2021 Air Quality Annual Status Report (ASR)

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

Date: 30 June 2021

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Executive Summary: Air Quality in Our Area

Sandwell Metropolitan Borough Council (SMBC) lies in the heart of the West Midlands, in an area of the UK known as "The Black Country". It is one of six local authorities which share full membership of the West Midlands Combined Authority (WMCA) including; Birmingham, Coventry, Dudley, Solihull, Walsall and Wolverhampton. It is a densely populated area covering approximately 8,600 hectares and approximately 327,378 [1] residents.

This report fulfils the requirements of the Local Air Quality Management (LAQM) process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 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 the national air quality objectives are likely to be achieved. Where exceedances are demonstrated or considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

This report presents details on changes in air quality during 2020 including the impact of the COVID-19 pandemic and describes the measures that Sandwell is taking to improve air quality now and in the future.

Air Quality in Sandwell

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

[1] https://www.sandwelltrends.info/population-change-interactive-chart/

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[2,3].

The mortality burden of air pollution within the UK is equivalent to 28,000 to 36,000 deaths at typical ages[4], with a total estimated healthcare cost to the NHS and social care of £157 million in 2017[5].

Sandwell was designated as an Air Quality Management Area (AQMA) in 2005 due to historic poor air quality, due to industrial emissions. Over the past 10 years, the levels of nitrogen dioxide have been decreasing across the Borough. However, levels of nitrogen dioxide still remain high in some areas, and particulate matter levels are estimated at being above World Health Organisation (WHO) limits in some parts of the borough. High traffic volumes, congestion and houses situated close to busy roads means nitrogen dioxide concentrations still play an important role in our decision-making with regards addressing air pollution. However, reducing levels of particulate matter (PM) has now become a priority as further research continues to demonstrate significant association to an increasing array of negative health impacts. We know that traffic is an important contributor of PM, but domestic burning of wood and coal are the greatest sources of man-made PM in urban areas such as Sandwell. We plan to do more to establish public awareness of both the sources of PM in our local area as well as explaining their health impacts. We want to provide clear and simple messages to explain the actions needed to reduce manmade particulate matter being released into the local environment.

For the first time since the AQMA was declared in 2005, Sandwell did not record any exceedances in any of the national objective levels for NO_2, PM_{10} or $PM_{2.5}$. However, it is predicted these results will become outliers and should not be relied on in predicting long-term trends, particularly in relation to levels of NO_2. The spring national lockdown in response to the Coronavirus (COVID-19) pandemic resulted in an unprecedented reduction in vehicle traffic, there were also favourable meteorological conditions during this period as well as other short-term behavioural changes made which all contributed to

[2] Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

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

[4] Defra. Air quality appraisal: damage cost guidance, July 2020

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

these unprecedented reductions. Therefore, although interesting, any significant reductions recorded in 2020 should be treated with caution as they are unlikely to be maintained or continued at the same pace in the future.

Declaration of Air Quality Management Area

A borough wide Air Quality Management Area was declared in Sandwell in 2005, as a consequence of exceedances of Nitrogen Dioxide (NO_2) and these raised levels of NO_2 pollution continue to persist in several areas of the borough. The borough's character is one of established industry accompanied by a substantial road network of local and major arterial roads, including the M5 and M6 Motorways, which are amongst some of the busiest and most congested roads in Europe.

Air Pollution Team

Sandwell Council's Air Pollution Team monitor and regulate air quality across the borough. Domestic and commercial activities are regulated using a variety of tools including the enforcement of Smoke Control Areas, investigating statutory nuisance complaints and permitting a range of industrial processes/activities under the Environmental Permitting Regulations. The team also consult on planning applications to prevent and mitigate adverse impacts on air quality from development.

Sandwell Council continues to maintain close working relationships with its partner organisations including the other West Midlands Authorities under the leadership of the Low Emissions Towns & Cites Programme, the West Midlands Combined Authority and the public transport delivery group, Transport for West Midlands.

Sandwell Key Priority Zones

Sandwell successfully maintained its air pollution monitoring network during 2020, including undertaking 12 months of continuous automatic air pollution monitoring at five locations. Nitrogen dioxide diffusion tubes were deployed in 123 locations. Twenty-two locations have triplicate tubes deployed in accordance with the Defra colocation data requirements. In total 163 individual diffusion tubes were being deployed each month to monitor Sandwell's annual mean NO_2.

In 2018 Sandwell Council had seven remaining priority zones as well as two Hotspots' Mallin Street, Smethwick and Gorsty Hill, Rowley Regis. These zones and hotspots have been

included within Sandwell's Air Quality Action Plan covering the period 2020-2025. In 2019, two zones and one hotspot were found to be compliant with NO_2 objectives and in 2020 all were found to comply as is shown in **Table 1.1** below.

Table 1.1 Sandwell NO_2 Key Priority Zones for 2020 to 2025 and Historical Non-Compliance with NO_2 National Objectives

Zone	Historic Area No.	Description of Area	NO_2 Compliant		
			2018	2019	2020
1	13	High Street / Powke Lane, Blackheath	X	X	✓
2	11	Bearwood Road, Smethwick	X	X	✓
3	1	M5 Corridor - Blakeley Hall Road, Oldbury to Birmingham Road (A41), West Bromwich	X	X	✓
4	10	Newton Road / Birmingham Road (A34), Great Barr	X	X	✓
5	14	Bromford Lane (including the Kelvin Way / Brandon Way Junction), West Bromwich	X	✓	✓
6	16	All Saints Way / Expressway, West Bromwich	X	✓	✓
7	15	West Bromwich, Trinity Way / Kenrick Way	X	X	✓
Hotspot 1		Mallin Street, Smethwick	X	X	✓
Hotspot 2		Gorsty Hill, Blackheath	X	✓	✓

Maps showing the priority zones listed **Table 1.1** above can be found in **Appendix D.**

We were encouraged in 2019 to note that the NO_2 national objective had not been exceeded in Zones 5 & 6 or at Hotspot 2, although exceedances continued to persist in five of the original historical areas and Mallin Street (Hotspot 1). The results in 2020 demonstrate **compliance in all zones and hotspots** which is welcomed but given the significant reduction in vehicle traffic during the national 'lockdown' in the spring of 2020 this is not considered to be an accurate gauge in assessing Sandwell's long-term progress in achieving lasting NO_2 reductions at these locations.

In 2019 steady progress was achieved when 17 locations finally demonstrated compliance with the national objective. 16 of these had exceeded the annual mean NO_2 objective since 2005 and one hotspot since 2018, these sites are listed in **Table 1.2**. below.

Table 1.2	
Area	**Areas compliant with the NO2 Objective in 2019**
2	Area to North of the M6 – Yew Tree Estate (Inc. Woodruff Way, Snapdragon Drive and Pimpernel Drive
3	Area to North of M6 Junction 8 – Wilderness Lane and Birmingham Road
4	Area to South of M6 Junction 8 (Inc. Longleat Cl, Ragley Drive and Himley Close
5	Area to Southeast of M6 Junction 7 (Inc. Scott Rd and Birmingham Rd) - Great
6	Area to Southwest of M6 Junction 7 (Birmingham Road and Hillside Road) –
7	Oldbury Ringway / Birmingham Road (A457), Oldbury
8	Dudley Road East / Roway Lane (A457), Oldbury
9	Area surrounding the M6/M5, Junctions 7- 8 Great Barr and 1-2 West Bromwich
12	Oldbury Road / Birmingham Road, Blackheath
14	Bromford Lane (including the Kelvin Way / Brandon Way Junction), West
16	All Saints Way / Expressway, West Bromwich
17	All Saints Way / Newton Road, West Bromwich
18	Soho Way / Grove Lane / Cranford Street, Smethwick
19	Horseley Heath, Tipton
20	Sedgley Road East /Dudley Port – Tipton
21	Myvod Road / Wood Green Road – Wednesbury
22	Gorsty Hill, Blackheath

A457 (Birmingham Road, Oldbury)

The A457 Birmingham Road, Oldbury lies within Priority Zone 3 and continues to be subject to NO_2 diffusion tube monitoring after being included within the '3rd Wave' of the government's Clean Air Strategy as this link road exceeded the national objective for NO_2. We have maintained 11 monitoring sites on this road, 7 where diffusion tubes have been deployed in triplicate, and there are an additional 4 sites existing where single diffusion tubes are deployed. The Automatic Urban and Rural Network (AURN) monitoring station is also located on this road. We were expecting that levels would be reduced in 2020 due to

traffic signal improvement works and bus retrofitting that were completed in November 2019 but due to the national lockdowns we have been unable to make a fair assessment of this. For example, in 2019 the A457 Birmingham Road, Oldbury (Tube BE) demonstrated the greatest exceedance of the mean annual objective at 47.9 µg/m^3. In 2020 the same site recorded 38 µg/m^3, this was a decrease of just over 20%, although the level is still high being within 10% of the national objective.

A41 (Birmingham Road, West Bromwich)

In 2019 a new exceedance was identified on a section of the A41 in West Bromwich between the M5 Junction 1 and the boundary with Birmingham City Council. This had not been subject to monitoring in previous years given that this section of 'A' road has relevant receptors set some distance away from the road. It was nevertheless identified in the '3rd Wave' of the Government's Clean Air Strategy model in 2018 as being likely to exceed the national objective for NO_2 and was subject to a feasibility study on how to reduce levels on this road. This study concluded that retrofitting buses to Euro VI standard would bring forward the date of compliance to 2020 and this work was completed in November 2019.

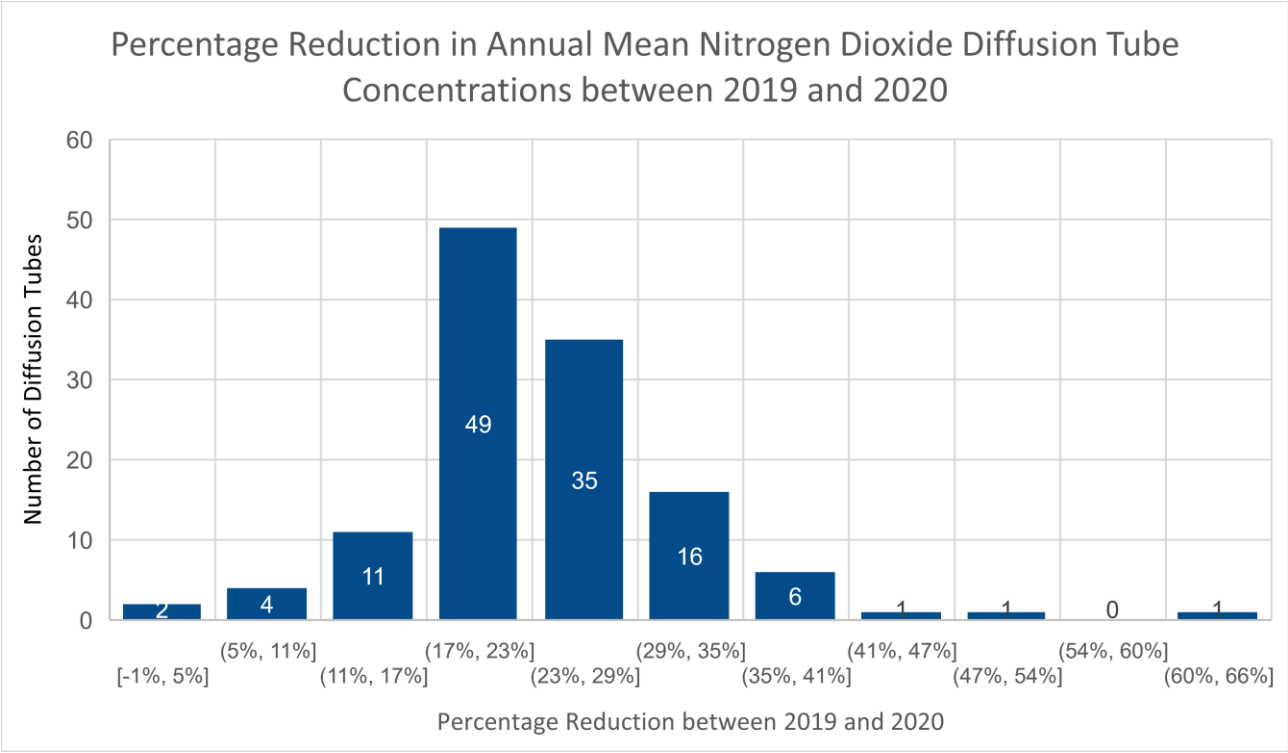
Since August 2019 we have continued to deploy NO_2 diffusion tubes in triplicate at five sites along the A41. Results for this year have confirmed a significant drop in NO_2 levels. In 2019 site PC1/2/3 had an annual mean of 44.6µg/m^3 this had decreased by almost 15% to 38.1 µg/m^3 in 2020 while the rest fell to concentration levels well within the national objective.

It is recognised that 2020 is an atypical year due to the pandemic and as agreed with Defra, long-term measurement of NO_2 levels along these link roads will need to continue if we are to determine the effectiveness of these interventions when traffic returns to post-pandemic levels.

Levels of NO2 recorded in Sandwell in 2020 compared with National Trends

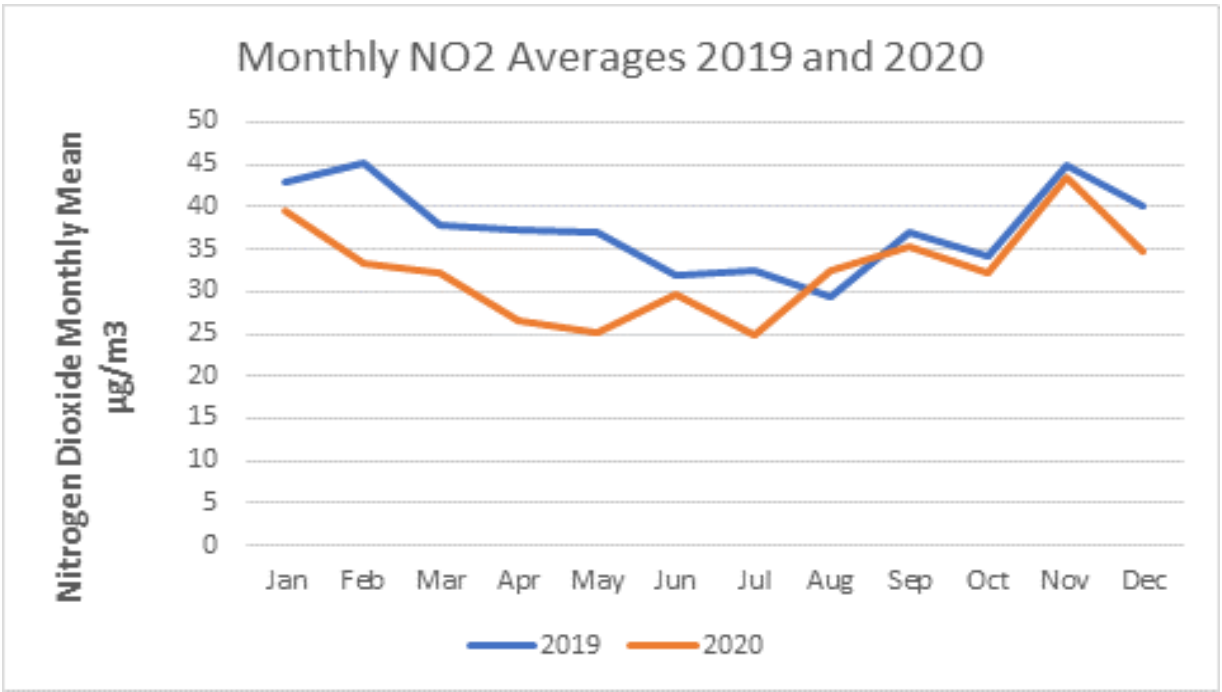
National trends for NO_2 were on a downward trajectory before 2020 and Sandwell continues to be in line with this trend, albeit it an accelerated rate caused by the pandemic. The Air Quality Expert Group (AQEG) estimated that during the initial lockdown period in 2020, urbanised areas of the UK saw reductions in NO_2 annual mean concentrations between 20 and 30% relative to pre-pandemic levels. Interestingly Sandwell's annual mean levels of NO_2 as recorded by our diffusion tubes, still demonstrated a decrease of 24% in 2020, with the majority of tubes recording percentage decreases of between 17 and 29% as is shown in **Figure 1.1**.

Figure 1.1



It is expected that much of this reduction was achieved during the first spring lockdown. As we can see in Figure 2.1 when we compare the raw data from the diffusion tubes between 2019 and 2020 the greatest reduction is seen between February and March.

Figure 1.2

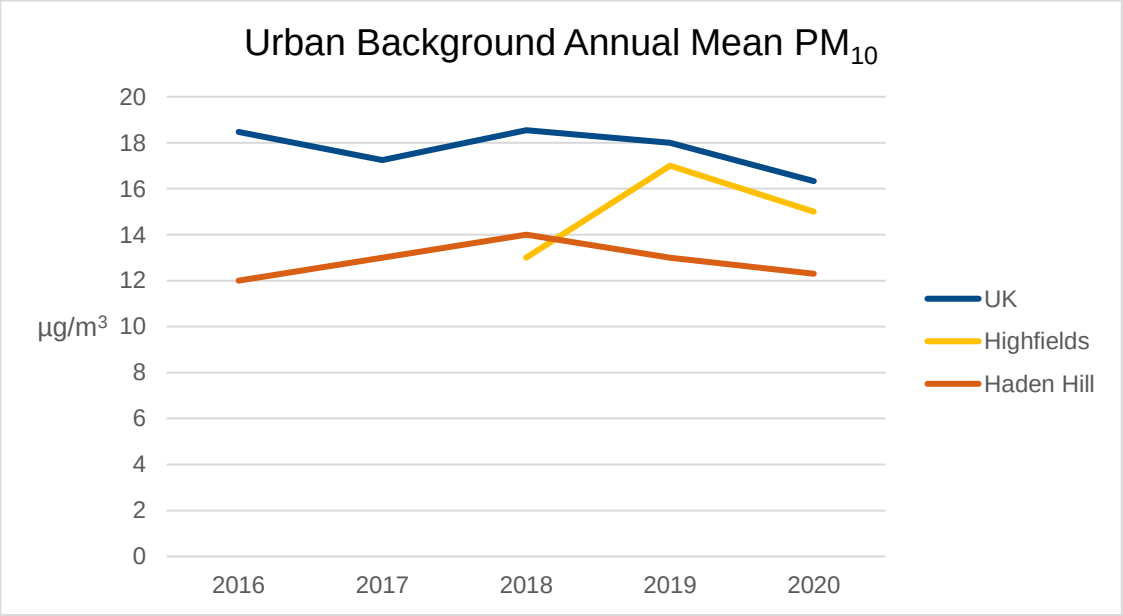


Particulate Matter

Although UK national air quality objectives for PM_{10} are currently met in Sandwell, we only monitored PM_{10} at four sites and $PM_{2.5}$ at one site in 2020. We are however aware that the UK Government's Air Quality Strategy 2019 included a pledge to consider implementing an AQOL (Air Quality Objective Limit) for $PM_{2.5}$. Given the health implications associated with ultrafine particulate matter, Sandwell have committed to installing $PM_{2.5}$ monitors in four of our five continuous monitoring stations by June 2021.

Urban background levels of PM_{10} levels did demonstrate some decline in 2020 and followed the UK trend, as shown in **Figure 1.3.**

Figure 1.3

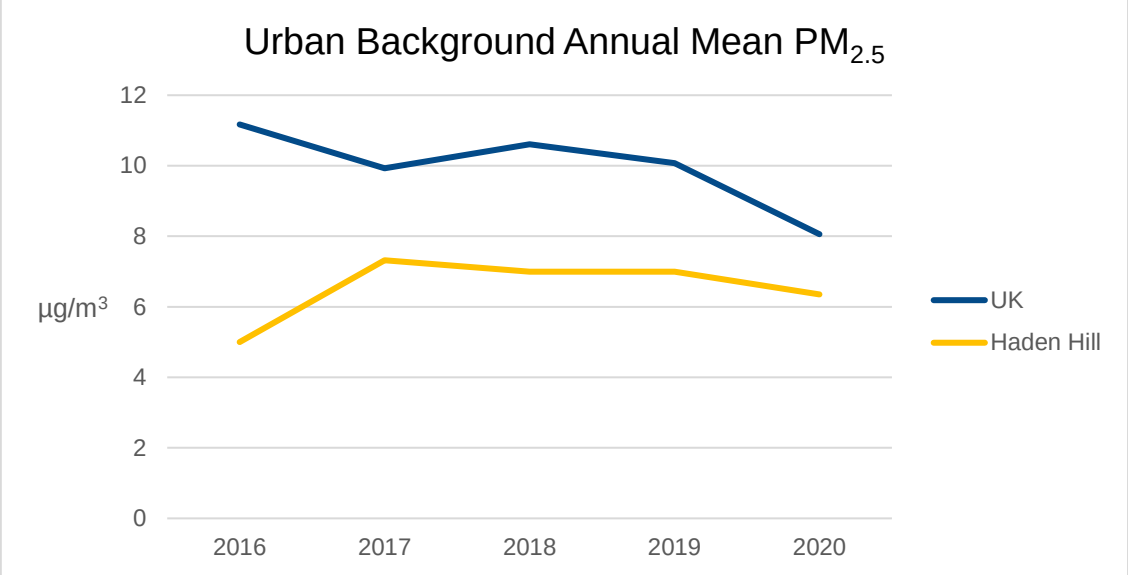


In 2020 we have continued to measure PM2.5 at Haden Hill. When compared with the UK trend since 2016 as is shown in **Figure 1.4** the concentrations increased in 2017 and have generally plateaued at around 7µg/m^3. Although it should be recognised that concentrations of $PM_{2.5}$ are still well below the UK annual mean.

We have estimated $PM_{2.5}$ levels in other parts of the borough by applying specific ratio calculations using ratified PM_{10} data from 3 of our continuous monitoring stations. These estimates suggest that $PM_{2.5}$ still exceeded the WHO health guideline of 10µg/m^3 at Birmingham Road, Oldbury with an estimated concentration of 1110µg/m^3. The fact that PM has not been as dramatically reduced as NO_2 in 2020 reflects that $PM_{2.5}$ is not as

closely associated with road traffic and that factors including domestic burning and transboundary transport have a greater influence

Figure 1.4



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We know that wood burning, and open fuel fires are a large contributor to emissions of particulate matter both in the UK and across Europe, and that this is more common in winter months. There are also many emission sources for particulate matter, so there may be other sources which contribute to this pattern. The contribution from sources originating outside of the UK can also be substantial. For example, April 2020 was characterised by strong easterly winds which transported a substantial amount of particulate matter from the continent at a time when agricultural activities also tend to cause increased suspension of this type of air pollution[6].

We ceased monitoring Sulphur dioxide monitoring in Sandwell at the end of 2018 following decommissioning of the OPSIS monitor on Bearwood Road.

[6] https://www.gov.uk/government/statistics/air-quality-statistics/concentrations-of-particulate-matter-pm10-and-pm25

Actions to Improve Air Quality

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

The 2019 Clean Air Strategy[7] sets out the case for action, with goals even more ambitious than EU requirements to reduce exposure to harmful pollutants. The Road to Zero[8] sets out the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

Defra Air Quality Grant 2020-2023

Although Sandwell has seen a gradual but improving downward trend in NO_2 concentrations in the last 11 years, this distinct downward trend has not been replicated in particulate matter concentrations, yet the list of potentially negative impacts on health from PM continues to grow.

During 2020 we reviewed our authority's ambitions to help improve local air quality, these were summarised as follows:

- Increase our monitoring of PM_{10} and $PM_{2.5}$ air quality across the borough at our continuous monitoring stations – this will provide important data for the national network as well as supporting us with developing local strategies and controls.
- Provide real-time air quality data including PM_{10} and $PM_{2.5}$ with those who live and work in Sandwell in an easily accessible and understandable format.
- Follow the principles of behaviour change theory, by moving away from instructing people and instead focusing on communicating a whole range of choices that individuals and groups can adopt to help reduce local air pollution.

[7] Defra. Clean Air Strategy, 2019

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

- Tap into existing communities and networks that have an interest in their local environment. Provide these communities with the necessary knowledge and support to understand how they can make a difference to air quality and assist them developing their own ideas.

We combined these ambitions to create a project entitled '*Working with Faith Groups in Sandwell to Improve Air Quality via Behavioural Change'*. This was entered as a bid to Defra for an Air Quality Grant in October 2020 and was confirmed as being successful in March 2021.

This project will be officially launched in June 2021 and will include a total of 16 faith centres over 2 years. The aim of the project is to work with faith leaders and their communities to improve air quality through initiatives driven by themselves. Each centre will have a low cost 'Zephyr' air quality monitor and a display screen that will be linked to a bespoke web-based dashboard that will show the real-time air quality data from their monitor as well as the other participating faith centres. They will be able to see local levels of NO_2, PM_{10}, $PM_{2.5}$ and Ozone using a green, amber and red rating, to assist with interpreting when air pollutant levels are low, medium or high.

All centres will also receive an 'air quality toolkit' communicating a whole range of choices that individuals and groups as a stimulus for ideas to help reduce air pollution.

Participants will be encouraged to complete an air quality questionnaire at both the start and end of their year of involvement. The findings will be used to evaluate changes in the participants' knowledge of air quality and any positive changes in their behavioural choices. It is not expected that there will be a detectable improvement in air quality, given that the monitors will only be in location for 12 months. The long-term aim is that the information and knowledge gained by participants will influence future behaviour e.g. transport choices, private and business vehicle purchases and heating choices, as well as having a positive influence on family, friends and colleagues.

12 Low cost Air Quality Monitors to be Deployed Across Sandwell

In 2020 Sandwell's Public Health Department also agreed funding to purchase an additional 12 Zephyr air quality monitors, these are planned to be deployed in 2021. These will be placed across the borough to enable additional real-time air quality data to be collected and assist us with identifying when and where pollutant levels are peaking at sites of significant concern e.g. areas with vulnerable population exposure such as the

young and elderly. They will serve to support and shape future decision making e.g. planning, development and transport proposals across the borough.

Low Emissions Towns and Cities Programme (LETCP)

Sandwell continues to be part of The Low Emissions Towns & Cities Programme (LETCP). This Defra funded project originally established in 2011 is a partnership comprised of the seven West Midlands Local Authorities (Birmingham CC, Coventry CC, Dudley MBC, Sandwell MBC, Solihull MBC, Walsall MBC and Wolverhampton CC) who continue to work collectively to reduce vehicle emissions whilst encouraging the uptake of cleaner vehicle fuels and technologies. Further information can be found at Walsall's Website: Low Emissions Towns and Cities Programme[9].

Planning Consultations

In 2016 Sandwell was one of four Black Country Councils (Sandwell, Dudley, Walsall and Wolverhampton) who adopted the Black Country Air Quality Supplementary Planning Document (SPD). This has continued to be implemented in 2020 by Air Quality Officers to ensure that we maintain a consistent approach when consulting on any planning application that may have a potentially negative impact on local air quality.

Planning Conditions

2020 saw a 23 per cent increase in the number of planning applications requiring the provision of electric vehicle charging points at both residential, commercial and industrial premises, a comparison with the last three years is shown in **Table 1.3** below.

Table 1.3

Year	Planning Apps Conditioned to provide Electric Vehicle Charging Points
2017	35
2018	32
2019	64
2020	79

[9] https://go.walsall.gov.uk/low_emissions_towns_and_cities_programme

Conditions requiring developers to provide a travel plan for air quality purposes were also attached to a further 9 planning permissions.

Conclusions and Priorities

Exceedances of National Air Quality Objectives

2020 was the first year since the AQMA was declared in 2005, that Sandwell did not record any exceedances of any of the national objective levels for NO_2, PM_{10} or $PM_{2.5}$. However, it is predicted these results will become outliers in future data analysis and should not be relied on in predicting long-term trends due to the COVID-19 pandemic spring national lockdown having such a large influence on reducing traffic volumes.

Significant Trends

In 2019 there was an overall decreasing trend of NO_2 levels in Sandwell, with the percentage of monitoring sites found exceeding the national objective reduced to 7.3%. The results in 2020 strongly continue this downward trend but are taken with the caveat that there has been a significant acceleration in NO_2 which is considered to have been assisted particularly by the spring national lockdown as well as warm and sunny meteorological conditions.

PM_{10} levels have decreased slightly in 2020 at all sites since last year, but there is no clear overall trend in the last five years with levels fluctuating since 2017. Only Birmingham Road Oldbury, a roadside station has seen a continuous reduction since 2018 and is now back at a level similar to that recorded in 2016.

Since 2017 $PM_{2.5}$ concentrations have been found to plateau at our one monitoring site at Haden Hill, Cradley Heath, although it should be acknowledged that this site has levels well below the WHO guidelines at 6.35µg/m^3. The estimated levels of $PM_{2.5}$ have decreased quite significantly since last year, but should be viewed with caution, not only because they are estimates but because the influence of the pandemic is yet to be determined. Being armed in the future with accurate $PM_{2.5}$ data from more stations will be important to provide accurate benchmarking of concentration levels and to enable us to create more targeted strategies to reduce emissions. Sandwell's aim is to continue to meet with the tougher health guidelines set by the World Health Organisation form $PM_{2.5}$. as this is a pollutant of significant health concern.

Sandwell Council's aims in relation to Air Quality are therefore to:

- Reduce the overall health impacts and burdens of poor air quality.
- Achieve compliance with the national air quality mean objective for Nitrogen Dioxide within the shortest possible time.
- Reduce PM_{10} and $PM_{2.5}$ concentrations to protect human health.
- Utilise real-time low-cost air quality monitors and monitor particulate matter and specifically $PM_{2.5}$ levels more widely.
- Undertake projects that engage with local communities to raise awareness of local air pollution and create real opportunities that have a positive impact on air quality.
- Update four of the five continuous monitoring stations to enable accurate benchmarking of NO_2, PM_{10} and $PM_{2.5}$ pollutant levels to enable the use of evidence based local air quality improvement strategies

Priority	Action
Priority 1	Identify and develop specific measures in consultation with communities to reduce NO_2 and PM concentrations at 'hotspot' and other locations where high levels of air pollutants are monitored and there is relevant population exposure.
Priority 2	Promote public transport, walking, cycling and switching to low or zero emission vehicles, including promoting and supporting the implementation of the Black Country ULEV strategy.
Priority 3	Review the impact that the council has on air quality and its role as a provider of public services, to develop a plan to reduce emissions from its activities.
Priority 4	Support and encourage taxi and private hire vehicle operators and drivers in reducing emissions from vehicles.

Priority 5	Application of existing and development of new planning development policies that support air quality improvements.
Priority 6	Develop information, social media and other campaigns to encourage positive behaviour change to active travel and improving physical health as well as switching to low emission vehicles.
Priority 7	Work in partnership with Birmingham City Council to mitigate negative impacts on Sandwell's air quality resulting from the implementation of the Clean Air Zone (CAZ).

Challenges

The longer-term impacts of the COVID-19 pandemic on Sandwell's air quality are yet to be fully realised. Although there have been significant improvements in air quality in 2020 there is concern that these could be outweighed by longer-term negative consequences e.g. decreased use of public transport and with the looming financial recession increases in domestic burning created by fuel poverty which have been linked with financial recessions in the past.[10].

Ambitions to revoke the 51 existing Smoke Control Orders and designate the whole of Sandwell as a Smoke Control Area remains a priority in 2021. This will present a challenge, as a significant amount of time will be required to ensure sufficient legal preparation and planning is undertaken to allow full consultation with all residents and businesses in Sandwell. We must ensure that all interested parties and stakeholders are given the opportunity to respond to the proposal before a final decision is made.

The Birmingham Clean Air Zone (CAZ) launches in June 2021. Given that Sandwell shares a border with Birmingham City Council, there are still concerns surrounding the potential negative impacts of this decision on Sandwell. The issue of traffic potentially re-routing to avoid the CAZ was modelled in 2019 and there was some assurance that the extra traffic for Sandwell would be minimal. On-going air quality and traffic monitoring will be required to

[10] Changes in domestic heating fuel use in Greece: effects on atmospheric chemistry and radiation. *Eleni Athanasopoulou1 et al*, Sept. 2017 https://core.ac.uk/reader/195237368

determine the impact of the Clean Air Zone when it comes into force and any further measures that might be required to mitigate any negative impact.

The implementation of the Black Country Ultra Low Emission Vehicle Strategy within Sandwell will require a lot of political support. This is an extremely ambitious strategy and requires determination and commitment from Sandwell Council to implement the actions required, including the provision of an extensive public charging infrastructure that will encourage uptake of cleaner vehicles whilst also meeting growing demand.

Local Engagement and How to get Involved

Sandwell is involved in a range of government action plans as well as providing a variety of schemes and strategies, community projects and more to improve air quality. There is a wide range of options and information available to the public to improve air quality and health. For example:

- Sandwell Carshare Scheme offers a way of alleviating stress, saving money and improving emissions. Parking congestion is also helped through this scheme.[11]
- TravelWise in Sandwell for information on how to plan a carshare, public transport journey, cycle journey, or walking journey.[12]
- Air Quality Sandwell offers the opportunity to report a pollution problem, and historical information about NO_2 levels in the borough.[13]
- Sandwell Walking Strategy 2015 to increase walking uptake, target resources and deliver improvement and enhancements to the walking environment over a 5-year period.[14]
- Healthy Sandwell offers support for your health and wellbeing. They can provide information about walking, increasing activity and more.[15]

[11] https://liftshare.com/uk/community/sandwell

[12] https://www.sandwell.gov.uk/info/200284/roads_travel_and_parking/1830/travelwise_in_sandwell

[13] https://www.sandwell.gov.uk/info/200274/pollution/485/air_quality/3

[14] https://www.sandwell.gov.uk/info/200222/healthy_sandwell_healthy_you/3250/sandwell_walking_strategy

[15] https://www.healthysandwell.co.uk/

- Smoke Control Areas shows information about which areas of Sandwell that are designated Smoke Control Areas by the Clean Air Act 1993. In Smoke Control Areas you can't emit smoke from a chimney unless you are burning authorised fuel or using "exempt appliances".[16]
- A press release from the Department for Environment, Food & Rural Affairs shows that wood burning stoves and coal fires are the largest source of PM2.5 in Sandwell, and the whole of the United Kingdom. Not using wet wood or coal in domestic burners or fires can improve air pollution.[17]
- Reporting a bonfire problem in Sandwell can help reduce air pollution. There are guidelines to follow when burning a bonfire to minimise the effect on air quality. Composting food and garden waste instead of burning it can reduce air pollution. Sandwell offers a discount on compost bins to help reduce methane and smoke emissions.[18]
- Air quality and climate change are closely linked. Sandwell's Climate Change and Air Quality website provides tips on how residents can help in the fight against climate change.[19]
- Planting and preserving trees are important in improving air quality. Sandwell's Tree Preservation Orders and Urban Tree Policy highlight the importance of trees and new tree planning. The Woodland Trust is a woodland conservation charity, and a source of information on tree planting as well as tree planting projects in Sandwell and more.[20]
- Using and purchasing electric cars helps reduce air pollution in and around Sandwell. The Black Country Ultra Low Emission Vehicle Strategy commits to deliver a network of electric vehicle charging points and ULEV public service vehicles. Residents can

[16] https://data.gov.uk/dataset/2e59be11-a9db-4b9e-8cbb-8e2f2567c588/sandwell-mbc-smoke-control-area

[17] https://www.gov.uk/government/news/government-takes-action-to-cut-pollution-from-household-burning

[18] https://www.sandwell.gov.uk/info/200274/pollution/3188/report_a_bonfire_problem

[19] https://www.sandwell.gov.uk/info/200274/pollution/4402/climate_change_and_air_quality_in_sandwell

[20] http://www.sandwell.gov.uk/download/downloads/id/21932/october_2014_-_urban_tree_policy.pdf

recommend a location for a residential on-street electric vehicle charging point in Sandwell.[21],[22]

- Switching to energy efficient bulbs and appliances, improving insulation, or replacing your boiler to low NO_x options can help reduce carbon emission and improve air quality. ECO3 in Sandwell is a government energy efficiency scheme designed to help reduce carbon emissions and tackle fuel poverty. Switching energy providers to those that are sourced from renewable energy sources help improves air quality.[23]
- The Clean Air Strategy 2019 sets out actions required across all parts of government and society to improve air quality. Supporting clean air legislation is important in improving air quality.[24]
- Sandwell's Eco Bus is a project designed to educate children and adults about their local environment, air pollution, climate change and recycling. It is a free service available to all Sandwell schools and community groups.[25]
- Charging points at work help make electric cars viable for commuters who live further away from their homes. If your work doesn't have an electric vehicle charge point installed, it could take advantage of the Government's Workplace Charging Scheme (WGS). The WGS is a voucher-based scheme that provides a contribution towards the up-front costs of the purchase and installation of electric vehicle to the value of £300 per socket – up to a maximum of 20 sockets. Employers can apply for vouchers using the Workplace Charging Scheme application.[26] Businesses who are want to put in workplace electric vehicle charging points- https://www.gov.uk/government/publications/workplace-charging-scheme-application-form.

[21] https://consultation.wolverhampton.gov.uk/bct/bct-ulev-strategy/supporting_documents/Black%20Country%20ULEV%20Strategy%202020.pdf

[22] https://wh1.snapsurveys.com/s.asp?k=158281500955

[23] https://www.eco3scheme.co.uk/

[24] https://www.gov.uk/government/publications/clean-air-strategy-2019

[25] https://www.sandwell.gov.uk/ecobus

[26] https://www.gov.uk/government/publications/workplace-charging-scheme-application-form

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Tables

1 Local Air Quality Management

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

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

Air Quality Management Areas

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

A summary of AQMAs declared by Sandwell MBC can be found in **Table 2.1**. The table presents a description of the AQMA that is currently designated within Sandwell MBC. A map of Sandwell MBCs AQMA boundary is also available on line at Air Quality Management Area Designation Order 2005 [27] .

Appendix D: Map(s) of Monitoring Locations and AQMAs also provides a map of the AQMA as well as the air quality monitoring locations within the AQMA. The air quality objective pertinent to the current AQMA designation are as follows:

- NO_2 annual mean.

[27] https://www.sandwell.gov.uk/downloads/file/768/air_quality_management_area_designation_order_2005

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
Sandwell Air Quality Management Area	Sandwell AQMA Order 2005	NO_2 Annual Mean	Sandwell Metropolitan Borough Council	YES	58.51 (C10D)	38.1 (PC1/PC2/PC3)	Air Quality Action Plan Sandwell MBC 2020	Visit the AQAP for Sandwell Air Quality Action Plan

☒ **Sandwell MBC confirm the information on UK-Air regarding their AQMA(s) is up to date**

☒ **Sandwell MBC confirm that all current AQAPs have been submitted to Defra**

Additional Information on Strategies to Improve Air Quality in Sandwell MBC

Clean Air Strategy 2018 Response

The government's Clean Air Strategy 2018 included a 'UK plan for tackling roadside nitrogen dioxide (NO_2) concentrations' to bring them within the statutory average annual limit of 40µg/m^3 in the shortest possible time. Sandwell was included in the "Third wave" of Local Authorities where air quality modelling identified road links in Sandwell that were likely to be exceeding the NO_2 national objective and must therefore become compliant before 2021 or earlier. Within Sandwell, seven road links were identified, four of these road links were under local authority control as listed in **Table 2.1a** below, with the remainder managed by Highways England.

Table 2.1 a – Road Links and Feasibility Studies			
Census ID	**Road Name**	**Description of Area**	**Priority Zone**
17142	A457 Oldbury	Roundabout with the A4034 and roundabout linking the A4031	3
99155	A41, J1 M5 West Bromwich	Between the roundabout with M5 Junction 1 & the local authority boundary with Birmingham City Council	3
99397	A41 Black Country Route at Wednesbury	Roundabout with the A4037 and the roundabout with A461 at Wednesbury	Not within a designated priority zone.
16330	A34 Great Barr	Junction at A4041 Newton Road and the M6 at Junction 7	4

Both road links 17142 and 99155 fall within Priority Zone 3 (A457 Birmingham Road and A41, Birmingham Road, West Bromwich) and Road link 16330 now falls within Priority Zone 4 (A34 Great Barr).

A consultant was appointed to undertake a feasibility study to evaluate the air quality impact and source apportionment at each of the four-road links and identify key mitigation measures that could be implemented to bring forward the predicted date of compliance.

The feasibility study concluded that retrofitting buses to Euro VI standard that travel along the 17142 (A457 Birmingham Road, Oldbury) and 99155 (A41, West Bromwich) road links, as well as optimising traffic signals on the A41 at Junction 1 M5, would bring forwarded the predicted date of compliance to 2019. The measures identified for the two remaining road links could not bring forward the date of compliance.

The traffic signal optimisation on the A41 was completed on target in September 2018. The retrofitting of the buses to Euro VI standard was completed in November 2019.

It was recognised that long term measurement of NO_2 levels along these link roads was required to determine the effectiveness of these interventions. In February 2019 NO_2 diffusion tubes were deployed (in triplicate) at 5 sites along the A41 West Bromwich M5 J1 link road. Then in August 2019 NO_2 diffusion tubes were deployed in triplicate at 7 locations along the A457 link road, whilst existing monitoring tubes continued to be deployed along this section. The aim being to monitor the levels at these sites for at least five years.

The data for 2020 has confirmed no exceedances on either road for NO_2, but it is recognised that 2020 is an atypical year due to the pandemic and the influence of the spring lockdown on traffic. As agreed with Defra, long-term measurement of NO_2 levels along these link roads will continue so that we can determine the true impact of these interventions when traffic returns to post-pandemic levels. We will therefore continue in 2021 with quarterly reporting of NO_2 data to Defra

Progress and Impact of Measures to address Air Quality in Sandwell

Defra's appraisal of last year's ASR concluded that Sandwell's report was well structured, detailed and provided the information specified in the guidance. Several comments were made by Defra in response to the report, these comments are highlighted in green and Sandwell MBC's response is provided below.

1. Robust and accurate QA/QC procedures were applied. Calculations for bias adjustment, annualisation and distance-correction factors were outlined in detail.

We will continue to ensure that these standards are maintained.

2. The Council has included discussion and review of its AQMAs and monitoring strategy, informed due to the extensive monitoring network and also the additional tubes in place to provide data for the new scheme. This demonstrates the Councils proactive and dedicated approach to improving air quality across the area.

Sandwell MBC continue to remain proactive and dedicated to improving air quality across the borough.

3. The need for an updated AQAP was mentioned in last years' ASR appraisal, and this has not yet been adopted. The Council is encouraged to adopt a revised AQAP in the next reporting year.

The publishing of Sandwell MBC's Air Quality Action Plan 2020-2025 was subject to unforeseen delay in 2020. A draft copy was available on Sandwell's website through 2020, and full approval was given by the Council Cabinet for adoption in March 2021. It has since been sent to DEFRA for appraisal and is awaiting feedback.

4. The Council has an extensive NO_2 monitoring strategy and monitoring of other pollutants undertaken by council, while not compulsory, is considered to be good to inform how to tackle those pollutants.

It is accepted that for Sandwell to be able to make progress in both understanding and reducing other pollutants, specifically particulate matter, we need to increase our monitoring capabilities. We have committed considerable financial investment towards updating the air quality monitoring equipment in four of our five continuous monitoring stations in 2021. This will mean that by June 2021 we will have four dual PM analysers measuring both $PM_{2.5}$ and PM_{10}. In addition to this, funding was also secured in 2020 for 12 'Zephyr' low-cost air quality monitors. These will be deployed in 2021 to provide supplementary monitoring of NO_2, PM_{10}, $PM_{2.5}$ and O_3. The real-time data will assist the Council, residents, businesses and developers in providing insight and more tailored response to local air quality issues across the borough.

5. The Public Health Outcomes Frameworks was mentioned in good detail. The Council have referred specifically to indicator D01, which is the fraction of mortality attributable to particulate air pollution, and this is encouraged.

   Sandwell MBC is very aware of the threat to health posed by $PM_{2.5}$ and the morbidity burden associated with long-term exposure to man-made particulate air pollution. The PHOF remains an important tool in tracking the progress we are making in reducing this morbidity burden.

6. The Council have provided maps of the diffusion tube monitoring network, tables of results and trends which are discussed in the report. Maps are provided however it would be useful for the reader to have closer view of the various sites.

   All maps provided were linked to a 'google map' website where the reader had the ability to zoom in for further detail if required. It is accepted that should a reader not have access to the internet then more detailed maps of the various sites would be of assistance, therefore we have provided maps for each of the six towns of Sandwell in this ASR for greater clarity.

7. Overall the report is detailed, concise and satisfies the criteria of relevant standards. The Council should continue their good and thorough work.

Sandwell's Air Quality Measures

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

Most of the measures stated are included in Sandwell's Air Quality Action Plan 2020-2025, but some additional measures have also been included, i.e. the wood burning stoves education campaign, the ambition to revoke the 51 existing smoke control areas to be

replaced with a single designation for the whole of Sandwell, and the air quality grant application to fund the 'Faith Centre Behavioural Change' project.

In addition to work undertaken by Sandwell MBC, the West Midlands Combined Authority (WMCA) continues to be a key player in forming policies and funding projects to improve air quality. The WMCA produced an overriding Strategic Economic Plan[28] which included a regional transport plan, produced by Transport for West Midlands. This plan is now recognised as the WMCA's Movement for Growth[29] strategic transport plan and provides a framework for the key transport challenges in the region, with significant investment programmes planned over the next 15 years or so. This plan includes a Sustainable Travel Team working in conjunction with the seven Metropolitan local authorities to support local businesses, education sites and individuals to make smarter travel choices resulting in improvements to air quality.

The Black Country Transport – Ultra Low Emission Vehicle Strategy was also agreed in May 2020. This is a strategic transport partnership between Dudley, Sandwell, Walsall and Wolverhampton Councils. The overarching aim is to accelerate the uptake of ULEVs across the area before the nationwide ban in 2030 on the sale of petrol and diesel vehicles. It sets out ambitious targets that Sandwell should meet to ensure that there is an EV charging infrastructure that will both promote the switch to ULEV's as well meet the growing demand for electric vehicles.

Key completed measures:

The following measures as identified in the ASR 2020 were completed in 2020.

- Sandwell secured conditions on 79 planning permissions requiring the provision of electric vehicle charging points. This was a 23% increase from 2019. In addition, conditions requiring a travel plan for air quality purposes were added to 9 planning permissions, these included commercial, residential and industrial developments.

[28] https://www.wmca.org.uk/what-we-do/strategy/

[29] https://www.tfwm.org.uk/strategy/sustainable-travel/

These conditions help to ensure future sustainable development by identifying and enforcing conditions required to mitigate any potentially negative impacts on air quality from new development.

- The draft Air Quality Action Plan was subject to public consultations in 2020 and was adopted by Sandwell's Cabinet in March 2021. It has since been sent to Defra for appraisal.
- The Black Country ULEV Strategy and the ULEV Parking Strategy was formulated, this included stakeholder engagement and public consultation. The strategy was adopted at the Black Country Joint Committee.
- The taxi fleet make-up was reviewed and updated to identify trends in the vehicle emission profiles. Of the 557 private-hire or taxi vehicles licensed in Sandwell in 2020, 539 were diesel, 4 electric, 2 petrol and 12 petrol hybrids. This data will be used as a bench mark to determine effectiveness of future strategies and interventions as part of our commitment to the Black Country ULEV Strategy.
- On-street EV residential charging web page was set up for residents to make known their suggestions for locations of 'On street' charging points[30].
- Staff resources were increased in the air pollution team with the employment of two new full-time Environmental Improvement Officers. This has provided the team with a greater capacity to promote air quality including; assisting and formulating local strategies, partnership working as well as the opportunity to spend time engaging with local communities to promote positive behaviour shift in favour of improved air quality.

Measures to be Completed in 2021:

Sandwell Metropolitan Borough Council expects the following measures to be completed over the course of the next reporting year (2021):

- Lane marking, capacity and traffic flow improvements were completed in 2018 on the Kelvin Way/Trinity Way roundabout in Zone 7, but unfortunately an assessment of the effectiveness of these measures was not possible in 2020 due to national 'lock

[30] https://www.sandwell.gov.uk/ev

downs' resulting in significantly lower traffic levels. This measure will therefore be subject to further review in the ASR 2022, when it is expected that more 'normal' traffic levels will have resumed.

- The actions required by the 'Third Wave' study were completed at the end of 2020. Data from this study has again been impacted by the COVID-19 pandemic, so will be reviewed again in the 2022 ASR to assess if road signalling optimisation and retro-fitting of buses (to Euro VI standards) using the A257 and A41 are achieving the predicted compliance with the national objective NO2 levels.
- Deployment of 21 'Zephyr' low cost air quality monitors across Sandwell to measure NO_2, O_3, PM_{10}, $PM_{2.5}$.
- A bespoke web-based dashboard will be launched to provide real-time, easily accessible air quality information for 8 Zephyrs. This will form part of the Defra air quality grant funded project and is set to run till December 2023.
- Sandwell MBC are aiming to become carbon neutral by 2030, with a commitment to 'reduce carbon from fleet vehicles and business mileage', which will have a positive impact on air quality. Data will be gathered in 2021 on Sandwell's MBC's own vehicles (including refuse collection vehicles) and grey fleet (staff owned vehicles used for work travel) as well as business mileage. This data will be submitted to the Energy Savings Trust who will be commissioned to produce a transport assessment. This is a powerful tool for Sandwell MBC's decision makers, by presenting them with the options available to both meaningfully reduce the council's carbon footprint and help improve air quality.
- The launch of a 'Wood Burning Stove' information campaign is planned to be undertaken in 2021 to coincide with publicity around designating the whole of the borough as a Smoke Control Area. The plan is to include a digital leaflet, local press releases and information on the council's website as well as the council's own social media communication channels.
- The Black Country ULEV strategy is planned to be adopted by Sandwell MBC's Cabinet.
- On street EV residential charging remains a priority, the aim is to complete procurement of a Charge Point Operator in 2021 as well as further site selection and cabinet approval of a specific operating model. This will also involve further public

consultation with a view to delivering the necessary EV charging infrastructure to encourage uptake and meet demand.

- Information provided by Sandwell's taxi licensing team on vehicle emission profiles will be used to work with the team to identify barriers to the purchase of low-emission and ultra-low emission vehicles as part of the Black Country ULEV Strategy. The plan is to help the team formulate a strategy to support taxi drivers in Sandwell in their uptake of cleaner vehicles in 2021/2022.
- It is intended to repeat and strengthen efforts to engage with Sandwell employees and cabinet members to promote the use of ultra-low emission transport technologies. We will work with departments across the council to improve low and ultra-low emission vehicle take up in 2021.

Sandwell MBC's Priorities for 2021

- Sandwell was awarded a Defra Air Quality Grant in March 2021 to undertake a community engagement project entitled "Working with Faith Groups in Sandwell to Improve Air Quality via Behavioural Change". This is a community driven project that will involve at least 16 faith centres over two years. This project is a major priority for the air quality team to be able to inform and empower local communities to understand the links between air quality and health how their actions can help reduce air pollution.
- A decision was made at the end of 2020 to invest in 12 'Zephyr' low cost air quality monitors. These will be used to validate some existing hotspots but will also be used to identify other sites of concern for air quality. Alongside the 8 'Zephyr' low cost air quality monitors acquired as part of the Defra Air Quality grant, Sandwell will have a significant amount of indicative real-time air quality data to analyse. Furthermore, the ability to monitor PM_{10} and $PM_{2.5}$ across the borough in real-time, particularly where there are sensitive receptors e.g. children and the elderly, will provide important and easily accessible air quality information to local people. We plan to use this data both to promote behavioural change but also to inform wider decision making within the Council including planning and transport.
- Work has begun on determining the feasibility of revoking the 51 designated Smoke Control Area across the borough and replacing these with one Smoke Control Order for the whole of Sandwell. Discussions have been held with Sandwell's legal department which has identified the necessary next steps including engagement with

residents and businesses to highlight any potential objections or concerns with this proposal.

- Implementation of the revised Air Quality Action Plan 2020-2025. This plan places an increasing focus on the uptake of low emission transport by domestic and commercial users as well as focusing on sustainable planning and development.
- Begin the delivery of the Black Country ULEV Strategy's planning policy and infrastructure recommendations.
- Completion of the Black Country ULEV Parking Study across Sandwell and delivery of its recommendations by Sandwell's Transportation Planning Department.
- The continuing identification of potential new measures to improve air quality both at site specific locations as well as borough wide initiatives.
- Respond to all relevant planning consultations in accordance with the Black Country SPD to ensure a consistent approach to new development proposals in terms of air quality. This is an important tool in mitigating the potential negative impacts of new development on local air quality.
- Promote and encourage continued home-working amongst council staff where possible, highlighting the air quality and health benefits gained from reducing unnecessary car travel into and around Sandwell.
- Provide opportunities for council staff to receive independent advice about switching to electric car use, this will include signing up for education/Q & A sessions provided by the Energy Savings Trust.
- Work with the West Midlands Combined Authority and Transport for West Midlands to deliver collaborative measures to improve air quality to encourage people to return to public transport use when safe.
- Engage with Birmingham City Council's air quality team and to continue to monitor any potential negative impacts following the implementation of the Birmingham Clean Air Zone in June 2021.

Principal Challenges and Barriers

- The principal challenges and barriers to implementation of Sandwell's AQAP[31], are around securing a sufficient and consistent level of funding. Towards the end of 2020 and start of 2021 significant investment has been made into resourcing the Air Quality Team, including a new member of staff and procuring new air quality monitoring equipment. However, funding will need to be sustained in the long-term if we are to maintain this momentum in understanding and improving air quality in Sandwell.
- Whilst the measures stated above and in Error! Reference source not found. will help to contribute towards compliance, Sandwell anticipates the use of other additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of the AQMA.

[31] https://www.sandwell.gov.uk/downloads/file/31636/aqap_2020_2025_-_adopted

Table 2.2 – Progress on Measures to Improve Air Quality

The expected efficacy of each of the proposed/actual measures has been colour-coded– Green most effective, amber medium effectivity and red least effective.

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	Black Country - ULEV Strategy - provision of electric charging infrastructure across Sandwell and other black country local authorities	Promoting Low Emission Transport	Other	2020	2030	Sandwell MBC and Black Country Authorities	Sandwell MBC and Black Country Local Authorities	NO	Partially Funded	£1 million - £10 million	Implementation	By 2025 - Transport emissions reduction of 10% for NOx, and 35% for PM	Increase of Sandwell's Vehicle Parc to 4%, 90% of population within 5 minutes' drive of a rapid charger	Ongoing work - draft strategy was completed in 2020	
2	Review of homeworking for Sandwell Council – move to long-term home-working contracts	Promoting Travel Alternatives	Encourage / Facilitate home-working	2020	2023	Sandwell MBC	Sandwell MBC	NO	Funded	£100k - £500k	Implementation	Reduction in pollution from staff commute and staff journeys around the district for meetings etc.	Reduction in car mileage claims	Majority of staff working at home still due to pandemic - staff survey/consultation to be undertaken in 2021 to establish long-term working arrangements	
3	Midland Metro Extension (Wednesbury to Brierley Hill)	Transport Planning and Infrastructure	Public transport improvements -interchanges stations and services	2017	2023	Sandwell MBC WMCA	WMCA, Black Country LEP and HS2 Connectivity	NO	Funded	> £10 million	Implementation	Reduction in emissions due to travel by metro vs. private vehicles	Increased public transport patronage	Work is currently in progress - can be tracked at https://metroalliance.co.uk/projects/wednesbury-to-brierley-hill-extension/	
4.	'Third wave' intervention to reduce NO2 concentrations on A41 and A457	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2018	2021	Sandwell MBC, DEFRA	DEFRA	Yes	Fully Funded	£50k - £100k	Completed	Reducing emissions - site specific targets to achieve annual mean <40µgm/m³	NO2 Diffusion tube data demonstrating annual mean <40µgm/m³	Bus retrofit and traffic signal works completed in 2019. Data to be monitored through 2021	Data from 2020 demonstrates no exceedances but data is not reliable due to impact on traffic from national lockdowns through the year.
5	Project proposed to work with Faith Centres across Sandwell to encourage behavioural change through the provision of low cost air quality monitors and a web based AQ dashboard and AQ toolkit	Public Information	Other	2020	2024	Sandwell MBC	Sandwell MBC	YES	Funded	£100k - £500k	Planning	No target	Behavioural change assessed through questionnaires at beginning and end of project	Application made to DEFRA in October 2020 for Air Quality Grant Funding	Grant awarded to Sandwell by DEFRA in March 2021 - update to be provided in ASR 2022

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
6	Provide air quality information and promote sustainable school transport	Promoting Travel Alternatives	Workplace Travel Planning	2019	2030	Sandwell MBC	Sandwell MBC	NO	Funded	< £10k	Implementation	Reduction in cars travelling to schools for drop off and pick up	Increase use of sustainable travel modes in schools	Limited progress due to limited funding available to promote sustainable school transport. Some promotion of ModeShift STARS tool in schools.	Updated Sustainable Modes of Travel Strategy (SMOTS) https://www.sandwell.gov.uk/download/downloads/id/28553/smbc_sustainable_modes_of_travel_to_school_strategy_-_2019_update.pdf
7	Improve branding to increase awareness and attractiveness of public transport	Promoting Travel Alternatives	Workplace Travel Planning	2012	2025	National Express, Transport for West Midlands	N/A	NO	Funded	£10k - 50k	Implementation	No target	Increased public transport patronage	On-going programme of brand improvement, including safer network, improved connections, signage and accessibility	Progress stalled in 2020 due to government guidance to avoid public transport to reduce virus transmission
8	Develop real-time air pollution monitoring to identify hotspots and areas of public exposure to air pollution	Other	Other	2018	2024	Sandwell MBC	Sandwell MBC	NO	Funded	£50k - £100k	Planning	No target	Installation of low cost air quality monitors	Low cost air quality monitors to be purchased	Low cost air quality monitors to be purchased in 2021 to enable a more flexible method of examining air quality in Sandwell and will include PM10 and PM2.5 monitoring.
9	Review transport planning and traffic infrastructure at each hotspot location. Use to identify and implement programme of work to reduce NO2 concentrations where applicable	Traffic Management	Other	2018	2023	Sandwell MBC	N/A	NO	Funded	£10k - 50k	Implementation	Reducing emissions - site specific targets to achieve annual mean <40µgm/m³	Annual average NO2 value reductions	Implementation on-going	Work limited by COVID-19 pandemic - disruption to transport and transport in 2020 has delayed this
10	Major highway improvement at Birchley Island (Junction 2, M5)	Traffic Management	Other	2014	2026	Sandwell MBC, WMCA	Sandwell MBC, Department of Transport	NO	Funded	> £10 million	Planning	Reduction in emission due to reduced traffic congestion	Reduction in emissions from vehicles queuing	Work expected to start in 2023	Dedicated cycle lanes and pedestrian routes to be included
11	Bus lane enforcement (cameras introduced on three bus lanes) Hagley Road West, Walsall Road and New Street	Traffic Management	UTC, Congestion management, traffic reduction	2019	2032	Sandwell MBC, Nation Express West Midlands, Transport for West Midlands	Sandwell MBC	NO	Funded	£500k - £1 million	Completed	Reduction in bus idling waiting to pull out, stuck in traffic	Increased public transport patronage	Completed - enforcement cameras in use	Improvement in bus service timetabling reliability, encourages alternative to private vehicles
12	Inclusion of Air Quality considerations in the updated Local Development Planning Framework. Including policies to reduce the need to travel and promote alternatives to car use.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2019	2023	Sandwell MBC, Low Emissions Towns and Cities Programme (LETCP), West Midlands Authorities (WMA), Black Country Core Strategy (BCCS)	N/A	NO	Funded	< £10k	Planning	Medium	Annual average NO2 value reductions	Ongoing work to co-ordinate all relevant local authorities and relevant departments.	

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
13	Provide air quality guidance to land/property developers prior to submitting planning applications	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2016	2023	Sandwell MBC, LETCP, WMA's and BCCs	DEFRA	NO	Funded	£50k - £100k	Implementation	No target	Publication of planning and procurement guidance - implemented across the West Midlands	Guidance/advice continues to be provided	The Black Country Supplementary Planning Document is referred to in all AQ planning applications
14	Consult on new planning applications for impact on local air quality	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2010	2032	Sandwell MBC, LETCP, WMA's and BCCs	N/A	NO	Funded	£10k - 50k	Implementation	No target	Conditions attached to planning applications are recorded and discharged when compliance is achieved.	On-going work stream	The Black Country Supplementary Planning Document is referred to in all AQ planning applications
15	Promotion of walking	Promoting Travel Alternatives	Promotion of walking	2010	2030	Sandwell MBC	Sandwell MBC	NO	Funded	< £10k	Implementation	No target	Increase in walking for key journeys, Sandwell Travel Surveys	On-going. Sandwell's walking strategy published in 2015. Sandwell TravelWise web page kept up-to-date	Sandwell website links directly to https://walkit.com/
16	Revocation of existing 51 designated smoke control areas and replacement with a single borough wide Smoke Control Order	Other	Other	2020	2022	Sandwell MBC	Sandwell MBC	NO	Funded	< £10k	Planning	Reduce PM emissions from burning unauthorised fuels	Reduction in emissions in PM from solid fuel burners	Legal advice sought - survey/consultation to be undertaken of residents and businesses in 2021	
17	Maintain up-to-date air quality information on Sandwell MBC's website to ensure it is a trusted 'go to' source for information for residents	Public Information	Via the Internet	2010	2030	Sandwell MBC	Sandwell MBC	NO	Funded	< £10k	Implementation	Reduce emissions from bonfires, wood burners and educate on causes of air pollution	Reduction in number of bonfire complaints	Council website is frequently updated to include relevant and important air quality information	
18	Campaign to educate residents on air pollution and health risks from wood burning and solid fuel stoves	Public Information	Via other mechanisms	2020	2024	Sandwell MBC	Sandwell MBC	NO	Funded	< £10k	Planning	Reduce PM emissions from burning unauthorised fuels	Reduction in emissions in PM from solid fuel burners	Campaign information being designed - to be launched in 2021	
19	Review Sandwell MBC's vehicle fleet including vehicle types, age and emissions profile to formulate a strategy to reduce emissions	Vehicle Fleet Efficiency	Other	2018	2021	Sandwell MBC, SERCO	N/A	NO	Not Funded	£500k - £1 million	Implementation	No target	Collating of appropriate data sets - including pre and post-pandemic vehicle use data	Work continues to be undertaken to collect data including grey fleet and refuse collection vehicles (RCV data to be provided by SERCO).	Data collection delayed by SERCO as their staff resources severely impacted by pandemic
20	Improving access to information regarding transport options	Promoting Travel Alternatives	Personalised Travel Planning	2010	2030	Sandwell MBC, Transport for West Midlands	Sandwell MBC, WMCA	NO	Partially Funded	£10k - 50k	Implementation	No target	Increased public transport patronage	On-going promotion of public transport options remains available and up to date https://www.sandwell.gov.uk/publictransport	Use of public transport decreased

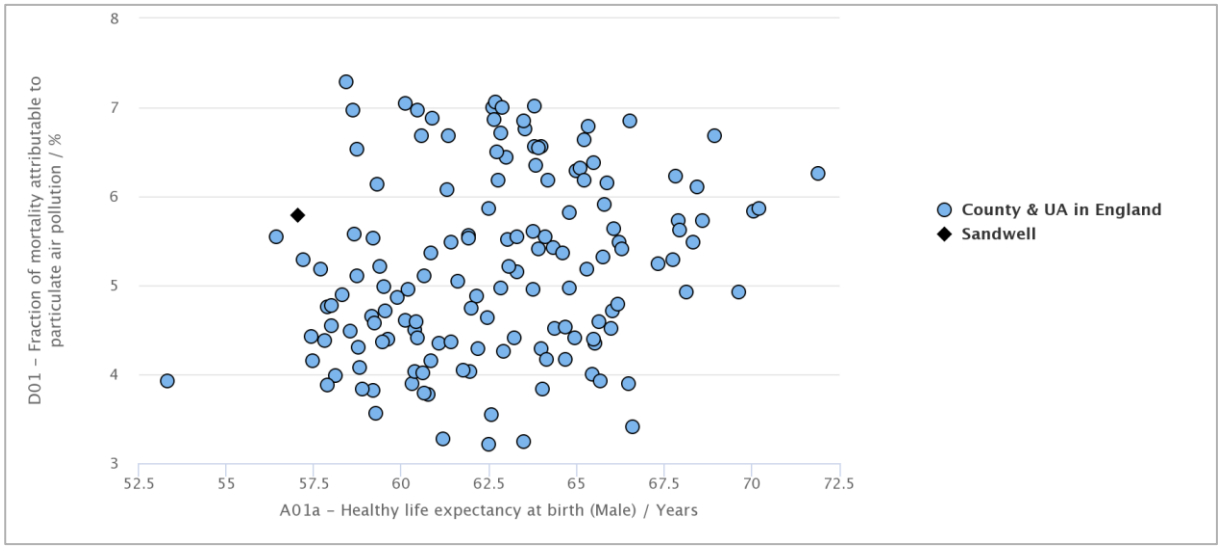
Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
21	Promotion of cycling	Promoting Travel Alternatives	Promotion of cycling	2010	2030	Sandwell MBC	Sandwell MBC, Transport for West Midlands	NO	Funded	< £10k	Implementation	No target	Increased uptake of cycling as alternative to car. Sandwell Travel Surveys	Sandwell's Local Cycling and Walking Infrastructure Plan (LCWIP) approved in 2019	Sandwell received £290,000 Active Travel fund enabling measures to improve provision for cycling in Oldbury and Smethwick.
22	Encourage travel plans for employers, schools and hospitals	Promoting Travel Alternatives	Workplace Travel Planning	2010	2030	Sandwell MBC, Nation Express West Midlands, Transport for West Midlands	Sandwell MBC	NO	Funded	< £10k	Implementation	No Target	Number of travel plans adopted by relevant organisations - including those attached as planning conditions	Used consistently as part of the planning process. ModeShift STARS also promoted	Travel plan supplementary planning document referenced in all planning applications
23	Review taxi fleet licences and private hire vehicle fleet licenced by Sandwell (including fleet composition, age and emission profiles)	Other	Other	2018	2020	Sandwell MBC	N/A	NO	Not funded	< £10k	Implementation	No target	Report summarising data findings	Data collected - monitoring to continue	
24	Encourage uptake of ULEVs in Sandwell's taxi fleet - identifying and highlighting opportunities for taxi owners to assist with purchase/lease of cleaner vehicles.	Promoting Low Emission Transport	Taxi emission incentives	2018	2025	Sandwell MBC	N/A	NO	Funded	< £10k	Planning	No target	Percentage increase in number of vehicles that are not diesel or petrol	Further joint work to be undertaken with Sandwell's Taxi licensing team to identify and promote cleaner vehicle uptake.	The pandemic has created a financial barrier for many taxi owners - with a much lower income in 2020 many are not in a financial position to invest in new cleaner vehicles.
25	Section 106 - Investigate use of 106 agreements to assist with air quality monitoring and compensate for developments with potentially negative impact on air quality	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2010	2030	Sandwell MBC	Sandwell MBC	NO	Funded	< £10k	Implementation	No target	Planning guidance and Black Country Policy Guidance requiring all development to contribute to offsetting emission creep, plus additional contributions for significant new sources.	Included in policies - subject to updating the Local Development Planning Framework	
26	Engage with council employees to promote low and ultra-low emission vehicle technologies	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	2018	2030	Sandwell MBC	N/A	NO	Funded	< £10k	Implementation	No target	Increased number of employees switching to low emission vehicles	On-going - limited progress in 2020	Opportunities for electric vehicle experience days were not possible in 2020
27	Promote car sharing amongst residents and businesses	Alternatives to private vehicle use	Car & lift sharing schemes	2010	2025	Sandwell MBC	N/A	NO	Funded	< £10k	Implementation	Low	Increased number of participants using the scheme	Implementation and promotion of the scheme on-going	Could not promote the scheme in 2020 due to the pandemic and risks of virus transmission.
28	Promotion of car club/pool vehicles and staff to share lifts	Promoting Travel Alternatives	Workplace Travel Planning	2010	2030	Sandwell MBC	N/A	NO	Not Funded	< £10k	Implementation	Reduce mileage claims by 30% and replacement of old vehicles with newer cleaner ones	Reduced mileage claims by local authority staff	On-going - progress – findings to be included in Energy Savings Trust report	The COVID 19 pandemic resulted in a seismic shift of working arrangements with the majority of staff working at home in 2020. See no.26.

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

Sandwell Metropolitan Borough Council is taking the following measures to address $PM_{2.5}$: As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases. The importance of $PM_{2.5}$ is also reflected by its more recent inclusion as a key indicator of mortality in the Public Health Outcomes Framework and is defined as a '*fraction of mortality attributable to particulate air pollution*'[32]

In 2010 in there was a morbidity burden of 6.9% associated with long-term exposure to man-made particulate air pollution to Sandwell residents over the age of 30. Between 2017 and 2019, this has only improved slightly with an estimated 6% morbidity burden, irrespective of gender. When Sandwell is compared with other local authorities in England as shown in **Figure 2.1.a** and **Figure 2.1.b,** healthy life expectancy is still relatively low for both males and females at just 59.5 years.

Figure 2.1.a Healthy Life Expectancy in Males compared with Fraction of Mortality Attributable to Fine Particulate Matter



[32] https://fingertips.phe.org.uk/profile/public-health-outcomes-framework

Although not the only issue, anthropogenic air pollution is a contributing factor in lowering the average age of healthy life-expectancy of Sandwell's residents. **Figure 2.1.c** demonstrates how the percentage fraction of mortality attributable to particulate matter air pollution is consistently around 1% higher in Sandwell when compared to England as a whole.

Figure 2.1.b Healthy Life Expectancy in Females compared with Fraction of Mortality Attributable to Fine Particulate Matter

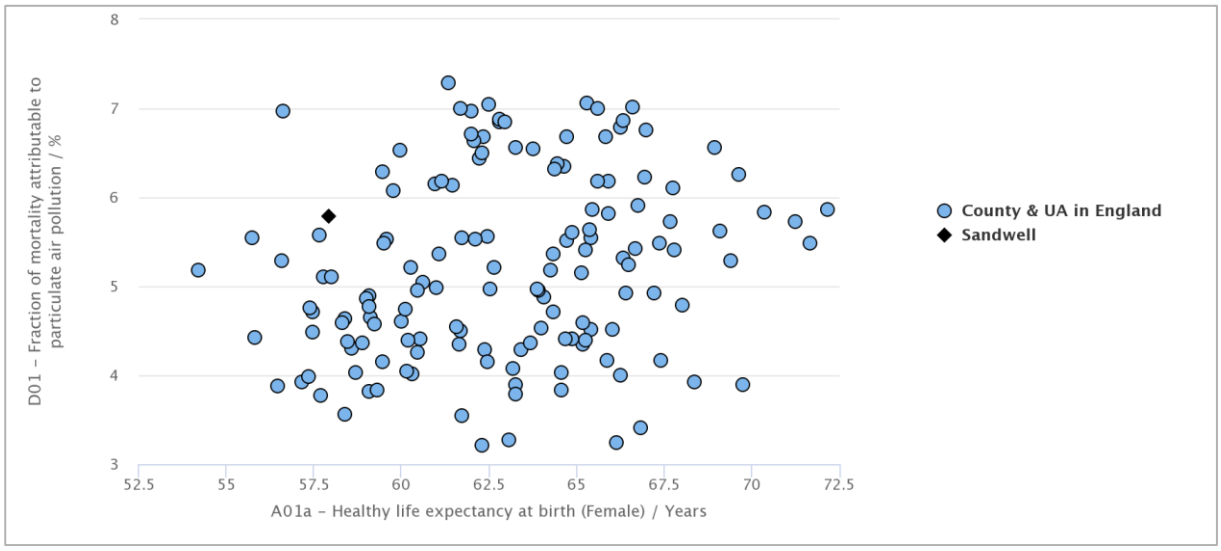
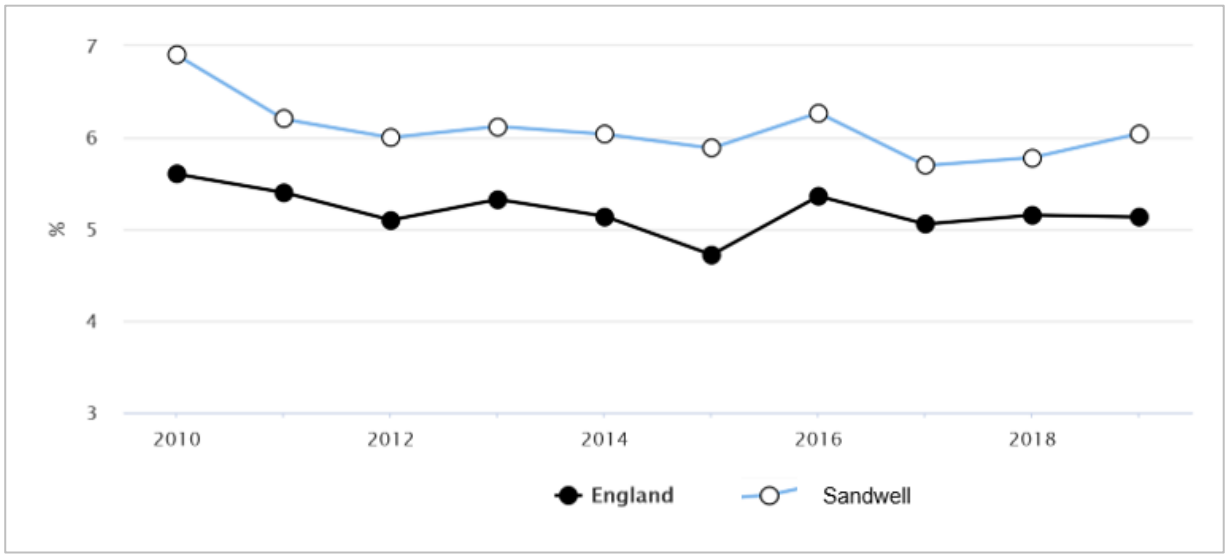


Figure 2.1.c Fraction of Mortality Attributable to Particulate Matter Air Pollution In Sandwell Compared With England



Historically, efforts to address air pollution in Sandwell have focused on reducing road traffic emissions due to their association with raised NO_2 concentrations. However, the growing body of evidence demonstrating the negative impacts of $PM_{2.5}$ on human health

means that we are now investing in and committing to more measures that will increase our understanding of the distribution $PM_{2.5}$ across Sandwell. This will assist us with formulating more appropriate and focused strategies in trying to reduce these levels. This will start with the installation of new $PM_{2.5}$ monitors at four of our five continuous monitoring sites. This information will be supplemented by the procurement of twelve low cost air quality monitors which will be installed in 2021 to give indicative readings of pollutant levels at locations across the borough.

We know road traffic creates approximately 12% of $PM_{2.5}$ in urban areas, but other sources are also important, but industrial emissions release approximately 16% and non-smokeless fuels for heating (including wood burning stoves) and other domestic sources of smoke such as bonfires can contribute approximately 38% of primary $PM_{2.5}$. We are also aware that air quality data from across the UK demonstrates that cities and urban areas like Sandwell (particularly in relation to concentrations of PM_{10} and NO_2) have worse air quality close to busy roads and these are often where poorer communities often live. It would therefore be helpful to have our own data to demonstrate actual levels of $PM_{2.5}$ in Sandwell to see if this is being reflected at a local level.

Although investment will be made in 2021 to increase our monitoring capacity of $PM_{2.5}$, we only monitored $PM_{2.5}$ at one site in 2020 Haden Hill in Cradley Heath. This is an urban background location site and can be compared with the annual mean $PM_{2.5}$ national objective of 25µg/m^3. Since 2016 the annual mean $PM_{2.5}$ at this site has risen slightly, from 5.01 µg/m^3 to 6.35 µg/m^3.

We have estimated levels of $PM_{2.5}$ at other sites in the borough for 2020 by using data from Haden Hill. The estimated levels of $PM_{2.5}$ are shown in **Table 2.2.3**. and in chart form in **Figure 3g**. Further details of the calculations undertaken are provided in **Appendix C.**

Table 2.2.3 Estimated Levels of $PM_{2.5}$ in Sandwell

Continuous Monitoring Site	Site Classification	Estimated Annual $PM_{2.5}$	
		2019	2020
Highfields, West Bromwich	Urban Background	12.07	7.95
Birmingham Road, Oldbury	Roadside	13.3	11.9
Wilderness Lane, Great Barr	Roadside	11.9	9.1

The estimated levels of $PM_{2.5}$ demonstrate that concentrations are still significantly higher in other parts of the borough than at Haden Hill. Even though estimated levels were lower in 2020 when road traffic was significantly reduced through national lockdowns, Birmingham Road Oldbury still remains above the WHO guideline of 10 µg/m^3.

Given that there is no safe level of exposure. Sandwell's ambition is to meet the WHO guideline of 10 µg/m^3 per annum, a standard based purely on reducing the risk to human health. By working to reduce all pollutant concentrations we will not only meet current national air quality objectives but also improve overall health outcomes.

Policy Guidance LAQM. PG16 acknowledges that many local authorities will consider how to address $PM_{2.5}$ alongside other pollutants when developing a range of measures to improve air quality and that few standalone $PM_{2.5}$ measures will be chosen (unless to address a very specific local problem).

Sandwell MBC is taking the following measures to address $PM_{2.5}$

Existing Measures

- Sandwell's updated Air Quality Action Plan 2020-2025 continues to refer to measures that will both limit and reduce $PM_{2.5}$ emissions in future years. This will include close partnership working with key stakeholders such as Public Health, Planning and Transportation and Sandwell's Climate Change Action Group.
- The Low Emissions Towns and Cities Planning Guidance and the Black Country Supplementary Planning Document aims to ensure that all new development is sustainable in terms of air quality. This guidance document has been used to ensure that appropriate mitigation measures are made a 'condition' of development. Conditions range from the installation of Electric Vehicle charging points at minor developments to a complete Low Emission strategy (in scale and kind) at major developments. These documents refer to $PM_{2.5}$ and the adoption of these low emission mitigation measures will reduce the impact of $PM_{2.5}$ in future years.
- Sandwell has continued to encourage modal shift towards walking, cycling, public transport and low emission vehicles, all of which will reduce emissions of $PM_{2.5}$ by easing congestion and improving vehicle emissions.
- Reducing traffic congestion through the careful management of road infrastructure including improving traffic and pedestrian signals and introducing speed restrictions

and parking enforcement measures to reduce obstructions on congested roads. These measures when incorporated together will help to reduce traffic congestion and therefore reduce $PM_{2.5}$ emissions and help to mitigate the impact on air quality.

- Improving public awareness of poor air quality and providing residents alternative transport options and opportunities through travel planning, social media, council webpages and better public transport branding continues. Aiming to reduce reliance on private vehicles and help address $PM_{2.5}$ emissions.
- Sandwell's Pollution Control team along with the Environment Agency continues to regulate the control of emissions (including $PM_{2.5}$) from industrial processes. Ensuring that all sites requiring an Environmental Permit operate within the required limits to reduce emissions of particulate matter.

New Measures

- Sandwell MBC is aware of the substantial advantages of extending its $PM_{2.5}$ monitoring network to improve understanding of concentrations across the borough and to be able to benchmark progress at reducing $PM_{2.5}$ at 'hotspot' sites. The council has now committed to the purchase of 12 low-cost air quality monitors for installation in 2021. These will be deployed across the borough to provide real-time data at key sites e.g. busy roads with relevant sensitive receptors as well as less busy streets where pollutant levels may be unexpectedly higher due to factors such as street canyons. There is also the option for them to be located for specific project work with local communities e.g. schools.
- It is a matter of concern that $PM_{2.5}$ emissions may begin to rise in Sandwell with the increased use of biomass technologies as well as the continued popularity and uptake of wood burning stoves. Currently Sandwell is covered in a patchwork of 51 designated Smoke Control Areas. This results in confusion and inequality with regards air quality controls for those living and operating businesses in Sandwell. A review began in 2020 with the proposal to revoke the existing 51 Smoke Control Orders with a view to designating the whole of the borough as a Smoke Control Area. A map showing the current extent of the Smoke Control Areas in Sandwell can be found in **Appendix G.**
- Alongside the review of Sandwell's existing Smoke Control Areas, it was also recognised that we need to raise awareness with residents about $PM_{2.5}$ air pollution

generated by wood burning stoves. A wood burning stove campaign is therefore also planned for 2021.

- The Defra Air Quality Grant awarded in March 2021 to work with faith communities in Sandwell to improve air quality via behaviour change, will also provide a platform for distributing information and education on the sources of $PM_{2.5,}$ The use of a web based dashboard relaying real-time air quality data which can display $PM_{2.5}$ levels should prove an effective and powerful tool to make this invisible threat to health more visible.

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

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

Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Sandwell Metropolitan Borough Council undertook automatic (continuous) monitoring at 5 sites during 2020. **Table A.1 in Appendix A** shows the details of the automatic monitoring sites. NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem. Automatic monitoring results are also available through the UK-Air website[33].

A map providing an overview of where the automatic monitoring stations are sited in Sandwell is shown on the map in **Appendix D.1.** 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

Sandwell Metropolitan Borough Council undertook non- automatic (i.e. passive) monitoring of NO_2 at 123 sites during 2020**. Table A.2** in **Appendix A** presents the details of the non-automatic sites.

Maps showing the location of the monitoring sites are provided at:

https://www.google.com/maps/d/u/0/edit?mid=1nGA4FFE8NldDGtwSqDS08felzsi0t6V-&usp=sharing

[33] https://www.airqualityengland.co.uk/

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**.

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 33%), and distance correction. Further details on adjustments are provided in **Appendix C.**

3.1.3 Nitrogen Dioxide (NO_2)

Table A.3 and **Table A.4** in **Appendix A** compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

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

Table A.5 in **Appendix A** compares the ratified continuous monitored NO_2 hourly mean concentrations for the past five years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

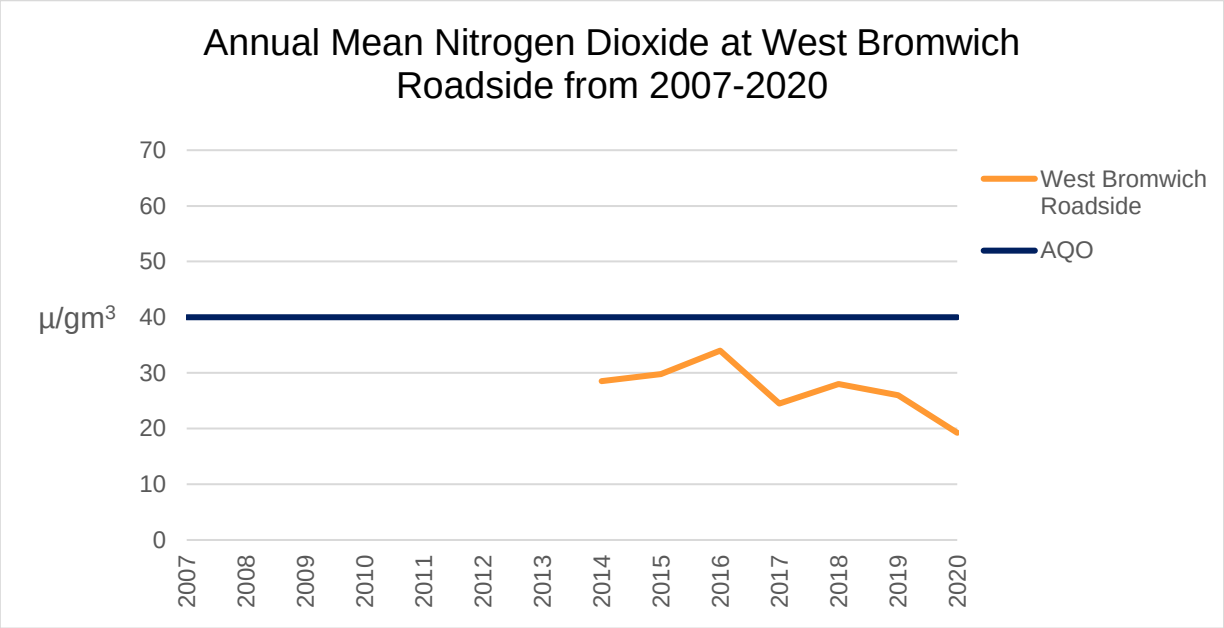
Interpretation of Nitrogen Dioxide Results

Continuous Monitoring Sites

- Data Capture was 85.7% or above at all five continuous monitoring sites, so no annualisation of data was required.
- The Cronehills Linkway, West Bromwich, known as ‘West Bromwich Roadside’ was established in 2014. This was installed to monitor the impact of new retail

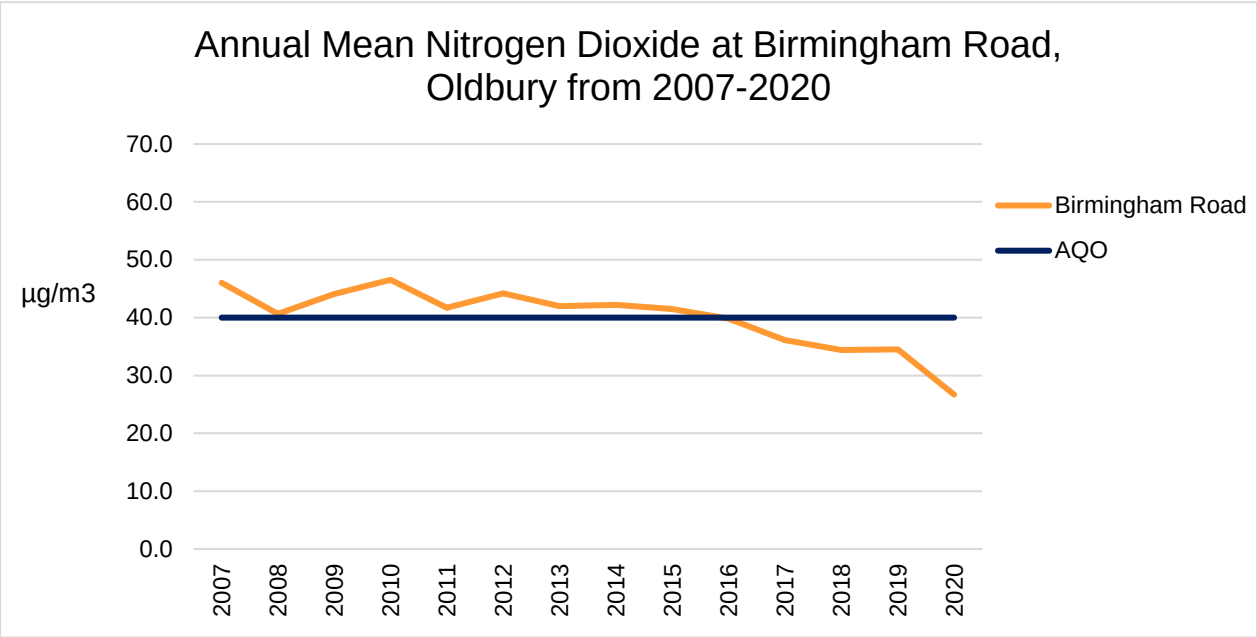
development and associated car parking established on the east side of West Bromwich town centre. The annual mean NO_2 concentration at this site was 19µg/m^3 in 2020 as is shown in **Figure 3a** . Mean annual NO_2 was, down 32% from 2019 which is the greatest reduction from any of the continous monitoring stations. The majority of traffic passing this station is entering the West Bromwich retail centre car park and interestingly mirrors the closure of non-essential shops for 30% of the year.

Figure 3a



- In 2015 Birmingam Road, Oldbury recorded an annual mean of 41.5µg/m^3, in 2020 this had fallen to 25.9µg/m^3 (it should be noted that the three diffusion tubes co-located at this station also recorded a similar bias adjusted mean of 27.8µg/m^3) and is now within the national objective. The general downward trend at this site as is shown in **Figure 3b**.
- Although Birmingham Road, Oldbury had been demonstrating an overall downward trend in NO_2 in 2019, the reduction from 33.5µg/m^3 to 25.9µg/m^3 in 2020 is a 26% decrease. This has without doubt has been influenced by the spring national lockdown in 2020. Even with reduced road traffic in 2020 there was still one passive diffusion tube deployed on this section of the A457 that recorded an annual mean of 38µg/m^3 which is within 10% of the national objective. It is expected that levels will rebound along this section of road in 2021, but whether they rebound to 2019 levels is yet to be determined.

Figure 3b



- West Bromwich Highfields is an Urban Background monitoring station. There has been little change in NO_2 levels over the last five years, with an annual mean of 21µg/m^3, so the 31% drop to 15µg/m^3 in 2020 would again is strongly linked to the spring national lockdown. This site has not follow the UK trend in the past where the annual mean concentration at urban background sites has reduced by an average of 1.0 µg/m^3 each year[34].
- The monitor at Haden Hill continues to record urban background levels near Cradley Heath. Levels at this site have decreased by 4µg/m^3 since last year to an annual mean of 11µg/m^3. Given that background levels at this site have shown little change in the last five years national lockdown is clearly reflected in this significant 27% reduction.
- The NO_2 annual mean at Wilderness Lane, Great Barr was 23µg/m^3. This was 7µg/m^3 lower than last year and represents a 26% reduction. Given that this site had year on year increases of NO_2 until last year as shown in **Figure 3c** below, it is not expected that this reduction will be sustained through 2021.

[34] https://www.gov.uk/government/publications/air-quality-statistics/ntrogen-dioxide

Figure 3c

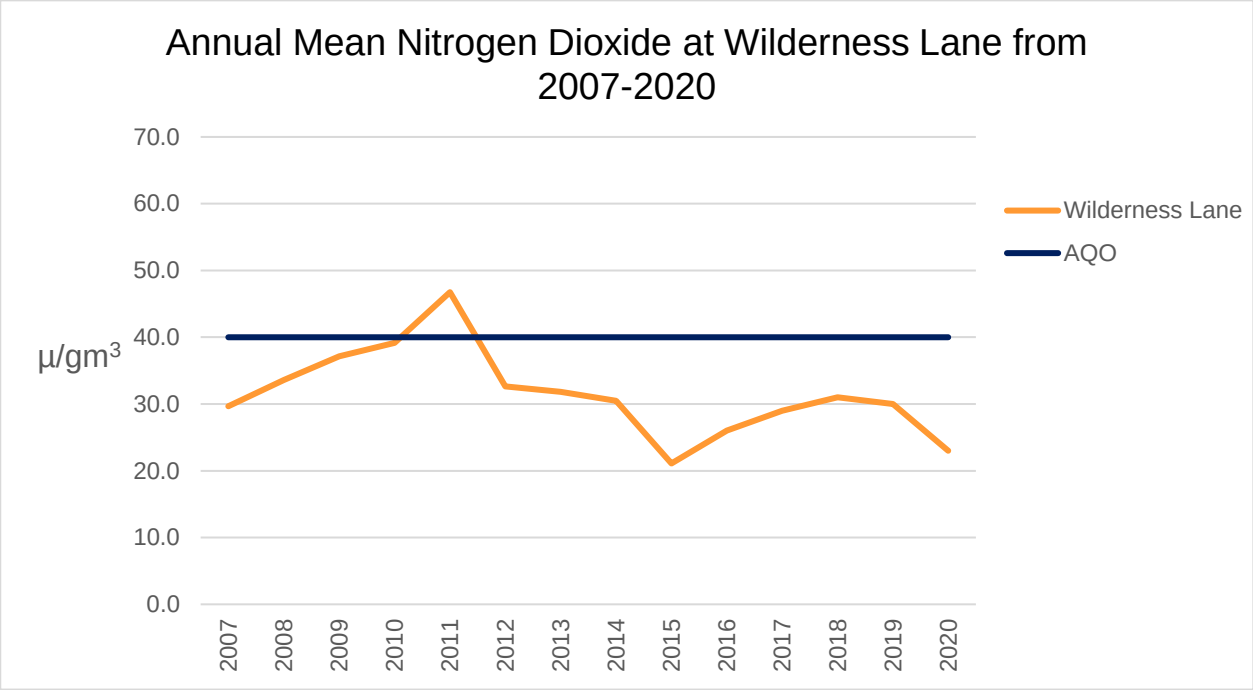


Table A.5 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past five years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

The results demonstrate that there have been no exceedances of the hourly NO_2 objective at any of the continuous monitoring stations. This is the second year in a row where no exceedances have been identified, but it is not surprising given road traffic reductions in 2020.

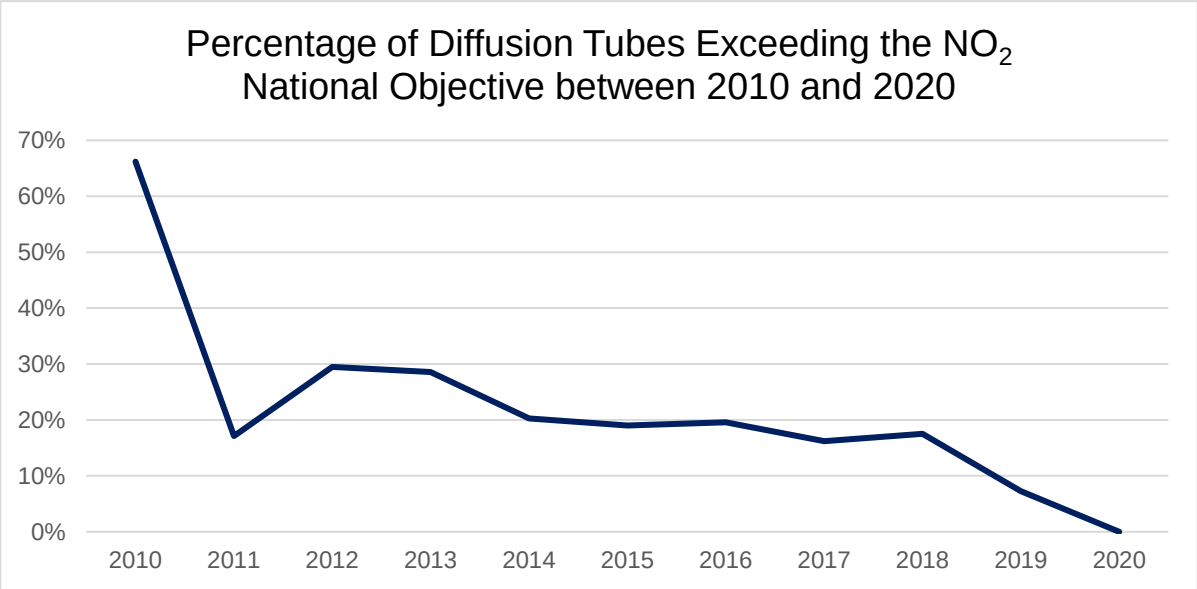
It is however acknowledged that the Bearwood Road site is no longer being monitored. Given that this is a busy road and is classified as a street canyon due to the close and terraced nature of the buildings, it will be a priority to re-establish some indicative monitoring at this site in the future, most likely through the use of a 'Zephyr' air quality monitor. Whilst long-term monitoring at this site remains under review, passive diffusion tube monitoring will continue at the ten monitoring sites currently located along Bearwood Road.

Diffusion Tubes

The long-term trends in diffusion tube data have demonstrated continual improvement in annual mean NO_2 concentrations at most of our sites, and a widespread compliance with the annual mean objective. 2020 is the first year since monitoring began that no sites

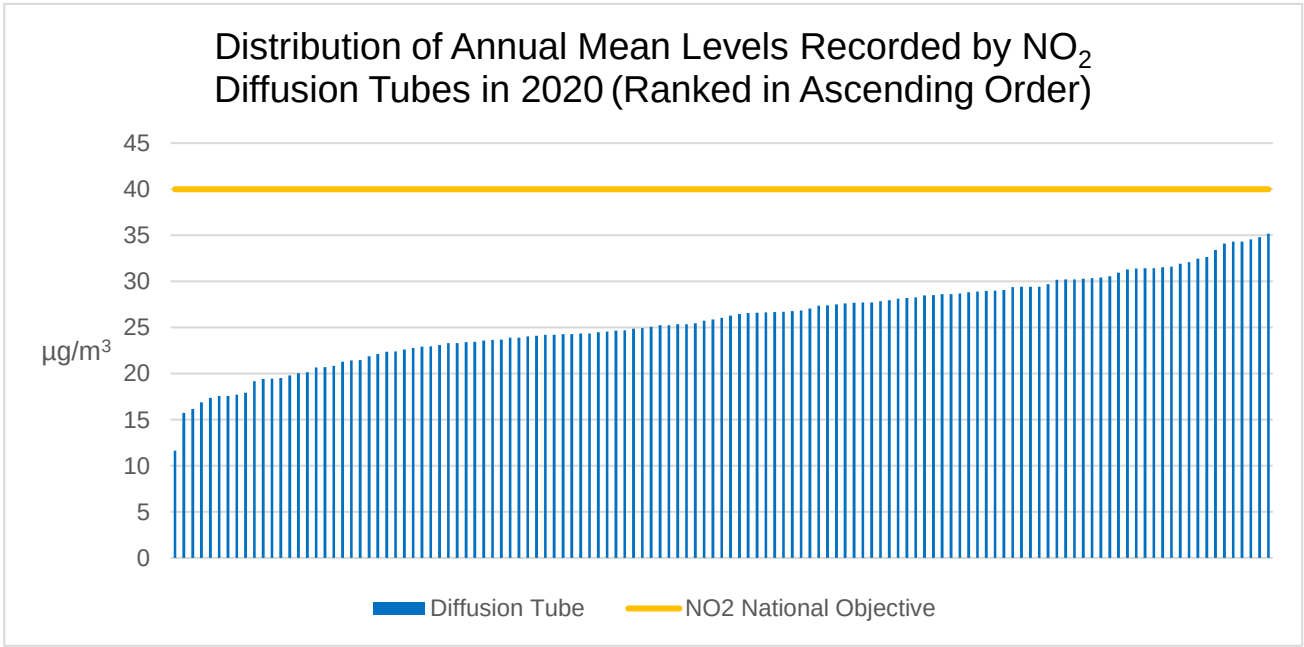
exceeded the objective. In 2019 only 7.3% (9 sites) were exceeding the objective, the consequence of the spring national lockdown on traffic has succeeded in bringing the annual means into compliance as shown in **Figure 3d** below.

Figure 3d



Further analysis of the data also demonstrates that in 2020 there were no sites (once adjusted for distance) where the levels were within 10% of the national objective. **Figure 3e** demonstrates the distribution of annual mean NO_2 (or average mean of triplicate diffusion tubes) located in Sandwell compared with the 40µg/m^3 national objective for NO_2.

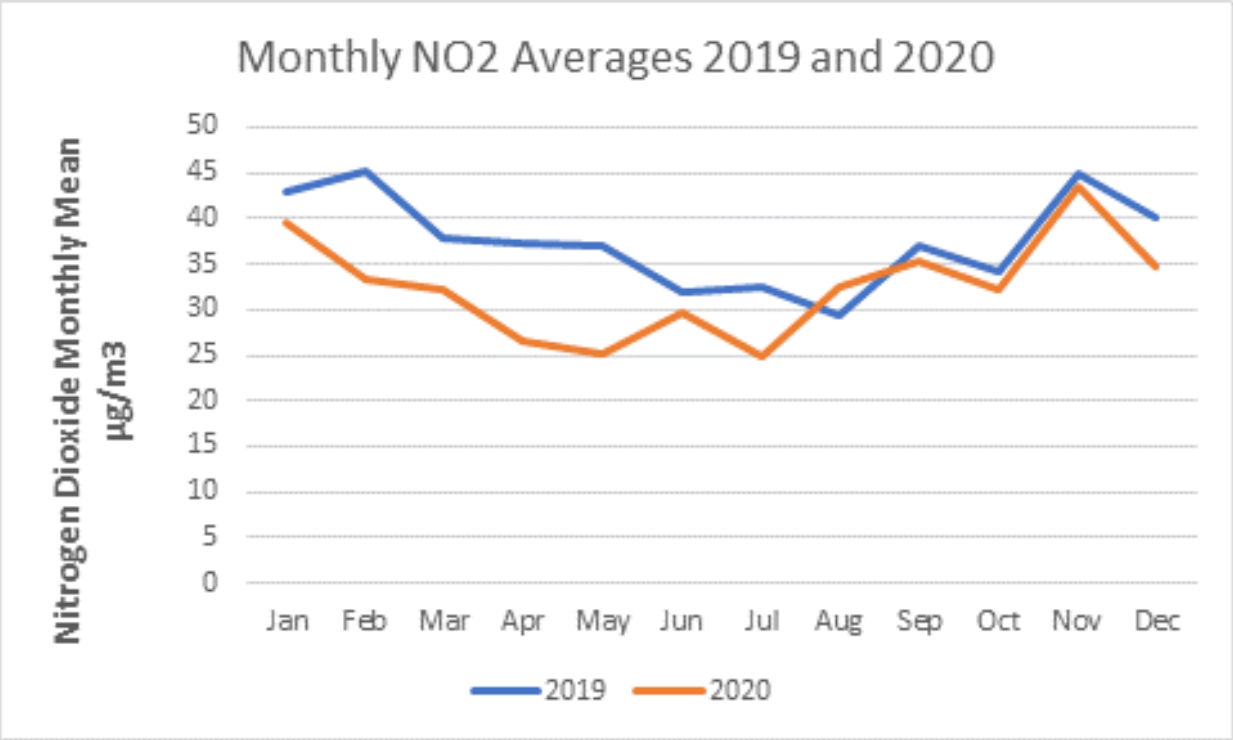
Figure 3e



The results clearly demonstrate the expected strong correlation between traffic and NO_2 and the significant impact that the reductions in traffic during national lockdowns had on Sandwell's air quality when reviewed as an annual mean.

It is also interesting to compare the monthly raw data from the diffusion tubes in 2019 and 2020 as shown in **Figure 3f**. Although this data has not been annualised or bias adjusted it does demonstrate how levels of NO_2 were clearly lower in the spring months of March to May 2020 than in 2019. Although NO_2 levels do normally reduce in the spring months due to better weather, the reduction is significant. It is evident that NO_2 levels were returning to those of 2019 in the autumn and winter months.

Figure 3f



Although annual NO_2 results from 2020 are all within the national objective it has been agreed with Defra that this year's data is unlikely to be representative of long-term trends in pollutant concentrations. We cannot be confident that air quality objectives will continue to be met in future years and therefore Sandwell will retain its borough wide Air Quality Management Area for exceedance of the annual mean NO_2 objective.

3.1.4 Particulate Matter (PM_{10})

Table A.6 in **Appendix A:** Monitoring Results compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of 40µg/m^3.

- Data Capture was 83.5% or above at four of the five continuous monitoring sites. However valid data capture at Haden Hill in Cradley Heath was only 41.9% and was therefore annualised.
- PM_{10} annual mean concentrations were already significantly below the national air quality objective of 40µg/m^3 and remain so, in 2020.
- In 2019 there was some concern that PM_{10} had risen slightly at all sites, following several years of decline. Although the levels recorded in 2020 demonstrate reductions in PM_{10} ranging between 12% at Highfields, West Bromwich to 24% at Wilderness Lane, Great Barr this is undoubtedly linked to reduce road traffic and will need to be reassessed in 2021.

Table A.7 in **Appendix A** compares the ratified continuous monitored PM_{10} daily mean concentrations for the past five years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

- Due to data capture being below 85% at Haden Hill, Cradley Heath, the 90.4th percentile of the 24-hour mean is provided in accordance with LAQM TG(16).
- Although the air quality objective for PM_{10} was achieved for all sites, there were still a few exceedances at 3 of the 4 sites. Highfields, West Bromwich recorded the greatest number of daily exceedances with a total of 3. The maximum daily mean recorded at this site was 62µg/m^3. It is worth noting that all but one of the exceedances recorded by the monitoring stations were on 6 and 7 November , correlating with the increased prevalence of bonfires and fireworks being lit at this time of year. This further demonstrates the dramatic impact that burning has on local air quality.

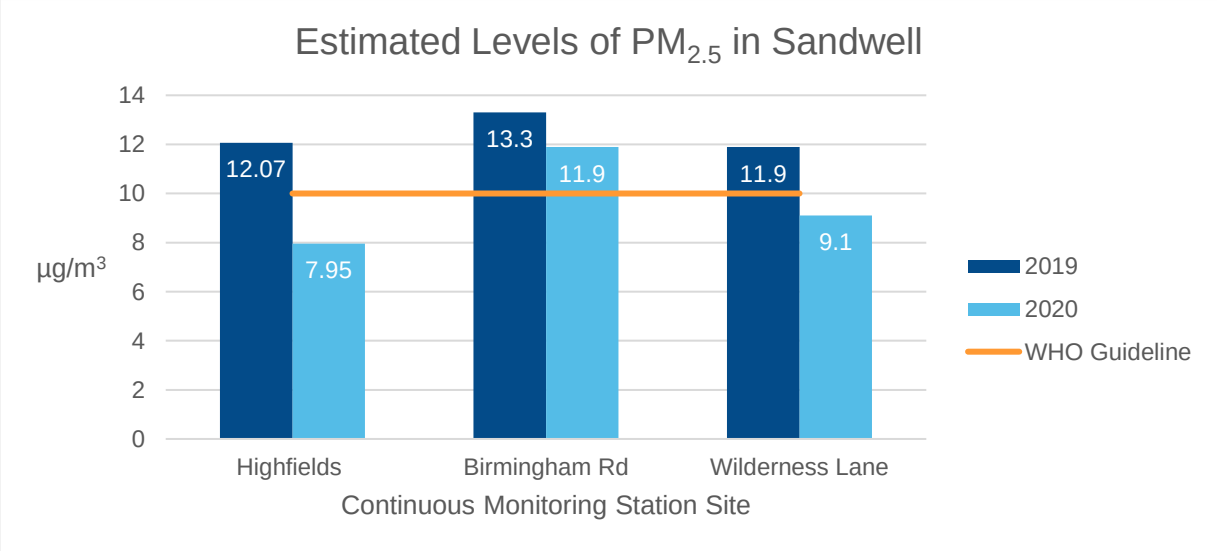
3.1.5 Particulate Matter ($PM_{2.5}$)

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

$PM_{2.5}$ is the pollutant which has the biggest impact on public health and on which the Public Health Outcomes Framework (PHOF) indicator is based. Although investment will be made in 2021 to increase our monitoring capacity of $PM_{2.5}$, we currently only monitor $PM_{2.5}$ at Haden Hill in Cradley Heath. This is an urban background location site, which allows for comparison with the national annual mean $PM_{2.5}$ objective of 25µg/m^3. Since 2016 the annual mean $PM_{2.5}$ at this site has risen slightly, from 5.01 µg/m^3 to 6.35 µg/m^3. The target for $PM_{2.5}$ was a 15% reduction of $PM_{2.5}$ between 2010 and 2020. The site had levels of 12.2 µg/m^3 in 2010 so this equates to a 48% reduction. Even if were to discount the results from 2020 due to the pandemic, the reduction achieved up until 2019 was 43%.

We have estimated levels of $PM_{2.5}$ at other sites in the borough for 2020 by using data from Haden Hill. The estimated levels of $PM_{2.5}$ are shown in **Figure 3g** below.

Figure 3g – Estimated Levels of $PM_{2.5}$ in Sandwell in comparsion with the WHO guideline



The estimated levels of $PM_{2.5}$ demonstrate that concentrations were higher in other parts of the borough in 2020 than at Haden Hill. The fact that levels still remain relatively high at Birmingham Road, Oldbury, given that NO_2 reduced more significantly, supports the science that primary particulate matter is more greatly influenced by other sources such as

domestic burning. So even though road traffic was dramatically reduced in 2020, Birmingham Road, Oldbury continued to exceed the WHO guideline of 10µg/m^3 per annum. In 2020 the estimated levels of $PM_{2.5}$ are potentially within sight of the WHO health guidelines of 10 µg/m^3 per annum. It is therefore considered that it would be more appropriate for Sandwell to aim to meet the tougher WHO health guidelines. This is an ambition which is supported by Defra in their publication 'Assessing progress towards WHO guideline levels of $PM_{2.5}$ in the UK 2019[35]. This states that, '*On the basis of scientific modelling, which has not considered full economic viability and practical deliverability, we believe that, whilst challenging, it would be technically feasible to meet the WHO guideline level for $PM_{2.5}$ across the UK in the future [2030]'.*

3.1.6 Ozone (O_3)

Currently, there is no requirement for local authorities to meet the WHO objectives for ground level ozone (O_3), as it is identified as a 'transboundary' pollutant which can drift across countries. It is therefore not included within the National Air Quality Objectives. The World Health Organisation Air Quality Objective for ozone is 100µg/m^3, where the daily maximum of the 8-hour running mean should not be exceeded more than 10 times per annum. This is because surface, or ground-level ozone, can trigger a variety of health problems, particularly for children, the elderly, and people of all ages who have lung diseases such as asthma.

Ozone is currently monitored at one location in Sandwell - Highfields, West Bromwich. In 2020 data capture was 99.2 %, the annual mean was 53µg/m3. This was a 20% increase in the annual mean from 2019. The maximum running 8-hour mean was 168µg/m^3 and the 100µg/m^3 limit was exceeded on 30 days. This was a 200% increase since last year, when 10 were recorded. There is an annual allowance of 10 days for exceedances, so the WHO ozone standard was exceeded.

It is worth noting that a rise in O_3 was also noted across the UK during the first lockdown in the spring of 2020, as is confirmed in a study published in December 2020 by the

[35] *https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/930104/air-quality-who-pm25-report.pdf*

University of York[36] . This study suggests that less traffic on the roads was part of the reason why damaging surface ozone levels rose during lockdowns. This is a phenomenon normally seen on Sundays in towns and cities when traffic levels are reduced. Further discussion on this phenomenon can be found in **Appendix F** where the impact of Covid-19 on local air quality management in Sandwell is explored in more detail.

[36] James D. Lee, Will S. Drysdale, Doug P. Finch, Shona E. Wilde, Paul I. Palmer. UK surface NO_2 levels dropped by 42% during the COVID-19 lockdown: impact on surface O_3. Atmospheric Chemistry and Physics, 2020; 20 (24): 15743 DOI: 10.5194/acp-20-15743-2020

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)
West Bromwich	Highfields	Urban Background	400187	291601	NO2	Yes	Chemiluminescence	35	21	2.5
West Bromwich	Highfields	Urban Background	400187	291601	PM10	Yes	TEOM	35	21	2.5
West Bromwich	Highfields	Urban Background	400187	291601	O3	Yes	Chemiluminescence	35	21	2.5
Birmingham Rd (Oldbury	Birmingham Road	Roadside	399857	289392	NO2	Yes	Chemiluminescence	8	5	2.5
Birmingham Rd (Oldbury	Birmingham Road	Roadside	399857	399857	PM10	Yes	TEOM	8	5	2.5
Wilderness Lane (Great Barr)	Wilderness Lane	Roadside	403956	294855	NO2	Yes	Chemiluminescence	147	11	2.8
Wilderness Lane (Great Barr)	Wilderness Lane	Roadside	403956	294855	PM10	Yes	TEOM	147	11	2.8
Haden Hill	Haden Hill	Urban Background	395755	285493	NO2	Yes	Chemiluminescence	105	119	2.5
Haden Hill	Haden Hill	Urban Background	395755	285493	PM10	Yes	TEOM	105	119	2.5
Haden Hill	Haden Hill	Urban Background	395755	285493	PM2.5	Yes	TEOM	105	119	2.5
West Bromwich Roadside	West Bromwich Roadside	Roadside	400521	291541	NO2	Yes	Chemiluminescence	11	7	1.6

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)
AD	Myvod Road - Wednesbury	Roadside	399639	296095	NO2	Sandwell	10.0	1.5	No	2.8
AE	Wood Green Road - Wednesbury	Roadside	399680	296089	NO2	Sandwell	11.1	1.7	No	2.7
AF	Wood Green Road - Wednesbury	Roadside	399672	296042	NO2	Sandwell	11.1	1.7	No	2.7
B17	Birmingham Road - Oldbury	Roadside	399733	289401	NO2	Sandwell	15.0	1.5	No	2.8
BA	Lamppost next to Birmingham Road - Oldbury	Roadside	399686	289431	NO2	Sandwell	4.0	4.0	No	2.8
BD	Birmingham Road - Oldbury	Kerbside	399889	289395	NO2	Sandwell	5.8	1.0	No	2.8
BDQ	Birmingham Road - Oldbury	Roadside	399943	289377	NO2	Sandwell	8.6	1.2	No	2.8
BE	Traffic sign outside Birmingham Road - Oldbury	Kerbside	399915	289353	NO2	Sandwell	2.5	0.8	No	2.7
BF	Birmingham Road - Oldbury	Roadside	399807	289408	NO2	Sandwell	5.8	0.3	No	2.6
BG	Birmingham Road, Oldbury	Roadside	399721	289429	NO2	Sandwell	5.6	0.3	No	2.7
BO	Birmingham Road - Oldbury	Roadside	400039	289366	NO2	Sandwell	6.2	0.3	No	2.8
BP	Birmingham Road - Oldbury	Roadside	400191	289441	NO2	Sandwell	6.8	6.8	No	2.8
BR	Birmingham oad - Oldbury	Roadside	399814	289407	NO2	Sandwell	3.0	5.9	No	2.1

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)
BS	Blakeley Hall Road - Oldbury	Roadside	399864	289427	NO2	Sandwell	16.3	8.6	No	2.9
B52	Lampost by 98 Birmingham Road - Oldbury	Roadside	399692	289428	NO2	Sandwell	5.0	3.0	No	2.8
C10A	Hagley Road West - Bearwood	Roadside	402285	286062	NO2	Sandwell	4.0	0.4	No	2.7
C10D	Hagley Road West - Bearwood	Kerbside	402298	286073	NO2	Sandwell	0.8	5.3	No	2.8
C11A	Halesowen Street - Rowley Regis	Roadside	397439	286416	NO2	Sandwell	4.9	4.9	No	2.8
C11D	High Street - Rowley Regis	Kerbside	397428	286381	NO2	Sandwell	1.3	0.5	No	2.7
C11E	Halesowen Street - Rowley Regis	Kerbside	397391	286359	NO2	Sandwell	4.5	0.1	No	2.8
C12A	Holly Road - Rowley Regis	Roadside	396899	286438	NO2	Sandwell	2.5	1.0	No	2.6
C12D	Powke Lane - Rowley Regis	Kerbside	396872	286454	NO2	Sandwell	3.0	0.1	No	2.7
C12E	Powke Lane - Rowley Regis	Roadside	396780	286465	NO2	Sandwell	3.5	3.0	No	3.0
C13D	Dudley Port - Tipton	Roadside	396411	291471	NO2	Sandwell	4.1	2.4	No	2.9
C14A	Ocker Hill Road - Tipton	Kerbside	397355	293929	NO2	Sandwell	16.0	0.6	No	2.9
C15A	Gorsty Hill - Cradley Heath	Roadside	396867	285536	NO2	Sandwell	2.0	2.0	No	2.7
C1A	Sandwell Road North - West Bromwich	Kerbside	400668	291726	NO2	Sandwell	5.0	0.3	No	2.5
C1D	Grafton Road - West Bromwich	Roadside	400664	292020	NO2	Sandwell	18.0	2.0	No	2.8

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)
C2A	All Saints Way - West Bromwich	Roadside	401050	292898	NO2	Sandwell	9.8	2.0	No	2.8
C2E	Heath Lane - West Bromwich	Roadside	401059	292966	NO2	Sandwell	4.9	1.0	No	2.8
C4A	Walpole Walk - West Bromwich	Roadside	400619	290153	NO2	Sandwell	9.0	0.3	No	2.8
C4D	Kenrick Way - West Bromwich	Kerbside	400657	290090	NO2	Sandwell	9.0	0.3	No	2.7
C4E	Kenrick Way - West Bromwich	Kerbside	400738	290113	NO2	Sandwell	6.0	0.5	No	2.7
C5A	Bromford Lane - West Bromwich	Roadside	399267	290084	NO2	Sandwell	2.1	0.2	No	2.8
C5D	Broadwell Road - Oldbury	Kerbside	399207	290032	NO2	Sandwell	8.3	0.7	No	2.8
C5E	Kellner Gardens - Oldbury	Roadside	399139	289947	NO2	Sandwell	2.9	1.9	No	2.7
C6A	Halesowen Street/Oldbury Ringway - Oldbury	Roadside	398937	289322	NO2	Sandwell	17.9	3.0	No	2.1
C6E	Stone Street - Oldbury	Kerbside	399229	289315	NO2	Sandwell	13.8	0.5	No	2.8
C7A	Dudley Road East - Oldbury	Kerbside	398283	290113	NO2	Sandwell	1.5	0.6	No	2.8
C7D	Dudley Road - Oldbury	Roadside	398136	290226	NO2	Sandwell	11.3	1.6	No	2.8
C7E	Dudley Road East - Oldbury	Kerbside	398042	290285	NO2	Sandwell	9.5	0.4	No	2.8
C7F	Asquith Drive, Tividale - Oldbury	Roadside	397493	290628	NO2	Sandwell	4.7	0.3	No	2.8
C7H	Dudley Road East - Oldbury	Roadside	398311	290135	NO2	Sandwell	4.4	0.5	No	2.7

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube Co-located with a Continuous Analyser?	Tube Height (m)
C9A	Bearwood Road - Bearwood	Roadside	402138	286650	NO2	Sandwell	2.6	0.3	No	2.9
C9D	Sandon Road - Bearwood	Roadside	402160	286554	NO2	Sandwell	2.3	2.0	No	2.8
DA1, DA2, DA3	Lamppost on corner of Bilhay Lane and A41 - West Bromwich	Roadside	399402	292095	NO2	Sandwell	15.0	3.0	No	2.8
DB1, DB2, DB3	Lamppost on Bilhay Street off A41 - West Bromwich	Roadside	399508	292068	NO2	Sandwell	30.0	5.0	No	2.8
DC1, DC2, DC3	Lamppost on the corner of Mill Street - West Bromwich	Roadside	400233	291783	NO2	Sandwell	20.0	1.5	No	2.8
DD1, DD2, DD3	Lamppost by Providence Place on A41 - West Bromwich	Roadside	400366	291781	NO2	Sandwell	60.0	2.0	No	2.8
DE1, DE2, DE3	Lamppost on Congregation Way by A41 - West Bromwich	Roadside	400728	291599	NO2	Sandwell	80.0	2.0	No	2.8
DF1, DF2, DF3	Lamppost on Congregation Way by A41 - West Bromwich	Roadside	400890	291558	NO2	Sandwell	50.0	2.0	No	2.8
DG1, DG2, DG3	Lamppost on Beeches Road - West Bromwich	Roadside	401040	291269	NO2	Sandwell	10.0	2.0	No	2.8

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)
DH1, DH2, DH3	Lamppost on the corner of Nicholls Street - West Bromwich	Kerbside	401195	290934	NO2	Sandwell	10.0	0.5	No	2.9
DEF1	Corner of Joseph St & W'ton Road - Oldbury	Roadside	398469	288673	NO2	Sandwell	40.0	2.0	No	2.8
DEF2	Corner of Birchley Park Ave and W'ton Road	Roadside	398405	288722	NO2	Sandwell	7.0	7.0	No	2.8
DP1	Horseley Heath - Tipton	Roadside	397324	292256	NO2	Sandwell	3.2	1.3	No	2.8
DP4	Tame Road - Tipton	Roadside	397344	292214	NO2	Sandwell	7.1	1.5	No	2.8
EA	Overend Street - West Bromwich	Kerbside	400869	291102	NO2	Sandwell	4.8	0.8	Yes	2.8
EB	Legge Street - West Bromwich	Roadside	400921	291001	NO2	Sandwell	6.9	2.3	Yes	2.8
ED	Cronehills Linkway - West Bromwich	Roadside	400555	291257	NO2	Sandwell	4.5	4.0	Yes	2.8
EE	St Michael Street - West Bromwich	Roadside	400275	291132	NO2	Sandwell	3.5	0.5	No	2.9
EF	Bromford Lane - West Bromwich	Roadside	399789	290547	NO2	Sandwell	5.5	5.2	No	2.9
FA1, FA2, FA3	Lamppost on A457 Birmingham Road - Oldbury	Roadside	398756	289622	NO2	Sandwell	272.0	2.0	No	2.8
FB1, FB2, FB3	Lamppost on A457 Birmingham Road - Oldbury	Roadside	398717	289574	NO2	Sandwell	275.0	2.0	No	2.9

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)
FC1, FC2, FC3	Lamppost on A457 Birmingham Road - Oldbury	Roadside	398788	289451	NO2	Sandwell	160.0	3.0	Yes	2.8
FD1	Lamppost on Judge Close - Oldbury	Roadside	399162	289413	NO2	Sandwell	39.0	3.0	Yes	2.8
FD2, FD3	Lamppost on Judge Close - Oldbury	Roadside	399162	289413	NO2	Sandwell	39.0	3.0	Yes	2.8
FE1, FE2	Lamppost on A457 Birmingham Road - Oldbury	Roadside	399375	289398	NO2	Sandwell	52.0	2.5	No	2.8
FE3	Lamppost on A457 Birmingham Road - Oldbury	Roadside	399375	289398	NO2	Sandwell	52.0	2.5	No	2.1
FF1, FF2, FF3	Lamppost on A457 Birmingham Road - Oldbury	Roadside	400370	289532	NO2	Sandwell	150.0	3.0	No	2.8
FG1, FG2, FG3	Lamppost on A457 Birmingham Road - Oldbury	Roadside	400535	289436	NO2	Sandwell	120.0	3.0	No	2.8
GA	AURN Site - Birmingham Road - Oldbury	Roadside	399858	289391	NO2	Sandwell	8.2	5.4	No	2.7
GB	AURN Site - Birmingham Road - Oldbury	Roadside	399858	289391	NO2	Sandwell	8.2	5.4	No	2.8
GC	AURN Site - Birmingham Road - Oldbury	Roadside	399858	289391	NO2	Sandwell	8.2	5.4	No	2.8
HA	High Street - West Bromwich	Kerbside	400383	291307	NO2	Sandwell	1.0	0.3	No	2.8

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)
HH1	Haden Hill - Cradley Heath	Urban Background	395754	285492	NO2	Sandwell	87.0	0.5	No	2.9
KD	Lamp-post outside Attingham Drive, Great Barr	Urban Background	403793	294661	NO2	Sandwell	13.0	0.3	No	2.9
KE	Ragley Drive, Great Barr	Kerbside	403925	294970	NO2	Sandwell	1.2	0.0	No	2.9
LA	AURN Site - Highfields West Bromwich	Urban Background	400216	291633	NO2	Sandwell	N/A	26.1	No	2.9
LB	AURN Site - Highfields West Bromwich	Urban Background	400216	291633	NO2	Sandwell	N/A	26.1	No	2.9
LC	AURN Site - Highfields West Bromwich	Urban Background	400216	291633	NO2	Sandwell	N/A	26.1	No	2.9
MA	Mallin Street - Smethwick	Roadside	400712	289296	NO2	Sandwell	2.0	1.8	No	2.9
MC	St Paul's Road - Smethwick	Kerbside	400748	289150	NO2	Sandwell	1.6	0.7	No	2.9
N1A	Kelvin Way - West Bromwich	Roadside	399647	290355	NO2	Sandwell	N/A	0.1	No	2.9
N1B	Clifford Road - West Bromwich	Kerbside	399615	290358	NO2	Sandwell	N/A	0.9	No	2.9
N2A	Soho Close - Smethwick	Kerbside	403126	288557	NO2	Sandwell	20.0	0.8	No	2.8
OA	Lightwoods Fish Bar, Bearwood Road	Roadside	402240	286203	NO2	Sandwell	2.9	0.2	No	2.8
OB	Travel Book Shop, Bearwood Road	Roadside	402195	286233	NO2	Sandwell	4.0	1.0	No	2.8

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)
OC	Halifax Building Society, Bearwood Road	Roadside	402245	286150	NO2	Sandwell	4.0	1.0	No	2.9
OD	Iceland, Bearwood Road	Roadside	402222	286162	NO2	Sandwell	5.2	1.0	No	2.9
OE	Bradford and Bingley, Bearwood Road	Roadside	402212	286234	NO2	Sandwell	4.0	1.0	No	2.9
OG	Lamp-post on Bearwood Road	Roadside	402187	286333	NO2	Sandwell	4.0	0.5	No	2.8
OH	Lamp-post on Bearwood Road	Kerbside	402192	286244	NO2	Sandwell	4.0	0.5	No	2.8
OI	Lamp-post on Bearwood Road	Kerbside	402214	286253	NO2	Sandwell	4.0	0.5	No	2.8
OJ	Lamp-post on Bearwood Road	Kerbside	402194	286246	NO2	Sandwell	4.0	0.5	No	2.8
OP4	Bearwood Road - Smethwick	Roadside	402229	286096	NO2	Sandwell	0.0	5.5	No	2.8
PA1, PA2, PA3	5 co-located tubes on a roadside lamppost outside Greggs, A41, West Bromwich	Kerbside	402461	290241	NO2	Sandwell	41.0	0.8	No	2.8
PB1, PB2, PB3	5 co-located tubes roadside on a lamppost adjacent to the footbridge, A41, West Bromwich	Roadside	402221	290290	NO2	Sandwell	55.0	1.5	No	2.9

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)
PC1, PC2, PC3	5 tubes co-located on a lamppost opposite Dartmouth Cricket Club (A41), West Bromwich	Roadside	401950	290355	NO2	Sandwell	25.0	1.5	No	2.9
PD1, PD2, PD3	3 tubes co-located on a lamppost opposite BP Garage (A41) West Bromwich	Kerbside	402111	290331	NO2	Sandwell	75.0	1.0	No	3.1
PE1, PE2, PE3	5 tubes co-located on a lamppost (A41) West Bromwich	Kerbside	402334	290279	NO2	Sandwell	55.0	1.0	No	2.8
PS1A	New Street, West Bromwich Ringway - West Bromwich	Roadside	400504	291239	NO2	Sandwell	6.2	0.1	No	2.1
RA	Lamp-post nearest Motorway, Roebuck Lane, W Brom	Roadside	401558	290077	NO2	Sandwell	43.0	42.0	No	2.9
SA	Springfield Site - Hillside Road, Great Barr	Roadside	403951	294852	NO2	Sandwell	N/A	53.0	No	2.7
SU	Summerfield Avenue, West Bromwich	Roadside	400476	291481	NO2	Sandwell	N/A	7.8	No	2.9
TA	Tividale Road, Tipton	Roadside	395958	290645	NO2	Sandwell	N/A	5.4	No	2.9

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)
TC	Burnt Tree Island, Tipton	Roadside	395854	290643	NO2	Sandwell	44.0	3.9	No	2.8
UA	Birchfield Lane - Oldbury	Roadside	398135	287603	NO2	Sandwell	32.0	2.0	No	2.8
UB	Birchfield Lane - Oldbury	Roadside	398167	287750	NO2	Sandwell	7.4	1.2	No	2.7
UC	Birchfield Lane - Oldbury	Kerbside	398170	287746	NO2	Sandwell	7.7	0.2	No	2.6
VD	Market Place - Tipton	Roadside	397628	292459	NO2	Sandwell	5.3	2.0	No	2.7
VT	Tipton Road - Tividale - Tipton	Roadside	397155	290867	NO2	Sandwell	10.3	2.7	No	2.9
WA	Lamp-post at side of Snapdragon Drive - Yew Tree	Roadside	401917	295329	NO2	Sandwell	8.0	0.2	No	2.9
WB	Lamp-post near end of Wolfsbane Drive - Yew Tree	Urban Background	402139	295119	NO2	Sandwell	68.0	N/A	No	1.8
WF	Lamp-post Woodruff Way - Yew Tree	Urban Background	402133	295234	NO2	Sandwell	8.0	0.2	No	1.9
WW2	Westmore Way - Wednesbury	Roadside	400551	296050	NO2	Sandwell	202.0	N/A	No	1.9
WW3	Westmore Way - Wednesbury	Roadside	400598	296035	NO2	Sandwell	195.0	N/A	No	1.8
XE	Lochranza Croft - Great Barr	Roadside	404435	294866	NO2	Sandwell	4.3	16.3	No	2.7
ZA	Lamp-post opposite 40 Abbotsford Avenue - Great Barr	Roadside	404504	294813	NO2	Sandwell	37.0	33.0	No	2.8

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)
ZC	Whitecrest - Great Barr	Roadside	404493	294532	NO2	Sandwell	3.0	1.9	No	2.7
ZK	1 Birmingham Road, Scott Arms - Great Barr	Roadside	404621	294291	NO2	Sandwell	17.2	0.3	No	2.8
ZO	Newton Road - Great Barr	Roadside	404290	294179	NO2	Sandwell	4.0	0.8	No	2.7
ZP	Newton Road - Great Barr	Roadside	404555	294219	NO2	Sandwell	3.2	0.4	No	2.8
ZQ	, Newton Road - Great Barr	Roadside	404539	294187	NO2	Sandwell	3.5	0.5	No	2.7
ZR	Newton Road, Scott Arms - Great Barr	Roadside	404410	294170	NO2	Sandwell	5.9	0.4	No	2.8

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.3 – Annual Mean NO_2 Monitoring Results: Automatic Monitoring (µg/m^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 2020 (%) (2)	2016	2017	2018	2019	2020
Highfields West Bromwich	400187	291601	Urban Background	Automatic	98.6	21.3	**N/A**	21.57	22	15
Birmingham Road Oldbury	399857	289392	Roadside	Automatic	85.7	**41.5**	39.8	36.1	34.4	25.85
Wilderness Lane Great Barr	403956	294855	Roadside	Automatic	98	21.2	26	29	31	23
Haden Hill Park Cradley Heath	395755	285493	Urban Background	Automatic	98.9	16.5	14	14	15	11
West Bromwich Roadside	400521	291541	Roadside	Automatic	97.1	29.8	34	24.5	28	19
Bearwood Road Smethwick	402181 286360 Northern point of OPSIS - source	402223 286097 Southern point of OPSIS - receiver	Kerbside	Automatic	N/A	**42.8**	**41**	35	30.26*	N/A

☒ **Annualisation has been conducted where data capture is <75% and >33% in line with LAQM.TG16**

☒ **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/m^3.

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

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

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

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

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

Table A.4 – Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
AD	399639	296095	Roadside	55.8	55.8	26.5	25.8	36.9	29.5	26.7
AE	399680	296089	Roadside	73.1	73.1	37.5	35.7	36.7	33.1	28.6
AF	399672	296042	Roadside	65.4	65.4	38.3	27.2	32.9	29.0	24.4
B17	399733	289401	Roadside	100.0	100.0		-	32.9	29.1	23.9
BA	399686	289431	Roadside	75.0	75.0	34.3	34.7	36.4	33.0	28.1
BD	399889	289395	Kerbside	100.0	100.0	**41.6**	**41.9**	**41.5**	37.7	31.6
BDQ	399943	289377	Roadside	92.3	92.3	**45.1**	**44.4**	**44.5**	**43.8**	31.3
BE	399915	289353	Kerbside	100.0	100.0	**46.7**	**45.6**	**47.9**	**47.9**	38.0
BF	399807	289408	Roadside	100.0	100.0	**40.0**	36.9	35.2	33.0	28.2
BG	399721	289429	Roadside	100.0	100.0	38.7	35.6	36	33.2	27.6
BO	400039	289366	Roadside	92.3	92.3	36.6	36.6	**41.3**	35.7	29.7
BP	400191	289441	Roadside	92.3	92.3	37.6	40	38.6	34.3	30.3
BR	399814	289407	Roadside	73.1	73.1	**40.6**	40.8	39.5	39.8	31.4
BS	399864	289427	Roadside	92.3	92.3	35.2	35.3	34.2	31.3	26.3
B52	399692	289428	Roadside	100.0	100.0		-	**40.5**	37.5	31.4
C10A	402285	286062	Roadside	100.0	100.0	**41.0**	**43.1**	**45.6**	39.6	23.9
C10D	402298	286073	Kerbside	100.0	100.0	**46.7**	**46.1**	**47.6**	**44.1**	33.4
C11A	397439	286416	Roadside	82.7	82.7	33.6	32.4	37.6	33.0	26.5
C11D	397428	286381	Kerbside	100.0	100.0	38.6	29.2	32.7	28.9	23.7
C11E	397391	286359	Kerbside	90.4	90.4	36.0	34.2	32.1	30.5	23.3

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2020 (%) [2]	2016	2017	2018	2019	2020
C12A	396899	286438	Roadside	100.0	100.0	**45.6**	**45**	**40.7**	**40.7**	34.3
C12D	396872	286454	Kerbside	100.0	100.0	**41.4**	38.9	36.9	37.5	26.6
C12E	396780	286465	Roadside	100.0	100.0	38.9	34.1	34.4	32.5	22.9
C13D	396411	291471	Roadside	82.7	82.7	30.3	31.3	30.7	33.1	25.7
C14A	397355	293929	Kerbside	82.7	82.7	30.4	-	31.4	30.9	24.9
C15A	396867	285536	Roadside	76.9	76.9	**41.1**	33.36	39.8	32.6	30.2
C1A	400668	291726	Kerbside	100.0	100.0	31.4	32.3	33.5	29.8	24.7
C1D	400664	292020	Roadside	100.0	100.0	**43.0**	39.3	**43**	36.8	30.3
C2A	401050	292898	Roadside	100.0	100.0	33.7	33.7	37.6	33.2	25.5
C2E	401059	292966	Roadside	100.0	100.0	22.1	33.5	38.5	31.1	25.9
C4A	400619	290153	Roadside	100.0	100.0	34.8	35.6	35	32.9	27.7
C4D	400657	290090	Kerbside	100.0	100.0	**43.0**	**43.1**	**43.1**	**40.8**	32.5
C4E	400738	290113	Kerbside	100.0	100.0	38.4	37.1	39.7	34.9	29.4
C5A	399267	290084	Roadside	100.0	100.0	29.6	28.1	31	27.5	22.8
C5D	399207	290032	Kerbside	100.0	100.0	37.7	37.6	38	35.8	29.0
C5E	399139	289947	Roadside	100.0	100.0	38.1	38.5	27.8	32.2	24.6
C6A	398937	289322	Roadside	100.0	100.0	31.5	35.4	32.6	31.6	26.7
C6E	399229	289315	Kerbside	100.0	100.0	31.6	31	31.4	30.6	24.9
C7A	398283	290113	Kerbside	100.0	100.0	25.8	24.9	33	39.0	29.4
C7D	398136	290226	Roadside	100.0	100.0	**47.4**	44.1	32.8	29.2	28.9
C7E	398042	290285	Kerbside	100.0	100.0	32.5	33.1	36.8	31.3	23.4

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2020 (%) [2]	2016	2017	2018	2019	2020
C7F	397493	290628	Roadside	92.3	92.3	35.9	36.7	34.4	34.4	27.5
C7H	398311	290135	Roadside	92.3	92.3	27.5	26.7	21.4	21.0	15.7
C9A	402138	286650	Roadside	100.0	100.0	32.1	30.1	31.5	29.1	22.1
C9D	402160	286554	Roadside	92.3	92.3	**40.1**	**40.2**	**44.8**	39.9	29.1
DA1, DA2, DA3	399402	292095	Roadside	100.0	100.0	-	-	-	29.6	24.5
DB1, DB2, DB3	399508	292068	Roadside	92.3	100.0	-	-	-	39.9	35.2
DC1, DC2, DC3	400233	291783	Roadside	100.0	100.0	-	-	-	26.4	21.9
DD1, DD2, DD3	400366	291781	Roadside	92.3	100.0	-	-	-	29.5	25.2
DE1, DE2, DE3	400728	291599	Roadside	92.3	100.0	-	-	-	31.0	25.3
DF1, DF2, DF3	400890	291558	Roadside	90.4	100.0	-	-	-	33.0	27.7
DG1, DG2, DG3	401040	291269	Roadside	100.0	92.3	-	-	-	35.0	28.6
DH1, DH2, DH3	401195	290934	Kerbside	100.0	100.0	-	-	-	26.3	22.4
DEF1	398469	288673	Roadside	100.0	100.0		38.28	30.8	30.7	26.0
DEF2	398405	288722	Roadside	100.0	92.3		21.25	21.8	21.1	16.1

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2020 (%) [2]	2016	2017	2018	2019	2020
DP1	397324	292256	Roadside	100.0	100.0	33.3	21.5	23.7	29.3	27.4
DP4	397344	292214	Roadside	100.0	92.3	26.3	30.3	35	28.8	19.2
EA	400869	291102	Kerbside	100.0	92.3	23.9	23.6	30.5	23.8	19.8
EB	400921	291001	Roadside	100.0	90.4	17.0	24.6	30.2	22.6	20.1
ED	400555	291257	Roadside	100.0	100.0	32.1	22.4	23.1	24.5	21.4
EE	400275	291132	Roadside	100.0	100.0	32.9	29.1	30.7	26.7	27.1
EF	399789	290547	Roadside	84.6	100.0	30.5	26.2	30.2	29.2	24.7
FA1, FA2, FA3	398756	289622	Roadside	92.3	92.3				37.2	31.4
FB1, FB2, FB3	398717	289574	Roadside	100.0	100.0				27.9	23.0
FC1, FC2, FC3	398788	289451	Roadside	100.0	100.0				33.8	28.3
FD1	399162	289413	Roadside	100.0	100.0				30.8	24.0
FD2, FD3	399162	289413	Roadside	100.0	100.0				30.8	24.2
FE1, FE2	399375	289398	Roadside	100.0	100.0				35.9	32.1
FE3	399375	289398	Roadside	100.0	92.3				35.9	32.7
FF1, FF2, FF3	400370	289532	Roadside	100.0	100.0				36.9	30.6
FG1, FG2, FG3	400535	289436	Roadside	100.0	100.0				33.7	30.2
GA	399858	289391	Roadside	90.4	100.0	38.8	**40.4**	38.8	34.7	27.7
GB	399858	289391	Roadside	100.0	100.0	37.1	**41**	38.4	36.1	28.0
GC	399858	289391	Roadside	100.0	100.0	39.0	39.8	38.7	35.6	27.8

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2020 (%) [2]	2016	2017	2018	2019	2020
HA	400383	291307	Kerbside	100.0	100.0	31.2	28.6	29.7	29.4	24.3
HH1	395754	285492	Urban Background	90.4	84.6	18.3	18.7	14.7	14.5	11.6
KD	403793	294661	Urban Background	92.3	92.3	30.3	25	26.7	24.4	19.5
KE	403925	294970	Kerbside	100.0	100.0	26.2	24	24.5	22.5	17.7
LA	400216	291633	Urban Background	92.3	100.0	23.1	21.5	22.5	22.7	16.9
LB	400216	291633	Urban Background	92.3	100.0	23.1	21.6	23.1	22.2	17.6
LC	400216	291633	Urban Background	84.6	100.0	22.5	22.3	22.8	22.1	17.4
MA	400712	289296	Roadside	100.0	100.0	**45.3**	**43.6**	**42.4**	**42.5**	34.6
MC	400748	289150	Kerbside	71.2	100.0	37.0	37.3	34.9	35.1	28.5
N1A	399647	290355	Roadside	55.8	100.0	**40.4**	36.1	38	38.5	30.9
N1B	399615	290358	Kerbside	63.5	100.0	33.2	35.75	**40.2**	34.9	29.4
N2A	403126	288557	Kerbside	100.0	90.4	26.9	24.7	26	25.1	19.5
OA	402240	286203	Roadside	92.3	100.0	36.5	32.2	34.4	31.3	25.3
OB	402195	286233	Roadside	100.0	100.0	38.3	**40.3**	41.1	36.6	26.6
OC	402245	286150	Roadside	100.0	100.0	33.4	31.8	36.6	33.6	26.6
OD	402222	286162	Roadside	100.0	90.4	36.7	39.9	**40.4**	35.6	27.4
OE	402212	286234	Roadside	100.0	92.3	34.2	28.6	34.1	32.3	26.8
OG	402187	286333	Roadside	100.0	100.0	37.3	32.5	34.8	32.7	24.2
OH	402192	286244	Kerbside	100.0	92.3	38.3	39.1	32.3	38.1	28.8
OI	402214	286253	Kerbside	100.0	92.3	35.7	30.9	36.3	29.5	24.3

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2020 (%) [2]	2016	2017	2018	2019	2020
OJ	402194	286246	Kerbside	92.3	84.6	38.9	38.8	36.7	34.4	28.7
OP4	402229	286096	Roadside	84.6	100.0	35.3	35.2	33.4	36.7	28.5
PA1, PA2, PA3	402461	290241	Kerbside	82.7	71.2				35.9	30.4
PB1, PB2, PB3	402221	290290	Roadside	100.0	100.0				34.9	29.4
PC1, PC2, PC3	401950	290355	Roadside	82.7	100.0				**44.6**	38.1
PD1, PD2, PD3	402111	290331	Kerbside	100.0	100.0				38.8	31.5
PE1, PE2, PE3	402334	290279	Kerbside	100.0	100.0				39.2	31.9
PS1A	400504	291239	Roadside	100.0	100.0	32.1	31.9	30.6	31.1	25.1
RA	401558	290077	Roadside	100.0	82.7	36.6	32	32.2	29.4	23.4
SA	403951	294852	Roadside	90.4	100.0	31.3	28.5	29.3	26.2	20.6
SU	400476	291481	Roadside	100.0	100.0	23.0	24.3	26.3	25.4	19.4
TA	395958	290645	Roadside	100.0	100.0	29.8	33.4	30.1	28.6	23.7
TC	395854	290643	Roadside	100.0	100.0	**47.9**	**45.5**	**42.9**	39.8	34.1
UA	398135	287603	Roadside	92.3	90.4	34.3	31.2	31.7	29.8	24.1
UB	398167	287750	Roadside	100.0	100.0	35.8	33.4	33.9	33.3	25.2
UC	398170	287746	Kerbside	100.0	100.0	36.9	35.6	36.1	32.4	26.9
VD	397628	292459	Roadside	82.7	100.0	25.0	23.6	25.5	25.6	21.3

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
VT	397155	290867	Roadside	92.3	92.3	28.2	28.1	26.6	26.3	21.5
WA	401917	295329	Roadside	100.0	100.0	32.6	31.7	30.7	29.1	22.6
WB	402139	295119	Urban Background	67.3	100.0	26.8	27	29	26.5	20.7
WF	402133	295234	Urban Background	100.0	82.7	30.0	30.75	30.7	27.7	20.0
WW2	400551	296050	Roadside	100.0	92.3			28.2	23.3	17.9
WW3	400598	296035	Roadside	100.0	100.0			28.5	22.6	17.6
XE	404435	294866	Roadside	100.0	67.3	30.9	23.91	30.6	26.3	20.8
ZA	404504	294813	Roadside	100.0	100.0	29.3	26.84	29.2	26.7	22.4
ZC	404493	294532	Roadside	92.3	100.0	30.7	27.99	31.8	27.0	23.6
ZK	404621	294291	Roadside	90.4	100.0	30.5	30.75	34.7	29.6	23.1
ZO	404290	294179	Roadside	100.0	100.0	33.2	32.1	33.3	30.2	24.3
ZP	404555	294219	Roadside	100.0	100.0	34.2	34.9	36.2	32.0	23.3
ZQ	404539	294187	Roadside	92.3	92.3	**50.3**	**49.2**	**49.1**	**41.2**	34.3
ZR	404410	294170	Roadside	90.4	90.4	**43.5**	**47**	**44.5**	**42.0**	36.5

☒ **Annualisation has been conducted where data capture is <75% and >33% in line with LAQM.TG16**

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

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

Notes:

The annual mean concentrations are presented as µg/m^3.

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

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

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

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

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

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

Figure A.1 – Trends in Annual Mean NO_2 Concentrations

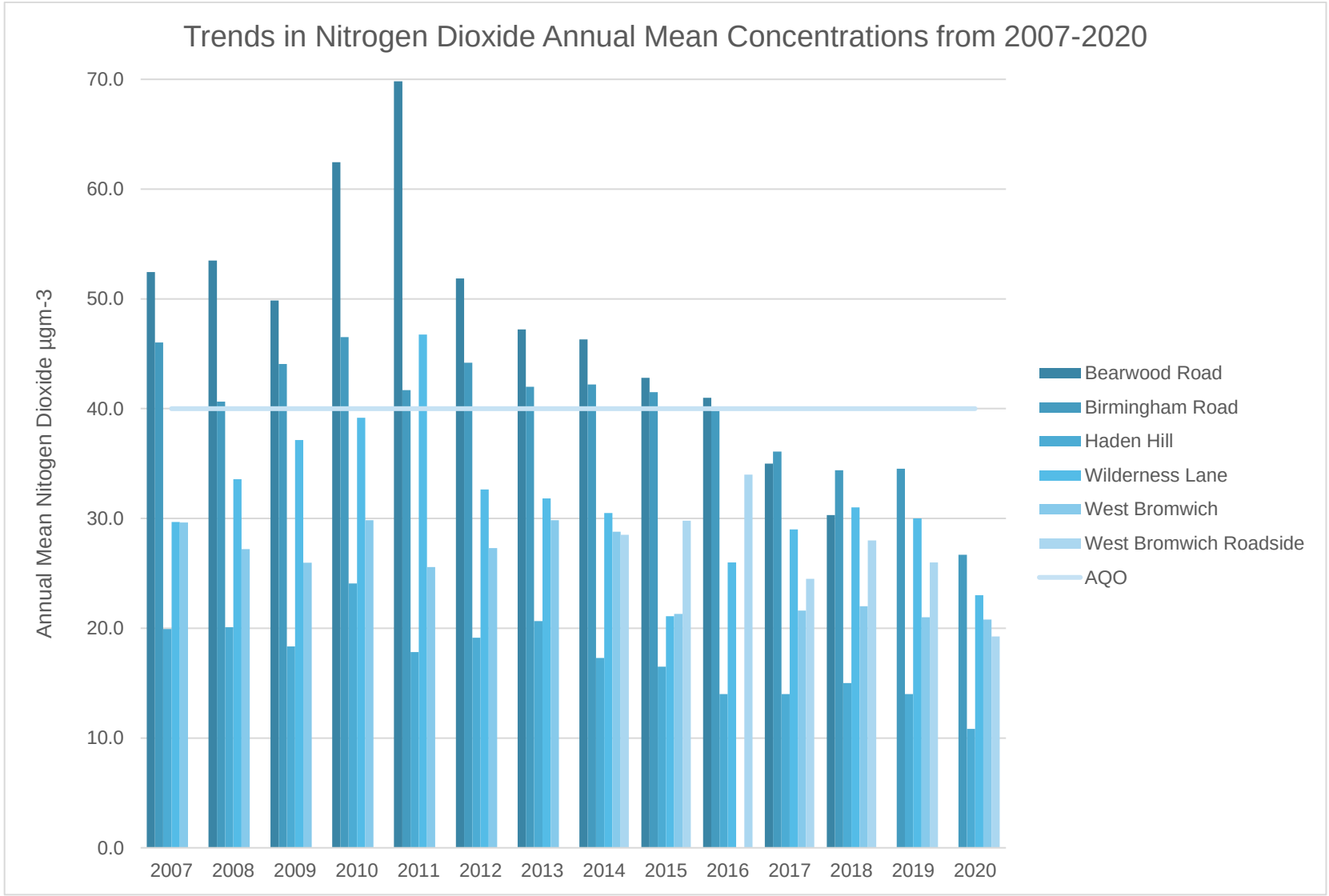


Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
Highfields West Bromwich	400187	291601	Urban Background	Automatic	98.6	**0(90.6)3**	**N/A**	**0(73)3**	0	0
Birmingham Road Oldbury	399857	289392	Roadside	Roadside	85.7	0	**0(131.9)3**	0	**0(116)3**	0
Wilderness Lane Great Barr	403956	294855	Roadside	Roadside	98	**0(82.7)3**	**0(90)3**	**0(69)3**	0	0
Haden Hill Park Cradley Heath	395755	285493	Urban Background	Urban Background	98.9	0	**0(71)3**	0	0	0
West Bromwich Roadside	400521	291541	Roadside	Roadside	91.1	0	**0(134)3**	**0(82)3**	0	0
Bearwood Road Smethwick	402181 286360 Northern point of OPSIS - source	402223 286097 Southern point of OPSIS - receiver	Kerbside	Kerbside	N/A	0	1	**0(132)3**	**0(113.1)1, 3**	N/A

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m^3 have been recorded.

Exceedances of the NO_2 1-hour mean objective (200µg/m^3 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 PM_{10} Monitoring Results ($\mu g/m^3$)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
Highfields West Bromwich	400187	291601	Urban Background	96.7	96.7	N/A	N/A	13	17	15
Birmingham Road Oldbury	399857	289392	Roadside	97.4	97.4	15	15	22	19	17
Wilderness Lane Great Barr	403956	294855	Roadside	83.5	83.5	N/A	11	14	17	13
Haden Hill Park Cradley Heath	395755	285493	Urban Background	99.4	41.9	12	13	14	14	12.3

☒ **Annualisation has been conducted where data capture is <75% and >33% in line with LAQM.TG16**

Notes:

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

Exceedances of the PM_{10} annual mean objective of $40\mu g/m^3$ are shown in **bold**.

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

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

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

Figure A.2 – Trends in Annual Mean PM10 Concentrations

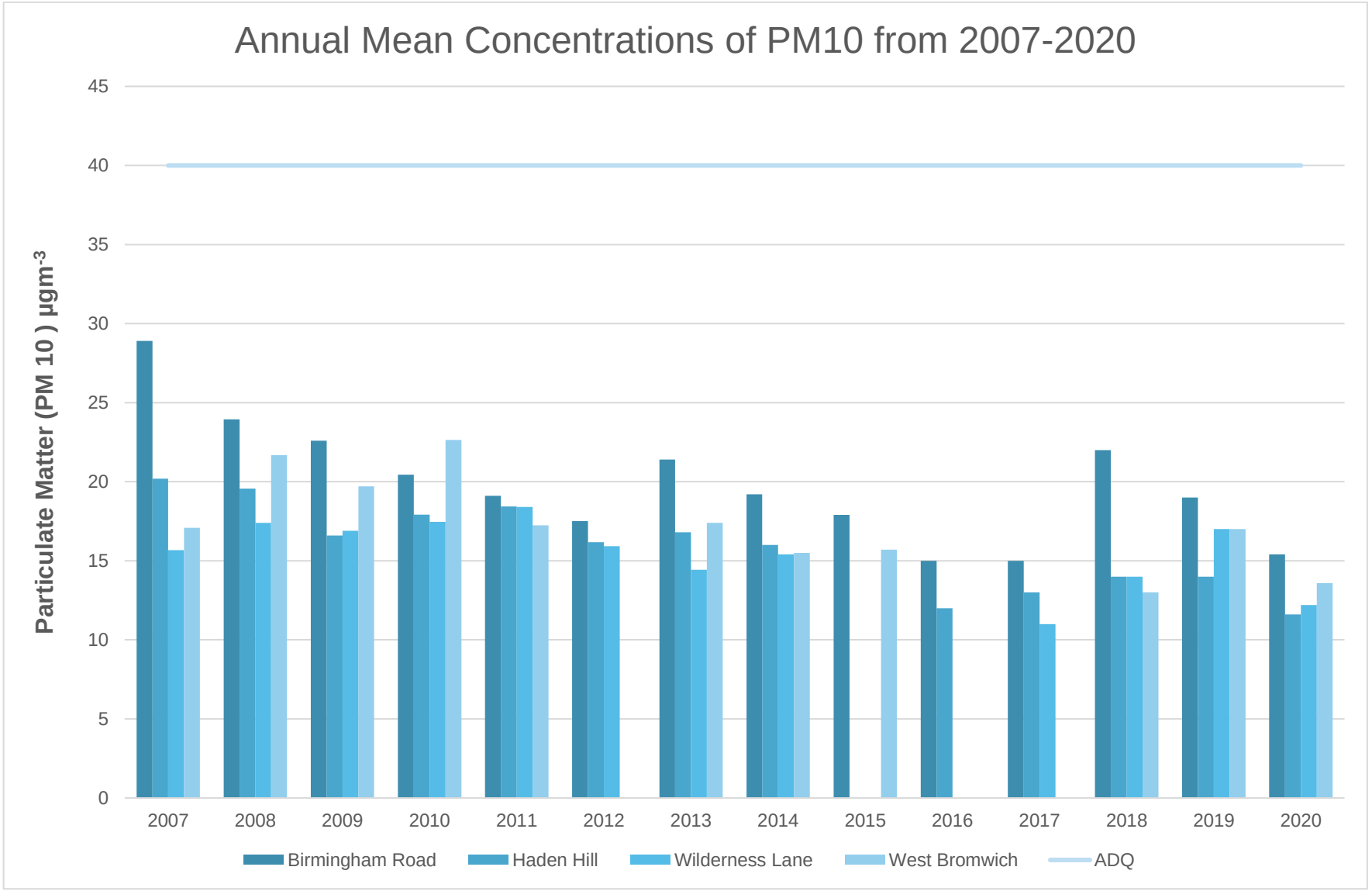


Table A.7 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
Highfields West Bromwich	400187	291601	Urban Background	96.7	96.7	**N/A**	**N/A**	1	**3**	2
Birmingham Road Oldbury	399857	289392	Roadside	97.4	97.4	**1(32.0)**	**3(26.0)**	**3(34.0)**	**6**	**2**
Wilderness Lane Great Barr	403956	294855	Roadside	83.5	83.5	**N/A**	**1(24)**[3]	1	**3(29)**	**1**
Haden Hill Park Cradley Heath	395755	285493	Urban Background	41.9	41.9	**0(19.0)**[3]	0	0	0	0(22)

Notes:

Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m^3 have been recorded.

Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in **bold**.

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

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

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

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

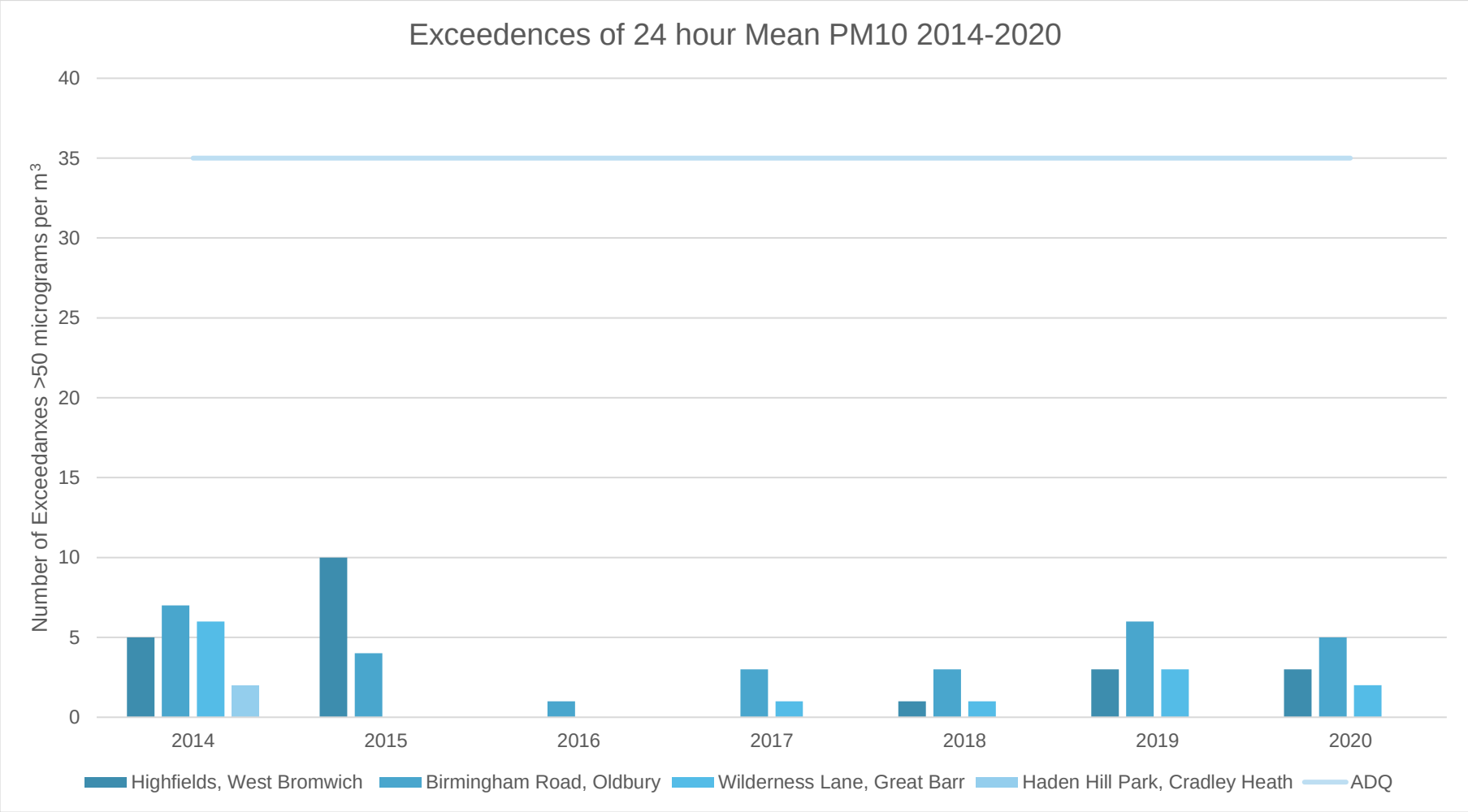


Table A.8 – Annual Mean $PM_{2.5}$ Monitoring Results ($\mu g/m^3$)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
Haden Hill	332395	433175	Urban Background	98.5	41.9	5.01	7.32	7	7	6.35

☒ **Annualisation has been conducted where data capture is <75% and >33% in line with LAQM.TG16**

Notes:

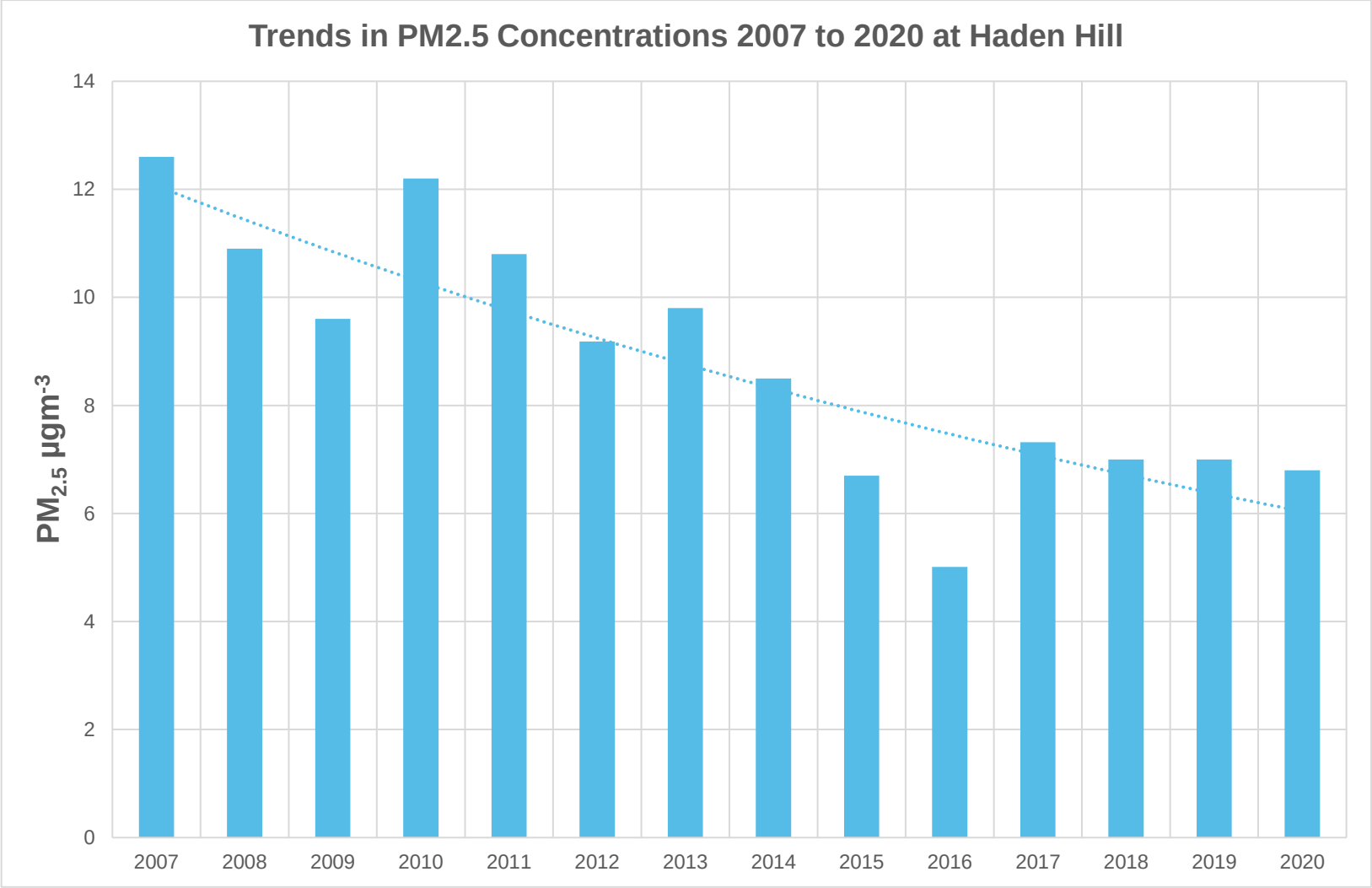
The annual mean concentrations are presented as $\mu g/m^3$.

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

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

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

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



Appendix B: Full Monthly Diffusion Tube Results for 2020

Table B.1 – NO_2 2020 Diffusion Tube Results (µg/m^3)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.82)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
AD	399639	296095	33.2	31.9	39.4	35.5	16.3	31.6	14.4						28.9	26.7	-	
AE	399680	296089	39.9	34.4	34.4	33.6	28.5	40.7	18.8				47.1	36.6	34.9	28.6	-	
AF	399672	296042	27.9	28.9	27.1		29.2	40.4	18.1				40.3	40.3	31.5	24.4	-	
B17	399733	289401	34.4	22.4	33.6	29.0	24.5	29.3	21.4	31.0	30.5	25.4	37.4	30.9	29.1	23.9	-	
BA	399686	289431	43.9	34.2	38.8	29.5	26.0		27.8			32.3	37.5	38.9	34.3	28.1	-	
BD	399889	289395	46.0	32.1	42.7	33.9	34.1	34.2	30.7	45.4	41.8	38.4	43.3	39.6	38.5	31.6	-	
BDQ	399943	289377	56.9	36.9	41.8		28.5	33.1	30.0	41.8	35.7	36.2	41.4	37.3	38.1	31.3	-	
BE	399915	289353	54.9	32.1	51.9	42.7	41.0	47.2	34.1	51.0	43.2	46.0	61.6	49.8	46.3	38.0	34.8	
BF	399807	289408	40.5	28.4	38.7	30.7	31.5	30.8	30.8	36.0	36.7	34.1	37.1	37.3	34.4	28.2	-	
BG	399721	289429	40.3	29.7	39.3	32.1	32.7	30.2	27.4	35.5	35.3	33.0	36.1	32.3	33.7	27.6	-	
BO	400039	289366	41.6		28.7	32.9	34.8	35.6	28.1	36.7	41.8	36.7	45.2	36.2	36.2	29.7	-	
BP	400191	289441	42.3		36.1	27.1	37.6	40.8	29.7	33.9	37.2	32.5	41.6	47.3	36.9	30.3	-	
BR	399814	289407	48.5		47.1	37.6	31.2	30.1	24.0		43.2		44.3	38.4	38.3	31.4	-	
BS	399864	289427	40.6		36.0	24.6	22.1	27.6	25.3	31.2	34.2	34.8	38.0	38.0	32.0	26.3	-	
B52	399692	289428	46.6	39.9	38.4	38.5	32.5	34.1	31.7	37.6	36.9	39.4	46.4	38.3	38.3	31.4	-	
C10A	402285	286062	34.4	22.4	33.6	29.0	24.5	29.3	21.4	31.0	30.5	25.4	37.4	30.9	29.1	23.9	-	
C10D	402298	286073	49.1	35.6	58.2	29.4	34.0	34.2	36.2	44.2	45.3	37.4	43.8	41.6	40.8	33.4	-	
C11A	397439	286416	43.3	34.2	39.1	23.8	21.4	26.0	29.3	33.8			39.9	32.1	32.3	26.5	-	
C11D	397428	286381	40.3	26.4	31.4	19.4	18.8	25.3	23.8	32.2	31.2	29.2	37.5	30.9	28.9	23.7	-	
C11E	397391	286359	34.4	27.4	35.4	24.1	20.0	22.0	27.0	29.3	32.5		30.4	30.5	28.4	23.3	-	
C12A	396899	286438	54.4	38.4	44.1	34.7	35.5	40.9	34.9	41.7	43.3	42.9	46.9	44.3	41.8	34.3	-	
C12D	396872	286454	42.9	27.6	40.2	29.6	31.0	31.5	22.4	26.2	25.4	26.7	45.6	40.6	32.5	26.6	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.82)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
C12E	396780	286465	39.7	24.2	35.4	28.0	30.3	29.2	16.1	20.6	21.4	22.2	35.4	33.0	27.9	22.9	-	
C13D	396411	291471	38.9	31.1	33.5	23.6	24.2	30.7	24.5	35.7	38.0	33.8			31.4	25.7	-	
C14A	397355	293929	41.7	34.7	31.7	26.7	23.6	27.9	22.4	29.4	31.8	34.2			30.4	24.9	-	
C15A	396867	285536				30.3	28.5	28.8	31.7	35.2	43.1	45.6	40.6	47.7	36.8	30.2	-	
C1A	400668	291726	43.2	39.7	30.1	21.2	17.6	22.3	19.2	28.1	29.2	31.0	43.1	36.4	30.1	24.7	-	
C1D	400664	292020	44.5	45.8	38.0	26.5	23.1	28.6	31.6	39.8	39.5	38.9	45.5	42.3	37.0	30.3	-	
C2A	401050	292898	31.5	34.2	35.6	26.4	22.1	28.6	21.9	34.9	34.8	31.6	34.5	36.5	31.0	25.5	-	
C2E	401059	292966	34.3	30.1	31.5	30.5	25.0	31.2	21.6	38.2	34.7	28.6	39.8	33.0	31.5	25.9	-	
C4A	400619	290153	38.4	42.8	33.6	21.8	21.1	26.4	27.9	31.3	39.6	33.9	50.1	39.0	33.8	27.7	-	
C4D	400657	290090	51.1	48.7	36.3	26.9	25.7	35.3	31.3	35.2	41.3	39.3	57.9	46.4	39.6	32.5	-	
C4E	400738	290113	38.9	41.4	38.7	29.6	25.1	33.7	25.0	40.0	37.0	34.5	47.6	39.0	35.9	29.4	-	
C5A	399267	290084	31.9	30.8	32.6	22.8	19.5	25.2	18.0	29.3	29.4	26.7	34.3	33.0	27.8	22.8	-	
C5D	399207	290032	36.0	44.0	37.2	31.4	28.5	34.5	26.5	39.4	36.4	30.9	44.1	34.9	35.3	29.0	-	
C5E	399139	289947	34.7	41.1	31.7	22.2	20.3	27.0	22.3	28.8	32.8	30.6	36.5	31.5	29.9	24.6	-	
C6A	398937	289322	38.5	40.8	33.0	25.3	26.4	31.7	28.6	31.9	34.1	32.2	36.5	31.7	32.6	26.7	-	
C6E	399229	289315	31.1	34.9	31.1	24.9	22.3	29.7	21.9	32.2	32.4	28.1	40.1	35.2	30.3	24.9	-	
C7A	398283	290113	46.9	54.1	42.1	33.3	34.6	41.2	19.8	31.5	31.6	24.7	38.3	32.5	35.9	29.4	-	
C7D	398136	290226	29.6	28.5	30.7	27.2	25.9	32.9	35.7	42.4	45.9	38.9	46.2	38.8	35.2	28.9	-	
C7E	398042	290285	29.2	39.1	28.3	19.9	22.2	25.7	25.2	26.2	32.9	29.6	41.1	23.2	28.5	23.4	-	
C7F	397493	290628	34.8	40.4	33.2		17.2	29.8	29.7	33.5	39.5	29.4	45.3	36.4	33.5	27.5	-	
C7H	398311	290135	24.6	19.2		16.8	12.9	15.9	13.0	17.9	18.5	19.7	26.7	25.9	19.2	15.7	-	
C9A	402138	286650	34.2	22.9	27.9	24.6	21.0	27.0	19.1	25.7	27.2	27.6	36.2	30.2	27.0	22.1	-	
C9D	402160	286554	41.6	24.7		33.2	32.2	37.1	26.0	43.2	36.5	37.6	42.6	35.2	35.4	29.1	-	
DA1	399402	292095	40.5	30.0	24.7	21.6	21.7	23.4	21.3	28.0	33.9	28.8	52.7	28.5	-	-	-	
DA2	399402	292095	41.0	35.4	24.8	22.5	21.7	25.8	23.8	27.1	33.4	28.4	52.2	31.1	-	-	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.82)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DA3	399402	292095	40.0	33.6	24.1	22.5			16.7		33.7	26.7	53.0	28.9	29.9	24.5	-	
DB1	399508	292068	60.0	46.9	29.3	28.5	30.7	32.6	38.3	37.4	49.6	39.8	70.2	38.4	-	-	-	
DB2	399508	292068	57.3	43.9	31.4	28.8	32.0	31.3	39.4	38.4	49.9	44.1	71.0	40.6	-	-	-	
DB3	399508	292068	57.8	50.6	33.8	29.7	31.5	35.8	40.0	39.2	55.8	43.6	71.2	45.5	42.9	35.2	-	
DC1	400233	291783	36.7	21.9	23.4	22.6	20.2	24.7	17.8	24.6	27.9	24.7	38.4	28.3	-	-	-	
DC2	400233	291783	32.8	28.0	23.2	25.6	20.8	24.2	17.4	25.6	27.9	24.7	38.0	29.2	-	-	-	
DC3	400233	291783	35.0	23.6	25.7	22.5	21.5	25.1	18.1	28.6	27.1	28.2	47.3	29.1	26.7	21.9	-	
DD1	400366	291781	31.4	28.1	28.0	30.0	28.6	32.5	21.2	35.4	32.6	28.0	43.4	32.9	-	-	-	
DD2	400366	291781	34.0	27.9	28.4	29.5	27.2	34.0	20.6	33.9	31.5	28.1	48.4	30.0	-	-	-	
DD3	400366	291781	30.1	27.1	28.8	31.0	27.8	33.8	16.2	35.8	33.1	29.9	40.6	28.4	30.8	25.2	-	
DE1	400728	291599	46.8	33.6	28.6	26.2	22.2	24.7	20.2	27.9	32.8	30.7	47.5	36.3	-	-	-	
DE2	400728	291599	44.3	32.9	23.1	26.0	21.3	23.8	20.2	25.0	32.2	30.0	47.7	30.9	-	-	-	
DE3	400728	291599	46.5	35.9	30.4	25.6	22.1	24.8	22.2	27.5	33.5	27.2	51.2	30.5	30.9	25.3	-	
DF1	400890	291558	50.2	41.6	31.4	28.3	27.9	31.1	24.1	33.8	38.8	32.5	53.0	34.5	-	-	-	
DF2	400890	291558	43.7	34.3	25.2	29.6	25.1	31.0	19.8	32.9	34.4	33.5	52.3	31.6	-	-	-	
DF3	400890	291558	44.0	39.4	28.5	29.3	26.1	31.7	22.8	27.1	35.3	34.1	48.7	29.1	33.8	27.7	-	
DG1	401040	291269	37.6	37.9	37.7	31.8	27.1	40.2		27.0	28.2	31.2	40.7	30.9	-	-	-	
DG2	401040	291269	45.4	29.9	40.0	32.3	31.0	40.6		29.8	33.3	32.0	43.9	27.7	-	-	-	
DG3	401040	291269	41.7	41.7	36.7	31.9	31.6	44.6		33.5	32.4	30.1	45.8	26.3	34.9	28.6	-	
DH1	401195	290934	33.6	31.0	26.8	20.7	18.7	21.8	16.7	26.3	28.7	27.7	48.5	31.0	-	-	-	
DH2	401195	290934	39.7	26.8	28.9	20.4	17.1	21.3	16.2	24.4	28.4	28.5	48.7	30.5	-	-	-	
DH3	401195	290934	37.5	31.0	29.3	20.6	17.8	22.2	17.0	24.2	27.9	24.3	42.2	26.3	27.3	22.4	-	
DEF1	398469	288673	42.7	30.6	34.7	22.2	19.6	23.2	28.0	33.4	36.6	32.1	44.0	34.0	31.8	26.0	-	
DEF2	398405	288722		15.5	24.7	17.9	15.1	16.0	12.6	21.9	22.3	21.6	25.3	23.7	19.7	16.1	-	
DP1	397324	292256	46.8	31.5	35.8	23.0	23.2	28.5	27.6	33.8	38.6	36.3	37.0	38.4	33.4	27.4	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.82)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DP4	397344	292214	31.6	23.2		20.9	17.3	20.9	15.5	20.1	23.8	23.4	33.5	26.9	23.4	19.2	-	
EA	400869	291102	32.6	28.0	23.6		13.6	19.1	14.6	21.2	25.7	24.6	35.7	26.9	24.1	19.8	-	
EB	400921	291001	28.3	27.9	23.6	18.3		20.3	15.8	22.9	24.1	24.4	33.9	30.7	24.6	20.1	-	
ED	400555	291257	31.8	20.1	21.1	15.2	17.2	21.1	24.9	26.6	32.9	31.1	41.3	30.5	26.1	21.4	-	
EE	400275	291132	40.3	37.3	35.3	24.2	17.4	31.1	24.1	38.4	37.1	31.5	39.1	40.1	33.0	27.1	-	
EF	399789	290547	33.1	27.8	34.7	25.5	18.7	25.3	19.3	35.3	33.6	33.1	39.6	35.4	30.1	24.7	-	
FA1	398756	289622	49.4		32.8	30.7	32.6	36.7	31.5	39.6	45.6	34.5	45.7	39.2	-	-	-	
FA2	398756	289622	50.6		29.7	29.9	34.5	34.8	32.5	38.8	45.4	38.0	47.4	34.6	-	-	-	
FA3	398756	289622			31.8	30.5	33.7	36.9	29.6	41.0	43.6	39.7	52.6	40.4	38.3	31.4	-	
FB1	398717	289574	36.0	24.3	27.1	26.0	23.6	33.7	14.4	32.9	30.2	28.7	39.5	29.1	-	-	-	
FB2	398717	289574	29.6	23.0	26.4	28.1	23.7	32.6	10.9	33.6	30.7	26.7	44.8	32.1	-	-	-	
FB3	398717	289574	34.3	26.1	24.6	25.3	23.1	32.8	14.3	31.1	24.5	27.6	40.8	16.1	28.0	23.0	-	
FC1	398788	289451	41.6	29.0	28.4	27.8	30.1	30.9	29.0	34.9	35.0	36.3	52.7	33.5	-	-	-	
FC2	398788	289451	48.7	38.0	30.2	24.4	30.0	32.6	28.0	33.9	39.0	35.0	51.4	34.2	-	-	-	
FC3	398788	289451	47.4	34.0	27.9	21.6	27.6	32.9	29.5	32.8	35.7	35.0	50.1	32.7	34.5	28.3	-	
FD1	399162	289413	34.1	34.9	27.5	21.3	21.0	25.5	19.6	29.2	31.0	28.6	47.4	31.5	29.3	24.0	-	
FD2	399162	289413	47.5	27.9	24.0	25.4	22.1	26.3	18.4	28.0	32.6	28.8	40.9	29.2	-	-	-	
FD3	399162	289413		28.5	27.0	23.6	22.1	27.8	17.3	29.0	29.4	27.0	43.6	34.1	29.5	24.2	-	
FE1	399375	289398	47.4	39.4	33.0	33.3	36.1		27.4	43.1	41.7	40.5	55.8	40.1	-	-	-	
FE2	399375	289398	48.0	37.2	33.8	32.2	34.1	40.0	26.2	46.5	43.0	38.1	48.6	34.2	39.2	32.1	-	
FE3	399375	289398	46.3		36.2	31.0	36.2	40.4	27.3	45.6	47.6	39.1	55.5	33.0	39.8	32.7	-	
FF1	400370	289532			33.7	23.4	29.3	31.8	28.1	33.2	39.9	39.4	57.1	44.2	-	-	-	
FF2	400370	289532	55.7	38.5	32.2	27.6	30.3	33.9	31.5	34.8	42.9	38.7	61.7	35.9	-	-	-	
FF3	400370	289532	46.3		31.0	27.6	29.0	30.8	26.8	34.5	41.5	31.5	51.7		37.3	30.6	-	
FG1	400535	289436	40.3	31.9	35.8	37.7	40.4	40.2	25.1	43.5	43.1	38.7	53.2	33.3	-	-	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.82)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
FG2	400535	289436	36.5	28.7	26.7	36.0	34.7	42.5	27.1	44.0	41.5	39.4	57.7	32.3	-	-	-	
FG3	400535	289436	39.4	?	30.2	31.1	30.5	34.6	27.3		34.5	34.9	45.5	32.9	36.8	30.2	-	
GA	399858	289391	44.4	32.3	34.5	26.0	27.3	30.9	28.6	34.3	37.3	34.2	37.3	38.0	33.8	27.7	-	
GB	399858	289391	40.4	32.9	35.6	27.7	26.7	29.9	29.8	34.6	36.8	34.8	41.3	38.8	34.1	28.0	-	
GC	399858	289391	39.4	30.8	39.9	22.5	27.0	30.1	29.8	31.9	37.6	40.4	39.3	38.6	33.9	27.8	-	
HA	400383	291307	31.9	26.1	28.3	22.2	22.5	26.9	21.7	30.9	34.4	32.4	42.3	35.7	29.6	24.3	-	
HH1	395754	285492	19.7	9.6	15.2		8.9	9.5		10.8	13.2	14.3	21.4	19.5	14.2	11.6	-	
KD	403793	294661	24.8	24.9	26.0	22.5	23.1	23.8	18.5	25.7		18.0	28.2	25.5	23.7	19.5	-	
KE	403925	294970	27.9	28.5	21.9	13.8	13.7	17.3	15.3	18.4	22.9	21.8	32.8	25.1	21.6	17.7	-	
LA	400216	291633	28.9	22.8	21.4	14.9	12.4	15.9	13.4	17.5	22.9	19.3	33.6	23.8	20.6	16.9	-	
LB	400216	291633	30.4	20.6	22.9	15.7	12.6	15.6	13.8	16.9	22.8	22.2	33.7	29.9	21.4	17.6	-	
LC	400216	291633	31.2	21.8	23.7	16.2	12.7	15.7	12.7	18.1	22.4	20.1	31.6	27.9	21.2	17.4	-	
MA	400712	289296	51.1	53.6	42.6	28.6	31.0	38.0	36.9	39.4	47.6	43.2	48.4	45.6	42.2	34.6	-	
MC	400748	289150	39.2	44.6	35.8	23.2	26.8	31.8	28.4	34.9	38.3	37.7	41.0	35.1	34.7	28.5	-	
N1A	399647	290355	44.4	49.5	37.3	25.8	25.6	34.0	27.7	38.8	42.5	36.5	47.9	42.5	37.7	30.9	-	
N1B	399615	290358	44.8	42.6	34.4	25.5	24.0	25.4	28.7	36.0	40.4	43.5	47.7	37.1	35.8	29.4	-	
N2A	403126	288557	20.4	20.5	23.7	21.0	20.2	23.3	16.5		24.7	24.3	31.0	36.3	23.8	19.5	-	
OA	402240	286203	35.9	35.6	32.5	25.4	24.1	28.1	21.4	34.8	36.0	29.8	32.2	35.2	30.9	25.3	-	
OB	402195	286233	49.8	26.2	39.6	22.5	22.8	25.6	27.7	28.8	33.8	35.7	40.1	36.8	32.5	26.6	-	
OC	402245	286150	36.9	34.5	38.3	27.7	24.6	27.6	23.3	39.8	33.6	32.4	39.9	30.5	32.4	26.6	-	
OD	402222	286162	44.6	26.7	32.3	21.2		24.2	31.2	34.7	39.7	36.9	39.7	36.6	33.4	27.4	-	
OE	402212	286234	37.9		36.6	25.1	24.3	28.6	22.7	39.9	36.1	32.0	40.2	35.8	32.7	26.8	-	
OG	402187	286333	31.9	22.5	34.9	24.1	23.4	28.5	20.4	33.1	31.1	30.9	37.2	36.3	29.5	24.2	-	
OH	402192	286244	48.0	38.1	37.4		22.1	25.7	27.5	32.7	37.2	38.3	41.2	38.4	35.1	28.8	-	
OI	402214	286253	30.8		28.0	25.0	21.6	28.8	19.9	36.3	31.8	32.4	34.9	37.0	29.7	24.3	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.82)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
OJ	402194	286246	41.9		34.6	20.7	24.2	29.1		34.5	37.1	39.9	45.5	42.4	35.0	28.7	-	
OP4	402229	286096	43.0	33.5	35.1	25.7	26.2	29.1	31.8	35.4	41.1	35.8	38.0	42.8	34.8	28.5	-	
PA1	402461	290241	37.8	34.1	38.6	34.7	34.9	45.5	30.2		43.8		48.0		-	-	-	
PA2	402461	290241	37.7		32.9	36.0	30.1		27.7		42.2		49.5		-	-	-	
PA3	402461	290241	36.4		35.5	34.8	34.2	38.9	27.9		37.0		42.9		37.1	30.4	-	
PB1	402221	290290	39.5	34.0	39.2	32.2	32.2	34.9	28.9	37.4	41.9	33.3	44.8	35.4	-	-	-	
PB2	402221	290290		33.1	35.0	28.9	30.8	35.0	29.8	37.1	40.9	34.8	49.3	38.4	-	-	-	
PB3	402221	290290	39.2	25.1	36.4	34.6	30.4	31.2	27.5	36.5	42.3	34.6	49.3	38.3	35.9	29.4	-	
PC1	401950	290355	51.6	52.9	43.6	32.5	40.2	42.3	45.0	50.6	49.4	49.8	61.1	47.0	-	-	-	
PC2	401950	290355	53.8	57.7	45.1	34.3	36.4	40.4	25.2	43.3	53.4	46.2	57.8	47.7	-	-	-	
PC3	401950	290355	58.6	51.9	45.7	35.0	40.5	44.0	51.1	48.7	53.9	32.2	61.1	42.2	46.4	38.1	-	
PD1	402111	290331	48.5	44.3	35.8	28.3	26.9	31.6	32.3	33.1	41.5	36.7	57.2	39.9	-	-	-	
PD2	402111	290331	52.6	41.4	38.5	29.1	26.3	34.1	32.4	33.3	40.2	34.7	51.4	42.9	-	-	-	
PD3	402111	290331	56.5	43.9	39.5	30.3	26.7	32.7	35.2	32.9	44.5	39.1	51.4	39.0	38.5	31.5	-	
PE1	402334	290279		45.3	41.4	33.5	28.0	29.6	27.7	37.8	50.8	38.1	48.3	38.7	-	-	-	
PE2	402334	290279		48.2		30.3	31.0	34.6	33.1	36.9	39.2	37.5	54.0	37.4	-	-	-	
PE3	402334	290279	49.7		35.0	31.4	28.2	33.4	33.2	36.1	44.6		49.2	36.7	38.9	31.9	-	
PS1A	400504	291239	37.1	34.8	36.3	23.7	16.5	22.3	26.6	24.1	36.4	34.0	42.2	33.0	30.6	25.1	-	
RA	401558	290077	32.5	28.3	33.4	24.0	20.3	28.4	17.2	36.3	34.9	30.6			28.6	23.4	-	
SA	403951	294852	31.2	31.9	27.3	18.6	16.6	20.8	17.8	23.8	25.9	27.0	33.6	27.8	25.2	20.6	-	
SU	400476	291481	26.5	23.9	26.4	21.2	18.1	20.2	14.7	24.1	27.1	23.6	33.3	25.1	23.7	19.4	-	
TA	395958	290645	38.0	30.0	28.2	20.8	23.6	25.8	23.1	27.9	31.5	30.5	36.6	30.2	28.8	23.7	-	
TC	395854	290643	54.0	51.6	41.5	25.8	27.2	29.9	41.8	36.5	44.4	41.3	61.4	44.1	41.6	34.1	-	
UA	398135	287603	36.1	25.1	33.1	24.4	22.2	28.0	21.2	33.4	30.7		32.2	36.8	29.4	24.1	-	
UB	398167	287750	36.7	26.6	28.8	25.9	24.5	26.0	28.2	32.1	34.3	35.6	35.6	35.0	30.8	25.2	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.82)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
UC	398170	287746	44.1	32.5	34.3	26.0	20.8	30.4	26.4	35.5	30.6	34.2	43.1	35.2	32.7	26.9	-	
VD	397628	292459	29.0	27.2	28.6	23.2	20.9	25.3	19.4	26.2	29.3	24.1	28.6	29.9	26.0	21.3	-	
VT	397155	290867	30.9	31.6	27.6		12.9	19.2	19.6	23.4	30.0	27.5	38.1	27.3	26.2	21.5	-	
WA	401917	295329	32.8	39.4	21.0	19.4	18.1	20.3	23.7	25.7	31.5	32.3	32.0	34.7	27.6	22.6	-	
WB	402139	295119	31.6	33.6	19.8	16.9	16.4	17.8	20.9	23.1	26.0	28.9	34.4	33.4	25.2	20.7	-	
WF	402133	295234	36.3		25.5	18.0	16.5	17.5	21.8	22.5	26.9	28.3	31.0		24.4	20.0	-	
WW2	400551	296050	21.9	23.3	24.1	20.2	16.6	19.4	15.8	20.8		20.1	30.2	28.1	21.9	17.9	-	
WW3	400598	296035	9.2	23.9	23.6	20.4	17.0	19.3	15.4	21.7	24.2	21.3	31.0	30.2	21.4	17.6	-	
XE	404435	294866	32.6	?	8.0				28.2	27.1	33.4	30.9	32.3	33.4	28.2	20.8	-	
ZA	404504	294813	31.7	29.1	24.2	21.7	11.4	21.0	23.8	26.8	29.7	30.5	44.0	34.3	27.3	22.4	-	
ZC	404493	294532	47.6	39.8	27.2	20.0	17.7	21.8	20.8	26.1	29.7	25.1	35.4	34.1	28.8	23.6	-	
ZK	404621	294291	36.1	34.3	26.6	20.3	20.5	24.5	22.1	25.7	29.4	28.9	36.9	32.8	28.2	23.1	-	
ZO	404290	294179	33.7	36.2	29.5	23.3	19.0	27.5	20.5	31.5	33.0	30.9	37.7	32.7	29.6	24.3	-	
ZP	404555	294219	36.2	35.7	29.9	21.0	18.7	24.5	19.8	28.4	28.9	27.9	39.8	30.3	28.4	23.3	-	
ZQ	404539	294187	47.8	46.3		35.0	33.9	42.1	32.6	47.1	39.0	41.0	52.2	43.6	41.9	34.3	-	
ZR	404410	294170	46.7	54.1	43.1	35.3		42.1	34.1	49.2	47.0	46.0	49.4	42.7	44.5	36.5	30.2	

☒ **All erroneous data has been removed from the NO_2 diffusion tube dataset presented in Table B.1**.

☒ **Annualisation has been conducted where data capture is <75% and >33% in line with LAQM.TG16.**

☐ **Local bias adjustment factor used.**

☒ **National bias adjustment factor used.**

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

☒ **Sandwell MBC confirm that all 2020 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System**.

Notes:

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

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

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 Sandwell During 2020

Sandwell MBC has not identified any new sources relating to air quality within the reporting year of 2020.

Additional Air Quality Works Undertaken by Sandwell During 2020

Sandwell MBC has not completed any additional works within the reporting year of 2020.

QA/QC of Diffusion Tube Monitoring

Air quality data must meet Quality Control and Quality Assurance (QA/QC) criteria. The purpose of this is to ensure that the concentrations of pollutants measured represent the actual concentrations of pollutants in the atmosphere. In addition, the data must be consistent over time and sufficiently accurate and precise to enable a comparison with the National Air Quality Objectives. Sandwell follows QA/QC procedures laid down in Technical Guidance provided by Defra in LAQM.TG (16).

In 2020 Sandwell used Gradko International as their diffusion tube supplier, details are shown in **Table C.1a** below. Diffusion tubes were exposed for monthly periods as prescribed in the Diffusion Tube Monitoring Calendar published by Defra[37].

Table C.1a	**NO_2 Diffusion Tube Details**
Supplier	Gradko International
Period	2020

[37] *https://laqm.defra.gov.uk/assets/2020laqmcalendar1.pdf*

Type of Tube	Nitrogen Dioxide NO_2
Type of Absorbent	Triethanolamine
Method of Tube Preparation	50% TEA in Acetone
Exposure Dates	LAQM Exposure Calendar 2020
Exposure Duration	One Month
Bias Adjustment Factor Applied	0.82

Gradko International follow the procedures set out in the Air Proficiency Testing Scheme (AIR-PT) an independent analytical proficiency testing scheme operated by LGC Standards. AIR offers several test samples designed to test the proficiency of laboratories undertaking analysis of chemical pollutants in ambient air.

Diffusion Tube Annualisation

Annualisation was required for 3 diffusion tube sites. The annualisation was completed using the Diffusion Tube Data Processing Tool[38]. The continuous monitoring data from four reference sites, Walsall Woodlands, Coventry, Telford and Leamington Spa were used as reference sites. Details of the sites and the annualisation results are presented in **Table C2.**

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2021 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG16 provides guidance regarding 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/NO_2

[38] *https://laqm.defra.gov.uk/tools-monitoring-data/dtdp.html*

continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Sandwell MBC have applied a national bias adjustment factor of 0.82 to the 2021 monitoring data. A summary of bias adjustment factors used by Sandwell MBC over the past five years is presented in **Table C.1b**

The local bias was calculated as shown in **Table C.3**, this resulted in a bias adjustment factor of 0.77. It was determined that the national bias adjustment factor would be used because it was slightly greater at 0.82 and would provide for more conservative annual mean concentrations. This use of the national bias adjustment factor provides a worse-case scenario of NO_2 levels in Sandwell to ensure that we are not underestimating NO_2 concentrations across the borough.

Table C.1b– Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2020	National	03/21	0.82
2019	National	03/20	0.81
2018	National	06/19	0.89
2017	National	03/18	0.97
2016 (Jan – July) **2016 (Aug – Dec)**	National National	09/16 09/16	0.79 0.96

NO_2 Fall-off with Distance from the Road

Wherever possible, local authorities must ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure is estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support website. Non-automatic annual mean NO_2 concentrations corrected for distance are presented in **Table B.1**. and a summary of the relevant exposed receptors is provided below in **Table C.1c**. Distance correction was required at these sites as the annual mean concentration was greater than 36µg/m^3 and the monitoring sites were not located at a point of relevant exposure.

TABLE C.1c – Summary of Fall-Off-With-Distance Calculations Required at Non-Automatic Monitoring Sites				
Diffusion Tube ID	**Raw Data**	**Bias Adjusted (0.82) and Annualised**	**Distance Corrected to Nearest Exposure**	**Comment**
BE (Birmingham Road Oldbury)	46.3	38.0	34.8	
PC1/PC2/PC3 – (A41 – Opposite Dartmouth Cricket Club)	46.4	38.1	35.6	Receptor 26.5m away so treat result with caution.
ZR (Newton Road, Great Barr)	44.5	36.5	30.2	

QA/QC of Automatic Monitoring

All analysers are calibrated at fortnightly intervals by an experienced Local Authority Officer and the results are scaled and validated every two months. The validation process takes account of: calibration factors, negative or out of range data, rapid 'spikes' in data and comparisons with results from other monitoring stations. This is in accordance with the procedure described in the AURN Operator's Manual.

All monitoring data is collected, scaled and ratified in accordance with Technical Guidance LAQM TG (16). The operation of all monitoring equipment was carried out in accordance with the AEA Site Operator's Manual.

The following automatic analysers are used within Sandwell's monitoring stations:

West Bromwich AURN

APNA370 Ambient NOx

APOA370 Ambient O_3

Tapered Element Oscillating Microbalance (TEOM) measuring PM_{10} (Particulate Matter < 10 microns).

West Bromwich Roadside

Teledyne API T200 Ambient NOx

Birmingham Road

APNA370 Ambient NOx

Tapered Element Oscillating Microbalance (TEOM) measuring PM_{10} (Particulate Matter < 10 microns).

Wilderness Lane – Great Barr

APNA370 Ambient NOx

Tapered Element Oscillating Microbalance (TEOM) measuring PM_{10} (Particulate Matter < 10 microns).

Haden Hill

APNA370 Ambient NOx

Tapered Element Oscillating Microbalance (TEOM) 1400AB Measuring PM_{10} (Particulate Matter <10 microns)

Tapered Element Oscillating Microbalance (TEOM) 1400AB Measuring $PM_{2.5}$ (Particulate Matter < 2.5 microns)

PM_{10} and $PM_{2.5}$ Monitoring Adjustment

Tapered Element Oscillating Microbalance (TEOM) data is collected and ratified. For non TEOM only instruments measuring PM_{10}, the King's College Volatile Correction Model has been applied to the data.

No such correction has been developed for $PM_{2.5}$ at the current time.

The instruments are manually checked on a fortnightly basis. Instrument filters are changed when the filter loading reaches 80% or is likely to reach 80% before the unit can be visited again. All work is carried out in accordance with the procedures described in the AURN Operator's Manual.

$PM_{2.5}$ Estimation of Concentrations

As discussed in Section 3.1.5 estimates of PM2.5 levels were calculated for three additional continuous monitoring sites. The calculations were made in accordance with Box 7.7 of LAQM TG (16) and are show in **Table C3.3** below.

TABLE C3.3 Estimation of PM2.5 Concentrations using PM10 Data					
Site	**Classification**	**Annual PM2.5**	**Annual PM10**	**Ratio PM2.5/ PM10**	
Haden Hill (Reference Site)	Urban Background	6.35	12	0.53	
					Estimated Annual PM2.5
Highfields, West Bromwich	Urban Background	-	15	0.53†	7.95
Birmingham Oldbury Road	Roadside	-	17	0.7ǂ	11.9
Wilderness Lane, Great Barr	Roadside	-	13	0.7ǂ	9.1

Automatic Monitoring Annualisation

Data with <75% data capture rate were adjusted in accordance with Box 7.9 of LAQM. TG (16), which states that it is permissible to annualise the data using background, roadside or kerbside sites. Valid data capture from Haden Hill in Cradley Heath was only 41.9% for $PM_{2.5}$ and PM_{10} so this data has been annualised. See **Table C2.1** and **Table C2.2**.

NO_2 Fall-off with Distance from the Road

Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure should be estimated using the NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in **Table B.1.**

† Local reference ratio for Haden Hill is 0.53 – annual PM_{10} is multiplied by this local reference as an 'Urban Background' classified site.

ǂ National derived correction factor is 0.7– annual PM_{10} is multiplied by national correction factor for roadside as no local reference site of the same roadside classification was available.

No automatic NO_2 monitoring locations within Sandwell MBC required distance correction during 2020.

Table C.2 – Annualisation Summary (concentrations presented in µg/m^3)

Site ID	Annualisation Factor Walsall Woodlands	Annualisation Factor Coventry Allesley	Annualisation Factor Telford	Annualisation Factor Leamington Spa	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
AD	1.1020	1.1136	1.1379	1.1461	1.1249	28.9	32.5	
AF	0.9447	0.9373	0.9643	0.9228	0.9423	31.5	29.7	
XE	0.9071	0.9103	0.9045	0.8752	0.8993	28.2	25.4	

Table C2.1 Annualisation Calculation Summary of PM_{10} at Haden Hill – Continuous Monitoring Site

Site	PM_{10} Annual Mean 2020	Period Mean 2020	Ratio Am/Pm
Haden Hill		13.40	
Background sites			
Birmingham Ladywood	11.78	12.92	0.91
Birmingham Acocks Green	12.15	12.98	0.94
		Sum of Ratios	1.85
		R (average)	0.92
		Annualised mean µg/m3	**12.32**

Table C2.2 Annualisation Calculation Summary of $PM_{2.5}$ at Haden Hill

Site	PM_{10} Annual Mean 2020	Period Mean 2020	Ratio Am/Pm
Haden Hill		6.35	
Background sites			
Birmingham Ladywood	7.21	7.77	0.93
Birmingham Acocks Green	7.86	8.28	0.95
		Sum of Ratios	1.88
		R (average)	0.94
		Annualised mean µg/m3	**6.35**

Table C.3 – Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4	Local Bias Adjustment Input 5
Periods used to calculate bias	12	12			
Bias Factor A	0.74 (0.7 - 0.78)	0.8 (0.73 - 0.87)			
Bias Factor B	35% (27% - 43%)	26% (15% - 36%)			
Diffusion Tube Mean (µg/m^3)	21.1	33.9			
Mean CV (Precision)	4.3%	4.5%			
Automatic Mean (µg/m^3)	15.6	27.0			
Data Capture	97%	98%			
Adjusted Tube Mean (µg/m^3)	16 (15-16)	27 (25 -30)			

Notes:

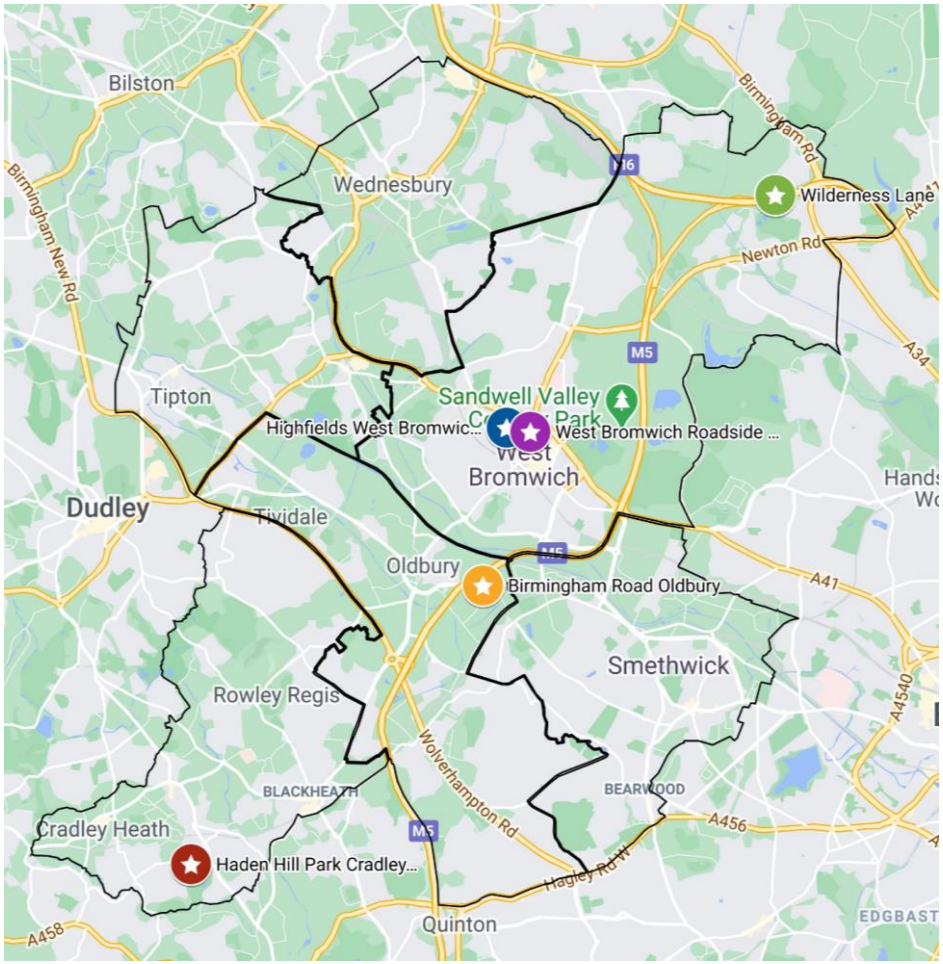
A combined local bias adjustment factor of 0.77 was calculated as shown above, however it was determined that the national bias would be used instead to adjust the 2020 diffusion tube results.

Table C.4 – NO_2 Fall off With Distance Calculations (concentrations presented in µg/m^3)

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
BE	0.8	3.3	38.0	26.25545	34.8	
PC1 PC2, PC3	1.5	26.5	38.1	23.07656	28.6	*Receptor is more than 20m further from the kerb than the monitor - treat result with caution.*
ZR	0.4	6.3	36.5	23.07656	30.2	

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

D.1 Map of Automatic Monitoring Stations in Sandwell

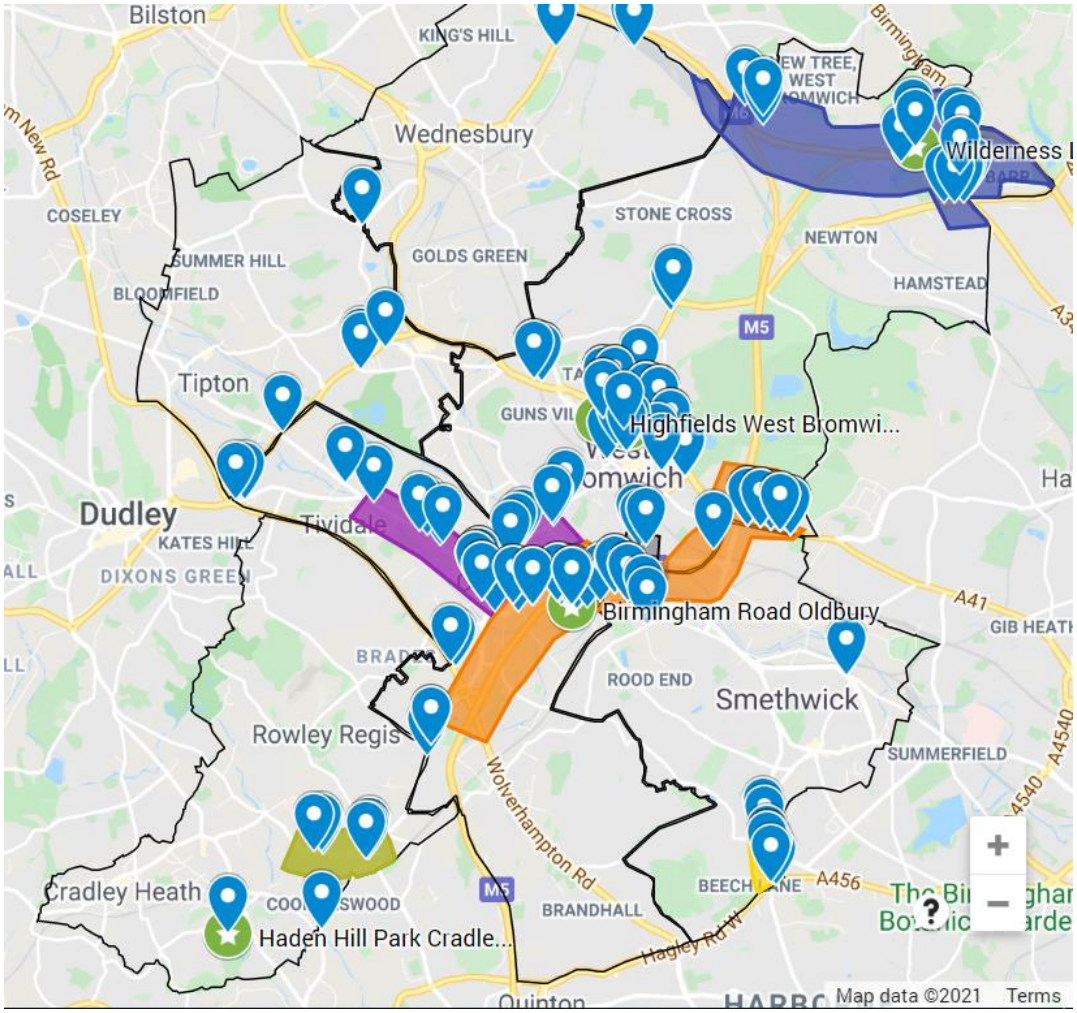


Legend

- Highfields, West Bromwich
- Birmingham Rd, Oldbury
- Wilderness Lane, Great Barr
- Haden Hill Park
- Cradley Heath
- West Bromwich Roadside Cronehills

For a full, interactive map of the diffusion tube network, automatic monitoring stations and priority zones in Sandwell please follow this link.

D.2 Map of Non-Automatic Monitoring Sites in Sandwell



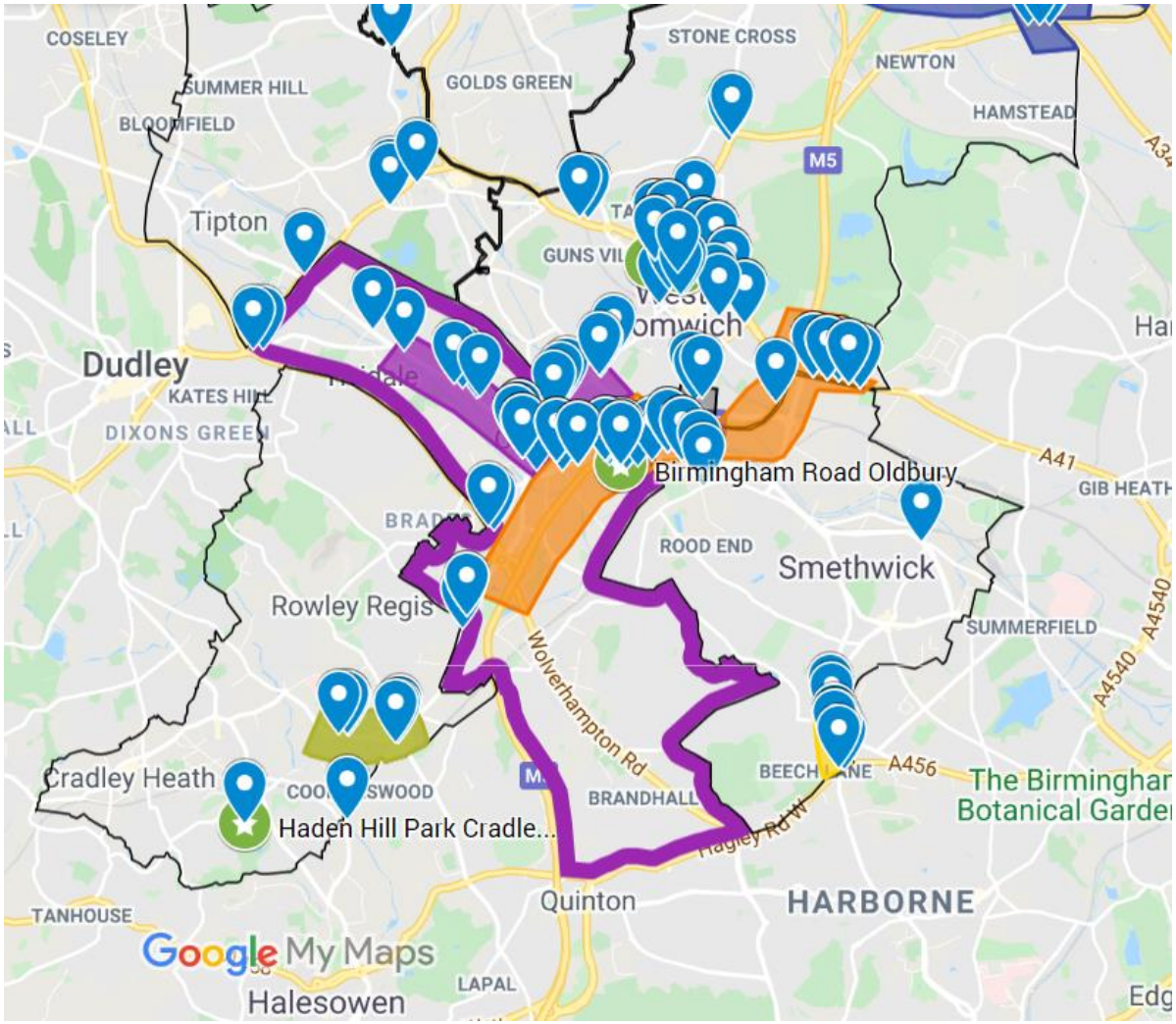
Legend

	Diffusion tube
	Automatic monitoring station

- Blackheath- Zone 1
- Bearwood Road, Smethwick- Zone 2
- Oldbury M5 Junctions 1 to 2- Zone 3
- Great Barr and Yew Tree- Zone 4
- Oldbury, Oldbury Ringway (Incl. Bromford Lane/Kelvin Way/Brandon Way)- Zone 5
- The Expressway/All Saints Way, West Bromwich- Zone 6
- West Bromwich, Trinity Way/Kenrick Way- Zone 7

For a full, interactive map of the diffusion tube network, automatic monitoring stations and priority zones in Sandwell please follow this link.

D.3 Map of Oldbury, Sandwell



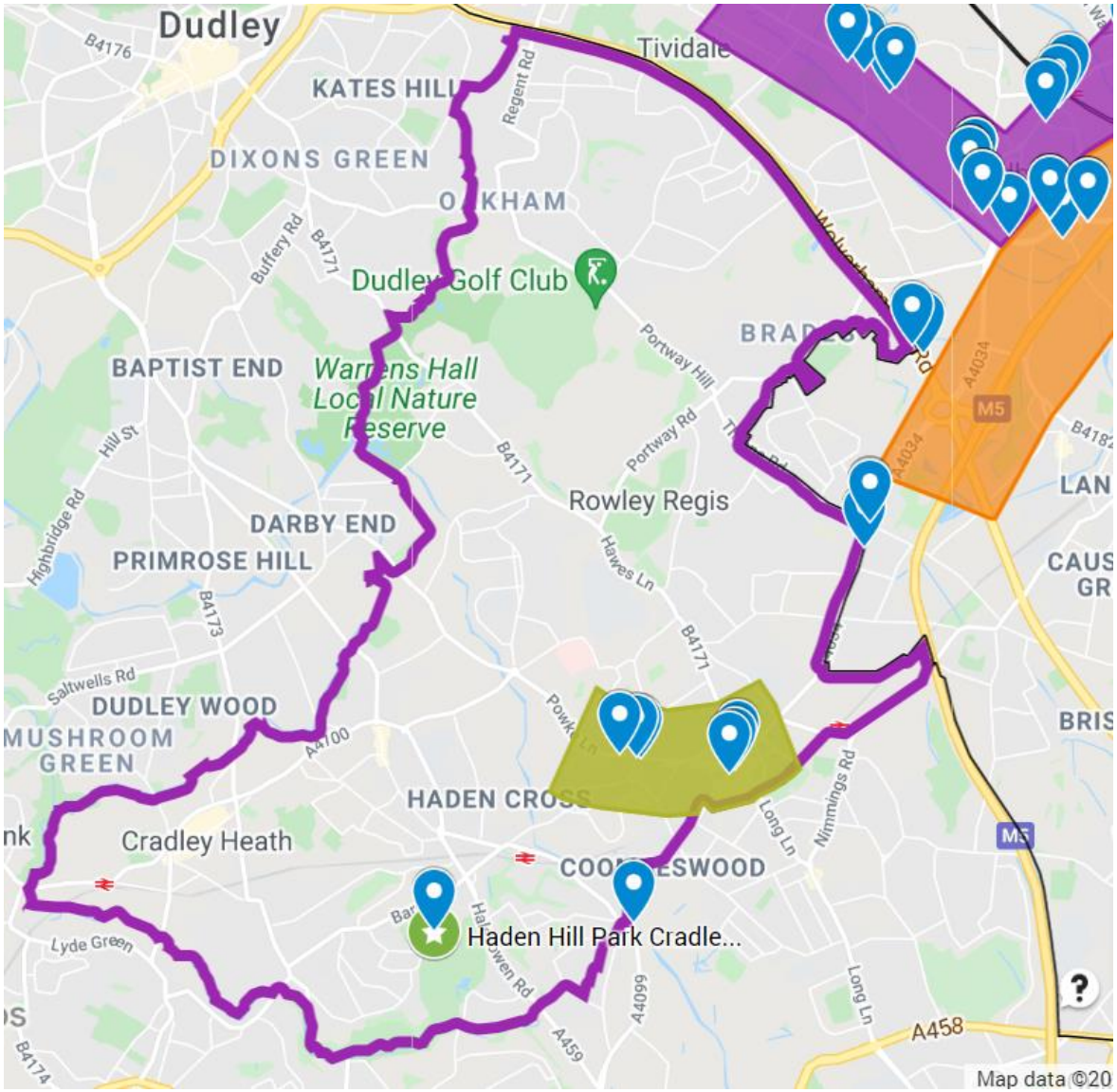
Legend

	Diffusion tube
	Automatic monitoring station

- Blackheath- Zone 1
- Bearwood Road, Smethwick- Zone 2
- Oldbury M5 Junctions 1 to 2- Zone 3
- Great Barr and Yew Tree- Zone 4
- Oldbury, Oldbury Ringway (Incl. Bromford Lane/Kelvin Way/Brandon Way)- Zone 5
- The Expressway/All Saints Way, West Bromwich- Zone 6
- West Bromwich, Trinity Way/Kenrick Way- Zone 7

For a full, interactive map of the diffusion tube network, automatic monitoring stations and priority zones in Sandwell please follow this link.

D.4 Map of Rowley Regis, Sandwell



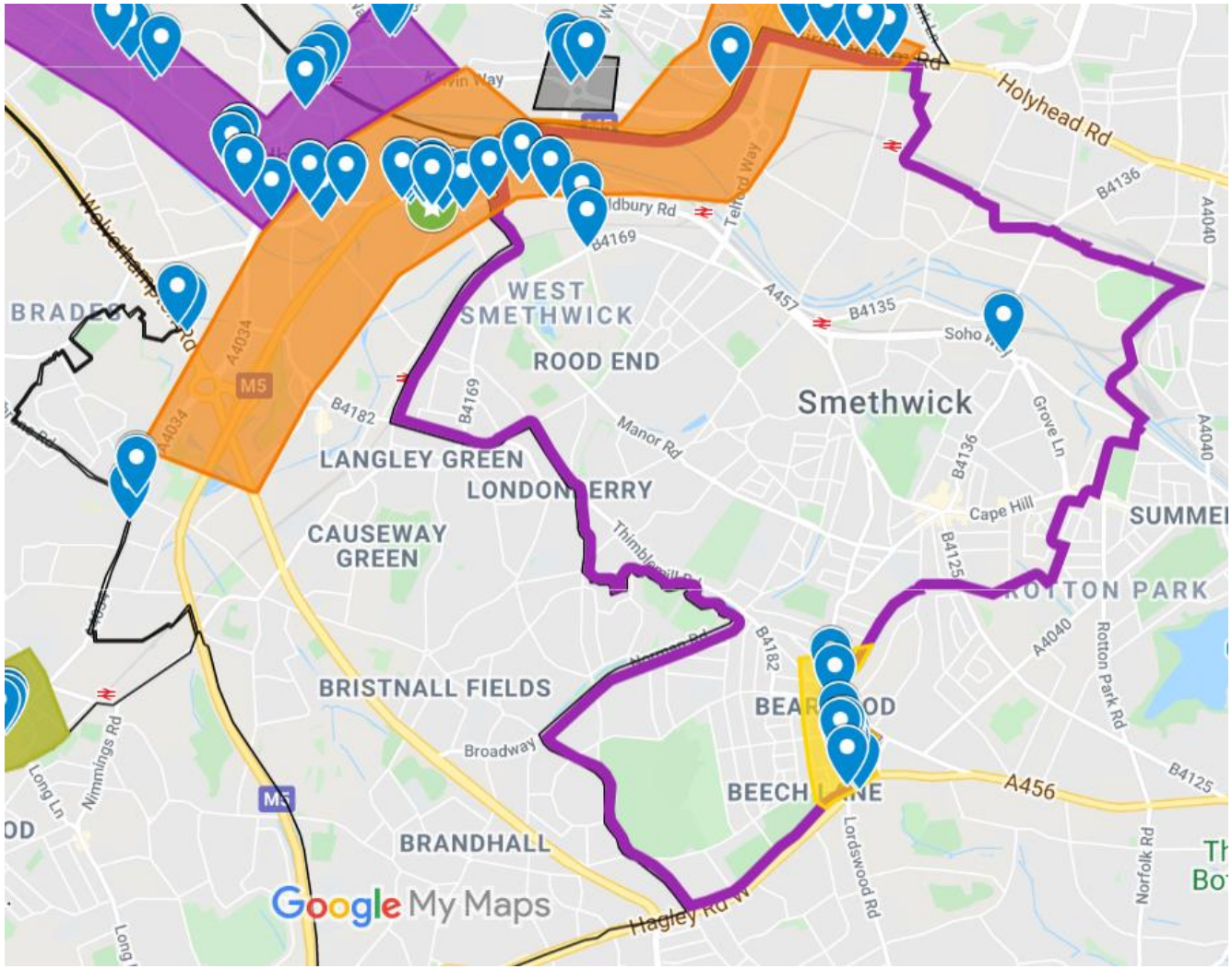
Legend

	Diffusion tube
	Automatic monitoring station

- Blackheath- Zone 1
- Bearwood Road, Smethwick- Zone 2
- Oldbury M5 Junctions 1 to 2- Zone 3
- Great Barr and Yew Tree- Zone 4
- Oldbury, Oldbury Ringway (Incl. Bromford Lane/Kelvin Way/Brandon Way)- Zone 5
- The Expressway/All Saints Way, West Bromwich- Zone 6
- West Bromwich, Trinity Way/Kenrick Way- Zone 7

For a full, interactive map of the diffusion tube network, automatic monitoring stations and priority zones in Sandwell please follow this link.

D.5 Map of Smethwick, Sandwell



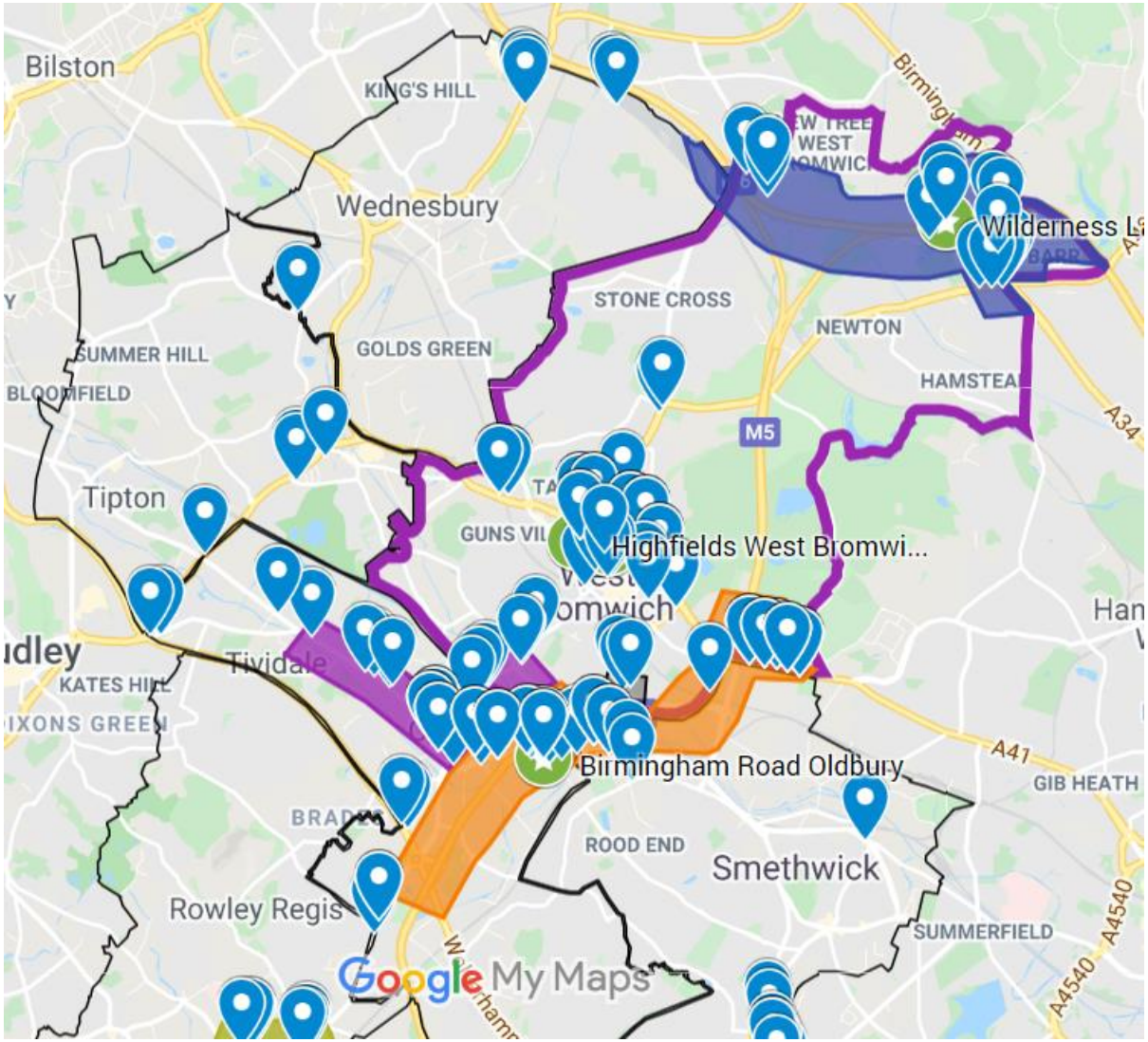
Legend

	Diffusion tube
	Automatic monitoring station

- Blackheath- Zone 1
- Bearwood Road, Smethwick- Zone 2
- Oldbury M5 Junctions 1 to 2- Zone 3
- Great Barr and Yew Tree- Zone 4
- Oldbury, Oldbury Ringway (Incl. Bromford Lane/Kelvin Way/Brandon Way)- Zone 5
- The Expressway/All Saints Way, West Bromwich- Zone 6
- West Bromwich, Trinity Way/Kenrick Way- Zone 7

For a full, interactive map of the diffusion tube network, automatic monitoring stations and priority zones in Sandwell please follow this link.

D.6 Map of West Bromwich, Sandwell



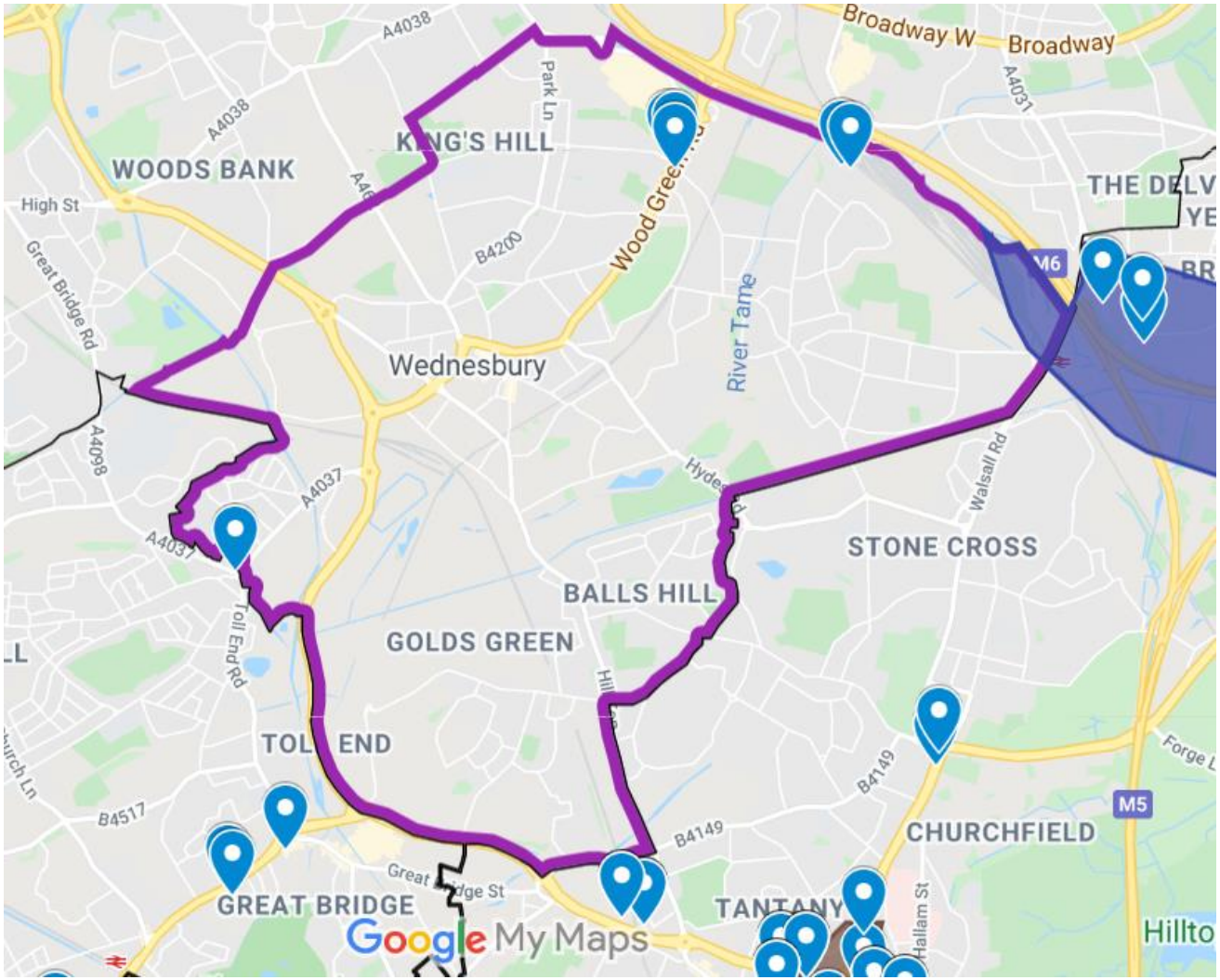
Legend

	Diffusion tube
	Automatic monitoring station

- Blackheath- Zone 1
- Bearwood Road, Smethwick- Zone 2
- Oldbury M5 Junctions 1 to 2- Zone 3
- Great Barr and Yew Tree- Zone 4
- Oldbury, Oldbury Ringway (Incl. Bromford Lane/Kelvin Way/Brandon Way)- Zone 5
- The Expressway/All Saints Way, West Bromwich- Zone 6
- West Bromwich, Trinity Way/Kenrick Way- Zone 7

For a full, interactive map of the diffusion tube network, automatic monitoring stations and priority zones in Sandwell please follow this link.

D.7 Map of Wednesbury, Sandwell



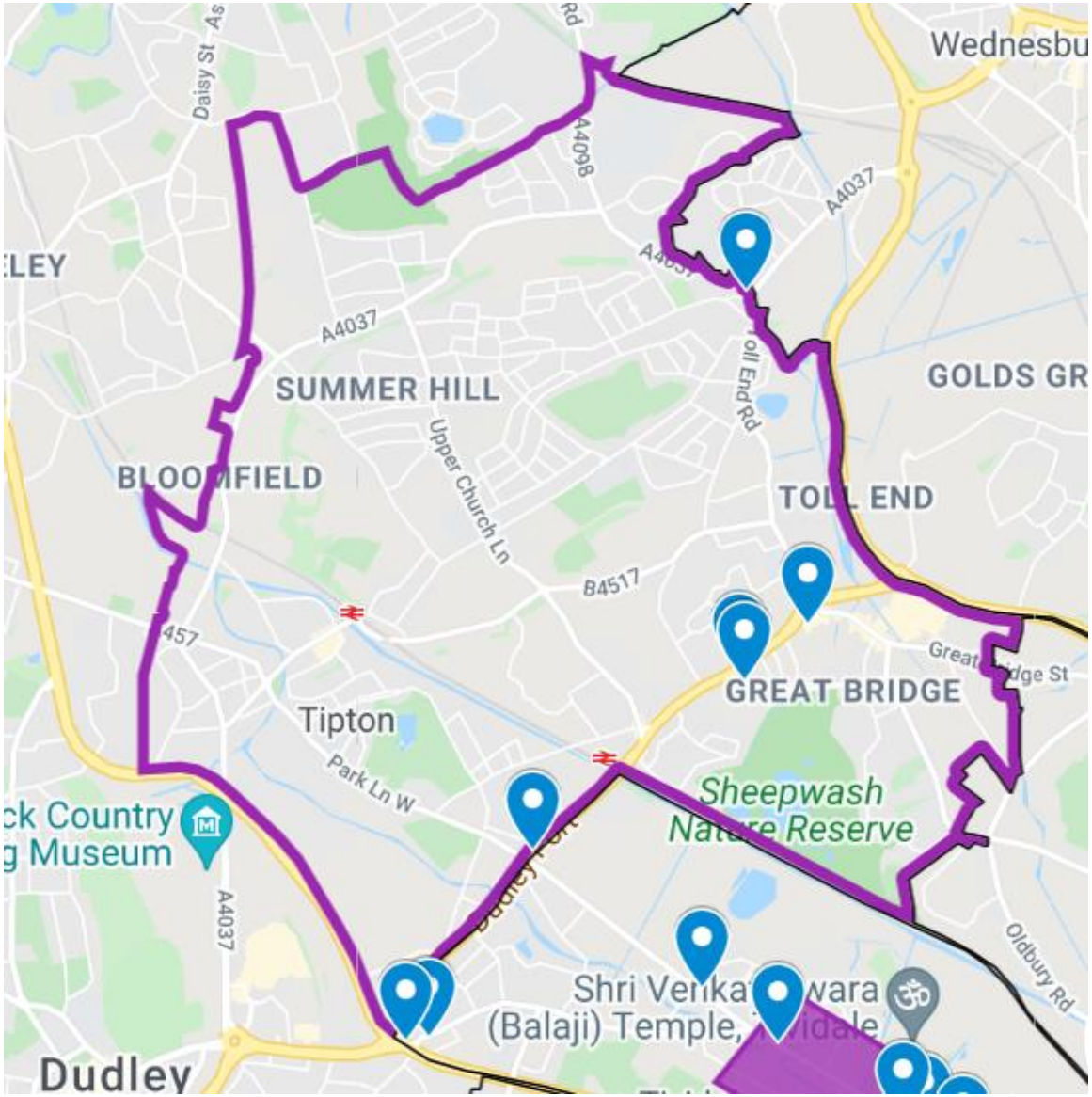
Legend

	Diffusion tube
	Automatic monitoring station

- Blackheath- Zone 1
- Bearwood Road, Smethwick- Zone 2
- Oldbury M5 Junctions 1 to 2- Zone 3
- Great Barr and Yew Tree- Zone 4
- Oldbury, Oldbury Ringway (Incl. Bromford Lane/Kelvin Way/Brandon Way)- Zone 5
- The Expressway/All Saints Way, West Bromwich- Zone 6
- West Bromwich, Trinity Way/Kenrick Way- Zone 7

For a full, interactive map of the diffusion tube network, automatic monitoring stations and priority zones in Sandwell please follow this link.

D.8 Map of Tipton, Sandwell



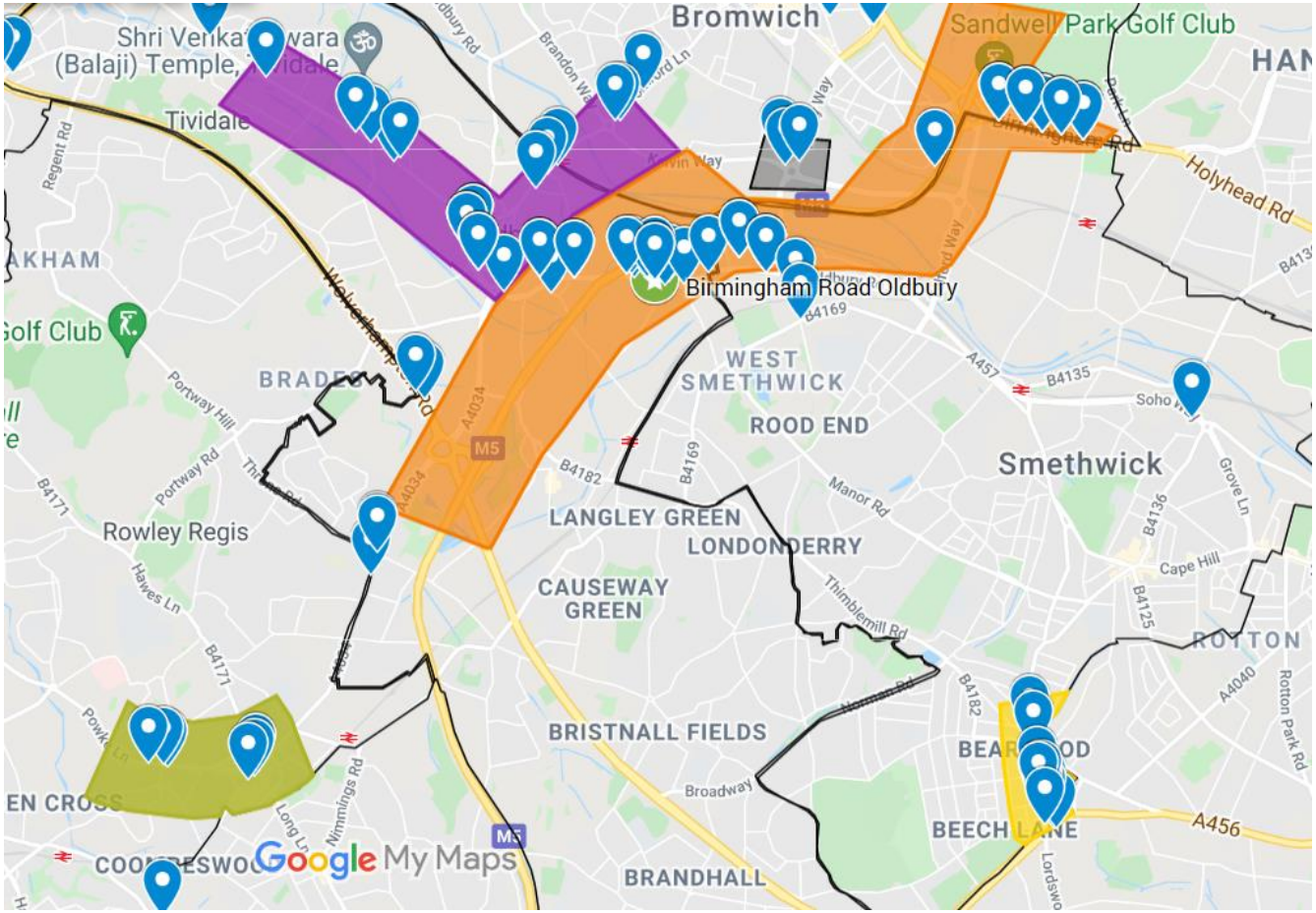
Legend

	Diffusion tube
	Automatic monitoring station

- Blackheath- Zone 1
- Bearwood Road, Smethwick- Zone 2
- Oldbury M5 Junctions 1 to 2- Zone 3
- Great Barr and Yew Tree- Zone 4
- Oldbury, Oldbury Ringway (Incl. Bromford Lane/Kelvin Way/Brandon Way)- Zone 5
- The Expressway/All Saints Way, West Bromwich- Zone 6
- West Bromwich, Trinity Way/Kenrick Way- Zone 7

For a full, interactive map of the diffusion tube network, automatic monitoring stations and priority zones in Sandwell please follow this link.

D.9 Map of Priority Zones 1, 2, 3, 5 and 7



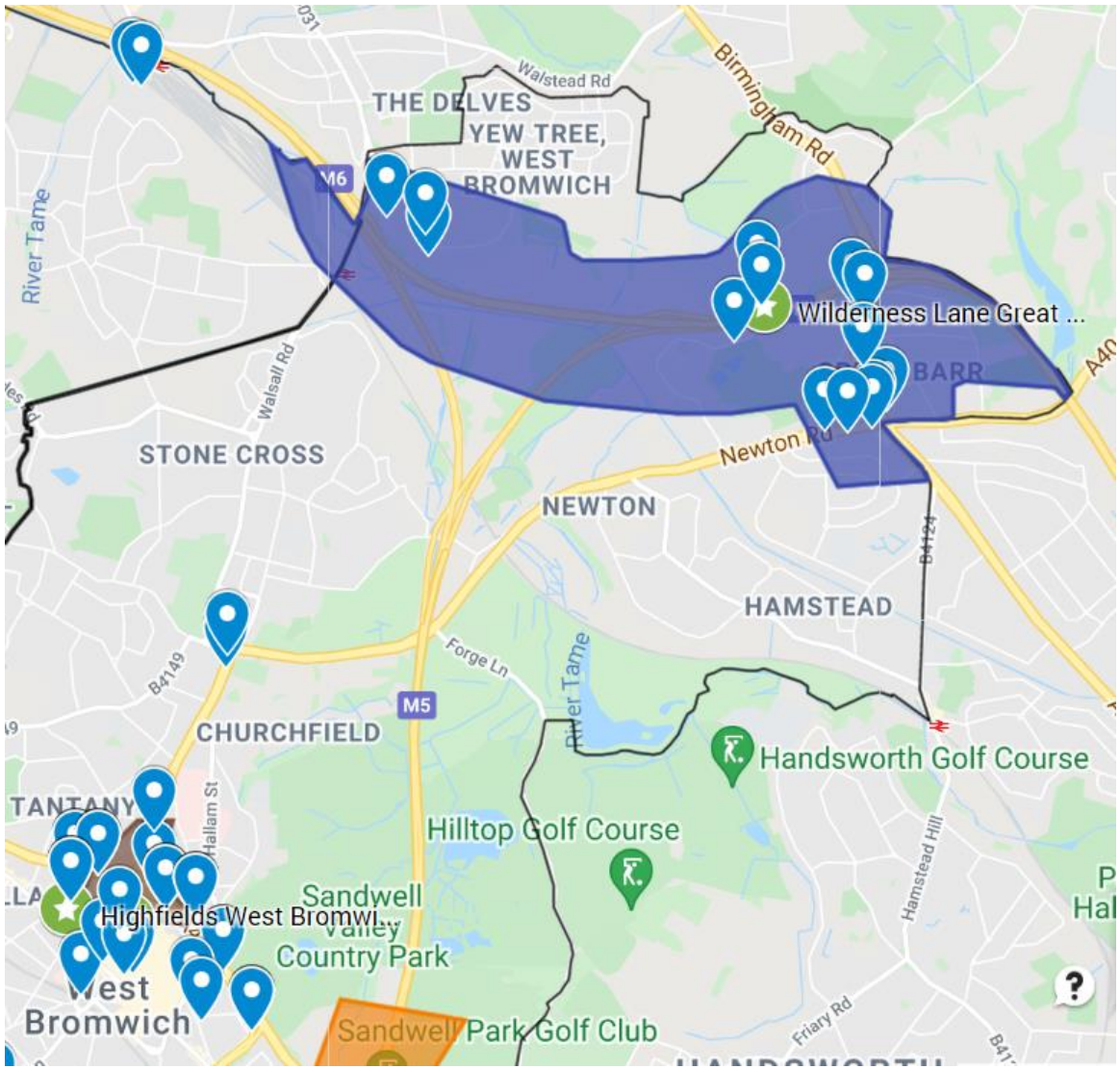
Legend

	Diffusion tube
	Automatic monitoring station

- Blackheath- Zone 1
- Bearwood Road, Smethwick- Zone 2
- Oldbury M5 Junctions 1 to 2- Zone 3
- Great Barr and Yew Tree- Zone 4
- Oldbury, Oldbury Ringway (Incl. Bromford Lane/Kelvin Way/Brandon Way)- Zone 5
- The Expressway/All Saints Way, West Bromwich- Zone 6
- West Bromwich, Trinity Way/Kenrick Way- Zone 7

For a full, interactive map of the diffusion tube network, automatic monitoring stations and priority zones in Sandwell please follow this link.

D.10 Map of Priority Zones 5 & 6



Legend

	Diffusion tube
	Automatic monitoring station

- Blackheath- Zone 1
- Bearwood Road, Smethwick- Zone 2
- Oldbury M5 Junctions 1 to 2- Zone 3
- Great Barr and Yew Tree- Zone 4
- Oldbury, Oldbury Ringway (Incl. Bromford Lane/Kelvin Way/Brandon Way)- Zone 5
- The Expressway/All Saints Way, West Bromwich- Zone 6
- West Bromwich, Trinity Way/Kenrick Way- Zone 7

For a full, interactive map of the diffusion tube network, automatic monitoring stations and priority zones in Sandwell please follow this link.

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[39]

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

[39] The units are in micrograms of pollutant per cubic metre of air (µg/m^3).

Appendix F: Impact of COVID-19 upon LAQM

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

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

Despite the challenges that the pandemic has given rise to, the events of 2020 have also provided Local Authorities with an opportunity to quantify the air quality impacts associated with wide-scale and extreme intervention, most notably in relation to emissions of air pollutants arising from road traffic. The vast majority (>95%) of AQMAs declared within the UK are related to road traffic emissions, where attainment of the annual mean objective for nitrogen dioxide (NO_2) is considered unlikely. On 23rd March 2020, the UK Government released official guidance advising all members of public to stay at home, with work-related travel only permitted when absolutely necessary. During this initial national lockdown (and to a lesser extent other national and regional lockdowns that followed), marked reductions in vehicle traffic were observed; Department for Transport (DfT) data[40] suggests reductions in vehicle traffic of up to 70% were experienced across the UK by mid-April, relative to pre COVID-19 levels.

This reduction in travel in turn gave rise to a change of air pollutant emissions associated with road traffic, i.e. nitrous oxides (NO_x), and exhaust and non-exhaust particulates (PM). The Air Quality Expert Group (AQEG)[41] has estimated that during the initial lockdown period in 2020, within urbanised areas of the UK reductions in NO_2 annual mean concentrations were between 20 and 30% relative to pre-pandemic levels, which

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

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

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

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

Impacts of COVID-19 on Air Quality within Sandwell

Nitrogen Dioxide Concentrations

When comparing the diffusion tube monitoring results for Sandwell from April to June 2020 with the same three months in 2019, NO_2 concentrations have been reduced by an average of nearly 26%. The annual mean reduction in concentration of NO_2 was 18% at roadside sites and 20% at kerbside sites. This mirrors the findings of the AQEG, suggesting that the greatest reductions in NO_2 concentrations were achieved during the spring lockdown. The differences between annual mean concentrations measured at both kerbside and roadside sites in 2019 and 2020 are shown in **Figure F.1a** and **Figure F.1b**

Figure F.1a

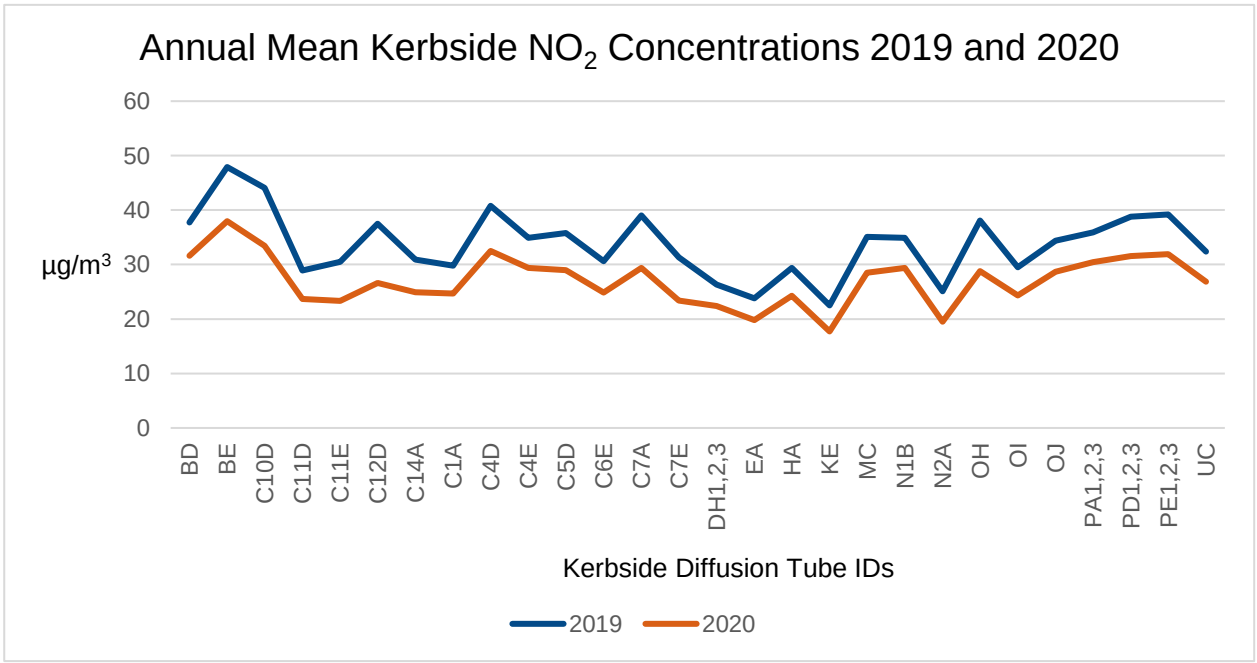
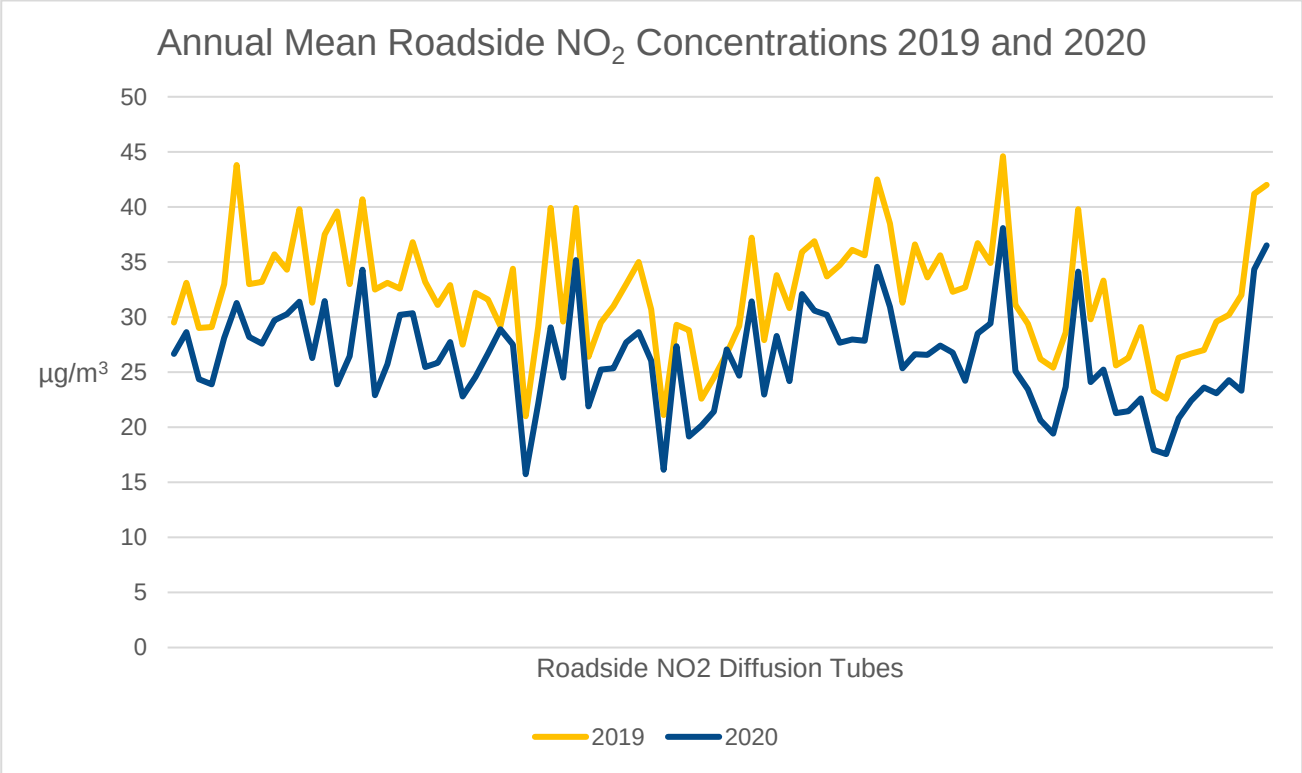


Figure F.1b



This is the first time that all diffusion tube sites have complied with the annual mean objective since declaration in 2005. The reduction in NO_2 experienced within 2020 demonstrates how both reducing and moving to cleaner forms of transport would enable us to achieve the annual mean objective in the future.

Ozone Levels

The average mean level of NO_2 at Highfields, West Bromwich decreased by 32 per cent but the annual mean for ground-level ozone (O_3) increased by 20 per cent at this site in 2020. This mirrors the findings of a study led by the University of York in 2020. This showed levels of nitrogen dioxide (NO_2) were down on average across the UK by 42 per cent, but surface ozone (O_3) increased by 11 per cent on average. Ground-level ozone is a health concern as it can trigger a variety of health problems, particularly in children and the elderly as well as anyone who has a lung disease such as asthma.

The rise in ground-level ozone is due to a change in chemistry between nitrogen oxide and O_3. When nitrogen oxide is released from car tailpipes it rapidly forms NO_2, but NO_2 paradoxically degrades ozone. So, when less nitrogen dioxide is being formed because there is less traffic, ozone continues to form due to chemical reactions created by hot sunny weather, as occurred in April and May 2020, the ozone is not being degraded as rapidly as normal and therefore levels rise.

The report concludes that if the Covid-19 lockdown is taken as an example of how air quality could be controlled by future restrictions in vehicle emissions e.g. electric cars, then we also need to consider the problem of O_3 formation. We don't want to create other forms of pollution that are also harmful to human health. We need to look at better control of man-made volatile organic compounds (VOCs) – gases emitted into the air from products and processes of industry which are also responsible for ground-level ozone formation.

Opportunities Presented by COVID-19 upon LAQM within Sandwell

- Transport for West Midlands (which is part of the West Midlands Combined Authority) received £3.85m to fund active travel measures in response to Covid-19. This was part of the Department for Transport's £250m Emergency Active Travel Fund. Sandwell Council was allocated £296,000 of this funding in the 'Tranche 1' phase, to complete a number of schemes to encourage people to cycle and walk, rather than drive or take the bus. This included creating one-way systems, cycle lanes, cones, barriers, lines, signs and pavement widening.
- 'Tranche 2' of the Emergency Active Travel Funding will be made available in 2021 to enable longer-termer changes to be made within the borough and these should also have a positive impact on local air quality. Sandwell MBC have created a number of proposals which are now open to consultation[42]. The suggested changes will predominantly increase the space given to pedestrians and cyclists within town centres. The main incentives are to make town centres more pleasant to visit by reducing the presence of private cars, increase trade, boost the local economy, and have a positive impact on local air quality.
- Sandwell's Public Health Department, led by Lisa McNally - Director of Public Health, contacted many religious centres across Sandwell during 2020 to ensure that important Covid-19 health messages were effectively communicated to their congregations and local communities. Consequently, strong and trusted relationships were formed

[42] https://sandwellwalking-and-cycling.commonplace.is/

between Sandwell's Public Health teams and many faith centres across the borough. It was these relationships, as well as the unfolding scientific research which identified significant connections between Covid-19 deaths and air pollution, that inspired the idea for the Faith Centre Air Quality Project and ultimately the successful bid for a Defra Air Quality Grant. The value of this project has even greater significance, if we also consider the research that suggests that ethnic minorities are more likely to live in polluted areas[43] and that there are links between Covid-19 deaths and air pollution[44]. As there is a significant representation of people who are black, Asian or minority ethnic (BAME) within Sandwell and these people are particularly well represented in our faith communities, this project provides a unique opportunity to help us reach out to those who may be most vulnerable to the health risks associated with air pollution.

Challenges and Constraints Imposed by COVID-19 upon LAQM within Sandwell

Staff Resources

Providing an emergency public health response to people living and working in Sandwell was a priority in 2020. The council required dedicated staff to provide support by e-mail and telephone via a dedicated Covid e-mail inbox. Given that there was only one air quality officer until the end of November, this work occupied approximately 30 per cent of the officer's time. Priority was given to meeting immediate service demands such as complaints and planning, and therefore limited the time available for reviewing, promoting and introducing new air quality initiatives.

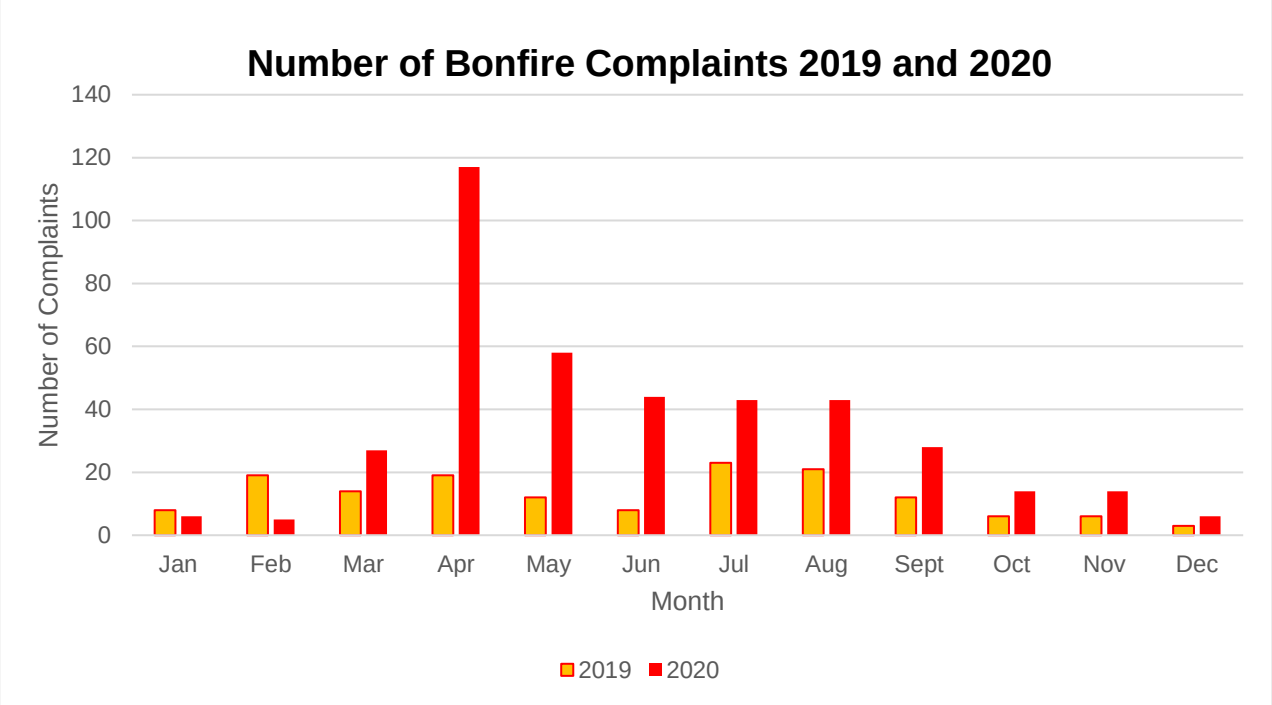
Bonfire Complaints

2020 saw a **168%** increase in bonfire complaints from 151 to 405. The numbers of complaints peaked in April 2020, with 117 complaints being received compared to 19 in April 2019. The peak in complaints correlates with the dates when the household waste recycling centre at Shidas Lane, Oldbury was closed from mid March until mid May 2020. Responding to this significant rise in complaints was a challenge for the air pollution team,

[43] https://www.imperial.ac.uk/news/163408/ethnic-minorities-deprived-communities-hardest-pollution/ Ethnic minorities and deprived communities hardest hit by air pollution, Sam Wong 26 January 2015

[44] https://www.sciencedirect.com/science/article/pii/S0269749120365489

particularly given the genuine health concerns of complainants and the practical difficulties of investigating complaints when staff were working from home and only 'essential travel' was allowed. This increase in domestic waste burning will most certainly have had a negative impact on local air quality. There was also concern that many reports being received suggested that the waste being burned was not garden waste, but domestic/household waste which is more likely to contain hazardous or toxic materials. Although we do not have data to confirm the precise impact bonfires had on air quality during this period, we do know that domestic burning will have had a negative impact on local air quality and unnecessairly increased people's exposure to pollutants including $PM_{2.5}$



Measures not carried out

- Normally an electric vehicle experience day would be provided for Clean Air Day. This would allow staff at the Council House to test drive electric cars, with the aim of encouraging staff who use their own vehicle for work to purchase an electric vehicle in the future. This, unfortunately could not be undertaken due to social distancing requirements.
- Due to the potential risks posed to Sandwell staff from contracting or spreading Coronavirus, routine site based Environmental Permitting Regulation inspections were postponed from 23rd March to December 31st, 2020. The decision was reviewed on a regular basis throughout the year but due to higher than average infection levels being experienced in Sandwell, this position was maintained into 2021. It was agreed that the

only visits to be undertaken were those deemed to be essential for protecting the environment.

- Measure 27 in **Table 2.2** focuses on the promotion of car sharing amongst residents and businesses as an alternative to single person car use. Due to the infection risks from Covid-19 Sandwell's Car Share Scheme could not be promoted or safely used after March 232020

A457 – Birmingham Road, Oldbury

- As discussed in the ASR 2020, additional diffusion tubes were deployed (in triplicate) on the A457 Birmingham Road, Oldbury to monitor NO_2 following the signaling and bus retrofit improvements as part of the '3rd Wave' project. This monitoring continued through 2020, but due to the pandemic we have not been able to determine if the levels of NO_2 along the A457 Birmingham Road, Oldbury, would have dropped along this road once the 'M5 (J1-J2) Oldbury Viaduct' roadworks had been completed in December 2019. (The A457 runs parallel to some of the M5 viaduct and is an alternative route for vehicles avoiding traffic on the M5.) We will therefore be interested to see if the reopening of the M5 and the signaling/retrofit of buses will have a positive impact on NO_2 levels here in the longer term. **Medium Impact**

A41, Birmingham Road, West Bromwich

- The monitoring of NO_2 levels along the A41, West Bromwich (M5 - J1 Link Road) continued in 2020 as part of the '3rd Wave' project. Again, the national lockdowns mean that the collection of meaningful long-term trend data was not possible in 2020. Data collection for 2021 will therefore be used to provide a better indication as to how effective these measures have been. **Medium Impact**

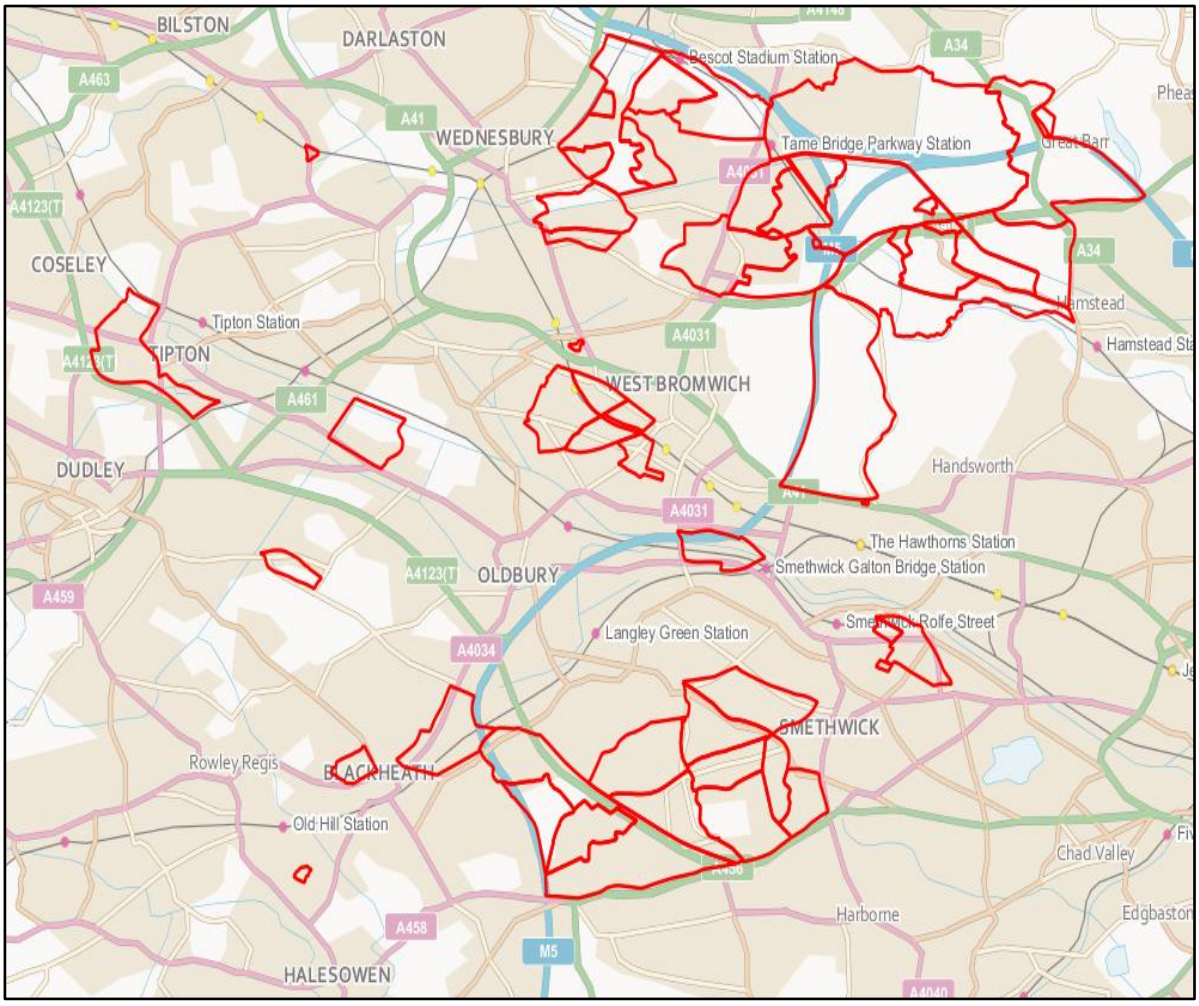
The impacts as presented above are aligned with the criteria as defined in Error! Reference source not found., with professional judgement considered as part of their application.

Table F 1 – Impact Matrix

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

Appendix G: Map of Sandwell's Smoke Control Areas

There are no sources in the current document.



Map provided by data.gov.uk: https://data.gov.uk/dataset/2e59be11-a9db-4b9e-8cbb-8e2f2567c588/sandwell-mbc-smoke-control-area

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Annual Status Report
CAZ	Clean Air Zone
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EV	Electric Vehicle
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide
ULEV	Ultra-Low Emission Vehicle
WHO	World Health Organisation

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