2020 Air Quality Annual Status Report (ASR)

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

June 2020

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Executive Summary: Air Quality in Our Area

Air Quality in Calderdale

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

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[3].

In 2019 Calderdale saw a continued fall in measured concentrations of nitrogen dioxide across the Borough, including within the AQMAs. This parallels the national picture. Work was concluded on the declaration of Calderdale No. 8 New Bank AQMA, where the annual mean was exceeded and where there is relevant exposure.

Also in line with national trends the concentrations of particulate matter were essentially unchanged from 2018, with Hebden Bridge showing slightly higher concentrations of $PM_{2.5}$ in 2019 than in 2018.

Actions to Improve Air Quality

Appendix F sets out the key areas of work for the Council, and details the progress made and the further actions needed. The headlines are

- significant improvements to the electric vehicle recharging network and promotion of ULEV vehicles, including major procurement by the Council
- changes to parking policy to include technological innovations such as app-based space finding and payment, and reduce hunting for spaces in town centres
- Adoption of corporate branding for air quality related public engagement work and pro-active work around Clean Air Day including anti-idling messaging and the launch of live air quality monitoring data on the website
- Progress with major schemes around Halifax town centre to improve traffic flows and prioritise public transport and the interconnectivity of transport hubs

Conclusions and Priorities

Exceedances of the annual mean objective for nitrogen dioxide were identified in all the AQMAs, although concentrations at many sites within the AQMAs were below the objective. There were no sites where the hourly mean objective was found to be at risk.

[1] Environmental equity, air quality, socioeconomic status and respiratory health, 2010
[2] Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006
[3] Defra. Abatement cost guidance for valuing changes in air quality, May 2013

Outside AQMAs there were isolated exceedances, the most significant in terms of receptors being in Mytholmroyd. This situation was noted in 2018 when it was tentatively associated with the long term flood alleviation works and roadworks. Work was undertaken in 2019 with a local primary school to monitor concentrations of particulate matter and nitrogen dioxide and assess the effectiveness of a green screen. The project was not conclusive but did result in useful lessons for future work.

Trends in nitrogen dioxide concentrations are downwards, while those in particulate matter are generally static.

Monitoring results at many sites indicate that most AQMAs are seeing a decrease in nitrogen dioxide concentrations. However, all the AQMAs have receptors at which the annual mean objective was exceeded in 2019. The Council's intention is to review the AQMA boundaries in detail in 2020.

Several combustion and incineration plant schemes have been permitted or are in preparation. The Council works closely with partners including the Environment Agency to ensure that such schemes are operated in accordance with permits, if required, and that the effect on local air quality is minimised.

The revised Local Plan is currently subject to a planning inquiry, but it will reallocate certain land to residential or business use. The impact of the expected development upon local air quality has been noted in outline, and applications for planning consent will be considered in conjunction with regional, national and local policies as appropriate, including the WYLES technical planning guidance.

There are several major schemes that have been given planning consent, either outline or full, or that are at an advanced stage of preparation. These include

- Business park at Wakefield Road, Brighouse with links to major works around Junction 25 of the M62 involving both Calderdale and Kirklees Council and partners. The expected increase in HDV traffic is to be accommodated by junction improvements and routing measures.
- Clifton garden suburb, a large-scale scheme for housing and mixed development to the northeast of Brighouse centre. This development is expected to design out some of the potential air quality issues associated with large developments by prioritising public transport, walking and cycling, and reducing the need to travel by car.
- Phase 1b of the A629 corridor development scheme, including significant alterations to the road layout south of Calderdale No. 1 AQMA at Salterhebble. This includes a new roundabout and removal of a notorious traffic bottleneck.
- Phase 2 of the A629 corridor development scheme in Halifax town centre, to re-route traffic more efficiently around the town centre, connecting transport hubs and improving access for pedestrians and cyclists.
- Redevelopment of Halifax bus station to upgrade the customer experience and improve accessibility and options for cleaner buses, including electric charging points.
- Construction of Elland rail station, expected to be completed by 2023. This will broaden the travel options for residents of the south of the Borough and encourage the use of the public transport network over private vehicle use.

Other schemes are at a very early stage of preparation and will be set out in future reports.

The Air Quality Action Plan [AQAP19] was updated in 2019 and although Calderdale No. 8 New Bank AQMA was declared after this update the actions relating to the other AQMAs on the A58 are expected to have a beneficial impact upon this AQMA.

In strategic terms the Council envisages that implementation of the Transport Strategy, Low Emissions Strategy and Local Plan will play a key role in tackling air quality issues. These elements therefore underpin many of the key priorities identified below.

- Priority 1 - promoting alternatives to private vehicle use, recognising the contribution of diesel vehicles and bidding for ULEV funding whenever possible
- Priority 2 – improving the transport network infrastructure, as set out in the Council's Transport Strategy and Local Plan
- Priority 3 –developing awareness of impacts and remedies, and integrating the priorities of other strategies and frameworks, such as public health (active travel), sustainability (carbon reduction strategy) and local planning (sustainable development)
- Priority 4 - encouraging public engagement and interest through improved communication and community involvement.

Local Engagement and how to get involved

The Council is very keen to engage with the public about air quality, and in 2019 launched its 'Let's clear the air' campaign. This was initially focussed on Clean Air Day but was further developed to include anti-idling and behavioural challenge messages. Social media feeds and radio and poster campaigns were used to get out the message that we can all do something to improve our air.

The Council has published its monitoring data on the Dataworks site and also has indicative live data on the site. Calderdale Libraries Service is working on a community project to engage residents in the air quality agenda.

Figure 1: campaign image for #letscleartheair

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1 Local Air Quality Management

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

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

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

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

A summary of AQMAs declared by Calderdale can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online here. Alternatively, see Appendix D: Map(s) of Monitoring Locations and AQMAs, which provides for a map of air quality monitoring locations in relation to the AQMA(s).

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)				Action Plan		
						At Declaration		Now		Name	Date of Publication	Link
Calderdale No.1 Salterhebble	Declared October 2005, amended April 2014	NO2 Annual Mean	Halifax	Stretch of the A629 south of Dryclough Lane	YES	46 µg/m3	µg/m3	52	µg/m3	AQAP 2019	Action Plan 2019	
Calderdale No.2 Sowerby Bridge	Declared July 2006	NO2 Annual Mean	Sowerby Bridge	A58 through central Sowerby Bridge	YES	53 µg/m3	µg/m3	45	µg/m3			

Calderdale No.3 Hebden Bridge	Declared August 2006	NO2 Annual Mean	Hebden Bridge	A646 through town centre	YES	48 µg/m3	µg/m3	46	µg/m3
Calderdale No.4 Luddendenfoot	Declared July 2007, amended March 2014	NO2 Annual Mean	Luddendenfoot	A646 through town centre	YES	50 µg/m3	µg/m3	41	µg/m3
Calderdale No.5 Stump Cross	Declared July 2007	NO2 Annual Mean	Halifax	A58 at junction of Leeds Road and Bradford Road	YES	58 µg/m3	µg/m3	39	µg/m3

Calderdale No.6 Brighouse	Declared July 2007, amended March 2014	NO2 Annual Mean	Brighouse	Encircling town centre	YES	51 µg/m3	µg/m3	49	µg/m3	
Calderdale No.7 Hipperholme	Declared March 2014	NO2 Annual Mean	Hipperholme	A58 Leeds Road close to junction with Brighouse Road	YES	47 µg/m3	µg/m3	48	µg/m3	
Calderdale No.8 New Bank	Declared February 2020	NO2 Annual Mean	Halifax	A58 east of Halifax town centre	YES		µg/m3		µg/m3	

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

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

Defra's appraisal of last year's ASR concluded that the conclusions reached were acceptable for all sources and pollutants.

Calderdale has taken forward a number of direct measures during the current reporting year of 2019 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

More detail on these measures can be found in the Air Quality Action Plan and Local Transport Strategy. Key completed measures are:

- Steering group set up to oversee implementation of Air Quality Action Plan, terms of reference agreed
- Upgrade of towpaths for cycling and walking progressed, due to be completed early 2020 and other initiatives underway
- Local cycling and walking infrastructure plan completed for Halifax (walking) and Brighouse (cycling)
- Rail station for Elland progressed, delivery by 2022/23, and community rail partnership being explored
- Sowerby Bridge identified for targeted action on air quality
- Business event November 2019 attended by Highways England to launch ECO Stars and engage with local businesses
- EV charging points installed for taxis and public use in eight car parks across Calderdale
- 30 ULEVs (electric vehicles) have now been ordered for Calderdale fleet, due to arrive end August 2020. A Project Team has been set up to deliver new EV charging infrastructure across multiple corporate sites. An additional 5 hybrid vehicles have also been ordered.
- Let's Clear the Air campaign launched with a focus on anti-idling and behaviour changing messages, with a radio and banner campaign
- Partnership with WYCA and bus operators: 39 additional buses retrofitted to higher emissions standards by May 2019. WYCA leading on Zero Emission Bus Roadmap
- Active travel for schools: Sustainable, Active, Fun, Environmental (SAFE) cup competition in schools. Final held June 2019.

Calderdale expects the following measures to be completed over the course of the next reporting year:

- Gaining a better understanding of local air quality through quantitative investigation of the impacts of interventions with the testing of new sensors and the work being undertaken jointly with the WYLES group;
- Further promotional work around Clean Air Day in October 2020;
- Progress on cycle infrastructure by the installation of temporary structures following/during COVID 19 to capitalise on the increase in cycling;

- Progress on street closures, removal of parking spaces and temporary widening of pavements to promote walking and facilitate social distancing;
- Revision of Air Quality Planning and Policy Guidance – joint activity with WYLES;
- School Streets – Calderdale is introducing school streets at 14 schools from 15 June 2020. Streets around these schools will be closed to traffic at school drop off and pick up times. This will be an initial trial for 6 weeks with potential to make this permanent from September. If successful other school sites will also be considered. The new restrictions are part of the national School Streets community based approach aiming to reduce car usage and air pollution and promote walking and cycling; and
- West Yorkshire Combined Authority is leading on a 'Zero Emission Bus Roadmap' which sets out a series of high-level recommendations to support the required level of zero emissions by 2036. The Roadmap represents the first stage in a wider piece of work to establish a delivery plan for the zero-emission bus fleet transition in West Yorkshire. Further work is now required to develop a detailed delivery plan for low and zero emission buses in West Yorkshire, considering technology selection, feasibility, costs, and wider investment plans of all partners. An action plan has been devised setting out the early workstreams and short term deliverables in the development of the wider delivery plan. Air quality is a vital element of these work streams including identifying AQMAs and developing a list of priority corridors for early adoption of zero emission technologies

Note added in proof: the Zero Emission Bus Roadmap has now been put on hold due to the Covid 19 measures. Bus companies are reported to be under financial pressure due to Covid 19 measures and the bus operators are currently unwilling to commit to upgrading bus fleets to electric and have therefore pulled out of the project.

Calderdale's priorities for the coming year are

- **Priority 1** - promoting alternatives to private vehicle use, recognising the contribution of diesel vehicles and bidding for ULEV funding whenever possible
- **Priority 2** – improving the transport network infrastructure, as set out in the Council's Transport Strategy and Local Plan
- **Priority 3** –developing awareness of impacts and remedies, and integrating the priorities of other strategies and frameworks, such as public health (active travel), sustainability (carbon reduction strategy) and local planning (sustainable development)
- **Priority 4** - encouraging public engagement and interest through improved communication and community involvement.

The principal challenges and barriers to implementation that Calderdale anticipates facing are set out below.

- The Council made a grant application for the project to promote electric taxis, and employ telematics. The application was not successful. While activity on this project can be progressed, albeit at a much reduced level, the situation with Covid 19 emergency measures has affected the taxi trade and it is unlikely that promotion of telematics and electric vehicles to this audience will happen until late 2021 or 2022;
- A joint grant application by the West Yorkshire authorities was made via West Yorkshire Low Emissions group, for work around education and promotion of air quality. This bid was also unsuccessful. Further exploration of how this could be funded will take place in 2020;
- Work in Calderdale schools using theatre performance for education combined with a library project in Sowerby Bridge is unlikely to go ahead due to Covid 19. This will be reviewed late 2020 for potential implementation in 2021. Digital platforms are also being explored to allow the project to move forward.

Progress on the following measures has been slower than expected, as set out below:

- The Parking Strategy is still in development but has been delayed partly due to the Covid 19 emergency measures;
- Promotion of car sharing has also been affected by Covid 19 emergency measures and social distancing in particular.

Calderdale Libraries have obtained Carnegie UK funding for a project entitled “Something in the Air?” This is part of the Engaging Libraries 2 programme, which focuses on engaging local people with research in and through libraries and raising the profile of libraries in this respect. Something in the Air? will address air quality and respiratory health in Sowerby Bridge. In partnership with an academic researcher, Council colleagues and local organisations, we hope to interact with people of all ages, increasing understanding of the chosen theme, in relation to both indoor and outdoor air quality. We hope that this will empower people in Sowerby Bridge to become part of the solution, changing behaviours, becoming a proactive community & taking up a range of opportunities for involvement, contributing to an improved local environment.

Table 2.2 sets out the measures identified in the Action Plan. The column indication the reduction in emissions has been left blank due to the problematic nature of quantifying this for the measures set out. Calderdale anticipates that the measures stated above and in Table 2.2 will achieve compliance in much of Hebden Bridge AQMA.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Calderdale anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of Brighouse, Salterhebble, New Bank, Hipperholme and Sowerby Bridge.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
AQAP1 (1)	Achieve better understanding of local air quality, including monitoring and source apportionment, queue length and congestion studies	Transport Planning and Infrastructure	Other	2009-2020	Calderdale MBC, neighbouring authorities,	Calderdale MBC, neighbouring authorities,	data collection	NA	Monitoring contracts extended. Live data now on website AQ dashboard.	ongoing	funding ended 2019, contracts renewed for 2020
					tools from Defra, WYCA	tools from Defra, WYCA					
AQAP1 (2)	Traffic flow and network improvements,	Traffic Management	UTC, Congestion management, traffic reduction	current	CMBC, Highways England, neighbouring Las, WYCA	CMBC, Highways England, neighbouring Las, WYCA	Improved traffic flows and reduced queue lengths at key network points,		Implementation on-going	ongoing	Funding
AQAP1 (3)	Urban Traffic Control (UTC) improvements	Traffic Management	UTC, Congestion management, traffic reduction	current	Calderdale MBC, neighbouring authorities	Calderdale MBC, neighbouring authorities	Improved traffic flows and reduced queue lengths at key network points, less parking space hunting		Proposal to link all signals in centralised system (UTC) based in Leeds. Variable Message Signs giving route-specific messages now established. Development of a parking strategy was due to commence early 2020 – likely to be delayed. APPY Parking technology now in use in town centres.	To be included in major projects and Corridor Improvement Plans. Further VMS included in Phase 4 scheme for A629	Modified since original action plan
AQAP1 (4)	Handling emissions data (Emissions Factor Toolkit)	Transport Planning and Infrastructure	Other	current	Calderdale MBC, tools from Defra	Calderdale MBC, tools from Defra			Informs annual status report	Ongoing	None identified
AQAP2 (1)	Air Quality web pages - improve, e.g. include live data	Public Information	Via the Internet	ongoing	Calderdale MBC	Calderdale MBC	Improved understanding of air quality issues		web pages updated, live data now online.	completed 2019	NA

AQAP2 (2)	Clean air campaign	Public information	Via internet/social media/other	Jun-19	Calderdale MBC	Calderdale MBC	Improved understanding of air quality issues		Successful event including branded messaging in June 2019	ongoing	N/A
AQAP2 (3)	Investigate freight partnership	Freight and Delivery Management	Freight Partnerships for city centre deliveries	2019 onwards	Kirklees MBC, Calderdale MBC, Highways England	Kirklees MBC, Calderdale MBC, Highways England			Preliminary work with operators	2021	Resources to engage with potential partners
AQAP3 (1)	Promote high occupancy travel	Transport Planning and Infrastructure	Strategic highway improvements, re-prioritising	ongoing	Calderdale MBC, Neighbouring Authorities	Calderdale MBC, Neighbouring Authorities	Reduction in vehicle numbers		Campaign 2018	ongoing	Resources and partner commitments
AQAP3 (2)	Cycling infrastructure improvements and facilities	Promoting Travel Alternatives	Promotion of cycling	2018 onwards	Calderdale MBC	Calderdale MBC	Increases in numbers cycling and reduction in car use		Calderdale Cycling forum reports into the cabinet transport working party, CCF meets regularly made up of Calderdale cycle reps council officers, members, schools & other stakeholders Upgrade of Upper Valley Towpath complete to Hebden Bridge – further work planned in phase 2 to Todmorden Phase 2 is underway – planned completion Feb 20 Hebble Trail extension plan now developed. Now incorporated into the WYTF Phase 4 Ryburn greenway feasibility study complete. Sustrans commissioned to progress study Pre-feasibility done on N Halifax routes. Now incorporated into transforming cities bid Bike racks in Halifax town centre now installed Complete	Ongoing	Funding and staffing resources and land ownership

AQAP3 (3)	Active Calderdale campaign	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	ongoing	Calderdale MBC	Calderdale MBC	Increases in cycling and walking		Walking and cycling infrastructure plan to be developed. LCWIP to be used in development.	2022	Commitment from communities
AQAP3 (4)	Metro travel card pool scheme	Alternatives to private vehicle use	Other	ongoing	Calderdale MBC, Metro	Calderdale MBC, Metro	Increase in public transport use		Calderdale's first LCWIP is complete – Halifax for walking & Brighouse for Cycling	ongoing	further cards purchased 2018
AQAP3 (5)	20mph areas	Traffic Management	Reduction of speed limits, 20mph zones	2017	Calderdale MBC	Calderdale MBC	Encourage more walking and cycling reduce fear of speeding traffic		zones completed	completed 2017	NA
AQAP3 (6)	Car sharing promotion	Alternatives to private vehicle use	Car & lift sharing schemes	2009-2020	Calderdale MBC	Calderdale MBC	Reduce private car use		car sharing scheme up and running - featured in Clean Air day 2018	ongoing	interest appears to be growing
AQAP4 (1)	ULEV procurement	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	2023 onwards	Calderdale MBC	Calderdale MBC	Reduce number of petrol and diesel cars and increase number of chargers		30 ULEVs (electric vehicles) have now been ordered for Calderdale fleet, due to arrive end August 2020. A Project Team has been set up to deliver new EV charging infrastructure across multiple corporate sites including Battinson Road, Mulcture House and Manor Heath. An additional 5 hybrid vehicles have also been ordered.	after 2023	Funding availability
AQAP4 (2)	EV recharging provision	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	current	Calderdale MBC supported by OLEV etc.	Calderdale MBC supported by OLEV etc.	Reduce number of petrol and diesel cars and increase number of chargers		4 rapid chargers installed 4-6 currently planned to be installed by the end of 2020. Potential 13 On-Street Residential Charge points to be installed with OLEV funding.	Date	Funding
AQAP4 (3)	Retrofit school bus fleet	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	2017	Calderdale MBC, neighbouring authorities	Calderdale MBC, neighbouring authorities				Date	None
AQAP5 (1)	Travel plans	Promoting Travel Alternatives	Workplace Travel Planning	Current	Calderdale MBC, neighbouring authorities	Calderdale MBC, neighbouring authorities				Ongoing	Need for section 106 agreement

AQAP5 (2)	School travel plans	Promoting Travel Alternatives	School Travel Plans	2020 onwards	Calderdale MBC, neighbouring authorities	Calderdale MBC, neighbouring authorities			Plan completed pre 2019	2020	Many schools not with Local Authority
AQAP5 (3)	Local Plan Air Quality Policies	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2017 onwards	Calderdale MBC	Calderdale MBC	Consistent approach to air quality in planning guidance		WYLES adopted and used. Currently being revised by WYLES delivery group	2021	WYLES includes AQ guidance for developers
AQAP5 (4)	Promote uptake of electric vehicles e.g. taxis	Promoting Low Emission Transport	Taxi emission incentives	2017 onwards	Calderdale MBC	Calderdale MBC	Reduction in number of petrol and/or diesel taxis		1 operating further promotion in place	Ongoing	Engagement of license trade
AQAP5 (5)	Promote and support use of public transport and improved infrastructure	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	2018 onwards	Calderdale MBC, WYCA	Calderdale MBC, WYCA	Reduction in private car use and increase in public transport		Clean Bus Technology grants awarded and fleet being upgraded. Development of station at Elland including access and parking. Delivery expected 2022/2023. WYCA to start work on new base plan and production schedules being developed. Developing community rail partnership to encourage more train travel.	2019	Funding
AQAP5(6)	Promote good practice is domestic burning	Policy guidance and development control	Other	Current	Calderdale MBC and DEFRA	Calderdale MBC and DEFRA			Published on website	ongoing	Enforcement
AQAP6 (1)	Community renewable energy scheme	Promoting Low Emission Plant	Public Procurement of stationary combustion sources	2019 onwards	Calderdale MBC	Calderdale MBC			Feasibility Modelling done	ongoing	Funding
AQAP6(2)	Promote locally grown food, goods and services	Freight and Delivery Management	Other	2018 onwards	CMBC, local partners including 'Incredible Edible'	CMBC, local partners including 'Incredible Edible'			Council policy agreed & land use for growing promoted		Ongoing Community take up
AQAP6 (3)	Improved energy efficiency	Other	Other		Calderdale MBC	Calderdale MBC					
AQAP6 (4)	Compliance checks for environmental permit	Promoting Low Emission Plant	Environmental permits	current	CMBC / Environment Agency	CMBC / Environment Agency			Part A1, A2, B and Schedule 9 and 13 permits in place	ongoing	N/A

AQAP6(5)	Introduction of green screens	Transport/planning/infrastructure	Other	current	Calderdale MBC	Calderdale MBC	Protection of children in playground from NO2 and PM		First installation May 2019	Ongoing	Finance
AQAP6(6)	Pilot school road closure	Transport/planning/infrastructure	Other	Current	Calderdale MBC/Schools	Calderdale MBC/Schools	Increase numbers of children walking to school		Plans in place	Ongoing	Community support
AQAP6(7)	Tackle idling vehicles	Traffic management	Congestion management/traffic reduction	Ongoing	Calderdale MBC	Calderdale MBC	Change driver behaviour and knowledge around air quality		Confirming legal orders	Ongoing	Compliance and resource

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

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

- **Biomass combustion (including domestic wood burning)**. The Council continues to support Defra's information campaign on domestic emissions and has incorporated guidance on appropriate selection of fuels on its web pages. The recent announcement that the burning of coal and certain other fuels is to be phased out has also been publicised. Burning of garden waste is discouraged where appropriate, and a green waste collection service is in operation. Much of urban Calderdale is covered by Smoke Control Areas, and the Council offers advice to householders about how to comply with the orders and where to seek further information.

- **Industrial sources**. The Council is working with local operators who hold environmental permits for combustion plant to ensure that emissions are controlled in accordance with the permits and, where feasible, to a tighter standard. The number of applications for small waste incineration plant has increased in the past year. A number of premises burning waste below the permitting threshold have been identified and given advice about obtaining a U4 exemption and reducing the smoke emissions from their appliances. The Council is working with the Environment Agency to identify and regularise waste burning in the Borough. Some RHI funded schemes have also been identified and the Council continues to work with its partners in the Yorkshire and Lincolnshire Pollution Advisory Group to understand what regulation may be achievable.

- **Public information**. The Council has used publicity materials to inform the public about better travel choices, and in particular avoiding private vehicle use where possible. Fine particulates from brake and tyre wear are becoming the focus of more attention, and encouraging people to use alternative transport modes and active travel may assist with this. The Let's Clear the Air Campaign gained momentum in 2019 and has been a high profile element of the Council's engagement with the community on air quality. Further work using this brand is planned for 2020.

Measures set out in the Action Plan to tackle nitrogen dioxide pollution are also expected to reduce concentrations of particulates. Guidance (such as [DE19C]) on open fires and wood burning is also relevant to tackling fine particulates. $PM_{2.5}$ concentrations tend to have significant regional contributions and the local measures may have limited impact.

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

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

Calderdale undertook automatic (continuous) monitoring at three sites during 2019. Table A.1 in Appendix A shows the details of the 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. Summaries of national monitoring results are available here.

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

3.1.2 Non-Automatic Monitoring Sites

Calderdale undertook non- automatic (passive) monitoring of NO_2 at 53 sites during 2019. Table A.2 in Appendix A shows the details of the sites.

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

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias[4], “annualisation” (where the data capture falls below 75%), and distance correction[5]. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3. Note that the concentration data presented in Table A.3 represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

AQMA No. 1 is monitored using the station AQS2. The trend in nitrogen dioxide concentrations is shown in Figure 2. The dip in 2018 is due to a loss of data and to major roadworks which reduced the traffic volumes.

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

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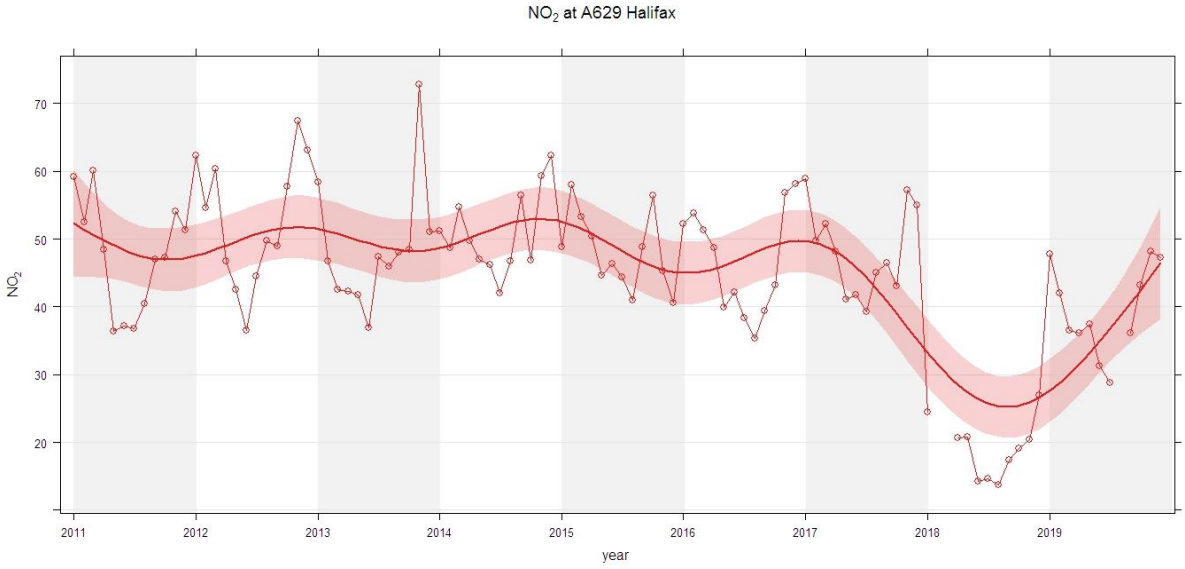

Figure 2: trend in nitrogen dioxide concentrations, AQMA No. 1, Salterhebble

The trend in concentrations of nitrogen dioxide at Hebden Bridge, monitored by station AQS3, is shown in Figure 3. There is a fairly clear downward trend since 2012.

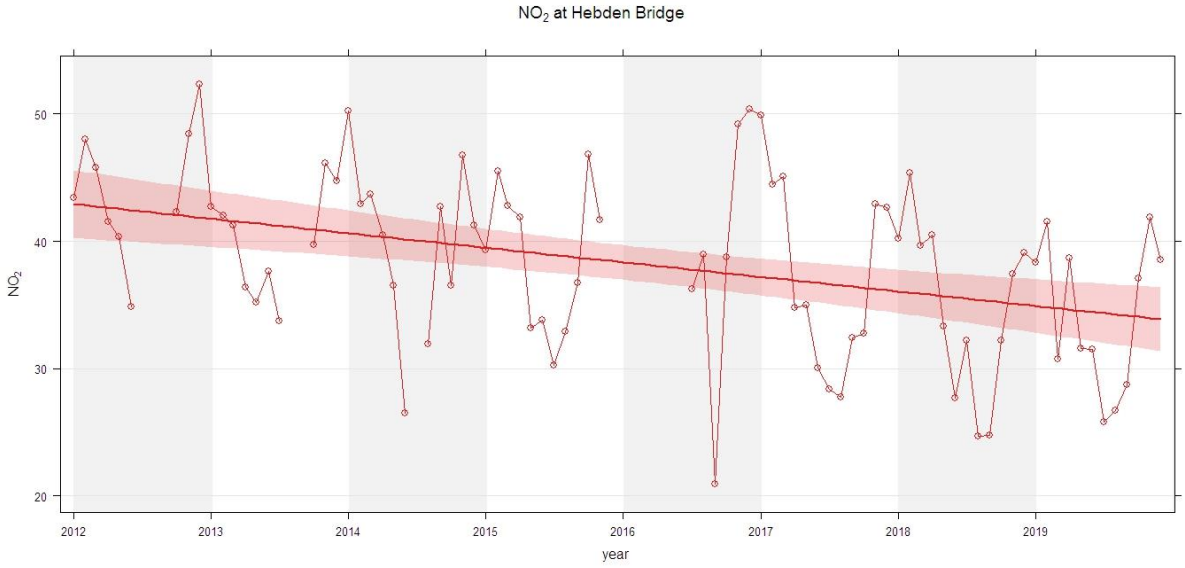

Figure 3: trend in nitrogen dioxide concentrations, AQMA No. 2 Hebden Bridge

The concentrations of nitrogen dioxide in Sowerby Bridge are shown in Figure 4. Again, a clear downward trend is evident.

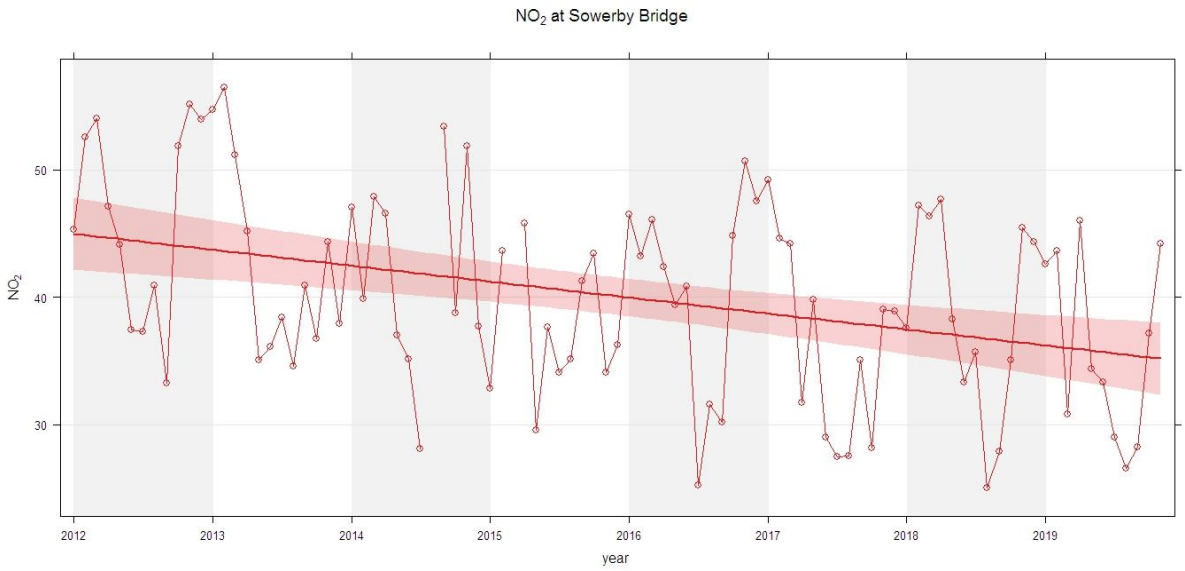

Figure 4: trend in nitrogen dioxide concentrations, AQMA No. 3 Sowerby Bridge

For diffusion tubes, the full 2019 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

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

The annual mean air quality objective was exceeded at a significant number of sites in 2019, most of these in AQMAs. The exceedances identified at New Bank on the A58 in Halifax (see [ASR19]) lead to that area being declared an AQMA, the order being sealed in February 2020. There were no annual means greater than 60µg/m^3, which indicates that an exceedance of the 1-hour mean objective is unlikely at any of the monitored sites.

The exceedance at tube MY-01 in Mytholmroyd is believed to be related to road traffic management during major flood alleviation works. The traffic management has been eased and the situation is being monitored.

3.2.2 Particulate Matter (PM_{10})

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of 40µgm^{-3}. The raw results from the unheated BAM were divided by 1.2 to arrive at the reported figure, as required by [TG16].

Table A.6 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the air quality objective of 50µgm^{-3}, not to be exceeded more than 35 times per year.

There were no exceedances of the air quality objectives at this site in 2019.

3.2.3 Particulate Matter ($PM_{2.5}$)

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

The concentration of $PM_{2.5}$ at AQS2, Halifax, has remained fairly stable at around 11 to 13μgm^{-3}.

The concentration $PM_{2.5}$ at AQS3, Hebden Bridge, has increased to 19 μgm^{-3}. There seems to be a rising trend in the concentrations at this location, although the reasons are not well understood.

3.2.4 Sulphur Dioxide (SO_2)

The Council does not monitor sulphur dioxide in the Borough.

Appendix A: Monitoring Results

Table A.1 - Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
AQS2	Huddersfield Road	Roadside	409485	423430	NO2; PM2.5	YES	Chemiluminescent; BAM	NA	3	1.5
AQS3	Hebden Bridge	Roadside	398990	427210	NO2; PM2.5	YES	Chemiluminescent; BAM	NA	3	1.5
AQS4	Sowerby Bridge	Roadside	406075	423615	NO2; PM10	YES	Chemiluminescent; BAM	NA	3	1.5

Notes:

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

(2) N/A if not applicable

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

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
LV-SAA	LV-SAA	Roadside	411201	419429	NO2	no	NA	NA	NO	2.5
LV-SCA	LV-SCA	Roadside	405911	416597	NO2	no	NA	NA	NO	1
LV-AT	LV-AT	Roadside	411533	419358	NO2	no	NA	4	NO	2.5
LV-62W	LV-62W	Roadside	416172	422282	NO2	no	NA	3	NO	2.5
LV-62E	LV-62E	Roadside	416717	422113	NO2	no	NA	4	NO	2.5
LV-LEE	LV-LEE	Roadside	417698	420709	NO2	no	NA	3	NO	2
LV-BRD	LV-BRD	Roadside	414683	423155	NO2	no	NA	2	NO	2
LV-NBN	LV-NBN	Roadside	409715	425754	NO2	no	NA	1	NO	2.5
LV-NBS	LV-NBS	Roadside	409708	425737	NO2	no	NA	2	NO	2.5
LV-NBX	LV-NBX	Roadside	409602	425797	NO2	no	NA	1	NO	2.5
LV-EWB	LV-EWB	Roadside	410104	421516	NO2	no	NA	1	NO	2.5
NB-NB1	NB-NB1	Roadside	409663	425740	NO2	no	2	2	NO	2.5
NB-GR	NB-GR	Roadside	409957	425642	NO2	no	3	3	NO	2
NB-GL	NB-GL	Roadside	410367	425975	NO2	no	11	2	NO	2.5
SC5	SC5	Roadside	410823	426265	NO2	yes	0	3	NO	3
HH-TC	HH-TC	Roadside	412718	425556	NO2	yes	5	1.5	NO	2.5
HH-LB	HH-LB	Roadside	412430	425479	NO2	yes	0	4	NO	2
HH-LT	HH-LT	Roadside	412450	425435	NO2	yes	0	3	NO	2.5

HH1	HH1	Roadside	412618	425503	NO2	yes	0	3	NO	2
WR2	WR2	Roadside	415090	422817	NO2	yes	0	4	NO	2.5
BH3	BH3	Roadside	414671	422740	NO2	yes	3	1.5	NO	2.5
BE4	BE4	Roadside	414478	422692	NO2	yes	0	1	NO	2.5
BE2	BE2	Roadside	414385	422457	NO2	yes	NA	2	NO	2.5
HXR1	HXR1	Roadside	414218	422957	NO2	yes	0	4	NO	2
CL1	CL1	Roadside	413261	420686	NO2	no	0	2	NO	2.5
HTAH	HTAH	Suburban	411494	419594	NO2	no	0	NA	NO	2
AT-BR	AT-BR	Suburban	411514	419548	NO2	no	10	NA	NO	2
AT-MR	AT-MR	Roadside	411581	419373	NO2	no	10	NA	NO	2.5
AT-MR2	AT-MR2	Roadside	411530	419377	NO2	no	12	9	NO	1.5
AQC1	AQC1	Roadside	409485	423431	NO2	yes	5	2	YES	1.5
AQC2	AQC2	Roadside	409485	423431	NO2	yes	5	2	YES	1.5
AQC3	AQC3	Roadside	409485	423431	NO2	yes	5	2	YES	1.5
CRH1	CRH1	Roadside	409767	423011	NO2	yes	0	2	NO	2.5
AQ20	AQ20	Roadside	409483	423337	NO2	no	0	5	NO	2
AQ21	AQ21	Roadside	409822	423167	NO2	yes	2	2	NO	2.5
HB6	HB6	Roadside	399502	427041	NO2	yes	0	4	NO	2
HQ1	HQ1	Roadside	398794	427237	NO2	yes	0	3	NO	2
HQ9	HQ9	Roadside	399236	427176	NO2	yes	0	2	NO	2.5
LF1	LF1	Roadside	403810	424977	NO2	yes	0	2	NO	2.5
LF2	LF2	Roadside	403738	425110	NO2	yes	0	1	NO	2.5
SB1	SB1	Roadside	406135	423639	NO2	yes	0	2	NO	2.5
SB3	SB3	Roadside	405961	423571	NO2	yes	0	2	NO	2.5
SB15	SB15	Roadside	406707	423824	NO2	yes	1	2	NO	2

SB16	SB16	Roadside	406638	423836	NO2	yes	0	2	NO	2.5
BS1 HB	BS1 HB	Roadside	398990	427210	NO2	yes	>10	3	YES	1.5
WV-SR1	WV-SR1	Roadside	409598	421167	NO2	no	0	2	NO	2.5
WV-SR2	WV-SR2	Roadside	409608	421160	NO2	no	3	2	NO	2.5
MY01	MY01	Roadside	401431	425995	NO2	NO	0	1	NO	2.5
MY02	MY02	Urban Background	401275	426046	NO2	NO	NA	>10	NO	2.5
MY03	MY03	Roadside	401204	426041	NO2	NO	0	2	NO	2.5
MY-04	MY-04	Roadside	401059	426179	NO2	NO	NA	2	NO	2.5
MY-05	MY-05	Roadside	401040	426186	NO2	NO	NA	2	NO	2.5

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3) (4)				
							2015	2016	2017	2018	2019
LV-SAA	411201	419429	Roadside	Diffusion Tube	100	100	-	**31**	**33**	**30**	**25**
LV-SCA	405911	416597	Roadside	Diffusion Tube	100	100	-	**56**	**48**	**46**	37
LV-AT	411533	419358	Roadside	Diffusion Tube	100	100	-	**54**	**47**	**47**	**45**
LV-62W	416172	422282	Roadside	Diffusion Tube	100	100	-	**43**	**40**	**40**	**37**
LV-62E	416717	422113	Roadside	Diffusion Tube	100	100	-	**42**	**40**	**38**	**36**
LV-LEE	417698	420709	Roadside	Diffusion Tube	100	100	-	**32**	**32**	**30**	**27**
LV-BRD	414683	423155	Roadside	Diffusion Tube	100	100	-	**28**	**31**	**28**	**27**
LV-NBN	409715	425754	Roadside	Diffusion Tube	100	100	-	**67**	**66**	**64**	**55**
LV-NBS	409708	425737	Roadside	Diffusion Tube	100	100	-	**55**	**42**	**44**	**41**
LV-NBX	409602	425797	Roadside	Diffusion Tube	100	100	-	**46**	**43**	**39**	**39**
LV-EWB	410104	421516	Roadside	Diffusion Tube	100	100	-	**30**	**27**	**27**	**27**
NB-NB1	409663	425740	Roadside	Diffusion Tube	100	100	-	-	**44**	**42**	**40**
NB-GR	409957	425642	Roadside	Diffusion Tube	100	100	-	-	**53**	**53**	**46**
NB-GL	410367	425975	Roadside	Diffusion Tube	100	100	-	-	**57**	**52**	**49**

SC5	410823	426265	Roadside	Diffusion Tube	100	100	**45**	**43**	**38**	**39**	**35**
HH-TC	412718	425556	Roadside	Diffusion Tube	100	100	**40**	**42**	**36**	**35**	**33**
HH-LB	412430	425479	Roadside	Diffusion Tube	100	100	**43**	**45**	**36**	**37**	**38**
HH-LT	412450	425435	Roadside	Diffusion Tube	100	100	**46**	**58**	**51**	**48**	**41**
HH1	412618	425503	Roadside	Diffusion Tube	100	100	**42**	**42**	**39**	**38**	**37**
WR2	415090	422817	Roadside	Diffusion Tube	100	100	**40**	**41**	**38**	**36**	**33**
BH3	414671	422740	Roadside	Diffusion Tube	100	100	**45**	**48**	**46**	**42**	**43**
BE4	414478	422692	Roadside	Diffusion Tube	100	100	**52**	**50**	**47**	**45**	**42**
BE2	414385	422457	Roadside	Diffusion Tube	100	100	**42**	**45**	**38**	**37**	**35**
HXR1	414218	422957	Roadside	Diffusion Tube	100	100	**54**	**53**	**49**	**49**	**42**
CL1	413261	420686	Roadside	Diffusion Tube	100	100	**38**	**43**	**34**	**33**	**29**
HTAH	411494	419594	Roadside	Diffusion Tube	100	100	**35**	**38**	**35**	**31**	**27**
AT-BR	411514	419548	Roadside	Diffusion Tube	100	100	**35**	**37**	**35**	**30**	**28**
AT-MR	411581	419373	Roadside	Diffusion Tube	100	100	**29**	**30**	**34**	**27**	**25**
AT-MR2	411530	419377	Roadside	Diffusion Tube	100	100	-	-	**34**	**32**	**28**
AQC1	409485	423431	Roadside	Diffusion Tube	100	100	**45**	**46**	**41**	**36**	**40**
AQC2	409485	423431	Roadside	Diffusion Tube	100	100	**50**	**46**	**43**	**36**	**39**
AQC3	409485	423431	Roadside	Diffusion Tube	100	100	**47**	**46**	**41**	**36**	**39**

CRH1	409767	423011	Roadside	Diffusion Tube	100	100	**53**	**54**	**52**	**52**	**42**
AQ20	409483	423337	Roadside	Diffusion Tube	100	100	**29**	**30**	**24**	**24**	**22**
AQ21	409822	423167	Roadside	Diffusion Tube	100	100	**53**	**50**	**48**	**45**	**44**
HB6	399502	427041	Roadside	Diffusion Tube	100	100	**40**	**38**	**35**	**31**	**30**
HQ1	398794	427237	Roadside	Diffusion Tube	100	100	**54**	**52**	**50**	**46**	**44**
HQ9	399236	427176	Roadside	Diffusion Tube	100	100	**42**	**42**	**36**	**39**	**35**
LF1	403810	424977	Roadside	Diffusion Tube	100	100	**46**	**46**	**39**	**41**	**34**
LF2	403738	425110	Roadside	Diffusion Tube	100	100	**38**	**38**	**35**	**34**	**29**
SB1	406135	423639	Roadside	Diffusion Tube	100	100	**53**	**50**	**45**	**46**	**42**
SB3	405961	423571	Roadside	Diffusion Tube	100	100	**44**	**46**	**40**	**43**	**35**
SB15	406707	423824	Roadside	Diffusion Tube	100	100	**45**	**42**	**37**	**34**	**34**
SB16	406638	423836	Roadside	Diffusion Tube	100	100	**43**	**42**	**38**	**40**	**36**
BS1 HB	398990	427210	Roadside	Diffusion Tube	100	100	-	**42**	38	37	**33**
WV-SR1	409598	421167	Roadside	Diffusion Tube	100	100	-	-	39	38	**38**
WV-SR2	409608	421160	Roadside	Diffusion Tube	100	100	-	-	29	31	**28**
MY01	401431	425995	Roadside	Diffusion Tube	100	100	-	-	**28**	**52**	**44**
MY02	401275	426046	Urban Background	Diffusion Tube	100	100	-	-	**42**	**24**	**21**
MY03	401204	426041	Roadside	Diffusion Tube	100	58	-	-	-	**42**	**39**

MY-04	401059	426179	Urban Background	Diffusion Tube	58	58	-	-	-	**29**	**27**
MY-05	401040	426186	Roadside	Diffusion Tube	58	58	-	-	-	**33**	**28**
AQS2	409485	423430	Roadside	Automatic	75	75	-	-	-	**38.6**	**39.7**
AQS3	398990	427210	Roadside	Automatic	96	96	-	-	-	**35**	**34.3**
AQS4	406075	423615	Roadside	Automatic	94	94	-	-	-	**38.1**	**36**

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

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

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

Notes:

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

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

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

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

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

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

The trend in concentrations of nitrogen dioxide determined using diffusion tubes is illustrated in Figure 5 for sites in Brighouse.

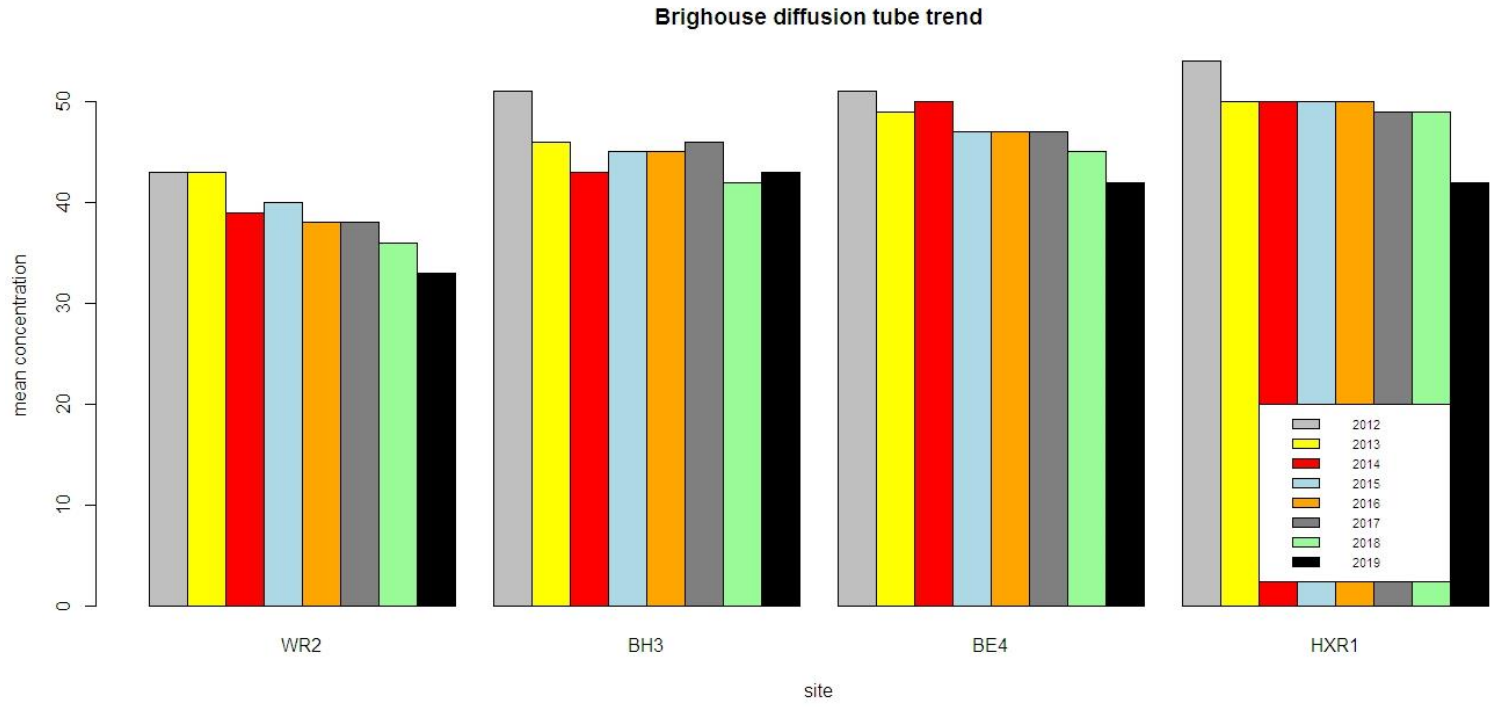

Figure 5: trends in nitrogen dioxide concentrations at Brighouse diffusion tube sites

The trend in annual mean concentrations for sites in Hipperholme is shown in Figure 6.

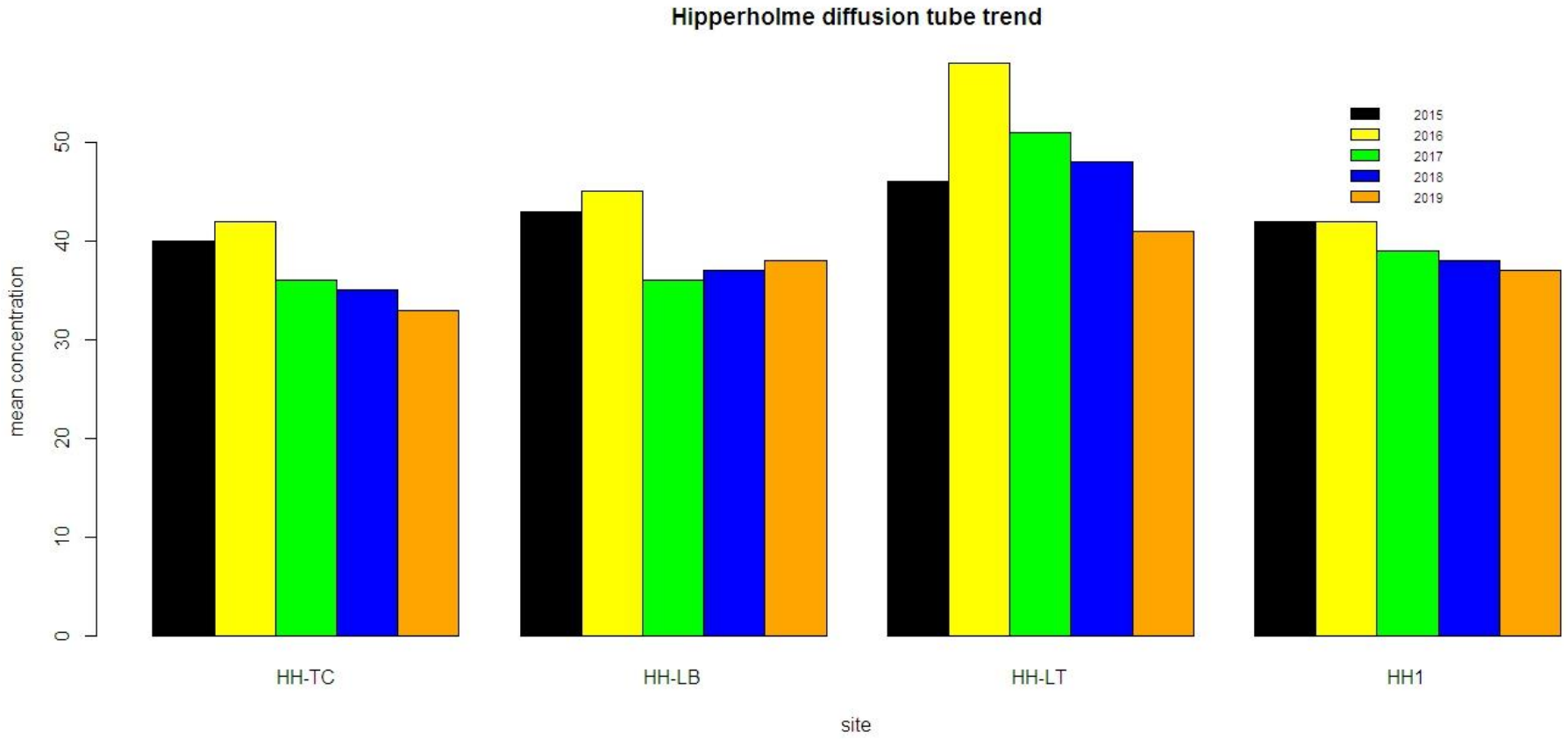

Figure 6: diffusion tube trend at Hipperholme sites

The trend in annual mean nitrogen dioxide concentrations is shown in Figure 7 for sites on the A629 in AQMA No. 1.

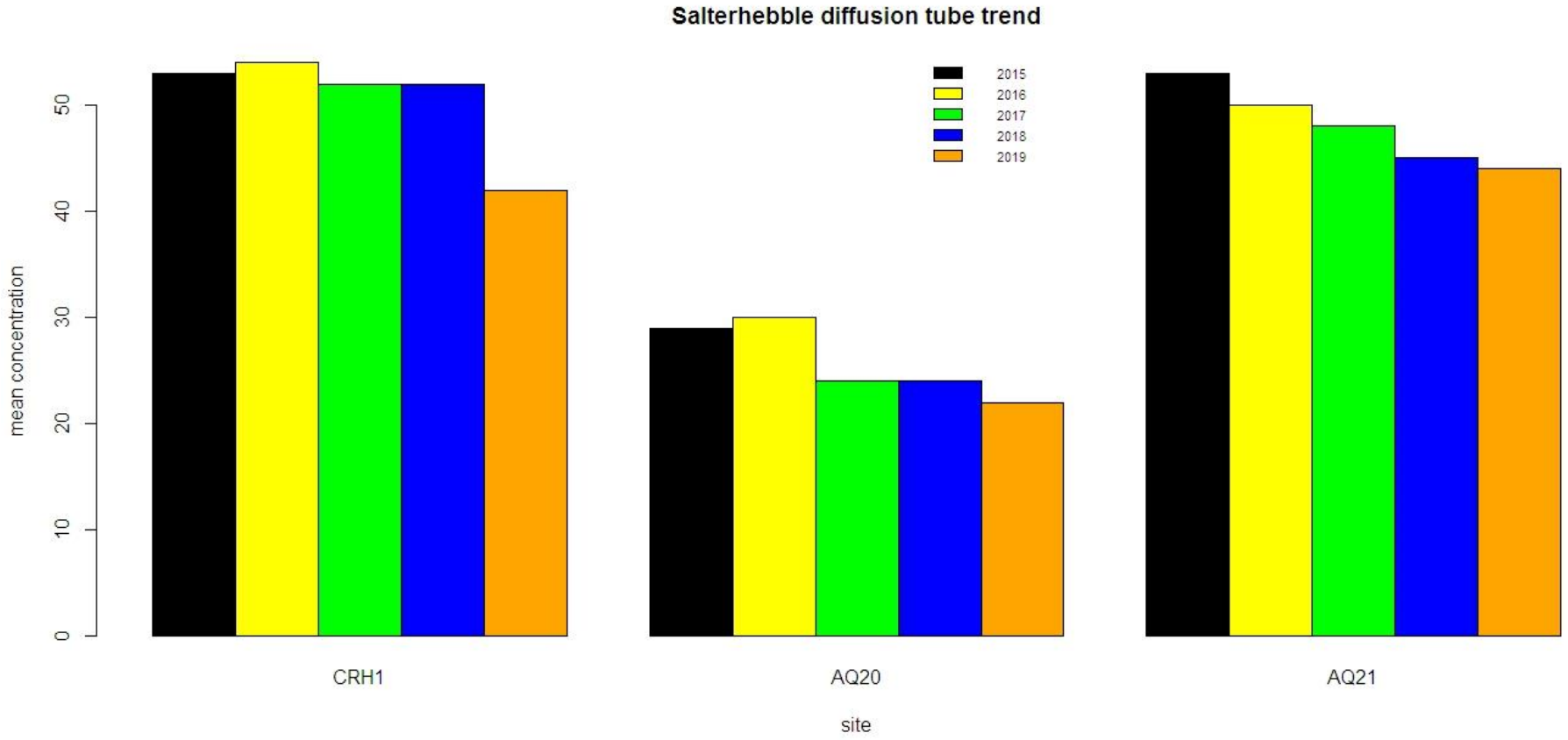

Figure 7: trend in annual mean dioxide concentrations at Salterhebble

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
							2015	2016	2017	2018	2019
AQS2	409485	423430	Roadside	Automatic	76	76	**2**	**0**	**0**	**4**	**4 (133.7)**
AQS3	398990	427210	Roadside	Automatic	98	98	**0**	**0**	**0**	**0**	**0**
AQS4	406075	423615	Roadside	Automatic	100	100	**0**	**0**	**0**	**1**	**1**

Notes:

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

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

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

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

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	PM_{10} Annual Mean Concentration ($\mu g/m^3$) (3)				
						2015	2016	2017	2018	2019
AQS4	406075	423615	Roadside	100	100	25	25	23	25	24

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

Notes:

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

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

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

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

(4) The raw results from the unheated BAM were divided by 1.2 to arrive at the reported figure, as required by [TG16].

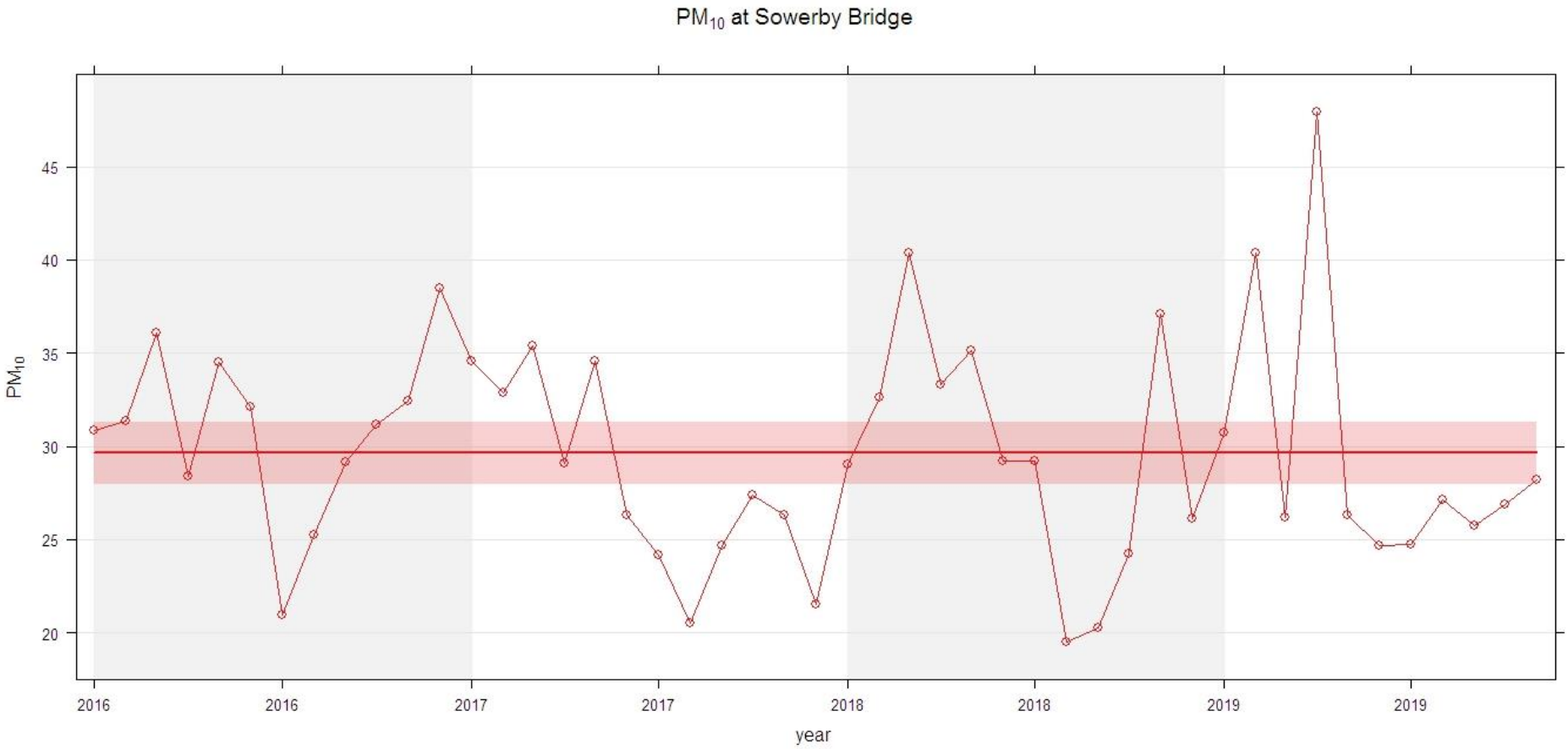

Figure 8: trend in PM_{10} concentration at Sowerby Bridge AQS4

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
						2015	2016	2017	2018	2019
AQS4	406075	423615	Roadside	100	100	-	15	8	12	19

Notes:

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

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

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

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

(4) The raw results from the unheated BAM were divided by 1.2 to arrive at the reported figure, as required by [TG16].

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	$PM_{2.5}$ Annual Mean Concentration ($\mu g/m^3$) (3)				
						2015	2016	2017	2018	2019
AQS2	409485	423430	Roadside	89.7	89.7	11	13	13	13	11
AQS3	398990	427210	Roadside	92.4	92.4	11	17	15	17	20

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

Notes:

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

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

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

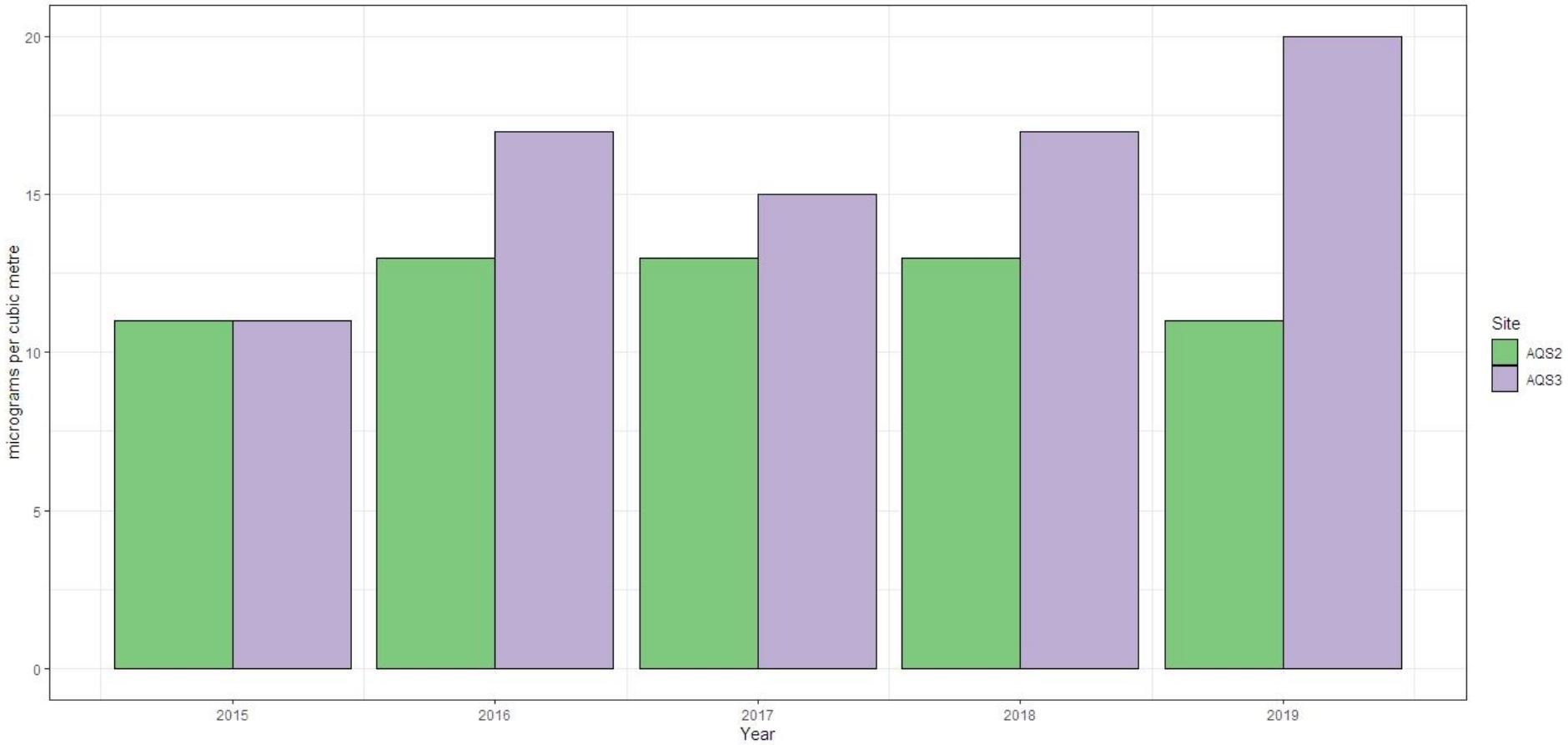

Figure 9: trends in concentrations of PM2.5 at AQS2 (Halifax) and AQS3 (Hebden Bridge)

Appendix B: Full Monthly Diffusion Tube Results for 2019

Table B.1 - NO_2 Monthly Diffusion Tube Results - 2019

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (f=0.87) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
LV-SAA	411201	419429	23.0	38.0	32.0	36.0	29.0	25.0	27.0	22.0	39.0	23.0	16.0	29.0	28.3	25	-
LV-SCA	405911	416597	31.0	61.0	64.0	43.0	43.0	33.0	48.0	63.0	39.0	23.0	35.0	32.0	42.9	37.0	-
LV-AT	411533	419358	68	63	50	68	49	53	52	47	39	32	55	38	51.2	45.0	-
LV-62W	416172	422282	62	48	45	52	41	46	40	40	29	38	46	30	43.1	37.0	-
LV-62E	416717	422113	68	50	45	40	37	37	40	38	33	28	46	35	41.4	36.0	-
LV-LEE	417698	420709	39	45	24	27	30	29	24	35	31	23	35	31	31.1	27.0	-
LV-BRD	414683	423155	40	43	30	36	30	25	30	26	30	23	21	32	30.5	27.0	-
LV-NBN	409715	425754	90	80	64	72	59	71	71	39	71	38	58	47	63.3	55.0	-
LV-NBS	409708	425737	70	62	43	41	45	46	50	51	56	33	36	29	46.8	41.0	-
LV-NBX	409602	425797	37	61	53	43	41	43	41	51	44	35	56	35	45.0	39.0	-
LV-EWB	410104	421516	66	39	20	39	22	26	24	25	19	22	36	39	31.4	27.0	-
NB-NB1	409663	425740	53	65	57	51	42	35	40	45			45	32	46.5	40.0	-
NB-GR	409957	425642	56	76	57		52	54	45	57	54	44	32	49	52.4	46.0	46.9
NB-GL	410367	425975	78	78	56	62	53	56	57	68	56	29	56	25	56.2	49.0	35.0

SC5	410823	426265	36	43	34	58	46	51	45	41	38	31	30	29	40.2	35.0	46.7
HH-TC	412718	425556	46	46	35	48	34	38	35	32	33	30	35		37.5	33.0	26.8
HH-1A	412430	425479		58	47	56	48	46	45	42	40	24	40	39	44.1	38.0	-
HH-LT	412450	425435	31	64	62	51	55	45	55	52	47	37	29	41	47.4	41.0	-
SB-AQ	412618	425503		32	38	65	43	52	45	37	38	40	44	31	42.3	37.0	-
WR2	415090	422817	50	47	44	42	38	43	38	36	23	27	36	38	38.5	33.0	-
BH3	414671	422740	60	59	49	46	49	47	55	54	49	43	36	40	48.9	43.0	37.8
BE4	414478	422692	60	55	52	51	48	44	50	49	48	36	48	40	48.4	42.0	-
BE2	414385	422457	53	49	30	51	43	40	36	41	43	31	36	32	40.4	35.0	-
HXR1	414218	422957	61	65	51	55	39	53	58	56	52	37	26	32	48.8	42.0	-
CL1	413261	420686	44	49	29	32	35	30	35	32	32	29	35	19	33.4	29.0	-
HTAH	411494	419594	43	40	39	36	25	28	32	30	25	22	22	33	31.3	27.0	-
AT-BR	411514	419548	35	41	35	45	29	31	26	28	31	25	33	24	31.9	28.0	-
AT-MR	411581	419373	33	40	39	24	25	24	27	27	14	29	34	23	28.3	25.0	-
AT-MR2	411530	419377	16	48	32	29	33	30	34	33	33	29	31	34	31.8	28.0	-
AQC1	409485	423431	53	77	59	47	47	42	45	45	37	27	28	41	45.7	40.0	-
AQC2	409485	423431	61	55	43	47	43	47	48	48	37	24	44	37	44.5	39.0	-
AQC3	409485	423431	57	59	50	49	45	30	45	44	42	30	52	29	44.3	39.0	-
CRH1	409767	423011	37	60	56	58	53	54	52	49	57	39	27	44	48.8	42.0	-
AQ20	409483	423337	33	32	25	25	28	20	23	19	25	20	29	23	25.2	22.0	-
AQ21	409822	423167	63	57	40	63	64	42	52	51	52	37	60	30	50.9	44.0	-
HB6	399502	427041	46	37	39	34	34	40	38	34	32	32	21	26	34.4	30.0	-
HQ1	398794	427237	66	63	52	48	52	59	56	59	46	35		24	50.9	44.0	-
HQ9	399236	427176	54	50	39	44	38	43	37	41	22	36	36	37	39.8	35.0	-
LF1	403810	424977	46	44	42	43	43	43	43	33	41	29	30	30	38.9	34.0	-
LF2	403738	425110	47	38	36	34	35	29	32	31	31	23	33	33	33.5	29.0	-

SB1	406135	423639	62	58	54	67	53	56	54	48	37	34	30	27	48.3	42.0	-
SB3	405961	423571	36	49	33	72	42	37	46	35	35	32	33	29	39.9	35.0	-
SB15	406707	423824	43	50	40	41	33	39	29	39	35	34	47	33	38.6	34.0	-
SB16	406638	423836	47	47	41	63	38	40	39	36	38	33	38	34	41.2	36.0	-
SB22	405823	423395	56	52	39	64	48	53	47	38	44	21	54	34	45.8	40.0	-
BS1 HB	398990	427210	48	52	44	55	35	27	39	39	16	20	37	41	37.8	33.0	-
WV-SR1	409598	421167	61	53	49	44	37	40	40	38	42	34	51	38	43.9	38.0	-
WV-SR2	409608	421160	26	40	32	47	28	29	31	29	33	32	34	25	32.2	28.0	-
MY01	401431	425995	68	58	60	52	46	40	57	53	49	39	42	37	50.1	44.0	-
MY02	401275	426046	34	34	26	21	19	21	22	22	23	18	22	21	23.6	21.0	-
MY03	401204	426041	52	40	33	56	41	47	46	43	47	37	46	52	45.0	39.0	-
MY-04	401059	426179	41	38	34	36	30	26	33	30	24	21	34	30	31.4	27.0	-
MY-05	401040	426186	23	43	32	39	31	30	38	33	22	24	43	28	32.2	28.0	-

☒ **Local bias adjustment factor used**

☐ **National bias adjustment factor used**

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

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

Notes:

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

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

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

(2) Distance corrected to nearest relevant public exposure.

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

C.1 Sources of pollution

The Council has continued to review sources of pollution in the Borough. There have been several applications for permits to operate incineration plant, but these have been for plant in areas away from AQMAs or residential areas. Air quality assessments have been submitted with the applications and the incinerators are not believed to have given rise to exceedances of air quality objectives in the Borough.

There have been changes to traffic flows on the A629 through AQMA No. 1 following the completion of Phase 1a of a major long-term upgrading scheme. It is not yet clear whether this will result in long term changes to the nitrogen dioxide concentrations in that area; and Phase 1b, which will involve works to the south of the AQMA is currently in preparation. Further major schemes will be discussed in future reports.

C.2 Dispersion modelling

The Council has not undertaken detailed dispersion modelling during 2019. Air quality assessments have been submitted to the Council in respect of major planning applications but none has predicted exceedances of air quality objectives outside an AQMA.

C.3 Additional evidence and work

Sowerby Bridge is the subject of various projects centred on air quality. The town has an AQMA declared along the A58, which is a busy through route to the M62. Disruption on the M62 can lead to increased traffic through the town with consequent congestion.

A traffic monitoring project using machine learning to identify vehicle types and counts was undertaken in 2019 and the results are in preparation. The presence of the continuous monitor on this stretch of road may allow some further analysis and modelling. Changes to improve the traffic flows are being planned as part of the corridor improvement programme.

The Council's library service is developing a community project in and around the town looking at the local impact of air pollution, its historic and contemporary contexts and how behaviour change could make a difference.

In 2019 the Council worked in partnership with a local school to erect a green screen between the school yard and the major road running past it. In addition to providing a visual screen the effect on pollutant concentrations in the school yard was to be studied. Pollutant monitoring was carried out but the results were inconclusive due to unforeseen issues with the monitors and the screen itself.

It was, however, possible to draw conclusions about average pollution levels in the school playground, and these were found to be comfortably below the air quality objectives.

C.4 Overview of continuous monitoring

The continuous monitoring station at Salterhebble measures nitrogen oxides and fine particulate matter ($PM_{2.5}$). The station is referred to as AQS2.

The continuous monitoring station at Hebden Bridge measures nitrogen oxides and fine particulate matter ($PM_{2.5}$). The station is referred to as AQS3.

The continuous monitoring station in Sowerby Bridge measures nitrogen oxides and particulate matter (PM_{10}). This station is referred to as AQS4.

C.5 Supply and analysis of nitrogen dioxide diffusion tubes

The nitrogen dioxide diffusion tubes for 2019 were supplied and analysed by West Yorkshire Analytical Services. The tubes were prepared with 50% TEA in acetone. West Yorkshire Analytical Services AIR-PT (which includes the former WASP scheme) scores improved from the 2015 findings, although they were not consistently 100% for 2019. The Council is satisfied that the laboratory had appropriate quality assurance procedures in respect of the analyses. The laboratory has now stopped supplying and analysing diffusion tubes.

A “travel blank” was submitted for analysis with each batch of tubes, and the concentrations recorded for this tube were consistently negligible in 2019.

C.6 Maintenance and data preparation and analysis

The automatic analysers are covered by a maintenance and callout contract, which allows for six-monthly maintenance visits and callouts for instrument faults. Council staff visit the sites every two weeks to check for faults and to check the instrument nitrogen oxides span and zeros. Trained staff change the BAM tapes, and clean the inlet and nozzle between service visits. There were no significant problems with the operation of AQS3 and AQS4 during 2019. AQS2 was out of operation for over a month due to an air conditioning unit supply issue and a power unit failure, but operated satisfactorily for the remainder of the year.

The measurements from all three automatic sites are collected using WinAQMS and Airodis software. It is checked for obvious errors and outliers (which are marked in the database) and backed up to the Council's secure network. For analysis the data is downloaded monthly as a csv file. The raw data is checked for inconsistencies before scaling the raw data using the span and zero values obtained on site every two weeks.

Particulate matter measurements are made using a beta attenuation monitor (BAM) with the appropriate inlets for PM_{10} or $PM_{2.5}$. Data is collected using the same system as the nitrogen dioxide analysers. The raw results from the unheated BAM are divided by 1.2 to arrive at the reported figure, as required by [TG16].

Periods embedded within long sections of missing data may need to be removed from the data as they are likely to be affected by instrument faults (and this is normally picked up during routine checks). Periods known to be affected by instrument faults are also removed. The data may then be put into a suitable format for importing into the open source software package "openair" ([R17], [CR12], [CR16]), or manipulated in a spreadsheet. The Council has chosen to use "openair" due to the range of analysis tools, ease of data manipulation and simple production of graphics.

Dealing with missing data is a delicate problem, but the data for 2019 was almost complete for AQS3 and AQS4. AQS2 (NO_2) had a significant amount of missing data (data capture 76%) due to an air conditioning failure and faulty analyser power unit.

The uncorrected mean for 2019 was 39.6μgm^{-3}. Data from the Leeds Headingley AURN site was used to perform the period correction on the AQS2 NO_2 data as follows. The period mean covered the operational period of AQS2.

Leeds annual mean = 28.8551 μgm^{-3}.

Leeds period mean = 29.4147 μgm^{-3}.

Factor = 28.8551÷29.4147

AQS2 annual mean (period corrected) = 38.9 μgm^{-3}.

C.7 Choice of bias correction factor for 2018

The Council runs a local colocation study at AQS2, Huddersfield Road. The diffusion tubes AQC1, AQC2, and AQC3 ore collocated within 30cm of the monitor inlet. Data collection from these tubes was 100% while for AQS2 the rate was 76%. The period corrected annual mean for AQS2 was used to derive the bias correction factor of 0.87 used in this report.

AQS2 annual mean (period corrected) = 38.9 μgm^{-3}.
AQC1, AQC2, AQC3 annual mean = 44.8 μgm^{-3}.
Bias correction factor 2019 (local) = 0.8677 (rounded to 0.87)

Consistency check 1: tube SB-AQ is collocated with AQS4. Annual mean for SB-AQ with bias correction factor of 0.87 = 37 μgm^{-3}. Annual mean for AQS4 = 36.0 μgm^{-3}.

Consistency check 2: tube BS1-HB is collocated with AQS3. Annual mean for BS1-HB with bias correction factor of 0.87 = 33 μgm^{-3}. Annual mean for AQS3 = 34.3 μgm^{-3}.

The factor suggested by the national study is 0.80. This gives results around 3μgm^{-3} lower than the results at all three continuous monitoring sites. The local factor has therefore been used in this report.

C.8 Annualisation of diffusion tube results

None of the diffusion tube results reported in 2019 were annualised.

C.9 Distance correction of diffusion tube results

Diffusion tubes NB-GR and NB-GL at New Bank were corrected to account for the different distances from the kerb of the tube and the nearest receptor using Version 4.2 of the Falloff-with-distance calculator. A sample of results is shown in Figure 10.

Enter data into the pink cells

Site Name/ID	Distance (m)		NO_2 Annual Mean Concentration ($\mu g/m^3$)			Comment
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor	
NB-GR	4.0	3.6	16.7	46.0	**46.9**	Predicted concentration at Receptor above AQS objective.
NB-GL	2.1	13.0	16.7	49.0	35.0	
HH-TC	1.5	6.5	13.8	33.0	26.8	

Figure 10: sample of falloff with distance calculations

The results for Stump Cross indicate that although the diffusion tube measured an annual mean below the objective, the concentration at the closest receptor to the kerb was above the objective.

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

This appendix shows the locations of monitoring sites covered in this report. Each map has a key.

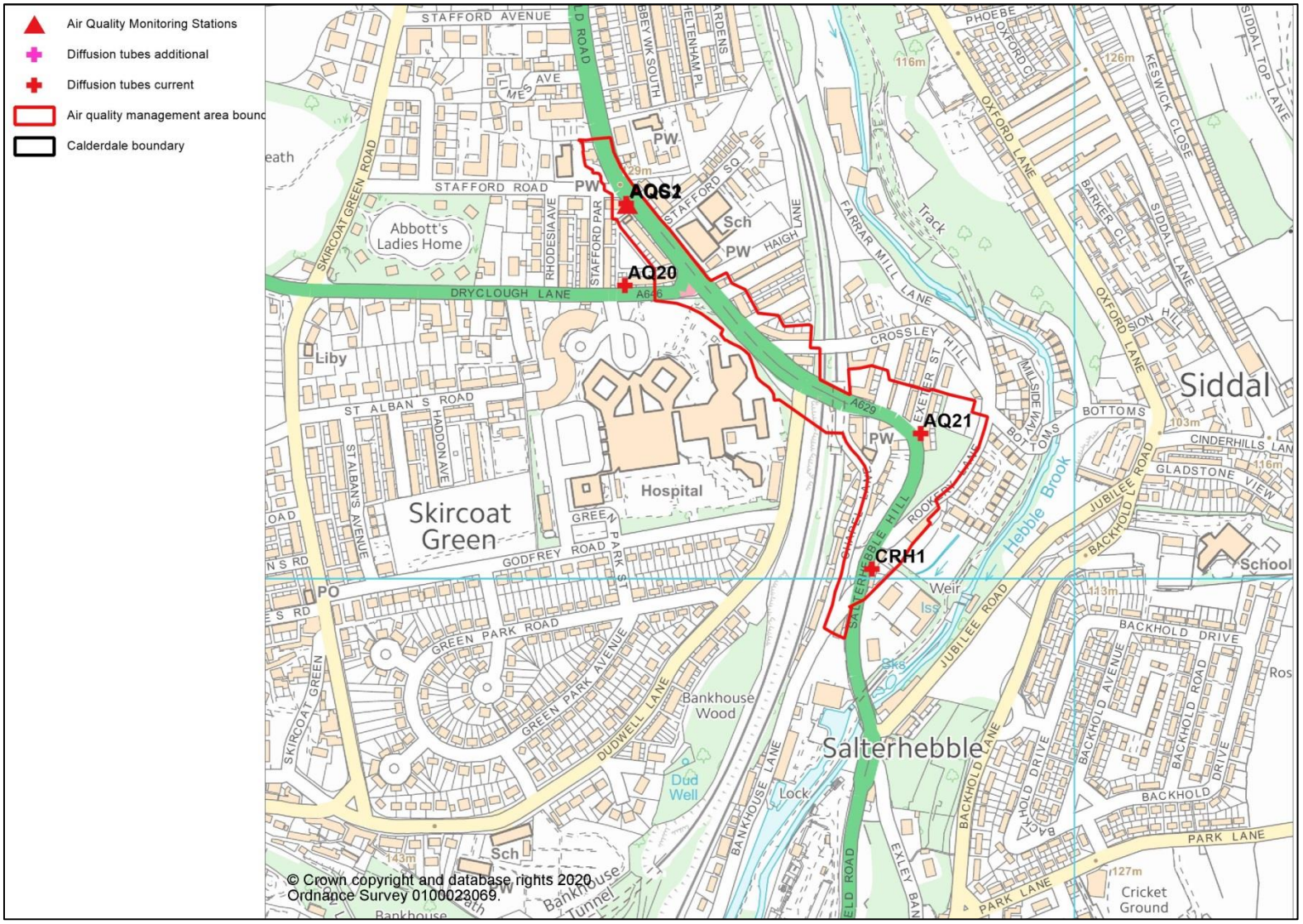

Figure 11: monitoring locations around Calderdale No. 1 AQMA at Huddersfield Rd Halifax

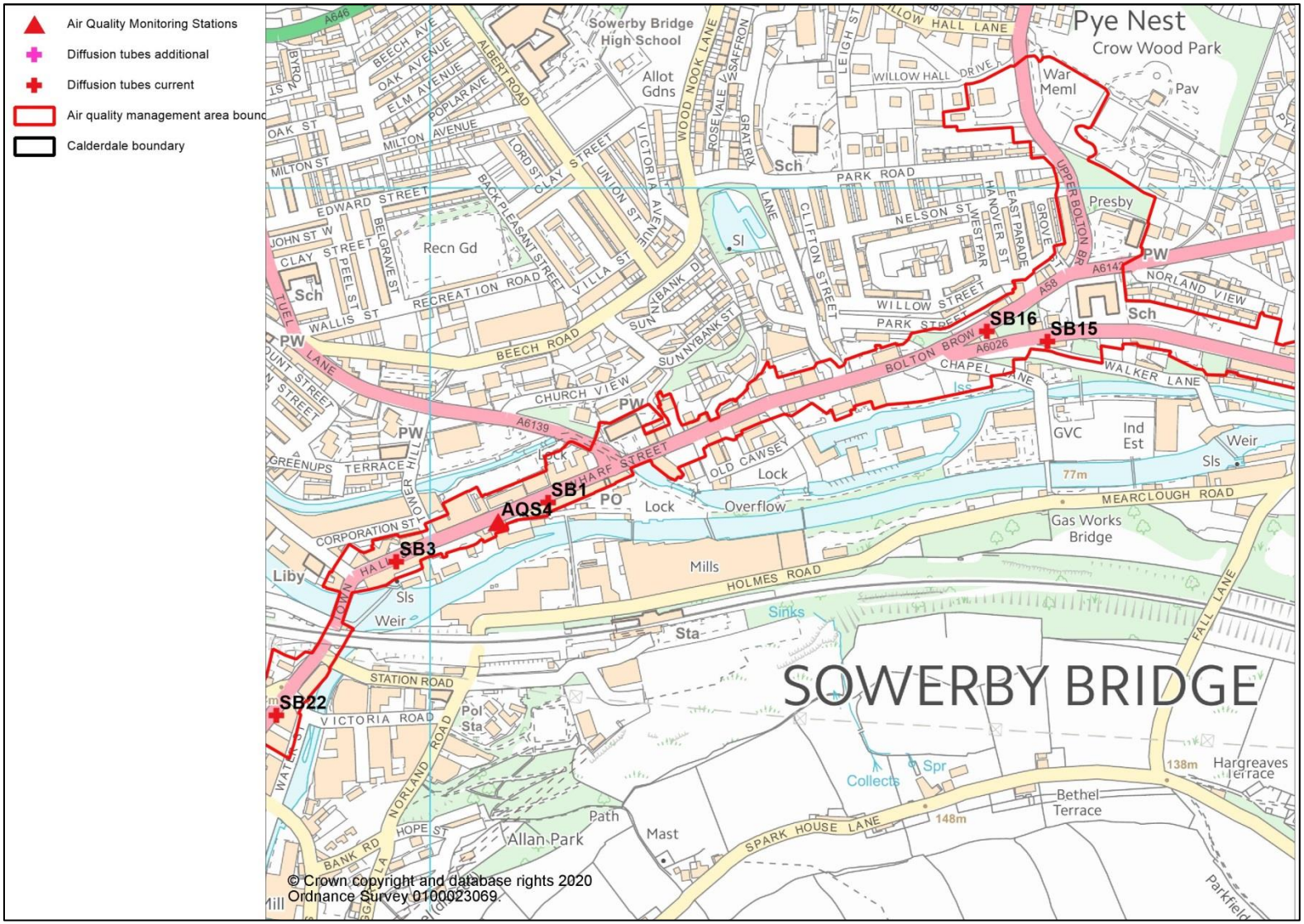

Figure 12: monitoring locations around Sowerby Bridge

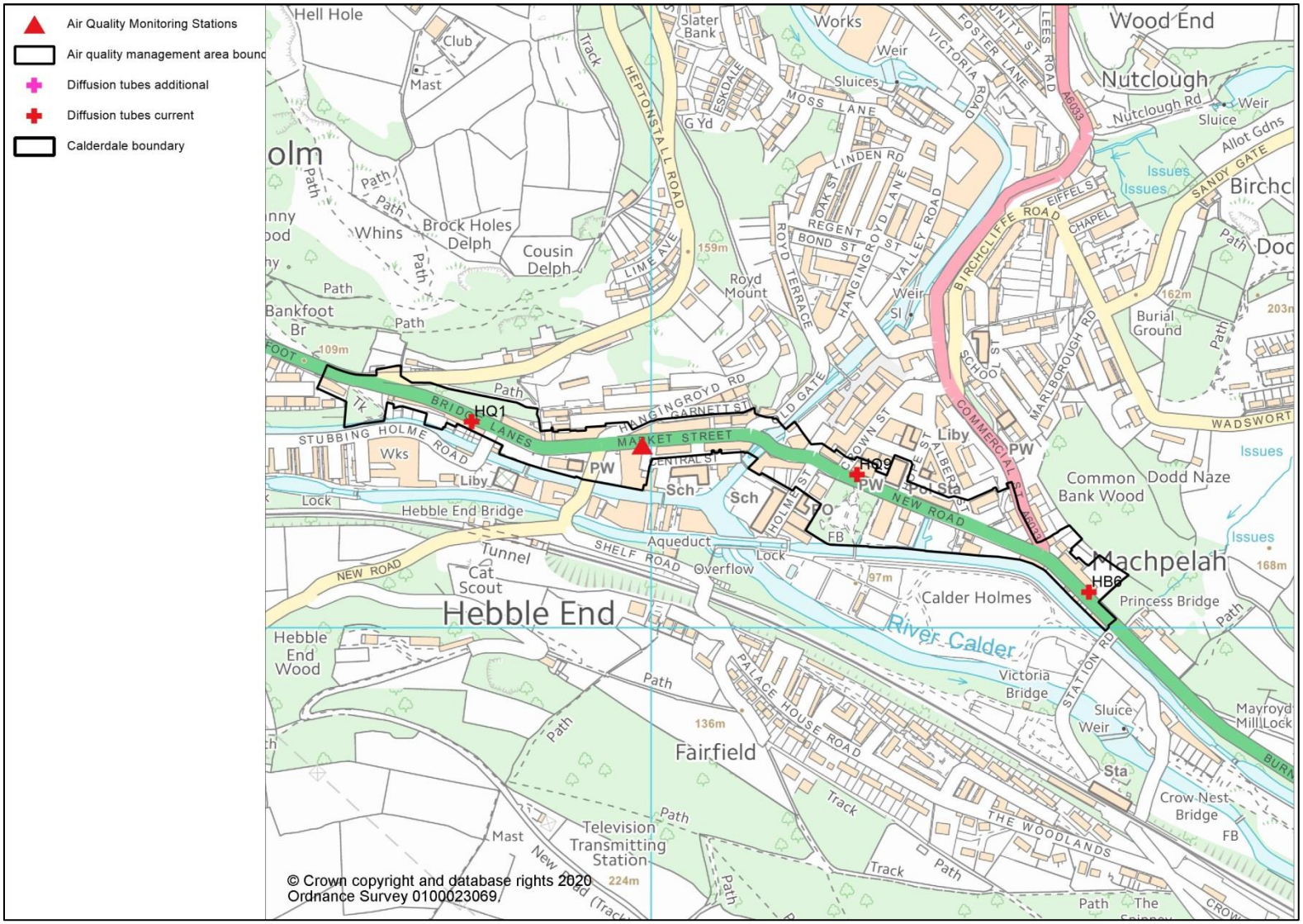

Figure 13: monitoring locations around Calderdale No. 3 AQMA, Hebden Bridge

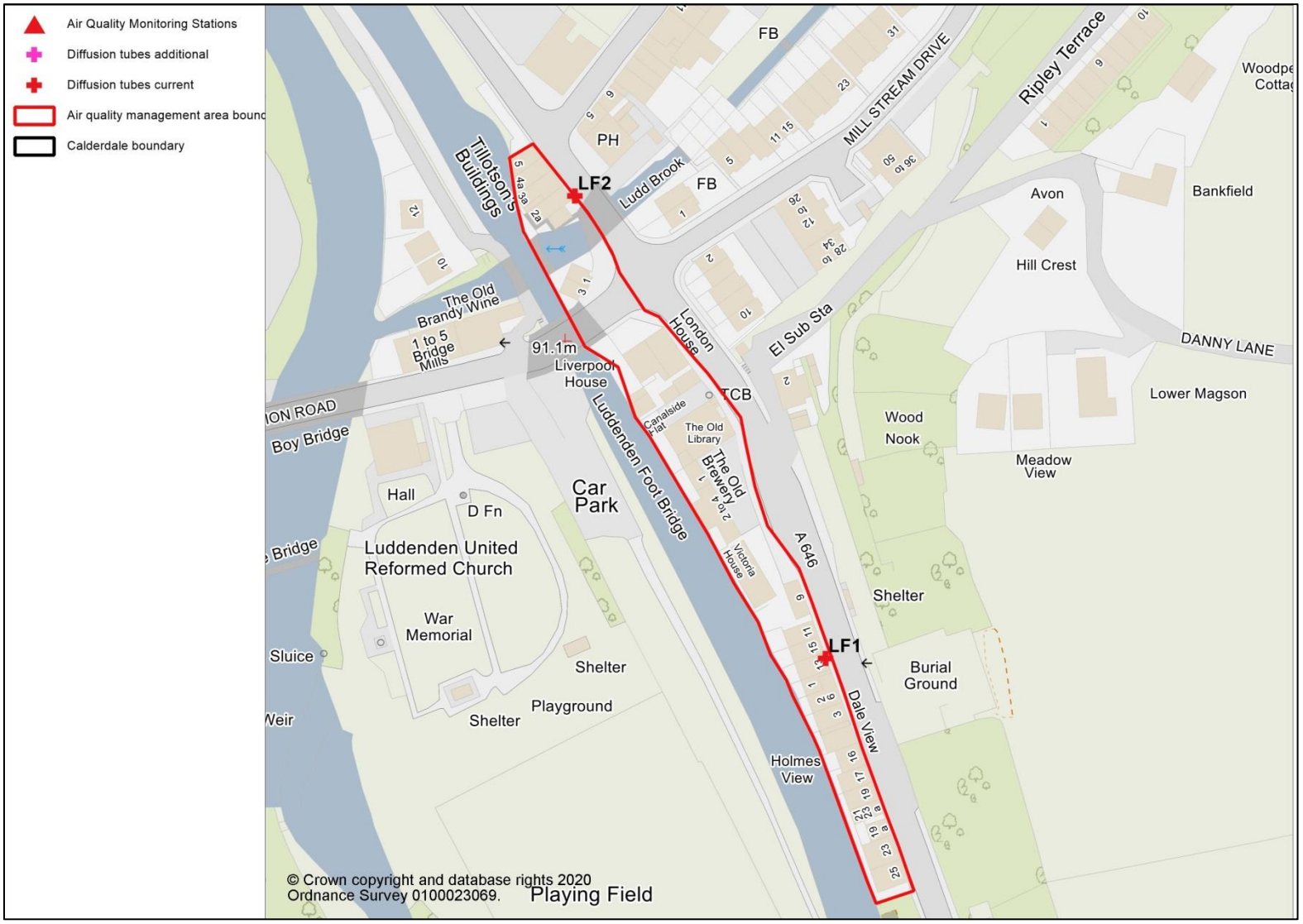

Figure 14: diffusion tubes in Luddendenfoot

Figure 15: diffusion tube at Stump Cross

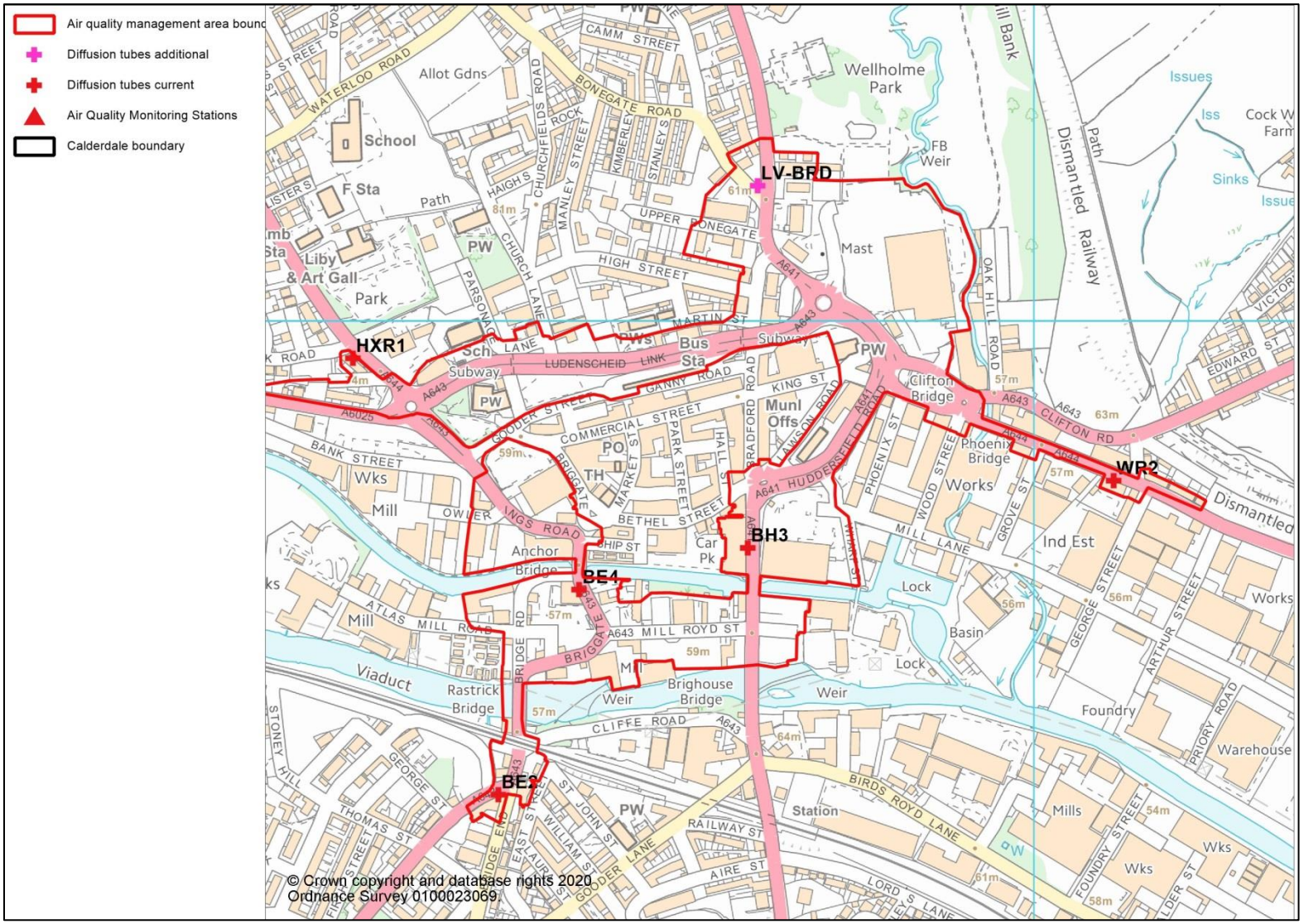

Figure 16: diffusion tubes in Brighouse

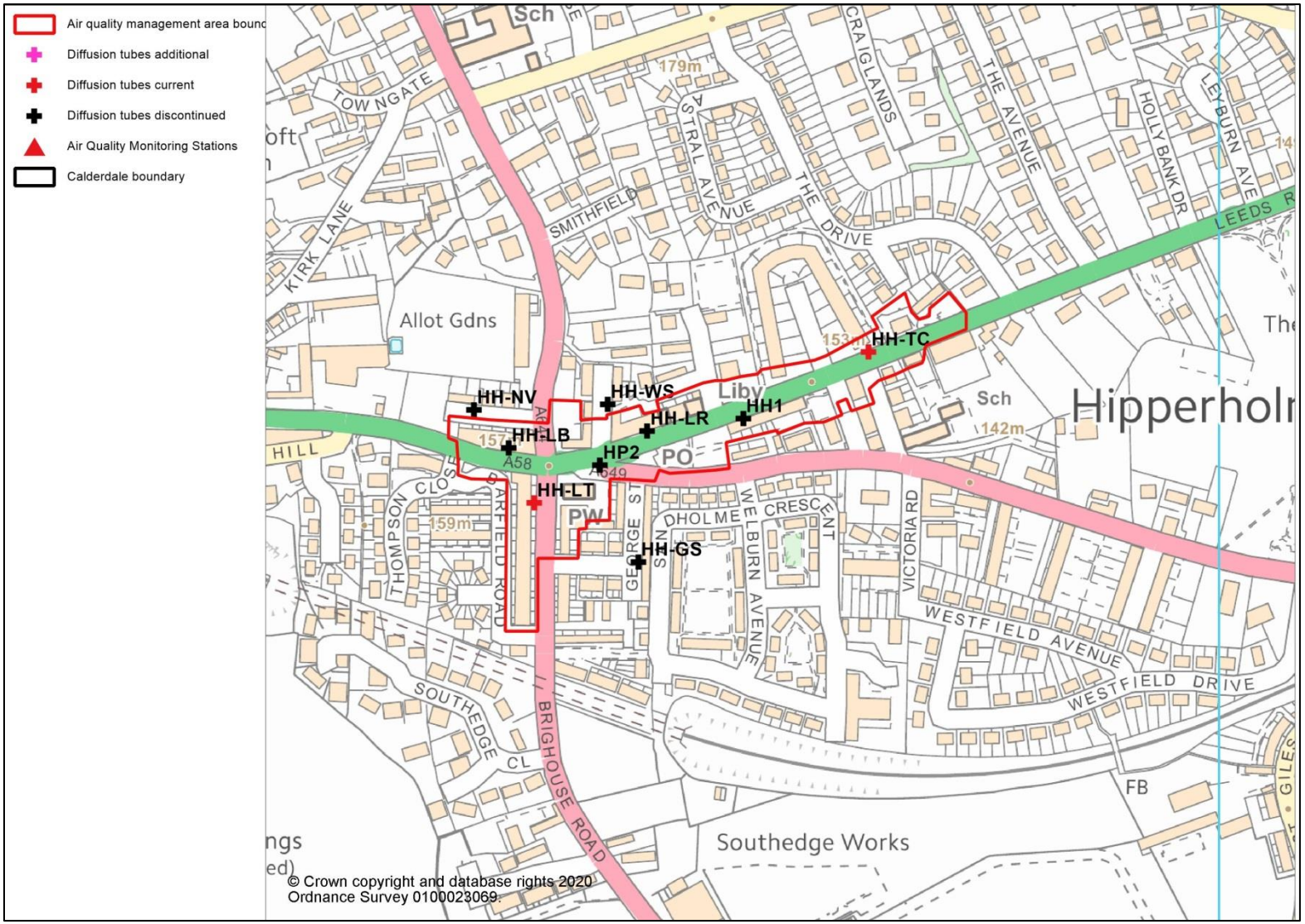

Figure 17: diffusion tubes at Hipperhome

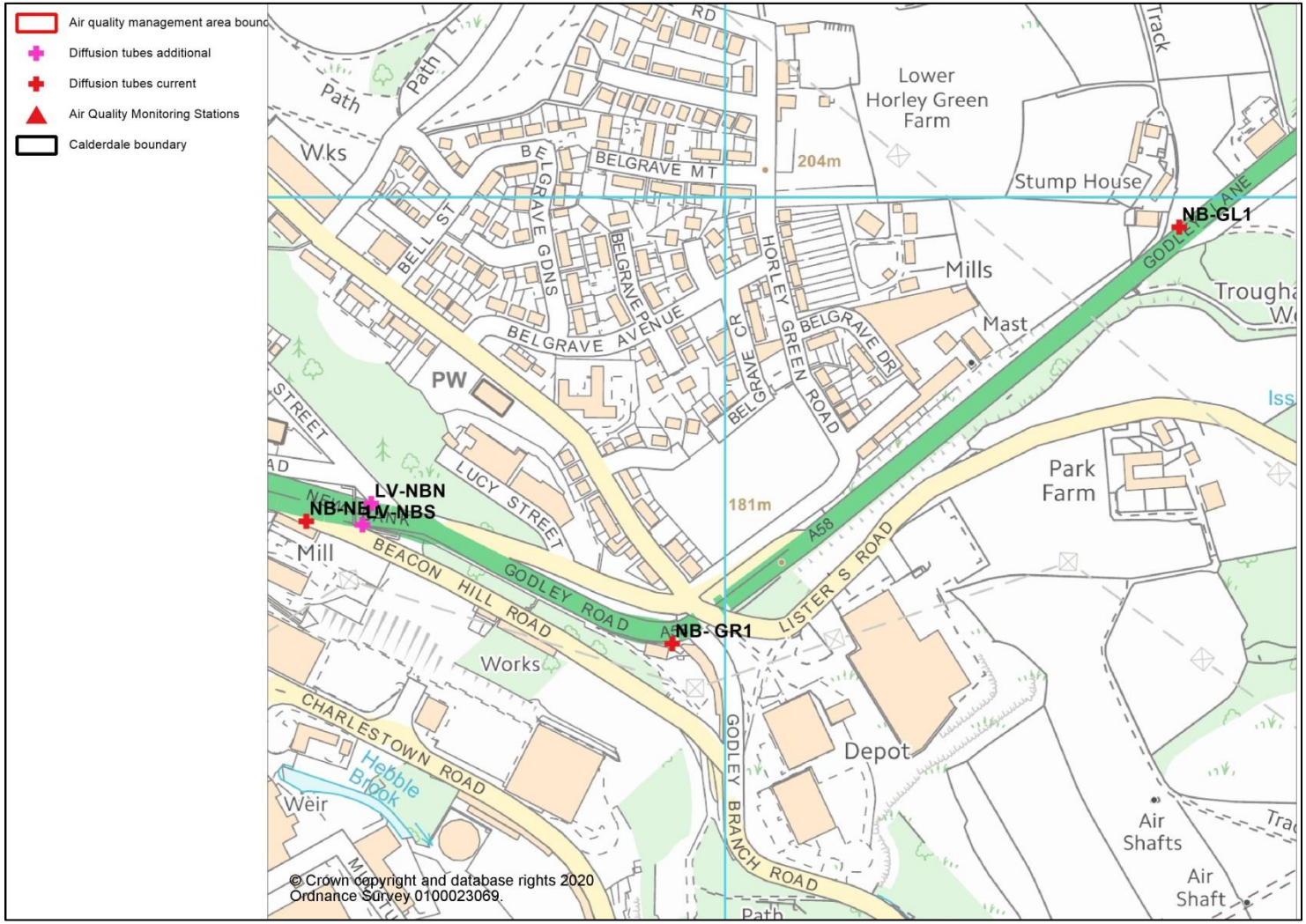

Figure 18: diffusion tubes at New Bank, Halifax

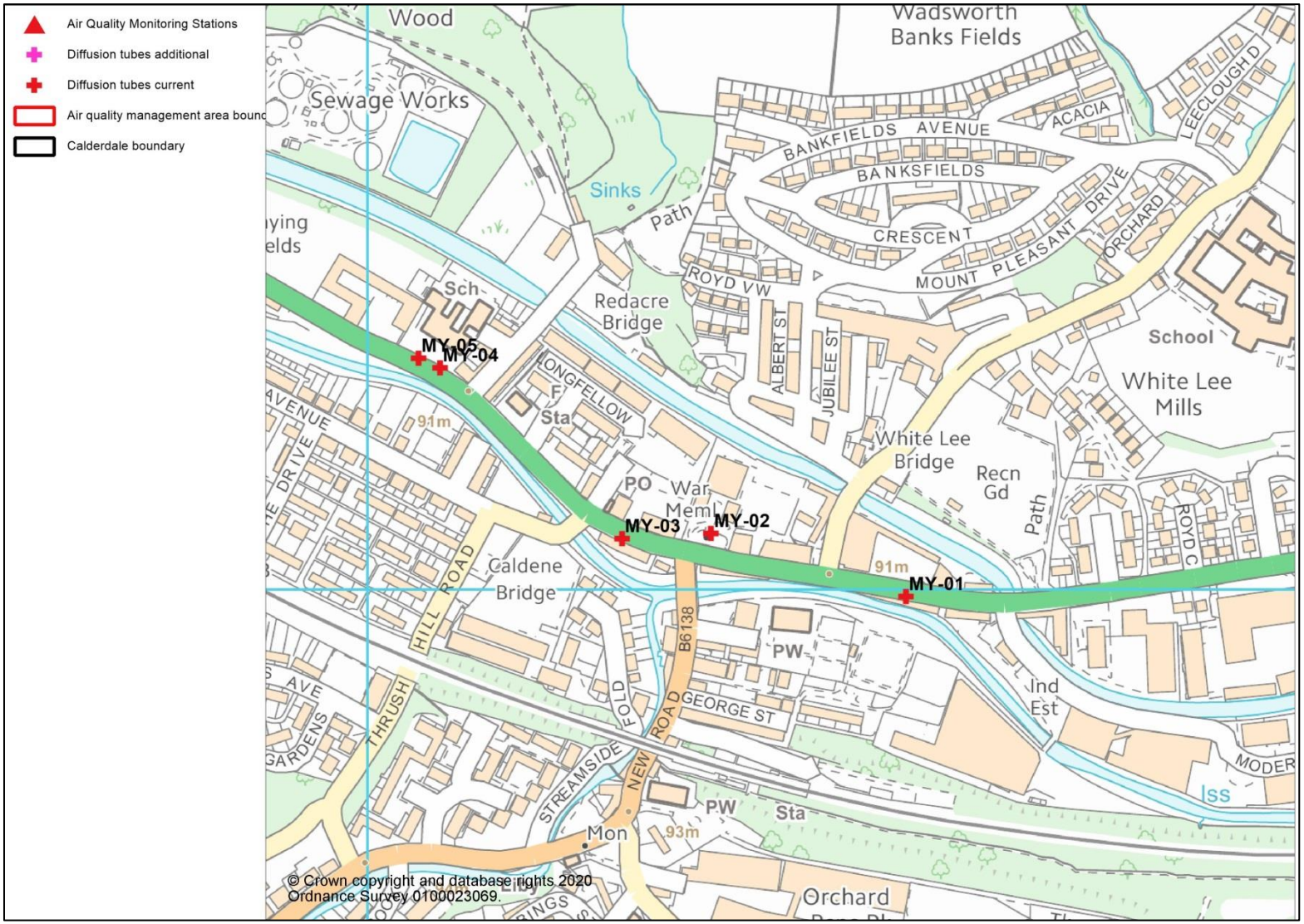

Figure 19: diffusion tubes in Mytholmroyd

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[6]	
	Concentration	Measured as
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

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

Appendix F: Action Plan governance

The table in this appendix sets out the plan for governance of the AQAP.

Action	AQAP reference/ policy/ strategy	Progress to date	lead	KPI
Action Plan development				
Review air quality steering group members and agree terms of reference and format of action plan	NA	Terms of reference and action plan format agreed	Named	completed
Establish low emissions/air quality delivery group	NA	Steering group to agree the make-up of the delivery group Group is now established and meets every 6 weeks. Relevant officers have been seconded onto the group as it has evolved (eg School Improvement Service) and how the action plan should be monitored. The AQAP is monitored by the AQ Steering Group at monthly meetings.	Steering group	

Monitoring and measurement				
Measure air quality at key sites and routes	AQAP1(1)	Ongoing - tubes and measuring sites. Monitoring strategy to be developed. Timing for this to be reviewed by AQ steering group. Funding confirmed for 2020 for diffusion tubes & 3 static sites. Also need information from major projects around monitoring of air quality. Major Projects team to confirm that AQ monitoring in place or planned for all major projects. Need to investigate whether and how we make live air quality data available. Complete – live data feeds are available via CMBC website-Data works AQ dashboard	Named	Data collection
Traffic Management				
Signalling strategies to be developed and improved using Leeds UTC	AQAP1(3)	Proposal through WYTF to link all district signals to one system (UTC) and join services together in Leeds. Being developed. Not directly relevant to air	Named	Improved traffic flows and queue lengths at key sites

		quality measure. **Ongoing**		
Improve real time messaging to drivers using VMS. Will inform drivers of delays on network	AQAP1(3)	VMS sites displaying route messages established. A646 - 5 sites operational and introducing a further two sites at Brighouse and Rishworth A629 to have new messages added but part of WYTF proposals for Phase 4 **Ongoing**	Named	Improved traffic flows
Development of parking strategy	Parking Strategy	Development of a parking strategy was due to commence early 2020 – likely to be delayed. Assess feasibility of technology to assist strategy development eg real time parking – being tested using APPY parking technology AppyParking now operational & testing underway. Parking standards incorporated within the local plan Green parking strategy – Assess options for green parking permits across Calderdale Cabinet Paper currently being drafted for this – likely to be delayed.	Named	Improved traffic flows
Improve traffic flow by improving signals needed to allow for interaction with freight/van in cab technology	AQAP2(3)	Not progressed – discussed feasibility for undertaking work with third party but not considered appropriate for Calderdale. **No further action**	Named	Improved traffic flows

Traffic Planning and Infrastructure				
Develop package of works to alleviate congestion. Corridor Improvement Programme -- A646 and A58/A672 corridor resilience; A629 corridor improvements	AQAP1 (all)	Sowerby Bridge outline proposal complete - outline business case only. Hebden Bridge and Luddenden Foot same stage. Full business case submission April 2020 A629 corridor improvements are a range of active delivery projects – phase 1s now complete; phase 1b/2 at planning stage; phase 3 not progressed; phases 4 and 5 in development. **Ongoing**	Named	Improved traffic flows
Develop NE Calderdale Transformational Project Package to alleviate congestion on A58 Hipperholme and A6036 Stump Cross		Package may include works in the wider NE Calderdale network. Only funded pre-feasibility. Complete – funding required. **Ongoing**	Named	Improved traffic flows
Improve A641 corridor Brighouse/SE Calderdale		Being delivered as part of WY+TF – pre feasibility stage **Ongoing**	Named	Improved traffic flows
Make A644 Cooper Bridge air quality compliant	NA	**Complete** – compliant	Named	% decrease giving measured concentration of xx
Cycling strategy actions	AQAP3(2)	Calderdale Cycling forum reports into the cabinet transport working party, CCF meets regularly made up of Calderdale cycle reps council officers, members, schools & other stakeholders Upgrade of Upper Valley Towpath complete to Hebden Bridge – further work planned in phase 2 to Todmorden Phase 2 is underway –	Named	Increase in cyclist numbers

		planned completion Feb 20 Hebble Trail extension plan now developed. Now incorporated into the WYTF Phase 4 Ryburn greenway feasibility study complete. Sustrans commissioned to progress study Pre-feasibility done on N Halifax routes. Now incorporated into transforming cities bid Bike racks in Halifax town centre now installed Complete		
Improve lighting of key cycle routes	AQAP3(2)	No funding yet identified Ongoing	Named	Increase in cyclist numbers
Incorporate air quality into planning considerations for new developments	AQAP5(3)	Part of planning regulations. Technical Planning Guidance Review being undertaken by West Yorkshire Low Emission Strategy group which includes Calderdale representatives.	Planning officer	Policies applied to all developments
Development of cycling and walking strategy and programme	AQAP3(3)	Walking and cycling infrastructure plan to be developed. LCWIP to be used in development. Calderdale's first LCWIP is complete – Halifax for walking & Brighouse for Cycling	Transportation	Increased numbers walking and cycling
Improve Calder Valley rail line	Transport Strategy [CMBC17]	Development of station at Elland including access and parking. Delivery expected 2022/2023 WYCA to start work on new base plan and production schedules being developed. Developing community rail partnership to encourage more train travel. Ongoing	Named	Improved transport integration
Develop strategy for total transport/mobility hubs	Transport Strategy [CMBC17]	Ongoing. Strategy and plan to be developed around integration of services in one hub. Potential for a demand responsive service and	Named	Improved transport integration

		incorporation of links to signposting or apps relating to walking and cycling routes. Ongoing		
Investigate feasibility and scope of a targeted action area	AQAP5(3)	Sowerby Bridge identified as a targeted action area – not a non-charging clean air zone as this is confusing for drivers and residents. Targeted action in Sowerby Bridge reliant on CIP and Masterplan due 2021/2022 but SB given priority in decisions around focused activity.	Named	
Create 'Healthy Streets' with aim of more attractive, accessible and people friendly streets	AQAP3(3)	Health streets principles incorporated into Calderdale HDC design guide – in development. Ongoing Healthy Street pilot proposal £1m in Park Ward. Ongoing & progressing	Named	Policies applied to all developments
Trial Green Screen	Project	Defra funding for Green Screen at Burnley Road school – installed by May 2019. Monitoring before and after ongoing. Issues with monitors and slow green growth mean that no continuous run of measurements, but based on one monitor together with diffusion tube data confident that concentrations of pollution in the school yard comfortably below air quality objectives.	Transportation and Environmental Health	
Low Emission Strategy and Transport				
Install charging facilities for taxis and for public use	AQAP5(4)	Installation of EV charging points - grant allocation from West Yorkshire. Leaders' briefing/cabinet paper done. One Uber electric taxi now available. Install charging facilities for taxis and for public use – We now 2 live and available to use (would have been 3 if it hadn't been for North Bridge getting knocked down). A further 5 will be installed in car parks by May 2020.	Named	Number of EV charging points

Procure ULEVs within Calderdale fleet where practical	AQAP4(1)	80+ council vehicles (including the mayoral vehicle) are due for renewal & 33 are to be replaced by EV's. CAFM supporting installing of chargers at key points. 30 ULEVs (electric vehicles) have now been ordered for Calderdale fleet, due to arrive end August 2020. A Project Team has been set up to deliver new EV charging infrastructure across multiple corporate sites including Battinson Road, Mulcture House and Manor Heath. An additional 5 hybrid vehicles have also been ordered. One handyman van is now ULEV.	Named	Reduced vehicle emissions
Promote usage of electric charging facilities	AQAP4(1)	Supplier will promote location and usage Ongoing	Named	Usage of EV charging points
Promote uptake and usage of electric vehicles	AQAP5(4)	West Yorkshire Electric Vehicle strategy in development. A request has been put through to WYCA for funding for WY EV strategy – approval early 2020 – likely to be delayed.	TBC	Uptake of vehicles
Install on street electric car charging using OLEV funding of £100k	AQAP4(1)	Business improvement identifying areas using MOSAIC to help prioritise locations. Aiming to apply this financial year Grant application successful. Install on street electric car charging using OLEV funding of £100k – We are in the procurement process	Named	Usage of EV charging points
Review implementation of WYLES	AQAP5(3)	Calderdale has adopted the WYLES. A WYLES officer has been appointed to progress	Named officers	

		WYLES strategy on behalf of the 5 WY authorities. Going forward the role will benchmark projects and monitor eg the performance of ECO stars		
Investigate ECO stars scheme	AQAP2(3)	ECO stars already committed to and funded by WYCA. TRL appointed April 2019. Planning stages for TRL to contact companies across West Yorkshire to encourage participation in the scheme. Business event held November 2019 to launch ECO stars and engage with businesses.	Named officers (TBC)	number of partners signed up
Improve bus fleet quality	AQAP3(1)	In partnership with WYCA and bus operators. First Bus has confirmed that 39 buses in Calderdale retrofitted by end May 2019 to add to the. 14 buses already compliant out of total 95 first buses. WYCA leading on Zero Emission Bus Roadmap to establish a delivery plan for zero emission bus fleet.	Named	Reduced vehicle emissions
Public Awareness of air quality				
Measure air quality in local communities and raise awareness of issue	Project	No suitable monitor found, We are continuing to monitor air quality in AQMAs and areas of concern but we have not launched any specific community-based monitoring projects.	Named	Data collection and raising awareness
Develop communications campaign including engagement, web pages and social media	AQAP2(2)	Requirements and communications being developed Let's Clear The Air campaign launched June 19 with anti-idling messages & action days Joint WYCA AQ grant bid applied for but not successful.	Communications team	Improved awareness of air quality issues
Capitalise on national events to raise awareness	AQAP2(2)	Clean Air day is 20 June 2019 and will be promoted Radio campaign & banners used to promote	Communications team/ Sheridan Paterson/Bridget Kusyj	Improved awareness of air quality issues

		Evaluation complete		
Promoting Travel Alternatives				
Increase car sharing and alternative transport	AQAP3(1)	Promotion of car sharing internally at CMBC ongoing. Further promotion with external companies required via workplace health. Promotion of car clubs eg Enterprise **Ongoing**	Named	Increased numbers using sustainable modes of transport
Promote public transport as alternative to car	AQAP3(1)	Needs to be coordinated with work undertaken by WYCA/Metro. Free first bus ticket incorporated in council tax statements 2018. Work is now progressed via WYCA Bus Alliance work streams	TBC	Increased numbers using sustainable modes of transport
Promote LEV for taxis	AQAP4(2)	A bid for an air quality qrant has been submitted to Defra for an engagement project to engage with the taxi operators & drivers using telematics & raising awareness. Bid not successful but alternative reduced testing programme will be considered in 2021	Named	Uptake of vehicles
Promote bikeability and bike library	AQAP3(2)	Programme continues and is promoted by all services Ongoing	Named	Take up of schemes
Promotion of alternative transport to Calderdale staff	AQAP3(2)	Promotion of metro cards, electric bikes, discounted travel card, bike and go integrated cycle scheme continues. Ongoing	Named	Take up of schemes
Develop schools active and safe travel strategy - linked to reducing obesity and road safety	AQAP3(3)	Obesity workshop up and running led by Public Health. Obesity summit planned for March 3rd with focus on young people	Named	Increased numbers walking and cycling
Park and ride expansion at rail stations	AQAP3(1)	Funded improvement schemes are being progressed at Mytholmroyd and Hebden Bridge stations Ongoing	Named	Improved transport integration
Bus Partnership agreement to be established	AQAP2(3)	Bus alliance now established WYCA leading on a Zero Emission Bus Roadmap – to	Named	Number of partners taking part

		develop a delivery plan for low & zero emission buses.		
Rights of Way Improvement Plan to be updated	AQAP3(3)	Plan needs to identify ways to promote and raise awareness of the routes – no resource currently to do this	Named	Increased numbers walking and cycling
Promotion of alternative transport to school	AQAP5(2)	Safe travel SAFE (Sustainable, Active, Fun, Environmental) cup competition run in schools each year by independent travel team. Schools develop campaigns about travelling to school in healthier and safer ways. Final held on 21st June 19. Unlikely to be repeated in 2020 due to Covid 19. Engagement with schools to be reviewed. Potential theatre in education to be delivered from September 2020 in conjunction with Library project – this may be delayed.	Named	Increased numbers walking and cycling
Compatibility with other programmes				
Carbon savings and improved energy performance of homes and businesses	AQAP6(3)	Feasibility of Halifax district heat network in Halifax centre for businesses and council portfolio. An air quality impact assessment is likely to be needed.	Named	
Promote energy saving and renewable energy schemes	AQAP6(1)	Calderdale Community energy webpages established and projects undertaken with schools	Named	
Support businesses to manage energy consumption and save money	AQAP6(3)	6c working with businesses, schools and colleges	Named	
Review environmental permits for all types of units/installations	Enforcement Policy (EH)	Inspection programme is in place Environmental health to assess the process of environmental permit applications with the Environment Agency	Named	
Promote good practice in domestic burning.	AQAP5(6)	Concerns with sources of fine particulate matter including domestic burning.		

		Enforcement is ongoing, mainly complaint-driven		

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
LAQM	Local Air Quality Management
LTP	Local Transport Plan
MOVA	Microprocessor Optimised Vehicle Actuation (a sensitive pad or strip in the road to inform traffic signal sequencing)
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides including nitrogen dioxide
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide
ULEV	Ultra-Low Emissions Vehicle
WYCA	West Yorkshire Combined Authority
WYLES	West Yorkshire Low Emissions Strategy
WY+TF	West Yorkshire Plus Transport Fund

References

[AQAP] Air Quality Action Plan (2019) https://www.calderdale.gov.uk/v2/sites/default/files/Air-Quality-Action-Plan-2019.pdf [accessed May 2020]

[ASR19] Calderdale MBC Annual Status Report 2019

[Dataworks] Calderdale Data Works at https://dataworks.calderdale.gov.uk/ - an open data site including air quality data [accessed 14th May 2019]

[CMBC17] Calderdale Council'sTransport Strategy https://www.calderdale.gov.uk/v2/residents/transport-and-streets/transport-improvements-and-initiatives/transport-strategy [accessed 14th May 2019]

[CR12] Carslaw D C and Ropkins K, openair --- an R package for air quality data analysis. Environmental Modelling & Software. Volume 27-28, 52-61, 2012

[CR16] Carslaw D C and Ropkins K, openair: Open-source tools for the analysis of air pollution data. R package version 2.0.0, 2016

[CR18] Carslaw DC, Openair Manual, University of York and Ricardo Energy & Environment, 21st March 2018

[DE17] UK plan for tackling roadside nitrogen dioxide concentrations Detailed plan, July 2017

[DE19] Clean Air Strategy 2019 at https://www.gov.uk/government/publications/clean-air-strategy-2019 [accessed May 2020]

[DE20] https://www.gov.uk/government/statistics/air-quality-statistics [accessed May 2020]

[DE19C] Open fires and wood-burning stoves, A practical guide DEFRA 2019

[PG16] Local Air Quality management Policy Guidance LAQM.PG(16), DEFRA 2016

[R17] R Core Team (2017). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/ last accessed 14th May 2019

[TG16] Local Air Quality management Technical Guidance LAQM.TG(16), DEFRA 2016.