2020 Air Quality Annual Status Report (ASR)

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

January 2021 (Reporting on calendar year 2019)

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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 part of the West Midlands Combined Authority (WMCA) sharing full membership with six other authorities; 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 2019 and describes the measures that Sandwell is currently undertaking to improve air quality now and in the future.

Air Quality in Sandwell

Impact of Air Quality on Health

Air pollution is associated with several adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas[2,3].

[1] https://www.sandwelltrends.info/population-change-interactive-chart/
[2] Environmental equity, air quality, socioeconomic status and respiratory health, 2010
[3] Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[4].

Declaration of Air Quality Management Area

In 2005 Sandwell Council declared a borough wide Air Quality Management Area for exceedances of the Nitrogen Dioxide (NO_2) annual mean but air pollution continues to be a problem. 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 are responsible for monitoring and regulating air quality across the borough. This includes regulating emissions from domestic and commercial activity using a variety of tools including the enforcement of Smoke Control Areas, investigating statutory nuisance complaints and regulating industries under the Environmental Permitting Regulations. The team also consult on planning applications to prevent and mitigate adverse impacts on air quality from new development.

Sandwell Council maintains 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 has maintained its air pollution monitoring network during 2019, including undertaking 12 months of continuous automatic air pollution monitoring at five locations. It has also expanded the number of locations where nitrogen dioxide diffusion tubes are deployed from 103 locations in 2018 to 123 in 2019. At each of the 20 new locations, triplicate tubes have been deployed in accordance with the Defra

[4] Defra. Abatement cost guidance for valuing changes in air quality, May 2013

colocation data requirements. In total 163 individual diffusion tubes are being deployed to monitor the annual mean NO_2.

In 2018 Sandwell Council had seven remaining priority zones including two 'Hotspots' Mallin Street, Smethwick and Gorsty Hill, Rowley Regis. These two hotspots have been included within the draft Air Quality Action Plan covering the period 2020-2025.

The following table describes how these zones relate to the historic Nitrogen Dioxide (NO_2) exceedance areas.

Table 1.1 Sandwell NO_2 Key Priority Zones for 2020 to 2025		
Zone	**Historical Area**	**Description of Area**
1	13	High Street / Powke Lane, Blackheath
2	11	Bearwood Road, Smethwick
3	1	M5 Corridor - Blakeley Hall Road, Oldbury to Birmingham Road (A41), West Bromwich
4	10	Newton Road / Birmingham Road (A34), Great Barr
5	14	Bromford Lane (including the Kelvin Way / Brandon Way Junction), West Bromwich
6	16	All Saints Way / Expressway, West Bromwich
7	15	West Bromwich, Trinity Way / Kenrick Way
Hotspot 1		Mallin Street, Smethwick
Hotspot 2		Gorsty Hill, Blackheath

Zone/Hotspot did not exceed national objective for NO_2 in 2019

A map showing the priority zones listed in **Table 1.1** can be found in **Appendix D.**

It is encouraging to note that the NO_2 national objective was not exceeded in Zones 5 & 6 or at Hotspot 2 in 2019. Although exceedances continue to persist in five of the original historical areas and at Mallin Street (Hotspot 1).

Steady progress has been achieved with the following 17 locations which originally exceeded the annual mean NO_2 objective in 2005 now demonstrating compliance with the national objectives in 2019:

Table 1.2	
Area	**Areas compliant with the NO2 Objective**
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

The NO_2 levels recorded at the Gorsty Hill levels have remained under the annual mean objective in both 2018 and 2019, but to ensure that this is a consistent trend we will continue to monitor this site for at least the next three years.

The A457 Birmingham Road, Oldbury in Priority Zone 3 has been subject to increased levels of NO_2 diffusion tube monitoring after being included within the '3rd Wave' of the government's Clean Air Strategy as a road exceeding the national objective for NO_2. There are a total of 11 monitoring sites on this road, 7 where diffusion tubes have been deployed in triplicate, in addition to 4 sites existing where single diffusion tubes are

deployed. The Automatic Urban and Rural Network (AURN) monitoring station is also located on this road. The A457 Birmingham Road, Oldbury (BE) exceeded the mean annual objective with levels of 47.9 µg/m^3. The increase in the last two years is of concern but it is expected that this should be reduced in 2020 following traffic signal improvement works and bus retrofitting that were completed in November 2019.

New Exceedances

A41 (Birmingham Road, West Bromwich)

New exceedances were 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 is a section of 'A' road where relevant receptors are set some distance away from the source of pollution. 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 NO2 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. Retrofitting of the buses to Euro VI standard was not completed until November 2019.

NO_2 diffusion tubes were deployed in triplicate at five sites in August 2019 to monitor progress. Results for this year have confirmed one exceedance at 44µg/m^3 and two within 10% of the national objective for NO_2.

It is recognised that long term measurement of NO_2 levels along these link roads is required to determine the effectiveness of these interventions.

Particulate Matter

Although UK national air quality objectives for PM_{10} are currently met in Sandwell, we only monitor $PM_{2.5}$ at one site. It is also recognised that in the most recent UK Government's Air Quality Strategy, published January 2020, a pledge was made to consider implementing an AQOL (Air Quality Objective Limit) for $PM_{2.5}$.

We are very aware of the health implications related to $PM_{2.5}$ and the need to monitor $PM_{2.5}$ more widely within the borough, our longer term aim is to expand local monitoring. Until this is possible we have established an estimate of $PM_{2.5}$ levels at 3 other sites in the borough using a ratio calculation derived from existing ratified PM_{10}

data. The estimates suggest that $PM_{2.5}$ exceeds the WHO health guideline of 10µg/m^3 at all three sites. More action is therefore required to reduce $PM_{2.5}$ in Sandwell.

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

Actions to Improve Air Quality

Tackling Nitrogen Dioxide and Particulate Matter

The principal source of air pollution in Sandwell is direct emissions from vehicles (petrol and diesel powered) using the road network. Busy junctions, narrow congested streets and town centres, consistently demonstrate exceedances of Nitrogen Dioxide.

In 2009 when Sandwell published its first air quality action plan (AQAP) it focussed on several key areas which included traffic management improvements, enhancing conditions for vehicles and pedestrians in shopping centres and promoting modal shift to walking and cycling.

Although 2010/2011 saw an initial worsening in air quality, subsequent years have demonstrated a gradual improvement in NO_2. The number of locations which exceed the NO_2 annual mean objective has also been significantly reduced from 22 to 5. However Particulate Matter (PM_{10}, $PM_{2.5}$) concentrations have either remained the same or demonstrated a slight increase. This is an issue of concern and requires a revised approach to determine the main sources of particulate matter and how we can reduce it in the future.

We consider that the best tool available to Sandwell MBC in improving local air quality is being able to provide the local population with real-time local air quality data. This should make an essentially invisible public health threat more visible. As a starting point it is proposed that Sandwell will bid for a Defra air quality grant in October 2020, with a view to purchasing approximately 12 low-cost air quality monitors. These monitors will help to inform us of how levels of air pollutants vary through the day and will help to identify locations where concentrations of pollutants are peaking at times when vulnerable people may be exposed to them. This may include sites where the annual average concentration may be within the relevant air quality objective, but we still want and need to reduce exposure.

We are aiming to provide those who live and work in Sandwell with a better awareness of what air quality is like in the streets that they know and use. In doing so this will allow for a stronger and more purposeful engagement. By increasing both knowledge and the provision of ideas and opportunities on how to make positive behavioural change, we aim to improve local air quality.

In addition, the provision of real-time air pollution data will be useful to Sandwell Council for supporting and shaping future decision making e.g. planning and development proposals.

Updating the Air Quality Action Plan

Further information on specific measures being taken in Sandwell are listed in Table 2.3 which has been included in Sandwell Council's Draft Air Quality Action Plan Measures for 2020-2025.

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[5].

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 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.

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

Planning Conditions

2019 saw a 50% increase in the number of planning applications requiring the provision of electric vehicle charging points at both residential, commercial and industrial premises.

Year	Planning Apps with Electric Vehicle Charging Point Conditions Attached
2017	35
2018	32
2019	64

Conditions requiring a travel plan for air quality purposes were also attached to a further 11 permissions.

Conclusions and Priorities

Significant Trends

There is an overall decreasing trend of NO_2 levels in Sandwell, with the percentage of monitoring sites found exceeding the national objective reduced from 17.5% to 7.3%.

There had been a trend in annual PM_{10} levels decreasing from 2008 to 2015 but levels have shown an increase from 2015 to 2019 which is of concern, particularly along the Birmingham Road, Oldbury.

$PM_{2.5}$ is a pollutant of significant health concern, and Sandwell MBC is committed to increasing its efforts to both monitor and reduce levels in the borough. Although the one urban background monitoring site complies with the UK national objective further monitoring is needed to determine baseline levels at other sites across the borough and to form purposeful and productive strategies to reduce emissions where required. Whilst Sandwell currently complies with UK national objectives, the current aim will be to meet with tougher health guidelines set by the World Health Organisation.

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.
- Investigate options for real-time low-cost air quality monitors and options to monitor particulate matter and specifically $PM_{2.5}$ levels more widely.
- Engage with local communities to raise awareness of local air pollution and opportunities to have a positive impact on air quality.
- Increasing staff resources in the air pollution team in 2020 to increase the capacity to undertake air quality work, including formulating local strategies, increasing partnership working and engaging local communities.

Priority	Action
Priority 1	Develop specific measures in consultation with communities to reduce NO_2 concentrations at "hotspot' locations.
Priority 2	Promote public transport, walking, cycling and switching to low or zero emission vehicles.
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).

Local Engagement and How to Get Involved

Sandwell offers a variety of schemes and strategies, community projects, is involved with government action plans 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.
- TravelWise in Sandwell for information on how to plan a carshare, public transport journey, cycle journey, or walking journey.
- Air Quality Sandwell offers the opportunity to report a pollution problem, and historical information about NO_2 levels in the borough.
- Sandwell Walking Strategy 2015 to increase walking uptake, target resources and deliver improvement and enhancements to the walking environment over a 5-year period.
- Healthy Sandwell offers support for your health and wellbeing. They can provide information about walking, increasing activity and more.
- Smoke Control Areas[6] shows information about which areas of Sandwell that are designated Smoke Control Areas by the Clean Air Act 1993. In Smoke Control Areas you cannot emit smoke from a chimney unless you are burning authorised fuel or using "exempt appliances".
- A press release[7] from the Department for Environment, Food & Rural Affairs shows that wood burning stoves and coal fires are the largest source of PM2.5

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

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

in Sandwell, and the whole of the United Kingdom. Not using wet wood or coal in domestic burners or fires can improve air pollution.

- Reporting a bonfire problem[8] 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.
- Air quality and climate change are closely linked. Sandwell's Climate Change and Air Quality website[9] provides tips on how residents can help in the fight against climate change.
- 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 how to plant a tree, get involved with ongoing tree planting projects in Sandwell and more.
- Using and purchasing electric cars helps reduce air pollution in and around Sandwell. The Black Country Ultra Low Emission Vehicle Strategy[10] commits to deliver a network of electric vehicle charging points and ULEV public service vehicles. Residents can recommend a location for a residential on-street electric vehicle charging point in Sandwell.
- 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.

[8] https://www.sandwell.gov.uk/info/200274/pollution/3188/report_a_bonfire_problem
[9] https://www.sandwell.gov.uk/info/200274/pollution/4402/climate_change_and_air_quality_in_sandwell
[10] https://www.blackcountrylep.co.uk/upload/files/Smart%20City/Black%20Country%20ULEV%20Strategy%20final%20v10%20Jan%202017.pdf

- The Clean Air Strategy 2019[11] 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.
- 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.
- Charging points at work help make electric cars viable for commuters who live further away from their homes. If your workplace doesn't have an electric vehicle charge point installed, it could take advantage of the Government's Workplace Charging Scheme (WGS)[12]. 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.

[11] https://www.gov.uk/government/publications/clean-air-strategy-2019
[12] https://www.gov.uk/government/publications/workplace-charging-scheme-guidance-for-applicants-installers-and-manufacturers

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1 Local Air Quality Management

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

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether 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 MBC to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England can be found in **Table E.1 in Appendix E.**

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

A summary of AQMAs declared by Sandwell Metropolitan Borough Council can be found in **Table 2.1.**

A map of Sandwell MBCs Air Quality Management Area boundary is available on line at 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	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)				Action Plan		
						At Declaration		Now		Name	Date of Publication	Link
Sandwell Air Quality Management Area	Sandwell AQMA Order 2005	NO2 Annual Mean	Sandwell Metropolitan Borough Council	Borough Wide Declaration	YES	58.51 (C10D)	µg/m3	43.1 (BE)	µg/m3	Air Quality Action Plan Sandwell MBC	2009	Sandwell Air Quality Action Plan 2009

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

In 2005, Sandwell MBC identified 22 areas exceeding the NO_2 annual mean objective. These are listed in table 2.1A below.

Table 2.1 A - Sandwell Nitrogen Dioxide Annual Mean Exceedance Areas	
Area	**Description of Area**
1	Area between M5, Birmingham Road and Blakeley Hall Road - Oldbury
2	Area to North of the M6 – Yew Tree Estate (including Woodruff Way, Snapdragon Drive and Pimpernel Drive
3	Area to North of M6 Junction 8 – Wilderness Lane and Birmingham Road Great Barr
4	Area to South of M6 Junction 8 (Including Longleat Close, Ragley Drive and Himley Close –Great Barr
5	Area to Southeast of M6 Junction 7 (including Scott Road and Birmingham Road) - Great Barr
6	Area to Southwest of M6 Junction 7 (including Birmingham Road and Hillside Road) – Great Barr
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
10	Newton Road / Birmingham Road (A34), Great Barr
11	Bearwood Road, Smethwick
12	Oldbury Road / Birmingham Road, Blackheath
13	High Street / Powke Lane, Blackheath
14	Bromford Road (including the Kelvin Way / Brandon Way Junction), West Bromwich
15	Trinity Way / Kenrick Way, West Bromwich
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

In 2018, seven of the original areas were found to still exceed the annual mean objective for Nitrogen Dioxide and these were redefined as priority zones along with two additional hotspots see Table 2.1B below.

Table 2.1 B Sandwell NO_2 Key Priority Zones in 2018		
Zone	**Historical Area**	**Description of Area**
1	13	High Street / Powke Lane, Blackheath
2	11	Bearwood Road, Smethwick
3	1	M5 Corridor, between Birmingham Road and Blakeley Hall Road - Oldbury
4	10	Newton Road / Birmingham Road (A34), Great Barr
5	14	Oldbury Ringway, including Bromford Lane, Kelvin Way / Brandon Way Junction
6	16	West Bromwich, All Saints Way / Expressway
7	15	West Bromwich, Trinity Way / Kenrick Way
Hotspot 1		Mallin Street, Smethwick
Hotspot 2		Gorsty Hill, Blackheath

This position has improved slightly in 2019 as monitoring results have demonstrated that the NO_2 national objective was not exceeded in Zone 5 and Zone 6 although levels were still within 10% of the national objective. Whilst levels at Hotspot 2, Gorsty Hill, Blackheath have continued to reduce and are now at 18.5% below the national objective.

The priority zones and hotspots shown in Table 2.1B below will be included in the new draft Air Quality Action Plan covering the period 2020 – 2025. They will continue to be monitored to evaluate the measures being taken with the aim being to maintain an overall downward trend in NO_2.

Table 2.1 C Sandwell NO_2 Key Priority Zones for 2020 to 2025		
Zone	**Historical Area**	**Description of Area**
1	13	High Street / Powke Lane, Blackheath
2	11	Bearwood Road, Smethwick
3	1	M5 Corridor - Blakeley Hall Road, Oldbury to Birmingham Road (A41), West Bromwich
4	10	Newton Road / Birmingham Road (A34), Great Barr
5	14	Bromford Lane (including the Kelvin Way / Brandon Way Junction), West Bromwich
6	16	All Saints Way / Expressway, West Bromwich
7	15	West Bromwich, Trinity Way / Kenrick Way
Hotspot 1		Mallin Street, Smethwick
Hotspot 2		Gorsty Hill, Blackheath

Zone/Hotspot did not exceed national objective for NO_2 in 2019

2.1.1 Updating Sandwell's Air Quality Action Plan

Sandwell current Air Quality Action Plan (AQAP) was last published in September 2009. A new AQAP was due to be published in 2018 but was delayed due to implications from the Government's Clean Air Strategy, (originally published July 2017 and updated in 2018[13]) and to consider the proposed introduction of a Clean Air Zone in Birmingham.

Clean Air Strategy Response

The government's Clean Air Strategy included a 'UK plan for tackling roadside nitrogen dioxide (NO_2) concentrations'. This plan set out how the UK Government would bring NO_2 concentrations within the statutory average annual limit of 40µg/m^3 in the shortest possible time. Sandwell was included in the "Third phase / Third wave" of Local

[13] Further details of the 'third wave of Local Authorities' can be found in the 'Supplement to the UK plan for tackling roadside nitrogen dioxide concentrations' October 2018. Supplement to UK Air Quality Plan October 2018

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 2.1C below, with the remainder managed by Highways England.

Table 2.1 C – 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 now 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 is recognised that long term measurement of NO_2 levels along these link roads is 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 2019 has confirmed one exceedance on the A41 (10% above the national objective) and two just under the national objective for NO_2. Whilst the triplicate data collected for the A457 link road has confirmed compliance with the statutory limit, two existing monitoring sites exceeding and seven within 10% of the national objective for NO_2.

The ongoing monitoring of these sites will continue in 2020 along with quarterly reporting to Defra.

Birmingham Clean Air Zone Response

The impact from the Birmingham Clean Air Zone was also highlighted as a concern in 2018 and resulted in another reason to delay publishing the AQAP. Given that Sandwell shares a border with Birmingham City Council, there were concerns raised about the potential negative impacts of this decision on Sandwell. Time was required to discuss Birmingham City Council's plans and to investigate any potential mitigation strategies that might be required to address the following concerns:

- That the most polluting vehicles would be sold cheaply to residents and businesses in neighbouring authorities who wouldn't travel into the CAZ on a regular basis.
- That the most polluting vehicles would re-route through Sandwell to avoid the Birmingham CAZ.
- Sandwell Taxis / Private Hire drivers would be disadvantaged as they would not receive any financial support to upgrade their vehicles.

Joint meetings were held between Councillors and officers from both Councils in 2019. Birmingham City Council provided clear rules for the CAZ, including who would be eligible for support. Full details are now listed on the Brum Breathes website[14], but unfortunately no financial support was made available for taxis / private hire drivers outside of Birmingham for upgrading their vehicles. This is an issue which is still under review by Sandwell MBC and further work is required to identify support measures. There is however a temporary worker exemption permit which will cover some workers in eastern Sandwell (but not taxi drivers).

The issue of traffic potentially re-routing to avoid the CAZ, possibly over a wide area and therefore using the M42 and M5 (for example), was modelled in 2019 and there was some assurance that the extra traffic for Sandwell would be minimal. This modelling is also supported by research[15] confirming that low emission zones not only reduce PM pollution, but that they don't do it at the expense of air quality outside the low emission zone. So, it is does not necessarily follow that older vehicles are moved into neighbouring authorities or are driving longer distances to avoid a low emission zone. Clearly ongoing air quality and traffic monitoring will be required to 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 unforeseen delay in the publication of the Air Quality Action Plan in 2018, has meant that that the AQAP 2009[16] has without doubt reached the end of its useful working life. For this reason, a new draft was completed for consultation in February 2020. This draft is in the process of being revised prior to its adoption in 2020.

2.2 Progress and Impact of Measures to Address Air Quality in Sandwell

Defra's appraisal of Sandwell's 2018/2019 ASR identified several issues that required addressing in future reports. Defra's comments are highlighted in green and our response is provided below.

[14] https://www.brumbreathes.co.uk/what-does-it-mean-for-me
[15] Keep Your Clunker in the Suburb: Low Emission Zones and Adoption of Green Vehicles discussion paper http://anon-ftp.iza.org/dp8180.pdf -
[16] The 2009 Action Plan can be found at: Air Quality Action Plan 2009

1. In Table 2.1 the concentration given for NO_2 for 'now' appears to be incorrect. The table states that in 2018 ('now') the level of exceedance (maximum monitored/modelled concentration at a location of relevant exposure) is 55.2 µg/m^3 at ZQ. Whereas in all other tables in the report and the accompanying data excel spreadsheet the concentration is 49.1 µg/m^3. The Council need to ensure that the correct concentration is displayed in all tables.

   This was an error which has been addressed in this report to ensure the data in both tables and spreadsheets are accurately transposed between spreadsheets and tables.

2. It is evident that improvements in pollutant concentrations within the borough over the years has been minor, particularly between 2017 and 2018. The Council have stated that their new AQAP will target the aforementioned 'priority zones' in the efforts to reduce pollutant concentrations. It is suggested that new measures introduced in the AQAP should be aggressive so that improvements within the borough can be achieved.

   Sandwell Council is committed to reducing pollutant concentrations in the borough, however as part of large urban conurbation, the authority's ability to make significant improvements is limited without a holistic approach with neighbouring authorities. Sandwell will therefore continue to be a proactive member of the West Midlands, Combine Authority (WMCA) in developing and following an overarching set of policies and plans for the development of integrated transport systems across the region.

   An initial launch of the Black Country Low Emission Strategy is also due to be launched in May 2020. This is likely to be an ambitious strategy which Sandwell will be supporting in a bid to reduce air pollution.

   Sandwell will be submitting a bid for Defra funding to support projects to reduce air pollution in known hotspots. as well as identifying locations with peak-time traffic related exceedances that may not be reflected in monthly means.

3. SMBC are encouraged to review their air quality monitoring strategy periodically to ensure that all potential hotspot locations are identified, for which then actions can be targeted accordingly.

Sandwell have continued to review their air quality monitoring strategy and consider that diffusion tubes and air quality monitoring stations continue to provide good coverage of the borough. The most obvious hotspots where the traffic levels are high and there are sensitive receptors have been identified and are being monitored. It is nevertheless considered that the purchasing of low-cost air quality monitors would enable a more flexible approach to future air quality monitoring, including the identification of less obvious hotspots. This would potentially result in the identification of locations with peak-time traffic related exceedances that might not be reflected in monthly means. This in turn would assist with the formulation of mitigation strategies, including projects to engage local communities.

The feasibility of purchasing low-cost AQ monitors will be subject to funding. The funding streams for the air pollution team are subject to review in 2020 following the repositioning of the Air Pollution Team into Sandwell's Public Health Department at the end of 2019. Therefore, to further increase the potential of achieving this ambition, Sandwell will bid in 2020 for a Defra Air Quality grant.

4. Appendix D provides a map of the monitoring locations and a link to Google Maps where the locations can be seen in more detail. However, the link does not appear to work. When the link is clicked it says, 'access denied'. Please ensure that this is rectified in future reports as there is currently no maps with the monitoring locations labelled.

   This issue has been addressed and a working link has been provided at https://www.google.com/maps/d/u/0/edit?mid=1BSyfEiQYRK4qput9YqlB9h17IUrdL4EU&ll=52.523470869063715%2C-1.996919644153936&z=14

5. The report intensively discusses the impact and measures taken towards addressing $PM_{2.5}$ emissions within the borough. This level of detail is commended.

   Sandwell continues to be aware of the impact of PM2.5 and further improvements to the monitoring network are being seriously considered to identify sources and appropriate mitigative measures. This includes renewing equipment in the continuous monitoring stations to expand the number of sites

where $PM_{2.5}$ is monitored as well as the use of low-cost air quality monitors. For the first time we have also provided estimates of PM2.5 levels using the ratio calculation for PM_{10} data from three of our continuous monitoring stations and are aiming to comply with tougher WHO health guidelines in the future.

6. A minor error was noticed in the excel data spreadsheet where on the Table A.3 tab, the diffusion tube ZC was incorrectly labelled as 38.1 and the NO_2 concentration for that tube in 2018 was incorrect. Please ensure this is rectified in future reports.

   This error has been corrected in the ASR 2020 Table A.3 spreadsheet.

Sandwell's Air Quality Measures

Sandwell has taken forward several direct measures during the current reporting year of 2019 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in **Table 2.2.** These measures have been taken from the draft Air Quality Action Plan 2020-2025.

The West Midlands Combined Authority (WMCA) remains a key player in improving air quality in the region. The WMCA produced an overriding Strategic Economic Plan[17] and alongside this also adopted a regional transport plan, produced by Transport for West Midlands. This plan is now recognised as the WMCA's Movement for Growth[18] 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. 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 draft Black Country Transport – Ultra Low Emission Vehicle Strategy is also planned for the Spring of 2020. This will be a strategic transport partnership between Dudley, Sandwell, Walsall and Wolverhampton Councils. The aim will be to accelerate

[17] https://www.wmca.org.uk/what-we-do/strategy/
[18] https://www.tfwm.org.uk/strategy/sustainable-travel/

the uptake of ULEVs across the area in anticipation of a nationwide 2035 ban on the sale of petrol and diesel vehicles.

Key completed measures:

- Lane marking, capacity and traffic flow improvements were completed in 2018 on the Kelvin Way/Trinity Way roundabout in Zone 7. The effectiveness of these measures will be reviewed in the ASR 2021 as major roadworks on the M5 motorway resulted in this road link carrying approximately 15% more traffic when compared to normal traffic conditions.
- Initial analysis of Sandwell's taxi fleet was completed in 2018. This data provides an important benchmark for work with Sandwell's Taxi Licensing Department both in formulating a low-emission taxi strategy as well as tracking future trends in vehicle fleet make-up.
- An electric vehicle experience day was held on Clean Air Day 20 June 2019. This allowed staff at Sandwell Council staff to test drive electric cars with the aim of encouraging staff who use their own vehicle for work purposes to purchase an electric vehicle in the future.

  Improving awareness and access to alternative vehicle technologies is essential to drive change.
- Two new electrical cars were added to Sandwell MBCs fleet. There are plans to replace at least 30 diesel vehicles in 2020, with electric and hybrid alternatives. When larger vehicles come to the end of their lease period these vehicles will be replaced with the lowest emission alternatives if electric is not an option.

  This is part of long term commitment by Sandwell MBC to invest in more sustainable transport which will reduce the negative impact on local air quality from Sandwell's own vehicle fleet.
- In 2019 Sandwell secured planning condition requiring the provision of electric vehicle charging points on 64 developments. This was a 100% increase from 2018. In addition, conditions requiring a travel plan for air

quality purposes were added to 11 planning permissions, these included commercial, residential and industrial developments.

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

- A draft Air Quality Action Plan was produced for public consultation in early 2020.

Measures to be Completed in 2020:

Sandwell Metropolitan Borough Council expects the following measures to be completed over the course of the next reporting year (2020):

- The Third Wave study will be completed at the end of 2020. Data from this study will be analysed to determine if the actions taken to optimise road signalling and retro-fit buses using the A257 and A41 has achieved compliance with the national objective NO2 levels.
- The taxi fleet make-up will be reviewed and updated in 2020 to identify trends in vehicle make-up with regards to their emissions profiles. This information will be used to identify barriers to the purchase of low-emission and ultra-low emission vehicles and this information used to formulate a strategy to support taxi drivers in Sandwell in their uptake of cleaner vehicles in 2021.
- It is intended to repeat and strengthen efforts to engage with Sandwell employees 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 2020.
- The Black Country Air Quality Supplementary Planning Document (SPD) is due to be updated in 2020. This should include a new reward scheme, and travel plan accreditation, as well as a review of parking standards.

Sandwell MBC's Priorities for 2020

- Adoption of the revised Air Quality Action Plan. 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.
- Sandwell employed a consultant in 2019 to validate existing hotspots and to identify other sites of concern for air quality, including road links. It was advised that the model outputs should be refined using Automatic Number Plate Recognition, which would enable accurate fleet and concurrent vehicle emissions to be profiled. This option will be reviewed in 2020 alongside other methods to provide a more detailed profile of air pollutants in real-time, for example the deployment of low-cost air quality monitors.
- Identification of 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.
- Work with the West Midlands Combined Authority and Transport for West Midlands to deliver collaborative measures to improve air quality.
- Work with Birmingham City Council to continue to identify and minimise any potential negative impacts of the implementation of the Birmingham Clean Air Zone.
- Increase staff resources in the air pollution team in 2020. Additional staffing capacity will enable the team to be involved in a greater variety of air quality work, including formulating local strategies, increasing partnership working and engaging local communities in positive behaviour shift by raising awareness of the importance of air pollution.

Measure 23 as listed in Table 2.2 has seen slower than expected progress for the following reason:

- The Midland Metro Extension (Wednesbury to Brierley Hill) Measure 23 in Table 2.2) has been subject to delay in the planning stages whilst trying to secure essential funding. This is beyond the control of the local authority, but work is expected to progress in 2020.

Principal Challenges and Barriers

The principal challenges and barriers to implementation of Sandwell's draft AQAP[19], are around securing a sufficient and consistent level of funding, including staff resources. This funding is fundamental both to updating monitoring equipment as well as ensuring that there are adequate staffing levels to facilitate the execution of these improvement strategies.

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

[19] https://www.sandwell.gov.uk/downloads/file/30804/aqap_2020_2025_draft_for_consultation_final

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Develop Air Pollution Model for Sandwell to identify additional hotspots and how these relate to traffic flowing through Sandwell	Other	Other	2018	Sandwell MBC	Sandwell MBC	Completion of Model	No target	Screening exercise carried out 2019 – use of low-cost air quality monitors now under consideration.	2021	This will be reviewed in 2020 to consider use of low-cost air quality monitors
2	Review transport planning and traffic infrastructure at each hot spot location and identify and implement programme of work where practicable to reduce NO2 concentrations	Traffic Management	Other	2018	Sandwell MBC	Sandwell MBC	Annual average NO2 value	Reducing Emissions - site specific targets to achieve <40µg/m3	Work due to begin in autumn 2020	2023	
3	Promote car sharing among residents and businesses	Alternatives to private vehicle use	Personalised Travel Planning	2006	Sandwell	Sandwell MBC	Increase in number of participants using the scheme.	Low	On-going implementation and promotion of the scheme	On-going	Further promotion of the scheme increased the number of registered users https://liftshare.com/uk/community/sandwell
4	Ensuring that Air Quality considerations are included in the new Local Development Framework. Including policies that seek to reduce the need to travel and promote the use of modes other than the car.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2009	Sandwell MBC, Low Emissions Towns and Cities Programme (LETCP), West Midlands Authorities (WMAs), Black Country Core Strategy (BCCS)	Sandwell MBC	Publication of procurement and planning guidance and continued implementation across the West Midlands Metropolitan Authorities	Medium at hotspot locations (long-term)	On-going	On-going	
5	Black Country - Low Emission Vehicle Strategy and Implementation Plan. Promotion of low emission vehicles.	Policy Guidance and Development Control	Low Emissions Strategy	2017	Sandwell and Black Country Authorities	Sandwell MBC and Black Country Authorities	Increase use of ultra-low emission vehicles	Reduced vehicle emissions	Funding obtained from Black Country Local Enterprise Partnership to develop plan in 2019	On-going	Promotion of low emission vehicles
6	Section 106 - Investigate the practicability of	Policy Guidance and	Air Quality Planning and	2009	Sandwell Development Management	Sandwell MBC	Planning guidance and Black Country	No target	On-going	On-going	

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
	section 106 agreements being used to secure monitoring funding and balancing measures in applications where air quality is an issue	Development Control	Policy Guidance		and Public Health		Supplementary Planning guidance states all development will be required to contribute to offsetting emission creep, plus larger contributions if significant new sources are introduced				
7	Provide guidance in relation to air quality for developers to follow when submitting planning applications.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2016	Sandwell, LETCP, WMAs and BCCS	Government Air Quality Grant	Improved vehicle emissions and use of public transport.	Publication of planning and procurement guidance with implementation across the West Midlands Authorities	On going	On-going	The Black Country Supplementary Planning Document was adopted in September 2016 and is referred to in all AQ planning applications.
8	Continue to consider air quality issues for new planning applications in line with the agreed planning protocol as in 7 above.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2009	Sandwell, LETCP, WMAs and BCCS	Sandwell MBC	Conditions attached to planning approvals and confirmation of appropriate discharge	No target	On-going	On-going	
9	Review Sandwell MBC's vehicle fleet including vehicle types, age and emission profiles to formulate strategy for reducing emissions.	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	2018	Sandwell MBC	Sandwell MBC	Report findings	No target	Partially complete, work rescheduled for autumn 2020	2022	
10	Review and implementation of electric charging and other low emission refuelling options for SMBC vehicles	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2019	Sandwell	Sandwell MBC	Number of electric charging points installed	Low	Public consultation about the need for EV charging points in Sandwell to be undertaken in early 2020. Findings to be reviewed.	2025	The Black Country authorities have received £130,00 0 from the LEP to move the EV agenda forward in the Black Country

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
11	Review taxi fleet licences and private hire vehicle fleet licenced by Sandwell (including fleet composition, age and emission profiles)	Other	Other	2018	Sandwell	Sandwell MBC	Report findings		Review on going	2025	
12	Determine the best and most effective ways to influence and improve low ultra-low emission vehicle use in taxi fleet	Promoting Low Emission Transport	Taxi emission incentives	2018	Sandwell	Sandwell MBC	Number of vehicles that comply with new standard	No target	Work programmed for later this year	2025	
13	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	Sandwell	Sandwell MBC	Number of employees switching to low emission vehicles	No target	Electric vehicle experience day held on Clean Air Day 2019, more promotion to be part of the emerging staff travel plan	On-going	
14	Promotion of car club/pool vehicles and the use of SMBC employees vehicles	Promoting Travel Alternatives	Workplace Travel Planning	2006	Sandwell MBC	Sandwell MBC	Reduced mileage claims by local authority staff	Reduce mileage claims by 30% and replacement of older vehicles with newer cleaner vehicles.	Implementation of this measure being discussed as part of the Council's staff travel plan	On-going	
15	Improve branding to increase the attractiveness of public transport	Promoting Travel Alternatives	Workplace Travel Planning	2012	National Express, Transport for West Midlands	Wes Midlands Combined Authorities (WMCA)	Increased public transport patronage	No target	On-going programme of brand improvement and public awareness including safer network, improved connections, signage and ease of access	On-going	
16	Improving access to information regarding transport options.	Promoting Travel Alternatives	Personalised Travel Planning	2009	Sandwell, Transport for West Midlands	Sandwell MBC, WMCA	Increased public transport patronage	No target	On-going promotion of branding and services available	On-going	
17	Promotion of walking	Promoting Travel Alternatives	Promotion of walking	2009	Sandwell	Sandwell MBC	Increase in walking for key journeys. Sandwell travel surveys	No target	Sandwell walking strategy published in 2015. Sandwell TravelWise webpage updated	On-going	Sandwell TravelWise webpage updated to promote alternative travel.

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
									to promote alternative travel. On-going promotion of cycling.		
18	Promotion of cycling	Promoting Travel Alternatives	Promotion of cycling	2009	Sandwell	Sandwell MBC	Increased uptake of cycling for key journeys. Sandwell Travel Surveys	No target	Sandwell's Local Cycling and Walking Infrastructure Plan (LCWIP) approved in 2019, funding required	On-going	
19	Encourage travel plans for employers, schools and hospitals	Promoting Travel Alternatives	Workplace Travel Planning	2001	Sandwell, National Express West Midlands and Transport for West Midlands.	Sandwell MBC	Number of travel plans adopted by relevant organisations (including those attached as conditions to planning approvals	No target	Travel plans are a recognised part of the planning process and required at significant workplace developments and all new and expanding schools. Start made with using on-line ModeShift STARS Education and Business Tools	On-going	Travel plan SPD adopted by Sandwell - referenced in all relevant planning applications.
20	Provide air quality information and promote sustainable transport in schools	Promoting Travel Alternatives	Workplace Travel Planning	2019	Sandwell MBC	Sandwell MBC	Increase in sustainable travel modes in schools	Reduction in NO2, PM10 and PM2.5 concentrations	Limited progress to date. School travel plans are a key element of the planning process but limited funding available to promote sustainable transport at schools. Started using online ModeShift STARS tool	On-going	An annually updated Sustainable Modes of Travel Strategy (SMOTS) for schools is required by the Education and Inspections Act (2006) to be produced by all local authorities http://www.sandwell.gov.uk/download/downloads/id/28553/smbc_sustainable_modes_of_travel_to_school_strategy_-_2018_interim_update.pdf

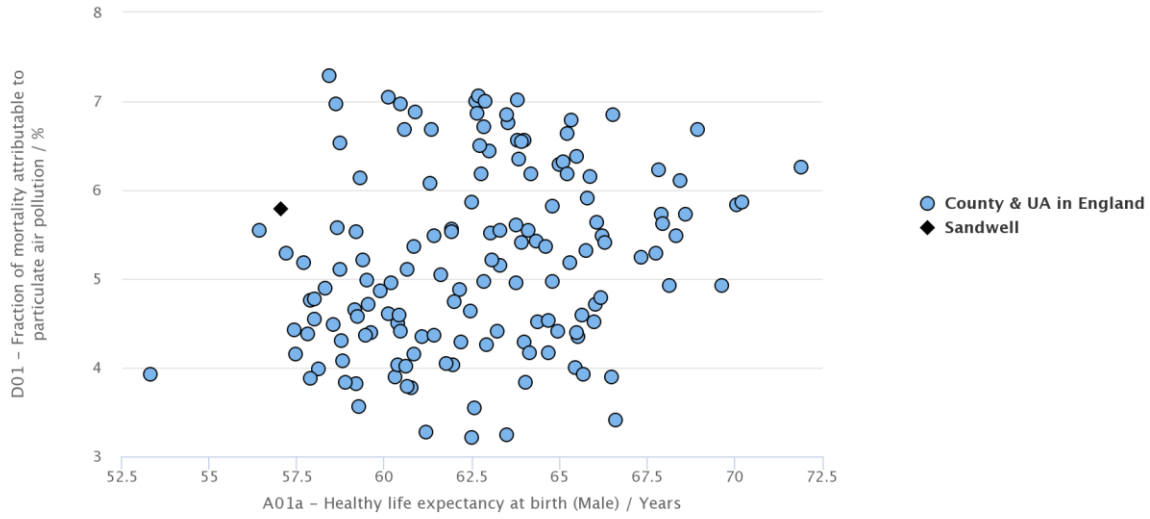
Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
21	Maintain Air Quality information on Sandwell MBC's website with a view to providing real-time AQ information.	Public Information	Via the Internet	2009	Sandwell	Sandwell MBC	Increased number of web page viewings	No target	On-going	On-going	Air Quality Grant Bid to be made for 2020 to fund low cost air quality monitors with public interfacing dashboard to provide real-time data for the public.
22	Major highway improvement at Birchley Island (Junction 2 M5.	Traffic Management	Other	2012	Sandwell, West Midlands Combined Authority	Department of Transport (DfT) major source of funding	Reduction in emissions because of reduced congestion.	No target	Work expected to start at the end of 2020	2022 / 23	
23	Midland Metro Extension (Wednesbury to Brierley Hill)	Transport Planning and Infrastructure	Other	2005	Sandwell and West Midlands Combined Authority	WMCA with contributions from Black Country LEP and HS2 connectivity	Increased public transport patronage	Low in respect of reductions at any one specific site.	Funding has been secured.	Completion of work estimated 2023	
24	Increased bus lane enforcement (increase in number of cameras on buses and static cameras for bus lane enforcement)	Traffic Management	UTC, Congestion management, traffic reduction	2009	Sandwell MBC, National Express Midlands (NEX), Transport for West Midlands	Sandwell MBC	Number of enforcement actions	Minor	Bus lanes along Walsall Street and Hagley Road West. Bus only street at New Street, West Bromwich	On-going	Marginal improvement due to improved bus journeys
25	Improvement of urban traffic control systems designed to reduce congestion	Traffic Management	UTC, Congestion management, traffic reduction	2009	Sandwell MBC, LETCP, WMAs and BCC	West Midlands Combined Authorities including Sandwell MBC	Reduced congestion at busy junctions	Minor	On-going use of the Urban Traffic Control with potential for further expansion.	On-going.	Potential reduction at locations where traffic control systems are in place.
26	Actions to mitigate any negative impact of the Birmingham Clean Air Zone	Transport Planning and Infrastructure	Other	2019	Sandwell MBC, BCC	Sandwell MBC	Reduction in NO2 on main routes leading to/from Birmingham's CAZ	No deterioration in air quality on main routes	Partnership established with BCC	Review in 2021	

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

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases. 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' [20]

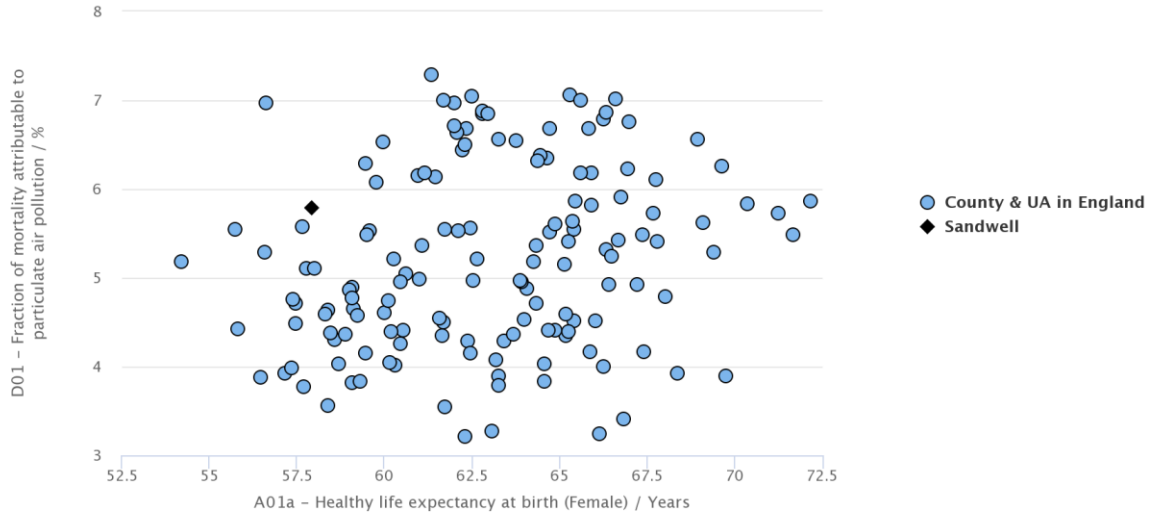
In 2010 in there was a morbidity burden of 6.9% associated with long-term exposure to man-made particulate air pollution to Sandwell residents over the age of 30. In 2019, this had improved slightly with an estimated 5.8% morbidity burden, irrespective of gender. However, when Sandwell is compared with other local authorities in England as shown in Figures 2.3.1 and 2.3.2, healthy life expectancy is still relatively low for both males and females at just 57. Although not the only factor, Sandwell's anthropogenic air pollution is a contributing factor in lowering the average age of healthy life-expectancy of its residents.

Figure 2.3.1 Public Health Outcomes Framework, Fraction of Mortality Attributable to Fine Particulate Matter (Male)



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

Figure 2.3.2 Public Health Outcomes Framework, Fraction of Mortality Attributable to Fine Particulate Matter (Female)



The primary source of particulate matter in Sandwell is from road traffic and diesel vehicles. Measures have therefore primarily focussed on the reduction of NO_2 concentrations and achieving compliance with national objectives, but it is now acknowledged that a shift in focus is required to ensure that we are also reducing particulate matter concentrations from road and other sources, given that there is no safe level of exposure. Sandwell is therefore looking towards meeting the WHO guideline which is 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 $PM_{2.5}$

- $PM_{2.5}$ is currently being monitored 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 2015 the annual mean $PM_{2.5}$ at this site has risen slightly, plateauing in 2018 and 2019 at 7 µg/m^3.

- Sandwell is aware of the advantages of extending its $PM_{2.5}$ monitoring network to improve its understanding of levels across the borough and to be able to benchmark its progress on reducing $PM_{2.5}$ at 'hotspot' sites. The Council will be investigating the possibility of deploying several low-cost air quality monitors 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 the canyoning influence.
- Sandwell is currently updating its Air Quality Action Plan and reference will be made 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 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 is aiming to reduce reliance on private vehicles and help reduce $PM_{2.5}$ 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.
- It is a matter of concern that $PM_{2.5}$ emissions may begin to rise with the increased use of biomass technologies as well as the use of and continued uptake of wood burning stoves. Historically only parts of Sandwell were designated at Smoke Control Areas, this requires review. There is also the need to raise awareness and educate people on the air pollution associated with wood burning stoves. A map showing the current extent of the Smoke Control Areas in Sandwell can be found in **Appendix F.**

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how it compares with objectives.

Sandwell undertook automatic (continuous) monitoring at five sites during 2019. **Table A.1** in Appendix A shows the details of these sites. National monitoring results are available at UK AIR[21].

A map providing an overview of where the automatic monitoring stations are sited in Sandwell is provided in **Appendix D.** More detailed information of the locations of the monitoring stations can be found at:

https://www.google.com/maps/d/u/0/edit?mid=1BSyfEiQYRK4qput9YqlB9h17IUrdL4EU&ll=52.523470869063715%2C-1.996919644153936&z=14

Further details on how the automatic stations are calibrated and how the data has been adjusted are included in **Appendix C.**

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias[22], "annualisation" (where the data capture falls below 75%), and distance correction[23]. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 in **Appendix A** compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3. Note that the concentration data presented in **Table A.3** 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).

[21] https://uk-air.defra.gov.uk/networks/find-sites
[22] https://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html
[23] Fall-off with distance correction criteria is provided in paragraph 7.77, LAQM.TG (16)

For diffusion tubes, the full 2019 dataset of monthly mean values is provided in **Appendix B**. Note that the concentration data presented in **Table B.1 - NO_2 Monthly Diffusion Tube Results - 2017**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)														
															Annual Mean		
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.87) and Annualised [1]	Distance Corrected to Nearest Exposure [2]
AD	399639	296095	**40.8**	39.2	23.0	32.0	25.5	23.4	31.3	29.2	28.8	37.3	**53.8**	**43.2**	34.0	29.5	
AE	399702	296115	**41.9**	**51.5**	29.7	**44.2**	37.7	34.6	22.8	21.8	35.5	38.8	**53.0**	**44.2**	38.0	33.1	29.7
AF	399647	296015	**40.4**	**47.1**	29.6	**47.8**	36.8	10.9	30.8	29.6	27.1	28.3	38.0	33.4	33.3	29.0	
B17	399699	289401	37.0	**40.5**	31.5	34.5	35.0	29.1	27.8	23.3	34.6	29.7	**45.7**	32.6	33.4	29.1	
BA	399686	289431	**40.3**	**45.1**	39.9	**45.3**	36.6	32.6	33.6	27.1	33.1	37.2	**43.6**	**40.7**	37.9	33.0	
BD	399914	289374	**45.1**	**48.1**	**43.0**	**49.8**	**50.1**	35.5	**40.6**	33.4	**45.4**	**40.9**	**49.2**	39.2	43.3	37.7	34.6
BDQ	399999	289360	**55.5**	**59.0**	**51.0**	**53.5**	**55.3**	**44.5**	**46.9**	39.7	**52.3**	**45.2**	**50.3**	**50.7**	50.3	**43.8**	37.9
BE	399920	289352	**56.1**	**67.9**	**51.9**	**62.0**	**55.3**	**50.9**	**52.7**	**48.4**	**60.4**	**45.0**	**57.1**	**53.1**	55.1	**47.9**	**43.7**
BF	399806	289404	38.7	**41.6**	36.4	**43.8**	**46.6**	35.2	36.6	26.6	37.2	32.7	**43.4**	36.6	37.9	33.0	
BG	399718	289427	**42.6**	**40.9**	36.5	**43.2**	**43.8**	32.1	35.4	29.5	**40.5**	33.2	**44.5**	36.2	38.2	33.2	
BO	400079	289389	38.9	**46.4**	**40.7**	**42.1**	**46.0**	35.0	38.9	27.5	**45.2**	38.0	**52.2**		41.0	35.7	
BP	399820	289400	**41.9**	39.4	**42.5**	**42.8**	**42.0**	33.4	38.0	29.3	**42.8**	36.8	**44.6**	**40.2**	39.5	34.3	
BR	399820	289402	**43.6**	**46.3**	**48.6**	**53.7**	**50.2**	**46.3**	**47.5**	**44.2**	**45.0**	27.1	**48.4**	**47.9**	45.7	39.8	37.9

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)														
															Annual Mean		
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.87) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
BS	399863	289396	39.3	**47.2**	37.1	39.1	30.8	27.8	30.7	28.8	34.6		**42.9**	38.2	36.0	31.3	
B52	399692	289428	**45.4**	**56.1**	**46.9**		32.7		36.5	32.9	**46.2**	**44.2**	**48.8**	**41.5**	43.1	37.5	36.4
C10A	402258	286049	**48.4**	**48.1**	**46.4**	**47.6**	**54.0**	**41.6**	**43.8**	38.8	**49.8**	**40.6**		**42.2**	45.6	39.6	33.2
C10D	402279	286062	**63.1**	**49.1**	**53.1**	**50.7**	**65.6**	**48.1**		**47.7**		39.4	**46.9**	**43.0**	50.7	**44.1**	36.5
C11A	397457	286434	**54.9**	31.2	**50.3**	31.6	38.6	32.5	33.8	31.4	**40.1**	32.3	**41.7**	37.3	38.0	33.0	
C11D	397421	286381	38.5	36.9	35.2	29.7		29.3	29.4	22.6	35.1	33.1	39.2	36.5	33.2	28.9	
C11E	397398	286366	**50.7**	36.4	**42.4**	30.4	32.1	30.0	29.6	29.5	34.5	30.2	37.7	37.3	35.1	30.5	
C12A	396899	286438	**58.6**	**51.7**	**54.6**	**44.7**	**49.7**	32.5	37.8	37.8	**49.9**	**41.6**	**48.1**	**54.0**	46.7	**40.7**	37
C12D	396872	286454	**57.1**	38.9	**48.2**	**41.1**	**46.7**	**41.4**	**45.9**	28.5	**43.9**	38.0	**48.3**	39.6	43.1	37.5	29.8
C12E	396780	286465	**45.9**	34.8	**42.7**	**43.0**	**43.9**	29.1	28.6	26.3	**43.2**	33.0	**42.2**	35.7	37.4	32.5	
C13D	396399	291457	36.4	**47.0**	36.2	34.4	39.4	29.3		31.2			**46.3**	**42.0**	38.0	33.1	
C14A	397355	293929	37.5	39.3	**40.5**	30.1	36.1	29.1	31.6	32.6	29.6	34.8	**47.0**	38.5	35.6	30.9	
C15A	396867	285536	**57.2**	**45.0**	**55.9**		30.5	28.2	28.4	20.6	31.8	33.1	**43.9**		37.5	32.6	
C1A	400668	291726	**40.6**	**45.3**	36.3	29.5	24.2	32.0	28.0	35.3	26.9	30.1	**43.1**	40.0	34.3	29.8	
C1D	400664	292020	**48.3**	**45.4**	**44.5**	36.2	38.1		37.5	39.3	**41.6**	34.7	**49.6**	**49.9**	42.3	36.8	31.3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)														
															Annual Mean		
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.87) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
C2A	401050	292898	**50.2**	29.3	**46.3**	38.8	**40.2**	35.3	32.9	29.9	29.7	39.6	**51.5**	33.9	38.1	33.2	
C2E	401059	292966	**42.1**		30.8	**45.8**	39.6	36.5	31.2	26.8	33.4	31.8	38.8	37.0	35.8	31.1	
C4A	400619	290153	42.8	**51.8**	**41.4**	30.2	33.0	30.2	34.0	32.4	39.1	34.2	**41.9**	**42.9**	37.8	32.9	
C4D	400657	290090	**47.2**	**61.6**	**52.6**	**41.3**	**43.4**	36.3	**41.5**	36.8	**46.2**	**44.0**	**55.7**	**55.4**	46.9	**40.8**	32.7
C4E	400738	290113	40.0	**51.4**	**44.2**	36.2	**41.6**	37.7	32.0	30.7	**43.5**	33.0	**48.3**	**43.2**	40.1	34.9	
C5A	399297	290133	37.2	39.1	26.4	33.6	29.1	30.2	25.9	22.5	31.3	28.4	**42.0**	34.1	31.6	27.5	
C5D	399199	290021	**46.0**	**49.1**	33.5	**40.0**	35.7	**40.0**	32.8	35.4	**43.3**	**41.9**	**58.1**	38.1	41.2	35.8	
C5E	399139	289947	**47.6**	**46.9**	34.0	36.5	29.6	34.6	28.8	27.4	33.3	35.9	**46.8**	**43.1**	37.0	32.2	
C6A	398926	289329	**42.1**	**43.1**	35.1	34.5	35.6	36.8	37.4	34.5	29.7	25.7	39.8	**41.8**	36.3	31.6	
C6E	399229	289315	**42.5**	**44.9**	28.5	37.4	31.4	31.4	28.3	27.0	34.2	36.4	**41.7**	39.0	35.2	30.6	
C7A	398137	290229	34.7	38.8	**56.4**	**42.4**	**56.8**		33.5	**43.0**	**52.0**	**41.9**	**44.7**	**49.0**	44.8	39.0	36.4
C7D	398279	290115	35.1	**44.0**	30.1	36.6	34.8	29.2	32.1	23.0	35.2	26.1	**42.0**	34.8	33.6	29.2	
C7E	398057	290286	**49.7**	**47.9**	**42.7**	32.5	34.0	24.1	27.7	30.4	34.0	33.3	38.7	36.7	36.0	31.3	
C7F	397493	290628	**45.0**	**55.0**	**46.8**	33.2	**42.7**	31.4	35.5	31.1	38.5	27.9	**49.8**	38.2	39.6	34.4	
C7H	398292	290123	27.1	30.4	25.4	22.0	21.6	19.2	16.9	16.4	22.8	21.5	37.0	29.4	24.1	21.0	

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															Annual Mean		
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.87) and Annualised [1]	Distance Corrected to Nearest Exposure [2]
C9A	402135	286654	**40.1**	**42.6**	29.9	38.2	27.4	28.3	24.3	21.3	36.1	32.7	**40.8**	**40.5**	33.5	29.1	
C9D	402160	286554	**52.9**	**49.5**	**45.4**	**52.8**	**50.7**	**46.8**			34.5	38.3	**46.5**	**41.2**	45.8	39.9	39.3
DA1	399402	292095								30.7	35.5	34.2	39.9	36.5	35.4		
DA2	399402	292095								31.5	31.3	33.4	43.6	38.8	35.7	29.6	
DA3	399402	292095								29.9	33.0	31.6	40.0	37.4	34.4		
DB1	399508	292068								47.1	58.1	37.4	53.4	49.2	49.0		
DB2	399508	292068								49.2	48.5		61.0	48.2	51.7	39.9	34.2
DB3	399508	292068								43.9	52.0		51.2	49.3	49.1		
DC1	400233	291783								20.0	31.2	30.9	45.4	34.0	32.3		
DC2	400233	291783								19.8	30.2	32.1	42.4	26.6	30.2	26.4	
DC3	400233	291783								20.7	32.4	29.5	38.8	34.9	31.3		
DD1	400366	291781								21.8	36.2	37.8	44.9	33.6	34.9		
DD2	400366	291781								21.1	33.2	35.5	48.6	36.5	35.0	29.5	
DD3	400366	291781								21.8	37.5	37.0	49.9	30.9	35.4		
DE1	400728	291599								29.5	35.4	34.9	47.9	39.3	37.4	31	

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															Annual Mean		
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DE2	400728	291599								29.8	33.0	32.9	45.0	37.3	35.6		
DE3	400728	291599								27.6	33.8	34.5	47.4	42.0	37.0		
DF1	400890	291558								25.4	35.8	36.0	47.9	42.5	37.5		
DF2	400890	291558								29.0	36.4	40.4	46.3	46.2	39.7	33	
DF3	400890	291558								24.2	36.1	38.9	47.8	45.3	38.4		
DG1	401040	291269								28.7	44.1	33.1	52.5	41.1	39.9		
DG2	401040	291269								26.6	40.7	32.2	56.9	51.8	41.6	35	
DG3	401040	291269								26.9	41.6	38.1	53.1	50.9	42.1		
DH1	401195	290934								22.9	32.0	26.5	33.2	37.0	30.3		
DH2	401195	290934								22.3	28.9	27.0	43.0	32.5	30.7	26.3	
DH3	401195	290934								23.0	30.4	26.0	41.2	38.4	31.8		
DEF1	398469	288673	48.1	42.8	31.8	24.8	30.9	30.6	33.8	29.5	38.4	35.1	37.9	39.8	35.3	30.7	
DEF2	398405	288722	31.2	26.5	21.7	26.6	25.3	19.1	19.5	13.7	25.2	24.1	33.8		24.2	21.1	
DP1	397324	292256	33.1	32.8	30.8	26.3	25.1	23.0	34.8	33.7	37.3	37.1	**46.3**	43.4	33.6	29.3	
DP4	397344	292214	40.1	42.9	**48.2**	33.5	37.3	35.1	22.4	19.7	25.2	23.0	38.2	31.1	33.0	28.8	

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)														
															Annual Mean		
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EA	400869	291102	38.6	38.9	26.6	23.0	21.5	20.7	20.3	20.1	23.1	24.7	36.2	34.1	27.3	23.8	
EB	400920	290998	33.3	38.0	23.0	25.2	22.8	19.7	20.2	19.9	25.3	27.2	24.3	33.2	26.0	22.6	
ED	400555	291257	25.9	38.4	27.1	30.2	32.8	31.1	20.3	17.0	23.9	24.9	35.1	31.1	28.1	24.5	
EE	400368	291123		45.9	39.0	17.9	21.2	18.3	30.3	27.9	32.7	28.8	35.6	39.6	30.6	26.7	
EF	399800	290557	42.8	45.2	25.6		24.4		27.2	28.1	26.4	30.3	**47.7**	37.8	33.6	29.2	
FA1	398756	289622								40.0	44.2	44.7	46.6	52.1	45.5	37.2	
FA2	398756	289622								36.6	37.2	48.4	46.4	44.1	42.5		
FA3	398756	289622								40.0	44.0	34.5	51.8		42.6		
FB1	398717	289574								20.2	24.5	30.7	45.7	35.3	31.3	27.9	
FB2	398717	289574								19.9	30.4	33.6	45.0	36.2	33.0		
FB3	398717	289574								18.4	32.6	35.5	47.2	35.5	33.8		
FC1	398788	289451								34.9	38.9	25.0	73.4	39.5	42.4	33.8	
FC2	398788	289451								29.1	39.4	37.1	49.1	37.8	38.5		
FC3	398788	289451								34.7	41.4	37.1	46.7	43.9	40.7		
FD1	399162	289413								25.9	30.4	34.2	37.2	41.3	33.8	30.8	

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															Raw Data	Bias Adjusted (0.87) and Annualised [1]	Distance Corrected to Nearest Exposure [2]
FD2	399162	289413								26.6	32.4	34.2	40.3	40.1	34.7		
FD3	399162	289413								25.6	27.4	34.7	52.8	52.1	38.5		
FE1	399375	289398								32.0	39.5	46.1	48.8	45.9	42.5		
FE2	399375	289398								35.1	41.6	39.8	57.5	38.9	42.6	35.9	
FE3	399375	289398								31.8	47.4	42.4	51.3	42.3	43.0		
FF1	400370	289532								33.9	45.0	34.9	47.6		40.4		
FF2	400370	289532								34.1	46.1	33.0		49.0	40.6	36.9	
FF3	400370	289532								39.8	36.0	39.0	58.5	52.9	45.2		
FG1	400535	289436								27.2	39.6	34.8	46.4	37.8	37.1		
FG2	400535	289436								28.3	39.7	40.0	56.2	42.1	41.2	337	
FG3	400535	289436								27.5	43.8	35.9	57.2	44.6	41.8		
GA	399858	289391	44.9	48.8	**40.4**	38.2	37.7	30.2	34.6	29.8	**43.2**	39.3	**46.9**	44.4	39.9	34.7	
GB	399858	289391	40.2	50.2	**41.5**	**43.2**	34.8	33.3	38.2	**40.3**	**46.1**	**40.7**	**46.6**	43.2	41.5	36.1	34.5
GC	399858	289391	44.1	49.0	39.1	**45.6**	39.9	33.4	37.0	33.9	**41.3**		**46.5**	40.7	41.0	35.6	
HA	400383	291307	35.8	43.5	36.8	33.9	36.7	27.4	29.4	25.0	34.2	30.4	39.2	33.3	33.8	29.4	

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HH1	395754	285492	29.7	16.9	14.8	17.3	12.3	11.3	9.7		15.3	15.9	24.3	16.1	16.7	14.5	
KD	403794	294698	40.7	32.2	25.2	28.2	33.1	25.5	19.2	16.9	27.1	26.0	36.8	25.1	28.0	24.4	
KE	403932	294951	30.6	39.2	23.9	22.0	19.7	22.8	20.0	22.1	22.8	25.8	32.8	28.8	25.9	22.5	
LA	400187	291601	32.5	39.1	31.6	20.2	21.4	19.4	19.8	17.3	22.6	25.8	32.7	30.4	26.1	22.7	
LB	400187	291601	29.0	41.3	27.8	18.7	21.8	18.1	19.3	16.0	24.2	25.8	34.3	29.9	25.5	22.2	
LC	400187	291601	32.6	39.6	31.1	19.5	21.4	18.1	18.8	18.2	21.4	24.7	29.8	29.8	25.4	22.1	
MA	400712	289296	48.9	64.3	**49.8**	**41.7**	**47.2**	**46.0**	**48.8**	**42.8**	**46.9**	**42.2**	**47.4**	60.4	48.9	42.5	42.2
MC	400748	289150	44.5	51.3	38.5	38.2	33.5	37.0	38.3	32.3	37.4	39.9	**48.2**	44.5	40.3	35.1	
N1A	399647	290355	54.6	62.8	35.3	37.1	34.4		37.6	37.8	38.0	**43.3**	**51.9**	54.5	44.3	38.5	29.2
N1B	399615	290358	57.8	49.6	**40.4**	**43.2**	15.8		36.5	36.7	35.8	32.1	**47.6**	45.8	40.1	34.9	
N2A	403158	288531	33.4	41.2	18.9	33.7	29.2	27.2	21.9	17.3	28.6	25.9	37.5	31.7	28.9	25.1	
OA	402232	286142	40.2	44.1	28.9	**40.1**	38.1	32.5	31.8	25.2	33.5	31.6	**43.0**	42.3	35.9	31.3	
OB	402210	286162	49.6	52.2	**40.4**	33.9	**41.8**	34.9	**41.7**	36.9	**41.8**	39.3	**44.4**	48.2	42.1	36.6	32
OC	402220	286180	41.4	47.2	35.2	**45.2**	**41.6**	29.2	36.5	25.8	**41.2**	35.3	**46.1**	39.2	38.6	33.6	
OD	402193	286235	48.2	50.6	**41.9**	37.0	**44.0**	33.4	37.4	34.5	39.3	39.1	**45.5**	40.6	40.9	35.6	

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			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.87) and Annualised [1]	Distance Corrected to Nearest Exposure [2]
OE	402207	286252	36.2	41.8	25.9	**45.4**	39.8	31.7	33.4	29.5	**42.2**	34.7	**46.1**	38.4	37.1	32.3	
OG	402178	286347	46.2	47.0	30.7	**47.4**	**40.8**	28.0	33.1	27.1	38.8	30.7	**43.8**	37.1	37.6	32.7	
OH	402212	286173	55.7	60.0	**46.9**	38.7	**40.7**	34.3	38.5	35.9	**47.3**	**42.0**	**42.0**	43.8	43.8	38.1	31.5
OI	402200	286264	45.6	45.3	26.7		32.4	32.4	27.4	22.5	36.2	29.8	**44.1**	31.2	34.0	29.5	
OJ	402194	286246	58.4	49.4	**43.0**	37.2	**42.3**		23.6	30.6	38.4	34.6		37.5	39.5	34.4	
OP4	402223	286097	52.8			39.7	**48.9**	36.0	38.5	36.1	**48.2**	35.8	**43.2**	43.3	42.2	36.7	29.9
PA1	402461	290241		50.7	33.9	**48.9**	**51.6**	36.6	**40.8**	28.3	**43.3**	27.2	**50.4**	36.6	40.7	35.9	
PA2	402461	290241		49.7	34.6	**44.7**	**52.2**	37.4	**40.6**	27.7	**42.5**	25.1	**54.8**	38.9	40.8		
PA3	402461	290241		58.0	33.1	**49.7**	**50.8**	23.2	**43.8**	28.4	**47.9**	37.9	**53.5**		42.6		
PB1	402221	290290		43.7	34.4	**41.1**	**45.9**	31.1	39.1	32.6		34.1	**46.4**	40.3	38.9	34.9	
PB2	402221	290290		42.1	34.6	**45.1**	**47.4**	35.4					**45.0**		41.6		
PB3	402221	290290		42.1	36.9	**43.0**	**43.1**	35.8	35.9	31.0	**45.2**		**48.3**	37.8	39.9		
PC1	401950	290355		52.2	**49.4**	**45.9**	**58.5**	**44.3**	**49.4**	**42.5**	**60.7**	**50.0**	**49.3**	52.3	50.4054	44.6	33.2
PC2	401950	290355		53.6	**52.7**	**42.5**	**44.4**	**46.7**	**54.2**	**44.2**	**63.6**	**41.4**	**57.1**	51.3	50.2		
PC3	401950	290355		55.8	**67.9**	**47.5**	**62.5**	**45.7**	**52.9**	**45.6**	**53.3**	**46.3**	**62.2**	46.9	53.3		

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)														
															Annual Mean		
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.87) and Annualised [1]	Distance Corrected to Nearest Exposure [2]
PD1	402192	290298		55.2	**51.8**	39.7	**42.9**	35.4	39.9		**46.7**	**41.4**	**49.1**	52.0	45.4	38.8	28.8
PD2	402192	290298		58.8	**49.4**	38.3	39.3	33.3	37.2	38.0	**46.4**		**56.9**	49.0	44.7		
PD3	402192	290298		61.2	**54.1**	**44.3**	38.4	36.3	**41.2**		**48.0**	35.1	**50.2**	47.7	45.7		
PE1	402326	290269		50.5	**56.0**	**41.5**	35.9	**43.2**	37.9	36.5	**48.5**	**43.1**	**50.7**	40.6	44.0	39.2	28.9
PE2	402326	290269		54.9	**50.8**	**40.6**	**42.0**	33.0	**43.1**	37.7	**47.6**	**41.1**	**47.6**	58.9	45.2		
PE3	402326	290269		53.8	**58.3**	**42.6**	**42.5**	38.8	**40.5**	35.4	**48.7**	39.6	**53.1**		45.3		
PS1A	400504	291239	42.2	52.7	**44.7**	26.4	33.8	29.3	33.0	30.6	30.6	28.5	35.3	41.5	35.7	31.1	
RA	401558	290077	34.3	44.9	31.2	32.9	33.1	24.8	26.8	23.1	31.7	27.1	**55.2**	39.9	33.7	29.4	
SA	403951	294852	33.5	39.9	28.7	32.1	22.5	26.0	25.1	24.5	23.9	29.9	**40.5**	34.3	30.1	26.2	
SU	400476	291481	34.0	36.5	29.5	32.1	29.7	24.3	22.6	20.1	27.0	27.7	37.2	29.6	29.2	25.4	
TA	395958	290645	35.5	42.9	37.0	32.8	31.3	24.5	28.6	26.9	31.5	30.5	37.7	35.2	32.9	28.6	
TC	395854	290643	61.5	59.0	**41.6**	**42.0**	**41.6**	37.4			**47.8**	34.9	**43.3**	47.8	45.7	39.8	29.9
UA	398146	287639	43.5	37.8	**41.1**	32.7	34.0	28.8	30.6	27.6	31.3	31.1	38.4	34.5	34.3	29.8	
UB	398214	287726	54.4	40.4	**42.7**	33.7	35.0	32.2	33.6	31.1	**40.2**	34.8	**47.1**	34.4	38.3	33.3	
UC	398170	287746	51.3	45.9	**47.9**	35.2	37.0	34.1	34.0	28.4	36.9	**40.3**	35.0	21.4	37.3	32.4	

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.87) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
VD	397640	292467	31.9	35.0	30.9	28.3			25.3	22.7	29.2	25.5		36.5	29.5	25.6	
VT	397155	290867	38.8	35.6	29.1	22.8	24.9	37.7	27.3	23.4	32.1	25.9	34.3	31.5	30.3	26.3	
WA	401917	295329	46.1	41.8	33.6	23.7	27.9	27.2		32.1	27.9	32.8	37.2	37.3	33.4	29.1	
WB	402139	295119	45.6	39.0		26.9	23.8	23.6	23.7	25.8	25.6	29.8	36.0	35.1	30.5	26.5	
WF	402133	295234	40.3	41.7	30.5		26.3	24.5	25.6	28.8	25.6	32.9	35.6	38.1	31.8	27.7	
WW2	400542	296052	34.1	32.3	21.0	31.5	25.7	23.0	19.2	15.3	22.9	26.7	**40.6**	29.5	26.8	23.3	
WW3	400596	296039	38.9	34.2	22.2	27.7		20.7	20.7	14.1	23.1	24.2	34.2		26.0	22.6	
XE	404446	294847	37.2	35.3	25.6			25.5	24.7	19.5	29.2	30.5	38.7	35.8	30.2	26.3	
ZA	404618	294932	41.1	36.0	30.3			24.8	25.6	23.4	29.7	28.8	34.9	32.7	30.7	26.7	
ZC	404488	294561	41.5	42.6	30.8			28.4	25.5	24.5	30.1	32.1	18.3	36.8	31.0	27.0	
ZK	404622	294290	36.7	40.8	29.5			30.1	25.7	29.0	**42.7**	33.6	34.0	38.1	34.0	29.6	
ZO	404515	294211	45.9	44.3	30.5	36.7	30.0	31.9	28.8	27.2	32.5	33.6	**42.9**	32.2	34.7	30.2	
ZP	404555	294219	42.5	50.0	34.7	38.2	29.0	36.7	31.5	31.7	30.5		**40.3**	39.0	36.7	32.0	
ZQ	404532	294191	52.4	52.7	**43.5**	**44.8**	**44.7**	**52.4**	**46.8**	35.9	**45.3**	**45.8**	**53.5**	50.9	47.4	41.2	36.3
ZR	404468	294183	53.0	59.9	**42.9**	**50.1**	**48.2**	**50.5**	**47.6**	**41.3**	28.8	**46.2**	**55.7**	54.9	48.2	42.0	35.1

includes distance corrected values, only where relevant.

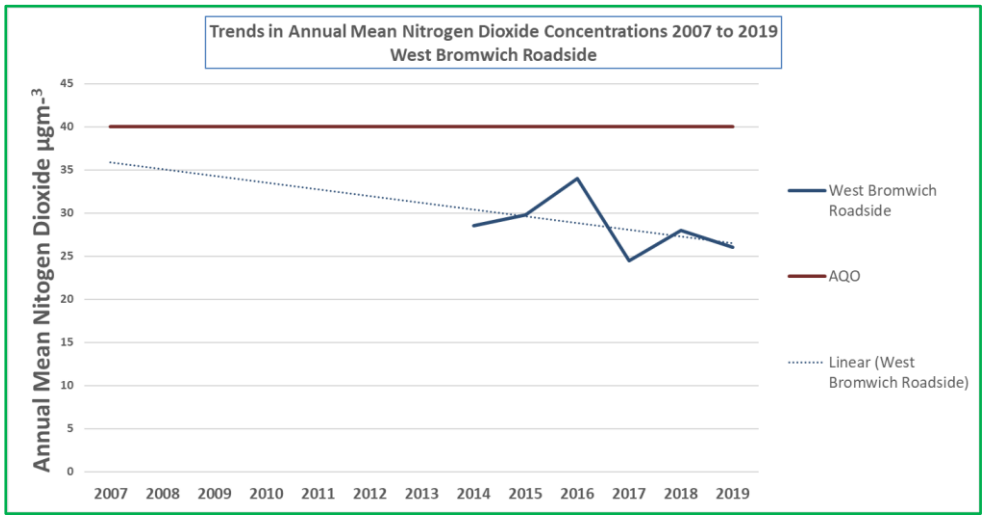
Table A.4 in **Appendix A** compares the ratified continuous monitored NO_2 hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

Interpretation of Nitrogen Dioxide Results

Continuous Monitoring Sites

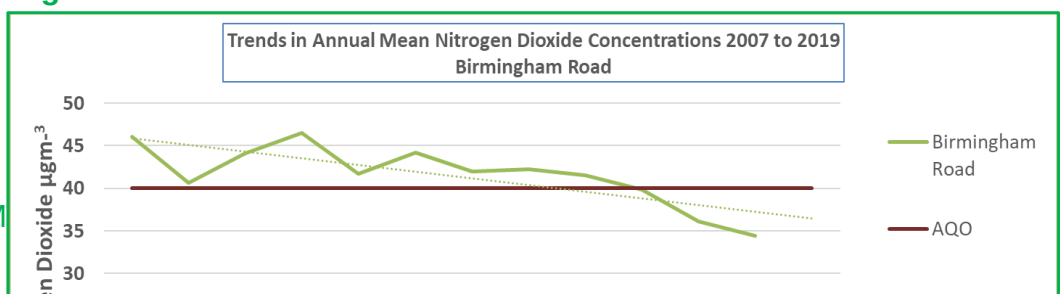
- Data Capture was 85.7% or above at all continuous monitoring sites so annualisation of data was not required.
- The Cronehills Linkway, West Bromwich, known as 'West Bromwich Roadside' was established in 2014. This was installed to monitor the impact of new retail development and associated car parking established on the east side of West Bromwich town centre. The annual mean NO_2 concentration at this site was 26µg/m^3 and as is shown in Figure 3.2.1 continues to show an overall downward trend, remaining significantly below the national air quality objective for NO_2.

Figure 3.2.1



- In 2015 Birmingam Road recorded an annual mean of 41.5 µg/m^3, in 2019 this had fallen to 33.5µg/m^3 (it should be noted that the three tubes co-located at this station had a mean of 35.5 µg/m^3) and is now within the national objective. The general downward trend at this site as is shown in Figure 3.2.2.

Figure 3.2.2.

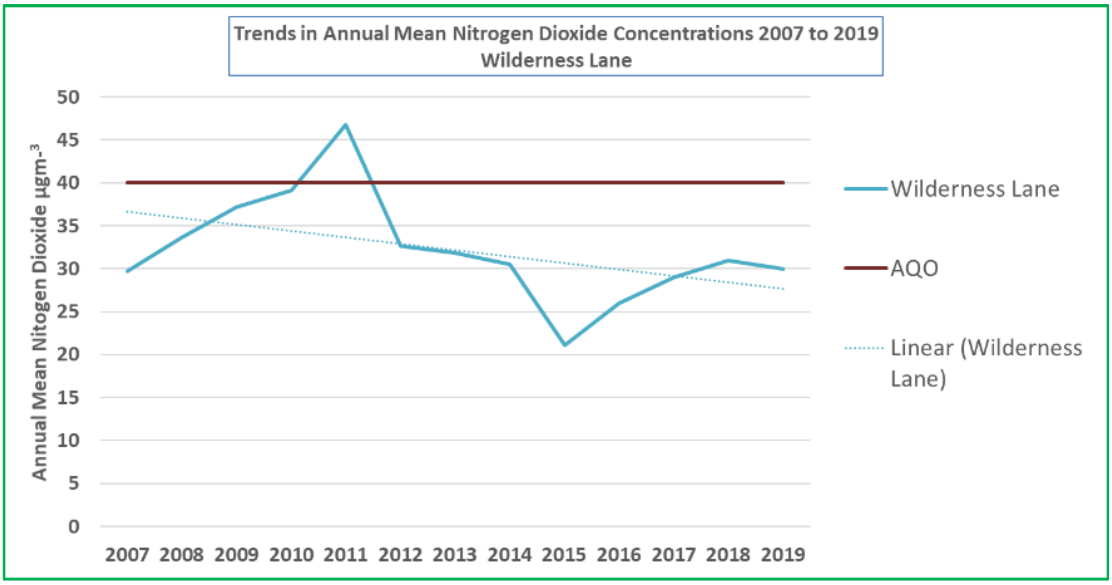


Although Birmingham Road, Oldbury station suggests an overall downward trend in NO_2, the national objective was still exceeded at two of the eleven sites where passive diffusion tubes were deployed on this section of the A457. This is likely to be a reflection of congestion/vehicle exceleration close to individual monitoring points but it is useful in demonstrating the importance of continuing to monitor this link road at more than one location so as to provide a more detailed picture of air pollution along this road.

- 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. This does not follow the UK trend where the annual mean concentration at urban background sites has reduced by an average of 1.0 µg/m^3 each year[24].
- The monitor at Haden Hill continues to record urban background levels near Cradley Heath. Levels have decreased by 1.0 µg/m^3 since last year to an annual mean of 14µg/m^3. Background levels at this site have shown little change in the last five years but do continue to be relatively low at only 35% of the national mean objective of 40 µg/m^3.
- The NO_2 annual mean at Wilderness Lane, Great Barr was 30 µg/m^3. Although this was only marginally lower than that recorded in 2018 (31 µg/m^3), this has broken the trend of year on year increases of NO_2 at this site since 2015 as shown in Figure 3.2.3.

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

Figure 3.2.3



- **Table A.4, Appendix A** demonstrates 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. It is 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 continuing monitoring at this site in the future. 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

- Long term trends in diffusion tube monitoring data show gradual improvements in annual mean NO_2 concentrations at majority of the sites, and a widespread compliance with the annual mean objective. However, some locations are still exceeding the objective, with concentrations either increasing or remaining at levels of exceedance in 2019.
- A total of 11 diffusion tube sites (8.9%) exceeded the NO_2 annual mean objective in 2019. This is a significant improvement on previous years and clearly demonstrates a downward trend in NO_2 levels which is encouraging.

Table 3 – Total number and percentage of Diffusion Tube Monitoring Sites which exceed the NO_2 Annual Mean Objective										
Year	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Number of Site that Exceed	88	25	43	32	29	18	19	16	18	9
Percentage of total sites that exceed NO_2 objective	66.2%	17.1%	29.5%	28.6%	20.3%	19%	19.6%	16.2%	17.5%	7.3%

- Areas that continue to demonstrate exceedances of the NO_2 national objective of 40 µg/m^3 are Birmingham Road, Oldbury (BDQ and BE), Bearwood Road/Hagley Road West, Smethwick (C10D), Holly Road, Blackheath (C12A), Kenrick Way, West Bromwich (C4D) Mallin Street (MA), the A41 (PC1/2/3) and Newton Road, Great Barr (ZQ and ZR).
- Mallin Street (MA) continues to exceed recommended levels. The annual mean was 42.5 µg/m^3 in 2019.
- The A457 Birmingham Road, Oldbury (BE) exceeded the mean annual objective with levels of 47.9 µg/m^3. The increase in the last two years is of concern but it is expected that this should be reduced in 2020 following traffic signal improvement works and bus retrofitting that were completed in November 2019. The road continues to be an area of concern with monitoring tubes in this key area recording levels within 10% of the national objective or above. The sites include BD, BR and B52 which recorded mean annual values of 37.7 µg/m^3, 39.8 µg/m^3 and 37.5 µg/m^3 respectively. This area will therefore remain a priority until concentrations along this route can be consistently established at levels below the annual mean objective.
- The previously identified area of concern Gorsty Hill (C15A) has dropped to annual mean of 32.6 µg/m^3. This site will not be revoked as a 'hotspot' for at least another three years, in order to be reasonably certain that improved levels of NO_2 concentrations are not a consequence of short term changes e.g. meterological conditions.

- The A41, West Bromwich was identified in 2018 as a road link likely to be exceeding the national objective, as discussed in Section 2.1 and was subject to the 'Third Wave' feasibility study and associated bus improvements to Euro VI standard. The triplicate tubes PC1/2/3 have confirmed that the national objective is still being exceeded at one site on this road with an annual mean of 44.63 µg/m^3. Two other sites PD1/2/3 (38.8 µg/m^3) and PE1/2/3 (39.2 µg/m^3) were also within 10% of the national air quality objective for NO_2. This link road will continue to be closely monitored to establish if the bus retrofits and introduction of other newer cleaner vehicles will result in a longer-term downward trend in NO_2 levels along this road.

At the current time Sandwell will retain its borough wide Air Quality Management Area for exceedences of the annual mean NO_2 Objective.

3.2.2 Particulate Matter (PM_{10})

Table A.5 in **Appendix A** compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

- PM_{10} annual mean concentrations remain significantly below the national air quality objective of 40µg/m^3 in 2019.
- There had been a trend in annual PM^{10} levels decreasing from 2008 to 2015 but levels have shown a slight increase from 2015 to 2019 which is of concern.

Table A.6 in **Appendix A** compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 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 Wilderness Lane, Great Barr, 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, Birmingham Road, Oldbury recorded the greatest number of daily exceedances with a total of 6. The maximum daily mean recorded at this site was 74 µg/m^3. This further demonstrates that Birmingham Road, Oldbury (A457) continues to be a priority for monitoring and may require further interventions to improve air quality.

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.7 in **Appendix A** presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years.

- $PM_{2.5}$ is currently only monitored at Haden Hill, at an urban background site. The levels of $PM_{2.5}$ have plateaued over the last two years at 7 µg/m^3 but are within the government's national air quality objective of 25 µg/m^3 This includes a target of 15% reduction of $PM_{2.5}$ between 2010 and 2020. (The site had levels of 12.2 µg/m^3 in 2010 so a reduction of more than 1.83 µg/m^3 by 2020 seems very likely even if levels continue to plateau in 2020).

$PM_{2.5}$ is the pollutant which has the biggest impact on public health and on which the Public Health Outcomes Framework (PHOF) indicator is based. For this reason, it was considered that where possible, levels of $PM_{2.5}$ at other sites in the borough should also be estimated. By using data from Haden Hill as reference site for Highfields and the national correction factor for the roadside monitors at Birmingham Road and Wilderness Road, the estimated levels of $PM_{2.5}$ were calculated and are shown in Table 3.2.3. Further details of the calculations undertaken are provided in **Appendix C**.

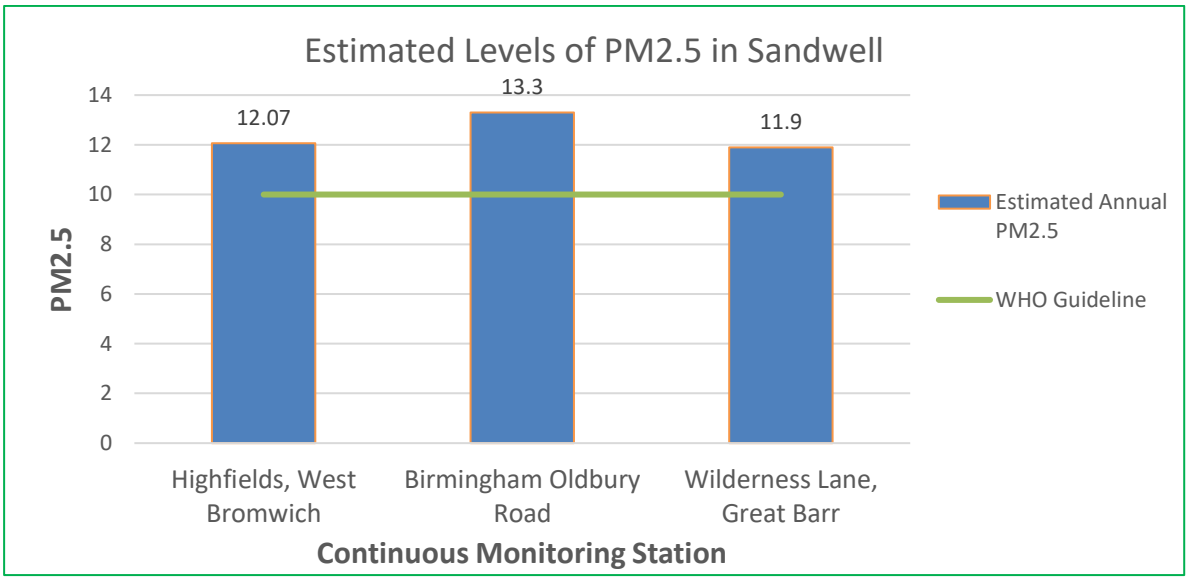
Table 3.2.3 Estimated Levels of $PM_{2.5}$ in Sandwell

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

The estimated levels of $PM_{2.5}$ demonstrate that concentrations are likely to be significantly higher in other parts of the borough than at Haden Hill. This would be expected for roadside locations, but it is particularly concerning to note at Highfields, West Bromwich, another urban background site. At present Sandwell has met the current 15% reduction target for the national objective at Haden Hill, and estimated levels of $PM_{2.5}$ are within sight of the WHO health guidelines of 10 µg/m^3 per annum. It therefore is 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[25]. 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]'.*

Figure 3.2.3 – Estimated Levels of $PM_{2.5}$ in Sandwell in comparsion with the WHO guideline



3.2.4 Ozone

Currently, there is no requirement for local authorities to meet the WHO objectives for ozone, 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.

Ozone is currently monitored at one location in Sandwell at Highfields, West Bromwich. In 2019 data capture was 99.2 %, the annual mean was 44µg/m3. The maximum running 8-hour mean was 137 µg/m^3 and the 100 µg/m^3 limit was exceeded on 10 days. There is an annual allowance of 10 days, so the WHO ozone standard was not exceeded.

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

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?	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	289392	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

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
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

The results have been corrected sing the VCM method as required by TG16

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

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
AD	Myvod Road - Wednesbury	Roadside	399639	296095	NO2	YES	10	1.5	NO	2.8
AE	Wood Green Road, Wednesbury	Roadside	399702	296115	NO2	YES	11.1	1.7	NO	2.7
AF	Wood Green Road, Wednesbury	Roadside	399647	296015	NO2	YES	11.1	1.7	NO	2.7
B17	Birmingham Road, Oldbury	Roadside	399699	289401	NO2	YES	15	1.5	NO	2.8
BA	Birmingham Road, Oldbury - Property 1	Roadside	399686	289431	NO2	YES	4	4	NO	2.8
BD	Birmingham Road, Oldbury - Property 2	Kerbside	399914	289374	NO2	YES	5.8	1	NO	2.8
BDQ	Birmingham Road, Oldbury - Property 3	Roadside	399999	289360	NO2	YES	8.6	1.2	NO	2.8
BE	Birmingham Road, Oldbury - Property 4	Kerbside	399920	289352	NO2	YES	2.5	0.8	NO	2.6
BF	Birmingham Road, Oldbury - Property 5	Roadside	399806	289404	NO2	YES	5.8	0.3	NO	2.7
BG	Birmingham Road, Oldbury - Property 6	Roadside	399718	289427	NO2	YES	5.6	0.3	NO	2.7
BO	Birmingham Road, Oldbury - Property 7	Roadside	400079	289389	NO2	YES	6.2	0.3	NO	2
BP	Birmingham Road, Oldbury - Property 8	Roadside	399820	289400	NO2	YES	6.8	0.3	NO	2.3
BR	Birmingham Road, Oldbury - Property 9	Roadside	399820	289402	NO2	YES	5.9	3	NO	2
BS	Blakeley Hall Road, Oldbury	Roadside	399863	289396	NO2	YES	16.3	8.6	NO	2.7

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
B52	Birmingham Road, Oldbury - Property 10	Roadside	399692	289428	NO2	YES	5	3	NO	2.8
C10A	Hagley Road West, Bearwood	Roadside	402258	286049	NO2	YES	4	0.4	NO	2.7
C10D	Hagley Road West, Bearwood	Kerbside	402279	286062	NO2	YES	5.3	0.8	NO	2.8
C11A	Halesowen Street, Rowley Regis	Roadside	397457	286434	NO2	YES	4.9	4.9	NO	2.8
C11D	High Street, Rowley Regis	Kerbside	397421	286381	NO2	YES	1.3	0.5	NO	2.7
C11E	Halesowen Street, Rowley Regis	Kerbside	397398	286366	NO2	YES	4.5	0.1	NO	2.8
C12A	Holly Road, Rowley Regis	Kerbside	396899	286438	NO2	YES	2.5	1	NO	2.6
C12D	Powke Lane, Rowley Regis – Traffic Lights	Kerbside	396872	286454	NO2	YES	3	0.1	NO	2.7
C12E	Powke Lane, Rowley Regis	Roadside	396780	286465	NO2	YES	3.5	3	NO	3
C13D	Dudley Port, Tipton	Roadside	396399	291457	NO2	YES	4.1	2.4	NO	2.9
C14A	Ocker Hill Road, Tipton	Kerbside	397355	293929	NO2	YES	16	0.6	NO	2.9
C15A	Gorsty Hill, Cradley Heath	Roadside	396867	285536	NO2	YES	2	2	NO	2.7
C1A	Sandwell Road North, West Bromwich	Roadside	400668	291726	NO2	YES	5	0.3	NO	2.5
C1D	Grafton Road, West Bromwich	Roadside	400664	292020	NO2	YES	18	2	NO	2.8

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
C2A	All Saints Way, West Bromwich	Roadside	401050	292898	NO2	YES	9.8	2	NO	2.8
C2E	Heath Lane, West Bromwich	Roadside	401059	292966	NO2	YES	4.9	1	NO	2.8
C4A	Walpole Walk, West Bromwich	Roadside	400619	290153	NO2	YES	9	0.3	NO	2.8
C4D	Kenrick Way, West Bromwich	Kerbside	400657	290090	NO2	YES	9	0.3	NO	2.7
C4E	Kenrick Way, West Bromwich	Roadside	400738	290113	NO2	YES	6	0.5	NO	2.7
C5A	Bromford Lane, West Bromwich	Roadside	399297	290133	NO2	YES	2.1	0.2	NO	2.8
C5D	Broadwell Road, Oldbury	Kerbside	399199	290021	NO2	YES	8.3	0.7	NO	2.8
C5E	Kellner Gardens, Oldbury	Roadside	399139	289947	NO2	YES	2.9	1.9	NO	2.7
C6A	Halesowen Street, Oldbury	Roadside	398926	289329	NO2	YES	17.9	3	NO	2.8
C6E	Stone Street, Oldbury	Roadside	399229	289315	NO2	YES	13.8	0.48	NO	2.7
C7A	Dudley Road East, Oldbury	Kerbside	398137	290229	NO2	YES	1.5	0.6	NO	1.9
C7D	Dudley Road, Oldbury	Roadside	398279	290115	NO2	YES	11.3	1.6	NO	2.9
C7E	Dudley Road East, Oldbury	Roadside	398057	290286	NO2	YES	9.5	0.4	NO	2.4
C7F	Asquith Drive, Tividale, Oldbury	Roadside	397493	290628	NO2	YES	4.7	0.3	NO	2.8
C7H	Dudley Road East, Oldbury	Roadside	398292	290123	NO2	YES	4.4	0.5	NO	2.7

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
C9A	Bearwood Road, Bearwood	Roadside	402135	286654	NO2	YES	2.6	0.3	NO	2.9
C9D	Sandon Road, Bearwood	Roadside	402160	286554	NO2	YES	2.3	2	NO	2.8
DA1	1 of 3 tubes co-located on a lamppost on corner of Bilhay Lane and A41, West Bromwich	Roadside	399402	292095	NO2	YES	15	3	NO	2.8
DA2		Roadside	399402	292095	NO2	YES	15	3	NO	2.8
DA3		Roadside	399402	292095	NO2	YES	15	3	NO	2.8
DB1	3 tubes co-located on a lamppost on Bilhay Street off A41, West Bromwich	Roadside	399508	292068	NO2	YES	30	5	NO	2.9
DB2		Roadside	399508	292068	NO2	YES	30	5	NO	2.9
DB3		Roadside	399508	292068	NO2	YES	30	5	NO	2.9
DC1	3 tubes co-located on a lamppost on the corner of Mill Street, West Bromwich	Roadside	400233	291783	NO2	YES	20	1.5	NO	2.8
DC2		Roadside	400233	291783	NO2	YES	20	1.5	NO	2.8
DC3		Roadside	400233	291783	NO2	YES	20	1.5	NO	2.8
DD1	3 tubes co-located on a lamppost by Providence Place on A41, West Bromwich	Roadside	400366	291781	NO2	YES	60	2	NO	2.8
DD2		Roadside	400366	291781	NO2	YES	60	2	NO	2.8

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
DD3		Roadside	400366	291781	NO2	YES	60	2	NO	2.8
DE1	3 tubes co-located on a lamppost on Congregation Way by A41, West Bromwich	Roadside	400728	291599	NO2	YES	80	2	NO	2.9
DE2		Roadside	400728	291599	NO2	YES	80	2	NO	2.9
DE3		Roadside	400728	291599	NO2	YES	80	2	NO	2.9
DF1	3 tubes co-located on a lamppost on Congregation Way by A41, West Bromwich	Roadside	400890	291558	NO2	YES	50	2	NO	2.8
DF2		Roadside	400890	291558	NO2	YES	50	2	NO	2.8
DF3		Roadside	400890	291558	NO2	YES	50	2	NO	2.8
DG1	3 tubes co-located on a lamppost on Beeches Road, West Bromwich	Roadside	401040	291269	NO2	YES	10	2	NO	2.9
DG2		Roadside	401040	291269	NO2	YES	10	2	NO	2.9
DG3		Roadside	401040	291269	NO2	YES	10	2	NO	2.9
DH1	3 tubes co-located on a lamppost on the corner of Nicholls Street, West Bromwich	Kerbside	401195	290934	NO2	YES	10	0.5	NO	2.9
DH2		Kerbside	401195	290934	NO2	YES	10	0.5	NO	2.9
DH3		Kerbside	401195	290934	NO2	YES	10	0.5	NO	2.9

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
DEF1	Corner of Joseph St & Wolverhampton Road, Oldbury	Roadside	398469	288673	NO2	YES	40	2	NO	2.8
DEF2	Corner of Birchley Park Ave and Wolverhampton Road, Oldbury	Roadside	398405	288722	NO2	YES	7	7	NO	2.8
DP1	Horseley Heath, Tipton	Roadside	397324	292256	NO2	YES	3.2	1.3	NO	2.8
DP4	Tame Road, Tipton	Roadside	397344	292214	NO2	YES	7.1	1.5	NO	2.8
EA	Overend Street, West Bromwich	Kerbside	400869	291102	NO2	YES	4.8	0.8	NO	2.8
EB	Legge Street, West Bromwich	Roadside	400920	290998	NO2	YES	6.9	2.3	NO	2.8
ED	Cronehills Linkway, West Bromwich	Roadside	400555	291257	NO2	YES	4.5	4	NO	2.8
EE	St Michael Street, West Bromwich	Roadside	400368	291123	NO2	YES	3.5	0.5	NO	2.9
EF	Bromford Lane, West Bromwich	Roadside	399800	290557	NO2	YES	5.5	5.2	NO	2.4
FA1	3 tubes co-located on a lamppost on A457 Birmingham Road, Oldbury	Roadside	398756	289622	NO2	YES	272	2	NO	2.8
FA2		Roadside	398756	289622	NO2	YES	272	2	NO	2.8
FA3		Roadside	398756	289622	NO2	YES	272	2	NO	2.8
FB1	3 tubes co-located on a lamppost on	Roadside	398717	289574	NO2	YES	275	2	NO	2.9

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
FB2	A457 Birmingham Road, Oldbury	Roadside	398717	289574	NO2	YES	275	2	NO	2.9
FB3		Roadside	398717	289574	NO2	YES	275	2	NO	2.9
FC1	3 tubes co-located on a lamppost on A457 Birmingham Road, Oldbury	Roadside	398788	289451	NO2	YES	160	3	NO	2.8
FC2		Roadside	398788	289451	NO2	YES	160	3	NO	2.8
FC3		Roadside	398788	289451	NO2	YES	160	3	NO	2.8
FD1	3 tubes co-located on a lamppost on Judge Close, Oldbury	Roadside	399162	289413	NO2	YES	39	3	NO	2.7
FD2		Roadside	399162	289413	NO2	YES	39	3	NO	2.7
FD3		Roadside	399162	289413	NO2	YES	39	3	NO	2.7
FE1	3 tubes co-located on a lamppost on A457 Birmingham Road, Oldbury	Roadside	399375	289398	NO2	YES	52	2.5	NO	2.9
FE2		Roadside	399375	289398	NO2	YES	52	2.5	NO	2.9
FE3		Roadside	399375	289398	NO2	YES	52	2.5	NO	2.9
FF1	3 tubes co-located on a lamppost on A457 Birmingham Road, Oldbury	Roadside	400370	289532	NO2	YES	150	3	NO	2.8
FF2		Roadside	400370	289532	NO2	YES	150	3	NO	2.8

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
FF3		Roadside	400370	289532	NO2	YES	150	3	NO	2.8
FG1	3 tubes co-located on a lamppost on A457 Birmingham Road, Oldbury	Roadside	400535	289436	NO2	YES	120	3	NO	2.8
FG2		Roadside	400535	289436	NO2	YES	120	3	NO	2.8
FG3		Roadside	400535	289436	NO2	YES	120	3	NO	2.8
GA	AURN Site - Birmingham Road, Oldbury	Roadside	399858	289391	NO2	YES	8.2	5.4	YES	3
GB	AURN Site - Birmingham Road, Oldbury	Roadside	399858	289391	NO2	YES	8.2	5.4	YES	3
GC	AURN Site - Birmingham Road, Oldbury	Roadside	399858	289391	NO2	YES	8.2	5.4	YES	3
HA	High Street, West Bromwich	Kerbside	400383	291307	NO2	YES	1	0.3	NO	2.8
HH1	Haden Hill, Cradley Heath	Urban Background	395754	285492	NO2	YES	87	0.5	YES	2.9
KD	Attingham Drive, Great Barr	Urban Background	403794	294698	NO2	YES	13	0.3	NO	2
KE	Ragley Drive, Great Barr	Roadside	403932	294951	NO2	YES	1.2	0	NO	2.9
LA	AURN Site – Highfields, West Bromwich	Urban Background	400187	291601	NO2	YES	N/A	26.1	YES	2.8

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
LB	AURN Site – Highfields, West Bromwich	Urban Background	400187	291601	NO2	YES	N/A	26.1	YES	2.8
LC	AURN Site – Highfields, West Bromwich	Urban Background	400187	291601	NO2	YES	N/A	26.1	YES	2.8
MA	Mallin Street, Smethwick	Roadside	400712	289296	NO2	YES	2	1.8	NO	3.9
MC	St Paul's Road, Smethwick	Kerbside	400748	289150	NO2	YES	1.6	0.7	NO	2.2
N1A	Kelvin Way, West Bromwich	Roadside	399647	290355	NO2	YES	N/A	0.1	NO	2.7
N1B	Clifford Road, West Bromwich	Urban Background	399615	290358	NO2	YES	N/A	0.9	NO	2.7
N2A	Soho Close, Smethwick	Kerbside	403158	288531	NO2	YES	20	0.8	NO	2.7
OA	Lightwoods Fish Bar, Bearwood Road	Roadside	402232	286142	NO2	YES	2.9	0.2	NO	2.8
OB	Halifax, Bearwood Road	Roadside	402210	286162	NO2	YES	4	1	NO	2.8
OC	Discount Flight Shop, Bearwood Road	Roadside	402220	286180	NO2	YES	4	1	NO	2.8
OD	Nightingales, Bearwood Road	Roadside	402193	286235	NO2	YES	5.2	1	NO	2.8
OE	Bradford and Bingley, Bearwood Road	Roadside	402207	286252	NO2	YES	4	1	NO	2.8
OG	Lamp-post on Bearwood Road	Roadside	402178	286347	NO2	YES	4	0.5	NO	2.8

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
OH	Lamp-post on Bearwood Road	Kerbside	402212	286173	NO2	YES	4	0.5	NO	2.8
OI	Lamp-post on Bearwood Road	Kerbside	402200	286264	NO2	YES	4	0.5	NO	2.7
OJ	Lamp-post on Bearwood Road	Kerbside	402194	286246	NO2	YES	4	0.5	NO	2.8
OP4	Bearwood Road, Smethwick	Roadside	402223	286097	NO2	YES	0	5.5	NO	4
PA1	3 tubes co-located on a lamppost outside Greggs, A41, West Bromwich	Kerbside	402461	290241	NO2	YES	41	0.8	NO	2.9
PA2		Kerbside	402461	290241	NO2	YES	41	0.8	NO	2.9
PA3		Kerbside	402461	290241	NO2	YES	41	0.8	NO	2.9
PB1	3 co-located tubes adjacent to the footbridge, A41, West Bromwich	Roadside	402221	290290	NO2	YES	23	1.5	NO	2.8
PB2		Roadside	402221	290290	NO2	YES	23	1.5	NO	2.8
PB3		Roadside	402221	290290	NO2	YES	23	1.5	NO	2.8
PC1	3 tubes co-located opposite Dartmouth Cricket Club (A41), West Bromwich	Roadside	401950	290355	NO2	YES	25	1.5	NO	2.9
PC2		Roadside	401950	290355	NO2	YES	25	1.5	NO	2.9
PC3		Roadside	401950	290355	NO2	YES	25	1.5	NO	2.9
PD1	3 tubes co-located on a lamppost	Kerbside	402192	290298	NO2	YES	75	1	NO	2.8

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
PD2	opposite BP Garage (A41) West Bromwich	Kerbside	402192	290298	NO2	YES	75	1	NO	2.8
PD3		Kerbside	402192	290298	NO2	YES	75	1	NO	2.8
PE1	3 tubes co-located on a lamppost (A41) West Bromwich	Kerbside	402326	290269	NO2	YES	55	1	NO	2.8
PE2		Kerbside	402326	290269	NO2	YES	55	1	NO	2.8
PE3		Kerbside	402326	290269	NO2	YES	55	1	NO	2.8
PS1A	New Street, West Bromwich Ringway, West Bromwich	Roadside	400504	291239	NO2	YES	6.2	0.1	NO	2.9
RA	Lamp-post nearest Motorway, Roebuck Lane, West Brom	Roadside	401558	290077	NO2	YES	43	42	NO	2.9
SA	Springfield Site - Hillside Road, Great Barr	Urban Background	403951	294852	NO2	YES	N/A	53	YES	3.2
SU	Summerfield Avenue, West Bromwich	Roadside	400476	291481	NO2	YES	0	7.8	NO	2.8
TA	Tividale Road, Tipton	Roadside	395958	290645	NO2	YES	0	5.4	NO	2.1
TC	Burnt Tree Island, Tipton	Roadside	395854	290643	NO2	YES	44	3.9	NO	2.9
UA	Birchfield Lane, Oldbury	Urban Background	398146	287639	NO2	YES	32	2	NO	2.7
UB	Birchfield Lane, Oldbury	Roadside	398214	287726	NO2	YES	7.4	1.2	NO	2.9

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
UC	Birchfield Lane, Oldbury	Kerbside	398170	287746	NO2	YES	7.7	0.2	NO	2.9
VD	Market Place, Tipton	Roadside	397640	292467	NO2	YES	5.3	2	NO	2.8
VT	Tipton Road, Tividale - Tipton	Roadside	397155	290867	NO2	YES	10.3	2.73	NO	2.8
WA	Snapdragon Drive, Yew Tree	Roadside	401917	295329	NO2	YES	8	0.2	NO	2.7
WB	Wolfsbane Drive, Yew Tree	Urban Background	402139	295119	NO2	YES	68	N/A	NO	2.6
WF	Woodruff Way, Yew Tree	Urban Background	402133	295234	NO2	YES	8	0.2	NO	2.7
WW2	Westmore Way, Wednesbury	Urban Background	400542	296052	NO2	YES	202	N/A	NO	2.8
WW3	Westmore Way, Wednesbury	Urban Background	400596	296039	NO2	YES	195	N/A	NO	2.8
XE	Lochranza Croft, Great Barr	Roadside	404446	294847	NO2	YES	4.3	16.3	NO	1.8
ZA	Abbotsford Avenue, Great Barr	Urban Background	404618	294932	NO2	YES	37	33	NO	1.7
ZC	Whitecrest, Great Barr	Roadside	404488	294561	NO2	YES	3	1.9	NO	1.9
ZK	Birmingham Road, Scott Arms, Great Barr	Roadside	404622	294290	NO2	YES	17.2	0.3	NO	1.8
ZO	Newton Road, Great Barr - Your Move Estate Agents	Kerbside	404515	294211	NO2	YES	4	0.8	NO	2.7
ZP	Newton Road, Great Barr	Roadside	404555	294219	NO2	YES	3.2	0.4	NO	2.8

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
ZQ	Victoria Wine - Newton Road, Great Barr	Roadside	404532	294191	NO2	YES	3.5	0.5	NO	2.7
ZR	Newton Road, Scott Arms, Great Barr	Roadside	404468	294183	NO2	YES	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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3) (4)				
							2015	2016	2017	2018	2019
Highfields West Bromwich	400187	291601	Urban Background	Automatic	98.6	98.6	**21.3**	**N/A**	**21.57**	**22**	**21**
Birmingham Road Oldbury	399857	289392	Roadside	Automatic	85.7	85.7	**41.5**	**39.8**	**36.1**	**34.4**	**33.5**
Wilderness Lane Great Barr	403956	294855	Roadside	Automatic	98	98	**21.2**	**26**	**29**	**31**	**30**
Haden Hill Park Cradley Heath	395755	285493	Urban Background	Automatic	98.9	98.9	**16.5**	**14**	**14**	**15**	**14**
West Bromwich Roadside	400521	291541	Roadside	Automatic	97.1	97.1	**29.8**	**34**	**24.5**	**28**	**26**
Bearwood Road Smethwick	402181 286360 Northern point of OPSIS - source	402223 286097 Southern point of OPSIS - receiver	Kerbside	Automatic	N/A	N/A	**42.8**	**41**	**35**	**30.26₴**	**N/A¥**
AC			Roadside	Diffusion Tube	0	0	**25.7**	-	-	-	**N/A**
AD	399639	296095	Roadside	Diffusion Tube	100	100	**30.6**	**26.5**	**25.8**	**36.9**	**29.5**
AE	399702	296115	Roadside	Diffusion Tube	100	100	**37.3**	**37.6**	**35.7**	**36.7**	**33.1**
AF	399647	296015	Roadside	Diffusion Tube	100	100	-	**38.3**	**27.2**	**32.9**	**29.0**
B17	399699	289401	Roadside	Diffusion Tube	100	100	-	-	-	**32.9**	**29.1**
B52	399692	289428	Roadside	Diffusion Tube	83	83	-	-	-	**40.5**	**37.5**
BA	399686	289431	Roadside	Diffusion Tube	100	100	**37.1**	**34.3**	**34.7**	**36.4**	**33.0**
BD	399914	289374	Kerbside	Diffusion Tube	100	100	**38.8**	**41.6**	**41.9**	**41.5**	**37.7**

¥ The Opsis monitor was removed in early 2019 as the business premises where it was sited closed and new arrangements could not be secured. Alternative continuous monitoring methods are under consideration for Bearwood Road.

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3) (4)				
							2015	2016	2017	2018	2019
BDQ	399999	289360	Roadside	Diffusion Tube	100	100	**36.1**	**45.1**	**44.4**	**44.5**	**43.8**
BE	399920	289352	Kerbside	Diffusion Tube	100	100	**46**	**46.7**	**45.6**	**47.9**	**47.9**
BF	399806	289404	Roadside	Diffusion Tube	100	100	**41.2**	**40**	**36.9**	**35.2**	**33.0**
BG	399718	289427	Roadside	Diffusion Tube	100	100	**42.4**	**38.7**	**35.6**	**36**	**33.2**
BO	400079	289389	Roadside	Diffusion Tube	92	92	**38.1**	**36.6**	**36.6**	**41.3**	**35.7**
BP	399820	289400	Roadside	Diffusion Tube	100	100	**39**	**37.6**	**40**	**38.6**	**34.3**
BR	399820	289402	Roadside	Diffusion Tube	100	100	**37.1**	**40.6**	**40.8**	**39.5**	**39.8**
BS	399863	289396	Roadside	Diffusion Tube	92	92	**40.7**	**35.2**	**35.3**	**34.2**	**31.3**
C10A	402258	286049	Roadside	Diffusion Tube	92	92	**42.1**	**41**	**43.1**	**45.6**	**39.6**
C10D	402279	286062	Kerbside	Diffusion Tube	83	83	**48**	**46.7**	**46.1**	**47.6**	**44.1**
C11A	397457	286434	Roadside	Diffusion Tube	100	100	**31.9**	**33.6**	**32.4**	**37.6**	**33.0**
C11D	397421	286381	Kerbside	Diffusion Tube	92	92	**39.3**	**38.6**	**29.2**	**32.7**	**28.9**
C11E	397398	286366	Kerbside	Diffusion Tube	100	100	**34.2**	**36**	**34.2**	**32.1**	**30.5**
C12A	396899	286438	Roadside	Diffusion Tube	100	100	**49.7**	**45.6**	**45**	**40.7**	**40.7**
C12D	396872	286454	Kerbside	Diffusion Tube	100	100	**39.7**	**41.4**	**38.9**	**36.9**	**37.5**
C12E	396780	286465	Roadside	Diffusion Tube	100	100	**37.3**	**38.9**	**34.1**	**34.4**	**32.5**
C13D	396399	291457	Roadside	Diffusion Tube	75	75	**33.8**	**30.3**	**31.3**	**30.7**	**33.1**
C14A	397355	293929	Kerbside	Diffusion Tube	100	100	-	-	-	**31.4**	**30.9**
C15A	396867	285536	Roadside	Diffusion Tube	83	83	**43**	**41.1**	**33.36**	**39.8**	**32.6**
C1A	400668	291726	Kerbside	Diffusion Tube	100	100	**40.5**	**31.4**	**32.3**	**33.5**	**29.8**
C1D	400664	292020	Roadside	Diffusion Tube	92	92	**39.3**	**43**	**39.3**	**43**	**36.8**
C2A	401050	292898	Roadside	Diffusion Tube	100	100	**34.6**	**33.7**	**33.7**	**37.6**	**33.2**
C2E	401059	292966	Roadside	Diffusion Tube	92	92	**33.7**	**22.1**	**33.5**	**38.5**	**31.1**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3) (4)				
							2015	2016	2017	2018	2019
C4A	400619	290153	Roadside	Diffusion Tube	100	100	**36**	**34.8**	**35.6**	**35**	**32.9**
C4D	400657	290090	Kerbside	Diffusion Tube	100	100	**39.1**	**43**	**43.1**	**43.1**	**40.8**
C4E	400738	290113	Kerbside	Diffusion Tube	100	100	**38**	**38.4**	**37.1**	**39.7**	**34.9**
C5A	399297	290133	Roadside	Diffusion Tube	100	100	**33.1**	**29.6**	**28.1**	**31**	**27.5**
C5D	399199	290021	Kerbside	Diffusion Tube	100	100	**34.9**	**37.7**	**37.6**	**38**	**35.8**
C5E	399139	289947	Roadside	Diffusion Tube	100	100	**37.2**	**38.1**	**38.5**	**27.8**	**32.2**
C6A	398941	289326	Roadside	Diffusion Tube	100	100	**34.5**	**31.5**	**35.4**	**32.6**	**31.6**
C6E	399229	289315	Kerbside	Diffusion Tube	100	100	**32.3**	**31.6**	**31**	**31.4**	**30.6**
C7A	398137	290229	Kerbside	Diffusion Tube	92	92	**32.9**	**25.8**	**24.9**	**33**	**39.0**
C7D	398279	290115	Roadside	Diffusion Tube	100	100	**36**	**47.4**	**44.1**	**32.8**	**29.2**
C7E	398042	290285	Kerbside	Diffusion Tube	100	100	**38.2**	**32.5**	**33.1**	**36.8**	**31.3**
C7F	397493	290628	Roadside	Diffusion Tube	100	100	**34.1**	**35.9**	**36.7**	**34.4**	**34.4**
C7H	398311	290135	Roadside	Diffusion Tube	100	100	**21.6**	**27.5**	**26.7**	**21.4**	**21.0**
C9A	402135	286654	Roadside	Diffusion Tube	100	100	**36**	**32.1**	**30.1**	**31.5**	**29.1**
C9D	402160	286554	Kerbside	Diffusion Tube	83	83	**35.1**	**40.1**	**40.2**	**44.8**	**39.9**
DA1	399402	292095	Roadside	Diffusion Tube	42	42	-	-	-	-	**29.6**
DA2	399402	292095	Roadside	Diffusion Tube	42	42	-	-	-	-	**29.6**
DA3	399402	292095	Roadside	Diffusion Tube	42	42	-	-	-	-	**29.6**
DB1	399508	292068	Roadside	Diffusion Tube	42	42	-	-	-	-	**39.9**
DB2	399508	292068	Roadside	Diffusion Tube	33	33	-	-	-	-	**39.9**
DB3	399508	292068	Roadside	Diffusion Tube	33	33	-	-	-	-	**39.9**
DC1	400233	291783	Roadside	Diffusion Tube	42	42	-	-	-	-	**26.4**
DC2	400233	291783	Roadside	Diffusion Tube	42	42	-	-	-	-	**26.4**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3) (4)				
							2015	2016	2017	2018	2019
DC3	400233	291783	Roadside	Diffusion Tube	42	42	-	-	-	-	**26.4**
DD1	400366	291781	Roadside	Diffusion Tube	42	42	-	-	-	-	**29.5**
DD2	400366	291781	Roadside	Diffusion Tube	42	42	-	-	-	-	**29.5**
DD3	400366	291781	Roadside	Diffusion Tube	42	42	-	-	-	-	**29.5**
DE1	400728	291599	Roadside	Diffusion Tube	42	42	-	-	-	-	**31.0**
DE2	400728	291599	Roadside	Diffusion Tube	42	42	-	-	-	-	**31.0**
DE3	400728	291599	Roadside	Diffusion Tube	42	42	-	-	-	-	**31.0**
DEF1	398469	288673	Roadside	Diffusion Tube	100	100	-	-	**38.28**	**30.8**	**30.7**
DEF2	398405	288722	Roadside	Diffusion Tube	92	92	-	-	**21.25**	**21.8**	**21.1**
DF1	400890	291558	Roadside	Diffusion Tube	42	42	-	-	-	-	**33.0**
DF2	400890	291558	Roadside	Diffusion Tube	42	42	-	-	-	-	**33.0**
DF3	400890	291558	Roadside	Diffusion Tube	42	42	-	-	-	-	**33.0**
DG1	401040	291269	Roadside	Diffusion Tube	42	42	-	-	-	-	**35.0**
DG2	401040	291269	Roadside	Diffusion Tube	42	42	-	-	-	-	**35.0**
DG3	401040	291269	Roadside	Diffusion Tube	42	42	-	-	-	-	**35.0**
DH1	401195	290934	Kerbside	Diffusion Tube	42	42	-	-	-	-	**26.3**
DH2	401195	290934	Kerbside	Diffusion Tube	42	42	-	-	-	-	**26.3**
DH3	401195	290934	Kerbside	Diffusion Tube	42	42	-	-	-	-	**26.3**
DP1	397324	292256	Roadside	Diffusion Tube	100	100	**33.3**	**33.3**	**21.5**	**23.7**	**29.3**
DP4	397344	292214	Roadside	Diffusion Tube	100	100	**30.6**	**26.3**	**30.3**	**35**	**28.8**
EA	400869	291102	Kerbside	Diffusion Tube	100	100	**32.7**	**23.9**	**23.6**	**30.5**	**23.8**
EB	400920	290998	Roadside	Diffusion Tube	100	100	**23.7**	**17**	**24.6**	**30.2**	**22.6**
ED	400555	291257	Roadside	Diffusion Tube	100	100	**31.6**	**32.1**	**22.4**	**23.1**	**24.5**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3) (4)				
							2015	2016	2017	2018	2019
EE	400368	291123	Roadside	Diffusion Tube	92	92	**35.6**	**32.9**	**29.1**	**30.7**	**26.7**
EF	399800	290557	Roadside	Diffusion Tube	83	83	**41.3**	**30.5**	**26.2**	**30.2**	**29.2**
FA1	398756	289622	Roadside	Diffusion Tube	42	42	-	-	-	-	**37.2**
FA2	398756	289622	Roadside	Diffusion Tube	42	42	-	-	-	-	**37.2**
FA3	398756	289622	Roadside	Diffusion Tube	33	33	-	-	-	-	**37.2**
FB1	398717	289574	Roadside	Diffusion Tube	42	42	-	-	-	-	**27.9**
FB2	398717	289574	Roadside	Diffusion Tube	42	42	-	-	-	-	**27.9**
FB3	398717	289574	Roadside	Diffusion Tube	42	42	-	-	-	-	**27.9**
FC1	398788	289451	Roadside	Diffusion Tube	42	42	-	-	-	-	**33.8**
FC2	398788	289451	Roadside	Diffusion Tube	42	42	-	-	-	-	**33.8**
FC3	398788	289451	Roadside	Diffusion Tube	42	42	-	-	-	-	**33.8**
FD1	399162	289413	Roadside	Diffusion Tube	42	42	-	-	-	-	**30.8**
FD2	399162	289413	Roadside	Diffusion Tube	42	42	-	-	-	-	**30.8**
FD3	399162	289413	Roadside	Diffusion Tube	42	42	-	-	-	-	**30.8**
FE1	399375	289398	Roadside	Diffusion Tube	42	42	-	-	-	-	**35.9**
FE2	399375	289398	Roadside	Diffusion Tube	42	42	-	-	-	-	**35.9**
FE3	399375	289398	Roadside	Diffusion Tube	42	42	-	-	-	-	**35.9**
FF1	400370	289532	Roadside	Diffusion Tube	33	33	-	-	-	-	**36.9**
FF2	400370	289532	Roadside	Diffusion Tube	33	33	-	-	-	-	**36.9**
FF3	400370	289532	Roadside	Diffusion Tube	42	42	-	-	-	-	**36.9**
FG1	400535	289436	Roadside	Diffusion Tube	42	42	-	-	-	-	**33.7**
FG2	400535	289436	Roadside	Diffusion Tube	42	42	-	-	-	-	**33.7**
FG3	400535	289436	Roadside	Diffusion Tube	42	42	-	-	-	-	**33.7**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3) (4)				
							2015	2016	2017	2018	2019
GA	399858	289391	Roadside	Diffusion Tube	100	100	**42.4**	**38.8**	**40.4**	**38.8**	**34.7**
GB	399858	289391	Roadside	Diffusion Tube	100	100	**40.3**	**37.1**	**41**	**38.4**	**36.1**
GC	399858	289391	Roadside	Diffusion Tube	92	92	**41.7**	**39**	**39.8**	**38.7**	**35.6**
HA	400383	291307	Kerbside	Diffusion Tube	100	100	**30.2**	**31.2**	**28.6**	**29.7**	**29.4**
HH1	395754	285492	Urban Background	Diffusion Tube	92	92	**15.1**	**18.3**	**18.7**	**14.7**	**14.5**
KD	403794	294698	Urban Background	Diffusion Tube	100	100	**28.7**	**30.3**	**25**	**26.7**	**24.4**
KE	403932	294951	Roadside	Diffusion Tube	100	100	**27.8**	**26.2**	**24**	**24.5**	**22.5**
LA	400187	291601	Urban Background	Diffusion Tube	100	100	**26**	**23.1**	**21.5**	**22.5**	**22.7**
LB	400187	291601	Urban Background	Diffusion Tube	100	100	**22.4**	**23.1**	**21.6**	**23.1**	**22.2**
LC	400187	291601	Urban Background	Diffusion Tube	100	100	**26.5**	**22.5**	**22.3**	**22.8**	**22.1**
MA	400712	289296	Roadside	Diffusion Tube	100	100	**45.5**	**45.3**	**43.6**	**42.4**	**42.5**
MC	400748	289150	Kerbside	Diffusion Tube	100	100	**37.3**	**37**	**37.3**	**34.9**	**35.1**
N1A	399647	290355	Roadside	Diffusion Tube	92	92	**39.7**	**40.4**	**36.1**	**38**	**38.5**
N1B	399615	290358	Kerbside	Diffusion Tube	92	92	**34.1**	**33.2**	**35.75**	**40.2**	**34.9**
N2A	403158	288531	Kerbside	Diffusion Tube	100	100	**25.9**	**26.9**	**24.7**	**26**	**25.1**
OA	402232	286142	Roadside	Diffusion Tube	100	100	**29.4**	**36.5**	**32.2**	**34.4**	**31.3**
OB	402210	286162	Roadside	Diffusion Tube	100	100	**38.5**	**38.3**	**40.3**	**41.1**	**36.6**
OC	402220	286180	Roadside	Diffusion Tube	100	100	**31.9**	**33.4**	**31.8**	**36.6**	**33.6**
OD	402193	286235	Roadside	Diffusion Tube	100	100	**40.4**	**36.7**	**39.9**	**40.4**	**35.6**
OE	402207	286252	Roadside	Diffusion Tube	100	100	**34**	**34.2**	**28.6**	**34.1**	**32.3**
OG	402178	286347	Roadside	Diffusion Tube	100	100	**31.1**	**37.3**	**32.5**	**34.8**	**32.7**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3) (4)				
							2015	2016	2017	2018	2019
OH	402212	286173	Kerbside	Diffusion Tube	100	100	**34.8**	**38.3**	**39.1**	**32.3**	**38.1**
OI	402200	286264	Kerbside	Diffusion Tube	92	92	**33.4**	**35.7**	**30.9**	**36.3**	**29.5**
OJ	402194	286246	Kerbside	Diffusion Tube	83	83	**43.8**	**38.9**	**38.8**	**36.7**	**34.4**
OP4	402223	286097	Roadside	Diffusion Tube	83	83	**36.8**	**35.3**	**35.2**	**33.4**	**36.7**
PA1	402461	290241	Kerbside	Diffusion Tube	92	92	-	-	-	-	**35.4**
PA2	402461	290241	Kerbside	Diffusion Tube	92	92	-	-	-	-	**35.5**
PA3	402461	290241	Kerbside	Diffusion Tube	83	83	-	-	-	-	**37.1**
PB1	402221	290290	Roadside	Diffusion Tube	83	83	-	-	-	-	**33.8**
PB2	402221	290290	Roadside	Diffusion Tube	50	50	-	-	-	-	**34.1**
PB3	402221	290290	Roadside	Diffusion Tube	83	83	-	-	-	-	**34.1**
PC1	401950	290355	Roadside	Diffusion Tube	92	92	-	-	-	-	**43.9**
PC2	401950	290355	Roadside	Diffusion Tube	92	92	-	-	-	-	**43.6**
PC3	401950	290355	Roadside	Diffusion Tube	92	92	-	-	-	-	**46.4**
PD1	402111	290331	Kerbside	Diffusion Tube	83	83	-	-	-	-	**39.5**
PD2	402111	290331	Kerbside	Diffusion Tube	83	83	-	-	-	-	**38.9**
PD3	402111	290331	Kerbside	Diffusion Tube	83	83	-	-	-	-	**39.7**
PE1	402334	290279	Kerbside	Diffusion Tube	92	92	-	-	-	-	**38.3**
PE2	402334	290279	Kerbside	Diffusion Tube	92	92	-	-	-	-	**39.3**
PE3	402334	290279	Kerbside	Diffusion Tube	83	83	-	-	-	-	**39.4**
PS1A	400504	291239	Roadside	Diffusion Tube	100	100	**34.6**	**32.1**	**31.9**	**30.6**	**31.1**
QE	403928	294933	Roadside	Diffusion Tube	0	0	**36.1**	-	-	-	**N/A**
RA	401558	290077	Roadside	Diffusion Tube	100	100	**36.1**	**36.6**	**32**	**32.2**	**29.4**
SA	403951	294852	Roadside	Diffusion Tube	100	100	**30.8**	**31.3**	**28.5**	**29.3**	**26.2**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3) (4)				
							2015	2016	2017	2018	2019
SU	400476	291481	Roadside	Diffusion Tube	100	100	27.9	23	24.3	26.3	25.4
TA	395958	290645	Roadside	Diffusion Tube	100	100	31.7	29.8	33.4	30.1	28.6
TC	395854	290643	Roadside	Diffusion Tube	83	83	-	47.9	45.5	42.9	39.8
UA	398146	287639	Roadside	Diffusion Tube	100	100	32.7	34.3	31.2	31.7	29.8
UB	398214	287726	Roadside	Diffusion Tube	100	100	34	35.8	33.4	33.9	33.3
UC	398170	287746	Kerbside	Diffusion Tube	100	100	34.4	36.9	35.6	36.1	32.4
VD	397640	292467	Roadside	Diffusion Tube	67	67	32.4	25	23.6	25.5	25.6
VT	397155	290867	Roadside	Diffusion Tube	100	100	-	28.2	28.1	26.6	26.3
WA	401917	295329	Roadside	Diffusion Tube	92	92	35.5	32.6	31.7	30.7	29.1
WB	402139	295119	Urban Background	Diffusion Tube	92	92	30.1	26.8	27	29	26.5
WF	402133	295234	Urban Background	Diffusion Tube	92	92	32.5	30	30.75	30.7	27.7
WW2	400542	296052	Roadside	Diffusion Tube	92	92	-	-	-	28.2	23.3
WW3	400596	296039	Roadside	Diffusion Tube	83	83	-	-	-	28.5	22.6
XE	404446	294847	Roadside	Diffusion Tube	83	83	27.3	30.9	23.91	30.6	26.3
ZA	404618	294932	Roadside	Diffusion Tube	83	83	29.7	29.3	26.84	29.2	26.7
ZC	404488	294561	Roadside	Diffusion Tube	83	83	26.8	30.7	27.99	31.8	27.0
ZK	404622	294290	Roadside	Diffusion Tube	83	83	28.5	30.5	30.75	34.7	29.6
ZO	404515	294211	Roadside	Diffusion Tube	100	100	31.9	33.2	32.1	33.3	30.2
ZP	404555	294219	Roadside	Diffusion Tube	92	92	33.8	34.2	34.9	36.2	32.0
ZQ	404532	294191	Roadside	Diffusion Tube	100	100	44.3	50.3	49.2	49.1	41.2
ZR	404468	294183	Roadside	Diffusion Tube	100	100	44.3	43.5	47	44.5	42.0

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

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

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

Notes:

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

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

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

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

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

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

Figure A.1 – Trends in Annual Mean NO_2 Concentrations

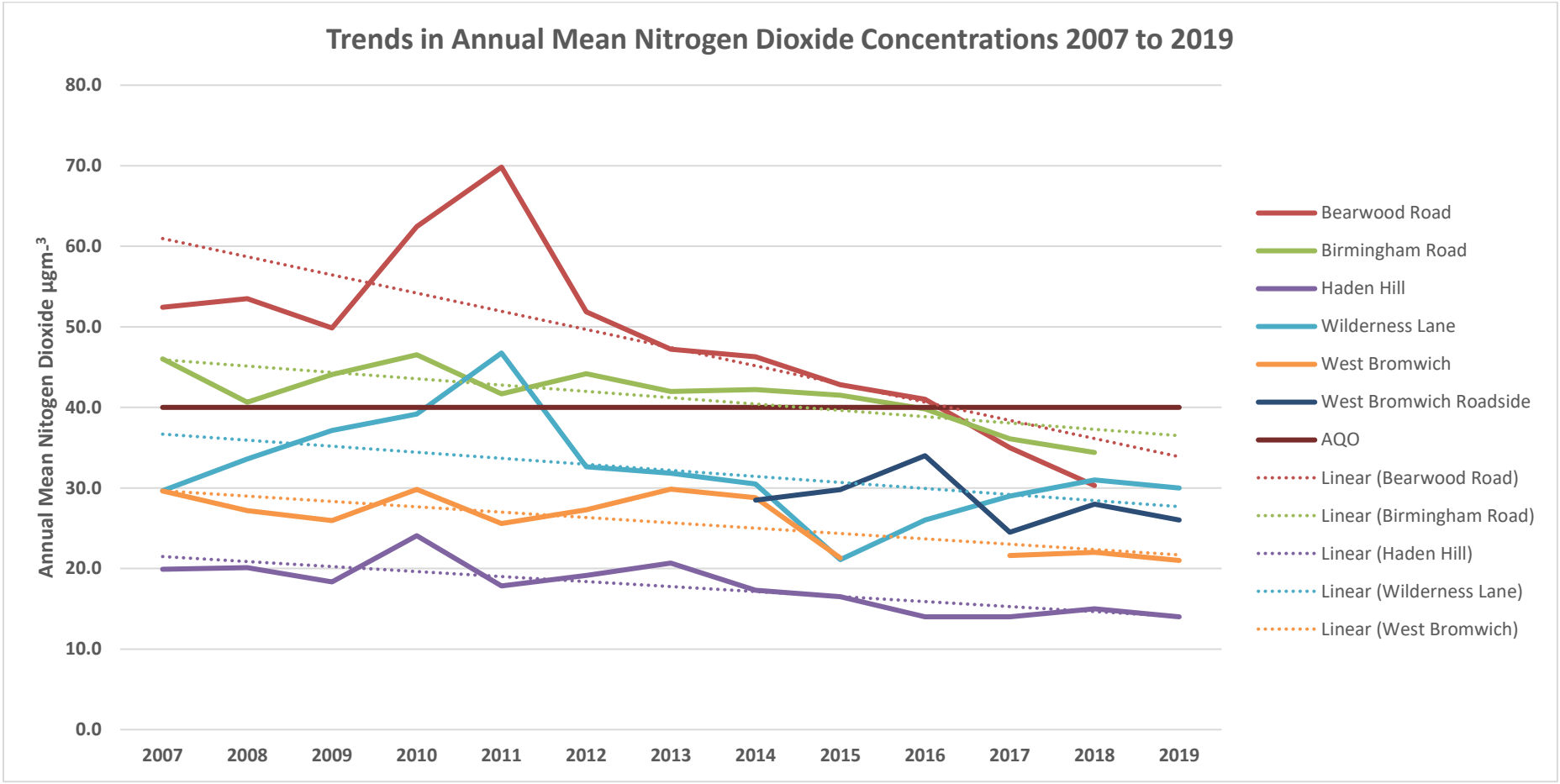


Table A.4 – 1-Hour Mean NO_2 Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
							2015	2016	2017	2018	2019
Highfields West Bromwich	400187	291601	Urban Background	Automatic	98.6	98.6	0(90.6)3	N/A	0(73)3	0	0
Birmingham Road Oldbury	399857	289392	Roadside	Roadside	85.7	85.7	0	0(131.9)3	0	0(116)3	0
Wilderness Lane Great Barr	403956	294855	Roadside	Roadside	98	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	98.9	0	0(71)3	0	0	0
West Bromwich Roadside	400521	291541	Roadside	Roadside	91.1	97.1	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	N/A	0	1	0(132)3	0 (113.1) 1,3	N/A

Notes:

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.**

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

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

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

Table A.5 – Annual Mean PM_{10} Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	PM_{10} Annual Mean Concentration ($\mu g/m^3$) (3)				
						2015	2016	2017	2018	2019
Highfields West Bromwich	400187	291601	Urban Background	99.5	99.5	N/A	N/A	N/A	13	17
Birmingham Road Oldbury	399857	289392	Roadside	99.2	99.2	15	15	15	22	19
Wilderness Lane Great Barr	403956	294855	Roadside	78.4	78.4	N/A	N/A	11	14	17
Haden Hill Park Cradley Heath	395755	285493	Urban Background	96.8	96.8	N/A	12	13	14	14

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

Notes:

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

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

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

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

Figure A.2 – Trends in Annual Mean PM_{10} Concentrations

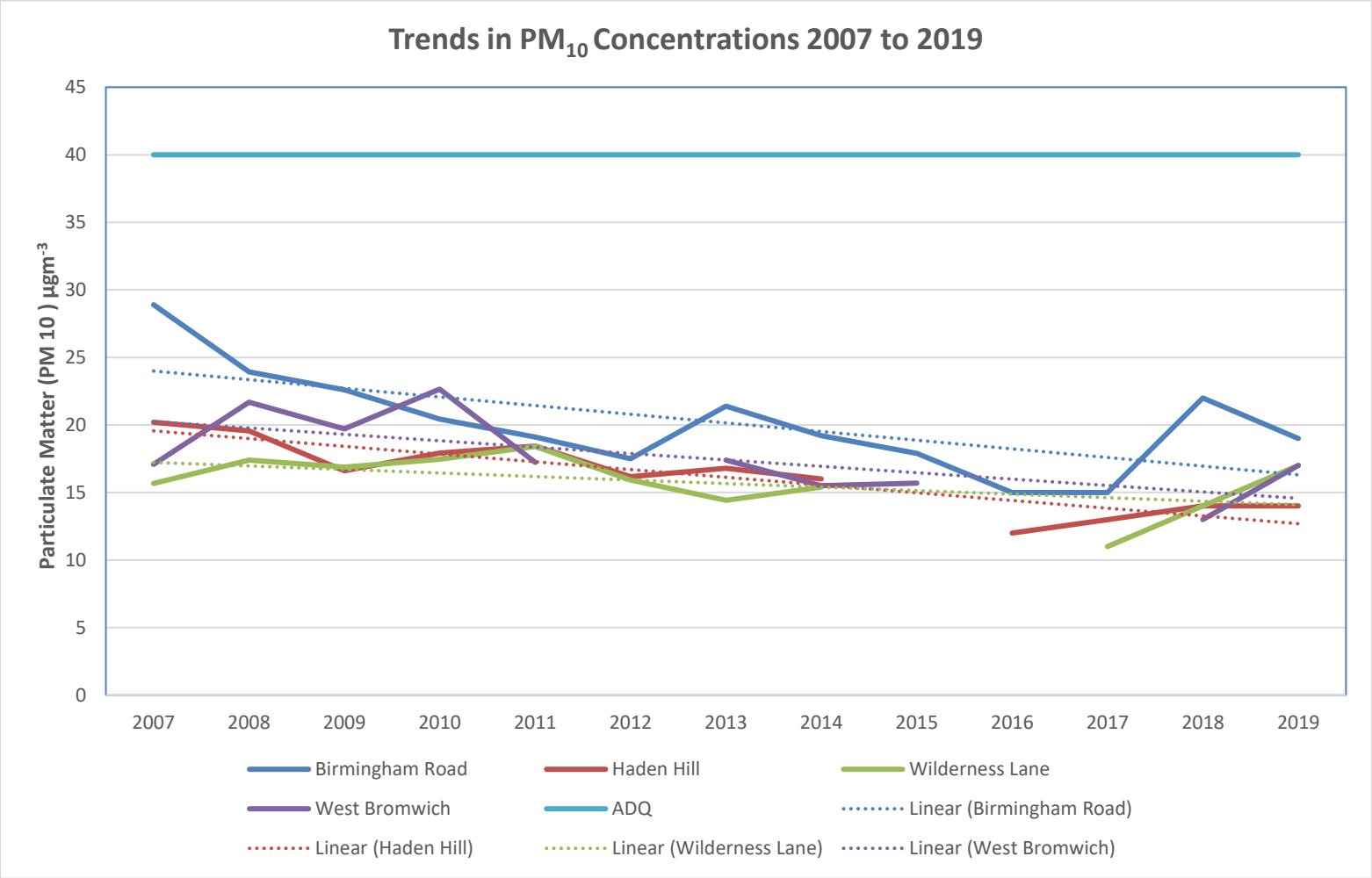


Table A.6 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
						2015	2016	2017	2018	2019
Highfields West Bromwich	400187	291601	Urban Background	99.5	99.5	**10(29.6)**	N/A	N/A	1	**3**
Birmingham Road Oldbury	399857	289392	Roadside	99.2	99.2	**4(36.2)**	**1(32.0)**	**3(26.0)**	**3(34.0)**	**6**
Wilderness Lane Great Barr	403956	294855	Roadside	91.7	91.7	N/A	N/A	1(24)	1	**3(29)**
Haden Hill Park Cradley Heath	395755	285493	Urban Background	96.8	96.8	N/A	0(19.0)	0	0	0

Notes:

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.**

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

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

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

Figure A.3 – Trends in Number of 24-Hour Mean PM_{10} Results >50µg/m^3

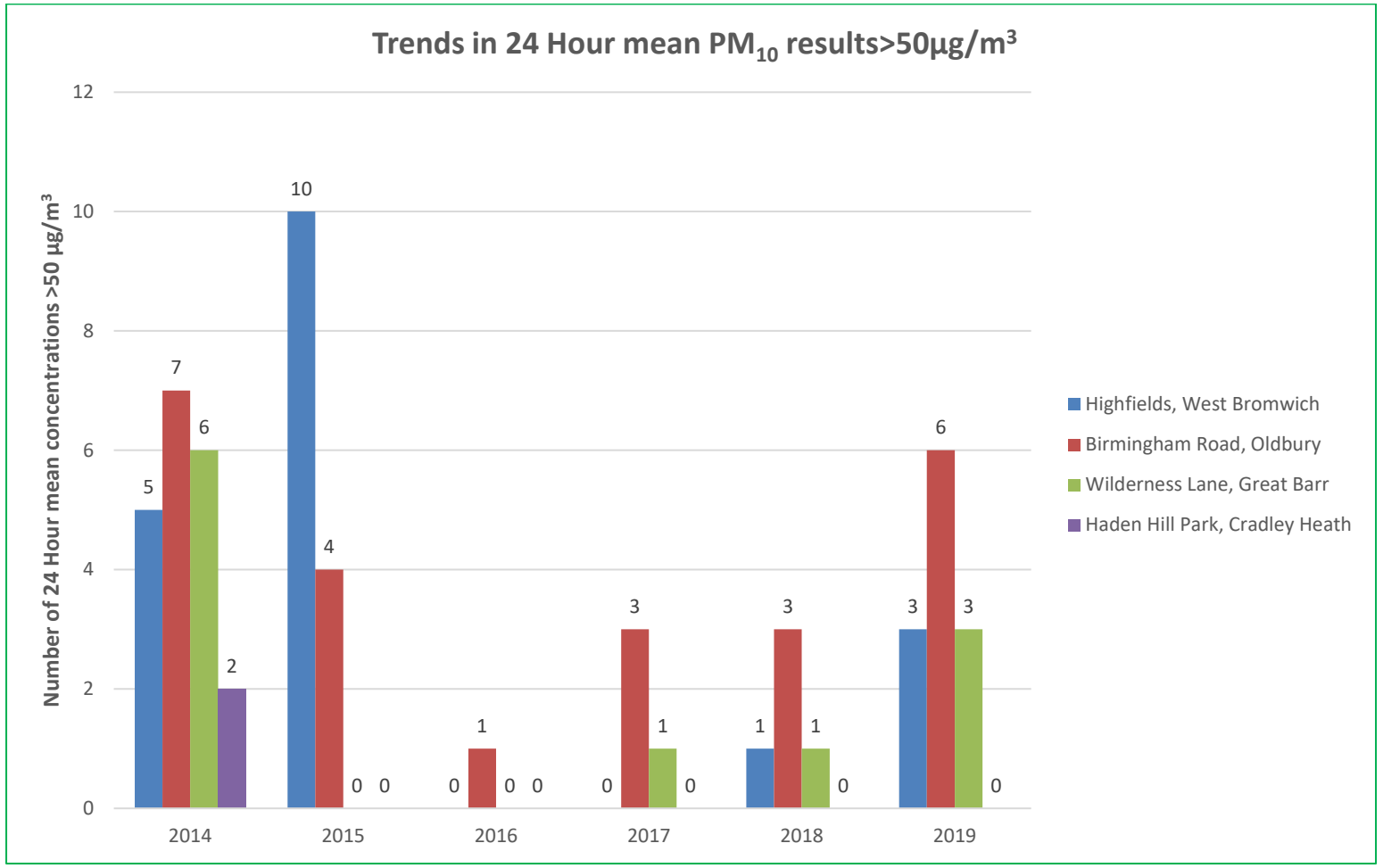


Table A.7 – $PM_{2.5}$ Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	$PM_{2.5}$ Annual Mean Concentration ($\mu g/m^3$) (3)				
						2015	2016	2017	2018	2019
Haden Hill	332395	433175	Urban Background	99.5	99.5	6.7	5.01	7.32	7	7

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

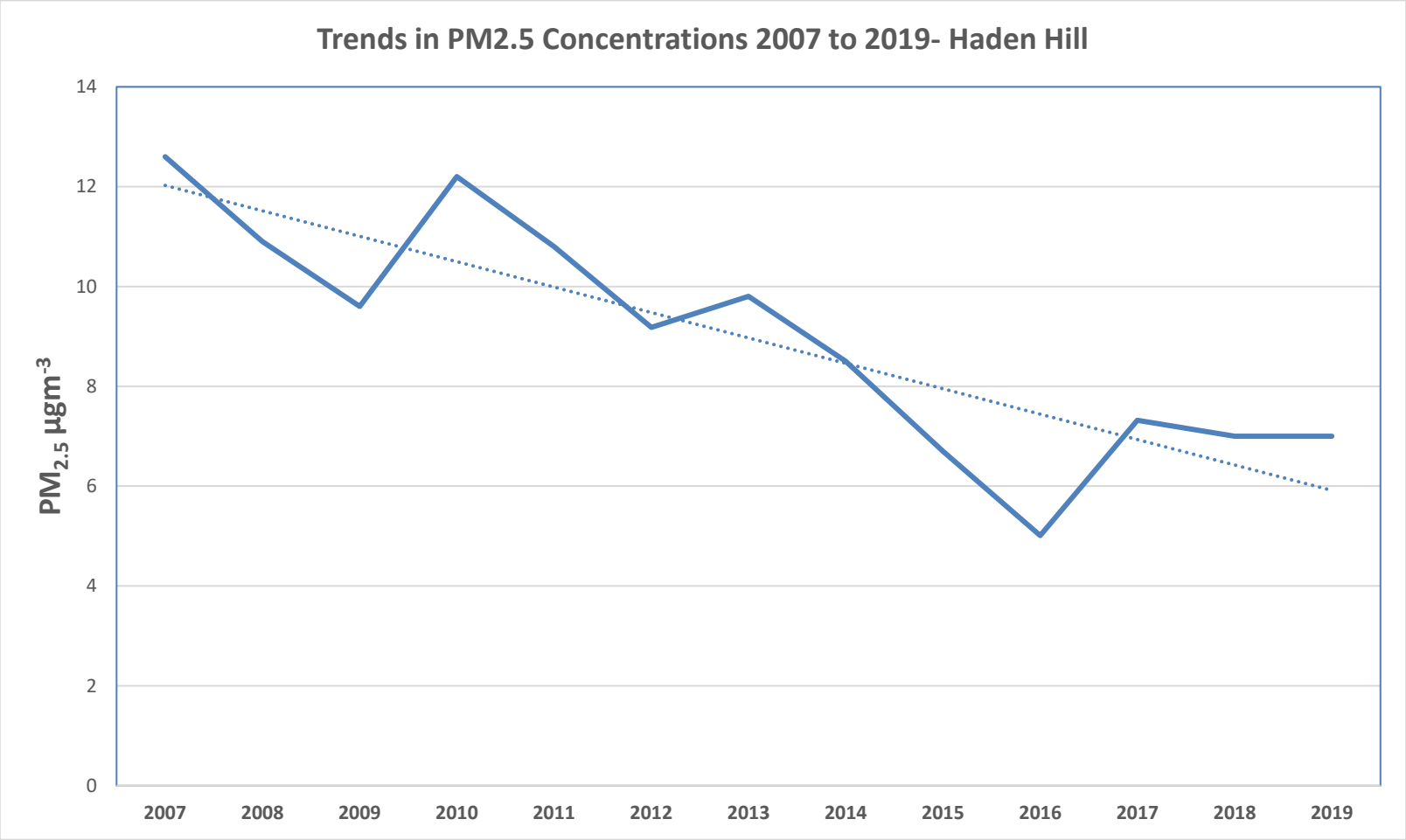
Notes:

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

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

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

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



Appendix B: Full Monthly Diffusion Tube Results for 2019

Table B.1 - NO_2 Monthly Diffusion Tube Results - 2017

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.87) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
AD	399639	296095	**40.8**	39.2	23.0	32.0	25.5	23.4	31.3	29.2	28.8	37.3	**53.8**	**43.2**	34.0	29.5	
AE	399702	296115	**41.9**	**51.5**	29.7	**44.2**	37.7	34.6	22.8	21.8	35.5	38.8	**53.0**	**44.2**	38.0	33.1	29.7
AF	399647	296015	**40.4**	**47.1**	29.6	**47.8**	36.8	10.9	30.8	29.6	27.1	28.3	38.0	33.4	33.3	29.0	
B17	399699	289401	37.0	**40.5**	31.5	34.5	35.0	29.1	27.8	23.3	34.6	29.7	**45.7**	32.6	33.4	29.1	
BA	399686	289431	**40.3**	**45.1**	39.9	**45.3**	36.6	32.6	33.6	27.1	33.1	37.2	**43.6**	**40.7**	37.9	33.0	
BD	399914	289374	**45.1**	**48.1**	**43.0**	**49.8**	**50.1**	35.5	**40.6**	33.4	**45.4**	**40.9**	**49.2**	39.2	43.3	37.7	34.6
BDQ	399999	289360	**55.5**	**59.0**	**51.0**	**53.5**	**55.3**	**44.5**	**46.9**	39.7	**52.3**	**45.2**	**50.3**	**50.7**	50.3	**43.8**	37.9
BE	399920	289352	**56.1**	**67.9**	**51.9**	**62.0**	**55.3**	**50.9**	**52.7**	**48.4**	**60.4**	**45.0**	**57.1**	**53.1**	55.1	**47.9**	**43.7**
BF	399806	289404	38.7	**41.6**	36.4	**43.8**	**46.6**	35.2	36.6	26.6	37.2	32.7	**43.4**	36.6	37.9	33.0	
BG	399718	289427	**42.6**	**40.9**	36.5	**43.2**	**43.8**	32.1	35.4	29.5	**40.5**	33.2	**44.5**	36.2	38.2	33.2	
BO	400079	289389	38.9	**46.4**	**40.7**	**42.1**	**46.0**	35.0	38.9	27.5	**45.2**	38.0	**52.2**		41.0	35.7	
BP	399820	289400	**41.9**	39.4	**42.5**	**42.8**	**42.0**	33.4	38.0	29.3	**42.8**	36.8	**44.6**	**40.2**	39.5	34.3	
BR	399820	289402	**43.6**	**46.3**	**48.6**	**53.7**	**50.2**	**46.3**	**47.5**	**44.2**	**45.0**	27.1	**48.4**	**47.9**	45.7	39.8	37.9
BS	399863	289396	39.3	**47.2**	37.1	39.1	30.8	27.8	30.7	28.8	34.6		**42.9**	38.2	36.0	31.3	

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.87) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
B52	399692	289428	**45.4**	**56.1**	**46.9**		32.7		36.5	32.9	**46.2**	**44.2**	**48.8**	**41.5**	43.1	37.5	36.4
C10A	402258	286049	**48.4**	**48.1**	**46.4**	**47.6**	**54.0**	**41.6**	**43.8**	38.8	**49.8**	**40.6**		**42.2**	45.6	39.6	33.2
C10D	402279	286062	**63.1**	**49.1**	**53.1**	**50.7**	**65.6**	**48.1**		**47.7**		39.4	**46.9**	**43.0**	50.7	**44.1**	36.5
C11A	397457	286434	**54.9**	31.2	**50.3**	31.6	38.6	32.5	33.8	31.4	**40.1**	32.3	**41.7**	37.3	38.0	33.0	
C11D	397421	286381	38.5	36.9	35.2	29.7		29.3	29.4	22.6	35.1	33.1	39.2	36.5	33.2	28.9	
C11E	397398	286366	**50.7**	36.4	**42.4**	30.4	32.1	30.0	29.6	29.5	34.5	30.2	37.7	37.3	35.1	30.5	
C12A	396899	286438	**58.6**	**51.7**	**54.6**	**44.7**	**49.7**	32.5	37.8	37.8	**49.9**	**41.6**	**48.1**	**54.0**	46.7	**40.7**	37
C12D	396872	286454	**57.1**	38.9	**48.2**	**41.1**	**46.7**	**41.4**	**45.9**	28.5	**43.9**	38.0	**48.3**	39.6	43.1	37.5	29.8
C12E	396780	286465	**45.9**	34.8	**42.7**	**43.0**	**43.9**	29.1	28.6	26.3	**43.2**	33.0	**42.2**	35.7	37.4	32.5	
C13D	396399	291457	36.4	**47.0**	36.2	34.4	39.4	29.3		31.2			**46.3**	**42.0**	38.0	33.1	
C14A	397355	293929	37.5	39.3	**40.5**	30.1	36.1	29.1	31.6	32.6	29.6	34.8	**47.0**	38.5	35.6	30.9	
C15A	396867	285536	**57.2**	**45.0**	**55.9**		30.5	28.2	28.4	20.6	31.8	33.1	**43.9**		37.5	32.6	
C1A	400668	291726	**40.6**	**45.3**	36.3	29.5	24.2	32.0	28.0	35.3	26.9	30.1	**43.1**	40.0	34.3	29.8	
C1D	400664	292020	**48.3**	**45.4**	**44.5**	36.2	38.1		37.5	39.3	**41.6**	34.7	**49.6**	**49.9**	42.3	36.8	31.3
C2A	401050	292898	**50.2**	29.3	**46.3**	38.8	**40.2**	35.3	32.9	29.9	29.7	39.6	**51.5**	33.9	38.1	33.2	
C2E	401059	292966	**42.1**		30.8	**45.8**	39.6	36.5	31.2	26.8	33.4	31.8	38.8	37.0	35.8	31.1	
C4A	400619	290153	42.8	**51.8**	**41.4**	30.2	33.0	30.2	34.0	32.4	39.1	34.2	**41.9**	**42.9**	37.8	32.9	
C4D	400657	290090	**47.2**	**61.6**	**52.6**	**41.3**	**43.4**	36.3	**41.5**	36.8	**46.2**	**44.0**	**55.7**	**55.4**	46.9	**40.8**	32.7
C4E	400738	290113	40.0	**51.4**	**44.2**	36.2	**41.6**	37.7	32.0	30.7	**43.5**	33.0	**48.3**	**43.2**	40.1	34.9	

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.87) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
C5A	399297	290133	37.2	39.1	26.4	33.6	29.1	30.2	25.9	22.5	31.3	28.4	**42.0**	34.1	31.6	27.5	
C5D	399199	290021	**46.0**	**49.1**	33.5	**40.0**	35.7	**40.0**	32.8	35.4	**43.3**	**41.9**	**58.1**	38.1	41.2	35.8	
C5E	399139	289947	**47.6**	**46.9**	34.0	36.5	29.6	34.6	28.8	27.4	33.3	35.9	**46.8**	**43.1**	37.0	32.2	
C6A	398926	289329	**42.1**	**43.1**	35.1	34.5	35.6	36.8	37.4	34.5	29.7	25.7	39.8	**41.8**	36.3	31.6	
C6E	399229	289315	**42.5**	**44.9**	28.5	37.4	31.4	31.4	28.3	27.0	34.2	36.4	**41.7**	39.0	35.2	30.6	
C7A	398137	290229	34.7	38.8	**56.4**	**42.4**	**56.8**		33.5	**43.0**	**52.0**	**41.9**	**44.7**	**49.0**	44.8	39.0	36.4
C7D	398279	290115	35.1	**44.0**	30.1	36.6	34.8	29.2	32.1	23.0	35.2	26.1	**42.0**	34.8	33.6	29.2	
C7E	398057	290286	**49.7**	**47.9**	**42.7**	32.5	34.0	24.1	27.7	30.4	34.0	33.3	38.7	36.7	36.0	31.3	
C7F	397493	290628	**45.0**	**55.0**	**46.8**	33.2	**42.7**	31.4	35.5	31.1	38.5	27.9	**49.8**	38.2	39.6	34.4	
C7H	398292	290123	27.1	30.4	25.4	22.0	21.6	19.2	16.9	16.4	22.8	21.5	37.0	29.4	24.1	21.0	
C9A	402135	286654	**40.1**	**42.6**	29.9	38.2	27.4	28.3	24.3	21.3	36.1	32.7	**40.8**	**40.5**	33.5	29.1	
C9D	402160	286554	**52.9**	**49.5**	**45.4**	**52.8**	**50.7**	**46.8**			34.5	38.3	**46.5**	**41.2**	45.8	39.9	39.3
DA1	399402	292095								30.7	35.5	34.2	39.9	36.5	35.4	29.6	
DA2	399402	292095								31.5	31.3	33.4	43.6	38.8	35.7		
DA3	399402	292095								29.9	33.0	31.6	40.0	37.4	34.4		
DB1	399508	292068								47.1	58.1	37.4	53.4	49.2	49.0	39.9	34.2
DB2	399508	292068								49.2	48.5		61.0	48.2	51.7		
DB3	399508	292068								43.9	52.0		51.2	49.3	49.1		
DC1	400233	291783								20.0	31.2	30.9	45.4	34.0	32.3		

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.87) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
DC2	400233	291783								19.8	30.2	32.1	42.4	26.6	30.2	26.4	
DC3	400233	291783								20.7	32.4	29.5	38.8	34.9	31.3		
DD1	400366	291781								21.8	36.2	37.8	44.9	33.6	34.9	29.5	
DD2	400366	291781								21.1	33.2	35.5	48.6	36.5	35.0		
DD3	400366	291781								21.8	37.5	37.0	49.9	30.9	35.4		
DE1	400728	291599								29.5	35.4	34.9	47.9	39.3	37.4	31	
DE2	400728	291599								29.8	33.0	32.9	45.0	37.3	35.6		
DE3	400728	291599								27.6	33.8	34.5	47.4	42.0	37.0		
DF1	400890	291558								25.4	35.8	36.0	47.9	42.5	37.5	33	
DF2	400890	291558								29.0	36.4	40.4	46.3	46.2	39.7		
DF3	400890	291558								24.2	36.1	38.9	47.8	45.3	38.4		
DG1	401040	291269								28.7	44.1	33.1	52.5	41.1	39.9	35	
DG2	401040	291269								26.6	40.7	32.2	56.9	51.8	41.6		
DG3	401040	291269								26.9	41.6	38.1	53.1	50.9	42.1		
DH1	401195	290934								22.9	32.0	26.5	33.2	37.0	30.3	26.3	
DH2	401195	290934								22.3	28.9	27.0	43.0	32.5	30.7		
DH3	401195	290934								23.0	30.4	26.0	41.2	38.4	31.8		
DEF1	398469	288673	48.1	42.8	31.8	24.8	30.9	30.6	33.8	29.5	38.4	35.1	37.9	39.8	35.3	30.7	
DEF2	398405	288722	31.2	26.5	21.7	26.6	25.3	19.1	19.5	13.7	25.2	24.1	33.8		24.2	21.1	

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.87) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
DP1	397324	292256	33.1	32.8	30.8	26.3	25.1	23.0	34.8	33.7	37.3	37.1	**46.3**	43.4	33.6	29.3	
DP4	397344	292214	40.1	42.9	**48.2**	33.5	37.3	35.1	22.4	19.7	25.2	23.0	38.2	31.1	33.0	28.8	
EA	400869	291102	38.6	38.9	26.6	23.0	21.5	20.7	20.3	20.1	23.1	24.7	36.2	34.1	27.3	23.8	
EB	400920	290998	33.3	38.0	23.0	25.2	22.8	19.7	20.2	19.9	25.3	27.2	24.3	33.2	26.0	22.6	
ED	400555	291257	25.9	38.4	27.1	30.2	32.8	31.1	20.3	17.0	23.9	24.9	35.1	31.1	28.1	24.5	
EE	400368	291123		45.9	39.0	17.9	21.2	18.3	30.3	27.9	32.7	28.8	35.6	39.6	30.6	26.7	
EF	399800	290557	42.8	45.2	25.6		24.4		27.2	28.1	26.4	30.3	**47.7**	37.8	33.6	29.2	
FA1	398756	289622								40.0	44.2	44.7	46.6	52.1	45.5	37.2	
FA2	398756	289622								36.6	37.2	48.4	46.4	44.1	42.5		
FA3	398756	289622								40.0	44.0	34.5	51.8		42.6		
FB1	398717	289574								20.2	24.5	30.7	45.7	35.3	31.3	27.9	
FB2	398717	289574								19.9	30.4	33.6	45.0	36.2	33.0		
FB3	398717	289574								18.4	32.6	35.5	47.2	35.5	33.8		
FC1	398788	289451								34.9	38.9	25.0	73.4	39.5	42.4	33.8	
FC2	398788	289451								29.1	39.4	37.1	49.1	37.8	38.5		
FC3	398788	289451								34.7	41.4	37.1	46.7	43.9	40.7		
FD1	399162	289413								25.9	30.4	34.2	37.2	41.3	33.8	30.8	
FD2	399162	289413								26.6	32.4	34.2	40.3	40.1	34.7		
FD3	399162	289413								25.6	27.4	34.7	52.8	52.1	38.5		

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.87) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
FE1	399375	289398								32.0	39.5	46.1	48.8	45.9	42.5	35.9	
FE2	399375	289398								35.1	41.6	39.8	57.5	38.9	42.6		
FE3	399375	289398								31.8	47.4	42.4	51.3	42.3	43.0		
FF1	400370	289532								33.9	45.0	34.9	47.6		40.4	36.9	
FF2	400370	289532								34.1	46.1	33.0		49.0	40.6		
FF3	400370	289532								39.8	36.0	39.0	58.5	52.9	45.2		
FG1	400535	289436								27.2	39.6	34.8	46.4	37.8	37.1	337	
FG2	400535	289436								28.3	39.7	40.0	56.2	42.1	41.2		
FG3	400535	289436								27.5	43.8	35.9	57.2	44.6	41.8		
GA	399858	289391	44.9	48.8	**40.4**	38.2	37.7	30.2	34.6	29.8	**43.2**	39.3	**46.9**	44.4	39.9	34.7	
GB	399858	289391	40.2	50.2	**41.5**	**43.2**	34.8	33.3	38.2	**40.3**	**46.1**	**40.7**	**46.6**	43.2	41.5	36.1	34.5
GC	399858	289391	44.1	49.0	39.1	**45.6**	39.9	33.4	37.0	33.9	**41.3**		**46.5**	40.7	41.0	35.6	
HA	400383	291307	35.8	43.5	36.8	33.9	36.7	27.4	29.4	25.0	34.2	30.4	39.2	33.3	33.8	29.4	
HH1	395754	285492	29.7	16.9	14.8	17.3	12.3	11.3	9.7		15.3	15.9	24.3	16.1	16.7	14.5	
KD	403794	294698	40.7	32.2	25.2	28.2	33.1	25.5	19.2	16.9	27.1	26.0	36.8	25.1	28.0	24.4	
KE	403932	294951	30.6	39.2	23.9	22.0	19.7	22.8	20.0	22.1	22.8	25.8	32.8	28.8	25.9	22.5	
LA	400187	291601	32.5	39.1	31.6	20.2	21.4	19.4	19.8	17.3	22.6	25.8	32.7	30.4	26.1	22.7	
LB	400187	291601	29.0	41.3	27.8	18.7	21.8	18.1	19.3	16.0	24.2	25.8	34.3	29.9	25.5	22.2	
LC	400187	291601	32.6	39.6	31.1	19.5	21.4	18.1	18.8	18.2	21.4	24.7	29.8	29.8	25.4	22.1	

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.87) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
MA	400712	289296	48.9	64.3	**49.8**	**41.7**	**47.2**	**46.0**	**48.8**	**42.8**	**46.9**	**42.2**	**47.4**	60.4	48.9	42.5	42.2
MC	400748	289150	44.5	51.3	38.5	38.2	33.5	37.0	38.3	32.3	37.4	39.9	**48.2**	44.5	40.3	35.1	
N1A	399647	290355	54.6	62.8	35.3	37.1	34.4		37.6	37.8	38.0	**43.3**	**51.9**	54.5	44.3	38.5	29.2
N1B	399615	290358	57.8	49.6	**40.4**	**43.2**	15.8		36.5	36.7	35.8	32.1	**47.6**	45.8	40.1	34.9	
N2A	403158	288531	33.4	41.2	18.9	33.7	29.2	27.2	21.9	17.3	28.6	25.9	37.5	31.7	28.9	25.1	
OA	402232	286142	40.2	44.1	28.9	**40.1**	38.1	32.5	31.8	25.2	33.5	31.6	**43.0**	42.3	35.9	31.3	
OB	402210	286162	49.6	52.2	**40.4**	33.9	**41.8**	34.9	**41.7**	36.9	**41.8**	39.3	**44.4**	48.2	42.1	36.6	32
OC	402220	286180	41.4	47.2	35.2	**45.2**	**41.6**	29.2	36.5	25.8	**41.2**	35.3	**46.1**	39.2	38.6	33.6	
OD	402193	286235	48.2	50.6	**41.9**	37.0	**44.0**	33.4	37.4	34.5	39.3	39.1	**45.5**	40.6	40.9	35.6	
OE	402207	286252	36.2	41.8	25.9	**45.4**	39.8	31.7	33.4	29.5	**42.2**	34.7	**46.1**	38.4	37.1	32.3	
OG	402178	286347	46.2	47.0	30.7	**47.4**	**40.8**	28.0	33.1	27.1	38.8	30.7	**43.8**	37.1	37.6	32.7	
OH	402212	286173	55.7	60.0	**46.9**	38.7	**40.7**	34.3	38.5	35.9	**47.3**	**42.0**	**42.0**	43.8	43.8	38.1	31.5
OI	402200	286264	45.6	45.3	26.7		32.4	32.4	27.4	22.5	36.2	29.8	**44.1**	31.2	34.0	29.5	
OJ	402194	286246	58.4	49.4	**43.0**	37.2	**42.3**		23.6	30.6	38.4	34.6		37.5	39.5	34.4	
OP4	402223	286097	52.8			39.7	**48.9**	36.0	38.5	36.1	**48.2**	35.8	**43.2**	43.3	42.2	36.7	29.9
PA1	402461	290241		50.7	33.9	**48.9**	**51.6**	36.6	**40.8**	28.3	**43.3**	27.2	**50.4**	36.6	40.7	35.9	
PA2	402461	290241		49.7	34.6	**44.7**	**52.2**	37.4	**40.6**	27.7	**42.5**	25.1	**54.8**	38.9	40.8		
PA3	402461	290241		58.0	33.1	**49.7**	**50.8**	23.2	**43.8**	28.4	**47.9**	37.9	**53.5**		42.6		
PB1	402221	290290		43.7	34.4	**41.1**	**45.9**	31.1	39.1	32.6		34.1	**46.4**	40.3	38.9		

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.87) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
PB2	402221	290290		42.1	34.6	**45.1**	**47.4**	35.4					**45.0**		41.6	34.9	
PB3	402221	290290		42.1	36.9	**43.0**	**43.1**	35.8	35.9	31.0	**45.2**		**48.3**	37.8	39.9		
PC1	401950	290355		52.2	**49.4**	**45.9**	**58.5**	**44.3**	**49.4**	**42.5**	**60.7**	**50.0**	**49.3**	52.3	50.40545	44.6	33.2
PC2	401950	290355		53.6	**52.7**	**42.5**	**44.4**	**46.7**	**54.2**	**44.2**	**63.6**	**41.4**	**57.1**	51.3	50.2		
PC3	401950	290355		55.8	**67.9**	**47.5**	**62.5**	**45.7**	**52.9**	**45.6**	**53.3**	**46.3**	**62.2**	46.9	53.3		
PD1	402192	290298		55.2	**51.8**	39.7	**42.9**	35.4	39.9		**46.7**	**41.4**	**49.1**	52.0	45.4	38.8	28.8
PD2	402192	290298		58.8	**49.4**	38.3	39.3	33.3	37.2	38.0	**46.4**		**56.9**	49.0	44.7		
PD3	402192	290298		61.2	**54.1**	**44.3**	38.4	36.3	**41.2**		**48.0**	35.1	**50.2**	47.7	45.7		
PE1	402326	290269		50.5	**56.0**	**41.5**	35.9	**43.2**	37.9	36.5	**48.5**	**43.1**	**50.7**	40.6	44.0	39.2	28.9
PE2	402326	290269		54.9	**50.8**	**40.6**	**42.0**	33.0	**43.1**	37.7	**47.6**	**41.1**	**47.6**	58.9	45.2		
PE3	402326	290269		53.8	**58.3**	**42.6**	**42.5**	38.8	**40.5**	35.4	**48.7**	39.6	**53.1**		45.3		
PS1A	400504	291239	42.2	52.7	**44.7**	26.4	33.8	29.3	33.0	30.6	30.6	28.5	35.3	41.5	35.7	31.1	
RA	401558	290077	34.3	44.9	31.2	32.9	33.1	24.8	26.8	23.1	31.7	27.1	**55.2**	39.9	33.7	29.4	
SA	403951	294852	33.5	39.9	28.7	32.1	22.5	26.0	25.1	24.5	23.9	29.9	**40.5**	34.3	30.1	26.2	
SU	400476	291481	34.0	36.5	29.5	32.1	29.7	24.3	22.6	20.1	27.0	27.7	37.2	29.6	29.2	25.4	
TA	395958	290645	35.5	42.9	37.0	32.8	31.3	24.5	28.6	26.9	31.5	30.5	37.7	35.2	32.9	28.6	
TC	395854	290643	61.5	59.0	**41.6**	**42.0**	**41.6**	37.4			**47.8**	34.9	**43.3**	47.8	45.7	39.8	29.9

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.87) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
UA	398146	287639	43.5	37.8	**41.1**	32.7	34.0	28.8	30.6	27.6	31.3	31.1	38.4	34.5	34.3	29.8	
UB	398214	287726	54.4	40.4	**42.7**	33.7	35.0	32.2	33.6	31.1	**40.2**	34.8	**47.1**	34.4	38.3	33.3	
UC	398170	287746	51.3	45.9	**47.9**	35.2	37.0	34.1	34.0	28.4	36.9	**40.3**	35.0	21.4	37.3	32.4	
VD	397640	292467	31.9	35.0	30.9	28.3			25.3	22.7	29.2	25.5		36.5	29.5	25.6	
VT	397155	290867	38.8	35.6	29.1	22.8	24.9	37.7	27.3	23.4	32.1	25.9	34.3	31.5	30.3	26.3	
WA	401917	295329	46.1	41.8	33.6	23.7	27.9	27.2		32.1	27.9	32.8	37.2	37.3	33.4	29.1	
WB	402139	295119	45.6	39.0		26.9	23.8	23.6	23.7	25.8	25.6	29.8	36.0	35.1	30.5	26.5	
WF	402133	295234	40.3	41.7	30.5		26.3	24.5	25.6	28.8	25.6	32.9	35.6	38.1	31.8	27.7	
WW2	400542	296052	34.1	32.3	21.0	31.5	25.7	23.0	19.2	15.3	22.9	26.7	**40.6**	29.5	26.8	23.3	
WW3	400596	296039	38.9	34.2	22.2	27.7		20.7	20.7	14.1	23.1	24.2	34.2		26.0	22.6	
XE	404446	294847	37.2	35.3	25.6			25.5	24.7	19.5	29.2	30.5	38.7	35.8	30.2	26.3	
ZA	404618	294932	41.1	36.0	30.3			24.8	25.6	23.4	29.7	28.8	34.9	32.7	30.7	26.7	
ZC	404488	294561	41.5	42.6	30.8			28.4	25.5	24.5	30.1	32.1	18.3	36.8	31.0	27.0	
ZK	404622	294290	36.7	40.8	29.5			30.1	25.7	29.0	**42.7**	33.6	34.0	38.1	34.0	29.6	
ZO	404515	294211	45.9	44.3	30.5	36.7	30.0	31.9	28.8	27.2	32.5	33.6	**42.9**	32.2	34.7	30.2	
ZP	404555	294219	42.5	50.0	34.7	38.2	29.0	36.7	31.5	31.7	30.5		**40.3**	39.0	36.7	32.0	
ZQ	404532	294191	52.4	52.7	**43.5**	**44.8**	**44.7**	**52.4**	**46.8**	35.9	**45.3**	**45.8**	**53.5**	50.9	47.4	41.2	36.3
ZR	404468	294183	53.0	59.9	**42.9**	**50.1**	**48.2**	**50.5**	**47.6**	**41.3**	28.8	**46.2**	**55.7**	54.9	48.2	42.0	35.1

☐ **Local bias adjustment factor used**

☒ **National bias adjustment factor used**

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

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

Notes:

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

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

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

(2) Distance corrected to nearest relevant public exposure.

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

C1. Significant changes to sources / changes to monitoring

A457 – Birmingham Road, Oldbury

The second half of 2019 saw the deployment of additional diffusion tubes (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. It is possible that the levels of NO_2 along the A457 Birmingham Road, Oldbury are likely to have been negatively impacted by the 'M5 (J1-J2) Oldbury Viaduct' roadworks. The roadworks began in April 2017 and were meant to be completed in the autumn of 2018 but the full re-opening of this section of the M5 did not occur until 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 are therefore 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 2020.

A41, Birmingham Road, West Bromwich

The monitoring of NO_2 levels along the A41, West Bromwich (M5 - J1 Link Road) was new in 2019 following its inclusion in the '3rd Wave' project. The annualised results for the diffusion tubes in 2019 confirm that two of the five sites were within 10% of the national objective for NO_2 and one exceeded it. Although there are currently no relevant receptors by these monitoring sites, there it is still a requirement to reduce NO_2 levels to below the national objective. There is also the potential that future re-development of land adjacent to this road could result in the introduction of sensitive receptors.

C2: Monitoring / modelling of emissions

Monitoring data in 2019 has found exceedances of the annual mean NO_2 objective at the following Priority Zones and Hotspots within our borough wide AQMA as shown in **Table C2.1**:

TABLE C2.1 Zones / Hotspots in Sandwell MBC with NO_2 Annual Mean Exceedance Areas	
Zone	**Description of Zone**
1	High Street/Powke Lane, Rowley Regis (Blackheath)
2	Bearwood Road, Smethwick
3	M5 Corridor - Blakeley Hall Road, Oldbury to A41 Birmingham Road, West Bromwich
4	Newton Road / A34 Birmingham Road, Great Barr
7	West Bromwich, Trinity Way / Kenrick Way
Hotspot 1	Mallin Street, Smethwick

Sandwell Council will continue to monitor air quality at key locations to track trends in pollutant concentrations and to determine on-going compliance with the objectives. Where locations are currently compliant with the objectives further monitoring will be undertaken to ensure compliance continues, with the aim of eventually removing identified locations from the list of key exceedance areas from the borough wide AQMA.

At the current time Sandwell will retain its borough wide AQMA, as this is deemed the most effective method for monitoring and reducing concentrations of NO_2 and other key pollutants such as particulate matter.

C3: QA/QC on monitoring data

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).

C3.1 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)

C3.2 PM 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.

C3.3 PM2.5 Data Estimation

As discussed in Section 3.2.3 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 PM10/ PM2.5	
Haden Hill (Reference Site)	Urban Background	10	14	0.71	
					Estimated Annual PM2.5
Highfields, West Bromwich	Urban Background	-	17	0.71†	12.07
Birmingham Oldbury Road	Roadside	-	19	0.7₮	13.3
Wilderness Lane, Great Barr	Roadside	-	17	0.7₮	11.9

† Local reference ratio for Haden Hill is 0.71 – annual PM_{10} is multiplied by this local reference as an 'Urban Background' classified site.

₮ 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 classification was available.

C3.4 Diffusion Tube Monitoring

In 2019 Sandwell used Gradko International as their diffusion tube supplier, details are shown in **Table C3.4** below. Diffusion tubes were exposed for monthly periods as prescribed in the Diffusion Tube Monitoring Calendar published by Defra[26].

Table C3.4	NO_2 Diffusion Tube Details
Supplier	Gradko International
Period	2019
Type of Tube	Nitrogen Dioxide NO_2
Type of Absorbent	Triethanolamine
Method of Tube Preparation	50% TEA in Acetone
Exposure Dates	LAQM Exposure Calendar 2019
Exposure Duration	One Month
Bias Adjustment Factor Applied	0.87

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.

C3.5 Choice of Bias Factor to Use

To guide the decision as to whether to use national bias adjustment factor or a local one a co-location bias study was completed using the NO_2 diffusion tubes located next to our own monitoring stations at Birmingham Road, Oldbury and at Highfields West Bromwich. The local bias adjustment co-location calculation spreadsheet provided by Defra was used for both stations[27]. The precision and accuracy of the data is shown in Table C3.5 and Table C3.6. Table C3.7 shows the precision adjusted results for the sites taking into account the use of triplicate tubes.

[26] https://laqm.defra.gov.uk/assets/dttimetable2019v1.pdf
[27] https://laqm.defra.gov.uk/bias-adjustment-factors/local-bias.html

Table C3.5

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	04/01/2019	31/01/2019	**44.9**	**40.2**	**44.1**	43	2.5	6	6.2
2	31/01/2019	26/02/2019	**48.8**	**50.2**	**49.0**	49	0.8	2	2.0
3	26/02/2019	28/03/2019	**40.4**	**41.5**	39.1	40	1.2	3	2.9
4	28/03/2019	02/05/2019	38.2	**43.2**	**45.6**	42	3.8	9	9.4
5	02/05/2019	30/05/2019	37.7	34.8	39.9	37	2.5	7	6.3
6	30/05/2019	04/07/2019	30.2	33.33	33.41	32	1.8	6	4.5
7	04/07/2019	08/08/2019	34.61	38.2	37	37	1.8	5	4.5
8	08/08/2019	05/09/2019	29.81	**40.34**	33.91	35	5.3	15	13.2
9	05/09/2019	26/09/2019	**43.16**	**46.08**	**41.25**	43	2.4	6	6.0
10	26/09/2019	31/10/2019	39.33	**40.7**		40	1.0	2	8.7
11	31/10/2019	28/11/2019	**46.87**	**46.58**	**46.54**	47	0.2	0	0.4
12	28/11/2019	09/01/2020	**44.39**	**43.16**	**40.7**	43	1.9	4	4.7
13									

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

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
	0	Good	r Data Capture
52	28.2	Good	r Data Capture
33.55	99.3	Good	Good
37.96	99.7	Good	Good
33.7	99.9	Good	Good
28.78	99.5	Good	Good
26.33	98.7	Good	Good
25.72	98.4	Good	Good
32.21	98.4	Good	Good
34.16	98.5	Good	Good
39.56	98.4	Good	Good
36.06	98.9	Good	Good
Overall survey -->		Good precision	Good Overall

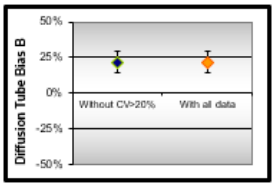
(Check average CV & DC from Accuracy calculations)

Site Name/ ID: Birmingham Road, Oldbury (AURN)

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

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 10 periods of data	
Bias factor A	0.83 (0.78 - 0.88)
Bias B	21% (13% - 28%)
Diffusion Tubes Mean:	40 µgm^{-3}
Mean CV (Precision):	6
Automatic Mean:	33 µgm^{-3}
Data Capture for periods used:	99%
Adjusted Tubes Mean:	33 (31 - 35) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 10 periods of data	
Bias factor A	0.83 (0.78 - 0.88)
Bias B	21% (13% - 28%)
Diffusion Tubes Mean:	40 µgm^{-3}
Mean CV (Precision):	6
Automatic Mean:	33 µgm^{-3}
Data Capture for periods used:	99%
Adjusted Tubes Mean:	33 (31 - 35) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Table C3.6

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	02/01/2019	29/01/2019	32.47	20.03	32.57	28	7.2	25	17.9
2	29/01/2019	26/02/2019	39.05	41.34	39.62	40	1.2	3	3.0
3	26/02/2019	25/03/2019	31.62	27.75	31.06	30	2.1	7	5.2
4	25/03/2019	30/04/2019	20.21	18.73	19.49	19	0.7	4	1.8
5	30/04/2019	28/05/2019	21.44	21.79	21.4	22	0.2	1	0.5
6	25/05/2019	02/07/2019	19.44	18.07	18.05	19	0.8	4	2.0
7	02/07/2019	06/08/2019	19.8	19.3	18.84	19	0.5	2	1.2
8	06/08/2019	03/09/2019	17.26	16.01	18.24	17	1.1	7	2.8
9	03/09/2019	24/09/2019	22.6	24.24	21.43	23	1.4	6	3.5
10	24/09/2019	29/10/2019	25.75	25.75	24.72	25	0.6	2	1.5
11	29/10/2019	26/11/2019	32.72	34.34	29.83	32	2.3	7	5.7
12	26/11/2019	06/11/2020	30.38	29.91	29.76	30	0.3	1	0.8
13									

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

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
34.39	99.7	Poor Precisior	Good
34.71	99.7	Good	Good
21.07	99.9	Good	Good
23.76	96.1	Good	Good
17.28	98.4	Good	Good
14.69	98.5	Good	Good
12.77	98.5	Good	Good
12.68	98.5	Good	Good
18.9	98.6	Good	Good
19.69	98.1	Good	Good
24.14	98.5	Good	Good
24	98.5	Good	Good
Overall survey -->		Good precision	Good Overall

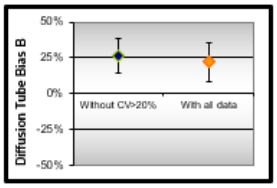
(Check average CV & DC from Accuracy calculations)

Site Name/ ID: Highfields West Bromich

Precision: 11 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 11 periods of data	
Bias factor A	0.81 (0.74 - 0.9)
Bias B	24% (12% - 36%)
Diffusion Tubes Mean:	25 µgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	20 µgm^{-3}
Data Capture for periods used:	98%
Adjusted Tubes Mean:	20 (19 - 23) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 12 periods of data	
Bias factor A	0.85 (0.76 - 0.96)
Bias B	18% (5% - 32%)
Diffusion Tubes Mean:	25 µgm^{-3}
Mean CV (Precision):	6
Automatic Mean:	22 µgm^{-3}
Data Capture for periods used:	99%
Adjusted Tubes Mean:	22 (19 - 24) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Table C3.7

Site Name/ID Birmingham Rd, Oldbury	Site Name/ID: Highfields, West Bromwich
Adjusted measurement (95% confidence level) Without periods with CV larger than 20% Bias calculated using 10 periods of data Tube Precision: 6 Automatic DC: 99% Bias factor A: 0.83 (0.78 - 0.88) Bias B: 21% (13% - 28%) *Information about tubes to be adjusted* Diffusion Tube average: 41 μgm^{-3} Average Precision (CV): 5 Adjusted Tube average: 34 +/- 2 μgm^{-3}	Adjusted measurement (95% confidence level) Without periods with CV larger than 20% Bias calculated using 11 periods of data Tube Precision: 4 Automatic DC: 98% Bias factor A: 0.81 (0.74 - 0.9) Bias B: 24% (12% - 36%) *Information about tubes to be adjusted* Diffusion Tube average: 25 μgm^{-3} Average Precision (CV): 4 Adjusted Tube average: 20 +/- 3 μgm^{-3}

As data was available from two local collocation studies a reasonable approximation of the local bias factor was calculated below using guidance provided in the LAQM local bias adjustment spreadsheet.

i. Average the Bias B Values of 21% and 24% = 22.5 %.
ii. Express 22.5% as a factor 0.225.
iii. Add 1 to 0.225 = 1.225
iv. Take the inverse to provide the bias adjustment factor = **0.81**

Year	Local Factor	National Factor	Factor Used
2019	0.81	0.87	National

It was determined that the national adjustment factor would be used because it is slightly greater than the local bias adjustment factor and would therefore be more conservative when reporting annual mean concentrations. The use of the national bias adjustment factor has therefore provided a worse-case, rather than best-case scenario of NO_2 levels to ensure we are not underestimating air pollutant concentrations in Sandwell.

C3.6 Triplicate Diffusion Tube Annualisation

Annualisation was required for all the triplicate diffusion tubes as data capture was below 75% for the year. This was completed using the procedure in Box 7.9 of LAQM TG (16)

and the LAQM annualisation tool[28]. The data was annualised using the continuous monitoring data from four reference sites, Coventry, Telford, Leamington Spa and Acocks Green, as shown in **Table C3.6**.1 The annualisation results are presented in **Table C3.6.2.**

Table C3.6.1

Continuous Monitoring Data Inputs

Enter data into the pink cells

Step 4	Continuous Background Monitoring Data

Start Date	01/01/2019
Start Time	00:00

	NO_2 Hourly Concentrations (µg/m^3)			
	Sufficient (>85%) annual data capture	Sufficient (>85%) annual data capture	Sufficient (>85%) annual data capture	Sufficient (>85%) annual data capture
Date & Time	*Coventry Allesley*	*Telford Hollinswood*	*Leamington Spa*	*Acocks Green*
01/01/19 00:00	6.00319	5.05666	5.03326	3.32141
01/01/19 01:00	9.13313	3.29203	7.93968	8.02794
01/01/19 02:00	8.69692	4.11929	6.8394	7.5255
01/01/19 03:00	7.00373	2.36323	7.6128	5.90522
01/01/19 04:00	4.27149	1.58796	6.01966	4.16904
01/01/19 05:00	4.57937	2.10346	4.60595	5.09557
01/01/19 06:00	5.61837		5.8528	3.07005
01/01/19 07:00	8.9278		13.11731	6.30964
01/01/19 08:00	8.85081		10.50841	5.26917

[28] https://laqm.defra.gov.uk/tools-monitoring-data/annualisation.html

Table C3.6.2

Sandwell MBC Triplicate Diffusion Tubes Annualisation and Bias Adjusted Annual Report Results

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)												Time Weighted Annual Mean (µg/m3)		Comment
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.87) and Annualised	
DA1	399402	292095								30.7	35.5	34.2	39.9	36.5	-	-	Duplicate/Triplicate site - Annual data provided for other tube
DA2	399402	292095								31.5	31.3	33.4	43.6	38.8	-	-	Duplicate/Triplicate site - Annual data provided for other tube
DA3	399402	292095								29.9	33.0	31.6	40.0	37.4	35.4	29.6	
DB1	399508	292068								47.1	58.1	37.4	53.4	49.2	-	-	Duplicate/Triplicate site - Annual data provided for other tube
DB2	399508	292068								49.2	48.5		61.0	48.2	-	-	Duplicate/Triplicate site - Annual data provided for other tube
DB3	399508	399508								43.9	52.0		51.2	49.3	47.7	39.9	
DC1	400233	291783								20.0	31.2	30.9	45.4	34.0	-	-	Duplicate/Triplicate site - Annual data provided for other tube
DC2	400233	291783								19.8	30.2	32.1	42.4	26.6	-	-	Duplicate/Triplicate site - Annual data provided for other tube
DC3	400233	291783								20.7	32.4	29.5	38.8	34.9	31.5	26.4	
DD1	400366	291781								21.8	36.2	37.8	44.9	33.6	-	-	Duplicate/Triplicate site - Annual data provided for other tube
DD2	400366	291781								21.1	33.2	35.5	48.6	36.5	-	-	Duplicate/Triplicate site - Annual data provided for other tube
DD3	400366	291781								21.8	37.5	37.0	49.9	30.9	35.3	29.5	

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)												Time Weighted Annual Mean (µg/m3)		Comment
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.87) and Annualised	
DE1	400728	291599								29.5	35.4	34.9	47.9	39.3	-	-	Duplicate/Triplicate site - Annual data provided for other tube
DE2	400728	291599								29.8	33.0	32.9	45.0	37.3	-	-	Duplicate/Triplicate site - Annual data provided for other tube
DE3	400728	291599								27.6	33.8	34.5	47.4	42.0	37.0	31.0	
DF1	400890	291558								25.4	35.8	36.0	47.9	42.5	-	-	Duplicate/Triplicate site - Annual data provided for other tube
DF2	400890	291558								29.0	36.4	40.4	46.3	46.2	-	-	Duplicate/Triplicate site - Annual data provided for other tube
DF3	400890	291558								24.2	36.1	38.9	47.8	45.3	39.4	33.0	
DG1	401040	291269								28.7	44.1	33.1	52.5	41.1	-	-	Duplicate/Triplicate site - Annual data provided for other tube
DG2	401040	291269								26.6	40.7	32.2	56.9	51.8	-	-	Duplicate/Triplicate site - Annual data provided for other tube
DG3	401040	291269								26.9	41.6	38.1	53.1	50.9	41.8	35.0	
DH1	401195	290934								22.9	32.0	26.5	33.2	37.0	-	-	Duplicate/Triplicate site - Annual data provided for other tube
DH2	401195	290934								22.3	28.9	27.0	43.0	32.5	-	-	Duplicate/Triplicate site - Annual data provided for other tube
DH3	401195	290934								23.0	30.4	26.0	41.2	38.4	31.4	26.3	
FA1	398756	289622								40.0	44.2	44.7	46.6	52.1	-	-	Duplicate/Triplicate site - Annual data provided for other tube
FA2	398756	289622								36.6	37.2	48.4	46.4	44.1	-	-	Duplicate/Triplicate site - Annual data provided for other tube
FA3	398756	289622								40.0	44.0	34.5	51.8		44.4	37.2	
FB1	398717	289574								20.2	24.5	30.7	45.7	35.3	-	-	Duplicate/Triplicate site - Annual data provided for other tube
FB2	398717	289574								19.9	30.4	33.6	45.0	36.2	-	-	Duplicate/Triplicate site - Annual data provided for other tube
FB3	398717	289574								18.4	32.6	35.5	47.2	35.5	33.4	27.9	

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)												Time Weighted Annual Mean (µg/m3)		Comment
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.87) and Annualised	
FC1	398788	289451								34.9	38.9	25.0	73.4	39.5	-	-	Duplicate/Triplicate site - Annual data provided for other tube
FC2	398788	289451								29.1	39.4	37.1	49.1	37.8	-	-	Duplicate/Triplicate site - Annual data provided for other tube
FC3	398788	289451								34.7	41.4	37.1	46.7	43.9	40.3	33.8	
FD1	399162	289413								25.9	30.4	34.2	37.2	41.3	-	-	Duplicate/Triplicate site - Annual data provided for other tube
FD2	399162	289413								26.6	32.4	34.2	40.3	40.1	-	-	Duplicate/Triplicate site - Annual data provided for other tube
FD3	399162	289413								25.6	27.4	34.7	52.8	52.1	36.8	30.8	
FE1	399375	289398								32.0	39.5	46.1	48.8	45.9	-	-	Duplicate/Triplicate site - Annual data provided for other tube
FE2	399375	289398								35.1	41.6	39.8	57.5	38.9	-	-	Duplicate/Triplicate site - Annual data provided for other tube
FE3	399375	289398								31.8	47.4	42.4	51.3	42.3	42.9	35.9	
FF1	400370	289532								33.9	45.0	34.9	47.6		-	-	Duplicate/Triplicate site - Annual data provided for other tube
FF2	400370	289532								34.1	46.1	33.0		49.0	-	-	Duplicate/Triplicate site - Annual data provided for other tube
FF3	400370	289532								39.8	36.0	39.0	58.5	52.9	44.1	36.9	
FG1	400535	289436								27.2	39.6	34.8	46.4	37.8	-	-	Duplicate/Triplicate site - Annual data provided for other tube
FG2	400535	289436								28.3	39.7	40.0	56.2	42.1	-	-	Duplicate/Triplicate site - Annual data provided for other tube
FG3	400535	289436								27.5	43.8	35.9	57.2	44.6	40.3	33.7	

C3.7 Fall-Off with Distance Corrections

The LAQM NO_2 Fall-Off with Distance Calculator (version 4.2)[29] was utilised to derive the NO_2 concentration at all locations where levels monitored at a site were within the 10% annual mean objective of 40µg/m^3 (between 36µg/m^3 and 40 µg/m^3) or above 40 µg/m^3 and were considered to have relevant receptors exposed. The results are shown in **Table C3.7** below.

Table C3.7 Fall-Off with Distance Calculations for relevant exposed receptors

Enter data into the pink cells

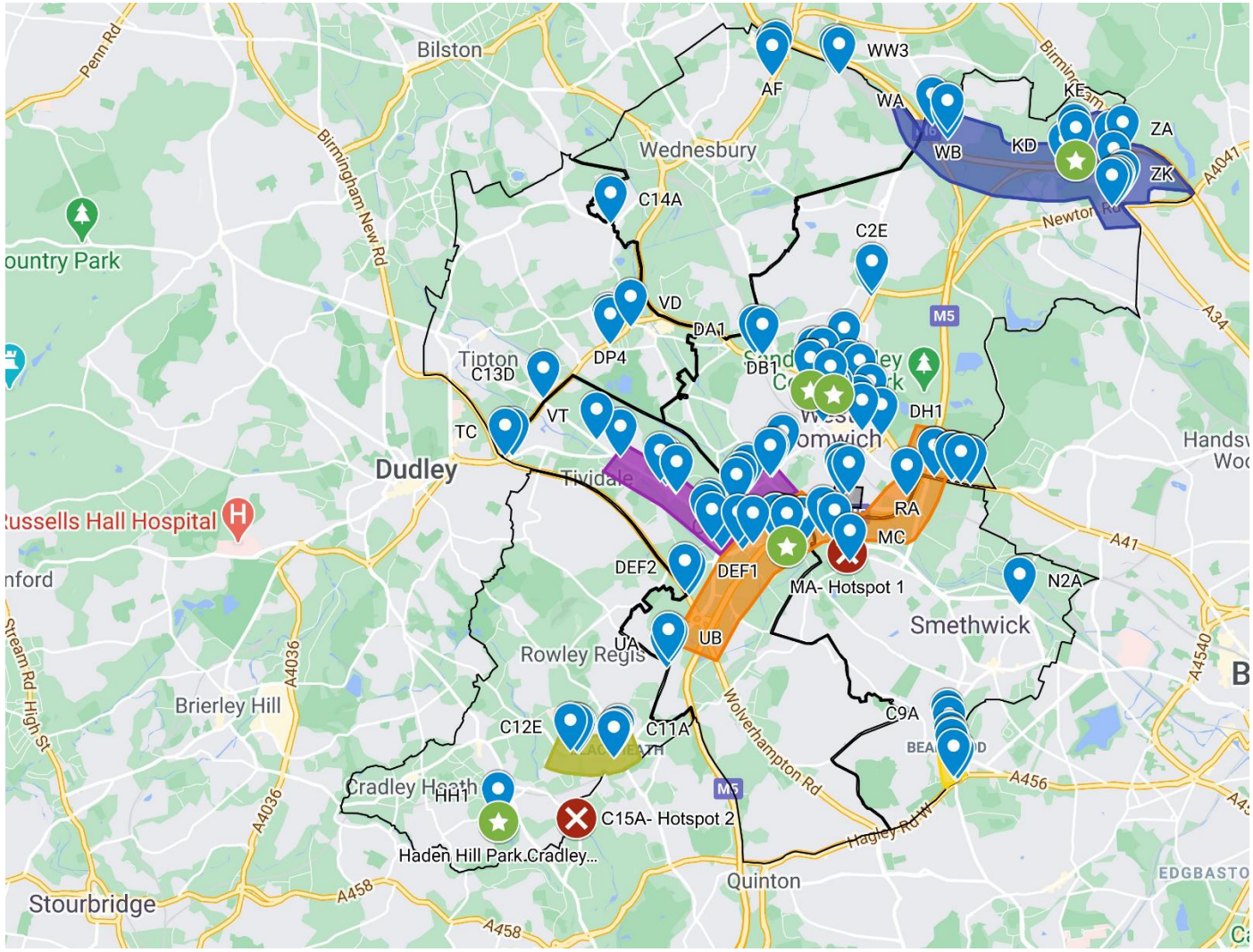
Site Name/ID	Distance (m)		NO_2 Annual Mean Concentration (µg/m^3)		
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor
BDQ	1.2	8.6	29.6	43.8	37.9
BE	0.3	5.8	29	47.9	**43.7**
BR	3	5.9	29	39.8	37.9
B52	3	5	29	37.5	36.4
C10A	0.4	4	23.3	39.6	33.2
C12A	1	2.5	20.5	40.7	37
C12D	0.1	3	21.1	37.5	29.8
C7A	0.6	1.5	23.6	39	36.4
C9D	2	2.3	21.3	39.9	39.3
DA1/DA2/DA3	3	15	26.1	39.9	34.2
DB1	3	15	26.1	39.9	34.2
GB	5.4	8.2	23.6	36.1	34.5
MA	1.8	2	30.8	42.5	**42.2**
N1A	2.1	50	26.1	38.5	29.2
OB	1	4	20.1	36.6	32
OH	0.5	4	20.1	38.1	31.5
OP4	0.4	4.5	20.1	36.7	29.9
PC1	1.5	25	26.1	44.6	33.2
PD1	1	50	26.1	38.8	28.8
PE1	1	50	26.1	39.2	28.9
TC	3.9	44	25.1	39.8	29.9
ZQ	0.5	3.5	27	41.2	36.3
ZR	0.4	5.9	27	42	35.1

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

The methodology consists of comparing the monitored annual mean NO_2 concentrations at a given point against known relationships between NO_2 concentrations and the distance from a road source. This is necessary because it is not always possible to measure concentrations at the precisely desired location. Background NO_2 levels were derived from the 2018 reference tables at UK-Air[30] .

[30] https://uk-air.defra.gov.uk/data/laqm-background-home

Appendix D: Maps of Air Quality Monitoring Locations and AQMAs

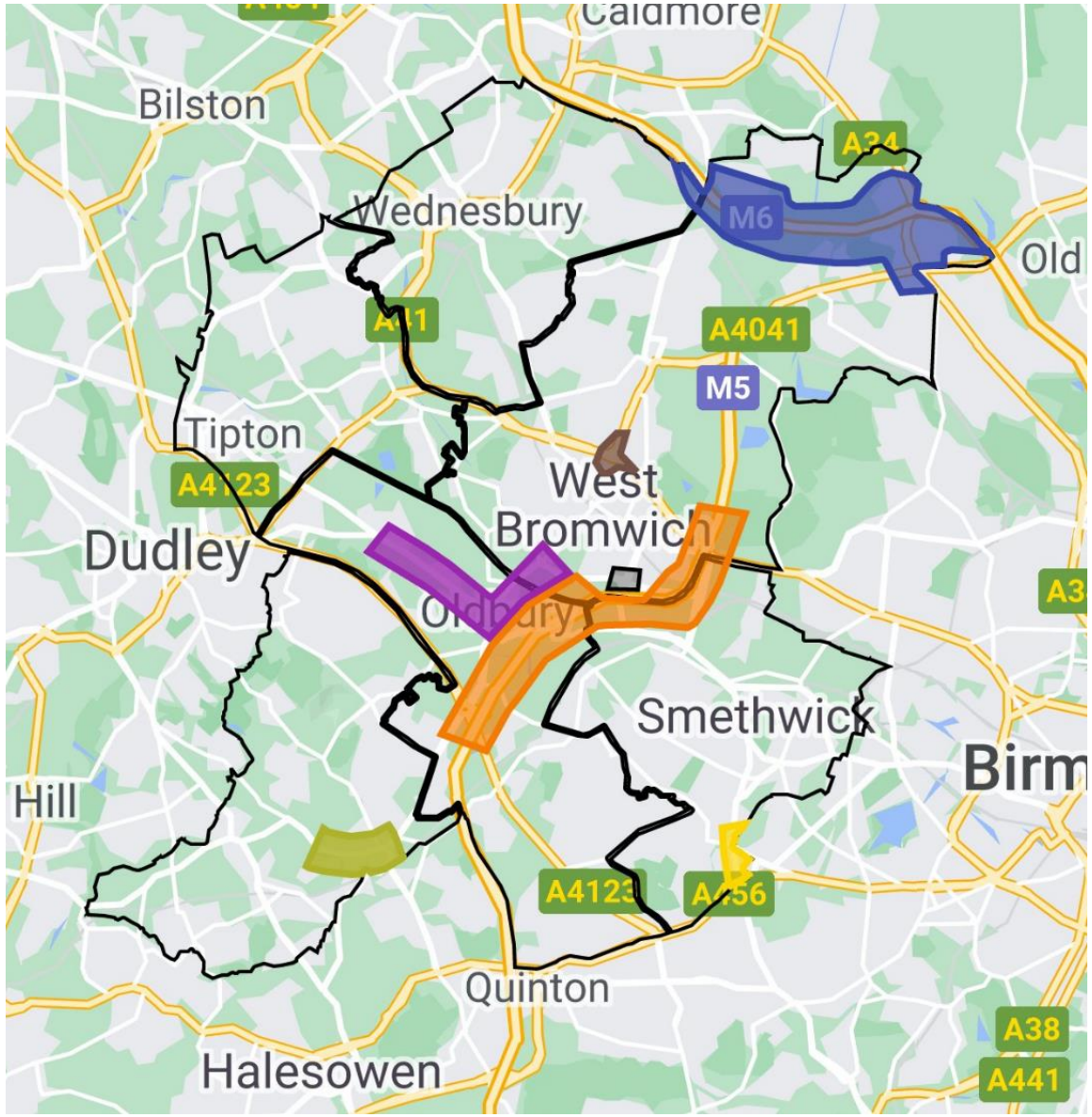


Legend:

- Diffusion Tube location
- 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

Location: Sandwell

Title: Priority Zones, Diffusion Tubes and Hotspots in Sandwell

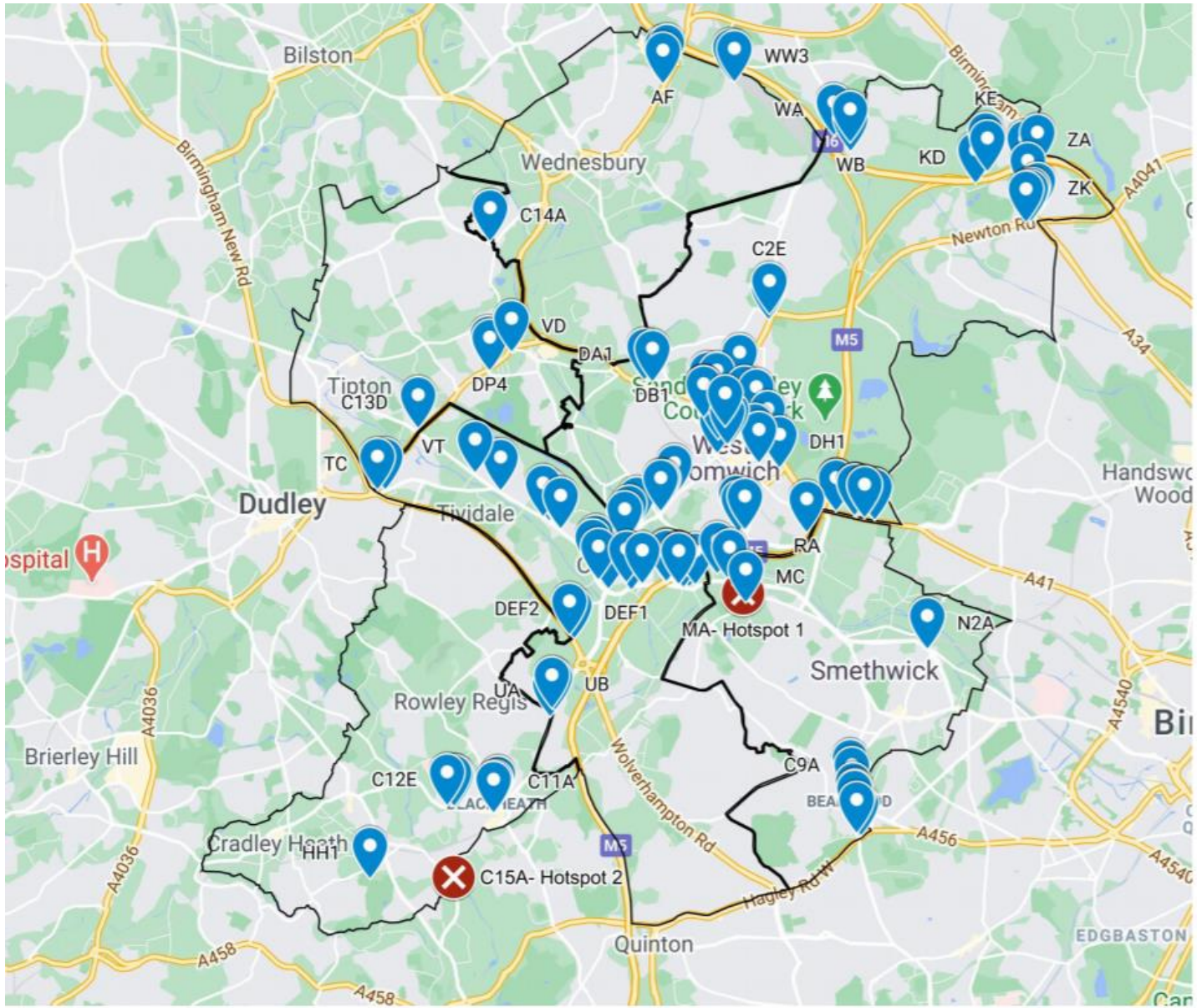


Legend:

- 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

Location: Sandwell

Title: Priority Zones in Sandwell



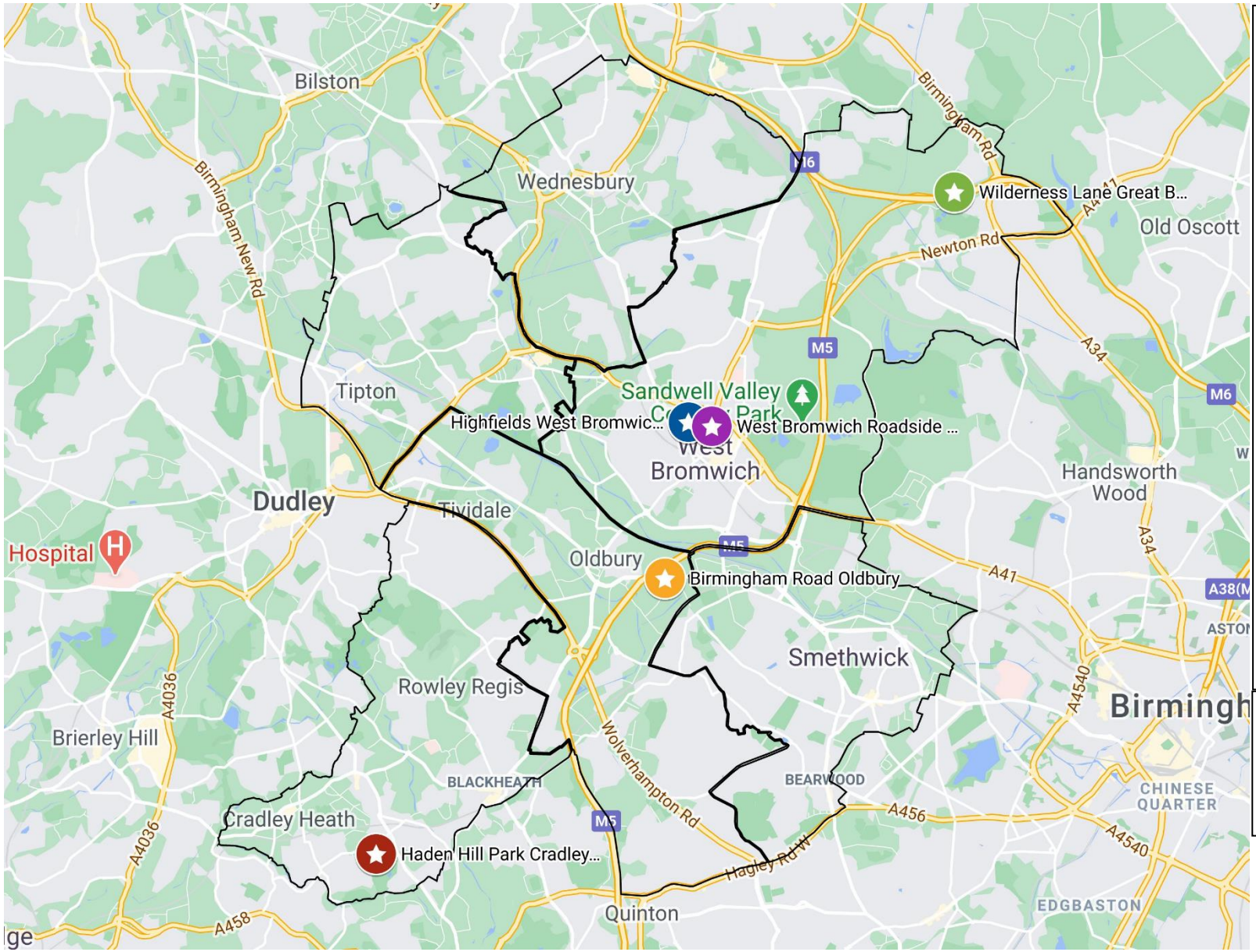
Legend:

Hotspot location

Diffusion Tube location

Location: Sandwell

Title: Diffusion Tubes and Hotspots in Sandwell



Legend:

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

Location: Sandwell

Title: Automatic Monitoring Stations in Sandwell

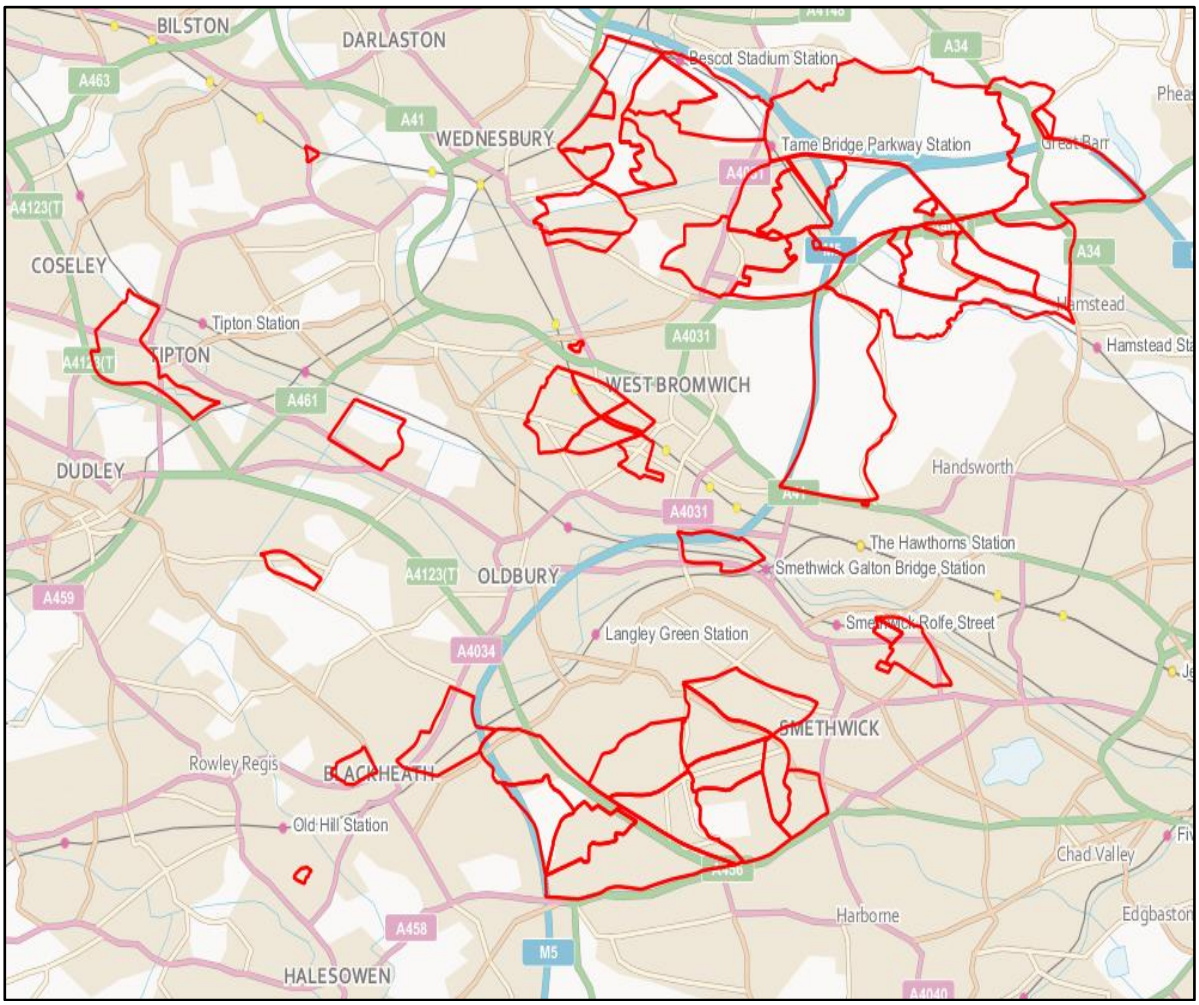
Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[31]	
	Concentration	Measured as
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
Particulate Matter ($PM_{2.5}$)	25µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

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

Appendix F: Map of Sandwell's Smoke Control Areas



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	Air Quality Annual Status Report
CAZ	Clean Air Zone
Defra	Department for Environment, Food and Rural Affairs
EU	European Union
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide
WHO	World Health Organisation

References

1. Census. 2011: http://www.statistics.go.uk/census2011
2. Environmental Enquiry, Air Quality, Socioeconomic and Respiratory health. 2010
3. Air Quality and Social Deprivation in UK: An Environmental Inequalities Analysis 2006
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