

Crawley Borough Council

2021 Air Quality Annual Status Report (ASR)

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



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Executive Summary: Air Quality in Our Area

Air Quality in Crawley

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

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

As part of the Local Air Quality Management process (LAQM) required by the Environment Act 1995, the Council carries out an annual review and assessment of air quality in the borough to identify local air quality hot spots and pollution sources. Road traffic is the main source of (nitrogen dioxide) pollution in Crawley, and our network of monitoring sites records concentrations along busy roads as well as at background locations and areas of specific interest (such as residential locations close to the airport), in order to give a broad picture of pollution levels across the borough. If the council finds areas of relevant exposure, where air quality objectives are not being met, it is required to declare an Air Quality Management Area (AQMA) and produce an action plan (AQAP) showing what steps it will take to improve air quality in that area.

Air Quality in Crawley is mainly good, with the exception of a small number of locations alongside busy roads within the AQMA. These are along the A2011 Crawley Avenue corridor to the M23 Motorway, and on Worth Park Avenue at the busy traffic light junction

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

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

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

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

near Three Bridges Station. The Council is working with its partners to target actions to improve air quality in these areas.

There are two national objectives for nitrogen dioxide. These are for the average level over a year, which should be below 40 $\mu\text{g}/\text{m}^3$, and the average level for one hour, which should be below 200 $\mu\text{g}/\text{m}^3$. Most of our NO_2 monitoring is done using diffusion tubes which can't measure hourly average, so guidance developed by the Department for Environment, Food and Rural Affairs (DEFRA) estimates that if the yearly average is below 60 $\mu\text{g}/\text{m}^3$ it will meet the hourly objective of 200 $\mu\text{g}/\text{m}^3$. The annual average objective applies to residential, hospital and educational sites. The hourly average objective applies to these sites and to busy streets and workplaces as well.

The measured results for 2020 NO_2 are shown in tables A.4 and B.1 of this report. These show that in 2020 levels of nitrogen dioxide were significantly lower than 2019 levels, and the objectives were met at every monitoring site. This reduction was caused by the substantial decrease in traffic flows as a result of COVID restrictions introduced in March 2020. Trends in annual nitrogen dioxide concentrations can also be seen in Figure A.1.1 – A1.6 and show downward trends at all sites.

Monitoring data shows NO_2 levels in Crawley have, at most sites, fallen since a peak in 2010 but have been broadly stable in the last 4/5 years. 2020 was an exceptional year due to the impact of Covid which brought about an unprecedented reduction in traffic flows during the ensuing periods of lockdown over the year.

Traffic volumes in the region fell by 60% and possibly more in Crawley due to the absence of airport activity during the first lockdown period. This resulted in significant reductions in pollution concentrations at both local and national levels. In Crawley this led to an average 42% reduction in NO_2 levels across the borough, and approximately 50% reduction in the vicinity of the airport.

The measured results for 2020 Particulate pollution (PM_{10} and $\text{PM}_{2.5}$) are shown in tables A.6 and A.8 of this report. These show that in 2020 levels of particulates were, similar to NO_2 , below the objective levels, and also showing downward trends (Figures A.4 – A5).

The lockdown response to Covid fundamentally changed how society across the UK behaved in their day to day travel, work and social activities, creating a real-time experiment in behavioral change and environmental impact. As we return to more normal patterns of life, the risk is that these gains will be reversed as people switch from public transport to cars, resulting in the number of vehicles on the road becoming even greater

than before Covid restrictions. This could lead to increased congestion, air pollution and greenhouse gases.

It is uncertain what the long term impact of COVID will be on air quality. However, going forward, the focus should be on maintaining the impetus of the lockdown behavioral change in a sustainable way by developing plans and infrastructure in favour of active travel. By supporting pedestrians and cyclist in this way local authorities can help make walking and cycling a safer and more attractive option for essential journeys and maintain air quality improvements.

The boundary area of the AQMA was expanded this year, and work to review the air quality action plan to include the new area will be undertaken in the next reporting year. As monitoring data and trends are identified, changes to action plan measures can be made, as necessary, to address any Covid-recovery impacts, and reported in future Annual Status Reports.

Actions to Improve Air Quality

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

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

The Council has taken forward a number of measures to target sources of pollution within the borough over the past reporting year, including:

⁵ Defra. Clean Air Strategy, 2019

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

- The Crawley Growth Programme continues to deliver sustainable transport infrastructure upgrades across the borough through a number of different schemes. Construction has started on the Eastern Gateway Public Realm and Sustainable Transport Scheme. This will provide highways improvement to deliver enhanced pedestrian and cycle access and improve connectivity in and round the town centre. This will in turn help promote active travel in everyday life, with benefits to health and wellbeing, as well as air quality.
- Electric Vehicle Strategy for West Sussex 2019-2030. Following publication of the strategy, the council has been working to identify sites at residential locations (where there is no off street parking) and neighbourhood shopping parades that can be made available for EV charging infrastructure for Crawley residents to incentivise conversion to EVs and help enhance carbon emission reduction and air quality.
- Defra-funded air quality project. In partnership with Sussex-air the council helped deliver the Schools Travel Emissions Project to raise awareness about air quality, and examine local solutions like reducing traffic and replacing short journeys with active travel on “clean air routes” to avoid exposure to air pollution. Air quality monitoring with diffusion tubes has been used to provide evidence of the effectiveness of the interventions on local air quality at schools. 35,000 school children across Sussex have been educated through the project and the message has spread more widely with staff and parents as a result of project material being available online due to Covid.
- Air Quality Management Area Order- Formal consultation and approval of the amended AQMA Order to extend the boundary was completed in March 2021.
- Net Zero Collective Group - In 2020 Crawley Homes (council owned housing) joined a collaboration of property services businesses, equipment manufacturers and social housing owners working with Southampton University to research the most efficient/effective method of energy saving/carbon reduction in residential accommodation whilst maximising the social value of investment. Using 10 Crawley Council properties (from mixed housing stock) this research will inform a programme of retrofit insulation (cavity wall insulation, external wall insulation for timber framed properties, and top-up loft insulation) across our property portfolio to achieve energy saving and add pas2035 additional measures. Going forward CBC is aiming for development to passive house standard to avoid retrofit and achieve Net zero.

- The Council has radically altered the way in which staff work as a result of the pandemic, which has accelerated a move toward home and agile working that is expected to partially remain. This will reduce staff travel to work in the long term, not just during the pandemic restrictions.
- Extension of the Council's monitoring network to include 5 new sites representative of residential exposure in the proposed Station Gateway Scheme locations. Exceedances of the objective are not expected at these sites, but understanding of concentrations can help inform the design stage of the scheme.
- Assessment of planning applications for air quality impacts, including identifying where emissions assessments are required for damage costs calculations and negotiating mitigation measures in accordance with Council and national planning policy and guidance.

Conclusions and Priorities

The impact of the reduction in traffic flows as a result of COVID-19 can be seen as a significant fall in NO₂ concentrations at all monitoring sites, and no exceedances of the objective levels (after fall off corrections) are reported at any sites in Crawley in 2020. However, concentrations are expected to rise again in 2021 so no adjustments to the AQMA are proposed at this stage.

Crawley Borough Council's priorities for the coming year are:

The Council's priorities for the coming year are:

- To develop the AQAP to reflect the new AQMA in the context of Covid-19 recovery.
- Preparing responses to the planning consultation for air quality and mitigation measures to offset the environmental impacts for the Gatwick Northern Runway application
- To re-introduce face to face educational/promotional events to raise awareness of air quality issues, including the annual Clean Air day, Breath Easy, and Junior Citizen.

Review and update the monitoring network to respond to local developments and identify pollution hotspots across the borough.

The principal challenges and barriers to implementation that the council anticipates facing are:

- The scale of development in the local area and adjacent to the AQMA which threatens to impact action plan measures and offset improvements in emissions from societal change and vehicle technology.
- Attitudes to air quality (and climate emergency) measures which may perceive them as potentially hindering or slowing Covid economic recovery and result in blocking, delaying or de-railing action plan projects.
- Funding constraints within Local Government and the impact of Covid on the Council's income streams may delay some projects/schemes that underpin air quality action plan measures. To minimise the effect of these cuts, the council will be looking for alternative funding to support these measures.

Local Engagement and How to get Involved

Crawley is one of the smallest local authorities in Sussex covering an area of 45 km². Despite its size, it attracts a high level of incoming commuter traffic, as well as many local car journeys. A large percentage of local traffic are journeys of less than 2km, and 58% of car trips are under 5km. These high volumes of traffic on our local roads cause congestion and contribute to worsening air quality. However, since many journeys are short, there is opportunity to improve local air quality by switching to sustainable transport options such as walking, cycling, public transport or car sharing.

Many of our action plan measures include schemes that are aimed at infrastructure improvements to reduce congestion, improve sustainable transport options and encourage modal shift. Awareness raising to support behavioural change is an important part of this process, and local engagement is integral to, not only understanding the needs of the community, but also for informing the public and stakeholders of proposed improvements.

In developing our air quality action plan it is important to work closely with interested parties, including community groups, elected members, transport planners, planning policy and development control. Public engagement for many of these schemes includes presentations at local venues at accessible times during the day, and at weekends, to provide maximum opportunity for comments from stakeholders and members of the public. In addition, detailed, focused stakeholder and user group meetings are held. The events are promoted

extensively, directly to stakeholders, as well as publicly, through posters, flyers and press releases, and the opportunity for online feedback is made available.

Although Covid restrictions have prevented some of our promotional work over the last 12 months, we otherwise engage with all Crawley's primary schools during our annual Junior Citizen event, and provide information to the public via our Sussex-air website with air quality data, news updates, educational resources, links and other services such as [air Alert](#). We also run public awareness campaigns for annual events such as Clean Air day and Breath Easy week via the West Sussex news journal "Connections", digital advertising boards on Manor Royal Business district and on local radio Spirit FM.

In addition to the initiatives the council is talking to tackle air quality, there are lots of ways we can get involved and take action on a personal level to improve air quality in Crawley:

Walk or cycle: Replace car journeys by walking or cycling to reduce traffic and traffic emissions. It has proven health and mental health benefits too.

Take public transport or car-share: For longer journeys consider car share or public transport, such as bus, coach or train.

Ultra-Low Emission Vehicle (ULEV): Consider buying an electric/hybrid car

If a car journey is necessary: try to drive in an eco-friendly style

- Drive smoothly and try not to accelerate or brake hard.
- Maintain your car to reduce harmful emissions
- Check tyre pressure is correct to minimise fuel use and emissions.
- Limited use of the air conditioning reduces fuel consumption and emissions
- Turn off engine when car stationary. Idling vehicles release lots of exhaust emissions.

Go for local produce: Long distance transport creates more air pollution.

Local authority engagement with decision makers and the public: The council publishes information on its website (www.crawley.gov.uk) and local magazine More information on local air quality in Crawley can be found at:

[Air Quality Monitoring in Crawley](#)

[Sustainable Transport in Crawley](#)

[The Crawley Growth Programme](#)

[airAlert](#)

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1 Local Air Quality Management

This report provides an overview of air quality in Crawley during 2020. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Crawley Borough Council to improve air quality and any progress that has been made.

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

2 Actions to Improve Air Quality

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 should prepare an Air Quality Action Plan (AQAP) within 12 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

A summary of AQMAs declared by Crawley Borough Council can be found in Table 2.1. The table presents a description of the AQMA that is currently designated within Crawley Borough Council. Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of the AQMA and also the air quality monitoring locations in relation to the AQMA. The air quality objectives pertinent to the current AQMA designation are as follows:

- NO₂ annual mean;

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
Crawley AQMA	11.03.21 (Amended)	NO ₂ Annual Mean	Land and residential properties surrounding the Hazelwick Roundabout. The AQMA was further extended in March 2021 to include land and residential properties surrounding Three Bridges Station as described in Schedule 2 to the Order.	NO	41µg/m ³	37µg/m ³	Crawley Air Quality Action Plan	AQAP

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

Crawley Borough Council confirm that all current AQAPs have been submitted to Defra

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

Defra's appraisal of last year's ASR:

The report is well structured, detailed, and provides the information specified in the Guidance, following the latest template. The following comments are made:

1. The Council continue to review and update their monitoring programme and have introduced 4 new monitoring locations, one of which has identified a new pollutant hotspot. This demonstrates the importance of reviewing monitoring locations. The Council should continue to evaluate their monitoring programme on a regular basis, to ensure that monitoring takes place at any sites of potential exceedance with relevant exposure.

Response: *Following the review and assessment, five new monitoring sites were added to the network at locations of where planned development will introduce relevant public exposure adjacent to roads, and therefore data is needed to inform future planning applications.*

2. The Council are commended on their detailed account of progress made on their action plan measures. The Council have outlined key measures completed in the reporting year and those they expect to complete in the next reporting year. Progress on each measure is discussed in great detail. The Council are encouraged to continue this level of detail in future ASRs. Overall Section 2.2 is well written, insightful and demonstrates the Council's active engagement in tackling air quality issues and promoting sustainable strategies to improve air quality within their borough.

Response: *Progress on action plan measures was slow during 2020 due to the impact of Covid. However, the council will continue to report progress through the ASR.*

3. The Council is currently undertaking statutory consultation on the declaration of an extension to an existing AQMA (option 1), or a new AQMA (option 2) prior to its formal declaration by legal order. Once a decision has

been made it is important a new AQAP/updated is produced as soon as possible to reflect the changes in AQMA designation.

Response: *The council formally declared an extension to the AQMA area (option 1) in March 2021 and is working on updating the action plan to reflect the new area.*

4. The Council have addressed comments made in the previous appraisal and have now referred to the Public Health Outcomes Framework, and the local indicator for PM_{2.5} in the district. The Council have also provided a comparison of the '3.01 - Fraction of mortality attributable to particulate air pollution indicator' value for Crawley to nearby LAs and National indicator values.

Response: *The current report references the Public Health Outcomes Framework, the local indicator for PM_{2.5} and the fraction of mortality attributable to particulate air pollution in Crawley.*

5. Overall the report is very good, highly detailed and provides the required information. The Council have continued to provide a detailed account of the status of their AQMA and future plans for their AQMA as well as an in-depth discussion of pollutant trends throughout the borough. The Council continue to exemplify good practice; this is encouraging to see and should be continued in future reports.

On the basis of the evidence provided by the local authority the conclusions reached are acceptable for all sources and pollutants. The next step for Crawley Borough Council is to submit their next Annual Status Report in 2021.

Progress summary of Crawley Borough Council's Action plan Measures

Crawley Borough Council has taken forward a number of direct measures during the current reporting year of 2020 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. 36 measures are included within Table 2.2, with the type of measure and the progress Crawley Borough Council have made during the reporting year of 2020 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

Key completed measures are:

- Crawley Growth Programme – Station Gateway Scheme. The public realm/highway improvement scheme was agreed by Cabinet 2019. The following stage in this scheme was completed during the reporting year: Planning permission granted April 2021.

Key outcomes from measure: Encourage modal shift, reduce vehicle emissions, reduced energy emissions from housing units.

- Crawley Growth Programme - Eastern Gateway Public Realm and Sustainable Transport. Highways improvement to deliver enhanced pedestrian and cycle access and improve connectivity in and round the town centre. The following stage in this scheme was completed during the reporting year: Planning permission for the scheme granted February 2021 and construction commenced June 2021.

Expected impact of measure: encourage modal shift and reduce vehicle emissions

- WSCC Electric Vehicle Strategy 2019-2030. The strategy aims to encourage and support the adoption of electric vehicles within the county. The objectives are to ensure sufficient charging infrastructure in place to support the vehicle charging, and ensure renewable energy sources are used. Crawley is identified in the strategy as a priority area for EV infrastructure.

https://www.westsussex.gov.uk/media/13766/electric_vehicle_strategy.pdf

The Strategy sets a target for 70% of new cars in the County to be electric by 2030. Since 30% of households in Crawley have no access to off road parking this creates a barrier to switching to EV. The following stage in the implementation of this strategy was completed during the reporting year: During 2020/21 the Council identified sites at residential locations (where there is no off street parking) and neighbourhood shopping parades that can be made available for EV charging infrastructure for Crawley residents to incentivise conversion to EVs and help enhance carbon emission reduction and air quality improve. The procurement process started early 2021.

Key outcomes from measure: Encourage uptake of EVs and reduce vehicle emissions

- New Directions for Crawley - Transport and Access Strategy – the council’s strategy addressing issues and options for shifting from a car-centred to a people-centred approach to mobility and access was completed and adopted 2020. Transport study/modelling to support the action plan is currently being undertaken. The action

plan will be on a 10-year time frame and together with Crawley's LCWIP, will inform the emerging Local Plan to guide design and access elements of new developments.

Key outcomes from measure: Encourage modal shift and reduce emissions

- Draft local Plan 2020-2035 – The Local Plan provides detailed environmental policy and guidance through the development control process. The following stage in this process was completed during the reporting year: Reg. 19 stage consultation. Waiting to hear if further stage of consultation required. If this is required then timetable for final adoption of the plan is likely to be: Submission of plan late 2021/early 2022, examination hearings summer 2022, adoption of plan late 2022.

Key outcomes from measure: environmental policies and guidance to help improve air quality.

- Defra-funded air quality project - in partnership with Sussex-air delivered Defra funded Schools Travel Emissions Project: to raise awareness about air quality, and examine local solutions, such as reducing traffic and replacing short journeys with active travel on "clean air routes" to avoid exposure to air pollution. The project was delivered on behalf of the Sussex authorities by Sustrans. Due to Covid, the nature of engagement with schools had to change, however delivery continued online with many sessions conducted through pre-recorded assemblies/ pupil led projects. Some of the engagement was able to take place face to face once restrictions lifted. This included air quality monitoring with diffusion tubes, which were used to provide evidence of the effectiveness of the interventions on local air quality at schools. 35,000 school children across Sussex have been educated through the project and the message has spread more widely with staff and parents as a result of project material being available online. Due to additional funding being available (as a result of an under-spend) the project has been extended for a further 9 months.

Key outcomes from measure: Awareness raising/ modal shift/ reduction in vehicle emission

- Crawley Local Cycling and Walking Infrastructure Plan (LCWIP) - practical plan for a high quality network of safe, convenient and attractive cycling and walking routes though Crawley. Following consultation in summer 2020 the LCWIP was completed and published. A further transport study is currently being undertaken to inform what levels of mitigation/active travel is needed to support LCWIP targets

Key outcomes from measure: Reduced vehicle emissions

- Air Quality Management Area Order- Cabinet briefing, formal consultation and approval of the amended AQMA Order to extend the boundary was completed in (March 2021).

Key outcomes from measure: Target air quality action plan measures to reduce emissions and improve air quality

- Net Zero Collective Group - Energy saving/carbon reduction in residential accommodation. In 2020 Crawley Homes (council owned housing) joined up to this collaboration of property services businesses, equipment manufacturers and social housing owners working with Southampton university researchers to find answers to the challenge of decarbonising UK buildings and homes. CBC put forward 10 Council properties (from mixed housing stock) to enable research into the most efficient/effective method of decarbonisation, whilst maximising the social value of investment. This research (results due 2022) will inform a programme of retrofit insulation (cavity wall insulation, external wall insulation for timber framed properties, and top-up loft insulation) across our property portfolio to achieve energy saving and add pas2035 additional measures. Going forward CBC is aiming for development to passive house standard to avoid retrofit and achieve Net zero

Key outcomes from measure: Reduce emissions and improve air quality

Crawley Borough Council expects the following measures to be completed over the course of the next reporting year:

- Three Bridges Station Improvement Scheme (Crawley Growth Programme): Following extension of AQMA into Three Bridges, an air quality assessment has been undertaken, which concluded air quality impacts within AQMA would be *negligible* and overall impact on local air quality not significant. The following stage in this scheme is expected to be completed during the next reporting year: Completion of the planning process for new station forecourt, bus shelters improved cycle and pedestrian route connections, new taxi rank, waiting area and car drop off, highway junction upgrades and new eastern access to the station. Approval expected 2021/22.

Expected impact of measure: Encourage modal shift

- Manor Royal Highways Scheme (Crawley Growth Programme): The following stage in this scheme is expected to be completed during the next reporting year: Highways

improvement to pedestrian/cycle access across the business district for residential development. Construction is expected to commence late 2021, for completion 2022.

Expected impact of measure: encourage modal shift and reduce vehicle emissions

- Climate Emergency Action Plan - a climate emergency was declared at full Council meeting in July 2019 with a pledge to reduce carbon emissions from the Council's activities by 45% by 2030 and to zero by 2050. The Council's Overview and Scrutiny Commission (OSC) made recommendations for local climate action in 2020 and an advisory group was set up to help implement OCS recommendations through Climate Emergency Action Plan for Crawley. The action plan is currently in draft and is expected to be completed during the next reporting year.

Key outcomes from measure: Reduce Carbon emissions

- Crawley Car Club - scheme with private sector partner to supply and run EV car /car club at new town centre residential development (Geraint Thomas House). Building works now completed and tenants expected to occupy from September 2021. The contract for the social enterprise company to run the scheme awarded Q3 2021 and the car club is expected to be operational from Q1 2022.

Expected impact of measure: encourage modal shift and reduce vehicle emissions.

- Gatwick Development Consent Order (DCO) – expansion plan for second (Northern) runway. In 2019 Gatwick set out its intention to take its Northern Runway plans forward through an application under the Planning Act 2008 – using the Development Consent Order process. Following the Scoping report in 2019, the project was paused in 2020 but has now been restarted. Gatwick are currently engaging with local authorities on the Environmental Impact Assessment, which has been sub divided into a number of topic areas and presented as Preliminary Environmental Impact Reports (PEIR). This stage of the process is expected to be completed during the next reporting year. Although the final decision will be made by the Secretary of State, the council's input into this process is important in highlighting/ challenging issues relating to the environmental impact of these proposals in Crawley and the surrounding areas, and specifically the expected consequences for air quality and climate change. During the next reporting year the council will be preparing its responses to the proposals for a range of measures including air quality and discussing mitigation principles to offset these impacts.

Expected impact of measure: emissions mitigation

- DfT funded “Mini Holland” Infrastructure project – This is an infrastructure transformation project designed to apply a holistic civil engineering approach to reshaping the transport network to improve connectivity for residents and visitors whilst delivering a safer, more accessible joined-up network. Upgraded highway routes are designed to accommodate the latest cycling infrastructure, improving the flow of road users, cyclists, and pedestrians, and enhancing the environments through which they travel.

The council has submitted an expression of interest bid for DfT funding for this project. As Crawley’s population grows the transport network needs to evolve, and improvements have to be made now so it has the capacity to efficiently and safely carry the extra new residents and businesses. The programme applies road and traffic modelling technology, and the latest materials to ensure the transformed infrastructure meets the demands for air quality improvement while optimising journey times and accommodating a growing population. The submission of the bid stage for this scheme is expected to be completed during the next reporting year: If the council wins this funding the results will be reported in next year’s ASR progress summary.

Expected impact of measure: encourage modal shift and reduce vehicle emissions.

Crawley Borough Council’s priorities for the coming year are:

- Update air quality modelling and source apportionment for the AQMA to help inform the revision of the current Air Quality Action Plan
- Review and publish new AQAP to reflect the amended AQMA
- Seek further grants/funding streams to support air quality action plan measures.
- Preparing responses to EIA for the Gatwick DCO proposals for air quality and mitigation measures to offset air quality impacts
- To re-introduce (following lifting of Covid Restrictions) face to face educational/promotional events to raise awareness of air quality issues, including the annual Clean Air day, Breath Easy, and Junior Citizen.
- Review and update the monitoring network to respond to local developments and identify pollution hotspots across the borough.

The principal challenges and barriers to implementation that the council anticipates facing are:

- Tackling increasing developmental pressure, the scale of which may impact action plan measures and offset improvements in emissions from societal change and vehicle technology.
- The pandemic has had a major impact on the Council's income streams. At the same time, expenditure on services for the most vulnerable members of our society has increased. As a result some council services will have to be reduced. It is anticipated that this may delay or de-rail some projects/schemes that underpin air quality action plan measures. To minimise the effect of these cuts, the council will be looking for funding streams/grants to support action plan measures.

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

- Crawley Growth Programme – whilst all of the projects are ongoing and none have been discontinued, a number of schemes have run behind schedule as a consequence of Covid, and some have seen timescales for scheme delivery extended by 1-2 years.
- Emission Standards for Licensed Taxis - The implementation of the new policy on emission standards for licensed hackney carriages and private hire vehicles has been delayed further this reporting year due to the economic impact of Covid on the taxi trade in Crawley which relies heavily on Gatwick airport. As the full financial consequences of the ongoing restrictions has become evident, the decision was taken to revisit the policy changes proposed to provide a more flexible model of delivery. A revised proposal will be drafted which will aim to maximise the financial incentives and support available to the Trade whilst still delivering on the air quality/climate change benefits. The draft proposal will be presented to the Licensing committee and re-consulted on during the next reporting year.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Crawley Borough Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of the Crawley AQMA.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	Crawley Growth Programme Three Bridges railway station Interchange improvement schemes	Transport Planning and Infrastructure	Public transport improvements -interchanges stations and services	2019 Design Stage	Delivery programme for scheme extended to 2025. Anticipate construction commencing 2022/23	Coast to Capital Local Enterprise Partnership WSCC/ CBC	LEP/ WSCC/ CBC	No	Fully funded	Estimated £2.94m Full scheme cost review currently being undertaken - expect to submit final cost estimate late 2021	Planning application due late 2021	Reduced vehicle emissions Medium/ High	Modal Shift/ Improved traffic flow (greatly improved cycle/ pedestrian route connections + traffic management upgrades)	Following extension of AQMA into Three Bridges, AQ assessment undertaken. Concluded AQ impacts within AQMA negligible and overall impact of scheme proposals on local aq not significant. Planning application being prepared for submission late 2021	Scheme comprises: New station forecourt, relocated bus shelters, improved cycle and pedestrian route connections, new taxi rank, waiting area and car drop off, highway junction traffic light upgrades, new 'eastern' access to the station comprising a vehicle drop off point and pedestrian access to platforms
2	Crawley Growth Programme Three Bridges Stations EV Parking/ charging points	Promoting Low Emission Transport	Priority parking for LEV's Procuring alternative Refuelling infrastructure to promote EV recharging	2020 Design Stage	Delivery of scheme extended to 2025 Anticipate construction commencing late 2022.	LEP/ WSCC/ CBC	LEP/WSCC/ CBC	No	Fully funded	> £1m	Awaiting submission of pre app - expected Q4 2021	Reduced vehicle emissions Medium	Modal Shift	A full scheme review completed 2020 Information being put together for pre-app – expected Q4 2021 Planning application expected Q1 2022 – but implementation unlikely before 2022/23	Increase supply electric vehicle points/ parking bays at the station (20 in total) identified in response to increase demand.
3	Crawley Growth Programme Station Gateway - public realm/ highway improvement scheme including car free residential/ commercial development	Transport Planning and Infrastructure	Public transport improvements -interchanges stations and services	2019 Design/ Approval/ Planning Stage	Phased delivery programme for scheme extended to 2025.	Coast to Capital Local Enterprise Partnership WSCC/ CBC/ Private Developer (Aurora Group)	LEP/ WSCC/ CBC/ Aurora Group	No	Fully funded (Public /Private funded scheme)	£5.4m	Planning Approval April 2021	Reduced vehicle and housing energy emissions Medium/ High	Low Emission/car free Housing Modal Shift/ Improved traffic flow	Crawley BC granted planning permission April 2021. Arora Group to progress their scheme first. S106 agreements currently being negotiated with developer – aiming for start date late 2021.	Progress slowed last year due to furloughing of key staff in Aurora group.
4	Crawley Growth Programme Eastern Gateway - highway improvement scheme to deliver better connectivity and enhanced pedestrian and cycle access	Transport Planning and Infrastructure	Other (see comments section)	2020 Design Stage	Works commenced June 2021 aim to be completed July 2022.	WSCC	LEP/ WSCC/ CBC	No	Fully Funded	Revised cost £8.8m (previous estimate £8.3m)	Commenced (June 2021)	Reduced vehicle emissions Medium/ High	Modal Shift/ Improved traffic flow	Project, led by WSCC, was delayed due to Covid. Planning granted Feb 2021 works commenced June 2021 on the Boulevard and roundabout at Crawley College.	Deliver improved connectivity, enhanced pedestrian/cycle access to Town Hall, County Buildings, Telford Place and Crawley College. Scheme covers eastern half of The Boulevard, Exchange Road, southern end Northgate Avenue, College Road (including roundabout), Southgate Avenue, up to/ including Station Way. Scheme also connects to Station Gateway project
5	Crawley Growth Programme Manor Royal - highway improvement scheme	Transport Planning and Infrastructure	Other (see comments section)	2020 Design Stage	Construction due to commence Spring 2021 for completion in 2022.	WSCC	LEP/ WSCC/ CBC	No	Fully Funded	£3.31m (Phased delivery – Phase one £1.2m)	Construction contract for Phase 1 awarded Spring 2021	Reduced vehicle emissions Medium/ High	Modal Shift/ Improved traffic flow	Detailed design and further engagement completed for the Manor Royal scheme Construction contract for Phase 1 awarded Q1 2021 Anticipate work for phase 1 will commence Q3 2021.	Manor Royal highways improvement scheme to deliver better connectivity and enhanced pedestrian and cycle

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															access across the Business district Covid has caused some delays re impact on construction workers
6	Crawley Growth Programme Extension to the new Manor Royal bus Route	Promoting Travel Alternatives	Bus route improvements	2020	2021/22	Coast to Capital Local Enterprise Partnership WSCC/ CBC MetroBus	LEP/ WSCC/ CBC	No	Fully Funded	£820k	Design completed Further engagement being undertaken	Reduced vehicle emissions No Target set Medium/low	Improved journey times and timetable accuracy / Modal shift	Design completed	January 2020 CGP awarded additional £820k funding to extend bus lanes Manor Royal Business District, reducing bus journey times Covid has caused some delays re impact on construction Industry
7	Crawley Growth Programme Town Centre Cycling & Walking Schemes connecting Eastern Gateway and Station Gateway with existing cycle route along High Street	Transport Planning and Infrastructure	Cycle network	2020 Design Stage	Construction due to start 2021/22. Completion estimate Q2/ Q3 2022/22 - provisional	Coast to Capital Local Enterprise Partnership WSCC/ CBC	LEP/ WSCC/ CBC	No	Fully Funded	£1.1m	Public consultation completed. Final design process has begun	Reduced vehicle emissions Medium/low	Modal Shift	Design is in progress for the western part of the scheme from the Boulevard which will complete the final link to the High Street. Next stage Planning with estimated start date for construction Q4 2021/ Q1 2022	Town Centre Cycling & Walking Scheme creates a single, attractive, safe and connected cycle route that runs around the town center.
8	Crawley's Declaration of Climate Emergency	Policy Guidance and Development Control	Other policy (see comments section)	Declared 2019	Climate Emergency Action Plan due late 2021/ early 2022 followed by ongoing implementation	CBC	CBC	No	Fully Funded	Not known. Individual measures funded on project by project basis	Draft Action Plan in Progress	Target set for 45% reduction in carbon emissions from the Council's activities by 2030 and net zero by 2050	Emissions balance sheet	Feb 2020 Overview and Scrutiny Commission (OSC) recommendations for local climate action- including: Climate Change Impact Assessment Document for all new council services/ projects/ programmes to ensure carbon reduction targets taken into account. Climate Emergency Officer Advisory Group set up Nov 2020 to help implement OCS recommendations through Climate Emergency Action Plan for Crawley. Draft Climate emergency action plan under development – aiming for first draft to committee late 2021 Final Action Plan 2022	Crawley's Draft action plan to include: Reduce energy demand Transition to low carbon heat/ cooling Stop investing in technologies now that leave a carbon legacy Promote & support innovation in delivery of low and zero carbon energy Development progress slowed due to impact of Covid
9	Defra funded AQ project Clean Burn Sussex Project to promote cleaner fuels, compliant stoves, efficient burning methods	Promoting Low Emission Plant	Other measure for low emission fuels for stationary and mobile sources	2019	2019/20	SAQP/CBC	Defra Grant Funded	yes	Fully funded	£32,000	Implemented/completed	Reduced Particulate emissions No Target set	Public awareness – survey results Reduction in particulate emission	Completed 2020 New webpage on Sussex-air website to raise awareness https://sussex-air.net/Cleanburn/clean-burning.aspx .	CBC webpages also updated with Clean Burn information 2020
10	Defra funded AQ project: Schools travel emissions	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	Sept 2020	Completed August 2021 9 month extension of project agreed	SAQP/Sustrans/ CBC	Defra Grant Funded	yes	Fully funded	£105,900 Defra AQ under-spend (due to Covid)	ongoing	Reduced vehicle emissions Medium	Awareness raising/ Modal shift/ reduction in vehicle emission	Sustrans have delivered one year "Air-Mazing Journeys" Sussex project on behalf of the Sussex authorities. Sustrans officers works with schools across Sussex in/ near AQMA's to	The nature of engagement with schools has changed due to Covid, however delivery has

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	project/ street closure				Sept 2021 - May 2022					used to extend current Sustrans schools project for another 9 months				raise awareness about air quality, and examine local solutions like reducing traffic and replacing short journeys with active travel on "clean air routes" to avoid exposure to air pollution. 35,000 school children across Sussex educated through the project. Twitter/newsletters used to communicate key information/ statistics/ links to video resources and raise awareness of air quality outside schools in Sussex.	continued online with many sessions having to be conducted through pre-recorded assemblies/ pupil led projects. Some of the engagement and the message has spread more widely with staff and parents via online delivery
11	Air Quality and Emissions Mitigation Guidance for Sussex	Policy Guidance and Developmnt Control	Air Quality Planning and Policy Guidance	Revised Guidance April 2021 (Original Guidance 2013)	ongoing	CBC with Sussex-air (SAQP)	SAQP/CBC	NO	Fully funded	N/A covered by SAQP annual subscription	Implemented (ongoing updates)	Reduction in emissions from transport associated with new developmnt through mitigation Individual scheme emissions calculations undertaken	Conditions on planning applications to require: Assessment of emissions from development Damage cost calculation Scheme of mitigation for emissions mitigation	Air Quality and Mitigation Guidance incorporated in Crawley Local Plan referenced to developers in local list Updated draft published April 2021	Development of the Guidance as Supplementary Planning Document (SPD) being considered – dependent on review of application in other Sussex authorities
12	Crawley Local Cycling and Walking Infrastructure Plan (LCWIP)	Transport Planning and Infrastructure	Cycle Network	Published March 2021	Ongoing implementation (see comments)	CBC /WSCC	Various Towns Fund/ CGP/Active Travel fund/ S106/CIL	No	Not known. Individual measures funded on project by project basis	Not known. Costs on project by project basis	Published.	Reduced vehicle emissions No Target set	Modal shift	Published. WSCC reviewing LCWIP routes. Further transport study being undertaken to inform what levels of mitigation/active travel needed to support LCWIP targets	LCWIP is plan for high quality network of 16 safe, convenient and attractive cycling /walking routes though Crawley. Various funding sources being sort to implement plan. LCWIP in Local Plan – developers required to mitigate impact thorough S.106/CIL contributions to LCWIP targets/ projects
13	West Sussex Walking and Cycling Strategy - provision of cycling infrastructure along Ifield Avenue	Transport Planning and Infrastructure	Cycle Network	2019	Estimated 2019	WSCC	WSCC	No	Fully Funded	Not Known	Completed Q2 2020	Reduced vehicle emissions No Target set	Modal shift	Delivery of cycling infrastructure along Ifield Avenue was completed in 2020	Delayed completion due to Covid
14	West Sussex Walking and Cycling Strategy - Infrastructure upgrade to cycle path Southgate Avenue	Transport Planning and Infrastructure	Cycle Network	2019	Estimated 2022 (provisional)	WSCC	WSCC/ Govt funding or other source	No	Partial WSCC/ Grant funded (not yet awarded)	£500k (likely to be increased see comments)	Seeking funding	Reduced vehicle emissions No Target set	Modal shift	Options appraisal to improve existing cycle path on Southgate Avenue commissioned in 2019 as part of implementation of West Sussex Walking and Cycling Strategy. Preliminary design not approved by CBC 2020 WSCC not able to fund full scheme. CBC applying for next round of active travel funding to enable full scheme 2021	Progress delayed due to inadequate scheme design/ funding shortfall
15	New Directions for Crawley - Draft Transport and Access Strategy	Policy Guidance and Developmnt Control	Other policy (see comments section)	2020 for Strategy (Action plan)	Estimated 2022/23 followed by ongoing	CBC/WSCC	WSCC/ CBC/various private/public	No	Not known. Individual measures funded on project by	Not known. Costs on project by project basis	Strategy adopted 2020. Transport study/ modelling 2021 Action Plan 2022/23	Reduced vehicle emissions No Target set	Modal shift / reduced traffic emissions	Strategy adopted 2020. Currently undertaking Transport study/ modelling for scenario testing to inform measures for action plan	The strategy document addresses issues and options for shifting from car-centred to people-

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				estimated 2022/23)	implementation		/ funding sources		project basis					and to feed transport filters into Local Plan Looking at impact of Low Traffic Neighbourhoods/walking/cycling/access for CBC Action Plan estimated 2022/23	centred approach to mobility and access The 10-year time frame action plan emerging from the New Directions strategy together with LCWIP, will inform the emerging Local Plan to guide design and access elements of new low traffic developments
16	Draft local Plan 2020-2035 To provide detailed environmental policy and guidance through the development control process.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Draft 2019	Adoption due 2022 (see comments section)	CBC	CBC	No	Fully Funded	Not Known	Reg 19 Consultation Stage completed June 2021.	Reduced air quality impact through development control requiring adherence to air quality policy and emission mitigation	Energy efficient housing/ commercial development with good public/active transport links to reduce emissions	Draft Local Plan 2020-2035 completed and early engagement consultation September 2019. Public consultation January - March 2020. Reg 19 Consultation completed June 2021 Waiting to hear if further stage of very focussed consultation required relating to water supply issues	If further stage of consultation required then timetable likely to be: Submission of plan late 2021/early 2022, Examination hearings Summer 2022, Adoption of plan late 2022.
17	WSCC Parking Standards Guidance	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Priority parking for LEV's	Approved 2019	ongoing	WSCC	WSCC	No	Fully Funded	Not known	Implemented	Reduced vehicle emissions Parking /EV parking standards Targets set in the guidance	future percentage increases in allocation for EV's and active transport	Targets for cycle storage and EV charging/ parking set by WSCC Parking Standards Guidance. CBC Parking Standards annex to the proposed submission draft local plan	The Guidance sets out parking standards, including targets for cycle storage and EV charging/ parking.
18	Electric Vehicle Strategy for West Sussex 2019-2030 to encourage and support the adoption of electric vehicles	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging	Approved 2019	ongoing	WSCC	Funded via concession contract to be delivered by the preferred supplier. As such no capital funding requirement for Council	No	Fully Funded	Not known	2020/2021 - Sites identified on CBC land at residential/ commercial locations Q3 2021 -Procurement for EV infrastructure provider	Reduced vehicle emissions. No emissions target set in Strategy. (Baseline: Transport contributes > third carbon emission across Crawley = 250 ktCO2 pA)	WSCC modelled predictions estimates across West Sussex need 3,305 publicly accessible charging points by 2025, and 7,346 by 2030. To achieve 70% switch to EV cars by 2030	2020/2021 - Crawley Council identified sites (irrespective of commercial viability) at: Residential locations with no access to off street parking and Neighbourhood shopping Parades Q3 2021 - Tender specification and draft contract/lease documents, drafted. Procurement process started	WSCC Strategy target for 70% of new cars in the County to be electric by 2030 However, 30% of households in Crawley have no access to off road parking therefore hard to switch to EV. The Strategy sets out a solution aimed at both encouraging quick switch to EVs and addressing barriers that are preventing the switch. The scheme will provide uplift in available EV charging infrastructure for Crawley residents to incentivise conversion to EVs and help enhance carbon emission reduction and air quality improvements
19	School Travel plans	Promoting Travel Alternatives	School Travel Plans	2017	Ongoing	West Sussex County Council (WSCC)	WSCC	No	Fully Funded	Not Known	ongoing	Reduced vehicle emissions	Modal Shift %children travelling to school by sustainable means	Increase % Uptake	Helps reduce emissions during morning rush hour

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												No Target set Medium/low			
20	CBC Travel Plans	Promoting Travel Alternatives	Workplace Travel Planning	2019	Estimated 2021 Ongoing implementation	CBC	CBC	No	Fully Funded	Not Known	Publication estimated Q4 2021	Reduced vehicle emissions No Target set Medium/low	% staff travelling by sustainable means	Draft Travel plan produced 2019 Staff travel survey 2020 will help inform and shape final plan	Progress delayed due to other priorities during Covid-19 pandemic.
21	easit Green Travel Network – easit discount (15%) staff rail/ bus commuting available to Crawley staff/ businesses	Promoting Travel Alternatives	Promote use of rail and bus	2018	Ongoing	easit/CBC	easit/CBC or member company	No	Partial Funding	Not Known	ongoing	Reduced vehicle emissions No Target set Medium/low	% staff travelling by sustainable means	Only 4 registrations this year – impact of covid reducing numbers of commuters	Council originally involved in funding the setting up of the scheme.
22	Crawley car club scheme with private sector partner	Promoting Travel Alternatives	Personalised Travel Planning	2019	Contract awarded 2021	CBC/ Private sector partner	Private sector partner/ S.106 contribution	No	Fully Funded	s.106 monies £20k Private sector contribution N/K	Contract awarded	Reduced vehicle emissions No Target set Medium/low	Reduction in private vehicle ownership	Contract awarded to supply and run EV car /car club at new Town Center residential development (Geraint Thomas House). Building completed – car club expected to start 2022	.
23	Crawley Borough Council Staff Travel Survey	Promoting Travel Alternatives	Personalised Travel Planning	2020	Dec 2020	CBC	CBC	No	Fully Funded	Not Known	Implemented	Reduced vehicle emissions No Target set	Modal shift/ staff travelling by sustainable means	Survey completed Dec 2020 Travel policy in progress 2021 Travel policy measures to feed into Climate Emergency Action Plan late 2021/22	The Council's staff travel survey which will inform the development for travel policy measures to be designed and included in the emerging Climate Emergency Action Plan in 2021/22.
24	Living Streets campaign - Information, events, and activities to promote walking	Promoting Travel Alternatives	Promotion of Walking	ongoing	Ongoing	WSCC Wellbeing/ Living Streets/ CBC	WSCC/ CBC	No	Fully Funded	Not Known	Implemented (annually)	Reduced vehicle emissions No Target set	Modal shift	Annual campaign event – Covid restrictions online for 2021	Information, events, and activities aimed at council staff and local businesses
25	Residential and Business Travel plans	Promoting Travel Alternatives	Residential/ Business travel plans	ongoing	Ongoing	CBC	CBC	No	Fully Funded	Not Known	Implemented (individual developers/ businesses)	Reduced vehicle emissions No Target set	% development occupants (residents or staff) using sustainable transport modes	Developments of certain size required to implement Travel Plan	Implemented through Planning process - each application has its own target plan
26	Staff car loan - Council Vehicle procurement requires vehicle emissions limit eligibility for loan	Promoting Low Emissions Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles.	2000	Ongoing	CBC	CBC	No	Fully Funded	Not Known	Implemented /ongoing (individual applications)	Reduced vehicle emissions CO2 level of < 150 g/kg.	Minimum CO2 level of < 150 g/kg.	16 new-staff car loan applications 2020/2021	
27	Council Vehicle Fleet LEVs Fleet replacement prioritising uptake of EV/low emission vehicles	Promoting Low Emissions Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	ongoing	ongoing	CBC	CBC	No	Fully Funded (capital replacement budget)	Not Know	Funding identified/ tender awarded.	Reduced vehicle emissions	Modal shift to LEV/ Zero emissions	Play Services to replace diesel van with electric van 2021 Funding identified/ tender awarded. Neighbourhood Services to replace 2 road sweepers. One replaced July 2021 Euro VI diesel rather than EV for operational reasons. Second sweeper funding identified for electric (depending on Manufacturers availability).	

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28	CBC Staff Bicycle Loan Scheme	Promoting Low Emissions Transport	Prioritising uptake of low emission vehicles	2015	ongoing	CBC	CBC	No	Fully Funded	Not Known	Implemented /ongoing (individual applications)	low	Modal shift from private vehicle to bicycle	No new loan awarded 2020/21	CBC staff loan to buy Bike
29	CBC Staff Bike to Work Scheme	Promoting Low Emissions Transport	Prioritising uptake of low emission vehicles	2015	ongoing	CBC/Cycles scheme	Cycles scheme	No	Fully Funded	Not Known	Implemented /ongoing (individual applications)	low	Modal shift from private vehicle to bicycle	5 new applicants 2020/21 (increase of 2 from 2019/20)	Bike Hire Scheme CBC/Partnership with "Cyclescheme" which allows employees to purchase bike through other shop outlets
30	Junior Citizen Event - educational programme on environmental issues, safety and citizenship, including "Air quality in our local area"	Public Information Promoting Travel Alternatives	Other (interactive games and Awareness raising)	1990	Ongoing 2020 Junior Citizen event will not go ahead this year due to Covid restrictions	CBC	CBC	No	Fully Funded	£8k	Postponed this year due to Covid	No Target set	Education and Modal Shift	Annually approximately 1200 KS2 (Yr6) pupils per year attend the event which has been running for over 30 years. Postponed this year due to Covid. Not sufficient certainty/ lead in time to organise the event – but expected to resume 2022.	Educational programme "Air quality in our local area" delivered through eco-action games and small discussion groups. Funding for future events may be cut due to lack of funding resulting from Covid-19 pandemic.
31	Emission Standards for Licensed Taxis	Promoting Low Emissions Transport	Taxi emission incentives	2020	Due to be adopted 2021/22 and implemented from 2022/23 Delayed (see Comments)	CBC	Individual operators capital replacement/ alternative funding sources	No	Fully / or partially grant funded	Not Known (Renewal purchase costs on individual basis)	Policy update currently in progress – not yet formally adopted -delayed due to Covid impact on taxi trade Review of policy in progress and re-consult 2021	Zero emissions by 2030	Currently under review Original indicators: new licensed taxis zero emission capable (ZEC) from April 2022 and existing licensed taxis retrofitted to meet Euro 6 by October 2022 Diesel-fuelled vehicles phased out by 2027)	Changes to policy on emission standards agreed at licensing committee Jan 2020 Consultation and ongoing dialogue with the trade during 2020/2021. Review and re-consult 2021	Following public consultation the time scales for adopting the new standards have been delayed as a result of Covid. The policy is expected to be adopted early in 2022
32	LED lighting installation Programme	Promoting Low Emission Plant	Shift to installations using low emission fuels	2012	Ongoing LED Replacement scheme when lights fail replaced with LED	CBC	CBC	No	Fully funded	Costed on a project by project basis	ongoing	LED replacement : 40% reduction weekly wattage (> 50k watts)	45% Reduction in CO2 Emissions by 2030 100% Reduction in CO2 Emissions by 2050	2021 Ongoing programme of LED lighting installation in communal areas of Council owned flats and sheltered blocks. 2022 New additional programme to be started to fit Battery Storage in communal blocks already supplied with a Solar PV system.	
33	airAlert Pollution Warning Service for people with asthma, COPD, or cardio problems. Voice call, text, or email sent to warn of high pollution and advise action to manage health	Public Information	Via other mechanisms SMS/ Mobile phone App/ Email	2006	ongoing	SAQP	SAQP	No	Fully funded	£4.2k	implemented	Health based service No Target set – but raises awareness of health impacts of pollution – manage chronic health conditions and drive behavioural change.	Uptake: Subscription numbers to the alert service	Over 800 registered subscribers. No direct emissions reductions but health benefits from direct application of monitoring data and raises awareness of air quality	Currently consulting with Sussex authorities in SAQP on whether to continue running the service or to subscribe to the (free) Met office forecasting alert

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34	Anti-idling promotion - Installation of anti-idling signs at Crawley's level crossing sites	Traffic Management	Anti-idling enforcement	Original signage 2003 Additional signage 2019	planned for 2020/21	SAQP/WSCC/CBC	SAQP funded by Sussex-air Defra funded anti idling around schools (2019)	yes	Fully funded	Exact cost not known (proportion of £25k for anti-idling campaign)	Completed	No Target set	Local air quality monitoring	Installation of additional anti-idling signs by WSCC for Crawley's level crossing sites completed 2020	
35	Public Health Information/ Awareness Campaigns promoting sustainable modes of travel to staff and public: Clean Air Day Event and Breathe Easy Week	Public Information	Other – see comments	Ongoing	Annual events - ongoing	CBC/WSCC/SAQP	CBC/ WSCC/ SAQP	No	Fully Funded	Not Known	Implemented (annually)	Campaign to raise awareness of health impacts of pollution, drive behavioural change and promote clean air No Target set	Engagement/number of pledges for behavioral change/ modal shift Take-up of initiatives Website hits Increase in air alert subscribers	Joint working with WSCC/SAQP/ Public Health/ CBC EH and Sustainability Teams to support campaigns and promotion of air Alert through social media posts on: Clean Air Day 17 June 2021 Breathe Easy Week 22 to 27 June 2021 Love Your Lungs Week British Lung Foundation (blf.org.uk) https://www.blf.org.uk/take-action/campaign/loveyourlungsweek	Public awareness campaign through editorials and advertisements in WSCC Connections and social media posts. Due to Covid restrictions public events were not possible this year
36	Net zero Collective Group Energy saving/carbon reduction in residential accommodation	Promoting Low Emission Plant	Emission control equipment for small and medium sized stationary combustion sources / replacement of combustion sources	2020	Ongoing retrofit programme	CBC /Net Zero Collective/ University of Southampton	CBC/ LEP funding for green retrofitting. Aiming to be eligible for GHG (LAD) 2022 (See progress/ comments)	No	Fully Funded (see Comments)	Circa £20K per property	Programme of retrofit insulation (cavity wall insulation, external wall insulation (timber framed properties) and top-up loft insulation) across property portfolio to add pas2035 additional measures https://netzerocollective.co.uk/	Aiming for net zero	Lower energy bills Reduce carbon footprint - measured by EPC rating before and after retrofit. Toolkit developed by Southampton Uni to calculate EPC (Future industry standard) for decarbonisation/ Energy efficiency	10 properties (from mixed variety housing stock) surveyed/ monitored/researched by university of Southampton to inform retrofit energy saving installs (2021/22) Currently waiting for analysis from Southampton university (Expected 2022) to inform retrofit going forward. Aiming for approx 100 homes to be eligible for Green Homes Grant Local Authority Delivery (GHG LAD) 2022. Seeking solutions to overcome current barriers to funding stream - due to funding requirements for completion timescales not achievable/green retrofit supply chain.	CBC putting forward selection of Council properties to enable research into the most efficient / effective method of decarbonising UK homes/ buildings and maximise the social value of investment. LEP funding through Town Investment plan to train/ retrain local heating engineers in new technologies and fund green retrofit. Going forward CBC's aiming for development to passive house standard to avoid retrofit and achieve Net zero

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

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

Those most at risk from air pollution are the young and elderly and those with predisposed medical conditions, which may be exacerbated by elevated levels of air pollution. A report by Public Health England (PHE) (Estimating Local Mortality Burdens Associated with Particulate Air Pollution, April 2014) estimates that particulate matter was a contributory factor in 29,000 deaths nationally in 2010. A further [report](#) by the Royal College of Physicians in 2016 predicted that air pollution contributed to the equivalent of 40,000 deaths in 2015.

PHE have produced a [Public Health Outcomes Framework for England](#) which identifies an indicator for the fraction of mortality attributable to particulate air pollution in each authority in the UK. Using this framework it is possible to compare the values for Crawley to regional and national values, as well as other nearby authorities in Sussex.

In Crawley, the latest (2019) estimated fraction of mortality attributable to long-term exposure to Particulates is 5.4 (Fig. 2.1). This is an improvement on the 2018 value of 5.8 and similar to other urban centres in the region such as Brighton and Hove (5.3), Adur and Worthing (5.1) and Reigate and Banstead (5.3). Crawley’s value is just above the average for the South East region (5.2) and England (5.1). Across West Sussex the values range from 4.5 to 5.4.

Fig. 2.1: Fraction of mortality attributed to particulate air pollution in Crawley and South East

Indicator	Period	England	South East region	Adur	Arun	Ashford	Aylesbury Vale	Basingstoke and Deane	Bracknell Forest	Brighton and Hove	Canterbury	Cherwell	Chichester	Chiltern	Crawley	Dartford	Dover	East Hampshire	Eastbourne	Eastleigh	Elmbridge
D01 - Fraction of mortality attributable to particulate air pollution	2019	5.1	5.2	5.1	4.7	5.1	-	4.6	5.3	5.3	5.1	5.4	4.5	-	5.4	5.3	4.9	4.4	4.9	4.7	5.7

Crawley borough council is working to address PM2.5 through measures aimed at reducing emissions from a range of sources in the area, including transport, industrial processes and domestic burning.

The council is taking the following measures to address PM_{2.5}:

1. Smoke Control Areas (SCA) in Crawley: Almost all of Crawley (with the exception of Gatwick Airport and some newer areas of development of the outskirts of the borough) is designated as a SCA. These areas were declared by Smoke Control Orders during the late 1950s and 1960s (after the public health crisis of the smogs of the 1950s) when Crawley was a rapidly expanding new town. The regulation of smoke emissions by means of controls on the solid fuel appliances and the type of fuel burnt within the SCA, will reduce the impact of PM_{2.5} emissions in the borough. However, as the popularity of wood burners has increased in recent years, complaints of smoke from wood burners has also risen, due mainly to the burning of waste and unseasoned wood. The need to educate a new generation of solid fuel owners was therefore identified, and a “clean burn” campaign was launched in 2020 through a Defra grant funded project ‘Clean Burn Sussex’. The campaign aims to raise awareness and encouraging choice of cleaner fuels in an attempt to reduce particulate emissions from domestic burning. The council has updated smoke control and domestic burning guidance on our website linking to the Clean Burn campaign.
2. Regulation of Industrial Process: Control emissions of PM_{2.5} from mineral processes such as concrete batching, concrete rushing and road-stone coating.
3. Air Quality Action Plan: Many of the measures in our action plan promote low emission travel alternatives (e.g. cycling, walking, electric vehicles, car sharing etc) and the Crawley Growth Programme infrastructure projects that facilitate modal change, indirectly helping to reduce Particulate emissions.
4. WSCC Electric Strategy: charging network to encourage low/zero emissions vehicles.
5. Policy Measures: These include procurement of low emission vehicles and tightening the emissions standards for licensed taxis
6. Local Plan Policy: Requirement to adhere to the Sussex Air Quality and Emissions Mitigation Guidance document
7. Local Transport Plan: Traffic management measures to reduce congestion, improve traffic flow and reduce road traffic pollutant emissions (including PM_{2.5})

8. Monitoring: Direct monitoring of PM_{2.5} has been undertaken in Crawley since a new particulate analyser (FIDAS) was installed at the continuous monitoring station at Gatwick Airport in March 2020. This monitoring capability will assist us in assessing PM_{2.5} levels in our local authority. The measured annual mean for PM_{2.5} in Crawley is 8ug/m³. Further details are given in Section 3 of the report.

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

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

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

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

3.1.2 Non-Automatic Monitoring Sites

Crawley Borough Council undertook non- automatic (i.e. passive) monitoring of NO₂ at 51 sites during 2020. Table A.2 in Appendix A presents the details of the non-automatic sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. annualisation and/or distance correction), are included in Appendix C.

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO₂)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO₂ annual mean concentrations for the past five years with the air quality objective of 40µg/m³. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2020 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

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

The data in Table B.1 shows that air quality in Crawley is mainly good. There is no evidence that the hourly objective for NO₂ was being exceeded at any sites across Crawley in 2020 (indicator level annual means > 60µg/m³) and the annual mean objective of 40 µg/m³ was achieved at most monitoring locations, with the exception of two sites next to busy roads (CR63 and CR101). Both these sites were roadside locations, meaning they are located closer to the road than to houses, and therefore are not truly representative of residential exposure because pollution concentrations decrease with distance from the source. In order to account for this falling off in pollution concentration, an adjustment is made (Appendix C) to provide a more representative estimation of exposure. After applying this fall-off adjustment, there were no exceedances at the point of relevant public exposure at sites CR63 and CR101. Therefore no sites within Crawley, including Crawley's AQMA, exceeded the national objectives for NO₂ in 2020.

NO₂ levels across Crawley showed an improvement from 2019 results. This improvement, can almost entirely be attributed to the significant impact COVID-19 has had nationally on

the environment, most notably in relation to emissions of air pollutants arising from road traffic. The impact of Covid is discussed in more detail in Appendix F.

2020 NO₂ Gatwick Airport

There were no exceedances of the annual or hourly mean objectives for NO₂ at the Gatwick East monitoring site (CA2) in 2020.

Fig 3.1

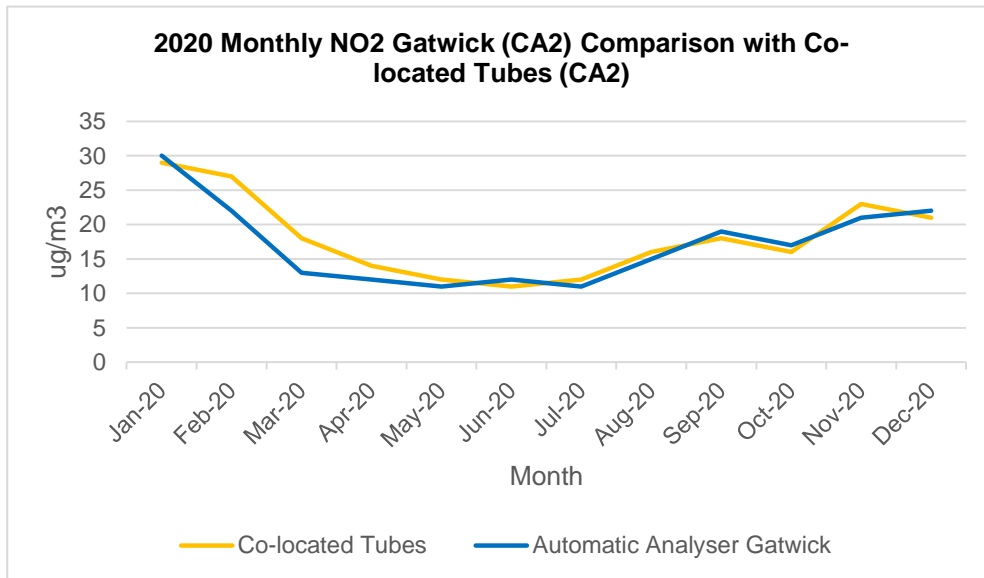
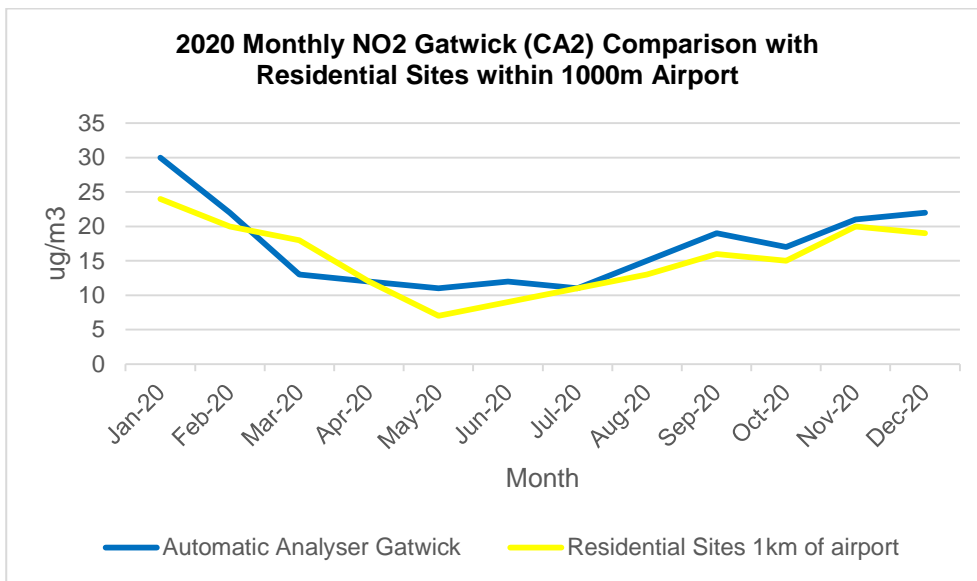


Fig 3.1 indicates that the co-located diffusion tube data at the CA2 site showed good correlation with the continuous data. The results show comparable annual means (18µg/m³/17µg/m³), and the same trend pattern.

Determining relevant exposure at residential properties within 1000m of the airport is one of the assessment criteria required for authorities with a major airport within their boundary. Fig 3.2 presents the 2020 monitoring data for residential properties within 1000m of Gatwick. The data shows there were no exceedances of the objective in 2020 and levels closely follow the same trend pattern as the airport data.

Fig 3.2



Figs 3.1 and 3.2 show the impact of the first national lockdown (23 March 2020) in the dramatic fall off in NO₂ levels (March – June) as widespread international border restrictions and lockdowns in many countries prevented air travel and resulted in unprecedented reductions in the volume of traffic accessing the airport, leading to a corresponding downturn in transport related NO₂ emissions.

Fig 3.3 and 3.4 below, compare NO₂ concentrations in 2020 with the pre-Covid levels in 2019 at locations around the airport

Fig 3.3

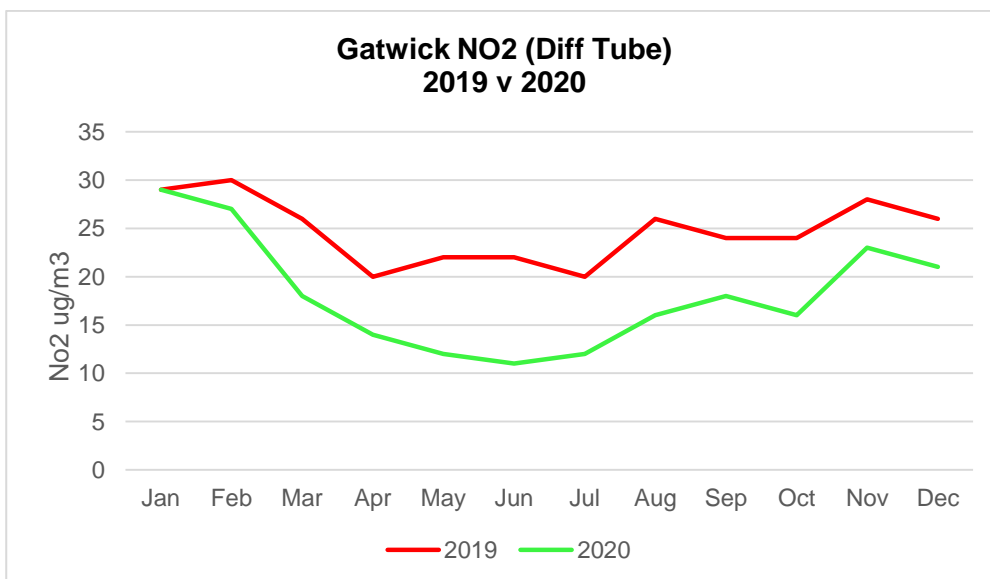
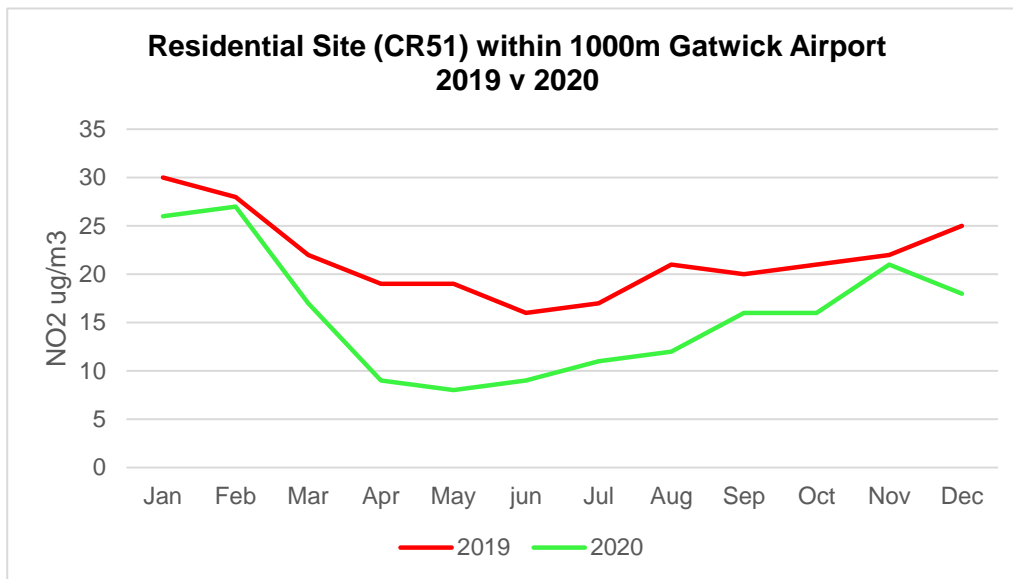


Fig 3.4



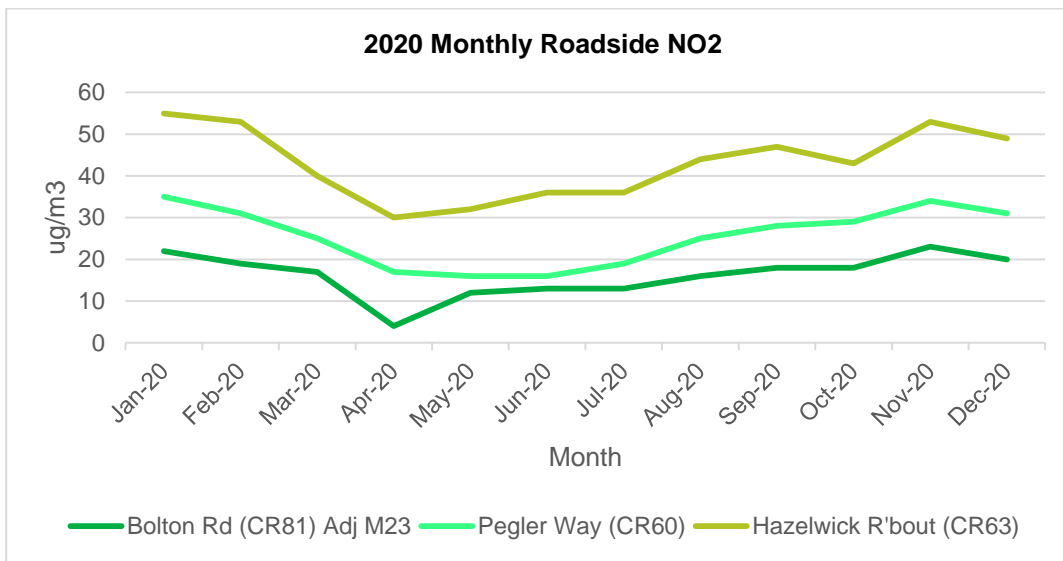
From the 1st January to 31st March 2021, there were 3,116 aircraft movements in total at Gatwick Airport, which is a decrease of almost 94% compared to the same three-month period in 2020. This was the last quarter before the COVID pandemic brought air traffic in the UK to a near standstill. The fall-off in passenger related road traffic which resulted, contributed to approximately $7\mu\text{g}/\text{m}^3$ reductions in 2020 annual mean NO_2 concentrations at monitoring sites around the airport, which equates to approx. 30% reduction in annual mean concentration relative to 2019.

2020 Roadside NO_2 in Crawley

There were no exceedances of the hourly mean objectives for NO_2 at any of the roadside monitoring sites in Crawley in 2020. Two sites (CR63 and CR101) exceeded the annual mean objective of $40\mu\text{g}/\text{m}^3$, but without any relevant public exposure.

Fig 3.5 shows the monthly trend in roadside NO_2 at three sites in Crawley during 2020. The top trendline shows the Hazelwick roundabout (CR63) in the AQMA. The middle trendline is for a roadside site in the town centre (CR60) and bottom trend line for a residential site (CR81) situated adjacent to the M23 motorway.

Fig 3.5



The steep drop in roadside NO₂ shown in March 2020 corresponds to the marked reductions in vehicle traffic observed following official guidance advising all members of public to stay at home, with work-related travel only permitted when absolutely necessary. The traffic volume data for Sussex shown in Fig 3.6 below, and the Department for Transport (DfT) national data, suggests reductions in vehicle traffic of up to 70% were experienced across the UK by mid-April, relative to pre COVID-19 levels.

Fig 3.6 Traffic Volumes Sussex at start Covid National Lockdown March - April 2020

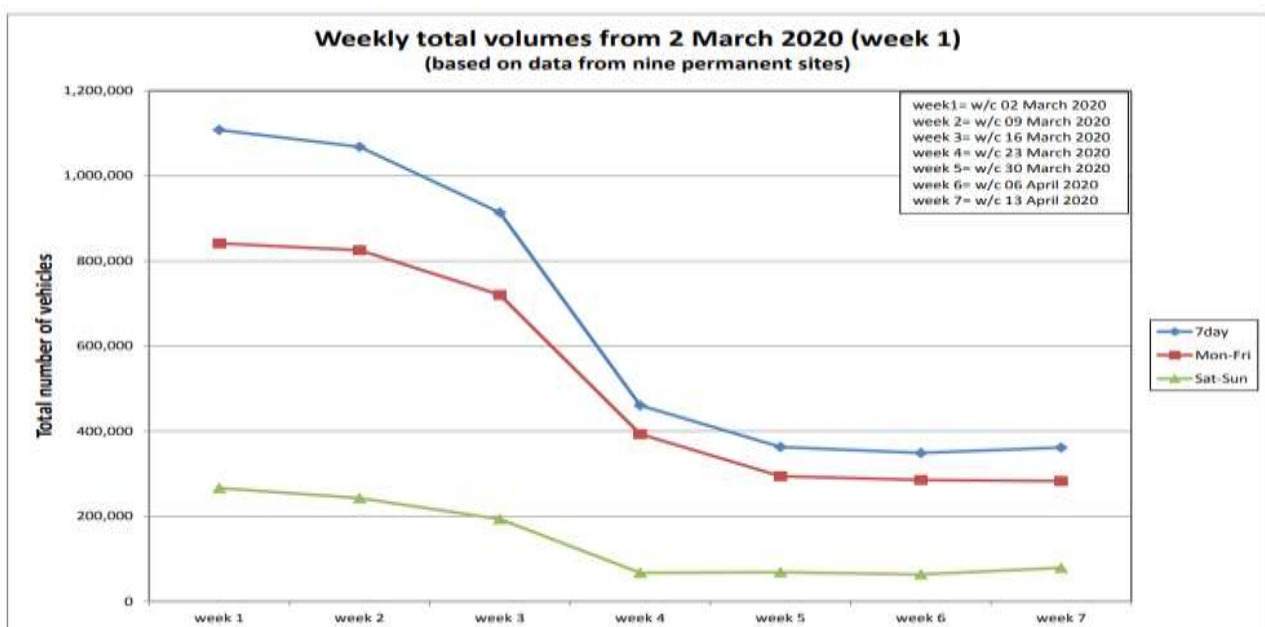


Fig 3.7

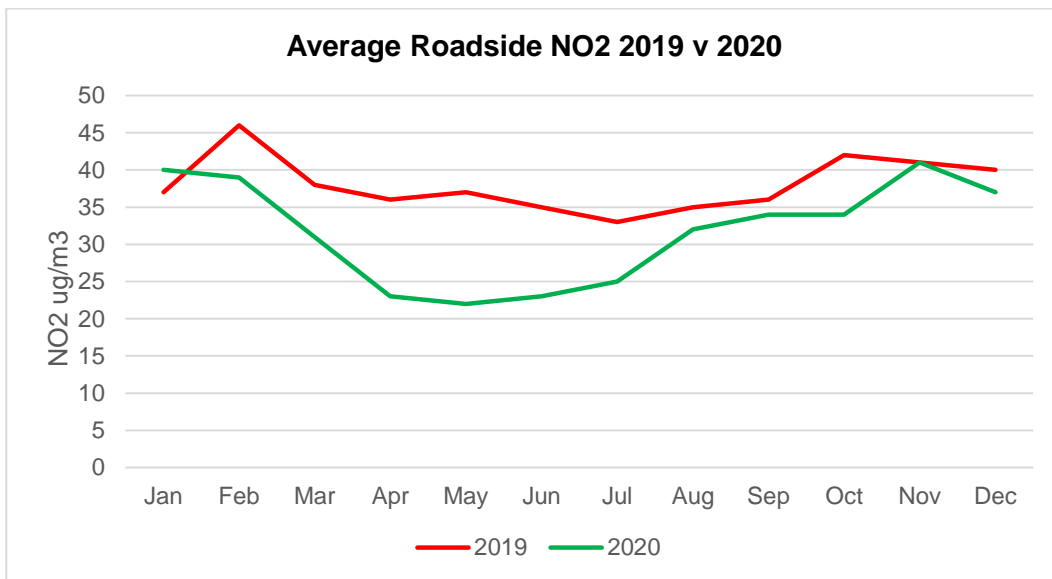


Fig 3.7 shows the impact of the Covid lockdown on average roadside NO₂ levels in 2020 compared to pre-lockdown 2019 data.

Fig 3.8

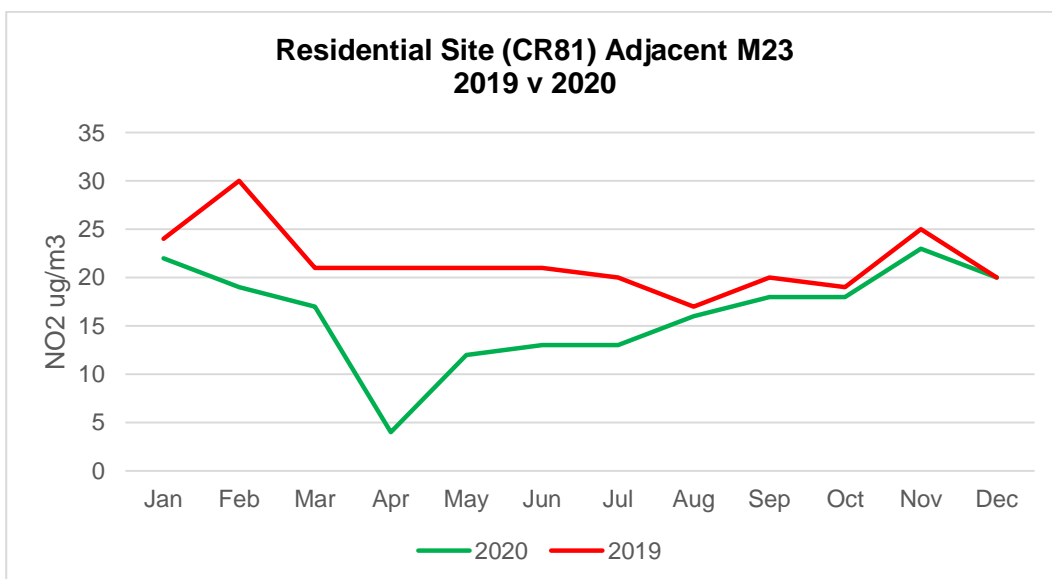


Fig 3.8 shows a sharp fall-off in NO₂ to 4ug/m³ in April (compared to 22ug/m³ in the same period 2019) at a residential site (CR81), close (13m) to the M23 motorway. Levels gradually returned to pre-lockdown levels around August 2020. The annual mean NO₂ concentrations at CR81 dropped from 22ug/m³ in 2019 to 16ug/m³ 2020 representing a 27% reduction in NO₂ pollution levels.

Fig 3.9

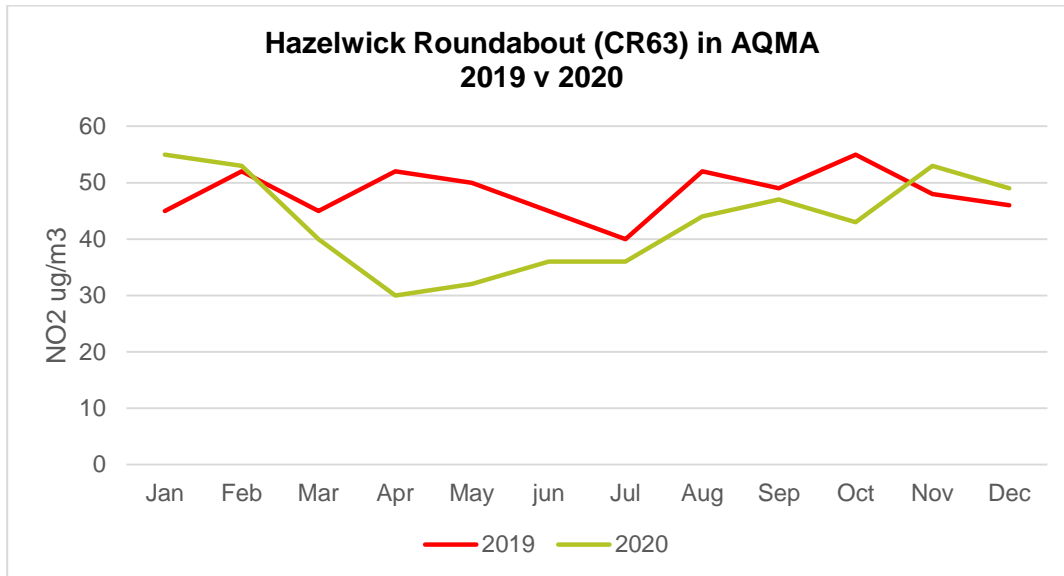


Fig 3.9 shows the fall-off in NO₂ levels at the Hazelwick roundabout site (CR63) within the AQMA. In April there was a 42% drop in NO₂ compared to the same period 2019 from 52ug/m³ to 30ug/m³) and the same pattern of returned to pre-lockdown levels around Aug/Sept 2020. The annual mean NO₂ concentrations at CR63 dropped from 49ug/m³ in 2019 to 42ug/m³ 2020 representing a 14% reduction in NO₂ pollution levels. However levels in November and December 2020 exceeded those during the same period in 2019 as restrictions eased and reluctance to use public transport over private car remained high.

2020 Background NO₂ in Crawley

There were no exceedances of the annual or hourly mean objectives for NO₂ at background sites in Crawley in 2020.

Fig 3.10 shows the monthly trend in background NO₂ at three sites in Crawley during 2020. The impact of the Covid lockdown is evident at all three sites with a clear decline in NO₂ levels from March and a steady climb back up in the autumn as restrictions lifted and traffic volumes increased. This pattern reflects the local, regional and national air quality profile.

Fig 3.10

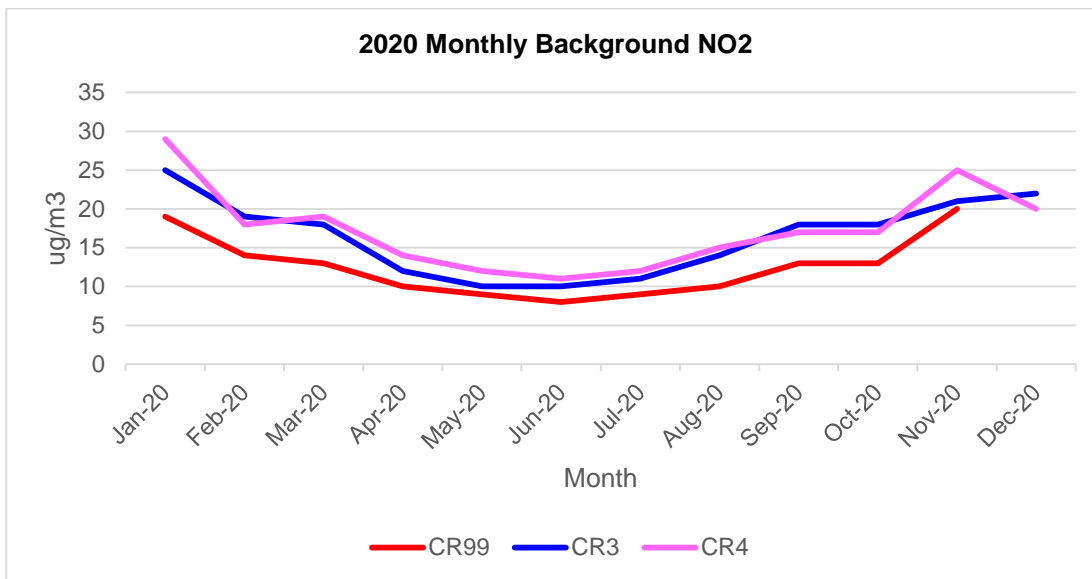
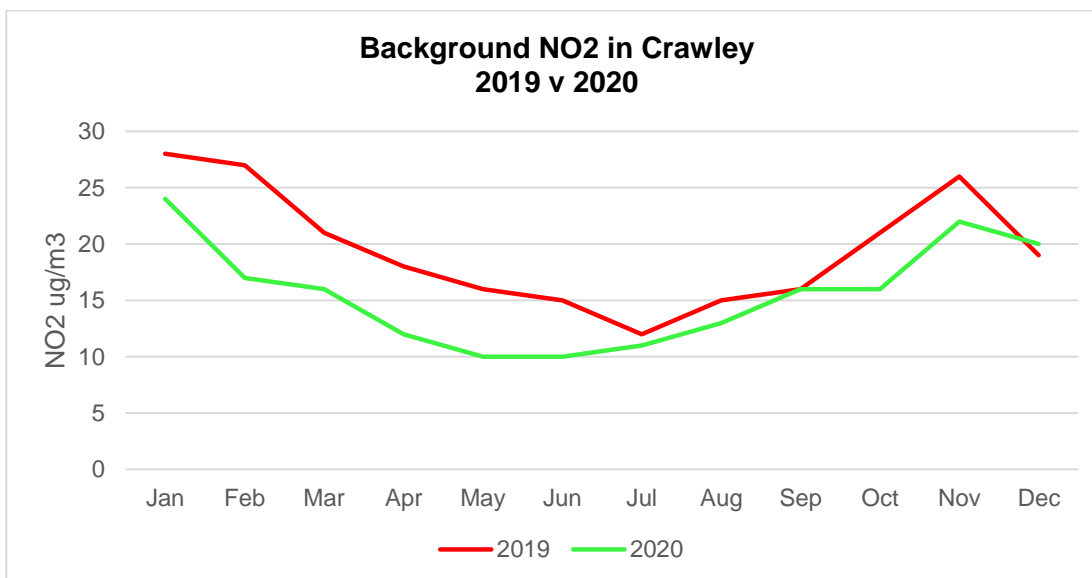


Fig 3.11 compares the 2019 and 2020 background NO₂ levels in Crawley. The greatest drop in NO₂ concentrations at background sites was seen in May 2020, with an average reduction of 6ug/m³, and the annual mean dropped from an average 20ug/m³ to 16ug/m³ representing a 20% reduction in background NO₂ concentrations.

Fig 3.11

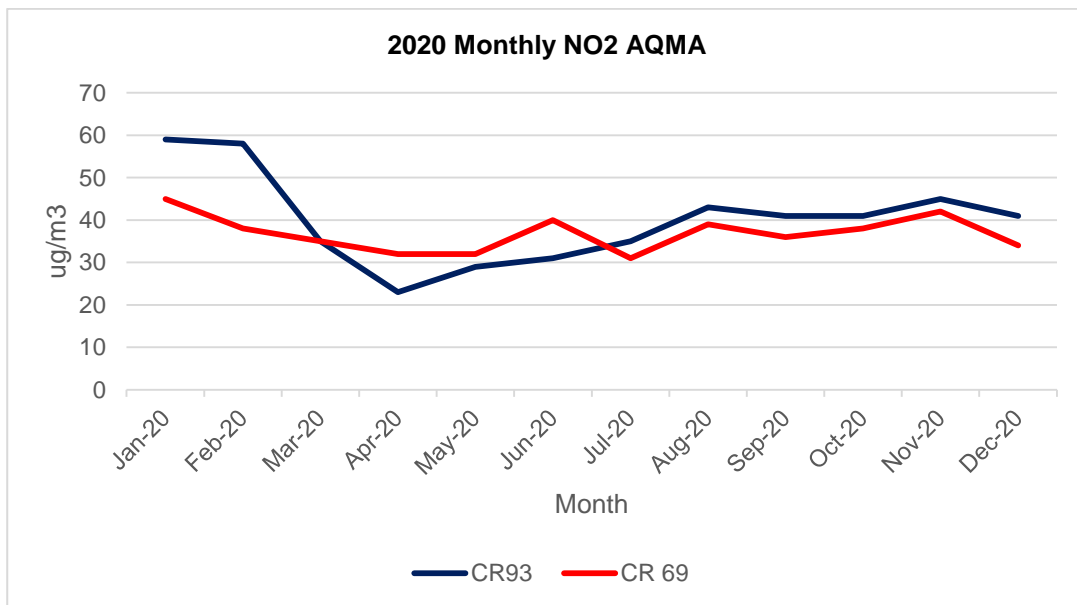


2020 NO₂ in Crawley AQMA

There were no exceedances of the annual or hourly mean objectives for NO₂ at sites with relevant exposure within the AQMA in 2020.

The NO₂ levels within the AQMA (Fig 3.12) showed the same trend as other sites across the borough, although concentrations generally remained much higher in these pollution hot spots, not falling below 23ug/m³ at their lowest.

Fig 3.12



The sharpest decline was seen in the Three Bridges area of the AQMA where a residential site (CR93) at a busy junction close to Three Bridges Railway station, which normally see levels around 40/50ug/m³, recorded NO₂ levels around 20/30ug/m³ during the first lockdown period, reflecting the impact the lockdown intervention had on traffic volumes and emissions, through busy commuter corridors.

Fig 3.13 below, shows the reduction in NO₂ levels at residential site (CR93) on the A2220 Worth Park Avenue in the Three Bridges area of the AQMA in 2020 compared to the 2019. Annual average concentrations dropped from 51ug/m³ in 2019 to 39ug/m³ in 2020 representing a 24% reduction in NO₂ pollution levels.

Fig 3.13

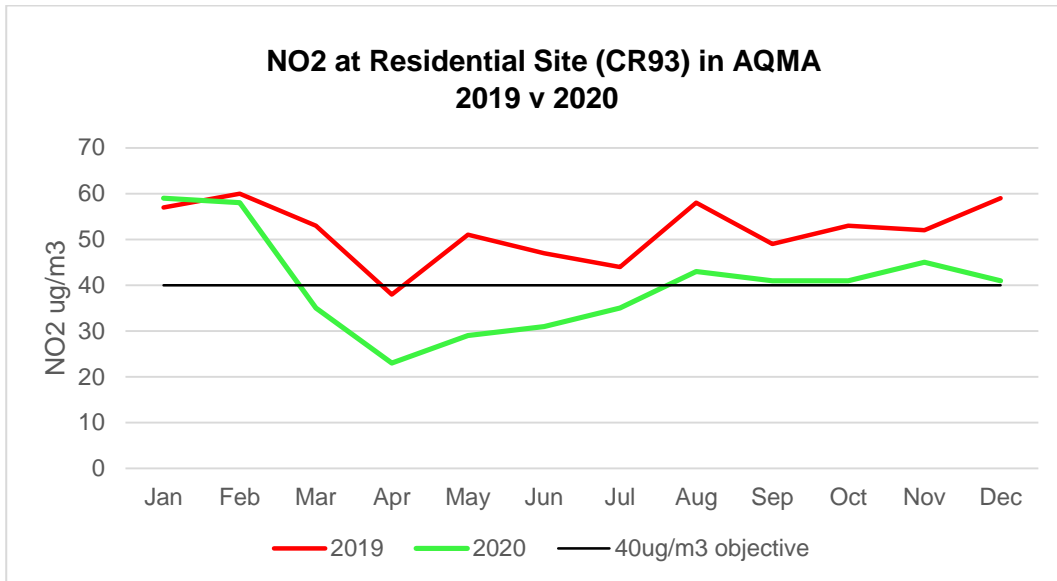
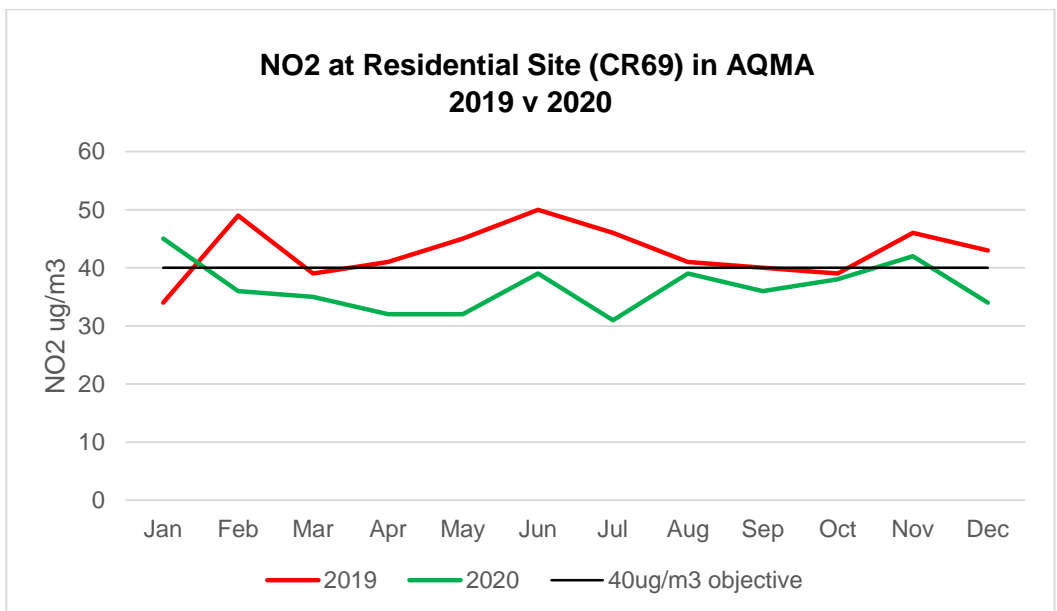


Fig 3.14 shows the fall-off in NO₂ levels at a residential site (CR69) adjacent to A2011 Crawley Avenue in the AQMA in 2020 compared to the 2019. Annual average concentrations dropped from 43ug/m³ in 2019 to 37ug/m³ in 2020 representing a 14% reduction in NO₂ pollution levels.

Fig 3.14



These reductions in NO₂ levels provide real-time evidence of how much traffic volumes need to fall within the AQMA to achieve compliance with the annual mean objective. Traffic data presented in Appendix A, shows in-bound traffic flows for Crawley fell by 40% during 2020 providing a rough estimate of the level of traffic reduction needed to achieve compliance along these main commuter routes into the town.

Monitoring results in 2020 showed unprecedented reduction in NO₂ levels due to the impact of Covid on road traffic volumes and the knock-on effect on air pollution levels. Despite lower than usual NO₂ levels, there will be no changes to the existing AQMA, unless a continuing trend of reduced NO₂ concentrations is maintained in future years.

3.2.2 Particulate Matter (PM₁₀)

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM₁₀ annual mean concentrations for the past five years with the air quality objective of 40µg/m³.

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

The PM₁₀ measured at the automatic monitoring site (CA2) on the eastern boundary of the airport, showed no exceedances of the air quality objectives for the annual mean or 24-hour objectives in 2020.

Fig 3.15

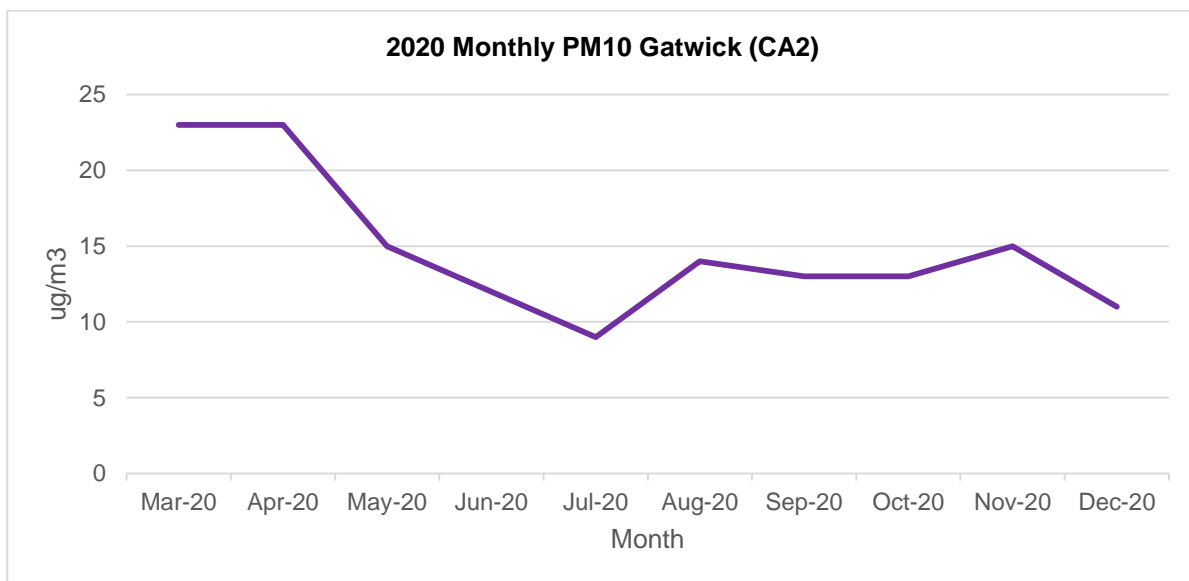


Fig 3.15 shows the monthly PM₁₀ trend for 2020. A new Fidas monitor was installed at the beginning of March 2020 to replace the old TEOM. For consistency only the Fidas data is presented in the fig 3.15. There was a significant decrease in PM₁₀ levels seen from March to June 2020, in keeping with the impact of Covid restrictions on pollution levels across the country.

Fig 3.16

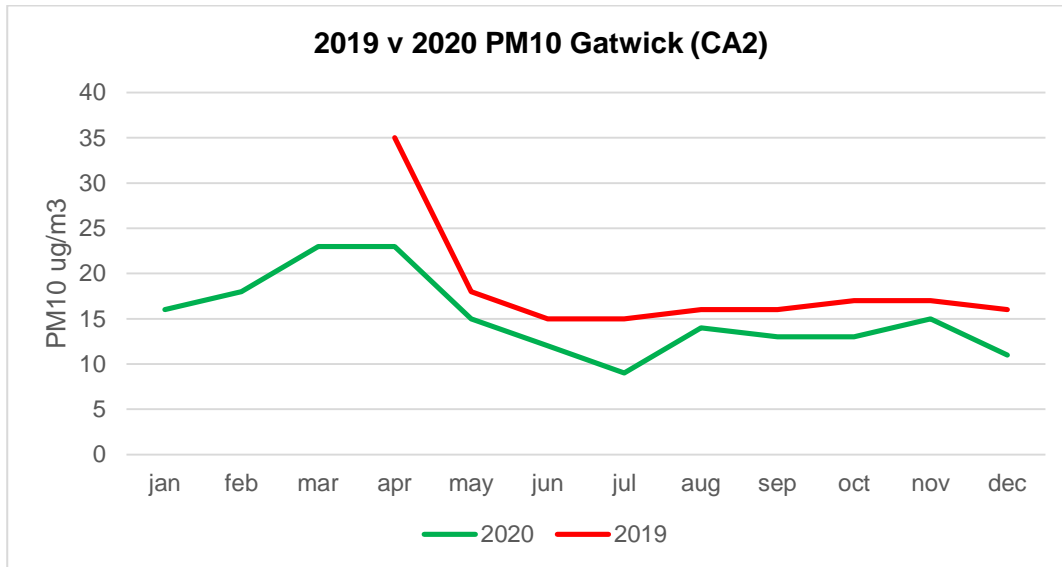


Fig 3.16 shows the PM₁₀ levels at Gatwick CA2 site in 2020 compared to the 2019. The annual mean PM₁₀ concentrations dropped from 21ug/m³ in 2019 to 15ug/m³ in 2020 representing a 29% reduction in annual mean PM₁₀. The reduction in passenger related road traffic in the vicinity of the airport is likely to have contributed to the drop in annual mean PM₁₀ concentrations at this site.

3.2.3 Particulate Matter (PM_{2.5})

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

Crawley Borough Council did not carry out monitoring for PM_{2.5} before March 2020. The Council installed a FIDAS analyser at the continuous monitoring station (CA2) at Gatwick Airport in March 2020, just before the first national Covid shutdown. The new analyser is capable of monitoring PM_{2.5} in addition to PM₁₀ and will continue to be reported in future ASRs.

Fig 3.17

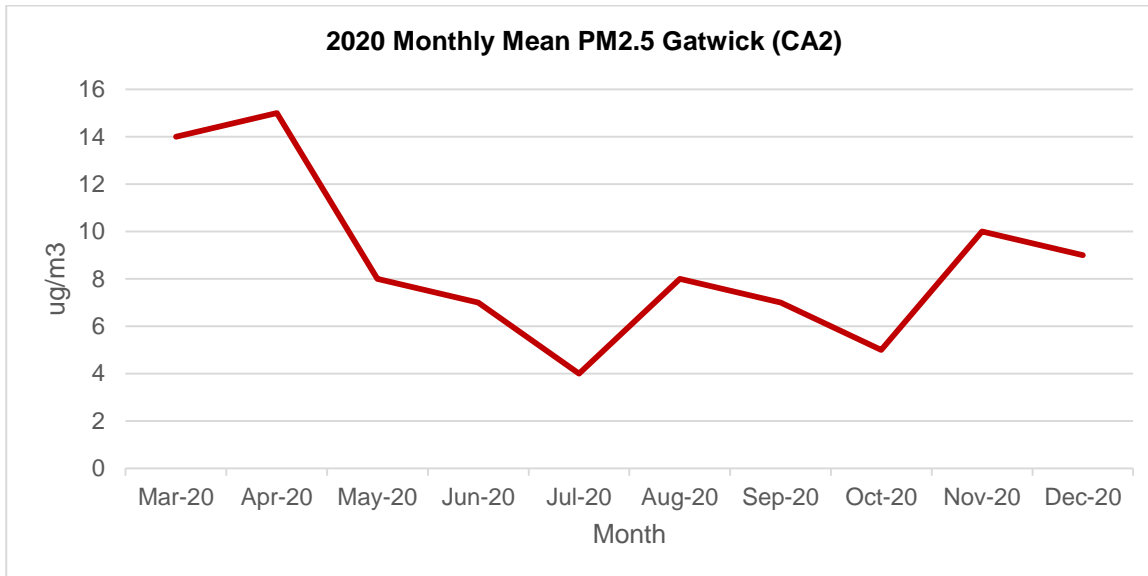


Fig 3.17 shows the monthly PM_{2.5} trend for 2020. The measured annual mean PM_{2.5} concentrations for 2020 was 8µg/m³ (which is below the AQS of 25µg/m³ and also below the WHO target of 10µg/m³). The estimated PM_{2.5} concentration for 2019 was 15µg/m³. This represents a 47% reduction in PM_{2.5} concentrations from 2019 (although comparison of estimated with measured concentrations should be treated with caution). However, the measured 2020 level is still likely to reflect lower pollution levels seen nationally due to the impact of Covid on transport emissions.

The local trend will continue to be monitored over coming years as the economy recovers from Covid, and to provide a baseline in the event the proposed Northern Runway expansion at Gatwick goes ahead.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
CA2	Gatwick East	Other/Suburban Industrial(AQD2008)	529417	141496	NO ₂ ; PM ₁₀ PM _{2.5}	NO	Chemiluminescent; FIDAS	63m	7m	1.8

Notes:

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

(2) N/A if not applicable

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

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
CR1	High Street	Roadside	526799	136785	NO ₂	N	15.8m	1.75m	N	2.0
CR3	Birch Lea	Urban background	528438	138392	NO ₂	N	6.85m	0.5m	N	2.0
CR4	Headley Close	Urban background	529864	138204	NO ₂	N	14.80m	0.5m	N	2.0
CR48	Lynhurst Cottage	Urban background	527110	139530	NO ₂	N	0m	21m	N	1.5
CR49	Charlwood Nursery	Urban background	526320	139860	NO ₂	N	0m	36m	N	1.5
CR50	Rowley Cottage	Urban background	527810	139929	NO ₂	N	0m	75m	N	1.5
CR51	Balcombe Road	Urban background	529490	141460	NO ₂	N	0m	21m	N	1.5
CR52	Gatwick East, (Tri-location)	Other/ Industrial (AQD2008)	529417	141496	NO ₂	N	63m	7m	Y	1.5
CR53	Gatwick East, (Tri-location)	Other/ Industrial (AQD2008)	529417	141496	NO ₂	N	63m	7m	Y	1.5
CR54	Gatwick East, (Tri-location)	Other/ Industrial (AQD2008)	529417	141496	NO ₂	N	63m	7m	Y	1.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
CR 55	Tinsley Close Fence (11)	Roadside	528446,	138085	NO ₂	Y	1.13m	5.7m	N	2.0
CR 60	Peglar Way	Roadside	526740	136934	NO ₂	N	6.5m	2.31m	N	2.0
CR62	Tinsley Close (10)	Urban background	528438	138088	NO ₂	Y	0m	13.6m	N	2.0
CR63	Woodfield Lodge (Roundabout)	Roadside	528153	137912	NO ₂	Y	30m	7.4m	N	2.0
CR64	Woodfield Lodge (Northgate Ave)	Roadside	528150	137825	NO ₂	Y	4.57m	1.62m	N	2.0
CR66	Brighton Rd (Rail crossing)	Roadside	526743	136346	NO ₂	N	0.5m	1.2m	N	2.0
CR69	Tinsley Close Facade(11)	Urban background	528443	138082	NO ₂	Y	0m	9.3m	N	2.0
CR72	Burlands	Urban background	525530	138472	NO ₂	N	6.75m	1.3m	N	2.0
	Tinsley Green	Urban Background	528978	139599	NO ₂	N	31.5m	0.5m	N	

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
CR74	Radford Road									1.5
CR75	Steers Lane	Urban Background	529335	139589	NO ₂	N	18.6m	2m	N	2.0
CR76	Hazelwick Court	roadside	528303	137800	NO ₂	Y	10.3m	2.52m	N	2.0
CR77	Hazelwick Ave (Bays)	Roadside	528362	137812	NO ₂	Y	6.34m	2.3m	N	2.0
CR78	Ferndown	Urban background	530037	138553	NO ₂	N	0m	40m	N	2.0
CR79	St Hildas Close	Urban background	529312	138534	NO ₂	N	0m	12m	N	2.0
CR80	Saxon Road	Urban background	530424	136521	NO ₂	N	0m	8.7m	N	2.0
CR81	Bolton Road	Urban background	529047	134474	NO ₂	N	0m	12.8m	N	2.0
CR85	Tinsley Lane Flats	Urban background	528286	138019	NO ₂	Y	13m	32m	N	2.0
CR86	Crown Buildings The Boulevard	Roadside	526876	136819	NO ₂	N	13.8m	0.5m	N	2.0
CR87	Broadway bus shelter	Roadside	526908	136754	NO ₂	N	3.5m (planned residential)	0.5m	N	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
CR88	Filbert Crescent	Urban background	525489	136573	NO ₂	N	0m	5.4m	N	2.0
CR89	Dalewood Garden	Urban background	527715	137893	NO ₂	y	0m	13.8m	N	2.0
CR91	Ocean Hse, Hazelwick Ave	Roadside	528681	137177	NO ₂	Y	4.7m	0.5m	N	2.0
CR93	St Marys Drive	Roadside	528895	137115	NO ₂	Y	1.5m	1.8m	N	2.0
CR94	Station Hill	Roadside	528841	137069	NO ₂	Y	5.45m	3.45	N	2.0
CR95	Daniels Hse, Worth Park Ave	Roadside	528882	137086	NO ₂	Y	5.44m	2.2m	N	2.50
CR96	Pound Hill Junior School	Roadside	529125	137196	NO ₂	N	35m	3.58m	N	2.0
CR97	Daisy Chain Nursery Haslett Ave East	Roadside	528615	136960	NO ₂	Y	3.52m	1.1m	N	1.5
CR98	Gatwick School Gatwick Road	Roadside	528515	139275	NO ₂	N	12.6m	2.13m	N	2.0
CR 99	Furnace Farm Road	Urban background	528410	135628	NO ₂	N	12.1m	1.5m	N	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
CR100	Horsham Road Level Crossing	Roadside	526326	136487	NO ₂	N	2.08m	1.46m	N	2.0
CR101	Horsham Road A2220	Roadside	525679	135556	NO ₂	N	8.91m	1.13m	N	2.0
CR102	Pease Pottage Hill A23	Roadside	526449	134139	NO ₂	N	5.10m	4.45m	N	2.0
CR103	171 St Marys Drive	Urban background	528848	137802	NO ₂	N	0m	12.6m	N	1.5
CR104	Southgate Ave	Urban background	527333	135 846	NO ₂	N	0m	4.7m	N	1.5
CR105	102 London Road	Roadside	526940	137831	NO ₂	N	10.1m	3.94m	N	2.0
CR106	147 London Road	Roadside	527000	138357	NO ₂	N	5.94m	3.91m	N	2.0
CR107	Rusper Road	Urban background	524806	136822	NO ₂	N	0m	10.5	N	1.5
CR 108	Belgrave Hse Station Way	Roadside	526901	136381	NO ₂	N	4m*	2.6m	N	2.0
CR 109	Moka Station Way	Urban background	527174	136357	NO ₂	N	9m*	14m	N	2.0
CR 110	Station car park	Roadside	526928	136356	NO ₂	N	8m*	3.6m	N	1.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
CR 111	Taj Car park	Roadside	526804	136375	NO ₂	N	0m*	2.4 m	N	1.5

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO₂ Monitoring Results: Automatic Monitoring (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
CA2	529417	141496	Other/Suburban Industrial	90	90	29	28	25	25	17
LGW3*			Other/Suburban Industrial	97	97	30	29	30	29	17

(* LGW3 Monitoring site not owned/run by Crawley borough Council - data presented here for the purpose of comparison)

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

Notes:

The annual mean concentrations are presented as µg/m³.

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

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

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

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

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

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

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
CR1	526799	136785	Roadside	100	100	40	33	33	35	26.26
CR3	528438	138392	Urban background	100	100	24	22	20	21	16.11
CR4	529864	138204	Urban background	92	92	25	23	21	23	17.46
CR48	527110	139530	Urban background	92	92	28	27	25	25	19.18
CR49	526320	139860	Urban background	100	100	19	18	18	17	10.32
CR50	527810	139929	Urban background	92	92	25	21	21	21	16.57
CR51	529490	141460	Urban background	92	92	25	24	22	22	16.03
CR52	529417	141496	Other/Industrial	100	100	30	30	24	26	17.57
CR53	528446,	138085	Other/Industrial	100	100	29	29	25	25	17.58
CR54	526740	136934	Other/Industrial	100	100	29	29	25	25	17.58
CR55	528438	138088	Roadside	100	100	42	41	41	42	36.23
CR60	528153	137912	Roadside	100	100	38	35	33	32	25.11
CR62	528150	137825	Urban background	100	100	40	40	38	40	33.51
CR63	526743	136346	Roadside	100	100	53	52	52	49	42.17
CR64	528443	138082	Roadside	100	100	41	41	40	38	30.42
CR66	525530	138472	Roadside	100	100	35	34	29	30	26.94

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
CR69	528978	139599	Urban background	100	100	43	42	40	44	35.81
CR72	529335	139589	Urban background	92	92	16	15	15	13	10.96
CR74	528303	137800	Urban Background	100	100	37	37	34	33	25.45
CR75	528362	137812	Urban Background	83	83	25	23	21	23	17.02
CR76	530037	138553	Roadside	100	100	43	40	35	35	27.62
CR77	529312	138534	Roadside	100	100	42	39	35	35	28.34
CR78	530424	136521	Urban background	100	100	29	26	24	22	16.96
CR79	529047	134474	Urban background	100	100	30	27	25	25	20.42
CR80	528286	138019	Urban background	100	100	32	27	28	27	19.47
CR81	526876	136819	Urban background	100	100	28	25	24	22	15.91
CR85	526908	136754	Urban background	92	92		27 ¹	30	30	30.48
CR86	525489	136573	Roadside	92	92		22 ¹	26	27	23.48
CR87	527715	137893	Roadside	100	100		38 ¹	38	39	29.00
CR88	526953	138658	Urban background	92	92		18 ¹	26	25	21.08
CR89	528681	137177	Urban background	100	100		19 ¹	22	22	17.14
CR91	528841	137069	Roadside	100	100		39 ²	34	32	27.96

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
CR93	528882	137086	Roadside	100	100		65²	48	53	39.34
CR94	529125	137196	Roadside	100	100			26	27	18.17
CR95	528615	136960	Roadside	92	92			31	32	24.36
CR96	528515	139275	Roadside	100	100			30	27	21.63
CR97	528410	135628	Roadside	100	100			41	37	27.66
CR98	526326	136487	Roadside	100	100			35	34	27.74
CR 99	525679	135556	Urban background	83	83	20	20	17	15	12.46
CR 100	526449	134139	Roadside	100	100			30 ⁽¹⁾	27	22.73
CR 101	528848	137802	Roadside	100	100			54⁽¹⁾	50	43.56
CR 102	527333	135 846	Roadside	100	100			37 ⁽¹⁾	34	26.22
CR103	528848	137802	Urban background	100	100				21	12.98
CR104	527333	135 846	Urban background	100	100				27	19.19
CR105	526940	137831	Roadside	100	100				44	35.76

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
CR106	527000	138357	Roadside	100	100				46	32.55
CR107	524806	136822	Urban background	100	83					14.31
CR 108	526901	136381	Roadside	100	83					19.32
CR 109	527174	136357	Urban background	100	83					20.12
CR 110	526928	136356	Roadside	86	50					16.66
CR 111	526804	136375	Roadside	100	58					22.34

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

Diffusion tube data has been bias adjusted

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

Notes:

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

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

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

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

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

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

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

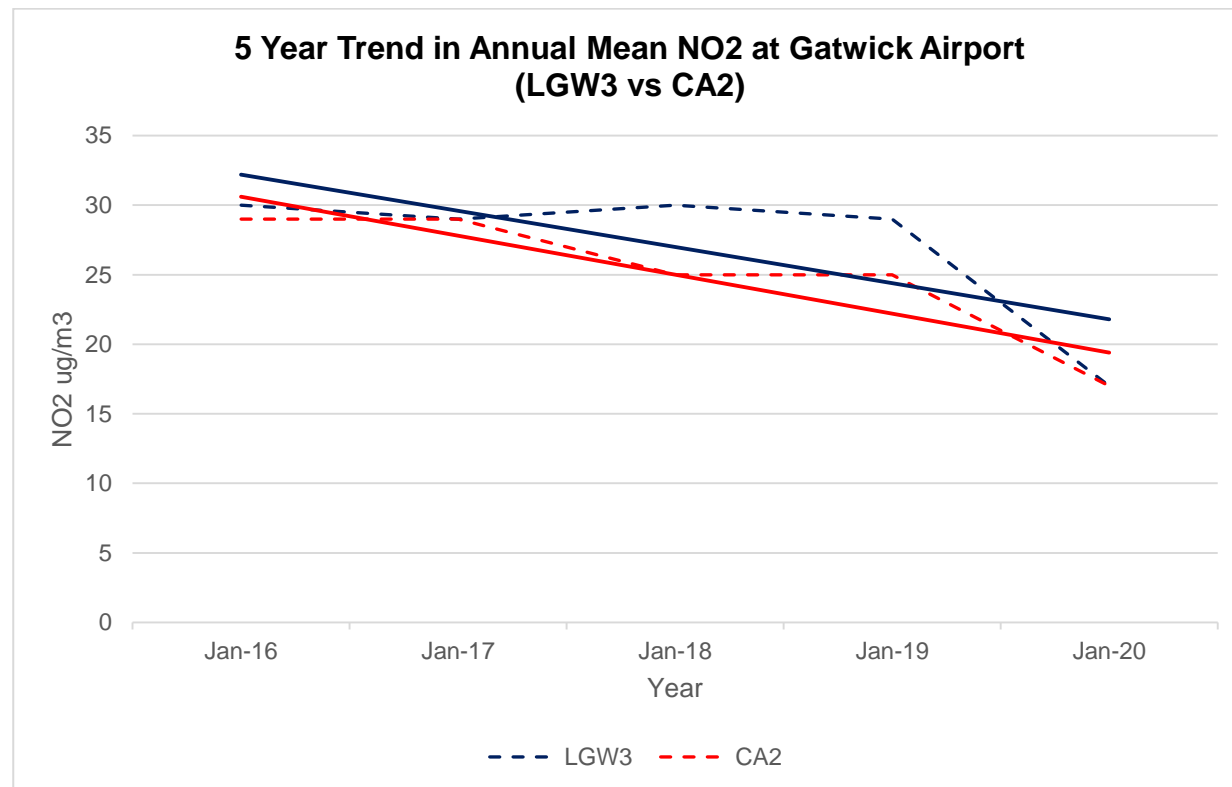
Figure A.1 – Trends in Annual Mean NO₂ Concentrations**Figure A1.1 Trend (5 yr) Annual Mean NO₂ Gatwick Airport comparing sites LGW3 (on-airport) to CA2 (eastern boundary airport)**

Figure A1.1 presents NO₂ annual mean concentrations for continuous automatic monitoring sites at Gatwick airport, comparing sites LGW3 (located on-airport at the eastern end of the runway) to CA2 (located on the eastern boundary of airport close to residential properties on Balcombe road). The 5 year trend is downwards. The sharp falloff in airport concentrations in 2020 as a result of the almost total shut down of the aviation industry, demonstrates the contribution on-airport emissions of NO₂ make to annual mean concentrations in the local area. In the absence of airport activity, NO₂ values fell to the same levels seen at residential locations around the airport.

Figure A1.2 Trend (10 yr) in Annual Mean NO₂ Gatwick CA2 Site - Comparison of co-located tubes with automatic analyser

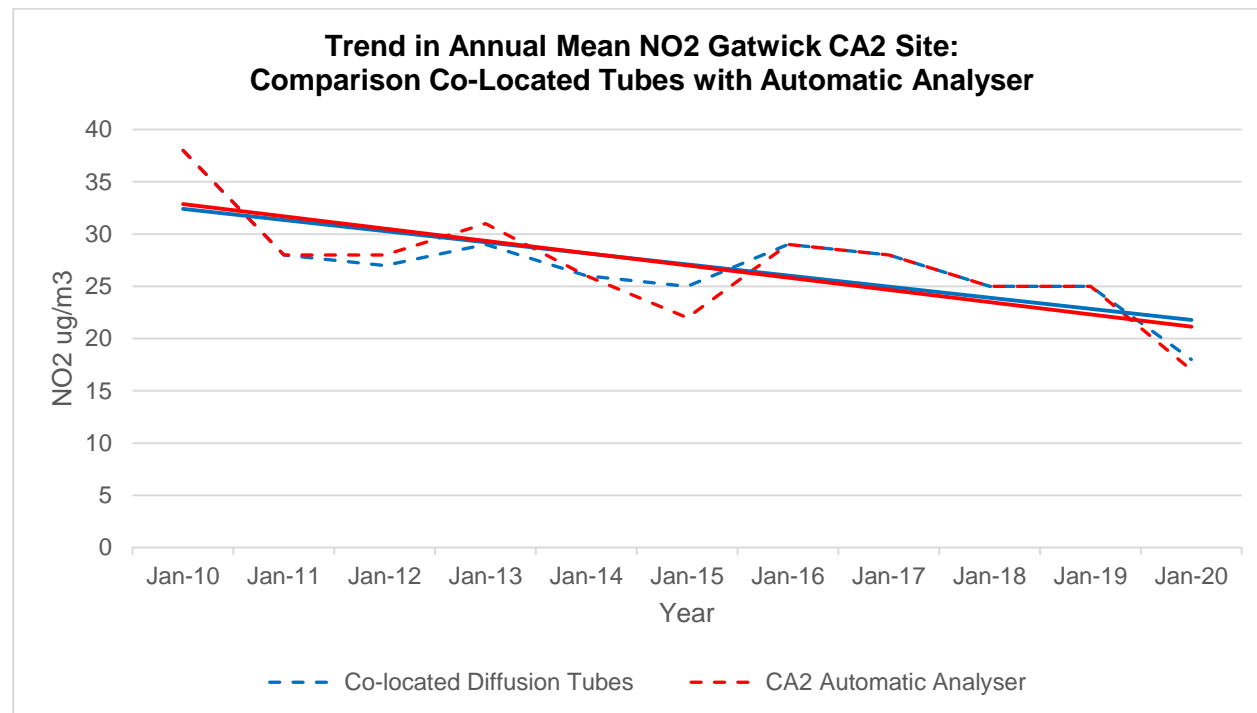


Figure A1.2 presents NO₂ annual mean concentrations for triplicate co-located tubes with the automatic analyser at Gatwick CA2 site between years 2010 to 2020. The co-located diffusion tube data (CR52, CR53, CR54) show close correlation with the continuous data from the automatic analyser, and the same trend pattern for the long term data. Both passive and continuous data shows a sharp fall-off in concentrations in 2020 as a result of the impact of Covid on road and air transport in the vicinity of the airport. There are no exceedances of the annual mean objective in 2020 and there is a general trend of reduction experienced across the sites. The downward trend is similar to that shown in previous years at this site, indicating that the unusually low concentrations shown in 2020 have not been responsible for reversing previous trends.

Figure A1.3 Trend (10 yr) in Annual Mean NO₂ at Gatwick (LGW3 site) Compared with Residential Sites within 1000m of Airport

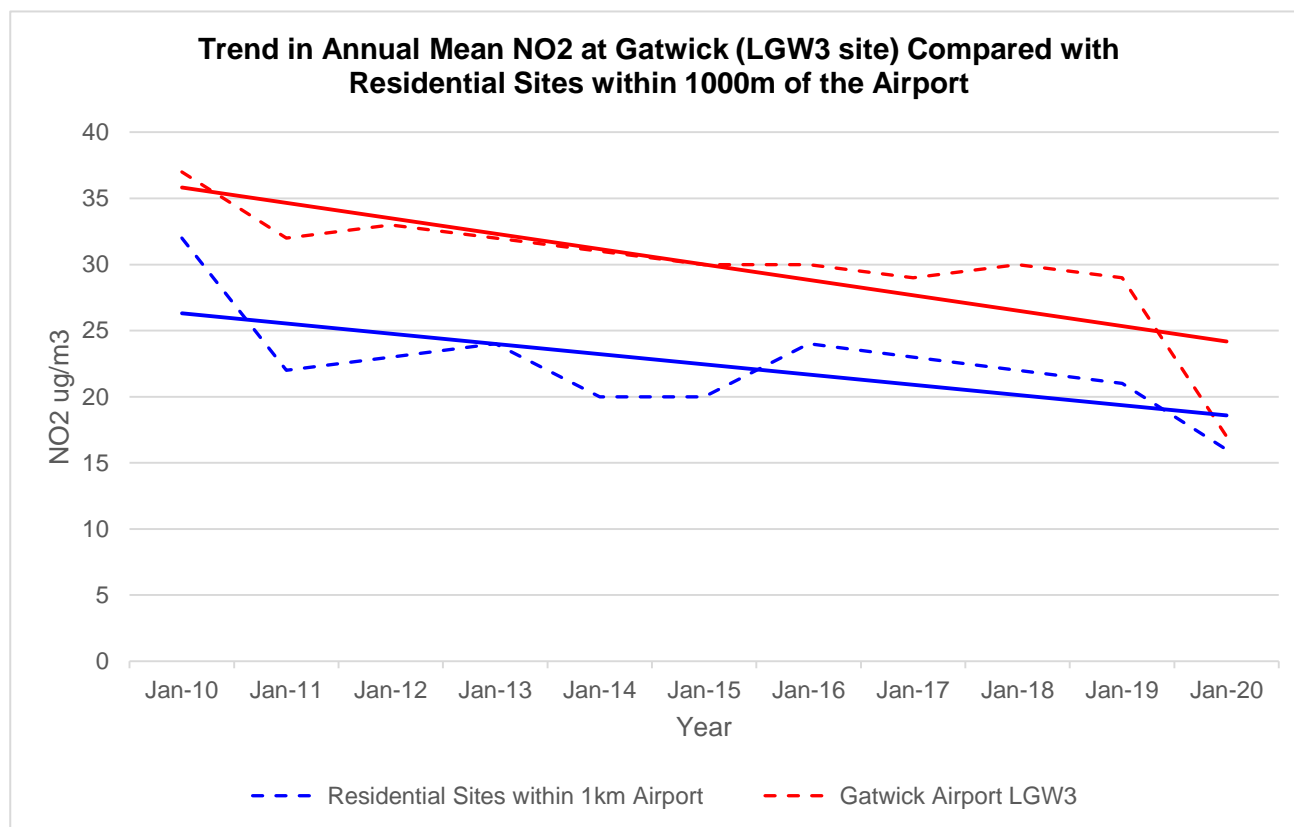


Figure A1.3 presents NO₂ annual mean concentrations for residential site located within 1000m of Gatwick airport compared to the concentrations at Gatwick's LGW3 site between years 2010 to 2020. There are no exceedances of the annual mean objective in 2020, and there is a general trend of reduction shown at both sites. The downward trend is similar to that shown in previous years indicating that the unusually low concentrations in 2020 have not been responsible for reversing trends, although the steep 2020 fall-off in concentrations (especially at LGW3) may affect future trends. In 2020 measured NO₂ concentrations at the airport were the same as those at residential locations for the first time since monitoring began (>20yrs).

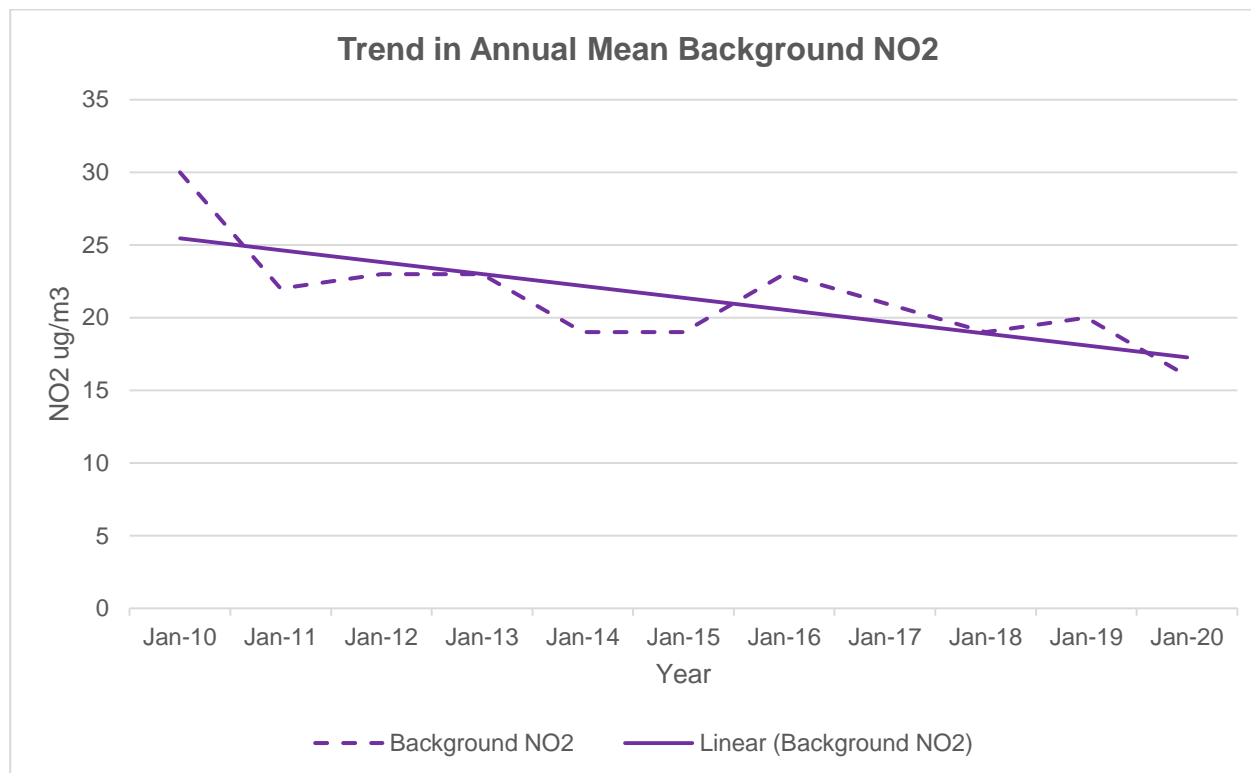
Figure A1.4 Trend (10 yr) in Annual Mean Background NO₂

Figure A1.4 presents the 10 year trend in NO₂ annual mean concentrations for background sites in Crawley between years 2010 to 2020. The long term trend shows a reduction in NO₂, reflecting the regional and national trend as policy/ technological/ behavioural measures have helped reduce background emissions.

In last year's ASR the downward trend over the past 5 years was beginning to level off, which may be attributed to increased development and traffic volumes in the borough. However, the unusually low concentrations shown in 2020 due to Covid has increased the steepness of the downward line. The trend will continue to be monitored and reviewed annually through the LAQM process to see how the post-Covid economic recovery impacts background levels across Crawley.

Figure A1.5 Trend (10 yr) in Annual Mean Roadside NO₂

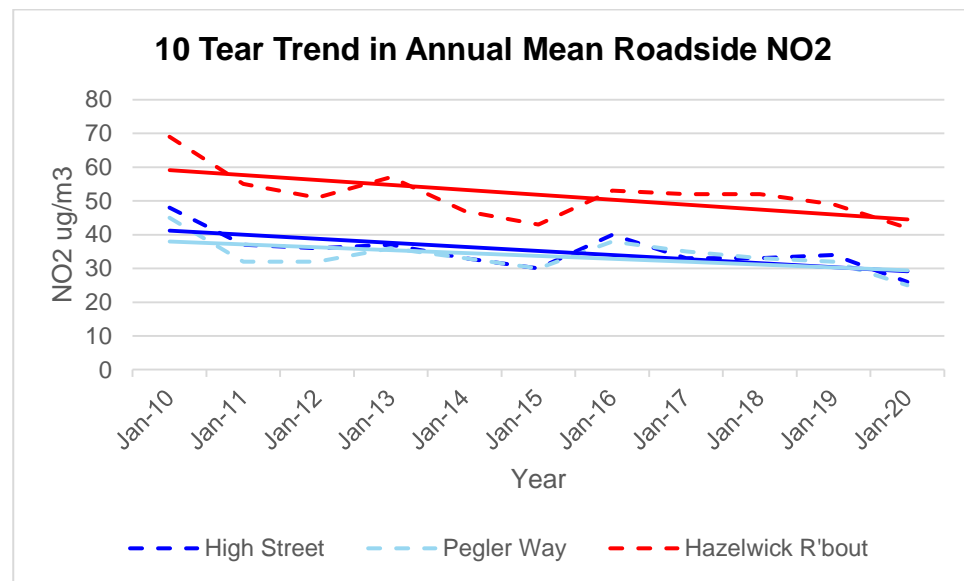


Figure A1.5a Trend (5 yr) in Annual Mean Roadside NO₂

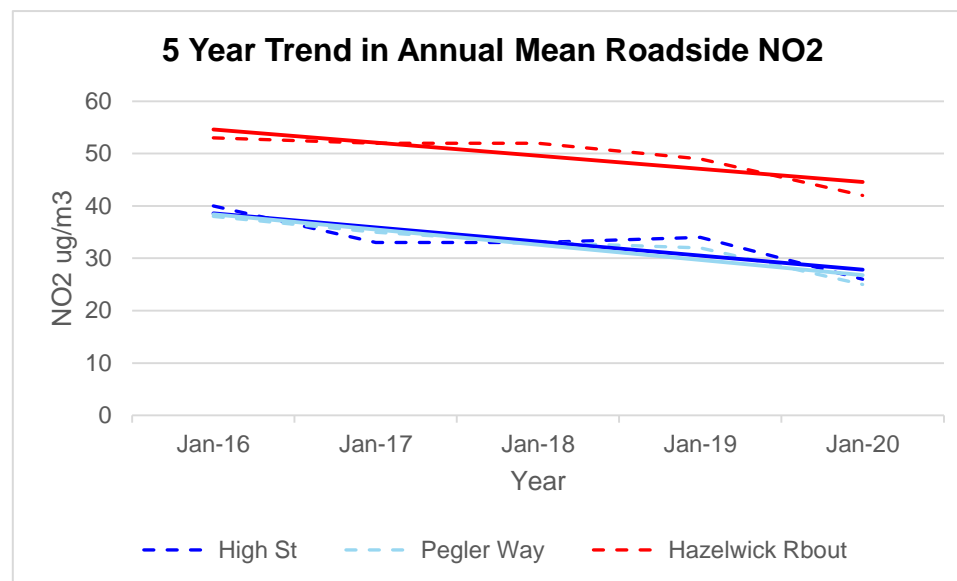


Figure A1.5 presents the 10 year trend in NO₂ annual mean concentrations for roadside sites in Crawley between years 2010 to 2020.

The long term trend shows a reduction in NO₂ across all sites, reflecting the regional and national trends.

Figure A1.5a presents the 5 year trend in roadside NO₂ in Crawley. In last year's ASR the 5 year trend for Roadside NO₂ was upwards, mirroring the upwards trend in road traffic volumes in Crawley pre-pandemic (2019). The 5 year trend in roadside NO₂ this reporting year shows a downward slope. This also reflects the trend reversal in traffic volumes in Crawley (2020) which changed from a rising trend pre-pandemic to a downwards trend as a results of concurrent lockdowns during 2020 (Fig A1.5b and Fig A1.5c below). Assuming restriction on travel won't be repeated, it remains to be seen if the downward trend in NO₂ concentrations continues to fall in coming years influenced by other factors, such as cleaner engine technologies, behavioural change etc. The trend will continue to be monitored and reviewed annually through the LAQM process.

Figure A1.5b Trend in Crawley Traffic Flow (2019 data set)

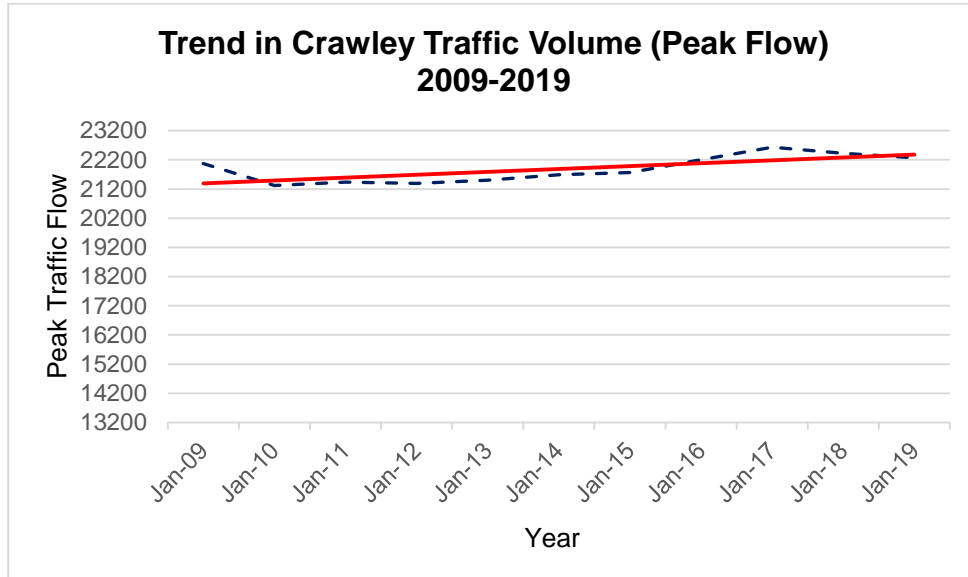


Figure A1.5c Trend in Crawley Traffic Flow (2020 data set)

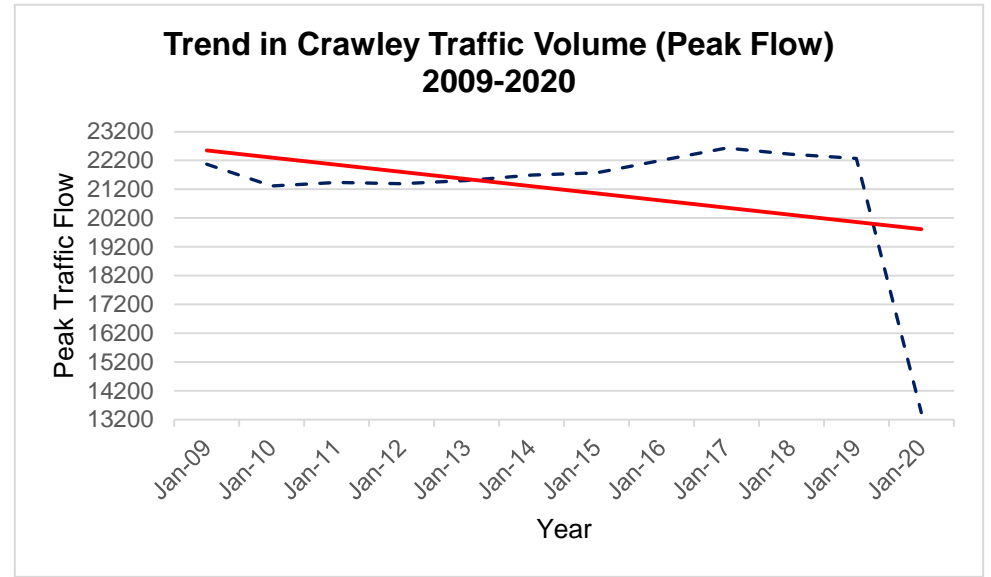


Figure A1.5b presents the long term trend in peak flow traffic for Crawley pre-pandemic, which up until 2019 showed an upwards trend.

Figure A1.5c presents the long term trend in peak flow traffic for Crawley at the time of the 2020 pandemic. The unprecedented reduction in 2020 road traffic brought about by travel restrictions during concurrent lockdowns resulted in a dramatic fall off in traffic volumes and a reversal in the trend. It remains to be seen if the downward trend will continue or if these gains will be reversed as people switch from public transport to private cars post-Covid.

Fig A1.6a Trend Annual Mean NO₂ AQMA (Crawley Ave)

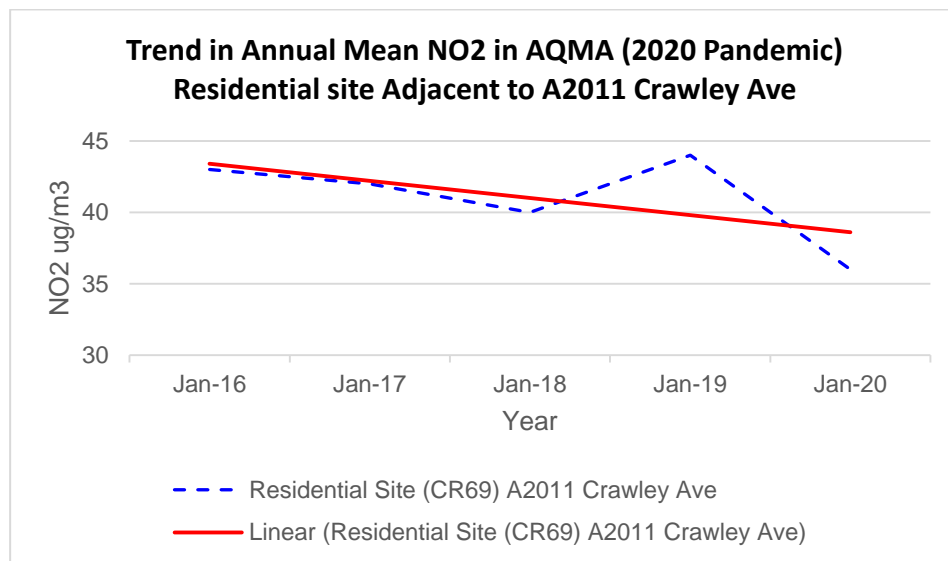


Fig A1.6b Pre-Covid Trend Annual Mean NO₂ AQMA (Crawley Ave)

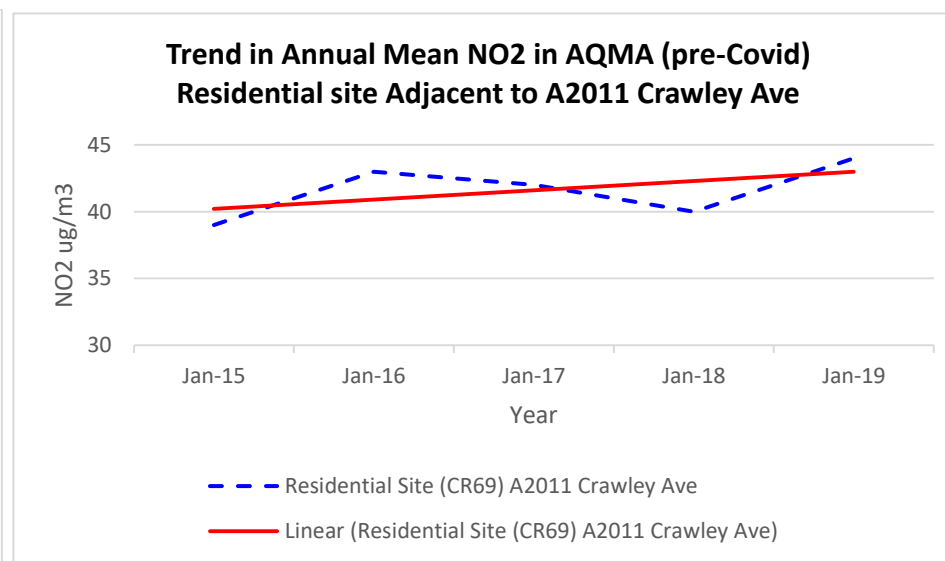


Figure A1.6a presents the trend in NO₂ annual mean concentrations at a residential site (CR69) within the AQMA. The site show a downward trend in NO₂ based on the 2020 (Pandemic year) data set. This downward trend reflects the pattern seen across Crawley (and also regionally/ nationally) as a result of Covid travel restrictions impacting vehicle emissions.

Figure A1.6b presents the trend in annual mean NO₂ at the same site based on the 2019 pre-pandemic data set, which shows an upward trend in NO₂. The comparison demonstrates the impact of the Covid restrictions on NO₂ concentrations, which was sufficient to reverse the rising trend in this location.

Locations within the AQMA will continue to be monitored and reviewed annually through the LAQM process to assess post-Covid trends.

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

There have been no exceedances of the NO₂ 1-hour mean objective (200µg/m³ not to be exceeded more than 18 times/year) over the past five years at Crawley's automatic monitoring station (CA2) on the eastern boundary of Gatwick airport. There have been no exceedances at Gatwick airports own monitoring station (LGW3) located on the Airport, close to the eastern end of the runway and to the A23.

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
CA2	529417	141496	Other/Suburban Industrial	Automatic	90	0	0	0	0	0
LGW3			Other/Suburban Industrial	Automatic	97	0	0	0	0	0

Notes:

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

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

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

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

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

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
CA2	529417	141496	Other/Suburban Industrial	95	95	18	18	18	21	15
LGW3			Industrial	97	97	17	19	19	14	14

Notes:

The annual mean concentrations are presented as µg/m³.

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

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

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

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

Figure A.2 – Trends in Annual Mean PM₁₀ Concentrations

Fig A3.1 Pre-Covid Trend Annual Mean PM₁₀ Gatwick (CA2)

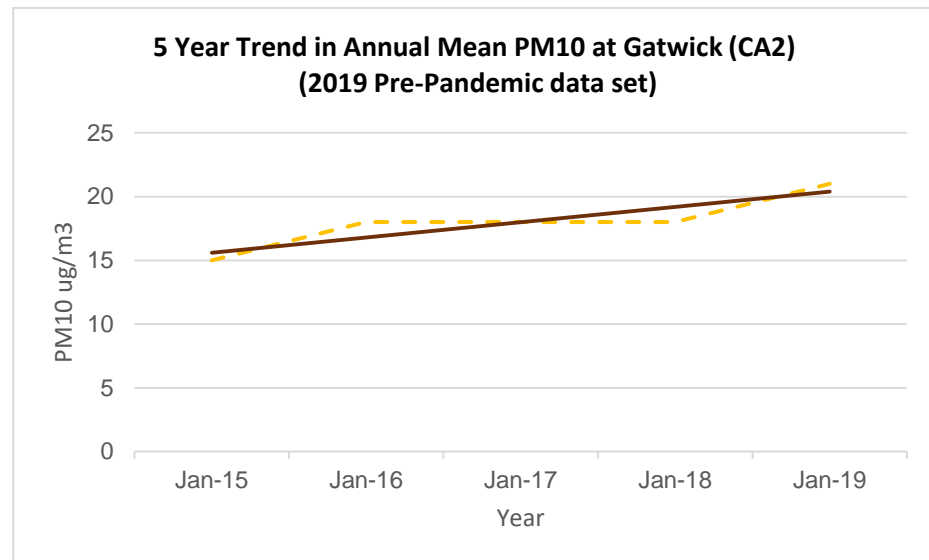


Fig A3.2 Post-Covid Trend Annual Mean PM₁₀ Gatwick (CA2)

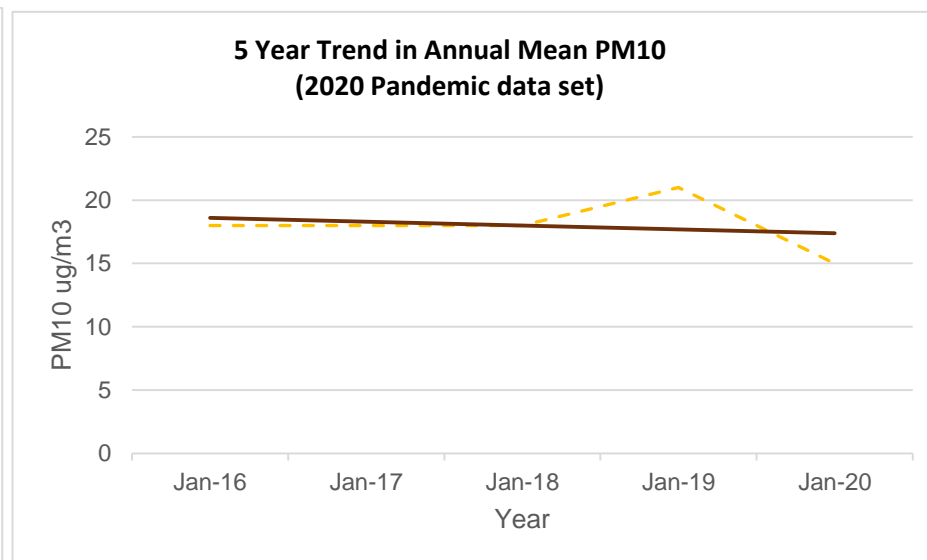


Figure A3.1 and A3.2 presents the 5 year trend in annual mean PM₁₀ concentrations Gatwick East site (CA2) before and after the introduction of 2020 Covid restrictions.

The significant decrease in PM₁₀ levels in 2020 resulted in the 5 year trend showing a downward slope in 2020, reversing the upward trend presented pre-pandemic. This decrease in pollution levels is typical of the effects of the pandemic on air quality seen across the region and nationwide. The trend will continue to be monitored and reviewed annually through the LAQM process.

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
CA2	529417	141496	Other/Suburban Industrial	95	95	1	0	2	4	4
LGW3			Industrial	97	97	7	3	1	4	0

Notes:

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

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

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

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

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

Figure A.3 – Trends in Number of 24-Hour Mean PM₁₀ Results > 50µg/m³

Fig. A.4.1 Trend in No. of 24-Hour Mean PM₁₀ > 50µg/m³ (CA2)

Fig. A.4.2 Trend in No. of 24-Hour Mean PM₁₀ > 50µg/m³ (LGW3)

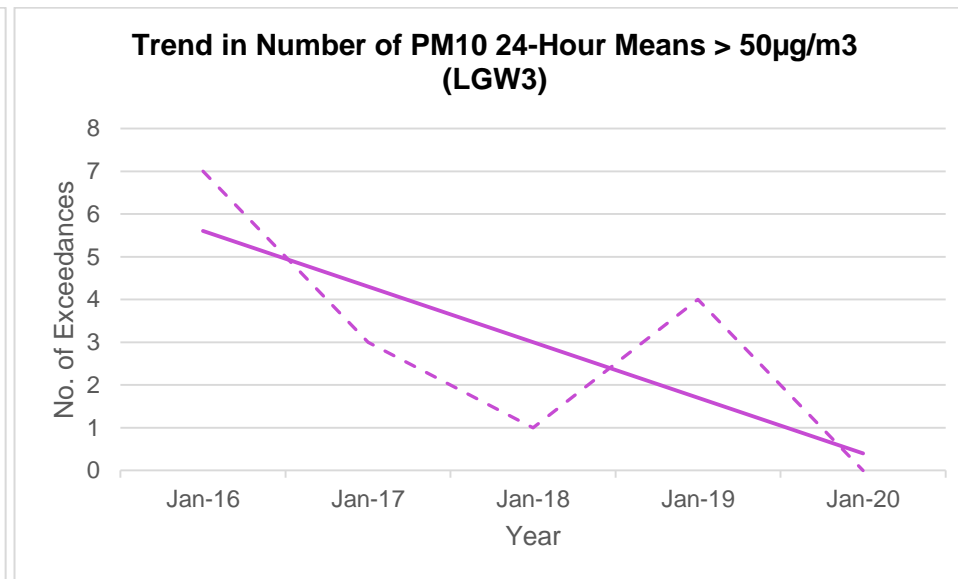
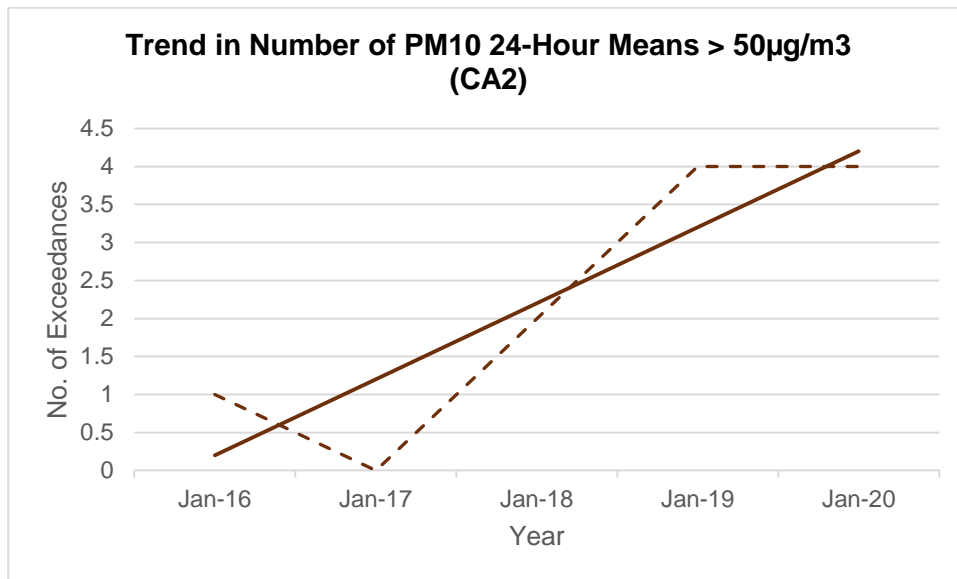


Figure A4.1 and A4.2 presents the 5 year trend in the number of 24-Hour Mean PM₁₀ > 50µg/m³ at the Gatwick East site (CA2) and Gatwick on-airport site (LGW3).

The on-airport site at the end of the runway (LGW3) shows a downwards trend and a reduction in the number of exceedances, from 4 in 2019 to none in 2020. By contrast the site (CA2) further away from the runway, to the east of the airport boundary and closer to the Balcome Road, shows an upward trend and no reduction in the the number of exceedances of the 24-Hour Mean PM₁₀ > 50µg/m³ objective in 2020 compared to the previous year.

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
CA2	529417	141496	Other/Suburban Industrial	100	80	13*	10*	12*	15*	8
LGW3			Industrial	97	97	-	-	-	8	8

* Data for years 2016-2019 are estimated values calculated as per the Technical Guidance LAQM.TG16

Notes:

The annual mean concentrations are presented as µg/m³.

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

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

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

Figure A.4 – Trends in Annual Mean PM_{2.5} Concentrations

Fig A5.1 Trend in Annual Mean PM_{2.5} (Pre-Pandemic)

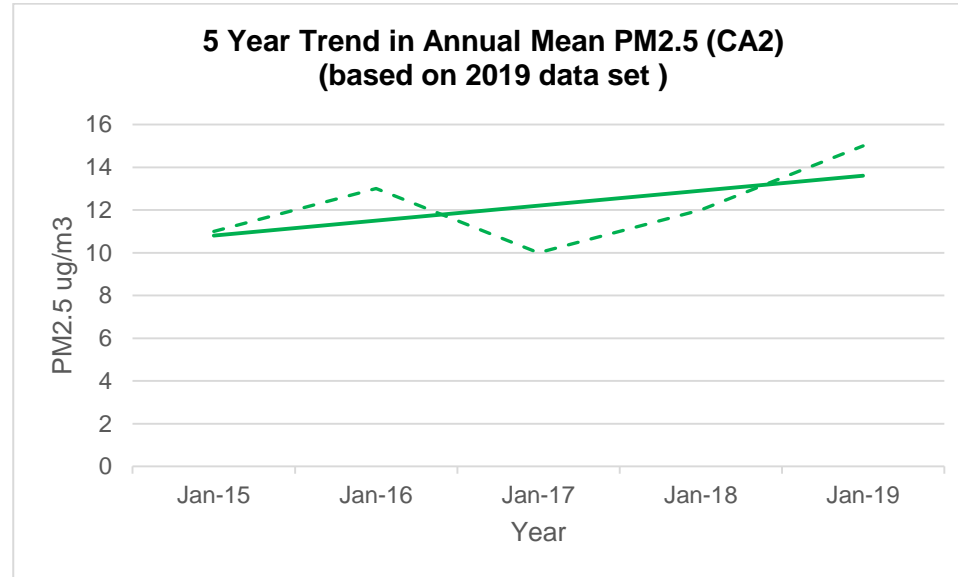


Fig A5.2 Trend in Annual Mean PM_{2.5}

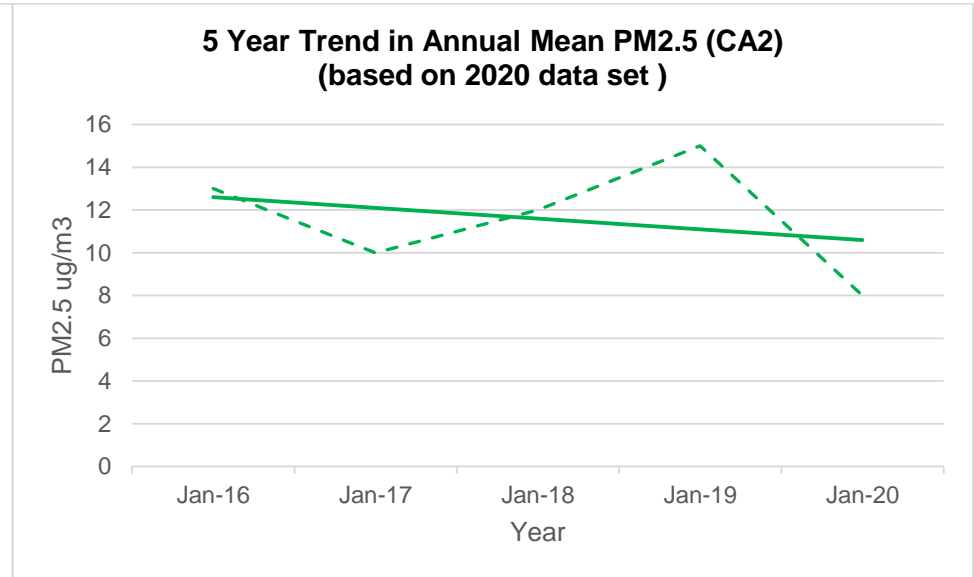


Figure A5.1 and Fig A5.2 presents the 5 year trend in the annual mean PM_{2.5} at the Gatwick East site (CA2) pre and post pandemic. The 2020 data is based on measured concentrations following the installation of a new FIDAS monitor at CA2 site. All previous data for years 2016-2019, is based on estimated values calculated as per the Technical Guidance LAQM.TG16, therefore caution is needed in making comparisons.

The significant decrease in PM_{2.5} levels in 2020 resulted in the 5 year trend showing a downward slope in 2020, reversing the upward trend presented pre-pandemic. The decrease in pollution levels is typical of the effects of the pandemic on air quality seen across the region and nationwide. The trend will continue to be monitored and reviewed annually through the LAQM process.

Appendix B: Full Monthly Diffusion Tube Results for 2020

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

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.98)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
CR1	529417	141496	31.50	32.61	28.13	19.68	19.09	18.26	21.07	26.91	28.39	29.01	35.56	31.31	26.79	26.26		
CR3	526799	136785	24.96	19.01	18.33	11.87	10.30	9.68	10.93	13.81	17.58	17.85	21.25	21.72	16.44	16.11		
CR4	528438	138392	28.72	18.24	18.49	13.48		10.84	11.88	14.98	17.34	17.40	24.56	20.03	17.81	17.46		
CR48	529864	138204	27.70	24.54	21.43	12.84		11.66	15.15	17.40	21.44	18.30	21.92	22.93	19.57	19.18		
CR49	527110	139530	14.85	11.00	12.17	9.62	6.71	6.20	6.98	9.39	11.69	9.77	14.70	13.24	10.53	10.32		
CR50	526320	139860	24.47	14.91	22.47	16.36		9.47	9.99	13.54	15.55	14.72	23.35	21.18	16.91	16.57		
CR51	527810	139929	25.93	26.92	17.12	8.77		8.86	10.54	12.02	15.74	15.85	20.58	17.59	16.36	16.03		
CR52	529490	141460	28.87	26.15	18.51	14.35	12.13	11.19	11.47	15.48	17.75	16.15	22.78	20.28	17.93	17.57		
CR53	529417	141496	28.51	26.26	19.25	13.05	11.71	10.88	11.67	15.46	18.31	15.52	23.39	21.28	17.94	17.58		
CR54	528446,	138085	29.45	27.32	15.63	13.34	12.33	11.99	11.34	15.50	18.76	17.12	21.35	21.18	17.94	17.58		
CR55	526740	136934	44.14	37.95	34.51	28.61	29.33	40.91	31.35	41.00	37.56	38.86	41.16	38.28	36.97	36.23	35.2	
CR60	528438	138088	34.84	31.24	24.84	17.62	15.78	16.38	19.21	25.76	27.69	29.44	34.05	30.67	25.63	25.11		
CR62	528153	137912	40.65	34.82	30.14	27.34	28.45	34.41	30.06	34.49	32.68	37.53	41.56	38.16	34.19	33.51		
CR63	528150	137825	55.11	52.8	39.54										43.03	42.17	30.5	Receptor is > 20m further from kerb than monitor – treat result with caution
CR64	526743	136346	37.37	29.92	29.29	25.05	26.98	26.46	24.32	33.62	34.81	32.80	37.17	34.67	31.04	30.42		
CR66	528443	138082	38.51	38.41	24.54	17.13	17.56	19.53	22.32	24.87	29.79	30.55	34.49	32.12	27.49	26.94		
CR69	525530	138472	44.59	37.57	35.08	31.64	31.61	39.45	31.06	38.71	35.94	37.67	41.60	33.61	36.54	35.81		
CR72	528978	139599	17.77	11.95	11.04	7.70		5.99	6.67	9.30	10.75	11.08	16.13	14.69	11.19	10.96		
CR74	528978	139599	34.22	28.64	25.89	20.31	24.65	22.15	23.63	25.56	32.05	26.02	22.68	25.80	25.97	25.45		
CR75	528303	137800	24.65	19.45	18.60	13.19	13.57	11.27	13.43	16.70	17.34	15.99	24.14	20.08	17.37	17.02		
CR76	528362	137812	36.56	29.26	26.74	24.01	23.89	20.03	21.74	28.74	32.36	29.30	34.55	30.99	28.18	27.62		
CR77	530037	138553	38.70	32.35	28.31	21.32	19.57	22.95	24.67	27.78	33.09	32.25	38.03	27.96	28.91	28.34		
CR78	529312	138534	25.02	14.55	18.72	16.10	13.45	12.58	12.90	17.16	18.15	15.58	21.67	21.77	17.30	16.96		
CR79	530424	136521	25.80	19.95	20.45	19.96	20.20	14.31	17.08	19.86	23.63	18.69	26.96	23.10	20.83	20.42		
CR80	529047	134474	25.22	16.45	20.07	22.57	19.32	15.10	13.78	21.01	22.27	18.16	22.00	22.48	19.87	19.47		
CR81	528286	138019	21.63	18.63	16.63	4.19	12.06	13.43	13.00	16.26	17.77	18.32	23.12	19.74	16.23	15.91		
CR85	526876	136819	41.43	34.82	33.40	27.59	25.70		23.57	28.48	31.62	28.11	35.37	32.00	31.10	30.48		
CR86	526908	136754	30.18	35.10	21.86	15.91		14.77	16.65	20.38	22.53	24.84	32.39	28.92	23.96	23.48		
CR87	525489	136573	42.97	26.92	30.33	19.80	17.35	20.78	27.29	31.12	35.51	33.17	35.14	34.73	29.59	29.00		
CR88	527715	137893	21.99	16.38	24.39	25.80		17.98	13.62	21.97	23.78	19.86	25.03	25.78	21.51	21.08		
CR89	526953	138658	21.47	17.51	18.96	17.93	15.73	11.41	12.92	16.44	18.90	15.52	22.43	20.71	17.49	17.14		
CR91	528681	137177	35.36	35.13	28.83	21.35	22.01	22.84	23.57	26.63	31.22	31.02	40.44	23.96	28.53	27.96		
CR93	528841	137069	58.79	58.08	35.30	22.67	29.41	30.61	34.77	42.77	41.22	41.28	45.40	41.38	40.14	39.34	37.1	Predicted concentration at receptor within 10% of AQS objective
CR94	528882	137086	30.57	2.09	22.38	19.30	19.93	0.00	11.10	20.68	22.38	21.89	27.12	25.06	18.54	18.17		
CR95	529125	137196	33.07	27.61	23.08	15.08		18.71	18.78	24.84	24.74	25.72	33.54	28.23	24.85	24.36		
CR96	528615	136960	31.95	30.69	21.73	13.15	14.81	14.66	18.00	18.75	24.04	23.50	27.54	26.02	22.07	21.63		
CR97	528515	139275	42.11	33.12	26.98	21.92	22.82	24.93	20.76	28.37	28.06	22.30	36.33	30.99	28.22	27.66		
CR98	528410	135628	40.89	33.03	29.15	18.48	21.14	19.25	21.89	26.70	30.52	30.63	35.95	32.05	28.31	27.74		
CR99	526326	136487	19.05	13.80	12.48	9.78		7.64	8.72	10.19	12.56	13.21	19.66		12.71	12.46		
CR100	525679	135556	30.51	21.63	21.84	20.53	18.25	18.19	17.69	23.95	25.33	24.55	29.51	26.34	23.19	22.73		
CR101	526449	134139	56.81	53.62	41.55	29.17	34.86	41.73	36.26	42.63	51.87	48.16	50.22	46.50	44.45	43.56	29.8	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.98)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
CR102	528848	137802	31.79	30.27	23.58	16.61	18.23	19.56	23.81	24.21	30.51	31.86	36.37	34.23	26.75	26.22		
CR103	528848	137802	20.35	14.82	14.02	9.78	9.90	8.93	11.51	12.89	14.66	12.33	21.56	17.65	13.24	12.98		
CR104	527333	135 846	30.46	23.79	21.14	16.17	13.87	14.09	15.17	19.92	21.54	22.60	26.41	26.44	19.58	19.19		
CR105	526940	137831	56.52	55.10	35.80	23.31	28.53	29.65	32.19	37.69	43.57	42.40	50.68	41.06	36.49	35.76		
CR106	527000	138357	43.52	42.58	34.18	25.21	25.97	27.88	28.23	33.27	33.89	36.14	46.82	40.59	33.22	32.55		
CR107	524806	136822			15.98	12.61	10.93	10.74	11.06	13.44	15.46	14.97	22.43	18.43	14.61	14.31		
CR108	526901	136381			21.16	16.99	15.13	12.40	14.82	19.25	23.26	21.07	28.28	24.80	19.72	19.32		
CR109	527174	136357			23.58	14.38	13.55	14.94	16.63	19.84	22.97	20.95	30.80	27.67	20.53	20.12		
CR110	526928	136356						11.01	11.53	15.74	18.90		25.38	21.13	17.28	16.66		
CR111	526804	136375						15.39	17.36	21.73	24.22	24.06	29.56	26.83	22.74	22.34		

- All erroneous data has been removed from the NO₂ diffusion tube dataset presented in Table B.1
- Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16
- Local bias adjustment factor used
- Where applicable, data has been distance corrected for relevant exposure in the final column
- Crawley Borough Council confirm that all 2020 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System

Notes:

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

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within Crawley Borough Council During 2020/21

There are a number of significant new or ongoing developments within the borough which may cumulatively contribute to pollution sources in the area. These include:

Commercial/Industrial Development, Manor Royal Business District (adjacent to the Hazelwick AQMA) - Planned development or currently under construction.

Commercial development currently under construction:

- Astral Towers, Betts Way: Storage and Distribution Warehouse Units (Class B8) – construction started 2020
- Forgewood employment land: - 5000m² business (B1/2/8) land - construction started 2020
- Churchill Court: Light Industrial (Class B2) and Storage and Distribution (Class B8) - construction started 2021

Commercial development coming forward 2021/22:

- Land at Jersey Farm: Industrial development (Class B8) – planning permission given but construction not started
- The Office, Crawley Business Quarter: Storage and Distribution Warehouse Units (Class B8) – awaiting planning decision
- The Base, Fleming Way: Storage and Distribution Warehouse Units (Class B8) – awaiting planning decision
- Napier way: Storage and Distribution Warehouse Units (Class B8) – awaiting planning decision
- Hydehurst Lane: Storage and Distribution Warehouse Units (Class B8) – awaiting planning decision
- Manor Royal District Heating Network: Two energy centres: one with ground source heat pump and one with low NOx gas boiler - feasibility study stage

Residential Development - Key Housing Sites: Sites identified as key housing sites in the Local Plan Map as planned development or currently under construction.

Residential development currently under construction:

- Zurich House, East Park, Southgate (59 dwellings) –construction started 2020
- Stoner House, Northgate Avenue (130 dwellings) – construction started 2020
- Town Centre District Heating Network (low NOx gas boiler) –construction started 2020
- Town Centre, The Boulevard: 91 dwellings (Geraint Thomas House) - construction started 2020

Residential development coming forward 2021/22:

- Station Gateway (Mokka Site residential units) - awaiting planning application
- Station Gateway (Begrave Hse) residential units - awaiting planning application
- Station Gateway (Overline House commercial/residential units) - awaiting planning permission
- Steers Lane (185 dwellings) - awaiting planning permission
- Longley House (120 dwellings) – Planning permission but construction not started
- Land East of Tinsley Lane(150 dwellings) – awaiting outlie planning permission

Major Planned development – Development schemes assessments / EIA due to size and impact on the local area.

Crawley Growth Programme:

- £60m investment programme (public and private) to deliver infrastructure improvements and growth/regeneration to sites in the town centre and Manor Royal business district, including: delivery of 11,300m² office/industrial space at the Nova site London Road, 1,000 new homes in Crawley town centre by 2030, new Crawley railway station and sustainable transport infrastructure (bus, cycle routes and pedestrian walkways).Phased development. Some schemes completed, others in development/design or awaiting planning permission

Forgewood residential neighbourhood:

- Ongoing development of new neighbourhood, including 2000 new residential units, local shops, amenities, community centre, school and realignment of surrounding roads. The Forgewood development was agreed on appeal before the Hazelwick AQMA was declared. The development has been under construction since 2016, and is expected to be completed/ fully operational 2022/3

West of Ifield urban development project

- Homes England to redevelop 194 hectares of land west of Ifield within the administrative area of Horsham District Council (HDC) and Crawley Borough Council (CBC) for residential mixed use neighbourhood. The scheme will include up to 4,000 homes, community infrastructure, commercial units and the creation of a new road including a bridge across the River Mole. As a project identified with a potential to impact air quality, the development will be subject to an EIA (as it is of a type falling within Schedule 2 of Town and Country Planning (Environmental Impact Assessment) Regulations 2017). The Scoping consultation has already been undertaken.

Gatwick Northern Runway Expansion

- The Gatwick Northern Runway Expansion Development is currently going through the Consent Order (DCO) process. The Proposed Development includes alterations to the existing northern runway to provide dual runway operations and enable increased capacity at the airport. The potential passenger throughput with development is predicted to be 74 million passengers per annum (mppa) by 2038. This represents a 13mppa increase above the “without development” potential of the single runway airport.

The proposals include construction works over a 15 year period, increased on-airport car parking for 18.5 k more vehicles and a 70% increase in surface access including passenger numbers, cargo freight and employment traffic.

Gatwick’s preliminary air quality assessment findings predicts negligible impacts at all receptors for NO₂, PM₁₀ and PM_{2.5} in 2029 and 2032 and no significant air quality effects expected for 2029 and 2032 at human receptors.

The council is awaiting more detailed information in the form of the Preliminary Environmental Impact Report (PEIR) for the formal S.42 consultation stage of the DCO, where it will be considering how the additional emissions created by the

scheme will impact Crawley's air quality action plan measures and in turn how this will effect progress in achieving compliance within the AQMA.

All new developments are examined through the planning system and where necessary air quality assessments and mitigation are required in order to offset the impacts of existing and new sources of pollution on future residents.

In addition, diffusion tube monitoring within the AQMA and surrounding areas will measure the effects of new developments and new pollution sources, allowing the council to identify pollution hotspots and assess long term trends. These results are reported annually through the LAQM process.

Additional Air Quality Works Undertaken by Crawley Borough Council During 2020/21

Following public consultation at the end of 2020 the Council approved the amendment of the Hazelwick AQMA boundary to include the roads around Three Bridges Station. The amended AQMA is known as the Crawley [AQMA](#) and was formally declared on 10 March 2021.

The need to amend the boundary was due to exceedance of the annual average air quality objectives for nitrogen dioxide (NO₂) at locations with public exposure on Worth Park Avenue and Haslett Avenue East. The area was therefore included to satisfy the requirements of the Environment Act 1995.

The declaration allows the Council to target measures to improve air quality through its action plan and to ensure that air quality is taken into account when considering planning decisions within the AQMA.

Work on developing the Air Quality Action Plan to reflect the extended area is due to start in 2021. Baseline studies and source apportionment work will be undertaken to help inform the plan and these studies will be reported on in next year's ASR.

QA/QC of Diffusion Tube Monitoring

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

The NO₂ diffusion tube analysis was carried out and analysed by Gradko Environmental (part of Gradko International Ltd) .The QA/QC methodology for Gradko Environmental Ltd is given below:

Tube Preparation: The preparation of the tubes is done using 20% Triethanolamine / 80% Deionised Water. The preparation procedures adhere to the guidance detailed in the document 'Diffusion Tubes for Ambient NO₂ Monitoring: Practical Guidance for Laboratories and Users', Issue 1a Feb.2008 (issued by AEA Energy and Environment).

Analysis Methods: Analysis of the NO₂ diffusion tubes is carried out using colorimetric techniques in accordance with Gradko International Ltd UKAS accredited (ISO/IEC 17025) internal laboratory procedures. The details in these procedures adhere to the DEFRA 'Diffusion Tubes for Ambient NO₂ Monitoring: Practical Guidance for Laboratories and Users, Issue 1a Feb 2008', issued by AEA Energy and Environment.

Quality Control Procedures: All tube components are maintained in a high state of cleanliness. New absorbents are prepared by the Laboratory and checked for levels of contamination.

The diffusion tubes are prepared in a dedicated clean laboratory and stored under refrigerated conditions to maintain stability. A sample of each batch of tubes prepared is checked by the analyst for blank levels. If the tubes are stored for more than one week, a further sample is taken and checked for any increases in blank levels. If the levels reach a pre-determined value, the batch of tubes is discarded.

Method Calibration: A full five to seven (dependant on range of concentrations being measured) point calibration is carried out monthly using NIST certified nitrite standards. The linear graph acceptance is $r^2 = 0.999$. At the start of every batch of tubes analysed, two nitrite standards are run to check the accuracy of the calibration graph, this is repeated at the end of the analysis run. Statistical graphs are maintained using the plots of the daily standard results and the acceptance criteria achieved before an analysis run is made. An

instrument calibration is run every two months using certified optical filters plus an annual preventative maintenance programme carried out by an external engineer is in operation.

Quality Assurance: The laboratory has a fully documented Quality Management System which has been assessed and accredited by UKAS (Accreditation No. 2187). A copy of the Quality Manual Contents Index is available on request.

Quality Control Procedures are supplemented by the use of external proficiency schemes such as W.A.S.P administered by Health and Safety Laboratories at Buxton and the NETCEN U.K. NO₂ Field Inter-comparison project administered by National Physical Laboratories (NPL), Teddington.

Diffusion Tube Annualisation

Where data capture is below 75%, it is necessary to annualise the data as described in Box 7.9 of the LAQM Technical Guidance TG (16). The reason for annualisation is that the concentration varies throughout the year, and the instrument may have been operational for a period of above or below average concentrations.

During the 2020 monitoring year, two sites were identified as requiring annualisation due to data capture of 50% at site CR110 and 58% at site CR 111.

The annualisation calculation was carried out using the Diffusion Tube Data Processing Tool (Bureau Vitas v1.1 June 2021)

The calculator tool follows the methodology described in LAQM TG(16):

- The measured mean concentration for the monitoring period is calculated.
- Data from two or more continuous background monitoring sites (with $\geq 85\%$ data capture) is inputted into the tool for the entire time period between the Monitoring Year Start and End dates (For 2020 the sites used were Gatwick East (CA2) and Poles Lane (RG3))
- Annual means for the year are calculated for these sites (CA2 and RG3)
- Period means are calculated for the monitoring period of interest
- The ratio of the annual mean to the period mean for each of the sites is calculated
- The average of these ratios is calculated. This is then the annualisation factor.
- The measured period mean concentration is multiplied by this annualisation factor to give the estimate of the annual mean for that year.

The Diffusion Tube Data Processing Tool calculated the annualised mean for the two sites (CR110 and CR111) as below:

Site	Period Mean (2020)	Annualised Annual Mean (2020)
CR110	17.3	17.0
CR111	22.7	22.8

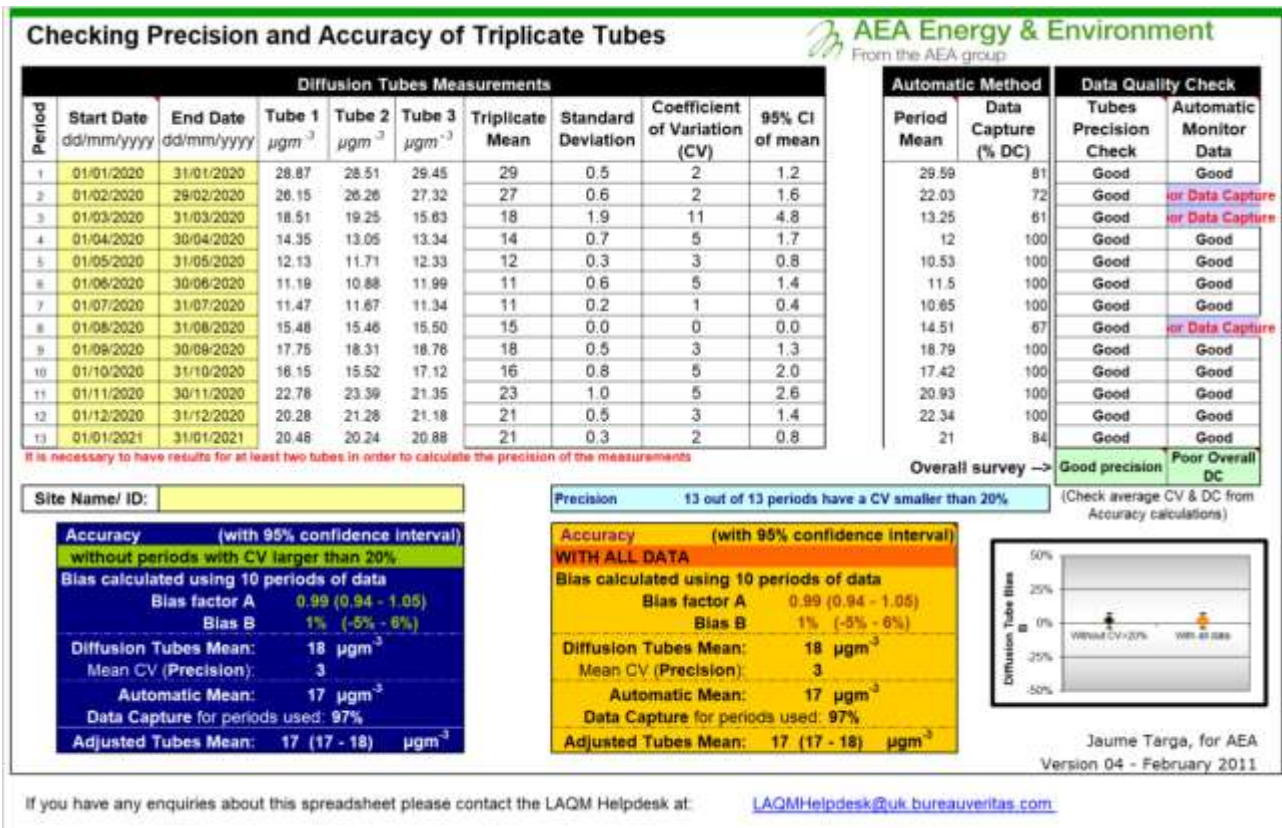
Diffusion Tube Bias Adjustment Factors

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

The national bias adjustment factor is 0.81 which has been obtained from the spreadsheet version 06/21, for Gradko diffusion tubes (20% TEA in water) using 27 studies.

National Diffusion Tube Bias Adjustment Factor Spreadsheet							Spreadsheet Version Number: 06/21			
Follow the steps below in the correct order to show the results of relevant co-location studies							This spreadsheet will be updated at the end of Sept 2021			
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods										
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet										
This spreadsheet will be updated every few months, the factors may therefore be subject to change. This should not discourage their immediate use.										
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners ACCO and the National Physical Laboratory					Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.					
Step 1:		Step 2:	Step 3:	Step 4:						
Select the Laboratory that Analyzes Your Tubes from the Drop-Down List		Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor shown in blue at the foot of the final column.						
If a spreadsheet is open, and you are able to find the data		If you have a co-location study, please enter the method used	If you have a co-location study, please enter the year used	If you have your own co-location study then see footnote 1. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMhelpdesk@bureauveritas.com or 0800 0327563						
Analysed By	Method	Year	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dt) (µg/m ³)	Automatic Monitor Mean Conc. (Cr) (µg/m ³)	Bias (B)	Tube Precision	Bias Adjustment Factor (A) (Cr/Dt)
Gradko	20% TEA in water	2020	RS	Maylebone Road (Hemsworth)	12	57	43	33.3%	0	0.76
Gradko	20% TEA in water	2020	R	Rath & North East Somerset	11	32	26	13.0%	0	0.88
Gradko	20% TEA in water	2020	R	Gairmseed Council	12	22	17	28.1%	0	0.78
Gradko	20% TEA in water	2020	R	Gairmseed Council	12	23	21	11.6%	0	0.90
Gradko	20% TEA in water	2020	R	Gairmseed Council	10	26	25	6.5%	0	0.94
Gradko	20% TEA in water	2020	R	Gairmseed Council	12	26	21	30.5%	0	0.77
Gradko	20% TEA in water	2020	R	Gairmseed Council	12	31	32	-3.4%	0	1.03
Gradko	20% TEA in water	2020	R	Luton Borough Council	9	36	28	33.0%	0	0.78
Gradko	20% TEA in water	2020	R	Nottingham City Council	12	31	34	-8.5%	0	1.08
Gradko	20% TEA in water	2020	R	Dudley MBC	11	33	28	19.9%	0	0.83
Gradko	20% TEA in water	2020	UR	Dudley MBC	11	23	14	61.2%	0	0.62
Gradko	20% TEA in water	2020	R	Dudley MBC	11	44	34	30.0%	0	0.77
Gradko	20% TEA in water	2020	R	Asht and North Down Borough Council	10	27	20	34.0%	0	0.75
Gradko	20% TEA in water	2020	R	Belfast City Council	10	26	21	22.0%	0	0.81
Gradko	20% TEA in water	2020	R	Belfast City Council	10	41	36	12.6%	0	0.89
Gradko	20% TEA in water	2020	R	Belfast City Council	10	36	25	43.0%	0	0.69
Gradko	20% TEA in water	2020	R	Lancaster City Council	11	27	23	19.9%	0	0.83
Gradko	20% TEA in water	2020	R	Lancaster City Council	10	32	28	13.0%	0	0.89
Gradko	20% TEA in water	2020	R	Canterbury Borough Council	9	23	20	13.0%	0	0.88
Gradko	20% TEA in water	2020	UR	Canterbury Borough Council	9	22	19	17.9%	0	0.86
Gradko	20% TEA in water	2020	R	Luton & Bedfordshire City Council	10	23	18	32.0%	0	0.76
Gradko	20% TEA in water	2020		Overall Factor (27 studies)				Use		0.81

The local bias adjustment factor was derived from the co-located diffusion tubes (prepared and analysed by Gradko) at the Gatwick East continuous analyser site (CA2). Details of the co-location study are present in below.



The 2020 local bias correction for Crawley was calculated as 0.98 using the LAQM spreadsheet tool provided in www.airquality.co.uk/archive/laqm/tools.php. Crawley Borough Council has applied a single local bias adjustment factor of 0.98 to bias adjust the 2020 diffusion tube monitoring data. A summary of bias adjustment factors used by Crawley Borough Council over the past five years is presented in Table C.1.

Table C.1 – Bias Adjustmnt Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2020	Local	N/A	0.98
2019	Local	N/A	1.02
2018	Local	N/A	1.00
2017	Local	N/A	1.00
2016	Local	N/A	1.06

Choice of Factor for Bias Adjustment:

The locally derived bias adjustment figure of 0.98, indicates very good correlation in the tube data relative to the reference method (chemiluminescence analyser), over the data capture period.

The national bias adjustment value for 2020 was 0.81. This value was slightly lower than the locally derived factor, indicating the correlation wasn't as close and that the diffusion tubes had a tendency to over-estimate actual concentrations when compared to the reference method.

In deciding which bias adjustment value to use, the following factors were taken into account in accordance to the guidance in LAQM-TG16:

Box 7.11 advises that: *“If the co-location site is unusual in some way: for example, affected by specific large NO_x sources other than road traffic, such as local industrial installations, this is a strong indication in favour of using a locally-derived factor”*

The co-location site is situated on the eastern boundary of the Gatwick Airport and therefore affected by NO_x sources from the Airport. The site is 60m from the nearest residential property, and there are many other residential properties within 1000m of the airport. Determining relevant exposure within 1km of the airport boundary is one of the assessment criteria required for authorities with a major airport within their boundary. This would therefore favour using the locally derived factor.

However, in paragraph 7.197 the guidance says that: *“care should be taken to avoid applying a bias adjustment factor derived from a local co-location study carried out for concentrations that are very different to those being measured in the wider survey”*

Although the effect of the airport as an area source should be considered it may be less of an influence at roadside locations where traffic sources will be the major consideration. At these locations the nationally derived factor may be more relevant. In 2020, the impact of the airport as a large NO_x source was significantly reduced due to the total ban on all non-essential flights. Gatwick was particularly hard hit by these controls since the majority of its flights are holiday/leisure based. The result was an effective shut down of airport activities. The co-location study was therefore a reflection of this impact.

Consultation with the laqm helpdesk in previous years resulted in the decision to use the more conservative locally derived bias factor. The rationale for this decision was that it

isn't appropriate to use two different bias factors within the report, but since both national and local factors were relatively close in value, and the precision and accuracy of the local co-location study was very good, the more cautious approach would be to use the local factor. Consequently all conclusions and recommendations made in this report were based on monitoring results adjusted with the 2020 bias adjustment figure of 0.98.

NO₂ Fall-off with Distance from the Road

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

Fall-off-with-distance calculations were required for five diffusion tube sites in 2020 (CR55, CR63, CR93, CR101, CR105). These are sites where the annual mean concentration was greater than 36µg/m³, and the monitoring site was not located at a point of relevant exposure. A summary of the sites and the output data from the Diffusion Tube Data Processing Tool is presented in Table C.4.

Diffusion Tube ID	Distance (m)		NO ₂ Annual Mean Concentration (µg/m ³)			Comment
	Monitoring Site to Kerb	Receptor to Kerb	Bias Adjusted and Annualised	Background	Predicted at Receptor	
CR05	5.7	6.0	30.2	18.0	35.2	
CR63	3.4	33.4	42.2	21.0	30.5	Warning: your receptor is more than 20m further from the kerb than your monitor - treat result with caution
CR93	1.0	3.3	38.3	23.0	37.1	Predicted concentration at Receptor within 10% the AQD objective
CR101	1.1	10.0	43.0	13.0	29.0	
CR105	3.9	14.0	36.9	15.0	30.5	

QA/QC of Automatic Monitoring

Crawley's monitoring site (CA2) on the eastern boundary of Gatwick airport has two automatic analysers: a nitrogen dioxides analyser (ML9841B) and a FIDAS 200 particulate monitor, which replaced the existing TEOM (Tapered Element Oscillating Microbalance) in March 2020.

The monitoring data from this site is available on the [sussex-air](#) website. Current and historic data is accessible to the public and commercial users by searching the sites on the interactive site locations map. The specific search request allows for a range of variables such as site location, pollutant, averaging period, monitoring dates etc. Data is then returned to the request in the form of graphs and Excel spreadsheets.

The website also provides an Application Programming Interface (API) for air quality data. This uses a copy of the live database, which validates the data and calculates information like air quality indexes and objectives. Live data can be viewed [here](#).

The monitoring site and data is maintained through a series of QA/QC processes and procedures:

Data Management and Local Site Operator (LSO)

Local Site Operator (LSO) duties and data management are carried out by Crawley Borough Council staff trained for this purpose. The purpose of site operator visits is to carry out regular calibration and site checks. Site calibration forms a fundamental part of the monitoring regime and support ratification of the automatically logged data.

Site visits provide information on a range of issues which may affect the operation of the monitoring equipment or the air quality in the vicinity of the analyser such as:

- Local Information to confirm roadworks, building work, sources of dust/smoke
- Site information to confirm security and correct functioning of the site as a whole
- Analyser information to confirm correct operation of the analysers
- Analyser response information enabling correct scaling of air quality data

To retain a high quality of data, fortnightly calibration visits are made by the LSO. These site visits allow the following functions to be undertaken:

- Site Inspection
- Pre-calibration checks
- Calibration of analyser

- Filter change
- Post-calibration checks and site inspection

In addition, non-routine site visits may be necessary in the event of instrument malfunction or power cuts.

Each analyser is calibrated to ensure any instrumental drifts since the previous calibration can be quantified. Any adjustments/recalibrated to the instruments must first be approved by the Management Unit (MU). The MU for Crawley's monitoring equipment is Environmental Research Group (ERG) Imperial College, London.

Verification and Ratification process,

The Environmental Research Group at Imperial College London carries out data verification and ratification on automatic monitoring data for the Sussex Air Quality Partnership.

Data verification and ratification is the process whereby provisional data are combined with all other relevant information to derive the best final dataset, which is as accurate as possible and has known measurement uncertainties to allow meaningful comparison with other data using specialised data handling software.

Verification is carried out on an ongoing basis and is nominally a process to "clean-up" the initial provisional data by reviewing/excluding/including any data due to instrument malfunctions or faulty calibrations, and updates to data scaling following application of the most recent calibration factors.

Ratification is a detailed manual check of the data set carried out on a monthly/ quarterly/ yearly basis. It requires a longer-term view of the dataset incorporating the results from independent QA/QC audits of the monitoring stations, and assessment on the validity of data by experienced air quality scientists. It will consider a range of variables such as: relationships between pollutants, the impact of air pollution episodes, the context of the results in the overall climate, national and regional pollutant patterns, long-term trends etc. Once all the checks and corrections have been completed the data is given a "fully ratified" status.

Service and Maintenance of the Automatic Monitoring Equipment

The NOx analyser (ML9841B) and the FIDAS 200 particulate monitor are both maintained and twice yearly serviced on contract with specialist service engineers operating BSI audited and accredited systems for quality.

The service methodology includes; pre-service inspection, visual inspection, calibration, flow check, leak check, inspection and recording of analyser internal diagnostics and communication check from remote site.

Engineer servicing or callout reports are supplied to the council as a record of the work carried out.

PM₁₀ and PM_{2.5} Monitoring Adjustment

The type of PM₁₀/PM_{2.5} monitor (FIDAS) utilised within Crawley Borough Council does not required the application of a correction factor.

Automatic Monitoring Annualisation

All automatic monitoring locations within Crawley Borough Council recorded data capture of greater than 75% therefore it was not required to annualise any monitoring data.

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

Site ID	Annualisation Factor Gatwick East (CA2)	Annualisation Factor Poles Lane Crawley (RG3)	Annualisation Factor Site 3 Name	Annualisation Factor Site 4 Name	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
CR110	0.9925	0.9726			0.9825	17.3	17.0	
CR111	0.9901	1.0119			1.0010	22.7	22.8	

Table C.3 – Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4	Local Bias Adjustment Input 5
Periods used to calculate bias	9				
Bias Factor A	0.98 (0.93 - 1.03)				
Bias Factor B	2% (-3% - 7%)				
Diffusion Tube Mean ($\mu\text{g}/\text{m}^3$)	17.3				
Mean CV (Precision)	3.4%				
Automatic Mean ($\mu\text{g}/\text{m}^3$)	16.9				
Data Capture	98%				
Adjusted Tube Mean ($\mu\text{g}/\text{m}^3$)	17 (16 - 18)				

Notes:

A single local bias adjustment factor has been used to bias adjust the 2020 diffusion tube results.

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

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted)	Background Concentration	Concentration Predicted at Receptor	Comments
CR55	5.7	6.8	36.2	18.0	35.2	
CR63	3.4	33.4	42.2	23.0	30.5	<i>Receptor is more than 20m further from the kerb than monitor - treat result with caution.</i>
CR93	1.8	3.3	39.3	23.0	37.1	<i>Predicted concentration at Receptor within 10% the AQS objective.</i>
CR101	1.1	10.0	43.6	13.0	29.8	
CR105	3.9	14.0	38.9	15.0	30.5	

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England⁷

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

⁷ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

Appendix F: Impact of COVID-19 upon LAQM

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

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

Despite the challenges that the pandemic has given rise to, the events of 2020 have also provided Local Authorities with an opportunity to quantify the air quality impacts associated with wide-scale and extreme intervention, most notably in relation to emissions of air pollutants arising from road traffic. The vast majority (>95%) of AQMAs declared within the UK are related to road traffic emissions, where attainment of the annual mean objective for nitrogen dioxide (NO₂) is considered unlikely. On 23rd March 2020, the UK Government released official guidance advising all members of public to stay at home, with work-related travel only permitted when absolutely necessary. During this initial national lockdown (and to a lesser extent other national and regional lockdowns that followed), marked reductions in vehicle traffic were observed; Department for Transport (DfT) data⁸ suggests reductions in vehicle traffic of up to 70% were experienced across the UK by mid-April, relative to pre COVID-19 levels.

This reduction in travel in turn gave rise to a change of air pollutant emissions associated with road traffic, i.e. nitrous oxides (NO_x), and exhaust and non-exhaust particulates (PM). The Air Quality Expert Group (AQEG)⁹ has estimated that during the initial lockdown period in 2020, within urbanised areas of the UK reductions in NO₂ annual mean concentrations were between 20 and 30% relative to pre-pandemic levels, which

⁸ Prime Minister's Office, COVID-19 briefing on the 31st of May 2020

⁹ Air Quality Expert Group, Estimation of changes in air pollution emissions, concentrations and exposure during the COVID-19 outbreak in the UK, June 2020

represents an absolute reduction of between 10 to 20 $\mu\text{g}/\text{m}^3$ if expressed relative to annual mean averages. During this period, changes in $\text{PM}_{2.5}$ concentrations were less marked than those of NO_2 . $\text{PM}_{2.5}$ concentrations are affected by both local sources and the transport of pollution from wider regions, often from well beyond the UK. Through analysis of AURN monitoring data for 2018-2020, AQEG have detailed that $\text{PM}_{2.5}$ concentrations during the initial lockdown period are of the order 2 to 5 $\mu\text{g}/\text{m}^3$ lower relative to those that would be expected under business-as-usual conditions.

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

Impacts of COVID-19 on Air Quality within Crawley

Air quality monitoring was maintained during the reporting year as the continuous monitoring site and diffusion tubes were in Covid safe locations which allowed site visits to continue. The laboratory carrying out the analysis of the diffusion tube closed due to Covid restrictions for two months. We had sufficient excess tubes to cover this period and were advised by the laboratory to carry out the changeover and refrigerate the tubes until normal service resumed. A dedicated officer was able to undertake the air quality monitoring regime throughout 2020 by adhering to social distancing and appropriate cleansing operations. There was therefore no significant disruption to the monitoring programme in Crawley as a consequence of COVID during 2020.

A report on air quality in Crawley during the COVID-19 outbreak (2020) was presented to Members in June 2020 to provide a summary of the impact of Covid on air quality in Crawley immediately after the first lockdown. The report was produced in the second quarter of 2020, using monitoring data up to June 2020 only. Further updated information based on a full 12 month's data following successive lockdowns during 2020 is provided in section 3.2 of the ASR report.



Report on Air (

The report gives a summary of air quality data from monitoring sites across Crawley and Sussex shows the drop in measured concentrations of nitrogen dioxide (NO_2) since

lockdown was introduced on March 23, and also compares concentrations during the first quarter of 2020 with the same period in 2019.

With many people working from home, schools shut and Gatwick airport effectively closed, the subsequent decrease in traffic over the lockdown period (mid-March to May) resulted in a significant fall in pollution levels across Crawley. Traffic volumes in the region fell by 60% and possibly more in Crawley due to the absence of airport activity during this period. This led to an average 42% reduction in NO₂ levels across the borough, and approximately 50% reduction in the vicinity of the airport in the period over the first lockdown. The average NO₂ reductions in the AQMA were lower, at 26%. However, this was still a substantial drop in an area where busy arterial routes into and out of the town were likely to have higher usage than other roads even during the lockdown.

Opportunities Presented by COVID-19 upon LAQM within Crawley Borough Council

The following opportunities and measures developed or implemented within 2020 that can be attributed to the pandemic in Crawley include:

1. West Sussex County Council was successful in accessing Government funding for pop-up cycle-ways, as an emergency response to increase travel options as part of the Government-led recovery plan from COVID-19. As an emergency response, the trial schemes were required to be planned and installed within three months. In Crawley this resulted in two new temporary dedicated cycle routes aimed at promoting cycling and providing more safe space for people to cycle to enable sustainable travel choices on key commuting routes and relieve the pressures on public transport and as an alternative to the car:
 - Hazelwick Avenue: Provision of protected on-carriageway cycle lanes connecting with the existing National Cycle Network 21 route (with potential to improve this section). Providing an alternative travel link to Manor Royal Business District, Crawley and Gatwick.
 - A2220 Hastlett Avenue: Providing continuity with the existing cycleway, linking the residential areas of Pound Hill, Three Bridges and Burley's Wood to the town centre.

The council hoped that the temporary schemes would be made a permanent feature. Unfortunately WSCC removed the temporary cycle lanes a few months

later citing increased congestion as a key issue. This was disappointing because closer collaborative work could have helped design better schemes which would have been more acceptable to local communities. This in turn would have provided benefits for active and sustainable travel, as well as contributing to air quality and carbon improvements.

2. The Government's lockdown response to Covid placed restrictions on movements and fundamentally changed how society in the UK behaved in their day to day travel, work and social activities. The council offices, along with most other work places, were forced to re-evaluate working practices and wide-scale homeworking was adopted across the country by many organisations, with the use of online meeting platforms to reduce face to face contact removing the necessity to travel for meetings. These work practices have continued in many organisations and have formed part of a longer term change. The unintentional benefit of these changes has been reduction in transport related emissions. It remains to be seen if these improvements will continue

Challenges and Constraints Imposed by COVID-19 upon LAQM within Crawley Borough Council

The following challenges and/or constraints have been experienced in relation to LAQM within 2020 that can be attributed to the pandemic. (The impacts presented below are given an impact rating aligned with the guidance presented in the LAQM Impact Matrix in Table F 1, with professional judgement considered as part of their application):

- The implementation of action plan measures associated with the Crawley Growth Programme have been delayed due to financial and staff constraints as a result of Covid restrictions, which has resulted in a number of schemes running behind schedule. Some schemes have seen timescales for delivery extended by 1-2 years, however none of the projects have been discontinued. **Medium Impact**
- The implementation of action plan measure for a revised Emission Standards for Licensed Taxis has been delayed due to the economic impact of Covid on the taxi trade in Crawley which relies heavily on Gatwick airport, which was effectively shut down for a year as a result of the pandemic. A decision was taken to draft a revised proposal for the policy changes to the emissions standard which will be presented

to the Licensing committee and re-consulted on during the next reporting year. This will aim to maximise the financial incentives and support available to the Trade whilst still delivering on the air quality/climate change benefits. The implementation of the measure will therefore be delayed by over a year. **Medium Impact**

- A revised AQAP is being developed for the Crawley AQMA. However, owing to the reallocation of Council resources during 2020, the development and implementation of the AQAP has been delayed. Current estimates are that the revised AQAP will be prepared in and sent out for draft consultation in September 2022. **Small Impact**
- As with previous years, a local bias adjustment factor has been utilised to adjust the diffusion tube results for 2020. The factor is lower than in previous years, but data capture was good and the tubes showed good overall precision. There is no reason therefore to conclude that the local adjustment factor is any less reliable than normal. **No Impact**

Table F 1 – Impact Matrix

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

Glossary of Terms

Abbreviation	Description
AADT	Annual Average Daily Traffic
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
AQS	Air Quality Strategy
ASR	Air quality Annual Status Report
CBC	Crawley Borough Council
CGP	Crawley Growth Programme
CAZ	Clean Air Zones
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
DFT	Department for Transport
EA	Environment Agency
EFT	Emissions Factor Toolkit
EPAQS	Expert Panel on Air Quality Standards
EU	European Union
FDMS	Filter Dynamics Measurement System
GAL	Gatwick Airport Ltd
GP	General Practitioner
GPS	Global Positioning Systems
HGV	HGV Heavy Goods Vehicle
KS2	Key Stage 2

LAQM	Local Air Quality Management
LEP	Local Enterprise Partnership
LEZ	Low Emission Zone
LGV	Light Goods Vehicle
LPTS	Local Plan Transport Strategy
MR BID	Manor Royal Business/Industrial District
MOVA	Microprocessor Optimised Vehicle Actuation (traffic light control system)
NAQS	National Air Quality Strategy
NPPF	National Planning Policy Framework
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
OLEV	Office for Low Emission Vehicles
PHE	Public Health England
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
RTPI	Real Time Passenger Information
SAQP	Sussex Air Quality Partnership
TBC	To be Confirmed
WHO	World Health Organisation
WSCC	West Sussex County Council
ZEC	Zero Emission Capable

References

- Local Air Quality Management Technical Guidance LAQM.TG16. April 2021. (Published by Defra)
- Local Air Quality Management Policy Guidance LAQM.PG16. May 2016. (Published by Defra)
- Sussex Air Quality Emissions Mitigation Guidance 2021
- Draft Crawley Borough Council Local Plan 2020-2035
- Crawley Growth Programme
- Crawley Town Centre Regeneration Programme 2016
- National bias adjustment factor spreadsheet: <http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html>
- Tube precision spreadsheet:
www.airquality.co.uk/archive/laqm/tools/AEA_DifTPAB_v03.xls
- Bureau Vitas LAQM [Diffusion Tube Data Processing Tool](#)