City of Lincoln Council

Annual Status Report 2022

Bureau Veritas

August 2022

Document Control Sheet

Identification	
Client	City of Lincoln Council
Document Title	City of Lincoln Council – 2022 Annual Status Report
Bureau Veritas Ref No.	AIR13715555

Contact Details		
Company Name	Bureau Veritas UK Limited	City of Lincoln Council
Contact Name	Viral Patel	Ian Wicks
Position	Consultant	Pollution Control Officer – Environmental Health
Address	Bureau Veritas Atlantic House, Atlas Business Park Manchester M22 5PR	City Hall, Beaumont Fee, Lincoln, LN1 1DF
Telephone	0779 077 1444	01522 873794
e-mail	Viral.patel@bureauveritas.com	environmental.health@lincoln.gov.uk
Websites	www.bureauveritas.co.uk	www.lincoln.gov.uk

Configuration				
Version	**Date**	**Author**	**Reason for Issue/Summary of Changes**	**Status**
V1	20/07/2022	V.Patel	Draft for comment	Draft
V2	04/08/2022	V.Patel	Minor Amendments	Final

	Name	Job Title	Signature
Prepared By	V.Patel	Consultant	
Approved By	P Bentley	Senior Consultant	

2022 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

Date: August 2022

Information	City of Lincoln Details
Local Authority Officer	Ian Wicks
Department	Pollution Control Officer – Environmental Health
Address	City Hall, Beaumont Fee, Lincoln, LN1 1DF
Telephone	01522 873794
E-mail	environmental.health@lincoln.gov.uk
Report Reference Number	CoL2022ASR
Date	August 2022

Executive Summary: Air Quality in Our Area

Air Quality in The City of Lincoln

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

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

During 2021, all monitoring locations within Lincoln City reported NO_2 annual mean concentrations below the Air Quality Strategy (AQS) objective of 40µg/m^3. This is the 3rd year running in which this is the case, with the maximum annual mean NO_2 concentration being 24.2µg/m^3 at the diffusion tube site 3, which is located within the Lincoln NO_2 Air Quality Management Area (AQMA). This site had last reported an exceedance in 2018, and concentrations have shown a decreasing trend over the past five years. The City of Lincoln intend to revoke the Lincoln NO_2 AQMA next year if the NO_2 annual mean concentrations for 2022 remain below the annual mean AQO.

Overall, there was minimal change in the annual mean NO_2 monitoring results in 2021 when compared to 2020 with some monitoring locations having reductions in annual mean NO_2 concentrations and others having slight increases. The minimal change in annual mean in NO_2 concentrations in 2021 is likely due to a potential continuation of decreased traffic volumes following the Government lockdowns in 2020 and the first half of 2021. Additionally, there has been a continuation of measures to improve air quality being

---

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

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

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

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

implemented. Figure 3.1 - Figure 3.3 illustrate the raw monthly NO_2 annual mean concentrations in 2019, 2020 and 2021 prior to adjustment or annualisation. As shown in the figures, data during 2021 is more similar to the monthly trends show in 2020 compared to 2019. Overall, the graphs and comparison of average changes in annual mean NO_2 concentration across the City show that the 2021 monitoring data has had minor changes compared to 2020, and as such 2021 NO_2 annual mean data is likely still not back to representative levels pre-COVID-19.

There were no exceedances of any of the other AQS objectives in 2020, which includes the NO_2 1-hour mean objective, and both the PM_{10} annual mean objective and 24-hour mean objective.

Actions to Improve Air Quality

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

The 2019 Clean Air Strategy[5] sets out the case for action, with goals to reduce exposure to harmful pollutants. The Road to Zero[6] sets out the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of AQMAs are designated due to elevated concentrations heavily influenced by transport emissions.

The Lincoln Transport Strategy was recently published, and the Interim Air Quality Action Plan (AQAP) published in 2019, continue to set out new actions and measures to improve air quality within the AQMA and across the city. These measures have been developed since the 2006 AQP. The review of the full AQAP has not yet been completed, mainly due to delays associated with COVID-19. The City of Lincoln will continue to prioritise the review of the final AQAP taking into account the latest available air quality data and likely amendments to the local air quality management regime expected later in 2022.

[5] Defra. Clean Air Strategy, 2019

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

Although COVID-19 has resulted in delays to the progression of measures, some key measures have been completed in the last few years including:

- Lincoln Eastern Bypass – completed final phase in December 2020, with demobilisation and off highway accommodation works currently nearing completion.
- Bus Priority Signals and Junctions at a total of 15 junctions across the city with more planed.
- All schools within City of Lincoln have adopted a travel plan.
- Total of 23 EV charging points have been installed. This includes a 50KW super rapid charge point and four new rapid charge points for residents without access to off road parking; and,
- Final published City of Lincoln Transport Strategy.

Additionally, many measures to improve $PM_{2.5}$ emissions have been implemented such as;

- Development of cycle network and infrastructure, including the Local Cycling and Walking Network Plan.
- Lincoln Hirebike, total of 27 public bike stations are in place, with electric bikes now available at some cycle stations.
- Sustainable Travel Grants with a total of £97,586.06 awarded in total to 35 businesses to incentivise active travel and improve infrastructure.
- Increases in Ultra Low Emission Vehicles (ULEV) into City of Lincolns vehicle fleet
- Additional installations of Electric Vehicle (EV) charging points across the City and provision for more EV charging.

Recently the City of Lincoln also introduced their new Environmental Policy[7] which aims to "work with our community on a city-wide programme to make Lincoln a net zero carbon city by 2030" Following this the City of Lincoln Council Decarbonisation Strategy and Action Plan[8] was also published. Some of the key measures within this action plan look to reduce emissions from transport sources through.

- Transitioning to an ULEV fleet
- The development of the City of Lincoln Council staff travel plan which was completed in July 2021

[7] https://www.lincoln.gov.uk/downloads/file/1159/city-of-lincoln-council-s-environmental-policy-2021

[8] https://www.lincoln.gov.uk/downloads/file/1227/city-of-lincoln-council-decarbonisation-plan-2022

- Securing more EV charging points, eight additional charging points were installed in 2021 with 60 EV charging points across the council making it in the top 10 in the UK as stated within the Decarbonisation Strategy.
- Online toolkit and cycling infrastructure with a DfT active travel fund secured for a temporary cycling route and additional funding for other cycle routes to be made permanent

Conclusions and Priorities

Compliance of the annual mean for NO_2 concentrations continues to be met at all monitoring locations within The City of Lincoln. It is expected that this will continue happening, even without the possible impacts of COVID-19. Once the impacts are better understood however, and if compliance is maintained in the following years, then the Council will intend to revoke the Lincoln NO_2 AQMA in 2023, in line with LAQM.TG16 guidance.

Reviewing the final AQAP is a priority for the City of Lincoln in the coming year, to help ensure the continual decline of NO_2 concentrations reported across the City, and ensure that compliance continues to be met throughout the City of Lincoln.

Monitoring of NO_2 and PM_{10} will continue within the current network so that pollutant concentrations can be monitored and any trends in concentration can be investigated.

Local Engagement and How to get Involved

The main source of air pollution within the City of Lincoln derives from transport sources. As such it is considered one key way for the public to get involved with helping to improve air quality within the city would be to look at sustainable alternatives to the way they travel.

The following are suggested alternatives to private travel that would therefore contribute to improving the air quality within the City:

- Use of public transport – The use of the bus facilities, which in turn reduces pollutant concentration through the number of vehicles and reducing congestion;
- Walk or cycle if your journey allows – From choosing to walk or cycle for your journey the number of vehicles is reduced and also there is the added benefit of keeping fit and healthy;
- Car/lift sharing – Where a number of individuals are making similar journeys, such as travelling to work or to school car sharing reduces the number of vehicles on the road

and therefore the amount of emissions being released. This can be promoted via travel plans through the workplace and within schools; and

- Alternative fuel / more efficient vehicles – Choosing a vehicle that meets the specific needs of the owner, fully electric, hybrid fuel and more fuel efficient cars are available, and all have different levels benefits by reducing the amount of emissions released.

Local Responsibilities and Commitment

This ASR was prepared by the Environmental Health Department of the City of Lincoln Council with the support and agreement of the following officers and departments:

Ian Wicks – Pollution Control Officer

Kate Bell – Climate Change Manager

Mark Lancaster – Local Transport Plan Policy Team (Lincolnshire County Council)

This ASR has been approved by:

Cllr Bob Bushell – Portfolio Holder for Remarkable Place

This ASR has not been signed off by a Director of Public Health.

If you have any comments on this ASR please send them to Ian Wicks at:

City Hall, Beaumont Fee, Lincoln, LN1 1DF

01522 873794

environmental.health@lincoln.gov.uk

Table of Contents

Figures

Tables

1 Local Air Quality Management

This report provides an overview of air quality in City of Lincoln in 2021. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

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

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

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

A summary of AQMAs declared by City of Lincoln can be found in Table 2.1. The table presents a description of the AQMA that is currently designated within City of Lincoln. Appendix D: Maps of Monitoring Locations and AQMAs provides a map of AQMA and also the air quality monitoring locations in relation to the AQMA. The air quality objectives pertinent to the current AQMA designation are as follows:

- NO_2 annual mean;

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by National Highways?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
Lincoln NO_2 AQMA	01/12/2001 (Updated 03/08/2018)	NO_2 Annual Mean	The area generally follows the major road network in the City Centre and arterial routes and is primarily due to road traffic emissions.	NO	56.7µg/m^3	24.2µg/m^3	Interim Action Plan for Lincoln NO_2 AQMA, August 2019	Visit the AQAP for the Lincoln NO_2 AQMA

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

☒ **City of Lincoln confirm that all current AQAPs have been submitted to Defra**

2.2 Progress and Impact of Measures to address Air Quality in City of Lincoln

Defra's appraisal of last year's ASR concluded that the report was detailed and demonstrated the council's dedication to improving air quality. Additionally, Defra commented that:

- *"The Council did not record any exceedances of any AQOs during 2020.*
- *An Interim AQAP was published by the Council in 2019. Nine measures from this AQAP are in Table 2.2 along with the 29 progress measures. The council should finalise the AQAP asap as possible.*
- *The Council have applied the local bias adjustment factor to their 2020 monitoring results, acknowledging that the factor calculated (0.63) is lower than the local factor in previous years, and significantly lower than the national factor for 2020 (0.81). The Council have provided suitable justification for their choice of factor and have listed the factors applied for the previous 4 reporting years for comparison. This level of detail is encouraged in future reports.*
- *It is encouraging to see the Council respond to comments made during the previous appraisal. This adheres with good practice and demonstrates the Council's dedication to improving air quality within their jurisdiction.*

The City of Lincoln has taken forward a number of direct measures during the current reporting year of 2022 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. 39 measures are presented, with 9 of these measures part of the interim AQAP, City of Lincoln are in the process of reviewing the full AQAP. The type of measure and the progress City of Lincoln have made during the reporting year of 2022 is also presented in Table 2.2, along with details on where there have been, or continue to be, barriers restricting the implementation of the measure.

More detail on these measures can be found in their respective Action Plans. The City of Lincoln Interim AQAP[9] and the current City of Lincoln Council AQAP[10]. The Lincoln

[9] https://democratic.lincoln.gov.uk/documents/s47891/Interim%20AQAP%20Appendix.pdf

[10] http://aqma.defra.gov.uk/action-plans/LC%20AQAP%202006.pdf

Transport Strategy[11] also provides key input into the measures to improve air quality across the City, this was under consultation during 2020, however has since been approved and published in 2021. Some of the key completed measures are;

- Lincoln Eastern Bypass – completed final phase in December 2020, with demobilisation and off highway accommodation works currently nearing completion.
- Bus Priority Signals and junctions at a total of 15 junctions across the city with more planed.
- All schools within City of Lincoln have adopted a travel plan.
- A total of 23 EV charging points have been installed. This includes a 50KW super rapid charge point and four new rapid charge points for residents without access to off road parking; and,
- Final published City of Lincoln Transport Strategy.

City of Lincoln's priorities for the coming year are to progress with the measures within Table 2.2 above and look to finalise a review of the AQAP. Measures within the newly adopted Lincoln Transport Strategy will also be implemented and advanced in the next year.

Additionally the City of Lincoln Council Decarbonisation Strategy and Action Plan[8] published in 2022 provides enhanced detailed on some transport related measures to reduce emissions including the City of Lincoln Council staff travel plan, funding for cycling infrastructure and additional EV charging points being installed making the City in the top 10 in the UK for charging points .

City of Lincoln worked to implement these measures in partnership with the following stakeholders during 2021:

- Lincolnshire County Council.
- East Midlands Air Quality Network.
- Lincolnshire District Councils.
- Department for Transport and Greater Lincolnshire; and
- Lincolnshire Environmental Protection Liaison Group.

[11] https://www.lincolnshire.gov.uk/downloads/file/3608/lincoln-transport-strategy#:~:text=The%20Lincoln%20Transport%20Strategy%20aims,area%20over%20the%20coming%20years.

The principal challenges and barriers to implementation that City of Lincoln anticipates, and the reasons behind slow implementation of measures, are due to the knock-on delays associated with the COVID-19 pandemic and awaiting consultation and finalisation of other strategies and plans, such as the Local Transport Strategy.

The City of Lincoln believes that the measures within the Interim AQAP and the ongoing measures above will continue to demonstrate compliance with the annual mean NO_2 Air Quality Objective within the Lincoln NO_2 AQMA and intend to revoke the AQMA 2023 on the basis of continued compliance in the monitoring data for 2022 and beyond.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	Lincoln Eastern Bypass	Traffic Management	Strategic highway improvements, Re-prioritising Road space away from cars, inc Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane.	Planning Phase 2011-2015; Implementation phase 2016-2020.	2020	Lincolnshire County Council	Lincolnshire County Council, Central Government and from third party developer contributions.		Fully Funded	>£10 million	Completed	2.5m^3 reduction at Broadgate (A15) monitoring location (see comments)	Change in AADT, including split for HDV/LDV on Broadgate.	New highway completed and operational by Dec 2020, with demobilisation and off highway accommodation works currently nearing completion. To- date, £122 million has been spent on the project. However, the final cost of the road is still being finalised and will not be known until all the accounts have been settled in the coming months. Pelham Bridge closure June 2021 - Sept 2021 to allow for deck repairs with LEB and East-West link used as diversion route.	The target pollution reduction is based on the "with" and "without" LEB scenarios contained within the Council's latest detailed air quality assessment.
2	East-West Link	Traffic Management	Strategic highway improvements, Re-prioritising Road space away from cars, inc Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane.	Planning Phase 2010-2014; Implementation phase 2014-2016.	2016	Lincolnshire County Council	Lincolnshire County Council		Fully Funded	£1 million - £10 million	Completed			Project completed	The principal aim of this development is to address congestion caused by two rail crossings in the city centre.
3	North Hykeham Relief Road (formerly Lincoln Southern Bypass)	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, inc Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane.	Planning Phase 2006; Implementation Phase not yet determined.	2027	Lincolnshire County Council	Lincolnshire County Council, Central Government and from third party developer contributions.		Partially Funded	>£10 million	Planning			Preferred route declared for protection in December 2006.Transport model updated during 2017/18. Outline Business Case prepared and submitted to DfT for funding support in July 2019, with £110 million being awarded in Nov 2020 by the DfT coming from government's Large Local Majors programme. The remaining budget will be funded by Lincolnshire County Council and	

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
														developer contributions, which the council will forward fund. TBC 2025: Construction starts, TBC 2027: Project complete - these dates are projected and subject to change dependent on external factors. The current scheme cost, included in the council's outline business case for funding, is £155 million.	
4	Road Network and Traffic Management Improvements	Traffic Management	UTC, Congestion management, traffic reduction.	Planning Phase 2007-2013; Implementation Phase 2008-2015.		Lincolnshire County Council	Lincolnshire County Council		Fully Funded	£1 million - £10 million	Completed	Not known	Change in vehicle queuing times	Broadgate/Silver Street/Clasketgate completed November 2008; Newark Road/Rookery Lane/Brant Road completed December 2013; Canwick Road/South Park completed July 2015. Improvements to signalised junctions at Wragby Road/Outer Circle Drive/ Wolsey Way completed in August 2018.	
5	Cycling Infrastructure	Transport Planning and Infrastructure	Cycle Network	On-going	On-going	Lincolnshire County Council	Lincolnshire County Council, Department for Transport		Partially Funded	£1 million - £10 million	Implementation	Not known	Length of new cycleway	Network continues to be developed as funding allows. Development of Local Cycling and Walking Network Plan on-going to assist in identifying future schemes. Separate cycleway constructed along the entire LEB, with provision also included to replicate the same alone the NHRR. Also improvement for cyclists were made on Wigford Way and Brayford Wharf East as part of LCC's award from the Access Fund.	
6	Quality Bus Corridors	Traffic Management	Strategic highway improvements, Re-prioritising	Planning Phase 2008; Implementati	Not Known	Lincolnshire County Council	Lincolnshire County Council,		Not Funded		Planning	Not known	% of buses on time	High Street Corridor completed December 2011.	Dependent on on-going review of Lincoln

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
			road space away from cars, inc Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane.	on Phase 2011			Department for Transport							Further corridors will be considered as part development /consultation for the new Bus Strategy.	Transport Strategy
7	Real-time Bus Passenger Information	Transport Planning and Infrastructure	Bus route improvements	Planning Phase 2006-2010; Implementation Phase 2008-2010.	On-going	Lincolnshire County Council and principal bus operators	Lincolnshire County Council, Department for Transport				Implementation	Not known	% of stops or routes with real-time info	Real time information is now available for all services provided by the three main operators within Lincoln. Real-time feed now provided direct to Traveline. Information also displayed at new Transport Hub and available via commercial and operator-owned Apps. All vehicles operating in the City have now been fitted with tracking software to active bus priority access at signalised junctions.	Dependent on on-going review of Lincoln Transport Strategy
8	Bus Priority Measures at Traffic Signals	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, inc Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane.	Planning Phase 2013; Implementation Phase on-going.	On-going	Lincolnshire County Council	Lincolnshire County Council		Fully Funded	£500k-£1 million	Implementation	Not known	No. of signals with bus priority	A total of 15 signalised junctions across the City now incorporate bus priority technology. Additional junctions in the north of the City to now be upgraded following the award of the contact to LCC's provider for these works R2P and agreement with traffic signals.	
9	New Public Transport Interchange	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services.	Planning Phase 2014; Implementation Phase Sep 2015.	On-going	City of Lincoln Council, Department for Transport and Greater Lincolnshire Local Enterprise Partnership.	City of Lincoln Council, Department for Transport and Greater Lincolnshire Local Enterprise Partnership.		Fully Funded		Completed	Not known	To be agreed	Transport Hub opened Jan/Feb 2018.	Support of Transport Hub on-going.

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
10	Park and Ride	Alternatives to private vehicle use	Bus based Park & Ride	On-going	On-going	Lincoln BIG, Stagecoach and Waitrose	Lincolnshire County Council, Lincoln BIG		Partially Funded		Implementation	Not known	Passengers carried	This is service is currently operating with a grant from Lincoln BIG, with discussions for a potential permanent location being considered as part of the development /consultation for the new Bus Strategy.	Future role of Park and Ride being consider by Lincolnshire County Council as part of on-going review of Lincoln Transport Strategy.
11	Alternative Fuel Buses	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles.	Planning Phase 2012; Implementation Phase 2013-2014		Lincolnshire County Council and principal bus operators			Not Funded		Planning	-	No. of alternative fuel buses	Being considered as part of the development /consultation for the new Bus Strategy.	Trial of biogas buses ended due to problems sourcing fuel.
12	Lincoln HireBike	Transport Planning and Infrastructure	Public cycle hire scheme	Planning Phase 2012; Implementation Phase 2013-2020	Ongoing	Lincolnshire County Council	Lincs County Council, Department for Transport, and Operator Income		Partially Funded		Implementation	Not known	No. of rentals and No. of registrants	Total of 27 bike stations in place. Electric bikes now available at some cycle stations. 2022 Update - Market engagement taking place to inform decision on new tendering process 4,536 rentals during 2018/19.	
13	Business Travel Plans	Promoting Travel Alternatives	Workplace Travel Planning	On-going	On-going	Lincolnshire County Council	Lincolnshire County Council					Not known	No of businesses with adopted travel plans	An online website has been launched for businesses and organisations to develop travel plans themselves. This is being signposted by planning if conditioned.	
14	School Travel Plans	Promoting Travel Alternatives	Workplace Travel Planning	Planning Phase 2005; Implementation Phase 2012	On-going	Lincolnshire County Council	Lincolnshire County Council					Not known	No. of schools with approved travel plans	All 363 local authority schools have an adopted travel plan. An updated travel plan is required as part of the planning process for school improvements. Work on-going with Education Department on Sustainable Modes of Travel to School (SMOTS) strategy. Currently supporting 17 schools as they work towards Modeshare awards.	
15	New bus services	Transport Planning and Infrastructure	Bus route improvements	Planning Phase 2012; Implementation Phase 2015		Lincolnshire County Council and principal			Fully Funded		Completed	Not known	Passengers carried	Incorporated as part of the main Stagecoach network for the LN6 area of the City.	

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
						bus operators									
16	Hykeham Station improvements	Alternatives to private vehicle use	Rail based Park & Ride	Planning Phase 2013; Implementation Phase 2014		Lincolnshire County Council and rail providers			Fully Funded		Completed	Not known	Passengers carried and frequency of trains	Car park upgrade complete. Free parking with onward travel opportunities by bus, rail and bike	
17	Sustainable Travel Grant for businesses	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	Planning Phase 2012; Implementation Phase 2013-2015.		Lincolnshire County Council			Fully Funded		Completed	North known	Amount of funding provided	35 businesses received £97,586.06	
18	Access LN6 - Cycle storage implementation	Transport Planning and Infrastructure	Cycle Network	Planning Phase 2012; Implementation Phase 2013-2015		Lincolnshire County Council	Lincolnshire County Council, Department for Transport		Fully Funded		Completed	Not known	No. of cycle parking spaces provided	718 cycle parking spaces provided since 2012. 0 - £500k of funding has been awarded from DfT for the 'Access Lincoln' project, establishing more cycle parking spaces is an element within this. Grant funding provided for St Marks Retail Park to install secure cycle storage for 90 bikes. Partnership work with East Midlands Trains to install secure storage for 100 bikes at Lincoln Rail station.	
19	Lincoln Transport Strategy	Transport Planning and Infrastructure	Strategic highway improvements, Re-prioritising road space away from cars, inc Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane.	2019		Lincolnshire County Council	Lincolnshire County Council		Fully Funded		Planning	Not known			
20	Lincoln Local Cycling & Walking Infrastructure Plan	Transport Planning and Infrastructure	Cycle Network	2019	2019	Lincolnshire County Council, City of Lincoln Council, North Kesteven District Council.	Lincolnshire County Council, Department for Transport		Fully Funded		Completed	Not known	KMs of new cycle lanes constructed	The first LCWIP for Lincoln has been completed. This consists of a plan for the greater Lincoln area, including surrounding villages, and a plan for the city centre. This will need review in the near future to ensure compliance with LTN 1/20.	

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
21	Bus Strategy	Transport Planning and Infrastructure	Bus route improvements	2021		Lincolnshire County Council	Lincolnshire County Council				Planning	Not known			
22	Local Transport Plan	Transport Planning and Infrastructure	Other	2022	2030	Lincolnshire County Council	Lincolnshire County Council/DfT/Midlands Connect	No	Not Funded	£1 million - £10 million	Planning	Not known	n/a	The current LTP has been adopted by LCC in January 2022, and there are currently projects being developed around EV. Freight and Access to Rail stations. These projects are in the development stage, and progress of these is being programmed throughout the various Local Transport Boards.	
23	Promotion of sustainable transport to work for City of Lincoln Staff	Promoting Travel Alternatives	Workplace Travel Planning	Planning Phase 2010; Implementation Phase ongoing	Ongoing	City of Lincoln Council	City of Lincoln Council					Not known	Change in travel to work behaviour	Mode of Travel Survey updated (Jan 2019 employee survey results): Car single journey 53% Cycling 7% Walking 14% Bus 8% Train 1%	Due to Covid we decided to delay the 2020 staff Travel Survey as a result of uncertainly over the future workplace arrangements. The next survey is due to take place on in June/July 2021.
24	Introduction of electric vehicles into City of Lincoln Council Fleet	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	Planning Phase 2011; Implementation Phase 2013	Ongoing	City of Lincoln Council	City of Lincoln Council					Not known	No. of electric vehicles in fleet	One electric vehicle introduced in 2013, replaced by a new EV in 2018. Review of new fleet vehicle lease and opportunities to introduce EVs currently underway and due to commence in 2021.	In 2020 the Councils fleet vehicles were reviewed in preparation for a new fleet vehicle lease contract. The new contract has been delayed and is now due to commence in April 2022 and will include the addition of 5 ULEVs to the CoLC's fleet.
25	Smarter Trip Planning for CoLC fleet	Vehicle Fleet Efficiency	Other	Planning Phase 2010; Implementation Phase ongoing		City of Lincoln Council	City of Lincoln Council					Not known	% reduction in CO2e emissions from CoLC fleet	Between 2018/19 and 2019/20 emissions from the Councils fleet vehicles reduced by 27%.	

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
														Between 2019/20 and 2020/21 emissions from the Council's fleet vehicles reduced by a further 24%.	
26	Provision of electric vehicle recharge points in CoLC car parks	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	Planning Phase - 2010; Implementation Phase 2012 - present	Ongoing	City of Lincoln Council	City of Lincoln Council					Not known	No. of recharge points available in CoLC car parks.	Total of 23 recharge points installed. This includes a 50KW super rapid charge point and 4 new rapid charge points for residents without access to off road parking.	Funding for an additional 4 EV Charge points (8 parking bays) has been secured and due to be commissioned in June 2021 for use by residents with limited access to off road parking. CoLC are working with LCC to review suitable sites for on street charge points in Lincoln in 2021/22. Additional provision EVR points dependent on demand and availability of funding streams.
27	Provision of electric vehicle recharge point for CoLC fleet use	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	Planning Phase - 2012; Implementation Phase - 2013		City of Lincoln Council	Defra AQ grant					Not known	No. of recharge points available for CoLC fleet	Funding secured through ORCS grant for 4 additional EV charge points to be located at City Hall, primarily for local residents during the evenings and weekends but also will be available to any additional CoLC fleet Mon-Fri 9-5pm.	The provision of further EVR points is dependent on the introduction of additional electric vehicles into the CoLC fleet.
28	Promotion of greener driving styles	Vehicle Fleet Efficiency	Driver training and ECO driving aids	Planning Phase - 2006; Implementation Phase - 2007-2010		City of Lincoln Council and other Lincolnshire district councils	Defra AQ grant for production of greener driving leaflet; CoLC for staff driver training					Not known	None	Greener driving leaflet produced by Lincolnshire Strategic Air Quality Partnership in 2007 (funded by Defra AQ grant) and distributed in the city by CoLC; Greener driving course provided to CoLC staff in 2010.	

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
29	Promotion of car sharing to public	Promoting Travel Alternatives	Other	Planning Phase 2007; Implementation Phase 2009	Completed	City of Lincoln Council, Lincolnshire County Council and Lincoln Business Improvement Group	Defra AQ Grant					Not known	None	Lincolnshire liftshare Scheme is available to anyone to help people arrange car sharing.	A bespoke car sharing scheme is currently under review for CoLC and LCC employees, subject to the outcome of the 2021 Staff Travel Survey.
30	Energy efficiency measures to reduce natural gas consumption	Promoting Low Emission Plant	Other	2009	Ongoing	City of Lincoln Council	City of Lincoln Council					Not known	Gas consumption	The City of Lincoln's Domestic gas consumption reduced by 20% since 2005 The City of Lincoln's Ind/Commercial gas consumption has reduced by 18% since 2005 The City of Lincoln Council's gas emissions has reduced by 6% since 2018/19.	
Measures included within Interim Air Quality Action Plan															
1	Lincoln Eastern Bypass	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, inc Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	Planning Phase 2011-2015; Implementation phase 2016-2020	2020	Lincolnshire County Council	Lincolnshire County Council, Central Government and from third party developer contributions.		Fully Funded		Completed	2.5µgm-3 reduction at Broadgate (A15) monitoring location (see comments)	Change in AADT, including split for HDV/LDV on Broadgate	New highway completed and operational by Dec 2020, with demobilisation and off highway accommodation works currently nearing completion.	The target pollution reduction is based on the “with” and “without” LEB scenarios contained within the Council’s latest detailed air quality assessment.
2	Adopt and implement East Midlands Air Quality Network’s ‘Air Quality and Emissions Mitigation – Planning Guidance’	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Planning Phase 2016 to present	Ongoing following adoption of guidance	City of Lincoln Council and East Midlands Air Quality Network	East Midlands Air Quality Network and City of Lincoln Council					Not quantified	Proposed KPI - % of planning approvals issued in accordance with development guidance.	The final draft of the guidance document was issued by EMAQN in July 2018 and was updated in March 2019.	Although not formally adopted at present, the guidance is being used on a good practice basis.
3	Review of Taxi Licencing	Promoting Low Emission Transport	Taxi Licensing Conditions	Planning Phase 2020-2021	New policy planned to be adopted	City of Lincoln Council	-					Not quantified*	Proposed KPI - % of private	Review of Taxi Licensing currently under way	* Baseline emissions data for

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
	Policy to include Emission Controls				by 31st March 2021								hire/taxi vehicles meeting Euro 6 (diesel) and Euro 4 (petrol) emissions standards or better.		existing fleet requires calculating
4	Eco recognition scheme for taxi/private hire vehicles	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	Planning Phase 2020-2021 as part of the taxi licensing policy review	New policy planned to be adopted by 31st March 2021	City of Lincoln Council	City of Lincoln Council					Not quantified	Proposed KPI - % of private vehicles/taxis registered with the recognition scheme.	Review of Taxi Licensing currently under way, which will consider proposals for an eco recognition scheme	
5	Review and implement CoLC Travel Plan	Promoting Travel Alternatives	Workplace Travel Planning	Review Phase - October 2018 to Summer 2019		City of Lincoln Council	City of Lincoln Council					Not quantified	Specific indicators to be established as part of the Travel Plan review.	Travel Plan for 2019 to 2024 was published in June 2020*	*Travel Plan is currently being reviewed due to the impact of Covid-19 pandemic on working arrangements.
6	Develop and implement an air quality guide to supplement CoLC's Social Value Procurement Policy	Policy Guidance and Development Control	Sustainable Procurement Guidance	-	Ongoing following adoption of agreed guidance	City of Lincoln Council	City of Lincoln Council					Not quantified	Specific indicators to be established as part of the development of the guide.	None	
7	Boiler Replacement Program for Council Housing Stock	Promoting Low Emission Plant	Public Procurement of stationary combustion sources	Ongoing	Ongoing replacement program	City of Lincoln Council	City of Lincoln Council					Not quantified	% of total no. of Council's housing stock fitted with low NOx boilers	Completed*	*Program completed with the exception a small number of hard to
8	Prepare a City of Lincoln Electric Vehicle Recharging Strategy	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	-	-	City of Lincoln Council	-					Not quantified	Specific indicators to be established as part of the development of the strategy	Emerging strategy reported to Executive Committee in Jan 2020	

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
9	Adoption of individual and business travel plans	Promoting Travel Alternatives	Personalised and workplace travel planning	Ongoing	On-going	Lincolnshire County Council and Lincoln BIG	-					Not quantified	To be confirmed	To be confirmed	

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.

City of Lincoln currently monitor PM_{10} concentrations at the Broadgate automatic monitoring station, but $PM_{2.5}$ concentrations are not currently monitored within the City. Therefore, concentrations of $PM_{2.5}$ have been estimated from PM_{10} measurements in line with guidance specified in LAQM.TG(16). Data from the Automatic Rural and Urban Network (AURN) monitoring station Chesterfield Roadside in Chesterfield (58km west of Lincoln) has been used to calculate an estimated $PM_{2.5}$ concentration at the Broadgate monitoring site. The Chesterfield Roadside site was chosen due to it being the closest AURN site to Broadgate where both PM_{10} and $PM_{2.5}$ are measured as well as it being an Urban Traffic location, similar to the Broadgate site.

The methodology detailed within Box 7.7 of LAQM.TG(16) has been followed to calculate a locally derived $PM_{2.5}$ / PM_{10} ratio of 0.62. Applied to the 2021 PM_{10} annualised annual mean concentration of 22.4µg/m^3, measured at Broadgate, this gives an estimated $PM_{2.5}$ annual mean of 13.9µg/m^3.

Current Defra 2021 background maps (based on 2018 monitored concentrations) for the City of Lincoln Council (2018 based) show that all background concentrations of $PM_{2.5}$ are far below the Stage 2 indicative annual mean $PM_{2.5}$ limit value of 20µg/m^3. The highest concentration is predicted to be 9.8µg/m^3 within the 1 x 1km grid square with the centroid grid reference of 497500, 370500. This is an area to the south of the city centre that contains a section of the A57 and A15. It is important to note that these estimations do not take into consideration any impacts as a result of the COVID-19 pandemic.

The Public Health Outcomes Framework data tool compiled by Public Health England quantifies the mortality burden of $PM_{2.5}$ within England on a county and local authority scale. The 2020 fraction of mortality attributable to $PM_{2.5}$ pollution across England is 5.6%, and in contrast the fraction within the City of Lincoln is below the national average at 4.8%.

The regional average for the East Midlands is above the City of Lincoln at 5.2%. The 2020 data has been used as it is currently the latest available.

Many of the measures within Table 2.2 above, the interim AQAP and the City of Lincoln Transport Strategy will target improvements in NO_2 concentrations across the council. However, most of these measures will also help to improve $PM_{2.5}$ emissions as they target the reduction in vehicle flow and private vehicle usage as well as the uptake of sustainable modes of transport, some of the measures more targeted at improving $PM_{2.5}$ include:

- Development of cycle network and infrastructure, including the Local Cycling and Walking Network Plan.
- Lincoln Hirebike, total of 27 public bike stations are in place, with electric bikes now available at some cycle stations.
- Sustainable Travel Grants with a total of £97,586.06 awarded in total to 35 businesses to incentivise active travel and improve infrastructure.
- Increases in ULEV into City of Lincolns vehicle fleet; and
- Additional installations of EV charging points across the city and provision for more EV charging.

The City of Lincoln Council Decarbonisation Strategy and Action Plan also provides measures as detailed above which will help to reduce $PM_{2.5}$ emissions.

Additionally, City of Lincoln Council has a number of smoke control areas, effectively covering the whole city. These are designated geographical areas where you cannot legally emit smoke from a chimney, unless using an authorised fuel, or using ‘exempt appliances’. Further information on smoke control and wood burning stoves can be found on the City of Lincoln website.

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

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

City of Lincoln undertook automatic (continuous) monitoring at two sites during 2021 - Lincoln Canwick Road, part of the UK Automatic Urban and Rural Network (AURN) measuring NO_2 concentrations, and Broadgate, measuring PM_{10} concentrations. Table A.1 in Appendix A shows the details of the automatic monitoring sites. Table A.3 and Table A.6 present the monitoring results for the two City of Lincoln automatic monitoring sites, with automatic monitoring results for the Canwick Road site also available through the UK-Air website .

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

3.1.2 Non-Automatic Monitoring Sites

City of Lincoln undertook non-automatic (i.e. passive) monitoring of NO_2 at 18 sites during 2021, including 1 triplicate co-location at the Canwick Road AURN site. Table A.2 in Appendix A presents the details of the non-automatic 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, annualisation (where the annual mean data capture is below 75% and greater than 25%), and distance correction. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

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

For diffusion tubes, the full 2021 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.5 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past five years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

All passive and automatic monitoring locations monitored concentrations below the annual mean NO_2 AQS objective of 40µg/m^3 in 2021. Despite there being some restrictions in place during the first half of 2021 due to the COVID-19 UK Government enforced lockdowns, traffic levels are understood to have increased back to pre-COVID levels. Figure 3.1 - Figure 3.3 illustrate the trend in monthly raw monitoring data for 2019, 2020 and 2021 prior to any adjustment or annualisation for monitoring locations within the AQMA. Overall, there is minimal difference between the average change in annual mean NO_2 concentrations between 2020 and 2021, whereas there is on average across all monitoring locations a 4.4µg/m^3 decrease in NO_2 when the 2020 and 2021 data is compared to 2019. This therefore illustrates that the raw 2021 monitoring data follows the trends shown in 2020 rather than 2019. Some monitoring locations showed small increases in annual mean NO_2 concentrations and others decreases. These fluctuations across all monitoring networks may be due to a combination of the effects of road traffic numbers returning to representative levels as well as air quality measures being

implemented in 2021. However, it is also possible that the effects of COVID-19 on road traffic is still seen across the City of Lincoln.

Figure 3.1 – Trend in Raw 2019 Monthly NO_2 Concentrations

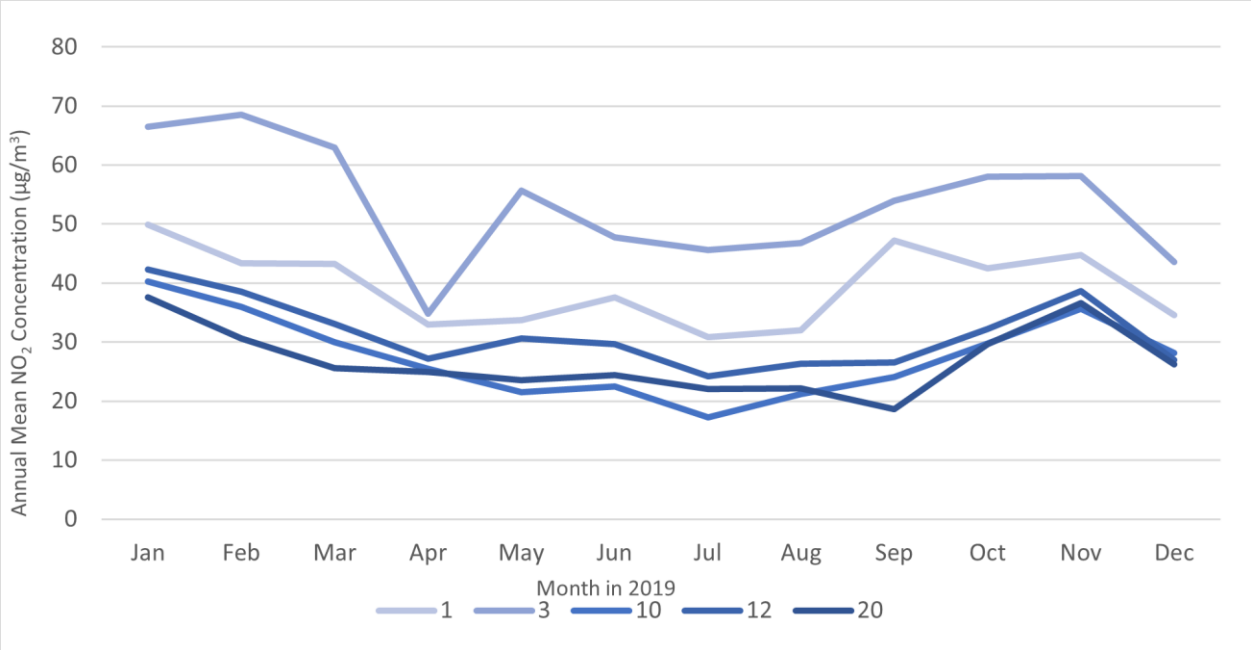


Figure 3.2 - Trend in Raw 2020 Monthly NO_2 Concentrations

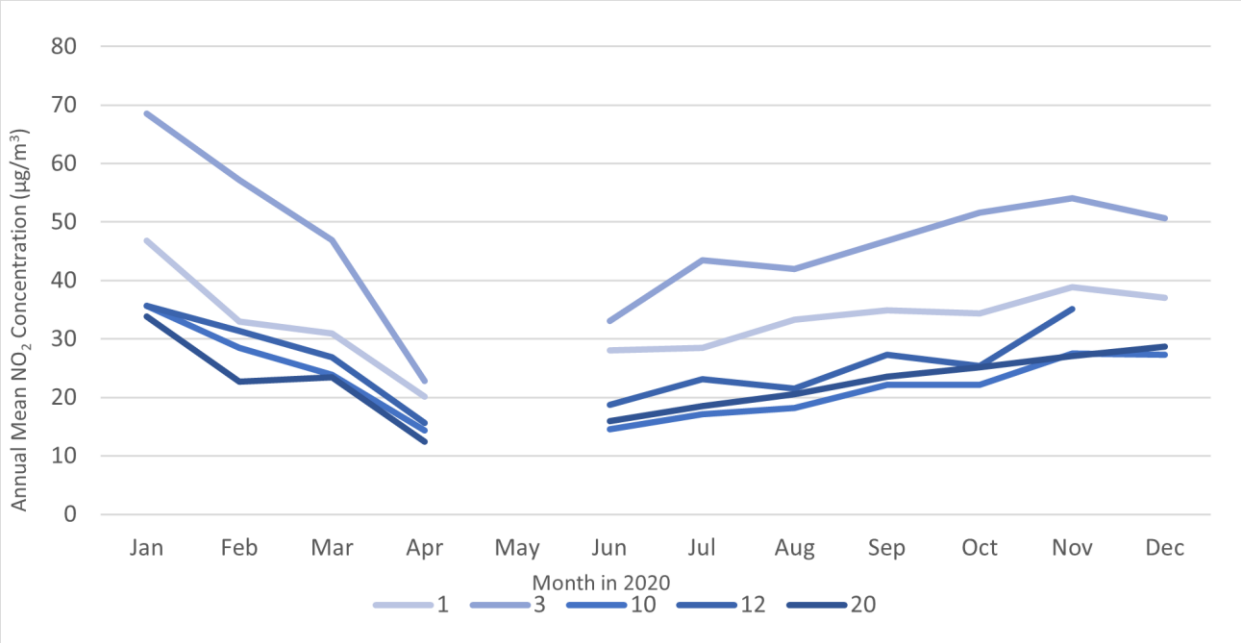
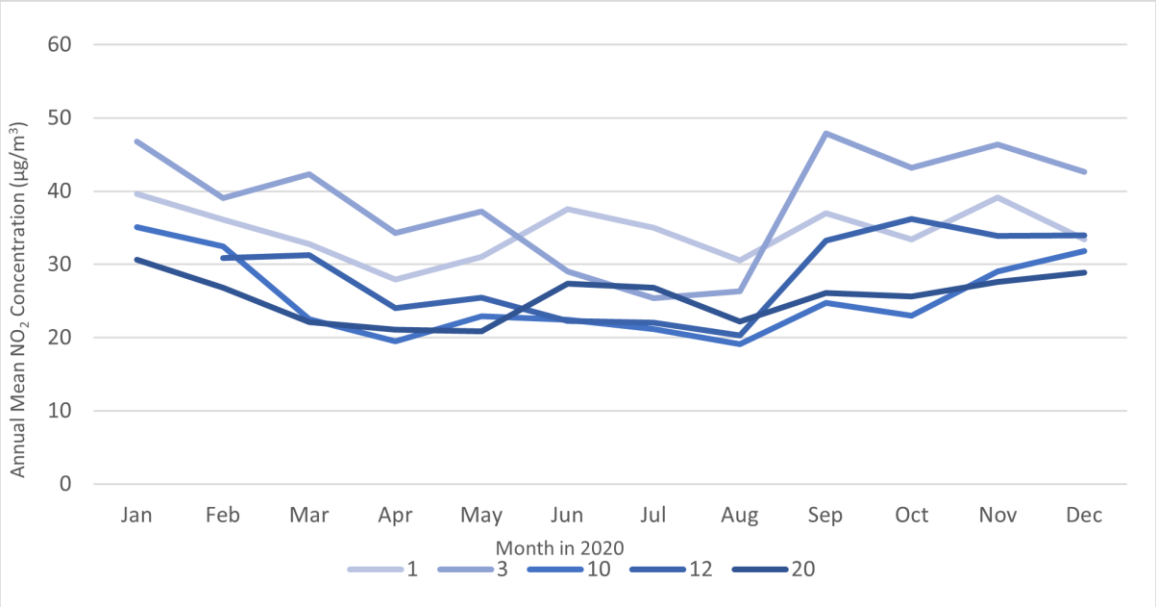


Figure 3.3– Trend in Raw 2021 Monthly NO_2 Concentrations



The maximum reported annual mean NO_2 concentration in 2021 was 24.2µg/m^3, reported at Site 3 which is located at Drill Hall, Broadgate. This site historically was exceeding concentrations up until 2018 and falls within the AQMA boundary. This site reports a decrease of 5.4µg/m^3 compared to 2020. Monitoring location 3 also illustrates the maximum decrease in NO_2 concentrations across all monitoring sites in City of Lincoln. Overall, however, there was no difference in the average change in annual mean NO_2 concentrations across all sites when compared to 2020 as discussed above.

No sites reported an annual mean concentration greater than 36µg/m^3, therefore fall-off with distance calculations have not been required.

At the automatic monitoring location, Canwick Road, there were no hours where concentrations were measured to be greater than 200µg/m^3. Additionally, as no passive monitoring sites reported an annual mean NO_2 concentration greater than 60µg/m^3 in 2020, it can be assumed that there are no sites where there is likely to be a risk of exceeding the 1-hour mean NO_2 AQS objective, as per guidance provided in LAQM.TG(16).

3.2.2 Particulate Matter (PM_{10})

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of 40µg/m^3.

Table A.7 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past five years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

The annual average PM_{10} concentration report in 2021 at the automatic monitoring location Broadgate is 22.4µg/m^3. This continues to be lower than the annual average PM_{10} AQS objective of 40µg/m^3, and this has been the case for the past six years. The annual average PM_{10} concentration is lower than that reported in 2020 (24.6µg/m^3).

There was only one 24-hour mean concentration within 2021 greater than 50µg/m^3, therefore there has been compliance with the 24-hour AQO . This is below the seven instances reported in 2020 however due to limited data capture in 2020 the 90.4th percentile was calculated.

3.2.3 Particulate Matter ($PM_{2.5}$)

As detailed in Section 2.3, $PM_{2.5}$ concentrations have been estimated from the monitored PM_{10} concentrations at Broadgate, which should be carried out in the absence of $PM_{2.5}$ monitoring – as per LAQM.TG(16). The estimated annual mean $PM_{2.5}$ concentration in 2021 is 13.89µg/m^3, below the guideline annual mean objective of 25µg/m^3 for $PM_{2.5}$.

The concentrations used to derive the $PM_{2.5}$ / PM_{10} ratio, and to estimate an annual mean $PM_{2.5}$ concentration, are presented in Table A.8.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
LCR	Lincoln Canwick Road (AURN)	Roadside	497962	370375	NO_2	NO	Chemiluminescent	0(3)	1.5	2.65
B	Broadgate	Roadside	497783	371282	PM_{10}	YES(4)	Unheated BAM 1020, corrected by dividing by 1.21	21	2	1.7

Notes:

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

(2) N/A if not applicable

(3) The location of LCR is on a street with housing only on the opposite side to the monitor, it has been assumed that concentrations recorded by the monitor are representative of the opposite side of the street where the relevant exposure is located.

(4) The Broadgate monitor is located within the revised Lincoln NO_2 AQMA boundary, the AQMA has not been designated for exceedances of either of the PM_{10} objectives.

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

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
1	The Avenue	Roadside	497107	371510	NO_2	YES – Lincoln AQMA	10.0	2.5	NO	2.9
2	106 Yarborough Road	Roadside	496946	372027	NO_2	NO	0.0	7.0	NO	2.7
3	Drill Hall, Broadgate	Roadside	497785	371300	NO_2	YES – Lincoln AQMA	0.0	2.5	NO	2.85
4	City Hall	Urban Background	497326	371421	NO_2	NO	16.5	N/A	NO	5.6
5, 6, 7	Canwick Road	Roadside	497962	370375	NO_2	NO	0.0	1.5	YES	2.6
8	Dixon Street	Roadside	497190	370080	NO_2	NO	0.0	4.0	NO	2.8
9	St Catherines	Roadside	497112	369351	NO_2	NO	4.5	2.5	NO	2.3
10	High Street	Roadside	497467	370956	NO_2	YES – Lincoln AQMA	N/A	0.5	NO	2.85
11	Carholme Road	Roadside	496590	371571	NO_2	NO	0.0	5.0	NO	2.6
12	Monks Road	Roadside	497908	371421	NO_2	YES – Lincoln AQMA	1.5	0.5	NO	2.75
14	Portland St/Archer St	Roadside	497835	370584	NO_2	NO	0.3	2.0	NO	2.8
15	Skellingthorpe Rd East	Roadside	495541	369272	NO_2	NO	7.5	2.3	NO	2.7
16	Skellingthorpe Rd Central	Roadside	494158	370303	NO_2	NO	6.5	2.5	NO	2.7
17	Skellingthorpe Rd West	Roadside	493543	370838	NO_2	NO	13.0	2.0	NO	2.7
18b	South Park/High St	Roadside	497195	369616	NO_2	NO	3.5	1.0	NO	2.8
19b	Newark Rd/ Brant Rd	Roadside	496720	368181	NO_2	NO	0.0	2.4	NO	2.75
20	Newland/Wigford Way	Roadside	497383	371250	NO_2	YES – Lincoln AQMA	0.0	6.0	NO	2.9
21b	78 Canwick Road	Roadside	498005	370245	NO_2	NO	0.5	2.1	NO	2.7

Notes:

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

(2) N/A if not applicable.

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
LCR	497962	370375	Roadside	91.9	91.9	31.9	33.3	29.2	21.4	20.8

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

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

Notes:

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

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

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

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

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

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

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

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
1	497107	371510	Roadside	100.0	100.0	31.0	27.7	26.8	21.0	21.7
2	496946	372027	Roadside	100	100.0	28.9	27.1	24.5	20.1	19.4
3	497785	371300	Roadside	100	100.0	**45.3**	**43.7**	36.4	29.6	24.2
4	497326	371421	Urban Background	100.0	100.0	14.4	14.1	12.3	9.3	9.6
5, 6, 7	497962	370375	Roadside	92.3	92.3	31.6	33.6	27.9	22.2	21.3
8	497190	370080	Roadside	100.0	100.0	28.2	24.3	22.9	18.1	20.6
9	497112	369351	Roadside	100.0	100.0	25.1	25.5	21.2	18.4	17.4
10	497467	370956	Roadside	100.0	100.0	25.4	21.2	18.8	14.4	15.9
11	496590	371571	Roadside	100.0	100.0	21.2	19.3	17.5	13.7	13.5
12	497908	371421	Roadside	92.3	92.3	26.6	24.1	21.3	16.3	18.0
14	497835	370584	Roadside	100.0	100.0	-	27.3	22.9	18.8	18.8
15	495541	369272	Roadside	100.0	100.0	-	25.1	20.7	17.6	18.9
16	494158	370303	Roadside	100.0	100.0	-	18.3	16.4	12.8	14.0
17	493543	370838	Roadside	100.0	100.0	-	22.6	20.5	15.5	17.1
18b	497195	369616	Roadside	80.8	80.8	-	27.1	26.2	22.2	21.7
19b	496720	368181	Roadside	100.0	100.0	-	20.5	21.1	17.6	18.6
20	497383	371250	Roadside	100.0	100.0	-	22.8	18.2	14.5	16.1
21b	498005	370245	Roadside	100.0	100.0	-	31.4	27.2	21.9	17.9

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

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

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

Notes:

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

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

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

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

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

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

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

Figure A.1 – Trends in Annual Mean NO_2 Concentrations at Monitoring Locations within AQMA

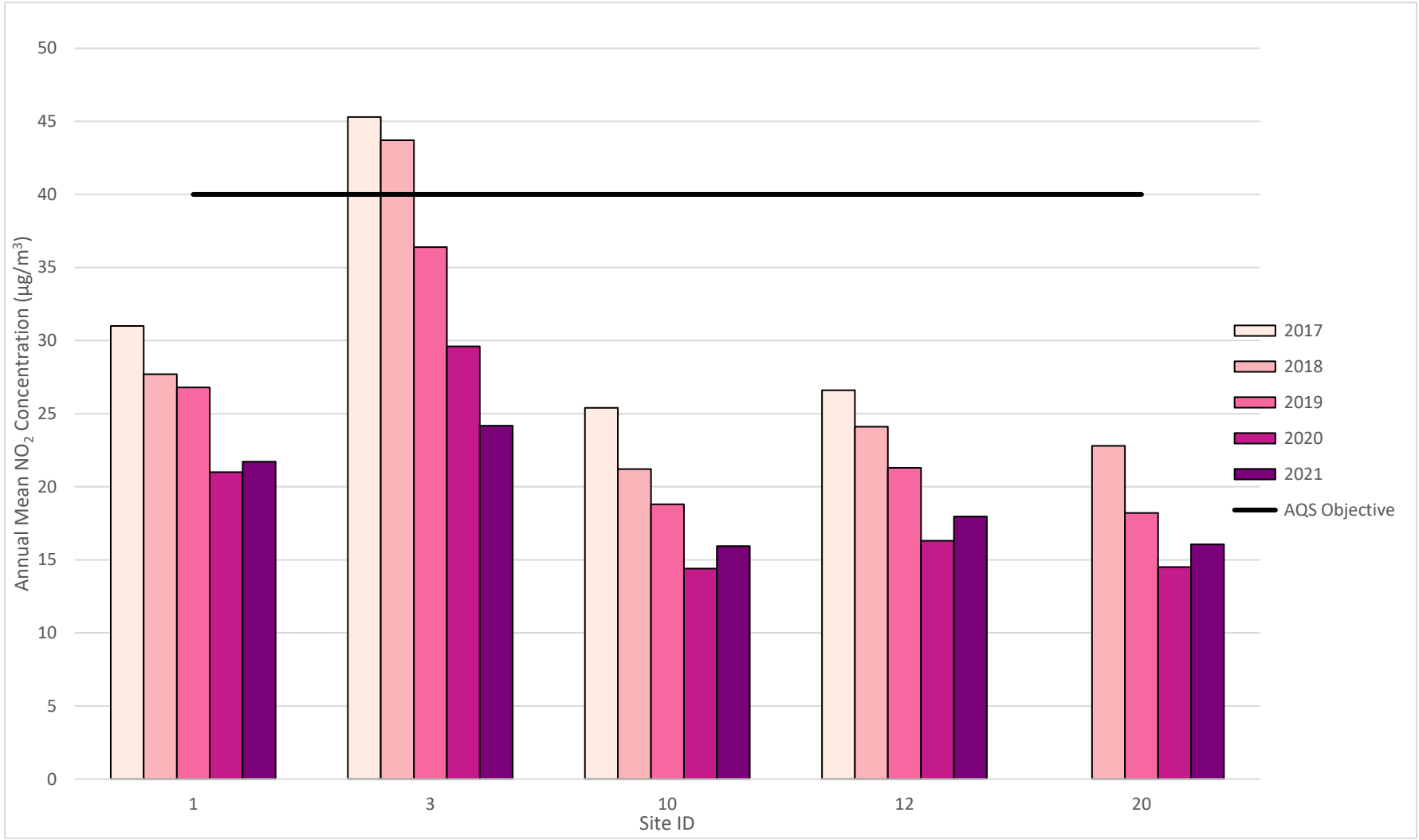


Figure A.2 – Trends in Annual Mean NO_2 Concentrations at Monitoring Locations Outside of AQMA

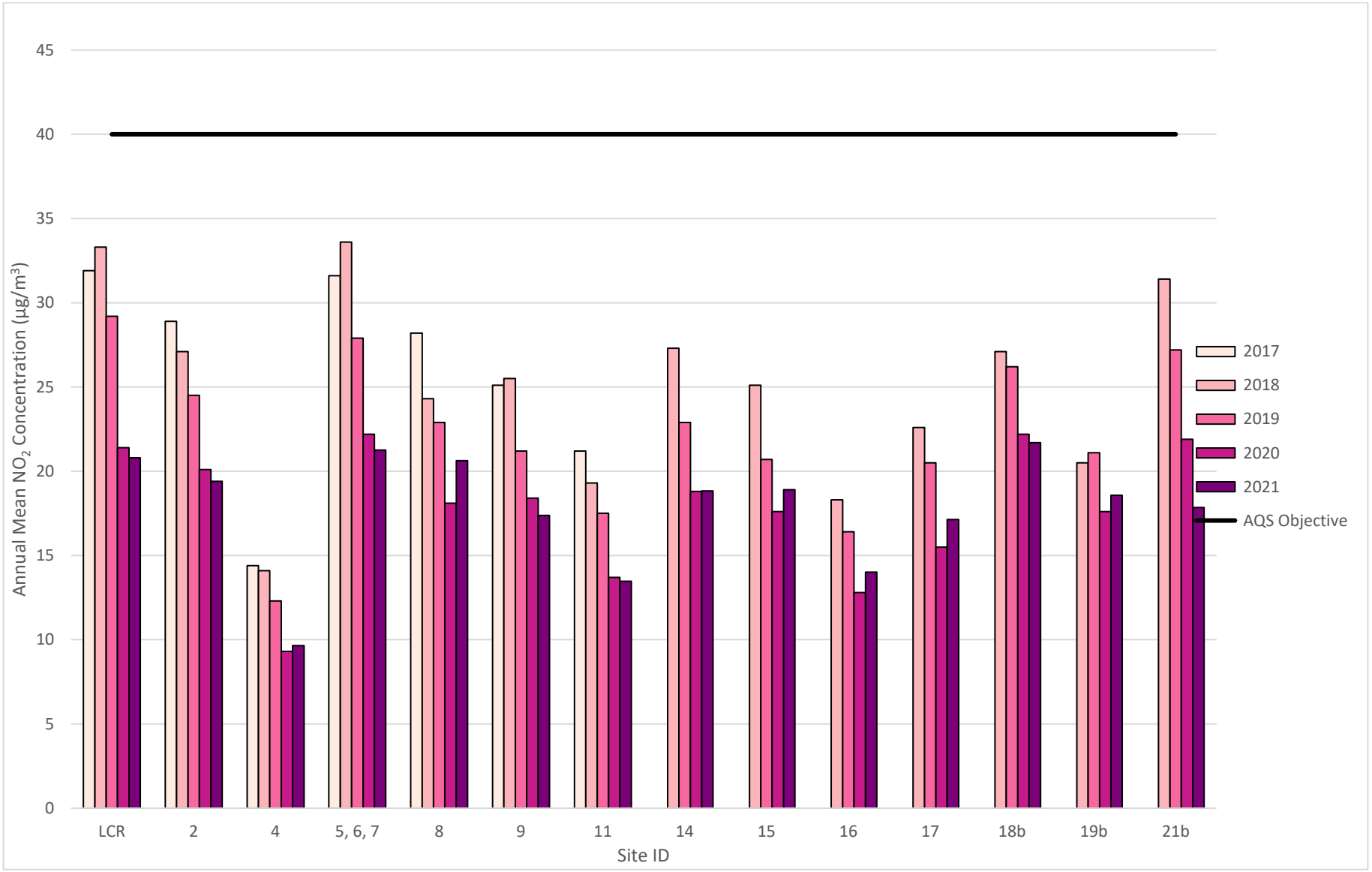


Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
LCR	497962	370375	Roadside	91.9	91.9	0	0	0	0	0

Notes:

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

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

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

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

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

Table A.6 – Annual Mean PM_{10} Monitoring Results ($\mu g/m^3$)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
B	497783	371282	Roadside	99.3%	99.3%	26.4	26.1	25.9	24.6	22.4

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

Notes:

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

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

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

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

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

Figure A.3 – Trends in Annual Mean PM_{10} Concentrations

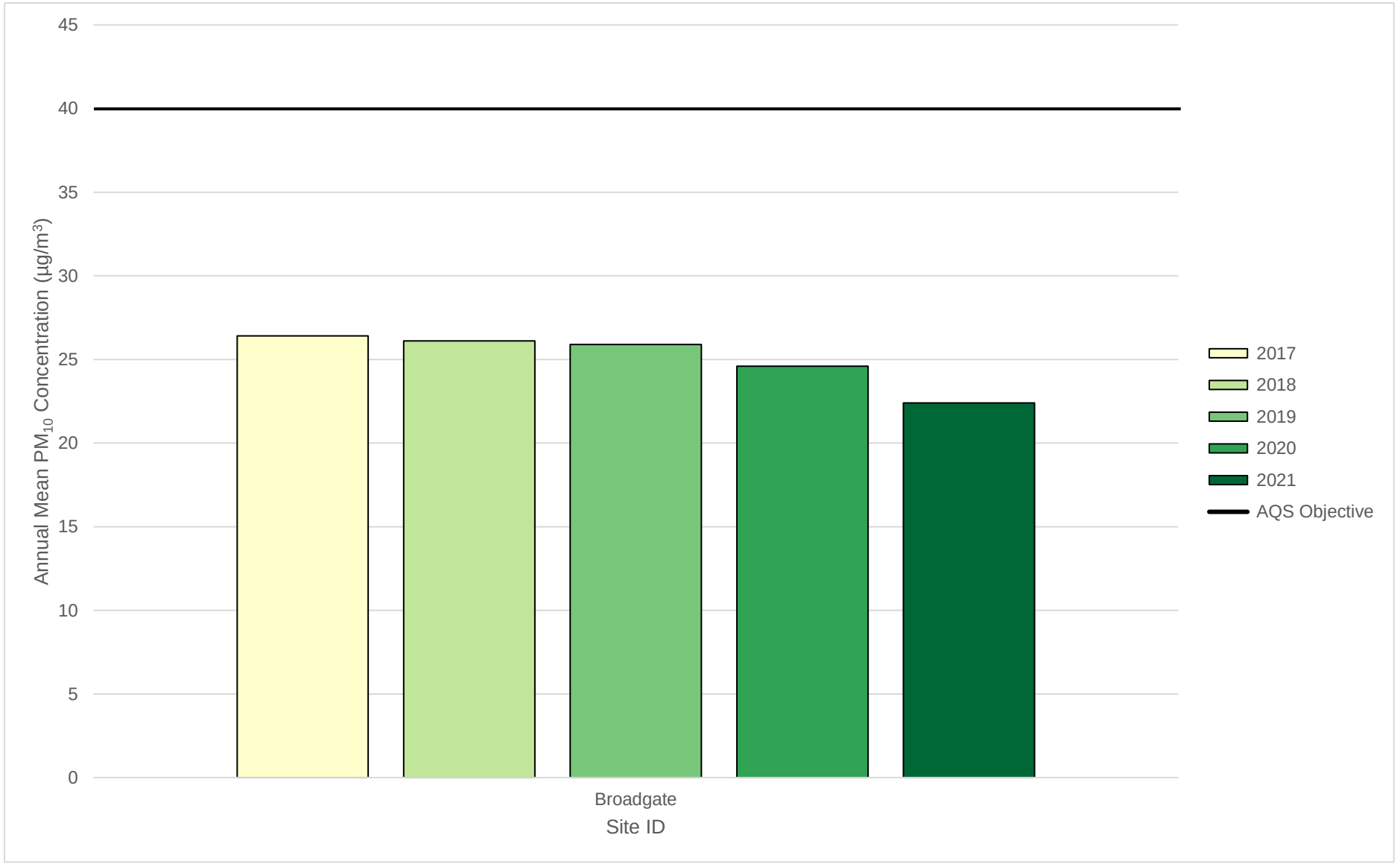


Table A.7 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
B	497783	371282	Roadside	99.3%	99.3%	12	14	22	7 (43.8)	1

Notes:

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

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

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

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

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

Figure A.4 – Trends in Number of 24-Hour Mean PM_{10} Results > 50µg/m^3

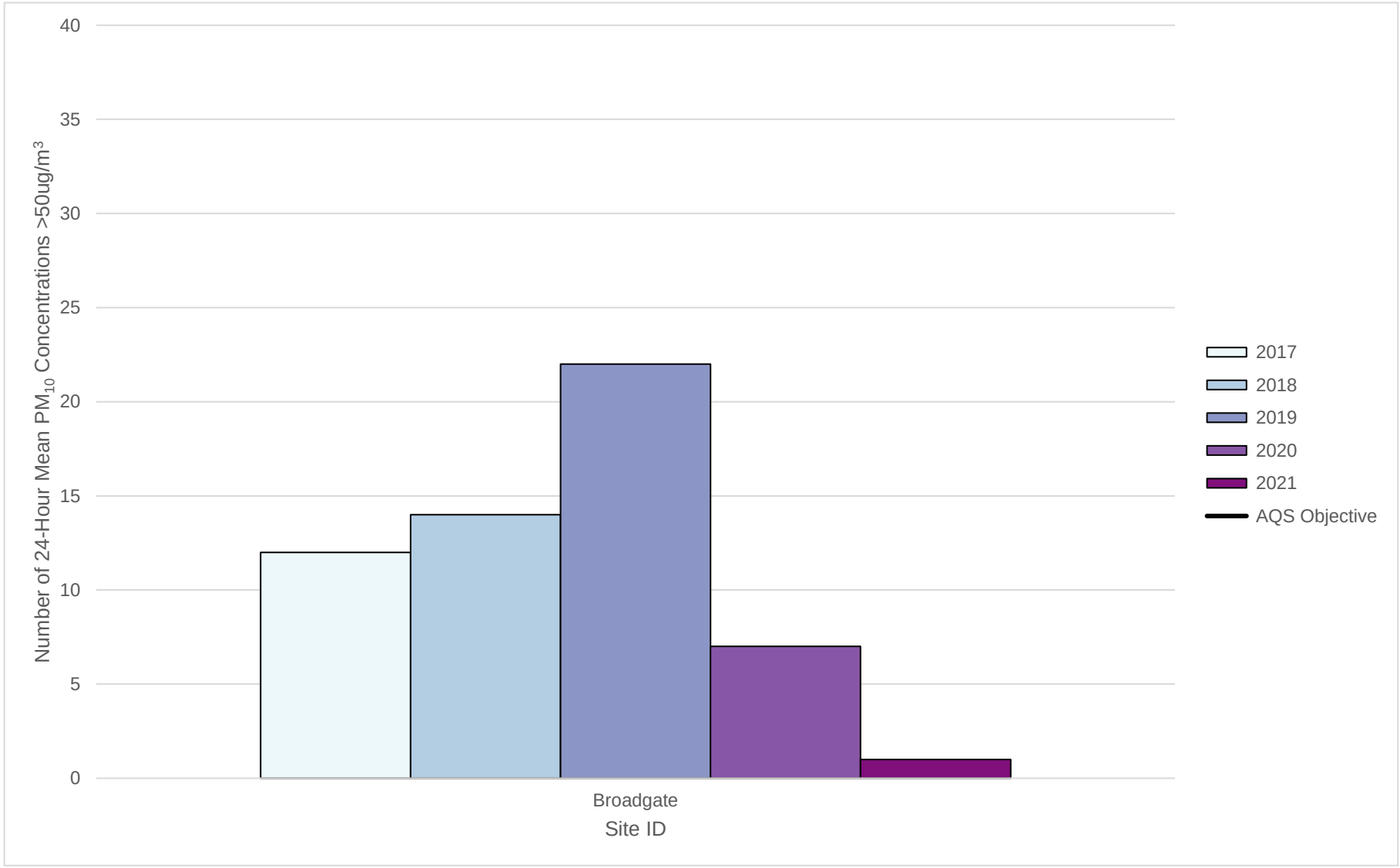


Table A.8 – Estimated Annual Mean $PM_{2.5}$ Monitoring Results (µg/m^3)

Site ID	Site Type	PM_{10} Valid Data Capture 2020 at CHR (%)	$PM_{2.5}$ Valid Data Capture at CHR (%)	CHR 2021 PM_{10} Annual Mean Concentration	CHR 2021 $PM_{2.5}$ Annual Mean Concentration	B 2021 PM_{10} Annual Mean Concentration	B 2021 $PM_{2.5}$ Annual Mean Concentration (Estimated)	Conversion Ratio
CHR: Chesterfield B: Broadgate	Roadside	99.9	99.9	11.8	7.3	22.4	13.9	0.62

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

Notes:

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

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

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2021

Table B.1 – NO_2 2021 Diffusion Tube Results (µg/m^3)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.63)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
1	497107	371510	39.6	36.1	32.8	27.9	31.0	37.5	35.0	30.6	37.0	33.4	39.2	33.4	34.5	21.7	-	
2	496946	372027	37.5	28.4	31.0	23.9	25.7	32.7	28.3	24.4	36.2	32.3	37.0	31.9	30.8	19.4	-	
3	497785	371300	46.8	39.1	42.3	34.3	37.3	29.0	25.4	26.3	47.9	43.2	46.4	42.6	38.4	24.2	-	
4	497326	371421	23.2	17.2	14.7	12.0	11.9	11.2	12.0	11.2	14.7	16.2	19.5	19.8	15.3	9.6	-	
5, 6, 7	497962	370375	39.4	38.3	35.8	34.5	29.3	28.5	26.1		38.4	29.8	36.9	34.3	33.7	21.3	-	Triplicate Site with 5, 6 and 7 - Annual data provided for 7 only
8	497190	370080	33.2	34.8	33.0	34.2	31.2	32.9	33.2	31.9	35.5	26.8	35.0	31.4	32.7	20.6	-	
9	497112	369351	39.2	32.8	28.6	21.2	22.2	22.3	20.3	21.9	27.5	31.9	32.9	30.4	27.6	17.4	-	
10	497467	370956	35.1	32.5	22.5	19.5	22.9	22.5	21.2	19.1	24.8	23.0	29.0	31.8	25.3	15.9	-	
11	496590	371571	28.9	25.2	20.9	18.4	18.5	18.0	16.7	15.8	24.5	24.3	21.5	24.1	21.4	13.5	-	
12	497908	371421		30.8	31.3	24.0	25.5	22.3	22.1	20.3	33.3	36.2	33.9	34.0	28.5	18.0	-	
14	497835	370584	38.6	33.1	30.9	31.4	26.7	23.0	19.0	25.1	29.9	29.3	37.9	33.7	29.9	18.8	-	
15	495541	369272	36.0	34.8	31.9	28.0	26.2	30.3	27.7	24.3	30.3	28.0	30.3	32.2	30.0	18.9	-	
16	494158	370303	26.6	23.3	21.3	22.0	21.9	20.2	22.5	19.1	23.9	20.3	26.7	19.4	22.2	14.0	-	
17	493543	370838	36.1	31.1	27.1	27.0	23.5	23.3	23.7	21.9	30.7	23.6	32.1	26.3	27.2	17.1	-	
18b	497195	369616	41.9	36.6	34.4	24.6	30.2	28.6		29.8	42.5		39.4	36.4	34.4	21.7	-	
19b	496720	368181	36.4	30.7	33.9	29.8	25.7	27.9	26.7	26.8	31.9	23.3	31.6	29.3	29.5	18.6	-	
20	497383	371250	30.6	26.8	22.1	21.1	20.9	27.4	26.8	22.2	26.1	25.6	27.6	28.9	25.5	16.1	-	
21b	498005	370245	38.0	31.1	28.1	22.2	28.6	18.1	17.4	20.3	32.7	34.6	36.1	32.7	28.3	17.9	-	

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

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

☒ **Local bias adjustment factor used**

☐ **National bias adjustment factor used**

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

☒ **City of Lincoln confirm that all 2021 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System**.

Notes:

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

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

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within City of Lincoln During 2021

One of the key sources to be introduced within the City of Lincoln in the future is the Western Growth Corridor. The hybrid application for 3200 dwellings plus commercial and leisure village areas was granted in January 2022. Air Quality has been considered as part of the Environmental Impact Assessment (EIA) with outline remedial measures proposed. The Air Quality Assessment will be reviewed at each reserve matters stage to ensure the assessment conclusions and recommendations remain valid.

Additional Air Quality Works Undertaken by City of Lincoln During 2021

City of Lincoln has not completed any additional works within the reporting year of 2021.

QA/QC of Diffusion Tube Monitoring

City of Lincoln's diffusion tubes in 2021 were supplied and analysed by Gradko International Ltd., using the 20% Triethanolamine (TEA) in water preparation method. Gradko's laboratory is UKAS accredited, participating in the AIR-PT Scheme for NO_2 tube analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO_2 concentrations reported are of a high caliber. The lab follows the procedures set out in the Harmonisation Practical Guidance.

All local authority co-location studies which use tubes supplied by Gradko with the 20% TEA in water preparation method in 2021 were rated as 'good', as shown by the precision summary results. This precision reflects the laboratory's performance and consistency in preparing and analysing the tubes, as well as the subsequent handling of the tubes in the field. Tubes are considered to have a "good" precision where the coefficient of variation of

duplicate or triplicate diffusion tubes for eight or more monitoring periods during a year is less than 20%.

Monitoring in 2021 had been completed in adherence with the 2021 Diffusion Tube Monitoring Calendar, whereby most changeovers were completed within ±2 days of the specified date.

Diffusion Tube Annualisation

All diffusion tube monitoring locations within City of Lincoln recorded data capture of 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2022 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG16 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

City of Lincoln have applied a local bias adjustment factor of 0.63 to the 2021 monitoring data. A summary of bias adjustment factors used by City of Lincoln over the past five years is presented in Table C.1.
A triplicate co-location study is carried out with the AURN Lincoln Canwick Road Site and has been established for a number of years. A local bias adjustment factor of 0.63 was calculated using v2.0 of the Diffusion Tube Data Processing Tool. Detail of this are shown in Table C.3.The diffusion tubes used in the co-location study had a “good overall precision”, and the automatic monitor had a “good overall data capture”.

The national factor for Gradko 20% TEA in water, as presented in the Diffusion Tube Bias Factors Spreadsheet v06_22, was 0.84 based on 34 studies.

The decision to apply the local factor is in accordance with LAQM.TG16, with the co-location study having both good overall data capture and precision, alongside being a long-established study conducted at an AURN monitoring location. Therefore, QA/QC conducted at this site is in accordance with national procedures. Although the local factor

has been decreasing each year, it is in-line with 2019 and 2020 factor, and the local factor is likely to be reflective of local air quality conditions. Additionally, the co-location study is at a roadside site, with the majority of the diffusion tube sites throughout the City of Lincoln also being at roadside locations. Although the national factor is higher and therefore more conservative, the application of this continues to result in no monitored annual mean NO_2 exceedances within the City of Lincoln, and a comparison of the application of both factors for point of reference is shown in Table C.2. The choice of bias adjustment factor to be applied to the monitoring data is reviewed each year.

Table C.1 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2021	Local	-	0.63
2020	Local	-	0.63
2019	Local	-	0.68
2018	Local	-	0.76
2017	Local	-	0.83

Table C.2 – Comparison of Application of National and Local Bias Adjustment Factors

Diffusion Tube ID	Raw NO_2 Annual Average	Bias Adjusted NO_2 Annual Average (National Factor)	Bias Adjusted NO_2 Annual Average (Local Factor)
1	34.5	28.9	21.7
2	30.8	25.9	19.4
3	38.4	32.2	24.2
4	15.3	12.9	9.6
5,6,7	33.7	28.3	21.3
8	32.7	27.5	20.6
9	27.6	23.2	17.4
10	25.3	21.3	15.9
11	21.4	18.0	13.5
12	28.5	23.9	18.0
14	29.9	25.1	18.8

Diffusion Tube ID	Raw NO_2 Annual Average	Bias Adjusted NO_2 Annual Average (National Factor)	Bias Adjusted NO_2 Annual Average (Local Factor)
15	30.0	25.2	18.9
16	22.2	18.7	14.0
17	27.2	22.8	17.1
18	34.4	28.9	21.7
19	29.5	24.8	18.6
20	25.5	21.4	16.1
21	28.3	23.8	17.9

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

No diffusion tube NO_2 monitoring locations within City of Lincoln required distance correction during 2021.

QA/QC of Automatic Monitoring

The Lincoln Canwick Road monitoring station is within the AURN, thus data and QA/QC are managed to AURN standards.

The Broadgate BAM monitoring station is run by the City of Lincoln Council. Local Site Operator duties, data management and QA/QC procedures are undertaken in-house in accordance with a written procedure. A service and maintenance contract is held by Enviro Technology Services plc. for servicing, maintenance and equipment support.

PM_{10} and $PM_{2.5}$ Monitoring Adjustment

Correction of the Beta Attenuation Monitor (BAM) was conducted in accordance with the methodology stipulated in paragraph 7.150 in LAQM.TG(16), namely a division by 1.21 of the monitored concentrations.

Automatic Monitoring Annualisation

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

Table C.3 – Local Bias Adjustment Calculation

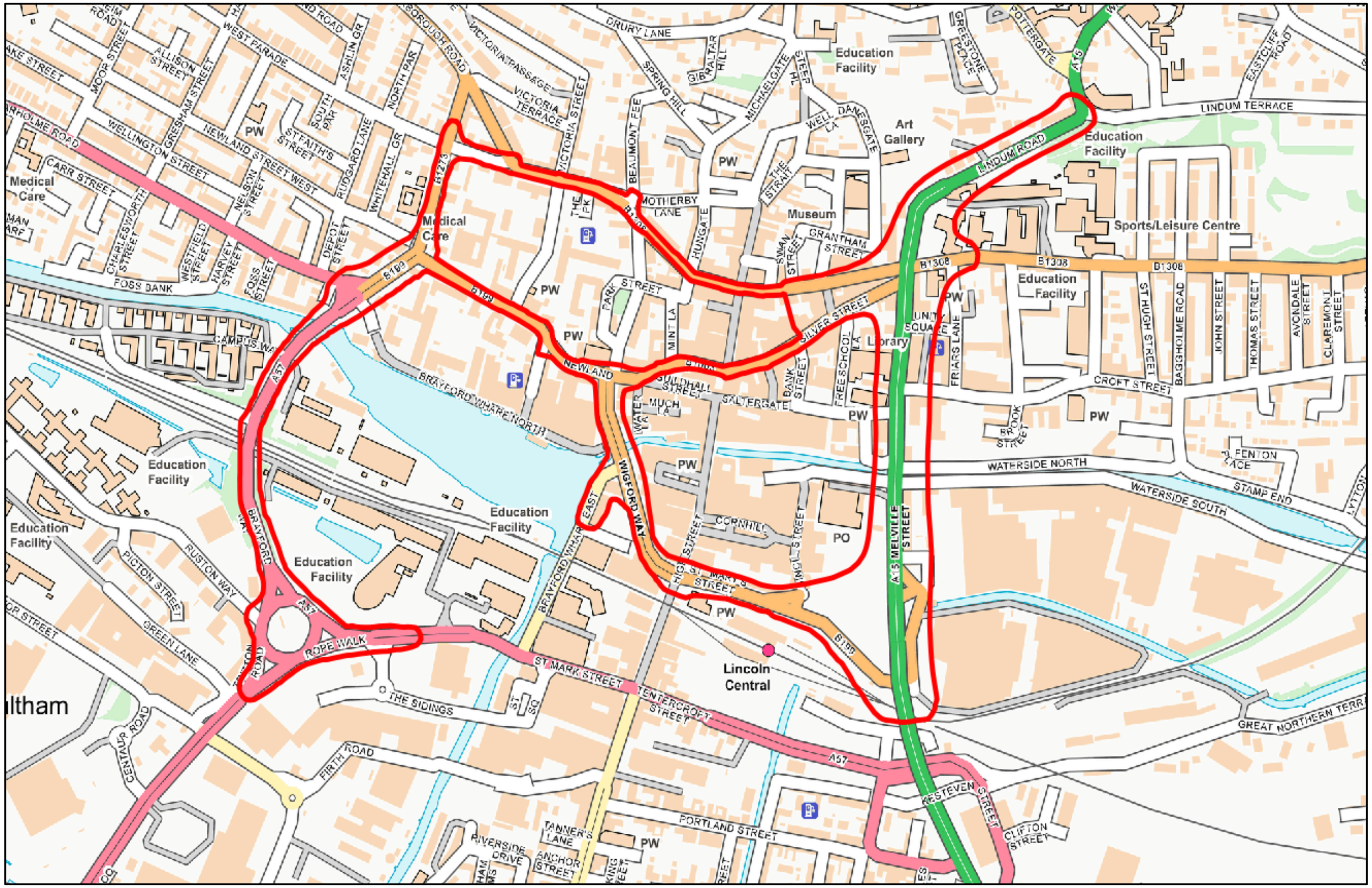
	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4	Local Bias Adjustment Input 5
Periods used to calculate bias	10				
Bias Factor A	0.63 (0.58 - 0.69)				
Bias Factor B	59% (45% - 72%)				
Diffusion Tube Mean (µg/m^3)	33.7				
Mean CV (Precision)	3.5%				
Automatic Mean (µg/m^3)	21.2				
Data Capture	100%				
Adjusted Tube Mean (µg/m^3)	21 (20 - 23)				

Notes:

A single local bias adjustment factor has been used to bias adjust the 2021 diffusion tube results.

Appendix D: Maps of Monitoring Locations and AQMAs

Figure D.1 – Map of Non-Automatic Monitoring Site



Legend

AQMA Boundary

Figure D.2 – Map of Automatic Monitoring Sites

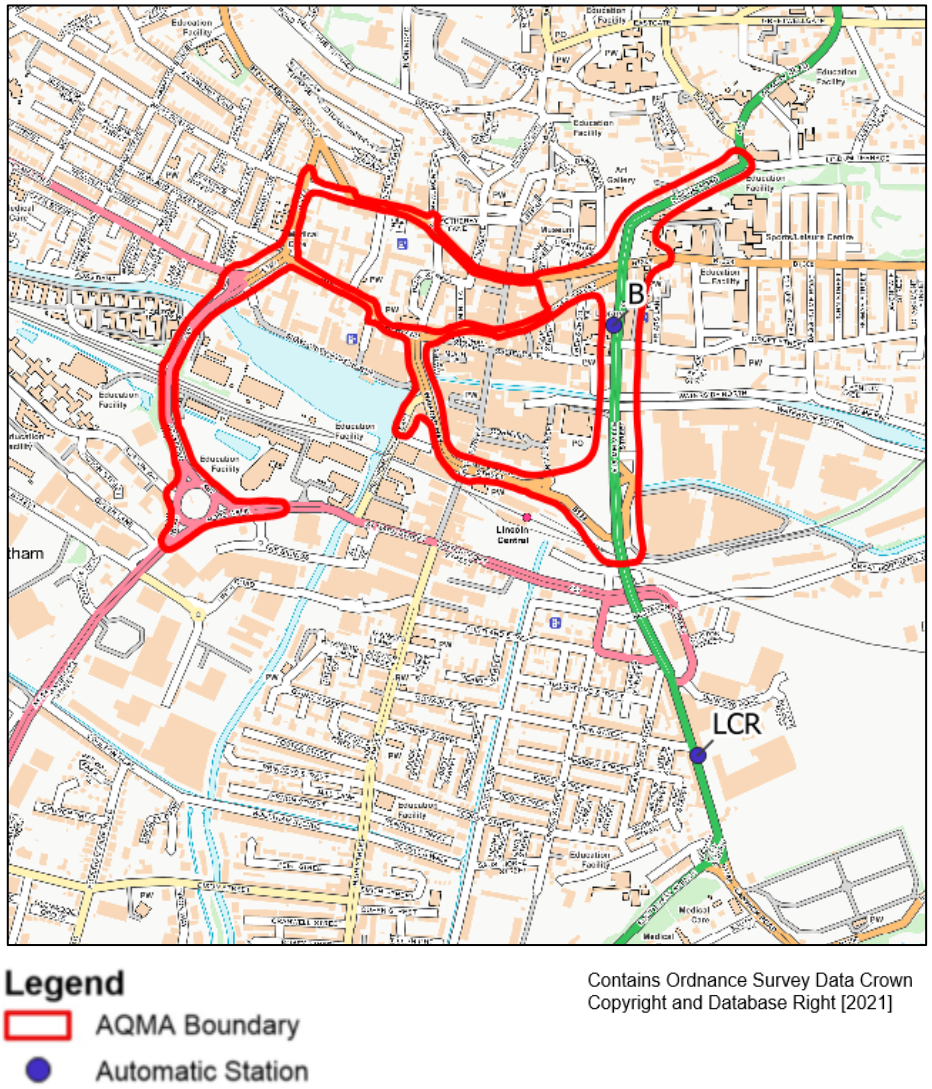
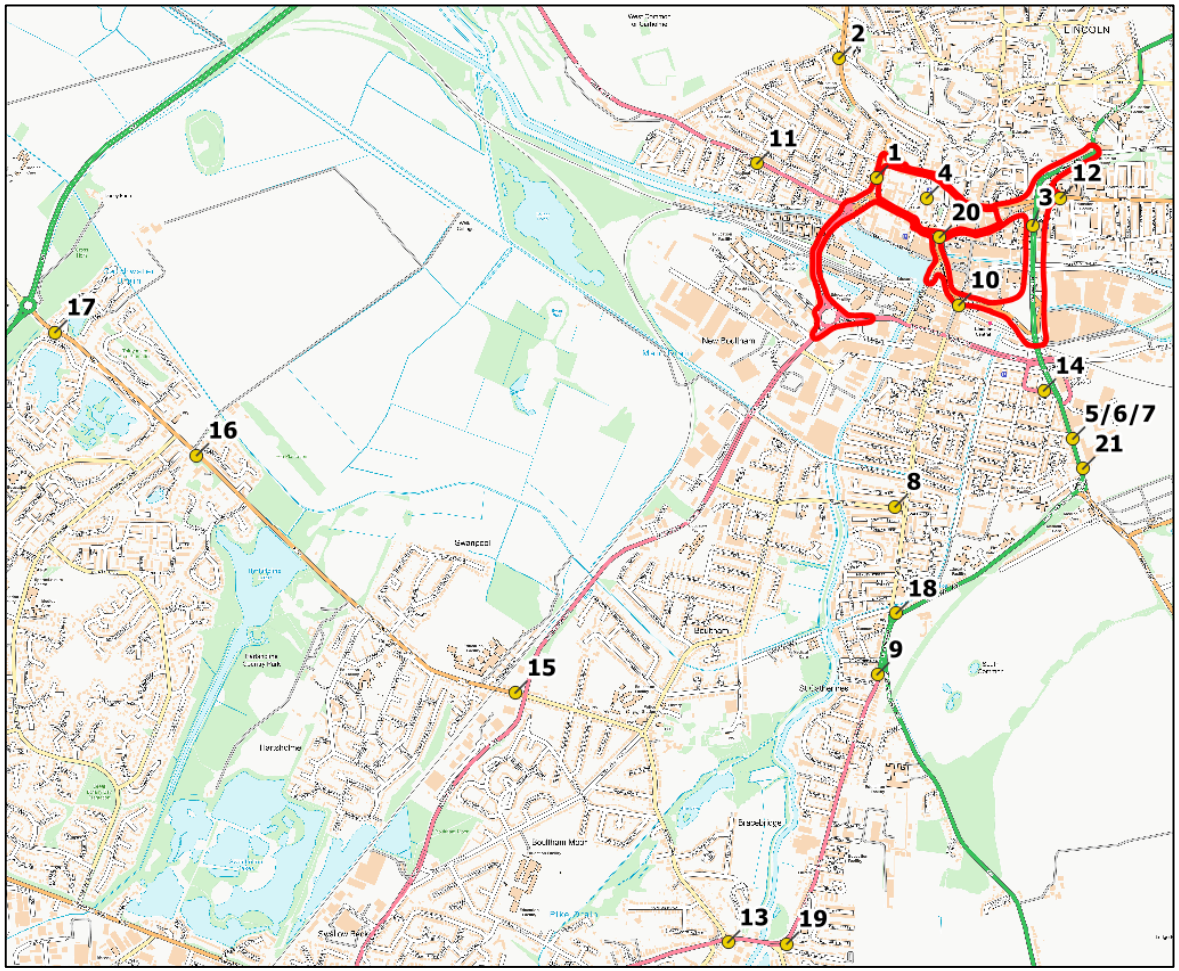


Figure D.3 – Map of Non-Automatic Monitoring Sites



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[12]

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

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

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
CO_2	Carbon Dioxide
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide
CoLC	City of Lincoln Council
AQS	Air Quality Strategy
EV	Electric Vehicle
ULEV	Ultra-Low Emission Vehicle
DfT	Department for Transport
LEB	Lincoln Eastern Bypass
LCC	Lincolnshire County Council
HDV	Heavy Duty Vehicle
LDV	Light Duty Vehicle

Abbreviation	Description
UTC	Urban Traffic Control
NHRR	North Hykeham Relief Road
SMOTS	Sustainable Modes of Travel to School
LCWIP	Local Cycling and Walking Infrastructure Plans
LTN	Local Transport Network
LTP	Local Transport Plan
ORCS	On-street Residential Chargepoint Scheme
EMAQN	East Midlands Air Quality Network

References

- Local Air Quality Management Technical Guidance LAQM.TG16. April 2021. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG16. May 2016. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland. City of Lincoln Council, 2006 Air Quality Action Plan.
- City of Lincoln Council, Interim Action Plan, 2019
- City of Lincoln Council 2021 Annual Status Report.
- City of Lincoln Council 2021 Appraisal Letter
- City of Lincoln Detailed Modelling Study, March 2017
- City of Lincoln Transport Strategy, 2020-2026
- City of Lincoln Council Decarbonisation Strategy and Action Plan 2021-2030
- City of Lincoln Council's Environmental Policy, September 2021