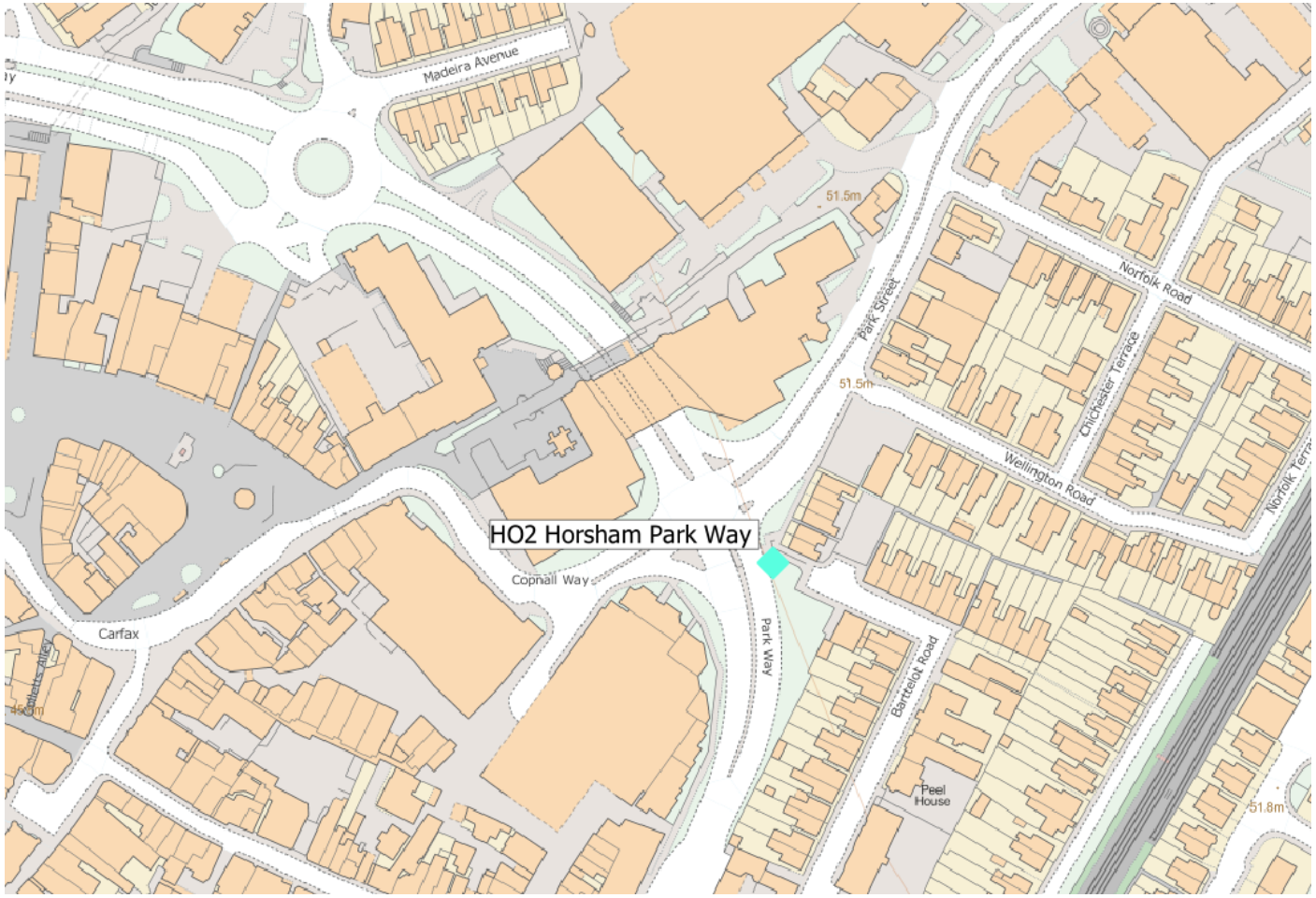
Monitoring Results – Distance Correction

Enter data into the pink cells

Site Name/ID	Distance (m)		NO_2 Annual Mean Concentration ($\mu g/m^3$)			Comment
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor	
Horsham 1N	2.0	5.5	13.4	26.4	23.3	
Park Way	2.1	11.0	13.4	22.1	18.7	
Horsham 5N	1.4	11.0	13.1	25.2	19.8	
Horsham 6N	1.5	12.7	11.6	21.5	16.9	
Horsham 7N	2.0	14.0	11.7	23.0	17.9	
Horsham 8N	1.6	9.6	12.0	21.9	17.9	
Cowfold 1,2	1.7	4.2	10.3	31.6	27.3	
Storrington 1	1.1	3.6	9.6	38.9	31.8	
Horsham 11n	1.0	1.5	13.4	26.6	25.5	
Storrington 4	2.2	5.0	9.6	29.7	25.7	
Storrington 5	1.9	3.8	9.6	23.3	21.1	
Storrington 6	1.9	9.6	9.6	18.8	15.4	
Storrington 7	1.6	8.3	9.6	18.4	15.2	
Cowfold 3	2.0	11.7	10.3	30.7	22.2	
Cowfold 4	3.6	26.6	10.3	26.8	17.8	Warning: your receptor is more than 20m further from the kerb than your monitor - treat result with caution.
N. Horsham 1N	1.9	6.8	11.4	19.3	17.0	
N. Horsham 2N	1.0	6.5	11.8	17.3	15.2	
Steyning 4N	0.9	2.4	9.1	20.1	18.0	
Pulborough 1	0.4	2.1	8.3	28.3	22.7	
Pulborough 2	1.5	3.3	8.2	17.9	16.2	
Billingshurst 1	1.5	2.5	9.5	26.2	24.3	
Storrington 8,9,10 AURN	4.6	14.2	9.3	22.9	18.4	
Storrington 13n	3.0	3.5	9.6	25.6	25.0	
Storrington 12n	2.3	9.3	9.6	26.0	20.5	
Storrington 11n	3.0	4.0	9.6	29.8	28.3	
Cowfold 5	2.0	11.3	10.3	22.5	17.5	
Cowfold 6n	1.8	4.8	10.3	23.5	20.5	
Cowfold 7n	1.1	3.1	10.3	36.1	30.6	
Storrington 14n	0.9	20.9	9.3	33.4	18.4	Warning: your receptor is more than 20m further from the kerb than your monitor - treat result with caution.
Storrington 15n	1.7	13.7	9.3	16.9	13.3	
Storrington 18n	1.9	6.9	9.6	16.0	14.1	
Cowfold AU A B C	6.5	26.5	10.3	23.6	17.5	Warning: your receptor is more than 20m further from the kerb than your monitor - treat result with caution.
Horsham 9N	1.5	2.5	13.1	26.5	25.0	
Southwater 1	1.5	2.5	8.9	23.5	21.9	

Appendix D: Maps of Monitoring Locations and AQMAs

Figure D1 – Location of Horsham Air Quality Monitoring Station

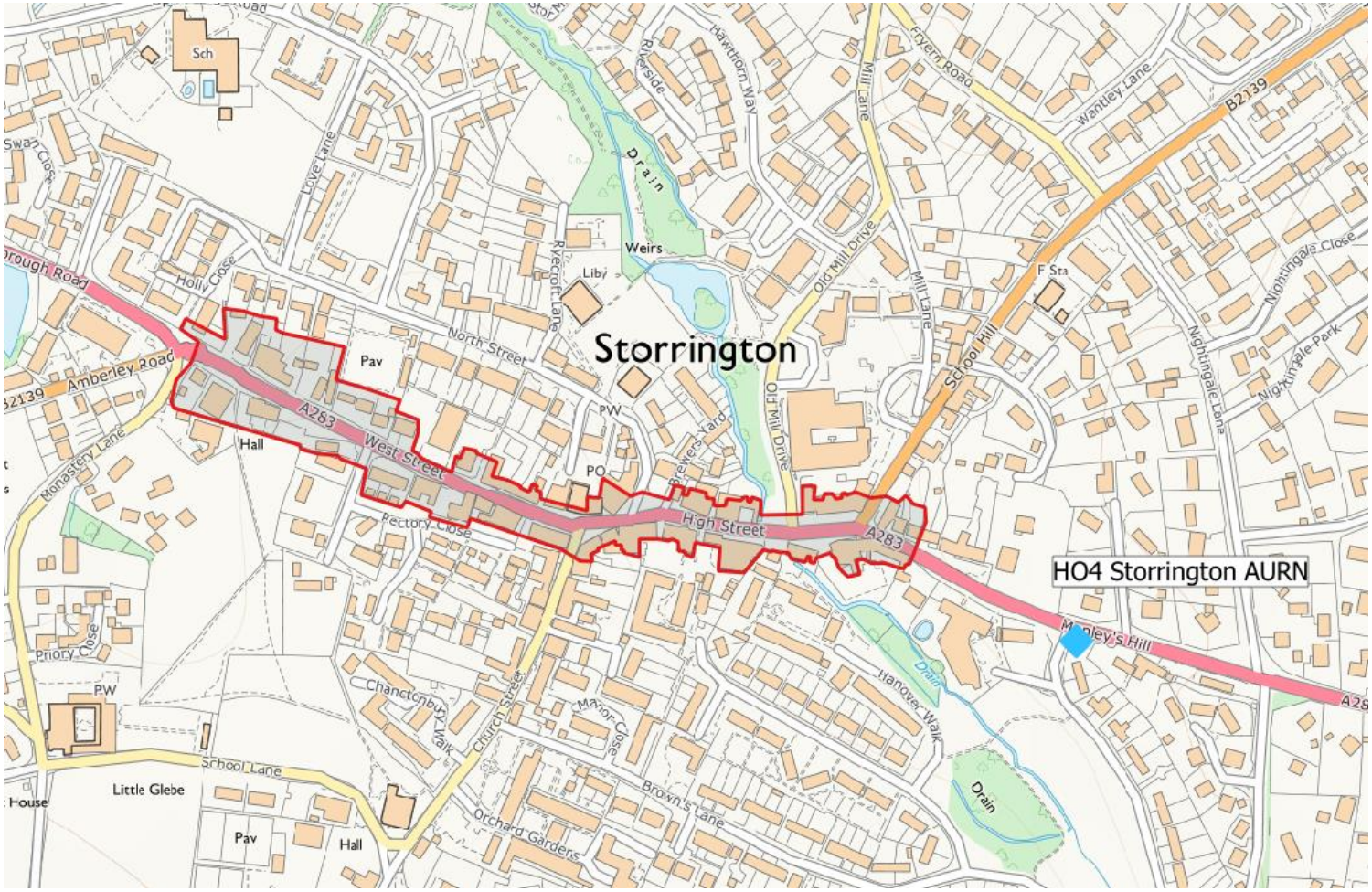


Legend

◆ Continuous Monitoring Location

Scale	**Title**
Not To Scale	Automatic Monitoring Sites – Horsham
Date **June 2020**	**Figure No. D1**

Figure D2 – Location of Storrington Air Quality Monitoring Station

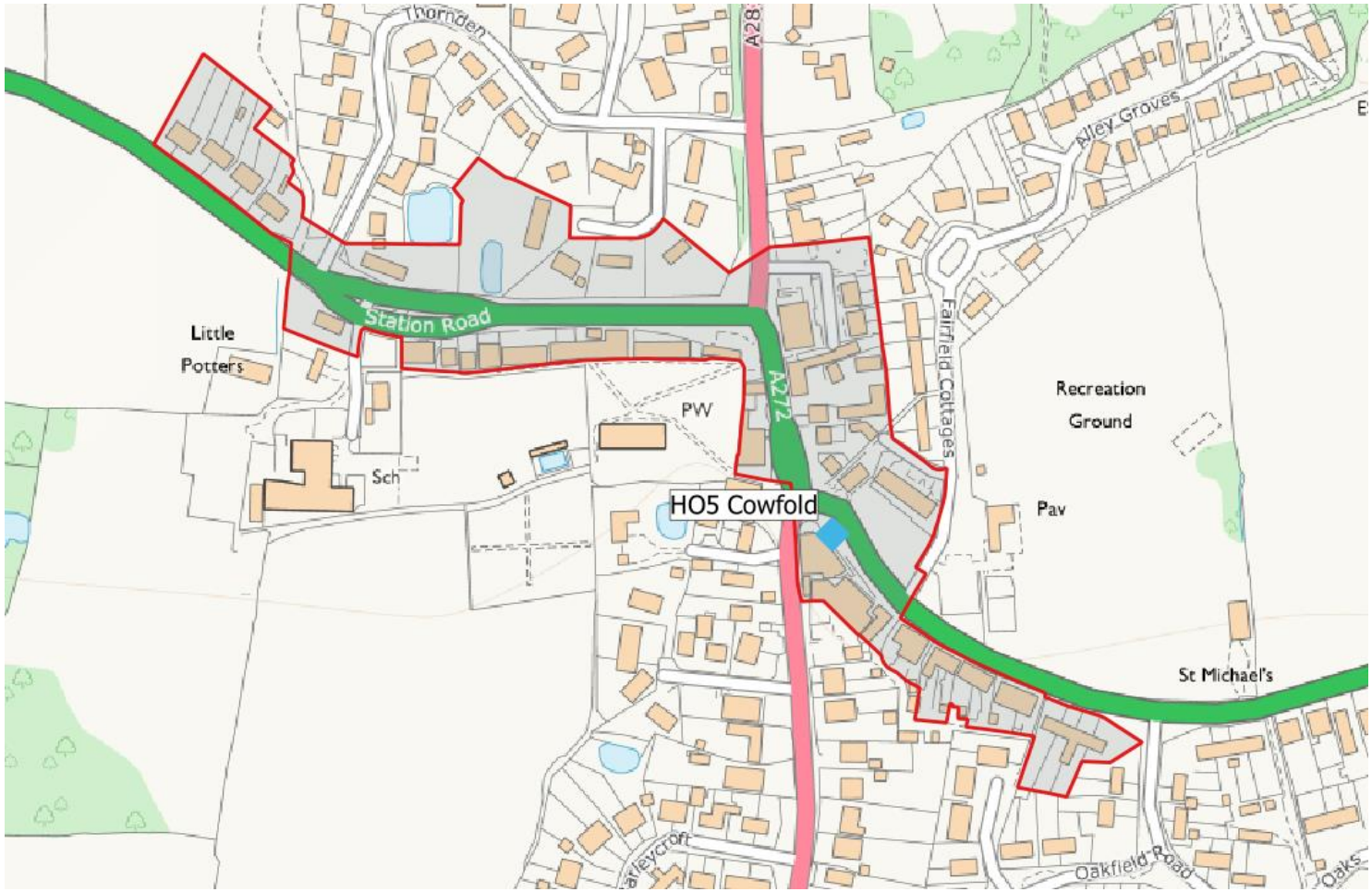


Legend

- Continuous Monitoring Location
- AQMA Boundary

Scale Not To Scale	**Title** Automatic Monitoring Sites – Storrington
Date June 2020	**Figure No. D2**

Figure D3 – Location of Cowfold Air Quality Monitoring Station



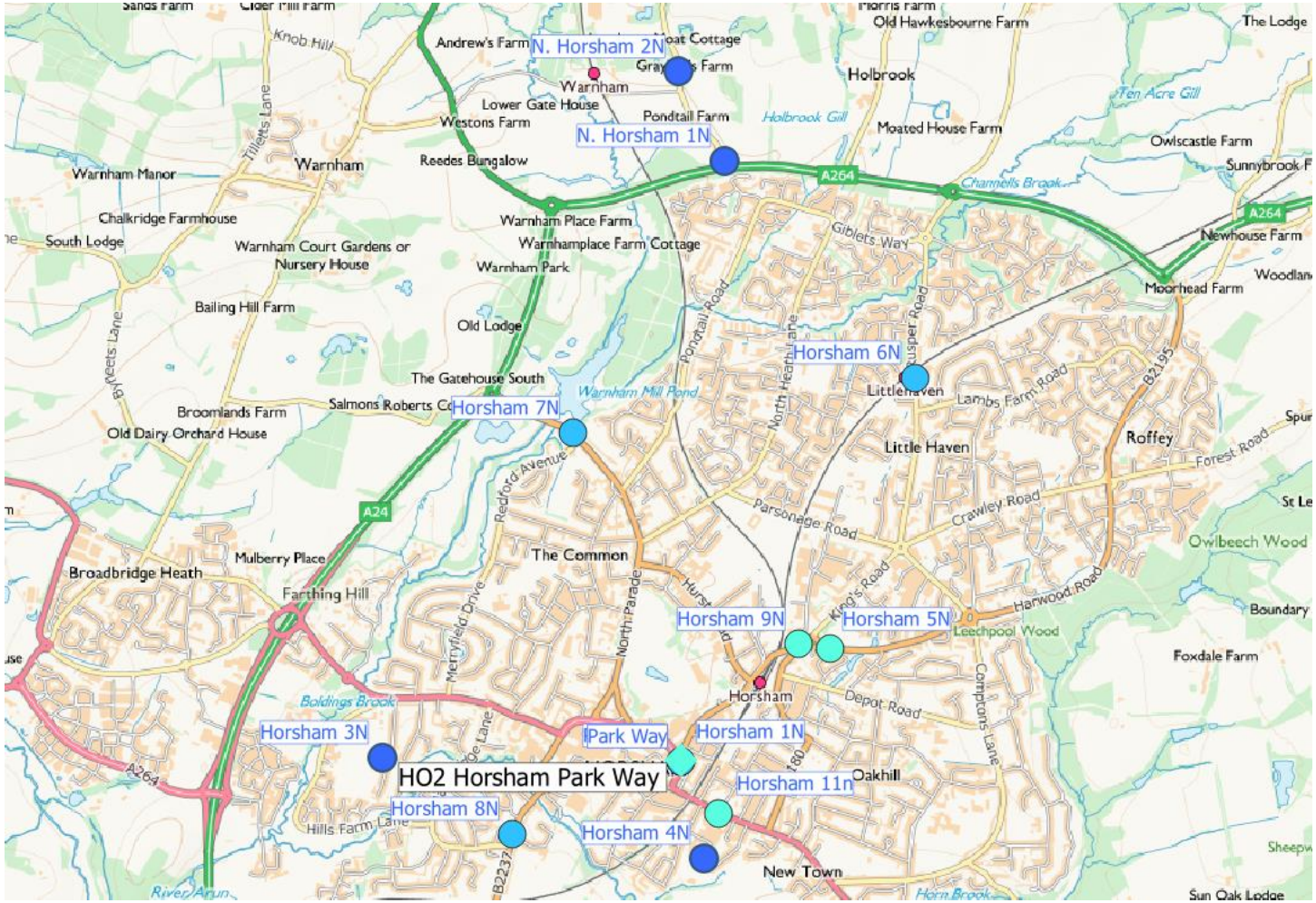
Legend

Continuous Monitoring Location

AQMA Boundary

Scale	Title
Not To Scale	Automatic Monitoring Sites – Cowfold
Date	**Figure No. D3**
June 2020	

Figure D4 – Locations of Diffusion Tube Monitoring Sites – Horsham



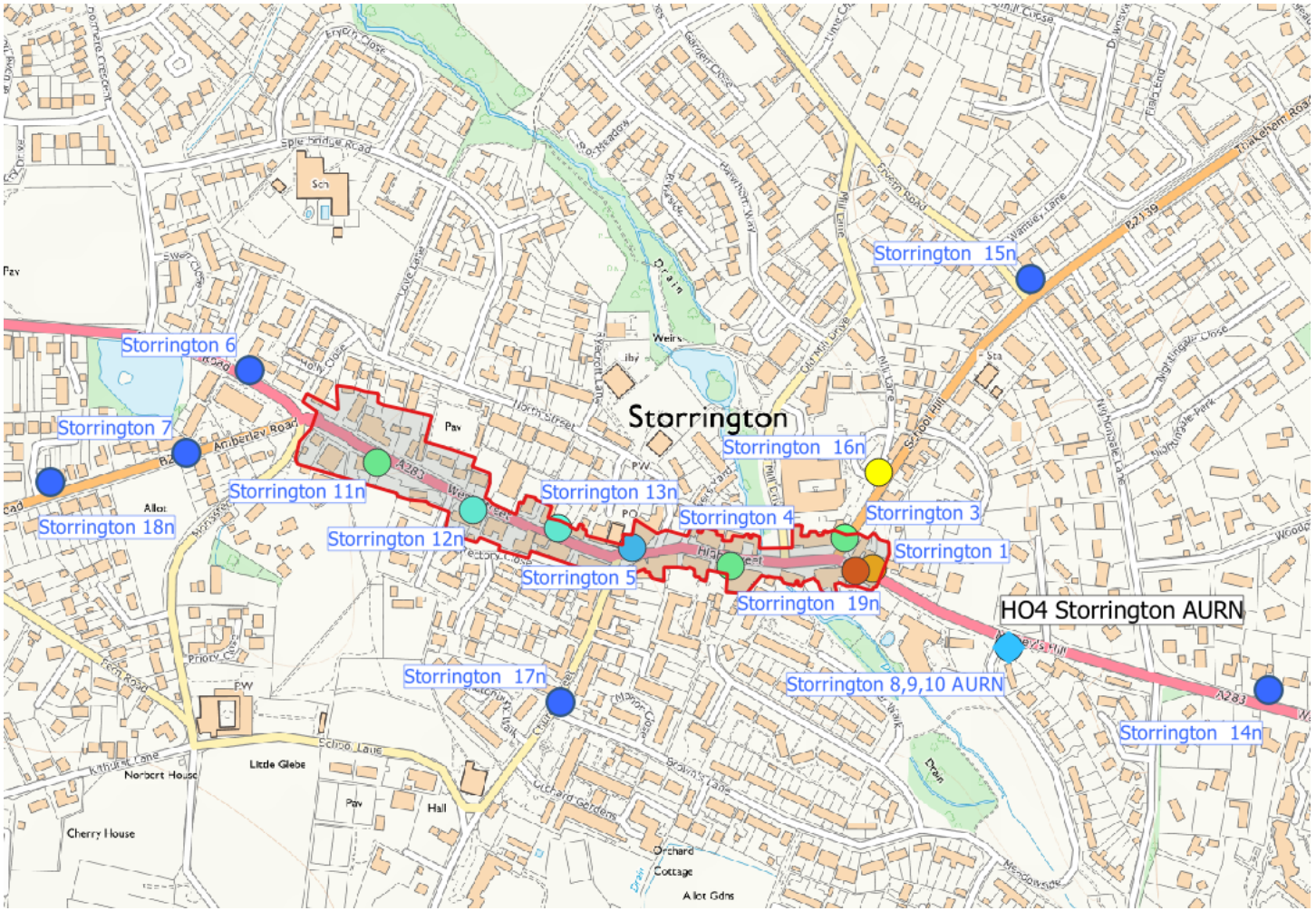
Legend

Diffusion Tube Location
2019 Concentration, µg/m3

- 0.0 - 20.0
- 20.0 - 24.0
- 24.0 - 28.0
- 28.0 - 32.0
- 32.0 - 36.0
- 36.0 - 40.0
- 40.0 - 45.0
- Continuous Monitoring Location

Scale Not To Scale	**Title** Non-Automatic Monitoring Sites – Horsham
Date June 2020	**Figure No. D4**

Figure D5 – Locations of Diffusion Tube Monitoring Sites – Storrington

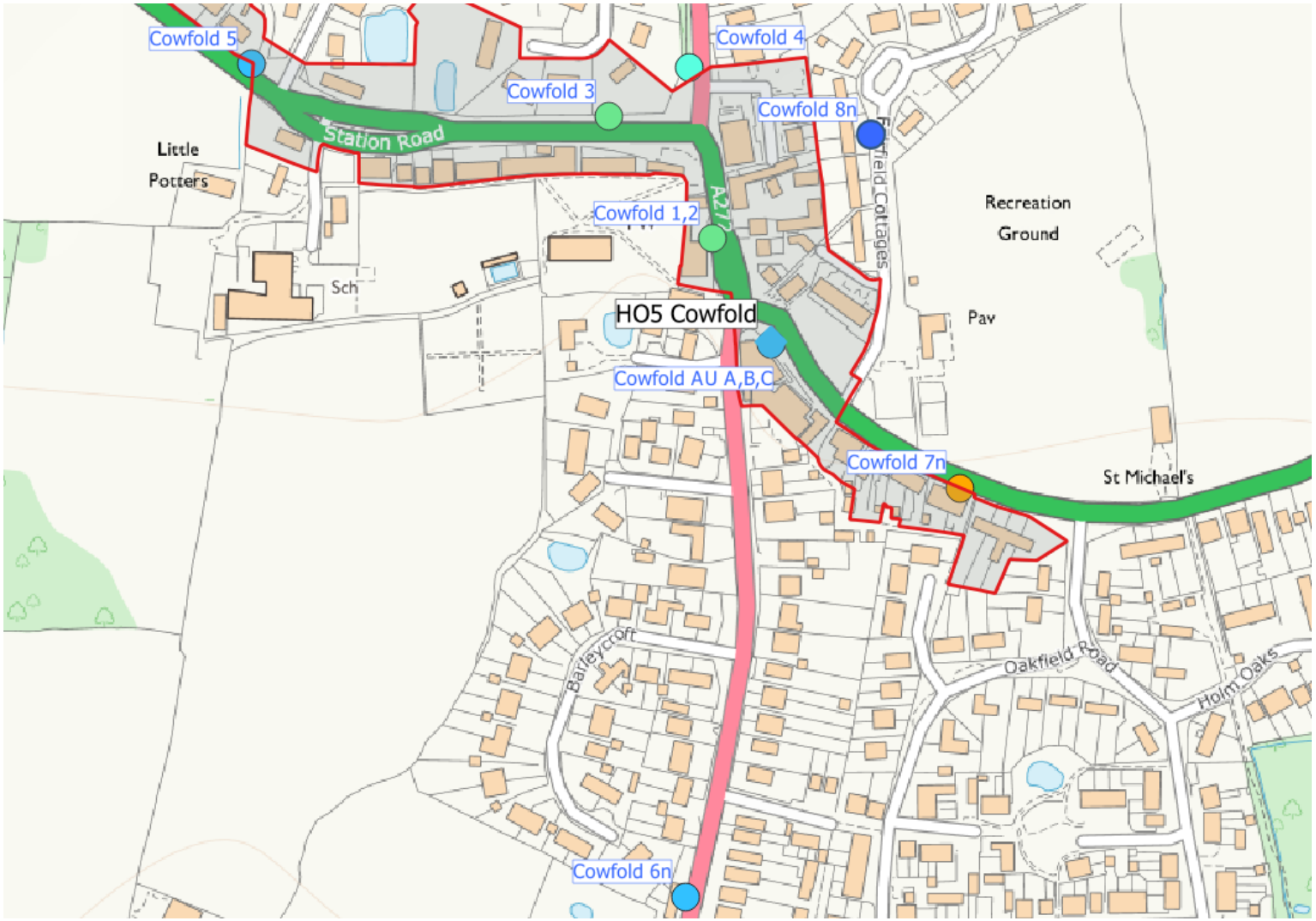


Legend

Diffusion Tube Location
2019 Concentration, µm/m3
- 0.0 - 20.0
- 20.0 - 24.0
- 24.0 - 28.0
- 28.0 - 32.0
- 32.0 - 36.0
- 36.0 - 40.0
- 40.0 - 50.0
- Continuous Monitoring Location
- AQMA Boundary

Scale	**Title**
Not To Scale	Non-Automatic Monitoring Sites – Storrington
Date	**Figure No. D5**
June 2020	

Figure D6 – Locations of Diffusion Tube Monitoring Sites – Cowfold



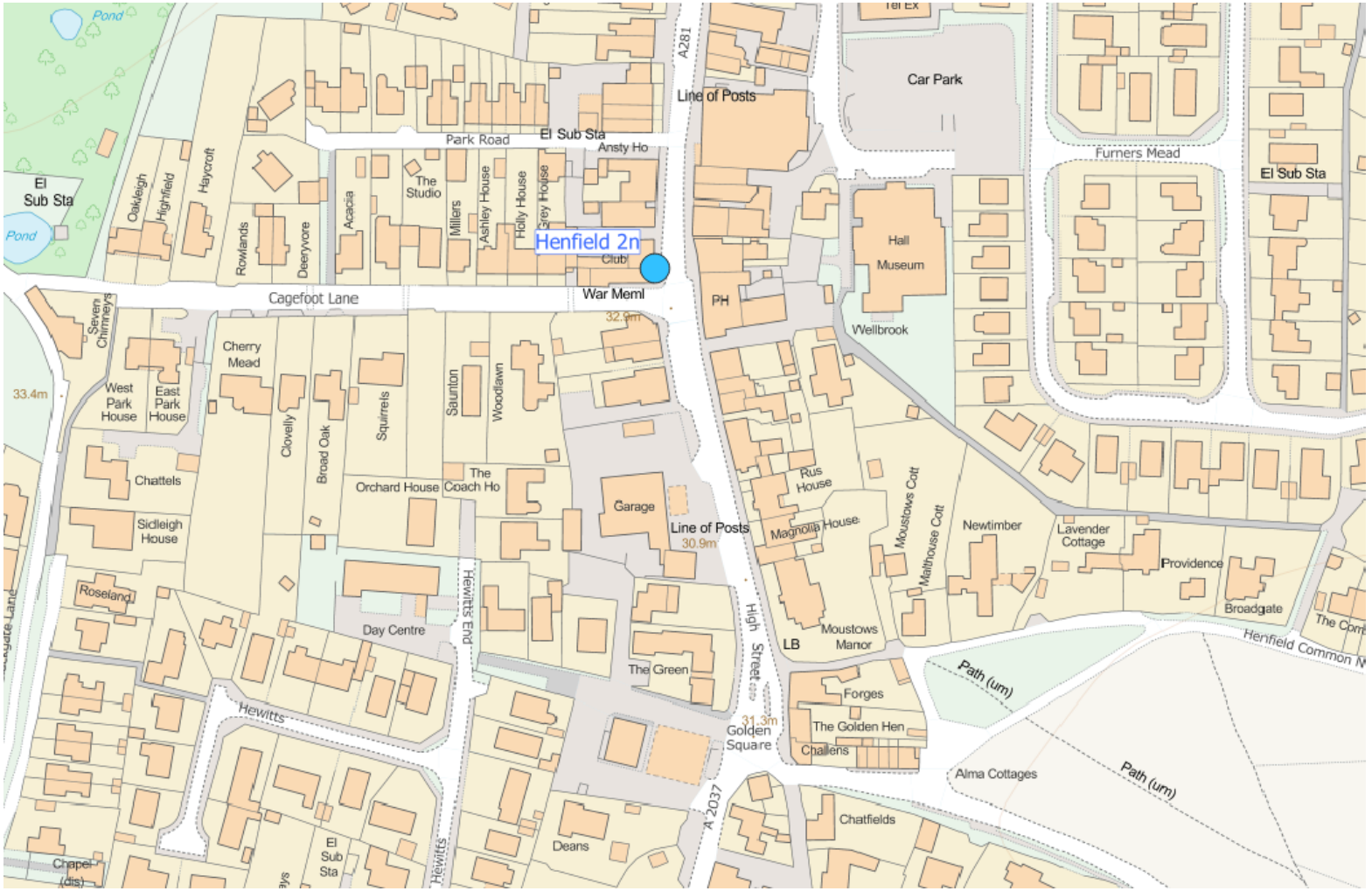
Legend

Diffusion Tube Location
2019 Concentration, µm/m3

- 0.0 - 20.0
- 20.0 - 24.0
- 24.0 - 28.0
- 28.0 - 32.0
- 32.0 - 36.0
- 36.0 - 40.0
- 40.0 - 50.0
- Continuous Monitoring Location
- AQMA Boundary

Scale	**Title**
Not To Scale	Non-Automatic Monitoring Sites – Cowfold
Date	**Figure No. D6**
June 2020	

Figure D7 – Locations of Diffusion Tube Monitoring Sites – Henfield



Legend

Diffusion Tube Location
2019 Concentration, µm/m3

- 0.0 - 20.0
- 20.0 - 24.0
- 24.0 - 28.0
- 28.0 - 32.0
- 32.0 - 36.0
- 36.0 - 40.0
- 40.0 - 50.0

Scale	**Title**
Not To Scale	Non-Automatic Monitoring Sites – Henfield
Date	**Figure No. D7**
June 2020	

Figure D8 – Locations of Diffusion Tube Monitoring Sites – Pulborough

Legend

Diffusion Tube Location
2019 Concentration, µm/m3

- 0.0 - 20.0
- 20.0 - 24.0
- 24.0 - 28.0
- 28.0 - 32.0
- 32.0 - 36.0
- 36.0 - 40.0
- 40.0 - 50.0

Scale	**Title**
Not To Scale	Non-Automatic Monitoring Sites – Pulborough
Date	**Figure No. D8**
June 2020	

Figure D9 – Locations of Diffusion Tube Monitoring Sites – Billingshurst

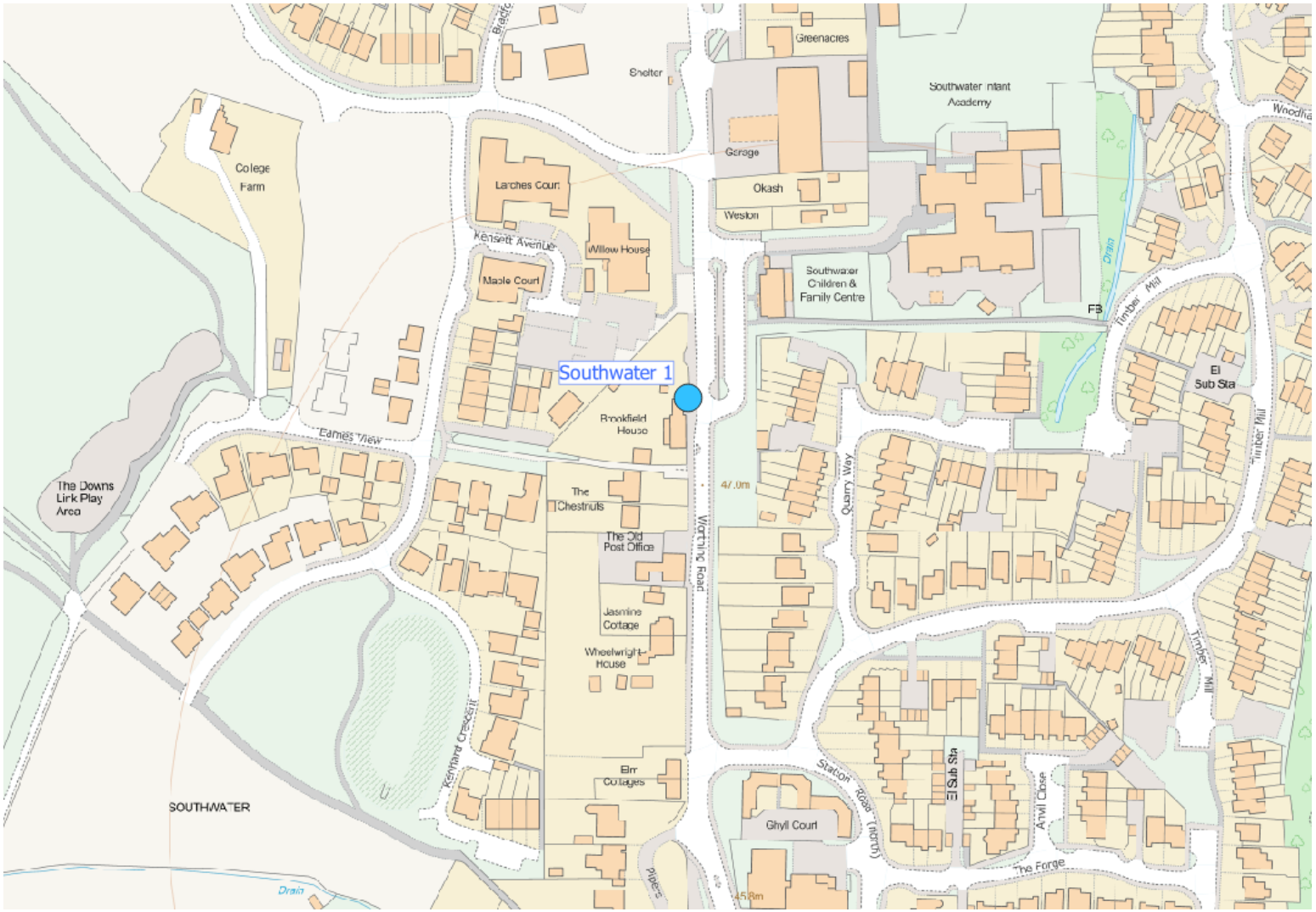
Legend

Diffusion Tube Location
2019 Concentration, µm/m3

- 0.0 - 20.0
- 20.0 - 24.0
- 24.0 - 28.0
- 28.0 - 32.0
- 32.0 - 36.0
- 36.0 - 40.0
- 40.0 - 50.0

Scale	**Title**
Not To Scale	Non-Automatic Monitoring Sites – Billingshurst
Date	**Figure No. D9**
June 2020	

Figure D10 – Locations of Diffusion Tube Monitoring Sites – Southwater



Legend

Diffusion Tube Location
2019 Concentration, µm/m3

- 0.0 - 20.0
- 20.0 - 24.0
- 24.0 - 28.0
- 28.0 - 32.0
- 32.0 - 36.0
- 36.0 - 40.0
- 40.0 - 50.0

Scale	**Title**
Not To Scale	Non-Automatic Monitoring Sites – Southwater
Date	**Figure No. D10**
June 2020	

Figure D11 – Locations of Diffusion Tube Monitoring Sites – Steyning

Scale	Title
Not To Scale	Non-Automatic Monitoring Sites – Steyning
Date	**Figure No. D11**
June 2020	

Appendix E: Industrial Processes

Within Horsham District Council there are a number of industrial processes that are controlled through permits issued under the Environmental permitting regime. Depending on the nature of the process, permits are issued either by the Environment Agency or by Horsham District Council.

There are 10 Part A1 installations in the Horsham District Council area operating under permits issued by the Environment Agency. Details of these processes are given in Table E1 below. There are also 37 Part B/A2 processes in the district with permits issued by Horsham District Council ; details of those are provided in Table E2 .

Table E1 – Industrial Processes with Permits Issued by the Environment Agency, 2019

Biffa Waste Services Ltd Brookhurstwood Landfill Langhurstwood Road Warnham West Sussex RH12 4QD Permits : GP3837YD, BP3835EE, VP3037EQ	Faccenda Group Limited Homefield Poultry Farm Broadford Bridge Road Billingshurst RH14 9EB Permit KP3336VT	Kinswood Eggs Limited Lackenhurst Lane Brooks Green Horsham RH13 0JO Permit QP3330AX
Cemex UK Materials Ltd Small Dole Leachate Treatment Plant Small Dole Landfill Henfield Road Small Dole West Sussex BN59XJ Permit QP3638YM	Hensel Recycling (UK) Ltd_ Maydwell Avenue, Slinford Permit EP3439DW	Viridor Waste Management Small Dole Landfill Henfield Road Small Dole Permit UP3635YS
Charles Muddle Limited_ Adversane Lane, Billingshurst Permit GP3338YC	Island Gas Ltd Storrington Oilfield East of A283 Cootham Storrington Pulborough Permit QP3632WN	
Four Seasons Fuel Four Seasons Farm Coneyhurst Nr. Billingshurst RH14 9DG Permit SP3632UN	Kimmeridge Oil & Gas Limited Woodbridge Farm, Adversane Ln, Billingshurst Permit AP3830JT	

Table E2 – Industrial Processes in 2019

Horsham DC Processes 2016/17				
Part B Processess				
Permit No.	Name	Process Type	Date Issued	Grid Reference
EPR4	Eurovia	Mobile Roadcoating	08/05/2013	517107, 130838
EPR8	Eurovia	Mobile Roadcoating	25/10/2013	517107, 130838
PPC10	Cemex	Bulk Cement	07/05/2008	510035, 114152
PPC11	Hawkins	Animal Incineration	02/01/2004	520793, 121379
EPR19	Thakeham Tiles	Bulk Cement	24/03/1993	510343, 115074
EPR33	Apollo Motor Company	Vehicle Refinishing	14/11/2011	516988, 136798
PPC34	Harwoods Bodyshop Five Oaks	Vehicle Refinishing	29/01/2007	509877, 128507
PPC53	PJ Brown Ltd	Mobile Crusher	18/03/2008	524039, 139393
EPR5	Edburton (Metrotrak)	Mobile Crusher	03/06/2013	522381, 111584
EPR41	Revival, Southwater	Dry Cleaning	01/12/2005	515746, 126351
EPR13	Dudman Group Ltd, Storrington	Bulk Cement	10/01/2013	509219, 113677
PPC50	Edburton (Apollo)	Mobile Crusher	10/04/2007	522381, 111584
EPR43	Taylors Dry Cleaners	Dry Cleaning	10/09/2007	516284, 131098
EPR44	Pulborough Cleaners	Dry Cleaning	17/09/2007	505192, 186007
EPR45	Hurst Cleaners	Dry Cleaning	17/09/2007	508689, 126127
EPR46	Rapide Dry Clean	Dry Cleaning	24/09/2007	516813, 130733
EPR47	Johnson Cleaners UK Ltd	Dry Cleaning	17/02/2010	517339, 130595
EPR48	JD Cleaners (Henfield) Ltd	Dry Cleaning	17/02/2010	521486, 116009
EPR49	Gem Cleaners, Storrington	Dry Cleaning	10/02/2010	508955, 114461
PPC54	Washington Coachworks Ltd	Vehicle Refinishing	03/04/2008	512105, 113826
EPR15	Hanson Concrete, Foundry Lane	Cement Storage	22/11/2010	518037, 131450
Part B Petrol Filling Stations				
PSS1	Horsham Service Station, Redkiln Way	Petrol Storage	10/11/1997	518630, 131620
PSS2	J Sainsbury PFS, Worthing Road, Horsham	Petrol Storage	19/08/1998	516870, 130396
PSS3	Tesco PFS, Broadbridge Heath	Petrol Storage	02/06/2008	515065, 130944
PSS4	Harwoods Garages Ltd, Pulborough	Petrol Storage	23/11/1998	504978, 119042
PSS6	Motor Fuel Group, Beeding Garage	Petrol Storage	18/02/2009	519674, 110411
PSS7	Shell UK Ltd, Hop Oast, Horsham	Petrol Storage	21/12/1998	516066, 128571
PSS8	Shell Uk Ltd, Broadbridge Heath	Petrol Storage	21/12/1998	515446, 131355
PSS10	Storrington Service Station	Petrol Storage	23/11/1998	508383, 114431
PSS11	Elite Garages Ltd, Pulborough	Petrol Storage	13/05/1999	504793, 118862
PSS12	Elite Garages Ltd, Mannings Heath	Petrol Storage	11/05/1999	519933, 128705
PSS14	Shell Service Station (804) Henfield	Petrol Storage	03/03/1999	521480, 115741
PSS18	Harwoods Garages Ltd, Five Oaks	Petrol Storage	26/02/2007	509916, 128496
PSS19	Godfreys of Horsham, Southwater	Petrol Storage	22/02/1999	515683, 126711
PSS20	Buck Barn Garage, West Grinstead	Petrol Storage	25/03/2013	516496, 122631
IPPC A2				
IPPC3	Wienerberger Ltd, Warnham Works	Brickworks	23/05/2006	517057, 134348
IPPC7	Ibstock Brick, Laybrook Factory	Brickworks	1/18/2011	511388, 118887

Appendix F: Summary of Air Quality Objectives in England

Table F1 – Air Quality Objectives included in Regulations for the purpose of LAQM in England

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Nitrogen dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m^3	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 µg/m^3	Annual mean	31.12.2004
Sulphur dioxide	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

Glossary of Terms

Abbreviation	Description
AIR-PT	Proficiency Testing scheme for laboratories involved in air quality analysis
AQAP	Air Quality Action Plan – A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air Quality Annual Status Report
AURN	Automatic Urban and Rural Network (UK air quality monitoring network)
CLC	County Local Committee
CYC	Charge-Your-Car eV charge point network
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
EH	Environmental Health
EV	Electric Vehicle
FDMS	Filter Dynamics Measurement System
HDC	Horsham District Council
HDPF	Horsham District Planning Framework
HE	Highways England
IWP	Integrated Works Programme
LAQM	Local Air Quality Management
LE	Low Emission
LEV	Low Emission Vehicle
LSTF	Local Sustainable Transport Fund
LTIP	Local Transport Investment Programme
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides
OLEV	Office for Low Emission Vehicles
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance/Quality Control
STIP	Strategic Transport Investment Programme
TRO	Traffic Regulation Order
ULEV	Ultra-Low Emission Vehicles
WASP	Workplace Analysis Scheme for Proficiency
WSCC	West Sussex County Council
TEA	Triethanolamine

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