City of
BRADFORD
METROPOLITAN DISTRICT COUNCIL

2021/2022 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

Date: June, 2022

Information	City of Bradford MDC Details
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1.0 Purpose of report

This Annual Status Report (ASR) has been produced to meet City of Bradford MDC's annual reporting requirements in relation to LAQM and the provisions of the Environment Act 1995. Its primary purpose is to examine Bradford's compliance with the UK national air quality objectives within the existing AQMAs and at other *'relevant locations'* within the wider Bradford district.

This report is not intended to form any part of the evidence base for the Government mandated Bradford CAP/CAZ (Clean Air Plan/Clean Air Zone) or provide a position statement on current compliance with EU limit values (which form the basis of the mandated CAZ requirement).

The previously prepared detailed business case for the Bradford CAP can be found here:

Link to Bradford CAP /CAZ Business case on Breathe Better Bradford website

2.0 Executive Summary: Air Quality in Our Area

2.1 Background

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

The mortality burden of air pollution within the UK is equivalent to 28,000 to 36,000 deaths at typical ages[3], with a total estimated healthcare cost to the NHS and social care of £157 million in 2017[4].

For some pollutants the government has set health based objective levels which Local Authorities must comply with. Where these objectives are not met, Local Authorities must declare Air Quality Management Areas (AQMAs) and draw up Air Quality Action Plans (AQAPs) to improve air quality. This system is known as Local Air Quality Management (LAQM). It is carried out by all Local Authorities as part of their duties under the Environment Act 1995 and subsequent regulations.

This Annual Status Report (ASR) has been produced to meet City of Bradford MDC's statutory reporting requirements in relation to LAQM and the provisions of the Environment Act 1995. Its primary purpose is to examine Bradford's compliance with the UK national air quality objectives within the existing AQMAs and at other *'relevant locations'* within the wider Bradford district.

National air quality objectives reflect the numerical value of the Air Quality Standards which central Government are legally required to meet. Whilst the numerical values of air

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

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

[3] Defra. Air quality appraisal: damage cost guidance, July 2021

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

quality standards and objectives are often the same, the places they apply and the way compliance with them is evaluated are the subject of two different regimes.

Where central Government considers additional local action is required to ensure compliance with a legally binding air quality standard it can mandate individual local authorities to deliver additional action over and above that already being undertaken locally under the LAQM regime.

In 2018, City of Bradford MDC was mandated by Ministerial Direction to work with the Joint Air Quality Unit (JAQU) (an amalgamation of the Government departments of DfT and Defra) to carry out a study (in accordance with Government guidance provided via JAQU) to identify interventions to bring forward Bradford's compliance with the EU limit values for nitrogen dioxide (NO_2).

Following completion of the study in 2020, and subsequent authorisation by JAQU and their technical independent technical review panels, the Government mandated Bradford to implement a Class C Charging Clean Air Zone (CAZ). This is due to be implemented in Bradford on the 26th September 2022. The Government has awarded the Council £39.3m to implement the CAZ, including Clean Air Funding (CAF) to support local businesses to upgrade their vehicles to CAZ standard.

The Bradford CAZ charges will not apply to private cars.

This report is not intended to form any part of the evidence base for the Government mandated Bradford CAP/CAZ or provide a position statement on current compliance with EU limit values (which form the basis of the mandated CAZ requirement).

The previously prepared detailed business case for the Bradford CAP can be found here:

Link to Bradford CAP /CAZ Business case on Breathe Better Bradford website

2.2 Air Quality in Bradford

The main air pollutants of concern in Bradford are nitrogen dioxide (NO_2) and particulate matter (PM). A significant source of these pollutants is traffic but industry, heat and power generation, domestic sources and natural activities also contribute.

In line with the rest of the UK, air quality in Bradford is generally improving, but there are places in the district which indicate persistent exceedances of the annual average nitrogen dioxide (NO_2) objective. Due to lower volumes of traffic during the Covid-19 pandemic concentrations of air pollutants in Bradford were generally lower in 2020 than in previous years. During 2021 some increases in pollutant concentrations back towards pre-pandemic levels were observed (as traffic increased) and this trend has continued into 2022.

Bradford has areas of high levels of deprivation and significant levels of health inequality. 27% of the Bradford district population live in areas classed as the 10% most deprived in England[5]. There are above average numbers of deaths from smoking, cancer, heart disease and strokes and it is estimated that emissions of man-made fine particles, PM2.5 cause 4.7% of total mortality[6]. There are marked differences in people's health within the Bradford district with people living in Wharfedale (to the north) typically living five years longer than people living in Tong (to the south). In Bradford there are more deaths as a resulting from smoking, cancer, heart disease, and strokes, and higher rates of mortality in children, than in most parts of the UK.

Poor air quality is closely linked to poor health and is frequently identified in the most deprived wards of the city. City of Bradford MDC fully recognises that improving local air quality is essential to deliver better health outcomes for all. This is particularly important for the above national average numbers of young people in the district (23.8% of the total population are under 16) whom are particularly sensitive to the effects of poor air quality. They may experience life-long impacts resulting from pollutant exposure in their early years.

[5] Link to poverty and deprivation briefing on CBMDC website

[6] Link to Office for Health Improvement and Disparities website

At present Bradford has four declared Air Quality Management Areas

- AQMA order 1 – Mayo Avenue
- AQMA order 2 – Manningham Lane / Queen's Road
- AQMA order 3 – Thornton Road
- AQMA order 4 – Shipley Airedale Road

Maps showing the locations of the AQMAs are available in Appendix D of this report or can be viewed on the council's website here: Link to maps of AQMAS on CBMDC website.

Air quality in all the AQMAs is generally improving but during 2021 there were remaining exceedances of the annual average nitrogen dioxide objective (NO_2) at monitoring sites in the Mayo Avenue, Manningham Lane and Shipley Airedale Road AQMAs. The last recorded exceedance of an air quality objective in the Thornton Road AQMA arose in 2018. The Thornton Road AQMA remains in place at present as there is still uncertainty around longer term conditions in this location post the Covid-19 pandemic.

Elevated pollutant levels have also been previously identified in other areas of the district. These include:

- Harrogate Road / Killinghall Road
- Saltaire crossroads
- Rooley Lane
- Tong Street
- Canal Road

Air quality in these areas is also generally improving but some exceedances of the annual average nitrogen dioxide objective (NO_2) still occurred around Saltaire crossroads in 2021.

During 2021 a large number of additional passive nitrogen dioxide (NO_2) diffusion tube monitoring locations were established around the district to assist with evaluation of the CAZ. This additional monitoring has highlighted futher areas of elevated pollutant concentrations around the city centre (Godwin Street, Market Street and Sunbridge Road) and along Manchester Road. Some exceedances of air quality standards and objectives may be occuring in these locations but further monitoring is needed to confirm this. Another site in Keighley showed elevated concentrations of nitrogen dioxide in 2021 but this site is currently not a relevant location for LAQM (no public exposure present near the site).

Additional monitoring has also recently been established in Ilkley and Silsden following concerns raised by residents about local air quality and the impacts of new development in these areas.

Initial partial year data from all new monitoring sites established during 2021 (annualised where necessary) are included in Appendix A of this report. They should be treated with caution as they only represent a relatively short period of monitoring and are likely to have been impacted on by the continuing aftermath of the Covid-19 pandemic. Monitoring is ongoing in all these locations and further results from these sites will be included in the 2023 ASR and in future CAZ evaluation reports.

2.3 Actions to Improve Air Quality

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

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

Bradford published its first Air Quality Action Plan in 2009 followed by the Bradford Low Emission Strategy (LES) in 2013. Bradford has also adopted the policies set out in the West Yorkshire Low Emission Strategy (WYLES) (2016). Bradford played a lead role in the development of the WYLES which sets out policies for a consistent approach to emission reduction across the West Yorkshire region.

These documents can be viewed in full here:

- Link to Bradford AQAP on CBMDC website
- Link to Bradford LES on CBMDC website
- Link to WYLES on CBMDC website

[7] Defra. Clean Air Strategy, 2019

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

Previous ASR reports have documented the measures delivered under these policies and further information is provided in Table 2.2 of this report. Some of the key projects delivered under these policies to date include:

- Development and application of the WYLES planning guidance that aims to ensure all new developments include air quality mitigation measures. The current guidance can be viewed here Link to WYLES planning guidance on CBMDC website. The guidance is due to be reviewed and updated in 2022/2023. This policy has secured the inclusion of EV charging points, low emission travel plans and additional emission mitigation measures on planning consents in Bradford since 2014.
- Development and implementation of the WYLES Low Emission Procurement Guidance which seeks to ensure emission impacts are considered during procurement of goods and services in Bradford. The current guidance can be viewed here Link to WYLES Low Emission Procurement Guidance on CBMDC website
- Undertaking of the Bradford and West Yorkshire Low Emission Zone feasibility study (2015). This has now been superseded by the Government mandated Bradford CAP and imminent implementation of the Bradford Clean Air Zone.
- A series of regional bus retrofit programmes
- Implementation of 88 electric taxi recharging points across the WYLES region Link to taxi recharging scheme information on WYCA website
- Anti-idling awareness activities in schools
- Introduction of Enterprise Car Clubs across the district
- Opening of new railways stations at Apperley Bridge (2015) and Low Moor (2017)
- Opening of the Bradford to Leeds Cycle Superhighway scheme which has now recorded over 1,000,000 cycle trips Link to Cycle Superhighway information on the City Connect website
- Introduction of electric vehicles into the CBMDC fleet, with an ambition for all cars and vans less than 3.5 tonnes to be replaced with electric by 2024.
- Introduction of a corporate cycle to work scheme in Bradford

Despite the large number of projects that have already been undertaken in Bradford to improve air quality, areas of the district continue to see exceedances of the national air quality objectives and EU air quality standards.

In 2018, City of Bradford MDC was mandated by Ministerial Direction to work with the Joint Air Quality Unit (JAQU) (an amalgamation of the Government departments of DfT and Defra) to carry out a study (in accordance Government guidance provided via JAQU) to

identify interventions to bring forward Bradford's compliance with the EU limit values for nitrogen dioxide (NO_2).

Following completion of the study in 2020, and subsequent sign-off by JAQU and their technical independent technical review panels, the Government mandated Bradford to implement a Class C Charging Clean Air Zone (CAZ). This is due to be implemented in Bradford on the 26th September 2022.

The Bradford CAZ charges will not apply to private cars.

The Government has awarded the Council £39.3m to implement the CAZ, including Clean Air Funding (CAF) to support local businesses to upgrade their vehicles to CAZ standard. This represents the highest funding award for a CAZ of this type in the UK.

So far this has resulted in:

- 89% of Bradford's 3700 licensed taxis being CAZ compliant. Bradford now has the cleanest taxi fleet in UK with drivers also benefiting from substantial fuel cost savings
- 85% (over 300) local buses upgraded ensuring all scheduled and tendered services meet CAZ standard. An additional £10 million of Government Zero Emission Bus Fund (ZEBRA) will see the introduction of 40 new electric buses during 2023.
- Defrayment of £7.4m to assist businesses to upgrade over 20% of all lorries operating in the district

- Upgrade of up to 50 coaches in the district
- Over 2,000 grant applications for £4,500 received from local businesses to help upgrade vans to CAZ standard.

The CAZ will cover an area of 22.4 km^2. 16 km of digital ducting has been prepared to support the CAZ, including development of 6 new fibre digital rings around the City and installation of over 360 cameras and 1,250 signs.

Bradford's CAZ will go live on Monday 26 September 2022. It is expected to reduce Bradford's NO_2 levels by up to 35% resulting in widespread compliance with legal limits across the district. CO2-equivalent (CO2e) emissions are also expected to reduce by 147,000 tonnes over the lifetime of the CAZ.

Further details about the Bradford CAZ and the supporting documents can be found on the Breathe Better Bradford website available here: Link to CAZ information on Breath Better Bradford website.

The area to be covered by the Bradford CAZ is shown in Appendix D.

Whilst compliance with legal limits is the main driver for the CAP/CAZ implementation, health improvement and reduction in greenhouse gases are both key secondary aims. As a result of the measures in the CAP air quality is expected to improve across all Bradford wards leading to a 10% reduction in emergency hospital admissions for heart disease, COPD, respiratory disease and asthma which currently account for 380 hospital admissions per week in the Bradford. The resultant savings to the NHS are expected to be substantial.

City of Bradford MDC is working closely with health researchers at Born in Bradford (BiB), to evaluate the health change associated with the CAP. Bradford is the only Local Authority in the UK to be undertaking this type of research. The research is funded through a £1.1m National Institute for Health Research (NIHR)/NHS bid. The project has collected baseline data to inform the success of the CAP in improving health, and is keeping track of the project as vehicles move across to cleaner alternatives via the support programmes. The project has a strong emphasis on community engagement and inclusion. The project has worked intensively with 12 schools in 2021 (both inside and outside the CAZ) with children recruited as air pollution scientists and provided with air pollution monitoring equipment to use on their daily journey to school.

The Council has also worked with partners to hold creativity labs for local schools where children were invited to find ‘solutions to pollution’. Following workshops at the schools an event was held at Bradford City Hall in 2021 with BBC Look North in attendance. The event was hosted by Council Leader Susan Hinchcliffe with the children pitching their air quality improvement ideas to an expert panel.

In March 2022 Chris Whitty (England’s Chief Medical Officer) visited Bradford and met with members of the Bradford Clean Air Programme team and Born in Bradford. As a result of this visit the Chief Medical Officer Report for 2021 will focus on air quality and will include a case study of Bradford’s air quality improvement work with Public Health colleagues and NHS researchers.

Over the coming year CBMDC has further plans to work with BiB, the University of York and the University of Bradford to further investigate indoor and outdoor concentrations of particulate matter in the district. Early planning is also taking place for the introduction of policies to encourage the uptake of low emission Non-Road Mobile Machinery (NRMM) in the district. This work is being undertaken in conjunction with London Local Authorities who already have a successful NRMM registration and improvement scheme in place. Both projects will be funded from the £253K air quality grant fund obtained by the Bradford Clean Air Programme team during March 2022 and will contribute towards the development of a wider Particulate Reduction Strategy (PRS) for Bradford. A further update on the progress of the 2021/22 air quality grant project will be provided in the 2023 ASR.

Air quality is impacted on by many activities especially those that impact on local highways or create new direct emissions to air. The Bradford Clean Air Programme team routinely work with colleagues across the council and from the West Yorkshire Combined Authority

(WYCA) to ensure that changes to the local road network in Bradford and any new large developments are adequately assessed for air quality impacts and mitigated accordingly.

Bradford is committed to a clean growth agenda that includes improved rail connectivity, mass transit systems and alternative fuel infrastructure. These will be designed and implemented in a way which continues to support clean air and carbon reduction whilst allowing the city to grow and thrive. The schemes will be funded through a £317 million West Yorkshire Transforming Cities Fund from the Department for Transport (DfT) (plus local match funding up to £140 million). More information on what the TCF fund will deliver for Bradford is available here:

Link to Transforming Cities Fund Programme for Bradford on WYCA website

Further air quality modelling has recently been commissioned to assess the long term impacts of the Bradford Local Plan and there are longer term plans to create a hydrogen bus test bed and an advanced fuel centre in the district.

Further information on the work the Bradford Clean Air Programme team is doing to assess, mitigate and monitor the impact of large infrastructure schemes and planning applications can be found in Appendix C.

2.4 Conclusions and Priorities

Air quality is generally improving across the Bradford District with some areas improving faster than others. There was a clear impact on all areas from the Covid-19 pandemic in 2020. The post Covid-19 situation is not yet clear with some 2021 concentrations being lower than before the pandemic and others higher. Exceedances of the annual average nitrogen dioxide (NO_2) objective still exist at monitoring locations, both within and outside the existing AQMAs. New additional areas of possible exceedance have been identified during 2021 following expansion of the diffusion tube monitoring network into other areas to evaluate the impact of the CAZ.

During 2022/23 the main focus of air quality improvement work in Bradford will continue to be the infrastructure, grant allocation, evaluation and marketing and communications workstreams associated with the launch of the CAZ.

The council will also progress plans for a Particulate Reduction Strategy (PRS) during 2022/23. The main challenges for this project will be the time taken to procure new monitoring equipment and obtaining access to individual homes to monitor indoor air quality. To reduce these risks the council is partnering with professional researchers at

BiB and University of York who already have extensive experience in undertaking community based monitoring projects. The NRMM aspect of the PRS is being developed in conjunction with London authorities who already have a good understanding of the construction industry and experience of undertaking on site equipment inspections.

Clean Air Programme officers at the council will continue to input into major highway and infrastructure improvement schemes and will continue to routinely review and comment on all relevant planning applications to ensure appropriate levels of emission mitigation and exposure reduction are implemented. The main challenges in these areas will be staffing resources to adequately assess all schemes and the ability to achieve ongoing sustainable growth. The West Yorkshire Low Emisison Planning guidance is in need of updating and this will be progressed with colleagues across the other West Yorkshire authorities over the coming year.

In accordance with the LAQM Covid-19 Supplementary Guidance[9], City of Bradford MDC will delay revocation of existing AQMAs, or the creation of any new AQMAs at this time as data has clearly been affected by Covid-19 impacts. This will also allow time for the CAZ to become operational and fully evaluated.

Bradford's current Air Quality Action Plan (2009) has been superseded by the Bradford Low Emission Strategy (2013) and the CAP (2019). It is recognised that the current AQAP needs fully updating to reflect the content of the Bradford LES and CAP and this will be progressed once sufficient resource is available to do so. At present the main focus of the Clean Air Programme team is the delivery of the CAZ. Outstanding administrative LAQM functions will be addressed once this is fully live.

2.5 Local Engagement and How to get Involved

CBMDC has previously consulted decision makers and the public on the declaration of AQMAs, the development of the Bradford and West Yorkshire Low Emission Strategies and on various infrastructure and highway improvement programmes.

Public consultations undertaken by CBMDC are usually made available via the council website here: Link to public consultation pages on CBMDC website .

[9] Link to LAQM supplementary guidance on covid-19 for laqm reporting in 2021

Consultation on WYCA funded schemes are usually consulted on via the WYCA website here: Link to public consultation pages on WYCA website

All planning applications received by CBMDC are made available for public review and comment on the Bradford planning portal Link to CBMDC planning portal.

Recent consultation activities relating to air quality improvement have been focused on the development of the Clean Air Zone. This has been complimented by a local publicity campaign and will also involve a more regional campaign covering the area within a one-hour drive of Bradford. A full public consultation on the CAZ proposals took place between February and April 2020. A number of workshops and events were held with transport operators, businesses and members of the public. There were 1637 responses to the consultation including 744 taxi drivers/operators and 88 businesses. Two thirds (67%) of respondents agreed that improving air quality should be a priority for the Council, 21% disagreed and 12% were unsure. The full results of the CAZ consultation are available on the Breathe Better Bradford website here: Link to CAZ consultation information on Breathe Better Bradford website.

The council continues to engage with all CAZ stakeholders using a wide range of different engagement methods to ensure the local community and businesses are fully aware of the

CAZ requirements /implementation dates and the exemption and vehicle upgrade grant opportunities available.

A telephone helpline has been set up specifically
CAZ related enquiries:

Clean Air Zone enquiries: 01274 435533

Opening hours:

Monday to Thursday, 8.30am to 5pm

Friday 8.30am to 4.30pm

To date there have been over 75,000 visitors to the Breathe Better Bradford website.

CBMDC actively supports Clean Air Day and as detailed above has undertaken a variety of air quality engagement work in schools.

In order to improve air quality in Bradford and reduce exposure to pollution, CBMDC advises residents to make simple changes to their everyday life;

- If able, reduce your vehicle use by walking and cycling for shorter journeys. Try and pick routes which are not as heavily trafficked (e.g. through parks and lesser used streets) to reduce the amount of pollution exposure.
- Make the most of public transport as an alternative to using a car, this can save money and reduce impact on the environment. Check out the information on the Council website for local transport provision and see if it can help better plan journeys - Link to public transport information on CBMDC website
- If you have children who are travelling to school consider the advice on the Council website to help make this journey more sustainable and improve their health - Link to sustainable school travel advice on CBMDC website
- If you own a vehicle which is regularly driven in urban areas, think about the impact on the environment when the time comes to replace it. Consider low emission alternatives, such as hybrids and electric vehicles. Although the initial purchase price may seem high in the longer term they may prove more cost effective through reduced fuel and tax costs. Government grants are available to help with the purchase of some low emission vehicles. More information is available here:

  Link to UK Government information on EV vehicle grants

If you need to own a vehicle and cannot replace it just yet you can still reduce your impact on the environment by following these ECO-driving tips:

- **Switch off your engine when parked**, especially outside schools and homes where children and residents are present.
- **Check your tyres -** Under-inflated tyres mean an engine has to work harder and will produce more emissions.
- **Clear the clutter -** remove unnecessary clutter from your boot and reduce engine workload.
- **Stick to the speed limit -** high speeds produce more emissions. At 70mph a driver could be using up to 15 per cent more fuel than at 50mph.
- **Slow down as you approach traffic jams** - Stop-start traffic jams use more fuel. Slow down early and take your foot off the accelerator. Use the stop start technology on your vehicle if it has it.
- **Close windows and cut down on the use of air conditioning** to reduce emissions
- **Share your journeys** - consider using the West Yorkshire car share scheme to help with this.
- If you have a solid fuel appliance, such as a wood burning stove, ensure you use it correctly with approved dry fuels to minimise smoke emissions. If you live in a Smoke Control Area (SCA) you must comply with the legal requirements for smokeless zones. Residents are advised that if they fail to comply they could risk a fine of up to £1,000 per offence. More information on SCAs is available here:

  Link to Smoke Control area information on CBMDC website

More information on smoke control rules can be found here:

Link to smoke control rules on UK Government website

Even if you don't live in a SCA you must avoid creating a smoke nuisance.

Link to smoke nuisance information on UK Government website

If you live in an urban area, consider buying a 'low nitrogen oxide' boiler the next time it requires replacement.

If you would like to see more done to improve air quality in your area then you could contact the local Councillor or MP and tell them about your concerns or ideas. To find out who your local Councillor or MP is and how to contact them;

Link to local democracy information on CBMDC website

Link to UK Parliament website

For more information on national campaigns to improve air quality visit;

Link to Global Action Plan Clean Air Day website

Link to Client Earth website

Link to Friends of the Earth website

Daily national air quality updates, pollution forecasts and advice about how to protect yourself from the impacts of poor air quality can be found at:

Link to UK Air website operated by Defra

2.6 Local Responsibilities and Commitment

This ASR was prepared by the Clean Air Programme team of City of Bradford MDC with the support and agreement of the following officers and departments:

- Planning, Transportation & Highways
- Health and Well Being

These additional partners support air quality work in Bradford

- West Yorkshire Combined Authority (WYCA)
- Born in Bradford (BiB)

This ASR has been approved by:

Andrew Whittles, Air Quality Programme Director, Department of Place

This ASR has not been signed off by a Director of Public Health as Bradford has a dedicated Air Quality Programme Director directly responsible for air quality monitoring and improvement and who regularly briefs the DPH and Members on all air quality matters.

If you have any comments on this ASR please send them to Elizabeth Bates report author at:

Clean Air Programme

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3.0 Local Air Quality Management

This report provides an overview of air quality in Bradford during 2020 and 2021. 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 normally an annual requirement showing the strategies employed by City of Bradford MDC to improve air quality and any progress that has been made. Due to ongoing work to establish a charging Clean Air Zone (CAZ) in Bradford during 2020 / 2021 special permission has been arranged with Defra to produce a single joint 2021/2022 ASR report on this occasion. City of Bradford MDC intends to return to an annual reporting schedule in 2023.

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

4.0 Actions to Improve Air Quality

4.1 Air Quality Management Areas

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

A summary of AQMAs declared by City of Bradford MDC can be found in Table 4.1. The table presents a description of the 4 AQMA(s) that are currently designated within City of Bradford MDC.

Appendix D: Map(s) of Monitoring Locations and **AQMAs** provides maps of AQMA(s) and also the air quality monitoring locations in relation to the AQMA(s). The air quality objectives pertinent to the current AQMA designation(s) are as follows:

- NO_2 annual mean*

** All the AQMAs in Bradford were originally declared for both the annual and hourly NO_2 objectives but only the annual average objective is now at risk of being exceeded*

No changes to Bradford's current AQMA declarations are planned at present.

A charging Clean Air Zone (CAZ) will come into force in Bradford on Monday 26th September 2022 covering the area of Bradford shown in Appendix D. The CAZ is being introduced to address ongoing exceedances of annual average limit values for nitrogen dioxide in response to a Government issued mandate to bring levels of nitrogen dioxide (NO_2) within legal limits in the shortest possible time. More information about the Clean Air Zone is available here: Link to the Breathe Better Bradford website.

Table 4.1 – Declared Air Quality Management Areas

0	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by National Highways?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
Mayo Avenue / Manchester Road (order 1)	2006	NO_2 annual mean	An area surrounding the junction of the A6177 and A641 with terrace housing and a primary school close to the roadside	NO	57 (Mayo Ave at continuous monitoring station not distance corrected)	35.3 (Mayo Ave distance corrected diffusion tube DT104)	Bradford Clean Air Plan (2020) Bradford Low Emission Strategy (2013) Bradford AQAP (2009)	Visit the AQAPs for Mayo Ave AQMA Link to Bradford Clean Air Plan (CAP) Link to Bradford Low Emission Strategy Link to Bradford Air Quality Action Plan
Manningham Lane / Queens Road (order 2)	2006	NO_2 annual mean	An area surrounding the junction of the A6177 and A650 with terrace housing close to the roadside	NO	33 (Manningham Lane at continuous monitoring station not distance corrected)	48.8 (Queens Road in line with receptor (*fallen from 54 in 2008)*	Bradford Clean Air Plan (2020), Bradford Low Emission Strategy (2013), Bradford AQAP (2009)	Visit the AQAPs for Manningham Lane Link to Bradford Clean Air Plan (CAP) Link to Bradford Low Emission Strategy Link to Bradford Air Quality Action Plan
Thornton Road (order3)	2006	NO_2 annual Mean	A canyonised area adjacent to the B6145 with residential accommodation and student accommodation adjacent to the road	NO	35 (Thornton Road continuous monitoring station at relevant receptor)	34 (Thornton Road continuous monitoring station at relevant receptor)	Bradford Clean Air Plan (2020), Bradford Low Emission Strategy (2013), Bradford AQAP (2009)	Visit the AQAPs for Thornton Road Link to Bradford Clean Air Plan (CAP) Link to Bradford Low Emission Strategy Link to Bradford Air Quality Action Plan

0	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by National Highways?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
Shipley Airedale Road (order 4)	2006	NO_2 annual mean	An area of the A650 Shipley Airedale Road where apartments are adjacent to multi-lane traffic flow	NO	68 (Shipley Airedale Rd continuous monitoring station not distance corrected)	49.5 (Shipley Airedale Rd distance corrected diffusion tube DT12)	Bradford Clean Air Plan (2020), Bradford Low Emission Strategy (2013), Bradford AQAP (2009)	Visit the AQAPs for Shipley Airedale Road Link to Bradford Clean Air Plan (CAP) Link to Bradford Low Emission Strategy Link to Bradford Air Quality Action Plan
Mayo Avenue / Manchester Road (order 1)	2006	NO_2 1 hour mean	An area surrounding the junction of the A6177 and A641 with terrace housing and a primary school close to the roadside	NO	unknown	147 (at monitor)	Bradford Clean Air Plan (2020), Bradford Low Emission Strategy (2013), Bradford AQAP (2009)	Visit the AQAPs for Mayo Ave Link to Bradford Clean Air Plan (CAP) Link to Bradford Low Emission Strategy Link to Bradford Air Quality Action Plan
Manningham Lane / Queens Road (order 2)	2006	NO_2 1 hour mean	An area surrounding the junction of the A6177 and A650 with terrace housing close to the roadside	NO	unknown	126 (at monitor)	Bradford Clean Air Plan (2020), Bradford Low Emission Strategy (2013), Bradford AQAP (2009)	Visit the AQAPs for Manningham Lane Link to Bradford Clean Air Plan (CAP) Link to Bradford Low Emission Strategy Link to Bradford Air Quality Action Plan
Thornton Road (order 3)	2006	NO_2 1 hour mean	A canyonised area adjacent to the B6145 with residential	NO	unknown	119 (at monitor)	Bradford Clean Air Plan (2020), Bradford Low	Visit the AQAPs for Thornton Road Link to Bradford Clean Air Plan (CAP)

0	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by National Highways?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
			accommodation and student accommodation adjacent to the road				Emission Strategy (2013), Bradford AQAP (2009)	Link to Bradford Low Emission Strategy Link to Bradford Air Quality Action Plan
Shipley Airedale Road (order 4)	2006	NO_2 1 Hour mean	An area of the A650 Shipley Airedale Road where apartments are adjacent to multi-lane traffic flow	NO	unknown	161 (at monitor)	Bradford Clean Air Plan (2020), Bradford Low Emission Strategy (2013), Bradford AQAP (2009)	Visit the AQAPs for Shipley Airedale Road AQMA Link to Bradford Clean Air Plan (CAP) Link to Bradford Low Emission Strategy Link to Bradford Air Quality Action Plan

☒ City of Bradford MDC **confirm the information on UK-Air regarding their AQMA(s) is up to date.**

☒ City of Bradford MDC **confirm that all current AQAPs have been submitted to Defra.**

4.2 Progress and Impact of Measures to address Air Quality in Bradford

Defra's appraisal of Bradford's last published ASR report (ASR 2020) concluded that the report was well structured, detailed, and provided the information specified in guidance. It was noted that there was a robust discussion of trends and that the mapping of monitoring locations and AQMAs was comprehensive.

The following areas for further investigation / improvement were identified:

1. Due to the slight increased trend in PM10 since 2014, and PM2.5 since 2017 the Council was encouraged, where practicable, to develop and implement robust measures to prevent further increase, given the well-documented adverse health impacts of exposure.

Action taken to date:

As detailed elsewhere in this report the council is in the final stages of implementing a charging Clean Air Zone. The primary driver for the CAZ is reduction of emissions of NO_2 to meet NO_2 limit values but the replacement and upgrading of the diesel fleet will also deliver significant reduction in local emissions of diesel exhaust particulate, particularly PM2.5 emissions which are the most harmful to health. 89% of the local taxi fleet has already been upgraded to become CAZ compliant. 40 new electric buses are due to enter the district in 2023 (ZEBRA funded). There are longer term plans to create a hydrogen bus test bed, an advanced fuel centre, Park and Ride facilities and further subsidised EV charging and infrastructure.

Transport is not the only source of harmful particulate emissions. In October 2021 the Council made a successful £235K Air Quality Grant bid application to support development of a wider Particulate Reduction Strategy. This strategy will seek to reduce particulate emissions from sources other road transport. The main elements of the project will be:

a) A community led investigation into the impact of domestic solid fuel burning on both indoor and outdoor air quality, supported by local interventions to reduce the impact of solid fuel use;
b) A particulate reduction marketing and communications campaign focused on reducing domestic PM emissions and minimising personal exposure;

c) A pilot scheme to control Non-Road Mobile Machinery (NRMM) emissions on construction sites, initially within the Bradford CAZ and with potential to be rolled out across the district and into the wider West Yorkshire region.

In addition, the Council continues to deliver a large number of other local air quality improvement and education activities as detailed in Table 2.2 and section 2.3 of this report which will further contribute to particulate emission reduction in Bradford. Health improvement is a main driver for the CAP/ CAZ implementation which is expected to improve air quality across all Bradford wards leading to a 10% reduction in emergency hospital admissions for heart disease, COPD, respiratory disease and asthma which currently account for 380 hospital admissions per week in the Bradford. The resultant savings to the NHS are expected to be substantial.

The PM10 and PM2.5 results for 2020 and 2021 detailed in this report are lower than all those reported in previous years.

2. A general improvement in annual mean NO_2 concentrations was noted compared to 2017/18, however concentrations within 2 of the Council's AQMAs were higher in 2019 at relevant exposure than they were at declaration. Further investigation is required in order to determine the reasons for this, and robust action is required to reduce concentrations in these areas.

The locations this comment relates to are Manningham Lane (AQMA 2) and Thornton Road (AQMA 3). Both these AQMAs were declared in 2006. At the time of the declarations the only data available were from the real time analysers in these areas. Following the declaration further diffusion tube monitoring was introduced around these areas and some of these sites returned higher values at the new receptor points than the original real time monitoring locations. This accounts for the large disparity in the values at declaration and in Table 2.1 of the recent ASR reports i.e. they relate to different relevant locations with the AQMAs. Continued air quality improvement is expected in both these locations due to the following:

a) Both the AQMAs are within the proposed CAZ. NO_2 reductions of around 10 to 12 $\mu g/m^3$ are expected at worst case receptor points in both these areas as a result of the CAZ (based on a 2018 baseline). Contour plots showing the modelled reduction in NO_2 concentrations before after the introduction of the CAZ can be viewed via this link:

Map of modelled NO_2 concentrations before and after CAZ introduction hosted on the Breathe Better Bradford website

b) A £47m route improvement scheme is being developed for the Bradford to Shipley corridor. Initial proposals include making the A650 Bradford Road / Keighley Road / Manningham Lane into a high quality green route with improvements for buses, pedestrians and cyclists. Some of the current traffic flow on the A650 would be diverted to a new high capacity route along Canal Road and Valley Road which should, in combination with the green route, result in significant reductions in air quality exposure in Manningham. The scheme is currently at the consultation stage. More information about the proposals is available here:
West Yorkshire Combined Authority consultation pages for the Bradford Shipley Route Improvement Scheme

c) A West Bradford Cycle Superhighway extension is currently being planned to create a segregated cycle route between Bradford city centre and Thornton village along Thornton Road. The route will pass directly through the Thornton Road AQMA. The scheme would be an extension of the existing Bradford Leeds Cycle Superhighway. The aim is to create greater opportunities for local trips to be made safely by cycle resulting in reduced local car trips along Thornton Road and surrounding routes. The scheme is currently in the development phase. More information about the proposed scheme is available here:
West Yorkshire Combined Authority consultation pages for the West Bradford Cycle Superhighway extension

3. As the AQAP is nearing the 5-year age mark, the Council are encouraged to consider updating their AQAP to address newly identified areas of concern, and ensure concentrations do not continue to increase within their AQMAs.

At the present time City of Bradford MDC is prioritising delivery of the measures in the Government mandated Clean Air Plan (CAP), including the launch of the CAZ. The CAP development included detailed modelling of Bradford's major urban road network against a 2018 baseline. The authority is confident that all current areas of concern relating to traffic emissions (including the current AQMAs) have been identified by the recent CAP modelling and that the CAP includes sufficient measures to address these in the immediate future. The diffusion tube monitoring network has been significantly expanded to cover the whole of the CAZ area and expected diversion routes to evaluate the impact

of the CAZ over the next five years. This additional monitoring will provide a high level of spatial intelligence about air quality conditions across the district and will quickly identify any areas that have not been adequately addressed via the CAZ. Should this arise additional localised air quality improvement measures will be need to be developed.

Further air quality modelling has recently been commissioned to assess the longer term impacts of the Local Plan. Bradford is already committed to a clean growth agenda that includes improved rail connectivity, mass transit systems and alternative fuel infrastructure. These will be designed and implemented in a way which continues to support clean air and carbon reduction whilst allowing the city to grow and thrive. The schemes will be funded through a £317 million West Yorkshire Transforming Cities Fund from the Department for Transport (DfT) (plus local match funding up to £140 million). More information on what the TCF fund will deliver for Bradford is available here:

Link to Transforming Cities Fund Programme for Bradford on WYCA website

It is acknowledged that the Bradford AQAP (2009) requires updating to reflect the CAP measures, the Bradford Low Emission Strategy measures (adopted 2013) and to reconsider the impact of other emission sources around the district (particularly those relating to PM emissions). This will be addressed once the CAZ and associated evaluation programme have been fully established and there is more resource time available to update the AQAP. It is currently anticipated that this work will be able to commence in 2022/2023.

As detailed above City of Bradford MDC has taken forward a number of direct measures during the current reporting years of 2020 and 2021 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 4.2.

26 measures are included within Table 4.2, with the type of measure and the progress City of Bradford MDC have made during the reporting year of 2021/22 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 4.2.

More detail on these measures can be found in the Bradford AQAP, the Bradford Low Emission Strategy and the more recent Bradford Clean Air Plan (CAP).

City of Bradford MDC expects the following measures to be completed over the course of the next reporting year:

- CAZ to go live on 26th September 2022 and continued defrayment of vehicle improvement grants to local businesses and transport operators

- 40 new electric buses to be introduced in 2023 (ZEBRA funded)

City of Bradford MDC's other priorities for the coming year will be:

- Evaluation of the CAZ implementation
- Commencement of particulate reduction strategy measures (funded by 2021/22 air quality grant fund
- Continued planning / delivery of major infrastructure projects including Park and Ride development, cycle superhighway extension, transport interchange improvements and major junction improvements / relief road provisions
- Continued public consultation and school / community engagement activities
- Creation of a hydrogen bus test bed and advanced fuel centre
- Additional subsidised EV charging infrastructure for local communities
- Review and update of local low emission planning guidance

City of Bradford MDC has worked to implement these measures in partnership with the following stakeholders during 2020/2021:

- Bradford taxi operators
- Local bus operators
- Local business community
- Local schools
- Residents
- Born in Bradford (BiB)
- Joint Air Quality Unit (JAQU)
- University of Bradford
- University of Leeds
- West Yorkshire Combined Authority
- West Yorkshire Travel Plan Network

The availability of new vehicles and upgrade equipment has been a challenge for delivery of the CAZ but is being overcome locally through the allowance of 'sunset periods' for businesses that have applied for improvement grants and /or provided evidence that orders for new vehicles are in place. Operators in this position will be able to operate their current vehicles free of charge in the CAZ until their new vehicles are delivered. The original launch date for the CAZ was January 2022 but this was extended to give local businesses more time to prepare.

City of Bradford MDC anticipates that the measures stated above and in Table 4.2 will achieve compliance in all AQMAs and the wider CAZ area.

The measures presented in Table 2.2 are arranged in chronological order of introduction.

The effectiveness of the measures in Table 2.2 is indicated by the shade of the colours.

The lighter shaded measures will have only a relatively small impact or take longer to implement.

The darker shaded measures are those which are expected to deliver the greatest or fastest emission reductions in Bradford.

Table 4.2: Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	On-going implementation and review of the Bradford Low Emission Strategy (LES)	Policy Guidance and Development Control	Low Emissions Strategy	2013	Policy completed 2013.	CBMDC , WYCA, BiB, Local universities, local developers	Defra air quality grant of £102,000 provided to develop the LES Various Government/ WYCA/CBMDC/BiB/ academia funded infrastructure / research/ education projects delivered as part of the LES. Local LES infrastructure (e.g. EV charging points) provided by local developers as a requirement of planning conditions	Yes	Funded	£100K-£500K (cost reflects policy development and on-going local administration only – not the cost of individual measures)	Implementation	Contains many policies to address emissions from vehicles and other sources in Bradford	Level of measured ongoing air quality improvement in Bradford AQMAs	This is a live document subject to on-going local delivery and review in response to national, regional and local policy developments	Availability of staff to continually update and implement measures Availability of funding for major schemes and the amount of time and resources needed to develop successful funding bids.
2	Bradford low emission planning guidance	Policy Guidance and Development Control	Clean Air Planning and Policy Guidance	2013	Policy completed 2013.	City of Bradford MDC, Local developers	Defra air quality grant of £102,000 provided to develop the LES and associated guidance	Yes	Funded	£100K-£500K (cost reflects policy development and on-going local administration only. Does not include the cost of on-site emission mitigation provided by individual developers as a result of this guidance	Implementation	Prevention and mitigation of vehicle and point source emissions from new development on a case by cases basis.	Number of EV charging points delivered on new developments	LES planning guidance routinely applied to all planning applications since 2014 Number of EV charging points conditioned currently estimated at around 8,000+	LES planning guidance requires updating to reflect new building control EV charging requirements and to address domestic heating emissions.
3	Bradford / WY LEZ feasibility study	Promoting Low Emission Transport	Low Emission Zone (LEZ)	2013	2015	CBMDC in conjunction with City of Leeds Council	DEFRA air quality grant 2013 £50,000	Yes	Funded	£50k -£100K for feasibility study >£10m to implement	Aborted	LEZ study indicated NOx emission of 195.6 tonnes on Bradford outer ring road. The more recent CAP proposals are expected to achieve full compliance with the NO2 objectives across the whole district by 2023.	Not applicable	LEZ not implemented. Superceded by Bradford Clean Air Plan (CAP) / CAZ	Following completion of the LEZ feasibility study both Leeds and Bradford were mandated to undertake new CAP feasibility studies at different times resulting in two different CAZ plans to replace the regional LEZ concept. The Leeds CAZ is currently on hold. The Bradford CAZ is due to commence in September 2022.

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
4	Feasibility study for Alternate Fuel Centre	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2013	2013	City of Bradford MDC	Feasibility study funded from DEFRA LES funding	Yes	Funded	<£10K	Completed	77 tonnes NO_x saving predicted from gas re-fuelling facilities (from 2013 feasibility study)	Not yet set	Feasibility study completed. Gas vehicle trials completed	Development of an alternative fuel centre is still under consideration including possibility of a hydrogen test bed.
5	Bradford bus retrofitting programme	Vehicle fleet efficiency	Vehicle retrofitting programmes	2014	2015	City of Bradford MDC in partnership with local bus operators	CVTF (2014) £394,998	No	Funded	£100K-£500K	Completed	Real world (PEMS) emission testing of the retrofitted buses showed a 95% reduction in NO_x emissions and improvements in air quality in Manningham Lane	Number of buses retrofitted	25 Euro III buses in Bradford retrofitted with SCRT. 11 in the city centre and 14 on Manningham Lane	Bradford CAZ-C implementation will set minimum Euro 6 equivalent standard for all local bus services operating in the CAZ.
6	Voluntary emission standards for buses	Promoting Low Emission Transport	Other	2015	2021	City of Bradford MDC / (WYCA / Bus operators	n/a - additional improvements funded by bus operators	No	Not funded	<10k Cost reflects CBMDC staff time on liaison with bus companies only, not the cost of improvements made.	Completed	24.7 tonnes of NOx reduction estimated for first local agreed target of Euro IV by 2018	Number of buses meeting locally agreed emission standard targets	Good progress was made with locally negotiated bus fleet emission reductions prior to the introduction of the CAZ standards that are now driving local bus improvements.	Measure now superceded by formal CAZ entry standards for buses.
7	Car clubs	Alternatives to private vehicle use	Car Clubs	2015	On-going implementation	CBMDC/ WYCA / Enterprise	No funding is provided to Enterprise to run the scheme. The original contract provided upfront promotion and vehicle leasing funding only (WYCA Local Transport Plan ITB funding).	No	Partially Funded	<10k	Implementation	Enterprise estimate that each round trip in one of their car share vehicles replaces 10.5 other vehicles. Enterprise car club vehicles are also estimated to produce 43% less CO2 from tailpipe emissions than the average UK car	Number of registered car club members	In September 2020 there were 363 individuals and 1618 corporate members registered with the Enterprise car scheme across West Yorkshire and York.	Scheme currently operating from 11 sites in Bradford. Further expansion of the scheme still anticipated in future years. Expected rate of expansion into other locations impacted on by Covid pandemic.
8	Adoption of West Yorkshire Low Emission Strategy	Policy Guidance and Development Control	Low Emissions Strategy	2016	Policy completed 2016.	City of Bradford MDC in conjunction with City of Leeds Council, Wakefield City Council, Calderdale Council and Kirklees Council	£150,0000 DEFRA air quality grant (2012)to develop the strategy and additional contributions from the WY LAs to deliver various measures around the region	Yes	Funded	£100K-£500K (cost reflects policy development and on-going administration only – not the cost of individual emission reduction measures)	Implementation	Contains many policies to address emissions from vehicles and other sources in West Yorkshire	Level of measured ongoing air quality in West Yorkshire	This is a live document subject to on-going local delivery and review in response to national, regional and local policy developments	Loss of dedicated WYLES officer post in 2021 and availability of remaining WY officers to update the WYLES and ensure continued implementation. Availability of funding for major schemes and the

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
															amount of time and resources needed to develop successful regional funding bids.
9	WYLES procurement guidance	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	2016	2016	City of Bradford MDC in conjunction with City of Leeds Council, Wakefield City Council, Calderdale Council and Kirklees Council	DEFRA air quality grant 2012 £150,0000	Yes	Funded	£100K-£500K (cost reflects policy development and on-going local administration only. Does not include any additional costs of procuring lower emission vehicles compared to conventional vehicles)	implementation	Reduced emission impact from vehicle based services and transport procured by WY LAs. Contracts assessed on an individual basis by several LAs. Overall impact difficult to quantify.	Number of contracts the policy is applied to in Bradford	Ongoing implementation within individual LAs	LEV procurement policy 5% of award decision as part of procurement policy (social values)
10	Low emission procurement policies for City of Bradford MDC fleet	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	2013	2016	City of Bradford MDC	In house project	No	Funded	<£10K (cost reflects policy development and on-going local administration only. Does not include any additional costs of procuring lower emission vehicles compared to conventional vehicles)	Implementation	Reduction of 332t/CO2e 2014/15-2015/16 via procurement of 7 electric vans and 2 electric pool cars with 3 additional charging stations	Number of CAZ compliant vehicles in CBMDC fleet	Whole life costs have been introduced into vehicle procurement considerations including air quality damage costs.	CBMDC now working towards making all council fleet cars and vans < 3.5 tonnes electric by 2024
11	Cycle Super Highway	Transport Planning and Infrastructure	Cycle network	2013	2016	City of Bradford MDC / WYCA (Metro)/ City Connect Partnership	DfT £18M £11M local funding	No	Funded	>£10M	Implementation	An estimated one million journeys have been made on the cycle superhighway since it opened in 2016. Actual emission savings have not yet been quantified.	Number of cycle journeys	Main scheme opened in 2016 Additional Shipley to Bradford (Canal Road) section opened May 2019	Further extension planned for Thornton Road as part of TCF allocation for Bradford
12	Delivery of new railway stations at Apperley Bridge and Low Moor	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	2000	Apperley Bridge opened Dec 2015 Low Moor opened May 2017	City of Bradford MDC / WYCA	Apperley Bridge £8 million (WYCA) Low Moor £10.8 million (WYCA)	No	Funded	>£10m	Completed	The new stations encourage rail travel as an alternative to the car.	Passenger numbers using the stations	Apperley Bridge 20,000 per month (pre-Covid 19 restrictions) Low Moor	The pandemic resulted in much lower use of trains in 2020 and 2021. Passenger

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												The actual emission savings to date have not been calculated.		133,060 (opening year) and expected to grow to 500,000 per annum. (pre-Covid 19 restrictions)	numbers at both sites are expected to begin to grow again as travel and work restrictions are lifted.
13	Staff Travel Plan	Promoting Travel Alternatives	Workplace Travel Planning	2013	2015	City of Bradford MDC	Developed in house	No	Not funded	<£10k	Completed	Plan aims to reduce single occupancy car trips by 5% over 5 years and reduce car commuter trips by staff from 62% (2014) to 57% by 2029	Number of single occupancy car trips and reduction in staff commuter car trips.	Progress monitoring not yet completed.	Plan is actively promoted to new starters. Progress monitoring and plan review /update due.
14	Identifying barriers to walking to school	Promoting Travel Alternatives	School Travel Plans	2017	School travel plan policy adopted 2017 Delivery ongoing	City of Bradford MDC / Bradford Institute of Health Research / Born in Bradford / Local education providers	Research partnership funding	No	Not funded	£10k to £50k	Completed	Study identified best policy measures to include in the CBMDC school travel plan policy. Subsequent policy continues to address school travel. Overall impact difficult to quantify.	Not applicable	Bradford school travel plan published 2017. School streets programme currently being developed to address some of the issues identified in the study	Willingness of parents and schools to engage with the research and/or change behaviour. On-going on site management of school street closures is a challenge.
15	Eco-stars Fleet Recognition Scheme	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	2017	2020	WYLES steering group / City of Bradford MDC / ECO-stars scheme	WYCA funded	No	Funded	£10K to £50K	Completed	The ECO stars scheme claims a typical van operator could see its annual output of carbon dioxide fall by six tonnes per year Link to Eco-stars website	Number of Bradford based operators joining the scheme	Scheme operated in West Yorkshire between 2017 and 2020	The introduction of the West Yorkshire ECO-stars scheme was a measure in the WYLES. Local scheme was reliant on an annual funding allocation which was not renewed in 2021.
16	West Yorkshire bus retrofitting project	Vehicle fleet efficiency	Vehicle retrofitting programmes	2018	2020	City of Bradford MDC in partnership with DEFRA, WYCA, West Yorkshire bus operators	DEFRA - £7.186 million LPTIP - £850k	No	Not funded	£1m to £10m	Completed	Programme estimated to have delivered 560 tonnes of NOx removal annually across the WY region	Not applicable	Programme retrofitted 471 buses across WY	Bradford CAZ-C implementation will set minimum Euro 6 equivalent standard for all local bus services operating in the CAZ.
17	Encouraging uptake of low emission taxis	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2018	2020	City of Bradford MDC / WYCA/ ENGIE	OLEV £2 million WYCA and partner LAs £1.2 million match funding	No	Funded	£1m-£10m	Completed	If 5.1% of WY taxis are replaced with electric this will equate to an 18% reduction in NO_x emissions and a health cost saving of £189,000 per annum (WYCA).	Number of charges undertaken	22 Rapid chargers installed across the Bradford District each has 2 bays one for public and the other designated for Taxi use. 100+ charge points installed across wider WY region.	This is the biggest rapid charging network outside London.

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														Between Sept 2020 and Oct 2021 the chargers have been used over 180,000 times.	
18	Public awareness	Public Information	Via other mechanisms	2016	Delivery ongoing	City of Bradford MDC / NHS / Born in Bradford/ Universities	Early activities funded mainly by partners. Government funded CAP settlement included funding for public engagement / marketing campaign for the CAP / CAZ.	No	Funded	£100-£500K	Implementation	Not quantified	n/a	Activities to date have included raising public awareness through the use of street infographics on air pollution stations, air quality and health online petition in partnership with Doctors and academics at the University of Leeds, workshops held in schools and anti-idling awareness raising. The Clean Air Plan / CAZ development is supported by the Breathe Better Bradford website Link to Breathe Better Bradford website	Further funding recently applied for (£300,000) to reach an audience within 1-hour drive of the CAZ. Air quality grant funding obtained in 2021/22 to develop a Particulate Reduction Strategy that will include public engagement on reducing particulate emissions and reducing personal exposure.
19	Clean Air Zone (CAZ)	Promoting Low Emission Transport	Low Emission Zone (LEZ)	2019	2022	City of Bradford MDC in partnership with JAQU and local stakeholders	£39.3m Central Government funded project	No	Funded	>£10m	Implementation	CAZ expected to deliver AQ standards at all locations in Bradford by 2023	Compliance with air quality standards	Consultation phase completed in 2021. 360 cameras, 1,250 signs and 6 new fibre digital rings now in place 89% of taxi fleet already CAZ compliant 85% of local buses already CAZ compliant and more electric buses on the way £7.4M in grants to assist HGV upgrades 2000 applications for LGV upgrade support Local exemption registration taking place HIA and other evaluation taking place	The CAZ was originally due to go live in January 2022 but the lead time was extended to allow residents and businesses more time to prepare. A new launch date of 26th September 2022 has been agreed with Government.

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20	School Streets Pilot Scheme	Traffic Management	Other	2021	2021	CBMDC/ Local schools/ Act Early Research Consortium	WYCA funded £66,000	No	Funded	£10K to £50K	Implementation	Not quantified	Self-reported measures on travel modes to school/perceptions of school environment pre- and post-school street Traffic Counts	Working with schools through a series of workshops to co-produce solutions to challenges/barriers to implementation	Staff time/capacity to put out signs and marshall the scheme Lack of community volunteers to support scheme
21	ZEBRA funded electric buses	Promoting Low Emission Transport	Public vehicle Procurement – Prioritising uptake of low emission vehicles	2022	2023	City of Bradford MDC in partnership with local bus operators and WYCA	£10M ZEBRA bus funding for 33 new electric buses in Bradford to support CAZ implementation. Some private investment from local bus operator	No	Funded	>£10M	Implementation	Predicted 0.5µg/m3 reduction in NO2 on Godwin Street and Sunbridge Road.	Not yet set	ZEBRA funding secured and buses being procured	The buses will operate on a shuttle corridor between Keighley and Bradford.
22	South Bradford Park and Ride and Expressway	Alternatives to private vehicle use	Bus based Park and Ride	2019	Works to commence by 2023 (based on current fund spending requirement)	CBMDC / WYCA	To be delivered as part of the wider West Yorkshire Transforming Cities Fund. £317 million from the Department for Transport (DfT) plus local match funding of up to £140 million. Link to TCF information on WYCA Your Voice website	No	Funded	>£10M	Planning	Impact assessment work ongoing at present. Should improve air quality in Mayo Avenue AQMA and the wider CAZ especially around Manchester Road	Not yet set	Business case completed. Public consultation took place in 2021. Detailed scheme design and planning in progress	Minimum 500 space P&R site planned to reduce congestion on Manchester Road and through Mayo Avenue AQMA More information on this project is available here: Link to information on South Bradford P&R and expressway on WYCA Your Voice website
23	Bradford Interchange Access	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	2019	Works to commence by 2023	CBMDC / WYCA	To be delivered as part of the wider West Yorkshire Transforming Cities Fund. £317 million from the Department for Transport (DfT) plus local match funding of up to £140 million. Link to TCF information on WYCA Your Voice website	No	Funded	>£10M	Planning	Scheme will improve access and environment around the rail / bus interchange to encourage further uptake of low emission transport options. Scheme will also incorporate low emission infrastructure for cars and taxis.	Not yet set	Business case completed and public consultation took place in 2021. Detailed scheme design and planning in progress	Long term ambition is still to have a new Northern Powerhouse rail station in Bradford to replace the current interchange and Foster Square stations. The scaling back of the HS2 scheme is likely to considerably set back the timeline for new rail facilities in Bradford making upgrade of the current interchange an essential interim measures. More information on

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															this project is available here: Link to Bradford Interchange improvement scheme information on WYCA Your Voice website
24	Bradford City Centre Cycling and Walking Improvements	Transport Planning and Infrastructure	Cycle network Bus route improvements	2019	Works to commence by 2023 (based on current fund spending requirement)	CBMDC / WYCA	To be delivered as part of the wider West Yorkshire Transforming Cities Fund. £317 million from the Department for Transport (DfT) plus local match funding of up to £140 million. Link to TCF information on WYCA Your Voice website	No	Funded	>£10m	Planning	The scheme will implement a series of bus, cycle and pedestrian improvement measures to promote bus use and enable safe walking and cycling to and within Bradford City Centre.	Not yet set	Business case completed and public consultation took place in 2021. Detailed scheme design and planning in progress	More information on the proposed walking, cycling and bus infrastructure upgrades can be found here: Link to Bradford City Centre cycling and walking infrastructure improvements on WYCA Your Voice website
25	West Bradford Cycle Superhighway extension	Transport Planning and Infrastructure	Cycle network	2019	Works to commence by 2023 (based on current fund spending requirement)	CBMDC / WYCA	To be delivered as part of the wider West Yorkshire Transforming Cities Fund. £317 million from the Department for Transport (DfT) plus local match funding of up to £140 million. Link to TCF information on WYCA Your Voice website	No	Funded	>£1m	Planning	The scheme will provide an additional link to the existing cycle superhighway and will run through the Thornton Road AQMA	Not yet set	Business case completed and public consultation took place in 2020. Detailed scheme design and planning in progress	More information on the West Bradford Cycle Superhighway extension is available here: Link to West Bradford Cycle Superhighway information on WYCA Your Voice website
26	Particle Reduction Strategy	Policy Guidance and Development Control	Low Emissions Strategy	2022	2024	CBMDC / London Las/ Local universities	Defra AQ grant fund 2021/22 £253k	Yes	Funded	£100k to £500k	Planning	The strategy will aim to deliver PM reduction across the whole district with a focus on domestic and construction emissions. An emission impact assessment will form part of the strategy development.	Not yet set	Successful AQ grant application in 2021 Exploratory discussions on NRMM emission reduction scheme being held with London authorities	Detailed PM source apportionment study to be undertaken prior to strategy development Indoor PM monitoring to be undertaken in conjunction with local universities New PM marketing and communications package to be developed

4.3 PM2.5 – Local Authority Approach to Reducing Emissions and/or Concentrations

In Bradford, emissions of man-made fine particles PM2.5 are estimated to cause 4.7% of total mortality. Road transport emissions are a significant source of fine particulate but locally elevated concentrations can also arise from biomass combustion, heating, industry and wind-blown dust. The World Health Organisation (WHO) classifies diesel exhaust emissions as carcinogenic.

Born in Bradford (BiB) is one of the largest and most important medical research studies currently being undertaken in the UK. It is tracking the lives of 13,500 Bradford born babies (and their families) to ascertain more about the causes of childhood illness. The work has already identified a number of important linkages between air pollution exposure including PM2.5 related impacts. The Council collaborates with BiB, the aim being to develop evidence based policy making.

The European Union (EU) annual mean air quality limit value (the "legal limit") for PM2.5 is currently 25 µg/m^3 but this is not included in the current LAQM objectives for local authorities. The UK government has recently consulted on two new long-term targets for PM2.5 which are expected to be included in future LAQM objectives. The first is an annual average limit for PM2.5 of 10 µg/m^3 (to be met across England by 2040), the second would be a 35 per cent reduction in population exposure to PM2.5 by 2040. These are not as stringent as the guidelines set by the World Health Organisation (which are currently 5 µg/m^3 annual mean and 15 µg/m^3 24-hour mean) but are more stringent than the current EU limit value.

City of Bradford MDC Public Health Department has funded PM2.5 monitoring at three of the existing air pollution stations (Bingley, Keighley and Shipley Airedale Road). The data is used to inform major research programmes (such as the 'Born in Bradford (BiB)' and is to be made available to the public via the Air Quality net website available here: Link to Air Quality Data Management website

Based on the PM2.5 monitoring undertaken in Bradford to date no areas are considered likely to exceed the current EU Limit Value for PM2.5 (annual average concentration of 25 µg/m^3) but the WHO annual average standard (annual average concentration of 5 µg/m^3) is known to be exceeded in some locations, especially close to busy roads. Some exceedances of the proposed UK annual mean standard are also considered likely

especially in areas which have specific sources of PM2.5 (such as areas with high domestic solid fuel burning) combined with high traffic levels.

Within the City of Bradford MDC, air quality and public health specialists collaborate to deliver the key outcomes in the Bradford LES and the WYLES. They are supported by colleagues from other Council departments such as transport, planning, highways, fleet management and procurement. There is a strong emphasis on improving the understanding of how air pollution impacts on health, and effectively communicating this to other professionals and members of the public

The Bradford LES and WYLES measures which aim to reduce emissions from diesel vehicles and biomass boilers are currently the most effective at reducing local PM2.5 emissions (as these are the main sources of this pollutant in Bradford). Over the next year the council will be supplementing these measures by implementing a charging CAZ and developing a local Particulate Reduction Strategy.

The CAZ will remove a large number of older diesel vehicles from Bradford's roads which are a significant source of PM2.5 emissions. 89% of Bradford's 3700 licensed taxis are already CAZ compliant and a new fleet of zero emission electric buses will be introduced into Bradford in 2023 (as a result of the recently successful £23 million bid to the Zero Emission Bus Regional Area (ZEBRA) fund by the West Yorkshire Combined Authority). In addition, over 300 scheduled and tendered bus services will be upgraded to meet the CAZ standard and £7.4m will be defrayed to assist businesses to upgrade over 20% of all lorries registered in the district and up to 50 coaches. Over 2,000 grants for £4,500 to upgrade vans to CAZ standard have also been applied for.

Whilst the CAZ vehicle emission upgrades will remove significant amounts of exhaust related PM2.5 emissions a significant amount of PM2.5 emissions relating to brake and tyre wear will remain. It is therefore important that the council also starts to tackle other sources of PM2.5 emissions in the district and continues work to facilitate the use of other modes of transport.

The new Particulate Reduction Strategy (funded by an AQ grant obtained from Defra in March 2022) will aim to increase public understanding of all sources of PM2.5 emissions and how to reduce their own exposure. The main objectives of the programme will be:

1. To increase public awareness and understanding of the sources and health impacts of particulate air pollution in their home and school environments in order to empower individuals to take their own personal behavioural change actions and to encourage

others to do the same. Particular emphasis will be placed on reducing emissions from domestic solid fuel burning and other activities in the home which give rise to particulate air pollution

2. To improve internal and public access to all air pollution data for Bradford to allow individuals to make informed choices about levels of personal exposure and to allow more informed local planning decisions

3. To reduce particulate emissions from construction activity in Bradford, a significant source of particulate pollution which is currently relatively uncontrolled at a local level and can have a significant impact on surrounding communities. These are often the most vulnerable inner city communities which are already subject to significant health inequalities and already experience the highest levels of pollution exposure.

These objectives will be achieved by:

1. Undertaking detailed mapping of particulate emission sources in Bradford
2. Undertaking community based particulate monitoring and action plan development (using a range of new particulate analysers to be purchased using the AQ grant funding).
3. Setting up a pilot NRMM Non-Road Mobile Machinery emission reduction scheme in the Bradford CAZ area (based broadly on the approach taken in London).
4. Increasing public access to real time air PM quality monitoring data and modelling information via the Air Quality net website available here: Link to Air Quality Data Management website
5. Developing a new high profile particulate reduction and awareness public information campaign as an extension of the existing 'Breathe Better Bradford' brand.

In addition to the LES, CAZ and emerging Particulate Reduction Strategy measures, City of Bradford MDC already has the following measures in place to reduce PM2.5 emissions:

Smoke Control Areas

Large areas of Bradford are designated as Smoke Control Areas (SCAs). Within these areas it is an offence to emit visible smoke from a chimney.

Maps showing the extent of Smoke Control Areas (SCAs) in Bradford can be found here:

Link to Smoke Control area information on CBMDC website

More information on smoke control rules can be found here:

Link to smoke control rules on UK Government website

Bonfires

Bonfires can be another significant source of $PM_{2.5}$ emissions. City of Bradford MDC provides advice on bonfires via this website

Link to nuisance bonfire advice on CBMDC website

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

This section sets out the monitoring undertaken within 2020 and 2021 by City of Bradford MDC and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2017 and 2021 to allow monitoring trends to be identified and discussed.

5.1 Summary of Monitoring Undertaken

5.1.1 Automatic Monitoring Sites

City of Bradford MDC undertook automatic (continuous) monitoring at 7 sites during 2020 and 2021. **Error! Reference source not found.** in Appendix A shows the details of the automatic monitoring sites. NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem. UK air quality net presents automatic monitoring results for all automatic monitoring undertaken by City of Bradford MDC. Results for the AURN (Automatic and Urban Rural Network) site at Mayo Avenue are available on the UK air website here: link to Bradford Mayo Avenue information on UK air website.

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

5.1.2 Non-Automatic Monitoring Sites

City of Bradford MDC undertook non- automatic (i.e. passive) monitoring of NO_2 at 100 sites during 2020 and 171 during 2021. **Error! Reference source not found.**(a) and A.2(b) in Appendix A present the details of the non-automatic sites for each year.

Maps showing the location of the monitoring sites within the AQMAs and other areas of concern are provided in Appendix D. An interactive GIS map showing the location and results from all the current NO_2 non-automatic monitoring sites is available here:

Link to interactive GIS map of Bradford monitoring sites hosted by arcgis

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.

5.2 Individual Pollutants

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

5.2.1 Nitrogen Dioxide (NO_2)

Table A.3 and Table A.(a) and 4(b) in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the period 2016 to 2021 with the air quality objective of 40µg/m^3. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2020 and 2021 datasets of monthly mean values are provided in Appendix B. Note that the concentration data presented in Tables B.1(a) and B.1(b) includes distance corrected values, only where relevant.

Table A.5**Figure A.13: Trends in Annual Mean NO_2 Concentrations around Parry Lane area**

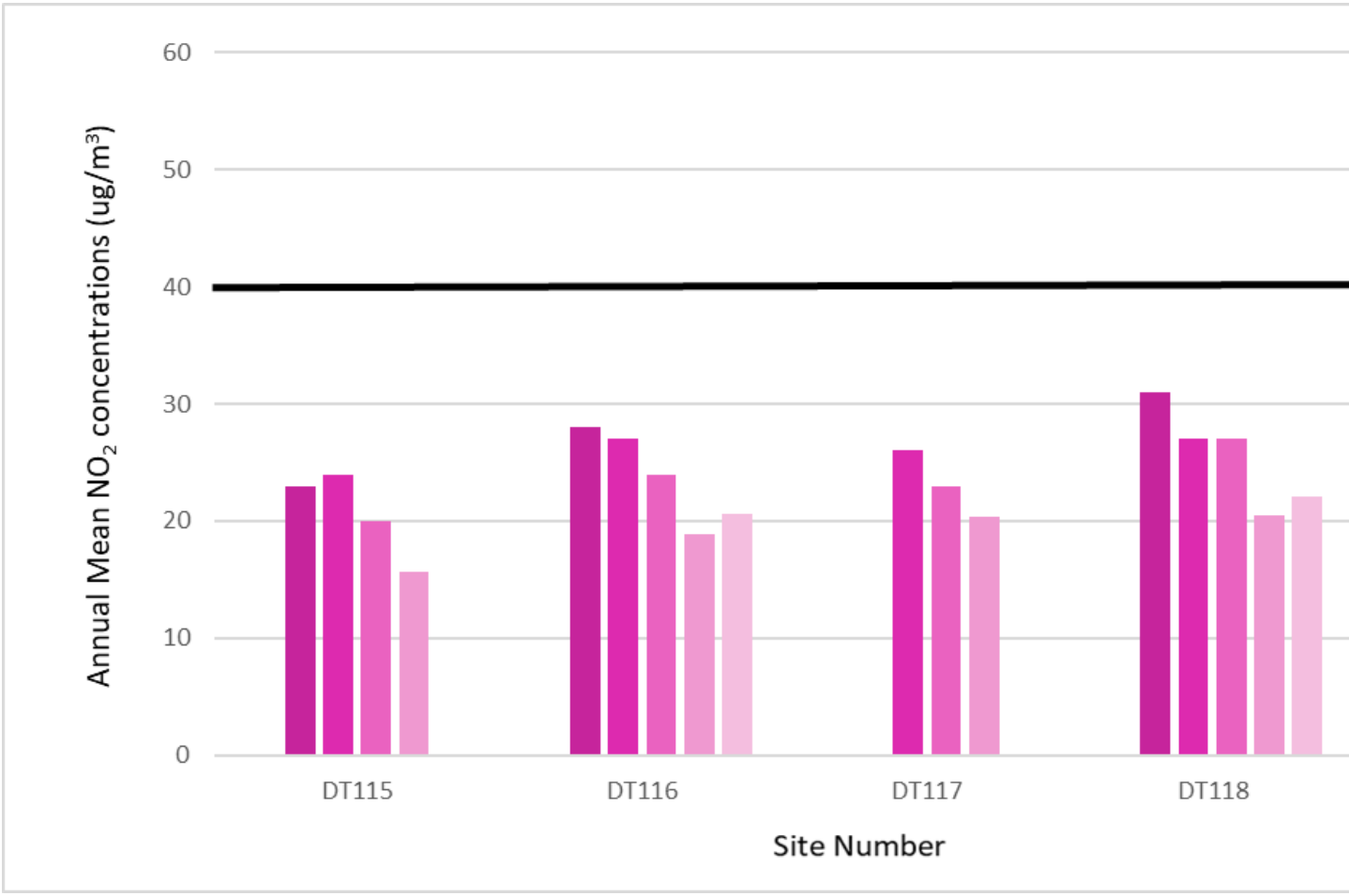
60
50
40
30
20
10
0
Annual Mean NO2 concentrations (ug/m3)
DT115
DT116
DT117
DT118
Site Number

Figure A.14: Trends in Annual Mean NO_2 Concentrations at planning baseline sites

Table A. in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the period 2016 to 2021 with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

During 2020 and 2021 there were no exceedances of the hourly objective for nitrogen dioxide at any automatic monitoring sites in the Bradford District. There have been no recorded exceedances of the hourly objective at any of the Bradford automatic sites since 2017. The locations of Bradford's automatic monitoring sites during 2020 and 2021 are shown in Figure D.1 (Appendix D).

Annual mean nitrogen dioxide concentrations of >60 µg/m^3 measured at a passive diffusion tube monitoring site can be indicative of exceedances of the hourly objective. The highest annual mean concentration recorded at a diffusion tube monitoring site in Bradford during 2020 was 47.1µg/m^3 at site DT71 on Queen's Road. This site is located in the Manningham Lane AQMA (order 2). The location of this tube is shown in Figure D.3 (Appendix D). The highest annual mean concentration recorded at a diffusion tube monitoring site in Bradford during 2021 was 50.6µg/m^3 at site DT12 on Shipley Airedale Road. This site is located in the Shipley Road AQMA (order 4). The location of this tube is shown in Figure D.3 (Appendix D). As the highest recorded diffusion tube measurements in 2020 and 2021 were well below 60 µg/m^3 it is unlikely that the hourly nitrogen dioixde objective was exceeded at any of the monitored locations in the Bradford district during 2020 or 2021.

As presented in Table A.3 (Appendix A) there were no exceedances of the annual mean nitrogen dioxide objective at any of Bradford's automatic monitoring sites during 2020. There were three exceedances at passive diffusion tube monitoring sites as detailed in Table A.4(a) (Appendix A). The 2020 exceedance sites were:

- DT12 – Treadwell Mills, Shipley Airedale Road (located within AQMA 4)
- DT72 – Queen's Road, Manningham (located within AQMA 2)
- DT50 – Saltaire crossroads (not currently an AQMA)

In 2021 there was one exceedance of the annual average nitrogen dioxide objective at an automatic site (C6 Shipley Airedale Road) as detailed in Table A.3. This site returned an annual average of 41µg/m^3 in 2021. In addition there were ten exceedances of the annual average nitrogen dioxide objective at passive diffusion tube monitoring sites in 2021 as detailed in Table A.4(b) (Appendix A). The 2021 passive monitoring exceedance sites were:

- DT12 - Treadwell Mills, Shipley Airedale Road (located within AQMA 4)
- DT72 - Queen's Road, Manningham (located within AQMA 2)
- DT104 - Mayo Avenue (located within AQMA 1)
- DT50 - Saltaire crossroads (not currently an AQMA but included in CAZ)
- DT31 - Saltaire crossroads (not currently an but included in CAZ)
- DT161 - Godwin Street (not currently in an AQMA but included in CAZ)
- DT167 - Market Street (not currently in an AQMA but included in CAZ)
- DT211 - Manchester Road (not currently in an AQMA but included in CAZ)
- DT191 - Opposite Low Mill, Keighley (not currently in an AQMA or CAZ)
- DT131- Fox corner Shipley (not currently in an AQMA but included in CAZ)

With the exception of site DT191 all the sites showing exceedances of the annual average nitrogen dioxide objective in 2020 and 2021 are within declared AQMAs and/or the area to be covered by the CAZ. Where applicable the results from these sites have been distanced corrected to the nearest relevant receptor point (Tables C.9(a) and (b)). After distance correcting only tubes DT72 and DT12 showed an exceedance at the nearest receptor point in 2020. In 2021 tubes DT72, DT12 and DT161 showed exceedances at the nearest relevant receptor points. A distance correction has not been undertaken for monitoring site DT72 as this site is located on a traffic light close to a junction but is in line with a relevant receptor point further along the road. Site DT131 has not been distance corrected as it forms part of the baseline monitroing for a highways improvement scheme and is not located near any relevant receptors.

Site DT191 is a kerbside side adjacent to the A6035 in Keighley where a planning proposal for an apartment block was received in February 2021 (21/00583/MAF). The tube is being used to validate the findings of a detailed air quality impact assessment undertaken for the site to ensure the proposed location is suitable for residential development. The proposed development site is located at the opposite side of the road to the diffusion tube and set back from the kerbside. The detailed air quality impact assessment submitted with the planning application indicates that concentrations at the proposed homes would be within the air quality objectives by the anticipated scheme completion year. At the time of this report the application was still under consideration.

Sites DT12 and DT72 are already located within AQMAs (AQMA 4 Shipley Airedale Road and AQMA 2 Manningham Lane/Queen's Road) and are expected to experience a significant improvement in air quality as a result of the Bradford CAZ implementation in

September 2022. Detailed modelling undertaken for the Bradford CAZ indicates that annual average NO_2 concentrations on Shipley Airedale Road may improve by up to 18µg/m^3 and Queen's Road by up to 15µg/m^3 as a result of the CAZ implementation (against a 2018 baseline). This is expected to bring both locations within the annual average objective. The modelling results can be viewed here: Link to Breathe Better Bradford website. In addition a major highway improvement scheme is currently being consulted on around the Manningham Lane / Queen's Road junction. When complete this scheme will considerably improve public transport, walking and cycling provision along the Manningham Lane corridor and traffic flows are expected to reduce accordingly. This should result in additional air quality improvement on Queen's Road in the future. Further information on this scheme can be found here: Link to West Yorkshire Combined Authority (WYCA) website about Shipley Corridor Improvement Scheme.

Site DT161 (Godwin Street) is not currently within an AQMA but will be included in the CAZ. The CAZ modelling indicates that concentrations on Godwin Street should improve by around 9µg/m^3 as a result of the CAZ implementation (against a 2018 baseline). This is expected to bring Godwin Street into compliance without the need for a further AQMA declaration. The situation on Godwin Street will be reviewed again in 2023 once the CAZ has been implemented.

As detailed in Figures A.4 and A.6 there has been a general improvement in air quality in both the Manningham Lane AQMA (order 2) and Shipley Airedale Road AQMA (order 4) since 2018.

AQMAs 2 and 4 will remain in place until concentrations are consistently below the nitrogen dioxide annual objective levels. Defra guidance indicates that this should be for a minimum of 3 consecutive years.

As presented in Figure A.3 there were no measured exceedances of the annual average nitrogen dioxide objective in the Mayo Avenue AQMA (order 1) during 2020 but one site exceeded the objective at the measurement position in 2021 (site DT104). The location of the monitoring sites in the Mayo Avenue AQMA are shown in Figure D.6. There have been a number of exceedances of the annual average nitrogen dioxide objective in the Mayo Avenue AQMA since 2016 but since 2016 concentrations have generally started to improve. Unlike the majority of other monitoring sites in Bradford passive monitoring sites DT103 and DT104 in the Mayo Avenue AQMA showed a higher concentration in 2020 than in 2019 despite the impacts of the Covid-19 pandemic. The slight increase at these sites during the pandemic could be due to the location of a major supermarket at the

opposite side of the road and an increase in the use of the site for click and collect shopping trips during lockdown periods. Whilst undertaking calibrations at the Mayo Avenue automatic monitoring site the monitoring officer at City of Bradford MDC noted that traffic levels remained high in this area compared to other places in the district throughout the lockdown periods. The nearby automatic monitoring site CM4 showed a decrease between 2019 to 2020 but as presented in Figure A.3 (Appendix A) it experienced the least concentration reduction of all the roadside automatic montitoring sites. Only the urban centre site at Keighley showed less of an improvement during this period. The CAZ modelling undertaken for the Mayo Avenue AQMA predicts reductions of around 12µg/m^3 in this area as a result of the CAZ implementation (against a 2018 baseline). This is anticipated to be enough to bring all the Mayo Avenue AQMA monitoring sites within the annual objective level. The AQMA declaration at Mayo Avenue will be kept in place until further monitoring indicates that all sites within this AQMA are consistently below the objective level.

Figure A.5 presents NO_2 annual mean concentrations for monitoring sites in the Thornton Lane AQMA betweeen years 2016 to 2021. There were no exceedances of the annual mean objective at any of these sites in 2020 or 2021. Concentrations recorded at all the Thornton Road AQMA monitoring sites in 2020 were lower than those in 2021 due to the Covid-19 pandemic. With the exception of site CM5 all sites have been below the annual mean objective for the last 6 years. There is no clear trend in NO_2 concentrations on Thornton Road with most 2021 values being similar or higher to those seen in this area prior to the Covid-19 pandemic. As detailed in Bradford's 2019 ASR report, automatic monitoring site CM5 experienced some operational issues prior to 2018 which have resulted in some uncertaintly around concentrations prior to the fault being identifed. The diffusion tube measurements undertaken within the Thornton Road AQMA have been consistently below the annual average NO_2 objective for the past five years.

The CAZ modelling undertaken for the Thorton Road AQMA predicts further reductions of around 12 µg/m^3 in this area as a result of the CAZ implementation (against a 2018 baseline). This is anticipated to be enough to bring all the Thornton Road monitoring sites well within the annual objective level. In addition to the CAZ there are also plans for an extension to the cycle superhighway down Thornton Road. This will provide further opportunity to reduce transport emissions on this corridor. There is more information about the West Bradford Cycle Superhigway extension available here: Link to information about West Bradford Cycle Superhighway extension on WYCA website.

The AQMA declaration at Thornton Road will be kept in place until further monitoring indicates that all sites within this AQMA are consistently below the objective level.

In previous ASR reports Bradford has also reported on air quality conditions in the following additional areas of concern:

- Harrogate Road / Killinghall junction
- Saltaire crossroads
- Rooley Lane / Tong Street
- Canal Road

These are locations where elevated concentrations of nitrogen dioxide have been measured in the past but where no AQMAs have been declared to date.

Figure A.7 (Appendix A) shows annual mean nitrogen dioxide concentrations at monitoring locations around the Harrogate Road / Killinghall Road junction. The locations of the monitoring sites in this area are shown on Figure D.11. The last recorded exceedance of the annual average objective in this area was recorded in 2018 at site DT42. Since 2018 concentrations in this area have reduced at all sites and are currently not of concern. Concentrations in 2020 were the lowest recorded in the last six years due to the Covid 19 pandemic. They increased again in 2021 to levels similar to those seen in this area in 2019 (prior to the pandemic).

The CAZ is expected to deliver further improvements at this junction of around 15µg/m^3 (based on a 2018 baseline). Monitoring will be continued in this area until the impact of the CAZ implementation has been fully evaluated and the council is satisifed that no further exceedances of the annual average nitrogen dioxide objective are likley to occur. There are no plans to declare an AQMA around the Harrogate Road / Killinghall junction at present.

Figure A.8 (Appendix A) shows annual mean nitrogen dioxide concentrations at monitoring locations around Saltaire crossroads. The locations of the monitoring sites in this area are shown on Figure D.9 As detailed above, site DT50 within this area showed an exceedance of the annual average objective in 2020 and 2021. Site DT31 exceeded the objective in 2021. Both these sites have regularly exceeded the objective since 2016. Concentrations in this area were generally lower in 2020 than in 2021 (due to the Covid 19 pandemic). Since 2016 there has been a general improvement in air quality in this area. The current trend is unclear with some 2021 concentrations being higher then pre-pandemic levels and others lower.

The CAZ is expected to deliver further improvements at this junction of around 18µg/m^3 (based on a 2018 baseline). This is expected to bring all the monitoring sites in this area into compliance once the CAZ is in place. As the majority of the sites in this area are already in compliance and there is already an action plan for improvement (CAP/CAZ implemention) a further AQMA will not be declared in this area at the present time. If there is any signficant delay to the implementation of the CAP/CAZ and air quality conditions do not start to improve as currently anticipated then the decision not to delcare an AQMA in this area may need to be reviewed in future years. Monitoring will continue in this area until the impact of the CAZ implementation has been fully evaluated and the council is satisifed that no further exceedances of the annual average nitrogen dioxide objective are likley to occur.

Figure A.9 (Appendix A) shows annual mean nitrogen dioxide concentrations at monitoring locations around Rooley Lane and Tong Street. The location of the monitoring sites in this area are shown on Figure D.10. The last recorded exceedance of the annual average objective in this area was in 2018 at site DT64 (Tong Street). Since 2018 concentrations at this site have fallen to well below the objective levels. All other sites in this area have been consistently below the annual objective level since 2016 and have shown gradual improvement over this period. Concentrations in 2020 were generally lower than those in 2021 (due to the Covid 19 pandemic). The post pandemic trend is currently unclear as some sites have remained below 2019 concentrations whilst others have increased. The CAZ is expected to deliver further improvements in this area of around 15 µg/m^3 near the automatic monitoring sites (CM7 and CM8 and 10µg/m^3 near site DT64 against a 2018 baseline). There are no plans to declare an AQMA in this area at present. Monitoring will continue in this area until the impact of the CAZ implementation has been fully evaluated and the council is satisifed that no further exceedances of the annual average nitrogen dioxide objective are likley to occur.

Figure A.10 presents NO_2 annual mean concentrations around the Canal Road area betweeen 2016 to 2021. The location of the monitoring sites in this area are shown on Figure D.12 There were no exceedances of the annual average objective in this area in 2020 or 2021. 2021 concentrations were generally slightly higher in this area than those recorded in 2020 (due to the covid 19 pandemic) but the difference between the two years was less pronounced than in other areas of the district. Prior to the pandemic most sites in this area were demonstrating a downward trend. The post pandemic trend in this area is currently unclear.

The last recorded exceedance of the annual average objective in this area was in 2018 at site DT73 (Canal Road). Since 2018 concentrations at this site have fallen to below the objective level. All other sites in this area have been consistently below the annual objective level since 2016 / 2017 and have shown gradual improvement over this period. The CAZ is expected to deliver further improvements in this area of around 10 to 12 µg/m^3 near to site DT73. There are no plans to declare an AQMA in this area at present.

There is potential for the Shipley corridor improvement scheme to increase traffic flow along the Canal Road in future years but this will be in the context of increased road space to reduce congestion, further implementation of sustainable transport infrastructure and a fully operational CAZ. Air quality staff are working with highways colleagues to fully assess the air quality impacts of the proposed scheme and to ensure that any changes to the road network in this area are undertaken in a way which will not have unacceptable impact on local air quality or the CAZ.

Monitoring will be continued in the Canal Road area until the council is satisfied that no further exceedances of air quality objectives are likely to arise.

In addition to the AQMAs and other areas of concern City of Bradford MDC also undertakes air pollution monitoring around the city centre and at other locations which are considered likely to be impacted on by planning proposals or major highways works.

Figure A.11 (Appendix A) presents annual mean nitrogen dioxide concentrations around Greengates crossroads. The location of the monitoring sites in this area are shown on Figure D.13. The monitoring in this area was established in 2016 to measure baseline concentrations prior to a major junction improvement scheme. Following completion of the scheme monitoring will be continued for a further 5 years to evaluate the impact of the scheme on local air quality. The scheme commenced in July 2020 and is approaching to completion. More information about the scheme is available here: Link to information about the Greengates crossroads highways improvement scheme on City of Bradford Council website.

As can be seen from Figure A.11 there have been previous exceedances of the annual average objective in this area but since the baseline monitoring started the situation has generally improved. Monitoring was ceased in the area in October 2020 to allow the construction works to take place and is gradually being re-established as the works are completed. There are no plans to establish an AQMA in this location at present. Some air quality improvements are expected following the completion of the junction improvements. A full air quality impact assessment for the scheme was undertaken by consultants to

accompany the planning application for the scheme and is available to view here: Link to Greengates crossroads planning application on City of Bradford MDC website. A further update on air quality in this area will be provided in the 2023 ASR.

Figure A.12 presents NO_2 annual mean concentrations at long term monitoring locations around the city centre between 2016 to 2021. The location of these monitoring sites are shown in Figure D.14. With the exception of site DT81 the lowest annual average NO_2 concentrations in the last 5 years were recorded in 2020 (as a result of the Covid 19 pandemic). Site DT81 was located close to the covid vaccination site at Jacob's Well which is likely to explain the slight rise in concentration at this location during 2020. City centre concentrations were generally higher in 2021 than in 2020 and in one case (DT84) slightly higher than the 2019 pre-pandemic level. The post on which site DT81 was mounted was removed in early 2021 so 2021 concentrations for this site are unavailable.

New city centre monitoring was introduced on Godwin Street in 2020 (sites DT161, DT162, DT163 and DT164) as this street was identified as being at high risk of exceeding the annual mean objective during the CAZ modelling process. These new sites have confirmed that the annual average nitrogen dioxide objective is still at risk of being exceeded in this area. Other new sites established on Market Street and Sunbridge Road during 2021 have also returned elevated concentrations during the first partial year of monitoring.

The city centre sites established for more than five years show some evidence of a slight downward trend. The CAZ is expected to reduce annual mean NO_2 concentrations by around 10 to 15µg/m^3 on some of the busiest city centre roads (based on a 2018 baseline). Improvements are expected to be greatest on bus/ taxi only access roads where all current vehicles will be subject to CAZ requirements. 89% of Bradford's 3700 licensed taxis are already CAZ compliant.

Monitoring will be continued at all current city centre monitoring locations during the CAZ evaluation period. There are no plans to introduce further AQMAs into the city centre at this time.

Figure A.13 (Appendix A) presents annual mean nitrogen dioxide concentrations around the Parry Lane area of the district. This baseline monitoring was commenced in 2016 in response to plans for a large diesel operated Short Term Operating Reserve (STOR) in the area. The location of these monitoring sites are shown in Figure D.15. There have been no exceedances of the annual average objective at these locations since monitoring began. The results for 2020 at these sites were the lowest recorded to date (due to the

Covid-19 pandemic). There is a general downward trend in this area at present. To date the STOR has not been developed but other changes are taking place in this area including the introduction of a new business park / fast food restaurant. The area has also previously been identified as a potential location for a Compressed Natural Gas (CNG) refuelling facility. Current concentrations in this area are well below the 40µg/m^3 objective. There is no requirement to declare an AQMA in this area at present.

Figure A.14 (Appendix A) presents annual mean nitrogen dioxide concentrations at other planning baseline sites around the district. All these sites have been established to monitor baseline conditions prior to implementation of new developments. The location of these sites are available in the GIS tool.

Site DT78 is close to a new secondary school on Thornton Road. The site was fully developed during 2020/2021 with the school opening in November 2021. The baseline monitoring was established in 2016 when the council became aware of proposals for a new school on this site which is adjacent to a busy main road. The monitoring helped to inform the exposure assessment undertaken for the site and influenced the final layout of the site which was redesigned to reduce the childrens exposure to air pollution, following advice from the air quality team. Further information about the air quality assessment in relation to this school can be found here: Link to Eden School planning application on City of Bradford MDC website. The 2021 concentration measured at this site was well within the annual average objective level.

Site DT113 was located on Young Street close to an application for an energy recovery centre based on tyre pyrolysis (18/02212/FUL). The baseline monitoring is now complete and monitoring will be re-established if and when the site becomes operational. The planning application was approved in October 2018 but an environmental operating permit has not yet been successfully obtained. There are no current concerns about air quality in this location.

Site DT120 was established as base line monitoring for a potential housing scheme which has not progressed. The site is now being used as part of the CAZ evaluation network. There are no current concerns about air quality in this location.

In summary air quality is generally improving across the Bradford District with some areas improving faster than others. There was a clear impact in all areas from the Covid-19 pandemic in 2020. 2021 concentrations may also be affected due to Tier 3 restrictions in early 2021 and the reductions in traffic associated with the response to the ‘Omicron wave’

in late 2021. The post Covid-19 situation has some 2021 concentrations being lower than before the pandemic and others higher.

During 2021 a large number of additional passive nitrogen dioxide diffusion tube monitoring locations were established around the district to assist with evaluation of the CAZ. Additional monitoring has also recently been established in Ilkley and Silsden following concerns raised by residents about local air quality and the impacts of new development in these areas. Initial partial year data from these new sites (annualised where necessary) are included in Appendix A of this report. They should be treated with caution as they only represent a relatively short period of monitoring and are likely to have been impacted on by the on going aftermath of the Covid-19 pandemic. Monitoring is ongoing in all these locations and further results from these sites will be included in the 2023 ASR and in future CAZ evaluation reports.

5.2.2 Particulate Matter (PM10)

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM10 annual mean concentrations for the past six years with the air quality objective of 40µg/m^3.

Table A.7 in Appendix A compares the ratified continuous monitored PM10 daily mean concentrations for the past six years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

All PM10 data has been verified and ratified by Air Quality Data Management Services (www.aqdm.co.uk) on behalf of City of Bradford MDC.

There have been no exceedances of the annual mean or 24 hour PM10 objectives in Bradford since 2016. Annual average concentrations of PM10 in Bradford in 2020 and 2021 were the same at all monitored locations and in all cases lower then those observed in previous years. 2020 had slightly more days when the daily average exceeded 50ug/m^3 than 2021. Prior to 2020 there was no clear trend in PM10 concentrations. The post pandemic situation is not yet clear.

Figure A.15 in Appendix A shows the trends in annual mean PM10 concentrations.

PM10 monitoring is currently on-going at the automatic monitoring sites where it is already in place. In October 2021 CBMDC successfully applied for an Air Quality Grant to develop a Particulate Reduction Strategy. Further PM10 monitoring around the district is planned to support this strategy during 2023.

5.2.3 Particulate Matter (PM2.5)

Table A.8 in Appendix A presents the ratified and adjusted monitored PM2.5 annual mean concentrations for the past five years.

All PM2.5 data has been verified and ratified by Air Quality Data Management Services (www.aqdm.co.uk) on behalf of City of Bradford MDC.

The annual average background level of PM2.5 recorded at CM2 (Keighley) in 2020 was the lowest recorded over the previous five years due to the impacts of the Covid-19 pandemic. Levels increased again slightly in 2021 but remained below the pre-pandemic levels.

The PM2.5 annual average concentations measured at CM6 (Shipley Airedale Road) and CM8 (Tong Street) during 2020 were also the lowest recorded in the previous five years due to the impacts of the pandemic. Site CM6 returned the same annual average in 2021 as 2020 but at site CM8 the 2021 annual average was slighlty higher than in 2020. Levels at both sites have remained below pre-pandemic levels.

Figure A.17 in Appendix A shows the trends in annual mean PM2.5 concentrations. Some variation in annual average background PM2.5 concentration is expected due to the influence of weather conditions but there is a clear reduction in PM2.5 concentrations during 2020 and 2021 compared to the previous 5 years.

PM2.5 concentrations in Bradford are well below the current EU target value of 25µg/m3 but in some locations the World Health Organisation (WHO) guideline of 5µg/m^3 is exceeded. The WHO guideline is currently exceeded in most urban centres in the UK but there is currently no statutory obligation for local authorities to meet either of these PM2.5 targets. Defra is currently undertaking a consultation on new environmental targets for the UK available here: link to DEFRA consultation on Environment Act 2021: environmental targets.

In October 2021 CBMDC successfully applied for an Air Quality Grant to develop a Particulate Reduction Strategy. Further PM2.5 monitoring around the district is planned to support this strategy during 2023. There will be a particular emphasis on monitoring PM2.5 emissions from solid fuel burning activities.

5.2.4 Sulphur Dioxide (SO_2)

Tables A.9(a) and A.9(b) in Appendix A compare the ratified continuous monitored SO_2 concentration for 2020 and 2021 at CM2 (Keighley) with the air quality objectives for SO_2.

The SO_2 data has been verified and ratified by Air Quality Data Management Services (www.aqdm.co.uk) on behalf of City of Bradford MDC.

There were no exceedances of the SO_2 air quality objectives at CM2 (Keighley) during 2020 or 2021. Monitoring of sulphur dioxide in Bradford has now ceased and will not be reported in the 2023 ASR.

Appendix A: Monitoring Results

Table A.1: Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
CM2	Keighley	Urban Centre	406058	441273	NO2; PM10	NO	Chemiluminescent	n/a	5	2.7
CM3	Manningham Lane	Roadside	415582	434457	NO2	YES, AQMA order 2, CAZ	Chemiluminescent	4	1.5	1.5
CM4	Manchester Road / Mayo Avenue	Roadside	415933	430569	NO2	YES, AQMA order 1, CAZ	Chemiluminescent	5	3.5	1.5
CM5	Thornton Road	Roadside	415870	433054	NO2	YES, AQMA order 3, CAZ	Chemiluminescent	0	2	1.5
CM6	Shipley Airedale Road	Roadside	416974	433245	NO2; PM10	YES, AQMA order 4, CAZ	Chemiluminescent	2	2	2.7
CM7	Rook Lane	Roadside	417860	430705	NO2	NO, CAZ	Chemiluminescent	1	1.5	1.5
CM8	Tong Street	Roadside	419188	430213	NO2; PM10	NO, CAZ	Chemiluminescent	0	5.8	2.7

Notes:

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

(2) N/A if not applicable

Table A.2(a): Details of Non-Automatic Monitoring Sites in 2020

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DT5	Harrogate Road (furthest from crossroads)	Roadside	417982	434886	NO2	no	0.0	1.3	No	2.7
DT39	Harrogate Road (nearest crossroads)	Roadside	417927	434799	NO2	no	2.0	1.2	No	2.3
DT42	Killinghall	Roadside	417902	434751	NO2	no	1.5	1.4	No	2.2
DT86	Otley Rd lamp post no 2	Roadside	417894	434753	NO2	no	0.0	2.5	No	2.5
DT99	Charnwood Grove/Harrogate Rd lp below junc	Roadside	418033	434970	NO2	no	17.0	1.8	No	2.7
DT100	Killinghall Rd opp car park LP former soc ser	Roadside	417949	434693	NO2	no	0.0	2.4	No	2.6
DT45	Rook Lane lampost 17	Roadside	417877	430717	NO2	CAZ	5.0	1.5	No	2.5
D76	post 12 junc Rook Ln/Tong St	Kerbside	418268	430732	NO2	CAZ	5.5	0.6	No	2.5
DT64	Tong Street	Roadside	419342	430114	NO2	no	0.5	2.9	No	2.5
DT88	Tong Street lamp post no 18	Roadside	418829	430399	NO2	no	0.5	2.4	No	2.3
DT89	Tong St/Broadstone Way Car Park	Roadside	419188	430213	NO2	no	5.0	3.9	No	2.4

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DT108	Thornton Rd LP 24 after Street Nox	Roadside	415891	433045	NO2	Yes, AQMA order 3, CAZ	0.1	4.3	No	2.7
DT109	Thornton Rd LP below Street Nox	Roadside	415858	433061	NO2	Yes, AQMA order 3, CAZ	0.1	4.3	No	2.6
DT110	Thornton Rd Lp adj to student accom	Roadside	415806	433061	NO2	Yes, AQMA order 3,CAZ	2.0	9.0	No	2.4
DT103	Mayo Ave first LP left of AQMS	Roadside	415925	430572	NO2	Yes, AQMA order 1,CAZ	5.1	3.4	No	2.6
DT104	Mayo Ave first LP right of AQMS	Roadside	415961	430558	NO2	Yes, AQMA order 1,CAZ	5.1	3.9	No	2.5
DT105	Manchester Rd LP nearest house 793	Roadside	415780	430504	NO2	Yes, AQMA order 1,CAZ	3.7	3.1	No	2.5
DT106	Smiddles Lane LP nearest fence to Bankfoot School	Roadside	415702	430701	NO2	Yes, AQMA order 1,CAZ	0.0	3.6	No	2.3
DT107	Broadway Ave off Manch Rd adj City bathrooms	Roadside	415833	430837	NO2	CAZ	0.0	5.2	No	2.5
DT92	Harrogate Rd	Roadside	419006	437217	NO2	no	n/a	1.5	No	2.5
DT93	New Line (former school)	Kerbside	419003	437308	NO2	no	n/a	1.0	No	2.5
DT94	Stockhill Rd (school)	Roadside	419103	437337	NO2	no	2.5	3.5	No	2.5
DT95	Harrogate Rd	Kerbside	419111	437322	NO2	no	n/a	1.0	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DT96	New Line (ped crossing)	Kerbside	419152	437209	NO2	no	7.0	1.0	No	2.5
DT68	Co-Located at AQ Station	Urban Centre	406060	441274	NO2	no	0.0	8.0	Yes	3.6
DT69	Co-Located at AQ Station	Urban Centre	406060	441274	NO2	no	0.0	8.0	Yes	3.6
DT70	Co-Located at AQ Station	Urban Centre	406060	441274	NO2	no	0.0	8.0	Yes	3.6
DT115	Buller Street lp4	Suburban	418421	432214	NO2	CAZ	0.0	n/a	No	2.5
DT116	Sticker Lane lp41	Roadside	418564	432218	NO2	CAZ	1.0	2.6	No	2.6
DT117	Parry lane lp4	Kerbside	418192	432208	NO2	CAZ	n/a	0.7	No	2.5
DT118	Fearnville Drive lp1	Roadside	418666	432470	NO2	no	15.0	1.3	No	2.5
DT12	Treadwell Mills	Roadside	416970	433259	NO2	Yes, AQMA order 4,CAZ	0.5	3.4	No	2.4
DT21	12 Prospect Street, Keighley	Urban Background	404719	440613	NO2	no	0.5	n/a	No	2.4
DT78	post 11 Aireworth Road KLY	Roadside	407380	441811	NO2	no	6.0	2.0	No	2.4
DT113	Young Street lp1	Roadside	414014	433357	NO2	no	0.0	2.6	No	2.5
DT120	Leeds Rd St Marys School	Roadside	417991	432926	NO2	CAZ	0.0	6.6	No	2.6

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DT139	Eden School site Thornton Road	Roadside	414396	433648	NO2	CAZ	20.0	2.1	No	2.3
DT160 (now DT119)	Laisterdyke lp 8	Roadside	418644	432899	NO2	CAZ	0.0	2.1	No	2.5
DT165	Apperley Lane 1	Roadside	419613	438317	NO2	no	8.8	1.5	No	2.5
DT166	Apperley Lane2	Roadside	419583	438500	NO2	no	n/a	1.8	No	2.5
DT30	Saltaire Rd opposite Methodist Ch	Roadside	413861	437772	NO2	CAZ	1.7	2.2	No	2.5
DT31	Bradford Road (Bingley Road) Saltaire on traffic lights	Roadside	413527	437713	NO2	CAZ	9.6	1.6	No	2.2
DT49	Moorhead Lane Saltaire	Roadside	413600	437653	NO2	CAZ	5.0	1.8	No	2.6
DT50	203 Bradford Road	Roadside	413510	437732	NO2	CAZ	3.4	2.0	No	2.3
DT91	Dove Street / Saltaire Road	Roadside	413697	437723	NO2	CAZ	0.0	2.4	No	2.5
DT101	Bradford Road (Bingley Road) LP39 Saltaire	Roadside	413418	437725	NO2	CAZ	8.0	1.1	No	2.5
DT102	Bradford Road (Bingley Road) Saltaire lp43	Roadside	413338	437720	NO2	CAZ	7.5	2.4	No	2.3
DT71	Manningham Lane near AQS	Roadside	415580	434461	NO2	Yes, AQMA order 2, CAZ	8.3	2.6	No	2.6

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DT72	post 2 Queens Rd (traffic lights)	Roadside	415573	434521	NO2	Yes, AQMA order 2,CAZ	0.0	3.1	No	3.1
DT73	post 61 Canal Rd (opp garden centre)	Kerbside	415438	435834	NO2	CAZ	22.0	0.6	No	2.4
DT74	post 4 Gaisby Ln (above cycle path)	Kerbside	415549	435918	NO2	CAZ	5.0	0.2	No	2.6
DT111	Canal Rd/ Midland Terr LP nr post box	Roadside	416015	435028	NO2	CAZ	3.0	2.6	No	2.5
DT112	Canal Rd LP nearest flats by car wash	Kerbside	415024	436743	NO2	CAZ	9.2	1.0	No	2.5
D79	Centenary Square	Urban Background	416282	432966	NO2	CAZ	0.1	70.0	No	2.6
D80	Lampost 40 City Exchange	Roadside	416388	432817	NO2	CAZ	0.1	5.4	No	2.6
D81	Lampost 5 Interchange bus entrance	Kerbside	416413	432674	NO2	CAZ	3.3	2.8	No	2.5
DT84	Wilton St- Omar Khan's	Kerbside	416054	432675	NO2	CAZ	0.0	12.4	No	2.5
D161	Godwin Street lamp post 6	Roadside	416148	433102	NO2	CAZ	0.0	1.8	No	2.4
D162	Godwin Street lamp post 7	Roadside	416148	433134	NO2	CAZ	0.0	2.7	No	2.4
D163	Godwin Street lamp post 8	Roadside	416147	433158	NO2	CAZ	0.0	1.7	No	2.6
D164	Godwin Street fall pipe easa training	Roadside	416139	433134	NO2	CAZ	0.0	1.7	No	2.6

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
D121	lp40 Bradford Rd nr Branch	Roadside	414546	436933	NO2	CAZ	7.1	2.6	No	2.4
D122	lp33 Bradford Rd nr Branch	Roadside	414567	436811	NO2	CAZ	8.0	2.3	No	2.2
D123	lp5 Otley Rd CE School	Kerbside	414660	436974	NO2	CAZ	7.8	0.5	No	2.4
D123A	Otley Rd/SunnyBank	Roadside	414766	437113	NO2	CAZ	20.0	1.4	No	2.5
D124	lp4 Otley Rd terrace props	Roadside	414620	436924	NO2	CAZ	6.3	2.0	No	2.4
D125	lp20 165 Otley Rd	Roadside	414674	436471	NO2	CAZ	8.3	2.5	No	2.6
D126	Bradford Rd pelican crossing	Kerbside	414643	436505	NO2	CAZ	11.0	0.7	No	2.5
D127	lp36 Keighley Rd	Roadside	415044	435558	NO2	CAZ	10.4	0.4	No	2.5
D128	lp11 Frizley Gardens	Urban Centre	415331	435796	NO2	CAZ	0.0	96.0	No	2.5
D129	lp24 Valley Road	Roadside	415089	436637	NO2	CAZ	20.0	2.6	No	2.5
D130	lp1 Midland Road, Canal Rd	Roadside	415839	434674	NO2	CAZ	3.0	3.4	No	2.4
D131	Fox Corner Shipley	Kerbside	414856	437605	NO2	CAZ	n/a	0.7	No	1.5
D132	lp36 Manningham Lane	Roadside	415717	434265	NO2	CAZ	3.5	1.1	No	2.3

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
D133	lp121 Canal Road gasworks	Roadside	416260	434581	NO2	CAZ	n/a	2.2	No	2.5
D140	lp4 14 Horton Park Ave	Roadside	414901	432115	NO2	CAZ	2.5	4.5	No	2.5
D141	lp71 279 Great Horton Rd	Roadside	414800	432143	NO2	CAZ	9.3	2.3	No	2.5
D142	lp74 464 Great Horton Rd	Roadside	414724	432095	NO2	CAZ	4.0	2.9	No	2.4
D143	lp64 bridal shop Great Horton Rd	Kerbside	414902	432251	NO2	CAZ	n/a	0.5	No	2.2
D144	lp26 Horton Grange Rd opp medical centre	Kerbside	414908	432312	NO2	CAZ	6.3	1.0	No	2.3
D145	lp62 Great Horton Rd nr Grange parade 368	Roadside	414800	432143	NO2	CAZ	1.3	2.5	No	2.5
D146	lp3 All Saints Road	Roadside	415005	432231	NO2	CAZ	0.0	5.0	No	2.3
D147	lp 14 181 Dirkhill Road	Roadside	415126	432171	NO2	CAZ	3.0	2.0	No	2.5
D148	lp3F footpath All Saints Rd/ Horton Pk Ave	Urban Background	415013	432151	NO2	CAZ	7.7	n/a	No	2.5
D149	lp53 cemetery Rd hardware store	Roadside	413750	433573	NO2	No	5.9	2.5	No	2.4
D150	Thornton Rd welcome to Fweather Gn sign	Roadside	413686	433610	NO2	No	5.0	3.0	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
D151	lp3 12 Allerton Rd	Roadside	413700	433687	NO2	No	2.5	2.3	No	2.6
D152	lp119 620 Thornton Rd	Roadside	413835	433663	NO2	No	1.5	2.9	No	2.5
D153	lp115 Thornton Rd	Roadside	413933	433674	NO2	No	1.5	3.0	No	2.5
D154	lp22 106 Whetley Hill	Roadside	414926	434111	NO2	CAZ	4.0	2.0	No	2.5
D155	lp21 87Whetley Hill	Roadside	414904	434114	NO2	CAZ	4.0	2.0	No	2.6
D156	lp33 Whetley Lane opp medical practice	Roadside	414781	434126	NO2	CAZ	0.0	2.4	No	2.5
D157	lp7 42 Toller Lane	Roadside	414749	434285	NO2	No	5.0	1.8	No	2.4
D158	lp11 Toller Lane opp St Chad's church	Kerbside	414675	434295	NO2	No	10.0	0.8	No	2.6
D159	lp4 Barden Street	Suburban	414906	434182	NO2	CAZ	0.1	25.0	No	2.6
D134	Lp2 Rylstone Street KLY	Roadside	406940	441922	NO2	No	13.0	1.1	No	2.3
D135	LP17 Hard Ings Road KLY	Roadside	406582	442028	NO2	No	6.8	2.3	No	2.6
D136	LP18 Hard Ings Road KLY	Roadside	406540	442038	NO2	No	0.5	2.7	No	2.6
D137	LP21 Hard Ings Road KLY	Roadside	406475	442046	NO2	No	4.1	2.7	No	2.4

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
D138	LP28 Hard Ings Road KLY	Roadside	406255	422140	NO2	No	n/a	2.3	No	2.6

Notes:

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

(2) N/A if not applicable.

Table A.2(b): Details of Non-Automatic Monitoring Sites in 2021

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DT5	Harrogate Road (furthest from crossroads)	Roadside	417982	434886	NO2	No	0.0	1.3	No	2.7
DT39A, DT39B, DT39C	Harrogate Road (nearest crossroads)	Roadside	417927	434799	NO2	No	2.0	1.2	No	2.3
DT99	Charnwood Grove/Harrogate Rd LP below junc	Roadside	418033	434970	NO2	No	17.0	1.8	No	2.7
DT208A, DT208B, DT208C	Harrogate Road opposite DT5	Roadside	417966	434884	NO2	No	5.0	1.4	No	2.4
DT42A, DT42B, DT42C	Killinghall	Roadside	417902	434751	NO2	No	1.5	1.4	No	2.2
DT45	Rook Lane lampost 17	Roadside	417877	430717	NO2	CAZ	5.0	1.5	No	2.5
DT86	Otley Rd lamp post no 2	Roadside	417894	434753	NO2	No	0.0	2.5	No	2.5
D76	post 12 junc Rook Ln/Tong St	Kerbside	418268	430732	NO2	CAZ	5.5	0.6	No	2.5
DT194	LP61 Rooley Lane	Roadside	417184	430315	NO2	CAZ	11.0	4.0	No	2.5
DT195	LP60 opposite DT194, Rooley Lane	Roadside	417178	430344	NO2	CAZ	n/a	2.7	No	2.4
DT196	LP74 Rooley Lane opposite Toby Carvery	Roadside	417369	430370	NO2	CAZ	5.9	2.4	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DT197	LP 116 outside Rooley Medical Centre	Roadside	417846	430739	NO2	CAZ	n/a	2.6	No	2.8
DT198	LP128 Rooley Lane/Gardiner Row	Roadside	417930	430975	NO2	CAZ	0.4	2.6	No	3.0
DT199A, DT199B, DT199C	Tong Street LP 202 opposite DT89	Roadside	419178	430193	NO2	No	n/a	3.5	No	2.8
DT200A, DT200B, DT200C	Tong Street opposite DT200 near KFC	Roadside	419328	430099	NO2	No	n/a	2.2	No	2.5
DT220A, DT220B, DT220C	Broadstone Way LP2 near junction with Tyersal Lane	Roadside	419215	431809	NO2	No	6.7	1.7	No	2.5
DT221A, DT221B, DT221C	Broadstone Way LP3 near junction with Tyersal Lane	Roadside	419196	431834	NO2	No	3.6	4.2	No	2.5
DT222A, DT222B, DT222C	LP on Wakefield Road near Busfield	Roadside	417861	431486	NO2	CAZ	30.0	5.3	No	2.4
DT223A, DT223B, DT223C	LP64 Wakefiled Road outside house no.705	Roadside	417862	431536	NO2	CAZ	3.0	2.0	No	2.5
DT218A, DT218B, DT218C	Near house 567 Sticker Lane LP 78&067	Roadside	418292	431290	NO2	CAZ	14.5	2.0	No	2.5
DT219A, DT219B, DT219C	Near house 528 Sticker Lane LP 76&666	Roadside	418303	431328	NO2	CAZ	13.0	2.6	No	2.4
DT116	Sticker Lane lp41	Roadside	418564	432218	NO2	CAZ	1.0	2.6	No	2.6

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DT118	Fearnville Drive lp1	Roadside	418666	432470	NO2	No	15.0	1.3	No	2.6
DT120A, DT120B, DT120C	Leeds Rd St Marys School	Roadside	417991	432926	NO2	CAZ	0.0	6.6	No	2.5
DT209A, DT209B, DT209C	LP57 Leeds Road opposite Steadman Terrace and 120	Roadside	417960	432907	NO2	CAZ	n/a	5.0	No	2.6
DT205	LP6 Killinghall Road across from house no. 17	Roadside	418597	433111	NO2	CAZ	13.0	3.3	No	2.2
DT206	LP5 Killinghall Road outside house no. 17 opp DT205	Roadside	418579	433109	NO2	CAZ	2.0	2.7	No	2.4
DT207A, DT207B, DT207C	Killinghall Road opp DT42	Roadside	417912	434759	NO2	No	0.3	3.9	No	2.4
DT233	LP 23 Killinghall Rd nr house 105 and pharmacy near Ellerton Street	Roadside	418546	433430	NO2	CAZ	1.5	3.5	No	2.5
DT232	LP24 outside 78 Killinghall Road	Roadside	418563	433432	NO2	CAZ	15.5	3.1	No	2.4
DT64A, DT64B, DT64C	Tong Street	Roadside	419342	430114	NO2	No	0.5	2.9	No	2.5
DT88	Tong Street lamp post no 18	Roadside	418829	430399	NO2	No	0.5	2.4	No	2.3
DT89A, DT89B, DT89C	Tong St/Broadstone Way Car Park	Roadside	419188	430213	NO2	No	5.0	3.9	No	2.4

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DT168	Rockhill Lane LP22 near M606	Suburban	417033	429293	NO2	No	13.0	17.0	No	2.5
DT171	Staithgate Lane Newhall Dr Lampost 4 House 26	Suburban	416678	429910	NO2	No	16.5	2.7	No	2.5
DT214A, DT214B, DT214C	Post outside 221 Bierley Lane nr junction with Rockhill Lane	Roadside	417715	429299	NO2	No	11.5	1.7	No	2.5
DT215A, DT215B, DT215C	Post corner of Sheldon Ridge	Roadside	417708	429380	NO2	No	5.5	1.6	No	2.4
DT216A, DT216B, DT216C	Post 2 Shetcliffe Lane outside house 17	Roadside	418853	430309	NO2	No	3.7	1.3	No	2.5
DT217A, DT217B, DT217C	Post 3 Shetcliffe Lane outside house 28	Roadside	418829	430288	NO2	No	4.5	1.6	No	2.5
DT201	Bowling Back Lane / Parry Lane LP35 outside house 250	Roadside	418108	432322	NO2	CAZ	0.0	1.8	No	2.5
DT202	Parry Lane LP2	Roadside	418135	432272	NO2	CAZ	n/a	2.2	No	2.5
DT203	LP 43 Bowling Back Lane opposite entrance to recycling centre	Roadside	418345	432366	NO2	CAZ	n/a	1.3	No	2.5
DT119A (DT160), DT119B, DT119C	Laisterdyke lp 8	Roadside	418644	432898	NO2	CAZ	0.0	2.3	No	2.4

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DT204A, DT204B, DT204C	Laisterdyke LP9 opp DT119	Roadside	418640	432870	NO2	CAZ	n/a	3.0	No	2.4
DT228A, DT228B, DT228C	LP80 Killinghall Rd between Fagley Road and Nothcote Road	Roadside	418090	434429	NO2	CAZ	3.5	2.9	No	2.5
DT229A, DT229B, DT229C	LP83 Killinghall Road between Fagley Road and Northcote Road	Roadside	418059	434509	NO2	CAZ	0.2	2.2	No	2.5
DT224A, DT224B, DT224C	Barkerend Road LP24 opp Discovery House	Roadside	417117	433431	NO2	CAZ	n/a	5.0	No	2.3
DT225A, DT225B, DT225C	Barkerend Road outside alterations shop	Kerbside	417087	433444	NO2	CAZ	n/a	0.5	No	2.3
DT227A, DT227B, DT227C	Otley Road LP 50 next to house 234	Roadside	417054	434165	NO2	CAZ	0.0	3.8	No	2.4
DT231A, DT231B, DT231C	Post 17 Gain Lane opp house 48 outside Morrisons HQ	Roadside	418791	434424	NO2	No	n/a	3.6	No	2.4
DT230A, DT230B, DT230C	Post 18 Gain Lane near house 48 opp Morrisons HQ	Roadside	418784	434409	NO2	No	11.5	3.7	No	2.4
DT103A, DT103B, DT103C	Mayo Ave first LP left of AQMS	Roadside	415925	430572	NO2	Yes, AQMA 1, CAZ	5.1	3.4	No	2.6
DT104A, DT104B, DT104C	Mayo Ave first LP right of AQMS	Roadside	415961	430558	NO2	Yes, AQMA 1, CAZ	5.1	3.9	No	2.5
DT105A, DT105B, DT105C	Manchester Rd LP nearest house 793	Roadside	415780	430504	NO2	Yes, AQMA 1, CAZ	3.7	3.1	No	2.5

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DT106A, DT106B, DT106C	Smiddles Lane LP nearest fence to Bankfoot School	Roadside	415702	430701	NO2	Yes, AQMA 1, CAZ	0.0	3.6	No	2.3
DT188A, DT188B, DT188C	Mayo Avenue LP20 opposite DT104	Roadside	415979	430522	NO2	Yes, AQMA 1, CAZ	n/a	1.8	No	2.5
DT189A, DT189B, DT189C	LP16 Mayo Avenue outside Matalan car park opp DT103	Roadside	415910	430551	NO2	Yes, AQMA 1, CAZ	n/a	2.6	No	2.1
DT186A, DT186B, DT186C	Manchester Road opp DT105 on LP81A end of Chellow St	Roadside	415743	430482	NO2	No	8.1	2.9	No	2.5
DT187A, DT187B, DT187C	Smiddles Lane LP4 in front of houses. Opposite school and DT106	Roadside	415715	430669	NO2	Yes, AQMA 1, CAZ	2.6	2.5	No	2.6
DT192A, DT192B, DT192C	Mayo Avenue LP32 outside house no 144	Roadside	416218	430420	NO2	CAZ	11.1	3.7	No	2.5
DT193 A, DT193B, DT193C	Mayo Avenue LP31 opposite 192	Roadside	416239	430435	NO2	CAZ	10.5	2.7	No	2.4
DT212A, DT212B, DT212C	Rooley Avenue LP11 outside house 49	Roadside	416398	430194	NO2	CAZ	11.1	3.7	No	2.4
DT213A, DT213B, DT213C	Rooley Avenue LP12 opposite house 212	Roadside	416390	430214	NO2	CAZ	13.0	1.3	No	2.5
DT211A, DT211B, DT211C	Manchester Road LP63B opposite 210	Roadside	415922	431089	NO2	CAZ	5.5	2.4	No	2.5

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DT71A, DT71B, DT71C	LP53 Manningham Lane adj real time monitoring site	Roadside	415580	434461	NO2	Yes, AQMA 2,CAZ	8.3	2.6	No	2.6
DT172A, DT172B, DT172C	LP47 junction of Maninngham Ln and Springbank Ln opp DT71	Roadside	415590	434478	NO2	Yes, AQMA 2,CAZ	12.0	2.5	No	2.5
DT72	LP2 Queens Rd (traffic lights)	Roadside	415573	434521	NO2	Yes, AQMA 2,CAZ	0.0	3.1	No	2.5
DT235A, DT235B, DT235C	LP3 outside house 21 Marlborough Ave	Roadside	415474	434456	NO2	Yes, AQMA 2,CAZ	5.0	2.5	No	2.5
DT156	LP33 Whetley Lane opp medical practice	Roadside	414781	434126	NO2	CAZ	0.0	2.4	No	2.5
DT236	LP19 Whetley Ln outside flats opp house 63	Roadside	414498	433935	NO2	CAZ	8.0	4.1	No	2.4
DT237	LP20 Whetley Ln A6177 opp DT236	Roadside	414536	433981	NO2	CAZ	5.5	2.5	No	2.4
DT238A, DT238B, DT238C	LP5 outside house 26 Wheltey Ln near junction with Thornton Rd	Roadside	414290	433759	NO2	CAZ	6.5	3.7	No	2.4
DT239A, DT239B, DT239C	LP6 Whetley Ln outside no. 27 tax investigation (opposite DT238)	Roadside	414268	433765	NO2	CAZ	4.0	4.2	No	2.4
DT139A, DT139B, DT139C	Eden School site Thornton Road	Roadside	414396	433648	NO2	CAZ	20.0	2.1	No	2.3

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DT240A, DT240B, DT240C	LP92 Thornton Rd opposite DT139	Roadside	414403	433665	NO2	CAZ	0.5	4.7	No	2.6
DT152	LP119 outside no.620 Thornton Road	Roadside	413835	433663	NO2	No	1.5	2.9	No	2.5
DT151A, DT151B, DT151C	LP3 outside no.12 Allerton Road	Roadside	413700	433687	NO2	No	2.5	2.3	No	2.6
DT149A, DT149B, DT149C	LP53 Cemetery Rd nr hardware store	Roadside	413750	433573	NO2	No	5.9	2.5	No	2.4
DT241A, DT241B, DT241C	LP15 Cemetery Rd outside house no.137 opp cemetery	Roadside	413840	432676	NO2	No	7.0	1.6	No	2.4
DT246A, DT246B, DT246C	Concrete LP013 outside house no.65 Horton Grange Rd	Roadside	414722	432432	NO2	CAZ	7.0	1.9	No	2.4
DT247A, DT247B, DT247C	Metal post 13A outside house no.66 Horton Grange Road on opp side of road to 246	Roadside	414731	432443	NO2	CAZ	6.0	1.8	No	2.4
DT144A, DT144B, DT144C	LP26 Horton Grange Road opp medical centre	Kerbside	414908	432312	NO2	CAZ	6.3	1.0	No	2.3
DT146	LP3 All Saints Rd	Roadside	415005	432231	NO2	CAZ	0.0	5.0	No	2.3
DT143A, DT143B, DT143C	LP64 Bridal Shop Great Horton Rd	Kerbside	414902	432251	NO2	CAZ	n/a	0.5	No	2.2

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DT142	LP74 464 Great Horton Rd	Roadside	414724	432095	NO2	CAZ	4.0	2.9	No	2.4
DT248	LP34 outside St Oswalds CofE academy A6177 Cross Ln	Roadside	414499	431676	NO2	CAZ	8.3	2.1	No	2.4
DT249A, DT249B, DT249C	LP10 outside 76 Southfield Ln (A6177) just before Quaker Ln turn off	Roadside	414862	431173	NO2	CAZ	2.7	1.3	No	2.3
DT250A, DT250B, DT250C	LP12 opp DT249 across from house no.100 Southfield Ln side of Co-op Academy Grange	Roadside	414788	431184	NO2	CAZ	23.0	2.3	No	2.4
DT251A, DT251B, DT251C	LP7 Southfield Rd (A6177) opp DT252	Roadside	415222	431010	NO2	CAZ	16.0	1.8	No	2.5
DT252A, DT252B, DT252C	LP6 Southfield Rd (A6177) outside house no.35	Roadside	415228	431031	NO2	CAZ	13.0	1.9	No	2.3
DT253A, DT253B, DT253C	LP6 Holdroyd Hill near house no.72 just after Sanderson Ave	Kerbside	415320	430090	NO2	No	1.4	0.3	No	2.4
DT254A, DT254B, DT254C	LP17 Fair Rd, Wisbey nr Oakdale Cres and Medical Centre	Roadside	414637	430131	NO2	No	6.3	2.0	No	2.3
DT255A, DT255B, DT255C	LP16 Fair Rd Wisbey nr caravan shop opp Oakdale Cres	Roadside	414629	430122	NO2	No	6.0	1.8	No	2.3

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DT256A, DT256B, DT256C	LP18 Moore Ave outside house no. 113	Roadside	414239	430526	NO2	No	13.0	2.5	No	2.4
DT257A, DT257B, DT257C	LP17 Moore Ave outside house no. 60	Roadside	414260	430531	NO2	No	13.9	2.3	No	2.6
DT258A, DT258B, DT258C	LP26 Beacon Rd house no.167	Roadside	413749	430389	NO2	No	12.1	1.7	No	2.3
DT259A, DT259B, DT259C	LP25 Beacon Rd house no.246	Kerbside	413785	430386	NO2	No	17.9	0.0	No	2.5
DT242A, DT242B, DT242C	LP18 outside house no.97 Clayton Road	Roadside	413721	432067	NO2	No	4.7	2.4	No	1.5
DT243A, DT243B, DT243C	LP17 outside house no. 110 Clayton Rd	Roadside	413729	432097	NO2	No	5.8	1.9	No	2.5
DT244	LP16 Hollingwood Lane nr Tanner Hill	Roadside	413225	431373	NO2	No	13.3	1.7	No	2.4
DT245	LP17 Hollingwood Lane opp DT244	Roadside	413243	431386	NO2	No	8.0	1.3	No	2.5
DT260A, DT260B, DT260C	LP8 Netherlands Ave near scout hut	Roadside	415368	429297	NO2	No	13.0	0.8	No	2.5
DT261A, DT261B, DT261C	LP7 Netherlands Ave outside house 51	Roadside	415339	429334	NO2	No	15.5	1.1	No	2.5
DT262A, DT262B, DT262C	LP12 outside house 50 Cleckheaton Rd	Roadside	415894	429519	NO2	No	5.6	4.0	No	2.5

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DT112A, DT112B, DT112C	Canal Road LP nearest flats by car wash	Kerbside	415024	436743	NO2	CAZ	9.2	1.0	No	2.4
DT73A, DT73B, DT73C	LP61 Canal Road (opp garden centre)	Kerbside	415438	435834	NO2	CAZ	22.0	0.5	No	2.4
DT74	LP4 Gaisby Lane	Kerbside	415549	435918	NO2	No	5.0	0.2	No	2.6
DT111A, DT111B, DT111C	Midland Terrace (Canal Rd)	Roadside	416015	435028	NO2	CAZ	3.0	2.6	No	2.5
DT173A, DT173B, DT173C	LP 62 Canal Road same side as the garden centre opposite DT73.	Roadside	415442	435799	NO2	CAZ	60.0	1.9	No	2.5
DT174A, DT174B, DT174C	LP18 Valley Rd opposite car wash and DT112	Roadside	415029	436771	NO2	CAZ	100.0	2.2	No	2.6
DT234A, DT234B, DT234C	Opposite side of road to 111 LP 106 house no. 11	Roadside	416019	434990	NO2	CAZ	n/a	2.4	No	2.3
DT79	Centenary Square	Urban Centre	416282	432966	NO2	CAZ	0.1	70.0	No	2.6
DT80	LP40 City Exchange	Roadside	416388	432817	NO2	CAZ	0.1	5.4	No	2.6
DT81	LP5 Interchage bus entrance	Roadside	416413	432674	NO2	CAZ	3.3	2.8	No	
DT84	Wilton St- Omar Khan's	Roadside	416054	432675	NO2	CAZ	0.0	12.5	No	2.5

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DT161A, DT161B, DT161C	Godwin Street LP 6	Roadside	416148	433102	NO2	CAZ	0.1	1.8	No	2.4
DT162A, DT162B, DT162C	Godwin Street LP 7	Roadside	416148	433134	NO2	CAZ	0.1	2.7	No	2.4
DT163A, DT163B, DT163C	Godwin St LP 8	Roadside	416147	433158	NO2	CAZ	0.1	1.7	No	2.6
DT164A, DT164B, DT164C	Godwin St EASA training	Roadside	416139	433134	NO2	CAZ	0.1	1.7	No	2.6
DT167A, DT167B, DT167C	LP 4 Market St	Kerbside	416392	433046	NO2	CAZ	2.5	0.6	No	2.5
DT185A, DT185B, DT185C	Market St opposite DT167	Roadside	416381	433054	NO2	CAZ	2.4	1.9	No	2.5
DT12A, DT12B, DT12C	Treadwell Mills - Shipley Airedale Rd	Roadside	416970	433259	NO2	Yes , AQMA 4, CAZ	0.5	3.4	No	2.4
DT108A, DT108B, DT108C	LP18 Thornton Road near AQMS	Roadside	415891	433045	NO2	Yes , AQMA 3, CAZ	0.1	4.3	No	2.7
DT109A, DT109B, DT109C	LP 20 Thornton Road near AQMS	Roadside	415858	433061	NO2	Yes , AQMA 3, CAZ	0.1	4.3	No	2.6
DT181A, DT181B, DT181C	LP opposite DT109 Thornton Road	Roadside	415845	433041	NO2	Yes , AQMA 3, CAZ	0.1	10.1	No	2.3
DT182A, DT182B, DT182C	LP opposite DT108 Thornton Road	Roadside	415874	433026	NO2	Yes , AQMA 3, CAZ	0.1	9.9	No	2.3

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DT110	LP adjacent to student accommodation Thornton Road	Roadside	415806	433061	NO2	Yes , AQMA 3, CAZ	2.0	9.0	No	2.4
DT183	Sunbridge Road near Tesco	Roadside	416215	433059	NO2	CAZ	7.1	1.1	No	2.4
DT184	Sunbridge Road near Tesco across road from DT183	Kerbside	416217	433071	NO2	CAZ	3.1	0.6	No	2.4
DT30A, DT30B, DT30C	29 Saltaire Road	Roadside	413861	437772	NO2	CAZ	1.7	2.2	No	2.5
DT31	Bradford Road / Bingley Road on traffic light opp Hirst Road	Roadside	413527	437713	NO2	CAZ	9.6	1.6	No	2.2
DT49A, DT49B, DT49C	outside house no.9 Moorhead Lane	Roadside	413600	437653	NO2	CAZ	5.0	1.8	No	2.6
DT50	outside no.203 Bradford Road	Roadside	413510	437732	NO2	CAZ	3.4	2.0	No	2.3
DT91A, DT91B, DT91C	Dove St / Saltaire Rd	Roadside	413697	437723	NO2	CAZ	0.1	2.4	No	2.5
DT175A, DT175B, DT175C	Saltaire Road opposite Dove St	Roadside	413709	437745	NO2	CAZ	3.4	2.0	No	2.5
DT176A, DT176B, DT176C	Moorhead Lane opp DT49	Roadside	413597	437628	NO2	CAZ	0.1	1.6	No	2.5
DT101A, DT101B, DT101C	LP39 Bingley Rd, Saltaire nearest shops	Roadside	413418	437725	NO2	CAZ	8.0	1.1	No	2.5

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DT102A, DT102B, DT102C	LP43 Bingley Rd, Saltaire	Roadside	413338	437720	NO2	CAZ	7.5	2.4	No	2.3
DT177A, DT177B, DT177C	LP 30 outside dress shop, Bradford Rd (Bingley Rd)	Roadside	413501	437732	NO2	CAZ	2.7	3.7	No	2.3
DT178A, DT178B, DT178C	Bingley Rd Saltaire LP 44 opposite D102	Roadside	413334	437703	NO2	CAZ	7.2	2.9	No	2.5
DT179A, DT179B, DT179C	LP40 Bradford Rd (Bingley Rd) Saltaire	Roadside	413417	437708	NO2	CAZ	5.5	2.5	No	2.4
DT180A, DT180B, DT180C	Saltaire Road outside Methodist Church	Roadside	413856	437784	NO2	CAZ	4.5	1.8	No	2.4
DT190	Low Mill Keighley near Aldi	Roadside	406495	441280	NO2	No	n/a	2.6	No	2.5
DT191	Low Mill Keighley - opposite DT190	Kerbside	406508	441310	NO2	No	n/a	0.5	No	2.5
DT21	12 Prospect Street Keighley	Urban Background	404719	440613	NO2	No	0.5	n/a	No	2.4
DT263	LP12 A65 outside house no.31 Springbank near All Saints school	Roadside	411245	447863	NO2	No	9.5	2.5	No	2.5
DT264	The Grove - Ilkley - outside Crew clothing	Roadside	411600	447618	NO2	No	0.1	2.3	No	2.3
DT265	LP8 outside Midland pub, Station Rd , Ilkley	Roadside	411782	447598	NO2	No	0.1	2.0	No	2.5

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DT266	LP 6 Brook St, Ilkley near Banyan	Roadside	411704	447666	NO2	No	0.1	1.3	No	2.5
DT267	LP TC 19 Leeds Rd, Ilkley near Woody's barbers	Roadside	411786	447811	NO2	No	0.5	2.8	No	2.5
DT78	LP11 Aireworth Road, Keighley	Roadside	407380	441811	NO2	No	6.0	2.0	No	2.4
DT68, DT69, DT70	Keighley AQMS	Urban Centre	406060	441274	NO2	No	0.0	8.0	Yes	3.6
DT121	lp40 Bradford Rd nr Branch	Roadside	414546	436933	NO2	CAZ	7.1	2.6	No	2.4
DT122	lp33 Bradford Rd nr Branch	Roadside	414567	436811	NO2	CAZ	8.0	2.3	No	2.2
DT123	lp5 Otley Rd CE School	Kerbside	414660	436974	NO2	CAZ	7.8	0.5	No	2.4
DT123A	Otley Rd/SunnyBank	Roadside	414766	437113	NO2	CAZ	20.0	1.4	No	2.5
DT124	lp4 Otley Rd terrace props	Roadside	414620	436924	NO2	CAZ	6.3	2.4	No	2.4
DT125	lp20 165 Otley Rd	Roadside	414674	436471	NO2	CAZ	8.3	2.5	No	2.6
DT126	Bradford Rd pelican crossing	Kerbside	414643	436505	NO2	CAZ	11.0	0.6	No	2.5
DT127	lp36 Keighley Rd	Roadside	415044	435558	NO2	CAZ	10.4	0.4	No	2.5
DT128	lp11 Frizley Gardens	Urban Background	415331	435796	NO2	CAZ	0.0	96.0	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DT130	lp1 Midland Road	Roadside	415839	434674	NO2	CAZ	3.0	3.4	No	2.4
DT132	lp36 Manningham Lane	Roadside	415717	434265	NO2	CAZ	3.5	1.1	No	2.3
DT129	lp24 Valley Road	Roadside	415089	436637	NO2	CAZ	20.0	2.6	No	2.5
DT131	Fox Corner Shipley	Kerbside	414856	437605	NO2	CAZ	n/a	0.7	No	1.5
DT133	lp121 Canal Road gasworks	Roadside	416260	434581	NO2	CAZ	n/a	2.2	No	2.2
DT134	Lp2 Rylstone Street KLY	Roadside	406940	441922	NO2	No	13.0	1.1	No	2.3
DT135	LP17 Hard Ings Road KLY	Roadside	406582	442028	NO2	No	6.8	2.3	No	2.6
DT136	LP18 Hard Ings Road KLY	Roadside	406540	442038	NO2	No	0.5	2.7	No	2.6
DT137	LP21 Hard Ings Road KLY	Roadside	406475	442046	NO2	No	4.1	2.7	No	2.4
DT138	LP28 Hard Ings Road KLY	Roadside	406255	442140	NO2	No	n/a	2.3	No	2.6

Notes:

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

(2) N/A if not applicable.

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Periods (%) (1)	Valid Data Capture 2020 (%) (2)	Valid Data Capture 2021 (%) (2)	2016	2017	2018	2019	2020	2021
CM2	406058	441273	Urban Centre	full year datasets	90.7%	83.3%	31	24.0	27.0	24.0	20.0	22.0
CM3	415582	434457	Roadside	full year datasets	96.2%	95.4%	**41**	39.0	**51.0**	**43.0**	35.0	32.0
CM4	415933	430569	Roadside	full year datasets	80.5%	97.9%	**46**	**42.0**	**44.0**	**41.0**	34.0	38.0
CM5	415870	433054	Roadside	full year datasets	92.3%	76.1%	31	30.0	**45.0**	39.0	29.0	34.0
CM6	416974	433245	Roadside	full year datasets	94.7%	83.6%	**52**	**40.0**	**48.0**	**46.0**	38.0	**41.0**
CM7	417860	430705	Roadside	full year datasets	85.6%	81.8%	36	31.0	38.0	38.0	29.0	35.0
CM8	419188	430213	Roadside	full year datasets	92.2%	97.6%	no data	32.0	34.0	33.0	23.0	23.0

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

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

Notes:

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

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

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

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

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

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

Table A.4(a): Annual Mean NO_2 Monitoring Results 2020: Non-Automatic Monitoring (µg/m^3)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
DT5	417982	434886	Roadside	82.7	82.7	39.0	35.0	29.0	29.0	25.7
DT39	417927	434799	Roadside	75.0	75.0	39.0	34.0	35.0	31.0	26.2
DT42	417902	434751	Roadside	82.7	82.7	**43.0**	**44.0**	**43.0**	34.0	30.6
DT86	417894	434753	Roadside	82.7	82.7	32.0	28.0	31.0	27.0	23.3
DT99	418033	434970	Roadside	82.7	82.7		25.0	25.0	24.0	19.3
DT100	417949	434693	Roadside	82.7	82.7		26.0	25.0	23.0	18.3
DT45	417877	430717	Roadside	82.7	82.7	38.0	38.0	32.0	27.0	24.0
D76	418268	430732	Kerbside	75.0	75.0	34.0	33.0	31.0	26.0	23.7
DT64	419342	430114	Roadside	82.7	82.7	**41.0**	**42.0**	**40.0**	34.0	31.5
DT88	418829	430399	Roadside	82.7	82.7	35.0	34.0	34.0	26.0	25.5
DT89	419188	430213	Roadside	82.7	82.7	36.0	38.0	34.0	29.0	24.8
DT108	415891	433045	Roadside	75.0	75.0		34.0	33.0	32.0	30.6
DT109	415858	433061	Roadside	82.7	82.7		35.0	34.0	31.0	28.9
DT110	415806	433061	Roadside	82.7	82.7		28.0	32.0	27.0	23.7
DT103	415925	430572	Roadside	82.7	82.7		**40.0**	**42.0**	35.0	35.4
DT104	415961	430558	Roadside	82.7	82.7		**43.0**	**51.0**	38.0	38.5
DT105	415780	430504	Roadside	82.7	82.7		37.0	**43.0**	37.0	33.6
DT106	415702	430701	Roadside	82.7	82.7		27.0	30.0	28.0	23.7
DT107	415833	430837	Roadside	82.7	82.7		23.0	24.0	23.0	19.3
DT92	419006	437217	Roadside	82.7	82.7	38.0	33.0	33.0	32.0	24.5
DT93	419003	437308	Kerbside	82.7	82.7	**40.0**	36.0	36.0	30.0	25.8
DT94	419103	437337	Roadside	82.7	82.7	27.0	26.0	25.0	23.0	18.4
DT95	419111	437322	Kerbside	73.1	73.1	**51.0**	**43.0**	39.0	34.0	23.4
DT96	419152	437209	Kerbside	82.7	82.7	38.0	36.0	34.0	33.0	24.1
DT68	406060	441274	Urban Centre	73.1	73.1	30.0	25.0	28.0	25.0	17.3
DT69	406060	441274	Urban Centre	73.1	73.1	31.0	28.0	28.0	28.0	17.7
DT70	406060	441274	Urban Centre	73.1	73.1	32.0	27.0	28.0	28.0	20.7
DT115	418421	432214	Suburban	82.7	82.7		23.0	24.0	20.0	15.6
DT116	418564	432218	Roadside	75.0	75.0		28.0	27.0	24.0	18.9
DT117	418192	432208	Kerbside	82.7	82.7			26.0	23.0	20.3
DT118	418666	432470	Roadside	82.7	82.7		31.0	27.0	27.0	20.5
DT12	416970	433259	Roadside	82.7	82.7	**69.0**	**62.0**	**55.0**	**52.0**	**45.8**
DT21	404719	440613	Urban Background	73.1	73.1	12.0	12.0	11.0	10.0	7.7
DT78	407380	441811	Roadside	82.7	82.7	23.0	23.0	20.0	21.0	14.0
DT113	414014	433357	Roadside	82.7	82.7		24.0	22.0	20.0	16.5

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
DT120	417991	432926	Roadside	65.4	65.4			35.0	31.0	27.1
DT139	414396	433648	Roadside	75.0	75.0				22.0	22.3
DT160 (now DT119)	418644	432899	Roadside	82.7	82.7					22.9
DT165	419613	438317	Roadside	75.0	75.0					22.0
DT166	419583	438500	Roadside	82.7	82.7					21.0
DT30	413861	437772	Roadside	75	75.0	**41.0**	37.0	40.0	31.0	26.9
DT31	413527	437713	Roadside	83.3	82.7	**50.0**	**49.0**	**51.0**	**42.0**	37.9
DT49	413600	437653	Roadside	83.3	82.7	35.0	31.0	33.0	27.0	22.4
DT50	413510	437732	Roadside	75	75.0	**60.0**	**63.0**	**58.0**	**49.0**	**40.7**
DT91	413697	437723	Roadside	75	75.0	35.0	**40.0**	38.0	29.0	27.7
DT101	413418	437725	Roadside	83.3	82.7		**44.0**	**42.0**	34.0	31.3
DT102	413338	437720	Roadside	83.3	82.7		36.0	**46.0**	38.0	32.5
DT71	415580	434461	Roadside	83.3	82.7	39.0	**43.0**	**40.0**	36.0	30.4
DT72	415573	434521	Roadside	58.3	57.7	**66.0**	**53.0**	**66.0**	**57.0**	**47.1**
DT73	415438	435834	Kerbside	75	75.0	**51.0**	**46.0**	**46.0**	38.0	33.2
DT74	415549	435918	Kerbside	83.3	82.7	22.0	23.0	20.0	18.0	17.1
DT111	416015	435028	Roadside	83.3	82.7		39.0	37.0	31.0	29.4
DT112	415024	436743	Kerbside	66.7	65.4		31.0	38.0	32.0	28.3
D79	416282	432966	Urban Background	74.5	74.5	29.0	33.0	32.0	27.0	20.7
D80	416388	432817	Roadside	75.0	75.0	33.0	33.0	36.0	31.0	27.2
D81	416413	432674	Kerbside	82.7	82.7	34.0	37.0	35.0	27.0	30.5
DT84	416054	432675	Kerbside	82.7	82.7	32.0	32.0	33.0	28.0	24.1
D161	416148	433102	Roadside	82.7	82.7					36.0
D162	416148	433134	Roadside	82.7	82.7					31.5
D163	416147	433158	Roadside	82.7	82.7					27.6
D164	416139	433134	Roadside	73.4	73.4					30.8
D121	414546	436933	Roadside	91.67	92.7					22.0
D122	414567	436811	Roadside	91.67	92.7					30.3
D123	414660	436974	Kerbside	75	74.3					30.6
D123A	414766	437113	Roadside	91.7	92.7					33.2
D124	414620	436924	Roadside	91.7	92.7					34.0
D125	414674	436471	Roadside	66.7	66.4					15.1
D126	414643	436505	Kerbside	91.7	92.7					19.4
D127	415044	435558	Roadside	91.7	92.7					36.1
D128	415331	435796	Urban Centre	91.7	92.7					13.0

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
D129	415089	436637	Roadside	91.7	92.7					26.8
D130	415839	434674	Roadside	83.3	86.7					29.7
D131	414856	437605	Kerbside	91.7	92.7					37.0
D132	415717	434265	Roadside	91.7	92.7					34.9
D133	416260	434581	Roadside	91.7	92.7					30.4
D140	414901	432115	Roadside	75	46.8					24.6
D141	414800	432143	Roadside	75	46.8					30.5
D142	414724	432095	Roadside	75	46.8					27.8
D143	414902	432251	Kerbside	75	46.8					34.2
D144	414908	432312	Kerbside	62.5	38.6					29.9
D145	414800	432143	Roadside	75	46.8					33.6
D146	415005	432231	Roadside	62.5	38.6					19.4
D147	415126	432171	Roadside	75	46.8					16.4
D148	415013	432151	Urban Background	75	46.8					14.4
D149	413750	433573	Roadside	75	46.8					27.9
D150	413686	433610	Roadside	62.5	37.0					25.1
D151	413700	433687	Roadside	75	46.8					27.5
D152	413835	433663	Roadside	75	46.8					33.4
D153	413933	433674	Roadside	75	46.8					35.6
D154	414926	434111	Roadside	75	46.8					25.4
D155	414904	434114	Roadside	75	46.8					34.6
D156	414781	434126	Roadside	75	46.8					33.3
D157	414749	434285	Roadside	75	46.8					31.8
D158	414675	434295	Kerbside	75	46.8					30.1
D159	414906	434182	Suburban	75	46.8					22.7
D134	406940	441922	Roadside	91.7	92.7					34.5
D135	406582	442028	Roadside	91.7	92.7					29.5
D136	406540	442038	Roadside	91.7	92.7					28.3
D137	406475	442046	Roadside	91.7	92.7					28.6
D138	406255	422140	Roadside	75	74.8					30.5

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

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

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

Notes:

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

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

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

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

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

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

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

Diffusion data processed prior to introduction of the diffusion tube processing tool is only available to nearest whole number.

Table A.4(b): Annual Mean NO_2 Monitoring Results 2021: Non-Automatic Monitoring (µg/m^3)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2021 (%) [2]	2017	2018	2019	2020	2021
DT5	417982	434886	Roadside	91.7	92.3	35.0	29.0	29.0	25.7	28.3
DT39A, DT39B, DT39C	417927	434799	Roadside	100	100.0	34.0	35.0	31.0	26.2	28.2
DT99	418033	434970	Roadside	100	42.3	25.0	25.0	24.0	19.3	20.7
DT208A, DT208B, DT208C	417966	434884	Roadside	100	42.3					19.4
DT42A, DT42B, DT42C	417902	434751	Roadside	100	100.0	**44.0**	**43.0**	34.0	30.6	33.1
DT45	417877	430717	Roadside	100	42.3	38.0	32.0	27.0	24.0	25.2
DT86	417894	434753	Roadside	100	100.0	28.0	31.0	27.0	23.3	28.0
D76	418268	430732	Kerbside	100	100.0	33.0	31.0	26.0	23.7	27.0
DT194	417184	430315	Roadside	100	42.3					25.3
DT195	417178	430344	Roadside	100	42.3					30.9
DT196	417369	430370	Roadside	100	42.3					28.8
DT197	417846	430739	Roadside	100	42.3					25.3
DT198	417930	430975	Roadside	100	42.3					29.0
DT199A, DT199B, DT199C	419178	430193	Roadside	100	42.3					18.7
DT200A, DT200B, DT200C	419328	430099	Roadside	80	42.3					20.7

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2021 (%) [2]	2017	2018	2019	2020	2021
DT220A, DT220B, DT220C	419215	431809	Roadside	93.3	42.3					17.8
DT221A, DT221B, DT221C	419196	431834	Roadside	100	42.3					16.3
DT222A, DT222B, DT222C	417861	431486	Roadside	93.3	42.3					21.0
DT223A, DT223B, DT223C	417862	431536	Roadside	100	42.3					36.8
DT218A, DT218B, DT218C	418292	431290	Roadside	100	42.3					30.1
DT219A, DT219B, DT219C	418303	431328	Roadside	84.6	42.3					25.6
DT116	418564	432218	Roadside	100	42.3	28.0	27.0	24.0	18.9	20.6
DT118	418666	432470	Roadside	80	34.6	31.0	27.0	27.0	20.5	22.1
DT120A, DT120B, DT120C	417991	432926	Roadside	100	42.3		35.0	31.0	27.1	30.6
DT209A, DT209B, DT209C	417960	432907	Roadside	93.3	42.3					33.1
DT205	418597	433111	Roadside	100	42.3					24.4
DT206	418579	433109	Roadside	100	42.3					29.4
DT207A, DT207B, DT207C	417912	434759	Roadside	100	42.3					22.4
DT233	418546	433430	Roadside	100	42.3					25.5
DT232	418563	433432	Roadside	100	42.3					23.0

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2021 (%) [2]	2017	2018	2019	2020	2021
DT64A, DT64B, DT64C	419342	430114	Roadside	95.8	92.3	**42.0**	**40.0**	34.0	31.5	32.7
DT88	418829	430399	Roadside	83.3	82.7	34.0	34.0	26.0	25.5	27.8
DT89A, DT89B, DT89C	419188	430213	Roadside	100	100.0	38.0	34.0	29.0	24.8	29.9
DT168	417033	429293	Suburban	100	67.3					29.4
DT171	416678	429910	Suburban	100	59.6					15.3
DT214A, DT214B, DT214C	417715	429299	Roadside	100	42.3					20.9
DT215A, DT215B, DT215C	417708	429380	Roadside	86.7	42.3					15.9
DT216A, DT216B, DT216C	418853	430309	Roadside	100	42.3					16.4
DT217A, DT217B, DT217C	418829	430288	Roadside	100	42.3					15.6
DT201	418108	432322	Roadside	100	42.3					30.0
DT202	418135	432272	Roadside	100	42.3					22.0
DT203	418345	432366	Roadside	80	32.7					23.6
DT119A (DT160), DT119B, DT119C	418644	432898	Roadside	100	42.3				22.9	24.4
DT204A, DT204B, DT204C	418640	432870	Roadside	100	42.3					19.2

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2021 (%) [2]	2017	2018	2019	2020	2021
DT228A, DT228B, DT228C	418090	434429	Roadside	80	42.3					32.3
DT229A, DT229B, DT229C	418059	434509	Roadside	100	42.3					22.9
DT224A, DT224B, DT224C	417117	433431	Roadside	100	42.3					26.4
DT225A, DT225B, DT225C	417087	433444	Kerbside	100	42.3					33.3
DT227A, DT227B, DT227C	417054	434165	Roadside	84.6	42.3					20.9
DT231A, DT231B, DT231C	418791	434424	Roadside	75	34.6					17.7
DT230A, DT230B, DT230C	418784	434409	Roadside	100	26.9					19.0
DT103A, DT103B, DT103C	415925	430572	Roadside	100	100.0	**40.0**	**42.0**	35.0	35.4	37.6
DT104A, DT104B, DT104C	415961	430558	Roadside	100	100.0	**43.0**	**51.0**	38.0	38.5	**41.0**
DT105A, DT105B, DT105C	415780	430504	Roadside	55	65.4	37.0	**43.0**	37.0	33.6	37.6
DT106A, DT106B, DT106C	415702	430701	Roadside	88.9	51.9	27.0	30.0	28.0	23.7	24.0
DT188A, DT188B, DT188C	415979	430522	Roadside	100	42.3					25.1

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2021 (%) [2]	2017	2018	2019	2020	2021
DT189A, DT189B, DT189C	415910	430551	Roadside	61.1	51.9					28.6
DT186A, DT186B, DT186C	415743	430482	Roadside	94.4	51.9					21.4
DT187A, DT187B, DT187C	415715	430669	Roadside	77.8	51.9					25.9
DT192A, DT192B, DT192C	416218	430420	Roadside	100	42.3					22.4
DT193 A, DT193B, DT193C	416239	430435	Roadside	93.3	42.3					28.7
DT212A, DT212B, DT212C	416398	430194	Roadside	80	32.7					25.6
DT213A, DT213B, DT213C	416390	430214	Roadside	80	42.3					22.3
DT211A, DT211B, DT211C	415922	431089	Roadside	100	42.3					**41.4**
DT71A, DT71B, DT71C	415580	434461	Roadside	33.3	57.7	**43.0**	**40.0**	36.0	30.4	29.7
DT172A, DT172B, DT172C	415590	434478	Roadside	88.9	51.9					30.2
DT72	415573	434521	Roadside	100	100.0	**53.0**	**66.0**	**57.0**	**47.1**	**48.8**
DT235A, DT235B, DT235C	415474	434456	Roadside	100	42.3					32.5
DT156	414781	434126	Roadside	100	42.3				33.3	30.0

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2021 (%) [2]	2017	2018	2019	2020	2021
DT238A, DT238B, DT238C	414290	433759	Roadside	93.3	42.3					24.4
DT236	414498	433935	Roadside	100	42.3					22.2
DT237	414536	433981	Roadside	100	42.3					23.9
DT239A, DT239B, DT239C	414268	433765	Roadside	80	34.6					30.3
DT139A, DT139B, DT139C	414396	433648	Roadside	80	42.3			22.0	22.3	25.3
DT240A, DT240B, DT240C	414403	433665	Roadside	100	42.3					30.0
DT152	413835	433663	Roadside	100	42.3				33.4	30.7
DT151A, DT151B, DT151C	413700	433687	Roadside	100	42.3				27.5	25.3
DT149A, DT149B, DT149C	413750	433573	Roadside	100	42.3				27.9	28.1
DT241A, DT241B, DT241C	413840	432676	Roadside	73.3	42.3					21.4
DT246A, DT246B, DT246C	414722	432432	Roadside	100	42.3					26.3
DT247A, DT247B, DT247C	414731	432443	Roadside	100	42.3					20.9
DT144A, DT144B, DT144C	414908	432312	Kerbside	73.3	42.3				29.9	28.9
DT146	415005	432231	Roadside	100	42.3				19.4	20.9

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2021 (%) [2]	2017	2018	2019	2020	2021
DT143A, DT143B, DT143C	414902	432251	Kerbside	86.7	42.3				34.2	33.3
DT142	414724	432095	Roadside	100	42.3				27.8	27.6
DT248	414499	431676	Roadside	60	25.0					26.6
DT249A, DT249B, DT249C	414862	431173	Roadside	66.7	34.6					25.9
DT250A, DT250B, DT250C	414788	431184	Roadside	66.7	34.6					20.5
DT251A, DT251B, DT251C	415222	431010	Roadside	100	42.3					22.7
DT252A, DT252B, DT252C	415228	431031	Roadside	100	42.3					29.5
DT253A, DT253B, DT253C	415320	430090	Kerbside	66.7	42.3					23.5
DT254A, DT254B, DT254C	414637	430131	Roadside	80	42.3					18.5
DT255A, DT255B, DT255C	414629	430122	Roadside	73.3	34.6					16.4
DT256A, DT256B, DT256C	414239	430526	Roadside	76.9	32.7					11.1
DT257A, DT257B, DT257C	414260	430531	Roadside	100	42.3					14.6
DT258A, DT258B, DT258C	413749	430389	Roadside	100	42.3					18.5

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
DT259A, DT259B, DT259C	413785	430386	Kerbside	92.3	42.3					17.3
DT242A, DT242B, DT242C	413721	432067	Roadside	100	42.3					17.3
DT243A, DT243B, DT243C	413729	432097	Roadside	100	42.3					21.7
DT244	413225	431373	Roadside	100	34.6					15.2
DT245	413243	431386	Roadside	100	42.3					16.2
DT260A, DT260B, DT260C	415368	429297	Roadside	100	42.3					12.0
DT261A, DT261B, DT261C	415339	429334	Roadside	100	42.3					12.8
DT262A, DT262B, DT262C	415894	429519	Roadside	100	42.3					26.6
DT112A, DT112B, DT112C	415024	436743	Kerbside	95.8	92.4	31.0	38.0	32.0	28.3	28.7
DT73A, DT73B, DT73C	415438	435834	Kerbside	100	100.0	**46.0**	**46.0**	38.0	33.2	38.0
DT74	415549	435918	Kerbside	100	100.0	23.0	20.0	18.0	17.1	17.2
DT111A, DT111B, DT111C	416015	435028	Roadside	100	100.0	39.0	37.0	31.0	29.4	33.8
DT173A, DT173B, DT173C	415442	435799	Roadside	100	52.6					32.1

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
DT174A, DT174B, DT174C	415029	436771	Roadside	100	52.6					23.3
DT234A, DT234B, DT234C	416019	434990	Roadside	100	43.1					30.1
DT79	416282	432966	Urban Centre	91.7	92.4	33.0	32.0	27.0	20.7	24.6
DT80	416388	432817	Roadside	100	100.0	33.0	36.0	31.0	27.2	28.9
DT81	416413	432674	Roadside	16.7	15.2	37.0	35.0	27.0	30.5	-
DT84	416054	432675	Roadside	100	100.0	32.0	33.0	28.0	24.1	29.0
DT161A, DT161B, DT161C	416148	433102	Roadside	100	100.0				36.0	**43.2**
DT162A, DT162B, DT162C	416148	433134	Roadside	95.8	92.4				31.5	38.9
DT163A, DT163B, DT163C	416147	433158	Roadside	100	100.0				27.6	36.5
DT164A, DT164B, DT164C	416139	433134	Roadside	100	100.0				30.8	34.0
DT167A, DT167B, DT167C	416392	433046	Kerbside	95.8	92.4					**45.3**
DT185A, DT185B, DT185C	416381	433054	Roadside	100	52.6					37.8
DT12A, DT12B, DT12C	416970	433259	Roadside	100	100.0	**62.0**	**55.0**	**52.0**	**45.8**	**50.6**
DT108A, DT108B, DT108C	415891	433045	Roadside	100	100.0	34.0	33.0	32.0	30.6	33.2

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2021 (%) [2]	2017	2018	2019	2020	2021
DT109A, DT109B, DT109C	415858	433061	Roadside	100	100.0	35.0	34.0	31.0	28.9	32.3
DT181A, DT181B, DT181C	415845	433041	Roadside	100	52.6					27.1
DT182A, DT182B, DT182C	415874	433026	Roadside	100	52.6					25.6
DT110	415806	433061	Roadside	100	100.0	28.0	32.0	27.0	23.7	26.5
DT183	416215	433059	Roadside	100	52.6					38.4
DT184	416217	433071	Kerbside	100	43.1					36.5
DT30A, DT30B, DT30C	413861	437772	Roadside	79.2	75.3	37.0	**40.0**	31.0	26.9	31.3
DT31	413527	437713	Roadside	91.7	92.4	**49.0**	**51.0**	**42.0**	**37.9**	**41.4**
DT49A, DT49B, DT49C	413600	437653	Roadside	95.8	92.4	31.0	33.0	27.0	22.4	25.9
DT50	413510	437732	Roadside	91.67	90.5	**63.0**	**58.0**	**49.0**	**40.7**	**41.8**
DT91A, DT91B, DT91C	413697	437723	Roadside	100	100.0	**40.0**	38.0	29.0	27.7	30.5
DT175A, DT175B, DT175C	413709	437745	Roadside	100	52.6					27.2
DT176A, DT176B, DT176C	413597	437628	Roadside	100	52.6					19.4
DT101A, DT101B, DT101C	413418	437725	Roadside	91.7	89.2	**44.0**	**42.0**	34.0	31.3	37.9

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2021 (%) [2]	2017	2018	2019	2020	2021
DT102A, DT102B, DT102C	413338	437720	Roadside	100	100.0	36.0	**46.0**	38.0	32.5	31.4
DT177A, DT177B, DT177C	413501	437732	Roadside	100	52.6					32.3
DT178A, DT178B, DT178C	413334	437703	Roadside	100	52.6					30.6
DT179A, DT179B, DT179C	413417	437708	Roadside	83.3	52.6					30.9
DT180A, DT180B, DT180C	413856	437784	Roadside	94.4	52.6					19.7
DT190	406495	441280	Roadside	83.3	43.1					26.5
DT191	406508	441310	Kerbside	100	52.6					**44.7**
DT21	404719	440613	Urban Background	100	52.6	12.0	11.0	10.0	7.7	8.0
DT263	411245	447863	Roadside	100	35.5					13.3
DT264	411600	447618	Roadside	100	35.5					12.3
DT265	411782	447598	Roadside	100	35.5					20.8
DT266	411704	447666	Roadside	75	26.0					17.7
DT267	411786	447811	Roadside	100	35.5					20.1
DT78	407380	441811	Roadside	83.3	84.8	23.0	20.0	21.0	14.0	17.0
DT68, DT69, DT70	406060	441274	Urban Centre	91.7	92.1	27.0	28.0	28.0	20.7	22.0
DT121	414546	436933	Roadside	91.7	90.7				22.0	22.1
DT122	414567	436811	Roadside	91.7	91.0				30.3	30.4

Diffusion Tube ID										
DT123	414660	436974	Kerbside	58.3	58.1				30.6	34.4
DT123A	414766	437113	Roadside	91.7	90.7				33.2	34.3
DT124	414620	436924	Roadside	100	98.6				34.0	31.6
DT125	414674	436471	Roadside	91.7	92.6				15.1	18.5
DT126	414643	436505	Kerbside	100	98.6				19.4	20.1
DT127	415044	435558	Roadside	100	98.6				36.1	37.5
DT128	415331	435796	Urban Background	91.7	89.3				13.0	12.5
DT130	415839	434674	Roadside	83.3	83.0				29.7	31.3
DT132	415717	434265	Roadside	100	98.6				34.9	37.8
DT129	415089	436637	Roadside	100	98.6				26.8	28.2
DT131	414856	437605	Kerbside	91.7	90.8				37.0	39.1
DT133	416260	434581	Roadside	100	98.6				30.4	32.1
DT134	406940	441922	Roadside	100	98.6				34.5	35.4
DT135	406582	442028	Roadside	100	98.6				29.5	29.7
DT136	406540	442038	Roadside	100	98.6				28.3	29.6
DT137	406475	442046	Roadside	91.7	92.7				28.6	34.1
DT138	406255	442140	Roadside	83.3	81.8				30.5	33.5

Figure A.1: Trends in Annual Mean NO_2 Concentrations at all real time sites

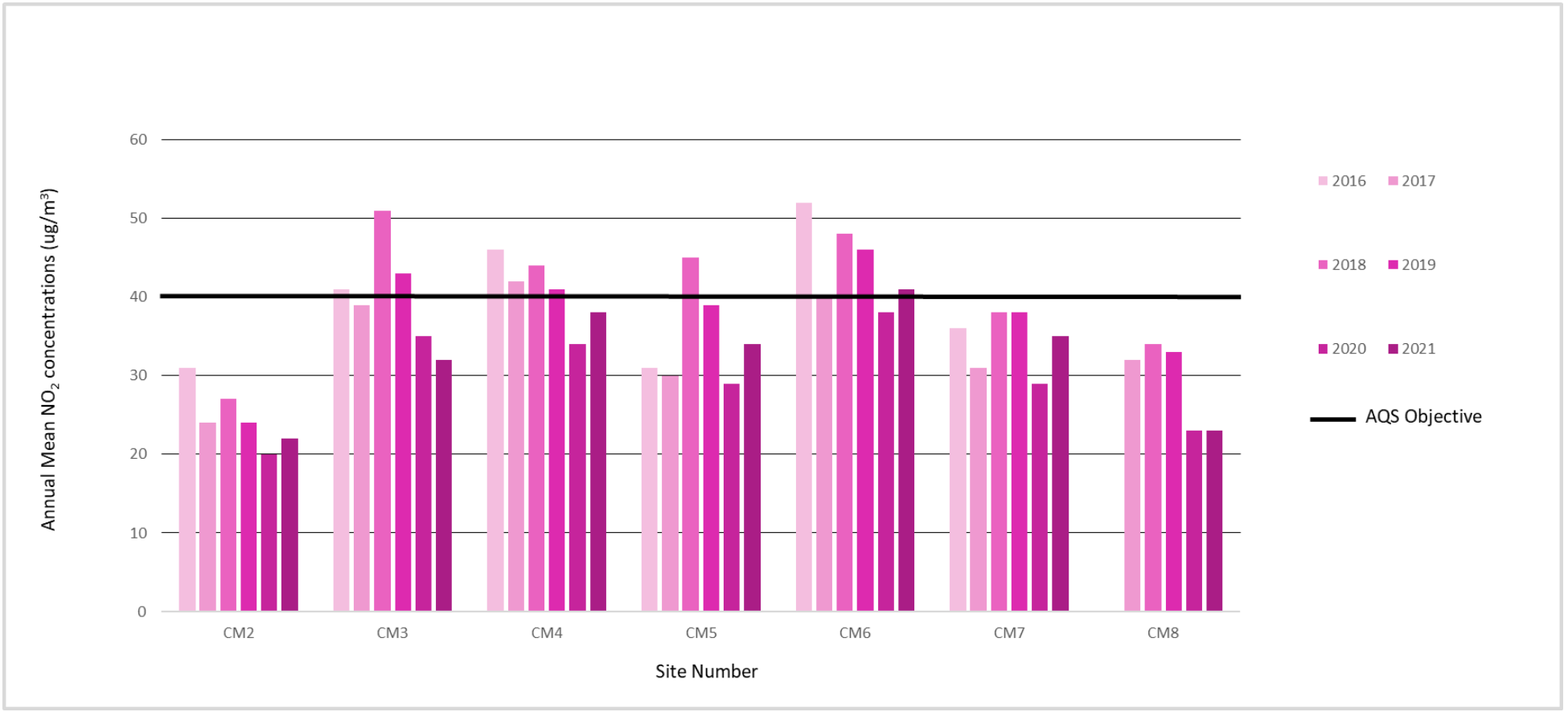

Figure A.2: Trends in Annual Mean NO_2 Concentrations at all background sites

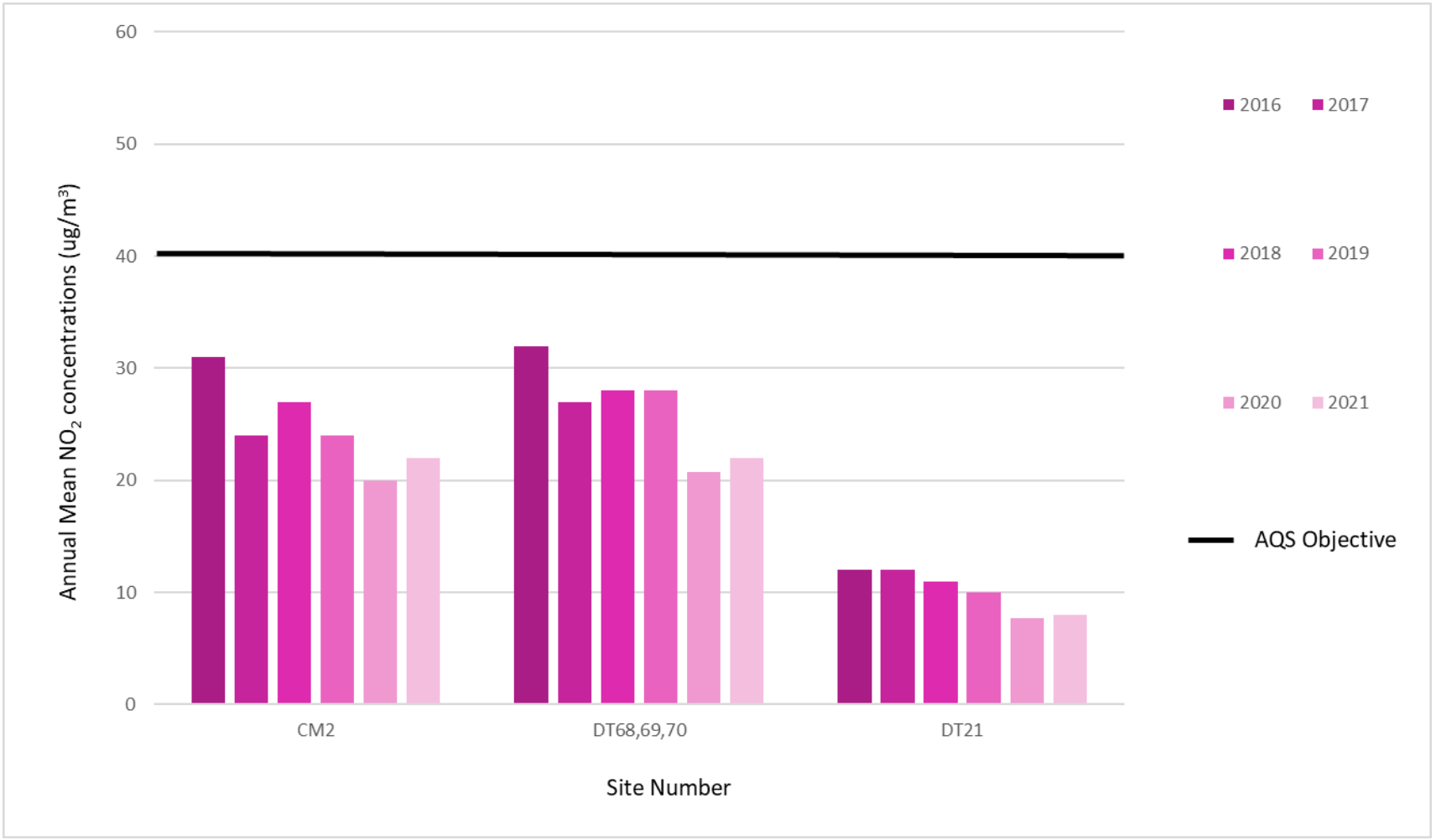

Figure A.3: Trends in Annual Mean NO_2 Concentrations in Mayo Avenue AQMA (order 1)

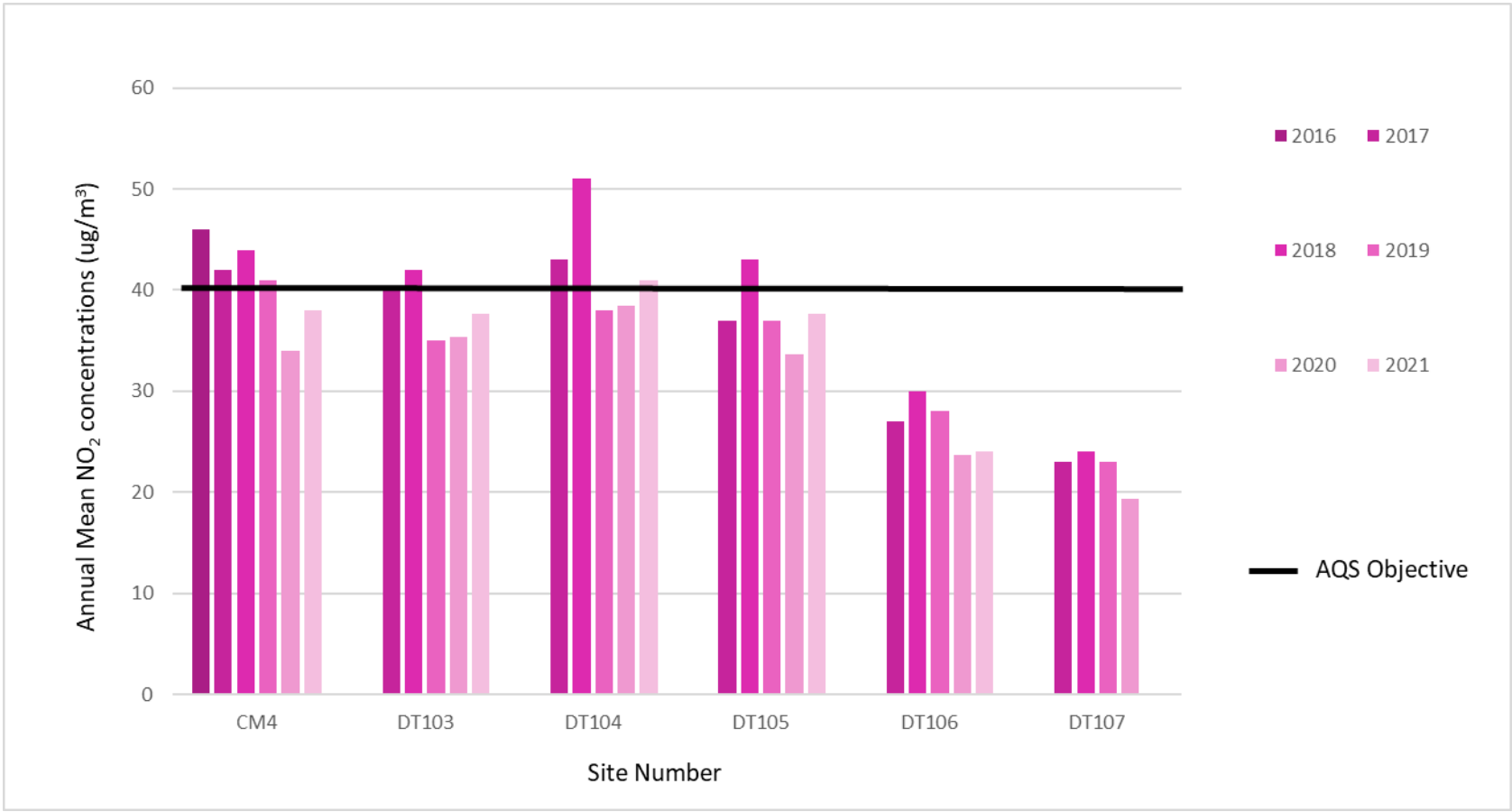

Figure A.4: Trends in Annual Mean NO_2 Concentrations in Manningham Lane AQMA (order 2)

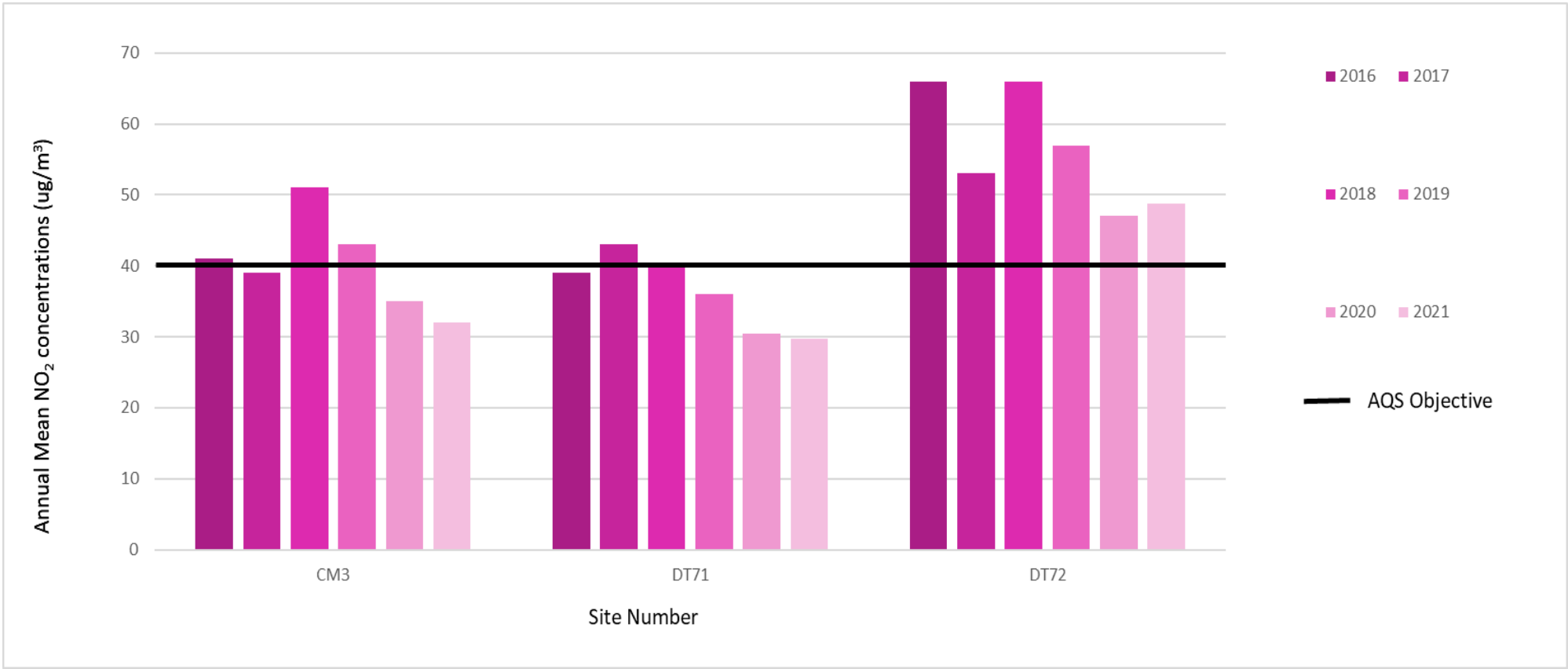

Figure A.5: Trends in Annual Mean NO_2 Concentrations in Thornton Road AQMA (order 3)

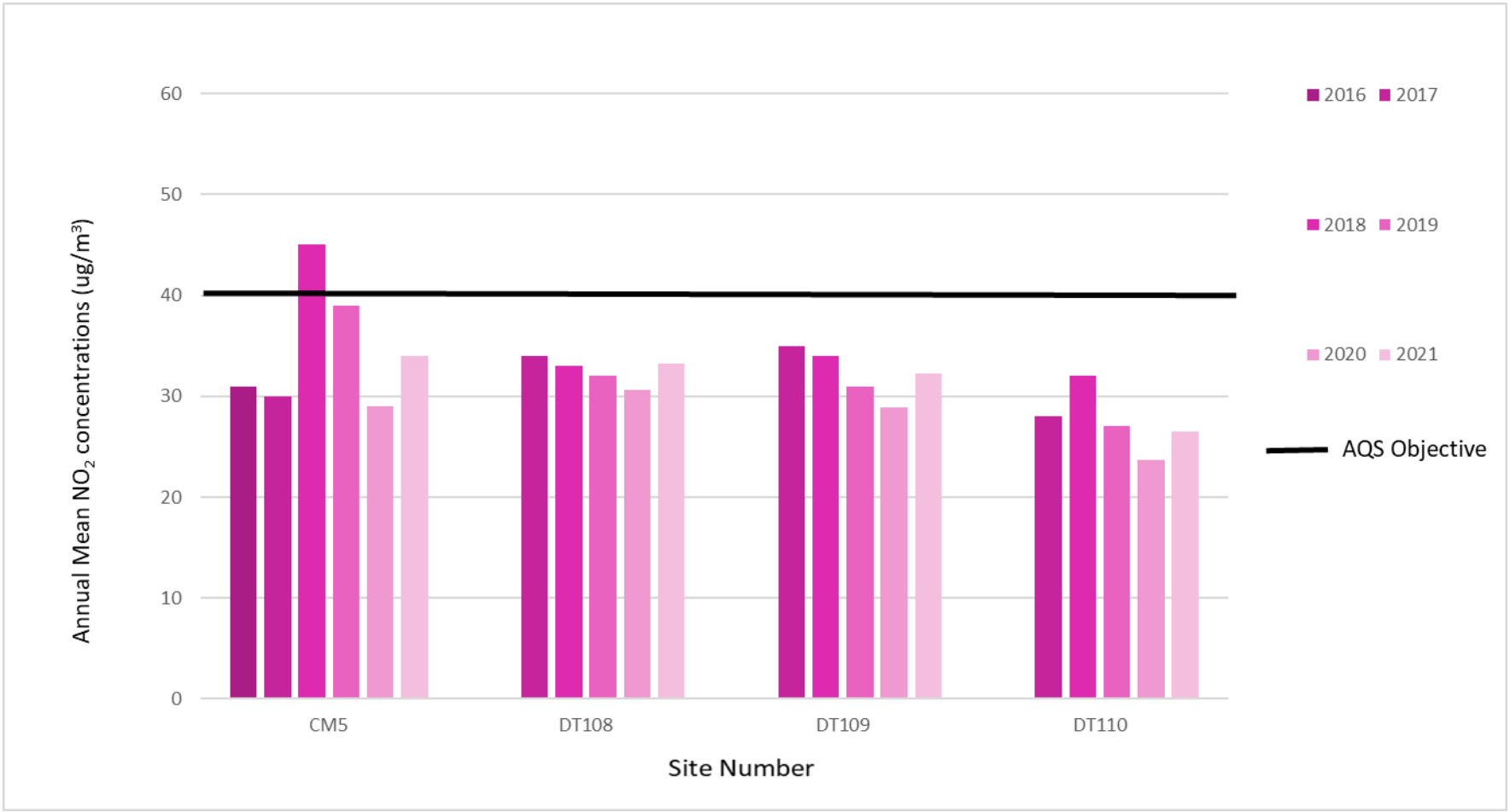

Figure A.6: Trends in Annual Mean NO_2 Concentrations in Shipley Airedale Road AQMA (order 4)

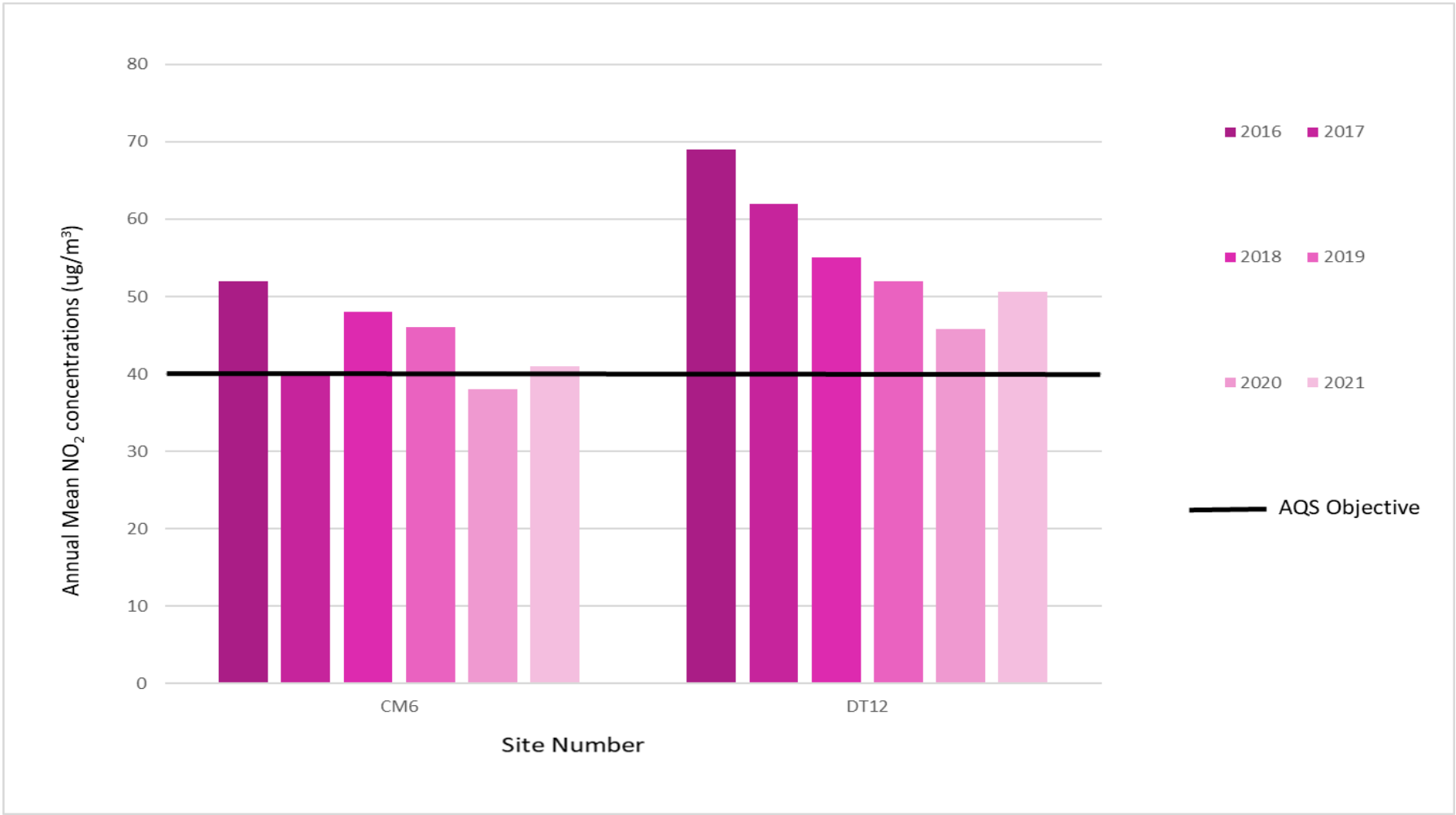

Figure A.7: Trends in Annual Mean NO_2 Concentrations around Harrogate Road / Killinghall junction (area of concern)

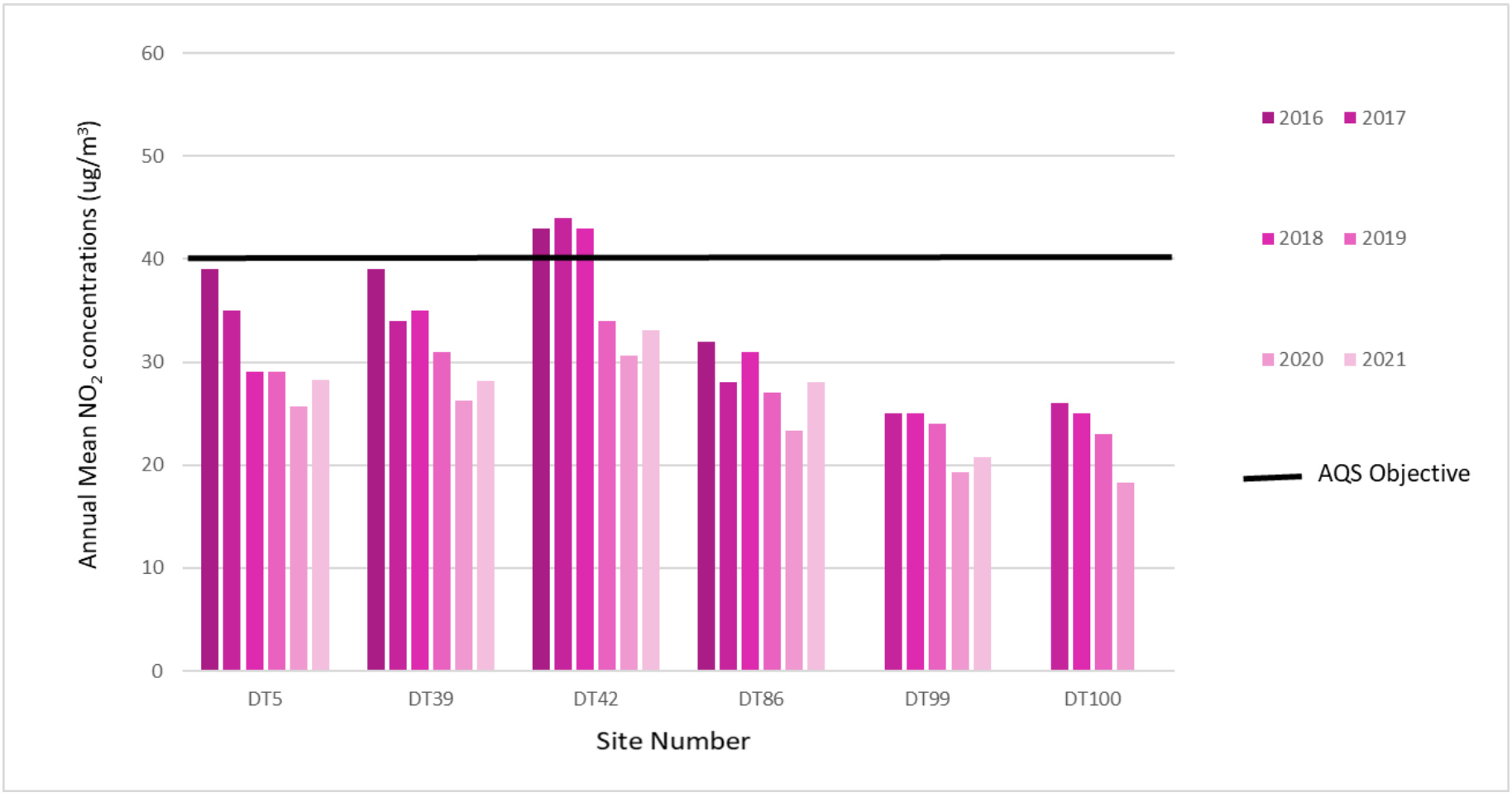

Figure A.8 Trends in Annual Mean NO_2 Concentrations around Saltaire Crossroads (area of concern)

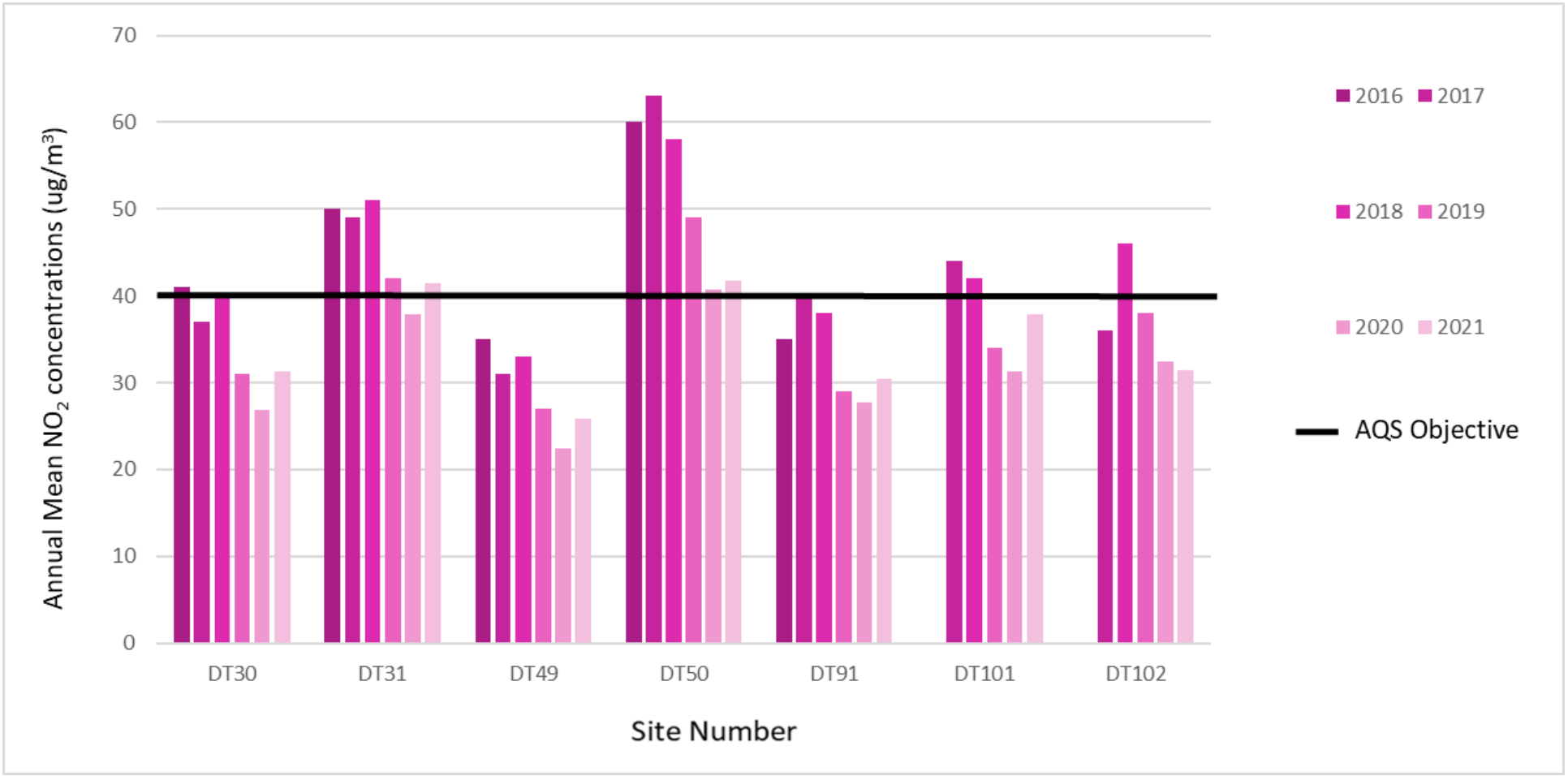

Figure A.9: Trends in Annual Mean NO_2 Concentrations around Rooley Lane and Tong Street (area of concern)

Figure A.10: Trends in Annual Mean NO_2 Concentrations around Canal Road (area of concern)

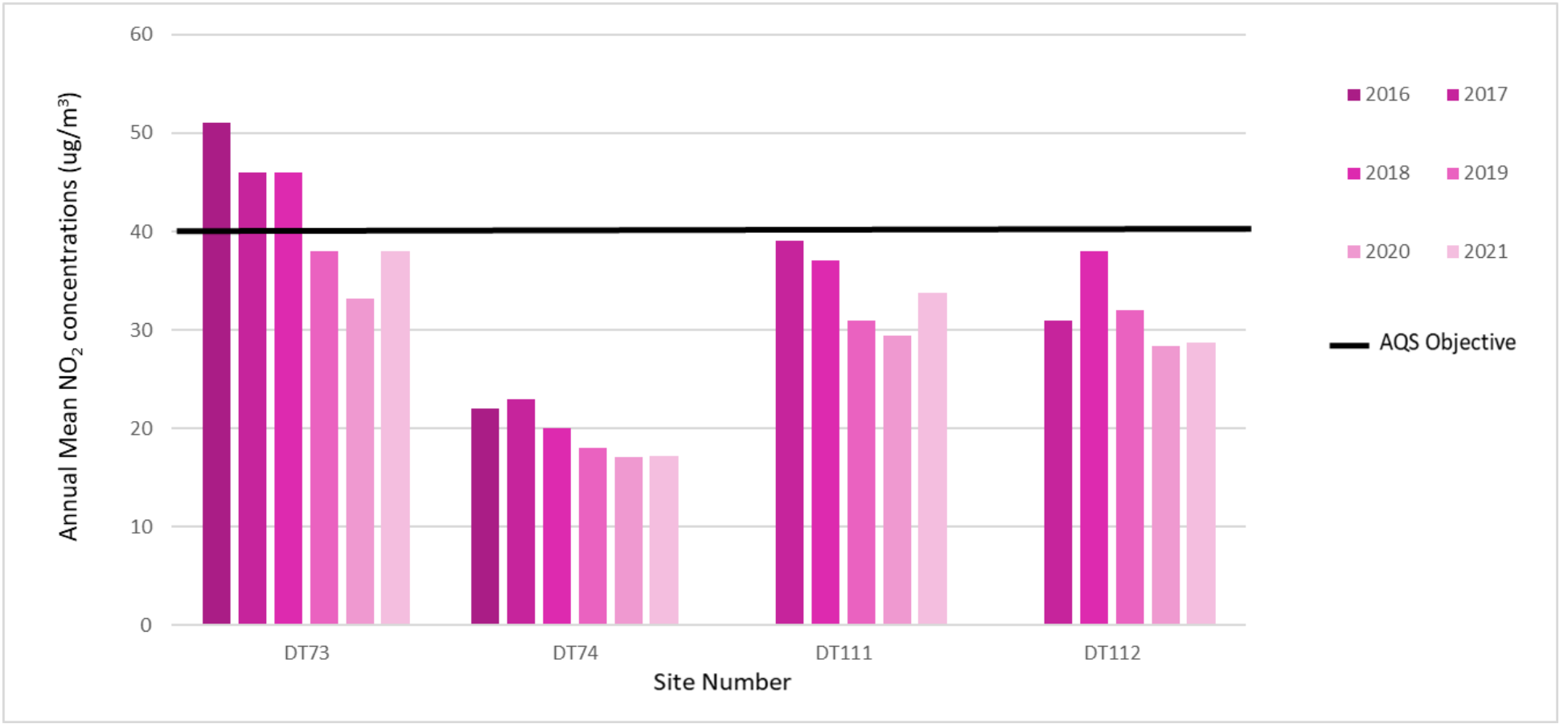

Figure A.11: Trends in Annual Mean NO_2 Concentrations around Greengates Crossroads (pre-highway scheme monitoring only)

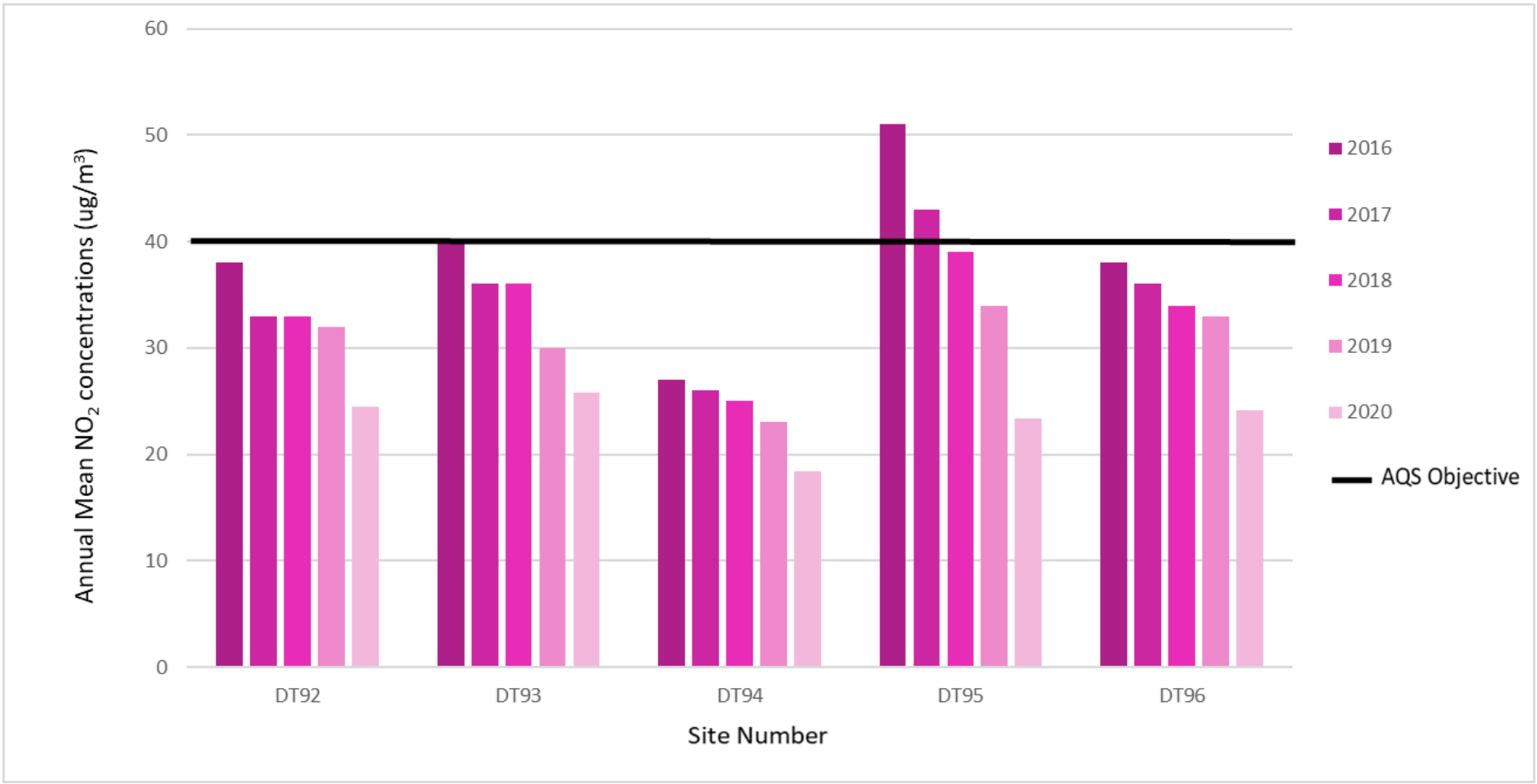

Figure A.12: Trends in Annual Mean NO_2 Concentrations at long term city centre sites

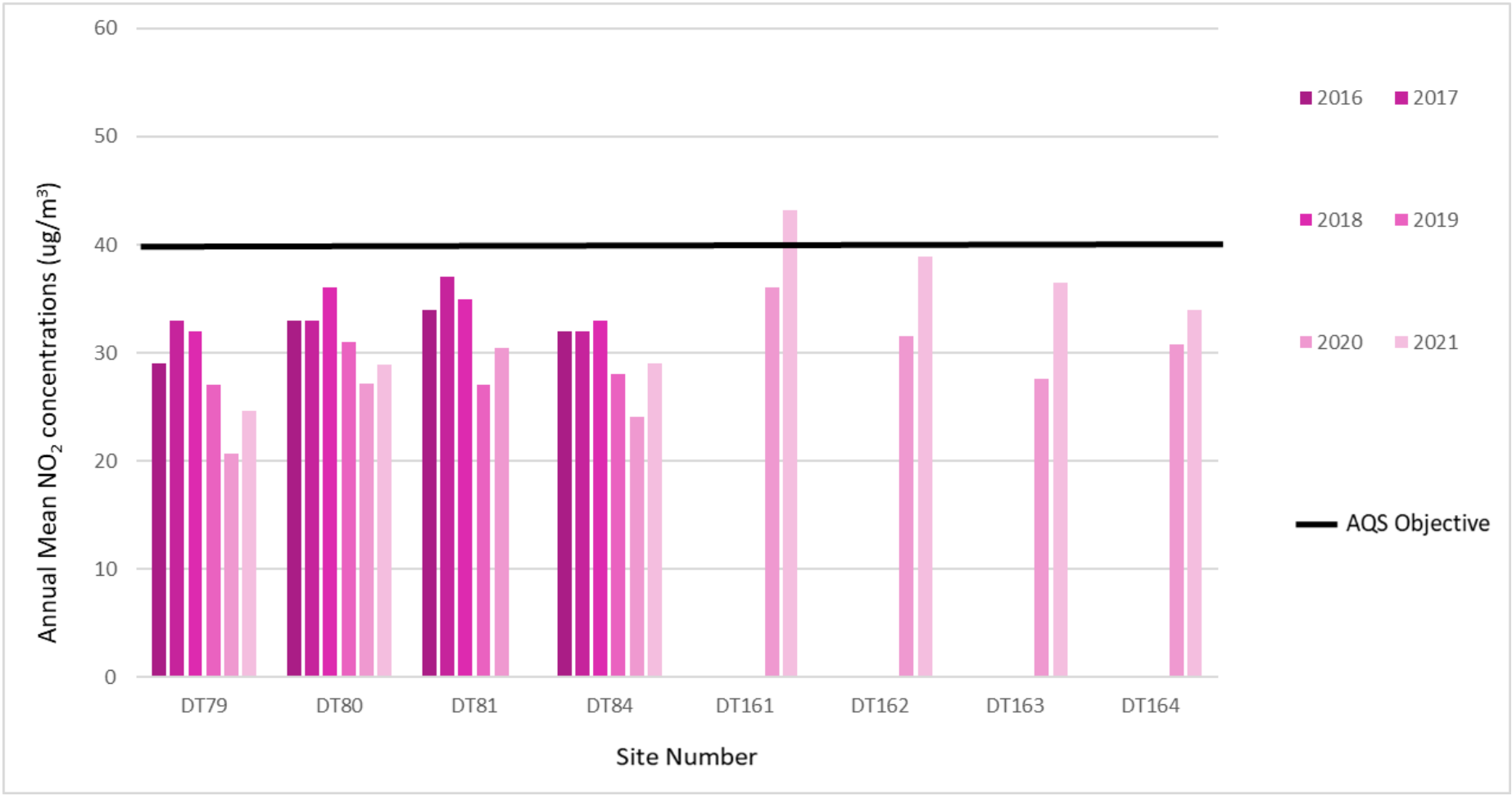

Figure A.13: Trends in Annual Mean NO_2 Concentrations around Parry Lane area

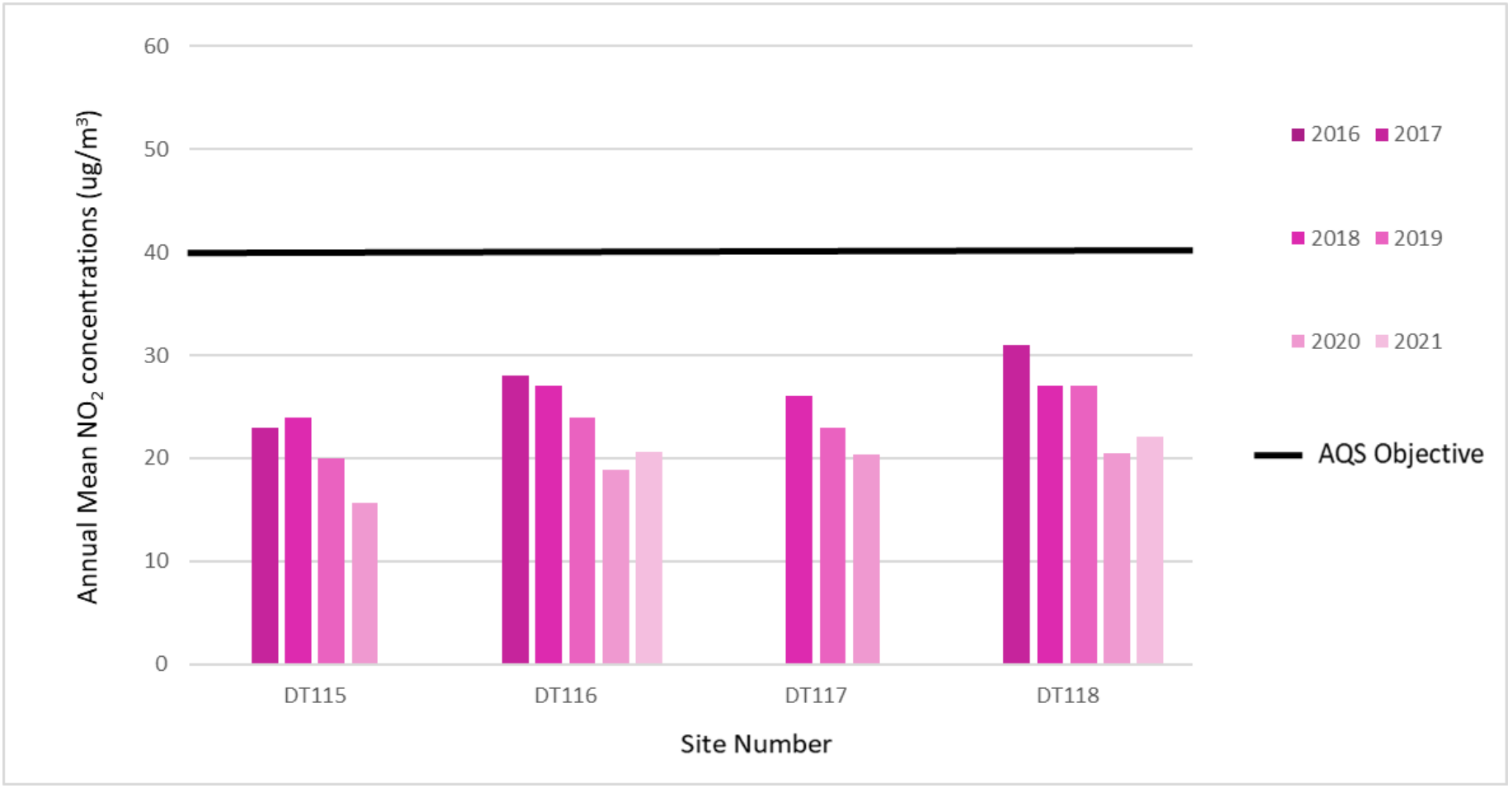

Figure A.14: Trends in Annual Mean NO_2 Concentrations at planning baseline sites

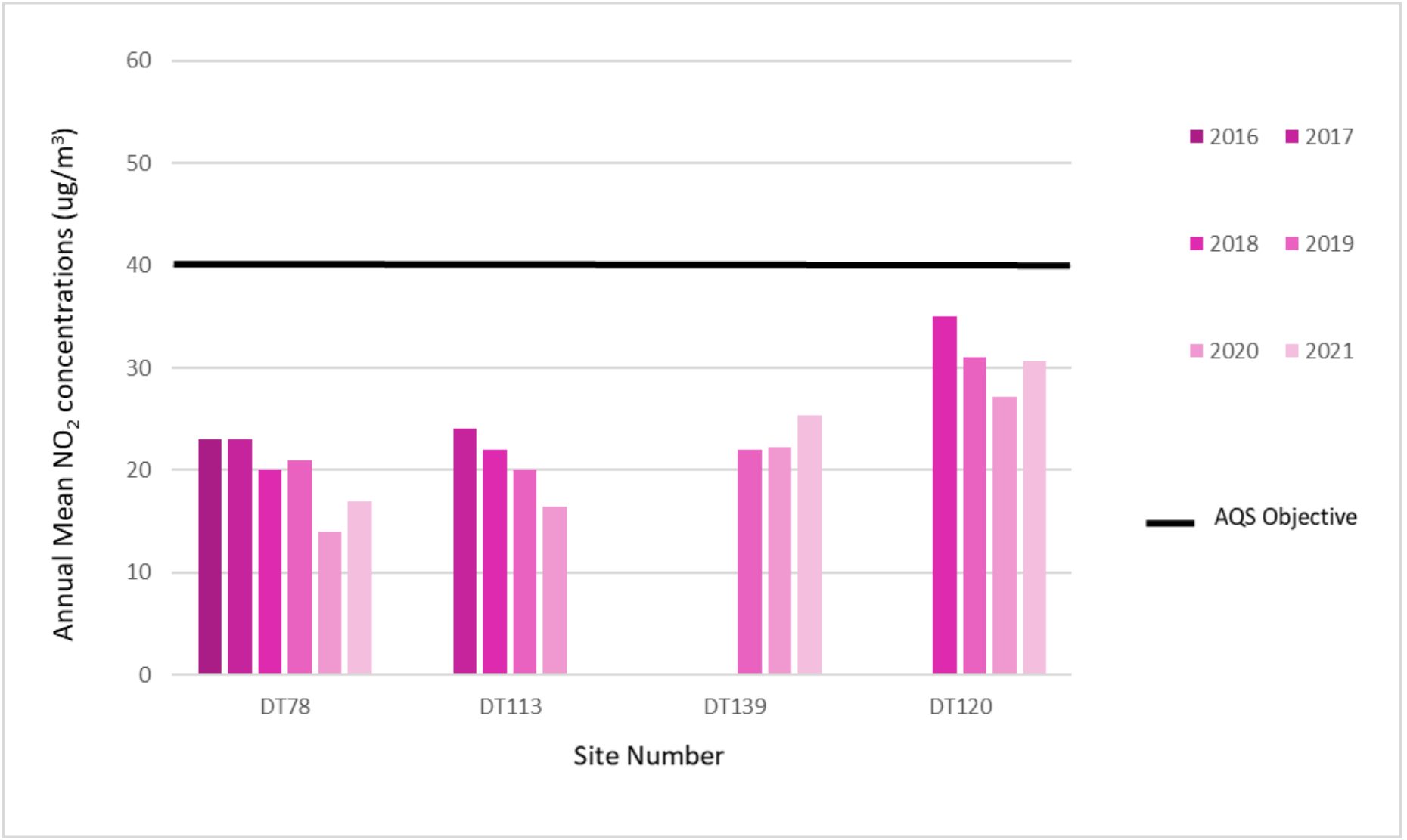

Table A.5: 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	Valid Data Capture 2021 (%) (2)	2016	2017	2018	2019	2020	2021
CM2	406058	441273	Urban Centre	full year	90.7	83.3	0	4	0	0	0	0 (61.0)
CM3	415582	434457	Roadside	full year	96.2	95.4	0 (114.3)	0 (100.0)	0 (133.9)	0	0	0
CM4	415933	430569	Roadside	full year	80.5	97.88	2	0	0	0	0 (116.4)	0
CM5	415870	433054	Roadside	full year	92.3	76.1	0	0	0	0	0	0 (93.3)
CM6	416974	433245	Roadside	full year	94.7	83.6	0	0 (138.0)	0	0	0	0 (99.7)
CM7	417860	430705	Roadside	ful year	85.6	81.8	0	0	0	0	0	0 (129.4)
CM8	419188	430213	Roadside	full year	92.2	97.6	-	0	0	0	0	0

Notes:

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

Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold**.

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

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

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

Table A.6: Annual Mean PM_{10} Monitoring Results (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	Valid Data Capture 2021 (%) (2)	2016	2017	2018	2019	2020	2021
CM2	406058	441273	Urban Centre	full year	93.2	89	16.0	14.0	17.0	16.0	12.0	12.0
CM6	416974	433245	Roadside	full year	99	86.3	21.0	19.0	21.0	23.0	17.0	17.0
CM8	419188	430213	Roadside	full year	92.5	97.9	-	16.0	16.0	17.0	14.0	14.0

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16 (not applicable)**

Notes:

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

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

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

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

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

Figure A.15: Trends in Annual Mean PM_{10} Concentrations

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	Valid Data Capture 2021 (%) (2)	2016	2017	2018	2019	2020	2021
CM2	406058	441273	Urban Centre	full year	93.2	89	1	2	4	4	1	0
CM6	416974	433245	Roadside	full year	99	86.3	8	5	4	12	4	1
CM8	419188	430213	Roadside	full year	92.5	97.9		4	1	1	2	0

Notes:

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

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

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

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

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

Figure A.16: Trends in Number of 24-Hour Mean PM_{10} Results > 50µg/m^3

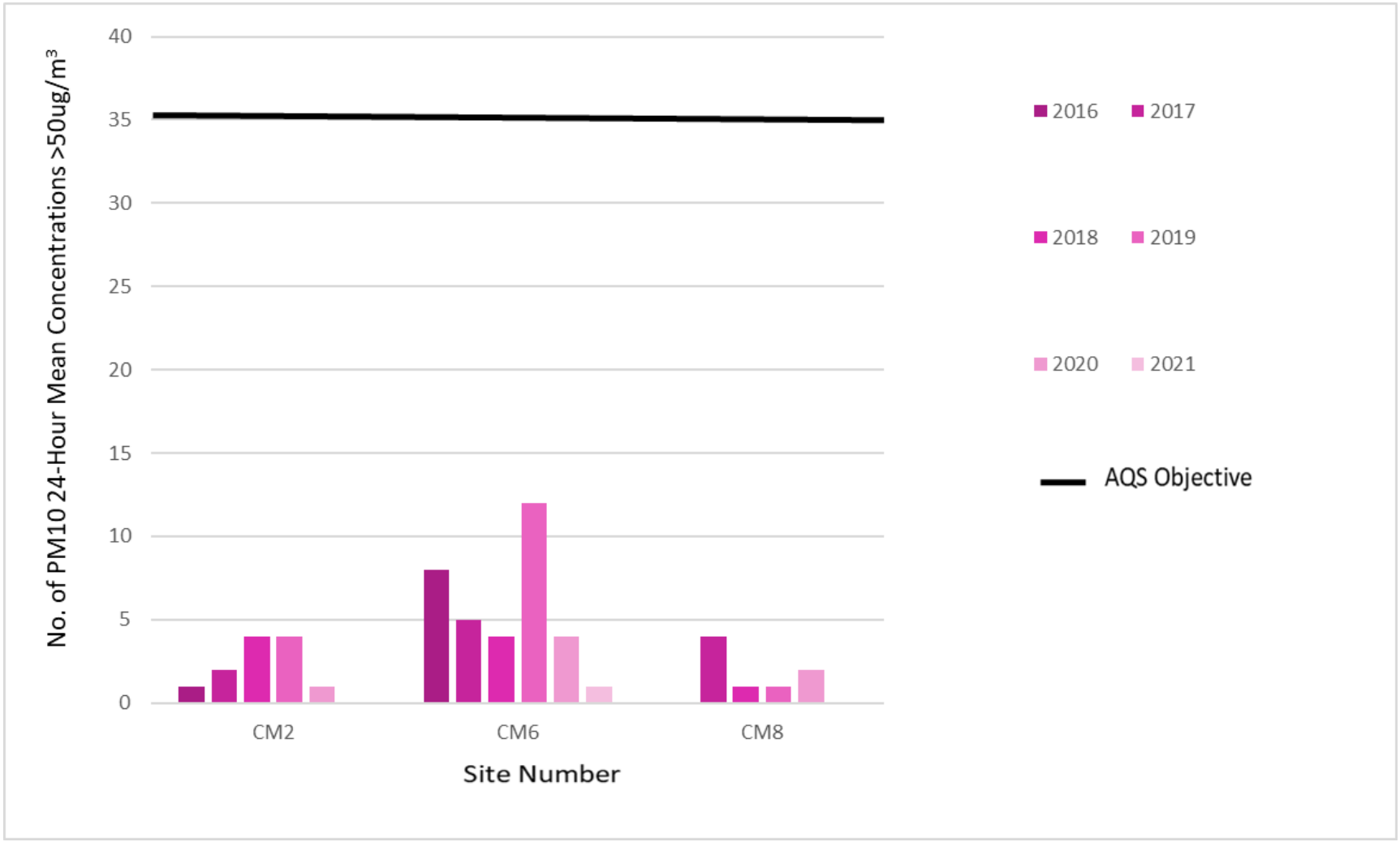

Table A.8: Annual Mean $PM_{2.5}$ Monitoring Results ($\mu g/m^3$)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	Valid Data Capture 2021 (%) (2)	2016	2017	2018	2019	2020	2021
CM2	406058	441273	Urban Centre	full year	99.8	88.6	9.0	9.0	11.0	10.0	5.0	7.0
CM6	416974	433245	Roadside	full year	99.7	85.9	13.0	12.0	14.0	14.0	9.0	9.0
CM8	419188	430213	Roadside	full year	98.2	97.3	-	10.0	10.0	12.0	7.0	8.0

☐ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16 (not applicable)**

Notes:

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

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

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

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

Figure A.17: Trends in Annual Mean $PM_{2.5}$ Concentrations

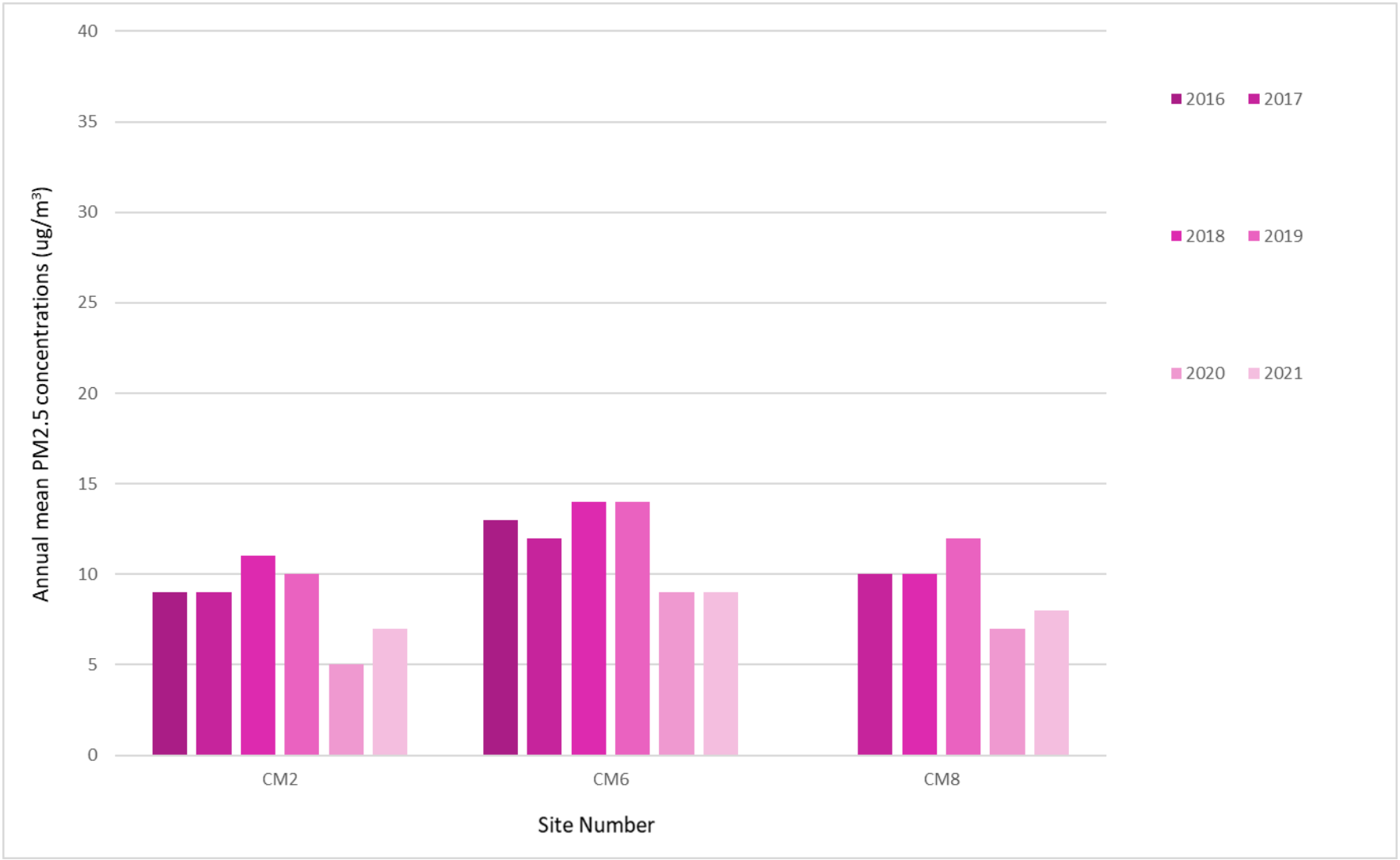

Table A.9(a) – SO_2 2020 Monitoring Results, Number of Relevant Instances

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	Number of 15-minute Means > 266µg/m³	Number of 1-hour Means > 350µg/m³	Number of 24-hour Means > 125µg/m³
CM2	406058	441273	Urban Centre	full year	88.6	0	0	0

Table A.9(b): SO_2 2021 Monitoring Results, Number of Relevant Instances

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	Number of 15-minute Means > 266µg/m³	Number of 1-hour Means > 350µg/m³	Number of 24-hour Means > 125µg/m³
CM2	406058	441273	Urban Centre	full year	**82.7**	**0 (21.0)**	**0 (19.0)**	**0 (3.0)**

Notes:

Results are presented as the number of instances where monitored concentrations are greater than the objective concentration.

Exceedances 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).

If the period of valid data is less than 85%, the relevant percentiles are provided in brackets.

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2020 and 2021

Table B.1(a): NO_2 2020 Diffusion Tube Results ($\mu g/m^3$)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.92.local bias factor)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DT5	417982	434886	36.0	40.0	9.0	14.0	21.0	27.0	26.0	30.0	32.0	39.0			27.9	25.7		
DT39	417927	434799	44.0	14.0	17.0	20.0	26.0		25.0	31.0	41.0	40.0			28.5	26.2		
DT42	417902	434751	35.0	25.0	23.0	22.0	32.0	36.0	31.0	38.0	44.0	46.0			33.3	30.6		
DT86	417894	434753	23.0	18.0	21.0	23.0	23.0	31.0	23.0	34.0	27.0	31.0			25.3	23.3		
DT99	418033	434970	28.0	17.0	14.0	14.0	18.0	20.0	20.0	24.0	26.0	28.0			21.0	19.3		
DT100	417949	434693	31.0	12.0	19.0	10.0	17.0	19.0	20.0	22.0	22.0	27.0			19.9	18.3		
DT45	417877	430717	32.0	22.0	20.0	16.0	24.0	25.0	25.0	27.0	35.0	34.0			26.1	24.0		
D76	418268	430732	23.0	21.0	20.0	19.0		29.0	22.0	31.0	33.0	34.0			25.8	23.7		
DT64	419342	430114	44.0	20.0	28.0	30.0	32.0	40.0	30.0	39.0	40.0	42.0			34.2	31.5		
DT88	418829	430399	35.0	33.0	8.0	22.0	24.0	32.0	24.0	30.0	32.0	35.0			27.7	25.5		
DT89	419188	430213	24.0	19.0	13.0	26.0	28.0	30.0	29.0	31.0	35.0	34.0			26.9	24.8		

DT108	415891	433045	40.0	27.0	26.0	21.0		35.0	27.0	37.0	40.0	46.0			33.2	30.6		
DT109	415858	433061	38.0	19.0	24.0	23.0	28.0	35.0	29.0	36.0	40.0	43.0			31.4	28.9		
DT110	415806	433061	41.0	11.0	23.0	18.0	21.0	26.0	24.0	27.0	35.0	34.0			25.8	23.7		
DT103	415925	430572	41.0	24.0	37.0	37.0	33.0	49.0	25.0	50.0	49.0	45.0			38.5	35.4		
DT104	415961	430558	45.0	33.0	41.0	28.0	36.0	53.0	36.0	49.0	50.0	49.0			41.8	38.5	33.6	
DT105	415780	430504	39.0	19.0	36.0	34.0	34.0	47.0	29.0	47.0	46.0	40.0			36.6	33.6		
DT106	415702	430701	34.0	18.0	28.0	20.0	22.0	30.0	23.0	25.0	27.0	32.0			25.8	23.7		
DT107	415833	430837	24.0	18.0	14.0	18.0	17.0	27.0	16.0	26.0	24.0	26.0			20.9	19.3		
DT92	419006	437217	30.0	27.0	12.0	18.0	25.0	28.0	23.0	30.0	33.0	38.0			26.6	24.5		
DT93	419003	437308	33.0	17.0	27.0	23.0	29.0	35.0	24.0	36.0	33.0	27.0			28.0	25.8		
DT94	419103	437337	30.0	14.0	12.0	12.0	15.0	20.0	19.0	19.0	24.0	33.0			20.0	18.4		
DT95	419111	437322	34.0	10.0	17.0	19.0	28.0	33.0	26.0	32.0	34.0				25.5	23.4		
DT96	419152	437209	29.0	16.0	18.0	16.0	28.0	35.0	30.0	25.0	29.0	35.0			26.2	24.1		
DT68	406060	441274	26.0	12.0	12.0	12.0	20.0	21.0	20.0	24.0	24.0				18.8	17.3		
DT69	406060	441274	31.0	24.0	11.0	14.0	18.0	22.0	18.0	10.0	24.0				19.2	17.7		
DT70	406060	441274	36.0	26.0	15.0	14.0	18.0	21.0	22.0	24.0	26.0				22.5	20.7		

DT115	418421	432214	26.0	9.0	13.0	11.0	14.0	17.0	17.0	15.0	22.0	25.0			16.9	15.6		
DT116	418564	432218	21.0	11.0	25.0	19.0	18.0	26.0	18.0		24.0	25.0			20.6	18.9		
DT117	418192	432208	27.0	28.0	17.0	11.0	17.0	21.0	23.0	19.0	27.0	28.0			22.1	20.3		
DT118	418666	432470	27.0	9.0	17.0	12.0	24.0	24.0	23.0	26.0	29.0	32.0			22.2	20.5		
DT12	416970	433259	78.0	21.0	30.0	28.0	53.0	49.0	48.0	59.0	62.0	72.0			49.8	**45.8**	**44.9**	
DT21	404719	440613	13.0	9.0	8.0	6.0	7.0	8.0	7.0	8.0	9.0				8.3	7.7		
DT78	407380	441811	24.0	4.0	9.0	9.0	13.0	16.0	17.0	16.0	20.0	24.0			15.2	14.0		
DT113	414014	433357	22.0	9.0	14.0	15.0	16.0	23.0	16.0	19.0	22.0	24.0			17.9	16.5		
DT120	417991	432926	50.0	20.0	19.0	25.0	28.0	32.0	30.0	30.0					29.0	27.1		
DT139	414396	433648		14.0	24.0	17.0	21.0	27.0	25.0	25.0	30.0	35.0			24.3	22.3		
DT160 (now DT119)	418644	432899	36.0	21.0	21.0	12.0	20.0	26.0	21.0	25.0	31.0	35.0			24.9	22.9		
DT165	419613	438317		17.0	25.0	12.0	23.0	29.0	20.0	28.0	29.0	33.0			23.9	22.0		
DT166	419583	438500	26.0	23.0	20.0	18.0	21.0	24.0	19.0	21.0	27.0	29.0			22.9	21.0		
DT30	413861	437772	35.0	27.0	24.0	17.0	24.0	30.0	30.0	36.0	38.0				29.2	26.9		
DT31	413527	437713	49.0	35.0	36.0	21.0	35.0	47.0	39.0	46.0	49.0	55.0			41.2	37.9	27.3	

DT49	413600	437653	26.0	14.0	24.0	14.0	21.0	32.0	24.0	26.0	32.0	31.0			24.3	22.4		
DT50	413510	437732	69.0	54.0	41.0		40.0	31.0	25.0	40.0	49.0	50.0			44.2	**40.7**	34.3	
DT91	413697	437723	40.0	32.0	29.0	12.0	23.0		28.0	30.0	36.0	40.0			30.2	27.7		
DT101	413418	437725	37.0	17.0	14.0	16.0	26.0	42.0	50.0	45.0	45.0	46.0			34.0	31.3		
DT102	413338	437720	59.0	29.0	23.0	25.0	32.0	41.0	33.0	33.0	38.0	42.0			35.3	32.5		
DT71	415580	434461	40.0	22.0	29.0	20.0	32.0	35.0	38.0	34.0	39.0	41.0			33.0	30.4		
DT72	415573	434521	45.0	24.0			55.0	65.0	48.0	64.0		62.0			50.8	**47.1**		
DT73	415438	435834	40.0	26.0	37.0	26.0	35.0	41.0	35.0	43.0	43.0				36.1	33.2		
DT74	415549	435918	29.0	22.0	15.0	10.0	12.0	16.0	13.0	31.0	18.0	21.0			18.6	17.1		
DT111	416015	435028	44.0	28.0	22.0	19.0	27.0	35.0	30.0	36.0	36.0	43.0			32.0	29.4		
DT112	415024	436743			16.0	19.0	22.0	29.0	25.0	31.0	36.0	40.0			27.4	28.3		
D79	416282	432966	38.0	14.0	14.0	16.0	18.0	28.0	22.0	27.0	29.0				22.5	20.7		
D80	416388	432817	39.0	22.0	18.0	24.0	26.0	40.0	25.0		36.0	41.0			29.6	27.2		
D81	416413	432674	37.0	27.0	26.0	29.0	28.0	42.0	25.0	41.0	40.0	41.0			33.2	30.5		
DT84	416054	432675	22.0	21.0	19.0	20.0	22.0	33.0	23.0	35.0	31.0	39.0			26.2	24.1		
D161	416148	433102	50.0	28.0	25.0	22.0	35.0	51.0	36.0	49.0	47.0	54.0			39.2	36.0		

D162	416148	433134	47.0	9.0	29.0	19.0	28.0	46.0	34.0	48.0	45.0	44.0			34.3	31.5		
D163	416147	433158	42.0	17.0	14.0	24.0	23.0	36.0	29.0	40.0	38.0	42.0			30.0	27.6		
D164	416139	433134	41.0	39.0	25.0	17.0	24.0	41.0		36.0	35.0	44.0			33.5	30.8		
D121	414546	436933	24.0	14.0	14.0		14.0	19.0	20.0	23.0	26.8	32.3	44.0	34.0	23.9	22.0		
D122	414567	436811	27.0	21.0	31.0		25.0	33.0	29.0	33.0	39.3	40.9	39.0	40.0	33.0	30.3		
D123	414660	436974	32.0	19.0	18.0		33.0	38.0	37.0	39.0			49.0	42.0	33.3	30.6		
D123A	414766	437113	38.0	15.0	22.0		38.0	46.0	28.0	42.0	42.9	45.8	45.0	41.0	36.1	33.2		
D124	414620	436924	42.0	43.0	22.0		30.0	36.0	35.0	36.0	38.7	44.2	48.0	39.0	37.0	34.0		
D125	414674	436471	20.0	9.0	14.0		14.0	23.0	15.0	21.0	18.1				16.6	15.1		
D126	414643	436505	25.0	5.0	15.0		15.0	23.0	16.0	22.0	21.0	27.6	28.0	33.0	21.1	19.4		
D127	415044	435558	43.0	21.0	23.0		31.0	43.0	28.0	46.0	43.2	47.8	55.0	55.0	39.3	36.1		
D128	415331	435796	17.0	12.0	14.0		9.0	12.0	9.0	12.0	12.6	11.6	23.0	23.0	14.2	13.0		
D129	415089	436637	19.0	26.0	19.0		29.0	32.0	28.0	32.0	32.5	35.7	36.0	34.0	29.1	26.8		
D130	415839	434674	43.0	20.0	18.0		28.0	36.0	36.0	34.0	34.4	35.5		40.0	32.3	29.7		
D131	414856	437605	49.0	20.0	40.0		34.0	35.0	35.0	37.0	41.1	48.0	49.0	50.0	40.2	37.0		
D132	415717	434265	43.0	28.0	21.0		30.0	38.0	37.0	37.0	35.5	48.2	56.0	49.0	37.9	34.9		

D133	416260	434581	39.0	16.0	20.0		26.0	37.0	29.0	35.0	36.2	39.8	41.0	46.0	33.1	30.4		
D140	414901	432115	29.0	19.0			24.0	31.0	24.0	29.0					26.0	24.6		
D141	414800	432143	32.0	23.0			31.0	44.0	28.0	36.7					32.3	30.5		
D142	414724	432095	34.0	18.0			30.0	36.0	25.0	34.5					29.4	27.8		
D143	414902	432251	23.0	25.0			41.0	47.0	37.0	46.0					36.2	34.2		
D144	414908	432312	39.0	18.0			31.0	46.0	28.0						32.2	29.9		
D145	414800	432143	31.0	24.0			42.0	42.0	34.0	42.9					35.6	33.6		
D146	415005	432231	27.0	10.0			21.0	24.0	22.0						20.9	19.4		
D147	415126	432171	16.0	18.0			19.0	16.0	17.0	18.8					17.4	16.4		
D148	415013	432151	21.0	9.0			13.0	18.0	12.0	18.0					15.2	14.4		
D149	413750	433573	32.0	21.0			30.0	30.0	31.0	32.7					29.6	27.9		
D150	413686	433610	30.0	15.0			29.0	35.0		31.2					28.0	25.1		
D151	413700	433687	32.0	17.0			29.0	38.0	24.0	35.9					29.1	27.5		
D152	413835	433663	35.0	20.0			37.0	46.0	36.0	39.0					35.4	33.4		
D153	413933	433674	36.0	25.0			39.0	42.0	41.0	42.5					37.7	35.6		
D154	414926	434111	31.0	19.0			24.0	31.0	27.0	28.0					26.9	25.4		

D155	414904	434114	49.0	23.0			32.0	38.0	38.0	37.4					36.7	34.6		
D156	414781	434126	26.0	26.0			37.0	51.0	30.0	44.5					35.3	33.3		
D157	414749	434285	39.0	28.0			33.0	38.0	28.0	37.0					33.7	31.8		
D158	414675	434295	24.0	27.0			27.0	41.0	33.0	38.2					31.9	30.1		
D159	414906	434182	30.0	15.0			24.0	24.0	25.0	25.6					24.1	22.7		
D134	406940	441922	54.0	15.0	22.0		34.0	39.0	40.0	38.0	40.4	41.0	48.0	46.0	37.5	34.5		
D135	406582	442028	42.0	26.0	11.0		30.0	35.0	30.0	26.0	38.0	38.0	43.0	42.0	32.1	29.5		
D136	406540	442038	33.0	32.0	28.0		30.0	36.0	25.0	25.0	34.4	32.0	38.0	29.0	30.7	28.3		
D137	406475	442046	34.0	24.0	13.0		28.0	36.0	25.0	27.0	30.3	35.0	48.0	48.0	31.0	28.6		
D138	406255	422140	18.0	23.0			28.0	33.0	34.0	36.0	37.3	40.0		41.0	33.1	30.5		

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

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

☒ **Local bias adjustment factor used.**

☐ **National bias adjustment factor used.**

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

☒ **City of Bradford MDC confirm that all 2020 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.**

Notes:

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

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

See Appendix C for details on bias adjustment and annualisation.

Table B.1(b): NO_2 2021 Diffusion Tube Results ($\mu g/m^3$)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.83 national bias factor)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DT5	417982	434886	39.7	37.4	29.8	31.3	32.6	28.8	30.6	33.4		39.7	39.1	33.2	34.1	28.3	-	
DT39A	417927	434799	45.3	37.3	30.8	32.5	37.1	28.9	30.7	29.2	33.1	34.7	35.2	32.1	-	-	-	Triplicate Site with DT39A, DT39B and DT39C - Annual data provided for DT39C only
DT39B	417927	434799							30.9	29.8	35.6	36.2	35.6	31.4	-	-	-	Triplicate Site with DT39A, DT39B and DT39C - Annual data provided for DT39C only
DT39C	417927	434799							30.5	25.9	31.3	35.4	36.4	33.1	34.0	28.2	-	Triplicate Site with DT39A, DT39B and DT39C - Annual data provided for DT39C only
DT99	418033	434970								21.1	27.6	28.3	32.0	29.6	27.7	20.7	-	
DT208A	417966	434884								23.0	24.9	25.3	26.1	27.9	-	-	-	Triplicate Site with DT208A, DT208B and DT208C - Annual data provided for DT208C only
DT208B	417966	434884								22.8	26.2	24.3	29.2	29.0	-	-	-	Triplicate Site with DT208A, DT208B and DT208C - Annual data provided for DT208C only
DT208C	417966	434884								22.8	25.5	28.2	26.8	26.8	25.9	19.4	-	Triplicate Site with DT208A, DT208B and DT208C - Annual data provided for DT208C only
DT42A	417902	434751	45.9	41.5	38.0	39.2	41.6	37.4	39.2	36.3	40.0	36.0	43.6	36.1	-	-	-	Triplicate Site with DT42A, DT42B and DT42C - Annual data provided for DT42C only
DT42B	417902	434751							38.1	37.6	42.2	42.6	42.4	36.6	-	-	-	Triplicate Site with DT42A, DT42B and DT42C - Annual data provided for DT42C only
DT42C	417902	434751							39.2	36.5	42.5	36.8	39.2	38.1	39.8	33.1	-	Triplicate Site with DT42A, DT42B and DT42C - Annual data provided for DT42C only
DT45	417877	430717								28.0	35.2	35.9	36.1	33.2	33.7	25.2	-	
DT86	417894	434753	38.6	39.8	27.5	34.6	37.8	28.7	33.8	29.9	39.1	31.0	31.3	33.4	33.8	28.0	-	
D76	418268	430732	37.8	39.8	29.0	38.0	39.4	27.6	32.5	25.9	32.1	28.8	35.4	23.3	32.5	27.0	-	
DT194	417184	430315								30.2	38.9	30.9	35.2	34.3	33.9	25.3	-	
DT195	417178	430344								33.5	43.2	43.9	47.2	39.2	41.4	30.9	-	
DT196	417369	430370								30.8	43.9	34.7	44.5	38.8	38.5	28.8	-	
DT197	417846	430739								32.1	39.4	28.7	33.6	35.4	33.8	25.3	-	

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DT198	417930	430975								37.7	47.6	38.6	36.6	33.2	38.8	29.0	-	
DT199A	419178	430193								20.3	26.9	19.8	31.5	25.9	-	-	-	Triplicate Site with DT199A, DT199B and DT199C - Annual data provided for DT199C only
DT199B	419178	430193								21.8	29.8	18.8	29.5	24.3	-	-	-	Triplicate Site with DT199A, DT199B and DT199C - Annual data provided for DT199C only
DT199C	419178	430193								22.8	29.8	18.9	25.2	29.5	25.0	18.7	-	Triplicate Site with DT199A, DT199B and DT199C - Annual data provided for DT199C only
DT200A	419328	430099								21.2		25.0	32.7	28.3	-	-	-	Triplicate Site with DT200A, DT200B and DT200C - Annual data provided for DT200C only
DT200B	419328	430099									29.0	24.4	33.9	30.5	-	-	-	Triplicate Site with DT200A, DT200B and DT200C - Annual data provided for DT200C only
DT200C	419328	430099								21.6		23.4	34.2	30.9	27.6	20.7	-	Triplicate Site with DT200A, DT200B and DT200C - Annual data provided for DT200C only
DT220A	419215	431809								15.7	25.0	21.9	28.7	25.7	-	-	-	Triplicate Site with DT220A, DT220B and DT220C - Annual data provided for DT220C only
DT220B	419215	431809								18.1	25.8	23.2	27.6	25.8	-	-	-	Triplicate Site with DT220A, DT220B and DT220C - Annual data provided for DT220C only
DT220C	419215	431809								17.1	23.6		31.4	26.1	23.9	17.8	-	Triplicate Site with DT220A, DT220B and DT220C - Annual data provided for DT220C only
DT221A	419196	431834								16.2	21.4	21.6	25.5	26.6	-	-	-	Triplicate Site with DT221A, DT221B and DT221C - Annual data provided for DT221C only
DT221B	419196	431834								16.3	20.3	21.8	26.0	27.3	-	-	-	Triplicate Site with DT221A, DT221B and DT221C - Annual data provided for DT221C only
DT221C	419196	431834								14.6	19.5	21.8	24.5	24.6	21.9	16.3	-	Triplicate Site with DT221A, DT221B and DT221C - Annual data provided for DT221C only
DT222A	417861	431486								26.4	29.0	21.3	28.7	30.8	-	-	-	Triplicate Site with DT222A, DT222B and DT222C - Annual data provided for DT222C only
DT222B	417861	431486								25.7	33.1	25.6	26.8		-	-	-	Triplicate Site with DT222A, DT222B and DT222C - Annual data provided for DT222C only
DT222C	417861	431486								26.3	31.6	22.0	29.7	32.6	28.1	21.0	-	Triplicate Site with DT222A, DT222B and DT222C - Annual data provided for DT222C only
DT223A	417862	431536								46.5	51.0	45.9	51.5	47.5	-	-	-	Triplicate Site with DT223A, DT223B and DT223C - Annual data provided for DT223C only
DT223B	417862	431536								45.1	55.9	42.7	60.5	48.2	-	-	-	Triplicate Site with DT223A, DT223B and DT223C - Annual data provided for DT223C only

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DT223C	417862	431536								44.2	59.5	48.9	53.6	37.7	49.2	36.8	32.8	Triplicate Site with DT223A, DT223B and DT223C - Annual data provided for DT223C only
DT218A	418292	431290								38.0	42.4	38.0	43.7	39.4	-	-	-	Triplicate Site with DT218A, DT218B and DT218C - Annual data provided for DT218C only
DT218B	418292	431290									43.1	38.2	42.5	39.7	-	-	-	Triplicate Site with DT218A, DT218B and DT218C - Annual data provided for DT218C only
DT218C	418292	431290									45.9	35.5	43.1	38.8	40.3	30.1	-	Triplicate Site with DT218A, DT218B and DT218C - Annual data provided for DT218C only
DT219A	418303	431328								29.9	35.6	36.1	32.4	35.7	-	-	-	Triplicate Site with DT219A, DT219B and DT219C - Annual data provided for DT219C only
DT219B	418303	431328									34.8	37.6	38.6	33.2	-	-	-	Triplicate Site with DT219A, DT219B and DT219C - Annual data provided for DT219C only
DT219C	418303	431328									33.4	35.8			34.2	25.6	-	Triplicate Site with DT219A, DT219B and DT219C - Annual data provided for DT219C only
DT116	418564	432218								23.3	30.2	25.1	31.4	28.1	27.6	20.6	-	
DT118	418666	432470								24.0	30.4	32.5		29.8	29.2	22.1	-	
DT120A	417991	432926								31.9	43.0	40.7	51.6	42.8	-	-	-	Triplicate Site with DT120A, DT120B and DT120C - Annual data provided for DT120C only
DT120B	417991	432926								35.2	42.9	45.0	52.6	42.7	-	-	-	Triplicate Site with DT120A, DT120B and DT120C - Annual data provided for DT120C only
DT120C	417991	432926								34.2	37.4	42.4	28.8	43.2	40.9	30.6	-	Triplicate Site with DT120A, DT120B and DT120C - Annual data provided for DT120C only
DT209A	417960	432907								37.4	50.2	45.3	38.5	42.2	-	-	-	Triplicate Site with DT209A, DT209B and DT209C - Annual data provided for DT209C only
DT209B	417960	432907								37.6	52.5	46.2	48.5	45.0	-	-	-	Triplicate Site with DT209A, DT209B and DT209C - Annual data provided for DT209C only
DT209C	417960	432907								36.8	46.5	47.4		46.2	44.3	33.1	-	Triplicate Site with DT209A, DT209B and DT209C - Annual data provided for DT209C only
DT205	418597	433111								28.8	33.1	30.1	39.6	31.4	32.6	24.4	-	
DT206	418579	433109								32.8	37.4	42.1	44.7	39.7	39.3	29.4	-	
DT207A	417912	434759								27.3	32.3	27.2	29.3	29.3	-	-	-	Triplicate Site with DT207A, DT207B and DT207C - Annual data provided for DT207C only

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DT207B	417912	434759								28.8	37.7	31.1	30.5	31.1	-	-	-	Triplicate Site with DT207A, DT207B and DT207C - Annual data provided for DT207C only
DT207C	417912	434759								27.4	35.8	28.4	26.5	27.6	30.0	22.4	-	Triplicate Site with DT207A, DT207B and DT207C - Annual data provided for DT207C only
DT233	418546	433430								30.7	35.2	35.5	35.0	34.2	34.1	25.5	-	
DT232	418563	433432								25.1	32.4	28.9	35.2	32.4	30.8	23.0	-	
DT64A	419342	430114	49.0	39.7		39.3	39.5	30.7	40.6	37.4	45.2	37.9	42.1	38.4	-	-	-	Triplicate Site with DT64A, DT64B and DT64C - Annual data provided for DT64C only
DT64B	419342	430114							43.2	36.2	41.1	37.2	38.4	35.4	-	-	-	Triplicate Site with DT64A, DT64B and DT64C - Annual data provided for DT64C only
DT64C	419342	430114							41.4	37.6	40.7	36.0	39.0	37.9	39.4	32.7	-	Triplicate Site with DT64A, DT64B and DT64C - Annual data provided for DT64C only
DT88	418829	430399	41.9	35.3		39.0	36.3	28.1	32.0	28.0	36.2		24.8	33.8	33.5	27.8	-	
DT89A	419188	430213	42.4	34.5	33.3	34.5	34.6	29.4	35.1	30.8	39.8	39.3	43.8	36.6	-	-	-	Triplicate Site with DT89A, DT89B and DT89C - Annual data provided for DT89C only
DT89B	419188	430213							36.0	29.3	35.9	39.1	39.8	34.6	-	-	-	Triplicate Site with DT89A, DT89B and DT89C - Annual data provided for DT89C only
DT89C	419188	430213							36.3	29.9	42.0	41.5	42.3	37.4	36.0	29.9	-	Triplicate Site with DT89A, DT89B and DT89C - Annual data provided for DT89C only
DT168	417033	429293					35.0	36.1	33.5	31.2	35.5	34.0	43.4	36.0	35.6	29.4	-	
DT171	416678	429910						16.9	17.5	14.9	20.4	18.4	20.1	21.9	18.6	15.3	-	
DT214A	417715	429299								20.2	28.6	31.5	32.6	27.8	-	-	-	Triplicate Site with DT214A, DT214B and DT214C - Annual data provided for DT214C only
DT214B	417715	429299								21.6	26.9	30.7	30.2	29.1	-	-	-	Triplicate Site with DT214A, DT214B and DT214C - Annual data provided for DT214C only
DT214C	417715	429299								23.3	26.5	32.1	28.2	29.2	27.9	20.9	-	Triplicate Site with DT214A, DT214B and DT214C - Annual data provided for DT214C only
DT215A	417708	429380								16.0		21.7	24.7	23.9	-	-	-	Triplicate Site with DT215A, DT215B and DT215C - Annual data provided for DT215C only
DT215B	417708	429380								16.1		20.9	23.9	22.7	-	-	-	Triplicate Site with DT215A, DT215B and DT215C - Annual data provided for DT215C only

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DT215C	417708	429380								15.7	21.1	21.3	26.0	23.1	21.3	15.9	-	Triplicate Site with DT215A, DT215B and DT215C - Annual data provided for DT215C only
DT216A	418853	430309								13.7	22.2	19.3	25.9	25.3	-	-	-	Triplicate Site with DT216A, DT216B and DT216C - Annual data provided for DT216C only
DT216B	418853	430309								17.5	20.3	18.5	27.3	26.1	-	-	-	Triplicate Site with DT216A, DT216B and DT216C - Annual data provided for DT216C only
DT216C	418853	430309								16.4	24.9	20.5	25.8	26.1	22.0	16.4	-	Triplicate Site with DT216A, DT216B and DT216C - Annual data provided for DT216C only
DT217A	418829	430288								15.8	20.0	18.7	23.6	24.4	-	-	-	Triplicate Site with DT217A, DT217B and DT217C - Annual data provided for DT217C only
DT217B	418829	430288								16.0	22.0	19.6	27.0	26.2	-	-	-	Triplicate Site with DT217A, DT217B and DT217C - Annual data provided for DT217C only
DT217C	418829	430288								15.7	20.9	16.9	22.0	24.6	20.9	15.6	-	Triplicate Site with DT217A, DT217B and DT217C - Annual data provided for DT217C only
DT201	418108	432322								30.8	45.4	42.0	43.4	39.3	40.2	30.0	-	
DT202	418135	432272								25.2	29.9	29.0	30.6	32.4	29.4	22.0	-	
DT203	418345	432366								24.8	34.8		38.2	30.0	31.9	23.6	-	
DT119A (DT160)	418644	432899								24.4	32.4	28.5	39.7	35.4	-	-	-	Triplicate Site with DT119A (DT160), DT119B and DT119C - Annual data provided for DT119C only
DT119B	418644	432898								28.9	33.2	35.4	45.5	34.4	-	-	-	Triplicate Site with DT119A (DT160), DT119B and DT119C - Annual data provided for DT119C only
DT119C	418644	432898								24.6	31.4	31.0	34.9	30.3	32.7	24.4	-	Triplicate Site with DT119A (DT160), DT119B and DT119C - Annual data provided for DT119C only
DT204A	418640	432870								18.2	26.0	23.7	28.1	29.5	-	-	-	Triplicate Site with DT204A, DT204B and DT204C - Annual data provided for DT204C only
DT204B	418640	432870								19.6	26.2	23.4	30.2	29.6	-	-	-	Triplicate Site with DT204A, DT204B and DT204C - Annual data provided for DT204C only
DT204C	418640	432870								21.9	26.7	23.1	28.4	30.0	25.6	19.2	-	Triplicate Site with DT204A, DT204B and DT204C - Annual data provided for DT204C only
DT228A	418090	434429								41.9	48.8	48.6	43.9	28.6	-	-	-	Triplicate Site with DT228A, DT228B and DT228C - Annual data provided for DT228C only
DT228B	418090	434429									48.7	52.0	46.9		-	-	-	Triplicate Site with DT228A, DT228B and DT228C - Annual data provided for DT228C only

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DT228C	418090	434429									46.6	49.1	50.3	29.7	43.2	32.3	-	Triplicate Site with DT228A, DT228B and DT228C - Annual data provided for DT228C only
DT229A	418059	434509								24.0	32.0	23.5	26.4	43.1	-	-	-	Triplicate Site with DT229A, DT229B and DT229C - Annual data provided for DT229C only
DT229B	418059	434509									31.8	29.1	28.5	45.0	-	-	-	Triplicate Site with DT229A, DT229B and DT229C - Annual data provided for DT229C only
DT229C	418059	434509									32.6	26.1	24.5	44.1	30.6	22.9	-	Triplicate Site with DT229A, DT229B and DT229C - Annual data provided for DT229C only
DT224A	417117	433431								36.1	36.4	34.3	38.0	32.2	-	-	-	Triplicate Site with DT224A, DT224B and DT224C - Annual data provided for DT224C only
DT224B	417117	433431									36.1	34.6	38.1	32.0	-	-	-	Triplicate Site with DT224A, DT224B and DT224C - Annual data provided for DT224C only
DT224C	417117	433431									34.6	33.8	38.4	33.9	35.4	26.4	-	Triplicate Site with DT224A, DT224B and DT224C - Annual data provided for DT224C only
DT225A	417087	433444								26.7	46.8	48.2	52.0	48.9	-	-	-	Triplicate Site with DT225A, DT225B and DT225C - Annual data provided for DT225C only
DT225B	417087	433444									47.9	50.7	54.1	45.2	-	-	-	Triplicate Site with DT225A, DT225B and DT225C - Annual data provided for DT225C only
DT225C	417087	433444									48.8	47.2	52.4	46.3	44.6	33.3	-	Triplicate Site with DT225A, DT225B and DT225C - Annual data provided for DT225C only
DT227A	417054	434165								23.2		28.7	29.9	28.7	-	-	-	Triplicate Site with DT227A, DT227B and DT227C - Annual data provided for DT227C only
DT227B	417054	434165									29.6	28.2		31.2	-	-	-	Triplicate Site with DT227A, DT227B and DT227C - Annual data provided for DT227C only
DT227C	417054	434165									30.3	29.0	27.5	29.0	28.0	20.9	-	Triplicate Site with DT227A, DT227B and DT227C - Annual data provided for DT227C only
DT231A	418791	434424									24.1		26.8	28.4	-	-	-	Triplicate Site with DT231A, DT231B and DT231C - Annual data provided for DT231C only
DT231B	418791	434424									26.0	26.6	27.9		-	-	-	Triplicate Site with DT231A, DT231B and DT231C - Annual data provided for DT231C only
DT231C	418791	434424										25.7	23.7	23.5	25.8	17.7	-	Triplicate Site with DT231A, DT231B and DT231C - Annual data provided for DT231C only
DT230A	418784	434409										26.4	24.3	26.9	-	-	-	Triplicate Site with DT230A, DT230B and DT230C - Annual data provided for DT230C only
DT230B	418784	434409										29.1	31.4	32.9	-	-	-	Triplicate Site with DT230A, DT230B and DT230C - Annual data provided for DT230C only

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DT230C	418784	434409										27.8	26.3	32.2	28.6	19.0	-	Triplicate Site with DT230A, DT230B and DT230C - Annual data provided for DT230C only
DT103A	415925	430572	55.2	46.6	40.6	51.6	53.4	43.2	46.1	42.8	50.2	36.4	40.0	38.1	-	-	-	Triplicate Site with DT103A, DT103B and DT103C - Annual data provided for DT103C only
DT103B	415925	430572							45.9	42.1	49.7	40.7	38.5	41.1	-	-	-	Triplicate Site with DT103A, DT103B and DT103C - Annual data provided for DT103C only
DT103C	415925	430572							46.2	38.6	50.9	36.2	37.0	38.1	45.3	37.6	32.5	Triplicate Site with DT103A, DT103B and DT103C - Annual data provided for DT103C only
DT104A	415961	430558	57.8	51.5	49.5	61.3	56.5	50.5	51.8	48.8	55.8	40.8	44.1	25.8	-	-	-	Triplicate Site with DT104A, DT104B and DT104C - Annual data provided for DT104C only
DT104B	415961	430558							55.7	48.0	48.9	41.9	48.6	23.7	-	-	-	Triplicate Site with DT104A, DT104B and DT104C - Annual data provided for DT104C only
DT104C	415961	430558							51.4	48.0	54.2	37.8	46.8	24.7	49.4	**41.0**	35.3	Triplicate Site with DT104A, DT104B and DT104C - Annual data provided for DT104C only
DT105A	415780	430504	54.6	53.8	38.4	48.6	57.3	46.6				40.0			-	-	-	Triplicate Site with DT105A, DT105B and DT105C - Annual data provided for DT105C only
DT105B	415780	430504									63.2	44.2			-	-	-	Triplicate Site with DT105A, DT105B and DT105C - Annual data provided for DT105C only
DT105C	415780	430504									63.4	45.6			50.7	37.6	33.3	Triplicate Site with DT105A, DT105B and DT105C - Annual data provided for DT105C only
DT106A	415702	430701							28.3	21.9	35.9	31.4	32.9	35.8	-	-	-	Triplicate Site with DT106A, DT106B and DT106C - Annual data provided for DT106C only
DT106B	415702	430701							28.5	22.8	35.0	30.1		33.8	-	-	-	Triplicate Site with DT106A, DT106B and DT106C - Annual data provided for DT106C only
DT106C	415702	430701							28.5	22.8	33.9	28.2		34.3	30.6	24.0	-	Triplicate Site with DT106A, DT106B and DT106C - Annual data provided for DT106C only
DT188A	415979	430522								29.1	38.7	23.6	35.2	33.7	-	-	-	Triplicate Site with DT188A, DT188B and DT188C - Annual data provided for DT188C only
DT188B	415979	430522								31.1	40.9	29.1	37.7	36.1	-	-	-	Triplicate Site with DT188A, DT188B and DT188C - Annual data provided for DT188C only
DT188C	415979	430522								30.3	38.9	27.2	38.0	33.0	33.5	25.1	-	Triplicate Site with DT188A, DT188B and DT188C - Annual data provided for DT188C only
DT189A	415910	430551							37.9	31.3	42.0	30.3	42.5	34.0	-	-	-	Triplicate Site with DT189A, DT189B and DT189C - Annual data provided for DT189C only
DT189B	415910	430551							42.6	30.0				34.7	-	-	-	Triplicate Site with DT189A, DT189B and DT189C - Annual data provided for DT189C only

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DT189C	415910	430551							40.5		38.9				36.4	28.6	-	Triplicate Site with DT189A, DT189B and DT189C - Annual data provided for DT189C only
DT186A	415743	430482							25.4	21.2	30.6	22.4	25.6	29.9	-	-	-	Triplicate Site with DT186A, DT186B and DT186C - Annual data provided for DT186C only
DT186B	415743	430482							28.9	20.0	35.2	26.4		32.7	-	-	-	Triplicate Site with DT186A, DT186B and DT186C - Annual data provided for DT186C only
DT186C	415743	430482							28.0	24.0	30.1	24.5	27.7	30.2	27.2	21.4	-	Triplicate Site with DT186A, DT186B and DT186C - Annual data provided for DT186C only
DT187A	415715	430669							34.2	28.3	39.6	30.1		30.1	-	-	-	Triplicate Site with DT187A, DT187B and DT187C - Annual data provided for DT187C only
DT187B	415715	430669							36.1	29.7	39.6	32.4	31.3	31.3	-	-	-	Triplicate Site with DT187A, DT187B and DT187C - Annual data provided for DT187C only
DT187C	415715	430669									40.6		32.2	31.2	33.0	25.9	-	Triplicate Site with DT187A, DT187B and DT187C - Annual data provided for DT187C only
DT192A	416218	430420								24.2	35.4	25.5	32.0	29.4	-	-	-	Triplicate Site with DT192A, DT192B and DT192C - Annual data provided for DT192C only
DT192B	416218	430420								24.3	35.7	25.9	35.0	33.8	-	-	-	Triplicate Site with DT192A, DT192B and DT192C - Annual data provided for DT192C only
DT192C	416218	430420								24.5	34.8	25.6	30.6	32.9	30.0	22.4	-	Triplicate Site with DT192A, DT192B and DT192C - Annual data provided for DT192C only
DT193 A	416239	430435								32.2	44.9	38.8	44.0	40.7	-	-	-	Triplicate Site with DT193 A, DT193B and DT193C - Annual data provided for DT193C only
DT193B	416239	430435								34.3	37.7	36.5	34.3	41.5	-	-	-	Triplicate Site with DT193 A, DT193B and DT193C - Annual data provided for DT193C only
DT193C	416239	430435								30.2	42.0	38.7		40.3	38.4	28.7	-	Triplicate Site with DT193 A, DT193B and DT193C - Annual data provided for DT193C only
DT212A	416398	430194								24.5	35.1	27.8	32.8		-	-	-	Triplicate Site with DT212A, DT212B and DT212C - Annual data provided for DT212C only
DT212B	416398	430194								24.4	38.6	28.1	36.7		-	-	-	Triplicate Site with DT212A, DT212B and DT212C - Annual data provided for DT212C only
DT212C	416398	430194								25.2	36.5	28.0	34.9		31.0	25.6	-	Triplicate Site with DT212A, DT212B and DT212C - Annual data provided for DT212C only
DT213A	416390	430214								21.7	35.0	28.5	29.2	33.6	-	-	-	Triplicate Site with DT213A, DT213B and DT213C - Annual data provided for DT213C only
DT213B	416390	430214								22.4	36.6	30.6	31.8	34.2	-	-	-	Triplicate Site with DT213A, DT213B and DT213C - Annual data provided for DT213C only

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DT213C	416390	430214									32.7			28.4	29.8	22.3	-	Triplicate Site with DT213A, DT213B and DT213C - Annual data provided for DT213C only
DT210A	415889	431081								22.7		25.5		29.1	-	-	-	Triplicate Site with DT210A, DT210A and DT210A - Annual data provided for DT210A only
DT210A	415889	431081								22.7		25.5		29.1	-	-	-	Triplicate Site with DT210A, DT210A and DT210A - Annual data provided for DT210A only
DT210A	415889	431081								22.7		25.5		29.1	-	-	-	Triplicate Site with DT210A, DT210A and DT210A - Annual data provided for DT210A only
DT211A	415922	431089								51.9	62.0	52.1	62.5	55.6	-	-	-	Triplicate Site with DT211A, DT211B and DT211C - Annual data provided for DT211C only
DT211B	415922	431089								49.5	60.1	48.2	64.5	56.3	-	-	-	Triplicate Site with DT211A, DT211B and DT211C - Annual data provided for DT211C only
DT211C	415922	431089								48.9	58.6	46.7	62.6	51.8	55.4	**41.4**	34.2	Triplicate Site with DT211A, DT211B and DT211C - Annual data provided for DT211C only
DT71A	415580	434461	35.5	41.5			44.0	37.8	44.0	34.8				40.1	-	-	-	Triplicate Site with DT71A, DT71B and DT71C - Annual data provided for DT71C only
DT71B	415580	434461							45.1						-	-	-	Triplicate Site with DT71A, DT71B and DT71C - Annual data provided for DT71C only
DT71C	415580	434461							40.4						39.6	29.7	-	Triplicate Site with DT71A, DT71B and DT71C - Annual data provided for DT71C only
DT172A	415590	434478							37.1	32.1	39.9	40.3	39.9	42.8	-	-	-	Triplicate Site with DT172A, DT172B and DT172C - Annual data provided for DT172C only
DT172B	415590	434478							39.2	33.4	39.1		39.1	44.3	-	-	-	Triplicate Site with DT172A, DT172B and DT172C - Annual data provided for DT172C only
DT172C	415590	434478							34.0	31.6	39.1		39.2	40.2	38.4	30.2	-	Triplicate Site with DT172A, DT172B and DT172C - Annual data provided for DT172C only
DT72	415573	434521	56.8	57.5	52.2	62.8	62.5	67.6	58.4	56.1	65.9	55.1	59.8	50.8	58.8	**48.8**	-	
DT235A	415474	434456								35.0	52.7	43.6	38.9	42.4	-	-	-	Triplicate Site with DT235A, DT235B and DT235C - Annual data provided for DT235C only
DT235B	415474	434456								39.7	55.6	45.4	43.0	42.7	-	-	-	Triplicate Site with DT235A, DT235B and DT235C - Annual data provided for DT235C only
DT235C	415474	434456								38.1	50.4	42.4	42.1	40.9	43.5	32.5	-	Triplicate Site with DT235A, DT235B and DT235C - Annual data provided for DT235C only
DT156	414781	434126								38.9	49.1	35.2	37.3	40.1	40.1	30.0	-	

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DT236	414498	433935								22.1	32.2	30.2	32.8	31.4	29.7	22.2	-	
DT237	414536	433981								29.4	35.2	29.0	33.3	33.2	32.0	23.9	-	
DT238A	414290	433759								26.5	35.4	32.6	32.8	33.3	-	-	-	Triplicate Site with DT238A, DT238B and DT238C - Annual data provided for DT238C only
DT238B	414290	433759								29.5	36.6	34.2	34.8		-	-	-	Triplicate Site with DT238A, DT238B and DT238C - Annual data provided for DT238C only
DT238C	414290	433759								27.7	36.3	30.4	33.9	32.2	32.6	24.4	-	Triplicate Site with DT238A, DT238B and DT238C - Annual data provided for DT238C only
DT239A	414268	433765								36.9		43.0	45.6	40.3	-	-	-	Triplicate Site with DT239A, DT239B and DT239C - Annual data provided for DT239C only
DT239B	414268	433765								37.7		44.0	41.7	40.0	-	-	-	Triplicate Site with DT239A, DT239B and DT239C - Annual data provided for DT239C only
DT239C	414268	433765								33.3		42.5	43.4	42.4	40.9	30.3	-	Triplicate Site with DT239A, DT239B and DT239C - Annual data provided for DT239C only
DT139A	414396	433648								27.8	11.8	35.9		37.1	-	-	-	Triplicate Site with DT139A, DT139B and DT139C - Annual data provided for DT139C only
DT139B	414396	433648									40.9	36.9	39.9	39.9	-	-	-	Triplicate Site with DT139A, DT139B and DT139C - Annual data provided for DT139C only
DT139C	414396	433648									38.3	35.5	34.4	37.2	33.9	25.3	-	Triplicate Site with DT139A, DT139B and DT139C - Annual data provided for DT139C only
DT240A	414403	433665								34.0	44.6	39.9	47.9	42.0	-	-	-	Triplicate Site with DT240A, DT240B and DT240C - Annual data provided for DT240C only
DT240B	414403	433665									41.6	37.3	43.5	38.6	-	-	-	Triplicate Site with DT240A, DT240B and DT240C - Annual data provided for DT240C only
DT240C	414403	433665									42.8	36.5	46.3	39.7	40.2	30.0	-	Triplicate Site with DT240A, DT240B and DT240C - Annual data provided for DT240C only
DT152	413835	433663								36.8	45.5	38.4	46.4	38.3	41.1	30.7	-	
DT151A	413700	433687								33.8	39.3	30.3	29.4	33.7	-	-	-	Triplicate Site with DT151A, DT151B and DT151C - Annual data provided for DT151C only
DT151B	413700	433687									41.4	33.4	31.9	31.6	-	-	-	Triplicate Site with DT151A, DT151B and DT151C - Annual data provided for DT151C only
DT151C	413700	433687									38.5	32.0	33.3	32.0	33.9	25.3	-	Triplicate Site with DT151A, DT151B and DT151C - Annual data provided for DT151C only

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DT149A	413750	433573								33.4	40.9	39.8	40.0	38.4	-	-	-	Triplicate Site with DT149A, DT149B and DT149C - Annual data provided for DT149C only
DT149B	413750	433573									41.4	41.2	41.3	33.9	-	-	-	Triplicate Site with DT149A, DT149B and DT149C - Annual data provided for DT149C only
DT149C	413750	433573									36.0	36.1	39.8	34.8	37.6	28.1	-	Triplicate Site with DT149A, DT149B and DT149C - Annual data provided for DT149C only
DT241A	413840	432676								24.0	31.8	26.5		27.9	-	-	-	Triplicate Site with DT241A, DT241B and DT241C - Annual data provided for DT241C only
DT241B	413840	432676									34.5	24.3	28.9	32.7	-	-	-	Triplicate Site with DT241A, DT241B and DT241C - Annual data provided for DT241C only
DT241C	413840	432676									34.7	28.3		31.0	28.7	21.4	-	Triplicate Site with DT241A, DT241B and DT241C - Annual data provided for DT241C only
DT246A	414722	432432								27.7	39.4	34.0	37.2	37.4	-	-	-	Triplicate Site with DT246A, DT246B and DT246C - Annual data provided for DT246C only
DT246B	414722	432432									40.5	34.9	39.3	36.6	-	-	-	Triplicate Site with DT246A, DT246B and DT246C - Annual data provided for DT246C only
DT246C	414722	432432									39.5	35.5	36.5	34.0	35.2	26.3	-	Triplicate Site with DT246A, DT246B and DT246C - Annual data provided for DT246C only
DT247A	414731	432443								23.4	33.8	25.9	29.7	32.1	-	-	-	Triplicate Site with DT247A, DT247B and DT247C - Annual data provided for DT247C only
DT247B	414731	432443									34.4	23.0	26.5	30.6	-	-	-	Triplicate Site with DT247A, DT247B and DT247C - Annual data provided for DT247C only
DT247C	414731	432443									31.1	25.5	24.8	31.0	27.9	20.9	-	Triplicate Site with DT247A, DT247B and DT247C - Annual data provided for DT247C only
DT144A	414908	432312								32.2	45.2	39.1	34.8	37.8	-	-	-	Triplicate Site with DT144A, DT144B and DT144C - Annual data provided for DT144C only
DT144B	414908	432312								35.6			36.2	38.9	-	-	-	Triplicate Site with DT144A, DT144B and DT144C - Annual data provided for DT144C only
DT144C	414908	432312								32.3			37.9	41.5	38.7	28.9	-	Triplicate Site with DT144A, DT144B and DT144C - Annual data provided for DT144C only
DT146	415005	432231								22.5	28.8	28.5	29.2	31.0	28.0	20.9	-	
DT143A	414902	432251								43.3	49.7		42.5	41.8	-	-	-	Triplicate Site with DT143A, DT143B and DT143C - Annual data provided for DT143C only
DT143B	414902	432251								44.1	49.6	41.9	38.5	44.5	-	-	-	Triplicate Site with DT143A, DT143B and DT143C - Annual data provided for DT143C only

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DT143C	414902	432251									50.8	42.1	47.8	46.8	44.6	33.3	-	Triplicate Site with DT143A, DT143B and DT143C - Annual data provided for DT143C only
DT142	414724	432095								34.9	44.0	35.0	36.8	33.7	36.9	27.6	-	
DT248	414499	431676								29.5	41.0			35.8	35.4	26.6	-	
DT249A	414862	431173								33.4		33.8	35.8	34.0	-	-	-	Triplicate Site with DT249A, DT249B and DT249C - Annual data provided for DT249C only
DT249B	414862	431173										34.6	36.0	37.7	-	-	-	Triplicate Site with DT249A, DT249B and DT249C - Annual data provided for DT249C only
DT249C	414862	431173										34.4	36.9	35.7	34.9	25.9	-	Triplicate Site with DT249A, DT249B and DT249C - Annual data provided for DT249C only
DT250A	414788	431184								22.7		21.5	29.2	32.5	-	-	-	Triplicate Site with DT250A, DT250B and DT250C - Annual data provided for DT250C only
DT250B	414788	431184										24.2	31.5	34.3	-	-	-	Triplicate Site with DT250A, DT250B and DT250C - Annual data provided for DT250C only
DT250C	414788	431184										23.8	31.7	34.2	27.6	20.5	-	Triplicate Site with DT250A, DT250B and DT250C - Annual data provided for DT250C only
DT251A	415222	431010								25.8	33.7	27.3	31.0	31.7	-	-	-	Triplicate Site with DT251A, DT251B and DT251C - Annual data provided for DT251C only
DT251B	415222	431010									36.4	24.5	33.7	32.8	-	-	-	Triplicate Site with DT251A, DT251B and DT251C - Annual data provided for DT251C only
DT251C	415222	431010									36.4	27.7	31.6	30.6	30.3	22.7	-	Triplicate Site with DT251A, DT251B and DT251C - Annual data provided for DT251C only
DT252A	415228	431031								32.5	45.6	38.4	38.5	39.0	-	-	-	Triplicate Site with DT252A, DT252B and DT252C - Annual data provided for DT252C only
DT252B	415228	431031									46.3	40.8	44.3	38.2	-	-	-	Triplicate Site with DT252A, DT252B and DT252C - Annual data provided for DT252C only
DT252C	415228	431031									45.0	35.9	42.6	39.3	39.4	29.5	-	Triplicate Site with DT252A, DT252B and DT252C - Annual data provided for DT252C only
DT253A	415320	430090								30.9		24.0		32.3	-	-	-	Triplicate Site with DT253A, DT253B and DT253C - Annual data provided for DT253C only
DT253B	415320	430090								32.3	41.8	26.1	32.8	34.8	-	-	-	Triplicate Site with DT253A, DT253B and DT253C - Annual data provided for DT253C only
DT253C	415320	430090								30.7	35.5	23.4	26.5	32.7	31.5	23.5	-	Triplicate Site with DT253A, DT253B and DT253C - Annual data provided for DT253C only

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DT254A	414637	430131								19.9		22.3	27.0		-	-	-	Triplicate Site with DT254A, DT254B and DT254C - Annual data provided for DT254C only
DT254B	414637	430131								21.4	29.2	24.3	28.6	26.2	-	-	-	Triplicate Site with DT254A, DT254B and DT254C - Annual data provided for DT254C only
DT254C	414637	430131								19.8	24.7		28.4	24.2	24.8	18.5	-	Triplicate Site with DT254A, DT254B and DT254C - Annual data provided for DT254C only
DT255A	414629	430122								16.4		17.2	23.9		-	-	-	Triplicate Site with DT255A, DT255B and DT255C - Annual data provided for DT255C only
DT255B	414629	430122								19.2		20.5	23.8	29.5	-	-	-	Triplicate Site with DT255A, DT255B and DT255C - Annual data provided for DT255C only
DT255C	414629	430122								18.5		20.1	24.2	24.6	22.1	16.4	-	Triplicate Site with DT255A, DT255B and DT255C - Annual data provided for DT255C only
DT256A	414239	430526								8.9	16.4		17.6	19.5	-	-	-	Triplicate Site with DT256A, DT256B and DT256C - Annual data provided for DT256C only
DT256B	414239	430526									17.2		19.4	10.6	-	-	-	Triplicate Site with DT256A, DT256B and DT256C - Annual data provided for DT256C only
DT256C	414239	430526									17.8		16.4	19.1	15.0	11.1	-	Triplicate Site with DT256A, DT256B and DT256C - Annual data provided for DT256C only
DT257A	414260	430531								14.3	21.4	16.8	17.1	21.2	-	-	-	Triplicate Site with DT257A, DT257B and DT257C - Annual data provided for DT257C only
DT257B	414260	430531									22.2	19.8	20.9	24.8	-	-	-	Triplicate Site with DT257A, DT257B and DT257C - Annual data provided for DT257C only
DT257C	414260	430531									22.5	19.6	20.0	23.6	19.5	14.6	-	Triplicate Site with DT257A, DT257B and DT257C - Annual data provided for DT257C only
DT258A	413749	430389								19.1	28.9	21.6	27.4	27.3	-	-	-	Triplicate Site with DT258A, DT258B and DT258C - Annual data provided for DT258C only
DT258B	413749	430389									30.0	20.3	25.1	29.4	-	-	-	Triplicate Site with DT258A, DT258B and DT258C - Annual data provided for DT258C only
DT258C	413749	430389									28.5	21.0	24.9	28.7	24.7	18.5	-	Triplicate Site with DT258A, DT258B and DT258C - Annual data provided for DT258C only
DT259A	413785	430386								18.8	27.7	21.8	22.4	28.1	-	-	-	Triplicate Site with DT259A, DT259B and DT259C - Annual data provided for DT259C only
DT259B	413785	430386									19.2	20.6	24.9		-	-	-	Triplicate Site with DT259A, DT259B and DT259C - Annual data provided for DT259C only
DT259C	413785	430386									27.3	22.1	24.0	26.0	23.2	17.3	-	Triplicate Site with DT259A, DT259B and DT259C - Annual data provided for DT259C only

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DT242A	413721	432067								19.3	25.9	22.7	22.7	26.1	-	-	-	Triplicate Site with DT242A, DT242B and DT242C - Annual data provided for DT242C only
DT242B	413721	432067								17.1	22.8	24.6	23.0	29.2	-	-	-	Triplicate Site with DT242A, DT242B and DT242C - Annual data provided for DT242C only
DT242C	413721	432067								15.8	22.5	22.8	25.6	27.6	23.2	17.3	-	Triplicate Site with DT242A, DT242B and DT242C - Annual data provided for DT242C only
DT243A	413729	432097								26.0	33.8	26.7	28.4	28.1	-	-	-	Triplicate Site with DT243A, DT243B and DT243C - Annual data provided for DT243C only
DT243B	413729	432097								24.5	33.5	28.8	28.7	28.7	-	-	-	Triplicate Site with DT243A, DT243B and DT243C - Annual data provided for DT243C only
DT243C	413729	432097								26.3	33.7	29.9	29.8	28.8	29.1	21.7	-	Triplicate Site with DT243A, DT243B and DT243C - Annual data provided for DT243C only
DT244	413225	431373									24.5	22.5	18.9	22.5	22.1	15.2	-	
DT245	413243	431386								16.5	24.2	20.6	21.0	25.9	21.7	16.2	-	
DT260A	415368	429297								10.1	19.0	13.9	18.1	18.1	-	-	-	Triplicate Site with DT260A, DT260B and DT260C - Annual data provided for DT260C only
DT260B	415368	429297								9.7	17.3	13.7	16.6	20.8	-	-	-	Triplicate Site with DT260A, DT260B and DT260C - Annual data provided for DT260C only
DT260C	415368	429297								11.6	18.2	14.2	18.0	20.8	16.0	12.0	-	Triplicate Site with DT260A, DT260B and DT260C - Annual data provided for DT260C only
DT261A	415339	429334								10.2	16.7	16.5	21.2	21.6	-	-	-	Triplicate Site with DT261A, DT261B and DT261C - Annual data provided for DT261C only
DT261B	415339	429334								10.9	17.2	14.8	18.2	20.9	-	-	-	Triplicate Site with DT261A, DT261B and DT261C - Annual data provided for DT261C only
DT261C	415339	429334								11.5	20.0	15.4	19.5	22.3	17.1	12.8	-	Triplicate Site with DT261A, DT261B and DT261C - Annual data provided for DT261C only
DT262A	415894	429519								29.4	40.0	35.4	41.8	33.5	-	-	-	Triplicate Site with DT262A, DT262B and DT262C - Annual data provided for DT262C only
DT262B	415894	429519								28.9	40.4	34.8	38.9	34.7	-	-	-	Triplicate Site with DT262A, DT262B and DT262C - Annual data provided for DT262C only
DT262C	415894	429519								28.5	38.0	32.3	40.9	36.8	35.6	26.6	-	Triplicate Site with DT262A, DT262B and DT262C - Annual data provided for DT262C only
DT112A	415024	436743	41.3	42.1	30.4	29.8	37.4		29.3	24.6	36.7	32.0	35.3	38.7	-	-	-	Triplicate Site with DT112A, DT112B and DT112C - Annual data provided for DT112C only

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DT112B	415024	436743							28.3	24.2	38.6	33.3	37.2	36.2	-	-	-	Triplicate Site with DT112A, DT112B and DT112C - Annual data provided for DT112C only
DT112C	415024	436743							28.5	27.5	38.6	39.2	36.2	37.2	34.6	28.7	-	Triplicate Site with DT112A, DT112B and DT112C - Annual data provided for DT112C only
DT73A	415438	435834	54.4	52.3	42.0	44.1	54.2	39.4	45.2	42.5	49.5	46.2	38.6	42.9	-	-	-	Triplicate Site with DT73A, DT73B and DT73C - Annual data provided for DT73C only
DT73B	415438	435834							47.8	40.1	51.2	48.9	38.3	46.6	-	-	-	Triplicate Site with DT73A, DT73B and DT73C - Annual data provided for DT73C only
DT73C	415438	435834							40.7	38.6	50.9	38.5	36.3	48.7	45.8	38.0	22.1	Triplicate Site with DT73A, DT73B and DT73C - Annual data provided for DT73C only
DT74	415549	435918	31.9	28.7	19.4	16.9	19.5	13.8	15.4	11.2	22.5	20.3	22.6	26.6	20.7	17.2	-	
DT111A	416015	435028	53.5	43.9	36.8	36.9	44.9	33.3	36.0	31.0	42.0	41.1	40.0	42.3	-	-	-	Triplicate Site with DT111A, DT111B and DT111C - Annual data provided for DT111C only
DT111B	416015	435028								34.6	45.8	42.1	42.1	44.7	-	-	-	Triplicate Site with DT111A, DT111B and DT111C - Annual data provided for DT111C only
DT111C	416015	435028								34.0	45.8	39.8	42.5	44.9	40.7	33.8	-	Triplicate Site with DT111A, DT111B and DT111C - Annual data provided for DT111C only
DT173A	415442	435799							37.6	34.3	41.9	46.1	46.6	40.3	-	-	-	Triplicate Site with DT173A, DT173B and DT173C - Annual data provided for DT173C only
DT173B	415442	435799							36.6	33.3	50.9	46.8	47.7	44.7	-	-	-	Triplicate Site with DT173A, DT173B and DT173C - Annual data provided for DT173C only
DT173C	415442	435799							35.7	31.3	42.9	36.5	45.0	37.7	40.8	32.1	-	Triplicate Site with DT173A, DT173B and DT173C - Annual data provided for DT173C only
DT174A	415029	436771							24.8	21.6	30.6	31.7	32.8	34.0	-	-	-	Triplicate Site with DT174A, DT174B and DT174C - Annual data provided for DT174C only
DT174B	415029	436771							25.3	24.6	32.8	32.0	32.5	35.1	-	-	-	Triplicate Site with DT174A, DT174B and DT174C - Annual data provided for DT174C only
DT174C	415029	436771							24.4	22.1	30.3	28.8	32.7	33.6	29.6	23.3	-	Triplicate Site with DT174A, DT174B and DT174C - Annual data provided for DT174C only
DT234A	416019	434990								31.3	44.1	41.7	40.8	42.6	-	-	-	Triplicate Site with DT234A, DT234B and DT234C - Annual data provided for DT234C only
DT234B	416019	434990								32.3	47.6	45.9	43.5	41.0	-	-	-	Triplicate Site with DT234A, DT234B and DT234C - Annual data provided for DT234C only
DT234C	416019	434990								31.3	42.2	39.1	37.1	41.4	40.3	30.1	-	Triplicate Site with DT234A, DT234B and DT234C - Annual data provided for DT234C only

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DT79	416282	432966	35.2	38.1	25.9	29.3	30.1	23.6	25.0	24.1		29.9	30.2	34.3	29.7	24.6	-	
DT80	416388	432817	45.9	42.7	33.1	35.1	43.3	32.1	33.7	34.6	42.2	3.6	38.1	39.8	34.9	28.9	-	
DT81	416413	432674	48.0	33.6											-	-	-	
DT84	416054	432675	40.8	38.8	27.6	37.7	40.5	31.0	31.8	25.2	40.0	32.5	37.2	35.9	34.9	29.0	-	
DT161A	416148	433102	47.9	51.3	47.7	51.4	59.7	50.8	46.8	48.3	59.0	51.4	53.7	50.9	-	-	-	Triplicate Site with DT161A, DT161B and DT161C - Annual data provided for DT161C only
DT161B	416148	433102							52.8	51.5	63.7	53.3	55.2	55.3	-	-	-	Triplicate Site with DT161A, DT161B and DT161C - Annual data provided for DT161C only
DT161C	416148	433102							48.6	48.6	58.6	49.2	53.6	51.2	52.1	**43.2**	**42.9**	Triplicate Site with DT161A, DT161B and DT161C - Annual data provided for DT161C only
DT162A	416148	433134	49.0	47.5		43.8	48.1	42.6	46.4	44.6	62.0	49.9	50.7	48.6	-	-	-	Triplicate Site with DT162A, DT162B and DT162C - Annual data provided for DT162C only
DT162B	416148	433134							41.3	41.9	53.8	44.8	43.4	46.3	-	-	-	Triplicate Site with DT162A, DT162B and DT162C - Annual data provided for DT162C only
DT162C	416148	433134							43.3	43.4	51.7	50.8	46.7	45.6	46.8	38.9	38.7	Triplicate Site with DT162A, DT162B and DT162C - Annual data provided for DT162C only
DT163A	416147	433158	39.5	39.2	39.1	41.2	52.6	38.9	42.8	41.3	52.5	49.6	46.3	48.4	-	-	-	Triplicate Site with DT163A, DT163B and DT163C - Annual data provided for DT163C only
DT163B	416147	433158							45.7	43.6	54.3	47.0	46.1	46.9	-	-	-	Triplicate Site with DT163A, DT163B and DT163C - Annual data provided for DT163C only
DT163C	416147	433158							35.8	40.4	50.9	46.0	44.0	46.9	44.0	36.5	36.2	Triplicate Site with DT163A, DT163B and DT163C - Annual data provided for DT163C only
DT164A	416139	433134	41.1	38.6	33.8	36.8	41.6	38.8	36.0	34.8	48.7	47.8	46.8	44.2	-	-	-	Triplicate Site with DT164A, DT164B and DT164C - Annual data provided for DT164C only
DT164B	416139	433134							38.0	37.2	50.7	50.1	45.7	43.7	-	-	-	Triplicate Site with DT164A, DT164B and DT164C - Annual data provided for DT164C only
DT164C	416139	433134							35.9	36.0	48.0	49.5	44.8	40.8	40.9	34.0	-	Triplicate Site with DT164A, DT164B and DT164C - Annual data provided for DT164C only
DT167A	416392	433046		59.4	52.1	56.0	62.2	56.0	50.8	49.8	61.2	53.5	42.4	51.4	-	-	-	Triplicate Site with DT167A, DT167B and DT167C - Annual data provided for DT167C only
DT167B	416392	433046							50.0	52.9	61.5	60.7	46.6	54.5	-	-	-	Triplicate Site with DT167A, DT167B and DT167C - Annual data provided for DT167C only

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DT167C	416392	433046							51.0	49.6	61.2	53.0	41.7	53.5	54.5	**45.3**	36.7	Triplicate Site with DT167A, DT167B and DT167C - Annual data provided for DT167C only
DT185A	416381	433054							43.9	43.9	51.3	51.3	42.5	49.1	-	**-**	**-**	Triplicate Site with DT185A, DT185B and DT185C - Annual data provided for DT185C only
DT185B	416381	433054							47.4	44.4	55.6	47.1	48.4	45.6	-	**-**	**-**	Triplicate Site with DT185A, DT185B and DT185C - Annual data provided for DT185C only
DT185C	416381	433054							48.7	45.5	52.7	50.0	51.2	48.2	48.1	37.8	33.8	Triplicate Site with DT185A, DT185B and DT185C - Annual data provided for DT185C only
DT12A	416970	433259	62.3	58.3	66.2	56.6	67.3	57.1	58.8	53.5	62.1	65.4	60.6	61.0	-	**-**	**-**	Triplicate Site with DT12A, DT12B and DT12C - Annual data provided for DT12C only
DT12B	416970	433259							56.5	60.2	68.7	62.2	60.4	63.5	-	**-**	**-**	Triplicate Site with DT12A, DT12B and DT12C - Annual data provided for DT12C only
DT12C	416970	433259							54.9	58.7	68.3	62.9	61.1	57.9	61.0	**50.6**	**49.5**	Triplicate Site with DT12A, DT12B and DT12C - Annual data provided for DT12C only
DT108A	415891	433045	48.1	41.9	34.9	43.2	38.0	35.4	40.7	35.2	44.6	36.9	40.5	40.5	-	**-**	**-**	Triplicate Site with DT108A, DT108B and DT108C - Annual data provided for DT108C only
DT108B	415891	433045							42.0	35.6	47.8	39.6	42.6	42.0	-	**-**	**-**	Triplicate Site with DT108A, DT108B and DT108C - Annual data provided for DT108C only
DT108C	415891	433045							36.8	30.9	44.5	33.9		40.0	40.0	33.2	**-**	Triplicate Site with DT108A, DT108B and DT108C - Annual data provided for DT108C only
DT109A	415858	433061	44.4	41.5	36.4	41.4	42.3	33.8	36.1	33.2	44.0	36.1	42.3	38.0	-	**-**	**-**	Triplicate Site with DT109A, DT109B and DT109C - Annual data provided for DT109C only
DT109B	415858	433061							38.1	33.4	44.3	35.7	38.9	39.2	-	**-**	**-**	Triplicate Site with DT109A, DT109B and DT109C - Annual data provided for DT109C only
DT109C	415858	433061							38.1	30.7	41.7	37.1	44.9	34.5	38.9	32.3	**-**	Triplicate Site with DT109A, DT109B and DT109C - Annual data provided for DT109C only
DT181A	415845	433041							28.0	27.0	38.2	35.6	37.3	37.3	-	**-**	**-**	Triplicate Site with DT181A, DT181B and DT181C - Annual data provided for DT181C only
DT181B	415845	433041							29.7	27.9	40.9	32.1	36.3	42.6	-	**-**	**-**	Triplicate Site with DT181A, DT181B and DT181C - Annual data provided for DT181C only
DT181C	415845	433041							28.5	28.3	37.5	36.1	36.3	39.5	34.5	27.1	**-**	Triplicate Site with DT181A, DT181B and DT181C - Annual data provided for DT181C only
DT182A	415874	433026							27.3	25.4	37.1	34.7	33.5	37.0	-	**-**	**-**	Triplicate Site with DT182A, DT182B and DT182C - Annual data provided for DT182C only
DT182B	415874	433026							29.7	25.8	35.6	32.5	36.5	37.2	-	**-**	**-**	Triplicate Site with DT182A, DT182B and DT182C - Annual data provided for DT182C only

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DT182C	415874	433026							27.7	25.7	35.7	31.2	34.7	36.8	32.6	25.6	-	Triplicate Site with DT182A, DT182B and DT182C - Annual data provided for DT182C only
DT110	415806	433061	39.4	35.7	28.8	29.3	32.7	26.7	26.6	25.0	33.0	34.6	34.9	36.3	31.9	26.5	-	
DT183	416215	433059							46.9	41.5	52.0	49.7	54.5	48.8	48.8	38.4	29.5	
DT184	416217	433071								44.9	56.1	46.6	52.1	45.9	48.8	36.5	29.8	
DT30A	413861	437772	46.0	44.9	32.9				33.7	32.0	40.3	35.0	38.0		-	-	-	Triplicate Site with DT30A, DT30B and DT30C - Annual data provided for DT30C only
DT30B	413861	437772							32.0	30.8	40.6	36.1	36.2		-	-	-	Triplicate Site with DT30A, DT30B and DT30C - Annual data provided for DT30C only
DT30C	413861	437772							31.3	32.2	42.7	36.0	37.1	38.7	37.7	31.3	-	Triplicate Site with DT30A, DT30B and DT30C - Annual data provided for DT30C only
DT31	413527	437713	55.5	41.0	38.3	50.6	57.3	51.3	52.4	47.3	52.0	49.3		52.3	49.9	**41.4**	29.1	
DT49A	413600	437653		63.4	13.8	33.6	31.0	27.7	29.9	27.0	29.1	25.4	27.0	30.1	-	-	-	Triplicate Site with DT49A, DT49B and DT49C - Annual data provided for DT49C only
DT49B	413600	437653							30.3	27.1	33.2	29.2	29.9	30.2	-	-	-	Triplicate Site with DT49A, DT49B and DT49C - Annual data provided for DT49C only
DT49C	413600	437653							29.6	26.7	33.5	28.4	28.0	29.6	31.2	25.9	-	Triplicate Site with DT49A, DT49B and DT49C - Annual data provided for DT49C only
DT50	413510	437732	66.0	53.7	52.2		47.2	42.0	49.5	42.9	54.3	46.3	53.3	49.0	50.4	**41.8**	35.1	
DT91A	413697	437723	46.4	38.2	35.9	33.9	38.4	33.4	31.7	31.3	35.0	37.5	39.7	41.6	-	-	-	Triplicate Site with DT91A, DT91B and DT91C - Annual data provided for DT91C only
DT91B	413697	437723							31.3	32.4	42.7	38.7	40.9	38.9	-	-	-	Triplicate Site with DT91A, DT91B and DT91C - Annual data provided for DT91C only
DT91C	413697	437723							30.1	29.7	40.1	34.4	36.3	35.5	36.7	30.5	-	Triplicate Site with DT91A, DT91B and DT91C - Annual data provided for DT91C only
DT175A	413709	437745							31.2	28.5	39.9	36.1	38.4	34.4	-	-	-	Triplicate Site with DT175A, DT175B and DT175C - Annual data provided for DT175C only
DT175B	413709	437745							32.0	28.1	37.8	35.2	40.6	36.7	-	-	-	Triplicate Site with DT175A, DT175B and DT175C - Annual data provided for DT175C only
DT175C	413709	437745							31.2	25.8	40.4	34.9	36.0	36.2	34.6	27.2	-	Triplicate Site with DT175A, DT175B and DT175C - Annual data provided for DT175C only

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DT176A	413597	437628							24.0	22.0	28.9	24.2	24.0	25.5	-	-	-	Triplicate Site with DT176A, DT176B and DT176C - Annual data provided for DT176C only
DT176B	413597	437628							24.5	22.6	28.2	24.4	21.7	26.4	-	-	-	Triplicate Site with DT176A, DT176B and DT176C - Annual data provided for DT176C only
DT176C	413597	437628							23.9	22.1	29.3	23.5	22.4	26.6	24.7	19.4	-	Triplicate Site with DT176A, DT176B and DT176C - Annual data provided for DT176C only
DT101A	413418	437725	53.0	48.4	39.6	41.4	49.5	39.8	49.2	42.3	50.6	38.9	50.7		-	-	-	Triplicate Site with DT101A, DT101B and DT101C - Annual data provided for DT101C only
DT101B	413418	437725							48.8	41.0	53.9	42.9	48.8		-	-	-	Triplicate Site with DT101A, DT101B and DT101C - Annual data provided for DT101C only
DT101C	413418	437725							50.2	41.3	47.5	40.2	49.1		45.6	37.9	26.4	Triplicate Site with DT101A, DT101B and DT101C - Annual data provided for DT101C only
DT102A	413338	437720	45.9	35.3	30.4	49.6	36.4	36.8	35.6	32.3	39.2	33.0	36.8	36.1	-	-	-	Triplicate Site with DT102A, DT102B and DT102C - Annual data provided for DT102C only
DT102B	413338	437720							37.1	29.0	41.1	33.3	41.9	37.9	-	-	-	Triplicate Site with DT102A, DT102B and DT102C - Annual data provided for DT102C only
DT102C	413338	437720							38.9	33.9	40.6	30.6	42.9	34.7	37.8	31.4	-	Triplicate Site with DT102A, DT102B and DT102C - Annual data provided for DT102C only
DT177A	413501	437732							45.2	35.6	45.6	37.1	43.0	37.3	-	-	-	Triplicate Site with DT177A, DT177B and DT177C - Annual data provided for DT177C only
DT177B	413501	437732							45.2	39.7	46.4	37.9	38.6	40.0	-	-	-	Triplicate Site with DT177A, DT177B and DT177C - Annual data provided for DT177C only
DT177C	413501	437732							45.4	39.7	46.8	36.7	46.3	37.4	41.1	32.3	-	Triplicate Site with DT177A, DT177B and DT177C - Annual data provided for DT177C only
DT178A	413334	437703							41.5	34.1	50.6	35.8	30.3	41.9	-	-	-	Triplicate Site with DT178A, DT178B and DT178C - Annual data provided for DT178C only
DT178B	413334	437703							38.8	32.8	46.9	37.1	37.1	40.8	-	-	-	Triplicate Site with DT178A, DT178B and DT178C - Annual data provided for DT178C only
DT178C	413334	437703							42.1	30.9	46.0	35.9	35.2	41.0	38.9	30.6	-	Triplicate Site with DT178A, DT178B and DT178C - Annual data provided for DT178C only
DT179A	413417	437708							39.0	32.8	43.0				-	-	-	Triplicate Site with DT179A, DT179B and DT179C - Annual data provided for DT179C only
DT179B	413417	437708							41.1	34.6	43.2	39.9	38.4	39.9	-	-	-	Triplicate Site with DT179A, DT179B and DT179C - Annual data provided for DT179C only
DT179C	413417	437708							38.3	34.0	44.2	42.6	40.6	37.2	39.4	30.9	-	Triplicate Site with DT179A, DT179B and DT179C - Annual data provided for DT179C only

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DT180A	413856	437784							17.1	16.9	27.1		31.4	32.9	-	-	-	Triplicate Site with DT180A, DT180B and DT180C - Annual data provided for DT180C only
DT180B	413856	437784							20.9	17.3	25.9	27.2	28.7	29.1	-	-	-	Triplicate Site with DT180A, DT180B and DT180C - Annual data provided for DT180C only
DT180C	413856	437784							19.2	15.6	28.3	25.4	28.9	30.1	25.1	19.7	-	Triplicate Site with DT180A, DT180B and DT180C - Annual data provided for DT180C only
DT190	406495	441280							33.5	31.3	33.7		37.9	32.2	33.6	26.5	-	
DT191	406508	441310							58.7	53.7	63.4	56.9	54.1	55.2	57.0	**44.7**	-	
DT21	404719	440613							7.9	5.7	10.2	10.2	12.7	13.5	10.2	8.0	-	
DT263	411245	447863									19.8	16.5	18.3	22.5	19.4	13.3	-	
DT264	411600	447618									17.0	15.7	16.9	21.1	17.9	12.3	-	
DT265	411782	447598									28.3	29.2	30.8	32.3	30.3	20.8	-	
DT266	411704	447666									26.7		24.7	28.6	26.9	17.7	-	
DT267	411786	447811									32.5	25.4	30.4	29.4	29.2	20.1	-	
DT78	407380	441811	27.9			20.1	21.5	15.6	9.6	16.1	24.2	22.0	22.4	25.9	20.5	17.0	-	
DT68	406060	441274		29.2	22.8	24.8	22.5	22.2	23.1	18.4	32.4	33.2	32.8	31.0	-	-	-	Triplicate Site with DT68, DT69 and DT70 - Annual data provided for DT70 only
DT69	406060	441274		31.8	24.9	22.6	25.9	21.9	21.9	19.9	30.8	27.5	34.5	31.4	-	-	-	Triplicate Site with DT68, DT69 and DT70 - Annual data provided for DT70 only
DT70	406060	441274		26.8	22.5	26.2	24.9	22.2	22.8	18.6	29.4	31.2	31.7	31.8	26.5	22.0	-	Triplicate Site with DT68, DT69 and DT70 - Annual data provided for DT70 only
DT121	414546	436933	32.7	31.1	23.6	25.7	23.9	19.5	24.0	22.2	missing	27.6	31.6	32.3	26.6	22.1	-	
DT122	414567	436811	37.1	missing	35.7	35.7	35.6	32.9	37.6	36.4	37.5	39.0	39.8	36.2	36.6	30.4	-	
DT123	414660	436974	missing	missing	missing	missing	37.9	35.4	40.2	37.0	41.4	39.7	39.3	missing	38.7	34.4	-	
DT123A	414766	437113	52.3	48.5	37.6	missing	33.1	37.2	41.3	39.8	45.6	37.5	40.4	45.4	41.3	34.3	-	
DT124	414620	436924	44.7	40.4	36.9	38.2	33.5	33.5	39.1	32.3	38.6	37.1	41.9	42.4	38.1	31.6	-	

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.83 national bias factor)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DT125	414674	436471	missing	30.8	19.5	26.6	22.9	17.1	17.0	17.0	23.0	21.7	23.0	26.8	22.2	18.5	-	
DT126	414643	436505	32.8	26.8	21.9	27.6	26.2	17.9	21.8	19.0	25.6	23.2	25.0	26.7	24.3	20.1	-	
DT127	415044	435558	55.3	51.9	41.7	53.7	46.8	38.3	44.9	39.5	47.6	42.2	34.6	49.3	45.2	37.5	23.4	
DT128	415331	435796	23.8	22.3	13.2	16.8	13.6	11.5	11.2	10.0	14.5	14.5	16.8	missing	15.0	12.5	-	
DT130	415839	434674	37.2	42.8	36.6	missing	missing	37.3	38.9	32.6	40.0	37.2	33.6	41.0	37.8	31.3	-	
DT132	415717	434265	52.5	45.8	41.5	42.1	45.2	40.4	42.9	41.0	51.6	43.1	49.8	52.5	45.5	37.8	32.1	
DT129	415089	436637	45.2	36.5	27.9	36.5	34.3	30.1	34.5	30.1	34.7	31.6	35.7	35.2	34.0	28.2	-	
DT131	414856	437605	50.1	43.5	44.3	missing	41.1	41.5	45.2	44.1	42.7	53.0	55.9	54.4	47.1	39.1	-	
DT133	416260	434581	50.6	43.9	33.9	36.5	38.2	31.9	32.9	32.5	38.9	43.4	39.2	44.6	38.7	32.1	-	
DT134	406940	441922	47.0	35.4	41.2	43.1	42.0	39.9	44.4	37.5	46.2	41.4	48.6	46.0	42.7	35.4	-	
DT135	406582	442028	47.1	38.8	31.4	35.0	33.5	28.7	33.9	32.8	38.1	36.0	38.2	39.4	35.8	29.7	-	
DT136	406540	442038	35.9	38.2	28.0	37.6	30.7	32.0	38.8	32.2	41.1	38.6	39.0	37.0	35.7	29.6	-	
DT137	406475	442046	missing	38.4	38.6	40.5	42.8	36.3	42.7	40.2	47.7	41.2	41.3	43.0	41.1	34.1	-	
DT138	406255	442140	48.6	33.7	41.5	missing	38.3	missing	40.8	37.2	46.6	43.2	39.1	36.8	40.4	33.5	-	

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

New or Changed Sources Identified Within City of Bradford MDC During 2020 and 2021

City of Bradford MDC routinely screens planning applications against the West Yorkshire Low Emission Planning Guidance to determine if they are likely to have a minor, medium or major impact on local air quality. Link to West Yorkshire Low Emission Planning Guidance

All applications with new parking spaces are required to provide type 1 mitigation in the form of EV charging points.

Applications with the potential to impact on relevant receptor points during the construction and demolition phases are also required to provide construction dust risk assessments and management plans.

Medium impact developments require additional type 2 mitigation in the form of a Low Emission Travel plan.

Major impact developments require a full air quality impact assessments and damage cost calculation. Some major developments are required to provide additional site specific type 3 emission mitigation strategies.

Where a new development has potential to introduce new relevant receptor points into an area considered at risk of exceeding air quality objectives an exposure assessment is also required.

Table C.1 shows medium and major applications for which mitigation was achieved in 2002 and 2021. Additional mitigation in the form of EV charging was obtained on many other minor applications not detailed in this table. A large number of pre-planning applications and condition discharge consents were also processed during 2020 and 2021.

Table C1: Planning mitigation 2020 and 2021

Planning reference	Proposal	Current status	Mitigation	Further comments
19/05302/FUL	Demolition of existing structures and redevelopment to provide coffee shop with drive thru and associated works	Granted	EV charging provision	Traffic below threshold for AQ impact assessment
20/00143/MAF	Construction of part three storey, part two storey secondary school and associated access, parking, sports facilities, landscaping, apparatus and engineering operations.	Granted	EV charging Secure bike storage Construction Dust Management Plan Travel Plan	Full air quality impact assessment reviewed AQ monitoring undertaken to establish conditions in the area before and after Changes made to site layout to reduce outdoor exposure during sports.
19/05007/MAF	Continuation of recycling construction and demolition waste and the restoration of the quarry	Granted	Fugitive dust management requirements	Continuation of an existing process
20/00174/MAF	Residential development of 67 dwellings	Refused	EV charging requested Construction Dust Management Plan requested	No AQ objection raised Application refused on other grounds.
20/00359/MAF	Hybrid planning application comprising of full planning permission for the construction of a retail food store (Use Class A1), together with car parking, landscaping and associated works and outline planning permission for a retail unit (Use Class A1) and coffee drive-thru (Use Class A3/A5) requesting consideration of access	Granted	EV charging Construction Dust Management Plan Travel Plan	Full air quality impact assessment reviewed
20/00662/MAF	Change of use of (D1) former Bradford College Garden Mills and Junction Mills to (C3) residential use to create a total of 107 No apartments, including new floor created	Granted	Mechanical ventilation on ground floor	Exposure assessment required due to location within an AQMA. Current

Planning reference	Proposal	Current status	Mitigation	Further comments
	within the building with concierge and gymnasium			measurements indicate AQ objectives met at building façade but mechanical ventilation to be provided as an alternative to opening windows during heavy traffic periods
20/00881/MAF	Industrial unit (B2 Class usage) with associated parking	Granted	EV charging	No relevant exposure on site. HGV levels below threshold for AQ impact assessment.
20/00137/MAF	Conversion of former industrial mill to develop 23 residential apartments	Granted	Secure cycle parking EV charging	Traffic below threshold for AQ impact assessment
20/00457/MAF	Masjid (mosque) and community centre	Granted	Cycle parking EV charging Construction Dust Management Plan	No relevant exposure on site Traffic below threshold for AQ impact assessment
20/01136/FUL	Construction of an extension to provide a level access loading dock. Installation of a new gas boiler flue. Provision of new roller shutter opening in external elevation. Installation of new RTO machine, externally	Granted	No additional mitigation required	Site covered by EA permitting
20/00949/MAO	Outline planning application for development of land for mixed use business and industrial units (B1, B2, and B8) (site area of 4.9ha) with associated parking and servicing space		EV charging Construction Dust Management Plan Low Emission Travel Plan	Full air quality impact assessment reviewed
19/02504/MAF	Hybrid planning application - full planning application to demolish and redevelop redundant primary tanks with a residential development of	Pending decision	EV charging requested Construction Dust	Full air quality impact assessment reviewed and

Planning reference	Proposal	Current status	Mitigation	Further comments
	150 dwellings and ancillary community hub, vehicular access, public open space and outline planning application to demolish and redevelop redundant filter beds for up to 100,000m2 of employment development (B1a, B1b, B1c, B2 and B8) together with ancillary retail (A1, A3, A5, D1 and D2), including means of vehicular access, with all other matters reserved		Management Plan requested Low Emission Travel Plan requested Emission mitigation strategy requested	further work requested. Baseline monitoring undertaken in 2020 to verify modelling baseline
20/01221/MAF	Change of use and conversion of D1 education use of former Old Building to form up to 190 no. C3 residential apartments including 24/7 concierge, media centre, cafe, games room, gymnasium and multi-purpose hall with landscaped communal courtyard	Granted	EV charging Low Emission Travel Plan	Exposure assessment reviewed and additional information requested. Final report indicated no risk to new residents.
20/01450/FUL	Construction of a new one way 'P-Loop Junction' link road between Harrogate Road and New Line, including two 60m long vehicle lanes, a new pedestrian footpath, a 1.5m cycle lane, two pedestrian crossings, new street lighting, new street planting and an Urban Traffic Control (UTC) layby. Construction of an access to the existing Farmfoods Store with associated car parking.	Granted	Scheme will reduce congestion at a busy crossroads	Air quality impact assessment reviewed. Some air quality improvement predicted. Pre and post scheme impact monitoring being undertaken by CAP team at CBMDC.
19/04942/MAO	Outline application for mixed use development of land consisting of retail units with light industrial units requesting consideration of access, layout and scale Construction of mixed use scheme consisting of a number of retail units along All Saints Road, with light industrial units to the rear.	Withdrawn	Insufficient information about AQ impacts included with application	AQ impact assessment and damage cost calculation requested to determine mitigation needs. Application subsequently withdrawn.

Planning reference	Proposal	Current status	Mitigation	Further comments
20/01558/MAF	Construction of new single storey managed workspaces/office space, with part mezzanine floors - Class B1 offices and B8 distribution use, including associated parking	Granted	Low emission Travel Plan EV charging Construction dust management plan requested	No relevant exposure on site. Traffic below threshold for AQ impact assessment
20/01289/MAF	Construction of 15 light industrial units	Granted	EV charging Construction dust management plan requested	No relevant exposure on site. Traffic below threshold for AQ impact assessment
20/01839/MAF	Construction of 12 industrial units (Use Class B2) with associated parking facilities, pedestrian access routes and servicing and structured low maintenance landscaping.	Granted	EV charging Construction dust management plan requested	No relevant exposure on site. Traffic below threshold for AQ impact assessment
20/02000/REG	Purpose built crematorium, bereavement suite, areas of hardstanding (car parks/access roads) and landscaped grounds.	Granted	EV charging Cycle parking Low Emission Travel Plan NOx abated cremators	Air quality impact assessment reviewed. No exceedance of AQ objectives at relevant receptor points
20/02346/MAF	Construction of foodstore and coffee shop with drive-thru facility together with access, car parking, servicing, landscaping and associated works	Granted	EV charging Construction dust management plan	Air quality impact assessment reviewed. Negligible impact in existing area of concern.
20/02976/MAF	Sheltered Housing Scheme consisting of 26 No 1 bed apartments with associated office space, residents lounge and kitchen facilities and associated external works and car parking	Granted	EV charging	Traffic below threshold for AQ impact assessment. No exposure concerns.
20/02933/MAF	Land Off Spen View Lane And Shetcliffe Lane Bierley Bradford West Yorkshire	Granted	EV charging Construction dust	Air quality impact assessment reviewed. No

Planning reference	Proposal	Current status	Mitigation	Further comments
			management plan Travel Plan	exposure concerns. Further work requested on cumulative impacts
20/03617/MAF	Construction of 49 dwellings with new church car park and public open space	Refused	EV charging requested Construction dust management plan requested	Application refused on other grounds.
20/02931/MAF	Change of use and conversion of D1 education use to form C3 use with 22no residential townhouses and 7no residential apartments	Granted	EV charging	Exposure assessment and AQ impact assessment reviewed. No exposure concerns due to distance from rod of receptors. Traffic impact negligible.
20/04492/MAF	Conversion of former mill complex, Barkerend Mill and North Mill to provide 117 apartments	Granted	EV charging Construction dust management plan Travel Plan	Traffic below threshold for AQ impact assessment. No exposure concerns.
20/04555/REG	Construction of purpose built crematorium, bereavement suite, areas of hard standing (car park/access roads) and landscaped grounds	Granted	EV charging Cycle parking Low Emission Travel Plan NOx abated cremators	Air quality impact assessment reviewed. No exceedance of AQ objectives at relevant receptor points
20/04540/FUL	Installation of a 1.5mwe combined heat and power unit with 16.5m exhaust, two thermal store tanks and a waste heat boiler and anciliary equipment	Granted	Minimum 14m stack height	AQ impact assessment reviewed. Potential impact on neighbouring premises if stack height below 14m. Process controlled by EA.
20/05292/MAF	Demolition of commercial structures and development of 18 new dwellings	Granted	EV charging	Traffic below threshold for AQ impact assessment. No

Planning reference	Proposal	Current status	Mitigation	Further comments
				exposure concerns.
20/05310/MAF	Residential development 69 units	Refused	EV charging requested Construction dust management plan requested	Application refused on other grounds
20/05383/MAF	Construction of distribution warehouse to replace warehouse building with ancillary offices and amenities and new electrical sub-station	Granted	EV charging Construction dust management plan requested	Traffic below threshold for AQ impact assessment. No exposure concerns.
21/00583/MAF	Four-storey building providing 24 apartments (Use Class C3) and three units with flexible commercial uses	Pending decision	EV charging requested Construction dust management plan requested	Detailed modelling of exposure impacts requested and monitoring undertaken. Results indicate that location is just below AQ objectives.
21/03779/FUL	Extension to an existing sports centre to provide additional facilities including two ECB compliant cricket lanes, community cafe and gymnasium.	Granted	EV charging Construction dust management plan	Traffic below threshold for AQ impact assessment. No exposure concerns.
21/01137/MAF	Demolition of dwelling followed by construction of residential scheme (146 units) with associated engineering, landscaping and access works	Granted	EV charging Construction dust management plan Travel Plan	Air quality impact assessment and exposure assessment reviewed. Some layout changes suggested reduce exposure and aid EV charging provision
21/01531/MAF	Development of business park [Use Classes B2, B8, E(g) and F1(a)] with conversion of building to cafe and managed office space	Granted	EV charging requested Construction dust management plan requested	Traffic below threshold for AQ impact assessment. No exposure concerns.

Planning reference	Proposal	Current status	Mitigation	Further comments
			CAZ compliance advice provided	
21/00842/MAF	Four industrial units and refurbishment of existing industrial building	Granted	EV charging Construction dust management plan requested	Traffic below threshold for AQ impact assessment. No exposure concerns.
21/01362/MAF	Demolition of existing buildings and construction of 5 retail units with 16 residential flats above at 196, 198, 200, 202 and 204 Barkerend Road	Refused		Insufficient information on transport impacts submitted
21/01683/FUL	Removal of existing abandoned forecourt canopy and infrastructure and demoltion of existing sales building and motor garage. To be replaced with new 4 Island forecourt and shop unit	Granted	EV charging	Pay to use EV charging recommended for refuelling forecourt in addition to standard staff provision
21/02661/FUL	Two storey extension and alterations to provide 24 bedroom hotel used primarily but not exclusively with existing function rooms	Granted	EV charging	Traffic below threshold for AQ impact assessment. No exposure concerns.
21/02805/MAF	General industrial units	Granted	EV charging requested Construction dust management plan requested CAZ compliance advice provided	Traffic below threshold for AQ impact assessment. No exposure concerns.
21/02958/MAF	Demolition of Hollycroft Care Home and construction of new build care home together with associated car parking, landscaping and amenity space provision	Pending consideration	EV charging requested Construction dust management plan requested Low Emission Travel Plan requested	Traffic below threshold for AQ impact assessment. No exposure concerns.

Planning reference	Proposal	Current status	Mitigation	Further comments
21/03653/MAF	Construction of a 5-storey office building with a retail and/or leisure unit at ground floor, with associated site works, creation of public realm and access works	Granted	EV charging Construction dust management plan Travel Plan	Air quality impact assessment and exposure assessment reviewed. No issues arising.
21/03758/MAF	Construction of 56 retirement living apartments (C3 use) and associated parking and landscaping	Pending consideration	EV charging requested Construction dust management plan requested Low Emission Travel Plan requested	Air quality impact assessment and exposure assessment reviewed. No issues arising
21/03170/FUL	Demolition of existing building, construction of drive-thru retail / bakery unit (Class E) with access alteration	Granted	EV charging Construction dust management plan Travel Plan Anti-idling signage requested	Detailed advice on location of outdoor seating provided
21/03174/FUL	Change of Use from Use Class B2 (industrial) to Sui Generis (Crematorium)	Withdrawn		Extensive consideration of AQ impact assessment and potential impact on CAZ. Application withdrawn before final recommendation
21/02916/MAF	Demolition of derelict pub and construction of a new, mixed-use community building consisting of a mosque, teaching rooms, two retail units and a tea room	Pending consideration	EV charging Construction dust management plan Travel Plan Anti-idling signage requested	Traffic below threshold for AQ impact assessment. No exposure concerns.
21/04368/MAF	Demolition of the existing properties and replace with a	Granted	EV charging	Traffic below threshold for AQ

Planning reference	Proposal	Current status	Mitigation	Further comments
	high quality residential scheme (Use Class C3) comprising of 73 new dwellings		Construction dust management plan Travel Plan	impact assessment. No exposure concerns.
21/04197/MAF	Construction of two B2 General Industrial blocks, one B8/E (g)(i-iii) block, and one Restaurant with associated parking area	Granted	EV charging Construction dust management plan Travel Plan CAZ compliance advice	Issues identified with AQ impact assessment which were resolved. Final report indicated negligible impact on nearby AQMA.
21/04831/MAF	Demolition and construction of a food store (Use Class E), retail pods (Use Class E/Sui Generis), a coffee drive-thru selling food and drink for consumption on and off the premises (Sui Generis), car parking, landscaping and associated works.	Pending consideration	EV charging requested Construction dust management plan requested Travel Plan requested CAZ compliance advice provided Anti-idlig signage requested	Traffic below threshold for AQ impact assessment. No exposure concerns.
21/05245/MAF	Residential development	Granted	EV charging Construction dust management plan requested	Traffic below threshold for AQ impact assessment. No exposure concerns.
21/06277/MAF	21/06277/MAF | Two commercial units (subdivisible) Use Classes Eg, B2 and B8 with ancillary trade counter, and a drive thru restaurant Use class Eb and Sui Generis with associated car parking, servicing and landscaping	Pending Consideration	EV charging requested Construction dust management plan requested Travel Plan requested	Further information on traffic impacts requested and improvement to Travel Plan

Planning reference	Proposal	Current status	Mitigation	Further comments
			CAZ compliance advice provided Anti-idling signage requested	

City of Bradford MDC has also considered the air quality impact assessment of the following major improvement schemes

Table C2: Improvement schemes under air quality consideration

Highways Scheme	Scheme overview	Status	Air quality work undertaken
Hard Ings Road improvement scheme	Increased road capacity to reduce congestion and provision of enhanced cycling and walking provision	Completed	Before scheme monitoring completed Post scheme monitoring now in place for 5 years Air quality impact assessments completed by third party and reviewed by CAP team
West Bradford Junctions Improvement Scheme	Upgrades planned at the junctions of Great Horton Road and Horton Grange Road, Thornton Road and Cemetery Road, and Toller Lane and Whetley Hill to reduce congestion	First round of consultation completed 2020 Compulsory Purchase Orders issued during 2021 Second round of consultation 2022 Works scheduled for 2022/23	Baseline air quality monitoring completed Air quality impact assessments completed by third party and reviewed by CAP team Post scheme monitoring by CAP team agreed
Harrogate Road and New Line Junction Improvement Scheme	Substantial widening of all four arms of Greengates junction and new P-Loop junction to facilitate movements from Harrogate Road. Improved signalling and facilities for walking and cycling.	Completed	Before scheme monitoring completed Post scheme monitoring now in place for 5 years Air quality impact assessments completed by third party and reviewed by CAP team
Bradford / Shipley Corridor Route Improvement Scheme	Creation of a high quality Green Route along Bradford Road/Keighley Road and Manningham Lane	Consultation on-going	Pre-scheme baseline monitoring in place along A650 and Canal Road Some air quality impact assessment works commenced

Highways Scheme	Scheme overview	Status	Air quality work undertaken
	and increased capacity on Canal Road to allow non-local traffic to be taken off the A650.		by third party with input from CAP team CAP team will continue to have ongoing input into the scheme development
Bradford Interchange Access scheme (Transforming Cities Fund)	New pedestrian access into Bradford Interchange to improve access to the interchange from key development sites in the city centre enhancing the experience and journey times for bus and rail users	Detailed scheme planning in progress	CAP team advising on exposure reduction issues and provision of EV infrastructure. Some long term air quality monitoring already ongoing in the area.
South Bradford Park & Ride and Expressway (Transforming Cities Fund)	Provision of a bus based Park and Ride facility in south Bradford adjacent to M606 motorway	Detailed scheme planning in progress	CAP team advising on air quality impact assessment requirements and provision of EV infrastructure / low emission buses. Air quality monitoring already in place along proposed bus route which will pass through Mayo Avenue AQMA.
West Bradford Supercycle highway extension (Transforming Cities Fund)	Access, safety and amenity improvements for cyclists and pedestrians between Bradford city centre and the West of the city, including the education quarter via creation of a 7km of dedicated cycleway along Thornton Road.	Detailed scheme planning in progress	CAP team advising on air quality impact assessment requirements. Some air quality monitoring already in place along the route. Scheme passes through Thornton Road AQMA

Additional Air Quality Works Undertaken by City of Bradford MDC During 2020 and 2021

Since the publication of the last ASR report Bradford has completed its Government mandated feasibility study and developed the Bradford Clean Air Plan (CAP). The authority is currently making final preparations for a Clean Air Zone (CAZ C+) due to go live on Monday 26 September 2022.

All information relating to the Clean Air Zone and the CAP business case is available to view on the Breathe Better Bradford website. Link to CAZ information on Breathe Better Bradford website

QA/QC of Diffusion Tube Monitoring

City of Bradford MDC undertakes diffusion tube monitoring across the district. As far as possible this is normally undertaken in line with the diffusion tube monitoring calendar provided by DEFRA with collections taking place within 2 days of the suggested collection date. The calendar is available on the LAQM helpdesk website.

During 2020 and 2021 there was some disruption to the deployment and collection of diffusion tubes in Bradford due to the unexpected closure of the supplier laboratory in February 2020, onset of the Covid-19 pandemic in March 2020 and retirement of the monitoring officer in October 2020. A new monitoring officer was employed in June 2021. From August 2021 diffusion tube collections have taken place in line with the Defra calendar. Since August 2021 the number of diffusion tube monitoring sites in Bradford has increased significantly due to commencement of additional baseline evaluation monitoring for the CAZ. Table C.3 below shows the target collection dates and actual collection dates for the Bradford diffusion tubes in 2020 and 2021.

Table C3: Diffusion tube collection dates in Bradford in 2020 and 2021

Target collection date	Actual collection dates	Maximum deviation from target period
8th January 2020	7th to 9th January 2020	None
5th February 2020	3rd to 6th February 2020	None
4th March 2020	2nd to 12th March 2020	6 days
1st April 2020	8th to 15th April 2020	13 days
29th April 2020	10th to 15th May 2020	14 days
3rd June 2020	2nd to 9th June 2020	4 days
1st July 2020	30th June to 2nd July 2020	None
29th July 2020	4th to 6th August 2020	6 days
2nd September 2020	1st to 2nd September 2020	None
30th September 2020	1st to 6th October 2020	4 days
4th November 2020	5th to 9th November 2020	3 days – some monitoring suspended due to staff shortage.
2nd December 2020	1st December 2020	None - some monitoring suspended due to staff shortage.
6th January 2021	7th to 11th January 2021	3 days
3rd February 2021	2nd to 4th February 2022	None
3rd March 2021	2nd to 4th March 2021	None
31st March 2021	1st April to 6th March 2021	4 days
5th May 2021	5th to 6th May 2021	None
2nd June 2021	2nd to 4th June 2021	None
30th June 2021	30th to 5th July 2020	3 days
4th August 2021	3rd to 5th August 2021	None
1st September 2021	1st to 3rd September 2021	None
29th September 2021	28th September to 1st October 2021	None
3rd November 2021	2nd November to 4th November 2021	None
1st December 2021	30th November to 3rd December 2021	None

During the 2020 period diffusion tubes were provided and analysed by a number of laboratories due to the contracted supplier West Yorkshire Analytical services ceasing to trade at short notice in February 2020. Emergency arrangements had to be made for supply and analysis of tubes by another supplier (Socotec) whilst procurement of a replacement contract took place. The new contract was placed with Gradko in April 2020 and has continued throughout 2021.

Table C4 below shows which labs supplied tubes and which analysed tubes throughout the 2020/2021 period. 50% TEA in acetone

All the tubes used during to the 2020 /2021 period (irrespective of supplier) were prepared using 50% TEA in acetone

Table C4: Diffusion tube supply and analysis for 2020 and 2021 period

Monitoring period	Supplier	Analysis
January 2020	West Yorkshire Analytical Services	West Yorkshire Analytical Services
February 2020	West Yorkshire Analytical Services	Socotec – analysis delayed
March 2020	West Yorkshire Analytical Services	Socotec
April 2020	West Yorkshire Analytical Services	Gradko
May 2020	Socotec	Gradko
June 2020 to December 2021	Gradko	Gradko

All the suppliers used in 2020 and 2021 participate(d) in the Inter-Laboratory comparison scheme AIR PT. This is an independent analytical proficiency-testing (PT) scheme, operated by LGC Standards and supported by the Health and Safety Laboratory (HSL). AIR PT is a new scheme, started in April 2014, which combines two long running PT schemes: LGC Standards STACKS PT scheme and HSL WASP PT scheme. AIR PT offers a number of test samples designed to test the proficiency of laboratories undertaking analysis of chemical pollutants in ambient indoor, stack and workplace air. One such sample is the AIR NO_2 test sample type that is distributed to participants in a quarterly basis. The results of this scheme are published annually.

The AIR PT NO_2 diffusion tube results for the relevant laboratories for the period covered by this progress report are shown in Table C.5. Due to the Covid-19 pandemic some rounds of testing were cancelled during 2020. At the time of writing AIR reports were only available for the period up to March 2021 (as confirmed by the LAQM helpdesk on 23 June 2022).

Table C.5: AIR PT NO2 diffusion tube results for laboratories used in 2020/2021

AIR round	Result for WYAS	Result for Socotec	Result for Gradko
January – February 2020	100%	-	-
May – June 2020	Not reported	Not reported	Not reported
July – August 2020	-	Not reported	Not reported
September– October 2020	-	-	75%
January – March 2021	-	-	25%

Diffusion Tube Annualisation

Defra has developed a diffusion tube data processing tool to assist local authorities in processing their NO_2 diffusion tube monitoring data. More information about the tool is available here Link to LAQM website.

Annualisation of the City of Bradford MDC data (where necessary) for 2020 and 2021 has been undertaken using this tool. Annualisation is required for any site with data capture less than 75% but greater than 25%.

Annualisation of 2020 data

In 2020, there were unique circumstances surrounding the supply and analysis of diffusion tubes in Bradford (as detailed above). It was therefore not possible to undertake annualisation of the Bradford diffusion tube data by comparison with a range of regional background monitoring data as would normally be done. The approach taken for 2020 annualisation and bias correction of the Bradford 2020 diffusion tube data is based on communication and agreement with the LAQM help desk.

During 2020 data were collected at most sites for a maximum of ten months of the year. More importantly, the tubes used throughout the year were supplied by different laboratories, and on occasions analysed by a different laboratory to that which supplied the tubes. This unique combination means that it was not possible to use any national bias factors in the 2020 data analysis, the only available route was to use local collocation site data in Keighley to calculate bias– see section on bias below). Further, with respect to annualisation, the variability in the month by month bias of each of these different types of tubes is likely to have been greater than the difference in the seasonality in concentrations between that of a local roadside site relative to remote background sites. This dictated that only local data from the Keighley continuous analyser (which was co-located with diffusion tubes from the various laboratories throughout 2020) could be used for annualisation of the 2020 Bradford diffusion tube data.

Overall the Covid risk rating for 2020 diffusion tube data should be considered large.

The following steps were used to annualise the 2020 data.

Step 1 – Diffusion tube deployment dates were inputted into the Defra diffusion tube processing tool. As there was large variation in change over dates for some of the tubes a total of 6 different processing tool runs were created with each run only containing tubes that were changed over within + or – 2 days of each other.

Step 2 – Monthly results for every tube were entered into the relevant run of the diffusion tube processing tool

Step 3 – Continuous real time data from the Keighley continuous monitoring site for the period 1/1/2020 to 31/12/2020 were entered into the annualisation input tab of the diffusion tube processing tool to generate an annualisation factor for each tube where data capture was between 3 and 8 months. No other continuous data were used to generate the annualisation factors for 2020.

Step 4 – The annualisation factors were applied automatically by the tool to each of the tubes where data capture was between 3 and 8 months.

Step 5 – The annualised results were then also corrected for bias using the diffusion tube processing tool (see bias correction details below).

Table C7(a) provides details of the tubes annualised in 2020.

Annualisation of 2021 data

During 2021 all diffusion tubes deployed were supplied and analysed by Gradko analytical and deployment dates were more broadly in line with the recommended Defra diffusion tube calendar dates than in 2020. Consistency in the supply and analysis of the diffusion tubes during 2021 meant that annualisation of the 2021 diffusion tube data could be undertaken in line with LAQM TG16 using a range of continuous background / urban centre data from across the region as for previous ASR reports.

The following steps were used to annualise the 2021 data.

Step 1 – Diffusion tube deployment dates were inputted into the Defra diffusion tube processing tool. As there was some variation in change over dates for some of the tubes a total of 5 different processing tool runs were created with each run only containing tubes that were changed over within + or – 2 days of each other.

Step 2 – Monthly results for every tube were entered into the relevant run of the diffusion tube processing tool

Step 3 – Continuous real time data from 4 different continuous analysers (all affliated to the AURN network) for the period 1/1/2021 to 31/12/2021 were used to calculate the 2021 annualisation factors. The sites used were:

- Leeds Centre
- Dewsbury Ashworth Grove
- Barnsley Gawber
- Manchester Piccadilly

These are all background or urban background sites within 50 miles of Bradford and had >85% data capture during 2021. The Keighley site was not used to annualise the 2021 diffusion tube data because data capture at the site during 2021 was <85% and the site is an urban centre site rather than a background site so does not meet the requirements of LAQM.TG16. As detailed above the use of the Keighley site for annualisation during 2020 was due to the unique situation arising from the supply and analysis of diffusion tubes. It was only undertaken under the direction of the LAQM helpdesk as no other alternative site was suitable in that year.

Step 4 – The annualisation factors were applied automatically by the tool to each of the tubes where data capture was between 3 and 8 months.

Step 5 – The annualised results were then also corrected for bias using the diffusion tube processing tool (see bias correction details below).

The majority of the diffusion tubes in the 2021 dataset have been annualised because a large number of them represent new sites established mid-2021 for the purpose of collecting baseline data for the CAZ. The tubes that have not been annualised are mainly those that were established prior to 2021. Table C7(b) provides details of all sites annualised in 2021.

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2021/22 ASR have been corrected for bias using adjustment factors. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG16 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

City of Bradford MDC have applied a **local** bias adjustment factor of 0.92 to the 2020 data and a **national** bias adjustment factor of 0.83 to the 2021 monitoring data. A summary of bias adjustment factors used by City of Bradford MDC over the past five years is presented in Table C.6.

Application of 2020 local bias factor

During 2020 diffusion tubes used in Bradford were supplied by different laboratories, and on occasions analysed by a different laboratory to that which supplied the tubes. This unique combination means that it was not possible to use any national bias factors in the 2020 data analysis, the only available route was to use local co-location site data in Keighley to calculate bias. The method used to calculate the local bias factor for 2020 was agreed in advance with the LAQM helpdesk and was undertaken as follows:

Step 1: Co-located monthly diffusion tube data for each of the three triplicate diffusion tubes which are co-located with the Keighley continuous analyser were entered into the Local Bias adjustment sheet of the Defra diffusion tube processing tool along with annual hourly NO2 data from Keighley for the period 1/1/2020 to 31/12/2020. The processing tool

indicated good precision in the tube data and good data capture at the continuous analyser making the data suitable for calculating a local bias factor.

Step 2: A local bias factor of 0.92 was generated by the diffusion tube processing tool and automatically applied to all the 2020 diffusion tube data included in the first run of the diffusion tube processing tool. This included all tubes that were consistently changed within +/- 2 days of the co-located Keighley tubes in 2020.

Step 3: The same local bias factor of 0.92 was then used in all the additional 2020 diffusion tube processing runs. To make this possible the value of 0.92 was entered as a 'national' factor into the other 2020 processing runs. This had to be done because the Keighley tubes had different change over dates to the tubes in the other processing tool runs and as a result couldn't be correctly inputted into the other data sets to keep generating the local bias in each separate. Different runs were needed to accommodate the variations in diffusion tube change over dates. This approach to applying the locally derived bias factor to the other 2020 runs was agreed with the LAQM helpdesk.

Due to uncertainties around the local bias and annualisation factors applied to the 2020 data the Covid risk rating for 2020 diffusion tube data should be considered large.

Application of 2021 national bias factor

During 2021 all the Bradford diffusion tubes deployed were supplied and analysed by Gradko. It has therefore been possible to apply the national correction factor of 0.83 for the Gradko tubes to the 2021 Bradford diffusion tube data set. This national bias correction factor was taken from the 03/22 version of the national spreadsheet and is based on co-location studies at 14 study sites.

For 2021 the national factor has been used in preference to a locally calculated 2021 bias factor at Keighley of 0.82. This is because data capture at the Keighley continuous analyser in 2021 was below 85% for the year and some months flagged as having low data capture during the calculation of the 2021 local bias factor. This will have impacted on the accuracy of the locally derived bias factor for 2021 making the use of the national factor more appropriate for this data set. The national factor of 0.83 returns slightly higher bias corrected annual averages than the local factor of 0.82 ensuring that the worst case values for NO_2 in 2021 are provided in this report. Although the local 2021 local factor has not been used in this report it is reassuring that there was close correlation between the local and national factor during this particular year.

Table C.6 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2021	National	03/22	0.83
2020	Local	-	0.92
2019	National	04/20	0.80
2018	National	09/19	0.80
2017	National	03/18	0.78

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the NO_2 fall-off with distance calculator available on the LAQM Support website (for automatic sites) and the Diffusion Tube Data Processing Tool (for diffusion tubes).

Where appropriate, automatic and non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1(a) and B.1(b). Details of these calculations for automatic sites are shown below. Distance correction for relevant diffusion tubes was undertaken using the Diffusion Tube Data Processing Tool.

Distance correction should be considered at any monitoring site where the annual mean concentration is greater than 36µg/m^3 and the monitoring site is not located at a point of relevant exposure (taking the limitations of the calculator into account).

Fall-off with Distance for automatic analysers

Only two automatic monitoring site CM6 (Shipley Airedale Road) and CM4 (Mayo Avenue) exceeded 36 µg/m^3 at the monitoring position in 2020 and/or 2021. These are the only automatic sites for which distance corrections have been undertaken. The details of these calculations are shown below.

Distance calculation for CM6 Shipley Airedale Road 2020

Enter data into the pink cells

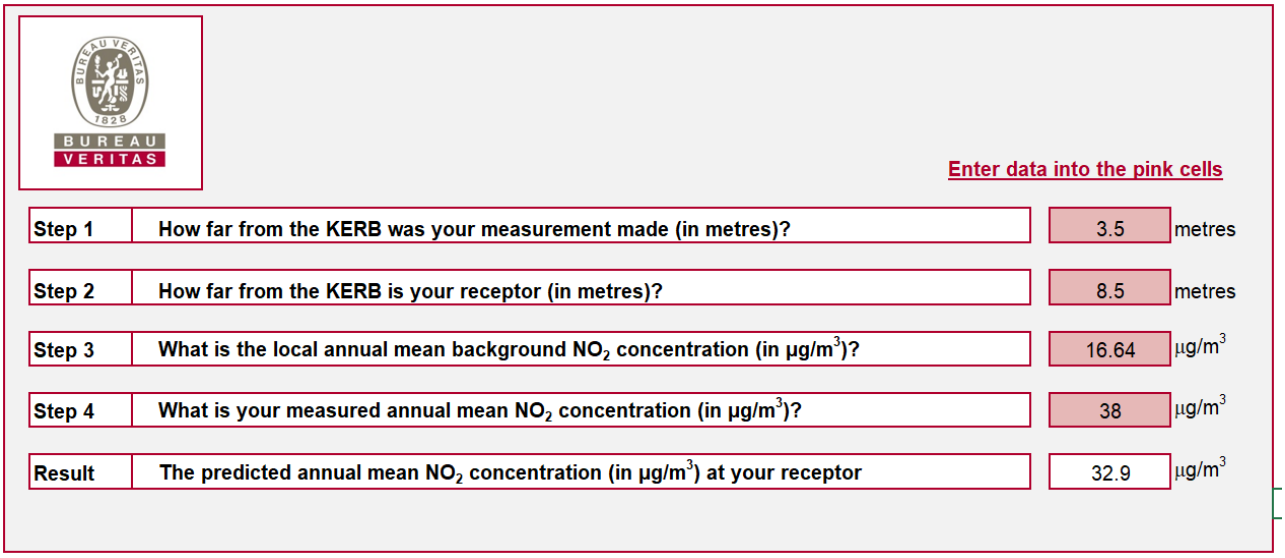
Step 1	How far from the KERB was your measurement made (in metres)?	2	metres
Step 2	How far from the KERB is your receptor (in metres)?	4	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	21.8	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	38	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	35.4	µg/m^3

Distance calculation for CM6 Shipley Airedale Road 2021

Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	2	metres
Step 2	How far from the KERB is your receptor (in metres)?	4	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	20.98	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	41	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	37.7	µg/m^3

Distance calculation for CM4 Mayo Avenue 2021



Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	3.5	metres
Step 2	How far from the KERB is your receptor (in metres)?	8.5	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	16.64	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	38	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	32.9	µg/m^3

QA/QC of Automatic Monitoring

City of Bradford Metropolitan District Council's air quality analysers are type approved as recommended in LAQM.TG1 (00) *Review and Assessment: Monitoring air quality* and LAQM.TG4 (00) *Review and assessment: Pollutant specific guidance.* All the real time data provided in this report is independently ratified data from council operated analysers with the exception of the Mayo Avenue site (CM4) which is affiliated to the Defra AURN network. City of Bradford MDC is currently contracted to provide Local Site Operator (LSO) support for the Mayo Avenue site which includes the undertaking of fortnightly manual calibrations. More information about the operation and management of AURN sites is available here Link to Defra AURN website.

The day to day operation of the Council's own automatic network is managed by the Clean Air Programme (CAP) team. The monitoring officer located within this team undertakes trouble shooting activities associated with the equipment operation (e.g. initial investigation of site malfunctions, communication resets, filter changes etc.) and is also responsible for the maintenance and upkeep of the sites to ensure the inlets remain free from obstacles and any damage to the sites or pest infestations are dealt with promptly. The monitoring officer liaises directly with the data management contractor and is generally able to provide a same day response to any concerns raised with the data or lack of communications during the working week. Where necessary the monitoring officer places a call out to the service and maintenance provider (currently Signal group) and ensures that repairs are carried out promptly and to the council's satisfaction.

Regular manual calibration of the monitoring equipment is essential to ensure the quality of the data collected is of a high standard. Manual calibrations supplement the automatic daily system calibrations that take place at all the sites each evening.

Routine calibration of the City of Bradford MDC sites is currently undertaken at least once per month at all sites by an independent contractor. The contractor was previously employed as an air quality officer at the council for many years and has been extensive knowledge of the Bradford air quality monitoring network. Having the independent contractor in place ensures routine calibrations are undertaken regularly and is not impacted on by the varying workload of the permanent members of the CAP team. Additional calibrations are undertaken by the CAP team monitoring officer and Signal group engineers following any interruption to the systems such as a breakdown or routine service. As the Mayo Avenue automatic site forms part of the AURN network it is calibrated at least once a fortnight with the additional calibrations undertaken by the CAP team monitoring officer.

During calibration visits a manual zero and span calibration check is performed. The methodology used is essentially that found in the AURN Local Site Operators and the manufacturer's instruction manual.

The basic steps are:

- Pre-calibration check of the general site condition and status of the analyser, before the zero and span checks are performed.
- Zero check to verify the performance of the analyser in the absence of the gas being monitored.
- Span check to verify the response of the analyser to gas of a known concentration.
- Post calibration check of the general site condition and status of the analyser on completion of all calibration routines.

A record of each analyser zero and span check is fully documented and sent to the data management contractor. Records of a calibrations are kept for up to 5 years.

The gases used for onsite span calibration checks at the Bradford owned air pollution stations are supplied by Air Liquide Ltd. Calibration gases for the Mayo Avenue site operated by DEFRA are supplied by BOC Ltd. Calibration gases are traceable via European Accreditation DIN EN 45001 and DIN EN ISO 900. The tolerance of the nitrogen dioxide and nitric oxide in air mixes is typically ±5%. Zero air is generated internally in the

Ambirak, and the scrubbers are changed when necessary in accordance with manufacturer's recommendations and the LSO Site Manual for the Ambirak.

Signal Group (the equipment supplier) provide six monthly routine service and maintenance visits and provide an emergency repair and breakdown service for the Bradford monitoring network. They normally respond to any call outs within 24 to 48 hours of the call being placed. Having a high quality service and maintenance contract in place is essential to maintain high levels of good quality data capture across the Bradford monitoring network.

All data generated by the Bradford automatic analysers is independently collected and ratified by an external contractor. The current data management service provider is Air Quality Data Management (AQDM), a well-established and respected air quality data management supplier. More information about AQDS can be found here: Link to Air Quality Data Management website AQDM remotely checks the operational status of all the Bradford monitoring sites on a daily basis (apart from the Mayo Avenue AURN site) and provide regular updates to the council on air quality conditions around the district. At the end of each year they provide a fully verified and ratified data set for every site to be used as the basis for ASR reporting. Having an independent data management contractor in place ensures the Bradford air quality data is of a high standard and any problems with the equipment are identified early thereby minimising data loss and ensuring high percentage data capture at all sites.

Daily air quality data from the Bradford Council operated network can be viewed daily on the Air Quality Net website operated by AQDS here: Link to Air Quality Net website

Daily air quality data from the Mayo Avenue AURN site can be viewed daily on the Air Quality England website here: Link to Mayo Avenue data on Air Quality England website

Short-term to Long-term Data Adjustment

No short to long term data adjustment was required for the real time NO_2 data for the purpose of this report.

No short to long term data adjustment was required for the PM10 or $PM_{2.5}$ data used in this report.

PM10 and PM2.5 Monitoring Adjustment

The type of PM10/PM2.5 monitor(s) utilised within City of Bradford MDC do not require the application of a correction factor. The data has been subject to independent ratification and verification checks by Air Quality Data Management.

Automatic Monitoring Annualisation

All automatic monitoring locations within City of Bradford MDC recorded data capture of greater than 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

Table C.7(a) – Annualisation Summary 2020 (concentrations presented in µg/m^3)

No automatic data required annualisation in 2020

Site ID	Annualisation Factor Keighley	Annualisation Factor Keighley	Annualisation Factor Keighley	Annualisation Factor Keighley	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT120	1.0162	1.0162	1.0162	1.0162	1.0162	29.0	29.5	
DT72	1.0072	1.0072	1.0072	1.0072	1.0072	50.8	51.2	
DT112	1.1190	1.1190	1.1190	1.1190	1.1190	27.4	30.7	
D125	0.9898	0.9898	0.9898	0.9898	0.9898	16.6	16.4	
D140	1.0261	1.0261	1.0261	1.0261	1.0261	26.0	26.7	
D141	1.0261	1.0261	1.0261	1.0261	1.0261	32.3	33.1	
D142	1.0261	1.0261	1.0261	1.0261	1.0261	29.4	30.2	
D143	1.0261	1.0261	1.0261	1.0261	1.0261	36.2	37.1	
D144	1.0092	1.0092	1.0092	1.0092	1.0092	32.2	32.5	
D145	1.0261	1.0261	1.0261	1.0261	1.0261	35.6	36.5	
D146	1.0092	1.0092	1.0092	1.0092	1.0092	20.9	21.1	
D147	1.0261	1.0261	1.0261	1.0261	1.0261	17.4	17.8	
D148	1.0261	1.0261	1.0261	1.0261	1.0261	15.2	15.6	
D149	1.0261	1.0261	1.0261	1.0261	1.0261	29.6	30.3	
D150	0.9744	0.9744	0.9744	0.9744	0.9744	28.0	27.3	
D151	1.0261	1.0261	1.0261	1.0261	1.0261	29.1	29.9	
D152	1.0261	1.0261	1.0261	1.0261	1.0261	35.4	36.3	
D153	1.0261	1.0261	1.0261	1.0261	1.0261	37.7	38.7	
D154	1.0261	1.0261	1.0261	1.0261	1.0261	26.9	27.6	
D155	1.0261	1.0261	1.0261	1.0261	1.0261	36.7	37.6	
D156	1.0261	1.0261	1.0261	1.0261	1.0261	35.3	36.2	
D157	1.0261	1.0261	1.0261	1.0261	1.0261	33.7	34.6	
D158	1.0261	1.0261	1.0261	1.0261	1.0261	31.9	32.7	
D159	1.0261	1.0261	1.0261	1.0261	1.0261	24.1	24.7	

Table C.7(b) – Annualisation Summary 2021 (concentrations presented in µg/m^3)

No automatic data required annualisation in 2021

Site ID	Annualisation Factor Leeds Centre	Annualisation Factor Dewsbury Ashworth Grove	Annualisation Factor Barnsley Gawber	Annualisation Factor Manchester Piccadilly	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT99	0.8838	0.9121	0.8942	0.9121	0.9006	27.7	25.0	
DT208A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT208A, DT208B and DT208C - Annual data provided for DT208C only
DT208B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT208A, DT208B and DT208C - Annual data provided for DT208C only
DT208C	0.8838	0.9121	0.8942	0.9121	0.9006	25.9	23.4	Triplicate Site with DT208A, DT208B and DT208C - Annual data provided for DT208C only
DT45	0.8838	0.9121	0.8942	0.9121	0.9006	33.7	30.3	
DT194	0.8838	0.9121	0.8942	0.9121	0.9006	33.9	30.5	
DT195	0.8838	0.9121	0.8942	0.9121	0.9006	41.4	37.3	
DT196	0.8838	0.9121	0.8942	0.9121	0.9006	38.5	34.7	
DT197	0.8838	0.9121	0.8942	0.9121	0.9006	33.8	30.5	
DT198	0.8838	0.9121	0.8942	0.9121	0.9006	38.8	34.9	
DT199A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT199A, DT199B and DT199C - Annual data provided for DT199C only
DT199B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT199A, DT199B and DT199C - Annual data provided for DT199C only
DT199C	0.8838	0.9121	0.8942	0.9121	0.9006	25.0	22.5	Triplicate Site with DT199A, DT199B and DT199C - Annual data provided for DT199C only
DT200A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT200A, DT200B and DT200C - Annual data provided for DT200C only

Site ID	Annualisation Factor Leeds Centre	Annualisation Factor Dewsbury Ashworth Grove	Annualisation Factor Barnsley Gawber	Annualisation Factor Manchester Piccadilly	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT200B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT200A, DT200B and DT200C - Annual data provided for DT200C only
DT200C	0.8838	0.9121	0.8942	0.9121	0.9006	27.6	24.9	Triplicate Site with DT200A, DT200B and DT200C - Annual data provided for DT200C only
DT220A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT220A, DT220B and DT220C - Annual data provided for DT220C only
DT220B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT220A, DT220B and DT220C - Annual data provided for DT220C only
DT220C	0.8838	0.9121	0.8942	0.9121	0.9006	23.9	21.5	Triplicate Site with DT220A, DT220B and DT220C - Annual data provided for DT220C only
DT221A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT221A, DT221B and DT221C - Annual data provided for DT221C only
DT221B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT221A, DT221B and DT221C - Annual data provided for DT221C only
DT221C	0.8838	0.9121	0.8942	0.9121	0.9006	21.9	19.7	Triplicate Site with DT221A, DT221B and DT221C - Annual data provided for DT221C only
DT222A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT222A, DT222B and DT222C - Annual data provided for DT222C only
DT222B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT222A, DT222B and DT222C - Annual data provided for DT222C only
DT222C	0.8838	0.9121	0.8942	0.9121	0.9006	28.1	25.3	Triplicate Site with DT222A, DT222B and DT222C - Annual data provided for DT222C only

Site ID	Annualisation Factor Leeds Centre	Annualisation Factor Dewsbury Ashworth Grove	Annualisation Factor Barnsley Gawber	Annualisation Factor Manchester Piccadilly	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT223A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT223A, DT223B and DT223C - Annual data provided for DT223C only
DT223B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT223A, DT223B and DT223C - Annual data provided for DT223C only
DT223C	0.8838	0.9121	0.8942	0.9121	0.9006	49.2	**44.3**	Triplicate Site with DT223A, DT223B and DT223C - Annual data provided for DT223C only
DT218A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT218A, DT218B and DT218C - Annual data provided for DT218C only
DT218B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT218A, DT218B and DT218C - Annual data provided for DT218C only
DT218C	0.8838	0.9121	0.8942	0.9121	0.9006	40.3	36.3	Triplicate Site with DT218A, DT218B and DT218C - Annual data provided for DT218C only
DT219A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT219A, DT219B and DT219C - Annual data provided for DT219C only
DT219B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT219A, DT219B and DT219C - Annual data provided for DT219C only
DT219C	0.8838	0.9121	0.8942	0.9121	0.9006	34.2	30.8	Triplicate Site with DT219A, DT219B and DT219C - Annual data provided for DT219C only
DT116	0.8838	0.9121	0.8942	0.9121	0.9006	27.6	24.9	
DT118	0.9049	0.9187	0.9031	0.9187	0.9113	29.2	26.6	
DT120A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT120A, DT120B and DT120C - Annual data provided for DT120C only

Site ID	Annualisation Factor Leeds Centre	Annualisation Factor Dewsbury Ashworth Grove	Annualisation Factor Barnsley Gawber	Annualisation Factor Manchester Piccadilly	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT120B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT120A, DT120B and DT120C - Annual data provided for DT120C only
DT120C	0.8838	0.9121	0.8942	0.9121	0.9006	40.9	36.9	Triplicate Site with DT120A, DT120B and DT120C - Annual data provided for DT120C only
DT209A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT209A, DT209B and DT209C - Annual data provided for DT209C only
DT209B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT209A, DT209B and DT209C - Annual data provided for DT209C only
DT209C	0.8838	0.9121	0.8942	0.9121	0.9006	44.3	39.9	Triplicate Site with DT209A, DT209B and DT209C - Annual data provided for DT209C only
DT205	0.8838	0.9121	0.8942	0.9121	0.9006	32.6	29.4	
DT206	0.8838	0.9121	0.8942	0.9121	0.9006	39.3	35.4	
DT207A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT207A, DT207B and DT207C - Annual data provided for DT207C only
DT207B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT207A, DT207B and DT207C - Annual data provided for DT207C only
DT207C	0.8838	0.9121	0.8942	0.9121	0.9006	30.0	27.0	Triplicate Site with DT207A, DT207B and DT207C - Annual data provided for DT207C only
DT233	0.8838	0.9121	0.8942	0.9121	0.9006	34.1	30.7	
DT232	0.8838	0.9121	0.8942	0.9121	0.9006	30.8	27.8	
DT168	1.0045	0.9905	0.9889	0.9905	0.9936	35.6	35.4	
DT171	1.0002	0.9932	0.9844	0.9932	0.9927	18.6	18.5	

Site ID	Annualisation Factor Leeds Centre	Annualisation Factor Dewsbury Ashworth Grove	Annualisation Factor Barnsley Gawber	Annualisation Factor Manchester Piccadilly	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT214A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT214A, DT214B and DT214C - Annual data provided for DT214C only
DT214B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT214A, DT214B and DT214C - Annual data provided for DT214C only
DT214C	0.8838	0.9121	0.8942	0.9121	0.9006	27.9	25.1	Triplicate Site with DT214A, DT214B and DT214C - Annual data provided for DT214C only
DT215A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT215A, DT215B and DT215C - Annual data provided for DT215C only
DT215B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT215A, DT215B and DT215C - Annual data provided for DT215C only
DT215C	0.8838	0.9121	0.8942	0.9121	0.9006	21.3	19.2	Triplicate Site with DT215A, DT215B and DT215C - Annual data provided for DT215C only
DT216A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT216A, DT216B and DT216C - Annual data provided for DT216C only
DT216B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT216A, DT216B and DT216C - Annual data provided for DT216C only
DT216C	0.8838	0.9121	0.8942	0.9121	0.9006	22.0	19.8	Triplicate Site with DT216A, DT216B and DT216C - Annual data provided for DT216C only
DT217A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT217A, DT217B and DT217C - Annual data provided for DT217C only
DT217B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT217A, DT217B and DT217C - Annual data provided for DT217C only

Site ID	Annualisation Factor Leeds Centre	Annualisation Factor Dewsbury Ashworth Grove	Annualisation Factor Barnsley Gawber	Annualisation Factor Manchester Piccadilly	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT217C	0.8838	0.9121	0.8942	0.9121	0.9006	20.9	18.8	Triplicate Site with DT217A, DT217B and DT217C - Annual data provided for DT217C only
DT201	0.8838	0.9121	0.8942	0.9121	0.9006	40.2	36.2	
DT202	0.8838	0.9121	0.8942	0.9121	0.9006	29.4	26.5	
DT203	0.8991	0.9005	0.8659	0.9005	0.8915	31.9	28.5	
DT119A (DT160)	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT119A (DT160), DT119B and DT119C - Annual data provided for DT119C only
DT119B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT119A (DT160), DT119B and DT119C - Annual data provided for DT119C only
DT119C	0.8838	0.9121	0.8942	0.9121	0.9006	32.7	29.4	Triplicate Site with DT119A (DT160), DT119B and DT119C - Annual data provided for DT119C only
DT204A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT204A, DT204B and DT204C - Annual data provided for DT204C only
DT204B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT204A, DT204B and DT204C - Annual data provided for DT204C only
DT204C	0.8838	0.9121	0.8942	0.9121	0.9006	25.6	23.1	Triplicate Site with DT204A, DT204B and DT204C - Annual data provided for DT204C only
DT228A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT228A, DT228B and DT228C - Annual data provided for DT228C only

Site ID	Annualisation Factor Leeds Centre	Annualisation Factor Dewsbury Ashworth Grove	Annualisation Factor Barnsley Gawber	Annualisation Factor Manchester Piccadilly	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT228B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT228A, DT228B and DT228C - Annual data provided for DT228C only
DT228C	0.8838	0.9121	0.8942	0.9121	0.9006	43.2	38.9	Triplicate Site with DT228A, DT228B and DT228C - Annual data provided for DT228C only
DT229A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT229A, DT229B and DT229C - Annual data provided for DT229C only
DT229B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT229A, DT229B and DT229C - Annual data provided for DT229C only
DT229C	0.8838	0.9121	0.8942	0.9121	0.9006	30.6	27.5	Triplicate Site with DT229A, DT229B and DT229C - Annual data provided for DT229C only
DT224A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT224A, DT224B and DT224C - Annual data provided for DT224C only
DT224B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT224A, DT224B and DT224C - Annual data provided for DT224C only
DT224C	0.8838	0.9121	0.8942	0.9121	0.9006	35.4	31.8	Triplicate Site with DT224A, DT224B and DT224C - Annual data provided for DT224C only
DT225A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT225A, DT225B and DT225C - Annual data provided for DT225C only
DT225B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT225A, DT225B and DT225C - Annual data provided for DT225C only
DT225C	0.8838	0.9121	0.8942	0.9121	0.9006	44.6	**40.1**	Triplicate Site with DT225A, DT225B and DT225C - Annual data provided for DT225C only

Site ID	Annualisation Factor Leeds Centre	Annualisation Factor Dewsbury Ashworth Grove	Annualisation Factor Barnsley Gawber	Annualisation Factor Manchester Piccadilly	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT227A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT227A, DT227B and DT227C - Annual data provided for DT227C only
DT227B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT227A, DT227B and DT227C - Annual data provided for DT227C only
DT227C	0.8838	0.9121	0.8942	0.9121	0.9006	28.0	25.2	Triplicate Site with DT227A, DT227B and DT227C - Annual data provided for DT227C only
DT231A	0.8194	0.8344	0.8248	0.8344	0.8282	-	-	Triplicate Site with DT231A, DT231B and DT231C - Annual data provided for DT231C only
DT231B	0.8194	0.8344	0.8248	0.8344	0.8282	-	-	Triplicate Site with DT231A, DT231B and DT231C - Annual data provided for DT231C only
DT231C	0.8194	0.8344	0.8248	0.8344	0.8282	25.8	21.4	Triplicate Site with DT231A, DT231B and DT231C - Annual data provided for DT231C only
DT230A	0.7811	0.8111	0.8032	0.8111	0.8017	-	-	Triplicate Site with DT230A, DT230B and DT230C - Annual data provided for DT230C only
DT230B	0.7811	0.8111	0.8032	0.8111	0.8017	-	-	Triplicate Site with DT230A, DT230B and DT230C - Annual data provided for DT230C only
DT230C	0.7811	0.8111	0.8032	0.8111	0.8017	28.6	22.9	Triplicate Site with DT230A, DT230B and DT230C - Annual data provided for DT230C only
DT105A	0.9685	0.8839	0.8370	0.8839	0.8933	-	-	Triplicate Site with DT105A, DT105B and DT105C - Annual data provided for DT105C only
DT105B	0.9685	0.8839	0.8370	0.8839	0.8933	-	-	Triplicate Site with DT105A, DT105B and DT105C - Annual data provided for DT105C only

Site ID	Annualisation Factor Leeds Centre	Annualisation Factor Dewsbury Ashworth Grove	Annualisation Factor Barnsley Gawber	Annualisation Factor Manchester Piccadilly	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT105C	0.9685	0.8839	0.8370	0.8839	0.8933	50.7	**45.3**	Triplicate Site with DT105A, DT105B and DT105C - Annual data provided for DT105C only
DT106A	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	Triplicate Site with DT106A, DT106B and DT106C - Annual data provided for DT106C only
DT106B	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	Triplicate Site with DT106A, DT106B and DT106C - Annual data provided for DT106C only
DT106C	0.9484	0.9494	0.9393	0.9494	0.9466	30.6	28.9	Triplicate Site with DT106A, DT106B and DT106C - Annual data provided for DT106C only
DT188A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT188A, DT188B and DT188C - Annual data provided for DT188C only
DT188B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT188A, DT188B and DT188C - Annual data provided for DT188C only
DT188C	0.8838	0.9121	0.8942	0.9121	0.9006	33.5	30.2	Triplicate Site with DT188A, DT188B and DT188C - Annual data provided for DT188C only
DT189A	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	Triplicate Site with DT189A, DT189B and DT189C - Annual data provided for DT189C only
DT189B	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	Triplicate Site with DT189A, DT189B and DT189C - Annual data provided for DT189C only
DT189C	0.9484	0.9494	0.9393	0.9494	0.9466	36.4	34.5	Triplicate Site with DT189A, DT189B and DT189C - Annual data provided for DT189C only
DT186A	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	Triplicate Site with DT186A, DT186B and DT186C - Annual data provided for DT186C only

Site ID	Annualisation Factor Leeds Centre	Annualisation Factor Dewsbury Ashworth Grove	Annualisation Factor Barnsley Gawber	Annualisation Factor Manchester Piccadilly	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT186B	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	Triplicate Site with DT186A, DT186B and DT186C - Annual data provided for DT186C only
DT186C	0.9484	0.9494	0.9393	0.9494	0.9466	27.2	25.7	Triplicate Site with DT186A, DT186B and DT186C - Annual data provided for DT186C only
DT187A	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	Triplicate Site with DT187A, DT187B and DT187C - Annual data provided for DT187C only
DT187B	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	Triplicate Site with DT187A, DT187B and DT187C - Annual data provided for DT187C only
DT187C	0.9484	0.9494	0.9393	0.9494	0.9466	33.0	31.2	Triplicate Site with DT187A, DT187B and DT187C - Annual data provided for DT187C only
DT192A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT192A, DT192B and DT192C - Annual data provided for DT192C only
DT192B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT192A, DT192B and DT192C - Annual data provided for DT192C only
DT192C	0.8838	0.9121	0.8942	0.9121	0.9006	30.0	27.0	Triplicate Site with DT192A, DT192B and DT192C - Annual data provided for DT192C only
DT193 A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT193 A, DT193B and DT193C - Annual data provided for DT193C only
DT193B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT193 A, DT193B and DT193C - Annual data provided for DT193C only
DT193C	0.8838	0.9121	0.8942	0.9121	0.9006	38.4	34.5	Triplicate Site with DT193 A, DT193B and DT193C - Annual data provided for DT193C only

Site ID	Annualisation Factor Leeds Centre	Annualisation Factor Dewsbury Ashworth Grove	Annualisation Factor Barnsley Gawber	Annualisation Factor Manchester Piccadilly	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT212A	0.9435	1.0166	1.0052	1.0166	0.9955	-	-	Triplicate Site with DT212A, DT212B and DT212C - Annual data provided for DT212C only
DT212B	0.9435	1.0166	1.0052	1.0166	0.9955	-	-	Triplicate Site with DT212A, DT212B and DT212C - Annual data provided for DT212C only
DT212C	0.9435	1.0166	1.0052	1.0166	0.9955	31.0	30.9	Triplicate Site with DT212A, DT212B and DT212C - Annual data provided for DT212C only
DT213A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT213A, DT213B and DT213C - Annual data provided for DT213C only
DT213B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT213A, DT213B and DT213C - Annual data provided for DT213C only
DT213C	0.8838	0.9121	0.8942	0.9121	0.9006	29.8	26.8	Triplicate Site with DT213A, DT213B and DT213C - Annual data provided for DT213C only
DT210A	0.8644	0.9097	0.8916	0.9097	0.8938	-	-	Triplicate Site with DT210A, DT210A and DT210A - Annual data provided for DT210A only
DT210A	0.8644	0.9097	0.8916	0.9097	0.8938	-	-	Triplicate Site with DT210A, DT210A and DT210A - Annual data provided for DT210A only
DT210A	0.8644	0.9097	0.8916	0.9097	0.8938	-	-	Triplicate Site with DT210A, DT210A and DT210A - Annual data provided for DT210A only
DT211A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT211A, DT211B and DT211C - Annual data provided for DT211C only
DT211B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT211A, DT211B and DT211C - Annual data provided for DT211C only

Site ID	Annualisation Factor Leeds Centre	Annualisation Factor Dewsbury Ashworth Grove	Annualisation Factor Barnsley Gawber	Annualisation Factor Manchester Piccadilly	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT211C	0.8838	0.9121	0.8942	0.9121	0.9006	55.4	**49.9**	Triplicate Site with DT211A, DT211B and DT211C - Annual data provided for DT211C only
DT71A	0.9833	0.8799	0.8811	0.8799	0.9060	-	-	Triplicate Site with DT71A, DT71B and DT71C - Annual data provided for DT71C only
DT71B	0.9833	0.8799	0.8811	0.8799	0.9060	-	-	Triplicate Site with DT71A, DT71B and DT71C - Annual data provided for DT71C only
DT71C	0.9833	0.8799	0.8811	0.8799	0.9060	39.6	35.8	Triplicate Site with DT71A, DT71B and DT71C - Annual data provided for DT71C only
DT172A	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	Triplicate Site with DT172A, DT172B and DT172C - Annual data provided for DT172C only
DT172B	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	Triplicate Site with DT172A, DT172B and DT172C - Annual data provided for DT172C only
DT172C	0.9484	0.9494	0.9393	0.9494	0.9466	38.4	36.4	Triplicate Site with DT172A, DT172B and DT172C - Annual data provided for DT172C only
DT235A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT235A, DT235B and DT235C - Annual data provided for DT235C only
DT235B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT235A, DT235B and DT235C - Annual data provided for DT235C only
DT235C	0.8838	0.9121	0.8942	0.9121	0.9006	43.5	39.2	Triplicate Site with DT235A, DT235B and DT235C - Annual data provided for DT235C only
DT156	0.8838	0.9121	0.8942	0.9121	0.9006	40.1	36.2	
DT236	0.8838	0.9121	0.8942	0.9121	0.9006	29.7	26.8	

Site ID	Annualisation Factor Leeds Centre	Annualisation Factor Dewsbury Ashworth Grove	Annualisation Factor Barnsley Gawber	Annualisation Factor Manchester Piccadilly	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT237	0.8838	0.9121	0.8942	0.9121	0.9006	32.0	28.8	
DT238A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT238A, DT238B and DT238C - Annual data provided for DT238C only
DT238B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT238A, DT238B and DT238C - Annual data provided for DT238C only
DT238C	0.8838	0.9121	0.8942	0.9121	0.9006	32.6	29.4	Triplicate Site with DT238A, DT238B and DT238C - Annual data provided for DT238C only
DT239A	0.8644	0.9097	0.8916	0.9097	0.8938	-	-	Triplicate Site with DT239A, DT239B and DT239C - Annual data provided for DT239C only
DT239B	0.8644	0.9097	0.8916	0.9097	0.8938	-	-	Triplicate Site with DT239A, DT239B and DT239C - Annual data provided for DT239C only
DT239C	0.8644	0.9097	0.8916	0.9097	0.8938	40.9	36.6	Triplicate Site with DT239A, DT239B and DT239C - Annual data provided for DT239C only
DT139A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT139A, DT139B and DT139C - Annual data provided for DT139C only
DT139B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT139A, DT139B and DT139C - Annual data provided for DT139C only
DT139C	0.8838	0.9121	0.8942	0.9121	0.9006	33.9	30.5	Triplicate Site with DT139A, DT139B and DT139C - Annual data provided for DT139C only
DT240A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT240A, DT240B and DT240C - Annual data provided for DT240C only

Site ID	Annualisation Factor Leeds Centre	Annualisation Factor Dewsbury Ashworth Grove	Annualisation Factor Barnsley Gawber	Annualisation Factor Manchester Piccadilly	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT240B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT240A, DT240B and DT240C - Annual data provided for DT240C only
DT240C	0.8838	0.9121	0.8942	0.9121	0.9006	40.2	36.2	Triplicate Site with DT240A, DT240B and DT240C - Annual data provided for DT240C only
DT152	0.8838	0.9121	0.8942	0.9121	0.9006	41.1	37.0	
DT151A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT151A, DT151B and DT151C - Annual data provided for DT151C only
DT151B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT151A, DT151B and DT151C - Annual data provided for DT151C only
DT151C	0.8838	0.9121	0.8942	0.9121	0.9006	33.9	30.5	Triplicate Site with DT151A, DT151B and DT151C - Annual data provided for DT151C only
DT149A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT149A, DT149B and DT149C - Annual data provided for DT149C only
DT149B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT149A, DT149B and DT149C - Annual data provided for DT149C only
DT149C	0.8838	0.9121	0.8942	0.9121	0.9006	37.6	33.9	Triplicate Site with DT149A, DT149B and DT149C - Annual data provided for DT149C only
DT241A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT241A, DT241B and DT241C - Annual data provided for DT241C only
DT241B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT241A, DT241B and DT241C - Annual data provided for DT241C only

Site ID	Annualisation Factor Leeds Centre	Annualisation Factor Dewsbury Ashworth Grove	Annualisation Factor Barnsley Gawber	Annualisation Factor Manchester Piccadilly	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT241C	0.8838	0.9121	0.8942	0.9121	0.9006	28.7	25.8	Triplicate Site with DT241A, DT241B and DT241C - Annual data provided for DT241C only
DT246A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT246A, DT246B and DT246C - Annual data provided for DT246C only
DT246B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT246A, DT246B and DT246C - Annual data provided for DT246C only
DT246C	0.8838	0.9121	0.8942	0.9121	0.9006	35.2	31.7	Triplicate Site with DT246A, DT246B and DT246C - Annual data provided for DT246C only
DT247A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT247A, DT247B and DT247C - Annual data provided for DT247C only
DT247B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT247A, DT247B and DT247C - Annual data provided for DT247C only
DT247C	0.8838	0.9121	0.8942	0.9121	0.9006	27.9	25.1	Triplicate Site with DT247A, DT247B and DT247C - Annual data provided for DT247C only
DT144A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT144A, DT144B and DT144C - Annual data provided for DT144C only
DT144B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT144A, DT144B and DT144C - Annual data provided for DT144C only
DT144C	0.8838	0.9121	0.8942	0.9121	0.9006	38.7	34.8	Triplicate Site with DT144A, DT144B and DT144C - Annual data provided for DT144C only
DT146	0.8838	0.9121	0.8942	0.9121	0.9006	28.0	25.2	

Site ID	Annualisation Factor Leeds Centre	Annualisation Factor Dewsbury Ashworth Grove	Annualisation Factor Barnsley Gawber	Annualisation Factor Manchester Piccadilly	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT143A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT143A, DT143B and DT143C - Annual data provided for DT143C only
DT143B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT143A, DT143B and DT143C - Annual data provided for DT143C only
DT143C	0.8838	0.9121	0.8942	0.9121	0.9006	44.6	**40.2**	Triplicate Site with DT143A, DT143B and DT143C - Annual data provided for DT143C only
DT142	0.8838	0.9121	0.8942	0.9121	0.9006	36.9	33.2	
DT248	0.9354	0.9058	0.8686	0.9058	0.9039	35.4	32.0	
DT249A	0.8644	0.9097	0.8916	0.9097	0.8938	-	-	Triplicate Site with DT249A, DT249B and DT249C - Annual data provided for DT249C only
DT249B	0.8644	0.9097	0.8916	0.9097	0.8938	-	-	Triplicate Site with DT249A, DT249B and DT249C - Annual data provided for DT249C only
DT249C	0.8644	0.9097	0.8916	0.9097	0.8938	34.9	31.2	Triplicate Site with DT249A, DT249B and DT249C - Annual data provided for DT249C only
DT250A	0.8644	0.9097	0.8916	0.9097	0.8938	-	-	Triplicate Site with DT250A, DT250B and DT250C - Annual data provided for DT250C only
DT250B	0.8644	0.9097	0.8916	0.9097	0.8938	-	-	Triplicate Site with DT250A, DT250B and DT250C - Annual data provided for DT250C only
DT250C	0.8644	0.9097	0.8916	0.9097	0.8938	27.6	24.6	Triplicate Site with DT250A, DT250B and DT250C - Annual data provided for DT250C only
DT251A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT251A, DT251B and DT251C - Annual data provided for DT251C only

Site ID	Annualisation Factor Leeds Centre	Annualisation Factor Dewsbury Ashworth Grove	Annualisation Factor Barnsley Gawber	Annualisation Factor Manchester Piccadilly	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT251B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT251A, DT251B and DT251C - Annual data provided for DT251C only
DT251C	0.8838	0.9121	0.8942	0.9121	0.9006	30.3	27.3	Triplicate Site with DT251A, DT251B and DT251C - Annual data provided for DT251C only
DT252A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT252A, DT252B and DT252C - Annual data provided for DT252C only
DT252B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT252A, DT252B and DT252C - Annual data provided for DT252C only
DT252C	0.8838	0.9121	0.8942	0.9121	0.9006	39.4	35.5	Triplicate Site with DT252A, DT252B and DT252C - Annual data provided for DT252C only
DT253A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT253A, DT253B and DT253C - Annual data provided for DT253C only
DT253B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT253A, DT253B and DT253C - Annual data provided for DT253C only
DT253C	0.8838	0.9121	0.8942	0.9121	0.9006	31.5	28.3	Triplicate Site with DT253A, DT253B and DT253C - Annual data provided for DT253C only
DT254A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT254A, DT254B and DT254C - Annual data provided for DT254C only
DT254B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT254A, DT254B and DT254C - Annual data provided for DT254C only
DT254C	0.8838	0.9121	0.8942	0.9121	0.9006	24.8	22.3	Triplicate Site with DT254A, DT254B and DT254C - Annual data provided for DT254C only

Site ID	Annualisation Factor Leeds Centre	Annualisation Factor Dewsbury Ashworth Grove	Annualisation Factor Barnsley Gawber	Annualisation Factor Manchester Piccadilly	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT255A	0.8644	0.9097	0.8916	0.9097	0.8938	-	-	Triplicate Site with DT255A, DT255B and DT255C - Annual data provided for DT255C only
DT255B	0.8644	0.9097	0.8916	0.9097	0.8938	-	-	Triplicate Site with DT255A, DT255B and DT255C - Annual data provided for DT255C only
DT255C	0.8644	0.9097	0.8916	0.9097	0.8938	22.1	19.7	Triplicate Site with DT255A, DT255B and DT255C - Annual data provided for DT255C only
DT256A	0.8991	0.9005	0.8659	0.9005	0.8915	-	-	Triplicate Site with DT256A, DT256B and DT256C - Annual data provided for DT256C only
DT256B	0.8991	0.9005	0.8659	0.9005	0.8915	-	-	Triplicate Site with DT256A, DT256B and DT256C - Annual data provided for DT256C only
DT256C	0.8991	0.9005	0.8659	0.9005	0.8915	15.0	13.4	Triplicate Site with DT256A, DT256B and DT256C - Annual data provided for DT256C only
DT257A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT257A, DT257B and DT257C - Annual data provided for DT257C only
DT257B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT257A, DT257B and DT257C - Annual data provided for DT257C only
DT257C	0.8838	0.9121	0.8942	0.9121	0.9006	19.5	17.6	Triplicate Site with DT257A, DT257B and DT257C - Annual data provided for DT257C only
DT258A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT258A, DT258B and DT258C - Annual data provided for DT258C only
DT258B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT258A, DT258B and DT258C - Annual data provided for DT258C only

Site ID	Annualisation Factor Leeds Centre	Annualisation Factor Dewsbury Ashworth Grove	Annualisation Factor Barnsley Gawber	Annualisation Factor Manchester Piccadilly	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT258C	0.8838	0.9121	0.8942	0.9121	0.9006	24.7	22.2	Triplicate Site with DT258A, DT258B and DT258C - Annual data provided for DT258C only
DT259A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT259A, DT259B and DT259C - Annual data provided for DT259C only
DT259B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT259A, DT259B and DT259C - Annual data provided for DT259C only
DT259C	0.8838	0.9121	0.8942	0.9121	0.9006	23.2	20.9	Triplicate Site with DT259A, DT259B and DT259C - Annual data provided for DT259C only
DT242A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT242A, DT242B and DT242C - Annual data provided for DT242C only
DT242B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT242A, DT242B and DT242C - Annual data provided for DT242C only
DT242C	0.8838	0.9121	0.8942	0.9121	0.9006	23.2	20.9	Triplicate Site with DT242A, DT242B and DT242C - Annual data provided for DT242C only
DT243A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT243A, DT243B and DT243C - Annual data provided for DT243C only
DT243B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT243A, DT243B and DT243C - Annual data provided for DT243C only
DT243C	0.8838	0.9121	0.8942	0.9121	0.9006	29.1	26.2	Triplicate Site with DT243A, DT243B and DT243C - Annual data provided for DT243C only
DT244	0.8194	0.8344	0.8248	0.8344	0.8282	22.1	18.3	
DT245	0.8838	0.9121	0.8942	0.9121	0.9006	21.7	19.5	

Site ID	Annualisation Factor Leeds Centre	Annualisation Factor Dewsbury Ashworth Grove	Annualisation Factor Barnsley Gawber	Annualisation Factor Manchester Piccadilly	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT260A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT260A, DT260B and DT260C - Annual data provided for DT260C only
DT260B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT260A, DT260B and DT260C - Annual data provided for DT260C only
DT260C	0.8838	0.9121	0.8942	0.9121	0.9006	16.0	14.4	Triplicate Site with DT260A, DT260B and DT260C - Annual data provided for DT260C only
DT261A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT261A, DT261B and DT261C - Annual data provided for DT261C only
DT261B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT261A, DT261B and DT261C - Annual data provided for DT261C only
DT261C	0.8838	0.9121	0.8942	0.9121	0.9006	17.1	15.4	Triplicate Site with DT261A, DT261B and DT261C - Annual data provided for DT261C only
DT262A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT262A, DT262B and DT262C - Annual data provided for DT262C only
DT262B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	Triplicate Site with DT262A, DT262B and DT262C - Annual data provided for DT262C only
DT262C	0.8838	0.9121	0.8942	0.9121	0.9006	35.6	32.1	Triplicate Site with DT262A, DT262B and DT262C - Annual data provided for DT262C only
DT173A	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	*Triplicate Site with DT173A, DT173B and DT173C - Annual data provided for DT173C only*
DT173B	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	*Triplicate Site with DT173A, DT173B and DT173C - Annual data provided for DT173C only*

Site ID	Annualisation Factor Leeds Centre	Annualisation Factor Dewsbury Ashworth Grove	Annualisation Factor Barnsley Gawber	Annualisation Factor Manchester Piccadilly	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT173C	0.9484	0.9494	0.9393	0.9494	0.9466	40.8	38.6	*Triplicate Site with DT173A, DT173B and DT173C - Annual data provided for DT173C only*
DT174A	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	*Triplicate Site with DT174A, DT174B and DT174C - Annual data provided for DT174C only*
DT174B	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	*Triplicate Site with DT174A, DT174B and DT174C - Annual data provided for DT174C only*
DT174C	0.9484	0.9494	0.9393	0.9494	0.9466	29.6	28.0	*Triplicate Site with DT174A, DT174B and DT174C - Annual data provided for DT174C only*
DT234A	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	*Triplicate Site with DT234A, DT234B and DT234C - Annual data provided for DT234C only*
DT234B	0.8838	0.9121	0.8942	0.9121	0.9006	-	-	*Triplicate Site with DT234A, DT234B and DT234C - Annual data provided for DT234C only*
DT234C	0.8838	0.9121	0.8942	0.9121	0.9006	40.3	36.3	*Triplicate Site with DT234A, DT234B and DT234C - Annual data provided for DT234C only*
DT185A	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	*Triplicate Site with DT185A, DT185B and DT185C - Annual data provided for DT185C only*
DT185B	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	*Triplicate Site with DT185A, DT185B and DT185C - Annual data provided for DT185C only*
DT185C	0.9484	0.9494	0.9393	0.9494	0.9466	48.1	**45.5**	*Triplicate Site with DT185A, DT185B and DT185C - Annual data provided for DT185C only*
DT181A	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	*Triplicate Site with DT181A, DT181B and DT181C - Annual data provided for DT181C only*

Site ID	Annualisation Factor Leeds Centre	Annualisation Factor Dewsbury Ashworth Grove	Annualisation Factor Barnsley Gawber	Annualisation Factor Manchester Piccadilly	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT181B	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	*Triplicate Site with DT181A, DT181B and DT181C - Annual data provided for DT181C only*
DT181C	0.9484	0.9494	0.9393	0.9494	0.9466	34.5	32.7	*Triplicate Site with DT181A, DT181B and DT181C - Annual data provided for DT181C only*
DT182A	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	*Triplicate Site with DT182A, DT182B and DT182C - Annual data provided for DT182C only*
DT182B	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	*Triplicate Site with DT182A, DT182B and DT182C - Annual data provided for DT182C only*
DT182C	0.9484	0.9494	0.9393	0.9494	0.9466	32.6	30.9	*Triplicate Site with DT182A, DT182B and DT182C - Annual data provided for DT182C only*
DT183	0.9484	0.9494	0.9393	0.9494	0.9466	48.8	**46.2**	
DT184	0.8838	0.9121	0.8942	0.9121	0.9006	48.8	**43.9**	
DT175A	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	*Triplicate Site with DT175A, DT175B and DT175C - Annual data provided for DT175C only*
DT175B	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	*Triplicate Site with DT175A, DT175B and DT175C - Annual data provided for DT175C only*
DT175C	0.9484	0.9494	0.9393	0.9494	0.9466	34.6	32.8	*Triplicate Site with DT175A, DT175B and DT175C - Annual data provided for DT175C only*
DT176A	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	*Triplicate Site with DT176A, DT176B and DT176C - Annual data provided for DT176C only*

Site ID	Annualisation Factor Leeds Centre	Annualisation Factor Dewsbury Ashworth Grove	Annualisation Factor Barnsley Gawber	Annualisation Factor Manchester Piccadilly	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT176B	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	*Triplicate Site with DT176A, DT176B and DT176C - Annual data provided for DT176C only*
DT176C	0.9484	0.9494	0.9393	0.9494	0.9466	24.7	23.4	*Triplicate Site with DT176A, DT176B and DT176C - Annual data provided for DT176C only*
DT177A	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	*Triplicate Site with DT177A, DT177B and DT177C - Annual data provided for DT177C only*
DT177B	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	*Triplicate Site with DT177A, DT177B and DT177C - Annual data provided for DT177C only*
DT177C	0.9484	0.9494	0.9393	0.9494	0.9466	41.1	38.9	*Triplicate Site with DT177A, DT177B and DT177C - Annual data provided for DT177C only*
DT178A	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	*Triplicate Site with DT178A, DT178B and DT178C - Annual data provided for DT178C only*
DT178B	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	*Triplicate Site with DT178A, DT178B and DT178C - Annual data provided for DT178C only*
DT178C	0.9484	0.9494	0.9393	0.9494	0.9466	38.9	36.9	*Triplicate Site with DT178A, DT178B and DT178C - Annual data provided for DT178C only*
DT179A	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	*Triplicate Site with DT179A, DT179B and DT179C - Annual data provided for DT179C only*
DT179B	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	*Triplicate Site with DT179A, DT179B and DT179C - Annual data provided for DT179C only*
DT179C	0.9484	0.9494	0.9393	0.9494	0.9466	39.4	37.3	*Triplicate Site with DT179A, DT179B and DT179C - Annual data provided for DT179C only*

Site ID	Annualisation Factor Leeds Centre	Annualisation Factor Dewsbury Ashworth Grove	Annualisation Factor Barnsley Gawber	Annualisation Factor Manchester Piccadilly	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT180A	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	*Triplicate Site with DT180A, DT180B and DT180C - Annual data provided for DT180C only*
DT180B	0.9484	0.9494	0.9393	0.9494	0.9466	-	-	*Triplicate Site with DT180A, DT180B and DT180C - Annual data provided for DT180C only*
DT180C	0.9484	0.9494	0.9393	0.9494	0.9466	25.1	23.8	*Triplicate Site with DT180A, DT180B and DT180C - Annual data provided for DT180C only*
DT190	0.9787	0.9487	0.9259	0.9487	0.9505	33.6	31.9	
DT191	0.9484	0.9494	0.9393	0.9494	0.9466	57.0	53.9	
DT21	0.9484	0.9494	0.9393	0.9494	0.9466	10.2	9.6	
DT263	0.8194	0.8344	0.8248	0.8344	0.8282	19.4	16.1	
DT264	0.8194	0.8344	0.8248	0.8344	0.8282	17.9	14.8	
DT265	0.8194	0.8344	0.8248	0.8344	0.8282	30.3	25.1	
DT266	0.8123	0.7947	0.7699	0.7947	0.7929	26.9	21.3	
DT267	0.8194	0.8344	0.8248	0.8344	0.8282	29.2	24.2	
DT123	1.0673	1.0680	1.0782	1.0680	1.0704	38.7	**41.4**	

Table C.8: Local Bias Adjustment Calculation for 2020 data

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4	Local Bias Adjustment Input 5
Periods used to calculate bias	9				
Bias Adjustment Factor A	0.92 (0.77 - 1.14)				
Diffusion Tube Bias B	9% (-12% - 30%)				
	9				
Diffusion Tube Mean (µg/m3)	21.2				
Mean CV (Precision)	7.8%				
Automatic Mean (µg/m3)	19.4				
Data Capture	94%				
Adjusted Tube Mean (µg/m3)	19 (16 - 24)				

Notes:

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

The 2021 data has been adjusted using a national factor.

Table C.9(a) NO_2 Fall off With Distance Calculations 2020 (concentrations presented in µg/m^3)

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	**Monitored Concentration (Annualised and Bias Adjusted**	**Background Concentration**	**Concentration Predicted at Receptor**	Comments
CM6	2	4	38	21.8	35.4	
DT104	3.9	9.0	38.5	17.3	33.6	
DT12	3.4	3.9	45.8	20.5	**44.9**	Predicted concentration at Receptor above AQS objective.
DT31	1.6	11.2	37.9	13.5	27.3	
DT50	2.0	5.4	40.7	13.5	34.3	
D127	0.4	10.8	36.1	13.1	23.1	
D131	0.7		37.0			Tube is not near any relevant receptor points at present. Monitoring is to assess impact of a highways scheme on surrounding area.

Table C.9b – NO_2 Fall off With Distance Calculations 2021 (concentrations presented in µg/m^3)

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	**Monitored Concentration (Annualised and Bias Adjusted**	**Background Concentration**	**Concentration Predicted at Receptor**	Comments
CM6	2	4	**41**	20.98	37.7	Predicted concentration at Receptor within 10% the AQS objective.
CM4	3.5	8.5	38	16.64	32.9	
DT223A, DT223B, DT223C	2.0	5.0	36.8	18.2	32.8	
DT103A, DT103B, DT103C	3.4	8.5	37.6	16.6	32.5	
DT104A, DT104B, DT104C	3.9	9.0	**41.0**	16.6	35.3	
DT105A, DT105B, DT105C	3.1	6.8	37.6	16.6	33.3	

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	**Monitored Concentration (Annualised and Bias Adjusted**	**Background Concentration**	**Concentration Predicted at Receptor**	Comments
DT211A, DT211B, DT211C	2.4	7.9	**41.4**	16.6	34.2	
DT73A, DT73B, DT73C	0.5	22.5	38.0	14.4	22.1	Warning: your receptor is more than 20m further from the kerb than your monitor - treat result with caution.
DT161A, DT161B, DT161C	1.8	1.9	**43.2**	16.8	**42.9**	Predicted concentration at Receptor above AQS objective.
DT162A, DT162B, DT162C	2.7	2.8	38.9	16.8	38.7	Predicted concentration at Receptor within 10% the AQS objective.
DT163A, DT163B, DT163C	1.7	1.8	36.5	16.8	36.2	Predicted concentration at Receptor within 10% the AQS objective.
DT167A, DT167B, DT167C	0.6	3.1	**45.3**	16.8	36.7	Predicted concentration at Receptor within 10% the AQS objective.
DT185A, DT185B, DT185C	1.9	4.2	37.8	16.8	33.8	
DT12A, DT12B, DT12C	3.4	3.9	**50.6**	21.0	**49.5**	Predicted concentration at Receptor above AQS objective.
DT183	1.1	8.2	38.4	16.8	29.5	
DT184	0.6	3.7	36.5	16.8	29.8	
DT31	1.6	11.2	**41.4**	12.9	29.1	
DT50	2.0	5.4	**41.8**	12.9	35.1	
DT101A, DT101B, DT101C	1.1	9.1	37.9	11.5	26.4	
DT191	0.5	n/a	**44.7**	9.9	n/a	Tube is not near any relevant receptor points at present. Monitoring is to assess suitability of the area for potential residential development only.

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	**Monitored Concentration (Annualised and Bias Adjusted**	**Background Concentration**	**Concentration Predicted at Receptor**	Comments
DT127	0.4	10.8	37.5	12.6	23.4	
DT132	1.1	4.6	37.8	18.6	32.1	
DT131	0.7		39.1			Tube is not near any relevant receptor points at present. Monitoring is to assess impact of a highways scheme on surrounding area.

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

Maps showing the location of key monitoring locations are provided in this Appendix. For more information about all current monitoring locations in City of Bradford MDC district please see the online interactive GIS map available here:

Link to interactive GIS map of Bradford monitoring sites hosted by arcgis

Figure D.1 Location of Bradford's automatic analysers during 2020 and 2021

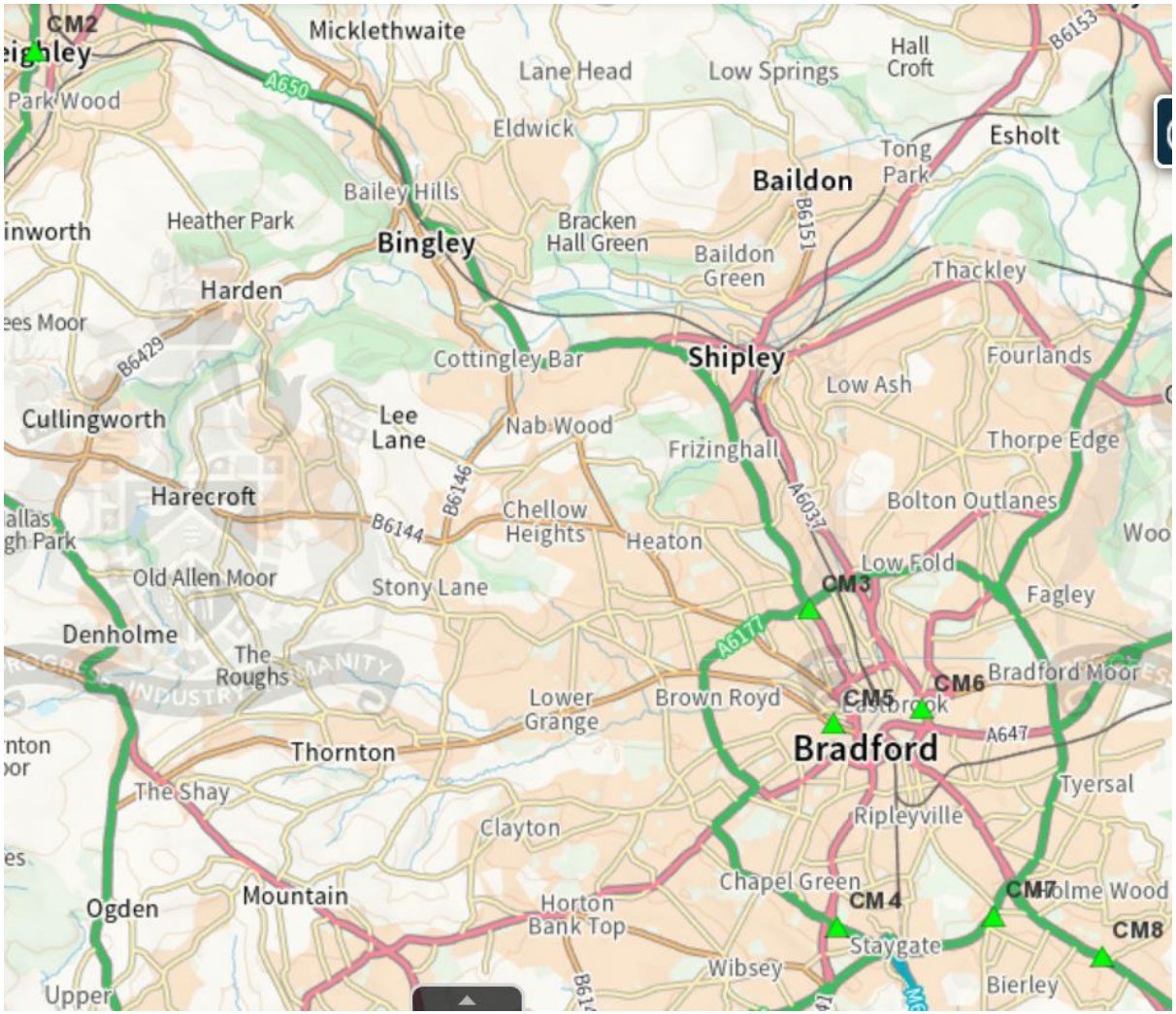


Figure D.2 Location of AQMAs and other areas of concern in Bradford

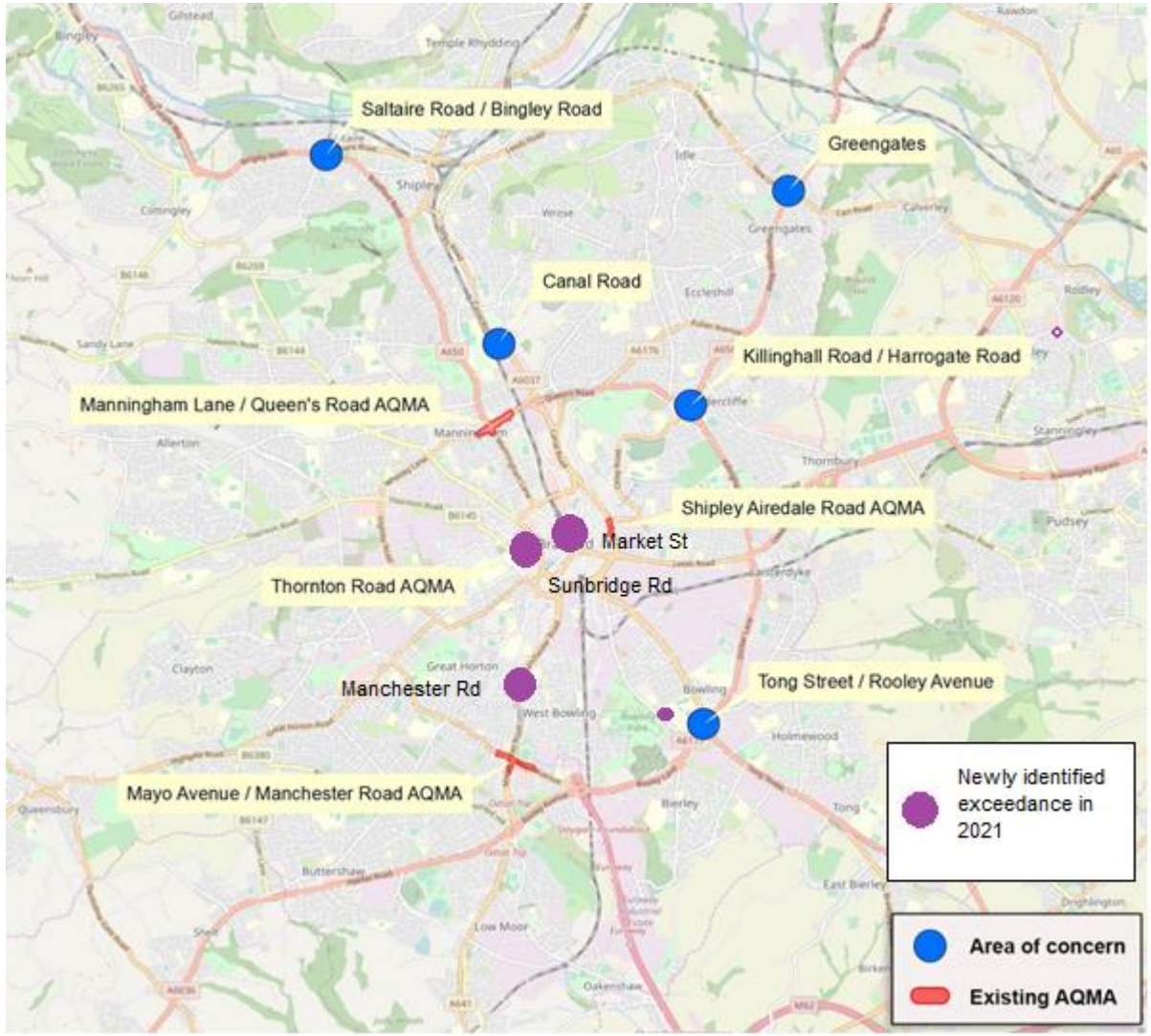
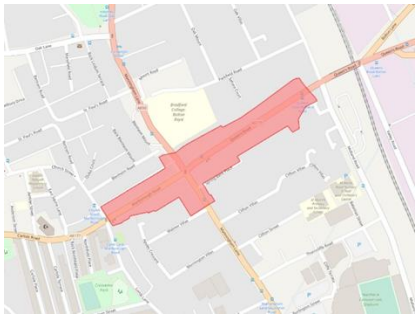
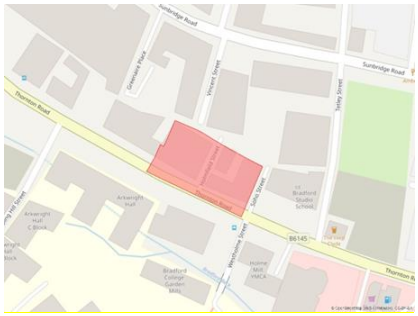


Figure D.3 Detailed AQMA maps for Bradford

Mayo Avenue / Manchester Road Order 1



Manningham Lane / Queen's Road Order 2



Thornton Road Order 3

Shipley Airedale Road Order 4

Figure D.4 Extent of Bradford CAZ

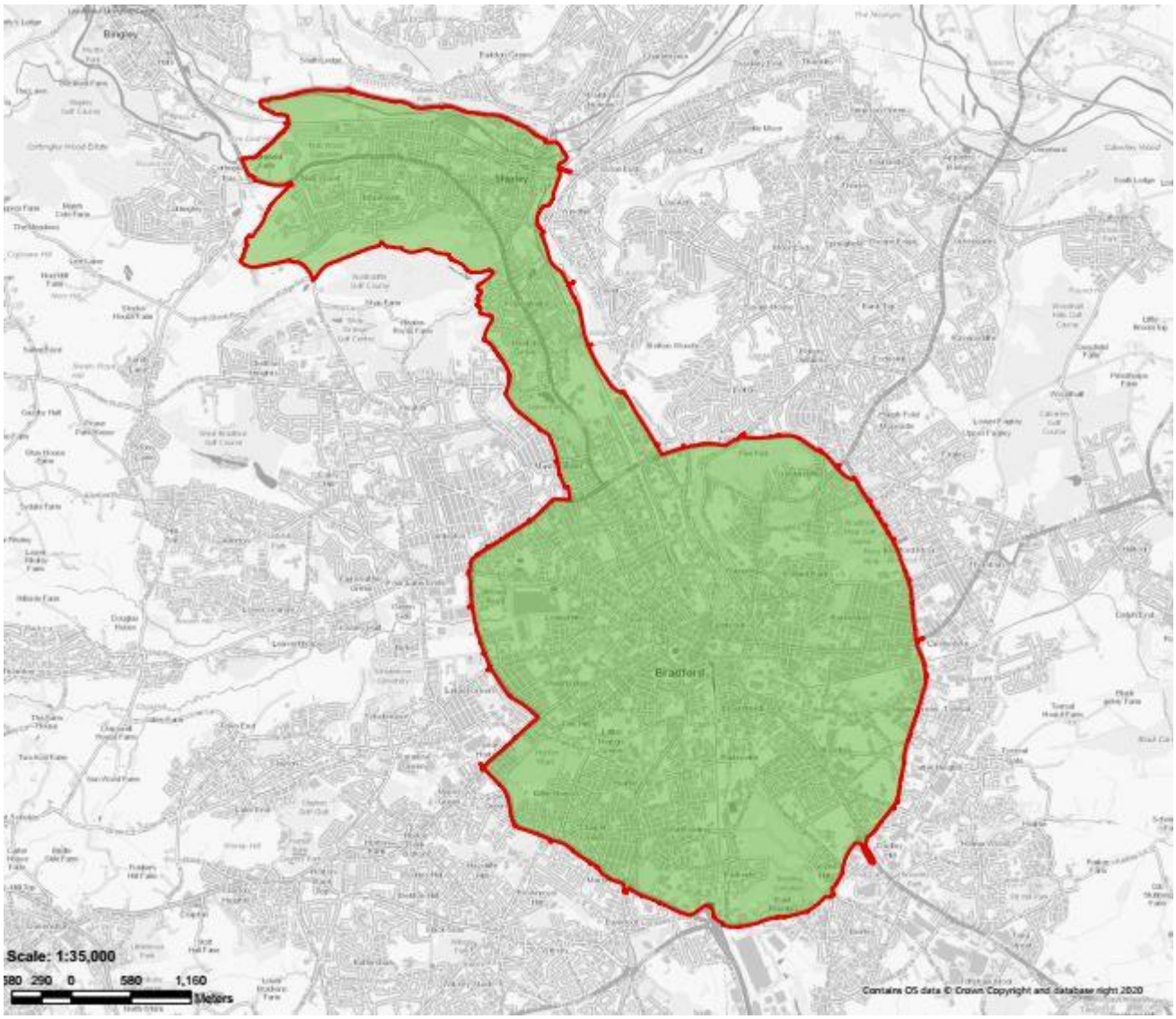


Figure D4 Manningham Lane AQMA monitoring sites

Figure D5 Shipley Airedale Road AQMA monitoring sites

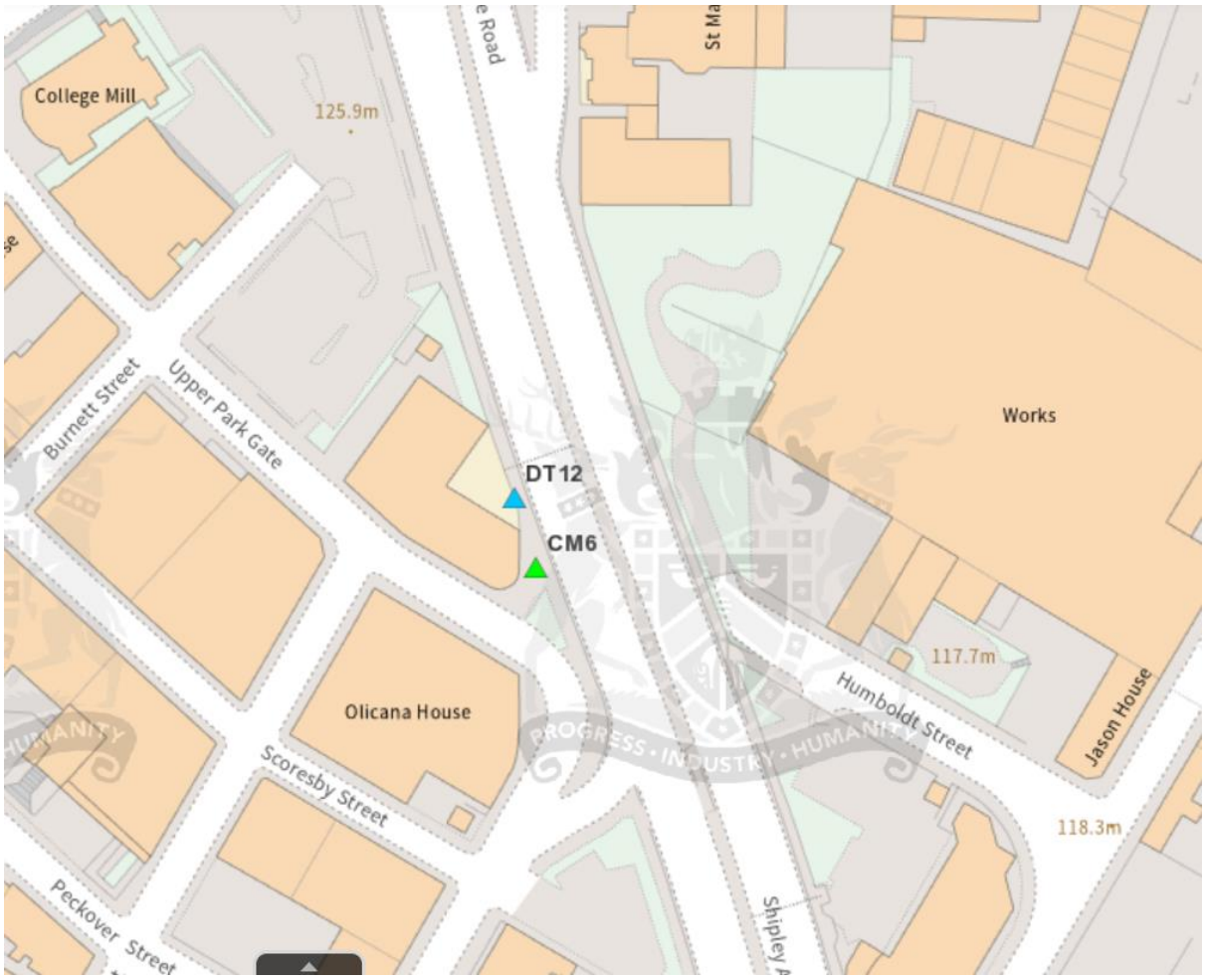


Figure D6 Mayo Avenue AQMA monitoring sites

Figure D7 Thornton Road AQMA monitoring sites

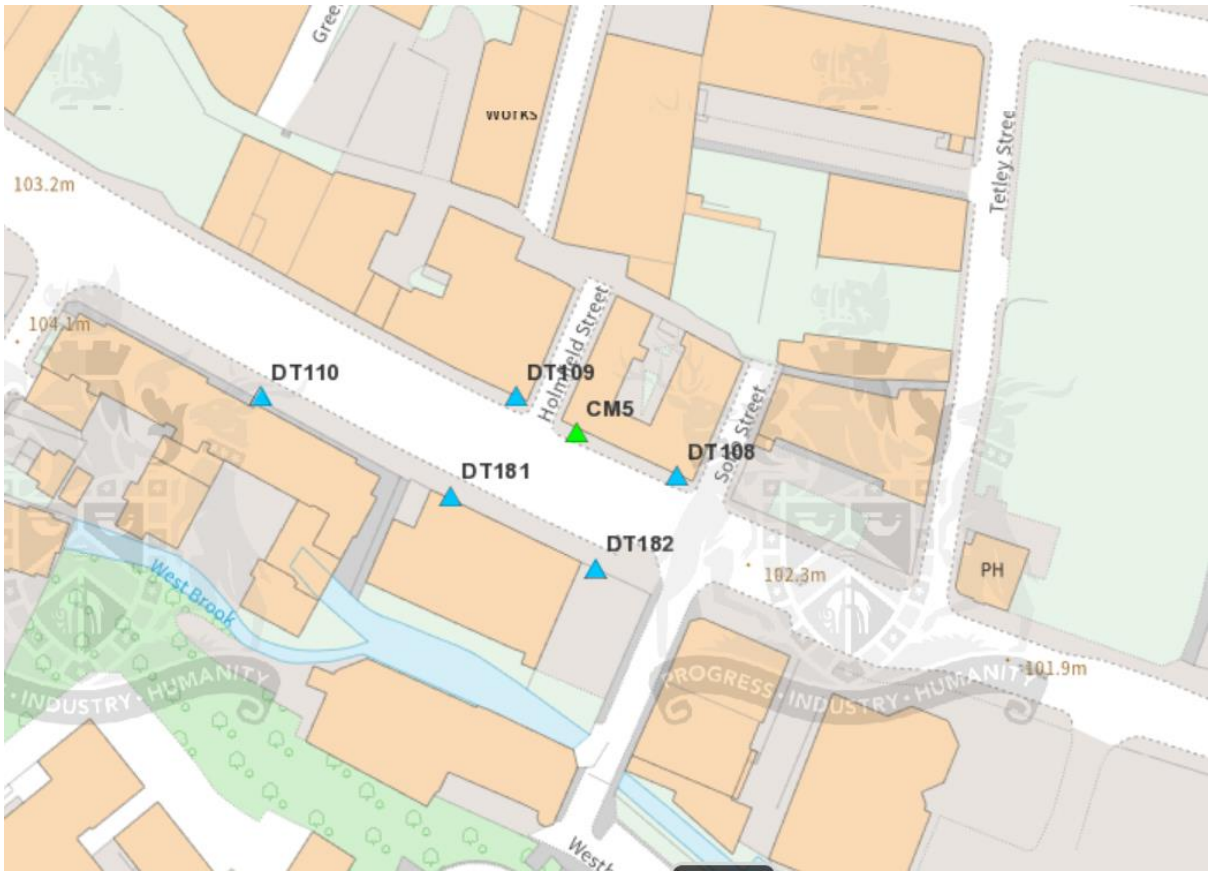


Figure D8 Keighley monitoring sites

Figure D9 Saltaire Road / Bingley Road monitoring sites

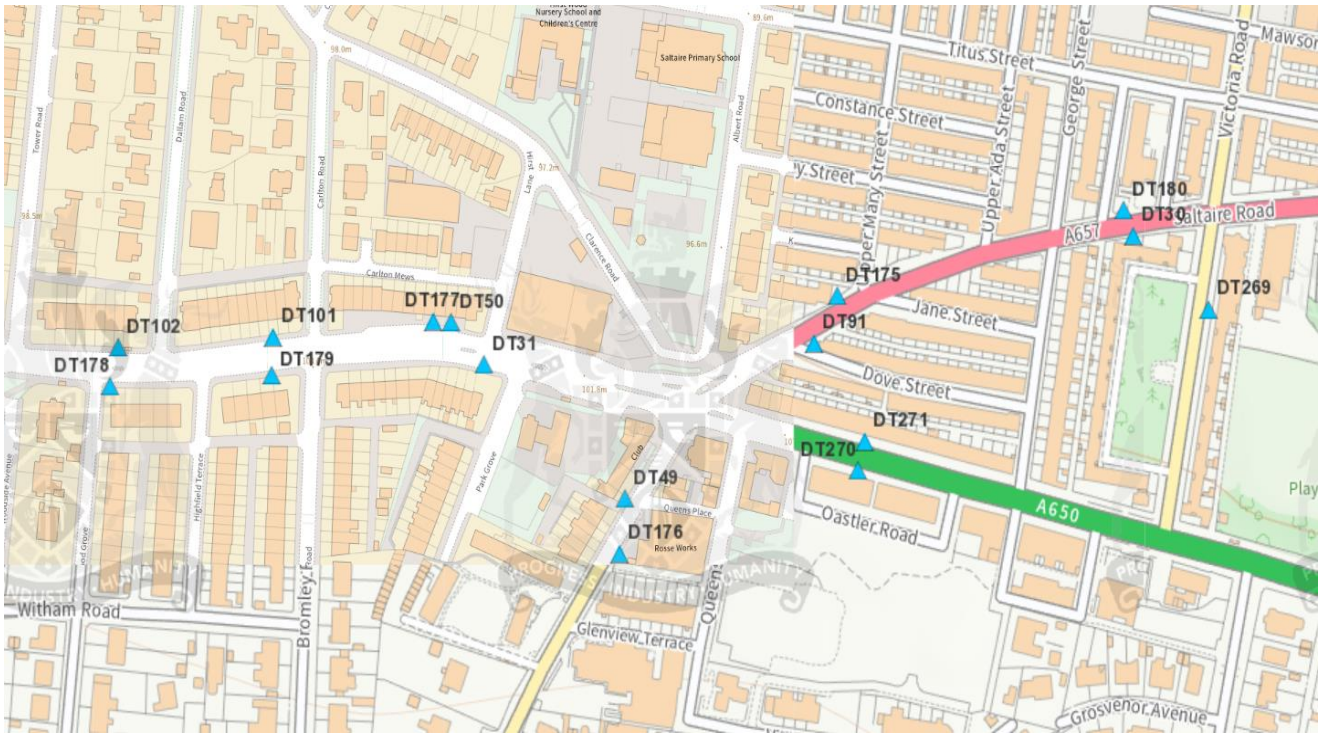


Figure D10 Rooley Lane / Tong Street monitoring sites

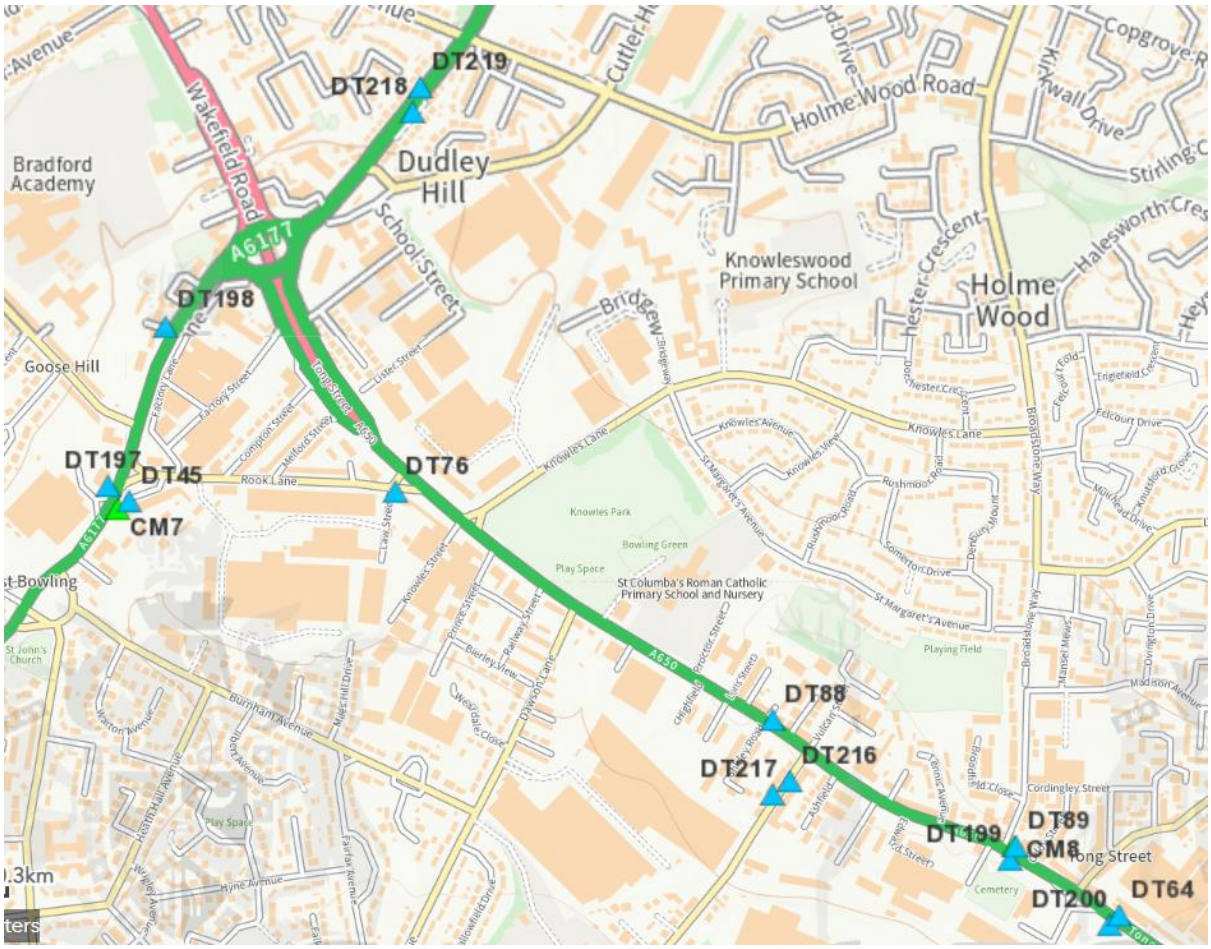


Figure D11 Killinghall Road / Harrogate Road monitoring sites

Figure D12 Canal Road monitoring sites

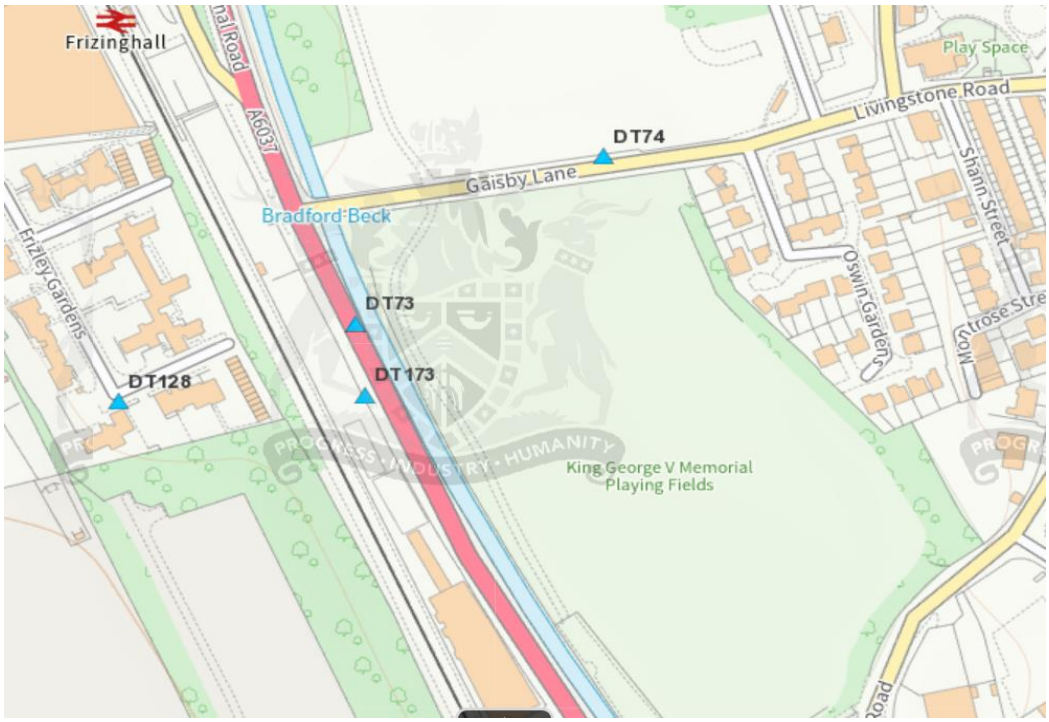


Figure D13 Greengates crossroads monitoring sites

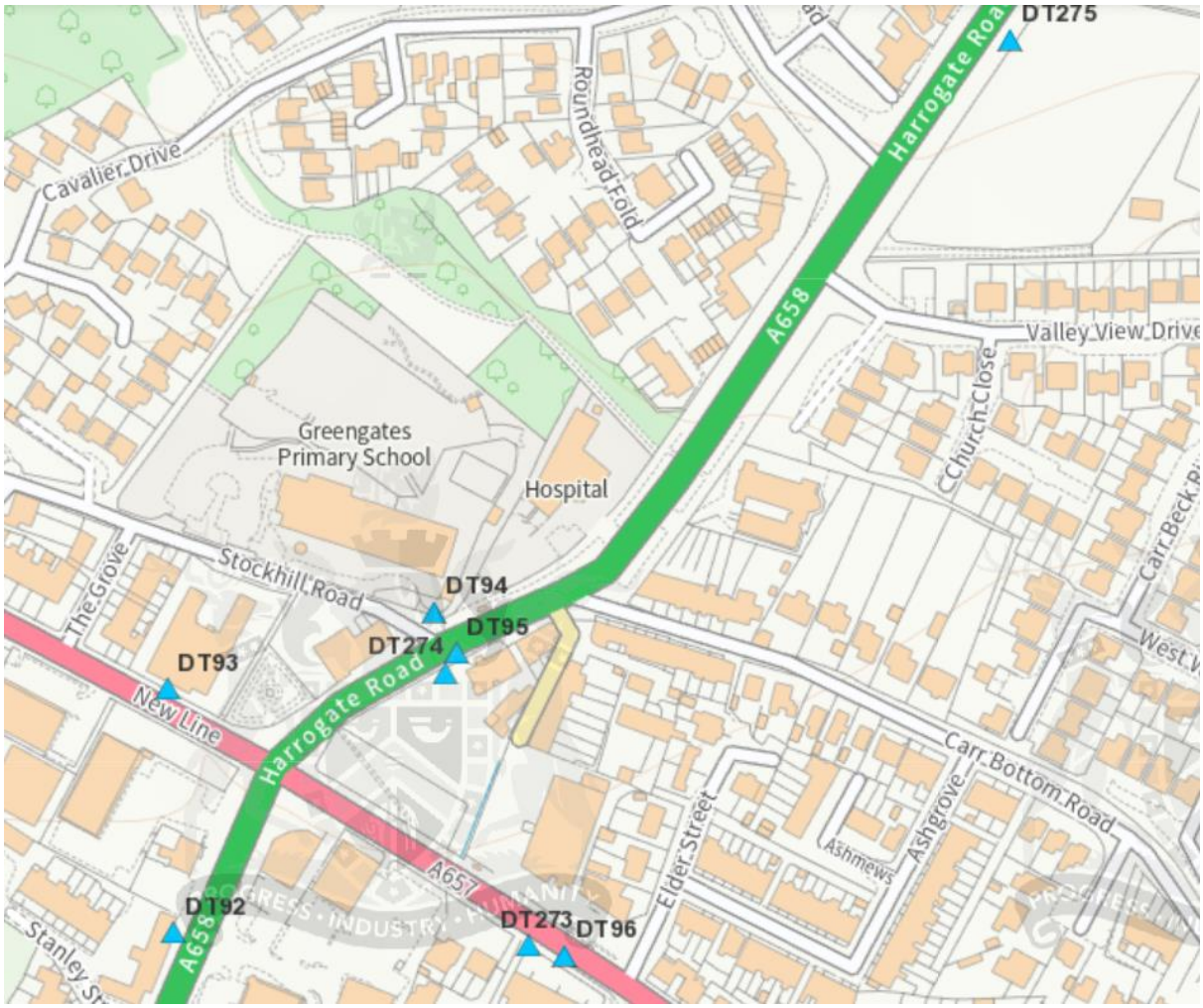


Figure D14 City centre monitoring sites

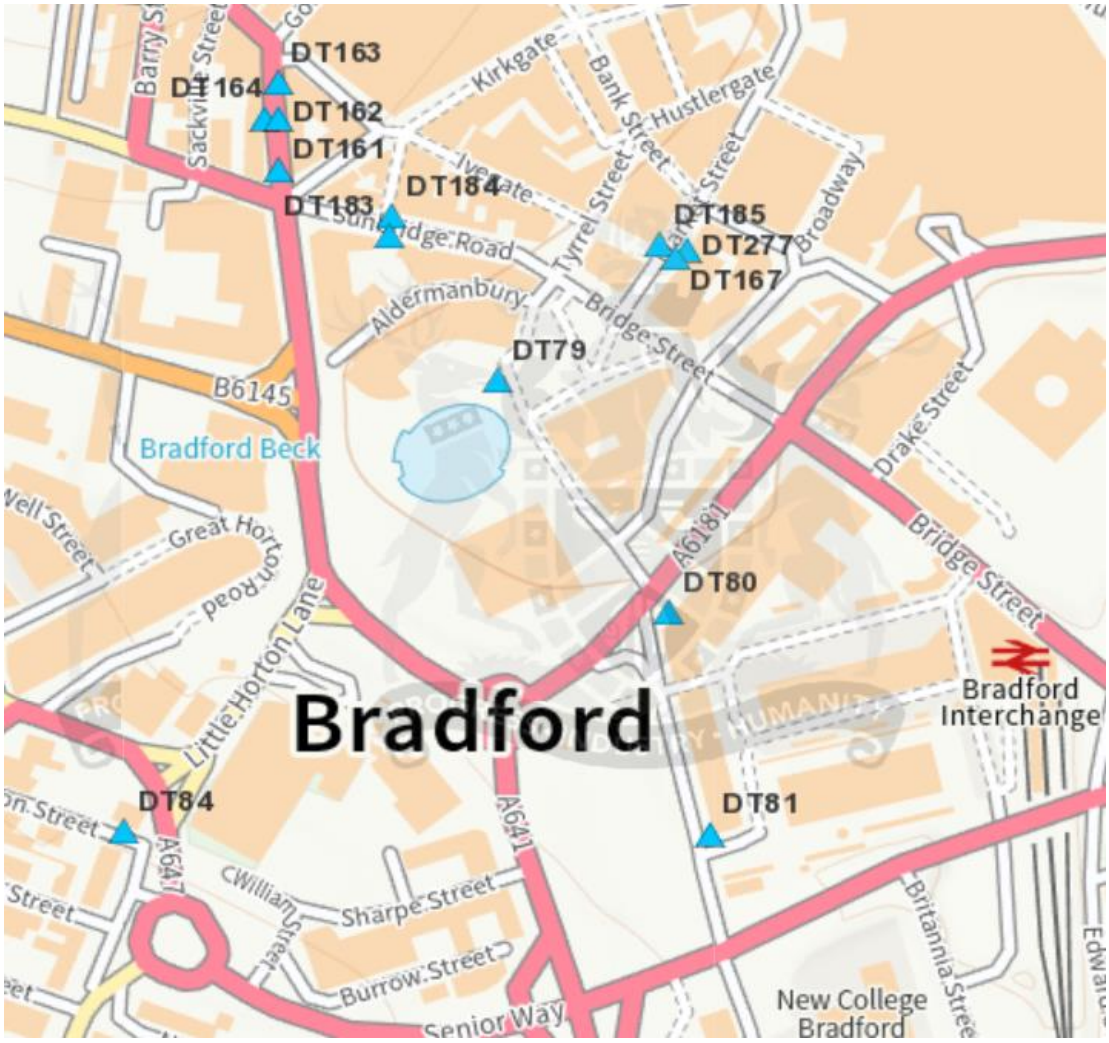


Figure D15 Parry Lane monitoring

Figure D16 Overview of monitoring near CAZ

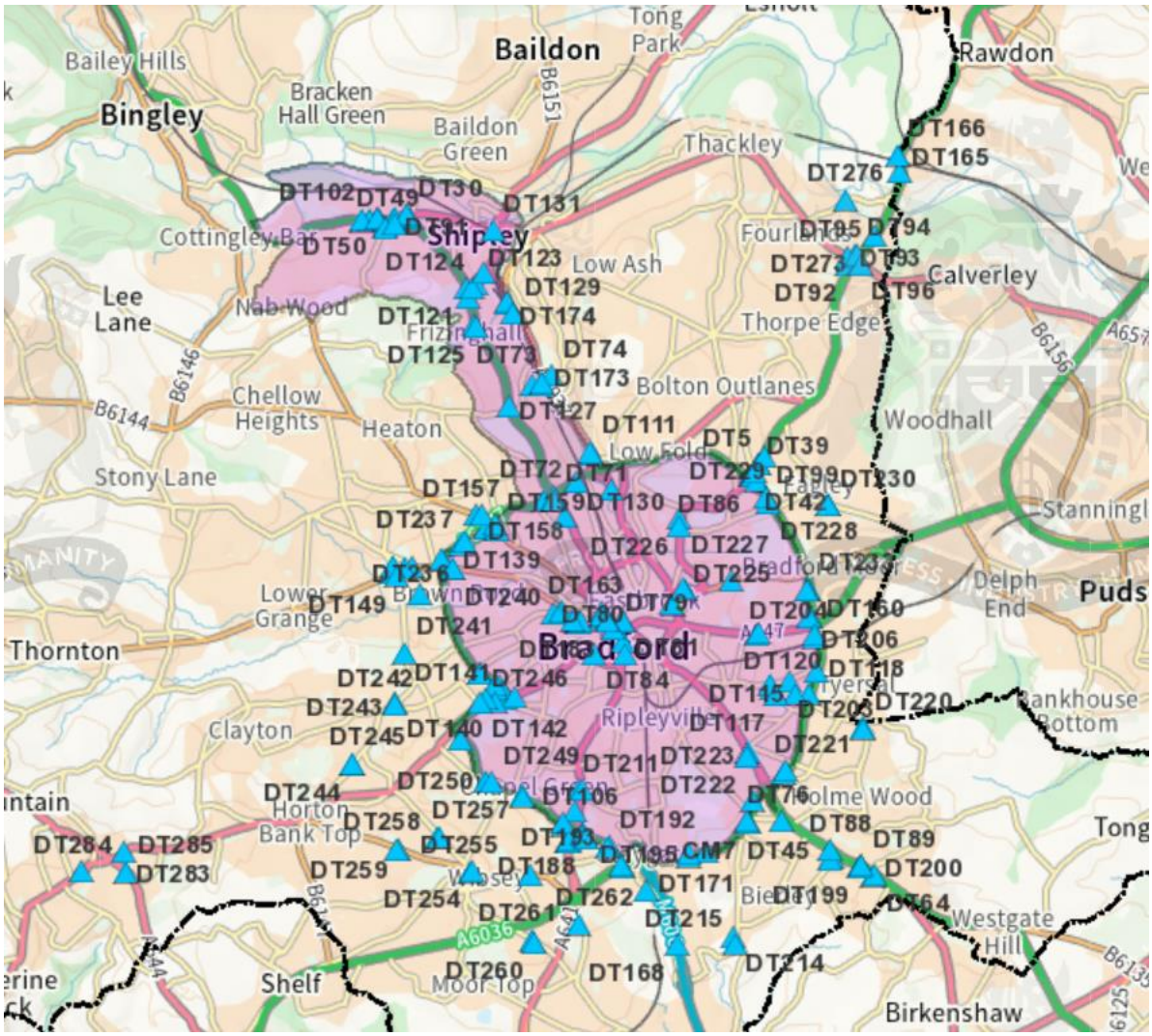
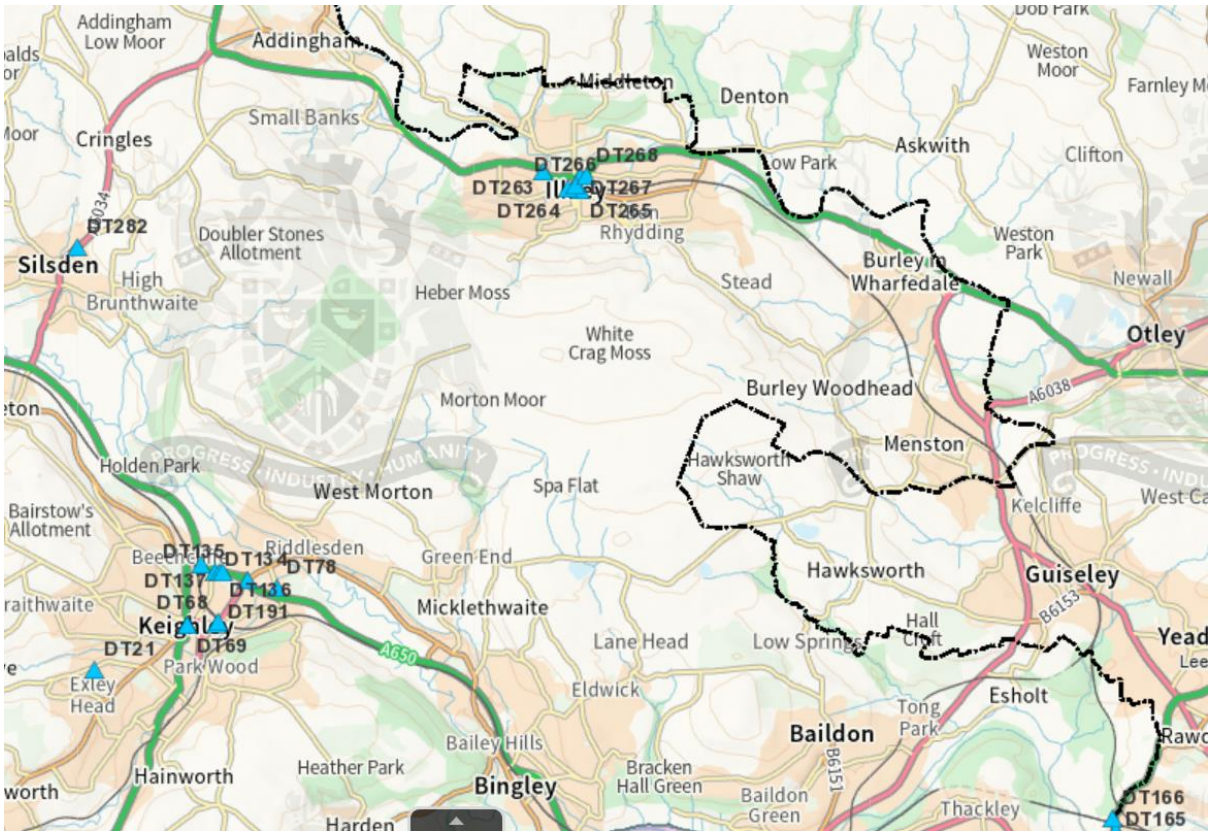


Figure D17 North district monitoring



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[10]

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

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

Appendix F: Impact of COVID-19 upon LAQM

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

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

Despite the challenges that the pandemic has given rise to, the events of 2020 have also provided Local Authorities with an opportunity to quantify the air quality impacts associated with wide-scale and extreme intervention, most notably in relation to emissions of air pollutants arising from road traffic. The vast majority (>95%) of AQMAs declared within the UK are related to road traffic emissions, where attainment of the annual mean objective for nitrogen dioxide (NO_2) is considered unlikely. On 23rd March 2020, the UK Government released official guidance advising all members of public to stay at home, with work-related travel only permitted when absolutely necessary. During this initial national lockdown (and to a lesser extent other national and regional lockdowns that followed), marked reductions in vehicle traffic were observed; Department for Transport (DfT) data[11] suggests reductions in vehicle traffic of up to 70% were experienced across the UK by mid-April, relative to pre COVID-19 levels.

This reduction in travel in turn gave rise to a change of air pollutant emissions associated with road traffic, i.e. nitrous oxides (NO_x), and exhaust and non-exhaust particulates (PM). The Air Quality Expert Group (AQEG)[12] has estimated that during the initial lockdown period in 2020, within urbanised areas of the UK reductions in NO_2 annual mean concentrations were between 20 and 30% relative to pre-pandemic levels, which

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

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

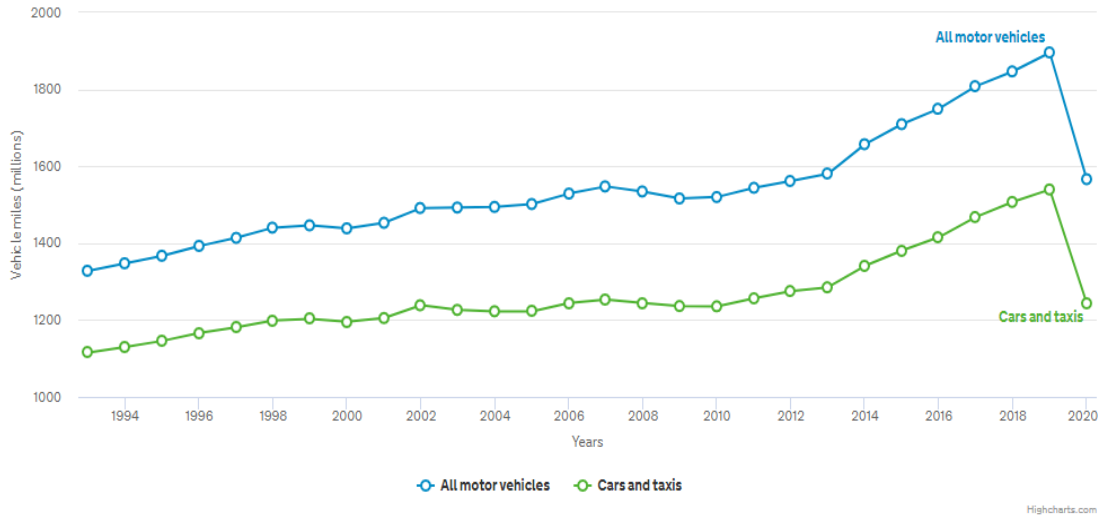
represents an absolute reduction of between 10 to 20µg/m^3 if expressed relative to annual mean averages. During this period, changes in $PM_{2.5}$ concentrations were less marked than those of NO_2. $PM_{2.5}$ concentrations are affected by both local sources and the transport of pollution from wider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

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

Impacts of COVID-19 on Air Quality within City of Bradford MDC Area

The Covid-19 lockdowns in 2020 provided an unexpected opportunity to study Bradford's air quality in the absence of normal traffic levels. As detailed within the monitoring section of this report there was widespread improvement in air quality across the district in 2020 compared with the previous 5 years due to the impact of the stay at home guidance and the significantly reduced traffic flows across the district. As shown in Figure F1 the annual traffic flow in Bradford during 2020 was considerably below those seen in the last 5 years falling back to levels similar to those seen around 10 years ago.

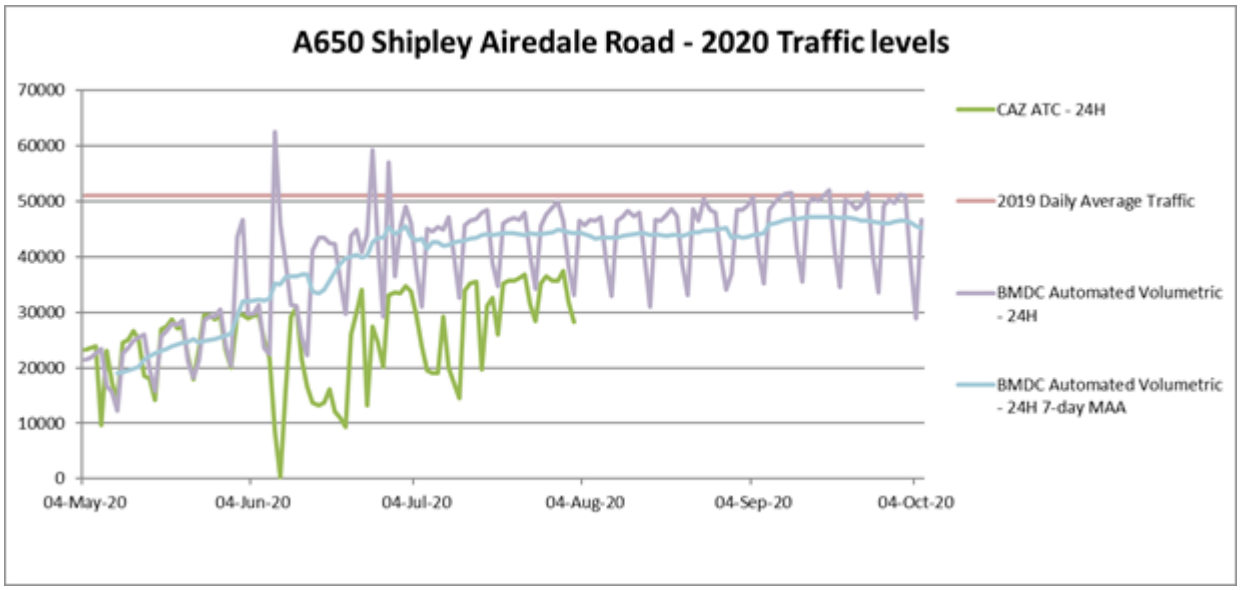
Figure F1: Annual traffic by vehicle type in Bradford[13]



[13] Department of Transport traffic statistics Link to Bradford transport statistics on DfT website

Local traffic data shows that traffic levels quickly increased after the lifting of the first lockdown period in 2020. In the week leading up to 15th September 2020 average daily traffic was at 92.5% of normal (2019 average) levels. Weekday traffic was found to be rising (as people returned to school and work) but weekend traffic was declining (less trips being undertaken for social, cultural and sporting reasons).

Figure F2: Traffic flow on Shipley Airedale Road May 2020 to October 2020



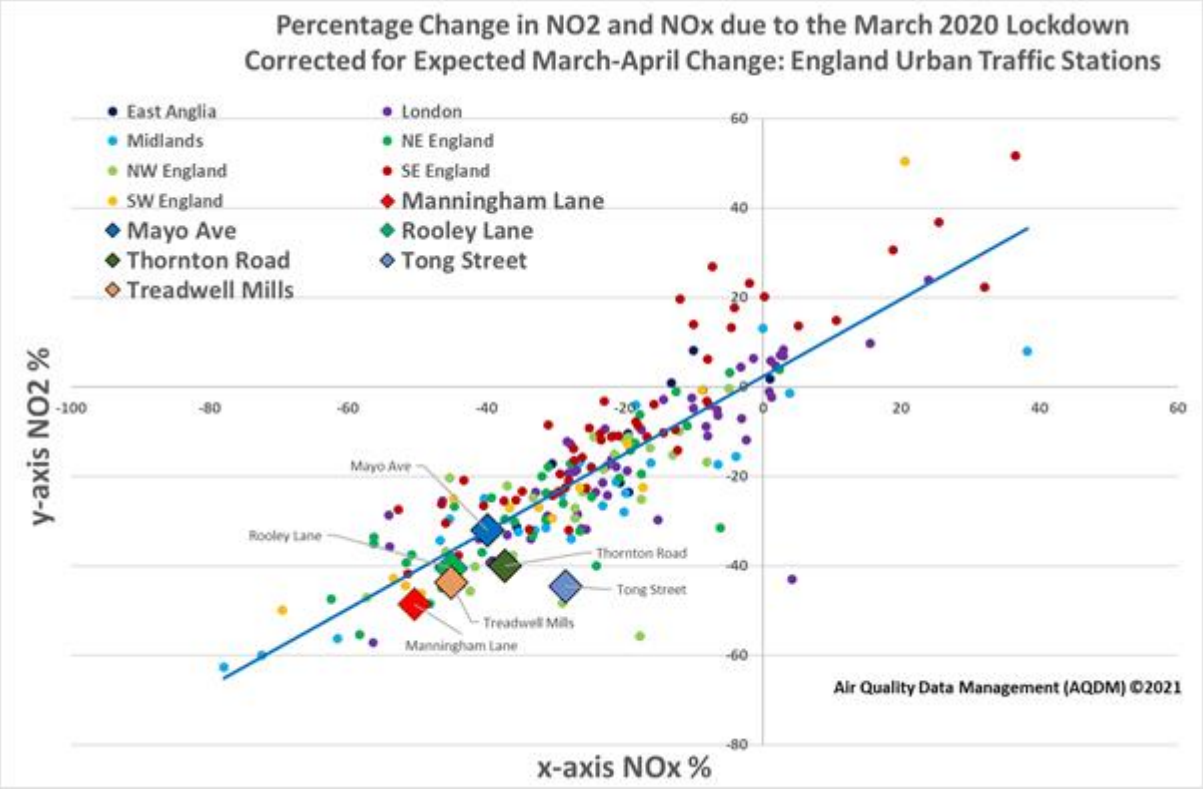
A detailed analysis of the 2020 lockdown effect on real time monitoring data in Bradford has been undertaken on behalf of the council by the independent data management contractor Air Quality Data Management. The main findings of this report were:

- There was a large decrease in NO_2 and NO_x concentrations at Bradford due to the March 2020 lockdown.
- The percentage decreases in concentrations in Bradford during the lockdown period were greater than the averages for the region and England

The first lockdown period in March 2020 coincided with the start of spring, clocks going forward and the start of the ozone season. There is often a decrease in NO_2 and NO_x concentrations every year during this period so to try and understand how the fall off in concentrations due to lockdown in 2020 compared with seasonal variations in previous years ('expected change') the drop off from March–April 2020 was compared with the average drop off seen in the period March-April 2015 to 2019 across a large number of air pollution stations and corrected to take account of the 'expected change'. The remaining change after this correction is considered to be the change as a direct result of the lockdown.

Figure F3 shows how the change in NO_2 and NO_x in Bradford due to the lockdown compared with other places in the UK. The reduction in NO_2 and NO_x at the majority of the Bradford real time monitoring sites was greater than the average seen at many other places in the UK. The reductions seen at Tong Street were some of the greatest seen across the data set. At Mayo Avenue the reductions were less prominent. As detailed in the main report the drop off in NO_2 concentrations in 2020 were seen in the diffusion tube data sets too. The reduced impact of the lockdown seen at Mayo Avenue is thought to be due to the presence of a major supermarket chain close to the monitoring sites which remained open throughout the lockdown period and may have attracted more car based *'click and collect'* type shopping trips during this period than normal.

Figure F3: Percentage change in NO_2 and NO_x due to March 2020 lockdown at Bradford Real time monitoring sites



In summary the Covid-19 lockdowns had a profound impact on air quality concentrations seen in Bradford during 2020, and to a lesser extent in 2021. Detailed analysis of the impact of the Tier 3 restrictions at the start of 2021 and the impact of the reaction to the Omicron wave at the end of 2021 have not yet been carried out. However, it is likely that these episodes will have also led to reductions in normal traffic volumes and will have impacted the air quality data.

The reductions seen in 2020 and potentially to a lesser extent in 2021, have confirmed that reducing vehicle emissions results in rapid improvement in air quality (supporting all previous evidence that could not previously be easily tested) but they also demonstrate the scale of the problem with some exceedances of air quality objectives still arising at monitoring points in Bradford during 2020, even after very large numbers of vehicle trips were removed from the road network.

Opportunities Presented by COVID-19 upon LAQM within City of Bradford MDC

At the beginning of the Covid-19 pandemic, the government launched its Emergency Active Travel Fund to support the creation of temporary infrastructure which would make it easier for people to social distance. In Bradford the Emergency Active Travel Fund was used to implement measures across the district such as widening pavements, dropping kerbs, closing Shay Lane to through traffic and temporarily removing parking bays to increase space and allow people to get around more safely.

In November 2020, the Department for Transport released a second round of funding, called the Active Travel Fund (ATF), to enable Councils to create high-quality, longer-term cycling and walking infrastructure. Bradford Council was successful in securing £2m from the ATF to implement a range of traffic measures, including cycle lanes, new cycle parking facilities and a series of Active Travel Neighbourhoods (ATNs). A series of Active Travel Neighbourhoods (ATNs), also known as Low Traffic Neighbourhoods (LTNs) are now being trialled across Bradford. ATNs are areas where a number of point closures are introduced on residential side streets to discourage non-local traffic from using these streets to cut through an area, often referred to as ‘rat running’.

The overall aims of an ATN is to:

- Reduce the number of vehicles travelling along residential streets;
- Reduce the speed of vehicles in an area;
- Improve road safety;
- Enable children to be able to play out safely;
- Encourage more people to spend time outside;
- Encourage local trips to be made by foot, scooter or cycle;

- Reduce commuter parking that contributes to congested pavements, creating more space on streets;
- Reduce pollution within local communities to improve air quality; and
- Boost people's confidence to safely walk or cycle to get around a neighbourhood

ATNs are being trialled in Barkerend, Frizinghall and Saltaire. Air quality monitoring has been put in place to support these trials.

Following the outbreak of Covid-19, Bradford's existing Economic Recovery Plan was stress-tested to produce an effective and ambitious post Covid-19 Economic Recovery Plan. The plan addressed the economic challenges that have arisen due to the Covid-19 pandemic and seeks to capitalise on key opportunities such as the emergence of the green economy, whilst continuing to build a more inclusive, sustainable and resilient economy.

The Economic Recovery Plan can be viewed in full here: Link to Bradford Economic Recovery Plan on CBMDC website

Key opportunities for improving air quality arising from the recovery plan include commitments to:

• Improve the quality and energy efficiency of homes and public buildings

• Reduce levels of fuel poverty

• Comply with UK air quality limits by 2022

• Reduce CO_2 per capita emission levels and keep them below UK average

• Develop local expertise and capabilities in retrofitting, sustainable food production, hydrogen LGVs and the circular economy

• Increase the value of environmental and low carbon sectors and the number of jobs in these sectors

Some of the key projects already started to deliver sustainable recovery include:

• Reducing the energy used for street lighting through an infrastructure replacement programme

• Planning for an air source heat pump based district heat network to remove the need for ageing boiler plant around the city centre

• Further expansion of the network of electric vehicle (EV) charging points and transitioning the Council's fleet to electric vehicles

• Increase renewable energy and electricity generation on the Council estate

• Improve air quality through our Breathe Better Bradford Clean Air Plan (including CAZ)

Bradford is working with the West Yorkshire Combined Authority to deliver a portfolio of major transport schemes worth in the region of £250 million over the next three years which include City Centre Transforming Cities Fund and capital programmes within the Local Growth Deal and West Yorkshire Transport Fund. The Leeds City Region is leading on transport and energy infrastructure related to the green economy such as Northern Powerhouse Rail and Leeds City Region Mass Transit.

Priorities for the recovery period are to build business cases for action in these key areas:

- Implementation of a neighbourhood-based energy efficiency retrofit programme (building on existing plans in the District to retrofit individual homes and public buildings)
- developing the concept of creating '15-minute neighbourhoods', to extend retrofitting to promote more sustainable living
- Creation of a sustainable food supply system (building on the District's existing assets and activity to develop a sustainable food supply system and building the District's reputation as a regional/national sustainable food hub)
- Development of the supply chain for hydrogen light goods vehicles (positioning the District's automotive businesses to win opportunities in the fuel cell electric vehicles supply-chain through having a UK 'test-bed' fleet of hydrogen light goods vehicles)
- Construction of a circular economy demonstrator – encouraging local businesses to invest in reprocessing of recycled or by-product materials and positioning the District as an exemplar of the circular economy in the UK.

The revised Economic Plan places a much greater emphasis on the protection of health and the environment in Bradford and provides opportunities for air quality and health improvement that may not have arisen in the absence of the pandemic.

Challenges and Constraints Imposed by COVID-19 upon LAQM within City of Bradford MDC

There were two main areas of challenge and constraint imposed by the Covid-19 pandemic on air quality work in Bradford during 2020 and beyond:

a. Availability of staff during the pandemic to deliver air quality measures and ensure monitoring equipment remained operational and maintained to a high standard.
b. Uncertainty around future traffic flows and vehicle types / age in Bradford as people adjust to the new 'normal'.

These issues have had various levels of impact on action plan delivery and air quality monitoring activities which have been assessed (where appropriate) in line with the impact matrix in Table F1.

Impacts on monitoring – real time

In line with instruction from the Central Management and Co-ordination Unit (CMCU) for the AURN, calibration frequency for the AURN site at Mayo Avenue was reduced to monthly for a short period during 2020. Calibration frequency at City of Bradford MDC's other automatic monitoring sites is normally run at monthly due to general staffing levels and was not impacted on by the pandemic. Data capture from all the Bradford monitoring sites exceeded 75% during 2020.

Automatic monitoring data capture impact: **None**

Automatic monitoring QAQC regime impact**: Small**

Impacts on monitoring - diffusion tubes

As detailed in Appendix C of this report there were problems with the supply and analysis of diffusion tubes in Bradford during 2020. This resulted in some tubes being analysed by different laboratories from which they were supplied and some tubes being stored for longer than normal prior to exposure. Additionally, staff shortages during the pandemic meant that some collection and exposure of tubes had to be undertaken outside the recommended Defra exposure periods but in most cases exposure remained within 4 to 5 week exposure intervals. Due to the involvement of several laboratories in the supply and analysis of diffusion tubes a local bias factor from the Keighley air pollution site had to be used for the 2020 diffusion tube data set (rather than the normal approach of using a national bias factor) and all annualisation calculations had to be conducted against the

Keighley real time data set. The impacts on passive diffusion tube monitoring are considered to be:

Passive monitoring data capture impact**: Small**

Passive monitoring adherence to change over dates impact: **Small**

Passive monitoring storage of tubes impact: **Small**

Passive monitoring bias adjustment factor: **High**

Impacts on action plan delivery

Throughout the Covid-19 pandemic Bradford has continued to prepare at pace for the implementation of the CAZ with staff adapting rapidly to home working. A team of CAZ delivery staff including an operations team, grant assessors and helpdesk operators were recruited during the pandemic with delivery continuing to schedule and evaluation monitoring commenced as planned in 2021. The pandemic has had very little impact on the internal CAZ delivery work. The original launch date for the CAZ was January 2022 but this was delayed to September 2022 in agreement with the Joint Air Quality Unit to give local businesses more time to prepare. Some delays have also been experienced with availability of new vehicles and the availability of retrofitting materials. This has been overcome by allowing a sunset period for local businesses who have the required upgrades on order.

During the pandemic work on delivery of the Bradford LES has continued as normal with all relevant planning applications reviewed as normal and emission mitigation sought in the usual manner.

The WYLES group continued to meet remotely throughout the pandemic. Delivery on some areas of the WYLES have slowed but this is due mainly to the loss of the WYLES co-ordinator post during 2021 and availability of other officers in the region to progress new work streams.

Impact on CAZ delivery **– Small**

(implementation has been delayed by >6 months from the original date but mainly to give local businesses more time to prepare and not as a direct result of the pandemic)

Impact on LES delivery (planning measures) – **None**

Impact on WYLES delivery **– None**

All other air quality improvement measures listed in Table 2.2 of the report have continued to progress throughout the pandemic with no major delays due to Covid 19.

Table F.1 – Impact Matrix

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

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide
JAQU	Joint Air Quality Unit
DfT	Department for Transport
CAZ	Clean Air Zone
CAF	Clean Air Fund
ZEBRA	Zero Emission Bus Fund
NIHR	National Institute for Health Research
CAP	Clean Air Programme
CBMDC	City of Bradford Metropolitan District Council
NRMM	Non-Road Mobile Machinery
PRS	Particle Reduction Strategy
WYCA	West Yorkshire Combined Authority
TCF	Transforming Cities Fund

References

- Local Air Quality Management Technical Guidance LAQM.TG16. April 2021. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG16. May 2016. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- COVID-19 Supplementary Guidance for LAQM Reporting in 2021, Defra 2021
- The Road to Zero – Next steps towards cleaner road transport and delivering our industrial strategy. July 18, DfT.