2018/2019 Air Quality Annual Status Report (ASR)

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

May 2020 (reporting on calendar years 2017 and 2018)

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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 or not the national air quality objectives are likely to be achieved. Where exceedences 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 2017 and 2018 and describes the measures that Sandwell is currently undertaking to improve air quality now and in the future. There are references to other work undertaken in 2019 where relevant to this report.

Air Quality in Sandwell

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children 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].

Air pollution in Sandwell is an ongoing problem and the Council declared a borough wide Air Quality Management Area for exceedences of the Nitrogen Dioxide (NO_2) annual mean in 2005. The borough is characterised by large areas of established industry and a complex road network of major arterial roads, including the M5 and M6 motorways, which are amongst the most utilised and congested roads in Europe.

Sandwell Key Priority Zones

Sandwell Council has identified seven key priority zones and two individual hotspots at Mallin Street, Smethwick and Gorsty Hill, Blackheath. These hotspots have been included within the new draft Air Quality Action Plan covering the 2020-2025.

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

Table 1.1 NO2 Key Priority Zones for 2020 to 2025

Sandwell MBC 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	Area between M5, Birmingham Road and Blakeley Hall Road - Oldbury
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	Trinity Way / Kenrick Way, West Bromwich
Hotspot 1		Mallin Street, Smethwick
Hotspot 2		Gorsty Hill, Blackheath

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

A map showing the priority areas listed in the table above can be found in Appendix D.

Sandwell maintains an extensive monitoring network and has undertaken 12 months of continuous automatic monitoring at six locations. It deployed individual diffusion tube at 99 locations in 2017 and 103 locations in 2018.

In 2018, seven of the original 22 exceedence areas continued to exceed the NO_2 annual mean objective. Exceedences at these seven locations have been persistent, demonstrating no significant evidence of a downward trend in NO_2 concentrations throughout the previous 5 years.

The following locations which originally exceeded the annual mean NO_2 objective following the declaration of the Air Quality Management Area (AQMA) were compliant with the objectives in 2018:

Table 1.2 Areas compliant with the NO2 Objective

Area	Areas Compliant with the NO_2 Objective - Description
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 Dr 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 are only marginally under the annual mean objective in 2018 and will remain a priority area until such time NO_2 levels are consistently below the objective level.

Exceedences were also identified in two locations not originally included in the 22 exceedance areas. These exceedance areas are Mallin Street, Smethwick and at Burnt Tree Junction/Birmingham New Road, Oldbury. There are currently no relevant receptors at the Burnt Tree Junction monitoring location but there may be in the future. The Council will continue to monitor air quality at key locations to confirm the trends in pollutant concentrations and compliance with published objectives.

Sandwell confirms compliance with the following pollutant objectives: Benzene, 1-3 Butadiene, Sulphur Dioxide, Carbon Monoxide, Particulate Matter (PM_{10}) and Lead.

National air quality objectives for PM_{10} are currently met in Sandwell. It is recognised there is lack of evidence to indicate there is a concentration of particulate matter below which health effects do not occur and therefore our aim is to achieve a reduction in the overall exposure of the population. $PM_{2.5}$ is currently monitored in one location.

Actions to Improve Air Quality

The principal source of air pollution in Sandwell is a direct result of emissions from the road network (petrol and diesel engines). Exceedences are observed at busy junctions, narrow congested streets and in town centres.

Sandwell published its first air quality action plan (AQAP) in 2009, which focused on several of key areas:

- Improvements to Urban Traffic Control Systems.
- Red routing of major arterial roads through the borough (with associated control of parking to ease congestion) including Bearwood, Blackheath, Great Barr, Oldbury, Smethwick, West Bromwich and Tipton.
- Major junction improvements on the A41 Expressway West Bromwich and Burnt Tree Island/Dudley Port in Tipton.
- Major bypass and traffic management works at Blackheath and Cradley Heath.
- Investment programmes aimed at easing traffic flows and reducing congestion and improving the efficiency of junctions, signalling and pedestrian crossings such as in West Bromwich, Bearwood and Blackheath.

- Enhancing conditions for both vehicles and pedestrians using shopping centres and high streets in Bearwood and West Bromwich.
- Promotion of modal shift including walking and cycling.

A table of actions from the 2009 report can be found in Appendix F. Following the implementation of the action plan, there was initially a worsening of air quality in 2010/11, but in subsequent years there has been a gradual improvement in NO_2 and Particulate Matter ($PM_{10/2.5}$) concentrations and a reduction in the number of locations which exceed the NO_2 annual mean objective. The 2009 action plan has drawn to the end of its working life. It can be reviewed on the Sandwell Council website Sandwell Air Quality. The table of actions can also be found in Appendix F.

Sandwell is currently in the process of updating its air quality action plan. The draft plan sets out measures the council proposes to take to improve air quality between 2020 and 2025 and the actions can be found in Table 2.2. A full public consultation was undertaken in early 2020. A final version of the Plan will be adopted in the near future.

Conclusions and Priorities

The principle source of air pollution in Sandwell is vehicle exhaust emissions from petrol and diesel engines. Elevated nitrogen dioxide levels are observed at busy junctions, narrow congested streets and in town centres.

The council's aims are:

- To reduce the overall health impacts and burdens of poor air quality
- To achieve the national air quality NO_2 annual mean objective across the borough in the shortest possible timeframe.
- To reduce PM_{10} and $PM_{2.5}$ concentrations to protect human health

These are supported by the following actions:

Table 1.3 Priority Actions

Priority	Action
Priority 1	Develop specific measures in consultation with communities to reduce NO_2 concentrations at "hot spot" locations.
Priority 2	Promote public transport, walking, cycling and switching to low or zero emission vehicles
Priority 3	Review what impact the council has on air quality in its role of as a provider of public services and develop a plan to reduce emissions from its activities. This will include reducing emissions from council fleet and employee vehicles.
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 campaigns to encourage behaviour change around improving physical health and increasing use of low emission vehicles.
Priority 7	Work in partnership with Birmingham CC to minimise negative impacts on Sandwell residents resulting from the implementation of the CAZ

Table 2.2 shows the Sandwell Council Draft Air Quality Action Plan measures for 2020 to 2025.

A number of projects have also been undertaken to supplement the work of the Air Quality Action Plan and improve the Air Quality in the borough.

- The Low Emissions Towns & Cities Programme (LETCP) is a Defra funded project established in 2011. It is a partnership comprising the seven West Midlands Local Authorities, (Birmingham CC, Coventry CC, Dudley MBC, Sandwell MBC, Solihull MBC, Walsall MBC, Wolverhampton CC) working together to reduce vehicle emissions, through the acceleration of the uptake of cleaner vehicle fuels and technologies. The programme included the following:
    - The Good Practice Air Quality Planning Guidance – a model approach to integrate air quality considerations into land use planning.

- The Good Practice Procurement Guidance – how public-sector procurement can influence vehicle emissions.
- The Low Emission Zone Technical Feasibility Study – an investigation into different highway scenarios to determine the suitability for a low emission zone.

All reports produced by the LETCP can be found on the LETCP website:

Low emissions towns and cities programme

- A bespoke Low Emission Strategy technical feasibility study was undertaken at Bearwood Road and reported in 2016 to determine the best scenario for targeting the high bus emissions which are contributing to the ongoing exceedance of the NO_2 objective. The best strategy would reduce NO_2 concentrations by 15% and would result in a £57,000 health impact saving. A reduction in particulate matter is also anticipated.
- Sandwell carried out a Social Marketing Campaign aimed at reducing the amount of air pollution in selected areas of the borough. The campaign ran for one calendar year June 2016 - June 2017 and aimed to encourage modal shift behavioural change in those that use the car for short journeys, including for work, leisure or the school run. As a secondary objective, the project intended to discourage engine idling and encourage traffic to reroute away from major air pollution hotspots.
- The four Black Country councils (Sandwell, Dudley, Walsall and Wolverhampton) adopted the Black Country Air Quality Supplementary Planning Document (SPD) in October 2016. This is currently subject to review and a revised document will be issued in the near future.
- Sandwell secured planning conditions that require the provision of electric vehicle charging points on 35 developments in 2017 representing an increase over the previous year (2016). These included residential, commercial and industrial developments. Conditions requiring a travel plan for air quality purposes were attached to a further five planning permissions. In 2018, 32 planning conditions were secured in respect of electric charging points. Conditions requiring travel plans were attached to 7 permissions

- The Black Country Ultra Low Emission Vehicle Strategy was published in January 2017. (Black Country Ultra Low Emission Vehicle Strategy)
- As part of the Government's Clean Air Strategy, it published the 'UK plan for tackling roadside nitrogen dioxide (NO_2) concentrations' in July 2017. The document set out how UK Government would bring NO_2 concentrations within the statutory average annual limit of 40 µg/m^3 in the shortest possible time. Sandwell was identified in a "third phase" of Local Authorities to have road links in exceedance of NO_2 limits in 2018, 2019 or 2020 but which are modelled to become compliant between now and 2021. Such Local authorities were directed to develop a Targeted Feasibility Study to identify measures that could bring forward compliance dates within the shortest possible time. Feasibility studies were carried out in respect of four road links in Sandwell and mitigation measures were identified for two road links (A457 Oldbury and A41 West Bromwich). More details can be found in Chapter 2.1

Local Engagement and How to get Involved

The priorities for Sandwell MBC are:

- To improve air quality in order to achieve the national air quality NO_2 annual mean objective across the Borough in the shortest possible timeframe and to maintain and improve PM_{10} and $PM_{2.5}$ concentrations in order to protect human health.
- To publish and implement a new Air Quality Action Plan, which will provide a range of measures including site specific measures to reduce emissions in the key priority zones and individual hotspot areas, promote alternative and sustainable travel, achieve compliance with the annual mean NO_2 air quality objective and reduce particulate matter concentrations as much as practicably possible. The plan should also reduce transport emissions, reduce emissions associated with new development, raise air quality awareness and work in partnership with key stakeholders to improve air quality.
- To fully participate in the West Midlands Combined Authority to achieve air quality improvements across the region.
- To continue monitoring for NO_2, PM_{10} and $PM_{2.5}$ to enable the prioritisation of resources and focus attention on the most relevant locations for air quality

improvements. Monitoring will also enable improvements in air quality to be quantified.

- To implement the Black Country Air Quality SPD and assess all planning applications in accordance with the guidance to ensure all development is sustainable in terms of air quality.
- To promote the uptake of alternative sustainable travel methods, including cleaner vehicle technologies through a range of measures to be included within the Air Quality Action Plan.
- To progress the work of the Sandwell and West Birmingham Air Quality Partnership. This was established in 2019 to address potential negative impacts in Sandwell from the implementation of the Clean Air Zone (CAZ) in Birmingham. The group is comprised of elected members, health, local authority and transportation professionals. It is also used as a vehicle to share knowledge and good practice to drive through air quality improvements.

There is a wide range of information available to encourage the public to use different modes of travel in order to improve air quality and improve health. For example: -

- Sandwell Council's TravelWise page provides information on making journeys by low carbon and healthy methods of transport, such as cycling, walking, public transport and car sharing. There is also travel related assistance for businesses and schools, and information for people and organisations making planning applications. TravelWise in Sandwell
- West Midlands Combined Authority (WMCA) has been granted a sustainable transport fund called 'Smart Network, Smart Choices' to increase walking, cycling and public transport within the West Midlands. Further information can be found at: TfWM (Transport for West Midlands) Sustainable Travel

- Walking helps to reduce the risk of disease, to lose weight, and to live longer. It can also save money by being the cheapest way of getting from place to place. Sandwell published its updated Walking Strategy in 2015 to promote walking, target resources and deliver improvements and enhancements to the walking environment, over a five-year period. Recently the Council published a new cycling and walking plan to get more people active and healthier and help tackle pollution and reduce congestion on the roads. Further information can be found at Sandwell Cycling and Walking Infrastructure Plan

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1 Local Air Quality Management

This report provides an overview of air quality in Sandwell during 2017 and 2018. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Sandwell to improve air quality and any progress that has been made. This report covers air quality over calendar years 2017 and 2018. It is intended to publish the 2020 ASR as soon as possible in order to comply with the Government requirements on reporting periods.

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 Sandwell's Borough wide AQMA declaration can be found in Table 2.1 below.

A map of the AQMA boundary are 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/m^3	49.1 (ZQ)	µg/m^3	Air Quality Action Plan Sandwell MBC	2009	Sandwell Air Quality Action Plan 2009

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

In total 22 areas were identified as exceeding the NO_2 annual mean objective following the declaration of the AQMA. These are listed in table 2.1A below.

Table 2.1 A Sandwell Nitrogen Dioxide Exceedence Areas

Table 2.1 A - Sandwell Nitrogen Dioxide Annual Mean Exceedence 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

Table 2.1 A - Sandwell Nitrogen Dioxide Annual Mean Exceedence Areas	
Area	**Description of Area**
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. These have been redefined as priority zones along with two additional hotspots. It is intended to undertake targeted feasibility studies at these locations to reduce NO2 concentrations. These are included in the new 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 2.1B Sandwell Nitrogen Dioxide Priority Zones 2020-2025

Table 2.1 B 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	Between M5, Birmingham Road and Blakeley Hall Road - Oldbury
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	Trinity Way / Kenrick Way, West Bromwich
Hotspot 1		Mallin Street, Smethwick
Hotspot 2		Gorsty Hill, Blackheath

Sandwell published its Air Quality Action Plan (AQAP) in September 2009 in order to discharge its obligations under Part IV of the Environment Act 1995. The action plan detailed how the Council intended to improve air quality within the Air Quality Management Area. The AQAP has been subject to regular review (as part of the LAQM reporting process) however the document has reached the end of its working life, with a significant number of actions completed or unlikely to be completed due to a range of factors including lack of evidence for the air quality benefits to support implementation and funding shortfalls.

During 2017 and early 2018 Sandwell began the process of developing a new Air Quality Action Plan, working in partnership with key stake holders to develop a comprehensive set of measures to include key target outcomes and where appropriate, predicted reductions in pollutant concentrations. The draft Action Plan was approved by Cabinet and a full public and stakeholder consultation was undertaken in early 2018. However, before the final publication of the action plan was adopted several key issues arose and the Council concluded it would need to revise the action plan further to address the points detailed below:

- To develop targeted measures to reduce NO_2 concentrations in the shortest possible timeframe within identified exceedance areas as recommended by the DEFRA assessment of the previous ASR report (insert reference).
- Sandwell shares a border with Birmingham City Council and the Council wished to consider what impact the implementation of the Birmingham Clean Air Zone (CAZ) would have on NO_2 levels in its area

As part of the Government's Clean Air Strategy, it published the 'UK plan for tackling roadside nitrogen dioxide (NO_2) concentrations' in July 2017. The document set out how UK Government would bring NO_2 concentrations within the statutory average annual limit of 40 µg/m^3 in the shortest possible time. Sandwell was identified in a "third phase" of Local Authorities to have road links in exceedance of NO_2 limits in 2018, 2019 or 2020 but which are modelled to become compliant between now and 2021. Such Local authorities were directed to develop a Targeted Feasibility Study to identify measures that could bring forward compliance dates within the shortest possible time.

Seven road links situated within Sandwell were identified in the National Air Quality Model as exceeding the NO_2 annual mean objective beyond 2018. Four road links were noted to be under local authority control and are tabled below, with the remainder managed by Highways England.

Table 2.1C - Road Links and Feasibility Studies

Table 2.1 C – Road Links and Feasibility Studies		
Census ID	**Road Name**	**Description of Area**
17142	A457 Oldbury	Roundabout with the A4034 and roundabout linking the A4031
99155	A41, J1 M5 West Bromwich	Between the roundabout with M5 Junction 1 & the local authority boundary with Birmingham City Council
99397	A41 Black Country Route at Wednesbury	Roundabout with the A4037 and the roundabout with A461 at Wednesbury
16330	A34 Great Barr	Junction at A4041 Newton Road and the M6 at Junction 7

Road link 17142 falls within priority area 3 (Birmingham Road) and Road link 16330 falls within priority area 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 measures to bring forward the predicted date of compliance.

The feasibility study concluded that retrofitting buses and traffic signal optimisation at road links 17142 (Birmingham Road) and 99155 (A41 at Junction 1 M5) would bring forward the predicted date of compliance, the measures identified for the two remaining road links could not bring forward the date of compliance. More details of the exercise will be contained in the Annual Status Report 2020.

Details regarding the third phase of the 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

Sandwell Council is currently in the process of updating its Air Quality Action Plan. A full public and stakeholder consultation was undertaken in early 2020 and the draft plan is in the process of being revised prior to its adoption in the near future.

The 2009 Action Plan can be found at: Air Quality Action Plan 2009

The table of actions from the 2009 plan can be found in Appendix F.

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

Defra's appraisal of the ASR 2017 recommended the following measures were undertaken. Defra's comments are highlighted in green below.

The Council are encouraged to improve data capture rates going forward, to ensure that the results presented are as accurate as possible.

Data capture improved during 2018. All monitoring stations except for Birmingham Road and Bearwood Road had data capture rates above 90 %.

Data capture for non- automatic monitoring locations was generally very good. An annualisation exercise was carried out at two locations (C12D and AF) where data capture was less than 75% over the calendar year 2018. Monitoring at diffusion tube locations WW2 and WW3 did not commence until October 2018 and the results have been presented as short term means.

It is recommended that SMBC provide maps in subsequent reports that show more detail and label the sites.

A link has been provided to Google maps which show the location of labelled monitoring points.

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

SMBC are therefore highly encouraged to formulate measures to target these specific areas, so that the annual mean objective can be met at all locations as soon as possible.

Feasibility studies have already been carried out in Zone 3 (Birmingham Road) and Zone 4 (Great Barr). With regard to Birmingham Road, buses on two tendered routes were upgraded to EURO 6 emission standards. Signalling improvements had already been carried out at Great Barr and no additional measures could be identified that would bring forward compliance with objectives.

It is recommended that the AQAP steering group meet annually after the adoption of the plan, in order that a review of the AQAP and its progress is undertaken. Where, evidence shows that barriers to progress have arisen, or measures are no longer suitable, the AQAP should be updated accordingly, to ensure that the annual mean NO2 objective is met as soon as possible.

The Council has set up an Air Quality Action group consisting of elected members, council officers and representatives from other bodies to progress the air quality agenda and the review the measures in the action plan. This work in continuing with air quality strategies now part of the Climate Change Action group.

Table 2.4 in the report provides a list of the draft air quality action plan measures. The column 'EU classification' is currently missing. SMBC are encouraged to include this information in subsequent reports.

Table 2.2 of the Annual Status 2018/2019 makes reference to EU classifications.

Sandwell has taken forward a number of direct measures during reporting years 2017 and 2018 in pursuit of improving local air quality. Details of all measures in progress or planned are set out in Table 2.3.

The table of measures has been taken from the first draft of the Air Quality Action Plan 2018 to 2023 published in early 2018. They were revised for the most recent consultation carried out in 2020.

The West Midlands Combined Authority (WMCA) also has an important role to play in improving air quality in the region. The Strategic Transport Plan Movement for Growth Movement for Growth sits alongside the WMCA Strategic Economic Plan Strategic Economic Plan WMCA as a complementary set of policies and plans which -provides the overarching approach to the development of a transport system into one which is fit for the challenges of economic & housing growth, social inclusion and environment change

The draft West Midlands Low Emission Strategy has been produced, with work being progressed in line with the key themes of the strategy.

Key completed measures:

- The Black Country Air Quality SPD has been developed in order to clarify the air quality position within the Black Country Core Strategy following the publication of the Low Emission Towns and Cities Best Practice Planning Guidance for the West Midlands. The SPD was adopted in October 2016. The principal aim of the SPD is to ensure all new development is sustainable in terms of air quality and where appropriate, secures mitigation measures that should be incorporated into developments. Mitigation requirements range from Electric Vehicle charging points at minor developments to a full Low Emission Strategy (in scale and kind) at 'Major' developments.
- Traffic signals, road markings and pedestrian routes were upgraded at Bearwood Road, Smethwick (Zone 2). Bearwood Road suffers from high NO_2 concentrations as a direct result of congestion and emissions from buses. The new upgrading works are intended to improve traffic flow, reducing queueing traffic, congestion and improve safety. The works were completed during 2017 and it is hoped they will improve the walking and cycling experience at Bearwood Road, a local shopping destination. The measures should reduce levels of NO_2 along Bearwood Road, currently designated as a street canyon.
- Improvements to lane marking, capacity and traffic flow have been undertaken in 2018 at the Kelvin Way /Trinity Way roundabout in Zone 7. The effectiveness of these measures has not yet been quantified due to major roadworks on the M5 motorway which has resulted in the junction carrying approximately 15% more traffic when compared to normal traffic conditions. The M5 roadworks were completed in late autumn 2019 Further evaluation of the junction improvements will be undertaken in the future.
- A Social Marketing Campaign was carried out, the aim being to reduce the amount of air pollution in selected areas of the borough. The campaign took place from June 2016 to June 2017 and aimed to encourage modal shift behavioural change in those that use the car for short journeys, including for work, leisure or the school run. As a secondary objective, the project intended to discourage engine idling and encourage traffic to reroute away from major air pollution hotspots. The project included the following:

  - Undertake insight work to determine current transport behaviours, understanding of air pollution/engine idling and alternative transport options and identify motivations and barriers to leaving the car at home.
  - Develop a campaign message and concept to raise awareness of poor air quality and encourage modal shift behavioural change.
  - Implement the campaign.
  - Develop a baseline evaluation framework to determine the success of the campaign.

- In 2017 Sandwell secured planning conditions that require the provision of electric vehicle charging points on 35 developments which represents an increase to the previous year. Conditions requiring a travel plan for air quality purposes were attached to a further five planning permissions. These included residential, commercial and industrial developments. In 2018 there were 32 developments which required the provision of electric vehicle charging points and 7 developments where travel plans were attached to planning decision notices.
- A full public consultation of the first draft Air Quality Action Plan was undertaken in early 2018 and again in 2020. The results of the consultation exercise are in the process of being reviewed with a view to it being adopted during the summer 2020.

Key Outcomes of the above measures:

- Improved air quality sustainability at new developments.
- Improved awareness and access to alternative vehicle technologies.
- Improved awareness of poor air quality and measures residents can take to improve air quality.
- An improvement in the health and fitness of the residents of Sandwell due to increased walking and cycling and improved air quality.

Measures to be completed over the next year (2020)

- A review of the taxi fleet licenced by Sandwell was carried out in 2018/19 to understand fleet make-up, age and emission profiling to enable formulation of a low emission taxi strategy and will be updated where necessary prior to full evaluation. This will also include a review of electric charging and other low emission re-fuelling provision.
- It is intended to repeat and strengthen efforts to engage with Sandwell employees to promote the use of ultra-low emission vehicle technologies and to work with departments across the Council to improve low and ultra-low emission vehicle uptake in 2020.
- The Black Country Air Quality SPD is in the process of being updated. The aim is for online tools (to enable reward scheme and travel plan accreditation) to be included, along with other improvements such as a review of parking standards.

Sandwell MBC's priorities are:

- Adoption of the revised Air Quality Action Plan in summer 2020. Following final publication, the implementation of measures will commence, including the promotion and uptake of alternative technologies, modal shift, low emission transport, low emission plant, traffic management, transport planning and infrastructure
- A screening exercise was undertaken by a consultant in 2019 to validate existing hotspots and identify any other road links of interest. It was recommended the model outputs should be refined using Automatic Number Plate Recognition data to assign an accurate local fleet and concurrent emissions profile. This may be used to undertake source apportionment and properly understand the most significant emission sources on each link, as this is essential to confidently target potential interventions.
- It is hoped that a local vehicle fleet profiling exercise including a source apportionment study using ANPR (Automatic Number Plate Recognition) to determine the age and vehicle types using roads in high priority zones can be pursued to assist in identifying mitigation measures at each location.
- Identify new measures to improve air quality at site specific locations and borough wide initiatives, which will benefit the air quality in the region.

- Ensure the Black Country Air Quality SPD is fully implemented, with appropriate air quality mitigation conditions attached to all relevant planning permissions to ensure all new development is deemed sustainable in terms of air quality.
- Work effectively with the West Midlands Combined Authority and the strategic transport authority to deliver measures to improve Air Quality.
- Work in partnership with Birmingham City Council to minimise negative impacts on Sandwell residents resulting from the implementation of the CAZ

Some measures described in the 2009 Action Plan (see Appendix F) have not been completed and are no longer under consideration. These include Measures 10 and 13 (Metro extension routes).

The West Midlands Freight Strategy WMCA December 2016 describes support for a West Midlands Strategic Freight Corridor from Stourbridge through to Lichfield via Walsall in relation to Measure 19 in the borough wide actions table. This could result in a reduction in NO_2 and PM_{10} $PM_{2.5}$ concentrations however, it is not known if it is going to proceed or when a likely completion date could be. (West Midlands Freight Strategy)

New SMBC vehicles are purchased to comply with Euro 5 and 6 standards rather than Euro 4 as described in Measure 23 in the 2009 Action Plan.

Promotion of eco-driving described in Measure 2 of the borough wide actions table.is ongoing through provision of advice on the Sandwell Council website.

The Midland Metro Extension (Wednesbury to Brierley Hill) (Measure 14 of the draft revised air quality action plan) was delayed in in the planning stages while funding was being secured. Large scale measures such as this require high level funding which may be beyond control of the local authority

The implementation of the measures set out in the draft revised Action Plan (Table 2.2) are dependent on securing a sufficient and consistent level of funding both to support any additional staff that may be required, and to deliver the programme.

Table 2.3 – 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	Other	Other	2018	Sandwell	Sandwell	Completion of Model	No target	Screening exercise carried out 2019.	2021	
2	Review transport planning and traffic infrastructure at each location and identify and implement programme of work where applicable	Traffic Management	Other	2018	Sandwell	Sandwell	Reducing Emissions	Medium at hot spot locations (long term)	Work due to begin autumn 2020	2022	
3	New Council Vehicles purchased are Euro 5 and 6 standard. Monthly fuel reports are produced, and regular user group meetings held to improve efficiency	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	2018	Sandwell	Sandwell	Improved Vehicle Fleet Composition	No target	On-going, monthly fuel reports and progress/improvement meetings	On-going	
4	Decrease use of council employee vehicles through the offer of car club/hire vehicles and the use of sustainable modes of travel	Promoting Travel Alternatives	Workplace Travel Planning	2006	Sandwell	Sandwell	Reduced mileage claims by local authority staff	Where other systems have been established the bill for mileage claims has been reduced by 30% and cleaner vehicles are used more	Implementation of this measure being discussed as part of the Council's staff travel plan	On-going	
5	Carry out full review of council vehicle fleet including vehicle types, age and emission profiles.	Vehicle Fleet Efficiency	Other	2018	Sandwell	Sandwell	Report findings	No target	Partially complete, remaining work rescheduled for autumn 2020	2021	
6	Review findings of action 5 to formulate service specific strategies for improving their vehicle fleet and setting emission - based targets	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	2018	Sandwell	Sandwell	Improvement plans developed and implemented.	To be determined	Review on-going	2021	
7	Review and implementation of electric charging and other low emission refuelling options	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2018	Sandwell	Sandwell	Number of electric charging points installed	To be determined	Public consultation about the need for EV charging points in Sandwell undertaken in early 2020. Findings to be reviewed	2025	Public Survey recently conducted in respect of electric charging infra structure
8	Review taxi fleet licences by Sandwell (including fleet composition, age and emission profiles	Other	Other	2018	Sandwell	Sandwell	Report findings	To be determined	Review ongoing	2021	

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
9	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	Number of vehicles that comply with new standard	No target	Work programmed for later this year	2025	
10	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	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	
11	Improvements of branding to increase attractiveness of public transport	Promoting Travel Alternatives	Workplace Travel Planning	2012	Bus operators/Transport for West Midlands	WMCA	Increased public transport patronage	No target	On-going programme of brand improvement and public awareness including safe network, improved connections, signage and ease of access	On-going	
12	Improving access to information regarding transport options.	Promoting Travel Alternatives	Personalised Travel Planning	2009	Sandwell and Transport for West Midlands	Sandwell Council and WMCA	Increased public transport patronage	No target	On-going promotion of branding and services available	On-going	
13	Major highway improvement at Birchley Island (Junction 2 M5).	Transport Planning and Infrastructure	Other	2012	Sandwell and 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	2022/2023	Preparatory site investigation works have commenced
14	Midland Metro Extension (Wednesbury to Brierley Hill	Transport Planning and Infrastructure	Other	2005	Sandwell and West Midlands Combined Authority (WMCA)	WMCA with contributions from Black Country LEP and HS2 Connectivity	Increased public transport patronage	Low in respect of reductions at a specific location.	Funding secured	Preparatory work on utilities has begun. Completion of work estimated to be 2023	Improvements in public transport should reduce emissions
15	Increased bus lane enforcement	Traffic Management	Other	2009	National Express/Transport for West Midlands	Sandwell Council	Number of enforcement actions	Minor	Limited progress in Sandwell	On-going	Improved bus journeys
16	Improvement of urban traffic control systems designed to reduce congestion	Traffic Management	UTC, Congestion management, traffic reduction	2009	West Midlands Combined Authorities???	Sandwell Council and WMCA	Reduced congestion at busy junctions	Low	Potential opportunity for further expansion	On-going.	
17	Ensure air quality considerations are included in the local development framework. Ensure policies 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/Low Emissions Towns and Cities Programme, West Midlands Authorities and Black Country Core Strategy	Sandwell Council	Improve vehicle fleet emissions and promote public transport	Medium at hot spot locations (long term)	Publication of procurement and planning guidance and implementation intended across the West Midlands Authorities.in 2016	On-going	
18	Black Country Low Emission Strategy and Implementation Plan.	Policy Guidance and Development Control	Low Emissions Strategy	2017	Sandwell and Black Country Authorities	Sandwell and Black Country Authorities	Increase use of ultra-low emission vehicles.	No target	Funding obtained from Black Country Local Enterprise Partnership to develop plan in 2019	On-going	Promotion of low emission vehicles.

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
19	Section 106 - Investigate the practicability of section 106 agreements being used to secure monitoring funding and balancing measures in applications where air quality is an issue	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2009	Sandwell Development Management and Public Health	Sandwell Development Management and Public Health	Planning guidance and Black Country Supplementary Planning guidance states all development will be required to contribute to offsetting emission creep, plus larger contributions if significant new sources are introduced	No target	On-going	On-going	
20	Provide guidance in relation to air quality for development to follow when submitting planning policies.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2016	Sandwell/Low Emissions Towns and Cities Programme, West Midlands Authorities and Black Country Core Strategy	Government Air Quality Grant	Improved vehicle emissions and use of public transport.	Publication of procurement and planning guidance with implementation intended across the West Midlands Authorities	On going	On-going	Black Country SPD on Air Quality adopted September 2016
21	Continue to consider air quality issues for new planning applications in line with agreed planning protocol as in 20 above	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2009	Sandwell/Low Emissions Towns and Cities Programme, West Midlands Authorities and Black Country Core Strategy	Sandwell Council	Number of conditions attached to approval and discharged	No target	On-going	On-going	
22	Promotion of walking	Promoting Travel Alternatives	Promotion of walking	2009	Sandwell Council	Sandwell Council	Increase in walking for key journeys. Sandwell travel surveys	No target	Sandwell walking strategy published in 2015. Sandwell Travellwise webpage updated to promote alternative travel. On-going promotion of cycling.	On-going	Sandwell Travelwise webpage updated to promote alternative travel.
23	Promotion of cycling	Promoting Travel Alternatives	Promotion of cycling	2009	Sandwell and Central Government	Sandwell Council	Number/miles of cycle lanes delivered	No target	Sandwell's Local Cycling and Walking Infrastructure Plan (LCWIP) approved in 2019, funding required	On-going	No funding from Central Government for LCWIPS
24	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 Council	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	On-going	
25	Air Quality information on website	Public Information	Via the Internet	2009	Sandwell Council	Sandwell Council	Number of web page viewings	No target	On-going	On-going	
26	Promote car sharing among residents and businesses	Promoting Travel Alternatives	Personalised Travel Planning	2006	Sandwell	Sandwell Council	Increase in number of participants using the scheme.	Low	On-going	On-going	

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 reflected by the inclusion of a key indicator of mortality in the Public Health Outcomes Framework.

Based on national estimates[5] (2010) the fraction of mortality attributable to anthropogenic (man-made) $PM_{2.5}$ in Sandwell is 6.9% of all deaths (equal to 198 deaths per annum), which is more than the premature deaths associated with obesity and road accidents combined. Nationally the average across England is 5.1%, thus the current levels of particulate air pollution have a considerable impact on the health of Sandwell residents.

The primary source of emissions in Sandwell is from road traffic and diesel vehicles. Whilst the majority of measures detailed within this report focus on the reduction of NO_2 concentrations and achieving compliance with the objectives, it is accepted that there is no safe level for particulate matter, including $PM_{2.5}$, therefore all pollutant concentrations must be reduced to meet the health based national air quality objectives and improve health.

Policy Guidance LAQM.PG (16) 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 $PM_{2.5}$:

- Sandwell currently undertakes $PM_{2.5}$ monitoring at Haden Hill in Cradley Heath. The site is located at an appropriate background location, which allows the comparison with the annual mean $PM_{2.5}$ objective of 25µg/m^3. In 2017, the annual mean was 7µg/m^3 although this figure should be treated with caution as

[5] Public Health England, 2014, '*Estimating Local Mortality Burdens Associated with Particulate Air Pollution*'

data capture achieved was only 52.9% due to technical issues. In 2018 data capture was 96.7%.

- Sandwell will review its requirements for measuring $PM_{2.5}$ and where appropriate may extend its $PM_{2.5}$ monitoring network in order to improve its understanding of $PM_{2.5}$ across the borough. Key locations for consideration will include roads with significant traffic flows and where relevant receptors are present.
- Sandwell is currently in the process of updating its Air Quality Action Plan and reference is made to measures that will 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.
- The LETCP Planning Guidance and the Black Country Air Quality SPD now ensure all new development is sustainable in terms of air quality and secure appropriate mitigation measures ranging from Electric Vehicle charging points at minor developments to a full Low Emission Strategy (in scale and kind) at Major developments. Both documents refer to $PM_{2.5}$ and with the adoption of low emission mitigation measures, will reduce the impact of $PM_{2.5}$ emissions in future years.
- Encouraging modal shift such as walking, cycling, public transport and low emission vehicles, will reduce emissions of $PM_{2.5}$ by easing congestion and improving vehicle emissions.
- Reducing traffic congestion through the careful management of road infrastructure, improved traffic and pedestrian signals, speed restrictions an parking enforcement to reduce obstructions on congested roads By incorporating all these measures traffic congestion will be reduced and air quality improved by reducing emissions of $PM_{2.5}$.Improving public awareness of poor air quality and alternative transport options through travel planning, social marketing, Council webpages and improved public transport branding will reduce $PM_{2.5}$ emissions

- Current environmental legislation regulates the control of emissions of Particulate Matter (including $PM_{2.5}$) from industrial processes. Sandwell and the Environment Agency continue to ensure all sites requiring an Environmental Permit operate within the required limits to reduce emissions of particulate matter. However, it is acknowledged the increased use of biomass technologies may give rise to increased $PM_{2.5}$ emissions if inappropriate technologies are used or combustion plants are poorly managed.

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 sites during 2017 and 2018. Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at DEFRA Monitoring Results

Maps showing the location of the monitoring sites are provided in Appendix D.

Locations of the monitoring stations and diffusion tube locations can also be viewed on Google Maps via this link.

https://www.google.com/maps/d/edit?hl=en&hl=en&mid=1NKc9ticQDoxcN5U_6phJcjm9cNAiaVtr&ll=52.54282040395067%2C-2.1003706435546974&z=11

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

3.1.2 Non-Automatic Monitoring Sites

Sandwell undertook non- automatic (passive) monitoring of NO_2 at 99 sites in 2017 and 103 sites in 2018. Table A.2 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Diffusion tube locations can also be viewed on Google Maps and can be accessed via the link above.

Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. “annualisation” and/or distance correction), are included in Appendix C.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias[6], "annualisation" (where the data capture falls below 75%), and distance correction[7]. 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).

For diffusion tubes, the full 2017 and 2018 datasets of monthly mean values are provided in Appendix B. Note that the concentration data presented in

Table B.**2** and Table B.2 A includes distance corrected values 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 is below 75% for two of the six automatic stations for 2017 due to technical issues. In 2018 data collection has improved with Annualisation only was only required at Birmingham Road The data have been annualised, to ensure they are representative of a full calendar year although where data captures are very low the figures should be treated with caution; further details are presented in Appendix C.
- A monitoring station was established at Cronehills Linkway, West Bromwich in 2014 and is known as 'West Bromwich Roadside'. The site was installed due to the redevelopment of the town centre and construction of a large retail

[6] https://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html
[7] Fall-off with distance correction criteria is provided in paragraph 7.77, LAQM.TG(16)

development. The annual mean NO_2 concentration for for the period 2014 and 2018 is significantly below the objective and demonstrates compliance with the annual mean objective.

- The Bearwood Road site no longer exceeds the annual mean objective. In 2017 an annual mean of 35 µg/m^3 was recorded and in 2018 it was was 30.3 µg/m$^{3.}$ However, data capture in 2018 was only 29.9% therefore this result should be treated with caution.
- The NO_2 annual mean recorded at Birmingham Road (36.1 µg/m) was below the objective. In 2018 an annual mean of 34.4 µg/m^3 was recorded. Techncial problems meant data capture was low and therefore the data had to be annualised.
- Data capture for NO_2 was low for the background location of West Bromwich Highfields (33.2%), with an annualised annual mean of an of 21.6 µg/m^3 being recorded . In 2018 data collection was 90%, the annual mean was 22 µg/m$^{3.}$ NO_2 annual mean concentrations recorded between 2015 and 2018 have changed little, with levels between 21 µg/m^3 and 22 µg/m^3 recorded.
- At Great Barr, the NO_2 annual mean recorded during 2018 was 31 µg/m^3 and has been increasing each year since 2015 . Levels are curretly 77.5% of the annual mean objective of 40 µg/m^3 This will be investigated further should trend continue.
- Levels at the background location of Haden Hill have changed little over the last three years, recording annual means between 14 µg/m^3 and 15 µg/m^3.
- Table A.4, Appendix A demonstrates there was only one exceedance of the hourly NO_2 objective at the 6 automatic monitoring stations in 2017 although data capture was very low. The 99.8th percentiles for each monitoring station are significantly below the hourly objective of 200µg/m^3. In 2018 there were no levels recorded that were above the hourly NO2 objective, the 99.8th percentile for Birmingham Road station was 116 µg/m^3.

Diffusion Tubes

- Long term trends (over 5 years or more) in diffusion tube monitoring demonstrate gradual improvements in annual mean NO_2 concentrations at the majority of sites and the widespread compliance with the annual mean objective. However, at a small number of locations, concentrations consistently exceed the objective, with concentrations remaining static or increasing in 2017 and 2018.
- A total of 16 diffusion tube sites (16.2%) exceeded the NO_2 annual mean objective in 2017 and 17.5% 2018. There has been year on year fluctuations in the total number of locations which exceed the objective, although overall there appears to be a downward trend in the total number of exceedences.

Table 3 – Total number and percentage of Diffusion Tube Monitoring Sties which exceed the NO_2 Annual Mean Objective

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**
Number of Site that Exceed	88	25	43	32	29	18	19	16	18
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%

- Four key areas, Birmingham Road Oldbury (BE, BF, BDQ, BD , BO and BR), Bearwood Road/Hagley Road Smethwick (C9D, C10A and C10D), Blackheath (C12A, C12D) and Newton Road Great Barr (ZQ and ZR), continue to show significant exceedences of the annual mean NO_2 objective of 40 µg/m^3
- At Mallin Street (MA) annual mean of 43.6µg/m^3 was recorded in 2017 and 42.4 µg/m^3 in 2018,

- Monitroing point TC at Burnt Tree Junction/Birmingham New Road, Oldbury, exceeded the annual mean objective, recording levels of 45.5 µg/m^3 of in 2017 and 42.9 µg/m^{3}in 2018. There are not currently any receptors near to tube TC however, land nearby is a permissioned site on the planning Brownfield Register and as such is considered 'ready for development'.It is noted that Dudley MBC carried a feasabiliy study of census ID 17611 (section of road between Castlegate and Burnt Treet in 2018. This area was subject to signal improvement works undertaken in 2018/2019.
- At Bromford Lane/Clifford Road (N1B), annual mean NO_2 levels have increased from 37.1 µg/m^3 to 40.2 µg/m^3 0. It is difficult to ascertain the exact cause of this increase, however this road was a signposted the diversion route for vehicles to use during the the M5 Oldbury Viaduct works. NO_2 annual mean levels at Gorsty Hill (C15A) were recorded as 39.5 µg/m^3 in 2017 annd 39.8 µg/m^3 in 2018. This area will remain a priority until such time as concentrations remain consistently below the annual mean objective.
- Trend analysis demonstrates NO_2 concentrations have remained relatively static between 2009 and 2018 at West Bromwich, and Haden Hill. Bearwood Road and Birmingham Road have shown an overall downward trend throughout the same period. At Great Barr, NO_2 concentrations recorded at the monitoring station have started to increase since 2015 and may require further investigation is this upward trend continues. However concentrations fo NO_2 recorded at this location are still well below the annual mean objective.

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.

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.

- PM_{10} annual mean concentrations are significantly below the national air quality objective of 40µg/m^3 in 2017 and 2018.

- Data collection at Wilderness Lane, Great Barr was below 75%; in 2017 therefore the results have been annualised in accordance with LAQM TG(16). In 2018 data collection was 91.7%Further details are provided in Appendix C.
- Due to unforeseen technical issues, no data was collected at West Bromwich Highfields in 2017. Data collection was 91.6% in 2018.
- Birmingham Road and Haden Hill demonstrated an overall downward trend in PM_{10} concentrations between 2007-2017. The PM_{10} annual mean increased to 22 µg/m^3 at Birmingham Road in 2018.
- In 2018 there was only one occasion where the hourly mean exceeded 50 µg/m^3 The 90.4th percentil was 34 µg/m^3

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.

Trend analysis confirms there has been a gradual reduction in the annual mean $PM_{2.5}$ concentration between 2007 and 2016 with a slight increase to 7 µg/m^3 in 2018; However, year on year concentrations are variable, with 2010, 2011 and 2013 demonstrating an increase compared to the previous years.

All authority areas are required to achieve a 15% reduction in annual mean $PM_{2.5}$ concentration between 2010 and 2020. There has been a 59% reduction at the Haden Hill background location between 2010 and 2018 (inclusive); however, this figure is likely to represent a best-case scenario. The annual mean concentration in 2010 was significantly higher than in previous and subsequent years, which resulted in a larger reduction during the following 5-year period and in reality, the percentage reduction is likely to be smaller

3.2.4 Sulphur Dioxide (SO_2)

Table A.8 in Appendix A compares the ratified continuous monitored SO_2 concentrations for 2017 and 2018 with the air quality objectives for SO_2.

Sulphur dioxide (SO_2) monitoring was undertaken undertaken at Bearwood Road OPSIS during 2017 and 2018. . The OPSIS is located at a roadside location and is an indicative monitoring method providing hourly data, therefore the 15-minute mean is

unavailable. Bearwood Road monitoring station is located in areas of relevant public exposure, where people are likely to spend an average of 15 minutes or more.

Table A.8 in Appendix A compares the ratified continuous monitored SO_2 concentrations for year 2018 with the air quality objectives for SO_2. Data capture was very low due to communication technical problems and has not been reported.

Figure A.5 depicts the trends in SO_2 concentrations during the period 2007-2017. Overall there has been a slight downward trend in annual mean and 99.7th / 99th percentiles throughout the period.

The OPSIS was removed in early 2019 as the occupier of the business premises to which the OPSIS reciever was attached was closed and a new arrangement could not be secured with the landlord. Alternative continuous monitoring methods are being considered at Bearwood Road.

3.2.5 Ozone

Local Authorities do not have a responsibility to meet the objectives for ozone as it is identified as a 'trans boundary' pollutant which can drift across countries. It is therefore not included within the National Air Quality Objectives. The World Health Organisation has set an Air Quality Objective for ozone at 100µg/m^3, where the daily maximum of the 8-hour running mean should not be exceeded more than 10 times per annum.

Ozone has been monitored at two locations within Sandwell; West Bromwich and Bearwood Road OPSIS. Bearwood Rd OPSIS is an indicative, non-standardised monitoring method. It was found that ozone measurements from the Bearwood OPSIS between 2016 and 2018 did not resemble AURN measurements so this has not been reported. . In 2018 data capture at Bearwood Road was also very low (29.9%) due to technical problems.

Technical issues with the Ozone Analyser at West Bromwich resulted in no data capture in 2017. In 2018 data capture was 95.3 %, the annual mean was 47µg/m3 with 26 Exceedences of the O_3 objective 8-hour mean of 100µg/m3

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	21m	2.5m
West Bromwich	Highfields	Urban Background	400187	291601	SO2	YES	Chemiluminescence	35	21m	2.5m
West Bromwich	Highfields	Urban Background	400187	291601	PM10	YES	TEOM FDMS[3]	35	21m	2.5m
West Bromwich	Highfields	Urban Background	400187	291601	O3	YES	Chemiluminescence	35	21m	2.5m
Birmingham Rd (Oldbury)	Birmingham Road	Roadside	399857	289392	NO2	YES	Chemiluminescence	8	5m	2.5m
Birmingham Rd (Oldbury)	Birmingham Road	Roadside	399857	289392	PM10	YES	TEOM FDMS[4]	8	5m	2.5m
Wilderness Lane (Great Barr)	Wilderness Lane	Roadside	403956	294855	NO2	YES	Chemiluminescence	147	11m	2.8m
Wilderness Lane (Great Barr)	Wilderness Lane	Roadside	403956	294855	PM10	YES	TEOM FDMS[5]	147	11m	2.8m
Haden Hill	Haden Hill	Urban Background	395755	285493	NO2	YES	Chemiluminescence	105	119m	2.5m
Haden Hill	Haden Hill	Urban Background	395755	285493	PM10	YES	TEOM	105	119m	2.5m

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	119m	2.5m
Bearwood Road OPSIS	Bearwood Road	Kerbside	402181 286360 Northern point of OPSIS - source	402223 286097 Southern point of OPSIS - receiver	NO2, SO2, O3	YES	Differential Optical Absorption Spectroscopy	5	8m or less, varies across transept	5.5m
West Bromwich Roadside	West Bromwich Roadside	Roadside	400521	291541	NO2	YES	Chemiluminescence	11	7m	1.6

OPSIS

One method used for gas analysis is called DOAS,(Differential Optical Absorption Spectroscopy). The light source is a xenon lamp and the detector is in its basic configuration a spectrometer, disclosing the fine details of a selected wavelength range, or “window”. Different windows are used to detect different gaseous species, or groups of such species. Mathematical processing of the detected spectrum and comparison with pre-recorded spectra of known gases and known concentrations within the selected window allow the actual gas concentration to be calculated

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
(3) FDMS filter was removed from the PM_{10} monitor and at Highfields on 5 March 2018.
(4) FDMS filter was removed from the PM_{10} monitor at Birmingham Road Oldbury on 23 February 2018,
(5) FDMS filter was removed from the PM_{10} monitor at Great Barr on 27 February 2018
The results have been corrected using 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)
KD	Lamp-post outside Attingham Drive, Great Barr	Urban Background	403794	294698	NO_2	YES	0	0.3	NO	2
KE	Property Ragley Drive Great Barr	Roadside	403932	294951	NO_2	YES	0	1.2	NO	2.9
SA	Springfield Site - Hillside Road, Great Barr	Roadside	403951	294852	NO_2	YES	0	5.1	YES	3.2
XE	Property Lochranza Croft Great Barr	Roadside	404439	294846	NO_2	YES	16.3	4.3	NO	1.8
ZA	Lamp-post Abbotsford Avenue - Great Barr	Roadside	404617	294931	NO_2	YES	0	0.3	NO	1.7
ZC	Property Whitecrest Great Barr	Roadside	404505	294821	NO_2	YES	3	1.9	NO	1.9
ZK	Property Birmingham Road, Scott Arms - Great Barr	Roadside	404622	294291	NO_2	YES	0	17.2	NO	1.8
ZO	Your Move Estate Agents 1-3 Newton Road - Great Barr	Roadside	404555	294219	NO_2	YES	0	2.9	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)
ZP	Doctors Surgery, 33 Newton Road - Great Barr	Roadside	404292	294180	NO_2	YES	0	3.2	NO	2.8
ZQ	Victoria Wine, Newton Road - Great Barr	Roadside	404547	294188	NO_2	YES	0	8.5	NO	2.7
ZR	Property Newton Road, Scott Arms - Great Barr	Roadside	404475	294181	NO_2	YES	0	5.9	NO	2.8
WA	Lamp-post Snapdragon Drive - Yew Tree	Roadside	401917	295329	NO_2	YES	0	0.2	NO	2.7
WB	Lamp-post Wolfsbane Drive - Yew Tree	Urban Background	402152	295064	NO_2	YES	7	1.5	NO	2.6
WF	Lamp-post Woodruff Way - Yew Tree	Urban Background	402119	295273	NO_2	YES	8	0.2	NO	2.7
B17	Lamp-post 2 Birmingham Road - Oldbury	Roadside	399699	289401	NO_2	YES	0	1.5	NO	2.8
BA	Lamp-post 1 Birmingham Road - Oldbury	Roadside	399686	289431	NO_2	YES	7.8	7.7	NO	2.8
B52	Lamp-post 3 Birmingham Road - Oldbury	Roadside	399692	289428	NO_2	YES	5	3	NO	2.8
BD	Property 1 Birmingham Road - Oldbury	Roadside	399914	289374	NO_2	YES	0	5.8	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)
BDQ	Property 2 Birmingham Road - Oldbury	Roadside	399999	289360	NO_2	YES	0	8.6	NO	2.8
BE	Traffic Sign Birmingham Road - Oldbury	Roadside	399920	289352	NO_2	YES	2.5	0.8	NO	2.6
BF	Property 3 Birmingham Road - Oldbury	Roadside	399809	289406	NO_2	YES	0	5.8	NO	2.7
BG	Property 4 Birmingham Road, Oldbury	Roadside	399718	289427	NO_2	YES	0	5.6	NO	2.7
BO	Property 5 Birmingham Road - Oldbury	Roadside	400079	289389	NO_2	YES	0	6.2	NO	2
BP	Property 6 Birmingham Road - Oldbury	Roadside	399820	289400	NO_2	YES	0	6.8	NO	2.3
BR	Property 7 Birmingham Road - Oldbury	Roadside	400171	289436	NO_2	YES	0	5.9	NO	2
BS	Property Blakeley Hall Road - Oldbury	Urban Background	399863	289396	NO_2	YES	16.3	8.6	NO	2.7
GA	AURN Site - Birmingham Road - Oldbury	Roadside	399858	289391	NO_2	YES	8.2	5.4	YES	3
GB	AURN Site - Birmingham Road - Oldbury	Roadside	399858	289391	NO_2	YES	8.2	5.4	YES	3
GC	AURN Site - Birmingham Road - Oldbury	Roadside	399858	289391	NO_2	YES	8.2	5.4	YES	3

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)
C5A	Bromford Lane - West Bromwich	Roadside	399297	290133	NO_2	YES	0	2.1	NO	2.8
C5D	Broadwell Road - Oldbury	Roadside	399199	290021	NO_2	YES	8.3	0.7	NO	2.8
C5E	Kellner Gardens - Oldbury	Roadside	399139	289947	NO_2	YES	2.9	1.9	NO	2.7
C6A	Halesowen Street - Oldbury	Roadside	398941	289326	NO_2	YES	0	17.2	NO	2.8
C6E	Stone Street - Oldbury	Kerbside	399229	289315	NO_2	YES	13.8	0.48	NO	2.7
C7A	Dudley Road East - Oldbury	Roadside	398137	290229	NO_2	YES	1.5	0.6	NO	1.9
C7D	Dudley Road - Oldbury	Kerbside	398279	290115	NO_2	YES	11.3	1.6	NO	2.9
C7E	Dudley Road East - Oldbury	Roadside	398042	290285	NO_2	YES	0	9.5	NO	2.4
C7F	Asquith Drive, Tividale - Oldbury	Kerbside	397493	290628	NO_2	YES	4.7	0.3	NO	2.8
C7H	Dudley Road East - Oldbury	Roadside	398311	290135	NO_2	YES	0	4.4	NO	2.7
C13D	Dudley Port - Tipton	Roadside	396399	291457	NO_2	YES	4.1	2.4	NO	2.9
VT	Tipton Road - Tividale -Tipton	Roadside	397155	290867	NO_2	YES	10.3	2.7	NO	2.8
OA	Lightwoods Fish Bar, Bearwood Road	Roadside	402232	286142	NO_2	YES	0	2.9	NO	2.8
OB	Travel Book Shop, Bearwood Road	Roadside	402210	286162	NO_2	YES	0	5.5	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)
OC	Discount Flight Shop, Bearwood Road	Roadside	402220	286180	NO_2	YES	0	3.2	NO	2.8
OD	Nightingales, Bearwood Road	Roadside	402193	286235	NO_2	YES	0	5.2	NO	2.8
OE	Bradford and Bingley, Bearwood Road	Roadside	402207	286252	NO_2	YES	0	4	NO	2.8
OG	Lamp-post on Bearwood Road	Roadside	402178	286347	NO_2	YES	4	0.5	NO	2.8
OH	Lamp-post on Bearwood Road	Roadside	402212	286173	NO_2	YES	4	0.5	NO	2.8
OH	Lamp-post on Bearwood Road	Roadside	402212	286173	NO2	YES	4	0.5	NO	2.8
OI	Lamp-post on Bearwood Road	Roadside	402200	286264	NO2	YES	4	0.5	NO	2.7
OJ	Lamp-post on Bearwood Road	Roadside	402194	286246	NO2	YES	4	0.5	NO	2.8
OP4	Bearwood Road - Smethwick	Roadside	402222	286098	NO2	YES	0	5.5	NO	4
C9A	Bearwood Road - Bearwood	Roadside	402135	286654	NO2	YES	0	2.6	NO	2.9
C9D	Sandon Road - Bearwood	Kerbside	402160	286554	NO2	YES	2.5	0.5	NO	2.8
C10A	Hagley Road West - Bearwood	Roadside	402258	286053	NO2	YES	0	4.6	NO	2.7
C10D	Hagley Road West - Bearwood	Kerbside	402258	286049	NO2	YES	5.3	0.8	NO	2.8
N2A	Soho Close - Smethwick	Roadside	402279	286049	NO2	YES	0	0.8	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)
MA	Mallin Street - Smethwick	Roadside	400712	289296	NO2	YES	2	1.8	NO	3.9
MC	St Paul's Road - Smethwick	Roadside	400748	289150	NO2	YES	1.6	0.7	NO	2.2
C11A	Halesowen Street - Rowley Regis	Roadside	397457	286434	NO2	YES	0	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
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	Roadside	398405	288722	NO2	YES	0	7	NO	2.8
C12A	Holly Road - Rowley Regis	Roadside	396899	286438	NO2	YES	0	2.5	NO	2.6
C12D	Powke Lane - Rowley Regis	Kerbside	396872	286454	NO2	YES	5.3	0.8	NO	2.7
C12E	Powke Lane - Rowley Regis	Roadside	396780	286465	NO2	YES	0	3.5	NO	3
UA	Birchfield Lane - Oldbury	Roadside	398146	287639	NO2	YES	0	2	NO	2.7
UB	Birchfield Lane - Oldbury	Roadside	398208	287749	NO2	YES	7.4	1.2	NO	2.9
UC	Birchfield Lane - Oldbury	Roadside	398170	287746	NO2	YES	7.7	0.2	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)
C15A	Station Road - Cradley Heath	Roadside	396867	285536	NO2	YES	3.3	2.3	NO	2.7
RA	Lamp-post nearest Motorway, Roebuck Lane, West Bromwich	Roadside	401558	290077	NO2	YES	0	1.1	NO	2.9
HA	High Street - West Bromwich	Roadside	400383	291307	NO2	YES	0	0.3	NO	2.8
LA	AURN Site - Highfields West Bromwich	Urban Background	400187	291601	NO2	YES	0	26.1	NO	2.8
LB	AURN Site - Highfields West Bromwich	Urban Background	400187	291601	NO2	YES	0	26.1	NO	2.8
LC	AURN Site - Highfields West Bromwich	Urban Background	400187	291601	NO2	YES	0	26.1	NO	2.8
SU	Property Summerfield Avenue, West Bromwich	Roadside	400476	291481	NO2	YES	0	7.8	NO	2.8
C1A	Grafton Road - West Bromwich	Roadside	400668	291726	NO2	YES	0	0.3	NO	2.5
C1D	Scott Close - West Bromwich	Roadside	400664	292020	NO2	YES	0	2	NO	2.8
C2A	All Saints Way - West Bromwich	Roadside	401050	292898	NO2	YES	0	9.8	NO	2.8
C2E	Heath Lane - West Bromwich	Roadside	401059	292966	NO2	YES	0	4.9	NO	2.8
C4A	Walpole Walk - West Bromwich	Roadside	400619	290153	NO2	YES	0	9	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)
C4D	Kenrick Way - West Bromwich	Roadside	400657	290090	NO2	YES	0	0.3	NO	2.7
C4E	Kenrick Way - West Bromwich	Roadside	400738	290113	NO2	YES	0	1.8	NO	2.7
PS1A	New Street, West Bromwich	Roadside	400504	291239	NO2	YES	0	6.2	NO	2.9
N1A	Ringway - West Bromwich	Roadside	399647	290355	NO2	YES	0	2.1	NO	2.7
N1B	Kelvin Way - West Bromwich	Kerbside	399615	290358	NO2	YES	0	0.9	NO	2.7
EA	Clifford Road - West Bromwich	Roadside	400869	291102	NO2	YES	4.8	0.8	NO	2.8
EB	Overend Street - West Bromwich	Roadside	400920	290998	NO2	YES	6.9	2.3	NO	2.8
ED	Legge Street - West Bromwich	Roadside	400368	291123	NO2	YES	4.5	1.5	NO	2.8
EE	Cronehills Linkway - West Bromwich	Roadside	400555	291257	NO2	YES	0	3.5	NO	2.9
EF	St Michael Street - West Bromwich	Roadside	399800	290557	NO2	YES	0	5.2	NO	2.4
AD	Bromford Lane - West Bromwich	Roadside	399639	296095	NO2	YES	11.2	1.8	NO	2.8
AE	Myvod 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
WW2	Wood Green Road - Wednesbury	Roadside	4005542	296052	NO2	YES	0	6.5	NO	2.8
	Westmore Way Wednesbury									

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)
WW3	Westmore Way Wednesbury	Roadside	400596	296039	NO2	YES	0	9.1	NO	2.8
C14A	Ocker Hill Road - Tipton	Roadside	397355	293929	NO2	YES	0	0.6	NO	2.9
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
VD	Market Place - Tipton	Roadside	397625	292564	NO2	YES	5.3	2	NO	2.8
TA	Property Tividale Road, Tipton	Roadside	395958	290645	NO_2	YES	0	5.4	NO	2.1
TC	Burnt Tree Island, Tipton	Roadside	395854	290643	NO_2	YES	0	3.9	NO	2.9
HH1	Haden Hill Monitoring Station	Urban Background	395754	285492	NO2	YES	0	87	YES	2.9

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 for 2018

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 2018 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3) (4)				
							2014	2015	2016	2017	2018
Highfields West Bromwich	400187	291601	Urban Background	Automatic	90.1	90.1	28.8	21.3	**N/A**	21.57	22
Birmingham Road Oldbury	399857	289392	Roadside	Automatic	35	35	**42.2**	**41.5**	39.8	36.1	34.4
Wilderness Lane Great Barr	403956	294855	Roadside	Automatic	91.7	91.7	30.5	21.2	26	29	31
Haden Hill Park Cradley Heath	395755	285493	Urban Background	Automatic	99.8	99.8	17.3	16.5	14	14	15
West Bromwich Roadside,	400521	291541	Roadside	Automatic	96.8	96.8	28.5	29.8	34	24.5	28
Bearwood Road Smethwick	402181 286360 Northern point of OPSIS - source	402223 286097 Southern point of OPSIS - receiver	Kerbside	Automatic	29.9	29.9	**46.3**	**42.8**	**41**	35	30.26[5]
KA	403387	294587	Urban Background	Diffusion Tube	0	0	27.9				
KB	403492	294678	Urban Background	Diffusion Tube	0	0	29.9				
KD	403794	294698	Urban Background	Diffusion Tube	100	100	31.6	28.7	30.3	25	26.7
KE	403932	294951	Roadside	Diffusion Tube	100	100	29.8	27.8	26.2	24	24.5
QE	403934	294934	Roadside	Diffusion Tube	0	0	31.2	36.1			
SA	403951	294852	Roadside	Diffusion Tube	100	100	28.6	30.8	31.3	28.5	29.3

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 2018 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3) (4)				
							2014	2015	2016	2017	2018
SB	403953	294855	Roadside	Diffusion Tube	0	0	38				
XE	404439	294846	Roadside	Diffusion Tube	84	84	32.9	27.3	30.9	23.9	30.6
YC	404104	294950	Roadside	Diffusion Tube	0	0	27.5				
ZA	404617	294931	Roadside	Diffusion Tube	84	84	35.7	29.7	29.3	26.8	29.2
ZC	404505	294821	Roadside	Diffusion Tube	84	84	25.7	26.8	30.7	28	31.8
ZK	404622	294291	Roadside	Diffusion Tube	84	84	29.4	28.5	30.5	30.8	34.7
ZN	404474	294659	Roadside	Diffusion Tube	0	0	32.1				
ZO	404555	294219	Roadside	Diffusion Tube	84	84	32.6	31.9	33.2	32.1	33.3
ZP	404292	294180	Roadside	Diffusion Tube	100	100	34.6	33.8	34.2	34.9	36.2
ZQ	404547	294188	Roadside	Diffusion Tube	100	100	**49.5**	**44.3**	**50.3**	**49.2**	**49.1**
ZR	404475	294181	Roadside	Diffusion Tube	100	100	**45.8**	**44.3**	**43.5**	**47**	**44.5**
WA	401917	295329	Roadside	Diffusion Tube	100	100	31.2	35.5	32.6	31.7	30.7
WB	402152	295064	Urban Background	Diffusion Tube	92	92	33.9	30.1	26.8	27	29
WF	402119	295273	Urban Background	Diffusion Tube	84	84	30.8	32.5	30	30.8	30.7
BA	399686	289431	Roadside	Diffusion Tube	100	100	38.6	37.1	34.3	34.7	36.4
BB	399692	289428	Roadside	Diffusion Tube	0	0	33.3				
BC	399751	289398	Roadside	Diffusion Tube	0	0	37.1				
BD	399949	289367	Roadside	Diffusion Tube	100	100	38.1	38.8	**41.6**	**41.9**	**41.5**
BDQ	399914	289374	Roadside	Diffusion Tube	75	75	39.1	36.1	**45.1**	**44.4**	**44.5**
BE	399999	289360	Roadside	Diffusion Tube	100	100	**51.2**	**46**	**46.7**	**45.6**	**47.9**
BF	399920	289352	Roadside	Diffusion Tube	100	100	**42.2**	**41.2**	**40**	36.9	35.2
BG	399809	289406	Roadside	Diffusion Tube	100	100	**42**	**42.4**	38.7	35.6	36
BO	399718	289427	Roadside	Diffusion Tube	92	92	37.8	38.1	36.6	36.6	**41.3**

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 2018 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3) (4)				
							2014	2015	2016	2017	2018
BP	400079	289389	Roadside	Diffusion Tube	75	75	39.9	39	37.6	**40**	38.6
BR	399820	289400	Roadside	Diffusion Tube	100	100	38.6	37.1	**40.6**	**40.8**	39.5
BS	400171	289436	Roadside	Diffusion Tube	100	100	**44.4**	**40.7**	35.2	35.3	34.2
B17	399863	289396	Roadside	Diffusion Tube	92	92					32.9
B52	399858	289391	Roadside	Diffusion Tube	92	92					**40.5**
GA	399858	289391	Roadside	Diffusion Tube	100	100	**44.8**	**42.4**	38.8	**40.4**	38.8
GB	399858	289391	Roadside	Diffusion Tube	92	92	**43.3**	**40.3**	37.1	**41**	38.4
GC	399858	289391	Roadside	Diffusion Tube	100	100	**45**	**41.7**	39	39.8	38.7
GD	399296	289503	Roadside	Diffusion Tube	0	0	**47.1**				
S3N	399462	289478	Urban Background	Diffusion Tube	0	0	35.2				
S5N	395958	290645	Urban Background	Diffusion Tube	0	0	37.1				
C5A	399297	290133	Roadside	Diffusion Tube	84	84	**40.4**	33.1	29.6	28.1	31
C5D	399199	290021	Roadside	Diffusion Tube	92	92	35.5	34.9	37.7	37.6	38
C5E	399139	289947	Roadside	Diffusion Tube	84	84	ZC	37.2	38.1	38.5	27.8
C6A	398941	289326	Roadside	Diffusion Tube	100	100	32.9	34.5	31.5	35.4	32.6
C6D	399004	289326	Roadside	Diffusion Tube	0	0	35.7				
C6E	399229	289315	Kerbside	Diffusion Tube	100	100	35.5	32.3	31.6	31	31.4
C7A	398137	290229	Roadside	Diffusion Tube	100	100	35.6	32.9	25.8	24.9	33
C7D	398279	290115	Kerbside	Diffusion Tube	92	92	32.2	36	**47.4**	**44.1**	32.8
C7E	398042	290285	Roadside	Diffusion Tube	100	100	**40.5**	38.2	32.5	33.1	36.8
C7F	397493	290628	Kerbside	Diffusion Tube	100	100	35.6	34.1	35.9	36.7	34.4
C7H	398311	290135	Roadside	Diffusion Tube	100	100	34.3	21.6	27.5	26.7	21.4
C7I	398359	290049	Roadside	Diffusion Tube	0	0	25.7				

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 2018 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3) (4)				
							2014	2015	2016	2017	2018
C13D	396399	291457	Roadside	Diffusion Tube	67	67	30	33.8	30.3	31.3	30.7
C13E	396346	291476	Roadside	Diffusion Tube	0	0	37.7				
DEF1	398469	288673	Roadside	Diffusion Tube	92	92				38.3	30.8
DEF2	398405	288722	Roadside	Diffusion Tube	92	92				21.3	21.8
VT	397155	290867	Roadside	Diffusion Tube	92	92			28.2	28.1	26.6
OA	402232	286142	Roadside	Diffusion Tube	100	100	37.3	29.4	36.5	32.2	34.4
OB	402210	286162	Roadside	Diffusion Tube	92	92	**43.4**	38.5	38.3	**40.3**	**41.1**
OC	402220	286180	Roadside	Diffusion Tube	92	92	**40.4**	31.9	33.4	31.8	36.6
OD	402193	286235	Roadside	Diffusion Tube	100	100	**41.8**	**40.4**	36.7	39.9	**40.4**
OE	402207	286252	Roadside	Diffusion Tube	100	100	34.9	34	34.2	28.6	34.1
OF	402176	286294	Roadside	Diffusion Tube	0	0	37				
OG	402178	286347	Roadside	Diffusion Tube	100	100	33.7	31.1	37.3	32.5	34.8
OH	402212	286173	Roadside	Diffusion Tube	84	84	**40**	34.8	38.3	39.1	32.3
OI	402200	286264	Roadside	Diffusion Tube	100	100	39.2	33.4	35.7	30.9	36.3
OJ	402194	286246	Roadside	Diffusion Tube	100	100	**44**	**43.8**	38.9	38.8	36.7
OP4	402222	286098	Roadside	Diffusion Tube	100	100	37.6	36.8	35.3	35.2	33.4
C9A	402135	286654	Roadside	Diffusion Tube	92	92	36.3	36	32.1	30.1	31.5
C9D	402160	286554	Kerbside	Diffusion Tube	100	100	39	35.1	**40.1**	**40.2**	**44.8**
C10A	402258	286053	Roadside	Diffusion Tube	100	100	**45.6**	**42.1**	**41**	**43.1**	**45.6**
C10D	402258	286049	Kerbside	Diffusion Tube	100	100	**49**	**48**	**46.7**	**46.1**	**47.6**
N2A	402279	286049	Roadside	Diffusion Tube	100	100	30.5	25.9	26.9	24.7	26
N2B	403224	288467	Kerbside	Diffusion Tube	0	0	30.7				
JA	403198	287675	Roadside	Diffusion Tube	0	0	29.4				
JB	403322	287728	Roadside	Diffusion Tube	0	0	31				

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 2018 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3) (4)				
							2014	2015	2016	2017	2018
MA	400712	289296	Roadside	Diffusion Tube	92	92	**40.7**	**45.5**	**45.3**	**43.6**	**42.4**
MB	400711	289302	Roadside	Diffusion Tube	0	0	38				
MC	400748	289150	Roadside	Diffusion Tube	100	100	**40.1**	37.3	37	37.3	34.9
MD	400773	289131	Roadside	Diffusion Tube	0	0	28.6				
C11A	397457	286434	Roadside	Diffusion Tube	100	100	37.3	31.9	33.6	32.4	37.6
C11D	397421	286381	Kerbside	Diffusion Tube	100	100	35.8	39.3	38.6	29.2	32.7
C11E	397398	286366	Kerbside	Diffusion Tube	100	100	34.2	34.2	36	34.2	32.1
C12A	396899	286438	Roadside	Diffusion Tube	100	100	**50.3**	**49.7**	**45.6**	**45**	**40.7**
C12D	396872	286454	Kerbside	Diffusion Tube	100	100	**42.7**	39.7	**41.4**	38.9	36.9
C12E	396780	286465	Roadside	Diffusion Tube	100	100	35.2	37.3	38.9	34.1	34.4
UA	398146	287639	Roadside	Diffusion Tube	100	100	32.6	32.7	34.3	31.2	31.7
UB	398208	287749	Roadside	Diffusion Tube	100	100	33.3	34	35.8	33.4	33.9
UC	398170	287746	Roadside	Diffusion Tube	100	100	37.6	34.4	36.9	35.6	36.1
C15A	396867	285536	Roadside	Diffusion Tube	100	100	**41.4**	**43**	**41.1**	34.4	39.8
RA	401558	290077	Roadside	Diffusion Tube	100	100	38.5	36.1	36.6	32	32.2
S7N	397996	287880	Urban Background	Diffusion Tube	0	0	29.7				
HA	400383	291307	Roadside	Diffusion Tube	92	92	33.1	30.2	31.2	28.6	29.7
LA	400187	291601	Urban Background	Diffusion Tube	92	92	26.1	26	23.1	21.5	22.5
LB	400187	291601	Urban Background	Diffusion Tube	100	100	25.9	22.4	23.1	21.6	23.1
LC	400187	291601	Urban Background	Diffusion Tube	100	100	26.3	26.5	22.5	22.3	22.8
LD	400394	291415	Urban Background	Diffusion Tube	0	0	27				

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 2018 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3) (4)				
							2014	2015	2016	2017	2018
SU	400476	291481	Roadside	Diffusion Tube	100	100	28.6	27.9	23	24.3	26.3
C1A	400668	291726	Roadside	Diffusion Tube	100	100	31.3	**40.5**	31.4	32.3	33.5
C1D	400664	292020	Roadside	Diffusion Tube	100	100	**42.9**	39.3	**43**	39.3	**43**
C2A	401050	292898	Roadside	Diffusion Tube	100	100	29.3	34.6	33.7	33.7	37.6
C2E	401059	292966	Roadside	Diffusion Tube	100	100	35.4	33.7	22.1	33.5	38.5
C4A	400619	290153	Roadside	Diffusion Tube	92	100	39.2	36	34.8	35.6	35
C4D	400657	290090	Roadside	Diffusion Tube	92	100	**40.4**	39.1	**43**	**43.1**	**43.1**
C4E	400738	290113	Roadside	Diffusion Tube	92	100	**40.6**	38	38.4	37.1	39.7
PS1A	400504	291239	Roadside	Diffusion Tube	100	100	33.9	34.6	32.1	31.9	30.6
PS1B	400504	291239	Roadside	Diffusion Tube	0	0	33.7				
PS2A	400525	291251	Roadside	Diffusion Tube	0	0	36.4				
PS2B	400525	291251	Roadside	Diffusion Tube	0	0	36.7				
N1A	399647	290355	Roadside	Diffusion Tube	92	92	35.8	39.7	**40.4**	36.1	38
N1B	399615	290358	Roadside	Diffusion Tube	92	92	39	34.1	33.2	34.7	**40.2**
EA	400869	291102	Roadside	Diffusion Tube	92		29.7	32.7	23.9	23.6	30.5
EB	400920	290998	Roadside	Diffusion Tube	92		29.4	23.7	17	24.6	30.2
EC	400889	291048	Roadside	Diffusion Tube	0	0	33.5				
ED	400368	291123	Roadside	Diffusion Tube	100	100	32.8	31.6	32.1	22.4	23.1
EE	400555	291257	Roadside	Diffusion Tube	84	84	**41.8**	35.6	32.9	29.1	30.7
EF	399800	290557	Roadside	Diffusion Tube	100	100	34.4	**41.3**	30.5	26.2	30.2
EG	399800	290558	Roadside	Diffusion Tube	0	0	29.9				
EH	400666	290458	Roadside	Diffusion Tube	0	0	26.5				
EI	400632	290227	Roadside	Diffusion Tube	0	0	30.6				
AC	399723	296148	Roadside	Diffusion Tube	0	0	**40.9**	25.7			

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 2018 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3) (4)				
							2014	2015	2016	2017	2018
AD	399639	296095	Roadside	Diffusion Tube	42	42	34.3	30.6	26.5	25.8	36.9
AE	399702	296115	Roadside	Diffusion Tube	84	84	33	37.3	37.6	35.7	36.7
AF	399647	296015	Roadside	Diffusion Tube	92	92	32.2		38.3	27.2	32.9
WW	400550	296043	Urban Background	Diffusion Tube	0	0	28.5				
WW2	4005542	296052	Roadside	Diffusion Tube	17	17					28.2
WW3 Old	400600	296041	Urban Background	Diffusion Tube	0	0	27.9				
WW3	400596	296039	Roadside	Diffusion Tube	17	17					28.5
WW4	400519	296095	Roadside	Diffusion Tube	0	0	29.5				
C14A	397355	293929	Roadside	Diffusion Tube	100		31.8	32.6	30.4	29.9	31.4
C14D	397353	293930	Roadside	Diffusion Tube	0	0	34.3				
OS2	395728	292514	Roadside	Diffusion Tube	0	0	19				
DP1	397324	292256	Roadside	Diffusion Tube	100	100	33.7	33.3	33.3	21.5	23.7
DP3	397350	292199	Roadside	Diffusion Tube	0	0	23.6				
DP4	397344	292214	Roadside	Diffusion Tube	100	100	33.5	30.6	26.3	30.3	35
DP5	396959	291993	Roadside	Diffusion Tube	0	0	32.9				
TE	395057	293073	Roadside	Diffusion Tube	0	0	25.6				
TF	395021	395021	Roadside	Diffusion Tube	0	0	31.4				
TG	394967	292595	Roadside	Diffusion Tube	0	0	24.6				
TI	394880	292576	Roadside	Diffusion Tube	0	0	26				
VA	394849	292425	Roadside	Diffusion Tube	0	0	39.4				
VB	397639	292465	Roadside	Diffusion Tube	0	0	30.9				
VC	397686	292483	Roadside	Diffusion Tube	0	0	33.5				
VD	397706	292520	Roadside	Diffusion Tube	84	84	35	32.4	25	23.6	25.5

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 2018 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3) (4)				
							2014	2015	2016	2017	2018
TA	395854	290643	Roadside	Diffusion Tube	100	100	30.2	31.7	29.8	33.4	30.1
TC	397,625	292,564	Roadside	Diffusion Tube	92	92			**47.9**	**45.5**	**42.9**
CH2	394310	285895	Roadside	Diffusion Tube	0	0	30				
CH3	394537	286032	Roadside	Diffusion Tube	0	0	32.7				
CH4	394696	286148	Kerbside	Diffusion Tube	0	0	27.4				
HH1	395754	285492	Urban Background	Diffusion Tube	92	92	17.7	15.1	18.3	18.7	14.7
HH2	395755	285493	Urban Background	Diffusion Tube	0	0	17.6				

☒ **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:

Exceedences 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.

(5) Short term mean is reported because data capture is below 30%.

Figure A.1 – Trends in Annual Mean NO_2 Concentrations

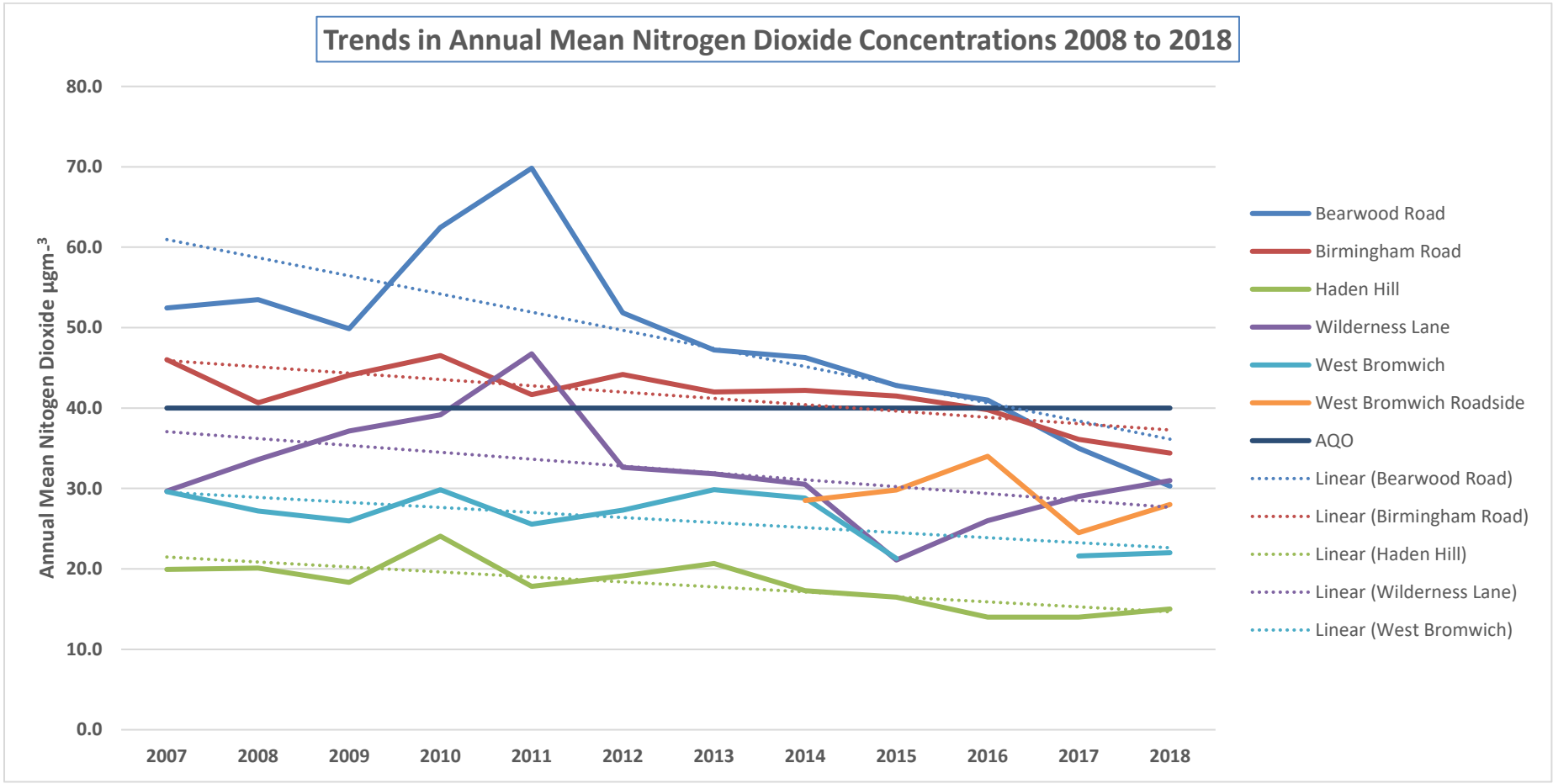


Table A.4 – 1-Hour Mean NO_2 Monitoring Results

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 2018 (%) (2)	NO_2 1-Hour Means > 200µg/m³ (3)				
							2014	2015	2016	2017	2018
Highfields West Bromwich	400187	291601	Roadside	Automatic	90.1	90.1	0 (115.5)[3]	0(90.6)[3]	N/A	0(73)[3]	0
Birmingham Road Oldbury	399857	289392	Urban Background	Automatic	35	35	1(131)[3]	0	0(131.9)[3]	0	0(116)[3]
Wilderness Lane Great Barr	403956	294855	Roadside	Automatic	94.1	94.1	0	0(82.7)[3]	0(90)[3]	0(69)[3]	0
Haden Hill Park Cradley Heath	395755	285493	Kerbside	Automatic	99.8	99.8	0	0	0(71)[3]	0	0
West Bromwich Roadside,	400521	291541	Urban Background	Automatic	96.8	96.8	0(166[3])	0	0(134)[3]	0(82)[3]	0
Bearwood Road Smethwick	402181 286360 Northern point of OPSIS - source	402223 286097 Southern point of OPSIS - receiver	Roadside	Automatic	29.5	29.5	4	0	1	0(132)[3]	0 (113.1)[1]

Notes:

Exceedences of the NO_2 1-hour mean objective (200µg/m³ 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 2018 (%) (2)	PM_{10} Annual Mean Concentration (µg/m³) (3)				
						2014	2015	2016	2017	2018
Highfields West Bromwich	400187	291601	Urban Background	91.6	91.6	15.5	15.7	N/A	N/A	13
Birmingham Road Oldbury	399857	289392	Roadside	84.1	84.1	19.2	17.9	15	15	22
Wilderness Lane Great Barr	403956	294855	Roadside	91.7	91.7	15.4	N/A	N/A	11	14
Haden Hill Park Cradley Heath	395755	285493	Urban Background	92.8	92.8	16	N/A	12	13	14

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

Notes:

Exceedences of the PM_{10} annual mean objective of 40µg/m³ 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

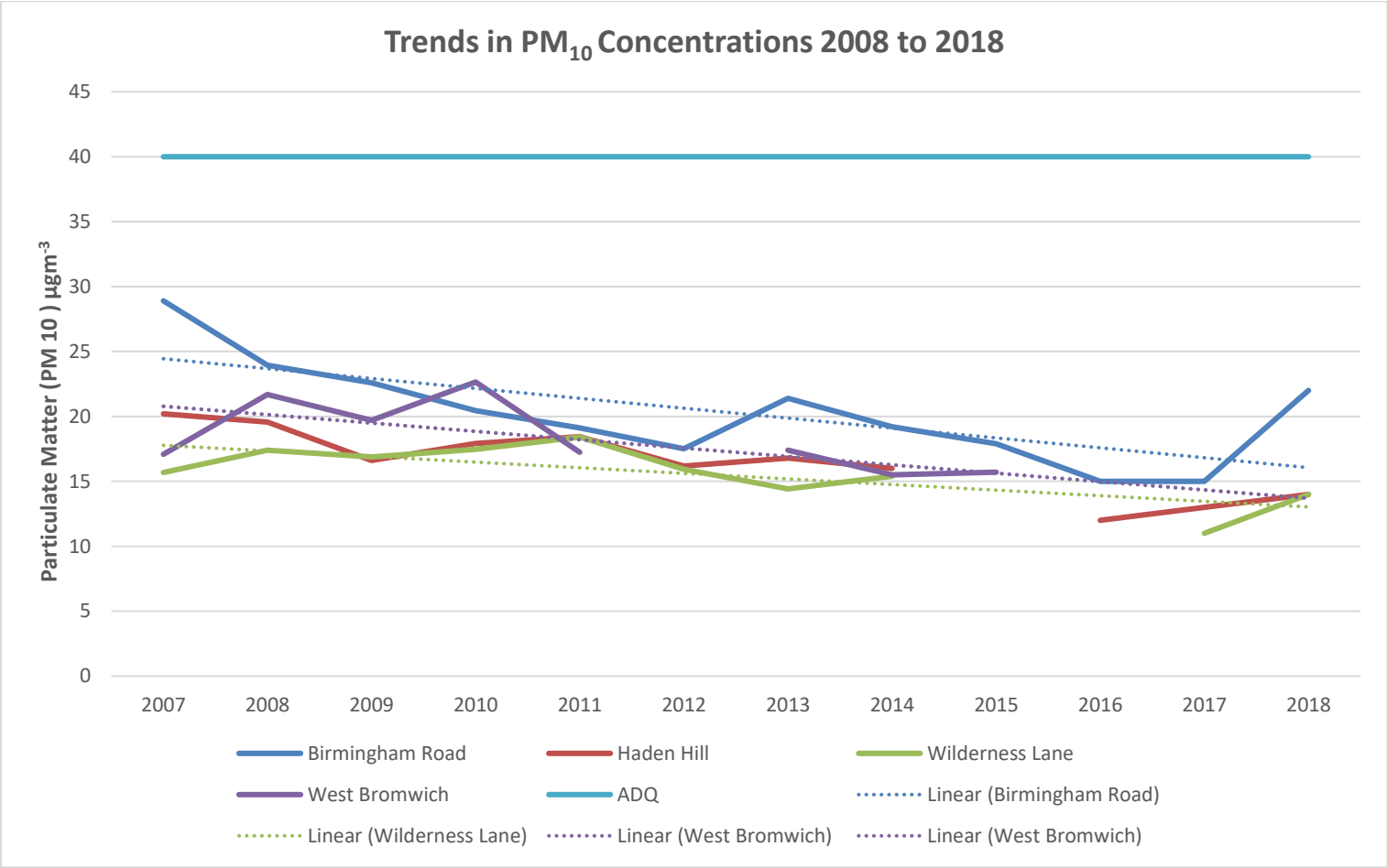


Table A.6 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
						2014	2015	2016	2017	2018
Highfields West Bromwich	400187	291601	Urban Background	91.6	91.6	5 (26.4)[3]	10(29.6)[3]	N/A	N/A	1
Birmingham Road Oldbury	399857	289392	Roadside	84.1	84.1	7(34.6)[3]	4(36.2)[3]	1(32.0)[3]	3(26.0)[3]	3(34.0)[3]
Wilderness Lane Great Barr	403956	294855	Roadside	91.7	91.7	6(30.4)[3]	N/A	N/A	1(24)[3]	1
Haden Hill Park Cradley Heath	395755	285493	Urban Background	92.8	92.8	2(27.4)[3]	N/A	0(19.0)[3]	0	0

Notes:

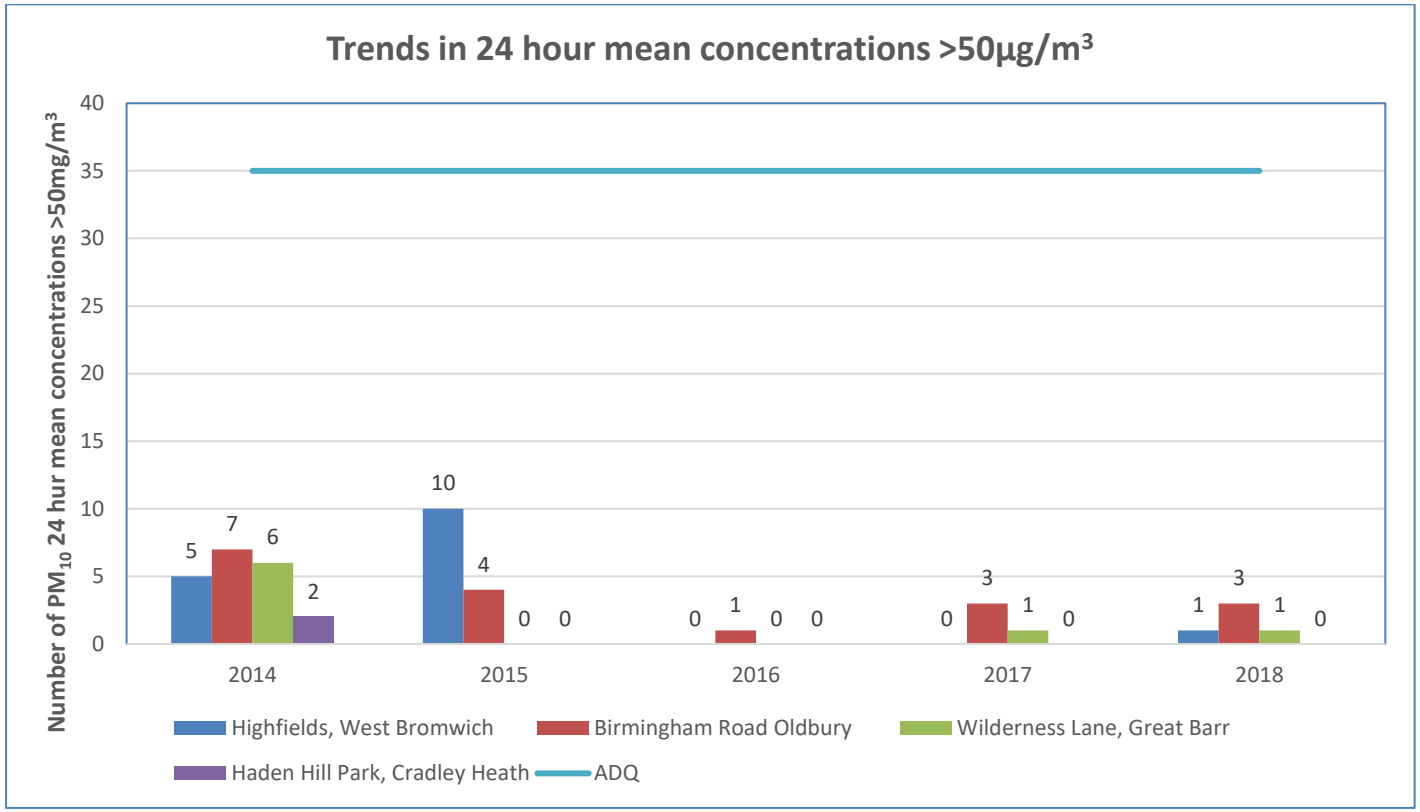
Exceedences of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in **bold.**

(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/m³



NB **Wilderness lane was off line 2015 and 2016**
Highfields was off line 2016 and 2017
Haden Hill was off-line 2015

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)				
						2014	2015	2016	2017	2018
Haden Hill	332395	433175	Urban Background	99.5	99.5	8.5	6.7	5.01	7.32	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

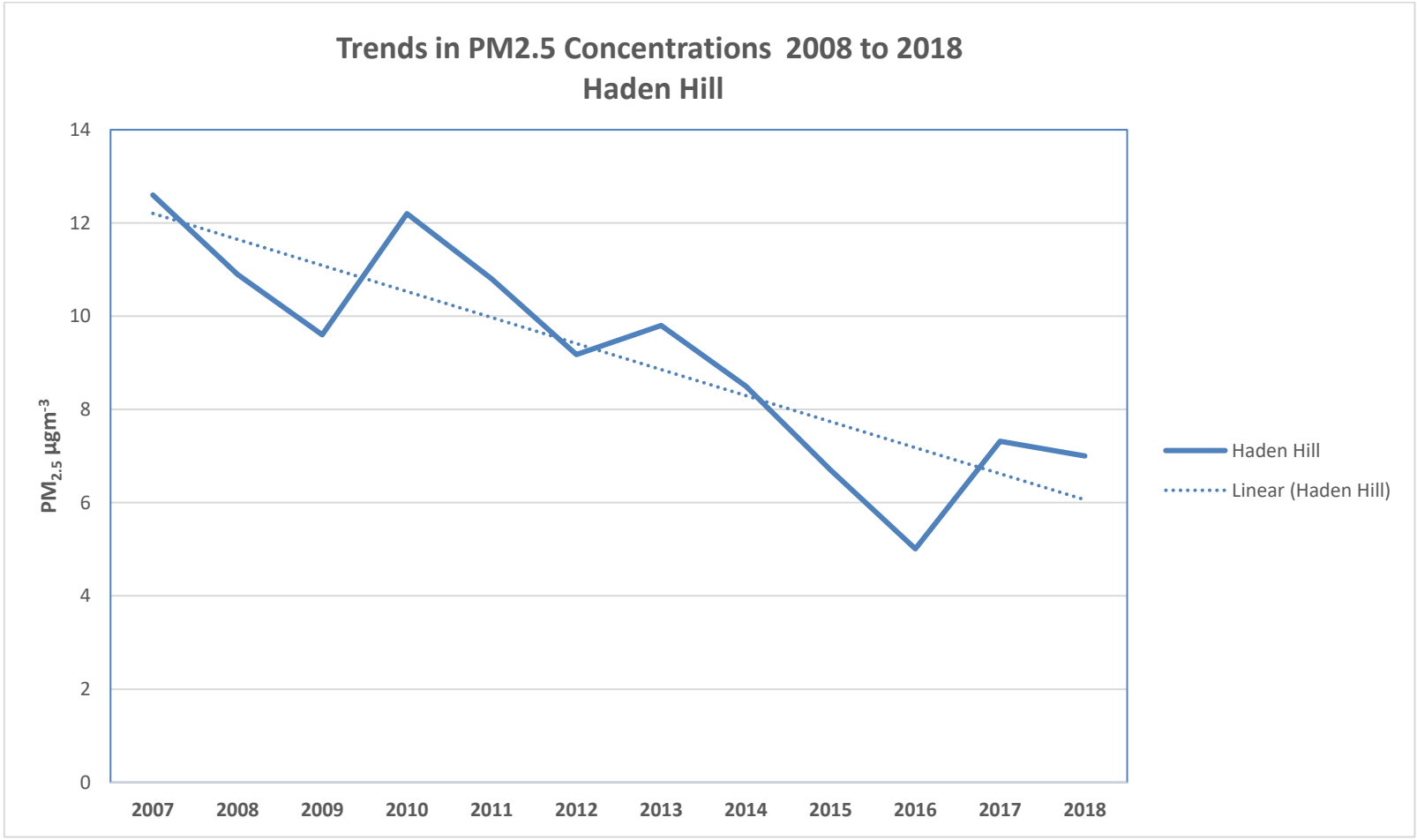


Table A.8 – SO_2 Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for monitoring Period (%) [1]	Valid Data Capture 2018 (%) [2]	Number of Exceedences 2018 (percentile in bracket) [3]		
						15-minute Objective (266 µg/m^3)	1-hour Objective (350 µg/m^3)	24-hour Objective (125 µg/m^3)
Bearwood Road Smethwick	402181 286360 Northern point of OPSIS - source	402223 286097 Southern point of OPSIS - receiver	kerbside	29.9%	29.9%	0[4,5]	0[4,]	0[4,]

Notes:

Exceedences of the SO_2 objectives are shown in **bold** (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed a year)

(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 relevant percentiles are provided in brackets.

(4) Data capture very low due to technical reasons

(5) 15-minute means not measured by OPSIS

Figure A.5 – Trends in SO_2 Concentrations

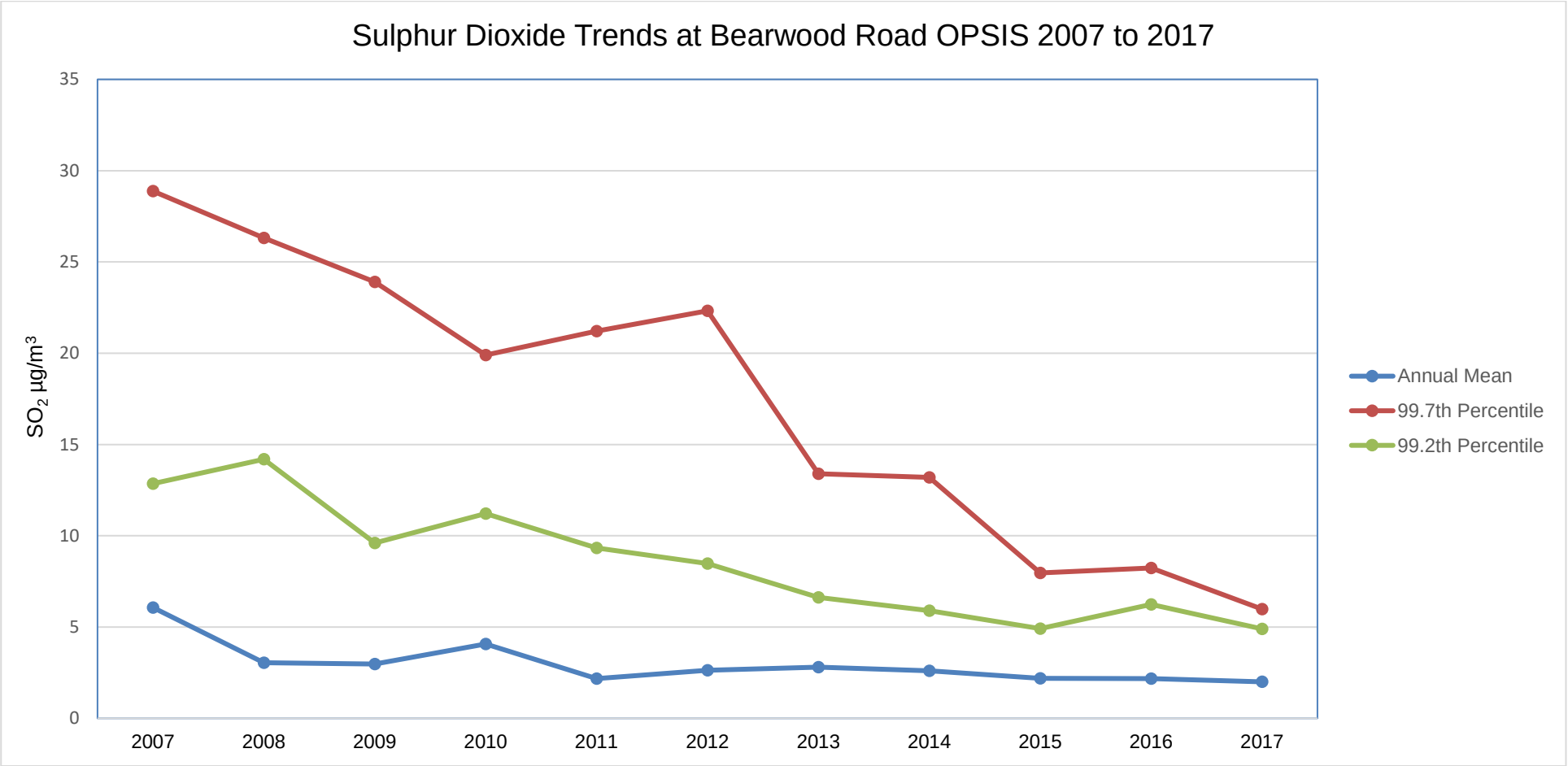


Table A.9 - O3 - Annual Mean Concentrations Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	Annual mean Concentration of O_3µg/m^3				
						2014	2015	2016	2017	2018
Highfields	400187	291601	Urban Background	95.3	95.3	47.2	50	25	44[1]	47
Bearwood Road OPSIS	402181 286360 Northern point of OPSIS - source	402223 286097 Southern point of OPSIS - receiver	Kerbside	0	0	62.8	65.8	N/A[3]	N/A[3]	N/A[3]

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) No data capture due to technical issues.

Table A.10 O3 – Number of Exceedences of Maximum Daily Concentrations (8-hour running mean)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	O_3 – Number of Exceedences of Maximum Daily Concentrations (8-hour running mean)				
						2014	2015	2016	2017	2018
Highfields	400187	291601	Urban Background	95.3	95.3	1	0	0	N/A	26
Bearwood Road OPSIS	402181 286360 Northern point of OPSIS - source	402223 286097 Southern point of OPSIS - receiver	Kerbside	N/A[3]	N/A[3]	0	0	N/A[3]	N/A[3]	N/A[3]

Notes:

Exceedence of the O_3 objective 8-hour mean of 100µg/m3 – 10 exceedences allowed per year

(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) No data capture due to technical issues.

Appendix B: Full Monthly Diffusion Tube Results for 2017 and 2018

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 (0.97) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
AD	399639	296095	41.7	36.6	25.6	21.7	26.6	20.0	20.8	19.6	27.7	20.0	28.3	30.5	26.6	25.8	
AE	399702	296115	47.2	39.8	38.2	39.4	38.4	34.0	39.6	34.1	20.0	31.8	37.0	42.3	36.8	35.7	
AF	399647	296015	35.1		27.2	23.2	32.9		28.9	26.8	12.5	24.1	35.5	34.4	28.1	27.2	
BA	399686	289431	43.2	40.9	40.5	29.6		29.4	30.8	30.9	35.6	31.0	39.5	42.3	35.8	34.7	
BD	399914	289374	44.6	46.7	50.2	39.3	45.0	36.2	37.4	39.2	45.5	36.1	52.7	45.2	43.2	**41.9**	
BDQ	399999	289360	44.7	46.1	51.1		43.7	40.5	39.7	43.5	48.8	38.9	49.0	57.1	45.7	**44.4**	
BE	399920	289352	48.8	46.9	51.7	41.8	52.5	39.1	44.2	42.4	53.6	41.6	54.0	47.0	47.0	**45.5**	
BF	399806	289404	39.8	38.6	39.8	38.2	41.0	29.5	35.6	33.9	43.4	32.0	44.8	39.8	38.0	36.9	
BG	399718	289427	38.0	38.8	41.1	36.0	40.4	32.7	32.9	31.6	38.2	27.5	43.3	39.0	36.6	35.5	
BO	400079	289389	37.6	35.1	40.3	39.6	42.4	36.5	39.3	32.2	40.5	22.9	42.9	42.7	37.7	36.5	
BP	399820	289400	41.1	39.1	46.4	39.8	41.4	37.4	39.5	37.5	50.2	30.3	47.1	45.6	41.3	**40.0**	
BR	399820	289402	40.0	41.9	40.7	46.8	40.9	34.4	40.8	42.5	45.4	37.7	46.8	46.2	42.0	**40.7**	
BS	399863	289396	43.3	44.2	45.5	31.8	30.5	28.0	28.7	26.7	39.9	35.0	43.6	39.5	36.4	35.3	
C10A	402258	286049	50.3	42.1	42.3	46.0	43.3	37.9	41.2	42.9	49.0	46.8	44.6	46.5	44.4	**43.1**	
C10D	402279	286062	50.7		41.0	52.7	42.6	43.4	43.7	47.1	51.3	49.5	43.0	57.7	47.5	**46.1**	**42.6**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations ($\mu g/m^3$)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.97) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
C11A	397457	286434	37.4	35.5	32.2	33.1	27.3	23.9	15.4	31.9	37.9	33.8	48.3	43.3	33.3	32.3	
C11D	397421	286381	2.1	41.2	39.4			16.7	29.9	25.4	36.2	30.2	40.0	39.5	30.1	29.2	
C11E	397398	286366	21.7	35.4	43.2	36.1	30.7	35.7	39.7	34.6	35.8	27.8	42.1	40.5	35.3	34.2	
C12A	396899	286438	53.9	49.7	48.0	40.0	46.6	43.2	34.1	44.7	52.6	41.7	55.5		46.4	**45.0**	
C12D	396872	286454	50.7	40.9	40.2	46.1	38.9	33.8	29.6	36.4	45.5	32.3	46.9		40.1	38.9	32.2
C12E	396780	286465	44.3	37.6	34.6		36.2	31.3	27.7	28.7	39.5	24.9	46.2		35.1	34.1	
C13D	396399	291457	36.9	38.2	32.5	29.2	33.0		24.3	25.3	35.1	28.0	37.5	34.7	32.2	31.3	
C14A	397355	293929		41.8	30.9	26.6	20.8	25.8	26.3	29.6	30.7	30.8	40.0	36.1	30.9	29.9	
C15A	396867	285536	23.0	44.5	43.5	13.7	42.6	41.7		34.8					34.8	33.4	
C1A	400668	291726	46.2	40.1	34.5	27.9		24.8	24.9	30.8		32.6	36.7	38.0	33.6	32.6	
C1D	400664	292020	47.9	42.2	42.2	41.8		28.3	35.3	40.1	34.7	36.7	48.9	51.4	40.9	39.6	
C2A	401050	292898	42.6	36.2	37.6	27.6	38.7	37.2	27.6	33.6	37.9	28.1	35.4	32.2	34.6	33.5	
C2E	401059	292966	43.6	37.3	36.2	28.2	36.0	31.4	34.9	27.0	34.7	25.4	33.2	33.9	33.5	32.5	
C4A	400619	290153	44.2	42.5	34.0	28.2	27.6	26.7	31.7	29.9	47.8	41.3	45.0	40.4	36.6	35.5	
C4D	400657	290090	61.3	53.0	50.4	40.9	38.5		36.4	35.0	39.3	32.8	55.2	46.0	44.4	**43.1**	
C4E	400738	290113	47.4	45.8	42.8	38.0	36.7	30.1	33.5	31.1	35.1	32.8	43.5	41.7	38.2	37.1	
C5A	399297	290133	37.4		28.8	24.3	30.1	26.3	23.1	27.5	30.5	24.0	34.1	32.6	29.0	28.1	
C5D	399199	290021	49.7		35.2	36.4	35.6	34.4	35.2	36.0	48.6	33.3	42.6	39.5	38.8	37.6	33.2
C5E	399139	289947	50.1	43.6	38.7	38.8	37.3	37.4	35.2	32.7	44.6	34.5	40.9	41.7	39.6	38.5	37.3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations ($\mu g/m^3$)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.97) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
C6A	398941	289326	41.4	38.2	33.8	31.7	31.8	36.8	28.9	38.5	41.1	34.6	43.1	38.4	36.5	35.4	
C6E	399229	289315	42.3	33.9	33.1	27.0	28.9	26.9	28.2	26.1	35.1	26.6	39.6	34.5	31.9	30.9	
C7A	398137	290229				21.6	21.5	15.8	26.5	22.9	33.0	24.2	33.8	31.7	25.6	24.9	
C7D	398279	290115	54.1	45.0	49.2	42.9	41.8	40.9	43.2	40.8	47.5	41.2	55.2	47.4	45.8	**44.4**	35.1
C7E	398042	290285	38.9	36.2	31.9	31.9	36.8	26.3	30.3	32.0	36.2	28.7	40.9	37.5	34.0	32.9	
C7F	397493	290628	47.7	41.3	38.3	35.1	33.9	31.4	32.9	31.6	37.3	31.8	44.2	40.7	37.2	36.0	29.6
C7H	398311	290135	41.4	36.7	36.5	32.0	28.8	26.8	15.4	9.7	19.5	16.8	24.8	25.8	26.2	25.4	
C9A	402135	286654	42.4	33.6	28.5	26.8	31.3	23.2	23.2	25.5	37.6	30.3	27.3	31.4	30.4	29.5	
C9D	402160	286554	38.0	41.4	39.8	41.6	28.9	34.0	33.7	38.6	45.5	41.4	40.1	41.7	41.5	**40.2**	34.0
DEF1	398469	288673					30.6	31.2	34.1	31.6	48.6	35.0	41.4	39.0	39.1	38.3	27.8
DEF2	398405	288722					23.1	15.9	17.9	16.1	24.1	14.2	23.9	19.8	19.4	21.3	
DP1	397324	292256	43.2	36.2	36.9	26.0	34.7	32.0	17.8	17.3	22.1	18.6	26.3	26.5	22.1	21.5	
DP4	397344	292214	36.8	27.0	25.1	18.0	27.5	17.2	34.6	31.3	39.1	32.1	43.3	43.0	31.3	30.3	
EA	400869	291102		29.1	24.3	23.0	23.6	18.3	17.7	23.0	25.8	19.9	33.0	30.4	24.4	23.6	
EB	400920	290998		28.2	23.8	23.9	19.6	17.3	17.6	19.6	28.1	20.0	38.2	30.3	24.2	23.5	
ED	400555	291257	38.4	32.1	29.0	18.2	18.2	15.5	16.3	18.1	21.4	15.9	27.2	26.8	23.1	22.4	
EE	400368	291123	34.4		29.8	26.5	26.5	23.3	24.8		31.4	27.2	37.6	38.5	30.0	29.1	
EF	399800	290557	35.1	30.9	30.5	22.6	29.1	24.5	22.4	22.7	31.8	11.2	33.2	30.1	27.0	26.2	
GA	399858	289391	46.2	46.8	47.4	36.9	36.2	32.7	36.9	37.9	46.6	38.0	48.7	45.0	41.6	**40.4**	

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations ($\mu g/m^3$)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.97) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
GB	399858	289391	45.9	51.2	48.1	37.2	36.0	36.5	32.8	34.1	43.3	41.8	53.6	46.8	42.3	**41.0**	
GC	399858	289391	45.8	42.4	41.5	39.8	37.6	31.1	34.8	38.3	42.6	37.5	53.9	47.1	41.0	39.8	
HA	400383	291307	37.3	31.9	30.2	28.7	29.2	25.9	23.9	23.9	31.7	22.3	34.7	34.5	29.5	28.6	
HH1	395754	285492	58.1	15.7	13.6	43.8		8.9	8.2	9.6	14.0	9.3			20.1	19.5	
KD	403794	294698	35.2	28.8	28.6	32.1	26.9	21.1	23.4	20.8	11.8	19.2	27.3	34.0	25.8	25.0	
KE	403932	294951	38.0	25.3	31.1	18.6	20.3	19.5		20.6	13.8	23.5	31.6	29.4	24.7	24.0	
LA	400187	291601	34.0	26.4	24.0	21.5	17.5	14.0	16.7	16.0	21.3	18.6	30.0	26.0	22.2	21.5	
LB	400187	291601	35.3	27.5	23.0	17.1	18.2	15.4	17.8	15.5	21.2	19.6	28.1	28.2	22.3	21.6	
LC	400187	291601	34.7	28.7	23.4	17.7	19.3	15.7	17.3	16.7	21.1	18.6	33.9	28.4	23.0	22.3	
MA	400712	289296	51.3	48.1	23.8	42.7	40.7	44.2	39.4	43.9	50.8	40.0	55.8	59.0	45.0	**43.6**	**43.3**
MC	400748	289150	45.1	40.3	41.0	31.2	35.2	37.3	29.4	32.6	43.1	36.1	47.4	43.2	38.5	37.3	
N1A	399647	290355	45.8		38.1	29.8	34.3	32.6	31.0	39.0	50.5	15.9	48.0	44.1	37.2	36.1	
N1B	399615	290358	50.2	36.8		29.8	39.2	37.1	34.3					46.7	39.2	34.7	
N2A	403158	288531	42.2	20.5	24.7			21.4	22.2	20.8	38.8			22.9	26.7	24.7	
OA	402232	286142	41.7	35.4	34.6	27.0	34.7	26.8	31.6	28.4	35.5	35.5	34.0	33.6	33.2	32.2	
OB	402210	286162	45.8	37.9	42.5	36.0	35.8	36.6	37.1	44.2	47.3	47.3	40.0	48.4	41.6	**40.3**	
OC	402220	286180		30.7	33.4	28.9	37.8	30.1	27.5	31.4	36.1	36.1		35.6	32.8	31.8	
OD	402193	286235	41.7	36.3		39.0	40.3	35.3	37.0	37.0	47.7	47.7	43.9	46.1	41.1	39.9	
OE	402207	286252	41.0	30.5	30.7	25.5	36.2	29.2	26.1	25.7	26.4	26.4	27.7	28.7	29.5	28.6	

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations ($\mu g/m^3$)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.97) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
OG	402178	286347	43.3	34.2	32.3	30.2	41.3	28.3	27.9	29.7	33.2	33.2	34.5	34.0	33.5	32.5	
OH	402212	286173	39.1	36.8	38.9	38.6	35.1	36.4	38.7	34.9	48.4	48.4	42.5	45.7	40.3	39.1	31.6
OI	402200	286264	41.6	32.7	32.1	28.6	40.8	27.1	29.1	27.9	32.5	32.5	26.8	30.4	31.9	30.9	
OJ	402194	286246	47.3	38.6	40.5	39.0	34.9	36.2	35.6	34.4	45.0	45.0	38.9	44.4	40.0	38.8	
OP4	402223	286097	39.3	35.7	40.6	34.1	28.8	32.7	32.4	34.7	40.4	40.4	38.0	38.5	36.3	35.2	
PS1A	400504	291239	38.9	35.4	34.3	29.1	29.5	27.3	27.9	29.7	31.7	31.2	40.1	39.6	32.9	31.9	
RA	401558	290077	47.5	46.8	36.5	28.7	36.7	23.4	25.6	24.6	31.9	28.0	32.4	33.6	33.0	32.0	
SA	403951	294852	43.7	37.3	39.4	23.0	25.6	25.0		20.4	16.1	28.1	29.7	34.9	29.4	28.5	
SU	400476	291481	36.1	31.3	24.5	22.6	24.6	18.5	20.3	19.5	24.6	20.9	28.9	29.0	25.1	24.3	
TA	395958	290645	41.4	35.2	39.1	28.0	28.5	26.8	29.1	28.8	33.7	29.1	32.8	37.1	32.5	31.5	
TC	395854	290643	57.1		53.5	45.0	36.8	40.2	43.1	44.7	56.8	42.1	60.9	55.7	48.7	**47.3**	
UA	398146	287639	35.0		34.1	27.7	33.6	28.5	29.0	25.9	36.6	24.2	36.0	36.3	31.5	30.6	
UB	398214	287726	46.0		36.0	37.6	32.2	31.1	29.6	30.2	38.8	26.0	38.7	29.0	34.1	33.1	
UC	398170	287746	48.6	38.5	37.5	35.0	34.0		31.3		39.3	32.5	39.4	31.3	36.7	35.6	
VD	397640	292467	34.3	29.9	27.4	19.0	26.6	19.4	19.0	19.4	26.1	20.3	26.5		24.3	23.6	
VT	397155	290867	39.3	32.8	29.6	28.1	22.6	22.2	23.3	23.8	29.7	26.0	35.5	34.6	29.0	28.1	
WA	401917	295329	42.2	36.2	38.9	34.7	23.7	28.8	29.2	30.8	19.8	32.0	36.9	39.1	32.7	31.7	
WB	402139	295119		19.9	32.7	26.9	22.4	29.1	26.7	25.2	17.7	29.8	37.2	38.5	27.8	27.0	
WF	402133	295234	44.0			19.0	26.5	29.1	24.6	25.8			40.2	40.3	31.2	30.8	

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations ($\mu g/m^3$)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.97) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
XE	404446	294847	56.3	24.3					23.7	20.8	11.3	17.3	30.9	32.6	27.1	23.9	
ZA	404618	294932	45.0	24.4					25.8	28.6	16.4	24.2	41.1	38.2	30.5	26.8	
ZC	404488	294561	46.2	27.7					24.9	25.9	31.1	24.6	36.2	37.5	31.8	28	
ZK	404622	294290	49.1	28.1					26.4	31.2	34.2	28.5	37.2	36.6	33.9	30.8	
ZO	404515	294211	52.0		37.6	26.2	34.9	28.6	28.6	28.0	28.4	27.0	38.7	38.3	33.5	32.5	
ZP	404555	294219	53.3	30.9	39.4	29.7	33.8	33.3	31.4	31.0	35.9	34.7	38.9	39.7	36.0	34.9	
ZQ	404532	294191	67.8	40.6	58.7	49.7	46.5	48.9	48.0	45.3	52.4	46.8	49.0	54.8	50.7	**49.2**	
ZR	404475	294181	66.0	39.5	52.0	41.7	55.0	44.1	48.5	42.4	50.0	41.3	52.0	48.3	48.4	**47.0**	

☐ **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:

Exceedences 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

Table B.2(A) - NO_2 Monthly Diffusion Tube Results – 2018

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 (0.89) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
AD	399639	296095	31.8			43.6				25.7	34.7	30.7		32.9	41.5	36.9[1]	32.5[2]
AE	399702	296115	42.2	43.8	48.8	42.1	46.3			25.6	36.6	41.4	41.9	43.5	41.2	36.7	32.4[2]
AF	399647	296015	42.5	42.0	41.3	35.2	29.0	23.6	26.3	19.7		41.1	65.3	40.2	36.9	32.9	
B17	399699	289401		38.3	42.3	35.9	31.8	35.3	36.5	22.5	35.2	39.4	51.8	37.9	37.0	32.9	
BA	399686	289431	46.2	46.0	52.1	41.4	43.0	34.2	39.1	31.7	28.4	43.0	40.4	45.9	41.0	36.4	
BD	399914	289374	47.8	49.1	52.9	45.6	51.3	43.9	52.2	33.9	40.5	49.9	43.2	48.9	46.6	**41.5**	
BDQ	399999	289360	49.2	50.4	55.8		51.9			43.4	52.9	53.4	44.3	48.6	50.0	**44.5**	
BE	399920	289352	50.8	47.0	56.1	59.5	50.2	49.6	55.7	44.6	50.6	52.1	58.7	70.4	53.8	**47.9**	**43.5[2]**
BF	399806	289404	39.5	38.5	46.7	40.3	43.2	36.8	38.4	32.8	37.6	43.7	38.3	39.1	39.6	35.2	
BG	399718	289427	39.3	41.7	47.3	43.1	39.4	38.2	46.0	33.4	38.1	41.4	38.7	38.9	40.4	36.0	
BO	400079	289389	40.8	41.1	37.6	44.1	5.6	41.6	44.9	36.4	43.0		129.1	46.0	46.4	**41.3**	
BP	399820	289400	42.8	45.7			48.3	49.6		37.2	40.3	45.3	37.2	44.0	43.4	38.6	
BR	399820	289402	47.3	42.6	50.2	44.0	40.5	30.5	48.5	40.0	50.5	48.2	42.1	48.0	44.4	39.5	
BS	399863	289396	38.9	41.5	46.4	38.8	32.0	28.1	37.9	29.1	36.6	37.2	47.0	48.0	38.5	34.2	
B52	399692	289428		55.5	53.8	46.0	45.2	38.5	49.4	38.2	27.5	49.0	46.0	51.6	45.5	**40.5**	38.9[2]
C10A	402258	286049	48.3	46.3	45.5	50.4	58.5	54.9	63.0	46.4	45.1	55.2	55.3	46.5	51.3	**45.6**	35.8[2]
C10D	402279	286062	50.8	46.6	49.3	36.3	58.9	58.2	69.0	54.9	61.5	59.3	44.5	52.2	53.4	**47.6**	**47.1[2]**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations ($\mu g/m^3$)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.89) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
C11A	397457	286434	43.0	42.5	41.1	47.3	31.0	38.9	46.8	44.5	36.7	36.8	57.0	41.6	42.3	37.6	
C11D	397421	286381	39.9	37.2	37.8	37.6	38.9	32.1	39.8	30.1	33.4	35.4	41.1	37.8	36.7	32.7	
C11E	397398	286366	39.1	36.7	34.8	36.1	37.4	33.6	39.8	33.9	35.7	34.6	35.4	36.1	36.1	32.1	
C12A	396899	286438	40.8	41.8	46.6	52.5	47.0	35.8	56.7	39.2	48.7	42.7	55.1	42.5	45.8	**40.7**	
C12D	396872	286454	31.1	45.4	44.3	42.8	42.9	37.1	49.6	34.2	41.8	43.9	43.4	40.7	41.4	36.9	30.9[2]
C12E	396780	286465	28.8	41.1	43.1	37.5	39.6	38.3	46.4	32.6	38.2	39.3	43.9	35.5	38.7	34.4	
C13D	396399	291457	37.5	39.2	36.2					24.5	37.1	35.5	40.9	44.3	36.9	30.7[1]	
C14A	397355	293929	41.5	35.6	40.8	34.4	32.9	24.4	36.6	22.2	33.5	37.1	36.5	48.3	35.3	31.4	
C15A	396867	285536	39.4	47.2	48.2	49.6	41.9	42.8	57.8	42.3	40.9	47.2	35.7	44.1	44.8	39.8	38.1[2]
C1A	400668	291726	42.5	37.1	41.4	36.7	27.7	19.9	29.2	30.4	35.2	37.6	71.3	42.6	37.6	33.5	
C1D	400664	292020	48.7	46.1	51.7	47.8	46.5	41.9	44.8	40.3	49.2	42.3	76.1	44.7	48.3	**43.0**	**43.0**
C2A	401050	292898	38.9	40.7	46.8	41.4	41.8	37.8	37.4	29.9	39.1	38.3	81.0	34.1	42.3	37.6	
C2E	401059	292966	40.8	41.5	50.4	45.2	42.9	41.1	35.0	24.7	32.9	40.3	85.8	38.5	43.3	38.5	
C4A	400619	290153	46.9	39.8	40.7	42.3	35.9		37.3	33.3	35.7	36.9	37.6	45.9	39.3	35.0	
C4D	400657	290090	56.1	45.2	47.5	48.7	43.8		44.5	41.4	48.3	51.0	50.1	55.9	48.4	**43.1**	
C4E	400738	290113	51.4	43.8	50.2	47.0	46.8		42.8	30.8	40.6	44.5	45.3	47.4	44.6	39.7	
C5A	399297	290133	35.6	32.2	42.0		44.6	32.8	31.9	25.4	34.2	36.4		34.6	35.0	31.1	
C5D	399199	290021		35.0	47.2	44.0	44.6	40.9	44.1	37.7	45.3	46.6	37.6	46.7	42.7	38.0	33.4[2]
C5E	399139	289947		41.1		0.9	19.5	29.7	33.4	29.7	37.5	37.2	42.0	41.4	31.3	27.8	

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations ($\mu g/m^3$)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.89) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
C6A	398941	289326	36.6	34.4	39.8	34.4	35.1	28.2	34.1	34.8	44.7	38.1	40.4	39.3	36.6	32.6	
C6E	399229	289315	38.7	34.1	42.3	29.7	33.6	30.6	41.5	28.5	34.5	38.6	37.8	33.2	35.3	31.4	
C7A	398137	290229	33.9	36.9	37.4	49.3	47.0	43.3	42.4	17.2	29.7	35.0	32.8	40.3	37.1	33.0	
C7D	398279	290115	48.7	48.3		37.0	34.1	33.5	36.1	27.8	28.3	38.0	33.9	39.2	36.8	32.8	
C7E	398042	290285	36.6	35.6	38.4	35.0	34.3	25.6	57.9	36.1	48.0	51.3	45.1	51.6	41.3	36.8	
C7F	397493	290628	41.9	40.1	40.0	38.1	36.1	28.4	42.7	31.1	38.0	44.1	36.3	46.8	38.6	34.4	
C7H	398311	290135	28.2	29.5	27.5	24.5	21.4	15.3	19.9	14.3	22.7	28.8	24.9	32.2	24.1	21.4	
C9A	402135	286654	33.5	34.3	40.2	35.2	36.6	27.2	37.0	25.3		41.3	40.5	38.7	35.4	31.5	
C9D	402160	286554	43.4	48.4	52.8	49.8	56.2	59.2	53.0	41.3	50.9	56.9	41.9	50.3	50.3	**44.8**	**44.8[2]**
DEF1	398469	288673	42.5		27.1	38.5	30.8	24.1	34.6	32.3	35.8	31.3	43.4	40.1	34.6	30.8	
DEF2	398405	288722	25.6		25.5	26.5	25.1	19.3	22.6	14.7	21.1	24.3	36.8	27.4	24.5	21.8	
DP1	397324	292256	29.7	33.3	34.0	26.2	25.6	22.2	24.2	16.6	24.0	27.4	24.7	31.1	26.6	23.7	
DP4	397344	292214	41.6	38.0	44.6	42.9	39.0	33.0	42.6	27.9	36.7	42.1	38.4	45.0	39.3	35.0	
EA	400869	291102	32.7	33.9	35.7	30.7	24.9	18.4	23.3	20.7		32.4	90.7	33.3	34.2	30.5	
EB	400920	290998	31.0	30.7	35.3	31.7	24.1	20.5	22.3	19.6		30.8	95.6	31.8	33.9	30.2	
ED	400555	291257	29.7	32.3	28.7	25.3	22.2	16.5	22.8	17.9	23.4	26.0	33.1	33.9	26.0	23.1	
EE	400368	291123	39.4	37.1	40.5	32.2	32.6	27.3	34.6	30.0		39.3	31.8		34.5	30.7	
EF	399800	290557	37.8	35.2	40.4	37.7	26.2	30.6	30.4		29.0	33.0	41.3	31.5	33.9	30.2	
GA	399858	289391	47.1	45.2	50.6	43.3	38.7	28.5	43.9	34.8	43.2	44.3	56.7	47.4	43.6	38.8	

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations ($\mu g/m^3$)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.89) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
GB	399858	289391	47.4	47.2		41.5	36.3	29.2	43.2	37.2	40.6	41.8	61.5	48.6	43.1	38.4	
GC	399858	289391	46.7	41.4	44.0	36.7	37.9	31.1	41.6	36.0	43.4	47.4	66.4	49.5	43.5	38.7	
HA	400383	291307		32.3	38.4	35.7	34.6	29.3	30.8	24.2	31.6	34.4	36.7	38.9	33.4	29.7	
HH1	395754	285492	14.0	23.6	20.4		14.9	11.9	12.3	9.3	13.5	18.4	23.6	19.5	16.5	14.7	
KD	403794	294698	29.1	30.9	40.1	30.2	34.2	29.8	27.4	22.9	24.5	29.3	33.1	28.2	30.0	26.7	
KE	403932	294951	31.7	31.0	36.0	23.2	23.4	18.5	23.1	22.8	28.2	27.2	34.8	30.4	27.5	24.5	
LA	400187	291601		28.7	29.5	25.3	23.3	15.4	23.4	16.3	23.9	28.8	32.1	35.5	25.7	22.8	
LB	400187	291601	29.6	29.0	28.9	27.6	22.1	15.5	22.7	18.2	22.9	29.2	31.5	33.9	25.9	23.1	23.1
LC	400187	291601	30.9	28.1	29.5	28.2	21.4	15.5	21.7	14.8	23.5	28.0	32.8	32.7	25.6	22.8	22.8
MA	400712	289296	56.1	45.1	55.8		41.5	35.7	52.3	45.4	50.0	50.2	42.7	49.4	47.7	**42.4**	**42.1**[2]
MC	400748	289150	46.8	36.7	46.9	43.3	34.8	27.7	41.4	35.7	42.1	38.6	37.3	39.6	39.2	34.9	34.9
N1A	399647	290355		45.9	40.0	49.0	34.6	37.9	45.6	39.6	45.6	45.5	41.6	45.0	42.8	38.0	38.0
N1B	399615	290358	55.7	42.0	51.5	48.3	32.7		38.6	37.5	44.9	48.1	51.2	46.1	45.1	**40.2**	
N2A	403158	288531	32.6	34.8	30.5	28.2	22.0	35.0	27.0	17.7	23.6	32.1	36.9	31.0	29.3	26.0	
OA	402232	286142	40.0	36.5	41.3	39.2	42.3	38.9	39.2	25.2	39.0	36.6	40.7	44.4	38.6	34.4	
OB	402210	286162		42.5	48.3	45.3	46.3	33.7	52.2	45.8	51.8	44.8	46.0	51.8	46.2	**41.1**	
OC	402220	286180	29.8	36.9	39.2	43.2	46.1		42.9	37.9	40.4	44.1	47.3	44.2	41.1	36.6	
OD	402193	286235	45.9	43.9	50.2	44.2	45.4	35.1	52.7	43.8	45.9	50.2	38.8	48.6	45.4	**40.4**	32.6[2]
OE	402207	286252	37.2	41.6	40.6	42.8	41.1	40.2	40.0	23.2	33.1	38.7	46.4	35.3	38.3	34.1	

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations ($\mu g/m^3$)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.89) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
OG	402178	286347	36.4	37.1	43.1	36.3	34.5	41.0	44.0	28.8	36.8	44.0	49.4	37.5	39.1	34.8	
OH	402212	286173	46.8	37.4	45.8	44.3	33.2	30.1			7.5	42.7	36.8	38.3	36.3	32.3	
OI	402200	286264	37.0	43.3	43.7	45.0	40.1	48.1	44.5	25.5	36.5	41.4	46.5	37.4	40.7	36.3	
OJ	402194	286246	43.9	38.5	44.8	42.1	35.2	32.7	50.2	42.2	44.2	45.3	34.6	41.6	41.3	36.7	
OP4	402223	286097	39.2	37.5	41.3	36.2	29.7	30.5	42.1	37.1	39.0	42.9	34.9	40.0	37.5	33.4	
PS1A	400504	291239	40.8	33.1	40.7	33.3	32.7	24.1	34.1	27.1	35.6	35.1	35.8	40.4	34.4	30.6	
RA	401558	290077	41.9	39.5	43.4	42.3	39.6	29.0	28.7	21.9	28.8	35.1	43.4	40.9	36.2	32.2	
SA	403951	294852	38.8	35.3	44.8	34.7	25.1	21.1	26.9	26.3	31.0	30.8	41.4	38.9	32.9	29.3	
SU	400476	291481	31.4	34.9	36.7	31.7	27.6	24.4	24.8	17.0	26.2	30.6	35.9	33.7	29.6	26.3	
TA	395958	290645	45.3	33.4	32.4	32.4	30.1	24.0	38.4	25.4	31.9	36.2	35.4	41.3	33.9	30.1	
TC	395854	290643		51.3	54.1	44.9	46.1	31.2	51.7	45.4	47.5	54.9	37.7	64.9	48.2	**42.9**	
UA	398146	287639	43.4	39.3	40.5	36.0	31.8	28.6	39.6	26.5	31.7	32.8	39.2	38.1	35.6	31.7	
UB	398214	287726	44.8	40.1	43.3	41.2	36.9	25.2	38.4	32.4	33.6	36.4	46.1	38.6	38.1	33.9	
UC	398170	287746	43.4	42.9	44.0	40.4	37.8	31.2	40.7	34.3	37.8	40.0	51.9	42.4	40.6	36.1	26.5[2]
VD	397640	292467	29.8	32.6		30.4		25.9	32.2	18.9	23.3	27.9	31.6	33.8	28.6	25.5	
VT	397155	290867		31.1	33.7	31.8	25.6	22.2	29.6	23.7	29.4	33.5	29.4	39.5	29.9	26.6	
WA	401917	295329	38.4	39.0	39.4	33.7	27.5	22.0	31.2	33.6	39.1	34.6	39.5	36.4	34.5	30.7	
WB	402139	295119		37.8	37.8	34.7	26.2	19.8	25.7	28.7	34.9	34.6	40.5	38.2	32.6	29.0	
WF	402133	295234	37.6	39.3	41.4	34.0	28.4	21.3			35.2	33.2	41.2	32.8	34.4	30.7	

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 (0.89) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
WW2	400542	296052											38.6	24.7	31.6	28.2[3]	
WW3	400596	296039											35.3	28.8	32.0	28.5[3]	
XE	404446	294847	36.0	16.9	45.9	39.6	34.2	32.3			31.0	32.3	43.8	31.6	34.4	30.6	
ZA	404618	294932	35.2	35.0	37.3	31.6	28.2	24.2			37.1	35.8	31.2	31.9	32.8	29.2	
ZC	404488	294561	36.5	37.0	41.3	34.9	34.1	23.4			37.6	37.5	39.6	35.7	35.8	31.8	
ZK	404622	294290	35.8	35.3	45.5	36.5	30.8	23.4			37.4	54.6	53.3	36.9	38.9	34.7	
ZO	404515	294211	37.1	39.5	48.8	37.0	38.2	32.6	32.0	30.1	37.0	35.5	42.7	38.4	37.4	33.3	
ZP	404555	294219	40.3	31.9	51.2	44.9	41.8	33.9	39.3	34.7	43.1	39.5	45.6	42.5	40.7	36.2	
ZQ	404532	294191	54.5	43.2	66.7	58.1	61.4	57.7	54.4	47.7	59.7	53.1	56.2	49.5	55.2	**49.1**	
ZR	404468	294183	52.4	39.4	65.1	56.5	58.7	52.4	50.9	47.3	55.1	33.5	40.1	49.0	50.0	**44.5**	

☐ **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:

Exceedences 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.

(3) Annualisation not undertaken because data capture is very low

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

C1: Significant changes to sources / changes to monitoring in 2017 and 2018

There were no significant changes in respect of sources of NO_2 to report in respect in 2017. Monitoring commenced at DEF1 and DEF2 locations in advance of the major repair works beginning on the Oldbury Viaduct (Juntions1 to 2 of the M5).

In 2018 additional diffusion tubes (B17 and B52) were deployed outside residential properties in Birmingham Road Oldbury). In October 2018 diffusion tubes were deployed at locations WW2 and WW3 (Westmore Way, Wednesbury). A planning application was submitted in August 2018 to construct a concrete sleeper plant near to the residential properties at Westmore Way.

The FDMS filter was removed from the PM_{10} monitor at Birmingham Road Oldbury on 23 February 2018, at Great Barr on 27 February 2018 and at Highfields on 5 March 2018. This was undertaken to improve data collection from the particulate monitors.

C2: Monitoring / modelling of emissions

Monitoring data 2018 has found exceedences of the annual mean NO_2 objective at the following previously identified locations within the existing borough wide AQMA:

Table C.1 Areas in Sandwell where the NO2 annual mean has been exceeded.

Sandwell MBC Nitrogen Dioxide Annual Mean Exceedence Areas	
Area	**Description of Area**
1	Area between M5, Birmingham Road and Blakeley Hall Road - Oldbury
10	Newton Road / Birmingham Road (A34), Great Barr
11	Bearwood Road, Smethwick
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

Sandwell Council will continue to monitor air quality at key locations to confirm the trends in pollutant concentrations, to determine whether compliance with the objectives is achieved in future years. Where locations are currently compliant with the objectives, further monitoring will be undertaken to confirm ongoing compliance, with a view to removing identified locations from the list of key exceedance areas within the borough wide AQMA.

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

C3: QA/QC on monitoring data

Air quality data should 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) with Filter Dynamics Measurement System (FDMS) measuring PM_{10} (Particulate Matter < 10 microns). FDMS removed on 5 March 2018

West Bromwich Roadside

Teledyne API T200 Ambient NOx

Birmingham Road

APNA370 Ambient NOx

Tapered Element Oscillating Microbalance (TEOM) with Filter Dynamics Measurement System (FDMS) measuring PM_{10} (Particulate Matter < 10 microns). FDMS removed on 23 February 2018

Wilderness Lane – Great Barr

APNA370 Ambient NOx

Tapered Element Oscillating Microbalance (TEOM) with Filter Dynamics Measurement System (FDMS measuring PM_{10} (Particulate Matter < 10 microns). FDMS filter removed on 27 February 2018.

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)

Short-term to Long-term Data adjustment 2017

Data with <75% data capture rate were adjusted in accordance with Box 7.9 of LAQM. TG (16), which states that it is permissible to annualise the data using background, roadside or kerbside sites. The data collated from the following sites has been annualised:

Nitrogen Dioxide

Site	$N0_2$ Annual Mean 2017	Period Mean 2017	Ratio Am/Pm
Highfields	23.65	38.92	
Background sites			
Leamington Spa	23.45	26.09	0.90
Coventry Allersley	21.88	23.65	0.93
		Sum of Ratios	1.82
		R (average)	0.91
		Annualised mean µg/m3	21.57

Site	$N0_2$ Annual Mean 2017	Period Mean 2017	Ratio Am/Pm
West Bromwich Roadside		21.68	
Background sites			
Leamington Spa	23.46	20.50	1.14
Coventry Allersley	21.88	19.63	1.11
		Sum of Ratios	2.26
		R (average)	1.13
		Annualised mean µg/m3	24.49

PM_{10} at Great Barr Monitoring Station

Site	PM_{10} Annual Mean 2017	Period Mean 2017	Ratio Am/Pm
Great Barr		11.87	
Background sites			
Leamington Spa	13.98	14.09	0.99
Nottingham City Centre	17.88	20.70	0.86
		Sum of Ratios	1.86
		R (average)	0.93
		Annualised mean µg/m3	11.01

$PM_{2.5}$ at Haden Hill Monitoring Station

Site	$PM_{2.5}$ Annual Mean 2017	Period Mean 2017	Ratio Am/Pm
Haden Hill		8.75	
Background sites			
Leamington Spa	10.67	11.57	0.76
Nottingham City Centre	11.57	12.64	0.92
		Sum of Ratios	1.67
		R (average)	0.84
		Annualised mean µg/m3	7.32

Annualisation of Nitrogen Dioxide diffusion tubes

Annualisation of diffusion tubes using AURN background sites Coventry Allersley and Walsall			
Location	Period Mean	Average Ratio	Annualised mean µg/m3
DEF1	36.40	1.13	39.70
DEF2	19.37	1.13	21.91
C15A	34.81	0.99	35.28
WF	31.70	1.0	31.40
ZE	27.13	0.91	25.14
ZA	30.46	0.91	28.23
ZC	31.76	0.91	29.43
ZK	33.90	0.91	31.42
N1B	36.16	0.99	36.15
N2A	26.67	0.95	26.21

Short-term to Long-term Data adjustment 2018

Nitrogen Dioxide at Birmingham Road Oldbury Monitoring Station

Site	Annual Mean 2018	Period Mean 2018	Ratio Am/Pm
Birmingham Road		38.92	
Background sites			
Leicester University	23.1	27.27	0.85
Walsall Wood	15.87	17.12	0.93
Nottingham City Centre	26.77	31.28	0.87
		Sum of Ratios	2.65
		R (average)	0.88
		Annualised mean µg/m3	34.37

Nitrogen Dioxide Monitoring Tubes

Site	Annual Mean	Period Mean (when C13D available) (µg/m^3)	Ratio
C13D		36.81	
Backgrounds sites			
Walsall Wood	16.48	17.42	0.95
Nottingham City Centre	27.45	29.53	0.93
Ratio			
Average Ratio			0.94
		Annualised Mean C13D (µg/m3)	34.52

Site	Annual Mean	Period Mean (when AD available) (µg/m3)	Ratio
AD		42.83	
Backgrounds sites			
Walsall Wood	16.07	17.02	0.94
Nottingham City Centre	27.65	27.85	0.99
Average Ratio			0.97
		Annualised Mean AD (µg/m3)	41.48

Monitoring at locations WW2 and WW3 began in October 2018. The results of these diffusion tubes were not annualised as data capture across the calendar year was only 17%.

Details of distance correction for diffusion tubes monitored in 2017

Enter data into the pink cells

Site Name/ID	Distance (m)		NO_2 Annual Mean Concentration ($\mu g/m^3$)		
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor
C10A	0.5	3.5	17.2	43.1	34.2
C10D	2.8	3.0	17.2	43.1	**42.6**
C12D	0.8	5.3	20.6	38.9	32.2
C5D	0.7	8.3	28.0	37.6	33.2
C5E	1.9	2.9	26.7	38.5	*37.3*
C7D	1.6	11.3	23.0	44.4	35.1
C7F	0.3	4.7	21.6	36.0	29.6
C9D	0.5	2.5	18.3	40.2	34.0
DEF1	2.0	40.0	23.3	38.3	27.8
OH	0.5	4.0	19.1	39.1	31.7
OJ	0.5	4.0	19.1	38.8	31.6
MA	1.8	2.0	29.5	43.6	**43.3**

Details of distance correction for diffusion tubes monitored in 2018

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
AD	1.8	11.2	26.4	36.9	32.5
AE	1.8	11.1	26.4	36.7	32.4
OD	0.5	4.0	19.1	40.4	32.6
OI	0.5	4.0	19.1	36.3	30.0
OJ	0.5	4.0	19.1	36.7	30.2
B52	3.0	5.0	28.0	40.5	*38.9*
C5D	0.7	8.3	28.0	38.0	33.4
MA	1.8	2.0	29.5	42.4	**42.1**
UC	0.2	7.7	18.8	36.1	26.5
C10A	0.5	3.5	17.2	45.6	35.8
C10D	2.8	3.0	17.2	47.6	**47.1**
C9D	0.5	2.5	18.3	44.8	*37.3*
BE	0.8	2.5	28.0	47.9	**43.5**
C15A	2.3	3.3	20.6	39.8	*38.1*
C12D	0.8	5.3	20.6	36.9	30.9

PM Monitoring Adjustment

Tapered Element Oscillating Microbalance (TEOM) data is collected and ratified. Filter Dynamics Measurement System (FDMS) TEOM's are gravimetrically equivalent and therefore require no further adjustment. 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.

C5.2 Diffusion Tube Monitoring

In 2017 Sandwell used the following diffusion tube supplier: Diffusion tubes were exposed for monthly periods as prescribed in the Diffusion Tube Monitoring Calendar published by DEFRA[8].

Diffusion Tube Details 2017 and 2018		
Supplier	Gradko International	Gradko International
Period	2017	2018
Type of Tube	Nitrogen Dioxide NO_2	Nitrogen Dioxide NO_2
Type of Absorbent	Triethanolamine	Triethanolamine
Method of Tube Preparation	50% TEA in Acetone	50% TEA in Acetone
Exposure Dates	LAQM Exposure Calendar 2017	LAQM Exposure Calendar 2018
Exposure Duration	One Month	One Month
Bias Adjustment Factor	0.97	0.89

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 a number of test samples designed to test the proficiency of laboratories undertaking analysis of chemical pollutants in ambient air.

[8] http://laqm.defra.gov.uk/diffusion-tubes/data-entry.html

Below is a table extracted from the Summary of Laboratory Performance for AIR No2 Proficiency Testing Scheme January 2017 to October 2018. Gradko International achieved 100% satisfaction for the period under review.

The following table lists those UK laboratories undertaking LAQM activities that have participated in recent AIR NO_2 PT rounds and the percentage (%) of results submitted which were subsequently determined to be **satisfactory** based upon a **z-score** of ≤ **±** 2 as defined above.

AIR PT Round	**AIR PT AR018**	**AIR PT AR019**	**AIR PT AR021**	**AIR PT AR022**	**AIR PT AR024**	**AIR PT AR025**	**AIR PT AR027**	**AIR PT AR028**
Round conducted in the period	January – February 2017	April – May 2017	July – August 2017	September – October 2017	January – February 2018	April – May 2018	July – August 2018	September – October 2018
Aberdeen Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Cardiff Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Edinburgh Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Environmental Services Group, Didcot	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]
Exova (formerly Clyde Analytical)	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Glasgow Scientific Services	100 %	50 %	0 %	100 %	100 %	100 %	50 %	100 %
Gradko International [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 %	100 %	100 %
Kent Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Kirklees MBC	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Lambeth Scientific Services	100 %	NR [2]	NR [2]	100 %	NR [2]	NR [2]	NR [2]	25 %
Milton Keynes Council	100 %	75 %	0 %	75 %	100 %	75 %	100 %	100 %
Northampton Borough Council	0 %	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Somerset Scientific Services	100 %	100 %	100 %	75 %	100 %	100 %	100 %	100 %
South Yorkshire Air Quality Samplers	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Staffordshire County Council	100 %	100 %	100 %	100 %	50 %	100 %	100 %	100 %
Tayside Scientific Services (formerly Dundee CC)	100 %	NR [2]	100 %	NR [2]	100 %	NR [2]	100 %	NR [2]
West Yorkshire Analytical Services	100 %	100 %	100 %	100 %	50 %	75 %	100 %	100 %

[1] Participant subscribed to two sets of test results (2 x 4 test samples) in each AIR PT round.
[2] NR No results reported
[3] Northampton Borough Council, Kent Scientific Services, Cardiff Scientific Services, Kirklees MBC and Exova (formerly Clyde Analytical) no longer carry out NO2 diffusion tube monitoring and therefore did not submit results.

Choice of Factor to Use

The 2017 and 2018 diffusion tube data has been bias adjusted in accordance with technical guidance LAQM TG(16) using a National Bias Correction Factor.

The National Bias Adjustment Factors were selected because Sandwell's was unable to undertake a co-location study due to difficulties with data capture in 2017. Data capture was also low at Birmingham Road due to technical problems in 2018. Sandwell Council's monitoring sites also cover a large range of site types including urban background, kerbside and roadside and facades of buildings which will result in variations in recorded concentrations. The National Factors are calculated from a range of diffusion tube settings and are deemed representative of all monitoring sites within Sandwell.

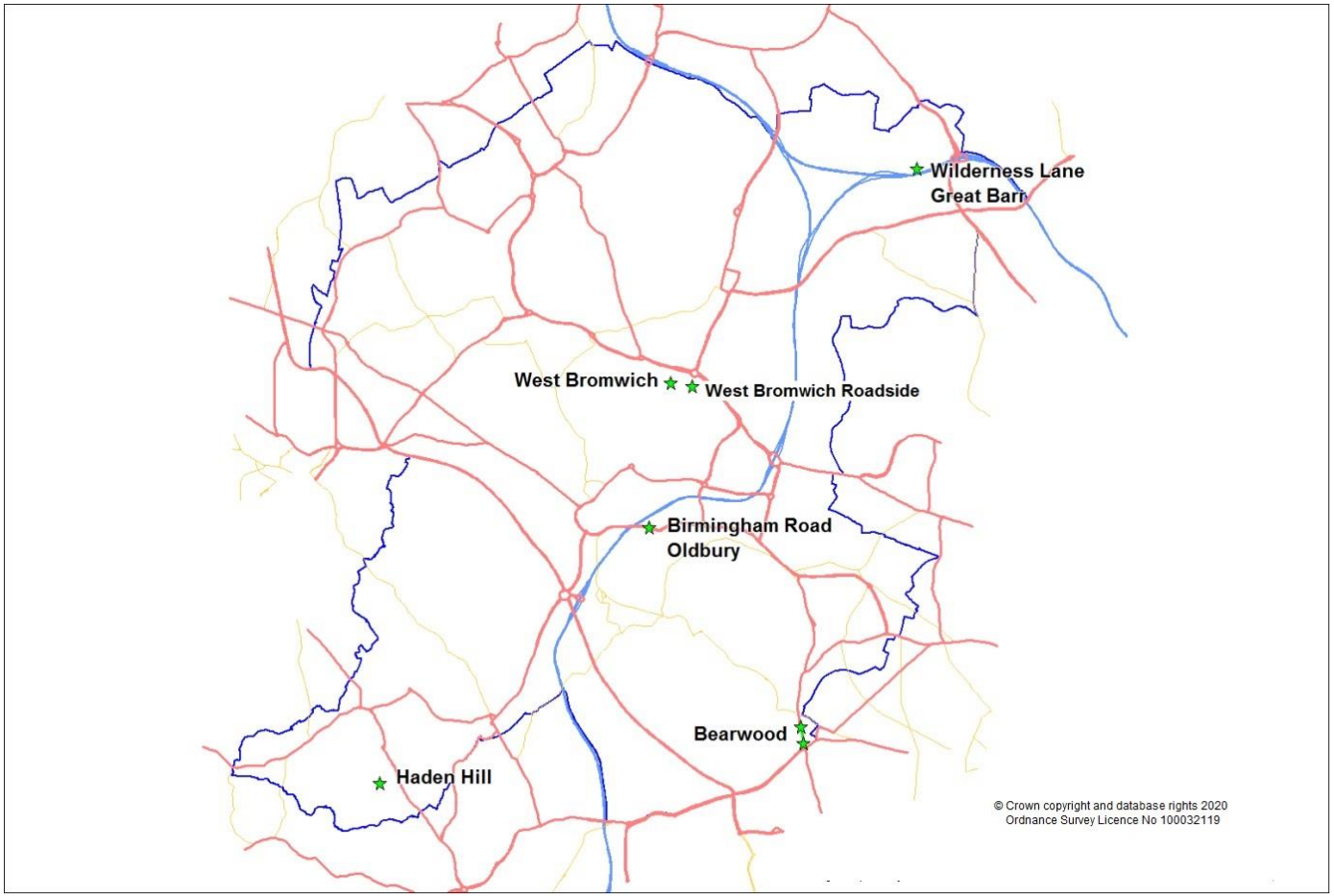
Where data capture is below the required 75% (9 months) of the full calendar year, the Annualised Mean has been estimated using the procedure set out in Box 7.9 of LAQM.TG(16) for short term monitoring data and is presented as the annual mean in Table A.2.

Tube TC has not been distance corrected because current receptors are too far from the location. The tube is situated in anticipation of nearby future development. Results have been distance corrected using DEFRA's NO_2 Fall-Off with Distance Calculator[9] to the closest receptor. Distance corrected results are presented in Table B.1. Diffusion tubes MC and EB have not been distance corrected in 2017 because it may be subject to the influence of more than one road.

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

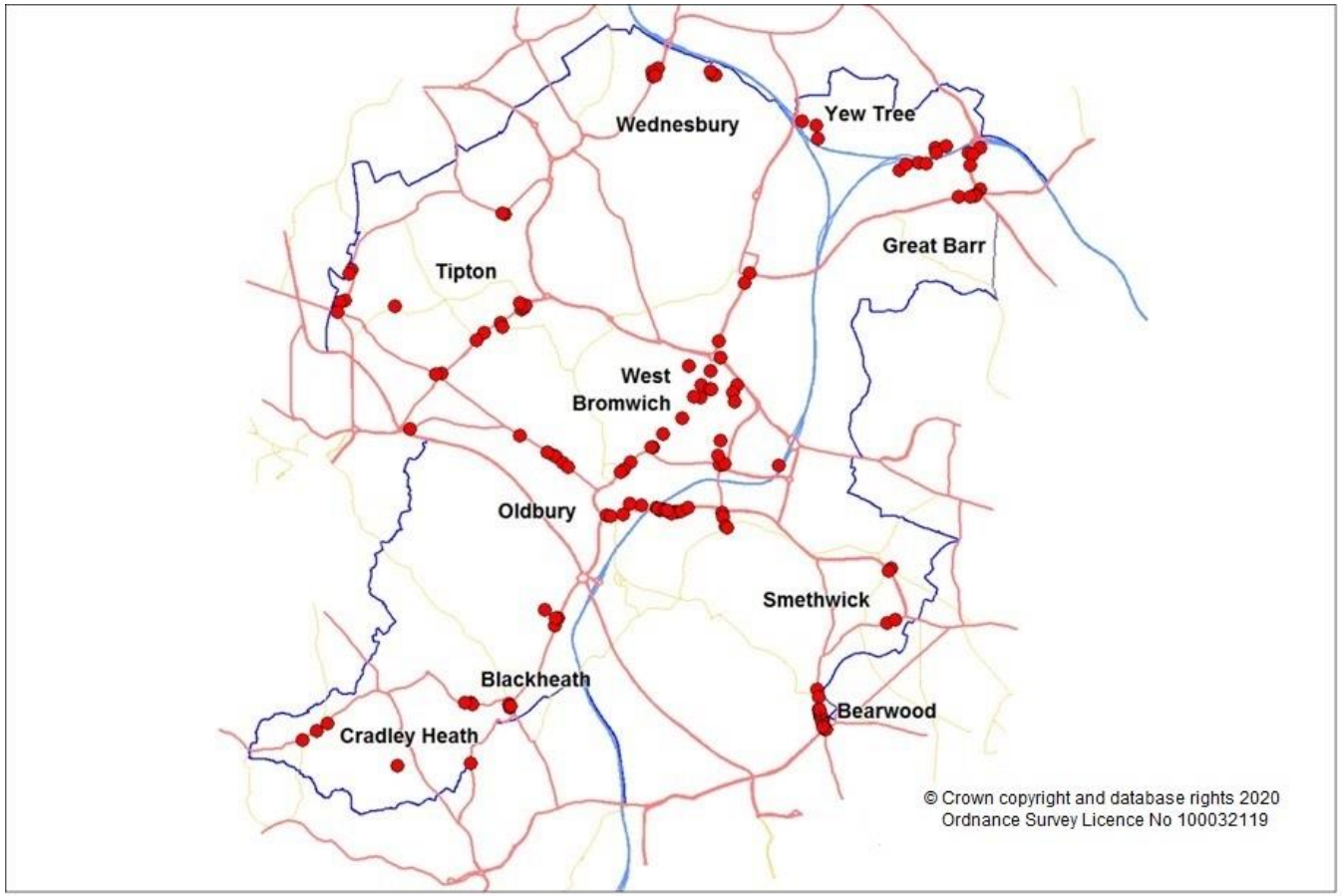
Appendix D: Map(s) of Monitoring Locations and AQMAs

Figure D1 – Location of Automatic Monitoring Stations



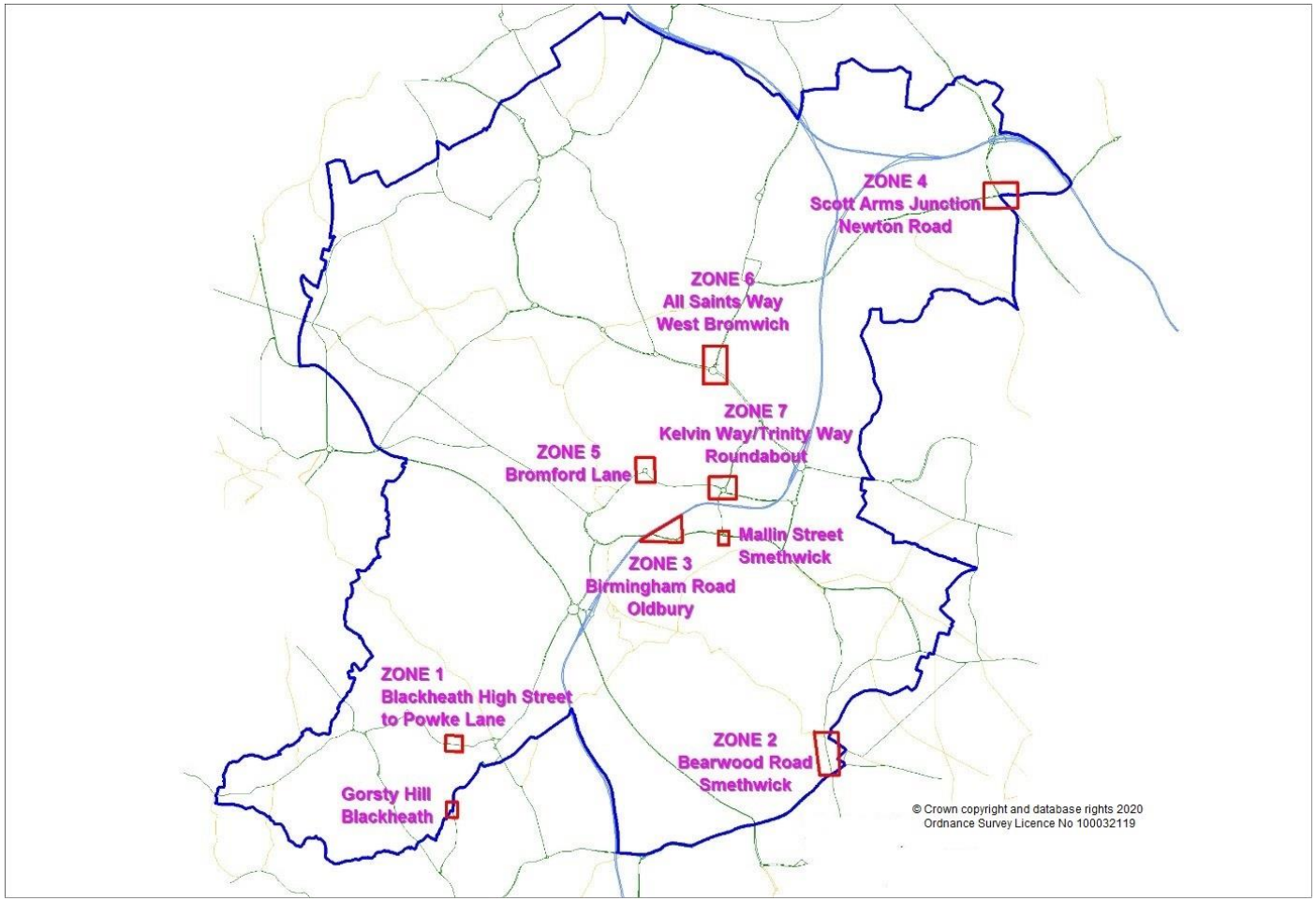
Locations can be viewed on Google Maps using this link
https://www.google.com/maps/d/edit?hl=en&hl=en&mid=1NKc9ticQDoxcN5U_6phJcjm9cNAiaVtr&ll=52.54282040395067%2C-2.1003706435546974&z=11

Figure D2 – Location of Nitogen Dioxide Diffusion Tubes



Locations can be viewed on Google Maps using this link
https://www.google.com/maps/d/edit?hl=en&hl=en&mid=1NKc9ticQDoxcN5U_6phJcjm9cNAiaVtr&ll=52.54282040395067%2C-2.1003706435546974&z=11

Figure D3 – Location of Hotspots



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[10]	
	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
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

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

Appendix F – Air Quality Actions from 2009

Specific Actions

	Action / Option	Lead Role	Impacts	Cost / Benefit				Rank	Timescale	Funding
				AQ	+ive	-ive	Cost			
Oldbury Ringway/Birmingham Road (A457), Oldbury										
1	The council will consider the possible relocation of existing residential properties	Sandwell Metropolitan Borough Council (SMBC) Planning / Housing	▪ Would not improve air quality but would reduce the number of people exposed to concentrations above the objective ▪ Improve quality of housing ▪ Help to achieve UDP ▪ Resentment by residents	3*	3	1	1	Med 6	Long term	A
2	Red route treatment - Red Route treatment including the control of parking which would ease congestion (predicted 10% reduction) but there is no obvious place to displace residential parking	SMBC Transportation (LTP commitment)	▪ Minor air quality improvement ▪ Reduced congestion ▪ May inconvenience local residents	1	2	1	2	Low 4	2010	S
Dudley Road East/Roway Lane, Oldbury										
3	Red route improvements	SMBC Transportation (LTP commitment)	▪ Minor air quality improvement ▪ Reduced congestion ▪ May inconvenience local residents	1	2	1	2	Low 4	2010	S
M5 J1-J2, Oldbury & West Bromwich & M6 J7-J8/M5, Great Barr & Yew Tree										
4	Improvements to traffic flow on M6 through implementing a programme to reduce incident response times to 20 minutes (from 60 minutes) 24 hours a day, seven days a wee	Highways Agency	▪ Reduced queuing times following incident providing a minor improvement in air quality ▪ Reduced congestion ▪ Improved safety	1	2	0	1	Low 4	Completed	S

	Action / Option	Lead Role	Impacts	Cost / Benefit				Rank	Timescale	Funding
				AQ	+ive	-ive	Cost			
M5 J1-J2, Oldbury & West Bromwich & M6 J7-J8/M5, Great Barr & Yew Tree										
5	An improved system of contingency planning for the motorway network has been implemented to improve traffic flows	Highways Agency and Local Authorities	▪ Predicted minor air quality improvement ▪ Reduced congestion ▪ Improved road safety	1	2	0	2	Med 5	Completed	S
6	Evaluate the suitability of active traffic management to improve traffic flows on the M6	Highways Agency	▪ Not known whether improvements in air quality would result, but minor improvements anticipated ▪ Reduced congestion ▪ Improve road safety	1	2	0	2	Med 5	Ongoing	A
7	A link is planned between the M54 and the M6 / M6 Toll this will relieve congestion on the M6 Junction 8 to 10A.	Highways Agency	▪ Minor improvement in air quality due to improved flow ▪ Reduced congestion ▪ May result in increased traffic flow due to improved capacity of these junctions	1	2	1	1	Low 3	2012	A
8	Ramp metering of junctions (M5 (J1 + 2) and M6 (J11 +16))	Highways Agency	▪ Minor improvements are anticipated (study carried out to date inconclusive) ▪ Reduced congestion ▪ Potential increased congestion on the slip road	1	2	1	2	Low 4	Trial completed at M5 J1 in 2008 further trials to be carried out	S
Newton Road/Birmingham Road (A34), Great Barr										
9	Route 51 improvements – a programme of works to improve traffic flows and reduce queue lengths. The package includes red route treatment, road improvements, traffic control systems and improvements in the bus service to bring them up to the bus showcase route standards	SMBC Transportation (LTP commitment)	▪ Minor improvement in air quality due to improved flow ▪ Reduced congestion ▪ May result in increased traffic flow due to improved capacity of the junction	1	2	1	2	Low 4	Completed	S
10	Future Metro Phase 2 – Varsity North	Centro & SMBC Transportation	▪ Reduced congestion ▪ Fast and effective transport ▪ Increases personal travel choices ▪ Encourages local employment opportunities ▪ Costly to implement	2	2	0	1	Med 5	2015	A

	Action / Option	Lead Role	Impacts	Cost / Benefit				Rank	Timescale	Funding
				AQ	+ive	-ive	Cost			
Bearwood Road, Smethwick										
11	Bus Showcase	Centro & SMBC Transportation	▪ Reduce congestion by reducing rate of traffic growth ▪ Increases personal travel choices ▪ Encourages local employment opportunities	1	3	0	2	Med 6	2009	S
12	Photocatalytic Paving – currently suspended due to poor results in the trial carried out by Camden Council	SMBC Environmental Protection	▪ Supplier suggests that 60-70% reduction in pollution can be achieved. However the trial carried out by Camden Council found reductions in NO_x concentrations of 12% across a year which could not definitely be ascribed to the paving. ▪ Costly to implement	1	1	0	1	Low 3	Suspended pending further research	A
Bearwood Road, Smethwick										
13	Future Metro Phase 2 - Birmingham West Route along Hagley Road West	Centro	▪ May improve visual amenity ▪ Reduced congestion ▪ Fast and effective transport ▪ Increases personal travel choices ▪ Encourages local employment opportunities ▪ Costly to implement	2	2	0	1	Med 5	Long term	S
14	Red route along Hagley Road	SMBC Transportation (LTP commitment)	▪ Minor air quality improvement ▪ Reduced congestion	1	2	0	2	Med 5	2009 / 10	S
Oldbury Road / Birmingham Road, Blackheath										
15	Blackheath Bypass was completed in 2006, the council will implement traffic management scheme to maximise the use	SMBC Transportation	▪ Could have highly significant improvements on air quality and potentially bring NO_2 levels below objective	3	3	1	1	Med 6	2009	A

	Action / Option	Lead Role	Impacts	Cost / Benefit				Rank	Timescale	Funding
				AQ	+ive	-ive	Cost			
	of the bypass. As a result of the bypass and Traffic Management proposals a reduction of 40% may be achieved		▪ Reduced congestion ▪ Improve safety in town centre ▪ Local amenity may improve in town centre but may be of detriment to amenity around bypass ▪ Does not encourage modal shift to public transport ▪ Local economy may be affected by loss of trade							
16	Close roads in Blackheath town centre for "In Town Without my Car Day"	SMBC Transportation & Environmental Protection	▪ Promote use of new bypass ▪ Raise awareness of air quality issues ▪ May inconvenience local residents and businesses	1	2	1	3	Med 5	2009 / 10	A
High Street / Powke Lane, Blackheath										
17	Possible Red Route Treatment *(may include side road entry treatments, new/revised traffic signals and new/revised stopping, loading and parking restrictions)*	SMBC Transportation	▪ Minor air quality improvement due to improved flow ▪ Reduced congestion	1	2	0	2	Med 5	2010	A
Bromford Road (including the Kelvin Way / Brandon Way junction), West Bromwich										
18	Implement Red Route Treatment *(may include side road entry treatments, new/revised traffic signals and new/revised stopping, loading and parking restrictions)*	SMBC Transportation	▪ Minor improvement on air quality due to improved flow Reduced congestion	1	2	0	2	Med 5	2010	S
Trinity Way / Kenrick Way, West Bromwich										
19	Implement Red Route Treatment	SMBC Transportation	▪ Minor improvement on air quality due to improved flow ▪ Reduced congestion	1	2	0	2	Med 5	2010	S

	Action / Option	Lead Role	Impacts	Cost / Benefit				Rank	Timescale	Funding
				AQ	+ive	-ive	Cost			
	(may include side road entry treatments, new/revised traffic signals and new/revised stopping, loading and parking restrictions)	(LTP commitment)								
All Saints Way / Expressway, West Bromwich										
20	Junction improvements will provide a vehicle underpass along the line of the A41 beneath the existing roundabout. The junction will also have bus priority measures.	SMBC Transportation (LTP commitment)	▪ Reduced congestion ▪ Although there is reduced congestion higher traffic speeds may mean there is no improvement in air quality	1	2	0	1	Low 4	2010	A
All Saints Way / Newton Road, West Bromwich										
21	Red Route *(may include side road entry treatments, new/revised traffic signals and new/revised stopping, loading and parking restrictions)*	SMBC Transportation (LTP commitment)	▪ Minor improvement on air quality due to improved flow ▪ Reduced congestion	1	2	0	2	Med 5	2009	S
Sedgley Road East / Dudley Port, Tipton										
22	Implement Red Route Treatment *(may include side road entry treatments, new/revised traffic signals and new/revised stopping, loading and parking restrictions)*	SMBC Transportation (LTP commitment)	▪ Minor improvement on air quality due to improved flow ▪ Reduced congestion	1	2	0	2	Med 5	2010	S
Soho Way/Grove Lane / Cranford Street, Smethwick										
23	Implement Red Route Treatment *(may include side road entry treatments, new/revised traffic signals and new/revised stopping, loading and parking restrictions)*	SMBC Transportation (LTP commitment)	▪ Minor improvement on air quality due to improved flow ▪ Reduced congestion	1	2	0	2	Med 5	2010	S

Borough wide Actions

	Action / Option	Lead Role	Impacts	Costs / Benefit				Rank	Timescale	Funding
				AQ	+ive	-ive	Cost			
Reducing Vehicle Emissions										
1	Improve the council fleet by – • Where possible any new SMBC vehicles purchased are to Euro 4 standard • Monthly fuel reports are produced and regular user group meetings held to try and improve efficiency	SMBC Transportation	▪ Reduce emissions from council fleet ▪ Reduction in greenhouse gases and particulates ▪ Lead by example	1	2	0	2	Med 5	Ongoing	S
2	Promote Eco-Driving – develop promotional strategy to encourage drivers to drive economically	SMBC Transportation & Environmental Protection	▪ Improves awareness of fuel efficiency & environmental impact of vehicles, ▪ Reduced greenhouse gases, ▪ More economical driving, ▪ Improve road safety	2	3	0	3	High 8	2009 / 10	W / A
3	Develop strategy to encourage drivers not to allow their engines to idle when parked	SMBC Transportation & Environmental Protection	▪ Reduced greenhouse gases, ▪ More economical driving ▪ Improve air quality	1	1	0	3	Med 5	2009 / 10	A

	Action / Option	Lead Role	Impacts	Costs / Benefit				Rank	Timescale	Funding
				AQ	+ive	-ive	Cost			
4	Establish a programme of vehicle emission testing	SMBC Environmental Protection	▪ Encourage vehicle maintenance ▪ Educate ▪ Reduces gross polluting vehicles ▪ Potentially reduce noise	1	1	0	3	Med 5	2009 / 10	A
Improving Public Transport to Reduce Traffic Volumes										
5	Showcase route extension and improvements (not all route funding secured).	SMBC Transportation / CENTRO (LTP commitment)	▪ Improve local air quality ▪ Encourage less car use by providing attractive alternative ▪ Reduced congestion ▪ Increased social inclusion and accessibility ▪ Reduced greenhouse gas emissions ▪ Possible impact on parking availability on routes and perceived negative impact on local trade	2	3	0	1	Med 6	Ongoing	S/A
6	Improvements of branding to increase attractiveness of public transport	Travel West Midlands / CENTRO (LTP commitment)	▪ Encourage less car use by providing attractive alternative ▪ Reduced congestion ▪ Increased social inclusion and accessibility ▪ Reduced greenhouse gas emissions	1	2	0	2	Med 5	Ongoing	W
7	Improving access to information regarding transport options	SMBC Transportation / CENTRO (LTP commitment)	▪ Encourage less car use by providing attractive alternative ▪ Reduction in congestion ▪ Increased social inclusion and accessibility ▪ Reduction in greenhouse gases	2	2	0	2	Med 6	Ongoing	W

	Action / Option	Lead Role	Impacts	Costs / Benefit				Rank	Timescale	Funding
				AQ	+ive	-ive	Cost			
8	Promote Midland Metro extension (Wednesbury to Brierley Hill)	SMBC Transportation / CENTRO (LTP priority)	▪ Encourage less car use by providing attractive alternative ▪ Reduced congestion ▪ Increased social inclusion and accessibility ▪ Reduced greenhouse gas emissions	2	2	0	1	Med 5	2012	A
9	Future Metro Phase 2 – 5W's. Wednesbury to Walsall Varity North – A34 Birmingham to M6 Junction 7 Birmingham West – Birmingham to Quinton.	SMBC Transportation / CENTRO (LTP priority)	▪ Encourage less car use by providing attractive alternative ▪ Reduced congestion ▪ Increased social inclusion and accessibility ▪ Reduced greenhouse gas emissions	2	2	0	1	Med 5	Long term	A
Improving Public Transport to Reduce Traffic Volumes										
10	Increased bus lane enforcement (increase number of cameras on buses for bus lane enforcement)	Travel West Midlands	▪ Encourage less car use by providing attractive alternative ▪ Reduced congestion	1	3	0	2	Med 6	Ongoing	S
Improving the Road Network to Reduce Congestion										
11	Introduction of Red Routes to ease congestion	SMBC Transportation (LTP commitment)	▪ Reduced congestion ▪ Minor improvement on air quality due to improved flow ▪ Improved road safety ▪ May inconvenience local residents	1	2	1	2	Low 4	Ongoing	S
12	Improvement of Urban Traffic Control Systems designed to reduce congestion	SMBC West Midlands Wide Initiative (LTP commitment)	▪ Improved road safety ▪ Reduced congestion ▪ Reduction in greenhouse gases and local air quality pollutants	2	2	0	1	Med 5	Ongoing	S
13	Burnt Tree Island improvements	SMBC / Dudley MBC Transportation (LTP priority)	▪ Reduced congestion ▪ Reduction in greenhouse gases and local air quality pollutants, although objective is not currently exceeded ▪ Improved road safety ▪ Improve bus journey times	1	2	0	1	Low 4	2009	A

	Action / Option	Lead Role	Impacts	Costs / Benefit				Rank	Timescale	Funding
				AQ	+ive	-ive	Cost			
14	Owen Street crossing	SMBC Transportation / Highways Direct (LTP priority)	▪ Reduced congestion ▪ Reduction in greenhouse gases and local air quality pollutants, although objective is not currently exceeded ▪ Improve safety	1	2	0	1	Low 4	2009	A
Improving the Road Network to Reduce Congestion										
15	Cradley Heath Bypass	SMBC Highways Direct (LTP commitment)	▪ Reduced congestion ▪ Reduction in greenhouse gases and local air quality pollutants, although objective is not currently exceeded ▪ Improved road safety ▪ Local amenity may improve in town centre but may be detriment to amenity around bypass. ▪ Does not encourage modal shift to public transport	2	3	1	1	Med 5	Completed	S
Using Area Planning Methods to Reduce Traffic Volumes and Exposure										
16	Ensure AQ considerations are included in the new Local Development Framework Ensure policies seek to reduce the need to travel and promote the use of modes other than the car	SMBC Planning & Environmental Protection	▪ Improve air quality ▪ Reduce car use ▪ Reduce exposure to poor air quality ▪ Possible general environmental improvements ▪ Potential social and economic impacts ▪ Perceived reduction in development opportunities ▪ May increase cost of development	3	2	1	3	High 7	Ongoing	W
Using Area Planning Methods to Reduce Traffic Volumes and Exposure										

	Action / Option	Lead Role	Impacts	Costs / Benefit				Rank	Timescale	Funding
				AQ	+ive	-ive	Cost			
17	Section 106 – Investigate the practicability of S106 agreements being used to secure monitoring funding and balancing measures in applications where AQ is an issue (section 106 agreements are to be replaced in the future with two new routes which together are designed to have the same effect as section 106 does now, the provisions retain the existing negotiated route while also providing for a set contribution payable by developers).	SMBC Planning & Environmental Protection	▪ To mitigate the effects of development on air quality ▪ To secure funding to monitor impact of developments ▪ May increase cost of development	2	2	1	3	Med 6	Ongoing	W
18	AQ guidance Provide guidance in relation to air quality for developers to follow when submitting planning applications	SMBC Environmental Protection & Planning	▪ To adopt consistent approach to AQ assessments for developers	2	2	0	3	High 7	Ongoing	W
19	Support use (reopening) of Stourbridge – Walsall line for rail freight	SMBC Transportation / Planning	▪ Reduction in greenhouse gases and local air quality pollutants ▪ Reduced congestion ▪ Reduce freight on roads	2	2	1	1	Low 4	Ongoing	A

	Action / Option	Lead Role	Impacts	Costs / Benefit				Rank	Timescale	Funding
				AQ	+ive	-ive	Cost			
20	Congestion charging – the council will continue to monitor the implications and effectiveness of any congestion charging proposals	SMBC Transportation	▪ Improve air quality ▪ Raise money for transport/public transport improvements ▪ Reduced congestion ▪ Reduce noise ▪ Cost to motorist ▪ Potential equity issues ▪ Unpopular with some motorists	2	2	3	1	Low 2	2014 subject to further research	A
Using Area Planning Methods to Reduce Traffic Volumes and Exposure										
21	Development Control – continue to consider air quality issues for new planning applications in line with the agreed planning protocol	SMBC Environmental Protection & Planning	▪ Improve air quality ▪ Reduce car use ▪ Reduce exposure to poor air quality ▪ Perceived reduction in development opportunities ▪ May increase cost of development	2	3	1	3	High 7	Ongoing	W
Reducing Air Pollution from Industry, Commerce and Residential Areas										
22	Continuation of Sandwell Energy Efficiency Advice Centre	SMBC Agenda 21	▪ Improve air quality (local pollutants and greenhouse gases) ▪ Reduce energy consumption	1	2	0	3	Med 6	Ongoing	W

	Action / Option	Lead Role	Impacts	Costs / Benefit				Rank	Timescale	Funding
				AQ	+ive	-ive	Cost			
23	Improvement of the energy rating of dwellings. The Warm Zone Scheme provides general energy efficiency advice and installation of energy efficiency measures.	SMBC Housing	▪ Reduction in the amount of energy used in residential properties ▪ Reduced fuel bills for householders ▪ Reduction in the amount of greenhouse gases and local air quality pollutants emitted associated with the production of electricity	1	3	0	3	High 7	Ongoing	S
Changing Levels of Travel Demand / Promotion of Alternative Modes of Transport										
24	Promotion of Walking	SMBC Transportation (LTP commitment)	▪ Improved fitness, improved overall town, village and local environment ▪ Reduced congestion ▪ Improved choice ▪ Increased social inclusion and accessibility ▪ Perceived danger from traffic	2	3	1	3	High 7	Ongoing	S
Changing Levels of Travel Demand / Promotion of Alternative Modes of Transport										
25	Promotion of Cycling	SMBC Transportation (LTP commitment)	▪ Improved fitness ▪ Improved overall town, village and local environment ▪ Reduction in congestion ▪ Improved choice ▪ Increased social inclusion and accessibility ▪ Perceived danger from traffic	2	3	1	3	High 7	Ongoing	S

	Action / Option	Lead Role	Impacts	Costs / Benefit				Rank	Timescale	Funding
				AQ	+ive	-ive	Cost			
26	Encourage travel plans for employers, schools & hospitals	SMBC Transportation / Travel West Midlands / CENTRO (LTP commitment)	▪ Reduces parking and congestion, improve wider environment (e.g. visual amenity and noise) ▪ Fosters improved relations between company, employees and local residents ▪ Reduction in greenhouse gases and local air quality pollutants ▪ Improved choice	3	3	0	3	High 9	Ongoing	A
27	Air Quality Monitoring • Reporting of results and publicity • Produce annual reports and publish results • Regularly review suitability of monitoring	SMBC Environmental Protection	▪ Raises public awareness ▪ Informs planning process	0	3	0	3	Med 6	Ongoing	W
Changing Levels of Travel Demand / Promotion of Alternative Modes of Transport										
28	Air Quality information on website • Publish AQ action plan on web and develop other service information	SMBC Environmental Protection	▪ Raises public awareness ▪ Easy access to relevant documentation and data	1	3	0	3	High 7	Ongoing	A
29	Promote car sharing among residents and businesses in the area	SMBC Transportation	▪ Improve air quality ▪ Reduced congestion ▪ Financial savings	3	3	0	3	High 9	Ongoing	A
30	Provide air quality information and promote sustainable transport in schools	SMBC Environmental Protection	▪ Raises public awareness ▪ Influences behavioural change ▪ Improves air quality ▪ Improved fitness (for those walking and cycling)	2	3	0	3	High 8	Ongoing	A

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
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (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
…CAZ	…Clean Air Zone

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