2020 Air Quality Annual Status Report (ASR)

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

June 2020

Local Authority Officer	Leicester City Council
Department	Planning, Development and Transportation
Address	City Hall 115 Charles Street Leicester LE1 1FZ
Telephone	+44 (0) 116 454 3184
E-mail	Jolanta.Obszynska@leicester.gov.uk
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Executive Summary: Air Quality in Our Area

Air Quality in Leicester City Council

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

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

The key points to note are:

- NO_2 pollution levels continued to decline within the city
- Annual average NO_2 levels did, however, still exceed the EU target (40µg/m^3) which means the city has retained an Air Quality Management Area
- There were no hourly exceedances of NO_2 levels
- PM_{10} levels did not exceed the EU annual average or 24-hour average limits
- $PM_{2.5}$ levels for urban background continue to be well below the EU annual average of 25µg/m^3
- Road traffic is the main source of pollution in the city, passenger diesel vehicles contributing the most
- No new sources of pollution were identified in 2019
- The draft Outline Business Case has been submitted to Joint Air Quality Unit and additional work is being undertaken to resubmit it
- Leicester is developing a new Local Transport Plan which will be adopted in 2021

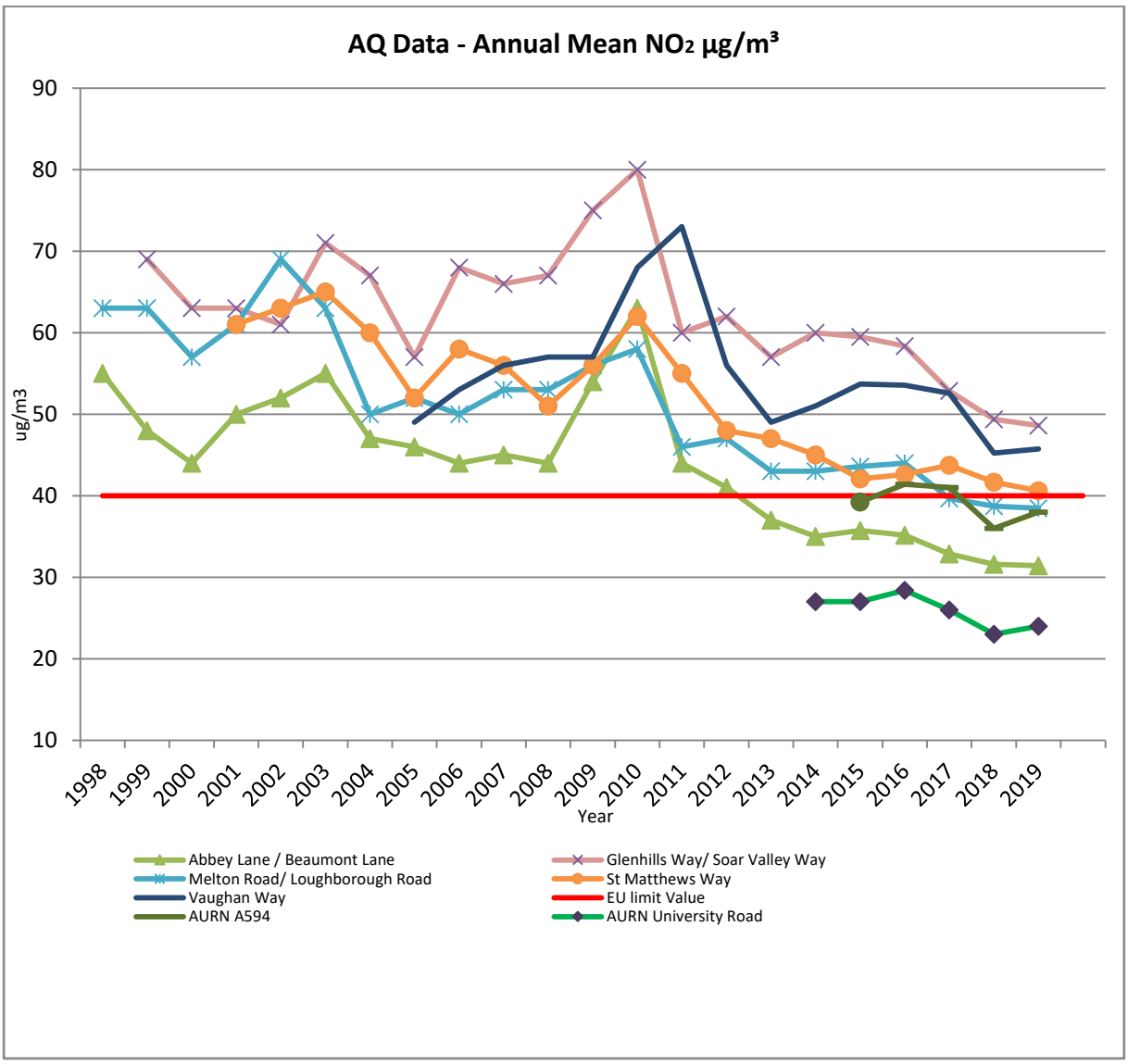
[1] Environmental equity, air quality, socioeconomic status and respiratory health, 2010
[2] Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006
[3] Defra. Abatement cost guidance for valuing changes in air quality, May 2013

Leicester's Air Quality Management Area

Leicester's Air Quality Management Area includes five, City Council owned automatic air quality monitoring stations located at strategic points on the main road network: Abbey Lane, Glenhills Way, Melton Road, St Matthews's Way and Vaughan Way. The NO_2 results since 1998 are shown in the graph below. NO_2 Pollution levels have fallen consistently since 2010/11.

Leicester also introduced a network of fifty diffusion tubes to monitor NO_2 levels around the city, predominantly within the AQMA, but also beyond it. The aim was to generate additional data needed for validation of air quality models carried out as part of preparation of Business Case and other work carried out for Joint Air Quality Unit to bring levels of NO_2 in shortest possible time. The diffusion tube network will be continued into 2022 to monitor the progress pollution levels and beyond if required.

Leicester City Council is part of an Air Quality Forum for Leicester and Leicestershire where development within the city and county are presented, discussed and knowledge exchanged. Environment Agency, Public Health England, Highways England and Freight Association representatives also attend forum meetings.



The map of the Air Quality Management Area and locations of the stations can be found at the following link: https://www.leicester.gov.uk/your-council/policies-plans-and-strategies/environment-and-waste/air-quality.

Secretary of State Direction on Air Quality

The Secretary of State for the Environment has "Directed" Leicester City Council to produce a Clean Air Plan bringing compliance with EU NO_2 objectives in the shortest possible time. Covering the entire administrative area, the Direction also makes clear air quality exceedances must not be transferred to areas outside the council's administrative boundary. In 2019 the Joint Air Quality Unit were provided a draft Outline Business Case to partly fulfil this obligation. This business case illustrated,

through a number of traffic and air quality models, that Leicester would be fully compliant for NO_2 in 2023 if the planned programme of interventions were followed. Further work on this plan is required in 2020 to bring this compliance year down to 2022.

Workplace Parking Levy

In May 2019 the City Mayor was re-elected to office on the back of a strong Manifesto which included a number of ambitious transport commitments. To help fund these the is the commitment to "Consult on a fair workplace parking levy to be used exclusively to fund a dramatic improvement to the city's transport system". In December the City Mayor challenged the Transport Strategy Team to get one up and running by the end of 2022, to extend the transport improvement works currently being developed for the Transforming Cities Fund.

Actions to Improve Air Quality

Leicester City Council (LCC) has the improvement of air qualities at the forefront of its actions. LCC has adopted its Air Quality Action Plan in November 2015 aimed at tackling the problem of traffic emissions. (https://www.leicester.gov.uk/your-council/policies-plans-and-strategies/environment-and-waste/air-quality)

Leicester City Council also works closely with its partners including local public health bodies, Public Health England and, through the Air Quality Forum, with Leicestershire County & District Councils to identify and deliver projects and initiatives to improve air quality.

Recent initiatives and actions are summarised below:

A. Reducing Transport Emissions

Clean Air Zone for Buses Agreement –the City Council & Leicester's major bus companies signed the "Leicester Clean Air Zone for Buses Partnership Agreement"

in 2018, which aims to upgrade the city bus fleet to Euro VI standard vehicles or above by January 2021. As part of this agreement further 211 buses will have been retrofitted by end of 2020 using five separate Clean / Green Bus Technology Fund grants.

E-Bike Pool - Green Bike Pool Initiative has provided funding for purchasing of six electric bikes by Cycling and Walking Team. Similar to the electric carpool, the e-bikes have been used extensively by members of Council staff. Initially City Hall based, the trial has been successful, so it has now been expanded to other Council offices and depots.

E-Bike Salary Sacrifice Initiative – in July 2018, the Cycling & Walking Team launched the Council's second cycle salary sacrifice scheme, enabling a wider range of bikes, including e-bikes, to be purchased from local retailers. 36 staff have taken up this opportunity to date. As indicated by the DfT's own "Propensity to Cycle Tool", e-bikes have the potential to significantly reduce car-based commuting and offer additional health benefits in a compact city like Leicester.

Electric Vehicle Uptake – Through European Regional Development Funding (ERDF) the Transport Strategy Team launched the Leicester Low Carbon Transport Accelerator (LLCTA) - Grants Scheme. The scheme aimed predominantly at Hackney and Private Hire drivers offers up to 40% off the difference between buying a new ultra-low emission vehicle and a diesel version. In the case of Hackney Cabs this has provided £10,000 towards the purchase of a £67,000 vehicle. To further encourage the uptake of these vehicles the Transport Strategy Team have secured the following funding to install new electric vehicle charging points in 2020.

- £500,000 from ERDF LLCTA for publicly available fast and rapid chargers
- £550,000 from the Office for Low Emission Vehicles (OLEV) / LCC for new dedicated taxi charging infrastructure

  £123,000 from OLEV / LCC for an On-street Residential Charger trail

B. Promoting Sustainable Transport

Connecting Leicester – an ongoing programme to create and provide a connected, safe and family friendly city centre. Its aim is to make the city an attractive destination

for shoppers, visitors, businesses and investors and a great place to live. Connecting the different parts of the city centre and reducing the dominance of roads is already creating an attractive, pedestrian-friendly, environment for local people to enjoy their historic city.

The priorities of Connecting Leicester are:

- Maintain a Leicester Bus Alliance to improve bus routes, reliability, frequency and affordability
- Deliver the next phase of new rapid-transit bus corridors
- Continue to make the city even easier to walk around
- Double cycling numbers between now and 2023, with continued investment in extending our segregated cycle network
- Enable better access between parking/bus stops and major attractions in the city centre for people with mobility issues
- Develop signs that take visual, hidden and cognitive disabilities into consideration
- Make a further 230 streets 20mph zones.

As part of the wider Connecting Leicester programme, there are plans to pedestrianize an area of the city centre to north of the Clock Tower. The aim is to improve access for buses, taxis, cyclists and pedestrians, and support and encourage regeneration in the area.

Key features of the plan include:

- Construction of a bus and taxi only road across the former ABC cinema site.
- Improvements to traffic flow and pedestrian safety on Mansfield Street.
- A better pedestrian link between the Haymarket and St Margaret's bus stations.
- Pedestrianisation of part of Church Gate, Haymarket and part of Belgrave Gate.
- An improved environment to create an area where people feel safe and want to visit.

- A new taxi rank on Belgrave Gate near the theatre steps.
- High quality surfacing to complement the existing city centre pedestrian zone.

Photograph 1: City Centre – artist impression

The Schools' Ride is a mass participation bike ride for pupils from around 12 schools across Leicester and Leicestershire and is the largest ride of its kind in the UK. The most recent event took place on Friday 5th July 2019 which saw over 300 schoolchildren take part. Schools' Ride is a unique celebration of Bikeability training and is organised each year by Leicester City Council, with the support of Leicestershire County Council, British Cycling, Sustrans and Leicestershire Police. Participating pupils' cycle from their school to Leicester City Centre, where they are greeted with an array of children's entertainment and a prize-giving ceremony to celebrate the completion of their Bikeability training, before cycling back to school.

Photograph 2: The Schools' Ride

National Clean Air Day – in support of National Clean Air Day, an exciting school-based event organised on the 20th of June 2019 promoted sustainable transport whilst raising awareness of air quality issues and the Smoke Control Area. Children were taught about air quality, importance of walking and cycling and reduction of car travel. Children were encouraged to do artwork themed around air quality. Street outside the school was closed to traffic and children either walked or cycled to school. A lot of sports activities were organised such as playing football, cricket, skipping and running. A highlight for the day was a fun fair organised for children with face painting, juice making using the specially adapted bike, art making and rickshaw rides. Many other organisations had their stands at the fair such as Sustrans, Police, Living Streets etc.

Usually the event is organised in Summer, but in Summer of 2020 the date has to be rearranged to Autumn due to the COVID10 outbreak.

Photograph 3: National Clean Air Day 20th June 2019 children's art

C. Improving Traffic Management

20 mph zones – the programme in residential areas has continued, particularly around schools. Sixty-seven schemes have been completed so far.

Anti-idling campaign – “Switch your engine for cleaner air”, seven campaigns rolled out across schools in the City, with refuse sites to be included in 2020 and potential whole city roll-out in 2021.

Photograph 4: Anti -Idling campaign

‘Sting’ – action days are taking place to tackle school-run drivers who drive or park dangerously, discard litter or leave their engines running while stationary. Leicester City Council and Leicestershire Police are carrying out the programme of visits to schools across the city, which have highlighted ongoing problems with motorists

behaving inconsiderately on roads outside the school gates. Up to date fifty-four "Sting" action days have been organised. During action days twenty-seven Penalty Charge Notices, ten Fixed Penalty Notices and four verbal warnings by the Police were given.

The 'sting' operation programme will be ongoing.

D. Enhancing Planning and the Environment

"Leicester Local Plan" - a new plan is being developed for adoption. Improving air quality is a core deliverable and will be a consistent theme throughout the Plan. Consultation on the document will take place in late 2020.

"Climate Emergency" – LCC has declared climate emergency in February 2019, a public consultation was undertaken and responses have been put into a report https://consultations.leicester.gov.uk/sec/climate-emergency/ . A new plan and strategy are being prepared and will be launched in Summer 2020.

E. Secure funding from Air Quality Grant to improve air quality

A funding was secured in 2018/19 to carry out a project to monitor $PM_{2.5}$ levels with portable monitors – Zephyrs^{tm} from EarthSense. The project also involves modelling of pollution levels, preparing the source apportionment, delivering information on woodburning to public through a smart device application, campaigns and leaflets.

Further funding was applied for (and subsequently secured) through Air Quality grant 2019/20 to identify the transboundary $PM_{2.5}$ pollution and the sources of it i.e. regional, national and international.

Conclusions and Priorities

Summary:

The air quality monitoring data obtained in 2019 shows an improvement in air quality with NO_2 levels generally falling across the Air Quality Management Area.

Monitoring:

Diffusion Tubes: The air quality data obtained from a passive network of fifty diffusion tubes monitoring NO_2 levels only identified a few annual exceedances of NO_2 levels, all of those located within the Air Quality Management Area. The network will continue to monitor NO_2 levels in 2021 and 2022 subject to revision for further years and assessment will be carried out on the trends.

Automatic Monitoring Stations: Two automatic air quality stations within our Air Quality Management Area (Abbey Lane & Melton Road) have recorded annual mean levels for NO_2 below the annual limit value of 40µg/m^3 again, following the downward trend observed in recent years. The Abbey Lane site has been recording NO_2 levels below the EU limit values for both annual and hourly means. If this trend continues, this area of Leicester could potentially be undeclared as an AQMA, at least in terms of NO_2 levels. Melton Road has recorded annual mean NO_2 levels under the EU limit of 40µg/m3 for the third time since installation.

The NO_2 annual mean at St Matthews Way station is only 0.6 µg/m^3 above the 40µg/m^3, so if the trends continue there is a high possibility of the compliance at this site next year.

In 2019 we commissioned Kings College London to analyse the results from St Matthews monitoring station and to find out if any outside influence was impacting on the data monitored such as location etc. Using qualitative MONNET and quantitative CUSUM analyses, an initial investigation of the differences between the NO_2 measurements sets from the AURN and LCC sites has been completed. This has indicated that the difference in annual mean concentrations in 2018 appears to have been ‘driven’ by wind direction patterns and not by instrument or site setup-related faults.

A review of the monitoring network will be carried out in 2020 to assess if any changes are necessary to the locations of both automatic monitoring stations and passive diffusion tubes.

Portable Air Quality Monitors: Portable air quality monitors called Zephyrs have been deployed in March 2020 mainly to monitor $PM_{2.5}$ levels but also monitor NO_2, PM_{10} and Ozone Although these type monitors are not classified as a reference device, they will supply a very important data on the sources of $PM_{2.5}$ within the city and the

prevalence of the wood burning as well. Early results has persuaded the City Mayor to invest in further monitors for deployment in late 2020. Depending on DEFRA guidance on these devices, it is hoped these will replace diffusion tubes as they produce near real time information on a number of pollutants.

Air Quality Action Plan:

There are a number of air quality related reports due in 2020 including:

- Outline / Full Business Case for the Secretary of State Air Quality Direction
- Outline of a new Local Transport Plan for Leicester
- Diffusion Tube Review
- Portable Monitor Review

Results of the first two reports in particular will have a large impact on the way Leicester will be introducing air quality benefits in the future. Although the ASR Appraisal for 2018 recommended a new Air Quality Action Plan in 2020, until these reports are finalised it would be impossible to update the Air Quality Action Plan. An update of the AQAP will be developed alongside development of a new Local Transport Plan to cover the period 2021 to 2036.

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Local Engagement and How to get Involved

Decision Makers:

Our Councillors and Officers sit on many business-related boards and forums to discuss transport matters and give latest briefings. These include:

- the Leicester Business Improvement District
- Leicester & Leicestershire Local Enterprise Partnership
- GoTravel Solutions business forum on transport
- City Centre Business Group
- Chamber of Commerce

Public:

Air quality has a high public profile in Leicester with councillor ward meetings often having a slot on the agenda.

We work with many action groups such as Friends of the Earth, UK100, Healthier Air for Leicester Campaign and Extinction Rebellion. However, throughout 2019 we have seen a shift away from discussion on air quality, due to the improvements we have made through the Air Quality Action Plan and a stronger commitment to carbon savings.

The Council hosts a number of transport citizen groups such as: Public Transport User Group and Bicycle User Group to help inform our future air quality and transport strategies.

We consult on all transport and air quality schemes giving citizens the chance to have their input.

The following websites provide information on various types of sustainable transport and also contain information about air quality:

Leicester ‘s Air Quality Action Plan:

https://www.leicester.gov.uk/your-council/policies-plans-and-strategies/environment-and-waste/air-quality

Leicester City Public Health:

http://www.leicester.gov.uk/health-and-social-care/public-health Leicester City Environmental Policy:

https://www.leicester.gov.uk/your-council/policies-plans-and-strategies/environment-and-waste/environmental-policy/

Planning sustainable travel journeys:

http://www.choosehowyoumove.co.uk/

Leicester Cycle City Action Plan:

https://www.leicester.gov.uk/media/179027/leicester-cycle-city-action-plan.pdf

Consultation Hub:

https://consultations.leicester.gov.uk/

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1 Local Air Quality Management

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

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Leicester City 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 Leicester City 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://www.leicester.gov.uk/your-council/policies-plans-and-strategies/environment-and-sustainability/air-quality/. Alternatively, see Appendix D: Map(s) of Monitoring Locations and AQMAs, which provides for a map of air quality monitoring locations in relation to the AQMA(s).

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)				Action Plan		
						At Declaration		Now		Name	Date of Publication	Link
AQMA Leicester City	Declared 2000 Amended 2007	NO_2, annual mean	Leicester	Area encompassing large section of the City Centre and along a number of radial roads and sections of the ring road	NO	Glenhills Way 51.4 µg/m3	St Matthews AQ 52.1 µg/m3	38.8 µg/m3	34.3 µg/m3	"Healthier Air for Leicester" Leicester's Air Quality Action Plan (2015-2026)	2015	http://www.leicester.gov.uk/media/180653/air-quality-action-plan.pdf

☒ **Leicester City 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 Leicester City Council

Defra's appraisal of last year's ASR concluded:

The report is well structured, detailed, and provides the information specified in the Guidance. The following comments are designed to help inform future reports.

1. The Public Health Outcomes Framework should be referenced, in addition to the referenced local framework data, with a comparison between the Council's air quality impact and the nationally derived air quality impact;

   Response: A new project has been undertaken supported by the Air Quality Grant to identify the pollution levels of $PM_{2.5}$. As part of the project Public Health colleagues have been involved to bring together the PHE Outcomes Framework and the data available at the council. Findings will be disseminated in a report to Defra and other authorities.

2. The 2018 reported concentrations in Table 2.1 for St. Matthews and Glenhills Way are incorrect for the 2018 distance corrected data, which is stated as 38.4µg/m3 and 42.2µg/m3 respectively. The 2018 values reported within Appendix C are 34.2µg/m3 and 38.6µg/m3

   Response - A robust editing process was undertaken to avoid future mistakes. The values that are 38.4µg/m^3 and 42.2µg/m^3 are for year 2017 calculations and 34.2µg/m3 and 38.6µg/m3 are for 2018.

3. Some templated advisory notes continue to be presented in the final report and should be removed;

   Response - A robust editing process was undertaken to avoid future mistakes.

4. The Council should not consider a review of their existing AQMA based on concentration trends until the 2019 NO_2 results have been reviewed. Should the Council wish to maintain the AQMA boundaries following the 2019 review, it is recommended that the 2015 AQAP is updated;

   Response:

The AQAP update will not happen in 2020 but is likely to be in 2021 as its development relies heavily on two key reports:

- Outline / Full Business Case for the Secretary of State Air Quality Direction will not be agreed with JAQU until Autumn 2020 at the earliest. If a charging Clean Air Zone is required, the consultation required will push back the agreement of a Full Business Case to 2021. Any agreed measures would form the basis for a new AQAP.
- Outline of a new Local Transport Plan for Leicester. The council has started to develop a new Transport Plan that builds on a successful £80 million Transforming Cities initiative.

The work carried out is to the high standards to Review and Assessment and the proposed measures can form basis for the new Air Quality Action Plan.

5. Generally, the report is good and provides a great deal of information, particularly surrounding the action plan measures. The report acts as a good first point of reference for members of the Public. The Council should continue their hard work in developing key actions such as continued review of the Leicester City monitoring strategy, the local NO2 plan, and the 2021 Clean Air Zone towards improving Leicester's air quality.

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

More detail on these measures can be found in their respective Action Plans Healthier Air for Leicester" Leicester's Air Quality Action Plan (2015-2026).

Key completed measures are:

- An agreement with bus companies in Leicester was signed "Leicester Clean Air Zone for Buses Partnership Agreement" to introduce the CAZ by January 2021 based on Euro VI standard for buses
- Completed work of Connecting Leicester:
    - King Richard III visitors Centre – pedestrians only area

- Jubilee Square- open area for pedestrians
- Cathedral Gardens- pedestrians only area
- Silver Street- paving
- New Walk Extension, Newarke Street and Southgate – shared space or vehicles and pedestrians
- Applegate- signs introduced for pedestrians, so it's easier to cross the inner ring road
- A new pedestrian-friendly route has been completed, creating an attractive approach to the 15th century built Wygston's House, helping to link all the city's heritage attractions with its modern shopping areas.
- Guildhall Lane has been re-paved and new seating and trees have also been added, creating a pleasant sitting area and entrance to the north porch of the Cathedral and the Guildhall. Guildhall Lane now provides pedestrian-friendly access to the new Jubilee Square and Wygston's House.
- Peacock Lane has been revamped as part of our aspirations to extend the pedestrian routes to the centre of Leicester. New features include large trees and planters with bench seating and a paved roadway.
- Extensions to the city centre pedestrian-friendly routes to Hotel Street, Grey Friars and St Martins provide links to Leicester' rich heritage and will also increase accessibility through to Leicester Market and other streets.
- Welford Road- better footpaths and a separate cycle lane along a stretch of Welford Road were created, from Newarke Street to Lancaster Walk. The new two-way cycle lane has replaced the bus lane on Welford Road.

- 20mph zones - at the end of 2019 we had a total of sixty-seven schemes which covered 1197 streets and 253.695 km of highway.

- Secretary of State Direction on Air Quality – Outline Business Case – a draft was submitted by the 31st October
- Nineteen electric vehicles were bought for the council fleet in total: 18 electric cars and a moped
- Several programmes of walking and cycling initiatives have been delivered, including the Ride Leicester Festival, led rides, led walks, “Wheels to Work” and cycle training for children.
- Three new bus lane enforcement cameras were introduced
- Smart cities – platform for sharing data introduced for internal use

Leicester City Council expects the following measures to be completed over the course of the next reporting:

- To deliver following schemes within the Connecting Leicester programme:
    - Abbey Park Road Improvements- improve a stretch of Abbey Park Road to create a two-way cycle track
    - Market Place South/Dolphin Square- improving facilities for pedestrians and cyclists, and making circulation through the area much easier, especially for pedestrians.
    - Clock Tower and Church Gate street improvements – project will pedestrianise an area of the city centre to north of the Clock Tower. It will improve access for buses, taxis, cyclists and pedestrians, and support and encourage regeneration in the area
    - Belgrave Gate improvements - it will create a safer and more attractive route for pedestrians and cyclists along Belgrave Gate, from the new Haymarket Bus Station to Belgrave Circle.
- To continue to deliver our programme of walking and cycling initiatives including the Ride Leicester Festival, led rides, led walks, “Wheels to Work” and cycle training for children and adults
- To work with the Office for Low Emission Vehicles (OLEV) to help introduce low emission taxis to Leicester

- To continue to bring electric vehicles and bikes into the city council's vehicle fleet to expand the fleet
- To deliver Air Quality Grant Project 2018/19 on PM 2.5
- To undertake an Anti-Idling campaign around transport
- To continue to improve the city's traffic management system and address "pinch points" on the highway network
- To deliver further 20 mph Zones in residential areas and particularly around schools
- To ensure air quality considerations are embedded in Leicester's new Local Plan
- Smart cities – to work with partners to deliver a smart system and smart data within the planning and transport arena, delivering service improvements, efficiencies and air quality benefits as a result

Leicester City Council's priorities for the coming year are:

Addressing the challenges and setting new goals requires a co-ordinated approach led by the city council but supported by many key stakeholders including academia, other authorities, government departments, private companies and the general public. The headline actions are summarised below:

- To work closely with Joint Air Quality Unit to meet the Secretary of State's Direction
- To link air quality improvement with the council's new Climate Emergency Action Plan
- To continue to lobby and work with Government to introduce national measures to reduce polluting emissions from diesel vehicles,
- To work with other local authorities and agencies
- To deliver a city-wide Clean Air Zone for buses by January 2021

- To be pro-active in our response to the Government Air Quality Plan for Nitrogen Dioxide (NO_2) consultation 2018 and any subsequent guidance or mandates
- To work with the Office for Low Emission Vehicles (OLEV) to help introduce low emission taxis to Leicester
- To continue to bring electric vehicles and bikes into the city council's vehicle fleet
- To form an effective partnership with bus operators – exploiting the full potential of the Bus Services Act 2017 to improve the quality and accessibility of bus services, promote modal shift and reduce harmful transport emissions
- To continue the Connecting Leicester programme and make our city more accessible to sustainable modes of transport such as walking and cycling
- To continue to deliver our programme of walking and cycling initiatives including the Ride Leicester Festival, led rides, led walks, "Wheels to Work" and cycle training for children and adults
- To learn form best practice and examples of schemes introduced successfully in other cities
- To continue Anti-Idling campaigns
- To keep introducing bus priority schemes such as bus gate cameras
- To continue to improve the city's traffic management system and address "pinch points" on the highway network
- To continue to deliver our programme of introducing 20 mph Zones in residential areas and particularly around schools
- To complete retrofitting of buses, so the whole bus fleet will be EURO VI
- To deliver a Full Business Case and have it fully approved
- To continue developing monitoring network, enhancing it with additional pollution monitors such as diffusion tubes and portable air quality monitors, to expand the monitoring network with further portable air quality monitors

- To ensure air quality considerations are embedded in Leicester's new Local Plan which is to be adopted in 2021
- Smart cities - we will work with partners, universities to realise the full potential of smart systems and smart data within the planning and transport arena, delivering service improvements, efficiencies and air quality benefits as a result

The principal challenges and barriers to implementation that Leicester City Council anticipates facing are:

- The additional issues that currently we are facing are associated with COVID19 pandemic. Working to the government guidelines and making sure that staff, consultants and contractors are safe and able to work is the main priority. The post COVID19 ways of working will change as we are already adjusting of working from home more, having over the internet meetings and going on site in a way that is consistent with government guidelines. Consultants and contractors also have changed the policies regarding working, and we are adapting to those as well. It is a learning curve that we all have to experience under current difficult circumstances, but the quality of our work will not suffer because of it.
- Lack of resources in terms of staff and funding. These in part may be addressed by applying for various government grants including Defra's Air Quality Grant.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Leicester City Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of Leicester Air Quality Management Area .

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Meynell's Gorse Park and Ride	Alternatives to private vehicle use	Bus based Park & Ride	1995	Leicester City Council and Leicestershire County Council	LTP (Local Transport Plan)	203,856	<0.1%	Implemented	1997	Passenger Journeys
2	Enderby Park and Ride	Alternatives to private vehicle use	Bus based Park & Ride	2005	Leicester City Council and Leicestershire County Council	LTP	261,961	<0.1%	Implemented	2009	Passenger Journeys
3	Birstall Park and Ride	Alternatives to private vehicle use	Bus based Park & Ride	2009	Leicester City Council and Leicestershire County Council	LTP	200,889	<0.1%	Implemented	2011	Passenger Journeys
4	Choose How You Move Car Share	Alternatives to private vehicle use	Car & lift sharing schemes	2007	Leicester City Council and Leicestershire County Council	ERDF (European Regional Development Fund)	9,132 total members (1/5/20)	<0.1%	9,132 registered since 2007	Ongoing	Website Liftshare.com
5	Alternatives to private vehicle use	Car Clubs	Car & lift sharing schemes	2015	Leicester City Council and Leicestershire County Council	OLEV	Two Car Clubs	<0.1%	Several companies have been approached regarding establishing a city-wide car club in Leicester. Negotiations are still ongoing.	Lack of access to electric charge points in some residential areas, currently being addressed by an electric vehicle charging point trial.	Car Club
6	A2 installations	Environmental Permits	Introduction/increase of environment charges through permit systems and economic instruments	2019	Leicester City Council	LCC (Leicester City Council) funding	2 permits	<0.1%	£3056.00 fees	2021	2020/21
7	Options and pilot schemes to improve the efficiency in the city	Freight and Delivery Management	Delivery and Service plans	2016	Leicester City Council	ERDF	Delivery of the successful scheme	<0.1%	Included in AQAP as action to be delivered by 2017	2017	Funding has been secured from the ERDF to trial 2-year Eco Stars scheme for Leicester
8	Questionnaire	Freight and Delivery Management	Freight Consolidation Centre	2016	Leicester City Council	LTP	High response	<0.01%	Preparation of questions	2017	The Freight Study (2017) looked at the potential role of a Freight Consolidation Centre for Leicester. It was recommended that Leicester City Council do not contribute financially. The proposal would be suitable for the private sector to take forward
9	Questionnaire	Freight and Delivery Management	Freight Partnerships for city centre deliveries	2016	Leicester City Council	LTP	High response	<0.01%	Preparation of questions	2018	A questionnaire has been drafted and we are currently awaiting the cost for the delivery of a questionnaire for the freight industry. Comments have been noted and used to revise the draft. This was circulated to the FQP for comment. The work was planned to be included as part of an EcoStars scheme. The EcoStars scheme will now not be progressed due to contractual issues.

10	Freight Quality Partnership	Freight and Delivery Management	Freight Partnerships for city centre deliveries	2000	Leicester City Council	LTP	Leicester freight businesses engaged	< 0.1%	Active forum, meetings	Ongoing	Comments were sought from the FQP on the Freight Study and possible design of the questionnaire. Comments received were used to help shape the design of the Freight Questionnaire
11	Pedestrian Preference zone	Freight and Delivery Management	Quiet & out of hours delivery	2006	Leicester City Council	Connecting Leicester	Scheme fully delivered	<0.1%	Scheme completed	2007	All deliveries in this zone have to be done before 11, successful scheme
12	Cleige- route map for lorries	Freight and Delivery Management	Route Management Plans/ Strategic routing strategy for HGV's	2012	Leicester City Council	Horizon 2020	Map delivered	< 0.1%	Map used by drivers	2013	Completed, map used by drivers
13	AQ considerations will be imbedded in the new Local Plan and Land use planning	Policy Guidance and Development	Air Quality Planning and Policy Guidance	2016	Leicester City Council	LTP	AQ imbedded in the documents	<0.1 %	Preliminary work carried out	2020	Currently ongoing
14	AQAP	Policy Guidance and Development	Low Emissions Strategy/Clean Air Zone	2015	Leicester City Council	LTP	Implementation of the LES	<0.1%	AQAP adopted in 2015	2026	Various schemes to be implemented to reduce pollution, the concept of Low Emission Zone in 2017 was replaced by Clean Air Zone, which will be implemented for buses in January 2021
15	AQAP	Policy Guidance and Development	Low Emissions Strategy/ Clean Air Zone Feasibility Study	May 2018	Leicester City Council, JAQU	Joint Air Quality Unit	Report delivered	10%	OBC draft was delivered in October 2019	OBC delivered in October 2019, further work scheduled for 2020	A set of schemes to bring the NO2 compliance in a shortest possible time, the impact of the schemes is assessed by using Traffic Model and Airviro Air Quality model
16	AQAP	Policy Guidance and Development	Low Emissions Strategy/ Freight CAZ	2018	Leicester City Council	Joint Air Quality Unit	Implementation of CAZ for freight vehicles	10%	Initial considerations	Not set yet	Initial considerations
17	AQAP	Policy Guidance and Development	Low Emissions Strategy/ Car based CAZ	2018	Leicester City Council	Joint Air Quality Unit	Implementation of CAZ for cars	10%	Initial considerations	Not set yet	Initial considerations
18	Local development plan	Policy Guidance and Development	Other policy	2015	Leicester City Council	LTP	AQ imbedded in the plan	< 0.1%	Draft of the plan ready	2020	Work is being completed
19	Air Quality Forum	Policy Guidance and Development	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	N/A	Blaby District Council	LTP	Exchange of knowledge across the districts in the Leicestershire, development and adoption of best practices	< 0.1 %	Forum meetings	N/A	AQ Forum to discuss issues of pollution across Leicestershire attended by districts, county and city representatives
20	East Midlands Air Quality network	Policy Guidance and Development	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	2015	Public Health England East Midlands	Public Health England	Delivery of joint strategies for East Midlands	< 0.1 %	Initial drafts of guidance documents	Not set	A network of air quality specialists and public health officials
21	Procurement strategy	Policy Guidance and Development	Sustainable Procurement Guidance, Social Value Charter	2014	Leicester City Council	LCC	AQ included in the procurement strategy	<0.1%	New policy for procurement developed	2018	Leicester City Council

22	Sustainable Procurement Guide	Promoting Low Emission Plant	Low Emission Fuels for stationary and mobile sources in Public Procurement	20016	Leicester City Council	LCC	Lowes emission plants	< 0.1 %	Implementation ongoing	Published 2018	Guidance is being prepared
23	Sustainable Procurement Guide	Promoting Low Emission Plant	Other Policy	2010	Leicester City Council	LCC	Adherence to the policy	< 0.1 %	Implementation ongoing	Published 2010	
24	Procurement of 110 ULEV vehicles to replace diesel vans	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	2015	Leicester City Council	LTP	19 vehicles already purchased	< 0.1 %	17 EV	2020	Ongoing
25	Clean Air Zone for Buses	Promoting Low Emission Transport	CAZ	2017	Leicester City Council	LTP	Agreement signed with major bus companies in Leicester	< 10 %	Agreement reached with bus companies	January 2021	The zone will include all the buses in Leicester belonging to 5 bus companies, which signed the agreement
26	Preferential location for EV at car parks	Promoting Low Emission Transport	Priority parking for LEV's	2015/2016	Leicester City Council	Not agreed yet	Planning stage	< 0.1 %	Planning	Ongoing	
27	Plugged In places - Midlands	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2012	Leicester City Council	LTP	24 plugs installed	< 0.1 %	All installed	2017	Scheme completed
28	500 EV charging points	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2015/2016	Leicester City Council	ERDF	KPI will be a % of the 500installed plugs	< 0.1 %	Planning stage CHRIS	2020	28 charging points implemented. Trail for on-street charging points is anticipated in 2020. ERDF funding bid for £500k submitted in spring 2018 was successful
29	TUSKER – ULEV salary sacrifice for city council employees	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	2016/2017	Leicester City Council	LTP	36 vehicles purchased up to date	< 0.1 %	36 vehicles delivered	Ongoing	Salary sacrifice for employees for electric cars and for the e-bikes
30	A discount on the licence fee of 40% for Euro 5 vehicles	Promoting Low Emission Transport	Taxi emission incentives	2013	Leicester City Council	LCC		< 0.1 %	Discount of 40% is discontinued as Euro 5 from 1 April 2017 as the Euro 5 vehicles are now standard. Standard fee applies		Discount no longer available
31	Euro 6 vehicles the licence fee is reduced	Promoting Low Emission Transport	Taxi emission incentives	2015	Leicester City Council	LCC	Increased interest	< 0.1 %	Licence fee discount of 50% for Euro 6 vehicles or ULEV from 1 April 2017. Fee is £108	Implemented	Fee is £108
32	Vehicle age policy for vehicles	Promoting Low Emission Transport	Taxi Licensing conditions	2012/2013	Leicester City Council	LCC	Applies to 337 hackney carriages and 1498 private hire vehicles	< 0.1 %	Policy reviewed in 2015	Ongoing	Vehicles over 11 years old are not licenced.
33	Spot check operations on taxis which include emission tests	Promoting Low Emission Transport	Other	2000	Leicester City Council	LCC	10 operations per year involving around 30 vehicles	< 0.1%	Ongoing operations	Ongoing	
34	Two vehicle tests per year which include an emission test	Promoting Low Emission Transport	Other	2000	Leicester City Council	Paid by drivers	All taxies to have 2 tests per year	< 0.1 %	2011 vehicle testing brought in house to ensure consistent application of standards	Ongoing	

35	Flexible working arrangements	Promoting Travel Alternatives	Encourage / Facilitate homeworking	2014	Leicester City Council	LCC	LCC gives the staff the opportunity to work from home either on a permanent basis or as and when there is a need due to domestic or health reasons.	< 0.1 %	LCC staff engaged	Ongoing	
36	Business Grants	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2011	Leicester City Council, but delivered through Go Travel Solutions (Local Social enterprise specialised in business engagement) and also grants from JAQU	ERDF/JAQU	Deliver to at least 3 businesses	< 0.1 %	48 grants issued	Ongoing	Monitoring has shown that in businesses engaged 25% of staff living within 5 miles of their workplace and who drove to work are now using sustainable travel
37	Business Travel Plans	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2012	Leicester City Council, but delivered through Go Travel Solutions (Local Social enterprise specialised in business engagement)	ERDF/LCC	Engaged with 60 + businesses	< 0.1 %	Engaged 553 businesses	Ongoing	Single occupancy car has dropped in the last year by 3% points from 85% to 82%
38	Statutory planning related Travel Plans secured through statutory planning conditions.	Promoting Travel Alternatives as required by the NPPF.	Promoting a decrease in single occupancy vehicle usage and promoting behaviour change across organisations in the city, as per statutory planning requirements	2002	Leicester City Council	LCC/Developers of schemes within the Leicester area	250 businesses organisations engaged in travel plans and monitoring	< 0.1 %	More than 389 businesses actively engaged as per their planning requirements	Ongoing	On average single occupancy vehicle usage has fallen by 14.6% over a 5-year period under the auspices of a planning related Travel Plan. A total of 75,167 employees are covered by planning related Travel Plans in the city.
39	Travel Portal- Choose How You Move	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2012	Leicester City Council and Leicestershire County Council	ERDF	424,574	< 0.1 %	74,701 users of the Choose How You Move website, and of them, 72,944 were new users.	Ongoing	Continued work to refresh and update the site is being undertaken along with continued and expanded promotion of the tool to businesses and communities within the Leicester and Leicestershire area.
40	Personalised Travel Planning Access Fund Leicester + Leicestershire	Promoting Travel Alternatives	Personalised Travel Planning	2018	Leicester City Council and Leicestershire County Council	Access Fund	To engage with	< 0.1 %	26% of households participated 11% reduction in lone work trips and 7% in cycling work trips.	2019	Further PTP work was planned for 2020 but this may now happen in 2021.
41	Wheels to work- fleet of pedal and electric bikes, which are available for loan by apprentices and other young people to get to work	Promoting Travel Alternatives	Personalised Travel Planning	2014	Leicester City Council, Melton Borough Council and Leicestershire County Council	ERDF	21 e-bike users during 2018/19	< 0.1 %	21 users loaned e-bikes	Ongoing	The service has been brought in-house, the set-up work meant delays to the operations reflecting in lower numbers. Delivery has been expanded from direct to public only to businesses as well and from only 6-month loan to include loan to own.
42	Car share	Promoting Travel Alternatives	Personalised Travel Planning	2010	Leicester City Council and Leicestershire County Council	ERDF	1000 new members per year	< 0.1 %	971 new members in 2019	Ongoing	22,097,860 car miles saved
43	Employment adviser training	Promoting Travel Alternatives	Promote use of rail and inland waterways	2012	Leicester City Council and Job Centre Plus and another employment agency	ERDF	Ensure ongoing training of 200 plus Work Coaches	< 0.1%	Continuous training with 200 plus employment advisors, information passed on to approximately 150 people a day	Ongoing	The training include advice on smart ticketing and sustainable travel, so it can be passed to people who come to Job Centre Plus, Training Agencies and Employment Agencies for work advice
44	Bike It Schools Programme	Promoting Travel Alternatives	Promotion of cycling	2010	Leicester City Council, delivered through Sustrans	ERDF	32,000 children engaged in 2019	< 0.1 %	Delivered in 70 schools	2017	

45	Bike It Neighbourhood Programme	Promoting Travel Alternatives	Promotion of cycling	2014	Leicester City Council, delivered through Sustrans	ERDF	600 adults engaged at 12 events	< 0.1 %	1794 adults engaged	Ongoing	
46	Led Rides and Festival Programme	Promoting Travel Alternatives	Promotion of cycling	2010	Leicester City Council and British Cycling	ERDF/LTP	15 000 attendees at Ride Leicester Festival and 8000 plus participants on led rides per annum	< 0.1 %	15 000 attendees at Ride Leicester Festival and 3000 plus participants on led rides per annum	Ongoing	17% of participants only cycle less than 12 times pa before the event
47	Bike Parks	Promoting Travel Alternatives	Promotion of cycling	2010	Leicester City Council	LTP/Sustrans	Ongoing	< 0.1 %	In 2019 15,693 cyclists used the bike park	Ongoing	This is more than in 2018. The City Council took the operation in house in April 2018 and numbers have risen since. There is now no bike shop at the Bike Park. A free Dr Bike service is provided by Sustrans once a month.
48	Bike Maintenance training	Promoting Travel Alternatives	Promotion of cycling	2011	Leicester City Council	Sustrans/LTP/ERDF	Ongoing	< 0.1 %	Future cycles ceased trading in Feb 2020, numbers trained are not available at present. Sustrans have trained 28 employees in businesses, 10 adults in the community and 42 adults in schools. A total of 80 adults.	Ongoing	The cycle maintenance training side of FC business was taken on by 'Future Cycles Training'. Sustrans, Community Cycles and Northside Bikes have been delivering additional cycle maintenance training to groups of people in the community.
49	Walking programme	Promoting Travel Alternatives	Promotion of walking	2015	Leicester City Council	ERDF	9 x walk programmes and 47 x walk events	< 0.1 %	371 participants in year 3 (315 in year 1; 365 in year 2; 1051 in total across project)	Ongoing	
50	Walk to school programme	Promoting Travel Alternatives	School Travel Plans	2011	Living Streets	Living Streets/LTP	Engage with 50 plus schools in Leicester	< 0.1 %	76 primary schools engaged (Sept 2012-June 2019)	Funding until March 2020	In the primary schools engaged walking has gone up from 62% to 74%
51	Sustainable Travel Challenge	Promoting Travel Alternatives	Other	2011	Leicester City Council	LTP/Better Pints	Total registrants 1296	< 0.1 %	Betterpoints-a total of 1604 County wide users with a 35% (above average) engagement rate. Of these 1604, 585 a third of users are registered within the AF postcode area and have completed 19,451 cycle journeys covering 48,639 miles and 84,423 walking activities covering 66,854 miles.	Jan-16	This scheme is run by Better Points now
52	Sustainable Travel Challenge	Promoting Travel Alternatives	Other	2016	Leicester City Council	LTP/Better Points	Total users	< 0.1 %	Workplace Challenge promoted during 2016-17 which is manged by Leicester and Leicestershire Sports Partnership, with walking and cycling added as activities. Currently 786 registered users.	2020	This scheme is run by Better Points
53	Bus routes, cycle routes, bus time tables	Public Information	Via leaflets	Annual	Leicester City Council	LCC	Annual publication	< 0.1 %		January 2018	Bus Map published and available to general public
54	Leaflets promoting walking	Public Information	Via leaflets	2015	The Ramblers Walks	ERDF	7,500 leaflets distributed	< 0.1 %	Completed	2015/2016	

55	Leaflets promoting walking and cycling	Public Information	Via leaflets	2016	Leicester City Council Get moving this summer	ERDF/Sustrans/LTP	2000	< 0.1%	?	2019	
56	FACE– internal newsletter	Public Information	Via other mechanisms	Weekly	Leicester City Council	LCC	Delivered to all of employees	< 0.1 %	Delivered weekly		
57	Air Quality action Plan 2015-2016	Public Information	Via radio	2015-AQAP	Leicester City Council	LTP	Adopted	< 0.1 %	Delivered as required		
58	Twitter: Leicester City Council	Public Information	Via the Internet	2015 - AQAP	Leicester City Council	LCC	Active	< 0.1 %	Messages sent as and when required	Ongoing	Promotion of air quality issues, events and support available from the Council.
59	Facebook: Leicester City Council	Public Information	Via the Internet	2015-AQAP	Leicester City Council	LCC	Active				
60	Leicester City website	Public Information	Via the Internet	2014	Leicester City Council	LCC	Webpage active	< 0.1 %	Webpage active	Ongoing	
61	Leicester	Public Information	Via the Internet	1990	Leicester City Council	LCC	Delivered to all of public	< 0.1 %	1036 likes on Facebook as of May 20192,977 tweets, 601 Followers as of May 2019. Over the last 28 days: 76 Tweets, 61.2K impressions, 1,538 profile visits		Both social media channels shared with Leicestershire County Council.
62	City Council AV display screen	Public Information	Other	2015-AQAP	Leicester City Council	LTP		< 0.1 %	Available daily, updated as and when	Ongoing	
63	AQAP	Traffic Management	Anti-idling campaign near schools	2015 AQAP	Leicester City Council	LTP		< 0.1 %	7 Campaigns rolled out at schools		Scheme introduced to Leicester schools
64	Bus Fleet	Traffic Management	Euro VI buses with anti-idling engine switch	2015	Leicester City Council	Clean Bus Technology Fund	193 buses introduced in total	< 0.1 %	80 buses introduced	Ongoing	
65	20mph zones	Traffic Management	Reduction of speed limits, 20mph zones	1999	Leicester City Council	Transport Improvement Works Programme, S106, S278	Continue to implement schemes where residents request them	< 0.1 %	67 schemes	Ongoing	1197 streets and 253.695 km of highway
66	Bus lanes	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	First bus lane was introduced in 1973, since then many bus lanes were implemented, and the work is ongoing	Leicester City Council	LTP	Continue to implement bus lanes where there is a need	< 0.1 %	75 bus lanes implemented	Ongoing	
67	SCOOT sites	Traffic Management	UTC, Congestion management, traffic reduction	1970	Leicester City Council	LTP	189 sites	< 0.1 %	277 sites	Ongoing	

68	Mova UTC System	Traffic Management	UTC, Congestion management, traffic reduction	1980	Leicester City Council	LTP	70 sites	< 0.1 %	70 sites	Ongoing	24 sites are dual, both SCOOT and Mova
69	Traffic sensitive streets	Traffic Management	Other	1991	Leicester City Council	LTP	Quarterly Network Management Scorecard reports	< 0.1 %	Regulation in place	Ongoing	Any work carried out on the city highways has to be agreed as not to impede the traffic i.e. avoidance of rush hour. Permit scheme in place.
70	Coordination of street works	Traffic Management	Other	1991	Leicester City Council	LCC	Regulations in place	<0.1 %	Regulation in place	Ongoing	
71	A46 better bus scheme to improve bus lane	Transport Planning and Infrastructure	Bus route improvements	2012	Leicestershire County Council	LTP	Scheme implemented., bus journey time significantly reduced	< 0.1 %	Scheme successful, reported 15% increase in bus patronage	Completed	
72	Cycle Lanes	Transport Planning and Infrastructure	Cycle network		Leicester City Council	ERDF/LTP/LCC/Sustrans		< 0.1 %	Off road cycle tracks 52.1km Cycle lanes (46.4km) and quiet streets (53.0km)99.4km Including bus lanes 120.6km Cycle tracks (in footway) 62.9km	Ongoing	On-going implementation subject to funding
73	Bike Share Cycle hire	Transport Planning and Infrastructure	Public bike share cycle hire scheme	2016	Leicester City Council	TBC	Recommendation report	, 0.1%	Procurement Planning is underway for a Pilot Project in 2018	TBC	Planning is underway with stakeholders; the launch will be in 2020
74	New Haymarket Bus station	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	2015	Leicester City Council, government grant, LEP	2016	Opened	< 5%	Implemented	Completed	
75	Leicester North-West major transport project	Transport Planning and Infrastructure	Other	2014	Local Growth Fund (LGF), administered by the LLEP		Scheme being implemented in stages, stage 1 completed in June 2016	< 0.1 %	Stage 1 completed in June 2016	Stage 2 in designed, scheme to be completed in 2019	Scheme delivered
76	Bus pinch points project	Transport Planning and Infrastructure	Other	2015	Leicester City Council	National Productivity Investment Fund (NPIF), administered by DfT	Reduced delays to buses at junctions and other nodes	< 0.1 %	Planning and initial design work carried out	2019	Won National Productivity Investment Fund and LEP funding for 6 pinch points to be addressed to be addressed.
77	Smart ticketing	Transport Planning and Infrastructure	Other	2011	Leicester City Council	Smart and Integrated ticketing fund, DfT	Onecard Scheme implemented	< 0.1 %	Onecard monthly ticket Weekly multi-operator smart ticketing	Ongoing	It is a part of DfT Smart Cities programme
78	Real Time Bus Passenger Information	Transport Planning and Infrastructure	Other	2012	Leicester City Council	Leicester City Council and Leicestershire County Council	Leicester and Leicestershire included in the scheme	< 0.1 %	Scheme implemented	Implemented	It provides also details for bus operators, so they can have information about bus performance. It allows to help them plan better and for us to have more information about bus pinch points.
79	Motorcycle rider education	Vehicle Fleet Efficiency	Driver training and ECO driving aids	2016	Leicester & Leicestershire Rutland road safety partnership	LTP	Reduction in KSI figures	< 0.1 %	Funding secured	Ongoing	Low capacity motorcycle accident reduction, training for Enhanced Rider Scheme and for CBT= novice riders or commuters scheme

80	PEMS test carried out for the Breath I, bus retrofit project to determine NO2 reduction in tailpipe emissions	Vehicle Fleet Efficiency	Testing Vehicle Emissions	2015/2016/2017	Leicester City Council	Clean Bus Technology Fund	PM 10, NOx reductions and NO2 reductions	< 0.1 %	All PEMS tests completed	2018	I
81	Retrofitting of buses Breathe I	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	2013	Leicester City Council	Clean Bus Technology Fund	32 buses retrofitted	< 0.1 %	All buses retrofitted	2019	
82	Retrofitting of buses Breathe II	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	2014	Leicester City Council	Clean Bus Technology Fund	5 buses retrofitted	< 0.1%	All buses retrofitted	2020	
83	Retrofitting of buses Breathe III	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	2015	Leicester City Council	Clean Bus Technology Fund	6 buses to be retrofitted	< 0.1 %	All buses retrofitted	2021	
84	Statutory planning applications related Travel Plans secured through statutory planning conditions.	Promoting Travel Alternatives as required by the NPPF.	Promoting a decrease in single occupancy vehicle usage and promoting behaviour change to sustainable travel modes across organisations in the city, as per statutory planning requirements	2002	Leicester City Council	LCC/Applicants for schemes	250 businesses organisations engaged in travel plans and monitoring	< 0.1 %	A total of 427 businesses actively engaged as per their planning requirements to do so.	Ongoing	On average single occupancy vehicle usage has fallen by 15.4.% over a 5-year period under the auspices of a planning related Travel Plan. A total of 77,612 employees are covered by planning related Travel Plans in the city.

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.

Leicester City Council is taking the following measures to address $PM_{2.5}$:

- Smoke Control Area was declared for the whole of Leicester City on the 1st of June 2018
- Leicester City Council has secured Air Quality Grant 2018/19 to study and model locally based fine particulate pollution ($PM_{2.5}$). An air quality grant has been awarded to monitor small particulates using portable air quality monitors – Zephyrs, to form a network of 10 units deployed across the city , map using near real time data and make the public more aware of $PM_{2.5}$ by using smart device applications and leaflets and how it affects our city and our health.
- Applied (and subsequently awarded) 2019/20 Air Quality Grant for identifying transboundary sources of $PM_{2.5}$ in Leicester using state of the art modelling and satellite data.
- Building on lessons from COVID 19 pandemic including the promotion and facilitation of homeworking, cutting out the need for transport
- Working closely with Defra
- To continue to lobby and work with Government to introduce national measures to reduce polluting emissions from diesel vehicles,
- To work with other local authorities and agencies
- To deliver a city-wide Clean Air Zone for buses in January 2021
- To work with the Office for Low Emission Vehicles (OLEV) to help introduce low emission taxis to Leicester

- To continue to bring electric vehicles and bikes into the city council's vehicle fleet
- To form an effective partnership with bus operators – exploiting the full potential of the Bus Services Act 2017 to improve the quality and accessibility of bus services, promote modal shift and reduce harmful transport emissions
- To continue the Connecting Leicester programme and make our city more accessible to sustainable modes of transport such as walking and cycling
- To continue to deliver our programme of walking and cycling initiatives including the Ride Leicester Festival, led rides, led walks, "Wheels to Work" and cycle training for children and adults
- To learn form best practice and examples of schemes introduced successfully in other cities
- To introduce Anti-Idling campaigns
- To keep introducing bus priority schemes such as bus gate cameras
- To continue to improve the city's traffic management system and address "pinch points" on the highway network
- To continue to deliver our programme of introducing 20 mph Zones in residential areas and particularly around schools
- To continue developing monitoring network, enhancing it with additional pollution monitors such as diffusion tubes and portable air quality monitors
- To ensure air quality considerations are embedded in Leicester's new Local Plan which is to be adopted in 2021
- Smart cities - we will work with partners, universities to realise the full potential of smart systems and smart data within the planning and transport arena, delivering service improvements, efficiencies and air quality benefits as a result

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.

Leicester City Council undertook automatic (continuous) monitoring at five sites during 2019. Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at https://uk-air.defra.gov.uk/data/ .

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

Leicester City Council undertook non- automatic (passive) monitoring of NO_2 at fifty sites during 2019. Table A.2 in Appendix A shows the details of the sites.

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

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3. Note that the concentration data presented in Table A.3 represents the concentration at the location of the monitoring site, following the application of bias adjustment and

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

annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2019 dataset of monthly mean values is provided in Appendix B. Note that Appendix B. Note that the concentration data presented in

Table B.1 includes distance corrected values, only where relevant.

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

All of the sites recorded NO_2 annual levels below 60µg/m^3 for annual mean, the highest level recorded was by the diffusion tube LCC 36 at Vaughan Way and it was 49.7 µg/m^3 and the highest annual mean of NO_2 recorded by the automatic monitoring station was 48.6µg/m^3 at Glenhills Way.

Error! Reference source not found. in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

Annual mean values for NO_2 for 2019 at Leicester air quality automatic monitoring stations when compared with 2018 data reported in 2019 ASR show an overall decline in NO_2 concentrations at Glenhills Way (GW), Melton Road (MR) and St Matthews Way (SM) and slight increase at Vaughan Way (VW) and Abbey Lane (AL). For the third consecutive time the air quality monitoring station at Melton Road showed annual mean NO_2 levels below 40µg/m$^{3.}$ None of the stations recorded annual mean for NO_2 over the 60µg/m^3, there were no hourly exceedences of 200 µg/m^3.

A small increase of annual NO_2 mean levels has been observed at Vaughan Way air quality station compared to a much bigger decrease in 2018.

There was a slight increase in the annual mean concentration of NO_2 recorded at two of the automatic air quality stations of NO_2 levels, but it was below 1 µg/m^3

Unusually mild winters of late have been in terms of pollution a driving factor in improving the air quality. Leicester did experience some cold snaps with heavy traffic, but despite such conditions the annual average NO_2 levels have fallen further compared to year 2018.

Fleet renewal with higher class of Euro engines and therefore less polluting, introduction of Ultra Low Emission vehicles into the fleet could be a possible explanation to such a downward trend in NO_2 levels in Leicester.

Overall the 2018 data shows a big improvement in air quality in Leicester.

3.2.2 Particulate Matter (PM_{10})

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

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

PM_{10} is monitored within Leicester but is not currently subject to an AQMA. PM_{10} annual mean data for all sites has consistently been within objective limits for air quality. All stations are also within objectives set for the 24-hour mean.

3.2.3 Particulate Matter ($PM_{2.5}$)

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

Leicester City Council did not carry out monitoring for the $PM_{2.5}$ in 2019. The $PM_{2.5}$ data has been collected by the urban background AURN located at University of Leicester on University Road since 2013. The annual mean concentrations for $PM_{2.5}$ have not breached the EU limit values of 25µg/m^3 in the past five years. The sources of pollution within the city appear to be domestic burning, transboundary sources, traffic, there are no large factories or power plants within the city or in close proximity.

3.2.4 Sulphur Dioxide (SO_2)

Table A.8 in Appendix A compares the ratified continuous monitored SO_2 concentrations for N/A with the air quality objectives for SO_2.

No monitoring of SO_2 has been carried out in Leicester

Appendix A: Monitoring Results

Table A.1 - Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
AURN University Road	University Road	Urban background	459178	302808	NO_2; $PM_{2.5}$	N	Chemiluminescent; FDMS	N/A	30	3
AURN A594	AURN A 594 St Matthews way	Roadside	459361	304908	NO_2, PM_{10}	Y	Chemiluminescent, FDMS	0	3	3
AL	Abbey Lane	Roadside	458574	306885	NO_2, PM_{10}	Y	Chemiluminescent, BAM	0	7	2
GW	Glenhills Way	Roadside	457083	300156	NO_2, PM_{10}	Y	Chemiluminescent, BAM	14	3	2
MR	Melton Road	Roadside	459528	306316	NO_2, PM_{10}	Y	Chemiluminescent, BAM	0	3	2
SM	St Matthews Way	Roadside	459221	305036	NO2	Y	Chemiluminescent,	10	2	2
VW	Vaughan Way	Roadside	458507	304904	NO_2, PM_{10}	Y	Chemiluminescent, BAM	0	3	2

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

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
LCC1	Lamppost on A563 Krefeld Way	Roadside	456672	307669	NO_2	NO	0	3	NO	2
LCC2	Lamppost on A563 Asquith Way	Roadside	459165	300271	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC3	Lamppost on A563 Red Hill Way	Roadside	458260	307900	NO_2	NO	0	3	NO	2
LCC4	Lamppost on A50 Groby Road	Roadside	457244	305572	NO_2	NO	0	3	NO	2
LCC5	Lamppost on A50 Groby Road	Roadside	455578	306395	NO_2	NO	0	3	NO	2
LCC6	Lamppost on A5630 Anstey Lane	Roadside	455825	307676	NO_2	NO	0	3	NO	2
LCC7	Lamppost on A563 New Parks Way	Roadside	455647	305825	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC8	Lamppost on Glenfield Road	Roadside	455917	304892	NO_2	YES, AQMA Leicester City	0	3	NO	2

LCC9	Lamppost on A563 New Parks Way	Roadside	455082	304761	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC11	Lamppost on A47 Hinckley Road	Roadside	456230	304273	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC12	Lamppost on A426 Aylestone Road	Roadside	457474	301061	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC14	Lamppost on Stretton Road	Roadside	457210	304276	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC15	Lamppost on A5460 Narborough Rd	Roadside	457690	303783	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC16	Lamppost on A563 Palmerston Way	Roadside	461014	301043	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC17	Lamppost on Braunstone Lane	Roadside	456380	302193	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC18	Lamppost on A5460 Narborough Road	Roadside	456754	302259	NO_2	YES, AQMA Leicester City	0	3	NO	2

LCC19	Lamppost on Upperton Road.	Roadside	457667	303460	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC20	Lamppost on A594 Waterloo Way	Roadside	459196	303882	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC21	Lamppost on A594 St Georges Way	Roadside	459431	304564	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC22	Lamppost on A563 Glenhills Way	Roadside	457869	300085	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC23	Lamppost on A5199 Welford Road	Roadside	459367	302117	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC24	Lamppost on B5366 Saffron Lane	Roadside	458542	302023	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC25	Lamppost on A5199 Welford Road	Roadside	459703	301072	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC26	Lamppost on A6 London Road	Roadside	461307	301478	NO_2	YES, AQMA Leicester City	0	3	NO	2

LCC27	Lamppost on A6 London Road	Roadside	460134	303093	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC28	Lamppost on A47 Uppingham Road	Roadside	463282	304552	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC29	Lamppost on A563 Colchester Road	Roadside	462891	305329	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC30	Lamppost on A47 Uppingham Road	Roadside	461806	305323	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC31	Lamppost on A6030 Coleman Road	Roadside	461596	304989	NO_2	NO	0	3	NO	2
LCC32	Lamppost on Forest Road	Roadside	460441	305322	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC33	Telegraph pole on A6 Abbey Lane	Roadside	458749	307184	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC34	Lamppost on A607 Melton Road	Roadside	460010	307324	NO_2	YES, AQMA Leicester City	0	3	NO	2

LCC35	Lamppost on A50 Frog Island	Roadside	458099	305184	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC36	Lamppost on A594 Vaughan Way	Roadside	458267	304623	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC37	Lamppost on St Nicholas Circle	Roadside	458182	304400	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC38	Lamppost on A6030 Victoria Road East	Roadside	461558	306508	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC40	Lamppost on A607 Melton Road	Roadside	460460	308234	NO_2	NO	0	3	NO	2
LCC41	Lamppost on A563 Troon Way	Roadside	460865	307949	NO_2	NO	0	3	NO	2
LCC42	Lamppost on Catherine Street	Roadside	460678	306582	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC43	Lamppost on Loughborough Road	Roadside	459304	307385	NO_2	YES, AQMA Leicester City	0	3	NO	2

LCC44abc	Co-location triplicate at Leicester University AURN, University Road	Urban Background	459185	302812	NO_2	NO	0	100	YES	2
LCC45	Lamppost on Leicester Road	Roadside	457596	310078	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC46	Lamppost on Scraptoft Lane	Roadside	464058	305532	NO_2	NO	0	3	NO	2
LCC47abc	Co-location triplicate Vaughan Way Automatic Monitoring Station	Roadside	458507	304904	NO_2	YES, AQMA Leicester City	0	3	YES	2
LCC48	Lamppost on A6030 Staughton Drive	Roadside	461577	302746	NO_2	NO	0	3	NO	2
LCC49	Lamppost on Hogarth Road	Roadside	457472	310229	NO_2	YES, AQMA Leicester City	0	3	NO	2
LCC50	Lamppost on B5327 Anstey Lane	Roadside	456269	307062	NO_2	NO	0	3	NO	2

Table A.3 – Annual Mean NO_2 Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3) (4)				
							2015	2016	2017	2018	2019
AURN University of Leicester	459178	302808	Urban Background	Automatic	N/A	99	27	28	26	23.2	24
AURN A594	459361	304908	Roadside	Automatic	N/A	98	**40**	**41**	**41**	36	38
AL	458574	306885	Roadside	Automatic	N/A	98	36	35	33	31	31.4
GW	457083	300156	Roadside	Automatic	N/A	99	**60**	**58**	**53**	**49**	**48.6**
MR	459528	306316	Roadside	Automatic	N/A	95	**44**	**44**	39.66	38.7	38.48
SM	459221	305036	Roadside	Automatic	N/A	93	**42**	**43**	**43**	**41**	**40.61**
VW	458507	304904	Roadside	Automatic	N/A	97	**54**	**54**	**53**	**45**	**45.73**
LCC1	456672	307669	Roadside	Diffusion Tube	N/A	100	-				32.6
LCC2	459165	300271	Roadside	Diffusion Tube	N/A	100	-				24.9
LCC3	458260	307900	Roadside	Diffusion Tube	N/A	100	-				34.1
LCC4	457244	305572	Roadside	Diffusion Tube	N/A	92	-				32.2
LCC5	455578	306395	Roadside	Diffusion Tube	N/A	100	-				36.0
LCC6	455825	307676	Roadside	Diffusion Tube	N/A	100	-				35.3
LCC7	455647	305825	Roadside	Diffusion Tube	N/A	100	-				31.5
LCC8	455917	304892	Roadside	Diffusion Tube	N/A	100	-				21.6

LCC9	455082	304761	Roadside	Diffusion Tube	N/A	100	-				30.1
LCC11	456230	304273	Roadside	Diffusion Tube	N/A	100	-				28.2
LCC12	457474	301061	Roadside	Diffusion Tube	N/A	100	-				28.9
LCC14	457210	304276	Roadside	Diffusion Tube	N/A	100	-				23.6
LCC15	457690	303783	Roadside	Diffusion Tube	N/A	100	-				38.3
LCC16	461014	301043	Roadside	Diffusion Tube	N/A	92	-				32.0
LCC17	456380	302193	Roadside	Diffusion Tube	N/A	100	-				25.6
LCC18	456754	302259	Roadside	Diffusion Tube	N/A	100	-				31.4
LCC19	457667	303460	Roadside	Diffusion Tube	N/A	100	-				39.6
LCC20	459196	303882	Roadside	Diffusion Tube	N/A	92	-				27.1
LCC21	459431	304564	Roadside	Diffusion Tube	N/A	100	-				30.3
LCC22	457869	300085	Roadside	Diffusion Tube	N/A	100	-				27.8
LCC23	459367	302117	Roadside	Diffusion Tube	N/A	100	-				35.6
LCC24	458542	302023	Roadside	Diffusion Tube	N/A	92	-				25.3
LCC25	459703	301072	Roadside	Diffusion Tube	N/A	100	-				21.9
LCC26	461307	301478	Roadside	Diffusion Tube	N/A	100	-				27.5
LCC27	460134	303093	Roadside	Diffusion Tube	N/A	100	-				34.1
LCC28	463282	304552	Roadside	Diffusion Tube	N/A	100	-				19.6

LCC29	462891	305329	Roadside	Diffusion Tube	N/A	92	-				24.7
LCC30	461806	305323	Roadside	Diffusion Tube	N/A	100	-				35.2
LCC31	461596	304989	Roadside	Diffusion Tube	N/A	100	-				27.6
LCC32	460441	305322	Roadside	Diffusion Tube	N/A	83	-				35.0
LCC33	458749	307184	Roadside	Diffusion Tube	N/A	100	-				32.5
LCC34	460010	307324	Roadside	Diffusion Tube	N/A	100	-				25.6
LCC35	458099	305184	Roadside	Diffusion Tube	N/A	100	-				33.7
LCC36	458267	304623	Roadside	Diffusion Tube	N/A	83	-				**49.7**
LCC37	458182	304400	Roadside	Diffusion Tube	N/A	100	-				38.0
LCC38	461558	306508	Roadside	Diffusion Tube	N/A	75	-				24.6
LCC40	460460	308234	Roadside	Diffusion Tube	N/A	100	-				30.8
LCC41	460865	307949	Roadside	Diffusion Tube	N/A	100	-				31.2
LCC42	460678	306582	Roadside	Diffusion Tube	N/A	75	-				29.5
LCC43	459304	307385	Roadside	Diffusion Tube	N/A	92	-				30.5
LCC44abc	459185	302812	Urban Background	Diffusion Tube	N/A	100	-				22.7
LCC45	457596	310078	Roadside	Diffusion Tube	N/A	100	-				17.7
LCC46	464058	305532	Roadside	Diffusion Tube	N/A	100	-				19.0
LCC47abc	458507	304904	Roadside	Diffusion Tube	N/A	92	-				**42.8**

LCC48	461577	302746	Roadside	Diffusion Tube	N/A	92	-				22.8
LCC49	457472	310229	Roadside	Diffusion Tube	N/A	100	-				18.0
LCC50	456269	307062	Roadside	Diffusion Tube	N/A	100	-				22.4

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

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

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

Notes:

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

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

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

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

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

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

Figure A.1 – Trends in Annual Mean NO_2 Concentrations

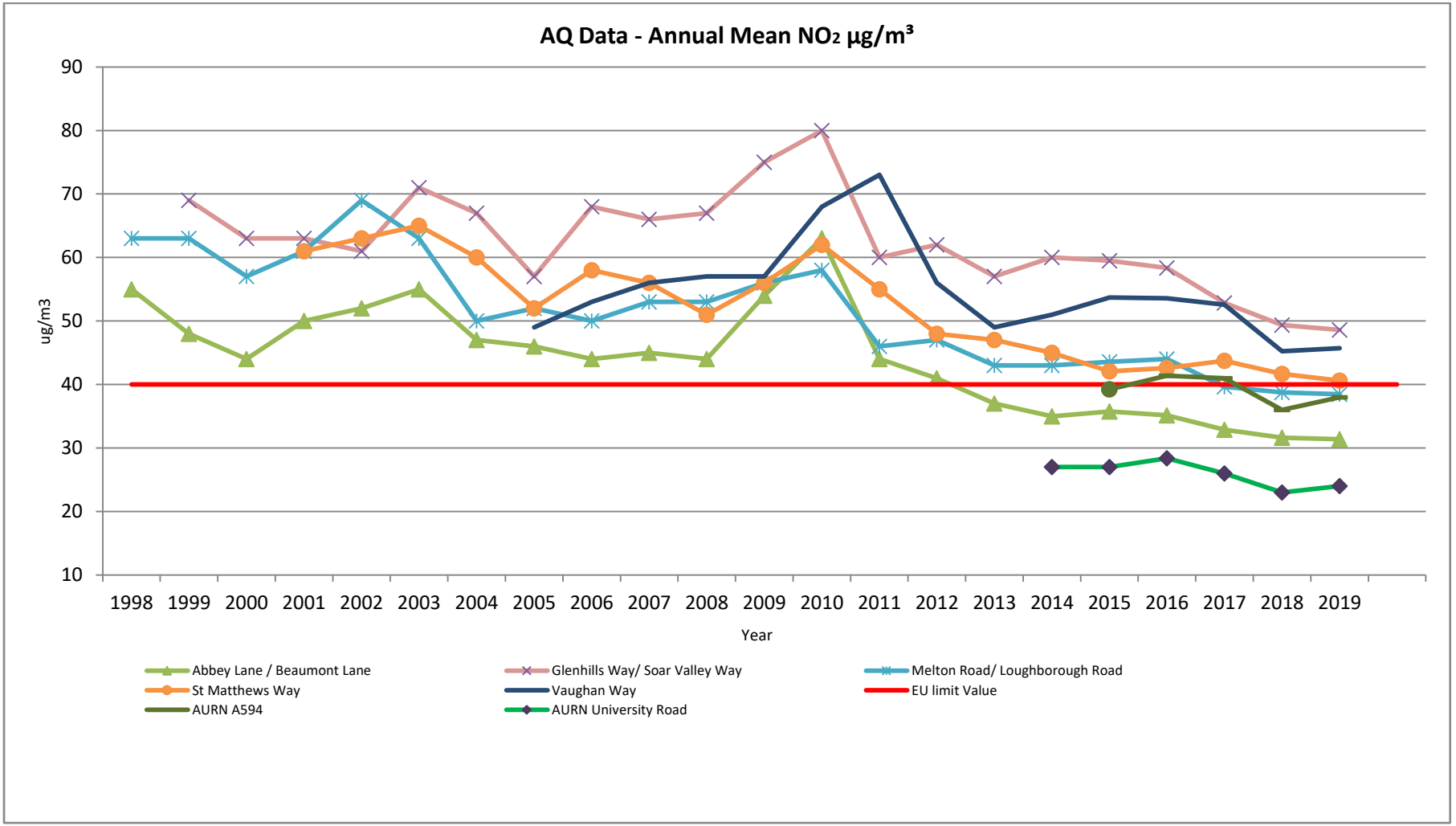


Table A.4 – 1-Hour Mean NO_2 Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
							2015	2016	2017	2018	2019
AURN University of Leicester	459178	302808	Urban Background	Automatic	N/A	99	**0**	**0**	**0**	**0**	**0**
AURN A594	459361	304908	Roadside	Automatic	N/A	98	**0**	**0**	**0**	**0**	**0**
AL	458574	306885	Roadside	Automatic	N/A		**0**	**0**	**0**	**0**	**0**
GW	457083	300156	Roadside	Automatic	N/A	99	**0**	**0**	**0 (1 in total)**	**0**	**0**
MR	459528	306316	Roadside	Automatic	N/A	95	**0**	**0**	**0**	**0**	**0**
SM	459221	305036	Roadside	Automatic	N/A	93	**0**	**0**	**0**	**0**	**0**
VW	458507	304904	Roadside	Automatic	N/A	97	**0**	**0 (1 in total)**	**0**	**0**	**0**

Notes:

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

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

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

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

Figure A.2 – Trends in Number of NO_2 1-Hour Means > 200µg/m^3

No exceedances were observed

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	PM_{10} Annual Mean Concentration (µg/m³) (3)				
						2015	2016	2017	2018	2019
AL	458574	306885	Roadside	N/A	98	21	13	19	21	21
GW	457083	300156	Roadside	N/A	99	28	20	20	20	19.5
MR	459528	306316	Roadside	N/A	95	22	17	20	19	17.5
VW	458507	304904	Roadside	N/A	99	22	20	20	22	22

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

Notes:

Exceedances of the PM_{10} annual mean objective of 40µg/m³ are shown in **bold.**

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

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

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

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

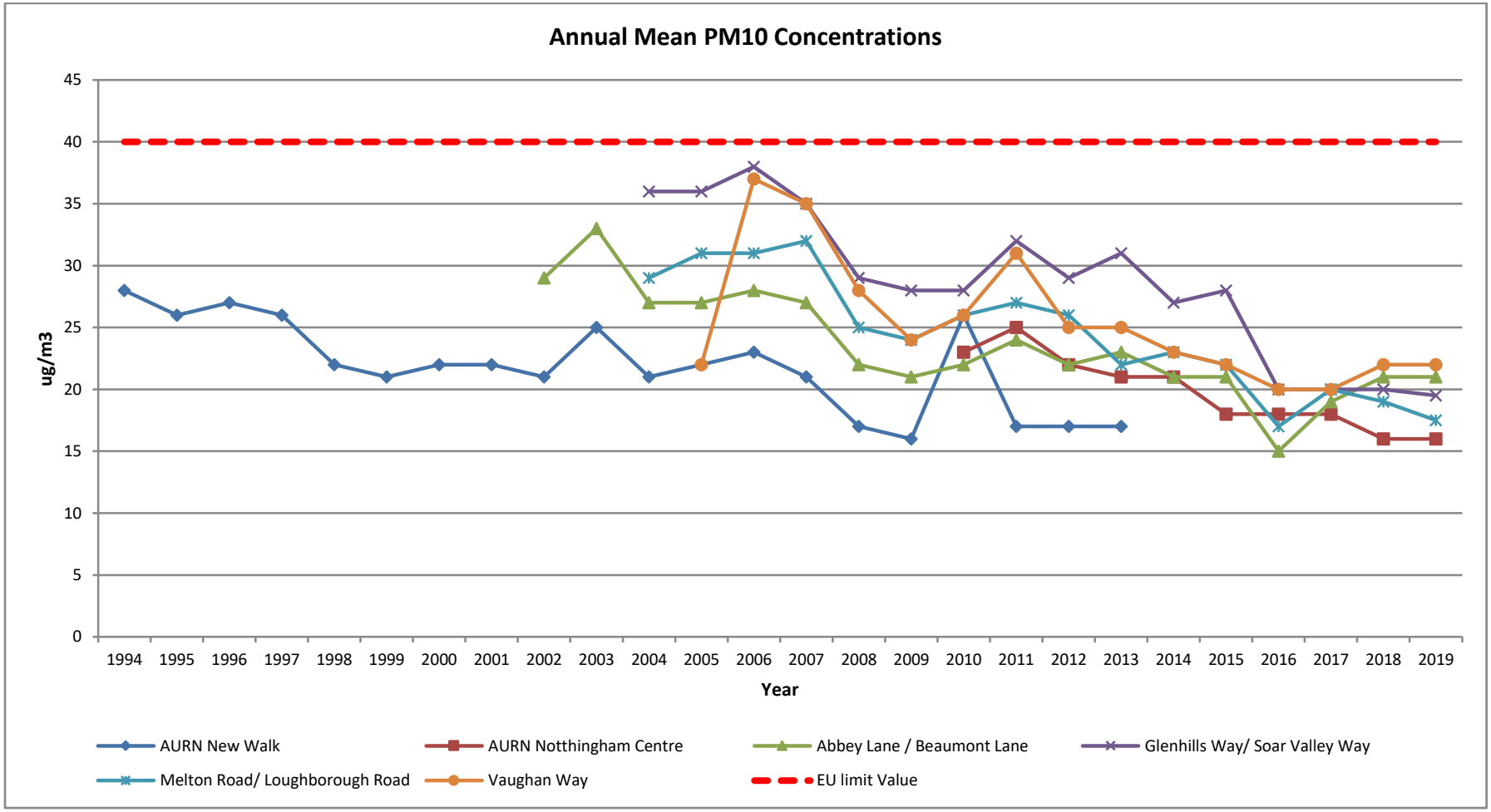


Table A.6 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
						2015	2016	2017	2018	2019
AL	458574	306885	Roadside	N/A	98	0 (8 in total)	0	0 (5 in total)	0 (8 in total)	**0 (10 in total)**
GW	457083	300156	Roadside	N/A	99	0 (9 in total)	0 (4 in total)	0 (2 in total)	0 (9 in total)	**0 (8 in total)**
MR	459528	306316	Roadside	N/A	95	0 (10 in total)	0	0 (2 in total)	0 (10 in total)	**0 (5 in total)**
VW	458507	304904	Roadside	N/A	99	0 (8 in total)	0 (1 in total)	0 (1 in total)	0 (8 in total)	**0 (11 in total)**

Notes:

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

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

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

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

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

No exceedances were observed

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	$PM_{2.5}$ Annual Mean Concentration ($\mu g/m^3$) (3)				
						2015	2016	2017	2018	2019
AURN University of Leicester	459178	302808	Urban Background	N/A	98	13	12	11.5	10.4	11

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

Notes:

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

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

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

Figure A.5 – Trends in Annual Mean $PM_{2.5}$ Concentrations

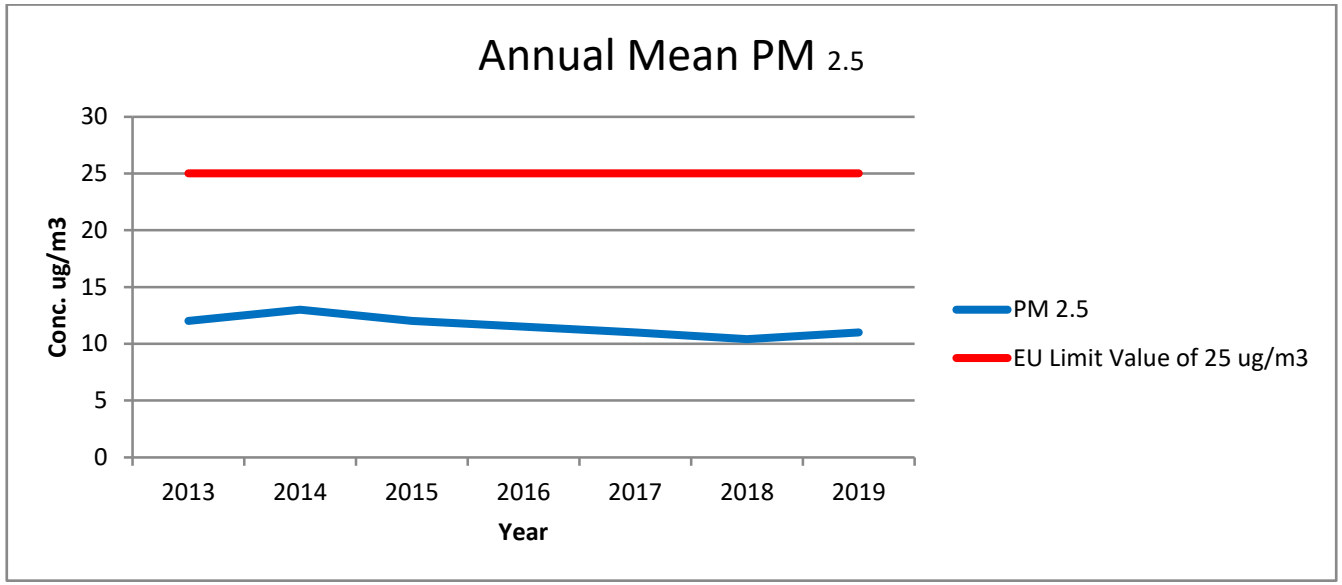


Table A.8 – SO_2 Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for monitoring Period (%) [1]	Valid Data Capture 2019 (%) [2]	Number of Exceedances 2019 (percentile in bracket) [3]		
						15-minute Objective (266 µg/m^3)	1-hour Objective (350 µg/m^3)	24-hour Objective (125 µg/m^3)
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Notes:

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

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

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

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

Figure A.6 – Trends in SO_2 Concentrations

No monitoring was undertaken

Appendix B: Full Monthly Diffusion Tube Results for 2019

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations ($\mu g/m^3$)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (factor) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
LCC1	456672	307669	40.2	36.6	35.9	39.6	38.4	42.0	40.9	46.3	43.3	44.3	34.4	34.6	39.7	32.6	0
LCC2	459165	300271	33.8	28.9	25.7	26.9	31.0	30.3	26.4	29.2	29.1	49.1	22.6	32.1	30.4	24.9	0
LCC3	458260	307900	49.9	35.3	36.9	38.2	41.9	42.7	40.7	49.6	40.5	42.5	42.6	38.8	41.6	34.1	0
LCC4	457244	305572	45.4	32.4	28.9	34	38.2	40.3	42.6	42.1	41.7	46.5	39.3	I/S	39.2	32.2	0
LCC5	455578	306395	46.5	40.2	43.2	41.9	43.6	41.2	39	50.3	38.5	55.8	44.4	42.5	43.9	36.0	0
LCC6	455825	307676	41.2	39.2	43.3	47.7	50	44.8	40.6	50.3	43.1	50	25.7	41.4	43.1	35.3	0
LCC7	455647	305825	47.7	35.8	29.5	34.7	33.4	32.3	38.3	40.2	36.2	47.8	45.1	40.6	38.5	31.5	0
LCC8	455917	304892	34.8	20.2	18.8	20.8	19.9	21.1	21.2	31.2	28.8	35.4	31.1	32.7	26.3	21.6	0
LCC9	455082	304761	44.8	31.3	28.9	32.8	31.3	31.8	35.7	39.4	36.9	47.5	40.7	39.6	36.7	30.1	0
LCC11	456230	304273	35.7	30.5	28.4	31.5	30.6	31.3	31	38.8	33.4	42.5	40.3	38.3	34.4	28.2	0
LCC12	457474	301061	39.6	28.5	24	31.8	31.7	29.6	34.8	42.4	37.9	35.6	44.8	42.8	35.3	28.9	0
LCC14	457210	304276	36	20.8	24.6	24.7	24.7	24.6	25.8	30.5	29.7	39.7	33.2	30.8	28.8	23.6	0
LCC15	457690	303783	57.5	38.7	46.8	44.3	45.7	45.2	45.8	47.3	54.5	51	42.1	40.9	46.7	38.3	0
LCC16	461014	301043	I/S	85.1	50.9	27.7	29.4	28.8	25.4	31.9	31.7	46.4	35.1	36.6	39.0	32.0	0

LCC17	456380	302193	36.2	27	25.7	23.5	26.8	26.8	26.7	33.1	37.7	44.6	32.4	34.6	31.3	25.6	0
LCC18	456754	302259	44	30.7	33.8	35.1	33.6	33	41.6	39.7	42.6	41.5	40.7	42.5	38.2	31.4	0
LCC19	457667	303460	57.6	38.2	38.2	41.9	43	48	48.9	49.8	50.6	57	50.3	56.7	48.4	39.6	0
LCC20	459196	303882	39.4	25.8	36.6	27.3	30.3	25.1	22.8	31.9	35.7	51.7	I/S	36.9	33.0	27.1	0
LCC21	459431	304564	46.1	26.5	26	28.5	33.6	32.4	29.1	38.3	42.5	52.9	40.8	46.3	36.9	30.3	0
LCC22	457869	300085	38.1	30.1	34	33	32.6	31.9	29.3	34.6	31.9	47.4	28.9	35	33.9	27.8	0
LCC23	459367	302117	49.3	39	29.9	40.9	40.8	42.5	44	46.2	36.5	54.2	47	50.8	43.4	35.6	0
LCC24	458542	302023	34.3	22.1	I/S	28.5	28	26.8	29	29.9	33.5	43.8	34.6	29.4	30.9	25.3	0
LCC25	459703	301072	36.7	23.2	24.6	20.7	21.9	24	18.1	25.5	31.3	35.4	27.9	31.3	26.7	21.9	0
LCC26	461307	301478	38.9	29	29.3	30.1	30.9	30.4	31.2	37	34.4	43.2	31.7	36.7	33.6	27.5	0
LCC27	460134	303093	45.8	34.8	37.9	39.6	39.8	39.4	39.7	48.3	40.5	49.1	43.8	40	41.6	34.1	0
LCC28	463282	304552	31.7	21.1	24.9	19.2	20.6	19	15	23.2	24.2	36.3	24.5	27.8	24.0	19.6	0
LCC29	462891	305329	39.6	22.9	22.6	25.7	25.8	26.7	26.4	30.6	31.7	44.3	34.8	I/S	30.1	24.7	0
LCC30	461806	305323	48.7	43	31.8	38.3	41.7	39.7	45.3	42.7	42.9	49.8	44	47.4	42.9	35.2	0
LCC31	461596	304989	40.3	31.5	26.5	28	29.3	30	31.5	36.1	36.7	37.5	37	39.7	33.7	27.6	0
LCC32	460441	305322	44.2	30.4	37.6	38.1	44.8	42.4	I/S	47.4	48.5	48.6	44.9	I/S	42.7	35.0	0
LCC33	458749	307184	52.2	33.8	28.1	31.2	30.2	31.6	35.1	39.8	45	51.9	49.2	47.7	39.7	32.5	0
LCC34	460010	307324	38.1	23.5	28.4	27.2	26.4	25.8	27.6	32.3	35.5	42.6	35.3	31.7	31.2	25.6	0
LCC35	458099	305184	51.7	34.8	36	31.9	33.3	35.5	34	41.7	46.2	51.4	49.3	46.7	41.0	33.7	0
LCC36	458267	304623	62.2	43	59.2	61.2	59.9	58.2	63	70.1	I/S	I/S	74.7	54.4	60.6	**49.7**	0
LCC37	458182	304400	52.7	43.4	34.2	46.1	43.9	43.3	48.3	49.5	48.4	54.3	46.9	45.6	46.4	38.0	0
LCC38	461558	306508	42.1	27	20.6	25.2	21.6	23.5	I/S	29.4	I/S	I/S	36.2	33.5	28.8	24.6	0
LCC40	460460	308234	49.1	30.8	31.3	30.9	31.3	34.2	38.7	39.1	42.6	34.8	45.6	43	37.6	30.8	0
LCC41	460865	307949	45.8	32.2	24.5	30.9	33.2	38	43.4	40.7	40.2	48.5	40.1	46.5	38.7	31.2	0
LCC42	460678	306582	47.2	I/S	I/S	I/S	31.2	29.6	32.6	35.7	37.2	40.1	37.4	41.6	37.0	29.5	0
LCC43	459304	307385	44.3	26.6	33.6	34.4	35.6	33.1	31.4	I/S	44.3	50.6	35.1	40.5	37.2	30.5	0

LCC44abc	459185	302812	33.5	23.6	20.7	24.9	22.1	20.5	23.9	29.8	31.8	33.8	35.8	34.1	27.9	22.7	0
LCC45	457596	310078	I/S	20.4	16.6	16.7	14.6	18.3	21.7	22	24.4	28.9	25.5	29	21.6	17.7	0
LCC46	464058	305532	29.2	17.9	20	20.4	18.7	19.7	17.6	I/S	23.5	34.3	24.1	29	23.1	19.0	0
LCC47abc	458507	304904	66	37.1	34.2	48.9	46.8	48.3	57.1	51.9	61.5	62.3	56.9	61	52.7	**42.8**	0
LCC48	461577	302746	35.2	20	21.4	23	26	I/S	I/S	I/S	29.4	41.7	31.3	38	29.6	22.8	0
LCC49	457472	310229	28.4	16.3	15.6	14.1	14.6	15.8	16.8	20.1	19.9	33.8	24.2	25.8	20.5	18.0	0
LCC50	456269	307062	32.2	25.1	29.4	24.9	27.6	20.5	19.6	28.1	31.5	34.5	26.7	I/S	27.3	22.4	0

☒ **Local bias adjustment factor used**

☐ **National bias adjustment factor used**

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

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

Notes:

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

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

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

(2) Distance corrected to nearest relevant public exposure.

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

Links to air quality data and AQAP:

1) "Healthier Air for Leicester" Leicester's Air Quality Action Plan (2015-2026)

https://www.leicester.gov.uk/media/180653/air-quality-action-plan.pdf

2) Nitrogen dioxide hourly mean summary table 1994-2018

https://www.leicester.gov.uk/media/179304/nitrogen-dioxide-hourly-mean-summary-table-1994-2017.pdf

3) Nitrogen dioxide annual mean summary table 1994-2018

https://www.leicester.gov.uk/media/179307/nitrogen-dioxide-annual-mean-summary-table-1994-2017.pdf

4) PM_{10} 24hr mean summary table 1994-2018

https://www.leicester.gov.uk/media/179305/pm10-24-hour-mean-summary-table-1994-2017.pdf

5) PM10 annual mean summary table 1994-2018

https://www.leicester.gov.uk/media/179306/pm10-annual-mean-summary-table-1994-2017.pdf

Predicted NO_2 annual mean concentrations at nearest relevant public exposure

A) Glenhills Way

Site	Annual NO_2 mean concentrations ($\mu g/m^3$)		
	2017	2018	2019
AURN (urban background) University Road	26	23	24
Glenhills Way	**53**	**49**	**48.6**
Nearest relevant public exposure	**42.2**	38.6	38.8

B) Matthews Way

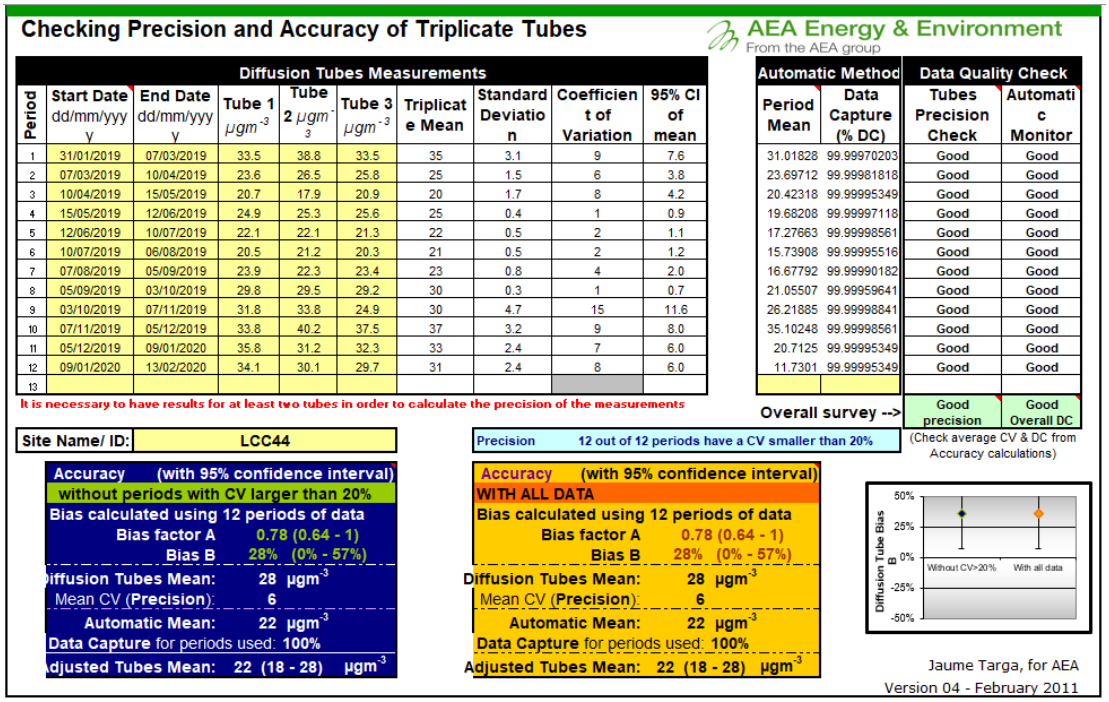
Site	Annual NO_2 mean concentrations ($\mu g/m^3$)		
	2017	2018	2019
AURN (urban background) University Road	26	23	24
St. Matthews Way	**44**	**41**	**40.6**
Nearest relevant public exposure	38.4	34.2	34.3

Data Capture of air quality stations

The data capture for all of the automatic air quality stations have been recorded as over 90% at all of the stations. It is within the limits set out by the Defra's Technical Guidance 2016 TG16. There were no major breakdowns of any of the stations recorded. Data capture and calibration has been carried out according to the Technical Guidance TG 16.

Bias Correction

Due to the inherent bias associated with passive NO_2 diffusion tubes, it is necessary to utilise an adjustment factor which can be applied to the monitoring dataset in order to calculate the concentration from the tube. The Local Bias Adjustment Factor Tool6, designed by AEA Technology on behalf of DEFRA, was used with monitoring data from the co-location sites (Vaughan Way and Leicester University AURN, to generate a combined local bias adjustment factor of 0.82 which was then utilised for bias correction, in accordance with LAQM.TG(16)



Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation	95% CI of mean
1	31/01/2019	07/03/2019	33.5	38.8	33.5	35	3.1	9	7.6
2	07/03/2019	10/04/2019	23.6	26.5	25.8	25	1.5	6	3.8
3	10/04/2019	15/05/2019	20.7	17.9	20.9	20	1.7	8	4.2
4	15/05/2019	12/06/2019	24.9	25.3	25.6	25	0.4	1	0.9
5	12/06/2019	10/07/2019	22.1	22.1	21.3	22	0.5	2	1.1
6	10/07/2019	06/08/2019	20.5	21.2	20.3	21	0.5	2	1.2
7	07/08/2019	05/09/2019	23.9	22.3	23.4	23	0.8	4	2.0
8	05/09/2019	03/10/2019	29.8	29.5	29.2	30	0.3	1	0.7
9	03/10/2019	07/11/2019	31.8	33.8	24.9	30	4.7	15	11.6
10	07/11/2019	05/12/2019	33.8	40.2	37.5	37	3.2	9	8.0
11	05/12/2019	09/01/2020	35.8	31.2	32.3	33	2.4	7	6.0
12	09/01/2020	13/02/2020	34.1	30.1	29.7	31	2.4	8	6.0
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor
31.01828	99.99970203	Good	Good
23.69712	99.99981818	Good	Good
20.42318	99.99995349	Good	Good
19.68208	99.99997118	Good	Good
17.27663	99.99998561	Good	Good
15.73908	99.99995516	Good	Good
16.67792	99.99990182	Good	Good
21.05507	99.99959641	Good	Good
26.21885	99.99998841	Good	Good
35.10248	99.99998561	Good	Good
20.7125	99.99995349	Good	Good
11.7301	99.99995349	Good	Good
Overall survey -->		Good precision	Good Overall DC

(Check average CV & DC from Accuracy calculations)

Site Name/ ID: LCC44

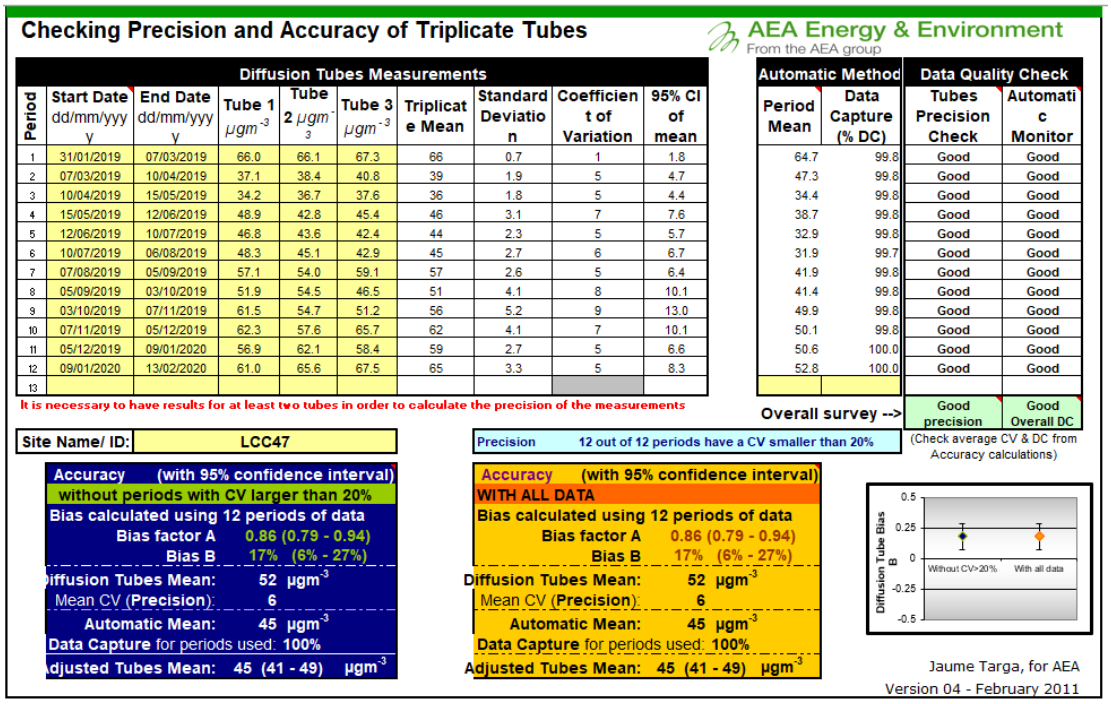
Precision: 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%
Bias calculated using 12 periods of data
Bias factor A: 0.78 (0.64 - 1)
Bias B: 28% (0% - 57%)
Diffusion Tubes Mean: 28 µgm^{-3}
Mean CV (Precision): 6
Automatic Mean: 22 µgm^{-3}
Data Capture for periods used: 100%
Adjusted Tubes Mean: 22 (18 - 28) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA
Bias calculated using 12 periods of data
Bias factor A: 0.78 (0.64 - 1)
Bias B: 28% (0% - 57%)
Diffusion Tubes Mean: 28 µgm^{-3}
Mean CV (Precision): 6
Automatic Mean: 22 µgm^{-3}
Data Capture for periods used: 100%
Adjusted Tubes Mean: 22 (18 - 28) µgm^{-3}

Jaume Targa, for AEA
Version 04 - February 2011

Co-location LCC44abc Local Bias Adjustment Factor Tool



Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation	95% CI of mean
1	31/01/2019	07/03/2019	66.0	66.1	67.3	66	0.7	1	1.8
2	07/03/2019	10/04/2019	37.1	38.4	40.8	39	1.9	5	4.7
3	10/04/2019	15/05/2019	34.2	36.7	37.6	36	1.8	5	4.4
4	15/05/2019	12/06/2019	48.9	42.8	45.4	46	3.1	7	7.6
5	12/06/2019	10/07/2019	46.8	43.6	42.4	44	2.3	5	5.7
6	10/07/2019	06/08/2019	48.3	45.1	42.9	45	2.7	6	6.7
7	07/08/2019	05/09/2019	57.1	54.0	59.1	57	2.6	5	6.4
8	05/09/2019	03/10/2019	51.9	54.5	46.5	51	4.1	8	10.1
9	03/10/2019	07/11/2019	61.5	54.7	51.2	56	5.2	9	13.0
10	07/11/2019	05/12/2019	62.3	57.6	65.7	62	4.1	7	10.1
11	05/12/2019	09/01/2020	56.9	62.1	58.4	59	2.7	5	6.6
12	09/01/2020	13/02/2020	61.0	65.6	67.5	65	3.3	5	8.3
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor
64.7	99.8	Good	Good
47.3	99.8	Good	Good
34.4	99.8	Good	Good
38.7	99.8	Good	Good
32.9	99.8	Good	Good
31.9	99.7	Good	Good
41.9	99.8	Good	Good
41.4	99.8	Good	Good
49.9	99.8	Good	Good
50.1	99.8	Good	Good
50.6	100.0	Good	Good
52.8	100.0	Good	Good
Overall survey -->		Good precision	Good Overall DC

(Check average CV & DC from Accuracy calculations)

Site Name/ ID: LCC47

Precision: 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%
Bias calculated using 12 periods of data
Bias factor A: 0.86 (0.79 - 0.94)
Bias B: 17% (6% - 27%)
Diffusion Tubes Mean: 52 µgm^{-3}
Mean CV (Precision): 6
Automatic Mean: 45 µgm^{-3}
Data Capture for periods used: 100%
Adjusted Tubes Mean: 45 (41 - 49) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA
Bias calculated using 12 periods of data
Bias factor A: 0.86 (0.79 - 0.94)
Bias B: 17% (6% - 27%)
Diffusion Tubes Mean: 52 µgm^{-3}
Mean CV (Precision): 6
Automatic Mean: 45 µgm^{-3}
Data Capture for periods used: 100%
Adjusted Tubes Mean: 45 (41 - 49) µgm^{-3}

Jaume Targa, for AEA
Version 04 - February 2011

Co-location LCC47abc Local Bias Adjustment Factor Tool

Annualisation

Diffusion tube sites LCC38, LCC42 and LCC48 each have 3 months of missing data (i.e. data capture of 75%). The results from these sites have been annualised to

represent a full annual data capture based upon the methodology contained within LAQM.TG(16)**Error! Bookmark not defined.**. The approach is based on the principle that patterns in pollutant concentrations are usually consistent across broad regions and therefore considers the relationship between period means and annual means at monitoring stations in the same region as the site of interest. LAQM.TG(16)**Error! Bookmark not defined.** stipulates that background sites should be used to avoid any local effects that may occur at roadside sites, and should, wherever possible lie within a radius of about 50 miles. Table below presents four Defra AURN background monitoring locations, which are within 50 miles of the site, and the annual mean NO2 concentrations measured between the start and end date of the twelve-month monitoring survey.

Urban background monitoring sites are characterised as urban locations distanced from sources and broadly representative of city-wide background concentrations. Rural background sites are sites where the sampling point is not influenced by agglomerations or industrial sites in its vicinity. Data from these sites is considered by LAQM.TG(16)**Error! Bookmark not defined.** to be suitable for the adjustment of short-term diffusion tube monitoring survey results to annual mean concentrations.

Automatic Monitoring Sites used for Annualisation

Coventry Allesley	430011	279376	Urban Background	20.0	100
Leamington Spa	431943	265733	Urban Background	17.2	100
Leicester University	459178	302808	Urban Background	21.7	100
Nottingham Centre	457440	340047	Urban Background	27.1	100

The relationship between the period mean and annual mean for the three diffusion tube sites annualised are shown in the tables below. The period mean is the average concentration measured at the automatic site during the same period that the diffusion tubes were exposed for (i.e. not including the data for the months where diffusion tube results are missing).

Diffusion tube site LCC38 was missing monitoring results for exposure periods 7, 9 and 10. The calculated annualisation factor is displayed below in table below

LCC38 Annualisation Factor

Leicester University	20.3	98.8	1.07
Coventry Allesley	19.4	99.0	1.03
Leamington Spa	16.3	96.5	1.05
Nottingham Centre	26.8	97.9	1.01
		Annualisation Factor	**1.04**

Diffusion tube site LCC42 was missing monitoring results for exposure periods 2, 3 and 4. The calculated annualisation factor is displayed below in table below.

LCC42 Annualisation Factor

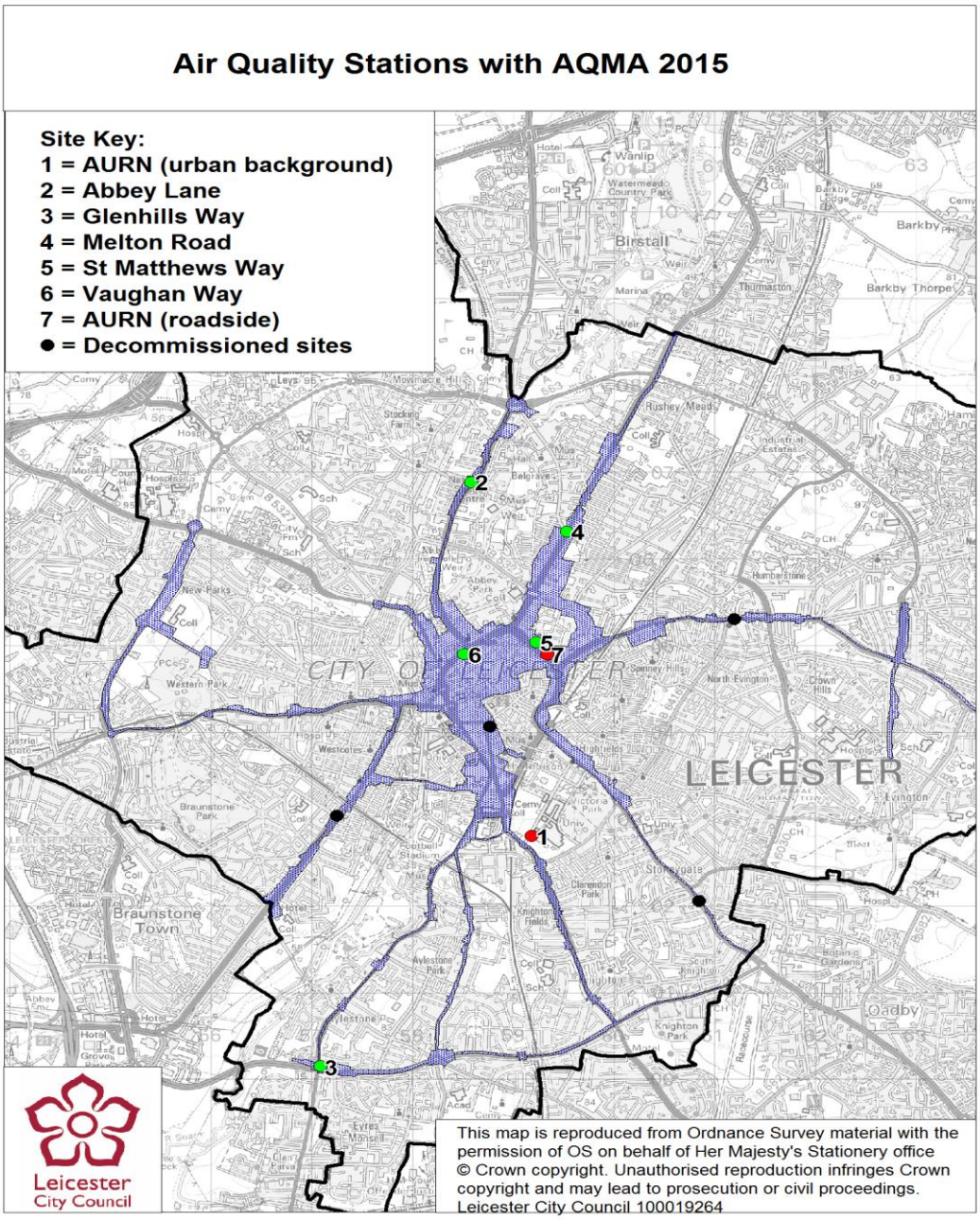
Leicester University	21.7	98.9	1.00
Coventry Allesley	20.8	98.9	0.96
Leamington Spa	18.0	96.4	0.96
Nottingham Centre	27.9	97.9	0.97
		Annualisation Factor	**0.97**

Diffusion tube site LCC48 was missing monitoring results for exposure periods 6, 7 and 8. The calculated annualisation factor is displayed below in table below.

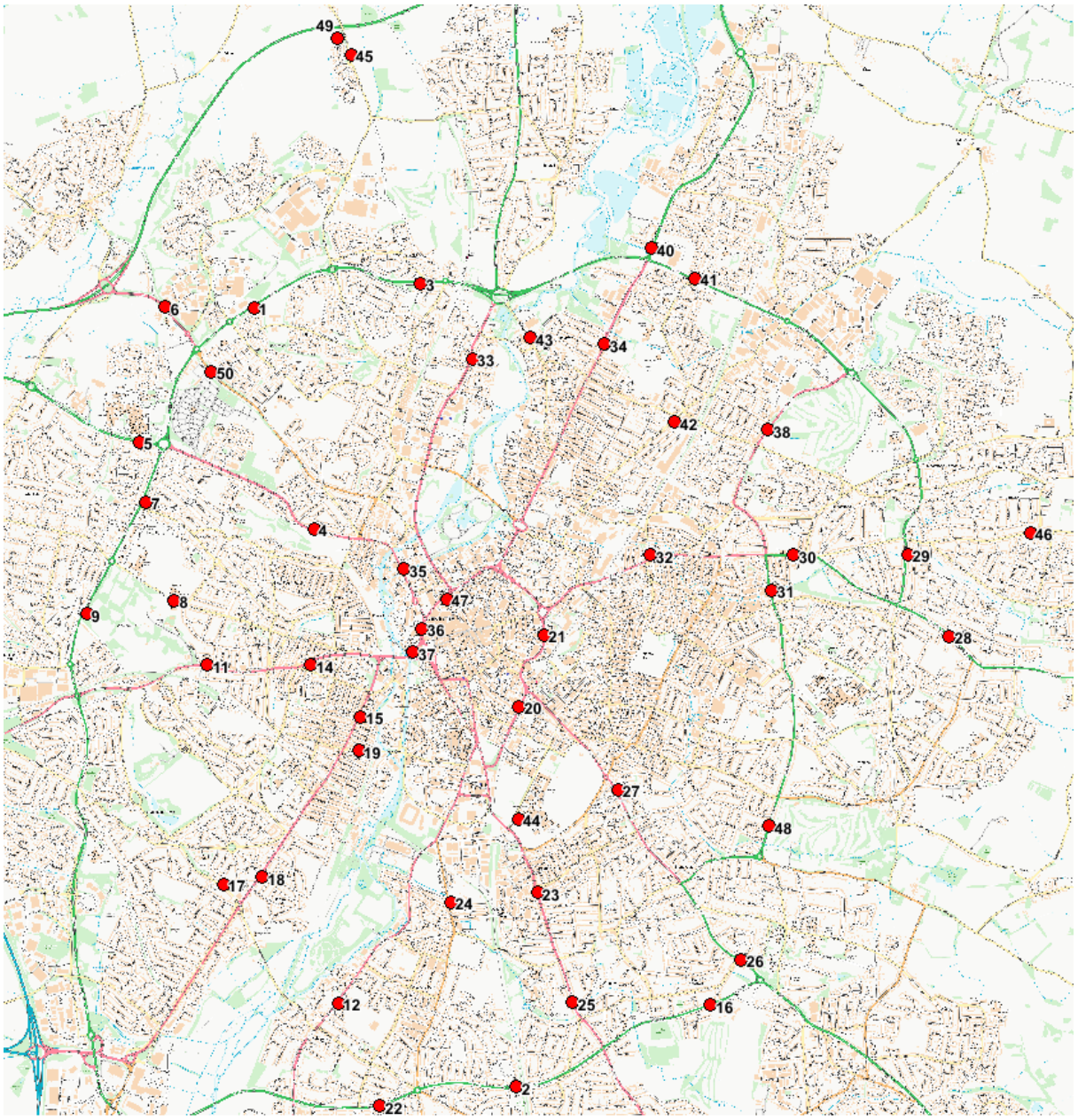
LCC48 Annualisation Factor

Leicester University	22.7	99.3	0.96
Coventry Allesley	21.4	99.1	0.94
Leamington Spa	18.6	95.9	0.92
Nottingham Centre	28.7	98.0	0.94
		Annualisation Factor	**0.94**

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



Map of Fifty Diffusion Tubes Network in Leicester



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[7]	
	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

[7] The units are in micrograms 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	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
ERDF	European Regional Development Fund
LAQM	Local Air Quality Management
LCC	Leicester City Council
LTP	Local Transport Plan
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

1) http://www.leicester.gov.uk/health-and-social-care/public-health

2) https://www.leicester.gov.uk/your-council/policies-plans-and-strategies/environment-and-waste/environmental-policy/

3) https://www.leicester.gov.uk/media/180653/air-quality-action-plan.pdf