

Crawley Borough Council

2023 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995
Local Air Quality Management, as amended by the
Environment Act 2021

Date: 2023



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Executive Summary: Air Quality in Our Area

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.

This report provides the results of air quality monitoring undertaken in 2022 across Crawley and is prepared in accordance with the guidance issue by the Department for Environment, Food and Rural Affairs (Defra).

Road traffic is the main source of (nitrogen dioxide) pollution in Crawley, and our network of monitoring sites measures concentrations along busy roads as well as at background locations and areas of specific interest (such as residential locations close to the airport), to give a broad picture of pollution levels across the borough.

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 29,000 to 343,000 deaths at typical ages³, with a total estimated healthcare cost to the NHS and social care of £157 million in 2017⁴.

Air Quality in Crawley is mainly good, with the exception of a small number of locations alongside busy roads where an air quality management area (AQMA) has been declared. The Council is working with its partners to tackle pollution and target measures to improve

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, January 2023

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

air quality in these areas. These action plan measures are summarised in Table 2.2 of the report.

There are two national objectives for nitrogen dioxide (NO₂). These are for the average level over a year, which should be below 40 µg/m³, and the average level for one hour which should be below 200 µg/m³. Most of our NO₂ 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 µg/m³ it will meet the hourly objective of 200 µg/m³. The annual average objective applies to residential, hospital and educational sites. The hourly average objective applies to these sites as well as busy streets and workplaces.

The measured results for NO₂ are set out in tables A.4 and B.1 of this report and show that national air quality objectives were met at all of Crawley's monitoring sites in 2022 (although one site in the AQMA near Three Bridges station was borderline for annual average NO₂).

Trend data shows a decline in concentrations of both NO₂ and Particulate Matter (PM₁₀ and PM_{2.5}) over the past 5 years at all long-term sites in Crawley, including sites next to busy roads and close to the airport. It's still too early to tell if the gradual increase in traffic levels seen in 2021 and 2022 will continue and subsequently impact air quality trends in future years or whether the current downward trend will be maintained. The current improving trend reflects the pattern seen regionally and nationally as a result of tighter vehicle emissions standards and other environmental regulation. At a local level, actions taken to facilitate active travel through local infrastructure upgrades and traffic management measures, can bring about more targeted improvements within the borough.

Many of the solutions for tackling transport related air quality fall outside the powers of the council to implement. The council therefore works closely with its Highways Authority at West Sussex County Council (WSCC) on many of its action plan measures, such as those in the Crawley Growth Programme and Local Cycling and Walking Infrastructure Plan (LCWIP) which are aimed at encouraging active travel and improving air quality. The council also works with its partners in neighbouring districts, the Sussex-air partnership, Environment Agency and other departments within the council including Planning, Economic Development and the Sustainability Team, who are involved in developing many of the action plan measures.

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades, there are some areas where local action is needed to protect people and the environment from the effects of air pollution.

The Environmental Improvement Plan⁵ sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term PM_{2.5} targets. The National Air Quality Strategy, due to be published in 2023, will provide more information on local authorities' responsibilities to work towards these new targets and reduce PM_{2.5} in their areas. The Road to Zero⁶ details the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

Crawley Borough Council works collaboratively with other departments in the council and with our partners across the County to improve air quality and health. Through the local planning process there is ongoing implementation of the Sussex Air Quality and Emissions Mitigation Guidance to secure air quality mitigation from developers based on the damage costs from additional traffic emissions associated with new development. The council also works closely with WSCC Highways to improve active travel options and sustainable infrastructure projects within the borough. As a member of the Sussex Air Quality Partnership, we contribute data from the council's air quality monitoring network into the wider Sussex network which supports the [Sussex Air Alert service](#). This service is free to the public, providing air pollution information to people with respiratory and heart conditions who may be adversely affected by poor air quality.

The Council has also taken forward a number of specific measures to target sources of pollution within the borough over the past reporting year. Further details are provided later in the report, but some of the key completed measures include:

⁵ Defra. Environmental Improvement Plan 2023, January 2023

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

Crawley Growth Programme: Through the CGP the Council has enhanced pedestrian, cycle and bus infrastructure, to improve connectivity around the town and help promote active and sustainable travel which benefits health and wellbeing, as well as air quality.

School Travel plans: Crawley has appointed a school's active transport project officer to raise awareness and promote behavioural change and modal shift within its schools.

Programme of LEV Replacement to Council's Fleet: There is ongoing prioritisation of EV/low emission vehicles through council's vehicle replacement programme.

West Sussex Electric Vehicle Strategy - EV Charge Point Project: ongoing programme to deliver electric vehicle charging network across the borough to encourage transition to EV vehicles and reduce vehicle emissions.

Air Quality Awareness Raising and Community Engagement: Air quality promotion via the council's [website](#) and social media pages, including [airAlert](#), and [Taxi EV engagement study](#)

Electric Vehicle Car Club: EV car club based at new Town Hall.

Net Zero Collective Group – Joint working research project between Crawley Homes (council owned housing) and Southampton University to find most cost-effective retrofit of energy saving/carbon reduction measures in council owned homes to achieve pas2035.

Full Decarbonisation Retrofit Programme to 59 Crawley Homes W1: Successful bid for £690K of funding from SHDF (Social housing de-carbonisation fund) Wave 1.

Full Decarbonisation Retrofit Programme to 408 Crawley Homes W2: Successful bid for £6.8m of funding from SHDF (Social housing de-carbonisation fund) Wave 2 .

Cavity Wall Insulation Crawley Homes: Successful bid for £4m of funding from Crawley Towns Fund to provide installation of cavity wall insulation to Pas 2035 standards for 248 blocks of flats (1511 homes) over 4 years.

Conclusions and Priorities

There were no exceedances of the annual mean air quality objective for nitrogen dioxide in 2022 and NO₂ concentrations remained below pre-COVID levels for a further year.

However, there are indications that traffic levels are gradually rising, and this was reflected in small increases in measured NO₂ in 2021 and 2022 at sites within the AQMA and around Gatwick. The effect was not seen so clearly at other roadside and background sites across the monitoring network, where NO₂ levels appeared more stable, and it

remains unclear at this time where pollutant levels will settle post-COVID. Given that the primary local source of pollution in Crawley is from vehicle emissions, we need to more fully understand the future trend in post-COVID vehicle movements and subsequent traffic related pollutant levels in order to effectively target air quality improvement measures. This is particularly important within the AQMA where levels continue to be high (within 10% of the AQO or borderline exceedance) along some busy roads.

There were no exceedances of the annual mean and 24-hour objectives for PM₁₀ in 2022 and annual mean PM_{2.5} was well below the target value of 20ug/m³. Currently Crawley Borough Council only monitors for particulate matter (PM) at one site at Gatwick airport. However, a new AURN site is being installed at a background site in Crawley in 2023 and we hope to be able to report on the monitoring results for this site in 2024.

Given the scale of development coming forward over the next 10 years if the Gatwick expansion project is approved, pollution levels will continue to be reviewed and assessed through the laqm process to determine how trends in NO₂ and PM_{10/2.5} develop in future years. Consequently, no changes to the existing AQMA are currently proposed.

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

- Complete updated AQAP whilst continuing to deliver measures to improve air quality already identified (see Table 2.2)
- Prepare responses to the planning consultation for the Gatwick Northern Runway DCO application targeting air quality mitigation measures to offset environmental impacts.
- Ongoing work with Development Control to identify damage costs and mitigation for air quality impacts from new development in accordance with national planning policy and Sussex Emissions and Mitigation Guidance
- Review and update the monitoring network to respond to local developments and identify pollution hotspots across the borough.
- Explore funding options and feasibility for expansion of the council's monitoring network for PM₁₀ and PM_{2.5} within the AQMA.

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

- Identifying schemes that can generate a measurable improvement in air quality and which are feasible, deliverable and funded.
- Increasing developmental pressure impacting action plan measures
- Securing resources and/or funding streams to implement air quality measures.

Local Engagement and How to get Involved.

Crawley is one of the smallest districts in Sussex covering an area of 45 km² but attracts some of the highest levels of incoming commuter traffic. As well as commuter traffic, many local car journeys are less than 2km, and about 58% of all car trips are under 5km. High volumes of traffic on our local roads contribute to congestion and poor air quality. However, since many journeys are short, there is opportunity to improve local air quality by switching to sustainable and active 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 and encourage modal shift.

In addition to the Council's initiatives to tackle air quality, there are many ways we can get involved and take action on a personal level to improve air quality in Crawley:

Walk or cycle: Replacing car journeys by walking or cycling to reduce congestion and emissions. These activities also have proven physical and mental health benefits.

Take public transport or car-share: consider car share or public transport.

Ultra-Low Emission Vehicle (ULEV): The sale of new petrol and diesel cars is due to end in the UK by 2030, consider EV or hybrid vehicle when next replacing your car.

Driving Style: There are ways to drive which help reduce emissions and can save money on fuel and wear and tear:

- Drive smoothly and try not to accelerate or brake hard.
- Regular maintenance and engine service will help reduce emissions.
- Correct tyre pressure reduces friction/drag and minimises fuel use and emissions.
- Limit use of the air conditioning to reduce fuel consumption and emissions.
- Turn off engine when car stationary to release less exhaust emissions.

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

Local authority engagement with decision makers and the public: Local engagement helps the council to understand the needs of the community, provide information and raise awareness to support behavioural change.

The council hosts an annual Junior Citizen event for all Crawley's primary school yr-6 pupils. This event has been used to raise awareness through interactive games on air quality issues and we are also continuing our Defra funded air quality Schools Project.

Public awareness campaigns such as Clean-Air Day and Breath Easy Week are promoted via West Sussex and Crawley Borough's websites and social media pages and on digital advertising boards throughout Manor Royal business district. The Sussex-air website also provides detailed information to the public on local air quality, news updates, educational resources, and links to other services such as [airAlert](#)

In developing our air quality action plan measures, the council will be consulting with the public and working closely with interested parties such elected members, transport planners, development control and policy planners.

More information on local air quality in Crawley can be found on its website: www.crawley.gov.uk

[*Air Quality Monitoring in Crawley*](#)

[*Sustainable Transport in Crawley*](#)

[*The Crawley Growth Programme*](#)

Local Responsibilities and Commitment

This ASR was prepared by the Environmental Health Department of Crawley Borough Council with the support and agreement of the following officers and departments:

Environmental Health Air Quality Officer - Community Services

Economic Regeneration Manager - Planning and Economic Development

Planning Policy Manager - Planning and Economic Development

Sustainability Manager - Planning and Economic Development

Fleet manager – Amenity Services

Energy Efficiency Officer - Crawley Homes

Sussex-air Quality partnership

West Sussex County Council's (WSCC) Highways, Transport and Planning

Following Defra's appraisal this ASR will be passed to approval by West Sussex Public Health.

If you have any comments on this ASR please send them to Gill Narramore at:

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1 Local Air Quality Management

This report provides an overview of air quality in Crawley Borough Council during 2022. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), 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 order to achieve and maintain the objectives and the dates by which each measure will be carried out. 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 18 months. The AQAP should specify how air quality targets will be achieved and maintained and provide dates by which measures will be carried out.

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. 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 is for 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	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
Crawley AQMA	11.03.21 (Amended)	NO ₂ Annual Mean	Land and residential properties as described in Schedule 2 to the Order.	NO	41µg/m ³	39µg/m ³	3 years (borderline including 2020 and 2021 Covid years)	Crawley Air Quality Action Plan	AQAP

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

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

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

The report is well structured and provides the information specified in the Guidance.

1. Trends are presented and discussed, and a robust comparison to air quality objectives is provided.

Response: *This year's report continues to report in detail on the trends in air quality in Crawley and how they relate to the air quality objectives.*

2. As stated in last year's ASR appraisal, the Council has plans to renew and update the AQAP based on the extension of the AQMA. It is understood that this has been further delayed due to limited staffing and modelling resources within the team. It is encouraged that the Council work to develop their action plan as soon as it is possible to do so.

- **Response:** *We are currently undertaking air quality modelling assessment of the baseline, future concentrations and source apportionment. We expect this work to be completed by August and we will then take forward a range of intervention options for scenario testing. Following consultations with the steering group we aim to complete the AQAP by the end of 2023. In the meantime, the Council continues to be actively engaged in tackling air quality issues and promoting sustainable strategies to improve air quality within the borough through a range of measures outlined in Table 2.2 of the ASR*

3. The Council has included last year's appraisal comments in the report, providing detailed responses to these and making changes to the report based on these comments. This is very encouraging to see.

4. As noted in last year's ASR appraisal, Hazelwick AQMA's date of amendment has not been updated on the website and the AQMA name in Table 2.1 was advised to be changed to "Hazelwick AQMA", instead of Crawley AQMA. It is noted that the council have submitted the date of amendment and new shapefile for the AQMA to Defra. However, the time of the appraisal this is still

not updated. The Council should ensure that the amendment/name is up to date on the UK-AIR website for next year's ASR.

Response: *The amended AQMA has now been updated on the Defra AQMA [website](#)*

5. The Council has robust QA/QC procedures in place. They provide a clear explanation and justification for the application of the local bias adjustment factor, including a comparison with the national bias adjustment factor. This is encouraging to see.
6. There were a few formatting errors in the report, namely missing subscripts (e.g. PM2.5, instead of PM_{2.5}). Although these do not affect the readability of the report, it is advised that the report is thoroughly checked for these before future submissions.

Response *The report has been checked for formatting errors and all attempts have been made to amend any errors found.*

Progress Summary of Measures to Improve Air Quality in Crawley

Crawley Borough Council has taken forward a number of direct measures during the current reporting year of 2022 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. 41 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 2022 -23 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

More detail on these measures can be found in Crawley Borough Council's [air quality](#) pages of the Council's website.

Key completed measures are:

Crawley Growth Programme

- Eastern Gateway Highway Improvement Scheme: Enhanced pedestrian/cycle access project completed, and scheme opened to the public August 2022.
- Manor Royal Highway Improvement Scheme: Phase 1 works completed August 2022 - junction improvements at County Oak/London Road, upgraded crossings, signals, lane markings and new bus stop.

- Three Bridges Rail Station Interchange Improvement Scheme: Planning permission granted March 2023.

Key outcomes from measure: Encourage modal shift and reduce vehicle emissions.

Climate Emergency Action Plan

- Council Climate Action Scorecard: independent evaluation of the council's Climate Emergency Action Plan completed March 2023 (results pending)

Key outcomes from measure: Determine effectiveness of the Councils CEAP based on criteria such as governance, funding, community engagement, target setting, commitment.

Defra Funded AQ Taxi Project

- Taxi and PHV (private hire vehicle) survey launched April 2023 (managed by Energy Saving Trust – results pending).
- [Taxi project page](#) launched May 2023 to provide advice and information on decarbonising transport and the aims of the project.

Key outcomes from measure: Engagement with Taxi trade to facilitate transition to EV vehicles and work towards decarbonising transport and cleaner air.

West Sussex Walking and Cycling Strategy

- Infrastructure upgrade to cycle path Southgate Avenue completed May 2023

Key outcomes from measure: Encourage modal shift and reduce vehicle emissions.

West Sussex Electric Vehicle Strategy - EV Charge Point Project

- Five on-street EV charge points installed, connected and operational on WSCC highways land at Parham Rd, Blackbird Ct, Ifield Drv, Shaws Rd, Dalton Cl.
- Two further charge points installed at CBC owned car parks at Gratton's Playing Field and Dobbins Place.

Key outcomes from measure: encourage transition to EV and reduce vehicle emissions. The Strategy sets a target for 70% of new cars in the County to be electric by 2030.

School Travel plans

- CBC funding half a full-time post for a school's active transport project officer from Sustrans working with schools in Crawley to engage staff, pupils and parents on active travel.

Key outcomes from measure: Awareness raising, behavioural change, modal shift and reduce vehicle emissions.

Crawley Borough Council Staff Travel Survey

- Staff Travel Plan completed for new Town Hall 2022

Key outcomes from measure: Encourage modal shift and reduce vehicle emissions.

Crawley Council Car Club Scheme

- EV Car club based at new Town Hall car park for staff and residents at residential block (Geraint Thomas House) completed 2022.

Key outcomes from measure: Encourage modal shift and reduce vehicle emissions.

Council Programme of Vehicle Replacement to LEVs Fleet

- Sept 2022 Toyota electric van for Outside Play Area Team to replace diesel van.
- Jan 2023 Euro 6 Maxus diesel van for Wellbeing Team, to replace old diesel van.
- Feb 2023 Toyota electric van for Facilities Team to replace diesel van.

Key outcomes from measure: Modal shift to LEVs and reduce vehicle emissions.

CBC/Net Zero Collective /Southampton Uni Retrofit Pilot and Research Project

- 2021/22 - completed pilot study on 10 council houses to assess the most efficient method for the retrofit and monitor the level of energy savings/carbon reduction.

Key outcomes from measure: Reduce emissions and carbon reduction.

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

Crawley Growth Programme

- Town Centre Cycling & Walking Scheme: Western Boulevard scheme to connect Eastern Gateway to Station Gateway with cycle route along the High Street, improved bus routes and walking & cycling infrastructure. Construction due 2023 and completion 2024.

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

Climate Emergency Action Plan

- 2023/24 Climate Emergency Strategy expected to be drafted and embedded into the Procurement Strategy.

Expected impact of measure: Encourage commitments to sustainability, carbon reduction reduced emissions, and improved air quality.

Defra funded 2022/23 Air Quality Grant: Taxi Project

- Taxi and Private Hire Survey (launched April 2023). Results of the survey will help the Council understand the barriers to transition, inform licensing policies and charging and network infrastructure decisions across Crawley to support taxi trade.

Expected impact of measure: Encourage modal shift to EVs and reduce vehicle emissions.

Local Plan

- Draft local plan expected to complete examination and be adopted.

Expected impact of measure: Provide detailed environmental policy and guidance to help improve air quality through the development control process.

Air Quality Action Plan

- Complete update of Air Quality Action Plan

Expected impact of measure: Identification and implementation of measures to reduce pollutant emissions and improve air quality within the AQMA.

Air Quality and Emissions Mitigation Guidance for Sussex

- Review and update of the Guidance Note

Expected impact of measure: Reduction in emissions from transport associated with new development through imposed mitigation measures.

EV Charge-Point Network for Crawley

- Electric vehicle charging points for Dalston Place, Maidenbower Place and Town Hall multistorey carpark

Expected impact of measure: Encourage transition to EV vehicles and reduce vehicle emissions.

Crawley Homes Programme of Energy Saving and Carbon Reduction Measures

- CBC/Net Zero Collective/ Southampton Uni pilot retrofit pas2035 additional measures in 11 Crawley homes.
- SHDF Wave 1 - full decarbonisation retrofit of 59 Crawley homes in Broadfield.

Expected impact of measure: Reduce emissions, carbon reduction and improve air quality.

Gatwick Northern Runway Development Consent Order (DCO)

- Gatwick Northern Runway Infrastructure Project - Application for DCO submitted Aug 2023. Examination and decision process expected to be completed Aug 2024.

Expected impact of measure: Emissions mitigation

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

- Completing the update of Crawley's Air Quality Action Plan
- Seek further grants/funding streams to support air quality action plan measures.
- Continue work through the Planning development control system to secure air quality mitigation from new development.
- Preparing responses to the Gatwick DCO through written representations, local impact reports, statements of common ground and proposals for mitigation measures to offset the air quality impacts of the proposals.
- Continue community engagement through events to raise awareness of air quality issues, including Clean Air day, Breath Easy and Junior Citizen as well as Defra funded schools and taxi community engagement projects
- Review and update the monitoring network to respond to local developments and identify pollution hotspots across the borough.

Crawley Borough Council worked to implement these measures in partnership with the following stakeholders during 2022:

- CBC Planning
- CBC Sustainability Officers
- CBC Housing and Amenity Service
- Sussex-air Partnership
- Neighbouring Local Authorities
- WSCC Highways Authority
- Environment Agency

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

- Identifying schemes that can generate measurable improvement in air quality and which are feasible, deliverable and funded.
- Increasing developmental pressure offsetting improvements in emissions. The cumulative impact of developments may extend the time taken to meet compliance with AQ objectives within the AQMA.
- Many of the solutions for tackling transport related air quality fall outside the powers of the council. Work with stakeholders and decision-making bodies outside of the council is therefore important to help to deliver action plan measures.

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

- Work to update the AQAP has started. Modelling to review air quality baseline and future concentrations within the AQMA is currently being undertaken. Next steps include source apportionment, scenario testing intervention measures and public consultation. Progress continues to be slowed by the impact of the Gatwick Northern Runway DCO, which has continued to divert staff resources away from LAQM work and is expected to continue over 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 Crawley AQMA.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	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 rail station Interchange improvement scheme	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	2019 Design Stage	Delivery programme for scheme extended to 2025. Anticipate construction commencing 2024/25 (Extended from 23/24)	Coast to Capital Local Enterprise Partnership WSCC/ CBC	LEP/ WSCC/ CBC	No	Partially funded	Estimated £5.2m Full scheme cost review currently being undertaken to take account of recent inflationary increases (Previous estimate £2.94m)	Planning permission granted March 2023. Detailed design underway prior to construction works contract being let	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 permission granted March 2023 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 2026 Anticipate construction commencing 2024/25. (Extended from late 2023/24)	LEP/ WSCC/ CBC	LEP/WSCC/ CBC	No	Fully funded	> £1m	Planning permission granted March 2023.	Reduced vehicle emissions Medium	Modal Shift	Planning permission granted March 2023	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 2026 Anticipate construction commencing 2024/25.	Coast to Capital Local Enterprise Partnership WSCC/ CBC/ Private Developer (Aurora Group)	LEP/ WSCC/ CBC/ Aurora Group	No	Fully funded (Public /Private funded scheme)	£7.4m (Previous estimate £5.4m)	Planning Approval (reserved matters) 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. Current intention to proceed with public realm and highways improvements ahead of the private developer (residential led) scheme. CBC leading design development underway ahead of a planning application submission in late 2023/early 2024 (Extended from Q4 2022)	Progress slowed over the pandemic 202/21
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 completed August 2022.	WSCC	LEP/ WSCC/ CBC	No	Fully Funded	Revised cost £9.15m (previous estimate £8.8m)	Commenced (June 2021)	Reduced vehicle emissions Medium/ High	Modal Shift/ Improved traffic flow	Project was completed on time and the scheme opened to the public August 2022 Delivered 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 of Phase 1 works commenced January 2022 and completed August 2022. Phase 2 works commencing August 2022 and due for completion 2023.	WSCC	LEP/ WSCC/ CBC	No	Fully Funded	Revised £3.981m (Previous estimate £3.31m) Phased delivery – Phase one £1.18m.	Phase 1 completed August 2022. Phase 2 commenced construction August 2022	Reduced vehicle emissions. Medium/ High	Modal Shift/ Improved traffic flow	Phase 1 works complete August 2022 delivered junction improvements at County Oak/London Road, upgraded crossing units, signal heads, lane markings and a new bus stop. Phase 2 works commenced Q3 2022 to include public realm improvements from Manor Royal	Manor Royal highways improvement scheme to deliver better connectivity and enhanced pedestrian and cycle access across the Business district.

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										Phase 2 incorporating the bus extension project £2.8m				to Gatwick Road roundabout, construction of a new bus/cycle lane along Manor Royal and improved crossings at County Oak Way & Metcalf Way	Covid has caused some delays re impact on construction industry
6	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	Planning permission approved 2022. Construction expected to commence 2023, completion due 2024. (Extended from 2023)	Coast to Capital Local Enterprise Partnership WSCC/ CBC	LEP/ WSCC/ CBC	No	Fully Funded	Estimated £1.1m. Full scheme cost review currently being undertaken to account for recent inflationary increases	Public consultation completed. Planning application granted 2022.	Reduced vehicle emissions Medium/low	Modal Shift	Detailed design for the Western Boulevard scheme complete. Planning permission granted 2022. TRO and S278 process underway. Western Boulevard scheme will connect Eastern Gateway to the High Street and deliver improvements to bus routes, walking & cycling infrastructure, and public realm Estimated start date for construction 2023	Town Centre Cycling & Walking Scheme creates a single, safe, and connected cycle route that runs around the town center.
7	Crawley's Declaration of Climate Emergency	Policy Guidance and Development Control	Other policy	Declared 2019	Climate Emergency Action Plan approved and published Nov 2021 This will be followed by ongoing implementation.	CBC	CBC	No	Fully Funded	Individual measures funded on project-by-project basis	Action Plan published Nov 2021	Target to reduce emissions by 50%, (previous target 45%) and as close to net zero as possible by 2030. To reach net zero by 2040 (previous target 2050)	Emissions balance sheet	2020 (Feb) Overview and Scrutiny Commission (OSC) recommendations for measures to ensure carbon reduction targets addressed within Council services. 2020 (Apr) Climate Change Impact Assessment for all new council services/ projects/ 2020 (Nov) Climate Emergency Advisory Group set up to implement OCS recommendations. 2021 (Nov) Published CEAP March 2023 – Council Climate Action Scorecard: independent evaluation of the council's Climate Emergency Action Plan – results due Aug 2023 2023/24 Looking to embed Climate Emergency Strategy (either stand alone or as part of social value charter) into the Procurement Strategy, to include set of standards for CE such as commitments to sustainability, carbon reduction, etc	Crawley's CEAP includes: Reduce energy demand Transition to low carbon heat/ cooling Stop investment in technologies that leave a carbon legacy Promote & support innovation in delivery of low and zero carbon energy Development Crawley Homes (Social Housing) - decarbonisation programme supports the CEAP – funding for 408 homes starting in 2023 will save 648 tonnes of carbon per year.
8	Defra funded AQ project: Taxi Project	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging.	2021	2023	CBC/SussexAir / WSCC	Defra Grant Funded	Yes	Fully Funded Defra funding	Proportion of the £376k funding for the Monitoring and Community Engagement Project	Planning//Project development	Reduced vehicle emissions by facilitating the uptake of more EV vehicles in taxi fleet	Increase % of EV/ ULEV's by Taxis and private hire vehicles	Defra AQ grant funded contract awarded to Energy Saving Trust. Taxi engagement campaign set up to facilitate a transition to EV vehicles by taxi drivers. Taxi and Private hire survey launched April 2023 –results expected Aug/Sept 2023 Taxi project page launched May 2023 to provide advice and information on how the council is working towards decarbonising transport and cleaner air.	Response rate low in Crawley – Taxi trade difficult to engage
9	Defra funded AQ project:	Public Information	Other (community Engagement – Schools)	Sept 2020	Project extended to 2024	SussexAir/ CBC/ Sustrans	Defra Grant Funded	yes	Fully funded Defra funding	Proportion of the £376k funding for the Monitoring	Sustrans working with Sussex Air to deliver the programme to schools across the Sussex area	No direct impact but aiming for reduced emissions	Awareness raising/ Modal shift/ reduction in vehicle emission	Between 2018-19, 2020-21 and 2021-22, Sustrans has delivered a school's air quality project for Sussex Air, funded by DEFRA.	The nature of engagement with schools changed due to Covid, and Sustrans have

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										and Community Engagement Project		indirectly through behavioural change / Modal shift	Sussex Air project targets are all output based. Sustrans also records behaviour change and knowledge surveys to measure impact of workshops on knowledge / understanding of air quality. 48% increase in Knowledge was recorded. Overall targets were exceeded	Sustrans worked with schools across Sussex in/ near AQMAs to raise awareness about air quality and ways to reduce air pollution through active travel. The project focussed on PM/NO ₂ air pollution 55,000 school children across Sussex educated through the project. The project extended into communities for 2023/24 due to its success in schools. Community groups across Sussex have the opportunity to have Sustrans at their event explaining health impacts of poor air quality and what can how to mitigate In addition, Twitter/newsletters used to communicate key information/ statistics/ links to video resources and raise awareness of air quality in Sussex.	found that offering a hybrid of in person and online delivery works well. The next phase of the programme will continue to deliver a hybrid model to schools across the Sussex area, as well as working with local communities. Training up teachers, using diffusion tubes to analyse local air quality, campaigning and looking at local and individual lifestyle changes to improve air quality
10	Air Quality and Emissions Mitigation Guidance for Sussex	Policy Guidance and Development 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 development 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 Further review/update planned for 2023/24	Development of the Guidance as Supplementary Planning Document (SPD) being considered – dependent on review of application across Sussex authorities
11	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	2020 LCWIP Published 2021 WSCC reviewing LCWIP routes. 2022 Consultants appointed 2023, Q1 Transport study started LCWIP in Local Plan – developers required to mitigate impact thorough S.106/CIL contributions to LCWIP targets/ projects	Crawley LCWIP plan for network of 16 high quality, safe, cycling /walking routes through the borough. Funding sources sought to implement plan. Considering S.106 /CIL contributions
12	West Sussex Walking and Cycling Strategy - Infrastructure upgrade to cycle path Southgate Avenue	Transport Planning and Infrastructure	Cycle Network	2019	Estimated 2023 (revised from 2022)	WSCC	Fully Funded WSCC	No	Partial WSCC/ Grant funded (not yet awarded)	£500k	Signed off by WSCC – due to start 2023	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. Southgate Avenue cycle route completed May 2023.	Progress delayed due to inadequate scheme design/ funding shortfall. 2022 Funding not found for full scheme so original WSCC scheme to proceed which has funding
13	New Directions for Crawley - Draft Transport and	Policy Guidance and Development Control	Other policy (see comments section)	2020 for Strategy	Action plan estimated 2023 followed by ongoing implementation	CBC/WSCC	WSCC/ CBC/various private/public/	No	Not known. Individual measures funded on project-by-	Not known. Costs on project-by-project basis	2022 Transport study consultants identified (not yet commissioned)	Reduced vehicle emissions No Target set	Modal shift / reduced traffic emissions	2020 Strategy adopted. 2022 Transport study consultants appointed to undertake transport study/ modelling for scenario testing to inform measures for	The strategy document addresses issues and options for shifting from car to people-centred

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	Access Strategy						funding sources		project basis					action plan and to feed into Local Plan. First Stage of the study completed Jan 2023 Second Stage to look at impact of Low Traffic Neighbourhoods/ walking/ cycling/ access not yet started due to lack of funding.	approach, mobility and access. 10-year action plan to be developed from New Directions strategy together with LCWIP - to inform emerging Local Plan to guide design and access elements of new low traffic developments
14	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 expected 2023 (see comments section)	CBC	CBC	No	Fully Funded	Not Known	Draft Local Plan 2020-2035 completed and early engagement consultation September 2019. Public consultation January - March 2020. Reg 19 Consultation completed June 2021 2021 council reviewed its draft Local Plan, to find a solution to water neutrality issues that have arisen due to Habitat Regulations. The council's adopted Local Plan (December 2015) remains up to date following its 5-year Review by Full Council in December 2020	Reduced air quality impact through development control requiring adherence to air quality policy and emission mitigation	Emissions mitigation. Energy efficient housing Good public/active transport links to reduce emissions	June 2021 consulted on the Reg. 19 draft Submission Local Plan 2022 Review of Local Plan undertaken to seek compliance with Habitat Regulations Draft Local Plan approved at Full Council Feb 2023 (for its Publication and Submission). Further Reg 19 publication consultation completed June 2023 Council now working towards submission of Local Plan's to Secretary of State for independent examination. If local plan is found to be legally compliant through its examination a ruling will be made through a Full Council decision on whether to adopt the local plan with any modifications which may have been recommended.	In 2021 Water neutrality emerged as an issue to be addressed through the Local Plan to ensure its compliance with the Habitat Regs. This resulted in significant delay to the Local Plan review timetable. The current published Local Development Scheme anticipates the Submission of the Local Plan in July/Aug 2023.
15	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 Submission of the Local Plan for independent Examination due July/Aug 2023 If local plan is found to be legally compliant through its examination CBC parking standards will become policy once the plan has been adopted.	The Guidance sets out parking standards, including targets for cycle storage and EV charging/ parking. Delayed due to Hold up with Local Plan
16	Electric Vehicle Strategy for West Sussex 2019-2030 (EV Charge Point Project)	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging	Approved 2019	ongoing	WSCC/ CBC	Funded via concession contract to be delivered by the preferred supplier. As such no capital funding requirement for Council	No	Fully Funded	Not known	EV infrastructure provider Connected-Kerb commissioned to deliver a district-wide electric vehicle charging point network. Sites identified across Crawley at WSCC and CBC owned on-street locations. 2022/23 Final consultation work to identify residential on-street locations.	No emissions target set in Strategy. (Baseline: Transport contributes > 30% carbon emission across Crawley = 250 ktCO2 pA)	Increased uptake of electric vehicles and reduce vehicle emissions. Increase % of charging points installed on streets WSCC modelled predictions estimates across West Sussex need 3,305 publicly accessible charging points by 2025, and 7,346 by 2030. To	2020/2021 - CBC identified sites (irrespective of commercial viability) at residential locations (with no access to off street parking) and commercial locations such as neighbourhood shopping Parades 2022 Contract with Connected Kerb to enable large scale roll out of public electric vehicle charge points across the borough within the next decade 2022/23 5 WSCC on-street locations now connected and operational	WSCC EV Strategy target for 70% of new cars in the County to be EV by 2030. In CBC 30% of households have no access to off road parking = barrier to switch. Strategy aims to address barriers and encourage quick switch to EVs.

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													achieve 70% switch to EV cars by 2030	Further CBC owned neighbourhood parade/carpark locations connected: Gratton's Drive Park, Dobbins Place Ifield Parade Coming forward for 2023/24 Dalston Place, Maidenbower Place, TH carpark to be assessed/fire safety checked.	Scheme will provide uplift in available EV charging infrastructure for CBC residents to incentivise EV uptake and reduce carbon/AQ emissions
17	School Travel plans	Promoting Travel Alternatives	School Travel Plans	2017	Ongoing	Crawley Borough Council and West Sussex County Council (WSCC)	CBC and WSCC	No	Fully Funded	Not Known	ongoing	Reduced vehicle emissions. No Target set Medium/low	% increase in modal shift % children travelling to school by sustainable means	2022 and ongoing: CBC funding half a full-time post for a Schools Active Transport Project Officer from Sustrans working with schools in Crawley to engage with school staff, pupils and parents on active travel. June 2023 Application made to WSCC by CBC for 18 month Experimental "School Streets" TRO (Traffic Regulation Order) at Ifield Mill School – outcome pending.	Helps reduce emissions during morning rush hour
18	Crawley Borough Council Staff Travel Survey	Promoting Travel Alternatives	Personalised Travel Planning	2020	Dec 2020	CBC	CBC	No	Fully Funded	Not Known	Survey completed Dec 2020 Draft Travel policy 2021 Staff Travel Plan submitted through the planning process (new Town Hall planning application) 2021 and conditioned in the planning consent Q2 2022 Completed 2022	Reduced vehicle emissions No Target set	Modal shift/ staff travelling by sustainable means	Survey completed Dec 2020 Travel policy 2021 The Council's staff travel survey to inform the Staff Travel plan for new Town hall and development of travel policy measures for emerging Climate Emergency Action Plan	
19	CBC Staff Travel Plans	Promoting Travel Alternatives	Workplace Travel Planning	2019	Estimated 2023 (revised from 2021) Ongoing implementation	CBC	CBC	No	Fully Funded	Not Known	Staff Travel Plan submitted through the planning process (new Town Hall planning application) 2021 and conditioned in the planning consent Q2 2022 Not yet Implemented.	Reduced vehicle emissions No Target set Medium/low	% staff travelling by sustainable means	Draft Travel plan produced 2019 Staff travel survey 2020 used shape final plan Plan submitted with the planning application for new Town Hall development 2021 Travel plan conditioned under planning consent 2022	Lack of staff resources delaying implementation
20	easit Green Travel Network – easit discount (15%) staff rail/ 48% 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	£2500 per year for membership	ongoing	Reduced vehicle emissions No Target set Medium/low	% staff travelling by sustainable means	8 registrations 2022/23	Council originally involved in funding the setting up of the scheme.
21	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 Co-Wheels	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 started 2022. 2022/25 New EV car club planned for Station Gateway infrastructure project (CGP) at Moka and Telford Place developments. This Car Club provision will be in highly accessible location (direct proximity of rail/bus stations and town centre facilities) and will be for public use as well as residents	

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22	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	Information, events, and activities aimed at council staff and local businesses
23	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
24	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.	12 new-staff car loan applications 2022/2023	
25	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	Sept 2022 Toyota electric van (V2044) delivered for Outside Play Area Team to replace diesel van (V1444). Jan 2023 Euro 6 Maxus diesel van (V2064) was delivered for Wellbeing Team, to replace old diesel van Feb 2023 Toyota Electric van (V2070) delivered for Facilities Team to replace diesel van (V1626)	
26	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 2022/23	CBC staff loan to buy Bike
27	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	6 new applicants 2022/23	Bike Hire Scheme CBC/Partnership with "Cyclescheme" which allows employees to purchase bike through other shop outlets
28	Junior Citizen Annual Event on citizenship safety, sustainability and environmental issues, including air quality	Public Information Promoting Travel Alternatives	Other (interactive games and Awareness raising)	1990	Ongoing	CBC	CBC	No	Fully Funded	£8k	From 2022 the event has returned to an annual September event (after being postponed in 2020 and 2021 due to covid)	No Target set	Education and Modal Shift	Annually approximately 1200 KS2 (Yr 6) pupils per year attend the event which has been running for over 30 years. The event was postponed 2020/21 due to uncertainty/ not enough lead in time to organise the event – but resumed 2022.	Educational programme "Air quality in our local area" delivered through eco-action games and small discussion groups.
29	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)	2020 Policy update not formally adopted due to Covid impact on taxi trade. Report to go to Licensing committee end of 2023 to reinstate targets to reduce emissions	Target for Zero emissions by 2030	Following post Covid consultation Original indicators: new taxis zero emission capable (ZEC) from Q2 2022/ existing taxis retrofitted to Euro 6 Q4 2022	Further work to include more robust emissions strategy as part of ongoing Policy review will be taken to Licensing Committee in Q4 2023, covering engine size, emissions and vehicle age limits. However, expansion of the London ULEZ could, help speed up transition of Crawley's Taxi fleet to cleaner vehicles, since Crawley is close to the ULEZ border Taxis	Introduction of tougher emission controls on Taxi trade seen as a financial burden on post-Covid Taxi Trade resulting in impaired progress on the

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													Diesel phased out 2027 dropped in favour of all new taxis to meet Euro 6 from Q2 2022	and PHVs (private hire vehicles) may need to upgrade their vehicles to be ULEZ compliant.	introduction of the 2020 Policy
30	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 providing 40% reduction weekly wattage (> 50k watts)	45% Reduction in CO2 Emissions by 2030 100% Reduction in CO2 Emissions by 2050	Ongoing programme of LED lighting installation in communal areas of flats and sheltered blocks.	
31	airAlert Pollution Warning Service for people with asthma, COPD, or cardio problems.	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 to help manage chronic health conditions and drive behavioural change.	Uptake: Subscription numbers to the alert service	Voice call, text, or email sent to warn of high pollution and advise action to manage health and drive behavioural change. Over 800 registered subscribers. No direct emissions reductions but health benefits from direct application of monitoring data and raises awareness of air quality	
32	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	
33	Public Health Information/ Awareness Campaigns promoting sustainable modes of travel to staff and public: Clean Air Day Event and Breath 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 https://www.blf.org.uk/take-action/campaign/loveyourlungsweek	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 15 June 2023 Breathe Easy Week 17 to 24 June 2023 Car free day 22 Sept 2023 Cycle to Work-day 4 August 2023 Love Your Lungs Week British Lung Foundation (blf.org.uk)	Public awareness campaign through editorials and advertisements in WSCC Connections and social media posts.
34	Net Zero Retrofit Pilot Project to assess different housing types in Crawley Council Houses (Crawley Homes) for Energy Saving and Carbon	Promoting Low Emission Plant	Other - installations of wall/floor/roof insulation and low emission heating to reduce emissions	2020	Estimated completion 2024	CBC /Net Zero Collective Group/ University of Southampton	CBC HRA (housing revenue account) capital programme	No	Fully Funded	Estimate £15-20K per property	Pilot project research study. Collaboration between CBC, Net Zero Collective Group and University of Southampton to monitor energy efficiency and find most cost-effective methodology for retrofit across a mixed property portfolio of CBC council homes to add pas2035 additional measures:	Reduction in Emissions 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. (Researching most efficient / effective	2021/22 - completed pilot study on 10 homes. Analysis of results by university of Southampton found energy savings of >30% achieved. 2022 - 2024 further pilot of 11 properties Aiming to find increased energy savings through battery installation. CBC contractors for Crawley Homes (Mears and Waites) are now Pas 2035 accredited and responsible for surveying coordinating and installing retrofit to	Some delay in completion timescales due to supply chain issues. Working with Crawley College new STEM Centre to provide specialist training in advanced technologies and green retrofit.

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	Reduction Measures										Insulation (cavity wall Insulation (external wall) Insulation (timber framed) Top-up loft insulation Air source heat pumps Solar with battery Removal of gas supply https://netzerocollective.co.uk		method of decarbonising UK homes/ buildings and maximise the social value of investment).	Pas 2035 standard from March 2023. Currently funded through CBC HRA capital programme. Going forward Looking for alternative funding streams such as LEP Town Investment Plan funds and Green Homes Grant Local Authority Delivery (GHG LAD) to continue retrofit programme.	CBC's aiming for new housing development to passive house standard (Pas 2035) to avoid retrofit and achieve Net Zero
35	Energy Efficiency Retrofit Project in Crawley Homes Wave 1	Promoting Low Emission Plant	Other - installations of wall/floor/roof insulation and low emission heating to reduce emissions	2022	2023/24	CBC	SHDF (Social housing de-carbonisation fund) Wave 1	No	Fully Funded SHDF W1 £690k	£690k Costed on a project-by-project basis	Full decarbonisation retrofit programme of works to Pas 2035 standard following on from pilot study (above). Works to include upgrades to insulation and low emission heating to 59 Crawley homes in Broadfield district of Crawley.	Reduction in Emissions Aiming for net zero	De-carbonisation Higher energy efficiency, reduced emissions, and lower energy bills	Survey work completed 2022. Work started on installation programme: Cavity wall Insulation, External wall Insulation (timber framed properties) Top-up loft insulation Air source heat pumps Solar PV with battery. Removal of gas supply	
36	Energy Efficiency Retrofit Project in Crawley Homes Wave 2	Promoting Low Emission Plant	Other - installations of wall/floor/roof insulation and low emission heating to reduce emissions	2023	2025	CBC	SHDF (Social housing de-carbonisation fund) Wave 2	No	Fully Funded SHDF W2 £6.8m	£6.8m Costed on a project-by-project basis	Full decarbonisation retrofit programme of works to Pas 2035 standard following on from pilot study (above). Works to include upgrades to insulation and low emission heating to 408 Crawley homes	Reduction in Emissions Aiming for net zero	De-carbonisation Higher energy efficiency, reduced emissions, and lower energy bills	Work due to commence 2023 on survey and installation for: Cavity wall Insulation, External wall Insulation (timber framed properties) Top-up loft insulation Air source heat pumps Solar PV with battery Removal of gas supply	
37	Crawley Homes Cavity Wall Insulation project in Crawley Homes (Town's Fund)	Promoting Low Emission Plant	Other - installations of wall insulation to reduce emissions	2023	4-year project 2023-2026	CBC	Town's Fund £4m	No	Fully Funded	£4m Costed on a project-by-project basis	2022 Successful bid for £4m funding from Crawley Town's Fund to install cavity wall insulation to 248 apartment blocks (1500 flats) over 4 years.	Reduction in Emissions by 2030	Higher energy efficiency, reduced emissions, and lower energy bills	Initial survey work commenced 2022. Installation started 2023.	
38	External Wall Insulation Project in Crawley Homes	Promoting Low Emission Plant	Other - installations of wall/floor/roof insulation and low emission heating to reduce emissions	2016	2022	CBC (Crawley Homes)	CBC	No	Fully Funded	Costed on a project-by-project basis	418 Crawley Homes houses fitted with external wall insulation in Langley Green, Northgate, Bewbush and Broadfield Project completed.	Reduction in Emissions by 2030	Higher energy efficiency, reduced emissions, and lower energy bills	103 houses in Northgate and Langley Green- EWI completed 2019. 315 houses in Bewbush & Broadfield EWI completed 2022.	
39	Solar PV Installation in Crawley Homes	Promoting Low Emission Plant	Other - installations of wall/floor/roof insulation and low emission heating to reduce emissions	2021	ongoing	CBC/WSCC	CBC/WSCC	No	Fully Funded	Costed on a project-by-project basis	Solar PV programme started and ongoing. 342 Residential houses/blocks completed to date	Reduction in Emissions by 2030	Higher energy efficiency, reduced emissions, and lower energy bills	Ongoing installation programme. Some communal blocks already supplied with Solar PV have battery storage others awaiting battery installation to improve energy efficiency.	
40	Thermal Insulation U-Value Improvement Programme in Crawley Homes	Promoting Low Emission Plant	Other - installations of wall insulation to reduce emissions	2022	Annual Planned Maintenance	CBC	CBC	No	Fully Funded	Costed on a project-by-project basis	Annual planned maintenance to improve U-Value in Crawley homes through a programme of upgrades to: Windows and doors Roof /loft Insulation Floor insulation (suspended timber floors)	Reduction in Emissions by 2030	Higher energy efficiency, reduced emissions, and lower energy bills	Works started 2023: Upgraded U-Value Windows and doors - 200 homes per annum Upgraded U-Value roof /loft Insulation 350 homes per annum	2024/25 - seeking funding through ECO4 for suspended timber floor insulation using Q-Bot to install floor insulation (60% reduction in energy loss through timber floor)
41	Boiler Efficiency Improvement Programme in Crawley Homes	Promoting Low Emission Plant	Other - installations of wall insulation to reduce emissions	2022	2025	CBC	CBC	No	Fully Funded	Costed on a project-by-project basis	Annual planned maintenance programme for boiler replacement. Aiming to phase out gas on existing properties by 2025	95% increase in efficiency Reduction in NOx Emissions	Reduction in NOx Emissions	Annual planned maintenance programme	

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

As detailed in Policy Guidance LAQM.PG22 (Chapter 8), 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.

PHE have produced a [Public Health Outcomes Framework](#) (PHOF) 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 (2021) estimated fraction of mortality attributable to long-term exposure to particulate pollution was 5.4% (this is the value using a new method which has adjusted up the values across the whole of the UK.).

These indicators are calculated for all local authorities in England, and Crawley's level (5.4) places it in a similar position to other urban centres in the region such as Reigate (5.6), Brighton (5.3) and Worthing (5.3), but below the higher mortality values attributable to PM in major cities such as London (7.2%) and the national average of 5.5%.

The mortality indicator for particulate pollution in Crawley has improved from the previous year (6.2%). This improvement was reflected across the region in Sussex and the Southeast and is likely to be due to natural year to year variation as well as increased regulatory measures and technology to control particulate pollution nationally and regionally.

The annual average target value for PM_{2.5} is 20µg/m³. The 2022 measured annual mean PM_{2.5} in Crawley was 8ug/m³. The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 require that in England an annual average of 10 µg/m³ for PM_{2.5} is achieved by the end of 2040 and population exposure to PM_{2.5} is at least 35% less than in 2018 (with interim targets for annual average of 12µg/m³ and at least 22% reduction, compared to 2018, by January 2028). Although there are no exceedances of PM_{2.5}

concentrations in Crawley, the council still has a duty to reduce emissions of and exposure to this pollutant.

Crawley borough council is working towards reducing PM_{2.5} in our local area 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 (SCAs) in Crawley:** Most of Crawley (except for Gatwick Airport and some more recent development areas in the borough) are designated SCAs. The popularity of wood burners has increased in recent years and this has subsequently resulted in a rise in complaints about smoke from domestic burning. In response the council, in partnership with other Sussex councils, launched a defra grant funded 'Clean Burn Sussex' campaign in 2020, aimed at raising awareness and encouraging the choice of cleaner fuels to reduce particulate emissions from domestic burning. Links to the [clean burn](#) smoke control and domestic burning guidance are available through the council's website.
Following the Environment Act 2021 amendments to smoke control regulation, and the section 31 grant payment from Defra this year (May 2023) to local authorities with SCAs, the council is looking into measures to further help reduce the impact of PM_{2.5} emissions in the borough. This includes an awareness campaign to inform the public and retailers about the new legislation and certification scheme in SCAs prohibiting the sale of the most polluting solid fuels.
- 2. Regulation of Industrial Processes:** Control emissions of PM_{2.5} from mineral processes such as concrete batching, concrete crushing, and road-stone coating.
- 3. Air Quality Action Plan:** Many of the action plan measures listed in Table 2.2 include infrastructure projects which support low emission travel alternatives (e.g., cycling, walking, electric vehicles, car sharing etc) and help facilitate modal change, which together work to reduce particulate emissions.
- 4. Policy Measures:** Council procurement of low emission vehicles and tightening the emissions standards for licensed taxis.
- 5. Local Plan Policy:** Implementation of the Sussex air quality and emissions mitigation guidance to reduce and, where that is not possible, mitigate emissions.
- 6. Local Transport Plan:** Traffic management measures to reduce congestion, improve traffic flow and reduce road traffic pollutant emissions, including PM_{2.5}.

7. **Monitoring:** Direct monitoring of PM_{2.5} has been undertaken in Crawley since a new particulate analyser was installed at Crawley's Gatwick Airport monitoring station (CA2) in March 2020. In addition, a new AURN site is being installed at a background site in Crawley in 2023 and we hope to be able to report on the monitoring results for this site in 2024. This monitoring capability will assist in assessing PM_{2.5} levels in our local authority.

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

This section sets out the monitoring undertaken within 2022 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 2018 and 2022 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 2022. 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](#) page presents automatic monitoring results for Crawley Borough Council, 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 2022. 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 2022 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.

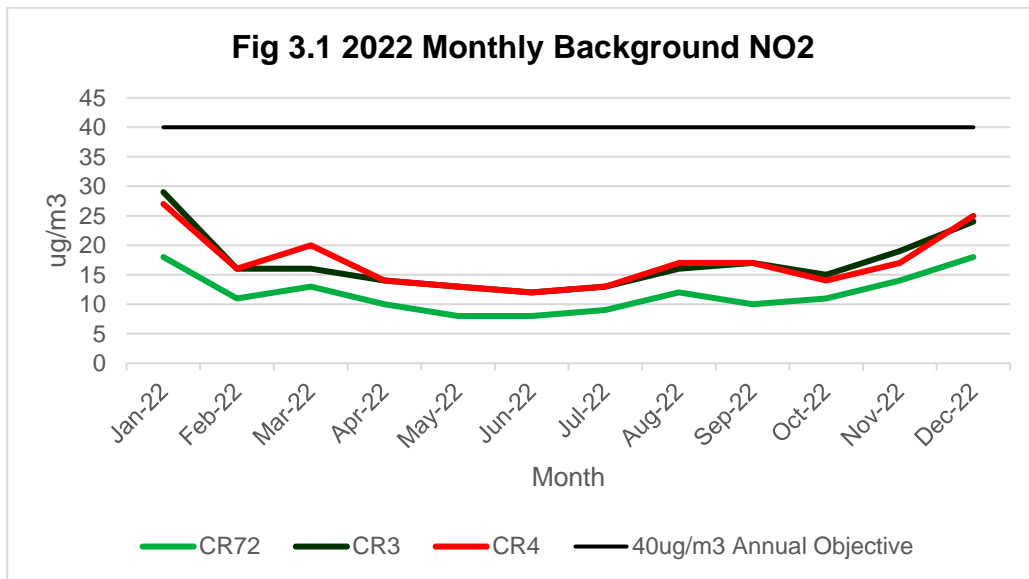
Table A.5 – 1-Hour Mean NO₂ Monitoring Results, Number of 1-Hour Means > 200µg/m³ in Appendix A compares the ratified continuous monitored NO₂ hourly mean concentrations for the past five years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year.

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 2022 (indicator level annual means > 60µg/m³) and the annual mean objective of 40µg/m³ was achieved at most monitoring locations, with the exception of three sites next to busy roads (CR63, CR93 and CR101). All these sites were at roadside locations where the tube was not located at the point of the human receptor (façade of the house), and therefore it is not truly representative of residential exposure because pollution concentrations decrease with distance from the source. 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 the sites. However, three sites within Crawley's AQMA are still recording levels within 10% of the annual mean objective for NO₂, indicating there is still work to be done to tackle air quality in these areas.

2022 Background NO₂ in Crawley

There were no exceedances of the annual or hourly mean objectives for NO₂ at background sites in Crawley in 2022.

Fig 3.1 below shows the monthly concentrations of NO₂ at three long term background sites in Crawley for 2022.

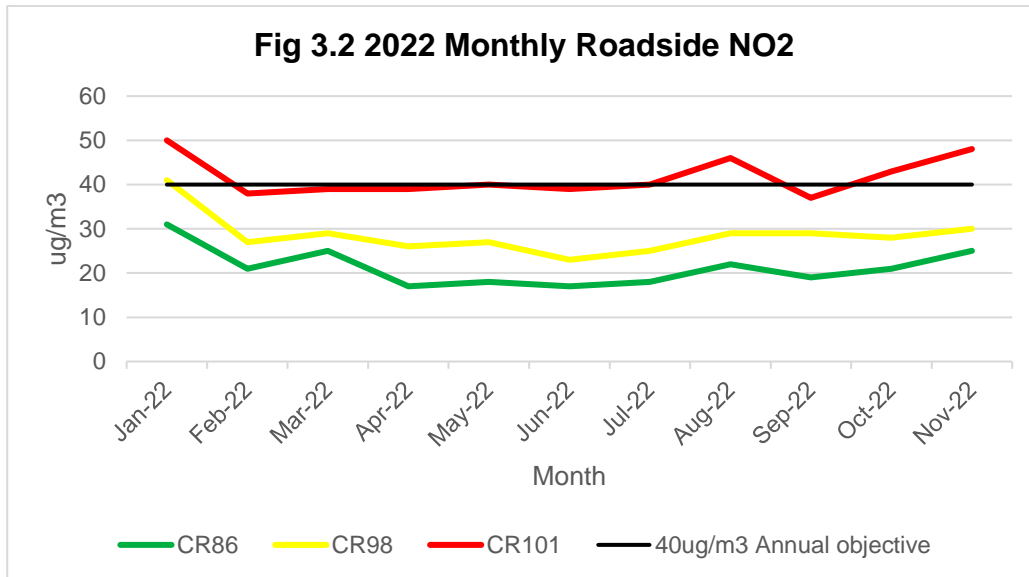


2022 Roadside NO₂ in Crawley

Three sites (CR63, CR93 and CR101) exceeded the annual mean objective of 40µg/m³, but after fall off with distance adjustments there was no relevant public exposure (Appendix C Table C.4). However, CR93 within the AQMA was borderline at 39µg/m³.

There were no indications (>60ug/m³ annual average NO₂) that the *hourly* mean objectives for NO₂ (200 µg/m³ > 18 times per year) had been exceeded at any of the roadside monitoring sites in Crawley in 2022.

Fig 3.2 shows the monthly concentrations of NO₂ at three long term roadside sites in Crawley during 2022.



Long term (5 year) trends in NO₂ levels are considered in more detail in Appendix A, where NO₂ concentrations are discussed in relation to traffic flows in Crawley to look at the impact Covid travel restrictions had on pollution levels and to what the extent pollution levels may be increasing in the post Covid recovery period.

2022 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 2022. However, two sites near the Hazelwick Roundabout recorded levels within 10% of the annual mean objective of 40ug/m³, and one site near to Three Bridges Station was close to exceeding the air quality objective despite traffic levels remaining about 15% lower than pre-Covid levels. It remains to be seen if commuter traffic to Three bridges Station will return to pre-Covid levels and how this may impact NO₂ concentrations in this location.

Fig 3.3 shows monthly concentrations of NO₂ in the Three Bridges area of Crawley’s AQMA during 2022.

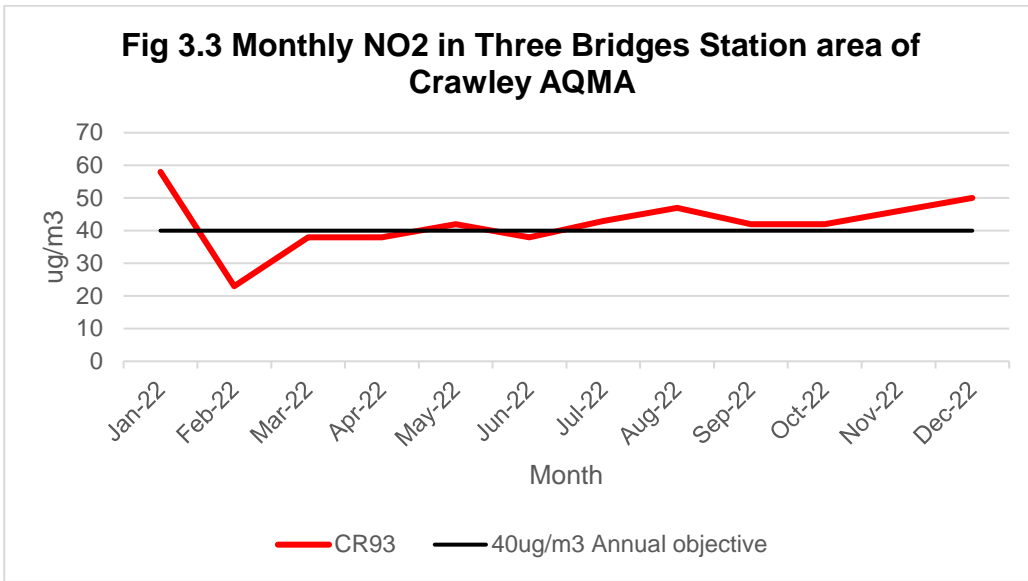
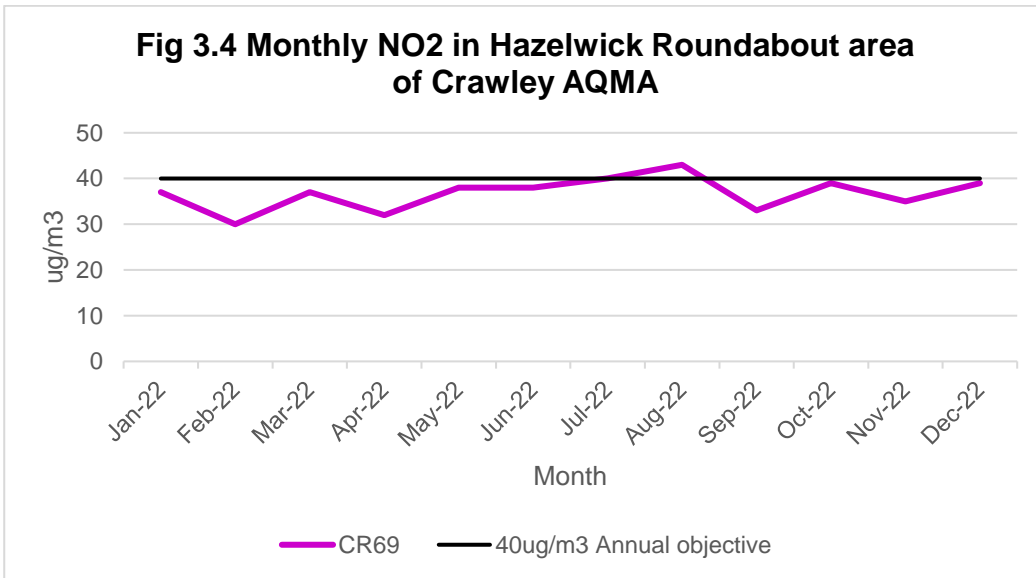


Fig 3.4 shows monthly concentrations of NO₂ in the Hazelwick Roundabout area of Crawley’s AQMA during 2022.

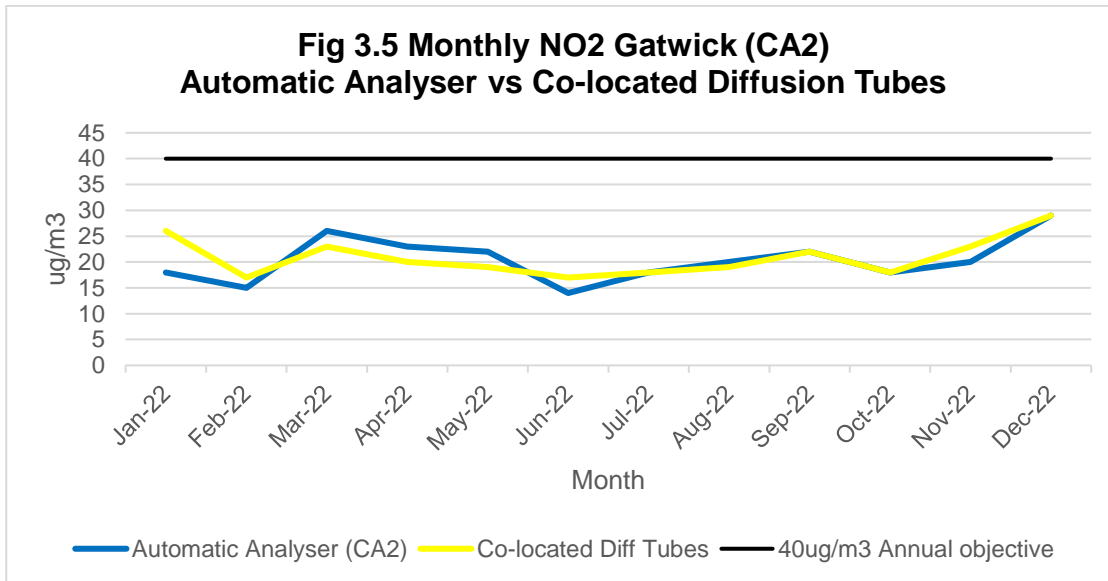


Although it is encouraging that levels of pollution in the AQMA are reducing and there are no exceedances, the council is not considering revoking the AQMA until a continuing trend of reduced NO₂ concentrations is maintained in future years.

2022 NO₂ Gatwick Airport

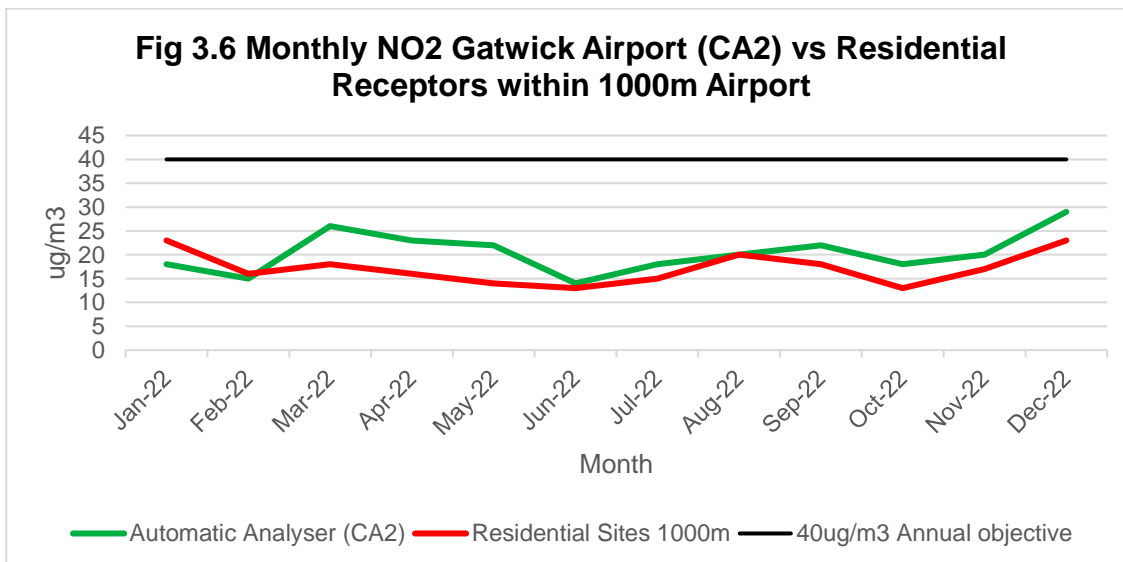
There were no exceedances of the annual or hourly mean objectives for NO₂ at the Gatwick East monitoring site (CA2) in 2022 or at any residential receptor sites close to the airport.

Fig 3.5 indicates that the co-located diffusion tube data at the CA2 site shows good correlation with the continuous data. The results show a similar monthly pattern and annual means (20.8µg/m³ and 20.9µg/m³).



Determining relevant exposure at residential properties within 1000m of the airport is one of the assessment criteria required for authorities with a major airport in their authority.

Fig 3.6 presents the 2022 monitoring data for residential properties within 1000m of Gatwick. The data shows there were no exceedances of the objectives in 2022 and levels follow the similar monthly pattern as the airport data.



The slight increase in NO₂ levels seen in 2021 and 2022 reflects the increased road and air transport activity as the airport recovers, with GAL predicting a return to pre-covid levels over the next 2 years. Given the scale of development coming forward over the next 10/15 years if the Gatwick expansion project is approved, pollution trends in and around the airport will continue to be monitored and reviewed annually through the LAQM process.

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.

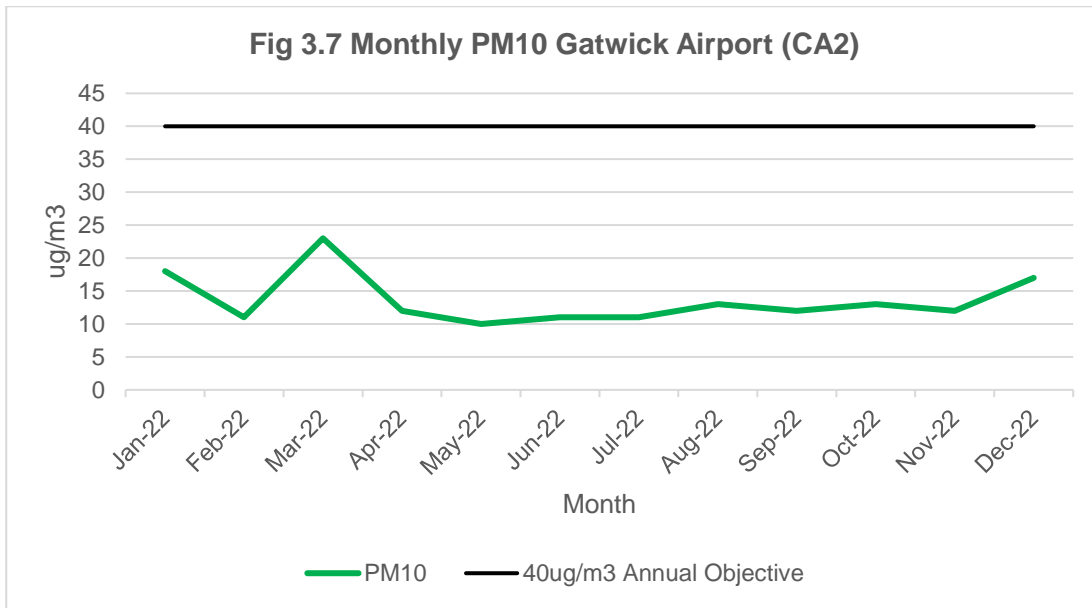
Table A.7 in Appendix A compares the ratified continuous monitored PM₁₀ daily mean concentrations for the past five years with the air quality objective of 50µg/m³, not to be exceeded more than 35 times per year.

A particulate monitor has been permanently located at Crawley's automatic monitoring station (CA2) on the eastern boundary of Gatwick airport for 20 years. A new particulate monitor (FIDAS) which measures both PM₁₀ and PM_{2.5} was installed at the beginning of March 2020 to replace the old TEOM monitor.

The FIDAS has been certified in the UK for use without the need for correction to the PM₁₀ data. The 2022 PM₁₀ monitoring results (Appendix A) showed compliance with both the annual and 24-hour mean objectives in 2022.

The annual mean PM₁₀ concentration recorded in 2022 was 14ug/m³, a decrease from the previous year's 18ug/m³, and the first time that the site has recorded concentrations below the annual mean 15µg/m³ air quality guideline level recommended by the [World Health Organisation](#) .

Fig 3.7 shows monthly concentrations of PM₁₀ at Crawley's continuous monitoring station at Gatwick (CA2) during 2022.



3.2.3 Particulate Matter (PM_{2.5})

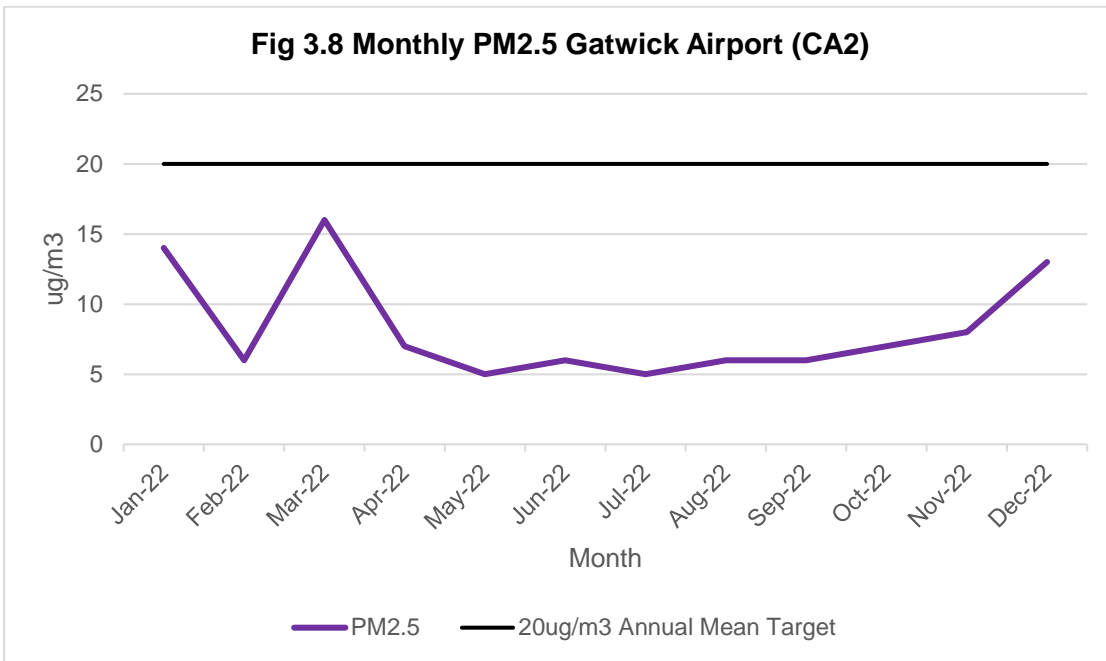
Table A.8 in Appendix A presents the ratified and adjusted monitored PM_{2.5} annual mean concentrations for the past five years.

Since the installation of the new particulate monitor in 2020 the council has been able to carry out real-time monitoring for PM_{2.5}. Before 2020, annual mean PM_{2.5} was estimated from the TEOM PM₁₀ measurements (CA2) using a local ratio of PM_{2.5} to PM₁₀, following the method described in Box 7.7 of Technical Guidance TG (16).

Although the FIDAS has been certified in the UK for use without the need for correction for PM₁₀ measurements, precautionary advice given in 7.174 of LAQM.TG (22) requires PM_{2.5} data to be corrected for slope by dividing by 1.06 (Appendix C). This correction has therefore been applied to PM_{2.5} raw data and reported in Appendix A (Table A.8)

The corrected annual average for PM_{2.5} in 2022 was 7.9 ug/m³, this value is well below the annual mean target value of 20ug/m³ and also meets the 2040 PM_{2.5} target of 10ug/m³. However, the results remain above the WHO-recommended annual mean guideline value of 5ug/m³.

Fig 3.8 shows monthly concentrations of PM_{2.5} at Crawley's continuous monitoring station at Gatwick (CA2) during 2022.



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/Industrial	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	14.8m	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
CR 55	Tinsley Close Fence (11)	Roadside	528446,	138085	NO ₂	Y	1.13m	5.7m	N	2.0
CR 60	Peglar Way	Roadside	526759	136948	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

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)
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	1.5m	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	525534	138472	NO ₂	N	6.75m	1.3m	N	2.0
CR74	Tinsley Green Radford Road	Roadside	528978	139599	NO ₂	N	31.5m	1.8m	N	1.5
CR75	Steers Lane	Roadside	529335	139589	NO ₂	N	18.6m	2m	N	2.0
CR76	Hazelwick Court	roadside	528292	137810	NO ₂	Y	10.3m	1.3m	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

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)
CR85	Tinsley Lane Flats	Urban background	528295	138009	NO ₂	Y	32m	9.4m	N	2.0
CR86	Crown Buildings The Boulevard	Roadside	526878	136821	NO ₂	N	13.8m	0.5m	N	2.0
CR87	Broadway bus shelter	Roadside	526908	136754	NO ₂	N	3.5m	0.5m	N	2.0
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	528603	136950	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

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 99	Furnace Farm Road	Urban background	528410	135628	NO ₂	N	12.1m	1.5m	N	2.0
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	2.7m	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 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
CR112	Manor Lodge	Roadside	527206	142325	NO ₂	N	0m	5m	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 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
CA2	529417	141496	Other/ Industrial	93	93	25	25	17	18	21
LGW3*			Other/ Industrial	98	98	30	29	17	18	22
RG3**			Rural	97	97	16	15	10	10	12

(* LGW3 site located on-airport South Terminal runway – owned/operated by GAL - data presented here for the purpose of comparison)

(** RG3 site located southwest of runway in Crawley – owned/operated by RBBC - 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.TG22 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)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
CR1	526799	136785	Roadside	92.3	92.3	33	35	26	28	27.8
CR3	528438	138392	Urban background	100.0	100.0	20	21	16	17	16.9
CR4	529864	138204	Urban background	100.0	100.0	21	23	18	18	17.0
CR48	527110	139530	Urban background	100.0	100.0	25	25	19	19	19.1
CR49	526320	139860	Urban background	100.0	100.0	18	17	10	12	13.9
CR50	527810	139929	Urban background	100.0	100.0	21	21	17	18	17.4
CR51	529490	141460	Urban background	100.0	100.0	22	22	16	15	17.1
CR52	529417	141496	Other/Industrial	100.0	100.0	24	26	18	18	20.8
CR53	529417	141496	Other/Industrial	100.0	100.0	25	25	18	18	20.0
CR54	529417	141496	Other/Industrial	100.0	100.0	25	25	18	18	20.7
CR55	528446,	138085	Roadside	92.3	92.3	41	42	36	35	36.6
CR60	526759	136948	Roadside	92.3	92.3	33	32	25	26	26.5
CR62	528438	138088	Urban background	100.0	100.0	38	40	34	34	35.7
CR63	528153	137912	Roadside	100.0	100.0	52	49	42	42	45.1
CR64	528150	137825	Roadside	100.0	100.0	40	38	30	31	30.7
CR66	526743	136346	Roadside	92.3	92.3	29	30	27	26	26.3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
CR69	528443	138082	Urban background	100.0	100.0	40	44	36	36	36.5
CR72	525534	138472	Urban background	100.0	100.0	15	13	11	11	11.6
CR74	528978	139599	Roadside	100.0	100.0	34	33	25	26	25.2
CR75	529335	139589	Roadside	90.4	90.4	21	23	17	19	20.4
CR76	528292	137810	Roadside	100.0	100.0	35	35	28	31	29.3
CR77	528362	137812	Roadside	100.0	100.0	35	35	28	31	30.9
CR78	530037	138553	Urban background	100.0	100.0	24	22	17	19	18.8
CR79	529312	138534	Urban background	100.0	100.0	25	25	20	21	20.8
CR80	530424	136521	Urban background	100.0	100.0	28	27	20	22	22.4
CR81	529047	134474	Urban background	100.0	100.0	24	22	16	17	16.9
CR85	528295	138009	Urban background	100.0	100.0	30	30	31	28	29.7
CR86	526878	136821	Roadside	100.0	100.0	26	27	24	21	21.9
CR87	526908	136754	Roadside	92.3	92.3	38	39	29	31	30.8
CR88	525489	136573	Urban background	84.6	84.6	26	25	21	22	22.1
CR89	527715	137893	Urban background	100.0	100.0	22	22	17	19	17.5
CR91	528681	137177	Roadside	100.0	100.0	34	32	28	30	28.9
CR93	528895	137115	Roadside	100.0	100.0	48	53	39	42	41.8

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
CR94	528841	137069	Roadside	100.0	100.0	26	27	18	25	24.6
CR95	528882	137086	Roadside	100.0	100.0	31	32	24	26	25.9
CR96	529125	137196	Roadside	100.0	100.0	30	27	22	21.7	21.2
CR97	528603	136950	Roadside	100.0	100.0	41	37	28	29	35.9
CR98	528515	139275	Roadside	100.0	100.0	35	34	27	29	28.9
CR 99	528410	135628	Urban background	51.9	51.9	17	15	13	14	13.2
CR 100	526326	136487	Roadside	100.0	100.0	30 ⁽¹⁾	27	23	26	26.2
CR 101	525679	135556	Roadside	100.0	100.0	54⁽¹⁾	50	44	41	42.0
CR 102	526449	134139	Roadside	100.0	100.0	37 ⁽¹⁾	34	26	29	27.6
CR103	528848	137802	Urban background	100.0	100.0		21	13	17	14.5
CR104	527333	135846	Urban background	100.0	100.0		27	19	23	21.1
CR105	526940	137831	Roadside	100.0	100.0		44	36	36	37.6
CR106	527000	138357	Roadside	100.0	100.0		46	33	37	36.8
CR107	524806	136822	Urban background	100.0	100.0			14	16	15.3
CR 109	527174	136357	Urban background	100.0	100.0			20	24	20.9
CR 110	526928	136356	Roadside	100.0	100.0			17	19	18.9

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
CR 111	526804	136375	Roadside	100.0	100.0			22	23	22.8
CR112	527206	142325	Roadside	100.0	100.0					18.1

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22

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.TG22 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%).

Trends in Annual Mean NO₂ Concentrations

Fig A.1 presents the 5-year trend in NO₂ annual mean concentrations for three long-term background sites (CR3, CR4 and CR72) in Crawley from 2018 to 2022.

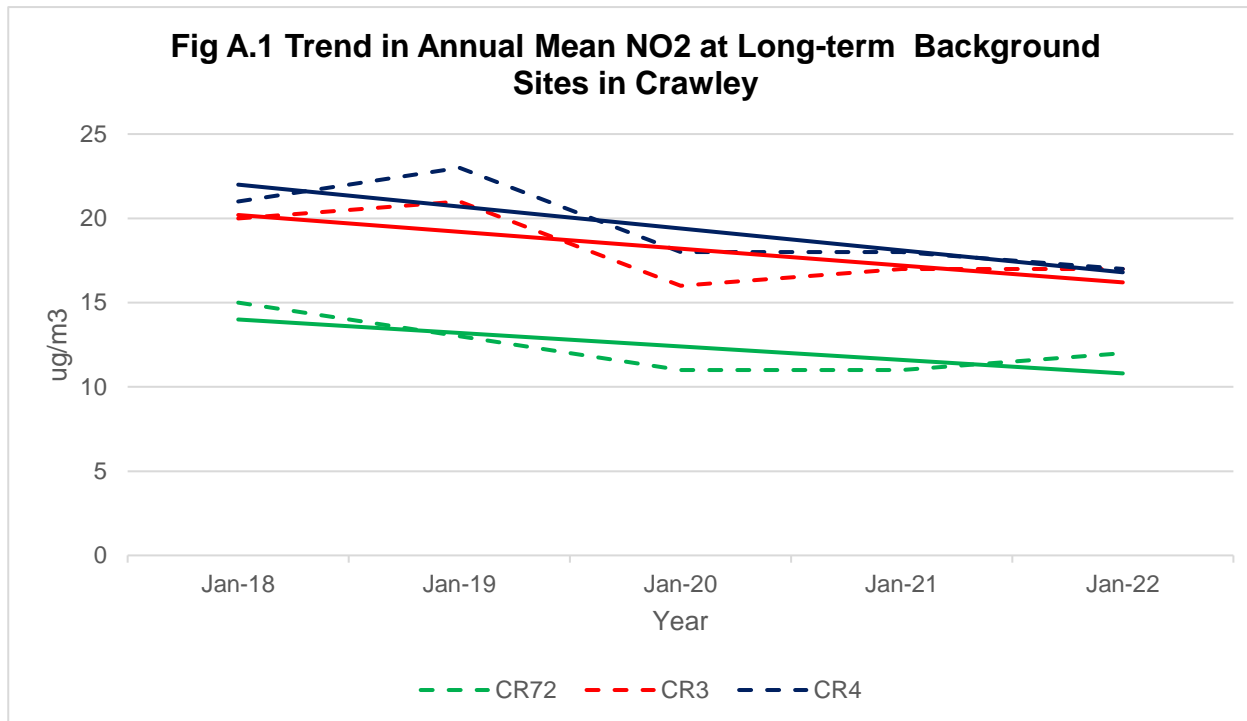


Fig A.2 presents NO₂ annual mean concentrations for long-term background sites in Crawley CR3, CR4 and CR72 between years 2018 to 2022. There are no exceedances of the 40 ug/m³ annual mean objective in 2022 and there is a general trend of reduction experienced across the sites.

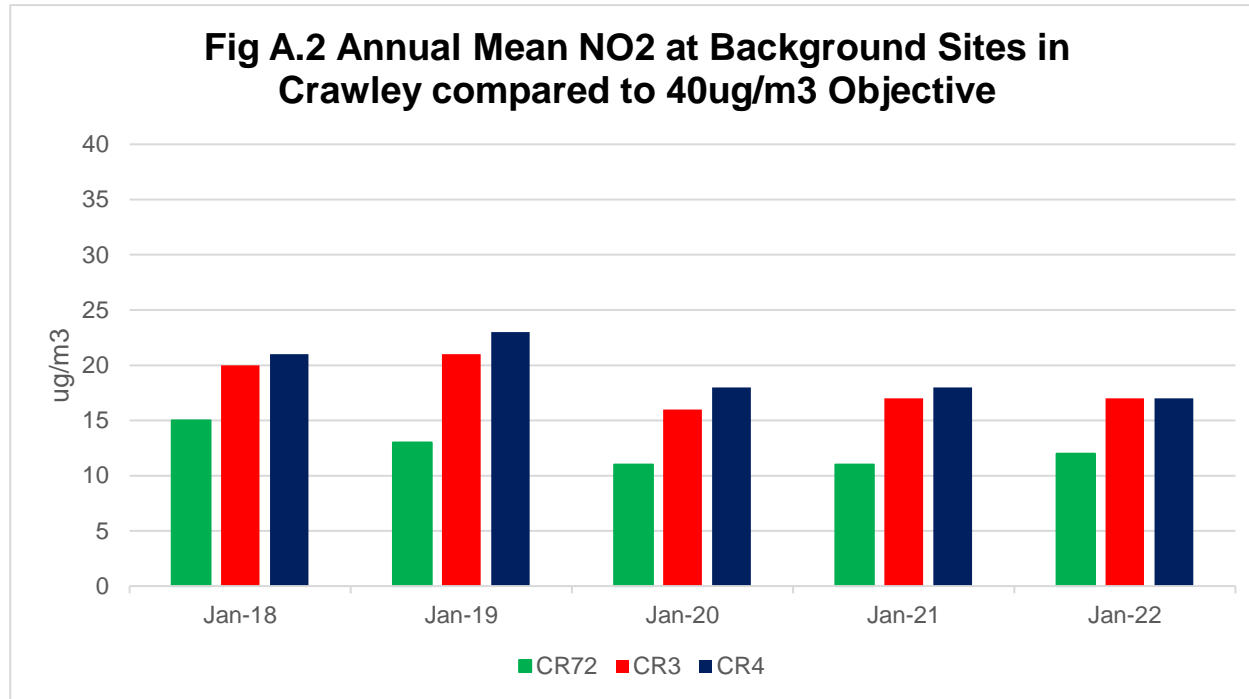
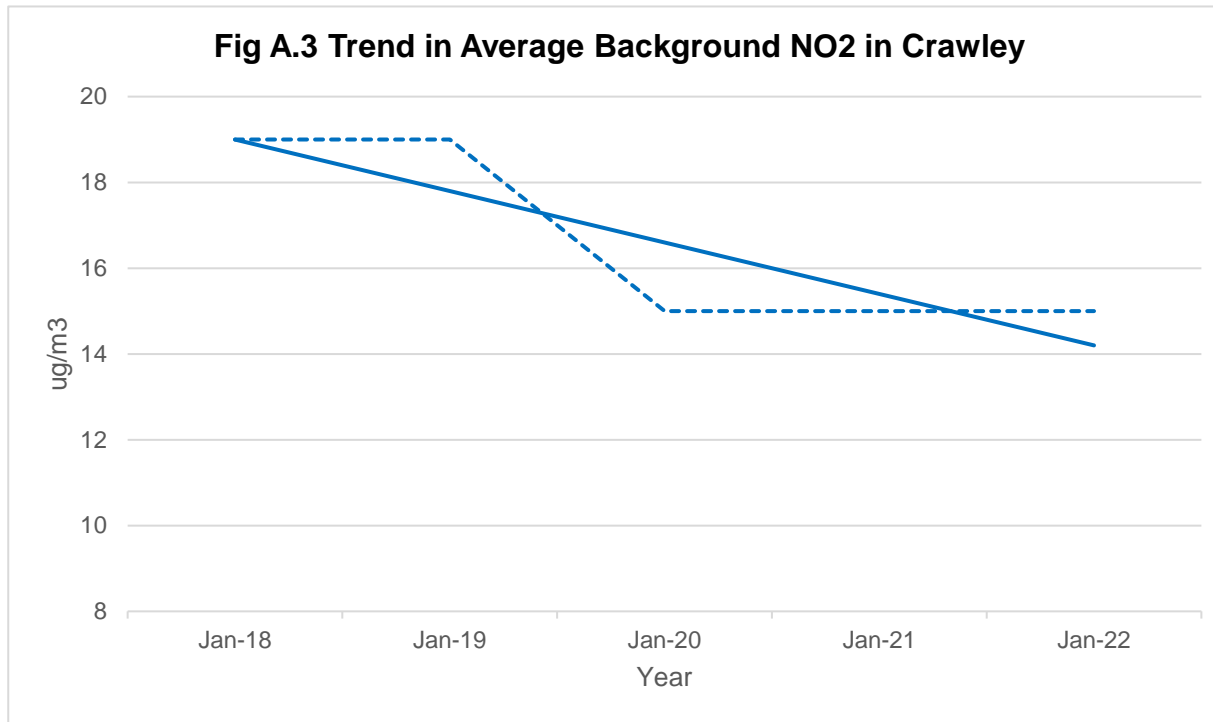


Figure A.3 presents the average 5-year trend for background NO₂ annual mean concentrations in Crawley from 2018 to 2022.



There were no exceedances of the annual mean objective at background sites in Crawley in 2022 and the long-term trend shows a reduction in NO₂. A similar trend in reduced background emissions is seen regionally and nationally.

Prior to Covid, a flattening of the trend in background NO₂ was emerging. However, the unusually low concentrations in 2020/21 due to Covid have increased the downward slope, and measured background NO₂ concentrations at most background sites across Crawley have remained more or less constant since 2020. It may still be too early to see if this is downward will be sustained or if the gradual rise in traffic and other emission sources will flatten the curve. Trends will continue to be monitored and reviewed annually through the LAQM process to see how the impact of development and traffic volumes in the post-Covid period is affecting background NO₂ levels in Crawley.

Trends in Roadside NO₂ Concentrations

Figure A.4 presents the 5-year trend in NO₂ annual mean concentrations for three long-term roadside sites (CR86, CR98 and CR101) in Crawley from 2018 to 2022.

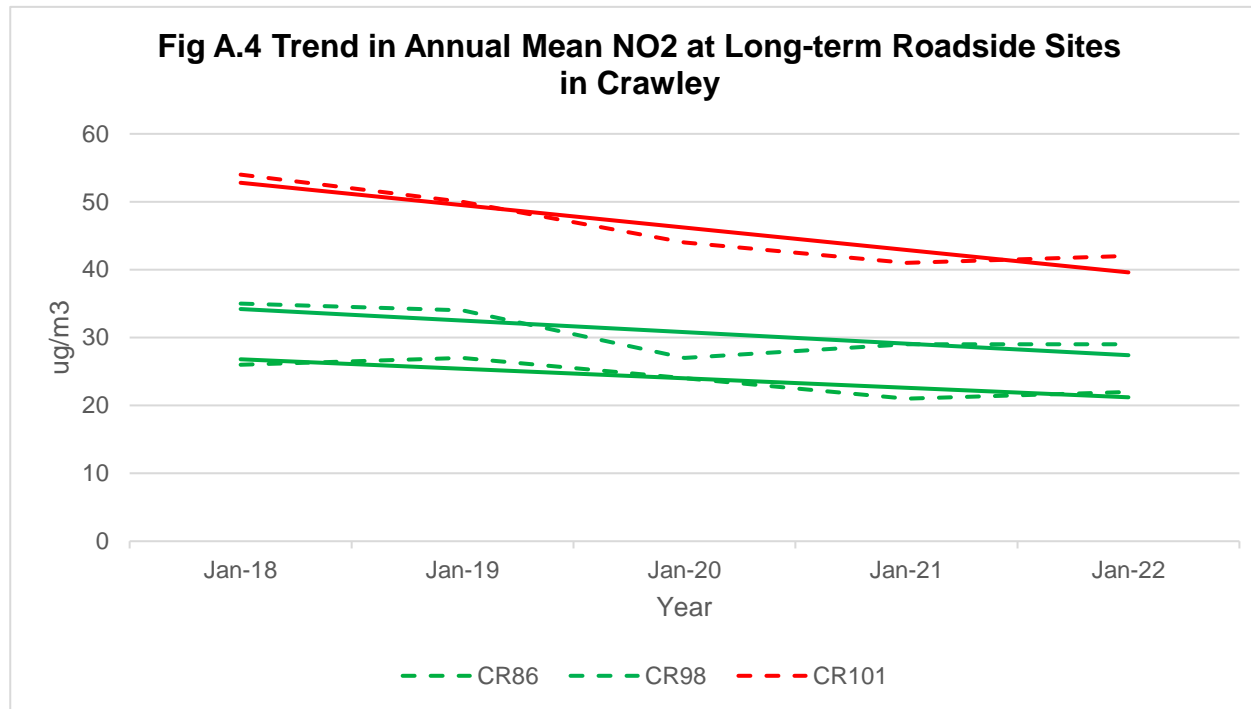
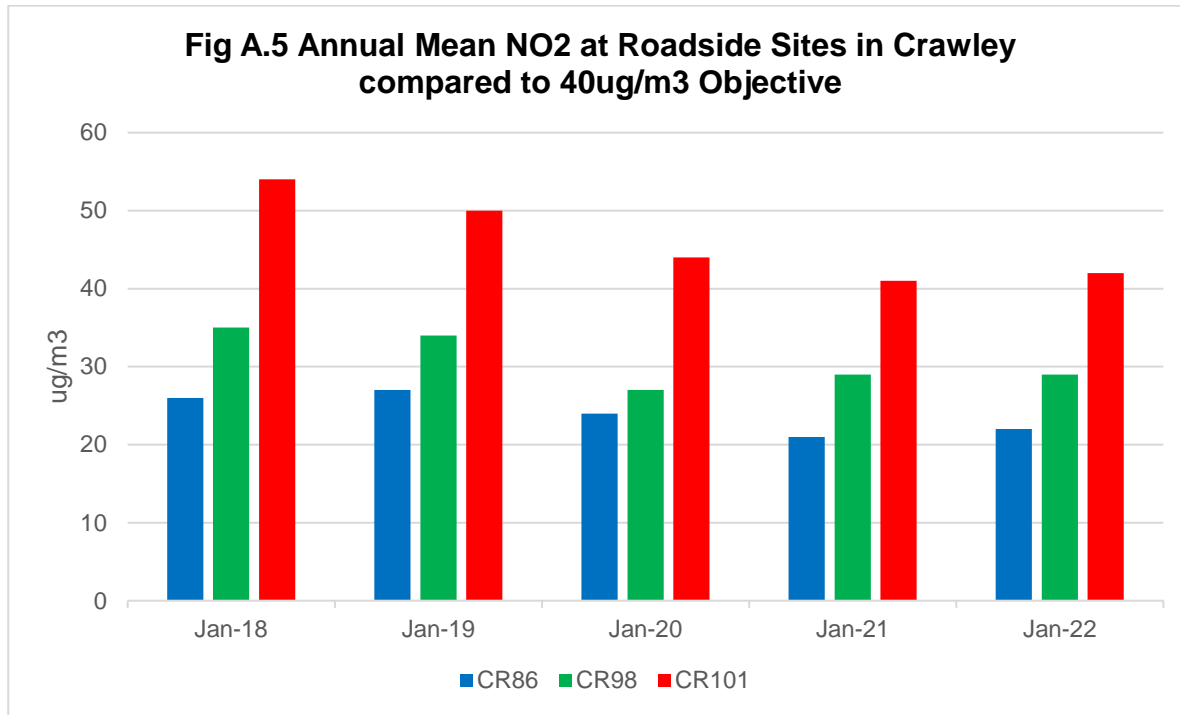


Fig A.5 presents NO₂ annual mean concentrations for long-term roadside sites in Crawley CR86, CR98 and CR101 between years 2018 to 2022 compared to the 40 ug/m³ objective.



Exceedances of the annual mean NO₂ objective were recorded at three roadside sites in Crawley in 2022, however, after adjustment for fall off with distance, there was no relevant public exposure. The long-term trend shows a reduction in NO₂ and a downward trend, reflecting the regional and national long-term trend as policy controls and engine technology, as well as local measures have helped reduce emissions.

Prior to Covid the 5-year trend (2015-2019) showed an upwards trend in NO₂ levels at roadside sites, as traffic levels and congestion remained high. Following the unprecedented reduction in road traffic caused by travel restrictions in 2020 (and to a lesser extent 2021) NO₂ levels fell steeply at roadside sites.

Traffic data for Crawley presented in **Figs A.6** and **A.7** below, uses peak in-bound flow to give an indication of year-on-year trends. Although this data is not a direct measure of total traffic volume in Crawley, it is a useful representation of how the travel restrictions during Covid impacted traffic volume.

Fig A.6 shows that from 2009 until 2019 traffic flows were more or less stable with the highest volumes recorded in 2017. A sharp drop was measured during 2020 when travel restrictions imposed by the pandemic reduced traffic volumes by nearly 50%.

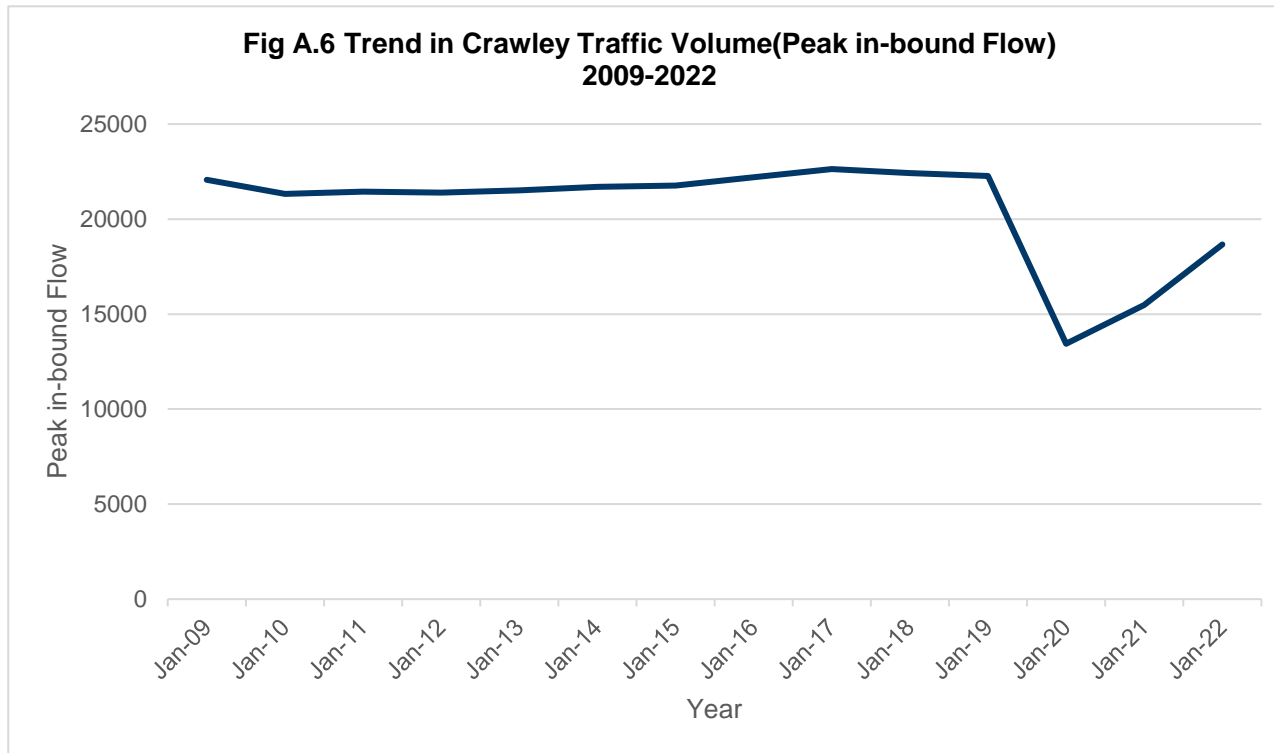
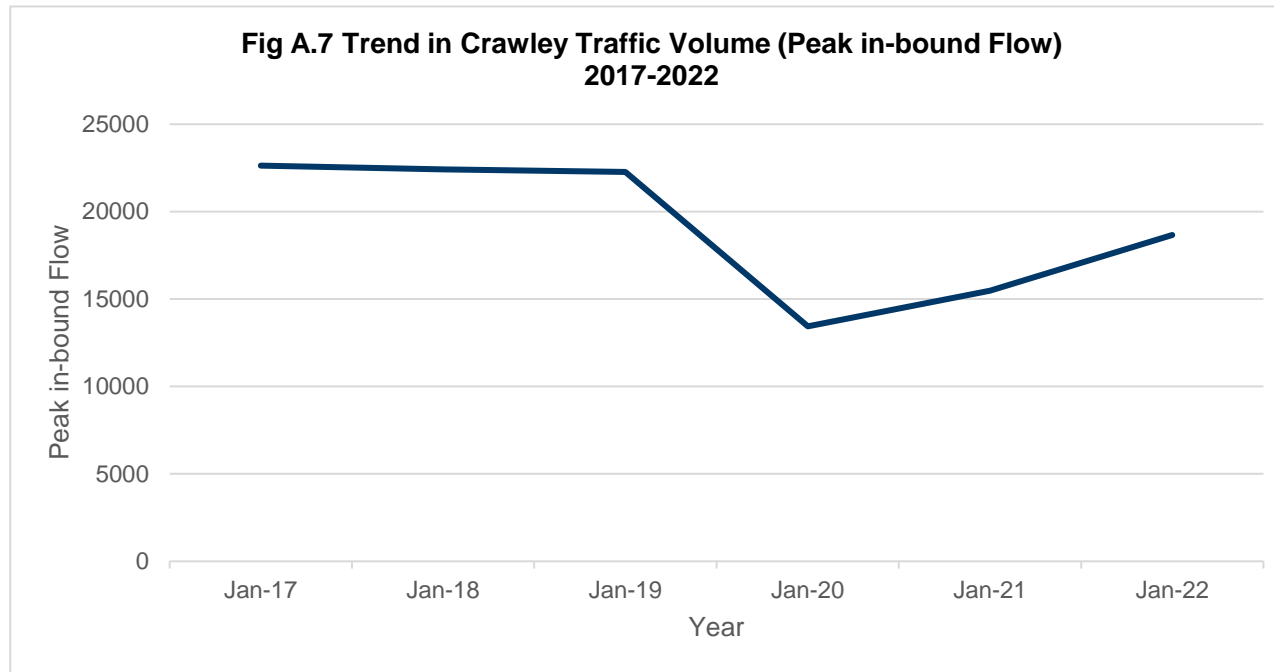


Fig A.7 shows that 2022 traffic levels are still below pre-Covid volumes (2022 is 83% of peak 2017 traffic).



A slight upturn in NO₂ concentrations was seen at some of the busier main road monitoring sites in 2022. However, NO₂ concentrations at most other roadside sites in Crawley continue to measure NO₂ concentrations similar to, or slightly lower than 2021 levels.

Although a gradual increase in traffic levels was seen in 2021 and 2022, traffic volumes are generally still below pre-Covid levels and it's still too early to tell if traffic will return to pre-Covid levels, or whether there has been a permanent modal shift to more sustainable transport, active travel and home working. Modal shift is part of a wider combination of factors which will help to drive the improvement in roadside NO₂ concentrations including lower traffic volumes and cleaner engine technologies. The trend will continue to be monitored and reviewed annually through the LAQM process.

Trends in AQMA NO₂ Concentrations

Fig A.8 presents the 5-year trend in NO₂ annual mean concentrations for two residential sites adjacent to the A2011 Crawley Avenue (CR69) and the A2220 close to Three Bridges Station (CR93) in the Crawley AQMA from 2018 to 2022.

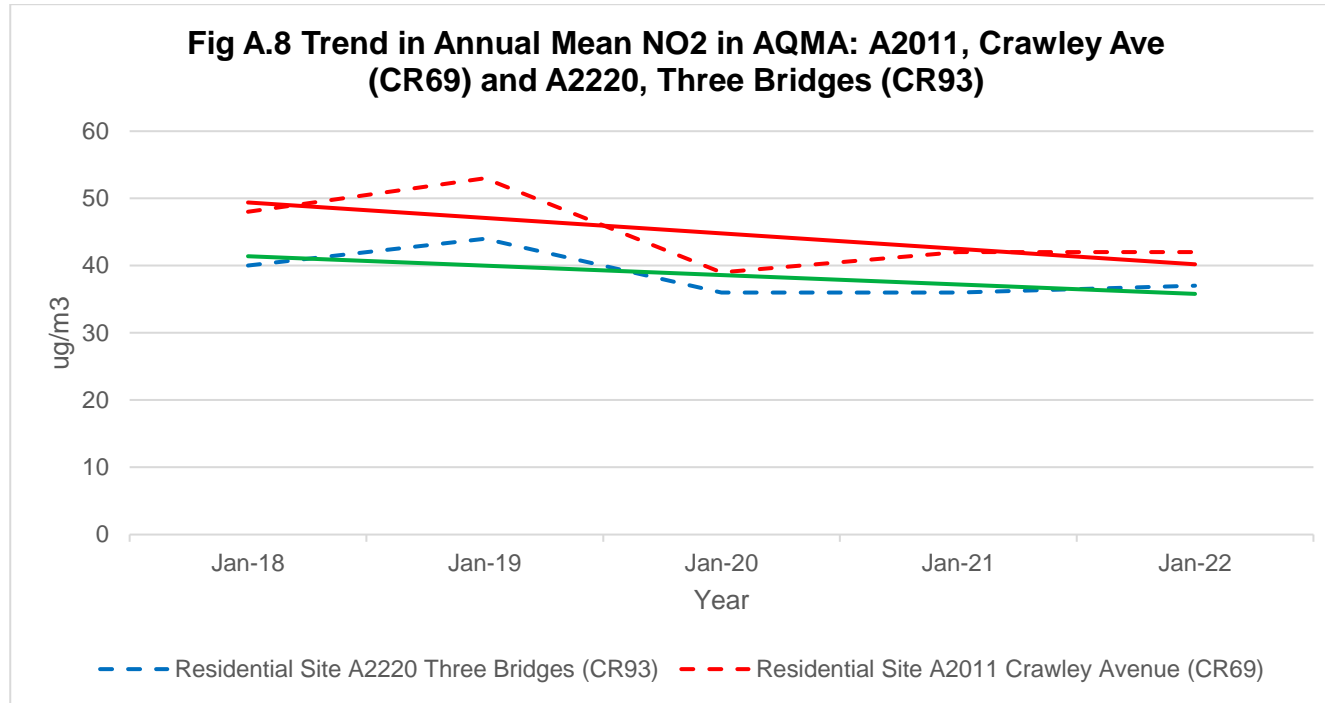
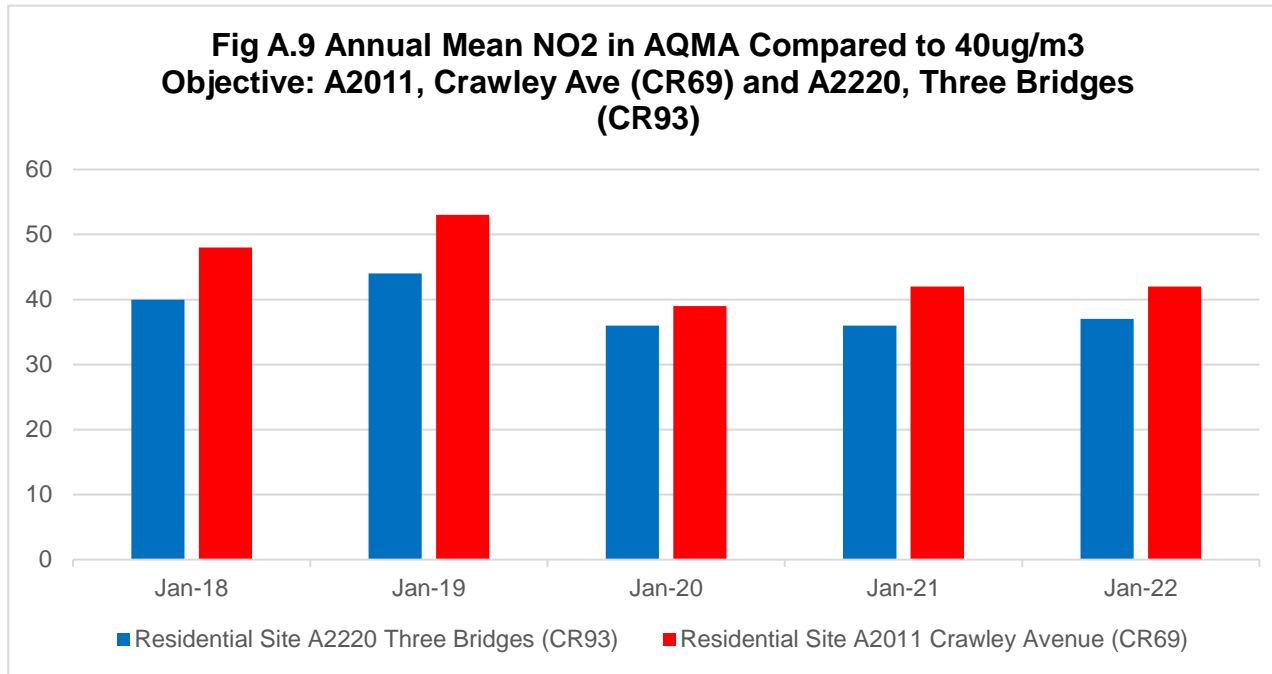


Fig A.9 presents NO₂ annual mean concentrations for Sites in AQMA (CR69 and CR93) between years 2018 to 2022 compared to the 40 ug/m³ objective.



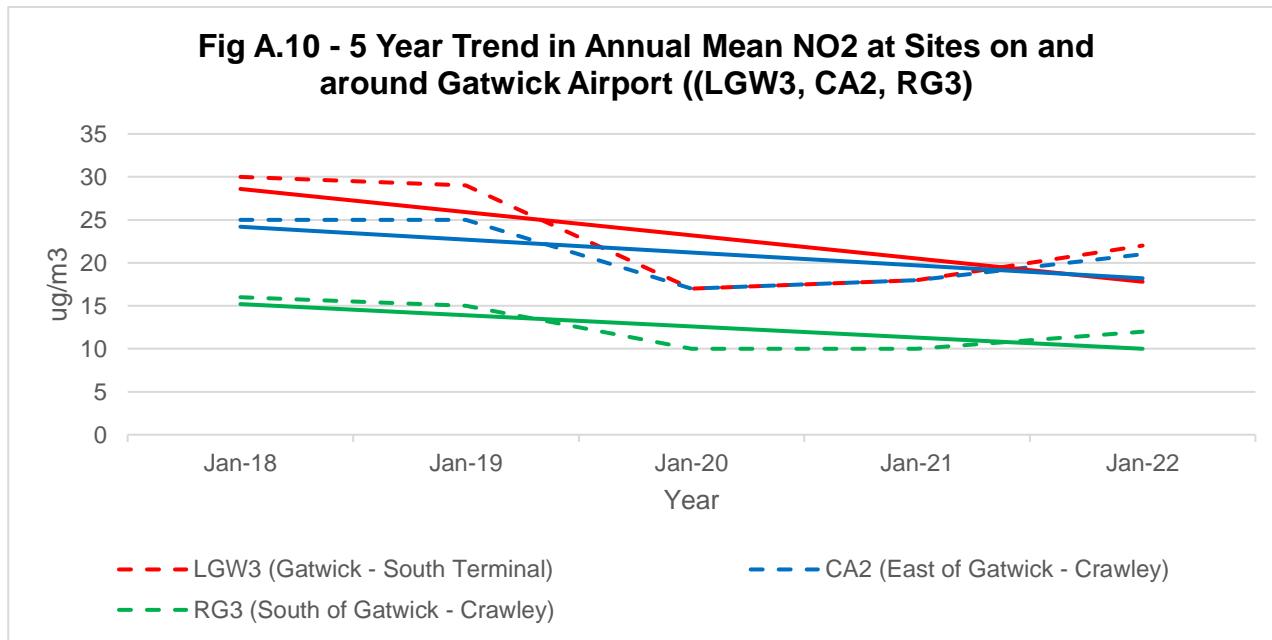
The 5-year trend in NO₂ is downwards at both sites, and after adjustment for fall off with distance, there were no exceedances of the annual mean objective at any sites in the AQMA in 2022. However, despite showing a continued downward trend, small increases in measured NO₂ were recorded in 2021 and 2022 at AQMA monitoring sites, and levels continue to be high, with site CR93 borderline for exceedance of the annual mean objective and CR69 within 10% of the objective.

Site CR93 is close to Three Bridges station (mainline London to Brighton line) and is therefore more directly influenced by commuter traffic and buses. Site CR69 is adjacent to the east bound dual carriage way to J10 of the M23 and close to Manor Royal business district and is influenced by commuter traffic but with a higher percentage of goods vehicles (LGV and HGV). The traffic data suggests there is a gradual post-covid upturn in traffic volumes. Given that the primary source of pollution in the AQMA is from vehicle emissions, we need to

more fully understand the future trend in post-COVID vehicle movements and subsequent traffic related pollutant levels in order to effectively target air quality improvement measures. Locations within the AQMA will continue to be monitored and reviewed annually through the LAQM process to assess trends.

Trends in NO₂ Concentrations at Gatwick Airport and Residential Properties close to the Airport

Fig A.10 presents the 5-year trend in NO₂ annual mean concentrations from 2018 to 2022 for continuous automatic monitoring sites on and around Gatwick Airport. GAL’s LGW3 site (located at the end of South Terminal runway) is compared with Crawley’s CA2 site (located east of the runway on the airport boundary close to Balcombe Road residential properties) and RG3 (located southwest of the runway at Poles Lane in a rural area of Crawley)



A slight upturn in annual mean NO₂ was seen at all three sites in 2022, but the 5-year trend continues to be downwards. Monitoring sites RG3, LGW3 and CA2 are located on a transect across the airport from southwest to northeast following the prevailing wind direction

(south-westerlies) in the area. Comparing the monitoring data from these three sites gives an indication of the level of emissions “picked up” from the airport from southwest (RG3) to northeast (CA2).

The sharp falloff in airport concentrations in 2020 was a direct result of the almost total shut down of the aviation industry due to Covid which also helped to demonstrate the contribution on-airport emissions of NO₂ make to annual mean concentrations in the local area. NO₂ levels saw a slight upturn in 2021 and 2022 but are still about 25% lower than pre-covid (2019) levels. Gatwick Airport Ltd (GAL) expects passenger throughput to return to pre-covid levels by 2025.

In August 2023 GAL submitted an application to the planning Inspectorate for an expansion of the airport to provide dual runway operations and increased capacity. The potential passenger throughput with development is predicted to be 74 million passengers per annum (mppa) by 2038, representing a 27mppa increase on today's capacity and a 13mppa increase above the “without development” potential of the single runway airport. Trends will continue to be monitored and reviewed annually through the LAQM process.

Fig A.11 presents the 5-year trend in annual mean NO₂ concentrations at Gatwick (LGW3) compared with residential sites within 1000m of the airport from 2018 to 2022.

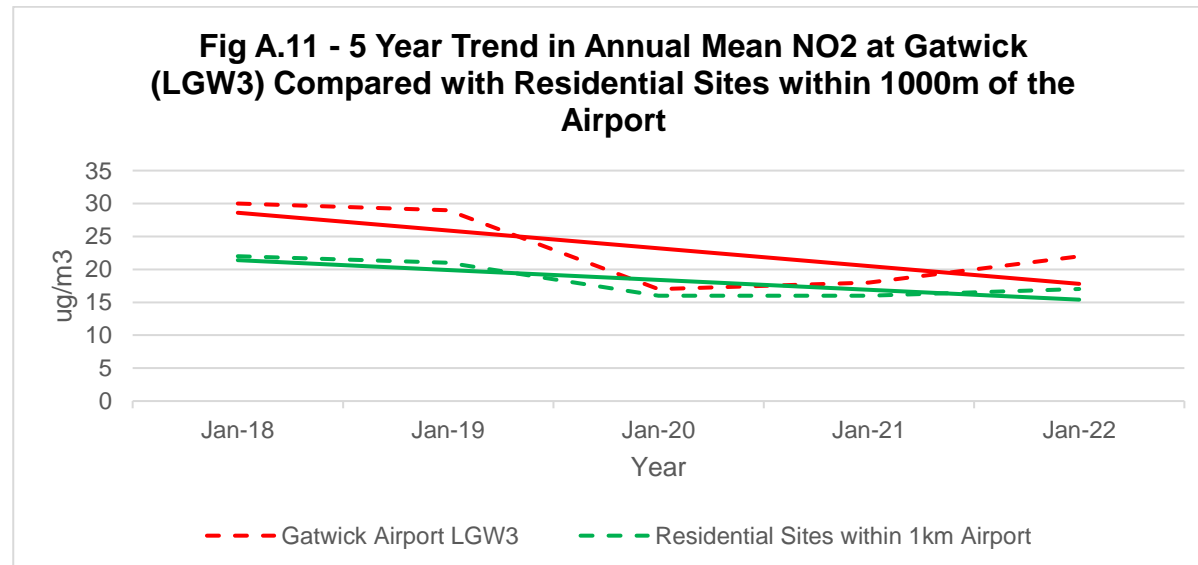
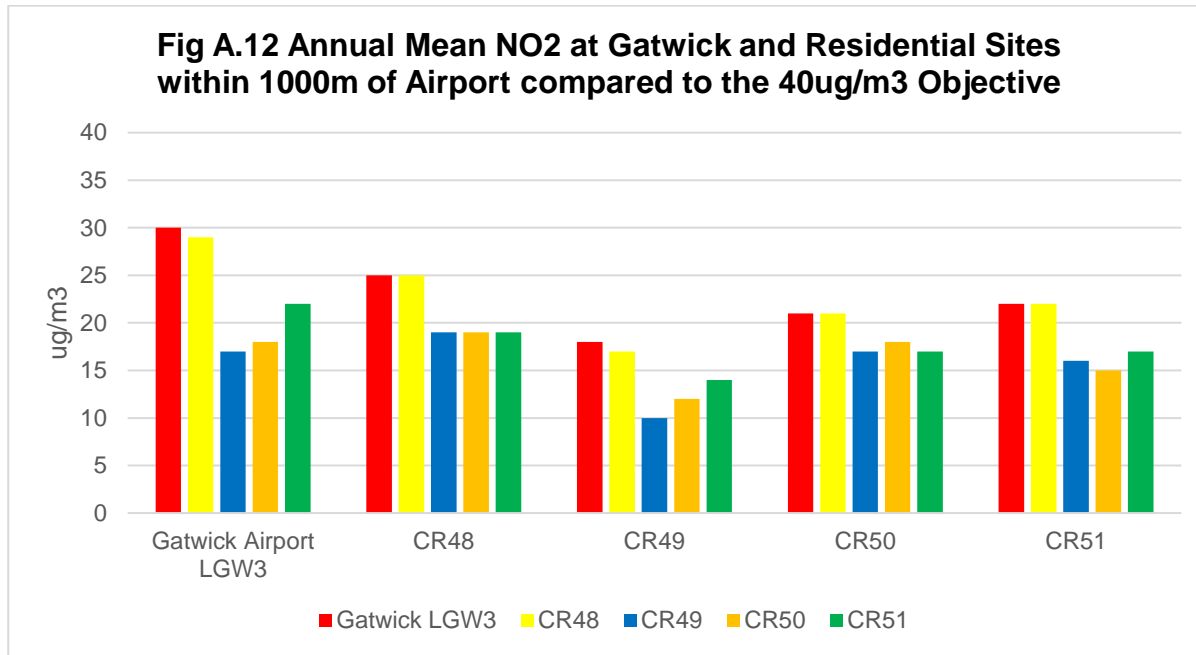


Fig A.12 presents NO₂ annual mean concentrations for Gatwick (LGW3) and residential sites within 1000m of the airport (CR48, CR49, CR50 and CR51) compared to the 40 ug/m³ objective from 2018 to 2022.



There were no exceedances of the annual mean objective for NO₂ in 2022 at Gatwick or any of the residential monitoring locations within 1000m of the airport. **Fig A.11** shows a long-term downward trend for both the airport and surrounding residential receptors close to the airport.

Both airport and residential NO₂ showed a steep decline in concentrations in 2020 as a result of Covid restrictions on road and air transport. 2020 levels of NO₂ fell more dramatically at the airport than elsewhere in the borough, with measured airport NO₂ concentrations almost at the same level as those of residential locations for the first time since monitoring began (>20yrs), demonstrating the contribution on-airport emissions of NO₂ make to annual mean concentrations in the local area. The slight increase in NO₂ levels

seen in 2021 and 2022 reflects the increased road and air transport activity as the airport recovers, with GAL predicting a return to pre-covid levels over the next 2 years.

Given the scale of development coming forward over the next 10/15 years if the Gatwick expansion project is approved, pollution trends in and around the airport will continue to be monitored and reviewed annually through the LAQM process.

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
CA2	529417	141496	Other/ Industrial	93	93	0	0	0	0	0
*LGW3			Other/ Industrial	98	98	0	0	0	0	0
**RG3			Rural	97	97	0	0	0	0	0

(* LGW3 site located on-airport South Terminal runway – owned/operated by GAL - data presented here for the purpose of comparison)

(** RG3 site located southwest of runway in Crawley – owned/operated by RBBC - data presented here for the purpose of comparison)

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 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
CA2	529417	141496	Other/ Industrial	95	95	18*	21*	15**	18**	14**
*LGW3			Other/Industrial	99	99	19	14	14	14	15

(* LGW3 site located on-airport South Terminal runway – owned/operated by GAL - data presented here for the purpose of comparison)

* TEOM monitor data

** FIDAS Monitor data

Notes:

The annual mean concentrations are presented as µg/m³.

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

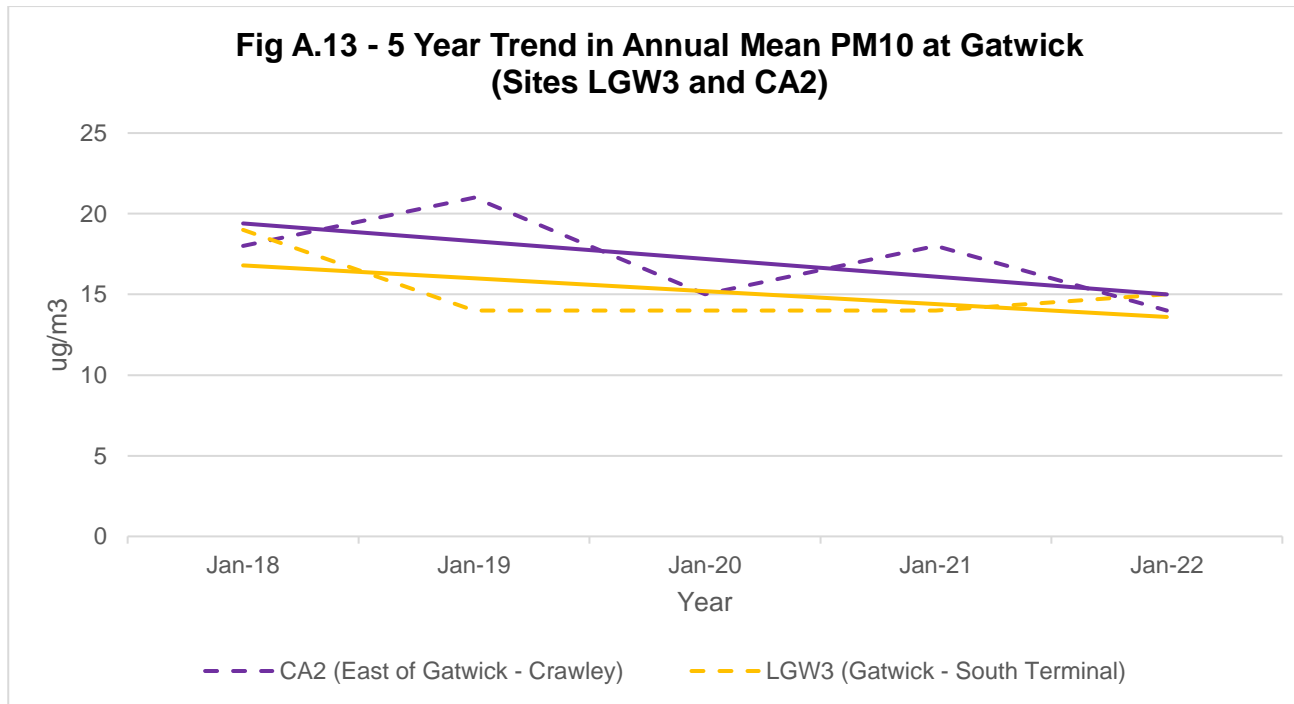
All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(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%).

Trends in Annual Mean PM₁₀ Concentrations

Fig A.13 presents the 5-year trend in annual mean PM₁₀ concentrations at Gatwick (LGW3) at the South terminal compared Crawley’s CA2 site, located east of the runway on the airport boundary close to residential properties on Balcombe Road.



There were no exceedances of the annual mean PM₁₀ objective at either site in 2022. Both sites show a downward trend in measured concentrations of PM₁₀ over the last five years. A new Fidas monitor was installed at the beginning of March 2020 to replace the old TEOM. For consistency all data is graphed, however, the measurement data may not be directly comparable between the different measurement instruments (TEOM and FIDAS). A slight increase in PM₁₀ concentrations was recorded at Gatwick’s LGW3 site in 2022 compared to the previous year, whereas at Crawley’s CA2 site PM₁₀ concentrations reduced to levels seen in 2020.

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 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
CA2	529417	141496	Other/ Industrial	95	95	2*	4*	4**	2**	1**
*LGW3			Other/Industrial	99	99	1	4	0	2	1

* TEOM monitor data

** FIDAS Monitor data

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%).

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 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
CA2	529417	141496	Other/ Industrial	95	95	12*	15*	8	8	8
*LGW3			Other/Industrial	99	99	8	9	8	9	9

* Data for years 2018-2019 are estimated values calculated from the TEOM PM₁₀ measurements (CA2) using ratio of PM_{2.5} to PM₁₀, as per the Technical Guidance LAQM.TG16

Notes:

The annual mean concentrations are presented as µg/m³.

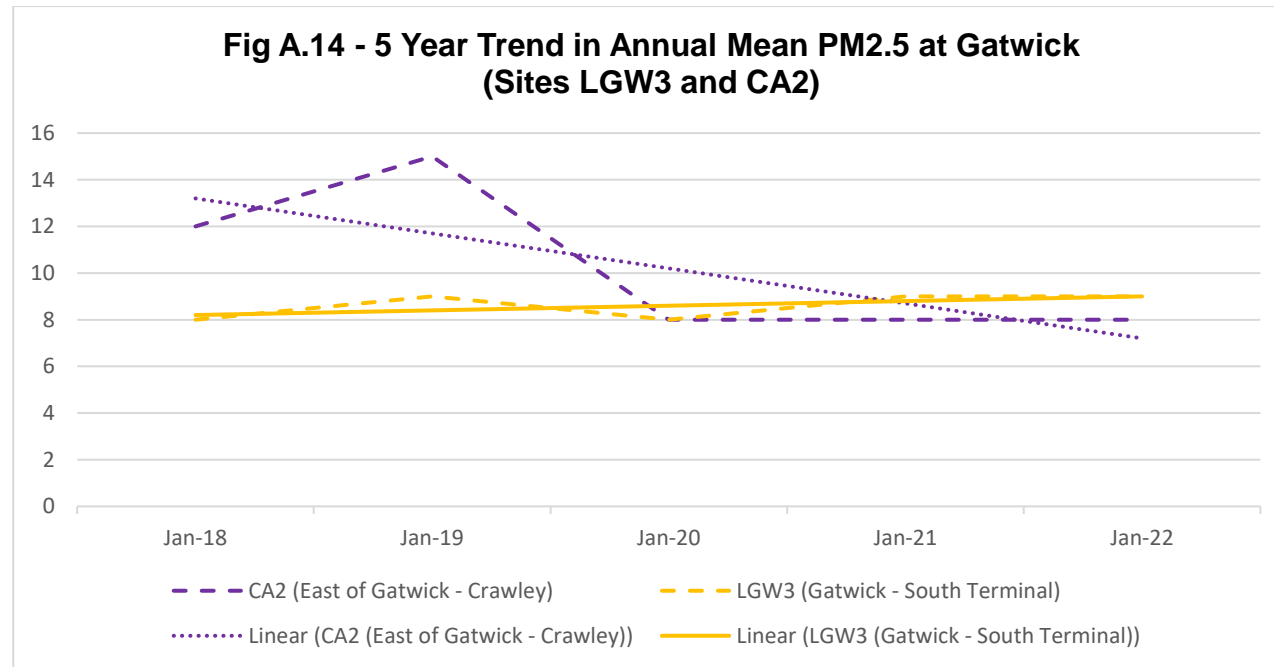
All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(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%).

Trends in Annual Mean PM_{2.5} Concentrations

Fig A.14 presents the 5-year trend in annual mean PM_{2.5} concentrations at Gatwick (LGW3) at the South terminal compared Crawley’s CA2 site, located east of the runway on the airport boundary close to residential properties on Balcombe Road.



A new Fidas monitor was installed at the CA2 site March 2020 replacing the TEOM which had been in place since 2006. For consistency all data is graphed, however, the data may not be directly comparable as prior to 2020 PM_{2.5} concentrations were based on estimated values from the CA2 TEOM measurements using local ratio of PM_{2.5} to PM₁₀ (Technical Guidance TG (16) methodology Box7.7).

There were no exceedances of the annual mean PM_{2.5} target value of 20ug/m³ at either site in 2022. The measured PM_{2.5} concentration at CA2 in 2022 was 8 ug/m³ and at LGW3 it was 9 ug/m³. Although these values are well below the national target value of 20µg/m³ they remain above the WHO-recommended annual mean guideline value of 5µg/m³.

Crawley's CA2 site shows a continuing overall downward trend in measured concentrations of PM_{2.5}, Gatwick's LGW site has a slight upward trendline due to year-on-year variation. PM_{2.5} concentrations at both sites have remained more or less stable for the last 3 years since Covid, and if this continues the long-term trend for PM_{2.5} at both sites is likely to flatten. The impact of Gatwick's Northern runway expansion plans may impact PM levels in future if the project receives approval. Trends will continue to be monitored and reviewed annually through the LAQM process.

Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1 – NO₂ 2022 Diffusion Tube Results (µg/m³)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.99)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
CR1	526799	136785	36.0	26.1	28.9	26.5	23.5		23.9	26.6	25.9	25.1	30.8	35.5	28.1	27.8	-	
CR3	528438	138392	28.5	16.2	16.4	14.4	13.2	12.1	12.8	15.8	16.9	14.7	19.0	24.3	17.0	16.9	-	
CR4	529864	138204	26.9	15.9	19.8	14.2	13.0	12.3	13.2	16.5	17.4	14.1	17.1	25.3	17.1	17.0	-	
CR48	527110	139530	30.2	18.9	19.2	17.5	15.8	15.4	16.6	19.9	21.7	14.3	18.8	23.5	19.3	19.1	-	
CR49	526320	139860	16.3	13.1	16.3	14.8	10.9	11.7	12.1	17.9	13.9	10.0	13.1	18.0	14.0	13.9	-	
CR50	527810	149929	24.9	14.9	21.2	18.0	13.1	12.4	14.5	17.9	17.7	13.4	18.2	24.2	17.5	17.4	-	
CR51	529490	141460	22.3	16.9	15.2	13.4	15.2	13.9	14.1	21.9	17.7	13.6	18.5	24.1	17.2	17.1	-	
CR52	529417	141496	28	17	24	20	19	17	17	22	22	18	23	29	21.29	20.86		
CR53	529417	141496	24	16	21	19	19	16	18	21	22	16	23	29	20.44	20.03		
CR54	529417	141496	27.0	18.0	24.0	19.7	18.3	16.7	18.4	15.0	22.7	18.6	22.1	29.9	20.9	20.7		
CR55	528446	138085	36.4	33.9	39.5	33.1	37.4	39.0	40.6	38.6	29.9	39.6		38.6	37.0	36.6	35.5	
CR60	526759	136948	35.8	26.1	30.7	24.2	24.0	24.1	20.9	28.0	21.0	26.1		33.7	26.8	26.5	-	
CR62	528438	138088	38.0	32.8	38.8	30.9	33.8	37.0	36.1	37.4	30.6	39.9	37.5	40.4	36.1	35.7	-	
CR63	528153	137912	59.2	40.9	51.6	42.3	46.5	42.2	42.6	35.5	41.0	44.5	48.0	51.8	45.5	45.1	32.4	
CR64	528150	137825	38.9	24.8	30.0	31.6	23.2	25.7	30.2	37.7	32.7	29.7	32.9	34.4	31.0	30.7	-	
CR66	526743	136346	35.1	27.7	25.0	22.8	24.9	23.1	24.5		19.7	22.9	30.9	35.3	26.5	26.3	-	
CR69	528443	138082	36.7	30.4	37.2	32.0	38.2	37.9	40.0	43.3	32.8	39.3	35.4	39.4	36.9	36.5	-	
CR72	525534	138472	17.7	10.9	12.9	9.8	7.5	7.7	8.6	12.2	10.4	10.7	14.0	18.4	11.7	11.6	-	
CR74	528978	139599	36.1	24.2	29.3	27.0	24.8	14.7	26.3	28.1	24.3	18.6	24.0	28.5	25.5	25.2	-	
CR75	529335	139589	32.7	17.0	23.6	17.9		22.2	17.8	18.5	19.7	15.5	17.8	23.9	20.6	20.4	-	
CR76	528292	137810	36.7	27.9	31.9	30.1	26.6	23.7	27.9	32.5	29.4	24.2	30.8	33.1	29.6	29.3	-	
CR77	528362	137812	46.1	26.9	32.8	27.6	29.3	24.0	29.2	32.2	29.3	27.8	32.7	36.7	31.2	30.9	-	
CR78	530037	138553	26.0	15.4	22.2	19.9	14.3	14.3	17.3	22.1	19.6	14.7	19.3	22.9	19.0	18.8	-	
CR79	529312	138534	27.3	17.9	26.1	23.9	16.7	15.5	18.6	25.4	22.3	13.6	18.8	25.6	21.0	20.8	-	
CR80	530424	136521	26.8	16.9	24.7	27.4	19.9	19.1	23.6	29.1	20.9	19.2	20.3	23.8	22.6	22.4	-	
CR81	529047	134474	19.6	15.6	18.3	15.4	15.4	14.2	15.9	20.9	15.2	15.0	17.1	22.2	17.1	16.9	-	
CR85	528295	138009	36.1	29.1	34.7	30.3	27.2	25.4	28.2	33.3	27.1	26.0	28.0	34.6	30.0	29.7	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.99)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
CR86	526878	136821	30.8	21.4	24.5	17.3	18.2	17.2	17.5	22.2	19.0	21.4	24.5	31.4	22.1	21.9	-	
CR87	526908	136754	39.3	27.3	31.4	27.0	31.3		23.9	33.7	34.2	28.1	31.5	34.4	31.1	30.8	-	
CR88	525489	136573	26.0	17.8	29.4	27.3	17.7		19.0		18.7	20.6	21.8	24.7	22.3	22.1	-	
CR89	527715	137893	27.7	15.4	21.8	16.6	13.1	12.6	15.4	18.2	16.7	13.2	18.4	22.9	17.7	17.5	-	
CR91	528681	137177	38.2	27.0	30.3	26.2	28.1	23.4	28.2	28.8	27.6	26.4	31.2	35.2	29.2	28.9	-	
CR93	528895	137115	58.3	23.2	38.1	37.7	41.6	38.4	43.0	47.3	41.9	41.8	46.1	49.6	42.2	41.8	39.1	
CR94	528841	137069	30.1	37.7	25.2	24.4	19.3	17.5	21.5	26.6	22.6	18.7	25.2	29.3	24.8	24.6	-	
CR95	528882	137086	38.5	20.0	27.0	23.1	22.8	22.5	25.4	27.7	25.6	23.3	27.8	30.6	26.2	25.9	-	
CR96	529125	137196	28.8	21.7	21.3	17.3	20.0	18.2	19.9	21.8	23.0	17.0	25.5	22.6	21.4	21.2	-	
CR97	528603	136950	38.0	26.8	37.6	26.3	31.9	36.3	40.5	44.1	37.2	35.7	39.6	41.3	36.3	35.9	-	
CR98	528515	139275	40.5	26.7	28.6	25.5	27.1	23.3	24.7	28.5	29.1	28.2	30.1	38.4	29.2	28.9	-	
CR99	528410	135628	20.1		14.1	11.0						8.4	15.3	20.8	14.9	13.2	-	
CR 100	526326	136487	33.9	22.6	29.4	24.9	21.4	21.1	22.3	29.3	25.3	24.2	31.9	31.7	26.5	26.2	-	
CR 101	525679	135556	50.2	37.7	38.6	39.3	40.4	38.7	40.1	46.3	37.1	43.3	48.3	49.4	42.5	42.0	28.5	
CR 102	526449	134139	33.5	27.5	32.1	28.3	25.9	25.3	23.1	26.2	26.7	23.6	31.2	31.5	27.9	27.6	-	
CR 103	528848	137802	22.2	13.8	16.6	12.5	12.2	9.8	12.7	13.2	15.5	11.4	15.9	20.1	14.7	14.5	-	
CR 104	527333	135846	29.3	19.0	23.8	19.4	17.0	15.1	17.5	21.8	20.8	19.5	23.5	29.2	21.3	21.1	-	
CR 105	526940	137831	57.4	34.5	35.6	31.5	34.9	29.3	33.9	35.3	35.4	36.4	41.7	50.0	38.0	37.6	28.5	
CR 106	527000	138357	46.4	34.8	39.1	32.8	34.4	32.1	31.4	38.1	36.6	36.2	40.3	43.8	37.2	36.8	30.5	
CR 107	524806	136822	21.7	14.5	18.2	14.6	11.1	11.1	12.1	16.1	12.6	12.8	18.6	22.6	15.5	15.3	-	
CR 109	527174	136357	31.1	20.5	22.7	19.0	18.4	15.9	15.7	21.3	19.8	18.9	21.4	28.2	21.1	20.9	-	
CR 110	526928	136356	27.6	16.3	23.1	20.1	14.2	12.9	17.9	20.9	17.0	14.4	20.0	24.4	19.1	18.9	-	
CR 111	526804	136375	33.5	20.5	23.6	20.7	19.3	18.2	25.3	22.2	17.4	20.2	26.6	29.0	23.0	22.8	-	
CR 112	527206	142325	24.1	16.9	20.0	16.4	14.2	14.3	15.9	19.9	15.7	16.8	20.4	24.5	18.3	18.1	-	

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.TG22

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 2022 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 During 2022-23

Major development sites can be a significant source of dust and vehicle pollution. All new development is examined through the planning system and where necessary air quality and emissions mitigation assessments are required in order to offset the impacts of new or changed sources of pollution on future residents.

In addition, diffusion tube monitoring within the AQMA and surrounding areas can 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.

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

Most industrial and commercial development occurs on Manor Royal Business District, which is located adjacent to Crawley's AQMA. The main route into and out of Manor Royal is via A23 Gatwick Road to the Hazelwick Roundabout, a busy junction within the AQMA with residential properties.

Commercial development currently under construction:

- Land at Jersey Farm, Manor Royal Business District: 1 Storage and Distribution Warehouse Units (Class B8) –construction started 2023
- Former Alpha-LSG, Faraday Road: 1 Storage and Distribution Warehouse Units (Class B8) –construction started
- Crompton Way, Manor Royal Business District: 3 Storage and Distribution Warehouse Units (Class B8) – due to start construction Q3 2023
- Former Car Supermarket site, Fleming Way, Manor Royal Business District: 2 Storage and Distribution Warehouse Units (Class B8) – due to start construction 2023

Commercial development coming forward 2023/24:

- Hydehurst Lane, Manor Royal Business District: 3 Storage and Distribution Warehouse Units (Class B8) – awaiting planning decision.
- Linac House, Fleming Way, Manor Royal Business District: 3 Storage and Distribution Warehouse Units (Class B8) and Office (Class B2) Units– awaiting planning permission pending legal agreement
- Tilgate Business Park, Brighton Road, - 2 Storage and Distribution Warehouse Units (B8) and Industrial Space(B2) – 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 completed – no application or planning permission.
- Three Bridges Station Improvement Work; Highways Alterations; Provision of Pedestrian/Cycle Access – Planning permission given
- Land at Former Thales Site, Gatwick Road, Manor Royal: MacDonalds Drive-Thru Restaurant and Starbucks Coffee Shop – awaiting planning permission pending legal agreement.

Residential Development

Key Housing Sites identified in the Local Plan Map may generate increased emissions during construction and operation from dust and increased traffic.

Over the last two reporting years the issue of water neutrality has emerged as an problem for residential development in the borough that must be addressed through the planning process to ensure its compliance with the Habitat Regulations. This is currently delaying the progress of most major residential development in Crawley.

Residential development currently under construction:

- Steers Lane Phase 1 (185 dwellings) – ongoing construction started
- Station Way (Former Moka Club) – 150 dwellings – Demolition started

Residential development coming forward 2023/24:

- Breezehurst Drive (85 dwellings) – Planning permission given but start delayed by water neutrality and legal agreement.
- Town Centre, The Boulevard: Phase 2 (182 dwellings) - planning permission given. Start delayed by water neutrality and looking for new commercial partner.

- Station Gateway (300 dwellings) including Overline House (85 dwellings) – Outline Planning Permission. Start delayed by water neutrality and legal agreement
- Longley House (120 dwellings) – awaiting planning permission - delayed due to water neutrality issues.
- Ambulance Station site, Ifield Avenue (44 dwellings) - awaiting planning permission - delayed due to water neutrality issues.
- Land East of Tinsley Lane (150 dwellings) – awaiting planning permission - delayed due to water neutrality issues.
- Steers Lane Phase 2 (60 dwellings) – awaiting planning permission - delayed due to water neutrality issues.
- Telford Place (Former Car Park) (300 dwellings) and 2 Commercial Units: awaiting planning permission
- Goffs Park Road, Retirement/ Care Facility (116 dwellings): awaiting planning permission

Major Planned Development with EIAs

These schemes require more detailed assessment and conditions due to size and impact on the local area.

Gatwick Northern Runway Expansion DCO

- The Gatwick Northern Runway Project proposes alterations to the existing northern runway to provide dual runway operations and increased capacity. 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 air quality assessment predicts increased emissions but 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 currently considering how the additional emissions created by the scheme will impact the local area and what mitigation measures may be required to offset them.

Forgewood - New 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 2025/26.

Community Centre completed Q1 2023, construction Phase 1B (neighbourhood centre and residential) ongoing including neighbourhood shops/parade due to start 2023 and residential units above shops. Phase 4B (450 residential units) awaiting planning permission.

Crawley Growth Programme – Infrastructure Project:

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

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 to include up to 10,000 homes, community infrastructure, commercial units and the creation of a new road including a bridge across the River Mole. The Scoping consultation has been completed but planning on hold for number of issues including water neutrality.

Additional Air Quality Works Undertaken by Crawley Borough Council During 2022-23

Work on updating the Air Quality Action Plan to reflect the extended area includes baseline studies, traffic count surveys, modelled concentrations and source apportionment work to inform and support measures to take forward into our updated AQAP.

QA/QC of Diffusion Tube Monitoring

Crawley Borough Council's NO₂ diffusion tube preparation and analysis are carried out by Gradko Environmental (part of Gradko International Ltd).

Gradko's laboratory is UKAS accredited to ISO:17025(2017) and follows the quality assurance/quality control procedures detailed in 'Diffusion Tubes for Ambient NO₂ Monitoring: Practical Guidance for Laboratories and Users' (Issue 1a, Feb 2008 - AEA Energy and Environment).

The laboratory's performance has also been assessed as satisfactory in the centralised AIR NO₂ PT scheme for quality assurance and quality control.

Gradko 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.

Gradko Quality Control Procedures: Quality Control Procedures are supplemented by use of external proficiency schemes 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),

Tube Preparation: The council uses tubes prepared using 20% Triethanolamine / 80% De-ionised Water (20% TEA in water). Tube preparation follows procedures set out in the Defra 2008 Practical Guidance for Laboratories.

Tube Analysis: Analysis of the NO₂ diffusion tubes is carried out using colorimetric techniques in accordance with Gradko's UKAS accredited (ISO/IEC 17025) internal laboratory procedures. These procedures follow the Defra 2008 Practical Guidance for Laboratories.

The council generally follows the diffusion tube monitoring calendar provided by the LAQM Helpdesk for tube exposure period. This provides an exposure time of 4 or 5 weeks, with an allowed variation in exposure time of ± 2 days.

Tubes received from Gradko are stored in a fridge before they are exposed, and location sites and fixings follow the recommendations in LAQM.TG (22). Three tubes are co-located with the continuous analyser at the Gatwick East site (CA2).

Diffusion tube monitoring data is ratified following the methods described in LAQM.TG (22) to ensure reporting spreadsheet inputs are accurate and any suspect analysed data is removed. An audit of the Council monitoring practices and procedures carried out by external auditors in 2022 found the council to have a sound system of governance, risk management and control in place.

Diffusion Tube Annualisation

With the exception of one site (CR99), all diffusion tube monitoring locations within Crawley’s monitoring network recorded data capture of >75% therefore annualization of monitoring data it was not required for these sites.

Data capture from the diffusion tube at background site CR99 (Furnace Farm Road) was below 75% (50%). This data has been annualised using the LAQM Diffusion Tube Data Processing Tool. Annualisation factors were gained using data from nearby automatic sites Horely Southeast (RG6) and Poles Lane (RG3). A summary of the calculation data is shown in Table C.1 below.

Table C.1 – Annualisation Summary (concentrations presented in µg/m³)

Site ID	Annualisation Factor - Site 1 RG3 Poles Lane	Annualisation Factor - Site 2 RG6 Horley	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
CR99	0.8780	0.9085	0.8933	14.9	13.3

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.TG22 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 for 2022 monitoring data is 0.84 which has been obtained from the spreadsheet version 06/23, for Gradko diffusion tubes (20% TEA in water) using 33 studies.

Diffusion Tube Bias Adjustment Factors 06/23 Issue of the Spreadsheet							
Laboratory	Method	Year	Previous Number of Studies	New (06/23) Update			
				No. Studies Added	Total No. of Studies	Factor	Change in Factor
Aberdeen Scientific Services	20% TEA in water	2022	7	0	7	0.75	-0.01
Edinburgh Scientific Services	50% TEA in acetone	2022	1	0	1	0.81	0.00
Glasgow Scientific Services	20% TEA in water	2022	6	0	6	1.05	0.00
Gradko	20% TEA in water	2022	27	6	33	0.84	0.01
Gradko	50% TEA in acetone	2022	14	1	15	0.82	0.00
Lambeth Scientific Services	50% TEA in acetone	2022	3	7	10	0.86	-0.09
Milton Keynes Council	20% TEA in water	2022	1	0	1	0.78	0.00
SOCOTEC Didcot	20% TEA in water	2022	5	6	11	0.76	0.00
SOCOTEC Didcot	50% TEA in acetone	2022	26	1	27	0.76	0.00
SOCOTEC Glasgow	20% TEA in water	2022	1	0	1	0.74	0.00
SOCOTEC Glasgow	50% TEA in acetone	2022	1	0	1	0.76	0.00
Somerset County Council	20% TEA in water	2022	6	8	14	0.85	0.03
Staffordshire Scientific Services	20% TEA in water	2022	12	1	13	0.86	-0.01
Tayside Scientific Services	20% TEA in water	2022	1	0	1	0.75	0.00
Number of Studies Included			111	30	141		

The large change in factor for Lambeth Scientific Services is due to the removal of the Surrey Heath result (Factor=1.32) as it was considered to be an outlier and the monitoring site has too much vegetation around the inlet.

Glasgow Scientific Services factor should be treated with caution as there is not a good linear relationship between the diffusion tube concentrations and the automatic analyser concentrations. The diffusion tubes under read the automatic analyser at concentrations below 21 µg/m³ and over read the automatic analyser at concentrations greater than 27 µg/m³. There is also a large spread in bias factors (0.78 - 1.33).

6 studies were updated due to ratified data becoming available since the March 2023 release.

2 studies were submitted for 2022 data that could not be included due to less than 9 valid data periods or poor data quality.

The National Diffusion Tube Bias Adjustment Factor Spreadsheet will be next updated at the end of September 2023

Crawley Borough Council has applied a local bias adjustment factor of 0.99 to the 2022 monitoring data. A summary of bias adjustment factors used by Crawley Borough Council over the past five years is presented in Table C.2.

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	Local	-	0.99
2021	Local	-	0.96
2020	Local	-	0.98
2019	Local	-	1.02
2018	Local	-	1.00

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). The monitoring data used in the co-location study is shown below and the calculation of the local bias adjustment factor is presented in Table C.3

AEA Energy & Environment
From the AEA group

Checking Precision and Accuracy of Triplicate Tubes

Diffusion Tubes Measurements									
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm ⁻³	Tube 2 µgm ⁻³	Tube 3 µgm ⁻³	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	05/01/2022	02/02/2022	27.9	24.5	27.1	26	1.8	7	4.5
2	02/02/2022	02/03/2022	17.3	16.1	18.0	17	1.0	6	2.4
3	02/03/2022	30/03/2022	23.5	20.8	24.0	23	1.7	8	4.3
4	30/03/2022	04/05/2022	20.0	19.4	19.7	20	0.3	2	0.8
5	04/05/2022	08/06/2022	18.7	18.7	18.3	19	0.2	1	0.5
6	08/06/2022	06/07/2022	17.0	16.4	16.7	17	0.3	2	0.8
7	06/07/2022	03/08/2022	16.6	17.3	18.4	18	0.9	5	2.3
8	03/08/2022	31/08/2022	22.1	21.2	15.0	19	3.9	20	9.6
9	31/08/2022	28/09/2022	22.2	21.8	22.7	22	0.4	2	1.1
10	28/09/2022	02/11/2022	18.2	16.3	18.6	18	1.2	7	3.0
11	02/11/2022	30/11/2022	22.7	23.2	22.1	23	0.6	2	1.4
12	30/11/2022	04/01/2023	29.2	29.0	29.9	29	0.5	2	1.2
13									

Period	Mean	DC	Precision	Automatic
1	18.4	11	Good	or Data Capture
2	15.3	94	Good	Good
3	25.8	97	Good	Good
4	22.5	64	Good	or Data Capture
5	22	53	Good	or Data Capture
6	14	99	Good	Good
7	18	100	Good	Good
8	20	100	Poor Precision	Good
9	22	97	Good	Good
10	19	100	Good	Good
11	20.2	100	Good	Good
12	29	97	Good	Good
13				

Overall survey -->

Precision 11 out of 12 periods have a CV smaller than 20%	(Check average CV & DC from Accuracy calculations)
Good precision	Poor Overall

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

Site Name/ ID:

Accuracy (with 95% confidence interval)	
without periods with CV larger than 20%	
Bias calculated using 8 periods of data	
Bias factor A	0.98 (0.91 - 1.07)
Bias B	2% (-6% - 10%)
Diffusion Tubes Mean:	21 µgm ⁻³
Mean CV (Precision):	4
Automatic Mean:	20 µgm ⁻³
Data Capture for periods used:	98%
Adjusted Tubes Mean:	20 (19 - 22) µgm ⁻³

Accuracy (with 95% confidence interval)	
WITH ALL DATA	
Bias calculated using 9 periods of data	
Bias factor A	0.99 (0.92 - 1.07)
Bias B	1% (-6% - 8%)
Diffusion Tubes Mean:	21 µgm ⁻³
Mean CV (Precision):	6
Automatic Mean:	20 µgm ⁻³
Data Capture for periods used:	98%
Adjusted Tubes Mean:	20 (19 - 22) µgm ⁻³

Jaume Targa, for AEA
Version 04 - February 2011

If you have any enquiries about this spreadsheet please contact the LAQM Helpdesk at: LAQMHelpdesk@uk.bureauveritas.com

Table C.3 – Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1
Periods used to calculate bias	9
Bias Factor A	0.99(0.9 – 1.12)
Bias Factor B	1% (-11% - 12%)
Diffusion Tube Mean (µg/m ³)	20.6
Mean CV (Precision)	5.9%
Automatic Mean (µg/m ³)	20.5
Data Capture	98%
Adjusted Tube Mean (µg/m ³)	20 (19 – 23)

Notes:

A single local bias adjustment factor has been used to bias adjust the 2022 diffusion tube results.

Choice of Factor for Bias Adjustment:

The locally derived bias adjustment figure of 0.99, 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 2023 was 0.84. 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 slightly 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 with the guidance in LAQM-TG22:

Box 7.13 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 63m 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 7.227 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.

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 good, the more cautious approach would be to use the local factor.

There was poor data capture for the continuous monitor on 3 out of 12 months in 2023. However, advice from laqm helpdesk (ref 8618 26/04/23) was that: *“...the data capture for the periods used in the calculation is 98%. As such, it would still be appropriate to use the local bias adjustment factor”*. Consequently, all conclusions and recommendations made in this report were based on monitoring results adjusted with the 2022 bias adjustment figure of 0.99.

NO₂ Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at the nearest location relevant for exposure has been 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 six diffusion tube sites in 2022 (CR55, CR63, CR93, CR101, CR105, CR106). 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.

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	36.6	16.80	35.5	
CR63	7.4	37.4	45.1	22.00	22.0	<i>Receptor > 20m from kerb than monitor. Treat result with caution</i>
CR93	1.8	3.3	41.8	22.00	39.1	<i>Conc at receptor within 10% of AQS.</i>
CR101	1.1	10.0	42.0	12.11	28.5	
CR105	2.7	12.8	37.6	14.33	28.5	
CR106	3.9	9.9	36.8	12.30	30.5	

QA/QC of Automatic Monitoring

Crawley's monitoring site (CA2), located 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.

Data collection for Crawley's monitoring station is undertaken by the Bureau Veritas through a contract with Sussex Air Partnership. The monitoring data from this site is available online at [sussex-air](#). Current and historic data is accessible to the public and commercial users by searching the sites on the interactive site locations map. The website also provides an API (application programming interface) 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](#).

Bureau Veritas also carry out the verification and ratification of the data for the whole of the Sussex monitoring network which is reported on the [Sussex-air](#) website.

Site calibration checks are undertaken every 4 weeks by the Local Site Operator (LSO), Enviro-Technology services Ltd. The analysers are also maintained and serviced every 6 months under contract with Enviro-Tech who provide our equipment support unit services (ESU).

PM₁₀ and PM_{2.5} Monitoring Adjustment

The Particulate monitor used by Crawley Borough Council's CA2 automatic monitoring site is a Palas Fidas 200 which measures both PM₁₀ and PM_{2.5}.

7.174 of LAQM.TG(22) advises that although the Fidas PM₁₀ data can be used without the need for correction, however, the PM_{2.5} should be corrected for slope by applying a factor of 1.06. The 2022 PM_{2.5} daw data (8.4ug/m³) has therefore been corrected by this factor to achieve equivalence to the reference method (7.92ug/m³).

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.

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

Figure D.1 – Map of Crawley AQMA Boundary

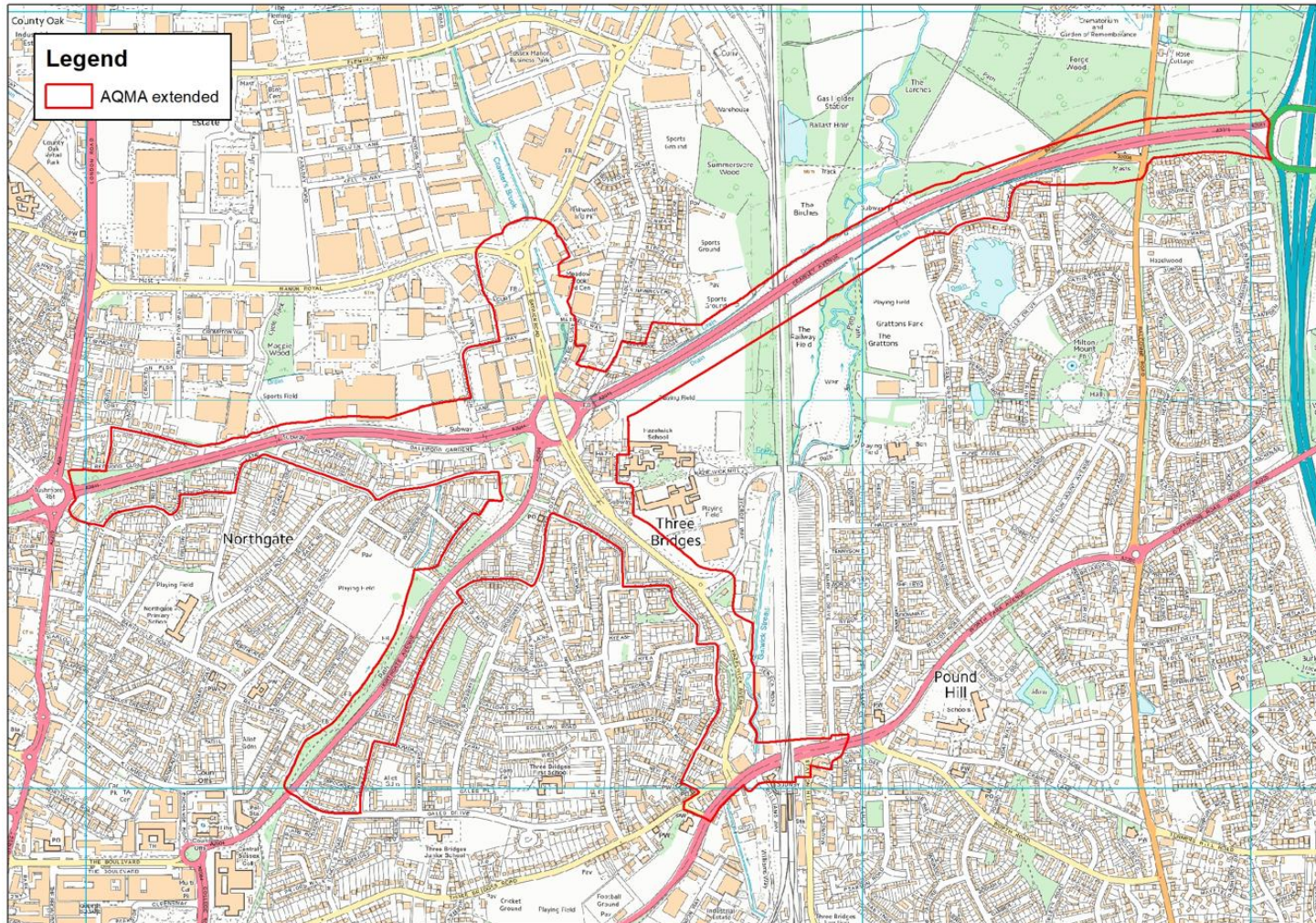


Figure D.2 – Map of Non-Automatic Monitoring Sites in Crawley in relation to AQMA

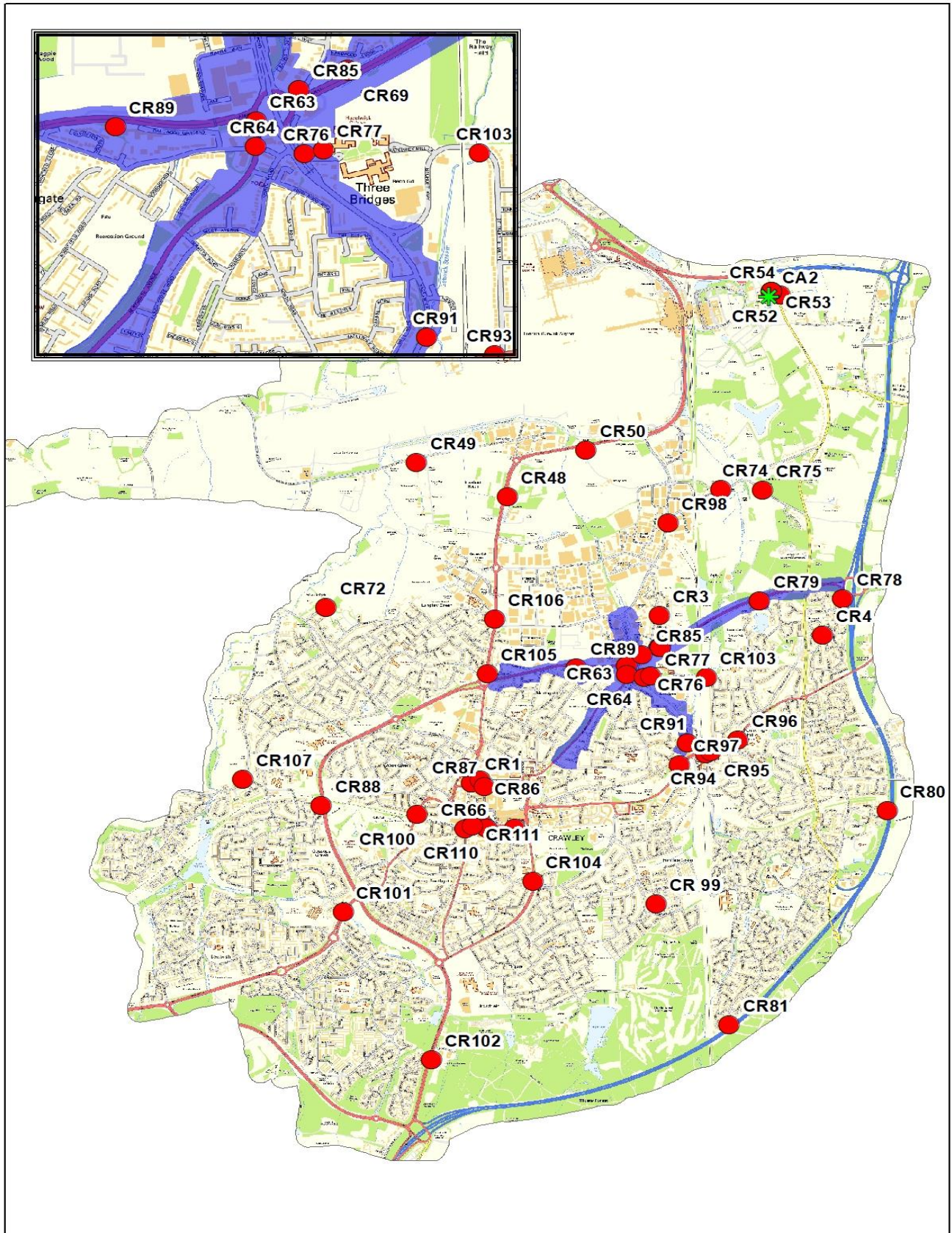


Figure D.3 Map of Diffusion Tube Sites: CR3, 55, 62, 63, 64, 69, 76, 77, 85, 89 and 103



Figure D.4 Map of Diffusion Tube Site: CR49



Figure D.5 Map of Diffusion Tube Sites: CR91, 93, 94, 95, 96 and 97

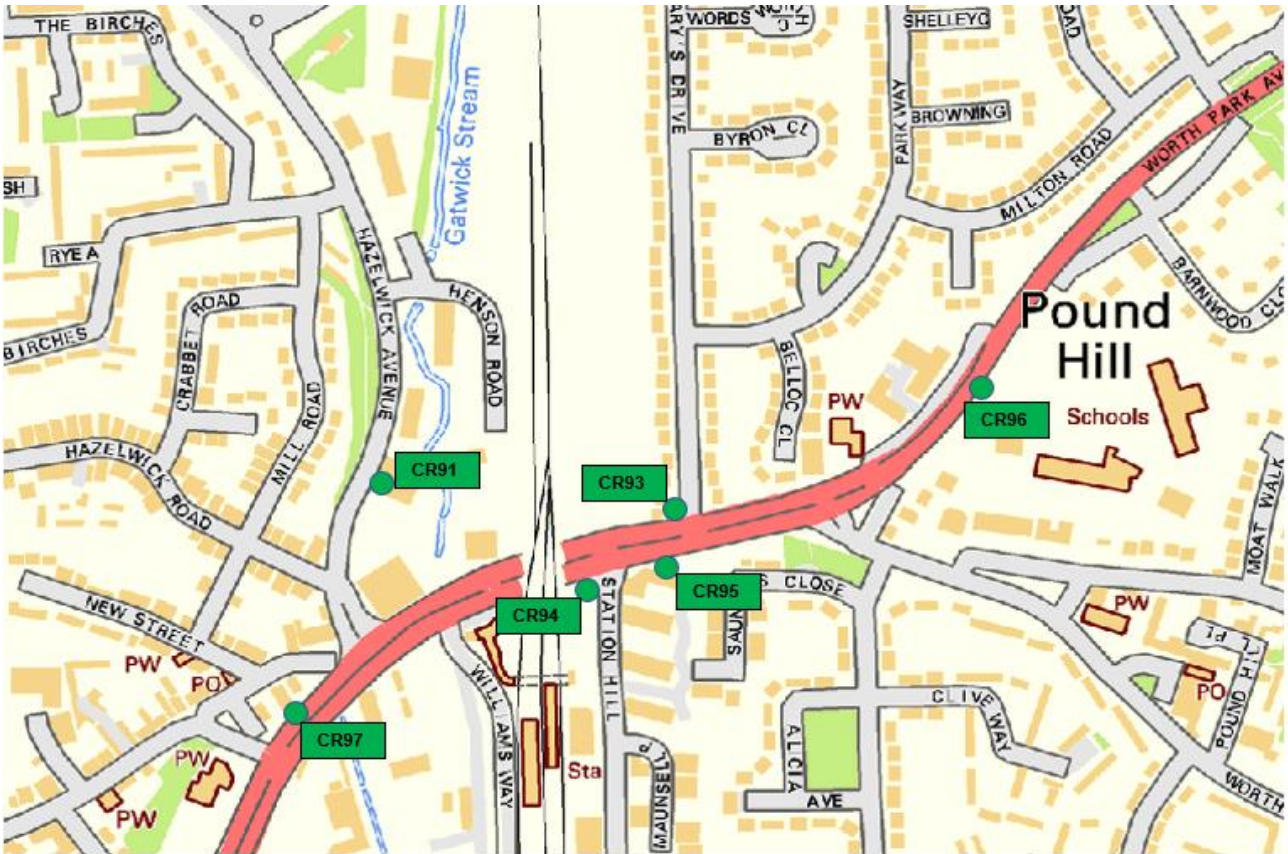


Figure D.6 Map of Diffusion Tube Sites: CR88 and CR107



Figure D.7 Map of Diffusion Tube Sites: CR1, 60, 66, 86, 87, 100, 108, 109, 110, 111

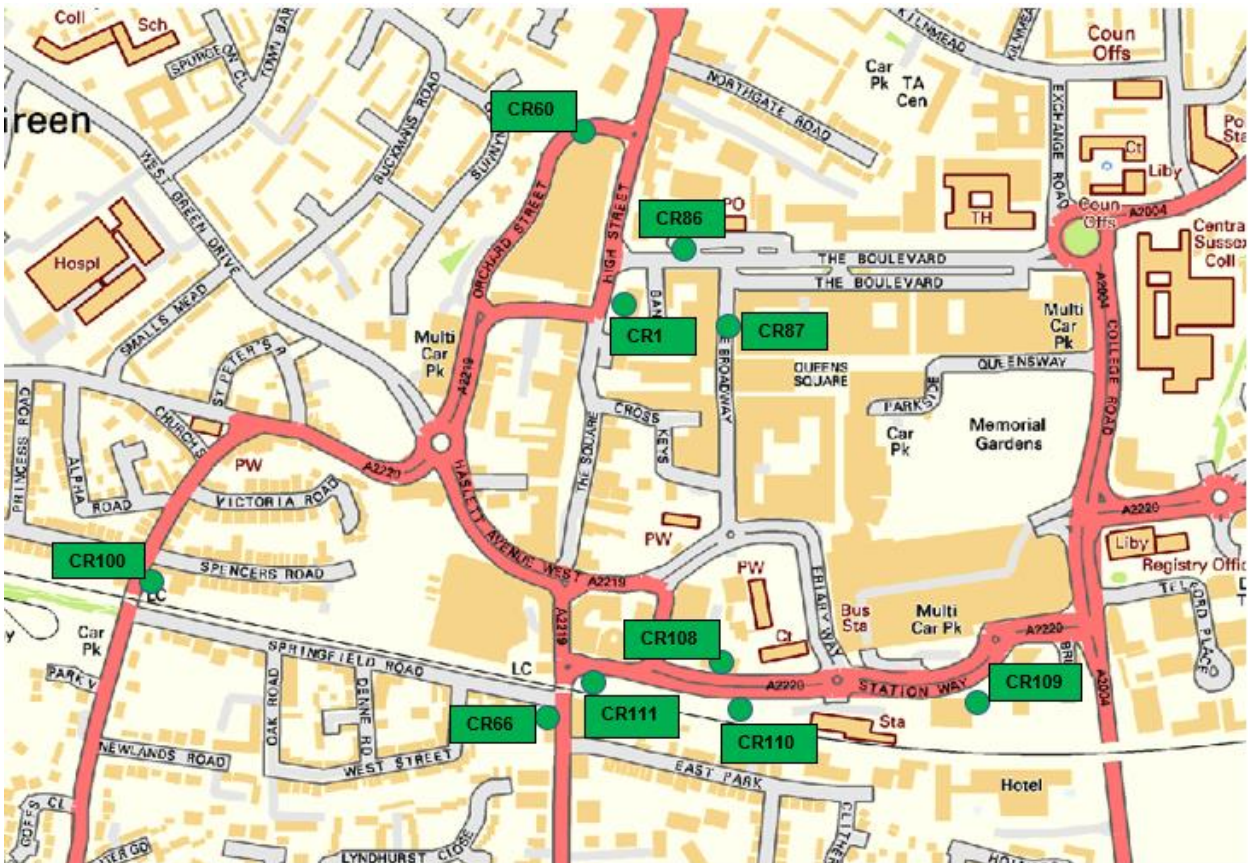


Figure D.8 Map of Diffusion Tube Site: CR104

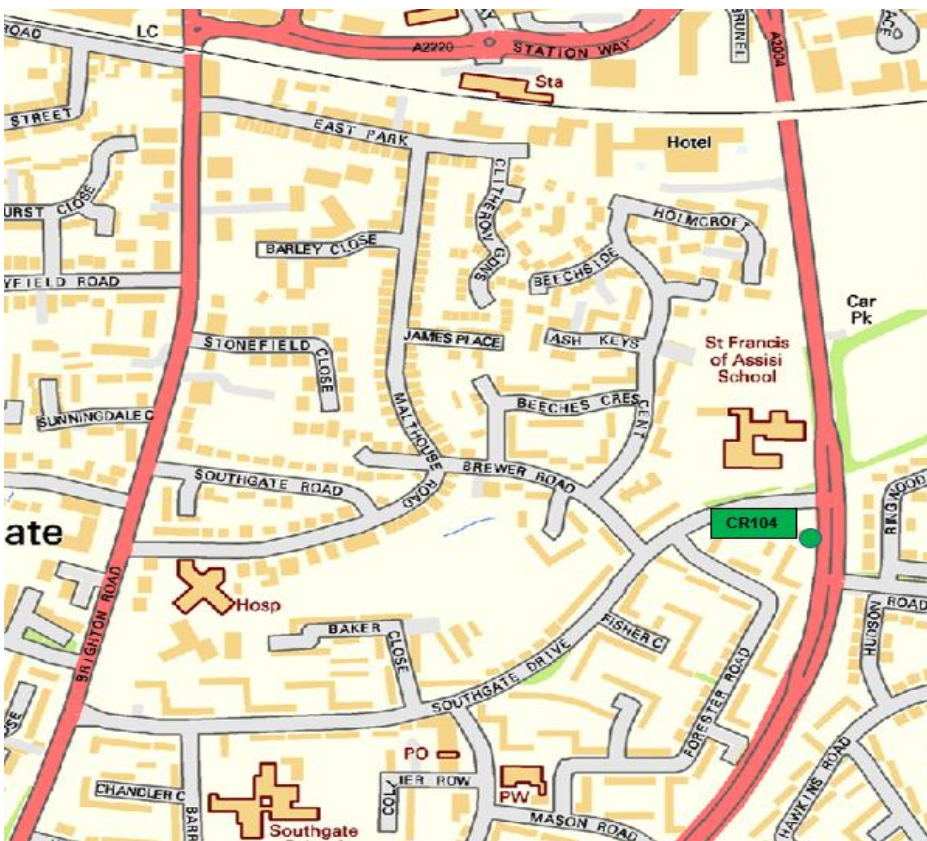


Figure D.9 Map of Diffusion Tube Sites: CR4, 78, 79



Figure D.10 Map of Diffusion Tube Sites: CR74 and CR75

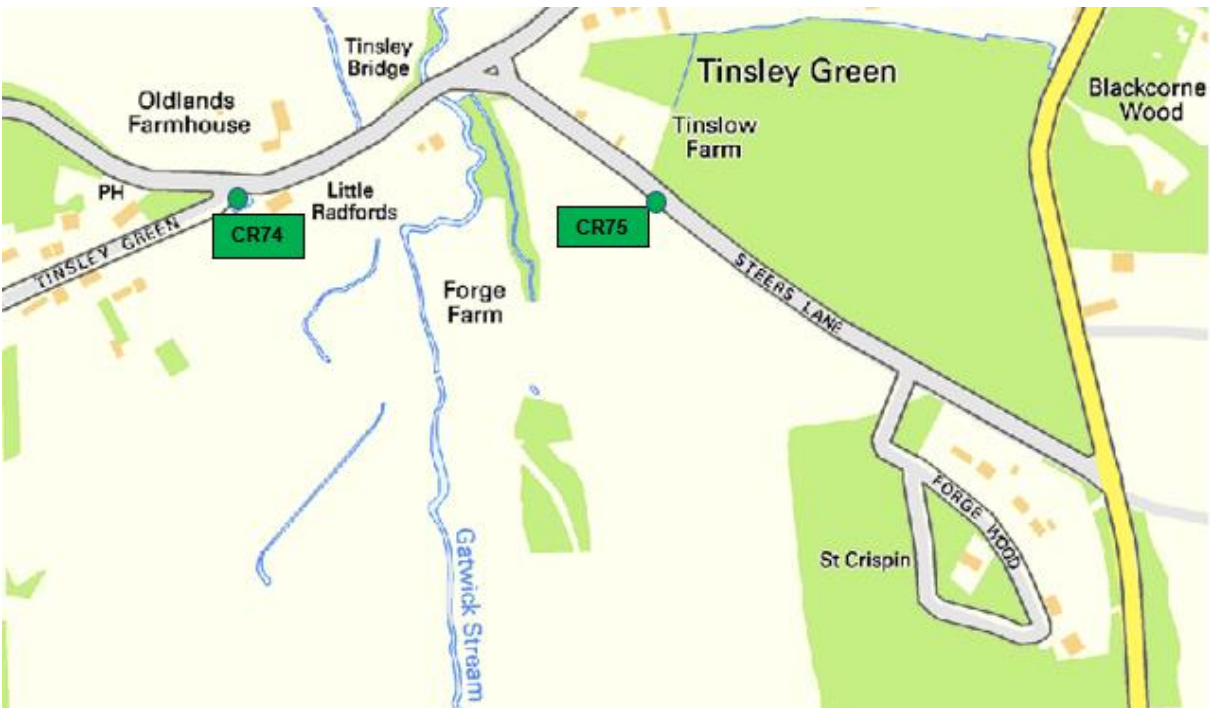


Figure D.11 Map of Diffusion Tube Sites: CR48, CR50 and CR98



Figure D.12 Map of Diffusion Tube Site: CR72

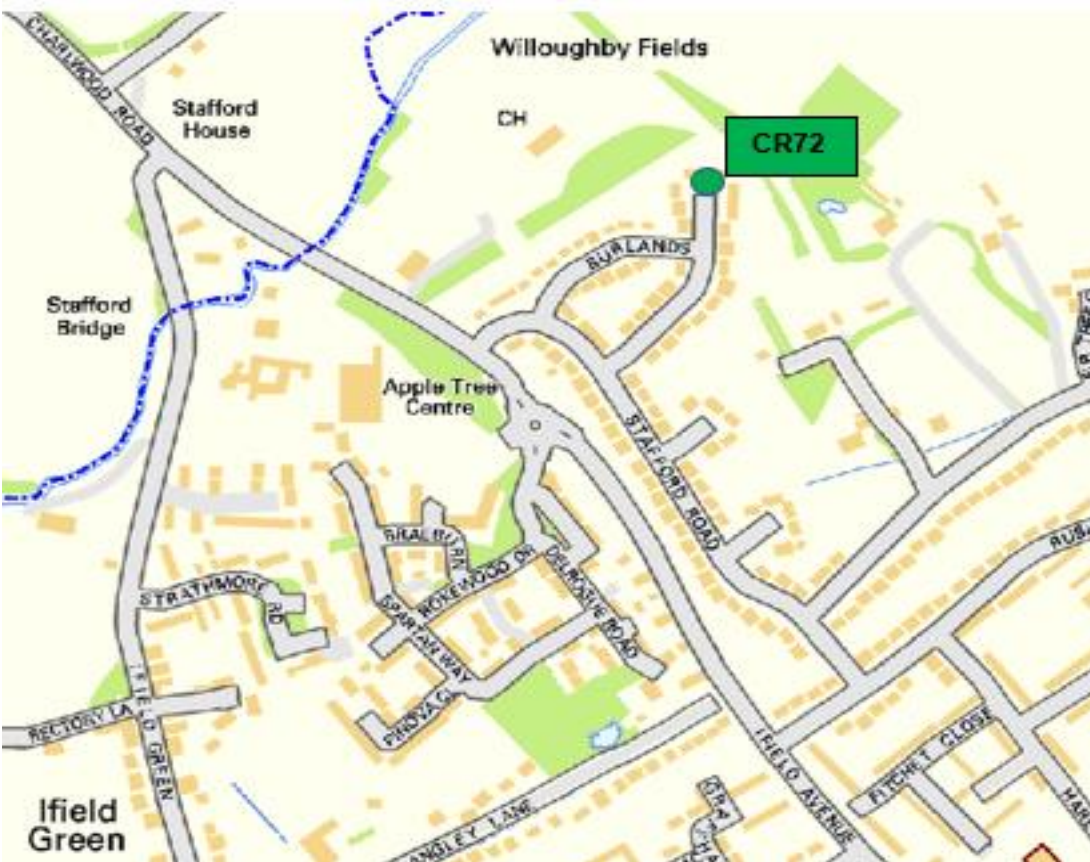


Figure D.13

Map of Diffusion Tube Sites: CR105 and CR106

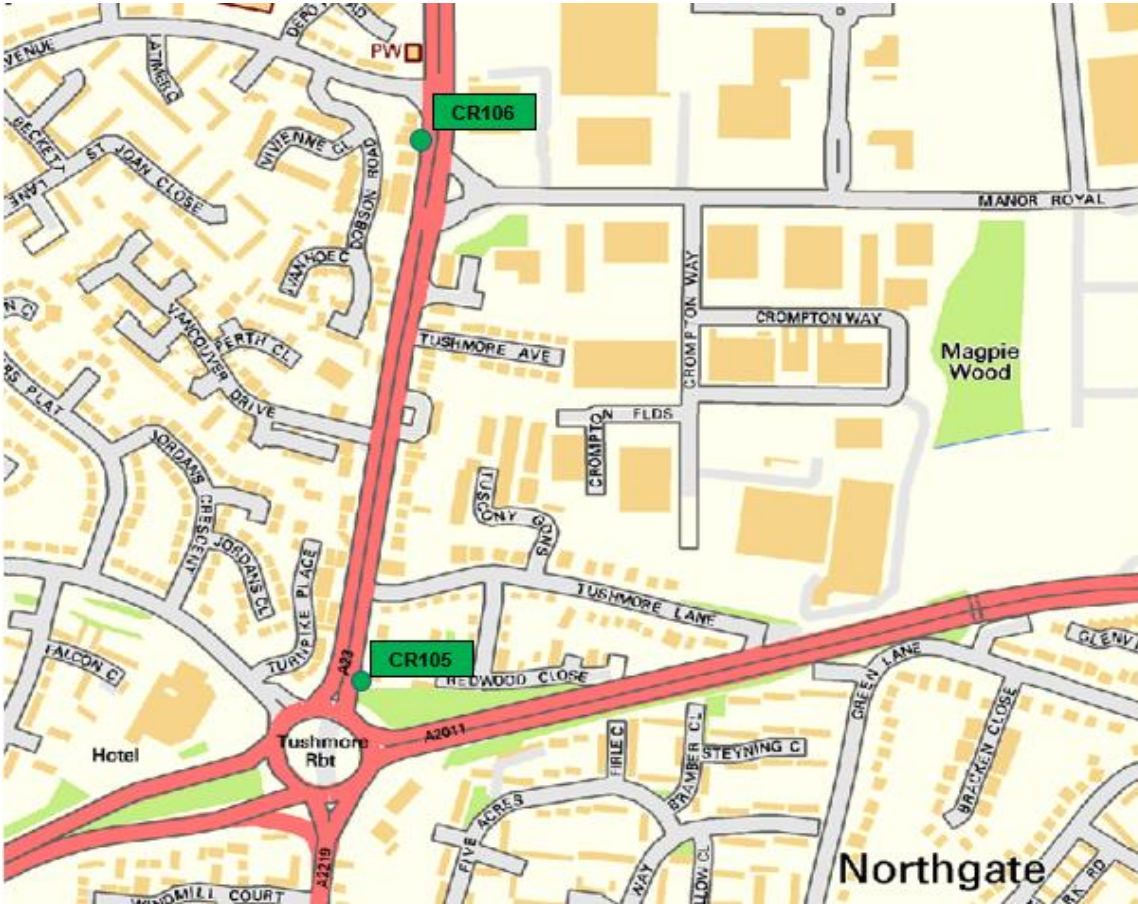


Figure D.14 Map of Diffusion Tube Site: CR99



Figure D.15 Map of Diffusion Tube Site: CR101

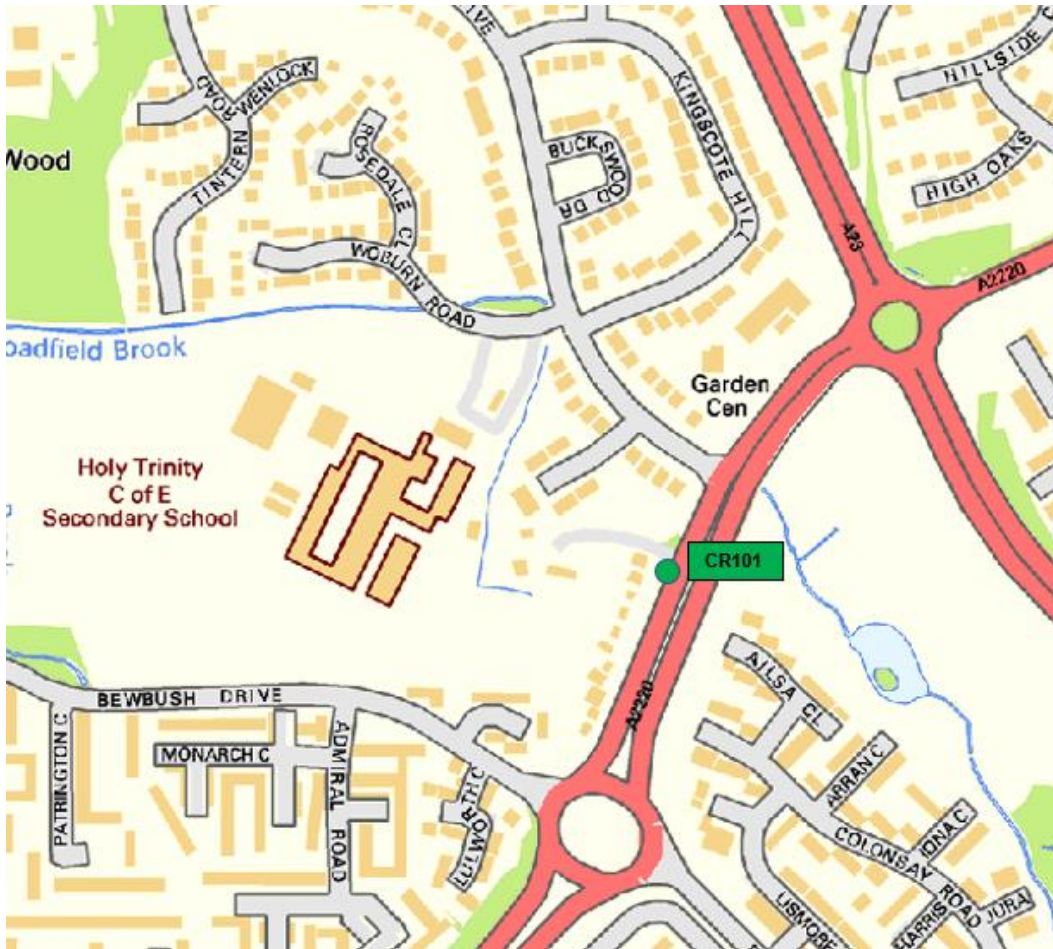


Figure D.16 Map of Diffusion Tube Site: CR102



Figure D.17 Map of Diffusion Tube Site: CR80



Figure D.18 Map of Diffusion Tube Site: CR81

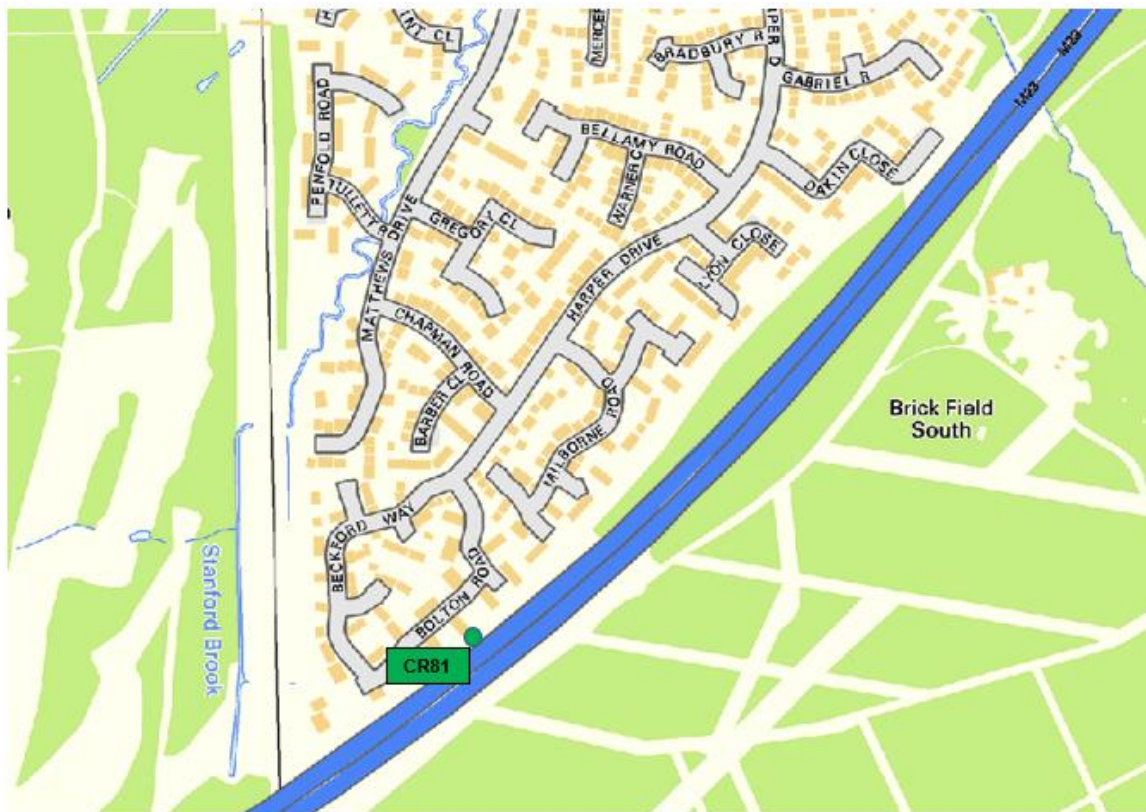


Figure D.19 Map of Diffusion Tube Site: CR112

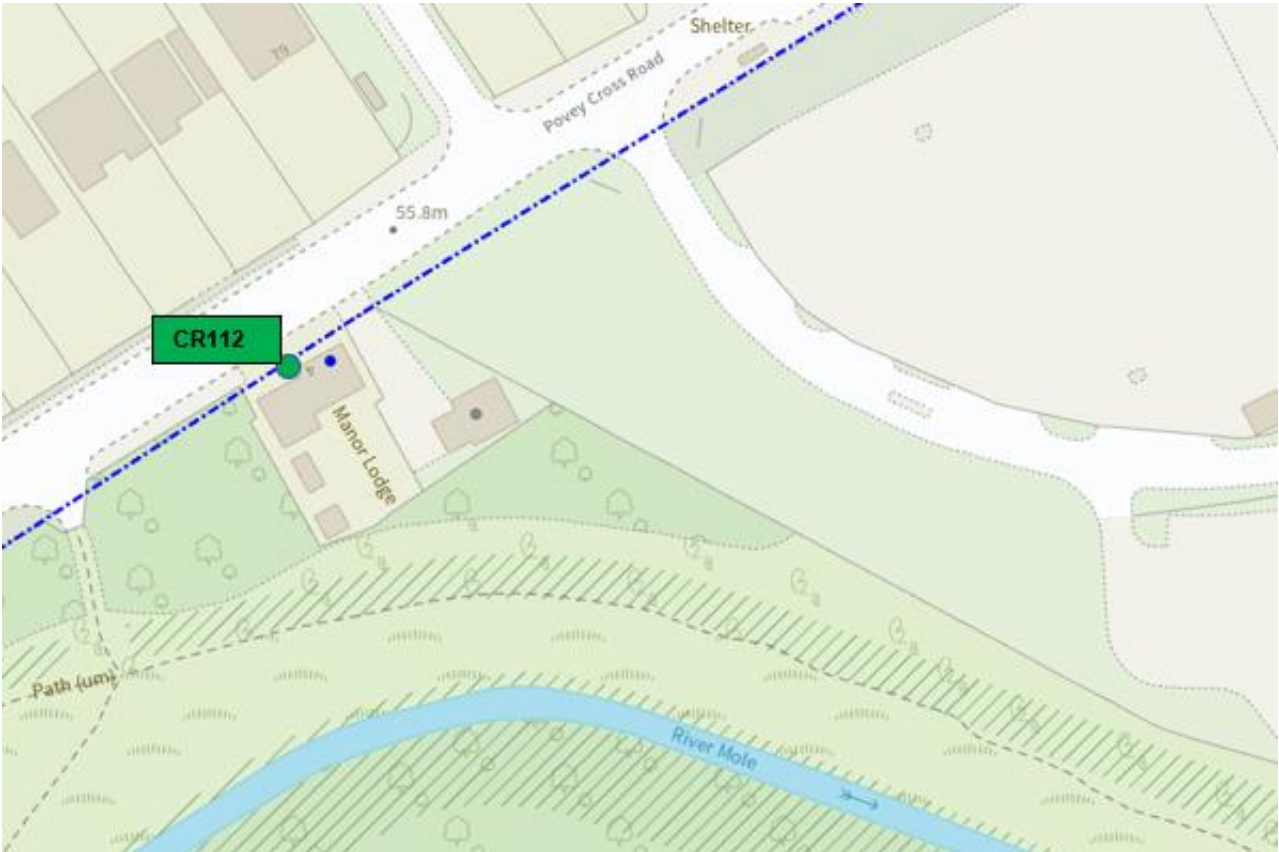


Figure D.20 Map of Diffusion Tubes Sites: CR51,52, 53, 54

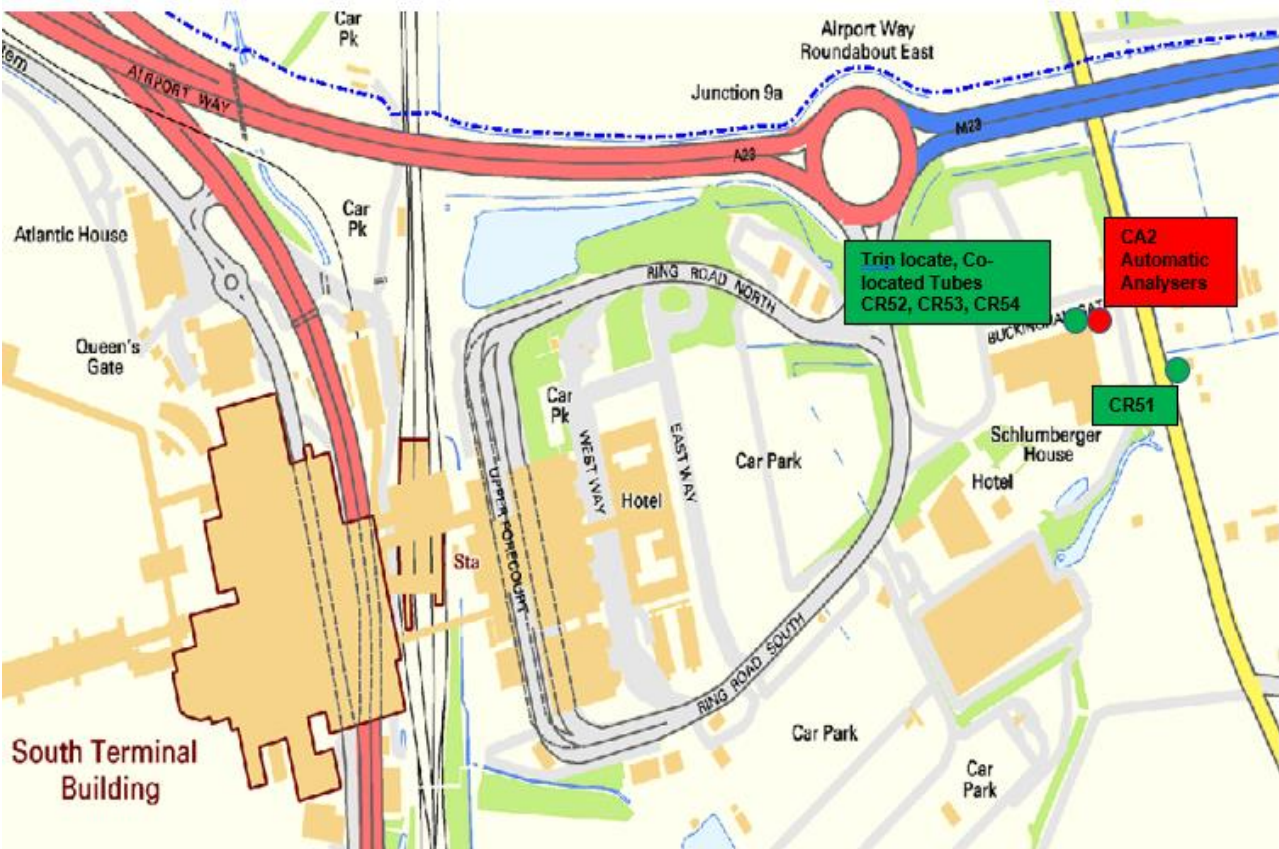
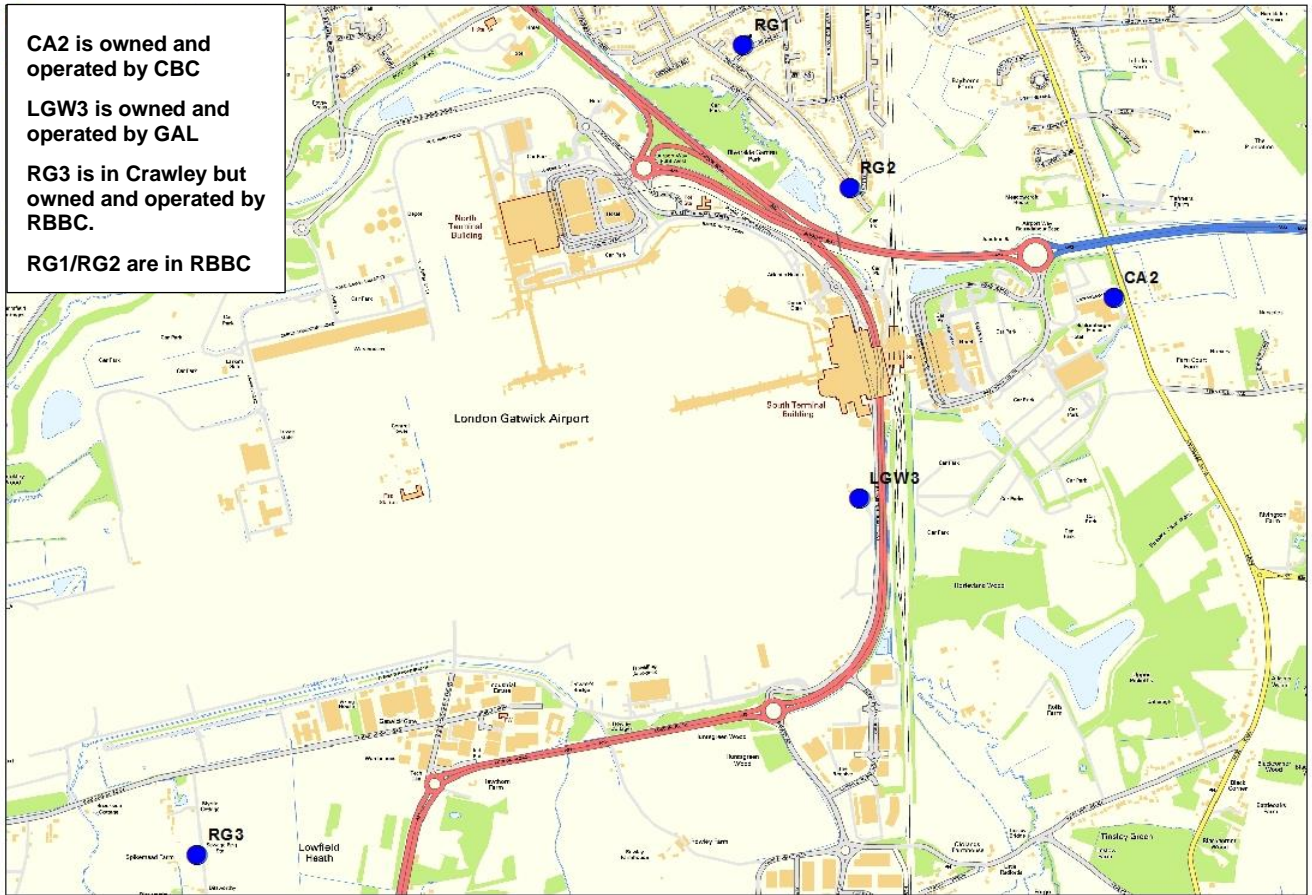


Figure D.21 – Map of Automatic Monitoring Sites in Crawley



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).

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
FIDAS	Fine Dust Aerosol Spectrometer
GAL	Gatwick Airport Ltd
LAQM	Local Air Quality Management
LEP	Local Enterprise Partnership
LEZ	Low Emission Zone

LPTS	Local Plan Transport Strategy
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
SAQP	Sussex Air Quality Partnership
WHO	World Health Organisation
WSCC	West Sussex County Council
ZEC	Zero Emission Capable

References

- Local Air Quality Management Technical Guidance LAQM.TG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- 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
- [Public Health Outcomes Framework](#)