



2018 Air Quality Annual Status Report (ASR)

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

Date: June 2018

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Executive Summary: Air Quality in Our Area

Kirklees is the third largest Metropolitan District in area - it covers 157 square miles or 40,860 hectares and a population of ~404,000. Measured in population terms Kirklees is one of the larger local authorities in England and Wales ranking 11th out of 348 districts. Over one tenth of the district is in the Peak District National Park. The extremes of altitude in Kirklees range from 33m (108 ft) at Thornhill Lees to 582m (1903 ft) at Black Hill.

Manufacturing industry, textiles and engineering still form a proportion of the local economy, the majority of it situated in the Huddersfield and Dewsbury areas and northwards to the M62. The urban areas comprise nine towns including the two larger towns of Huddersfield and Dewsbury.

Air Quality in Kirklees

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 billion³.

The air quality issues within Kirklees are focused around the road network connecting the towns, and traffic which passes between the West Yorkshire conurbation along the M62 and Greater Manchester.

Kirklees Council have conducted monitoring across the district where these primary roads are in close proximity to relevant human activity. To date Kirklees has identified 2 primary pollutants of concern. They are Nitrogen Dioxide and Particulate Matter.

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

Current trends indicate that the levels of these pollutants have fallen over the last 5 years, but health related objectives are still exceeded within the district.

Kirklees currently has 9 Air Quality Management Areas (AQMA) within the district. These are in Bradley in Huddersfield and Scouthill in Dewsbury. Following on from previous assessments in 2016 Kirklees Council is in the process of revoking the Scouthill AQMA, amending the Bradley AQMA and on 01 November 2017 introduced a further 7 AQMAs at the following locations;

- Birchencliffe, Huddersfield
- Birkenshaw, Bradford
- Eastborough, Dewsbury
- Edgerton, Huddersfield
- Liversedge / Heckmondwike
- Huddersfield Town Centre
- Outlane, Huddersfield

Kirklees Council noted exceedance of the annual NO₂ AQO at a further 2 locations, that being Lindley Moor Road in Lindley and Manchester Road in Thornton Lodge. The exceedances are at singular diffusion tube locations and we have therefore followed national guidance, expanding the monitoring network around these areas in order to determine the extent of air quality issue.

Current 5 year trends for NO₂ indicate that the levels fell significantly between 2012 & 2013 within the Kirklees District, but since that time concentrations have stagnated for 3 years around 45 to 40µg/m³, which indicates further work is required in addition to improvements in vehicle engine technology and fleet turnover in order to bring about compliance.

Actions to Improve Air Quality

Kirklees Council has taken forward a number of measures during the current reporting year of 2017 in pursuit of improving local air quality.

Key completed measures are:

- 2nd Year of the West Yorkshire ECO-Stars Scheme
- Recruitment of a West Yorkshire Low Emission Strategy (WYLES) delivery officer.
- Procurement of a supplier for electric vehicle charging infrastructure for both taxi and public charging
- Commercial bus fleet exhaust emissions reduction technology retro-fitting scheme

Kirklees Council has been successful in securing funding to employ an officer to deliver further outcomes from the WYLES Document. It is anticipated that this officer will be in place by September 2018 and employed for 2 years.

Kirklees Council, West Yorkshire Combined Authority and the 4 other West Yorkshire local authorities are also currently working on delivering a strategic charging network for electric taxis, with the addition of public charging. The scheme is funded by Office for Low Emission Vehicles (OLEV) and currently the combined authority (WYCA) and West Yorkshire councils are working together to procure a single supplier. It is anticipated that installation of the charge points will not occur until Quarter 3 2018 and therefore at this time the measure is not delivering an emissions reduction.

Kirklees Council recently noted improvement at one of our Air Quality Management Areas (AQMAs) as a result of Urban Traffic Control measures at a congested junction. To build on this success further, Kirklees has employed a 3rd party company to rationalise the signal system further, specifically with emissions reduction as the primary aim. Currently the results of this trial are being analysed to determine potential reduction elsewhere within the district.

In conjunction with the other West Yorkshire authorities, Kirklees have been successful in securing funding from the Clean Bus Fund. The money is to be used to retrofit exhaust emission reduction technology to buses which are Euro V across the district.

Conclusions and Priorities

During the 2017/18 reporting year Kirklees Council priorities for air quality are listed below;

- Construct new action plan for the district and AQMAs
- Continue to Integrate the West Yorkshire Low Emission Strategy into Council Policy
- Rationalise UTC management to minimise pollution events
- Work with neighbouring authorities to create a regional public charging network
- Launch the Electric Taxi Scheme
- Declare AQMA for Thornton Lodge

Local Engagement and How to get Involved

If you wish to get information for air quality, please use the following websites:

<http://www.kirklees.gov.uk/community/noisePollution/pollution.aspx>

<http://www.kirklees.gov.uk/involve/entry.aspx?id=821>

<https://uk-air.defra.gov.uk/>

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1 Local Air Quality Management

This report provides an overview of air quality in **Kirklees Council** during **2017**. 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 **Kirklees Council** 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 Kirklees Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at

https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=140 and
<http://www.kirklees.gov.uk/community/noisePollution/pollution.aspx>

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).

01 November 2017 Kirklees Council declared 7 new AQMAs in Huddersfield and Dewsbury

We are in the process of amending AQMA 1.

We are in the process of revoking AQMA 2.

Maps for amendments, revocations and new AQMAs are available in Appendix E:
Map(s)

We propose to declare a new AQMA in the **Thornton Lodge** area (see Appendix E).

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
AQMA 1 Bradley TO BE AMMENDED	Declared 17/10/08	NO2 Annual Mean	Huddersfield	The designated area incorporates the Leeds Road (A62) - Bradley Road (A6107) junction	NO	73	µg/m3	40	µg/m3	New Air Quality Action Plan Under Construction Previous Action Plan 2007	2007	http://www.kirklees.gov.uk/beta/crime-and-safety/air-pollution.aspx
AQMA 2 Scouthill TO BE REVOKED	Declared 27/02/09	PM10 24 Hour Mean	Dewsbury	Now revoked, the designated area incorporated part of Huddersf	NO	43 Days	Exceedances	N/A	Exceedances	N/A	2007	http://www.kirklees.gov.uk/beta/crime-and-safety/air-pollution.aspx

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				ield Road (A644) in Scouthill								
AQMA 3 Ainley Top	Declare d 01/11/17	NO2 Annual Mean	Huddersf ield	The designat ed area incorpor ates Halifax Road (A629), Lindley Moor Road Bradley Road (A643), Warren House Lane and Stirling Wood Close, which is in close proximity to the Ainley Top Roundab out at Birchenc liffe	YES	44	µg/m3	21	µg/m3	New Air Quality Action Plan Under Construc tion Previous Action Plan 2007	2007	http://www.kirklees.gov.uk/ beta/crime-and-safety/air- pollution.aspx

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AQMA 4 Birkenshaw	Declared 01/11/17	NO2 Annual Mean	Bradford	The designated area incorporates Bradford Road (A651), Whitehall Road East (A58), Carlton Court, Grove Terrace, Swincliffe Crescent, Milford Grove, Tetley Drive and Manor Park Gardens, which is in close proximity to the M62 and A651-A58 Roundabout at Birkenshaw	YES	45	µg/m3	µg/m3	New Air Quality Action Plan Under Construction Previous Action Plan 2007	2007	http://www.kirklees.gov.uk/beta/crime-and-safety/air-pollution.aspx
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AQMA 5 Eastborough	Declared 01/11/17	NO2 Annual Mean	Dewsbury	The designated area incorporates Leeds Road (A653), Dewsbury Ring Road (A638), Wakefield Road (A638), Highgate Road, Highgate Terrace, Bank Street and Old Bank Road, which is in close proximity to Dewsbury Town Centre	NO	60	µg/m3	µg/m3	New Air Quality Action Plan Under Construction Previous Action Plan 2007	2007	http://www.kirklees.gov.uk/beta/crime-and-safety/air-pollution.aspx
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AQMA 6 Edgerton	Declared 01/11/17	NO2 Annual Mean	Huddersfield	The designated area incorporates Edgerton Road (A629) and Blacker Road, which is in close proximity to Huddersfield Town Centre	NO	54	µg/m3	µg/m3	New Air Quality Action Plan Under Construction Previous Action Plan 2007	2007	http://www.kirklees.gov.uk/beta/crime-and-safety/air-pollution.aspx
AQMA 7 Liversedge	Declared 01/11/17	NO2 Annual Mean	Liversedge	The designated area incorporates Huddersfield Road (A62), Bradford Road (A638), Wakefield Road (A638), Wormald Street and Well Street, which is	NO	45	µg/m3	µg/m3	New Air Quality Action Plan Under Construction Previous Action Plan 2007	2007	http://www.kirklees.gov.uk/beta/crime-and-safety/air-pollution.aspx

				in Liversed ge								
AQMA 8 Outlane	Declare d 01/11/17	NO2 Annual Mean	Huddersf ield	The designat ed area incorpor ates New Hey Road and Round Ings Road, which is in close proximity to the M62 at Outlane	YES	54	µg/m3		µg/m3	New Air Quality Action Plan Under Construc tion Previous Action Plan 2007	2007	http://www.kirklees.gov.uk/ beta/crime-and-safety/air- pollution.aspx
AQMA 9 Huddersf ield Town Centre	Declare d 01/11/17	NO2 Annual Mean	Huddersf ield	The designat ed area incorpor ates Roads borderin g and within the Huddersf	NO	55	µg/m3		µg/m3	New Air Quality Action Plan Under Construc tion Previous Action Plan 2007	2007	http://www.kirklees.gov.uk/ beta/crime-and-safety/air- pollution.aspx

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				ield Ring Road									
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Kirklees Council confirm 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 the Kirklees District

Defra's appraisal of last year's ASR was as follows:

"The report is well structured, detailed, and provides the information specified in the Guidance following the latest template.

1. There is a significant amount of data missing from the 2016 report, from both automatic monitors and diffusion tubes. The implication of this is that it is difficult to accurately interpret and appraise the results. We recommend strongly that the Local Authority takes all necessary steps to ensure this does not occur again.
2. A new AQAP will be developed in 2018 to include the new AQMAs. It will be important to ensure that the new AQAP includes measures which target air quality improvements in these areas.
3. Whilst there are a number of exceedances indicated in the results, it is also noted that a number of the diffusion tube sites have demonstrated continued compliance for the last five years, with annual means well below objective levels. The sites indicating exceedances outside of AQMAs should be investigated further.
4. We recommend the Council continue to review their monitoring programme, and consider relocating some of these diffusion tubes to locations of relevant exposure where monitoring has not yet taken place, but where there may be exceedances of air quality objectives.
5. The Council should provide details of annualisation and distance corrections in Appendix C, clearly stating the background concentrations used in these calculations, and providing example calculations as necessary.
6. It would be useful if the maps of the AQMA boundaries provided in Appendix D also demonstrated the locations of monitoring sites within and surrounding the AQMAs. "

Kirklees Council has taken forward a number of direct measures during the current reporting year of 2018 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 their respective Action Plans and the West Yorkshire Low Emission Strategy (WYLES). Key completed measures are:

- Rationalisation of Traffic Signals in AQMA 1

Kirklees Council's priority for the coming year is to continue to construct a new Action Plan for the district, with a focus to improve air quality districtwide and within the AQMAs.

In parallel to the creation of the Action Plan, Kirklees Council are also in the process of writing an Air Quality Strategy, which will replace the current Air Quality Strategy from 2007. Both the Action Plan and the Strategy are timetabled for completion during the 2018/19 reporting year.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Kirklees anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of our 8 NO₂ AQMA's.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Install Split Cycle Offset Optimisation technique (SCOOT) Traffic Management System within AQMA 1	Traffic Management	Other	LA	2013	2013	Reduction in queuing time	Reduction in emissions	Installed	2013	
2	Alter SCOOT to incorporate actual Air Quality pollution levels	Traffic Management	Other	LA	2015	2016	Reduction in NOx and PM10	Reduction in emissions	Planning stage	2017	
3	Bus priority at lights in AQMA 1	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	LA	2013	2014	Reduction in queuing time for public transport	Reduction in emissions	Implemented scheme	2014	

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4	Bradley Junction. Re-model one of the busiest Road Junction in Kirklees in AQMA 1	Transport Planning and Infrastructure	Other	TBC	2014	2019	Reduce congestion levels at AM/PM peaks	Reduction in emissions	Pre-design stage	2021	
5	Ravensthorpe Bypass. Complete by pass of AQMA 2.	Transport Planning and Infrastructure	Other	TBC	2012	2021	Divert traffic away from AQMA 2	Reduction in emissions	Feasibility Study carried out	2026	
6	Cooper Bridge Gyrotory proposed in AQMA 1	Transport Planning and Infrastructure	Other	TBC	2014	2019	Reduction in queuing time	Reduction in emissions	Junction designed. Funding sought	2021	
7	Proposed New Junction 24a on M62	Transport Planning and Infrastructure	Other	TBC	2013	2021	Reduction in traffic volume through AQMA 1	Reduction in emissions	Feasibility Study	2023	
8	Bus Lanes approaching AQMA 1	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	LA	2010	2011	Reduction in delays to buses	Reduction in emissions	Bus lane installed	2012	
9	Resource Smart Resource Corridor	Policy Guidance and Developm	Other policy	TBC	2016	TBC	Reduction of NO2 in AQMA	Reduction in emissions			

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		ent Control									
10	Internal Travel Plans	Policy Guidance and Development Control	Other policy	LA	2008	2009	Uptake of sustainable options	Reduction in emissions	Adopted and implemented	Ongoing	
11	Transport Plans for Businesses required	Policy Guidance and Development Control	Other policy	LA	Pre 2006	Pre 2006	Uptake of sustainable options	Reduction in emissions	Asking for plans through planning process	Ongoing	
12	School Travel Plan Framework	Policy Guidance and Development Control	Other policy	LA	2005	2006	Uptake of sustainable options	Reduction in emissions	Schools were encouraged to produce travel plans and funding sought to fund infrastructure requirements	Ongoing	
13	Bikeability in schools. Council staff visited schools giving cycling safety training.	Promoting Travel Alternatives	Promotion of cycling	LA	2009	2010	Increase in cycling	Reduction in emissions	Promoted cycling in schools via education programmes on road safety	2014	
14	Spenn Valley Greenway (Traffic Free Cycleway on former railway line)	Transport Planning and Infrastructure	Cycle network	LA	1998	2000	Increase in cycling	Reduction in emissions	Cycleway implemented	2000	
15	Calder Valley Cycleway (Traffic Free Cycleway)	Transport Planning and Infrastructure	Cycle network	LA	2004	2008	Increase in cycling	Reduction in emissions	Cycleway implemented	2008	

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	on former railway line)										
16	City Cycle Ambition Grant 2	Policy Guidance and Development Control	Other policy	Grant	2015	2015	Increase in cycling	Reduction in emissions	Bid submitted for cycleway improvements	2016	
17	Free Parking for Electric Vehicles and 50% discount on parking for other ULEV	Promoting Low Emission Transport	Priority parking for LEV's	LA	2007	2008	Uptake of low emission and Ultra Low Emission Vehicles	Reduction in emissions	Scheme is operational	On going	
18	City Car Club	Alternatives to private vehicle use	Car Clubs	LA	2008	2009	Use of club cars	Reduction in emissions	Introduced car club to Kirklees District	Ongoing	
19	Car Sharing Scheme	Promoting Travel Alternatives	Other	LA	2006	2007	Use of website	Reduction in emissions	Contribute to license fee for car sharing website and private subsite for council staff	Ongoing	
20	Local Free Bus around Huddersfield Town Centre and Dewsbury Town Centre	Alternatives to private vehicle use	Other	LA	2005	2006	Bus Patronage	Reduction in emissions	Bus runs in both Huddersfield and Dewsbury	Ongoing	
21	Conversion of Fleet to ULEV where appropriate	Vehicle Fleet Efficiency	Other	LA	2008	2009	Number of fleet changed to EV	Reduction in emissions	We have used an electric transit type van for a number of years and have had the Energy Savings trust review our fleet to see if further	Ongoing	

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									swithes to Electric vehicles can be made		
22	Air Quality report to Newspaper	Public Information	Via other mechanisms	LA	Pre 2006	Pre 2006	Awareness of Air Quality amongst the public	Reduction in emissions	Daily Reports sent to newspaper	Ongoing	
23	Bike to work scheme within Council, discount cycle purchase scheme	Promoting Travel Alternatives	Promotion of cycling	LA	2008	2009	Uptake of bikes	Reduction in emissions	Implemented scheme and promoted to workforce	Ongoing	
24	Local sustainable transport fund project to promote modal shift in schools. Dedicated officer visiting schools promoting modal shift	Promoting Travel Alternatives	Other	Grant	2011	2012	Monitor transport options at local schools	Reduction in emissions	Funded officer to go into schools and promote modal shift	Ongoing	
25	Air Quality Strategy	Policy Guidance and Development Control	Other policy	LA	2005	2006	Local policy using Air Quality as a decision factor	Reduction in emissions	Document completed and adopted	2006	
26	Deep Clean in AQMA 2	Other	Other	LA	2013	2014	Reduction in PM10 levels	Reduction in emissions	First deep clean conducted. 2014 reduction in exceedances of daily PM10 in AQMA	Ongoing	

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									Planning to conduct clean in 2015		
27	Mote sensing real-time emissions	Vehicle Fleet Efficiency	Testing Vehicle Emissions	Grant	2010	2012	Results from research	Reduction in emissions	Analysed emissions of local traffic		
28	Electric Vehicle Charge point Installed in Council Depot	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	Grant	2013	2014	Number of fleet changed to EV	Reduction in emissions	Charge point installed in council depot	2014	
29	Trial of EV vehicles as pool car	Promoting Low Emission Transport	Other	LA	2014	2014	Uptake of LEVs	Reduction in emissions	Car was used by various staff to conduct daily works	2014	
30	Smokey Vehicle hotline	Public Information	Other	LA	Pre 2000	Pre 2000	Number of calls received	Reduction in emissions	Customers can call and report vehicles with smokey exhausts	Ongoing	
31	Planning conditions on all applications for sustainable transport	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Grant	2014	2014	Number of conditions on approval	Reduction in emissions	Currently request EV charge points on all new developments	Ongoing	
32	Green Procurement Toolkit	Policy Guidance and Development Control	Sustainable Procurement Guidance	LA	2005	2006	use of toolkit in procurement	Reduction in emissions	Green procurement toolkit created for Low carbon	2015	

33	West Yorkshire Low Emission Strategy	Policy Guidance and Development Control	Low Emissions Strategy	Grant	2012	2013	Policy adopted by Kirklees Council	Reduction in emissions	Strategy document completed in draft form. To go out for review	2015	
34	Hotel EV Charge Point Project. Electric Vehicle Charge points installed in a number of accommodation providers	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	LA	2014	2015	use of the charge points	Reduction in emissions	Applications from hotels. Number of sites installed	2015	
35	Install SCOOT within AQMA 2	Traffic Management	UTC, Congestion management, traffic reduction	LA	2012	2013	Reduction in queuing time	Reduction in emissions	Installed	2013	
36	New links to Greenway (Cycle Path) added through planning	Transport Planning and Infrastructure	Cycle network	LA	2000	2000	Increase cycle routes	Reduction in emissions	Recommended conditions to planning	Ongoing	
37	Subsidised Metro Cards for Staff	Promoting Travel Alternatives	Workplace Travel Planning	LA	Pre 2006	Pre 2006	Promote use of public transport	Reduction in emissions	Scheme is operational	Ongoing	
38	Metro Cards Introduced for work journeys	Promoting Travel Alternatives	Workplace Travel Planning	LA	2008	2009	Reduce use of cars for shorter journeys	Reduction in emissions	Metro Cards in use for public transport for council staff to undertake their daily work	Ongoing	
39	Installing EV Charge points into private car	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote	LA	2015	2015	Usage of charge points	Reduction in emissions	Bid successful and sites identified	2015	

	parks (three sites, 4 units installed)		Low Emission Vehicles, EV recharging, Gas fuel recharging								
40	Congestion performance funding	Traffic Management	UTC, Congestion management, traffic reduction	LA	2011	2012	Number of children going to schools using non private vehicles to access sites	Reduction in emissions	Funded officer to go into schools and promote modal shift	2014	
41	Bus priority at lights in AQMA 1. Gives late buses priority through Air Quality Management Area 1	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	LA	2013	2014	Reduction in queuing time for public transport	Reduction in emissions	Implemented scheme	2014	
42	Bluetooth journey monitoring	Traffic Management	Other	LA	2013	2014	Inform smart traffic management	Reduction in emissions	Ran trial of bluetooth data collection system	2016	
43	Retrofitting of School Buses with Pollution abatement equipment	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	Grant	2013	2013	All school buses now retrofitted and emissions reduced by 90%	Reduction in emissions	All school buses now retrofitted and emissions reduced by 90%	2014	
44	Installation of Rapid Charge Network across West Yorkshire	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging,	TBC	2014	2015	Rapid charge network across West Yorkshire being installed	Reduction in emissions	Sites identified and installation due to begin in next few weeks	2015	

			Gas fuel recharging								
45	Ainley Top Junction improvements	Traffic Management	Other	HA	2012	2014	Reduction in traffic congestion	Reduction in emissions	Extra Lanes installed on Roundabout	2015	
46	A629 Corridor Improvement	Transport Planning and Infrastructure	Other	LA	2013	2018	Reduction in traffic congestion	Reduction in emissions	Bid for funding being prepared	2021	
47	A653 Corridor Improvement	Transport Planning and Infrastructure	Other	LA	2013	2018	Reduction in traffic congestion	Reduction in emissions	Bid for funding submitted	2018	
48	Bus priority at lights in AQMA 2	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	LA	2012	2013	Reduction in queuing time for public transport	Reduction in emissions	Implemented scheme	2013	
49	West Yorkshire ECO-Stars Scheme	Vehicle Fleet Efficiency	Driver training and ECO driving aids	LA	2015/16	2016	Improvement in HGV Fleets	Reduction in emissions	Scheme purchased, Implementation begun	Ongoing	
50	Electric Vehicle Taxi Scheme	Promoting Low Emission Transport	Taxi emission incentives	Grant	2017	2018-2020	Provide taxi charging network across West Yorkshire	Reduction in emissions	Procurement Stage	2020	

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51	Rationalisation of traffic light management system	Traffic Management	UTC, Congestion management, traffic reduction	LA	2017	2018	Determine the best UTC prioritisation to reduce AQ impact	Reduction in emissions	Rationalisation & modelling completed.	2020	
52	Bus Retrofitting Scheme	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	Grant	2018	2019	Euro IV & V Buses to retrofitted and emissions reduced by 90%	Reduction in emissions	Procurement Stage	2020	
53	WYLES Delivery Officer	Other	Other	Grant	2018	2018	Officer to delivery work under contained within the WYLES	Reduction in emissions	Recruitment Stage	2020	

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.

Kirklees Council is taking the following measures to address PM_{2.5}:

- Included PM_{2.5} as key indicator for the Health and Wellbeing Board
- Collaborative working between Public Health, Environmental Health, Planning and Highways to conduct a 2015 baseline Air Quality Model for the whole Kirklees District for PM_{2.5} as part of local plan works.
- PM_{2.5} monitors have been installed at 2 locations within the district. Due to a database corruption the 2017, Kirklees had to undertake a data recovery exercise. The data that was recovered was of poor quality, attributable in part to the fact that officers were unable to conduct poll of data while the database was corrupted. Kirklees Council are in the process of modernising the data collection system in order to prevent this occurring in the future.

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.

Kirklees Council undertook automatic (continuous) monitoring at 2 sites during 2017.

Due to a corrupted database Kirklees Council are unable to provide real-time monitoring data for 2016. The council worked with our service provider to recover data for 2017. The data that was recovered was of poor quality, attributable in part to the fact that officers were unable to conduct poll of data while the database was corrupted. Kirklees Council are in the process of modernising the data collection system in order to prevent this occurring in the future.

Notwithstanding this, passive diffusion tubes were located at the automatic monitoring, which still provides Kirklees Council with data on the current NO₂ conditions within the area.

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.

3.1.2 Non-Automatic Monitoring Sites

Kirklees Council undertook non- automatic (passive) monitoring of NO₂ at 78 sites during 2017. The Council expanded their network in order to review 2 areas of exceedance, specifically in Thornton Lodge and Lindley Moor. 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.

3.1 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, “annualisation” and distance correction. Further details on adjustments are provided in Appendix C.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, “annualisation” and distance correction. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO₂)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³.

For diffusion tubes, the full 2017 dataset of monthly mean values is provided in Appendix B.

Due to corrupted database issues and recovered data quality, Kirklees Council are unable to provide real-time monitoring data for 2017.

In light of the lack of available data for the real-time monitors in 2017, observation made in the 2016 ASR are the most up to date, which at the time indicated falls across the 7 monitoring locations.

Data obtained from passive diffusion tubes over 2017 have been ratified, annualised in accordance with national guidance and presented in Appendix A.

Figure A.1 in Appendix A shows trends over the last 6 years for diffusion tube locations. The data has been divided into 3 areas, Average of all our diffusion tubes, Average of diffusion tubes within our new AQMAs and Average of diffusion tubes within our longstanding AQMAs.

It is noted that between 2012 and 2013 concentrations within the AQMAs and overall fell by roughly 10µg/m³. Since that time concentration levels have stagnated within the AQMA's 1 and 2, until 2017 when we have noted a fall. Trends within the new AQMA's and at other non AQMA monitoring locations saw slightly increases by 1 to 2 µg/m³ until 2017, when levels fell, which is in line with what has been observed within the other AQMA's. There are still a number of areas across the district which

do not meet the AQO. This indicates that further measures are needed to return to ensure this downward trend is not an outlier and it must also be noted that the assumptions around the turnover in fleet bringing about required reductions should be treated with caution.

In addition to the current 9 Air Quality Management Areas, as part of the ASR 2017, Kirklees Council identified a further 2 areas where singular passive monitoring sites have returned results in breach of health related objectives. These are along Lindley Moor Road in Lindley and Manchester Road in Thornton Lodge, both of which are within the Huddersfield area. Diffusion tubes located at a singular location are good as an indicator that failure may be occurring in an area, but does not give a clear picture of the conditions, which is why Kirklees Council officers expanded the monitoring network in February 2017 to determine the extent of these issues within these areas.

Results of the additional monitoring for Thornton Lodge and Lindley Moor Road are in Appendix A. The diffusion tube data has been used to validate modelling of conditions within these areas. Results of the modelling exercise is contained within Appendix E. Conclusions of this expanded monitoring / modelling exercise has lead Kirklees to conclude that we do not require an AQMA on Lindley Moor Road, but will need an AQMA at Thornton Lodge.

In addition to the councils LAQM responsibilities, Kirklees Council was given a Ministerial Directive relating to failures identified by the Pollution Climate Model, which indicated that of EU limit values were in exceedance at the Dumbell roundabout at Junction 27 of the M62. Kirklees Council is in the process of submitting a formal report in response to this ministerial directive, the contents of which will be published in revised National Action Plans due October 2018.

3.2.2 Particulate Matter (PM₁₀)

Due to a corrupted database Kirklees Council are unable to provide real-time monitoring data for 2016. The council worked with our service provider to recover data for 2017. The data that was recovered was of poor quality, attributable in part to the fact that officers were unable to conduct poll of data while the database was

corrupted. Kirklees Council are in the process of modernising the data collection system in order to prevent this occurring in the future.

3.2.3 Particulate Matter (PM_{2.5})

Due to a corrupted database Kirklees Council are unable to provide real-time monitoring data for 2016. The council worked with our service provider to recover data for 2017. The data that was recovered was of poor quality, attributable in part to the fact that officers were unable to conduct poll of data while the database was corrupted. Kirklees Council are in the process of modernising the data collection system in order to prevent this occurring in the future.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
Roadside 3	RS3 - Bradley	Roadside	417255	420761	NO ₂ ; PM ₁₀	YES	Chemiluminescent; Met-One BAM	3	3	1.5
Roadside 6	RS6 - Ainley Top	Roadside	411739	419007	NO ₂ ; PM ₁₀	YES	Chemiluminescent; Met-One BAM	8	5	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	Y OS Grid Ref	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)
1	Dewsbury Bus Station	Other	424506	421535	NO ₂	NO	N	0.8	NO	2
2	Bus Station - Huddersfield	Other	414214	416504	NO ₂	YES	N	4.1	NO	2
3	Edgerton Road	Roadside	413504	417439	NO ₂	YES	Y (2.0)	2.4	NO	2
4	Princess Street, Batley	Roadside	424464	424395	NO ₂	NO	Y (4.3)	1.8	NO	2
5	Huddersfield Road Ravensthorpe	Roadside	422443	420380	NO ₂	NO	Y (1.6)	1.9	NO	2
6	Leeds Road - Cooper Bridge	Roadside	417872	421050	NO ₂	YES	Y (5.2)	6	NO	2
7	Westgate Huddersfield	Urban Centre	414434	416744	NO ₂	YES	Y (0.5)	0.5	NO	2
8	Bradford Road Fartown 1	Roadside	414496	417795	NO ₂	NO	Y (2.5)	2.5	NO	2
9	Bradley Road	Kerbside	417280	420482	NO ₂	NO	Y (13.4)	0.7	NO	2
10	Leeds Road Bradley 1	Roadside	417227	420337	NO ₂	NO	Y (3.2)	2	NO	2
11	Chapel Hill Huddersfield	Roadside	414389	416262	NO ₂	YES	Y (0.1)	5.5	NO	2
12	Leeds Road Bradley 2	Roadside	417335	420412	NO ₂	NO	Y (3.7)	1.8	NO	2
13	Whitehall Road East	Roadside	420377	427871	NO ₂	YES	Y (2.1)	2.6	NO	2
14	Oastler Avenue	Urban Background	413669	416463	NO ₂	NO	N	1.7	NO	2
15	Ainley Top 1	Other	420441	427353	NO ₂	YES	N	3	YES	2

16	Ainley Top 2	Other	420441	427353	NO ₂	YES	N	3	YES	2
17	Ainley Top 3	Other	420441	427353	NO ₂	YES	N	3	YES	2
18	Huddersfield Road Birstall	Roadside	422686	426229	NO ₂	NO	Y (4.2)	1.9	NO	2
19	Huddersfield Road Scouthil	Roadside	423563	421014	NO ₂	NO	Y (6.5)	2.7	NO	2
20	Rockley Street Dewsbury	Roadside	424853	421828	NO ₂	YES	Y (9.5)	1.5	NO	2
21	Castlegate Huddersfield	Roadside	414149	416686	NO ₂	YES	Y (6.9)	2.1	NO	2
22	Leeds Road Bradley 3	Roadside	417418	420479	NO ₂	YES	Y (3.2)	1.5	NO	2
23	Leeds Road Mirfield 2	Roadside	418483	420978	NO ₂	NO	Y (14.1)	1.6	NO	2
24	Lindley Moor Road	Roadside	409941	418471	NO ₂	NO	Y (15.4)	2	NO	2
25	Leeds Road - RS3 - 1	Other	423185	420612	NO ₂	NO	N	6	YES	2
26	Leeds Road - RS3 - 2	Other	423185	420612	NO ₂	NO	N	6	YES	2
27	Leeds Road - RS3 - 3	Other	423185	420612	NO ₂	NO	N	6	YES	2
28	Ring Road Huddersfield	Roadside	414745	416710	NO ₂	YES	Y (0.1)	3.3	NO	2
31	Blacker Road 1	Roadside	413400	417495	NO ₂	YES	Y (8.3)	2.7	NO	2
32	Blacker Road 2	Roadside	413513	417481	NO ₂	YES	Y (5.0)	2.6	NO	2
33	Wakefield Rd / Huddersfield Road	Roadside	420727	423668	NO ₂	YES	Y (4.3)	2.4	NO	2
34	Frost Hill Liversedge	Roadside	420845	423770	NO ₂	YES	Y (0.3)	1.9	NO	2
35	Leeds Road Liversedge	Roadside	420853	423866	NO ₂	YES	Y (9.4)	1.9	NO	2

36	Huddersfield Road Mirfield 1	Kerbside	420304	419766	NO ₂	NO	Y (2.9)	0.9	NO	2
37	Bradford Road, Birkenshaw	Roadside	420356	427810	NO ₂	YES	Y (2.5)	2.2	NO	2
38	Whitehall Road West	Roadside	420222	427764	NO ₂	YES	Y (18.3)	1	NO	2
39	Bradford Road, Batley	Roadside	424526	424326	NO ₂	NO	Y (1.7)	2.1	NO	2
40	Leeds Road Dewsbury	Roadside	424871	421921	NO ₂	YES	Y (1.2)	1.6	NO	2
41	Chain Bar Roundabout	Roadside	418285	426630	NO ₂	NO	Y (12.5)	3.4	NO	2
42	Leeds Road Dewsbury - 2	Roadside	424969	422002	NO ₂	YES	Y (5.6)	1.9	NO	2
43	John Street Dewsbury	Roadside	425083	422022	NO ₂	YES	Y (6.0)	1.9	NO	2
44	Calmswood Road Eastborough	Roadside	425179	422114	NO ₂	NO	Y (-7.2)	1.7	NO	2
45	Bradford Road Fartown 2	Roadside	414480	417720	NO ₂	NO	Y (0.5)	7.2	NO	2
46	Willow Lane East Fartown	Roadside	414546	417759	NO ₂	NO	Y (0)	2.2	NO	2
47	Roundings Road Outlane	Other	407942	417261	NO ₂	YES	Y (0)	14.4	NO	2
48	Flush Liversedge	Roadside	421039	423673	NO ₂	YES	Y (0)	2.6	NO	2
49	Manchester Road Thornton Lodge 2	Roadside	413659	416182	NO ₂	NO	Y (3.5)	3.7	NO	2
50	Manchester Road Thornton Lodge 1	Roadside	413414	415981	NO ₂	NO	Y (1.6)	2.5	NO	2
51	High Street Heckmondwike	Roadside	421904	423580	NO ₂	YES	Y (4.9)	1	NO	2
52	Penistone Road Waterloo	Roadside	417627	416472	NO ₂	NO	Y (7.8)	2.4	NO	2

53	Yates Lane Milnsbridge	Roadside	411564	415902	NO ₂	NO	Y (1.6)	1.7	NO	2
54	Wakefield Road Dewsbury	Roadside	425196	421566	NO ₂	YES	Y (2.7)	3.2	NO	2
55	Huddersfield Road Holmfirth	Roadside	414187	408264	NO ₂	NO	Y (3.2)	1.7	NO	2
56	Wakefield Road Huddersfield	Roadside	415009	416420	NO ₂	YES	N	2.8	NO	2
57	Cambridge Road 1	Roadside	414291	417281	NO ₂	YES	N	2.2	NO	2
58	Cambridge Road 2	Roadside	414350	417270	NO ₂	YES	N	2.6	NO	2
61	Bradford Road - Birkenshaw	Roadside	420422	427349	NO ₂	YES	Y(12.1)	2.1	NO	2
62	Manor Park Gardens - Birkenshaw	Roadside	420472	427360	NO ₂	YES	Y(9.2)	1.2	NO	2
63	White Hall Road West 1- Birkenshaw	Roadside	419866	427561	NO ₂	NO	Y(7.0)	2.9	NO	2
64	Whitehall Road West 2 - Birkenshaw	Other	419914	427588	NO ₂	NO	N	0.1	NO	2
65	Whitehall Road West 3 - Birkenshaw	Roadside	419981	427623	NO ₂	NO	N	3	NO	2
66	Milford Grove - Birkenshaw	Other	420349	427434	NO ₂	YES	N	1.3	NO	2
67	Moor Lane 1 - Birkenshaw	Roadside	421132	427273	NO ₂	NO	N	1.7	NO	2
68	Moor Lane 2 - Birkenshaw	Roadside	421128	427298	NO ₂	NO	N	0.9	NO	2
69	Bradford Road - Cleckheaton - Airstation	Roadside	418237	426555	NO ₂	NO	N	1	NO	2

70	Huddersfield Road - Scouthill - Airstation	Roadside	423236	420752	NO ₂	YES	Y(6.6)	3.2	NO	2
71	Lindley Moor Road 2	Roadside	411007	419190	NO ₂	NO	Y (10.1)	3.5	YES	2
72	Lindley Moor Road 3	Roadside	410227	418653	NO ₂	NO	Y(6.6)	2.4	NO	2
73	Lindley Moor Road 4	Roadside	410080	418568	NO ₂	NO	N	1.8	NO	2
74	Lindley Moor Road 5	Roadside	410095	418559	NO ₂	NO	Y(1.7)	3.4	NO	2
75	Blackmoorfoot Road - Thornton Lodge	Roadside	413153	425894	NO ₂	NO	Y(2.7)	1.5	NO	2
76	Manchester Road - Thornton Lodge 3	Roadside	413198	415957	NO ₂	NO	Y(5.0)	1.3	NO	2
77	Manchester Road - Thornton Lodge 4	Roadside	413455	416013	NO ₂	NO	Y(1.2)	2.2	NO	2
78	Thornton Lodge Road - Thornton Lodge	Roadside	413464	415983	NO ₂	NO	N	2	NO	2

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2017 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2013	2014	2015	2016	2017
Roadside 3	Roadside	Automatic	0	0	<u>33.20</u>	36.00	39.80	N/A	N/A
Roadside 6	Roadside	Automatic	0	0	<u>42.30</u>	41.70	44.40	N/A	N/A
1	Other	Diffusion Tube	100%	100%	<u>47.67</u>	46.64	45.34	47.42	42.50
2	Other	Diffusion Tube	100%	100%	<u>43.39</u>	44.97	46.74	41.58	42.25
3	Roadside	Diffusion Tube	100%	100%	<u>49.24</u>	47.85	53.70	41.43	61.63
4	Roadside	Diffusion Tube	42%	42%	<u>38.79</u>	39.95	35.16	32.68	25.20
5	Roadside	Diffusion Tube	100%	100%	<u>40.22</u>	40.08	41.50	35.60	35.88
6	Roadside	Diffusion Tube	100%	100%	<u>36.88</u>	38.64	38.94	40.46	42.56
7	Urban Centre	Diffusion Tube	100%	100%	<u>46.33</u>	42.82	44.81	38.78	35.38
8	Roadside	Diffusion Tube	100%	100%	<u>37.84</u>	39.99	38.30	33.33	35.50
9	Kerbside	Diffusion Tube	67%	67%	<u>34.98</u>	41.19	39.21	36.63	35.34
10	Roadside	Diffusion Tube	100%	100%	<u>39.89</u>	41.25	42.11	43.73	37.31
11	Roadside	Diffusion Tube	100%	100%	<u>41.23</u>	41.61	42.40	37.79	36.50
12	Roadside	Diffusion Tube	100%	100%	<u>39.31</u>	40.17	42.57	43.40	37.44
13	Roadside	Diffusion Tube	100%	100%	<u>35.37</u>	36.86	40.38	36.20	36.13

14	Urban Background	Diffusion Tube	100%	100%	<u>17.95</u>	18.62	16.34	20.96	21.13
15	Other	Diffusion Tube	92%	92%	<u>N/A</u>	N/A	38.47	N/A	34.50
16	Other	Diffusion Tube	83%	83%	<u>N/A</u>	N/A	40.09	N/A	49.13
17	Other	Diffusion Tube	92%	92%	<u>N/A</u>	N/A	38.51	N/A	37.16
18	Roadside	Diffusion Tube	100%	100%	<u>47.89</u>	44.77	45.40	41.00	37.81
19	Roadside	Diffusion Tube	92%	92%	<u>46.35</u>	42.58	39.84	45.20	33.00
20	Roadside	Diffusion Tube	100%	100%	<u>40.82</u>	39.73	40.68	36.20	35.69
21	Roadside	Diffusion Tube	100%	100%	<u>45.17</u>	43.94	44.92	45.05	40.13
22	Roadside	Diffusion Tube	92%	92%	<u>52.50</u>	47.85	43.36	43.88	41.39
23	Roadside	Diffusion Tube	100%	100%	<u>46.83</u>	42.90	42.63	40.00	40.19
24	Roadside	Diffusion Tube	83%	83%	<u>48.91</u>	49.01	50.48	49.01	50.18
25	Other	Diffusion Tube	67%	67%	<u>22.10</u>	22.20	20.39	N/A	28.03
26	Other	Diffusion Tube	75%	75%	<u>23.64</u>	23.50	20.61	N/A	24.67
27	Other	Diffusion Tube	75%	75%	<u>23.63</u>	25.06	19.97	N/A	26.58
28	Roadside	Diffusion Tube	100%	100%	<u>51.83</u>	49.03	54.68	53.13	55.94
31	Roadside	Diffusion Tube	100%	100%	<u>34.70</u>	32.68	34.96	41.75	32.13
32	Roadside	Diffusion Tube	100%	100%	<u>42.14</u>	41.83	47.42	45.38	44.19
33	Roadside	Diffusion Tube	75%	75%	<u>35.88</u>	35.78	33.75	54.80	42.67

34	Roadside	Diffusion Tube	100%	100%	<u>34.94</u>	35.35	33.21	54.20	39.50
35	Roadside	Diffusion Tube	100%	100%	<u>45.92</u>	44.02	38.86	72.40	46.19
36	Kerbside	Diffusion Tube	83%	83%	<u>43.91</u>	40.71	42.49	38.80	42.23
37	Roadside	Diffusion Tube	100%	100%	<u>36.63</u>	36.18	36.36	30.00	36.06
38	Roadside	Diffusion Tube	100%	100%	<u>42.63</u>	40.68	38.66	36.00	36.13
39	Roadside	Diffusion Tube	92%	92%	<u>42.79</u>	42.52	40.40	39.30	36.41
40	Roadside	Diffusion Tube	100%	100%	<u>51.08</u>	45.24	60.39	54.40	53.44
41	Roadside	Diffusion Tube	83%	83%	<u>42.13</u>	43.03	45.25	43.50	39.83
42	Roadside	Diffusion Tube	100%	100%	<u>48.03</u>	47.37	42.99	43.60	45.94
43	Roadside	Diffusion Tube	92%	92%	<u>46.53</u>	42.82	43.97	43.00	38.59
44	Roadside	Diffusion Tube	100%	100%	<u>38.43</u>	35.78	36.68	32.20	34.44
45	Roadside	Diffusion Tube	100%	100%	<u>35.99</u>	36.84	37.45	36.70	35.69
46	Roadside	Diffusion Tube	100%	100%	<u>36.87</u>	32.08	37.87	39.53	37.13
47	Other	Diffusion Tube	100%	100%	<u>44.45</u>	42.17	54.16	35.52	44.06
48	Roadside	Diffusion Tube	100%	100%	<u>44.15</u>	44.62	43.82	64.68	47.31
49	Roadside	Diffusion Tube	100%	100%	<u>44.06</u>	38.69	42.71	37.1875	38.00
50	Roadside	Diffusion Tube	100%	100%	<u>42.94</u>	43.72	45.49	42.075	39.19
51	Roadside	Diffusion Tube	100%	100%	<u>37.88</u>	43.65	40.04	55.4	36.00

52	Roadside	Diffusion Tube	92%	92%	<u>48.34</u>	35.24	36.23	36.465	34.64
53	Roadside	Diffusion Tube	100%	100%	<u>36.13</u>	32.27	35.07	33.495	28.31
54	Roadside	Diffusion Tube	100%	100%	<u>40.55</u>	38.57	39.60	39	35.00
55	Roadside	Diffusion Tube	100%	100%	<u>36.82</u>	31.76	39.05	33.495	31.88
56	Roadside	Diffusion Tube	100%	100%	<u>41.20</u>	39.50	39.93	40	39.56
57	Roadside	Diffusion Tube	91%	92%	<u>25.87</u>	28.81	41.56	46.86	27.19
58	Roadside	Diffusion Tube	75%	75%	<u>45.74</u>	39.17	32.35	30.36	41.71
61	Roadside	Diffusion Tube	100%	92%	<u>N/A</u>	N/A	N/A	N/A	35.80
62	Roadside	Diffusion Tube	100%	92%	<u>N/A</u>	N/A	N/A	N/A	30.20
63	Roadside	Diffusion Tube	100%	92%	<u>N/A</u>	N/A	N/A	N/A	28.09
64	Other	Diffusion Tube	91%	83%	<u>N/A</u>	N/A	N/A	N/A	52.05
65	Roadside	Diffusion Tube	100%	92%	<u>N/A</u>	N/A	N/A	N/A	48.14
66	Other	Diffusion Tube	91%	83%	<u>N/A</u>	N/A	N/A	N/A	29.40
67	Roadside	Diffusion Tube	100%	92%	<u>N/A</u>	N/A	N/A	N/A	29.05
68	Roadside	Diffusion Tube	91%	83%	<u>N/A</u>	N/A	N/A	N/A	24.75
69	Roadside	Diffusion Tube	91%	83%	<u>N/A</u>	N/A	N/A	N/A	28.95
70	Roadside	Diffusion Tube	100%	92%	<u>N/A</u>	N/A	N/A	N/A	31.70
71	Roadside	Diffusion Tube	100%	92%	<u>N/A</u>	N/A	N/A	N/A	38.86

72	Roadside	Diffusion Tube	100%	92%	<u>N/A</u>	N/A	N/A	N/A	36.89
73	Roadside	Diffusion Tube	100%	92%	<u>N/A</u>	N/A	N/A	N/A	43.43
74	Roadside	Diffusion Tube	100%	92%	<u>N/A</u>	N/A	N/A	N/A	30.00
75	Roadside	Diffusion Tube	73%	67%	<u>N/A</u>	N/A	N/A	N/A	29.44
76	Roadside	Diffusion Tube	73%	67%	<u>N/A</u>	N/A	N/A	N/A	32.25
77	Roadside	Diffusion Tube	91%	83%	<u>N/A</u>	N/A	N/A	N/A	46.58
78	Roadside	Diffusion Tube	91%	83%	<u>N/A</u>	N/A	N/A	N/A	24.15

Diffusion tube data has been bias corrected (**confirm by selecting in box**)

Annualisation has been conducted where data capture is <75% (**confirm by selecting in box**)

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 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.

Figure A.1 – Trends in Annual Mean NO₂ Concentrations

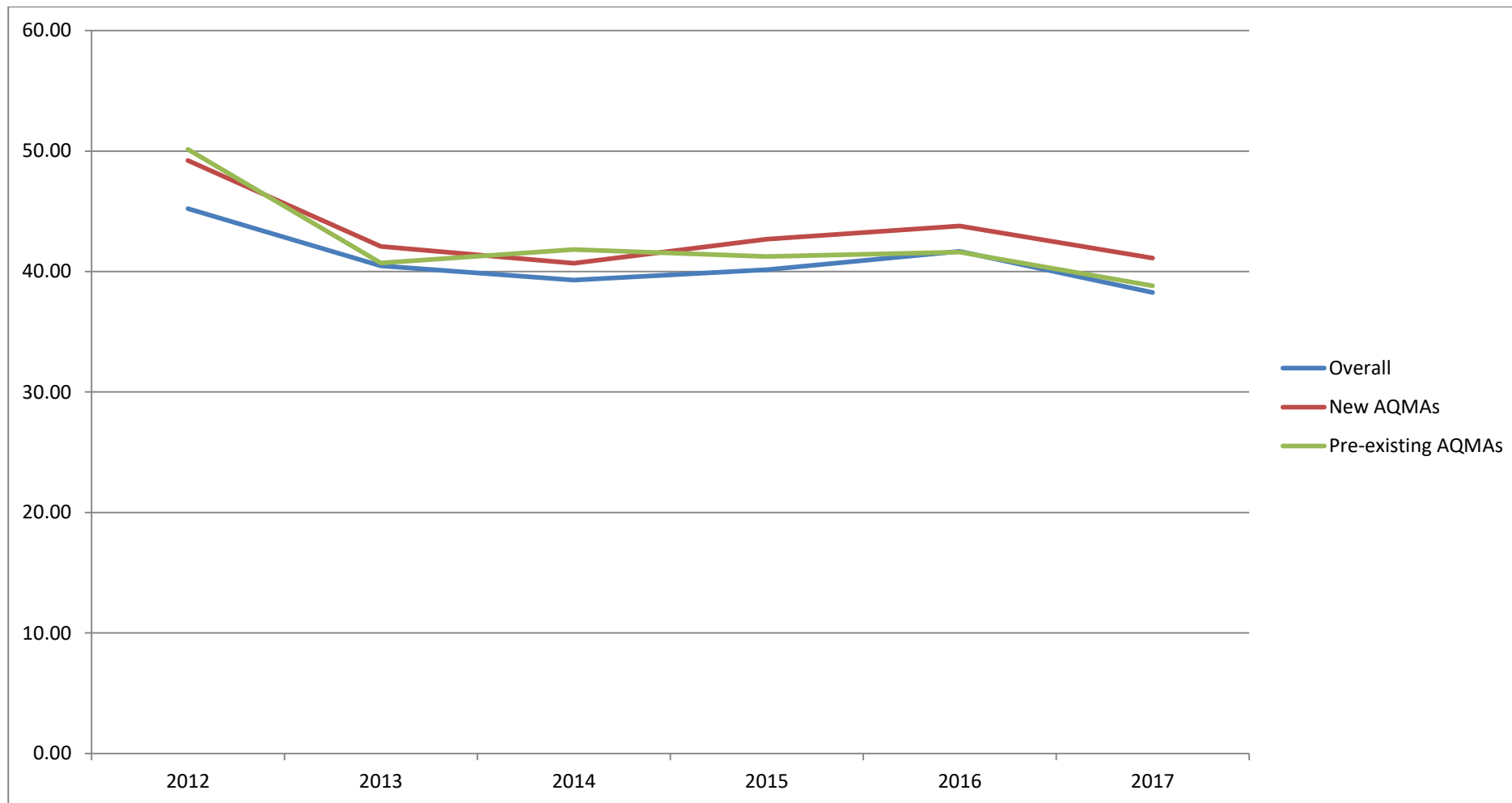


Table A.4 – 1-Hour Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2017 (%) ⁽²⁾	NO ₂ 1-Hour Means > 200µg/m ³ ⁽³⁾				
					2013	2014	2015	2016	2017
Roadside 3	Roadside	Automatic	0	0	0	2 (139.91)	7 (171.37)	N/A	N/A
Roadside 6	Roadside	Automatic	0	0	0 (102.04)	2 (128.0)	0	N/A	N/A

Notes:

Exceedances of the NO₂ 1-hour mean objective (200µg/m³ not to be exceeded more than 18 times/year) are shown in **bold**.

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

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

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

Table A.5 – Annual Mean PM₁₀ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2017 (%) ⁽²⁾	PM ₁₀ Annual Mean Concentration (µg/m ³) ⁽³⁾				
				2013	2014	2015	2016	2017
Roadside 3	Roadside	0	0	22.08	20.12	18.72	N/A	N/A
Roadside 6	Roadside	0	0	N/A	17.13	25.95	N/A	N/A

Annualisation has been conducted where data capture is <75% (confirm by selecting in box)

Notes:

Exceedances of the PM₁₀ annual mean objective of 40µg/m³ are shown in **bold**.

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

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

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

Table A.6 – 24-Hour Mean PM₁₀ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2017 (%) ⁽²⁾	PM ₁₀ 24-Hour Means > 50µg/m ³ ⁽³⁾				
				2013	2014	2015	2016	2017
Roadside 3	Roadside	0	0	22.08	20.12	18.72	N/A	N/A
Roadside 6	Roadside	0	0	N/A	17.13	25.95	N/A	N/A

Notes:

Exceedances of the PM₁₀ 24-hour mean objective (50µg/m³ 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.

Table A.7 – PM_{2.5} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2017 (%) ⁽²⁾	PM _{2.5} Annual Mean Concentration (µg/m ³) ⁽³⁾				
				2013	2014	2015	2016	2017
Roadside 3	Roadside	0	0	N/A	N/A	N/A	N/A	N/A
Roadside 6	Roadside	0	0	N/A	N/A	N/A	N/A	N/A

Annualisation has been conducted where data capture is <75% (confirm by selecting in box)

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.

Appendix B: Full Monthly Diffusion Tube Results for 2017

Table B.1 – NO₂ Monthly Diffusion Tube Results - 2017

Site ID	NO ₂ Mean Concentrations (µg/m ³)												Annual Mean		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (factor) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
DT1	36	42.1	-	-	59.1	52.9	-	47	55	38.4	45.2	46.8	46.9	42.3	41.2
DT2	35.7	23.3	19.7	17.1	18.2	19.5	25.7	17	27	19	33	27.6	23.6	21.2	21.2
K1	78.0	69.0	74.0	64.0	56.0	55.0	35.0	28.0	54.0	41.0	63.0	63.0	56.7	42.5	
K2	71.0	59.0	78.0	58.0	49.0	45.0	47.0	41.0	62.0	32.0	67.0	67.0	56.3	42.3	
K3	88	70	74	74	56	58	55	39	287	43	71	71	82.2	61.6	54.8
K4				39	28					25	38	38	33.6	28.8	
K5	52	63	44	54	48	47	28	25	74	31	54	54	47.8	35.9	
K6	78	58	52	66	47	46	45	32	57	28	86	86	56.8	42.6	37.4
K7	69	47	60	45	50	39	28	27	40	35	63	63	47.2	35.4	
K8	52	55	55	49	45	38	35	25	51	31	66	66	47.3	35.5	
K9	77	66	66					18	36	22	46	46	47.1	26.5	
K10	88	66	66	47	30	44	29	44	40	37	53	53	49.8	37.3	
K11	59	53	54	56	54	48	30	43	22	43	61	61	48.7	36.5	
K12	70	57	61	42	42	47	32	47	48	37	58	58	49.9	37.4	
K13	66	64	70	38	41	44	36	24	56	41	49	49	48.2	36.1	

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K14	41	31	31	11	58	16	10	18	23	37	31	31	28.2	21.1	
K15		58	66	55	18	29	35	38	39	28	70	70	46.0	34.5	
K16		60	70	59	42	38	30		184	32	70	70	65.5	49.1	39.7
K17		58	65	53	53	52	24	49	25	38	64	64	49.5	37.2	
K18	69	72	58	52	54	37	29	23	57	38	58	58	50.4	37.8	
K19	12	59	62	53		20	39	32	78	23	53	53	44.0	33.0	
K20	70	61	69	49	60	5	38	30	66	25	49	49	47.6	35.7	
K21	80	66	66	54	38	45	50	29	69	19	63	63	53.5	40.1	34.3
K22	81	65	70	48	62	49	22		66	22	61	61	55.2	41.4	35.4
K23	76	66	68	46	52	51	47	35	47	29	63	63	53.6	40.2	27.3
K24	86	73	92	70	57	55	52	50			67	67	66.9	50.2	33.4
K25		62	63	32	38	29		23	27	25			37.4	30.0	
K26		52	58	26	42	26	15	27	31	19			32.9	24.7	
K27		50	52	28	41	32	34	23	42	17			35.4	26.6	
K28	99	84	142	69	69	60	52	47	86	29	79	79	74.6	55.9	55.6
K31	66	54	57	36	37	26	32	41	40	17	54	54	42.8	32.1	
K32	80	65	75	61	56	55	51	36	61	23	72	72	58.9	44.2	36.6
K33	67	62	57	39				19	93	35	70	70	56.9	42.7	36.5
K34	64	59	66	50	64	44	33	22	95	21	57	57	52.7	39.5	
K35	91	74	68	58	56	46	13	31	142	28	66	66	61.6	46.2	34.6
K36	73	56	67	53	55		26		80	19	67	67	56.3	42.2	34.2
K37	73	59	55	41	39	35	45	34	64	18	57	57	48.1	36.1	
K38	67	51	64	39	50	47	28	34	78	16	52	52	48.2	36.1	
K39	75	50	60	38	31	33	60		67	14	53	53	48.5	36.4	
K40	97	72	89	70	74	69	47	74	111	28	62	62	71.3	53.4	49.9
K41			67	56	51	47	39	35	62	20	77	77	53.1	39.8	
K42	88	75	74	44	51	39	47	26	73	42	88	88	61.3	45.9	37.5

K43	81	56	73	47	52	42	42	38		25	55	55	51.5	38.6	
K44	46	49	63	39	44	39	41	29	57	22	61	61	45.9	34.4	
K45	67	57	58	46	54	37	41	37	47	29	49	49	47.6	35.7	
K46	75	58	68	30	49	42	54	40	52	20	53	53	49.5	37.1	
K47	69	72	78	61	39	39	33	47	66	43	79	79	58.8	44.1	44.1
K48	92	73	61	49	68	43	44	37	141	37	56	56	63.1	47.3	47.3
K49	75	57	65	47	36	40	38	46	57	27	60	60	50.7	38.0	
K50	85	73	62	46	41	34	32	48	47	33	63	63	52.3	39.2	
K51	74	60	60	45	42	30	22	25	61	25	66	66	48.0	36.0	
K52	69	45	70	48	54	12	30	39		25	58	58	46.2	34.6	
K53	62	47	52	32	39	20	32	32	23	16	49	49	37.8	28.3	
K54	78	61	59	49	39	21	22	22	69	30	55	55	46.7	35.0	
K55	58	49	54	40	38	24	30	34	43	36	52	52	42.5	31.9	
K56	69	61	73	57	55	20	32	41	70	21	67	67	52.8	39.6	
K57	52	52	45	28	33	26	37	15	29	34	42	42	36.3	27.2	
K58	76	74	81	61	56	22	46	44	58	1.4	74	74	55.6	41.7	
K59	77	70	49	34	36	16	25	33	100	28		53	47.4	35.5	
K60	111	58		37	40	26	35	38	92	21			50.9	38.2	
K61		60	66	45	41	23	33	42	64	49	51	51	47.7	35.8	
K62		61	61	39	33	28	30	42	38	21	45	45	40.3	30.2	
K63		51	59	26	47	33	26	26	45	9	45	45	37.5	28.1	
K64		86	77	70	69	59	68	46		39	90	90	69.4	52.1	
K65		82	96	80	56	18	52	39	63	32	94	94	64.2	48.1	
K66		49	45	28	28	28	29		70	27	44	44	39.2	29.4	
K67		56	55	29	29	29	36	20	48	28	48	48	38.7	29.0	
K68		41	52	33	30	27	27		34	20	33	33	33.0	24.8	
K69			64	39	23	30	30	26	32	32	55	55	38.6	29.0	

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K70		58	45	39	42	29	40	30	66	36	40	40	42.3	31.7	
K71		49	59	51	51	29	39	85	41	46	60	60	51.8	38.9	
K72		49	64	66	40	24	55	34	48	29	66	66	49.2	36.9	
K73		61	74	73	59	34	56	44	36	44	78	78	57.9	43.4	
K74		43	56	40	34	31	22	55	28	25	53	53	40.0	30.0	
K75		58	57	38	38	33		20			35	35	39.3	29.7	
K76		57	58	39	42	35	32	31	50				43.0	37.4	
K77		73	77	66		60	52	37	67	31	79	79	62.1	46.6	43.5
K78		37	41	28	35	23	20		29	13	48	48	32.2	24.2	

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. (Distance correction has been applied if the monitoring location has a relevant receptor and exceeding AQO)

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 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

Kirklees Council get their tubes from West Yorkshire Analytical Services. The tubes are prepared using 50% tea: 50% acetone mix.

C.1.1 Factor from Local Co-location Studies

Kirklees Council currently have 2 Co-location studies conducted at our monitoring stations, but due to station failures, non of our studies had >75% and are therefore not valid.

C.1.2 Diffusion Tube Bias Adjustment Factors

In addition to our own scheme, West Yorkshire Analytical Services participate in co-location studies and derive bias adjustment factors for their tubes. The bias adjustment factor for West Yorkshire Analytical Service is 0.75

C.1.3 Discussion of Choice of Factor to Use

In 2016, Kirklees Council did not generate a bias adjustment factor from their own studies. Therefore, the national figure for West Yorkshire Analytical Service has been used

C.3 QA/QC of Automatic Monitoring

Data ratification is carried out internally by one person (Senior Technical Officer) periodically, normally at monthly intervals. After ratification it is stored on an Excel files in the Kirklees air quality archive.

Data verification is carried out by two staff who have had their competency verified after internal training. Verification takes place twice per day on weekdays, and the of Friday p.m. to Monday a.m. on Monday morning.

Roadside 3 – Hunsworth Lane

Station	Roadside 3 – Hunsworth Lane
Analyser Model	Horiba: APNA-360CE, FH 62 I-R
Logging system	Each analyser has a data distribution board and communicates directly via modem for data download twice per day
Calibration Gas	NO, zero air.
Routine Calibration	Automatic calibration carried out every 72 hours
Daily zero and span Check	No
Air Conditioning	Yes
Service Contract	Horiba: 2 x 6 monthly service and breakdown/repair call out.

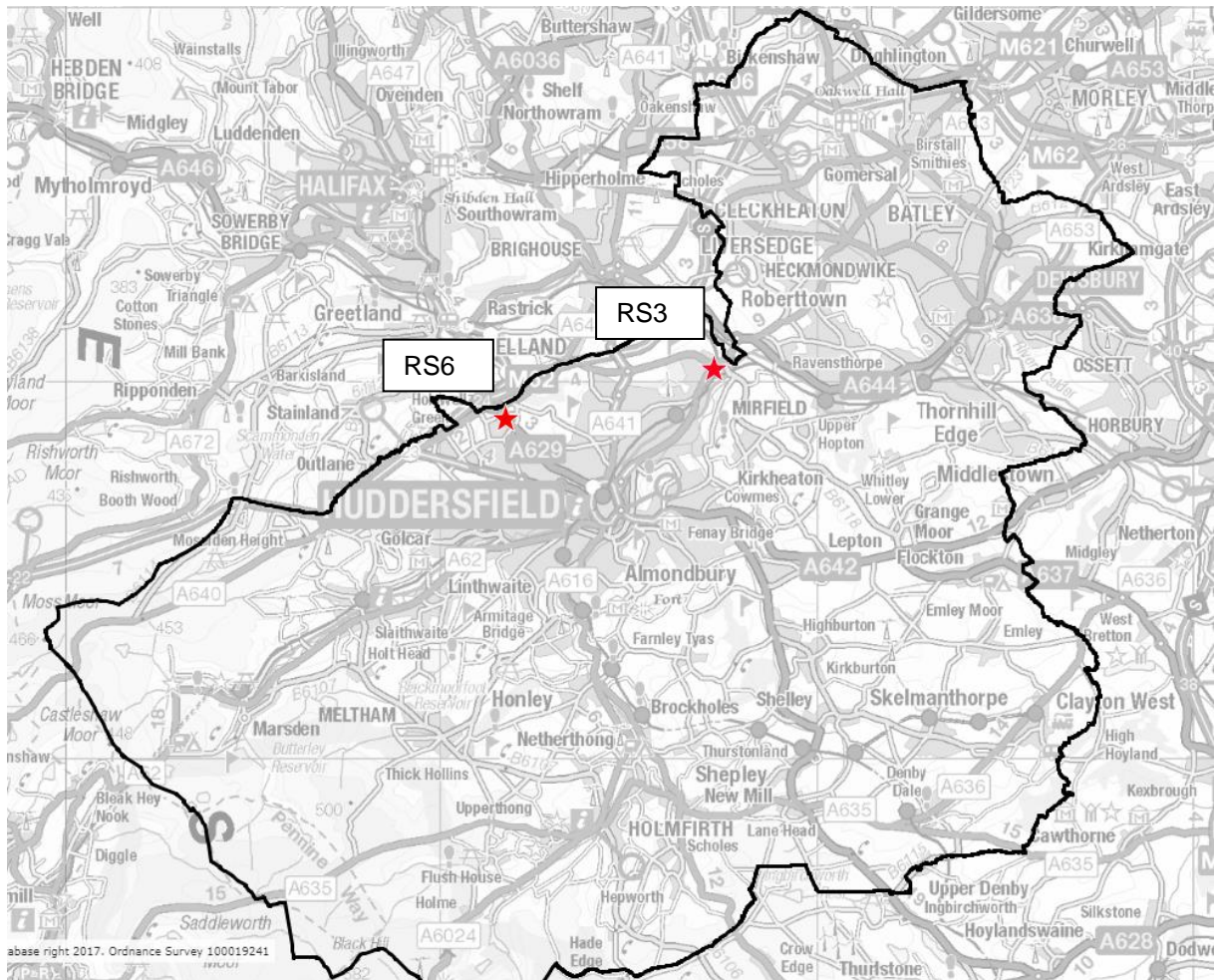
Roadside 6– Ainley Top

Station	Roadside 6 – Ainley Top
Analyser Model	Horiba: APNA-360CE, MET-One BAM
Logging system	Each analyser has a data distribution board and communicates directly via modem for data download twice per day
Calibration Gas	NO,
Routine Calibration	Automatic calibration carried out every 72 hours
Daily zero and span Check	No
Air Conditioning	Yes
Service Contract	Horiba: 2 x 6 monthly service and breakdown/repair call out.

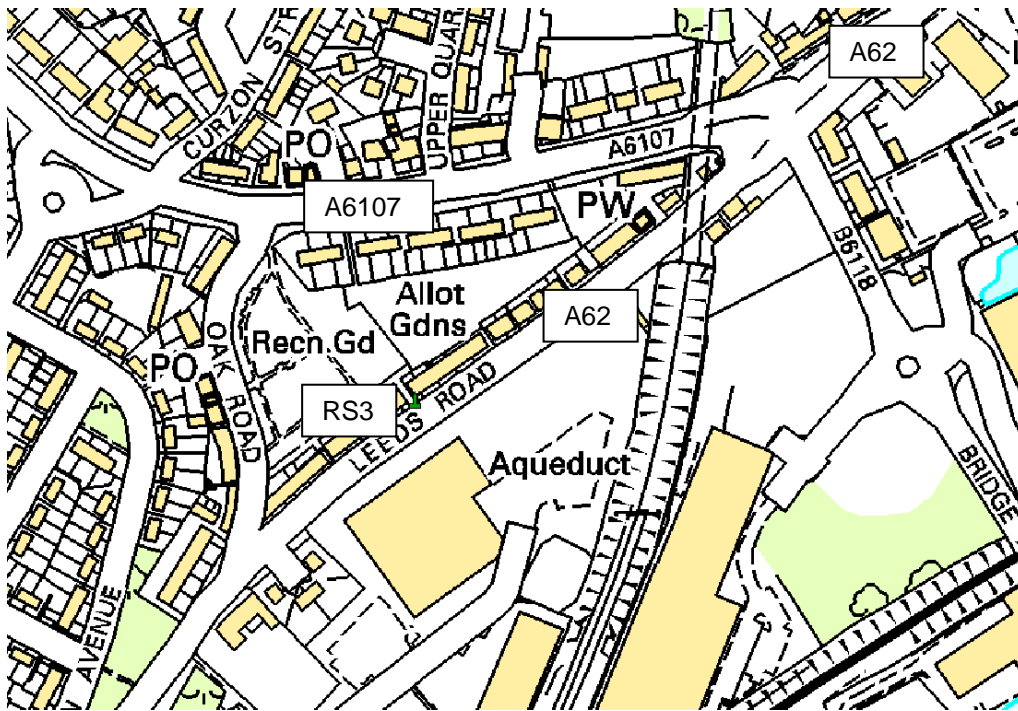
Appendix D: Map(s) of Monitoring Locations and AQMAs

1 Continuous Monitor Sites

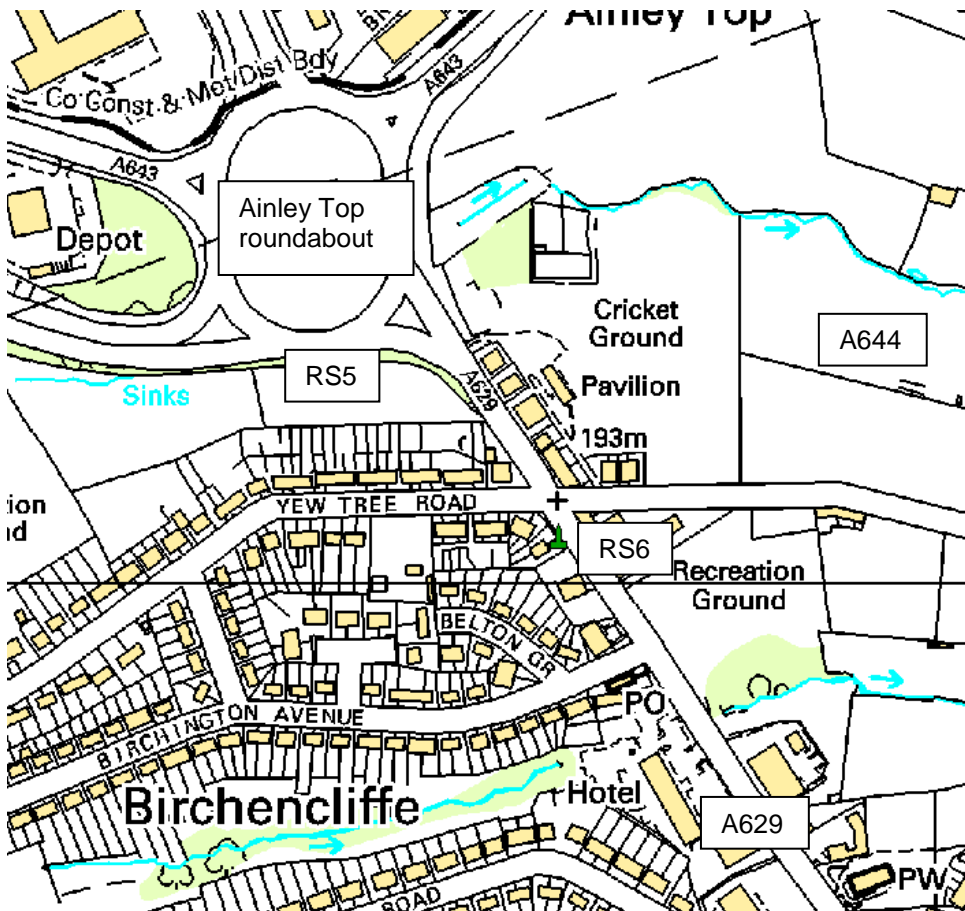
D 1.1 Automatic Monitoring Sites across district



D 1.2 Automatic Monitoring Site New Roadside 3

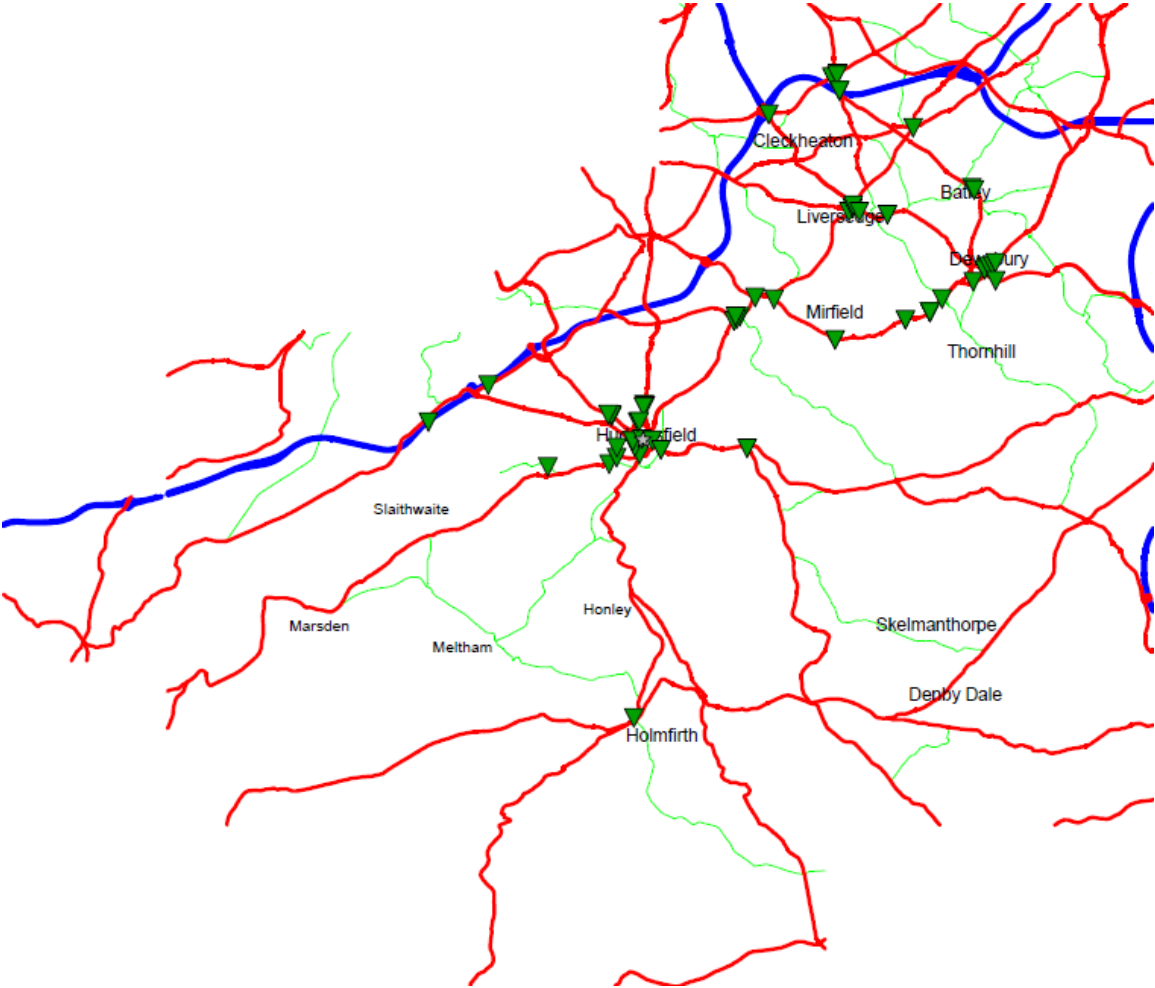


D 1.3 Automatic Monitoring Site Roadside 6

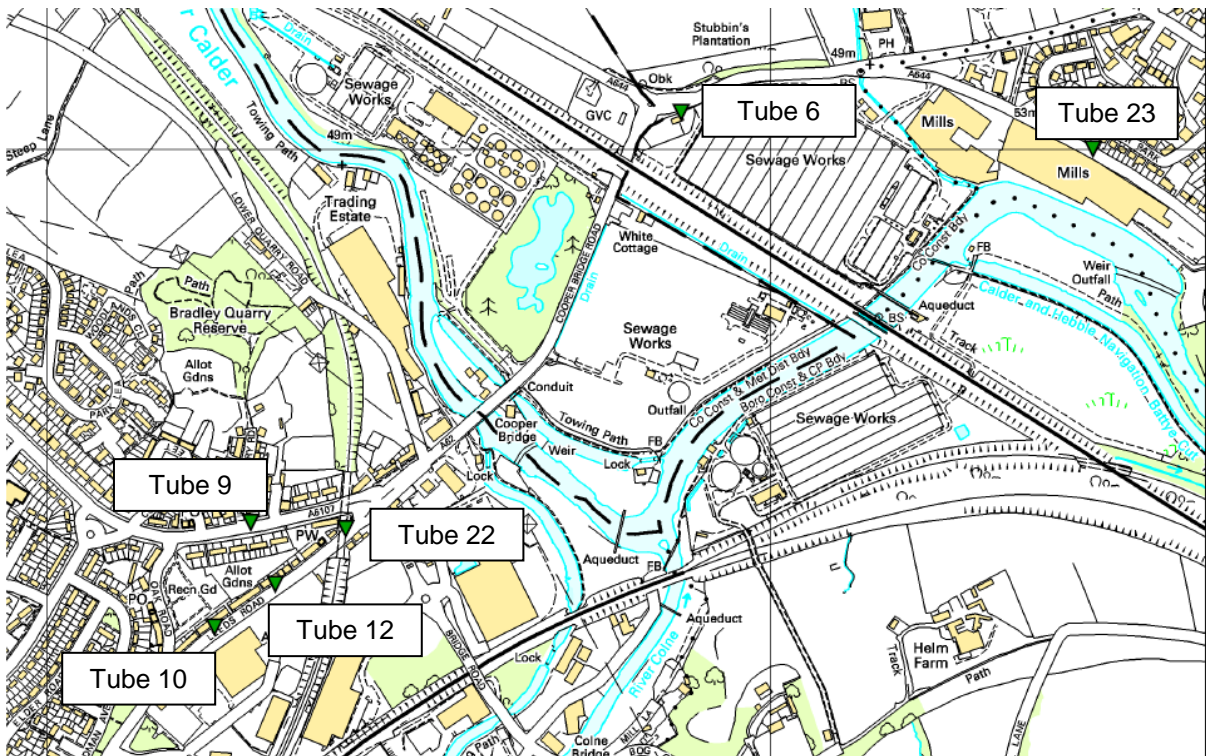


D.2 Passive Monitor Sites

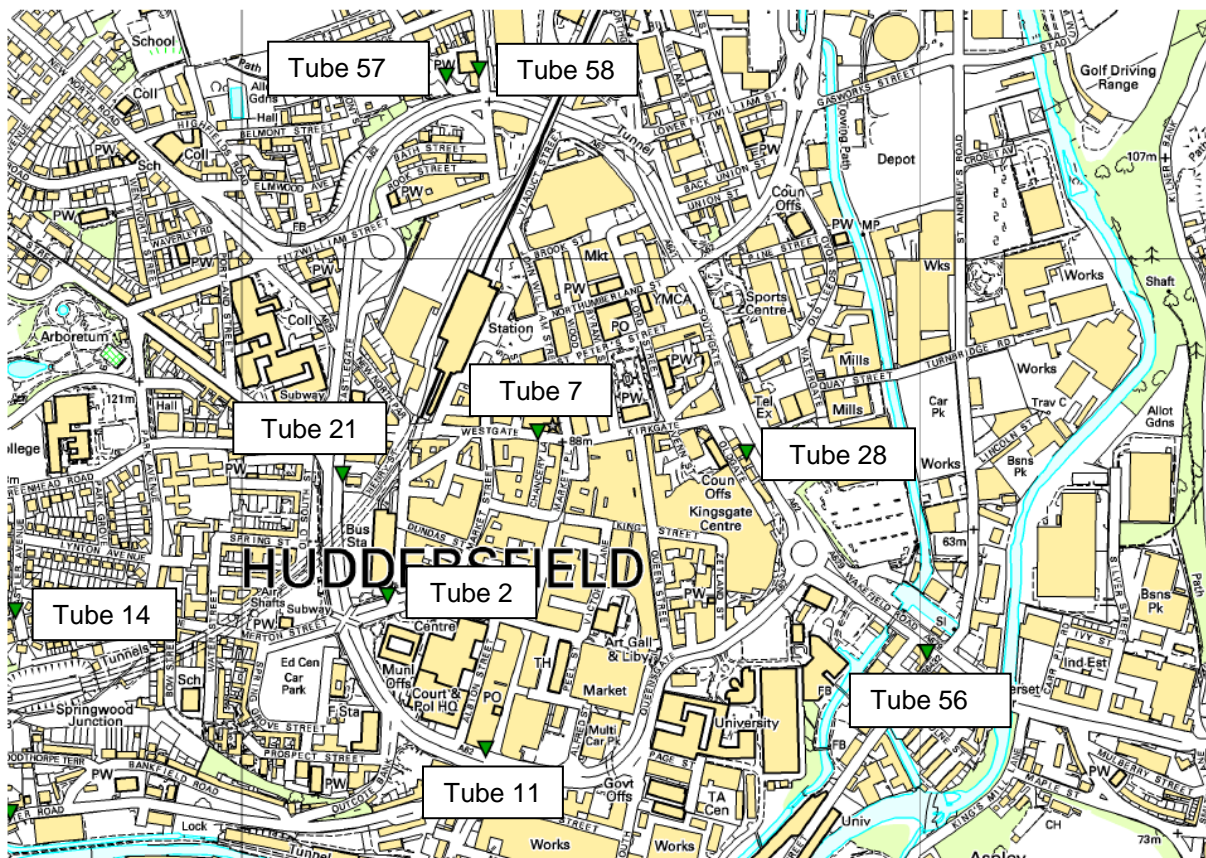
D 2.1 Non-Automatic Monitoring Sites across district



D 2.2 AQMA 1 Bradley diffusion tubes



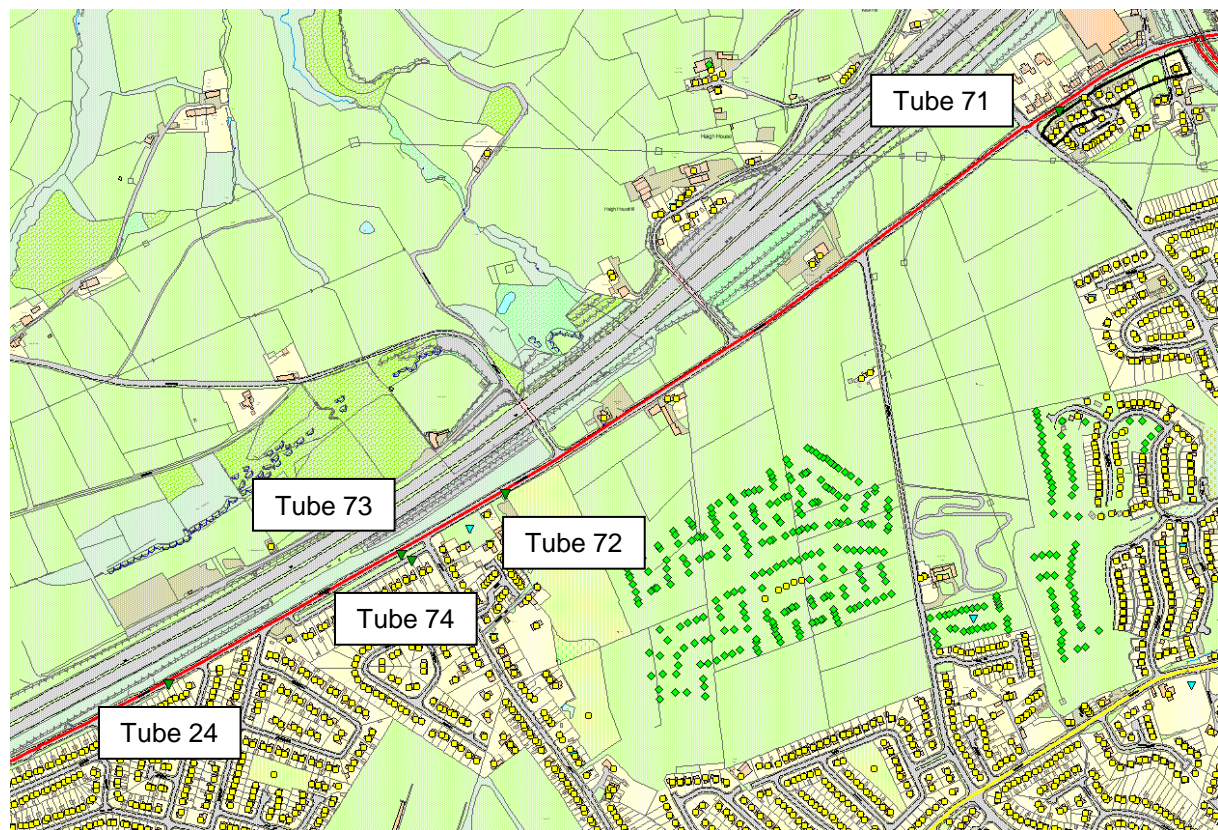
D 2.3 Huddersfield town centre diffusion tubes



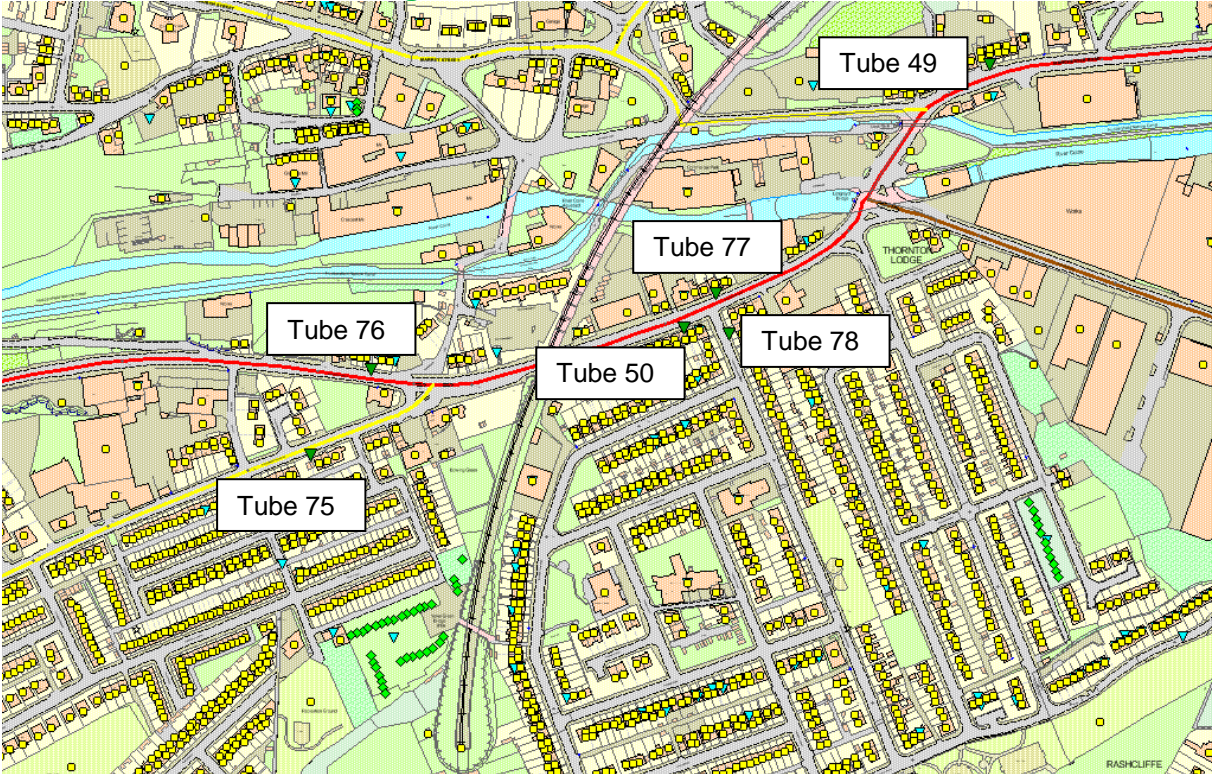
D 2.8 Edgerton diffusion tubes



D 2.9 Lindley Moor Road diffusion tubes

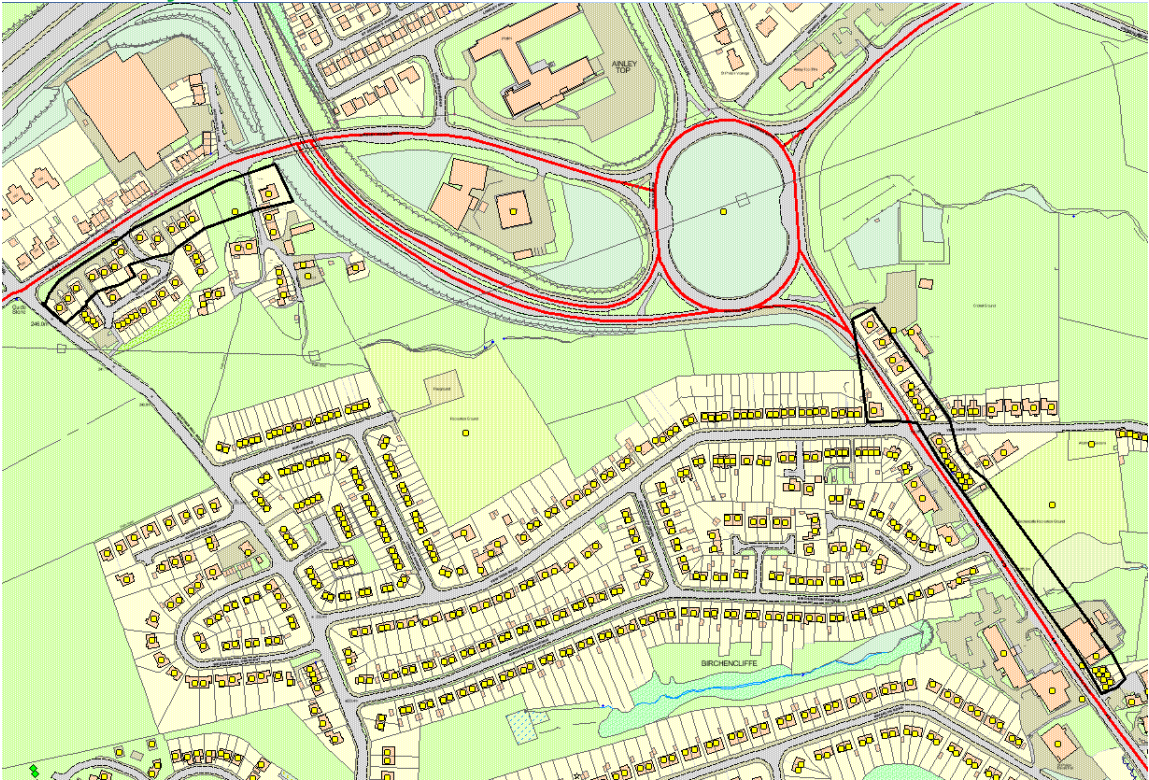


D 2.10 Thornton Lodge diffusion tubes

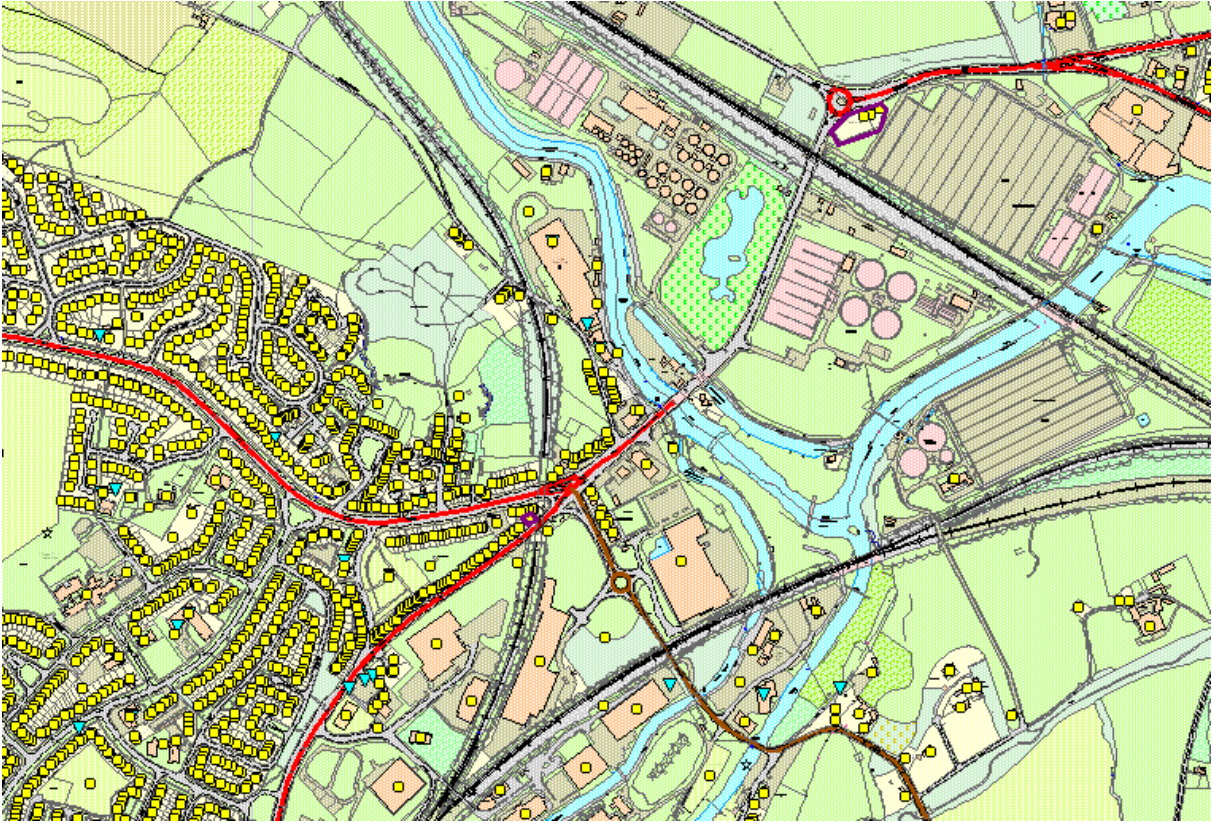


D.3 Air Quality Management Areas

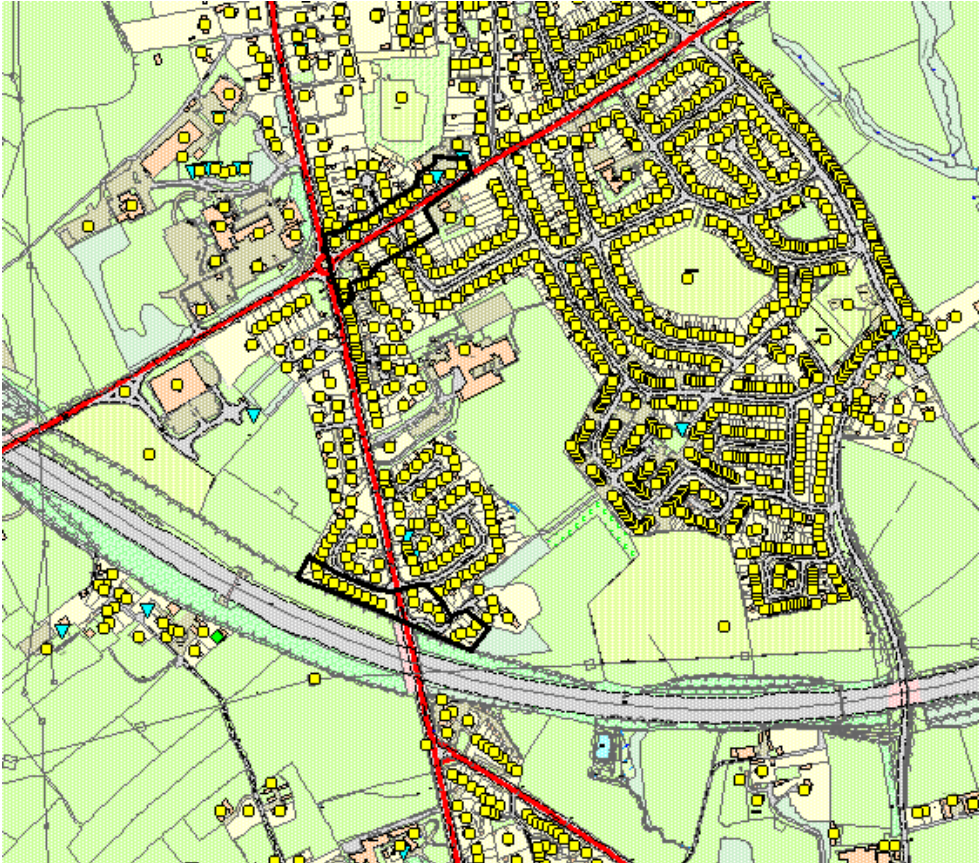
D 3.1 Ainley Top AQMA



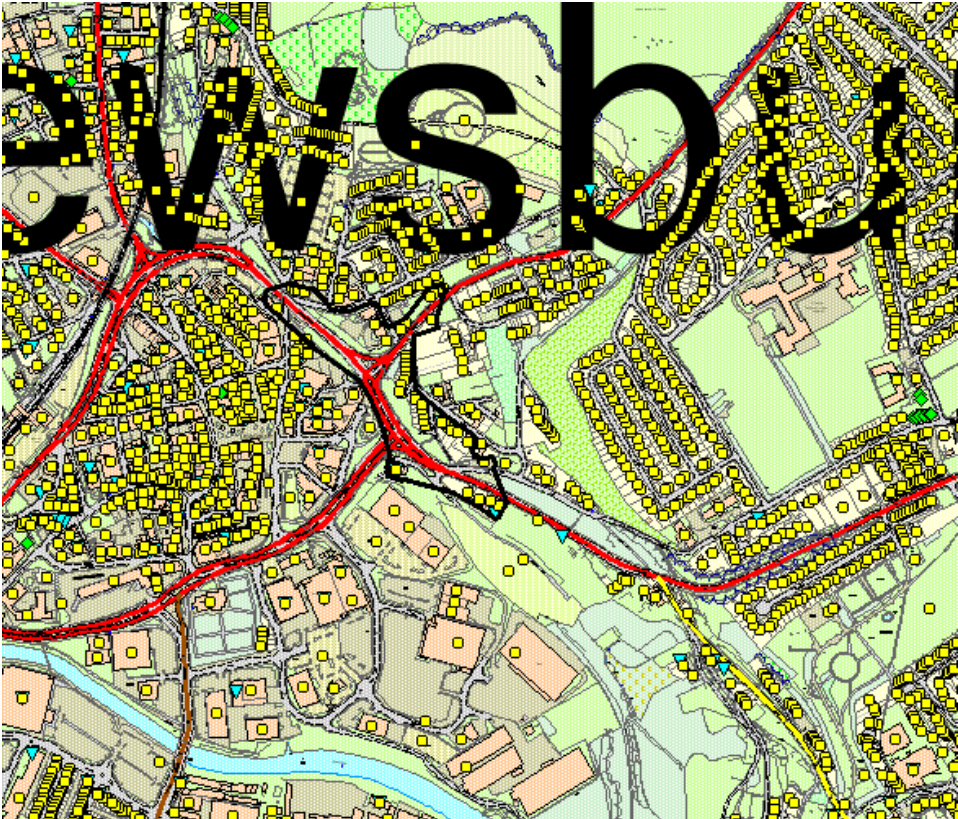
D 3.2 Amended Bradley AQMA



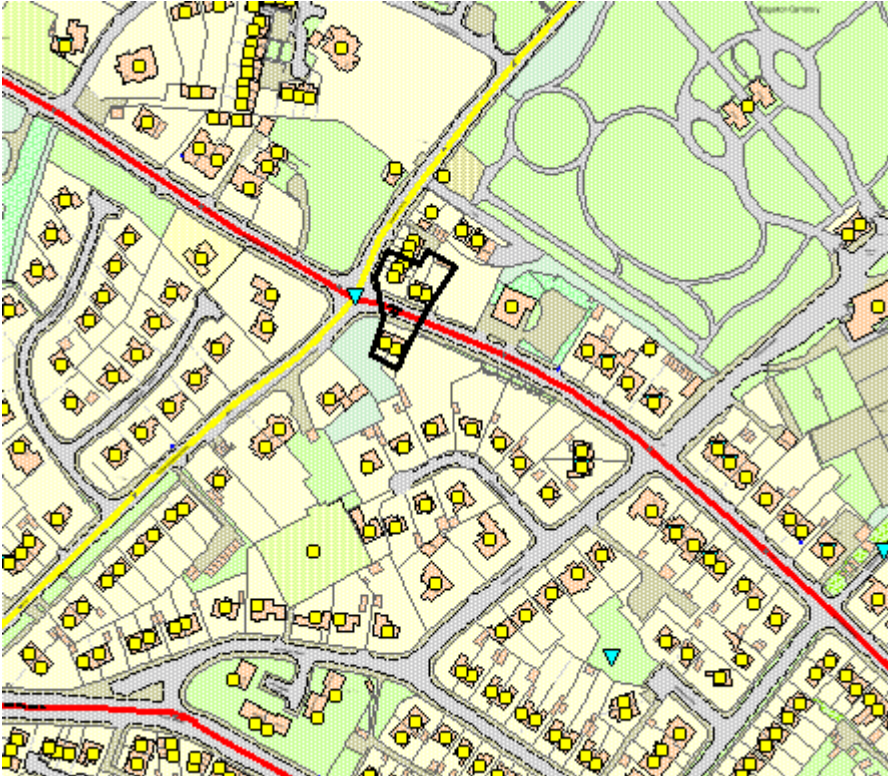
D 3.3 Birkenshaw AQMA



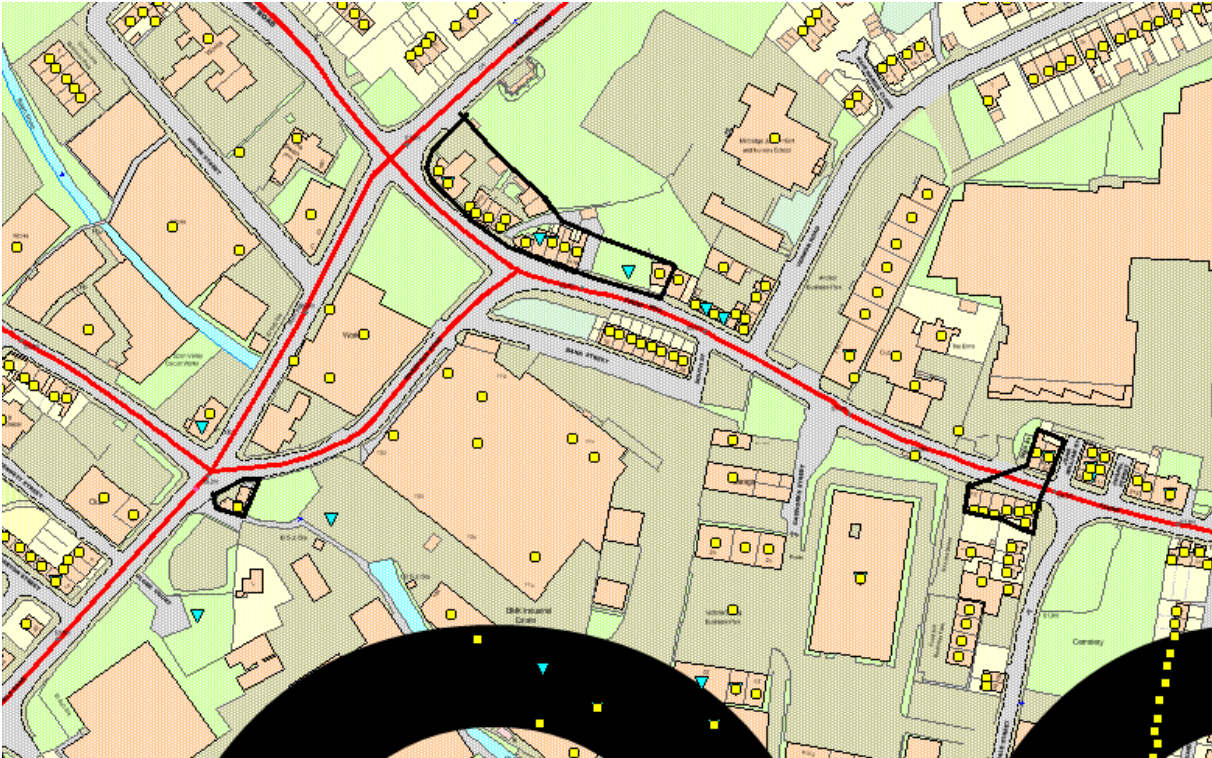
D 3.4 Eastborough AQMA



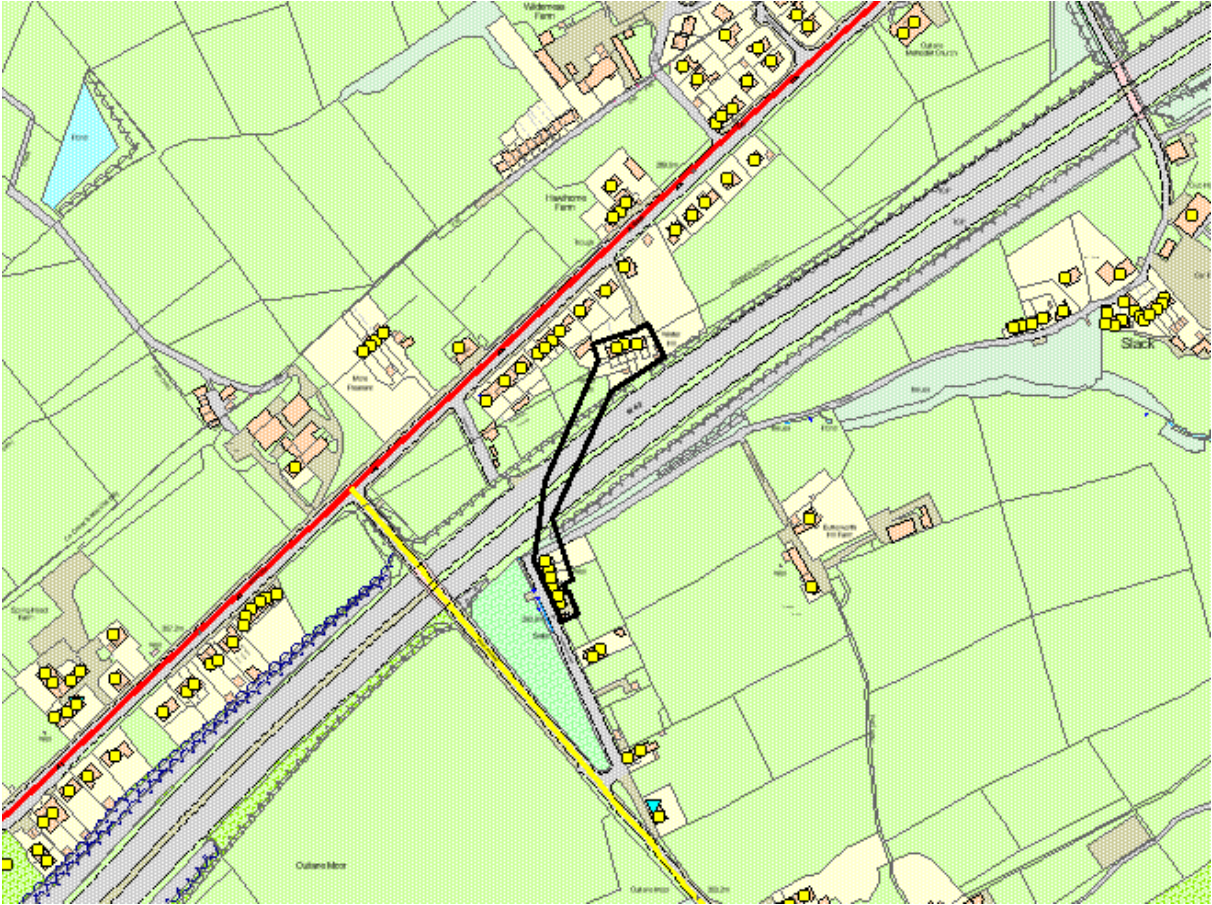
D 3.5 Edgerton AQMA



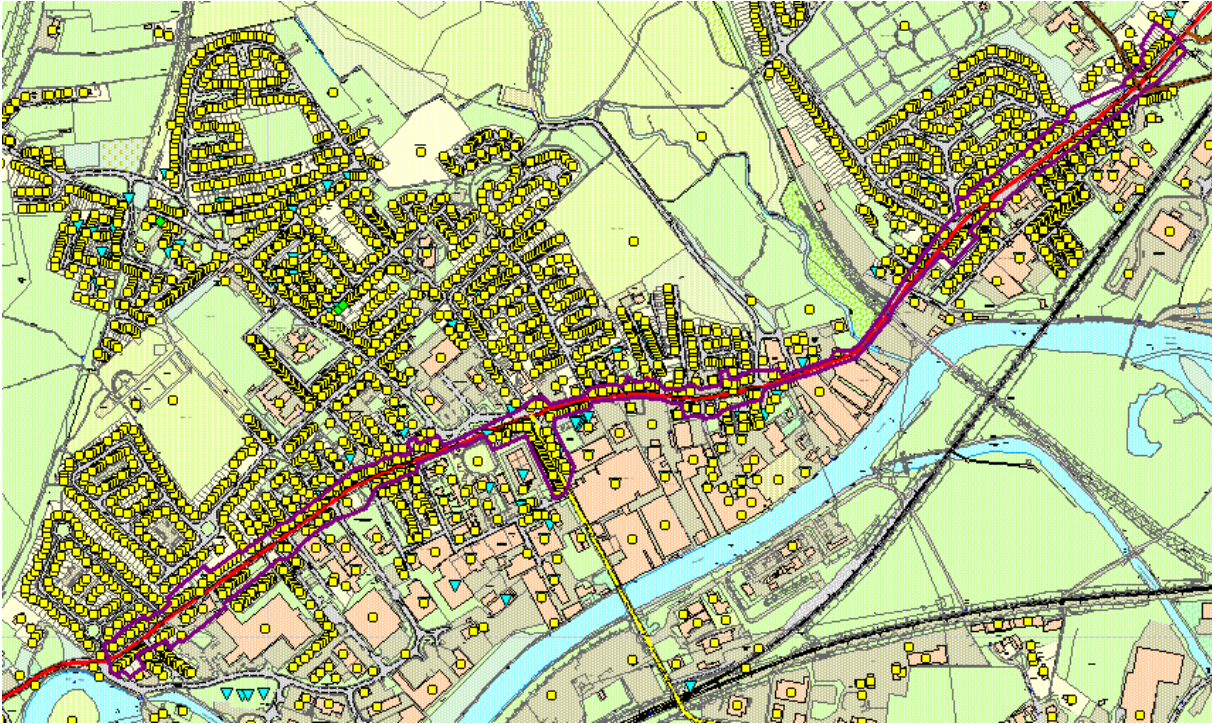
D 3.6 Liversedge / Heckmondwike AQMA



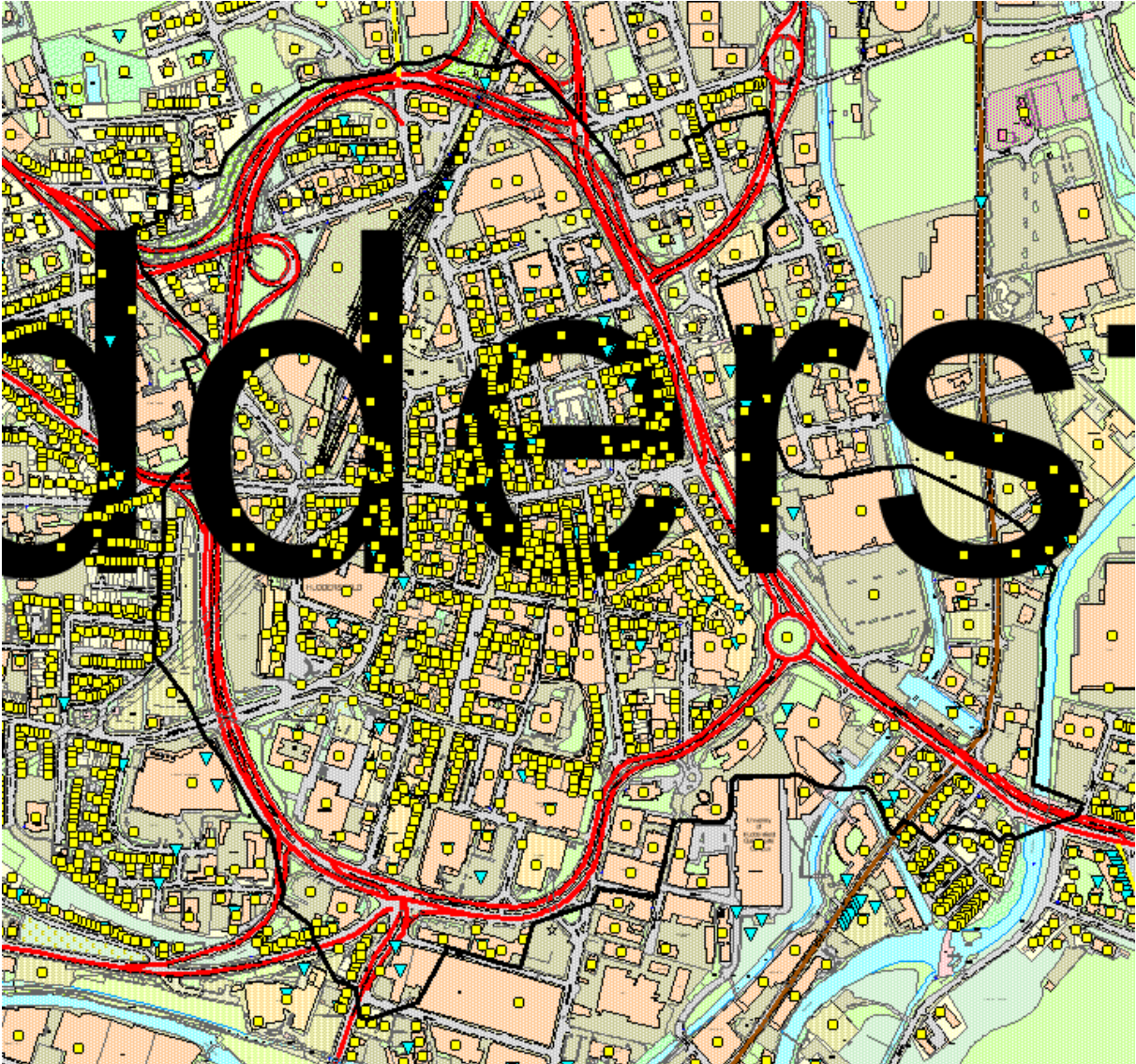
D 3.7 Outlane AQMA



D 3.8 Revoked Scouthill AQMA



D 3.9 Huddersfield Town Centre AQMA



Appendix E: Air Quality Modelling

E.1 Lindley Moor Road

Kirklees Council has modelled the annual mean NO_x for 2017 in the along Lindley Moor Road. This modelling was conducted to determine the boundaries of the AQMA.

Kirklees Council has used Atmospheric Dispersion Modelling System for Urban areas (ADMS Urban) to create this model and validated it against the 2017 automatic monitoring data.

Meteorological Data for the model has been taken from Leeds / Bradford Airport Met Office Weather Station. The weather data for 2015 has been selected as the weather patterns in that year are representative of the usual weather conditions in the district.

The Traffic Figures have been obtained from the Department of Transport count points in close proximity to the assessment areas and expanded in accordance with national guidance for increase vehicle number.

Traffic counts and average speeds were entered into ADMS (Urban), which uses Emissions Factor Toolkit V8.0

Background figures for the model have been taken from the *2017 based background maps* (DEFRA).

The topography and road layout was obtained from Kirklees Council GIS data and ordinance survey records.

Kirklees conducted a statistical procedure as set out in TG(09) to determine the model uncertainty and performance. Table F.1.1 indicates the results at diffusion tube sites and the results of the statistical analysis are contained within Table F.1.2 and Figure F.1.1.

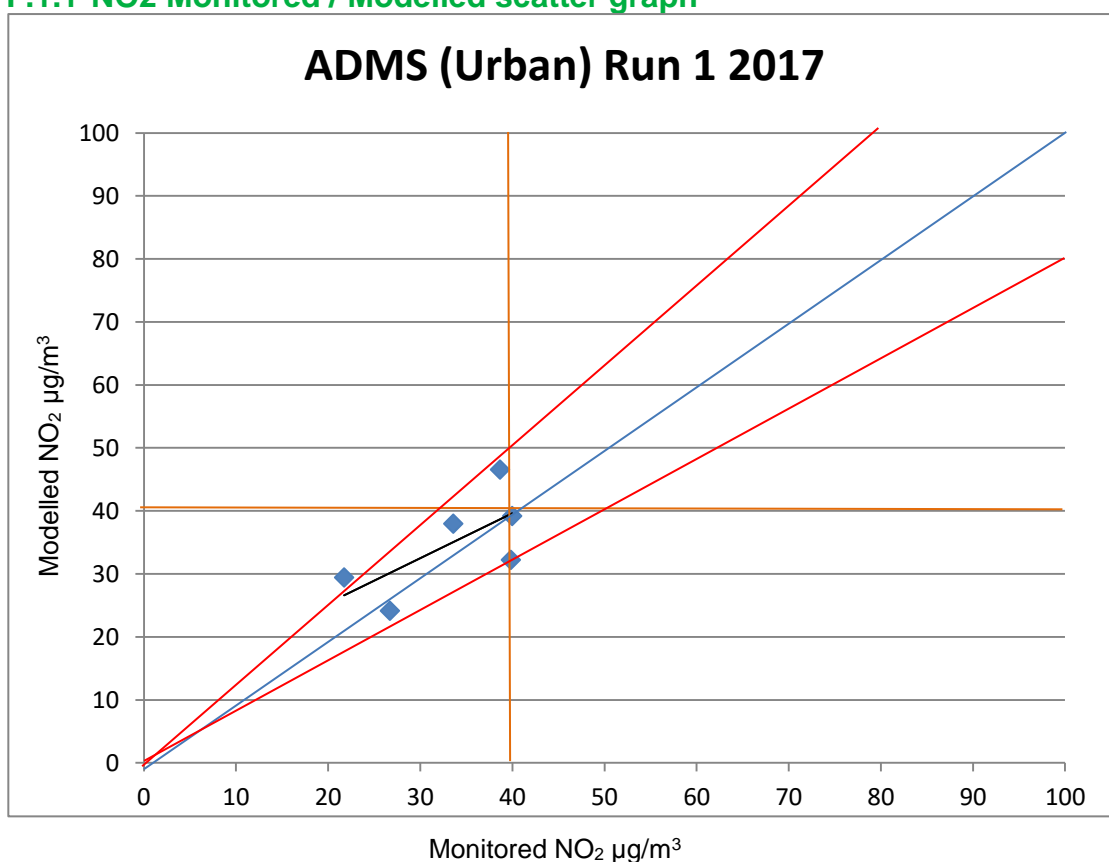
Table F.1.1 Results of Run at diffusion tube sites and statistical analysis of model

	Tube result (µg/m³)	Modelled increment NO_x (µg/m³)	Calculated NO₂ from NO_x (µg/m³)	% Difference	Correction Factor
Tube 24	50.18	7.8165	20.9	-58	2.40
Tube 71	38.86	6.8165	20.41	-47	1.90
Tube 72	36.89	8.2593	21.11	-43	1.75
Tube 73	43.43	8.3306	21.15	-51	2.05
Tube 74	30.00	7.92	20.95	-30	1.43

Table F.1.2 Statistical analysis of the corrected data

RMSE	20.12
Fractional Bias	0.36

Figure F.1.1 NO2 Monitored / Modelled scatter graph

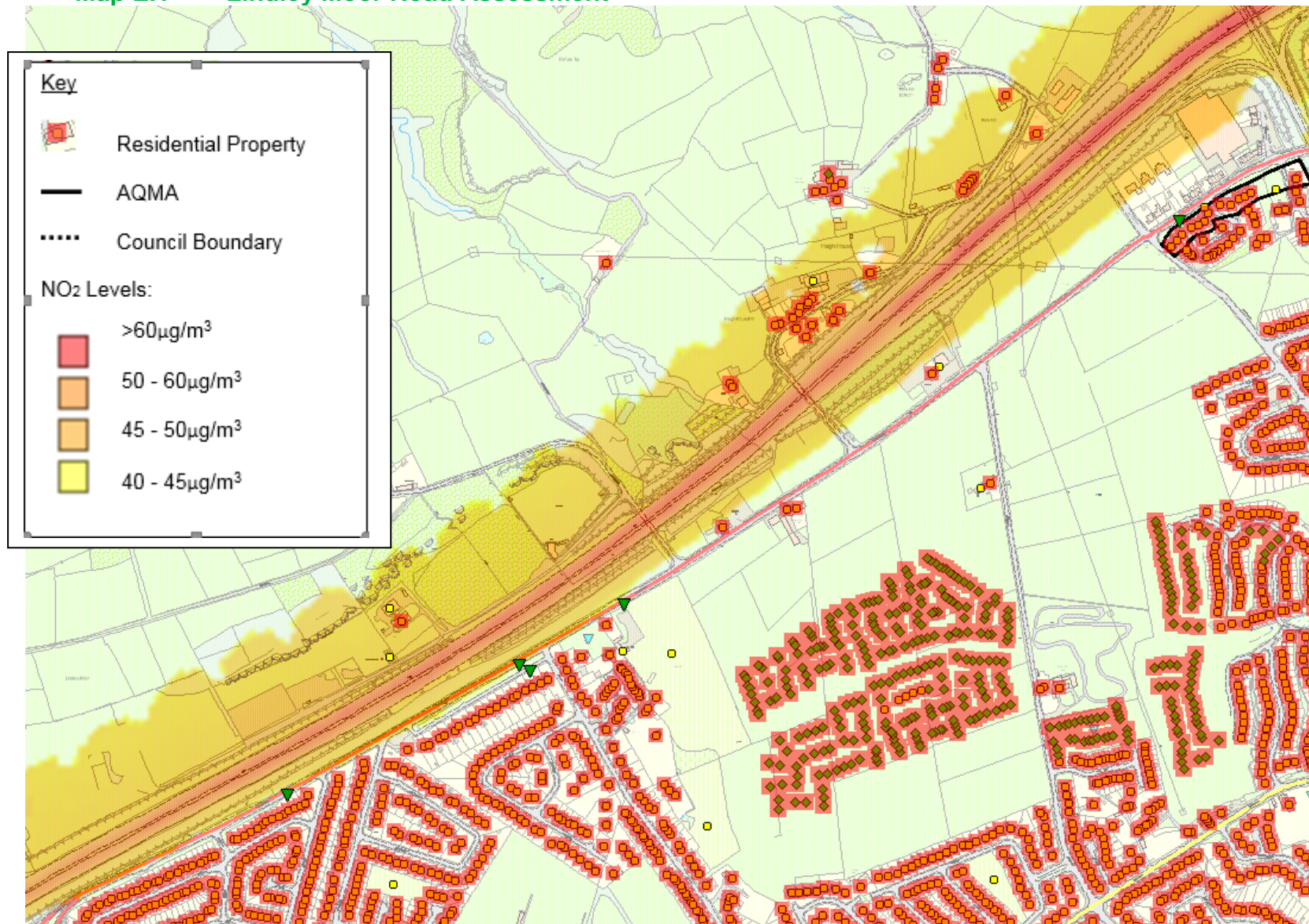


While statistical analysis carried out at the validation stage shows that the model is underestimating by roughly half.

Figure F.1.1 graphs the correlation between the monitored and modelled data after correction factor of 2.03 has been applied. It is clear to see that trend line is close to the mid-point and all points fall well within the +/- 20% region

Map 3.1 was constructed using the correction factor of 2.03. The yellow and red areas indicate the areas of exceedance and how NO₂ diffuses around the Lindley Moor Road assessment area. It should be noted that no residential properties fall within the exceedance plumes. We therefore recommend that this area does not require an AQMA at this time.

Map E.1 Lindley Moor Road Assessment



E.2 Thornton Lodge

Kirklees Council has modelled the annual mean NO_x for 2017 in the along Lindley Moor Road. This modelling was conducted to determine the boundaries of the AQMA.

Kirklees Council has used Atmospheric Dispersion Modelling System for Urban areas (ADMS Urban) to create this model and validated it against the 2017 automatic monitoring data.

Meteorological Data for the model has been taken from Leeds / Bradford Airport Met Office Weather Station. The weather data for 2015 has been selected as the weather patterns in that year are representative of the usual weather conditions in the district.

The Traffic Figures have been obtained from the Department of Transport count points in close proximity to the assessment areas and expanded in accordance with national guidance for increase vehicle number.

Traffic counts and average speeds were entered into ADMS (Urban), which uses Emissions Factor Toolkit V8.0

Background figures for the model have been taken from the *2017 based background maps* (DEFRA).

The topography and road layout was obtained from Kirklees Council GIS data and ordinance survey records.

Kirklees conducted a statistical procedure as set out in TG(09) to determine the model uncertainty and performance. Table F.1.1 indicates the results at diffusion tube sites and the results of the statistical analysis are contained within Table F.1.2 and Figure F.1.1.

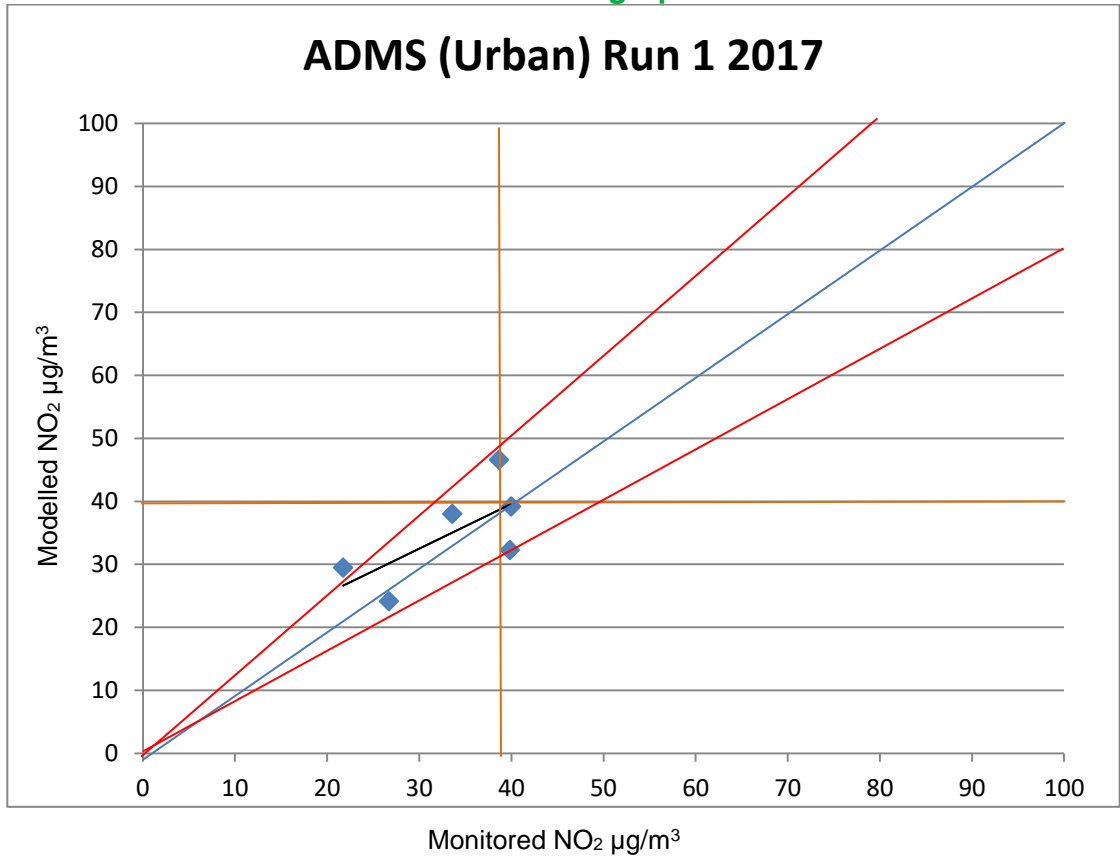
Table F.1.1 Results of Run at diffusion tube sites and statistical analysis of model

	Monitoring results (NO ₂ µg/m ³)	Model Road increment NO _x Prediction (µg/m ³)	NO ₂ Converted from predicted NO _x (µg/m ³)	% Difference of Converted NO ₂	Correction Factor
Tube 49	38	118.00358	61.08	61	0.62
Tube 50	39.19	161.33688	72.66	85	0.54
Tube 75	29.44	51.54768	39.49	34	0.75
Tube 76	32.25	160.39198	72.42	125	0.45
Tube 77	46.58	152.08848	70.29	51	0.66
Tube 78	24.15	77.00	48.54	101	0.50

Table F.1.2 Statistical analysis of the corrected data

RMSE	29.74
Fractional Bias	-0.67

Figure F.1.1 NO2 Monitored / Modelled scatter graph

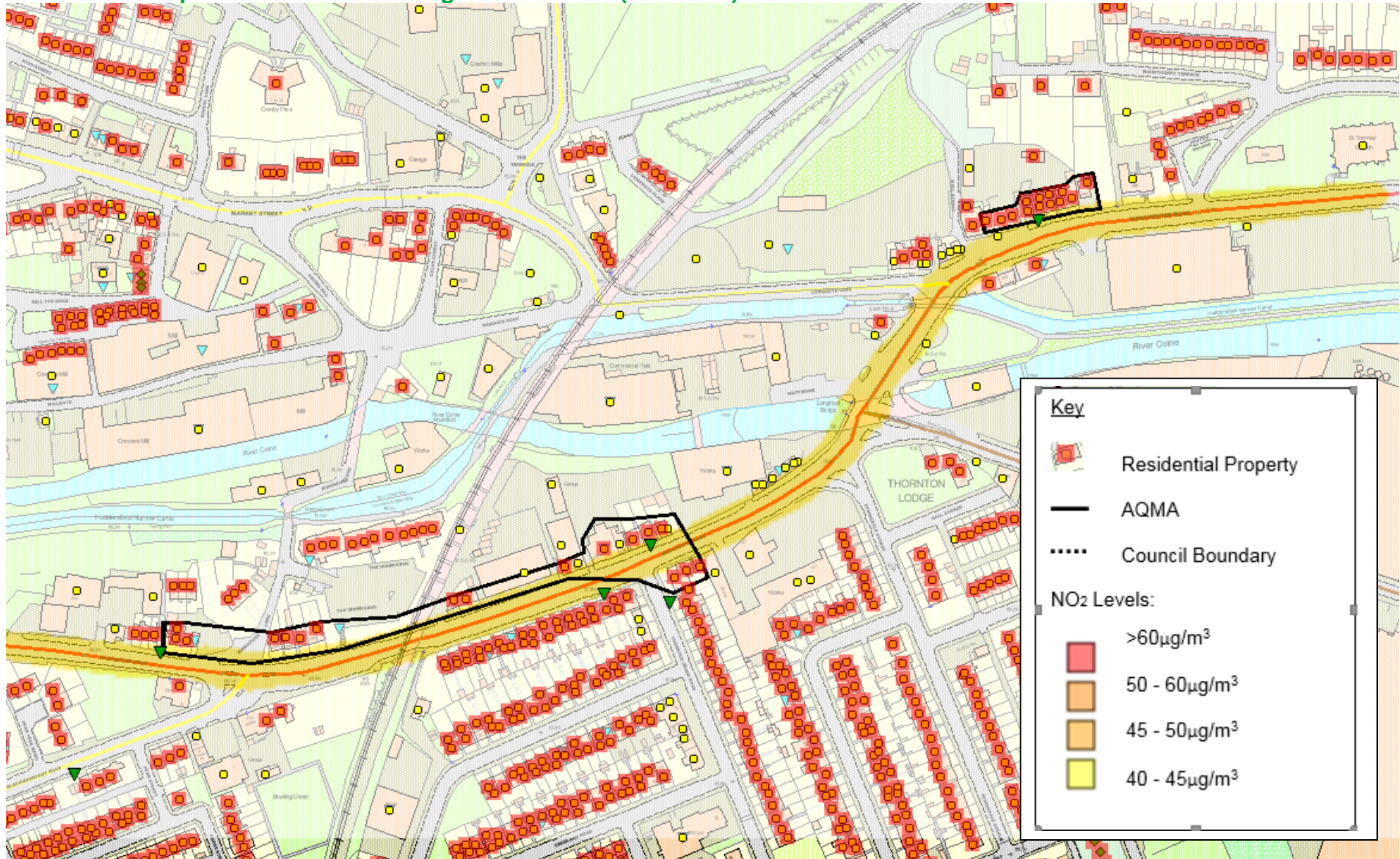


While statistical analysis carried out at the validation stage shows that the model is over estimating.

Figure F.1.1 graphs the correlation between the monitored and modelled data after correction factor of 0.55 has been applied. It is clear to see that trend line is close to the mid-point and all points fall well within the +/- 20% region

Map 3.1 was constructed using the correction factor. The yellow and red areas indicate the areas of exceedance and how NO₂ diffuses around the Thornton Lodge assessment area

Map E.2 Thornton Lodge Assessment (AQMA 10)



Appendix F: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective ⁴	
	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

⁴ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO ₂	Sulphur Dioxide
...	...

References

Part IV Environment Act 1995. (c.25) London: HMSO

Local Air Quality Management Technical Guidance LAQM TG (16) DEFRA 2016

Air Quality (England) Regulations 2000. SI 2000/928, London: HMSO

Air Quality (England) (Amendment) Regulations 2002. SI 2002/3043, London: HMSO

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