# 2018 Air Quality Annual Status Report (ASR) for Broxtowe Borough Council

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

June 2018

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| Report Reference number | BBC/AQ/ASR/2018 |
| Date | June 2018 |

# Executive Summary: Air Quality in Our Area

## What is Air Pollution and where does it come from?

Air pollution is generally defined as any type of particulate (dust) or gaseous substance (e.g. Oxides of Nitrogen) that is emitted into the atmosphere due to the combustion of fuels such as coal, oil, gas, petrol, diesel and the burning of wood or natural gas from domestic central heating boilers or power stations. When these fuels are combusted they are emitted into the atmosphere and they affect the air quality within the United Kingdom (UK).


Source - Air Quality: A Briefing for Directors of Public Health, March 2017
https://laqm.defra.gov.uk/assets/63091defraairqualityguide9web.pdf

Poor air quality can affect people's health on a daily basis and can also result in premature death. Therefore, it is imperative that poor air quality is recognised as a public health issue and that continual measures are taken to improve the air quality even if the air quality objectives in the UK are being met.

The two main types of air pollution within the United Kingdom are Nitrogen Dioxide ($NO_2$) and Particulate Matter ($PM_{10}$ and $PM_{2.5}$), therefore this report will explain the effects of these pollutants on health, the concentration levels within the Borough of Broxtowe and measures that have been, and will be taken to improve the air quality within the Borough.

## What is Nitrogen Dioxide?

Nitrogen Dioxide is a reddish brown gas with the chemical formula $NO_2$. Nitrogen Monoxide is a colourless gas with the chemical formula NO. Collectively $NO_2$ and NO are known as Oxides of Nitrogen which chemical formula is NOx.

As mentioned previously NOx is normally emitted into the atmosphere due to the combustion of fuels such as coal, oil, gas, petrol, diesel and the burning of wood or as natural gas from domestic central heating boilers or power stations.

Some sources of NOx release NOx in the form of $NO_2$ into the atmosphere, these are known as primary sources of $NO_2$ which are mainly emitted from vehicle exhausts. It was previously believed that it was petrol vehicles that were the main source of $NO_2$ however the use of diesel particulate filters within the exhaust systems of diesel vehicles have resulted in high concentrations of $NO_2$ being emitted into the atmosphere.

Another source of $NO_2$ in the atmosphere is due to a chemical reaction in the atmosphere between NO and Ozone ($O_3$). This is classed as a secondary source of $NO_2$. However, if concentrations of $O_3$ are low near to the source of NO then $NO_2$ will not be formed.

## What is Particulate Matter?

Particulate matter is the term used for a mixture of solid particles and/or liquid droplets within the air. Particulate matter varies in size with some particles being easily visible to humans e.g. dust, soot, smoke and vapour from domestic boiler flues. However some particles are so small that they cannot be seen with the naked eye and it is these particles that are easily absorbed deep into the lungs and cannot

be expelled when they are breathed in. Research has shown that there is significant harm to health at concentrations of Particulate Matter well below the current EU and UK limit values. (See Appendix I for the Air Quality Objectives for the UK).

There are many sources of particulate matter in the United Kingdom, examples of these are:

- Vehicle exhausts
- The wearing of brake pads, tyres and asphalt
- Rust from vehicles
- Poor fuel combustion
- Dust from demolition and building sites
- Bonfires and inefficient burning of solid fuel e.g. wood.

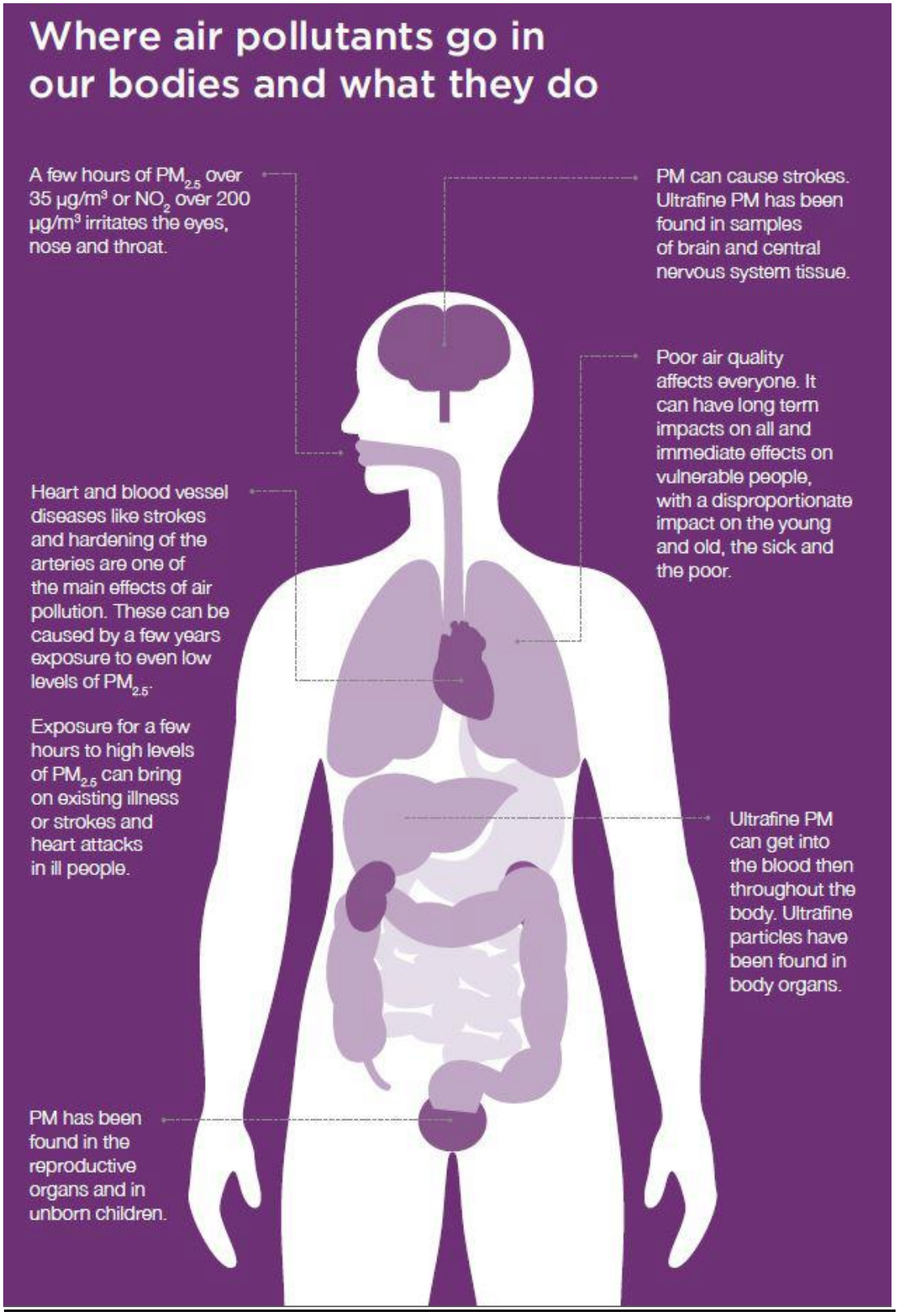
Within the United Kingdom the main particulate matter that causes concern is particulates that are classed as 'fine particles' ($PM_{2.5}$) or 'inhalable coarse particles' ($PM_{10}$). The particles are measured in size and referred to as microns (µm). $PM_{10}$ are particles that are 10 microns to 2.5 microns in size, and $PM_{2.5}$ are particles that are 2.5 microns or less.

## What are the Health Effects of Poor Air Quality?

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].

[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




Source - Air Quality: A Briefing for Directors of Public Health, March 2017
https://laqm.defra.gov.uk/assets/63091defraairqualityguide9web.pdf

## Health Effects of Nitrogen Dioxide

The main health effect of breathing in raised levels of Nitrogen Dioxide is the increased likelihood of respiratory problems, as Nitrogen Dioxide inflames the lining

of the lungs, and it can reduce immunity to lung infections. This can cause problems such as wheezing, coughing, colds, flu and bronchitis and can exasperate pre-existing conditions like asthma and Chronic Obstructive Pulmonary Disease.

## Health Effects of Particulate Matter

The health effects associated with short term and long term exposure to particulate matter are; exacerbation of asthma, effects on lung function, increases in hospital admissions for respiratory and cardiovascular conditions, and also increases in mortality[4]. Public Health England has produced estimates of the risk of mortality from particulates for all local authorities in the United Kingdom. The estimates are based on the researched evidence of mortality risk combined with modelled levels of background air pollution to which populations are exposed to at each local authority. Table i provides the results for the East Midlands, Nottingham City, Nottinghamshire County and Broxtowe Borough Council.

**Table i – Estimated Effects of Annual Mortality in 2015 of human-made $PM_{2.5}$ Air Pollution.**

| Area | Attributable fraction | Attributable * Deaths aged 30 and over | Associated life-years lost |
|---|---|---|---|
| East Midlands | 5.1 | 2,266 | 27,189 |
| Nottingham City | 5.3 | 127 | 1,525 |
| Nottinghamshire County | 5.0 | 410 | 4,914 |
| **Broxtowe Borough Council** | **5.2** | **58** | **691** |

**Source**: Estimating Local Mortality Burdens associated with particulate air pollution, PHE, 2014.

*Air pollution is likely to contribute a small amount to the deaths of a larger number of exposed individuals rather than being solely responsible for the number of deaths equivalent to the calculated figure of attributable deaths.

[4]Gowers, A.M. et al Estimating Local Mortality burdens associated with Particulate Air Pollution, Public Health England, 2014.

Although the figures in Table i show that in Broxtowe Borough Council there are believed to be 58 deaths attributable to human-made air pollution, this figure needs to be put into context as deaths that are attributable to smoking and alcohol consumption are far higher. For example Nottingham City had 127 deaths attributable to human-made air pollution, but there are 401 deaths attributable to smoking[5] and 143 deaths related to alcohol consumption[6].

However, as previously mentioned in this report it must be noted that research has shown that there is significant harm to health at concentrations of Particulate Matter well below the current EU and UK limit values.

## Air Quality in the Borough of Broxtowe

The main air quality issue within the Borough is due to the M1 and the A52 which is the main road that connects Nottingham to Derby and is used heavily by commuters. Residential properties are situated alongside the M1 and the A52.

The main pollutant of concern within the Borough is Nitrogen Dioxide which is emitted from vehicle exhausts and is prevalent in areas where there are congested roads. However, it must also be noted that ambient background levels are affected by emissions from domestic heating e.g. Oxides of nitrogen from boilers and particulate matter from solid fuel burners.

Broxtowe Borough Council participates in the United Kingdom Nitrogen Dioxide diffusion tube network and has 43 diffusion tubes sites throughout the Borough. The sites are primarily monitoring the M1 corridor and the A52. Some of the diffusion tubes are sited within and near to the existing Air Quality Management Area (AQMA), which is situated in Trowell. Monitoring is still being undertaken in the three revoked AQMAs to ensure that the concentrations remain below the air quality objective. Further information of the AQMA is discussed in Chapter 2.1 of this report.

[5] Tobacco Control Profiles 2014-2016, Public Health England. http://fingertipsreports.phe.org.uk/health-profiles/2017/e06000018.pdf
[6] Local Alcohol Profiles for England, 2016. https://fingertips.phe.org.uk/profile/local-alcohol-profiles/data#page/4/gid/1938132832/pat/6/par/E12000004/ati/102/are/E06000018/iid/91382/age/1/sex/4

The 2017 nitrogen dioxide results show that the air quality levels are below the objective of 40µg/$m^3$ for all of the monitoring locations throughout the Borough. The results are discussed in greater detail in Chapter 3.2.1 of this report.

In January 2016 the $NO_2$ monitoring sites increased to 43 sites and only 15 of these sites were in use before 2016. In January 2017, 2 of the original sites were discontinued and 10 of the 13 original sites are showing a downward trend in $NO_2$ levels. 1 site has stayed the same and the remaining 2 sites have shown a slight increase. The trends are discussed in greater details on Chapter 3.2.1 of this report and Appendix C contains the trend graphs for the 13 sites.

In respect of particualtes, the modelled background level provided by Defra for the Borough of Broxtowe is predicted to be between 9µg/$m^3$ and 12µg/$m^3$ for 2017, with the annual mean for 2017 being 10µg/$m^3$. The World Health Organisation (WHO) guideline level for $PM_{2.5}$ is 10µg/$m^3$.

Broxtowe Borough Council has a close working relationship with Highways England and Nottinghamshire County Council Highways Department. Highways England manages the M1 Motorway and the A52 which run through the Borough. Nottinghamshire County Council Highways Department manage the remaining roads that run through the Borough; this includes the A610/B600 Nuthall Roundabout.

The Council works with Highways England and Nottinghamshire County Council by continuing to monitor air quality levels throughout the Borough, to inform them of any changes to the air quality levels, to provide maps of the air quality management areas and to provide yearly air quality reports. By working together actions are implemented where possible to ease congestion by maintaining a steady flow of traffic throughout the Borough and to also promote sustainable travel.

The Environmental Health team at Broxtowe Borough Council also works closely with the Environment Agency who attends the Nottinghamshire Environmental Protection Working Group meetings and colleagues in the Planning department at the Council. This ensures that air quality issues are raised and considered throughout the planning process.

# Actions to improve Air Quality

Below is a brief summary of the core actions to target sources of pollution in the Borough of Broxtowe over the past year.

- Marketing and promotion of sustainable transport alternatives – both the County Council and Broxtowe Borough Council continue to develop and deliver programmes to encourage more sustainable travel. These include infrastructure improvements such as the County Council's integrated transport programme delivering improvements for pedestrians, cyclists and bus users; as well as marketing materials and campaigns developed in partnership with stakeholders such as passenger transport operators
- Go-Ultra Low programme – the County Council, in partnership with Nottingham and Derby City Councils, successfully secured £6.1m of funding to deliver the Go-Ultra Low programme between 2016 and 2021. The programme includes the development and delivery of an area-wide electric vehicle charging infrastructure network; and during 2017 the partnership procured a preferred delivery partner of the charging infrastructure. Work is now underway to identify a feasible network across the Derbyshire/Nottinghamshire area
- Retrofitting of buses – In February 2018 it was announced that the County Council (and Nottingham City Council) had successfully secured funding from the Green Technology Fund to retrofit some of the most polluting buses in the County – including a number of buses that travel in the Borough. Work is now underway to retrofit the identified vehicles
- Traffic signal improvements – All traffic signalling equipment at A610 Nuthall Island was replaced during 2017/18; with the installation of additional traffic monitoring cameras and advanced remote control systems to enable reactive and pro-active interventions to improve traffic flows. A review of the signal timings and linking at the signal junction was also undertaken.
- Personal travel planning with Beeston residents- which resulted in a 5% reduction of journeys to work by car amongst participants
- Effective network management – the County Council continues to work with stakeholders to effectively manage its highway network. Along with the co-

ordination of works, contingency planning, and effective event and incident planning , the County Council has purchased an additional camera enforcement car to effectively enforce parking violations

- Workplace Travel Plans – Broxtowe Borough Council and Nottinghamshire County Council have completed a council travel plan to determine which modes of transport are suitable. Travel Plans are also developed with businesses through the development control process.
- Joint Strategic Needs Assessment - Air Quality is now a chapter in the Joint Strategic Needs Assessment and it is part of the Health and Wellbeing Board Considerations.

Further information on these core actions and progress on grant funded projects are discussed in greater detail in Table 2.2 of this document.

## Conclusions and Priorities

The 2017 nitrogen dioxide results show that the air quality levels are below the objective of 40µg/$m^3$ for all of the monitoring locations throughout the Borough including the AQMA. Although the objectives are being met it is very important to continue to improve air quality within the UK as poor air quality is a public health concern.

Therefore to continue to improve the air quality in the Borough the priorities for Broxtowe Borough Council in addressing air quality for the coming year are to:

- Review the $NO_2$ diffusion tubes network annually, discontinue sites where the annual air quality levels are comfortably below the objective, and relocate them to new sites within the Borough. Extensive monitoring will allow Broxtowe Borough Council to identify and focus on 'problem' areas.
- Continue to reduce the levels of $NO_2$ in the Borough by working with Highways England and Nottinghamshire County Council.
- Continue to be a member of the East Midlands Air Quality Network (EMAQN), to liaise with colleagues in Public Health and other local authorities.
- Continue to promote the final version of the "EMAQN Air Quality and Emissions Mitigation: guidance for developers" document.

- Continue to be a member of the Nottinghamshire Environmental Protection Working Group, and to liaise with colleagues in Public Health and the Health and Wellbeing Boards (Nottingham City and Nottinghamshire County) to ensure that Air Quality continues to be included in the Joint Strategic Needs Assessment for the County and any future work that involves air quality issues.
- Engage with the public about air quality and raise awareness of the health effects of air quality.
- Continue to provide the public, companies and businesses within the Borough with methods that they can use to improve air quality for themselves and also the health of their employees.
- Continue to promote green travel e.g. walking, cycling by providing leaflets.
- Continue to support bus companies and taxis that operate within the Borough to reduce emissions.
- Continue to review suitable research methods for reducing air quality levels for both $NO_2$ and particulate matter.
- Ensure that the new Nottinghamshire Air Quality Strategy when completed is promoted and used once more as a valuable working document.
- Review Broxtowe Borough Councils Air Quality Action Plan and update the document to ensure that it is still relevant and that the measures are suitable to reduce air quality within the Borough.
- Pending a Planning Policy Review in 2019, Environmental Health is continuing to liaise with the Planning Department at BBC about the installation of Electric Vehicle Charging Points on future large commercial or large housing developments within the Borough. This is to promote sustainable travel.
- Continue to attend regional HS2 meetings to ensure that suitable mitigation measures are made during the construction phase and when HS2 is operational.

One of the challenges associated with addressing the air quality in the Borough is that the main source of the air quality problem is the M1 Motorway, which is managed by Highways England and is not under the control of Broxtowe Borough Council. Although Broxtowe Borough Council have a close working relationship with Highways England it is unable to impose or make any changes to the M1 to improve the air quality within the neighbouring residential areas. However, Highways England has undertaken projects at great expense in the past to improve the air quality within the Borough e.g. widening scheme and Smart Motorway scheme.

Apart from the M1 and the A52 all of the roads within the Borough are managed by Nottinghamshire County Council who manages the traffic flows, repairs, diversions etc. There are several challenges associated with this. The first challenge is that Broxtowe Borough Council is unable to impose or make any changes to the structure or flow of the roads. The second challenge is that the allocated County Council integrated transport funding has been reduced by approximately £3.5m from 2015/16 onwards. This significantly reduces the funding available for transport improvements that will deliver air quality improvements.

The cessation of the Local Transport Fund funding in March 2016 and the Department for Transport's decision to not award Sustainable Transport Transition Year Funding 2016/17 to the D2N2 area bid also means that several of the proposed actions in the action plan will be delayed further until such time as funding becomes available from Central Government.

A lack of funding and resources is also a challenge that Broxtowe Borough Council face in trying to address the air quality in the Borough. The lack of resources/funding does not allow the monitoring of $PM_{10}$ and $PM_{2.5}$ within the Borough as the equipment is expensive to buy and also maintain. However although monitoring is not carried out, there are measures that are enforced in the Borough which would reduce airborne particulates, see Chapter 2.3 in this report for further information.

## Local Engagement

Since the 2017 Annual Status Report (ASR) Broxtowe Borough Council (BBC) has continued to be in the East Midlands Air Quality Network (EMAQN), who review current air quality issues for the area. EMAQN has collectively produced a report to assist local authorities and developers when determining whether an air quality assessment is needed during the planning application process. The aim of EMAQN is to engage decision makers from different disciplines to assist in reducing AQ levels as a whole in the East Midlands. This also enables neighbouring counties to communicate more openly, which is vital for BBC due to it being next to Derbyshire because the A52 is a major source of air pollution which runs through Derbyshire and Nottinghamshire. Defra have identified Derby and Nottingham as exceeding the air quality objective therefore they are mandated to implement a Clean Air Zone (CAZ). EMAQN is run by Public Health England.

## How to Get Involved

Residents and Businesses living or working in Nottinghamshire can improve the air quality in the area by taking simple measures. One of the main changes that can be made is to use sustainable travel more and reduce dependency on the car when possible. Below are some of the actions that people can take, and particularly for short journeys.

- Public transport – To use all means of public transport whenever possible e.g. trams, buses and trains. You can find your local bus networks at http://www.triptimes.co.uk/, and a bus planning tool for trips further afield at http://www.traveline.info/. Details on travelling on school buses to Nottinghamshire schools and assistance available to do so, can be found at http://www.nottinghamshire.gov.uk/education/travel-to-schools. The tram timetable is available at http://www.thetram.net/. The Big Wheel promotes sustainable travel within the Nottingham urban area (including parts of Broxtowe); it assists people and businesses with journey planning and advice. Further information can be found at http://www.thebigwheel.org.uk/ . Sustrans is also a charity that promotes sustainable travel and further information can be found at http://www.sustrans.org.uk/

- Car sharing schemes - Nottinghamshire have a car share scheme which is available to anyone at https://liftshare.com/uk/community/nottinghamshare but all businesses can produce their own.
- Park and Ride – There are a variety of Park and Ride sites within Nottinghamshire, which serve the Nottingham Tram and buses. Information for these Park and Ride sites which includes maps of their locations are found at http://www.nottinghamshire.gov.uk/transport/public-transport/park-and-ride
- Walking and Cycling – The health benefits of physical activity e.g. walking or cycling outweigh the risks from air pollution. You can easily avoid the worst pollution by travelling along quieter streets. Even walking on the side of the pavement furthest from the road can help.

  Walking -

  - Walk short distances rather than drive; this also has the benefit of improving your health as well.
  - Information on walking networks in Nottinghamshire can be found at http://www.nottinghamshire.gov.uk/planning-and-environment/walking-cycling-and-rights-of-way/walking and http://www.nottinghamcity.gov.uk/transport-parking-and-streets/rights-of-way-walking-and-cycling/walking-in-nottingham/ and a planning tool for deciding your route when walking can be found at http://walkit.com/.
  - Walking and cycling to school – School travel plans promote group cycling and walking for pupils to safely get to school. Information on the travel to school options can be found at http://www.nottinghamshire.gov.uk/education/travel-to-schools.

  Cycling –

  - Use the extensive cycle routes that are available throughout Nottinghamshire. Maps and cycling journey planners that cover all of Nottinghamshire, including the city and further afield are available at http://www.nottinghamshire.gov.uk/planning-and-environment/walking-cycling-and-rights-of-way/cycling. Maps of just the city cycle routes for Nottingham are available at http://www.nottinghamcity.gov.uk/cycling .

There are also cycle centres within Nottinghamshire that are run by RideWise who are a Nottingham based charity. RideWise provide weekly advice, training, bike rides, free bike loans and information about routes and journey planning. Further information about RideWise can be found at http://www.ridewise.org.uk/ride/index.php

- Driving- When you have to drive you can still help to improve air quality by;
    - Make sure that your car is at its most efficient and think about how you drive, this will also save you money. Tips on how to save money on fuel and reduce your emissions are available at http://www.energysavingtrust.org.uk/travel/driving-advice.
    - If you are thinking about changing your car consider buying a low-emission vehicle, you can get more information on these vehicles and the support available at http://goultralownottingham.org.uk/
- Smoke Control Area – Large parts of Nottinghamshire is a smoke control area, therefore you cannot emit smoke from a chimney unless you are burning an authorised fuel or using an exempt appliance e.g. some burners or stoves. Further information on suitable fuels and exempt appliances can be found at https://smokecontrol.defra.gov.uk/index.php. All appliances must be kept in good working order to ensure that they are working efficiently and it is advised that you contact your Local Council to determine whether you are in a smoke control area or not.
- Bonfires – To not have bonfires at all and to compost all garden waste and recycle rubbish rather than burn it.
- House Boilers – Ensure that boilers are serviced regularly and kept in good working order. If a boiler needs replacing then purchase one that has a low NOx emission rating.

# Table of Contents

# 1 Local Air Quality Management

This report provides an overview of air quality in Broxtowe Borough Council during 2017. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Broxtowe Borough 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 L.1 in Appendix L.

# 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 the objectives.

Broxtowe Borough Council revoked the AQMA in Nuthall on the 26th June 2017, see Appendix G: Revocation Order for the AQMA in Nuthall.

Further information about the remaining AQMA declared by Broxtowe Borough 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.broxtowe.gov.uk/for-you/environmental-health-noise-and-pollution/air-quality/ Alternatively, see Appendix E: Maps of Monitoring Locations and Appendix F: Map of AQMA in Trowell, which provides a map of all the monitoring locations throughout the Borough and also a map of the AQMA in Trowell.

**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 concentration at a location of relevant exposure) | | Action Plan (inc date of publication) |
|---|---|---|---|---|---|---|---|---|
| | | | | | | At Declaration µg/m$^3$ | Now µg/m$^3$ | |
| AQMA 1 Trowell | 1st February 2006 | $NO_2$ annual mean | Trowell, Nottingham | AQMA 1 encompasses twenty properties on parts of Iona Drive and Tiree Close next to the M1 motorway in Trowell | Yes | 45 | 38 | Action Plan 2008. |

## 2.2 Progress and Impact of Measures to address Air Quality in Broxtowe Borough

Defra's appraisal of last year's ASR concluded that;

- *The ASR 2017 Report states that after 5 years with no exceedances, the Nuthall AQMA will be Revoked by September 2017. This is supported.* **- BBC revoked the Nuthall AQMA on the 26th June 2017.**
- *BBC in January 2016 revised the monitoring network and expanded the diffusion tube network from 23 to 43 diffusion tubes. Only 15 of the sites remaining are at the original locations. It would be useful to plot trend graphs for all the locations as it makes it easy to interpret improvements in air quality, particularly AQMAs.* **- The trends are discussed in greater detail in Chapter 3.2.1 of this report and Appendix C contains the trend graph for the 13 sites.**
- *Trowell AQMA will continue to be monitored even though it does not have any exceedances, to determine the effect of the introduction of a SMART Motorway scheme on the M1. It has had an extra diffusion tube located within it to ensure more representative monitoring. This is supported.* **- BBC will continue to monitor and report on the Trowell AQMA. See Chapter 3.2.1 of this report for the results.**
- *The maps provided in the report are very clear, and it is very useful to have the DT locations shown on the map of the AQMA. This should be continued in future reports.* **- BBC will continue to show the DT locations on the AQMA Map. See Appendix E.**

Broxtowe Borough Council (BBC) and Nottinghamshire County Council (NCC) have taken forward a number of measures during the current reporting year of 2017/2018 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2 More detail on these measures can be found in BBC Action Plan, the Nottinghamshire Local Transport Plan 2011-2026 (and its implementation plans) and Highways England Reports (Post opening project evaluation reports for the M1 Junction 25 to 28 widening and the A52 West of Nottingham Corridor Improvements).

Key completed measures are:

- All Traffic signals were replaced on the A610 Nuthall Island. Additional traffic monitoring cameras and advanced remote control systems were installed to enable reactive/proactive traffic management. A review of the signal timings and linking at the signal junction was also undertaken.
- A second CCTV vehicle was purchased by Nottinghamshire County Council.
- School travel plans developed by the County Council at schools in the Borough.
- A review of BBC refuse collection area has resulted in a restructure and the fleet size has been reduced by one vehicle.
- An increase in the number of members registered in the car share scheme to 3,141 members. As a result there is a 42.15kg reduction in NOX during 2017.
- Collectively Nottingham County Council and Nottingham City Council secured £2.8 million from the Green bus technology Fund to retrofit older buses. This includes 6 different services that operate in the Borough of Broxtowe.
- All BBC and NCC Fleet vehicles are fitted with a tracking system.
- 7,518 people received cycle training during 2017/18.
- Personal travel planning with Beeston residents which resulted in a 5% reduction of journeys to work by car amongst participants
- The £149.7m A453 improvement scheme to ease existing highway congestion and improve road safety on the trunk road between the M1 J24 and the A52 Nottingham, which was completed in July 2015. These improvements could potentially reduce the numbers of vehicles travelling north to other M1 junctions and using alternative routes such as the A610 to access Nottingham.
- Hi Vis slap bands and rucksack covers for cycling were given out at BBC events.
- Cycle centres that provided advice, free cycle training for families and led group rides weekly, were run until September 2017 by BBC.
- Broxtowe Cycle Quest was developed and promoted in 2017.

- A Poster campaign promoting securing cycles properly was completed in 2017 by BBC.
- BBC has undertaken a review of the Councils travel plan by reviewing lease cars, car allowances and work place parking.

Broxtowe Borough Council expects the following measures to be completed over the course of the next reporting year:

- ❖ Taxi Licensing - from 13th June 2018 all petrol vehicles will be required to meet Euro 5 standards, all new diesel vehicles will be required to meet Euro 6 emissions.
- ❖ Taxi Licensing - Hybrid and Electric Vehicles to be licensed as "Taxi's" by quoting minimum 70kW and reducing boot space requirement to allow for battery storage.
- ❖ Construction of improved cycle links between Beeston, the Enterprise Zone and the City.
- ❖ Identification of the Nottinghamshire public electric vehicle charging network.

Broxtowe Borough Council's priorities for the coming year are predominantly through measures to make the best use of the transport networks and through smarter travel measures that will encourage people to travel more sustainably. Measures will include:

- Traffic control and information provision to minimise disruption and delay on County Council managed roads (including the A610) such as contingency planning, the effective co-ordination of works and the provision of real-time travel information
- Parking enforcement on County Council managed roads to ensure that the traffic keeps moving
- Travel planning such as the development of new travel plans at businesses across the county through planning conditions

- Measures to reduce the need to travel at peak times such as the provision and encouragement of flexible working arrangements
- The facilitation of smarter travel behaviour such as the provision of a car sharing scheme and integrated and concessionary ticketing schemes
- The encouragement of smarter travel behaviour such as the marketing and promotion of passenger transport, walking and cycling, provision of cycling and walking route maps, cycle training programmes, and web-based journey planners
- The encouragement of the uptake of low-emission vehicles through the delivery of the Nottingham Go Ultra Low City bid funding
- Enhancements to the local cycling and walking networks

The principal challenges and barriers to implementation that Broxtowe Borough Council and Nottinghamshire County Council anticipates facing are:

- Ensuring funding is allocated to the above measures to continue their delivery. The top-slicing of 43% of the integrated transport block from 2015/16 onwards by the government and allocating it to the Local Growth Fund means that from 2015/16 the integrated transport funding allocated to Nottinghamshire County Council reduced by approximately £3.5m; significantly reducing the funding available for transport improvements that will deliver air quality improvements.
- Ensuring sufficient mitigation is secured through the development control process to address the potential impacts on the highway network of not only individual developments but also the cumulative impacts of development.

Progress on the following measures has been slower than expected due to:

- Introduction of a car club in the county as this will only be introduced once the club in the City proves consistently successful/self-sufficient over a period of time (the Nottingham City car club was only introduced in April 2014).

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Broxtowe Borough Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of AQMA 1 in Trowell.

## Table 2.2 - Progress on Measures to Improve Air Quality

| Measure No. | Measure | EU Category | EU Classification | Organisation involved and funding source | Planning Phase | Implementation Phase | Key Performance Indicator and reduction in pollutant | Progress to Date, comments / barriers of implementation | Estimated Completion Date |
|---|---|---|---|---|---|---|---|---|---|
| 1 | **Light rail tram infra-structure** | Transport Planning and Infrastructure | Public transport improvements-interchanges stations and services | NCiC/NCC; DfT/WPL funding | Pre - 2012 | 2013-2016 | Increased passenger transport patronage | •NET Phase 2 (with route through Broxtowe) opened 2015<br>•No further schemes other than a possible extension to the HS2 Terminus in Toton. | **Complete** |
| 2 | **Car sharing scheme** | Alternatives to private vehicle use | Car & lift sharing schemes | NCC | Pre-2006 | On-going | Restrain average journey times in the morning peak to a 1% increase per year<br>42.15kg NOx reduction during 2017 through the car share activities | •3,141 members registered.<br>•Implementation on-going.<br>•No BBC staff are now available to promote this. | On-going |
| 3 | **Nottingham City Clean Air Zone** | Promoting Low Emission Transport | Low Emission Zone (LEZ) or Clean Air Zones (CAZ) | NCiC; DfT funding | 2016-2019 | 2019/20 | Reduced Emissions | •Modelling of a number of options has been undertaken<br>•Results of the modelling are now being analysed to identify a preferred option<br>•Consultation will be undertaken by Nottm City once a preferred option has been identified | 2020 |
| 4 | **Introduction of car club** | Alternatives to private vehicle use | Car Clubs | NCC/NCiC | 2014-2017 | Dependent on success of Nottingham city scheme | Restrain average journey times in the morning peak to a 1% increase per year | •Nottm city scheme introduced in 2014. Expansion of scheme into county dependent on its success<br>•Funding for implementation to be determined | N/A |

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|---|---|---|---|---|---|---|---|---|---|
| 5 | **Nottingham Go-Ultra Low City bid** | Promoting Low Emission Transport | Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging | NCiC/NCC; OLEV funding | 2015/16 | 2016-2021 | On-going take-up of cleaner vehicles | •£6.1m funding secured for 2016-2021<br>•Preferred partner to deliver EV charging infrastructure procured during 2018<br>•Identification of area-wide charging infrastructure underway<br>•Process established for businesses to apply for grants to introduce EV charging infrastructure<br>•Public promotional event planned for June 2018<br>•Implementation on-going | 2021 |
| 6 | **Inspection of Permitted Processes** | Environmental Permits | Introduction/increase of environment charges through permit systems and economic instruments | BBC | N/A | On-going | Reduced Emissions | • Annual inspections of permitted processes were undertaken; all permitted processes were risk rated with the higher risk processes incurring a higher annual subscription fee. The risk rating did not change in 2017, and all permitted processes were fully compliant. | On-going |
| 7 | **Planning and Policy Guidance** | Policy Guidance and Development Control | Air Quality Planning and Policy Guidance | BBC | 2015-2016 | 2016 | Reduced Emissions | • Review of the Broxtowe Local Plan to ensure that air quality remains an important consideration when granting planning permission and to encourage developers to include sustainable travel measures as part of the planning application. | On-going |

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|---|---|---|---|---|---|---|---|---|---|
| 8 | **Optimisation of traffic signals** | Traffic Management | UTC, Congestion management, traffic reduction | NCC/Via EM Ltd: NCC revenue funding | N/A | On-going | Restrain average journey times in the morning peak to a 1% increase per year | •Cableless linking facility' installed during 2017 at Nuthall Island signals allowing them to be optimised to favour differing peak periods/traffic flows<br>•All traffic signalling equipment at A610 Nuthall Island was replaced during 2017/18 alongside the introduction of additional traffic monitoring cameras and advanced remote control systems were also installed to enable reactive and pro-active interventions to improve traffic flow<br>•A review of the signal timings and linking at the signal junction was also undertaken during 2017/18<br>• Implementation on-going | On-going |
| 9 | **Traffic control and information** | Traffic Management | UTC, Congestion management, traffic reduction | Nottinghamshire County Council (NCC)/Via EM Ltd/Nottingham City Council (NCiC): NCC and NCiC revenue funding | N/A | On-going | Restrain average journey times in the morning peak to a 1% increase per year | • Traffic control centre that monitors traffic movement on the local highway network (not the trunk road/motorways) and provides real time traffic control over many traffic signal installations, including on A610 at Nuthall<br>• The Travelwise centre remains in operation 24hrs a day, every day.<br>• Implementation on-going<br>• Potential barrier: Lack of future revenue funding | On-going<br><br>On-going |

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|---|---|---|---|---|---|---|---|---|---|
| 10 | **Co-ordination of street works** | Traffic Management | UTC, Congestion management, traffic reduction | NCC/Via EM/NCiC: NCC and NCiC revenue funding | N/A | On-going | Restrain average journey times in the morning peak to a 1% increase per year | • Systems for notice management and coordination have been upgraded to enhance noticing handling, monitoring of works proposals, coordination of works and directing timing of works<br>• Street designations/network hierarchy review is on-going to improve data quality for works promoters and network managers and to prioritise works management<br>• Regular coordination meetings held between all works promoters and regional partners in additional to regular meetings between HE and regional partners to create a framework programme of planned works affecting strategic and local routes<br>• Detailed journey time monitoring undertaken annually since 2005/06<br>• Implementation on-going | On-going<br>On-going<br>On-going<br>On-going |
| 11 | **Real time travel information** | Public Information | Other | NCC/Via EM Ltd: NCC revenue funding | N/A | On-going | Restrain average journey times in the morning peak to a 1% increase per year | •Information conveyed by all forms of media (press, radio, website, social media etc.).<br>•The Travelwise centre remains in operation 24hrs a day, every day.<br>•Implementation on-going | On-going<br>On-going |

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|---|---|---|---|---|---|---|---|---|---|
| 12 | **Contingency planning, and effective event and incident management** | Traffic Management | UTC, congestion management, traffic reduction | NCC/Via EM/NCiC/Highways England (HE): NCC, NCiC, HE revenue funding | N/A | On-going | Restrain average journey times in the morning peak to a 1% increase per year | • The local operating agreement between the authority and HE has been comprehensively reviewed to identify the relevant parts of the network which have interaction on each authority and to put in place appropriate communication channels for management of incidents and dissemination of information<br>• Key locations on the local network have been identified and associated diversion routes investigated in line with the developing network hierarchy<br>• Incidents dealt with through agreed procedures and regular partnership meetings held. Working in close collaboration with the City and HE, tactical diversion routes have been developed for the emergency diversion of traffic from any part of the strategic road network, to reduce the delay in rerouting traffic to ease congestion at the time of incidents<br>• Detailed journey time monitoring undertaken annually since 2005/06.<br>• Implementation on-going | On-going<br>On-going<br>On-going<br>On-going |
| 13 | **Civil Parking Enforcement** | Traffic Management | Workplace Parking Levy, Parking Enforcement on highway | NCC; NCC revenue funding | Pre-2008 | On-going | Manage parking to improve journey time reliability. | •Introduced on County roads in May 2008 to help ensure parking does not interfere with the free flowing traffic.<br>•Implemented and on-going | Implemented and On-going |
| 14 | **CCTV enforcement vehicle** | Traffic Management | Workplace Parking Levy, Parking Enforcement on highway | NCC; NCC revenue funding | N/A | On-going | Manage parking to improve journey time reliability | • 'Camera car' to enforce school keep clear and bus stop clearway markings became fully operational during 2016<br>•A second CCTV vehicle was purchased in 2017/18. | Implemented and on-going |

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|---|---|---|---|---|---|---|---|---|---|
| 15 | **Increase proportion of bio-fuels to public transport fleet** | Vehicle Fleet Efficiency | Promoting low emission public transport | NCC | N/A | On-going | On-going take-up of cleaner vehicles | •NCC secured £527,000 OLEV funding and will match fund the scheme with £410,000 from its transport budget to introduce two electric buses (and their associated infrastructure) on route 510, serving communities in Beeston and Stapleford.<br>•Implementation on-going | On-going |
| 16 | **Bus service improve-ments** | Transport Planning and Infrastructure | Public transport improvements-interchanges stations and services | NCC/PT operators | N/A | On-going | Increased passenger transport patronage | •Review of all of the bus services in the county, including commercial, supported and specialist services. The aim of this work is to review and design cost effective services that meet local needs.<br>•Implementation on-going | On-going |
| 17 | **Bus infra-structure** | Transport Planning and Infrastructure | Public transport improvements-interchanges stations and services | BBC and NCC; integrated transport block funding | N/A | On-going | Increased bus patronage | •An annual programme of updates and maintenance of all stops including updating network maps to ensure all information is current and accurate is on-going.<br>•Implementation on-going<br>•BBC provides 50% of the funds for the installation of new bus shelters and real time bus information at bus stops. | On-going<br><br>On-going |
| 18 | **Concession-ary fare schemes** | Transport Planning and Infrastructure | Other | NCC/NCiC/ PT operators | N/A | On-going | Increased passenger transport patronage | •Implementation on-going | On-going |
| 19 | **Marketing and promotion of passenger transport** | Promoting Travel Alternatives | Other | NCC/NCiC / PT operators | N/A | On-going | Increased passenger transport patronage | •Various marketing campaigns undertaken in partnership with operators and Nottingham City Council, co-ordinated through the Greater Nottingham Bus Quality Partnership.<br>•Implementation on-going | On-going |

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|---|---|---|---|---|---|---|---|---|---|
| 20 | **Encouragement of low-emission public transport fleets** | Vehicle Fleet Efficiency | Vehicle Retrofitting programmes | NCC/NCiC /OLEV funding | N/A | On-going | Reduced Emissions | •NCC secured £1.3m; and NCiC secured £1.5m from the Green Bus Technology Fund in Feb 2018 to retrofit older buses<br>•This includes 21, 34, 35, Indigo, Rainbow 1 and Rapid 1 services in the borough<br>•Implementation on-going | On-going |
| 21 | **Encouragement of low-emission public transport fleets** | Vehicle Fleet Efficiency | Promoting Low Emission Public Transport | NCC/NCiC /PT operators; NCT (operator)funding | N/A | On-going | Reduced Emissions | •The Statutory Quality Partnership Schemes (SQPSs) in place affecting all buses travelling through AQMA. | On-going |
| 22 | **20mph speed limits outside schools** | Traffic Management | Reduction of speed limits, 20mph zones | NCC; integrated transport block funding | 2012/13 | 2013-2016 | Increased walking/cycling trips | •Advisory 20mph speed limits installed outside all feasible schools | 2016/17 |
| 23 | **School travel plans** | Promoting Travel Alternatives | School Travel Plans | NCC: DfT funding | N/A | 2000-2011 | Restrain average journey times in the morning peak to a 1% increase per year | •STPs have been developed and approved at all but 3 schools in Broxtowe<br>•Funding withdrawn by DfT | **Complete** |
| 24 | **Zoning of refuse collections** | Vehicle Fleet Efficiency | Fleet efficiency and recognition schemes | BBC | N/A | 2016-2017 | Reduced emissions | •A review of the refuse collection areas at BBC to enable the areas to be zoned to ensure that the collection rounds are within the designated zone which reduces the amount of non-productive travelling time.<br>•Update - The Refuse round restructure is now complete and we have reduced the fleet size by one vehicle. | **Complete** |

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| 25 | **Fleet vehicle tracking system** | Vehicle Fleet Efficiency | Driver Training and ECO driving aids | BBC/NCC | N/A | 2015-2017 | Reduced emissions | • All BBC and NCC fleet vehicles are fitted with a vehicle tracking system, which records vehicle speed and idling time. A review of the journeys undertaken will ensure that if necessary measures can be implemented e.g. staff training, to improve fleet efficiency. | **Complete** |
| 26 | **Eco-Stars programme** | Vehicle Fleet Efficiency | Fleet efficiency and recognition schemes | District councils/NCC/ NCiC | N/A | 2013-2015 | Reduced Emissions | • Introduced 2013 but funding (LSTF) expired in 2015. Alternative funding sources being investigated | 2015 |
| 27 | **Taxi Licensing Conditions** | Promoting Low Emission Transport | Taxi Licensing Conditions | BBC | 2016-2019 | 2011<br>2019 | Reduced emissions | • No cars normally older than 8 years will be licensed as a taxi within the borough.<br>• A review of the taxi licensing conditions will be undertaken to establish a common policy of conditions throughout the County.<br>• From 13th June 2018 all petrol vehicles will be required to meet Euro 5 standards, all new diesel vehicles will be required to meet Euro 6 emissions.<br>• Hybrid and Electric Vehicles to be licensed as "Taxi's" by quoting minimum 70kW and reducing boot space requirement to allow for battery storage. | On-going<br>2019<br>2018<br>2018 |
| 28 | **Nottingham city workplace parking levy (WPL)** | Traffic Management | Workplace Parking Levy, Parking Enforcement on highway | NCiC | Pre-2012 | 2012 and on-going | Restrain average journey times in the morning peak to a 1% increase per year | • NCiC introduced WPL within the city in 2012 and have used funding to make passenger transport improvements in the city | Introduced 2012 and on-going |

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|---|---|---|---|---|---|---|---|---|---|
| 29 | **Sustainable Travel information for the Public** | Public Information | Via leaflets, internet, other | BBC | N/A | On-going | Increased use of public transport | • BBC provide leaflets on safe cycling on the tram lines, bus routes, Broxtowe cycling map, Broxtowe Country and Erewash Valley routes and walking leaflets. These are all available in Council owned buildings. All of the leaflets are also available on the internet and given out at all events and festivals and ad hoc delivered to cycle shops/libraries/schools and so on.<br>• Broxtowe Matters is a pamphlet that goes out to all households in the Borough and this has information in about sustainable travel and directs the public to further information.<br>• Social media is used to message the public and provide them with information about events and sustainable travel methods.<br>• Sustainable Travel is also promoted in the reception on the TV at the Council buildings to increase public awareness. | On-going for all |
| 30 | **Personalised travel planning** | Promoting Travel Alternatives | Personalised Travel Planning | NCC/AECOM; integrated transport block/Access Fund funding | 2015/16 | 2016/17 | Restrain average journey times in the morning peak to a 1% increase per year | • Personalised Travel Planning undertaken in Beeston during 2016/17 | 2016 |
| 31 | **Web based journey planners** | Public Information | Via the Internet | NCC | N/A | On-going | Increased walking/cycling / passenger transport trips | • Nottinghamshire is part of the national, multi-modal Traveline journey planner Web links to the Traveline site are publicised and available from the County Council's website.<br>• Implementation on-going | On-going |

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|---|---|---|---|---|---|---|---|---|---|
| 32 | **Cycle hire scheme** | Transport Planning and Infrastructure | Public cycle hire scheme | NCiC/NCC ; funding source to be determined | 2017/18 | Dependent on commercial cycle hire scheme providers | Increased cycling trips | •Feasibility study commissioned by NCiC for a city scheme which potentially could include parts of the county such as Beeston<br>•Hire schemes at the nearby University of Nottingham in place<br>•Feasibility study undertaken on a city based hire scheme which potentially could include parts of the county such as Beeston<br>•Commercial operators have expressed an interest in introducing a hire scheme in Nottingham and therefore any delivery is dependent on their implementation timescales | Not known - dependent on commercial cycle hire scheme providers |
| 33 | **Cycling networks** | Transport Planning and Infrastructure | Cycle network | NCC/Via EM/NCiC: LGF, s106 funding | 2015/16-2016/17 | 2017/18-2018/19 | Increased cycling trips | •Construction of improved cycle links between Beeston, Enterprise Zone and the City underway and due to be completed during 2018/19 | 2018/19 |
| 34 | **Cycle parking facilities** | Transport Planning and Infrastructure | Cycle network | NCC; integrated transport block funding | 2014 | 2015 | Increased cycling trips | •Cycle hub installed in 2015 to integrate with bus/rail services | **Complete** |
| 35 | **Cycle training** | Promoting Travel Alternatives | Promotion of cycling | NCC; DfT funding | N/A | On-going | Increased cycling trips | •7,518 people received cycle training during 2017/18.<br>•Implementation on-going | On-going |

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|---|---|---|---|---|---|---|---|---|---|
| 36 | **Marketing of cycling** | Promoting Travel Alternatives | Promotion of cycling | BBC | 2012-2017 | On-going. | In Broxtowe district there has been a 30% increase in cycling between 2010 and 2014 | •Review installing new cycle stands in Broxtowe with partners. Beeston Train station complete with the installation of cycle hub in the Council car park, trialled removable stands in Stapleford, new stands installed Eastwood/Beeston Town Centres, improved/more stands Kimberley Leisure Centre and Council Offices.<br>•Develop and promote the Broxtowe Cycle Quest 2016 and 2017. BBC and Ridewise Ltd with funding from the Lifestyle fund in 2016 developed the scheme. The Quest includes 8 routes promoted on trails in Broxtowe/surrounding area with a quiz and prize draw. Promoted throughout Broxtowe and Ridewise networks in Greater Nottingham through social media/posters/email networks/Broxtowe Matters to every household in the borough.<br>•As a follow on from the TravelRight project in Broxtowe two cycle centres will be kept open until September 2017 being run by Ridewise Ltd. External funding will be required to keep these open beyond September. These provide free cycle training for families, advice and led group rides weekly.<br>•Hi Vis slap bands and rucksack covers have been given out at events. | **Complete**<br>**Complete**<br>**Complete**<br>**Complete 2017/18** |

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|---|---|---|---|---|---|---|---|---|---|
| 36 | **Marketing of cycling Cont** | Promoting Travel Alternatives | Promotion of cycling | BBC | N/A | On-going | Increased cycling trips | •Cycle security events and locks have been given away at Beeston Train Station, Beeston Town Centre and at other events in partnership with the Police, BBC and the TravelRight project. Poster campaign promoting securing cycles properly to be completed 2017.<br>•Promote safe cycling on tram lines at events/social media and leaflets.<br>•Produce and promote Broxtowe Cycling Map.<br>•Promotion to staff yearly about sustainable travel options. A number of sites have lockers/shower facilities/secure cycle parking for staff who commute to work other than by car and for leisure use encouraging healthy living. | **Complete**<br>On-going<br>**Complete**/ promotion on-going<br>On-going |
| 37 | **Marketing of cycling** | Promoting Travel Alternatives | Promotion of cycling | NCC | N/A | On-going | Increased cycling trips | •Cycling in Nottinghamshire has increased by 11% between 2010 and 2016; and in Broxtowe district there has been a 13% increase in cycling between 2010 and 2016. It is not possible to analyse these figures at a more local level.<br>•Implementation on-going | On-going |
| 38 | **Cycle maps** | Promoting Travel Alternatives | Promotion of cycling | NCC; DfT funding | N/A | On-going | Increased cycling trips | •Greater Nottingham cycling maps reviewed during 2018, updated and available as a leaflet and online | 2018 and on-going |
| 39 | **Marketing of walking** | Promoting Travel Alternatives | Promotion of walking | NCC | N/A | On-going | Increased walking trips | • Marketing of walking is undertaken in a variety of formats. Various campaigns have been undertaken.<br>• Implementation on-going | On-going |

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|---|---|---|---|---|---|---|---|---|---|
| 40 | **Marketing of walking** | Promoting Travel Alternatives | Promotion of walking | BBC | N/A | On-going | Increased walking trips | •Develop Broxtowe Country Trail and promote it.<br>•Promotion of walking for health<br>•Promotion of Erewash Valley Trail and other local walks. | **Complete**/ promotion on-going |
| 41 | **Pedestrian infrastructure improvements** | Transport Planning and Infrastructure | Other | NCC/BBC | N/A | On-going | Increased walking trips | •Pedestrian improvements developed and delivered as part of the annual integrated transport programme. Funding also secured to deliver improvements through the planning process | On-going |
| 42 | **Flexible working arrange -ments** | Promoting Travel Alternatives | Encourage / Facilitate home-working | NCC/BBC | N/A | On-going | Restrain average journey times in the morning peak to a 1% increase per year | •NCC operates flexible working arrangements for all its staff<br>•BBC New Ways of working being introduced. Increase in Home working expected. | On-going<br>On-going |
| 43 | **Workplace travel plans** | Promoting Travel Alternatives | Workplace Travel Planning | Broxtowe BC planning/ NCC | N/A | On-going | Restrain average journey times in the morning peak to a 1% increase per year | •Developed with businesses as part of planning conditions<br>•BBC has undertaken a review of the Councils travel plan by reviewing Lease cars, car allowances and work place parking. Produced a transport map specifying the modes of transport the organisation considers acceptable if other modes or transport are not suitable. Feasibility study of having bus card/Tickets for employee use.<br>•No BBC staff available to promote this due to redundancy. | On-going<br>**Complete** |

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|---|---|---|---|---|---|---|---|---|---|
| 44 | **NCC car pool vehicles** | Alternatives to private vehicle use | Car Clubs | NCC | N/A | 2016/17 | Restrain average journey times in the morning peak to a 1% increase per year | •NCC upgraded its pool vehicles to lower emission diesel vehicles | 2016 |
| 45 | **Low emission vehicle procurement** | Promoting Low emission transport | Company vehicle Procurement - prioritising uptake of low emission vehicles | BBC | 2015 | 2015-2024 | Reduced emissions | •All new fleet vehicles at BBC are Euro6 emissions complaint. There are 90+ fleet vehicles and they are on a 10 year replacing rolling programme.<br>•Update - BBC have purchased three new Euro 6 vehicles in the last 12 months replacing three older vehicles. | 2024 |
| 46 | **Eco-driver training sessions** | Vehicle Fleet Efficiency | Driver training and ECO driving aids | NCC | 2012 | 2012 | Reduced emissions | •Eco-driving training sessions held for NCC staff | **Complete** |
| 47 | **Broxtowe Transport Sub Group** | Transport Planning and Infrastructure | Other | BBC | N/A | On-going | Reduced emissions | •BBC facilitates a transport sub group to bring together partners and stakeholders to discuss transport issues and share information in the Borough. Partners include NCC, NCT buses, Barton buses, PEDALS( local cycling pressure group) and Sustrans.<br>• Due to staff redundancies there are no BBC staff to promote this. | The group is no longer operating |
| 48 | **Integrated ticketing** | Transport Planning and Infrastructure | Other | NCC/NCiC/ PT operators | N/A | On-going | Increased passenger transport patronage | •Integrated ticketing strategy developed in 2014/15.<br>•New smartcard platform introduced in 2014. Robin Hood card scheme introduced in 2015 | On-going |

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|---|---|---|---|---|---|---|---|---|---|
| 49 | Nottinghamshire Air Quality Strategy | Policy Guidance and Development Control | Air Quality Planning and Policy Guidance | NCC/NCiC /district councils | 2017/ 2018 | 2018/19 | Raising awareness and reduced emissions | •A review of the Nottinghamshire Air Quality Strategy is underway | 2018/19 |
| 50 | Joint Strategic Needs assessment | Policy Guidance and Development Control | Air Quality Planning and Policy Guidance | NCC/NCiC /district councils | N/A | 2017 | Raising awareness and reduced emissions | •Air Quality is now a chapter in the Joint Strategic Needs Assessment and part of the Health and wellbeing Board considerations. | On-going |

**BBC**= Broxtowe Borough Council, **NCC**= Nottinghamshire County Council, **HE** = Highways England, **NCiC**= Nottingham City Council, **DfT** = Department for Transport

## 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.

As BBC does not monitor $PM_{2.5}$ the only methods that can be used to try and determine what the potential levels of $PM_{2.5}$ in the Borough are is to review the nearest relevant Automatic Urban and Rural Network (AURN) site which monitors $PM_{2.5}$ and to identify the modelled background levels for the Borough from Defra's webpages.

The nearest AURN site is in Nottingham City and for 2017 the annual mean concentration is 11.57µg/$m^3$. The modelled background level provided by Defra for the Borough of Broxtowe are predicted to be between 9µg/$m^3$ and 12µg/$m^3$ for 2017, with the annual mean for 2017 being 10µg/$m^3$. The modelled background concentrations are shown to be in the higher range along the M1 Motorway, The background maps are shown in Appendix H.

Although no air quality objective has been set yet, the World Health Organisation guideline value for $PM_{2.5}$ is currently 10µg/$m^3$ (although it is believed that the guideline value will be reviewed in the future) therefore the modelling results show that parts of the Borough are exceeding this value. Therefore, BBC are working towards reducing the $PM_{2.5}$ levels by taking the following measures:

- Ensuring that dust management plans are requested during the planning application stage for all sites that involve large scale demolition and building works.
- To ensure that best practicable means of dust control measures are being used regardless of how large the development is. These measures can

include the use of bowsers, road sweepers and dust suppression to prevent 'trackout'. Also minimise dust generating activities on dry windy days and if there are stockpiles ensure they are covered to prevent wind-whipping.

- Ensuring that developers are carrying out dust suppression monitoring on site at large development sites.
- Ensuring that water suppressants are in use when Nibblers and mobile crushers are on site.
- Educating the public in matters that contribute to air quality e.g. not having bonfires.
- Educate and advise the public about using exempt appliances with the correct fuel for that appliance in BBCs smoke control areas.
- Enforcing the Clean Air Act 1993 and the Environmental Protection Act 1990 where necessary to minimise the risk of particulates becoming air borne.
- To continue to manage, advice and enforce the Pollution Prevention and Control Regulations 1999 and the Environmental Permitting (England and Wales) Regulations 2010 on permitted processes when necessary
- To encourage, support and promote sustainable travel within the Borough by working with a variety of organisations and neighbouring local authorities.
- To continue to promote green travel e.g. walking, cycling, low emissions/ electric vehicles and the tram network.
- To continue to support bus companies and taxis that operate within the Borough to reduce emissions.
- To continue to review suitable research methods for reducing air quality levels for particulate matter e.g. the use of vegetation.
- Promote and encourage the use of the final version of the "EMAQN Air Quality and Emissions Mitigation: guidance for developers" document.
- To assist and advice consultants working on the proposed HS2 project. This ensures that suitable dust control measures will be used throughout the project.

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

## 3.1 Summary of Monitoring Undertaken

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

### 3.1.1 Automatic Monitoring Sites

BBC does not utilise any automatic air quality monitoring within the Borough

### 3.1.2 Non-Automatic Monitoring Sites

BBC undertook non- automatic (passive) monitoring of $NO_2$ at 43 sites during 2017. Table A.1 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix E. 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 D.

## 3.2 Individual Pollutants

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

### 3.2.1 Nitrogen Dioxide ($NO_2$)

Table A.2 in Appendix A compares the ratified and adjusted monitored Nitrogen Dioxide ($NO_2$) annual mean concentrations for the past 5 years with the air quality objective of 40µg/$m^3$.

For diffusion tubes, the full 2017 dataset of monthly mean values is provided in Table B.1 of Appendix B.

## Nitrogen Dioxide Diffusion Tube Monitoring Results

The results from the bias corrected $NO_2$ diffusion tube monitoring have shown that there are no exceedences of the 40µg/$m^3$ air quality objective at any of the 43 monitoring locations within the Borough for 2017.

Although there are no exceedances of the $NO_2$ objective there is still one AQMA within the Borough, which is situated in Trowell. The monitoring results from the diffusion tubes sited in the AQMA will be discussed in greater detail below.

In June 2017 the AQMA in Nuthall was revoked. However, BBC will continue to undertake monitoring at the same locations to ensure consistency and to enable annual trends to be reviewed.

As well as discussing the results from the recently revoked AQMA and the current AQMA. The following chapter will discuss areas of concern within the Borough where the air quality levels are higher than average, but still within the Air Quality Objective. This is to determine whether any trends are developing, which will allow suitable measures if necessary, to be put in place to reduce the likleyhood of an exceedance in the future.

## Revoked AQMA in Nuthall

There are three diffusion tube sites located on Nottingham Road in Nuthall that are located within the recently revoked AQMA in Nuthall. The results below show that since 2012 the levels of $NO_2$ are consistently below the objective of 40µg/$m^3$ for all three sites.

**Table 3.1 – Results for the Revoked AQMA in Nuthall 2012 – 2017.**

| Site ID | $NO_2$ Annual Mean Concentration (µg/$m^3$) | | | | | |
|---|---|---|---|---|---|---|
| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| BX01 or 33 | 31 | 33 | 29 | 28 | 29 | 29 |
| BX05 or 34 | 32 | 33 | 32 | 29 | 29 | 27 |
| BX13 or 35 | 35 | 33 | 34 | 34 | 32 | 34 |

Monitoring will continue to be undertaken at these three sites and the results will be reported in the 2019 Air Quality Annual Status Report.

### AQMA in Trowell

Since January 2016 there are now two monitoring sites within the AQMA in Trowell as opposed to just one site. They are situated between Junction 25 and 26 of the M1 and are monitoring $NO_2$ levels from the M1 Motorway. The tubes are sited on the façade of properties that are the closest to the M1.

The original monitoring site is on the façade of a property on Iona Drive, which has been there since 2011. The new monitoring site is on the façade of a property that is in Tiree Close (See Appendix F for the map of the AQMA and the tube locations). The diffusion tube monitoring results from 2012 to 2017 are shown below.

**Table 3.2 – Results for AQMA in Trowell 2012 – 2017.**

| Site ID | $NO_2$ Annual Mean Concentration ($\mu g/m^3$) | | | | | |
|---|---|---|---|---|---|---|
| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| 18 | - | - | - | - | 34 | 33 |
| BX11 or 19 | **42** | 39 | 38 | **42** | 38 | 37 |

Although the 2016 and the 2017 $NO_2$ results for both sites in the AQMA are below the air quality objective, the 2015 data did show an increase in $NO_2$. This may have been as a result of the Smart Motorway scheme on the M1 between junctions 28 and 31 (junctions 25 to 28 were completed in 2010), which had just been opened at the time of writing the 2016 report. Therefore it was considered that this may have caused congestion further South, which could have had an effect on increasing the air quality levels in 2015.

However, the results do show that there is a decreasing trend (if the 2015 data is seen as an anomaly due to the Smart Motorway Scheme), as the $NO_2$ levels have reduced by $1\mu g/m^3$ from 2016 to 2017. Although the reductiion in $NO_2$ is not great, a decreasing trend is showing. It is hoped that this will show as a significant decreasing

trend in future years. Therefore BBC will continue to monitor $NO_2$ levels in this area and work alongside Highways England to improve air quality levels.

### A610/B600 Nuthall Island

Since 2016 there have been two new sites for monitoring the air quality levels on the Nuthall Island (Site's 36 and 37). The reason for changing the origional site (BX 22) was due to the diffusion tube being located less than 1m from Nottingham Road which was very near to the A610/B600 Nuthall Island but not near the residential properties. Therefore, the site was not a true representaion of the levels that receptors are receiving at their properties so the site was relocated to the façade of a residential property in January 2016 (See Appendix I for the Map of the roundabout and the current monitoring locations).

In January 2016 a second site was also chosen to determine what the $NO_2$ levels are on a residential property that is situated on the opposite side of the roundabout to Site 36 where the traffic is leaving Nottingham City and travelling into the Borough of Broxtowe. The results from 2012 to 2017 are shown for the 'old' site and the 2016/2017 results for the 'new' sites are shown below.

**Table 3.3 – Results for Nuthall Island 2012 – 2017.**

| Site ID | $NO_2$ Annual Mean Concentration ($\mu g/m^3$) | | | | | |
|---|---|---|---|---|---|---|
| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| BX 22 | 42 | 41 | 39 | 41 | - | - |
| 36 | - | - | - | - | 35 | 35 |
| 37 | - | - | - | - | 32 | 30 |

The results above show that that the origional site did not provide a true representation of $NO_2$ levels at the façade of the properties. However, the two 'new' sites are showing that the levels are below the air quality objective by $5\mu g/m^3$ for site 36 and $10\mu g/m^3$ for site 37.

Due to the diffusion tube sites being reloacted in 2016 a significant trend in levels of $NO_2$ can not currently be identified. However, BBC will continue to monitor $NO_2$ levels at these sites and provide an update in the 2019 ASR. BBC will continue to work alongside Nottinghamshire County Council to improve air quality levels.

**Bramcote Island, Derby Road, Bramcote**

Since January 2016, increased monitoring has been undertaken at this location due to the origional site showing exceedances of the air quality objective of 40µg/$m^3$. The original site (BX04) was discontinued and relocated in January 2016 to a neighbouring property at a more suitable height and nearer to Bramcote Island (Site 41). An additional site was also choosen to determine whether the concentration reduces further away from the roundabout (Site 40). Both sites are on the façade of properties on Derby Road. (See Appendix J for the Map of the roundabout and the monitoring locations).

As discussed in the 2016 ASR, the diffusion tube results were believed to be over the objective level for several years as there were a number of parallel traffic schemes which were being undertaken in the Borough and also within Nottingham City. Therefore as suspected, the traffic schemes affected the results when comparing the past results to the results since 2016.

**Table 3.4 – Results for Bramcote Island 2012 – 2017.**

| Site ID | $NO_2$ Annual Mean Concentration (µg/$m^3$) | | | | | |
|---|---|---|---|---|---|---|
| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| BX 04 | 42 | 38 | 42 | 41 | - | - |
| 40 | - | - | - | - | 38 | 33 |
| 41 | - | - | - | - | 37 | 36 |

The table above shows that in 2017 Site 40 is 33µg/$m^3$, which is a reduction of 5µg/$m^3$ and Site 41 is 36µg/$m^3$, which is a reduction of 1µg/$m^3$ in comparison to the 2016 results. Therefore there is a downward trend and both of these sites are below the objective level. However, BBC will continue to monitor and report on the $NO_2$

levels in this area and work alongside Highways England to improve air quality levels in this area.

**Town Street, Bramcote.**

In December 2016 a review was undertaken of the mornitoing network and as Town Street is often used as a ‘rat run’ in rush hour to avoid the A52 a decision was made to monitor at this location.

The new site started in January 2017 and the exact location was picked as the street is narrowed due to resdients parking outside their properties, which tends to cause a ‘bottle neck’ situation in rush hour (See Appendix K for the Map identifying the monitoring location). The siting of the tube has been choosen so that it is parallel with the façade of a nearby residential property as there were no suitable downpipes to attach it to the façade of the property.

**Table 3.5 – Results for Town Street 2012 – 2017.**

| Site ID | $NO_2$ Annual Mean Concentration (µg/m$^3$) | | | | | |
|---|---|---|---|---|---|---|
| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| 48 | - | - | - | - | - | 38 |

Above is the result for the site. The result for 2017 is 38µg/m$^3$, which is close to the 40µg/m$^3$ objective. As this is a new site for 2017 a comparison or trend can not currently be made.

Due to the result above, a decision was made to start monitoring at a second location on Town Street, which started in January 2018 (the tube is sited on the façade of a house that is near to the Bramcote Island end of Town Street). The additional site in 2018 is to determine whether there is a potential issue along all of Town Street or just at the site where there is a bottle neck.

The results and maps for the new site and Site 48 will be in the 2019 ASR.

**The Results and Trends for the Thirteen Monitoring Sites 2013 - 2017.**

As mentioned previously in Chaper 2.2 of this report. Defra requested that trend graphs and comparrisons are made for the thirteen sites that have been continously monitored since 2013. See Appendix C for the trend graph for all thirteen sites.

The trend graph in appendix C shows that out of the thirteen sites, ten of the sites are showing a downward trend since 2013 (Sites 1, 5, 7, 19, 20, 22, 34, 38, 39, 43), two are showing an upward trend (Sites 31 and 35) and one site has stayed the same (Site 33).

The sites that are showing the upward trend are Site 31 which is at Hayley Close, Kimberley and Site 35 which is at 20 Nottingham Road, Nuthall.

**Site 31- Hayley Close, Kimberley.**

Since 2013, Site 31 has shown a trend increase of 2µg/m$^3$ overall. However the concentration with the 2µg/m$^3$ increase is still 32µg/m$^3$ , which is below the air quality objective of 40µg/m$^3$. The slight increase of concentration at this site, is thought be due to a housing development that is being undertaken nearby as there has been an increase in the volume of traffic in that area.

**Site 35 - 20 Nottingham Road, Nuthall.**

Since 2013, Site 35 has shown a trend increase of 1µg/m$^3$ overall. Even with the increase in 1µg/m$^3$ the site is showing a concentration of 34µg/m$^3$ , which is below the air quality objective of 40µg/m$^3$. It must be noted that the sites which are nearest to the M1 Motorway are Site 33 and Site 34 and these sites have either stayed the same or have shown a reduction trend. Therefore it is not thought that the slight increased at Site 35 is due to the M1 motorway.

The breakdown of the annual figures for each year from 2013 to 2017 can be viewed in Appendix A, Table A.2 of this report.

### 3.2.2 Particulate Matter ($PM_{10}$)

BBC does not monitor $PM_{10}$ within the Borough.

### 3.2.3 Particulate Matter ($PM_{2.5}$)

BBC does not monitor $PM_{2.5}$ within the Borough.

### 3.2.4 Sulphur Dioxide ($SO_2$)

Previous air quality reports have shown there are no relevant sources of Sulphur Dioxide within the Borough. Subsequently, the Council does not monitor for this pollutant

# Appendix A: Monitoring Results

**Table A.1 – Details of Non-Automatic Monitoring Site.**

| Site ID | Site Name | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA ? | Distance to Relevant Exposure (m) (1) | Distance to kerb of nearest road (m) ) (2) | Tube co-located with a Continuous Analyser? | Height (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| 46 | Middle Street, Beeston | R | 452914 | 336650 | $NO_2$ | N | 0 | 4^ | N | 1.9 |
| 47 | 6 Broughton street, Beeston | R | 452593 | 337186 | $NO_2$ | N | 0 | 2^ | N | 1.8 |
| 1 | 113 Wollaton Road, Beeston | R | 452527 | 337313 | $NO_2$ | N | 0 | 1^ | N | 1.9 |
| 2 | 166 Derby Road, Beeston | R | 452091 | 338122 | $NO_2$ | N | 0 | 7^ | N | 1.8 |
| 3 | 8 Queens Road East, Beeston | R | 453659 | 337412 | $NO_2$ | N | 0 | 12^ | N | 1.8 |
| 4 | 226 Queens Road, | R | 453361 | 336627 | $NO_2$ | N | 0 | 6^ | N | 1.8 |

| Site ID | Site Name | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA ? | Distance to Relevant Exposure (m) (1) | Distance to kerb of nearest road (m) ) (2) | Tube co-located with a Continuous Analyser? | Height (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Beeston | | | | | | | | | |
| 5 | Chilwell Olympia School, Beeston | UB | 451782 | 335320 | $NO_2$ | N | 0 | 104^ | N | 1.9 |
| 6 | 127 Attenborough Lane, Chilwell | R | 451482 | 334936 | $NO_2$ | N | 0 | 13^ | N | 1.7 |
| 7 | 31 Hickton Drive, Chilwell | R | 450756 | 334328 | $NO_2$ | N | 0 | 10^ | N | 1.9 |
| 8 | The Manor Pub, 350 Nottingham Road, Toton | R | 450422 | 334243 | $NO_2$ | N | 0 | 5^ | N | 1.8 |
| 9 | Toton branch Surgery, 2 Banks Road, Toton | R | 449876 | 334804 | $NO_2$ | N | 0 | 8^ | N | 1.8 |
| 10 | 1 Katherine Drive, Toton | R | 449748 | 335472 | $NO_2$ | N | 0 | 13^ | N | 1.7 |

| Site ID | Site Name | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA ? | Distance to Relevant Exposure (m) (1) | Distance to kerb of nearest road (m) ) (2) | Tube co-located with a Continuous Analyser? | Height (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| 11 | 269 Stapleford Lane, Toton | R | 449694 | 335501 | $NO_2$ | N | 0 | 7^ | N | 1.8 |
| 12 | Lamppost, Stapleford Lane, Toton | R | 449615 | 335664 | $NO_2$ | N | 0 | 2^ | N | 1.9 |
| 13 | George Spencer Lower School, Toton | R | 449266 | 336075 | $NO_2$ | N | 0 | 16^ | N | 1.8 |
| 45 | 209 Toton Lane, Stapleford | R | 449467 | 336220 | $NO_2$ | N | 0 | 16^ | N | 1.8 |
| 15 | George Spencer Academy, Stapleford | R | 449406 | 336135 | $NO_2$ | N | 0 | 9^ | N | 1.9 |
| 16 | 24 Brampton Drive, Stapleford | R | 449516 | 336216 | $NO_2$ | N | 0 | 11^ | N | 1.7 |

| Site ID | Site Name | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA ? | Distance to Relevant Exposure (m) (1) | Distance to kerb of nearest road (m) ) (2) | Tube co-located with a Continuous Analyser? | Height (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| 17 | Lamppost Church Street, Stapleford | R | 448890 | 337190 | $NO_2$ | N | 0 | 3^ | N | 1.8 |
| 18 | 20 Tiree Close, Trowell | R | 448560 | 338889 | $NO_2$ | Y | 0 | 26 | N | 1.7 |
| 19 | 15 Iona Drive, Trowell | R | 448586 | 339023 | $NO_2$ | Y | 0 | 23 | N | 1.9 |
| 20 | 30 Derbyshire Avenue, Trowell | R | 448652 | 339652 | $NO_2$ | N | 0 | 39 | N | 1.9 |
| 22 | 81 Nottingham Road, Trowell | R | 448832 | 340098 | $NO_2$ | N | 0 | 33 | N | 1.8 |
| 23 | Church Lane, Cossall | R | 448195 | 342287 | $NO_2$ | N | 0 | 2^ | N | 1.7 |
| 24 | Gin Close Way, Awsworth | R | 448230 | 344446 | $NO_2$ | N | 2 | 2^ | N | 1.8 |

| Site ID | Site Name | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA ? | Distance to Relevant Exposure (m) (1) | Distance to kerb of nearest road (m) ) (2) | Tube co-located with a Continuous Analyser? | Height (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| 44 | 32 Mansfield Road, Eastwood | R | 446509 | 347091 | $NO_2$ | N | 0 | 2^ | N | 1.8 |
| 27 | Sun Inn Pub, 6 Derby Road, Eastwood | R | 446465 | 346985 | $NO_2$ | N | 0 | 6^ | N | 1.8 |
| 28 | 9 Derby Road, Eastwood | R | 446401 | 346985 | $NO_2$ | N | 0 | 8^ | N | 1.8 |
| 30 | 560 Nottingham Road, Giltbrook | R | 448544 | 345241 | $NO_2$ | N | 0 | 3^ | N | 1.9 |
| 31 | 15 Hayley Close, Kimberley | R | 448826 | 344883 | $NO_2$ | N | 0 | 11^ | N | 1.9 |
| 32 | 59b Main Street, Kimberley | R | 450122 | 344658 | $NO_2$ | N | 0 | 5^ | N | 1.8 |
| 33 | 19a Nottingham Road, Nuthall* | R | 451631 | 344526 | $NO_2$ | Y | 0 | 42 | N | 1.7 |

| Site ID | Site Name | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA ? | Distance to Relevant Exposure (m) (1) | Distance to kerb of nearest road (m) ) (2) | Tube co-located with a Continuous Analyser? | Height (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| 34 | 19a Nottingham Road, Nuthall* | R | 451631 | 344526 | $NO_2$ | Y | 0 | 42 | N | 1.7 |
| 35 | 20 Nottingham Road, Nuthall | R | 451728 | 344440 | $NO_2$ | Y | 0 | 32 | N | 1.9 |
| 36 | 113 Nottingham Road, Nuthall | R | 452232 | 344033 | $NO_2$ | N | 0 | 20^ | N | 1.7 |
| 37 | 114 Nottingham Road, Nuthall | R | 452331 | 343910 | $NO_2$ | N | 0 | 27^ | N | 1.7 |
| 38 | Opp Sherwin Arms, Derby Road, Bramcote | R | 450389 | 337866 | $NO_2$ | N | 2 | 1^ | N | 1.8 |
| 39 | 9 Bembridge Court, Bramcote | R | 450434 | 337781 | $NO_2$ | N | 0 | 6^ | N | 1.6 |
| 40 | 153 Derby Road, Bramcote | R | 450632 | 337929 | $NO_2$ | N | 0 | 14^ | N | 1.7 |

| Site ID | Site Name | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA ? | Distance to Relevant Exposure (m) (1) | Distance to kerb of nearest road (m) ) (2) | Tube co-located with a Continuous Analyser? | Height (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| 41 | 169 Derby Road, Bramcote | R | 450555 | 337909 | $NO_2$ | N | 0 | 11^ | N | 1.8 |
| 48 | Near 73 Town Street, Bramcote | R | 450817 | 337592 | $NO_2$ | N | 0 | 2 | N | 1.8 |
| 49 | 4 Commercial Avenue, Beeston | R | 452084 | 336940 | $NO_2$ | N | 0 | 7^ | N | 1.9 |
| 43 | Broxtowe Borough Council Offices | UB | 452733 | 336962 | $NO_2$ | N | 0 | 10^ | N | 1.8 |

**Notes:**

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

(2) N/A if not applicable.

(^) All distance to kerb to nearest road relate to the M1 which is the primary source of $NO_2$ throughout the borough unless indicated using the ^ symbol

(*) Co-located tubes

**Table A.2 – Annual Mean $NO_2$ Monitoring Results**

| Site ID | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) [1] | Valid Data Capture 2017 (%) [2] | $NO_2$ Annual Mean Concentration ($\mu g/m^3$) [3] | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2013 | 2014 | 2015 | 2016 | 2017 |
| 46 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | - | 24 |
| 47 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | - | 25 |
| 1 | Roadside | Diffusion Tube | 100 | 100 | 32 | 32 | 29 | 30 | 28 |
| 2 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | 31 | 29 |
| 3 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | 26 | 22 |
| 4 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | 30 | 28 |
| 5 | Urban Background | Diffusion Tube | 100 | 100 | 22 | 21 | 20 | 20 | 19 |
| 6 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | 26 | 25 |

| Site ID | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) [1] | Valid Data Capture 2017 (%) [2] | $NO_2$ Annual Mean Concentration ($\mu g/m^3$) [3] | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2013 | 2014 | 2015 | 2016 | 2017 |
| 7 | Roadside | Diffusion Tube | 100 | 100 | 27 | 26 | 26 | 27 | 26 |
| 8 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | 31 | 29 |
| 9 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | 24 | 21 |
| 10 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | 26 | 26 |
| 11 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | 30 | 29 |
| 12 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | 29 | 25 |
| 13 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | 31 | 34 |
| 45 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | 28 | 29 |
| 15 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | 36 | 26 |

| Site ID | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) [1] | Valid Data Capture 2017 (%) [2] | $NO_2$ Annual Mean Concentration ($\mu g/m^3$) [3] | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2013 | 2014 | 2015 | 2016 | 2017 |
| 16 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | 28 | 26 |
| 17 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | 37 | 35 |
| 18 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | 34 | 33 |
| 19 | Roadside | Diffusion Tube | 100 | 100 | 39 | 38 | **42** | 38 | 37 |
| 20 | Roadside | Diffusion Tube | 100 | 100 | 33 | 30 | 26 | 26 | 24 |
| 22 | Roadside | Diffusion Tube | 100 | 100 | 30 | 30 | 26 | 27 | 24 |
| 23 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | 24 | 22 |
| 24 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | 26 | 24 |
| 44 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | 36 | 33 |

| Site ID | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) [1] | Valid Data Capture 2017 (%) [2] | $NO_2$ Annual Mean Concentration ($\mu g/m^3$) [3] | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2013 | 2014 | 2015 | 2016 | 2017 |
| 27 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | 26 | 24 |
| 28 | Roadside | Diffusion Tube | 92 | 92 | - | - | - | 25 | 21 |
| 30 | Roadside | Diffusion Tube | 92 | 92 | - | - | - | 27 | 28 |
| 31 | Roadside | Diffusion Tube | 100 | 100 | 30 | 32 | 30 | 30 | 32 |
| 32 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | 30 | 29 |
| 33 | Roadside | Diffusion Tube | 100 | 100 | 33 | 29 | 28 | 29 | 29 |
| 34 | Roadside | Diffusion Tube | 92 | 92 | 32 | 32 | 29 | 29 | 27 |
| 35 | Roadside | Diffusion Tube | 100 | 100 | 33 | 34 | 34 | 32 | 34 |
| 36 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | 35 | 35 |

| Site ID | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) [1] | Valid Data Capture 2017 (%) [2] | $NO_2$ Annual Mean Concentration ($\mu g/m^3$) [3] | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2013 | 2014 | 2015 | 2016 | 2017 |
| 37 | Roadside | Diffusion Tube | 92 | 92 | - | - | - | 32 | 30 |
| 38 | Roadside | Diffusion Tube | 100 | 100 | 22 | 34 | 31 | 34 | 30 |
| 39 | Roadside | Diffusion Tube | 100 | 100 | 32 | 32 | 28 | 31 | 26 |
| 40 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | 38 | 33 |
| 41 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | 37 | 36 |
| 48 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | - | 38 |
| 49 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | - | 24 |
| 43 | Urban Background | Diffusion Tube | 100 | 100 | 22 | 23 | 21 | 21 | 18 |

1

**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 Technical Guidance LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details

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

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

☒ **If applicable, all data has been distance corrected for relevant exposure**

# Appendix B: Full Monthly Diffusion Tube Results for 2017

**Table B.1 – $NO_2$ Monthly Diffusion Tube Results - 2017**

| Site ID | $NO_2$ Mean Concentrations (µg/m$^3$) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual Mean | | |
| | | | | | | | | | | | | | Raw Data | Bias Adjusted (0.89) and Annualised (1) | Distance corrected to Nearest Exposure (2) |
| 46 | **42** | 33 | 29 | 25 | 24 | 17 | 19 | 21 | 23 | 25 | 35 | 26 | 27 | 24 | - |
| 47 | **46** | 31 | 29 | 26 | 23 | 20 | 20 | 20 | 26 | 26 | 37 | 28 | 28 | 25 | - |
| 1 | **44** | 31 | 34 | 31 | 26 | 26 | 25 | 29 | 30 | 30 | 36 | 34 | 31 | 28 | - |
| 2 | **45** | 39 | 37 | 29 | 30 | 28 | 24 | 28 | 30 | 30 | 38 | 27 | 32 | 29 | - |
| 3 | 35 | 33 | 26 | 23 | 23 | 18 | 18 | 20 | 23 | 22 | 30 | 26 | 25 | 22 | - |
| 4 | **43** | 37 | 33 | 32 | 23 | 26 | 24 | 23 | 26 | **46** | 38 | 31 | 32 | 28 | - |
| 5 | 34 | 26 | 21 | 18 | 16 | 13 | 13 | 15 | 20 | 20 | 30 | 27 | 21 | 19 | - |
| 6 | **42** | 34 | 30 | 25 | 22 | 21 | 20 | 23 | 25 | 26 | 35 | 29 | 28 | 25 | - |
| 7 | **45** | 34 | 29 | 28 | 25 | 26 | 19 | 25 | 27 | 30 | 38 | 32 | 30 | 26 | - |
| 8 | **45** | 35 | 38 | 30 | 32 | 27 | 23 | 27 | 31 | 30 | 39 | 33 | 32 | 29 | - |
| 9 | 39 | 28 | 23 | 23 | 21 | 19 | 16 | 17 | 22 | 16 | 33 | 26 | 24 | 21 | - |
| 10 | 34 | 33 | 31 | 29 | 20 | 24 | 23 | 26 | 30 | 31 | **41** | 23 | 29 | 26 | - |

| Site ID | $NO_2$ Mean Concentrations (µg/m$^3$) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual Mean | | |
| | | | | | | | | | | | | | Raw Data | Bias Adjusted (0.89) and Annualised (1) | Distance corrected to Nearest Exposure (2) |
| 11 | **46** | 35 | 34 | 34 | 26 | 28 | 28 | 31 | 33 | 31 | 39 | 31 | 33 | 29 | - |
| 12 | **50** | 37 | 29 | 26 | 23 | 17 | 20 | 20 | 29 | 22 | 39 | 28 | 28 | 25 | - |
| 13 | **52** | **50** | **44** | 23 | 40 | 37 | 30 | 32 | 34 | 37 | 39 | 38 | 38 | 34 | - |
| 45 | **49** | 40 | 37 | 28 | 25 | 26 | 24 | 26 | 31 | 31 | **44** | 33 | 33 | 29 | - |
| 15 | **47** | 36 | 33 | 29 | 24 | 21 | 22 | 20 | 28 | 24 | 36 | 28 | 29 | 26 | - |
| 16 | **44** | 38 | 31 | 25 | 25 | 23 | 21 | 23 | 28 | 27 | 36 | 32 | 30 | 26 | - |
| 17 | **50** | **48** | **41** | 37 | 32 | 36 | 32 | 34 | 38 | 37 | **48** | 37 | 39 | 35 | - |
| 18 | **44** | **44** | 39 | 41 | 28 | 34 | 31 | 36 | 32 | 38 | **44** | 34 | 37 | 33 | - |
| 19 | **54** | 40 | **44** | 43 | 28 | 38 | 33 | 39 | 37 | **42** | **52** | **51** | **42** | 37 | - |
| 20 | **41** | 35 | 32 | 21 | 30 | 23 | 20 | 18 | 25 | 22 | 27 | 25 | 27 | 24 | - |
| 22 | 38 | 35 | 36 | 20 | 29 | 26 | 19 | 19 | 25 | 25 | 26 | 26 | 27 | 24 | - |
| 23 | **41** | 29 | 26 | 23 | 21 | 20 | 17 | 21 | 23 | 24 | 31 | 25 | 25 | 22 | - |
| 24 | 39 | 31 | 31 | 27 | 22 | 22 | 18 | 22 | 26 | 25 | 35 | 28 | 27 | 24 | 23 |
| 44 | **54** | **41** | **41** | 35 | 33 | 33 | 31 | 32 | 36 | 36 | **42** | 34 | 37 | 33 | - |
| 27 | **41** | 32 | 28 | 26 | 25 | 21 | 20 | 20 | 26 | 23 | 33 | 26 | 27 | 24 | - |

| Site ID | $NO_2$ Mean Concentrations (µg/m$^3$) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual Mean | | |
| | | | | | | | | | | | | | Raw Data | Bias Adjusted (0.89) and Annualised (1) | Distance corrected to Nearest Exposure (2) |
| 28 | (a) | 30 | 27 | 22 | 22 | 19 | 18 | 19 | 25 | 20 | 28 | 26 | 23 | 21 | - |
| 30 | **46** | 32 | 32 | 26 | 23 | (a) | 23 | 26 | 29 | 30 | **42** | 36 | 31 | 28 | - |
| 31 | **51** | 40 | 37 | 37 | 23 | 31 | 30 | 31 | 31 | 35 | **44** | 40 | 36 | 32 | - |
| 32 | **44** | 38 | 37 | 33 | 30 | 30 | 25 | 27 | 30 | 22 | 40 | 32 | 32 | 29 | - |
| 33 | **44** | 39 | 35 | 26 | 30 | 29 | 24 | 24 | **46** | 29 | 32 | 31 | 32 | 29 | - |
| 34 | **43** | 35 | 37 | 27 | 26 | 29 | 23 | 25 | 30 | 20 | 33 | (a) | 30 | 27 | - |
| 35 | **42** | 39 | **44** | 42 | 25 | 37 | 31 | 36 | 33 | 39 | **43** | **41** | 38 | 34 | - |
| 36 | **56** | **45** | 36 | 34 | 29 | **44** | 31 | 34 | 40 | **45** | **47** | **45** | 39 | 35 | - |
| 37 | **42** | 34 | 40 | (a) | 30 | 31 | 26 | 27 | 33 | 27 | **41** | 34 | 33 | 30 | - |
| 38 | **44** | 39 | 34 | 40 | 33 | 29 | 25 | 25 | 31 | 29 | **43** | 39 | 34 | 30 | 28 |
| 39 | 40 | 34 | 34 | 23 | 31 | 26 | 19 | 22 | 32 | 24 | 32 | 29 | 29 | 26 | - |
| 40 | **46** | **42** | **42** | 34 | 36 | 38 | 33 | 31 | 26 | 35 | **42** | 37 | 37 | 33 | - |
| 41 | **48** | **41** | **42** | 39 | 37 | 39 | 30 | 33 | 39 | 40 | **47** | **44** | 40 | 36 | - |
| 48 | **52** | 40 | **45** | 37 | 35 | **44** | 35 | 36 | **42** | **43** | **56** | **42** | **42** | 38 | - |
| 49 | **42** | 31 | 27 | 26 | 23 | 19 | 19 | 21 | 28 | 25 | 36 | 31 | 27 | 24 | - |

| Site ID | $NO_2$ Mean Concentrations ($\mu g/m^3$) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual Mean | | |
| | | | | | | | | | | | | | Raw Data | Bias Adjusted (0.89) and Annualised (1) | Distance corrected to Nearest Exposure (2) |
| 43 | 36 | 26 | 22 | 17 | 16 | 13 | 13 | 14 | 19 | 19 | 28 | 26 | 21 | 18 | - |

**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.

(a) Missing tubes

☒ **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**

# Appendix C: A Trend Graph for 13 Continuous Monitoring Sites from 2013 to 2017

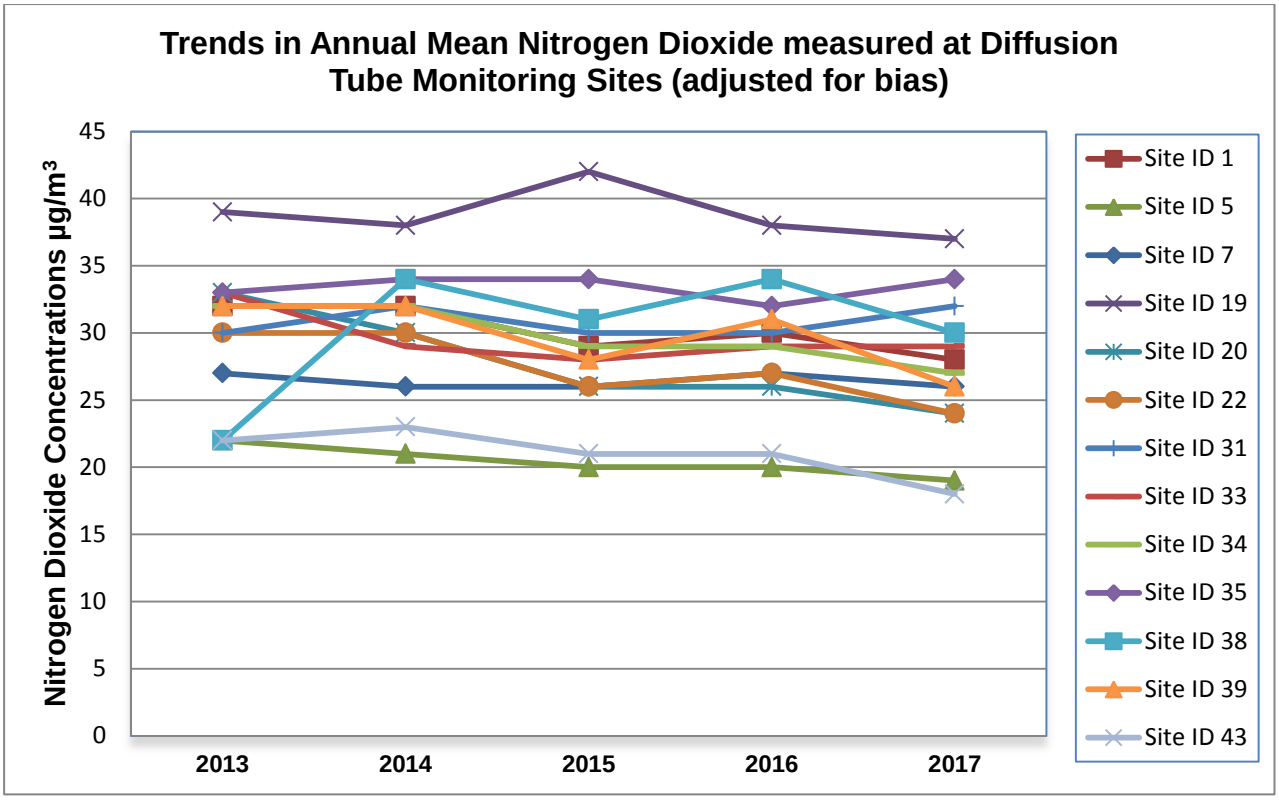



**Figure C.1 – Trend Graph of 13 Sites 2013 to 2017.**

**Site ID 1** = 113 Wollaton Road, Beeston

**Site ID 5 =** Chilwell Olympia School, Beeston

**Site ID 7 =** 31 Hickton Drive, Chilwell

**Site ID 19 =** 15 Iona Drive, Trowell

**Site ID 20 =** 30 Derbyshire Avenue, Trowell

**Site ID 22 =** 81 Nottingham Road, Trowell

**Site ID 31 =** 15 Hayley Close, Kimberley

**Site ID 33 =** 19a Nottingham Road, Nuthall

**Site ID 34 =** 19a Nottingham Road, Nuthall

**Site ID 35 =** 20 Nottingham Road, Nuthall

**Site ID 38 =** Opposite Sherwin Arms, Derby Road, Bramcote

**Site ID 39 =** 9 Bembridge Court, Bramcote

**Site ID 43 =** Broxtowe Borough Council Offices

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

## Nitrogen Dioxide Diffusion Tube Adjustment Information

BBC diffusion tubes are supplied and analysed by Gradko Ltd. Since April 2008 BBC has entered into a contract with Gradko along with all Nottinghamshire Local Authorities to ensure that any deviations within different laboratory practices are ruled out. This enables data to be easily compared between the County authorities. The tubes are prepared using a 20% solution of triethanolamine (TEA) in de-ionised water. The tubes are exposed for one month before being returned for laboratory analysis.

## Diffusion Tube Bias Adjustment Factors

The national bias adjustment factor was used to bias correct the data. The adjustment factor specific to each year is shown below.

### 2017 Figures

The Review and Assessment (R&A) Helpdesk Database 2017 bias adjustment factor for Gradko 20% TEA in water tubes = 0.89. This figure is the average of 34 studies and was taken from Spread sheet Version Number: 03/18.

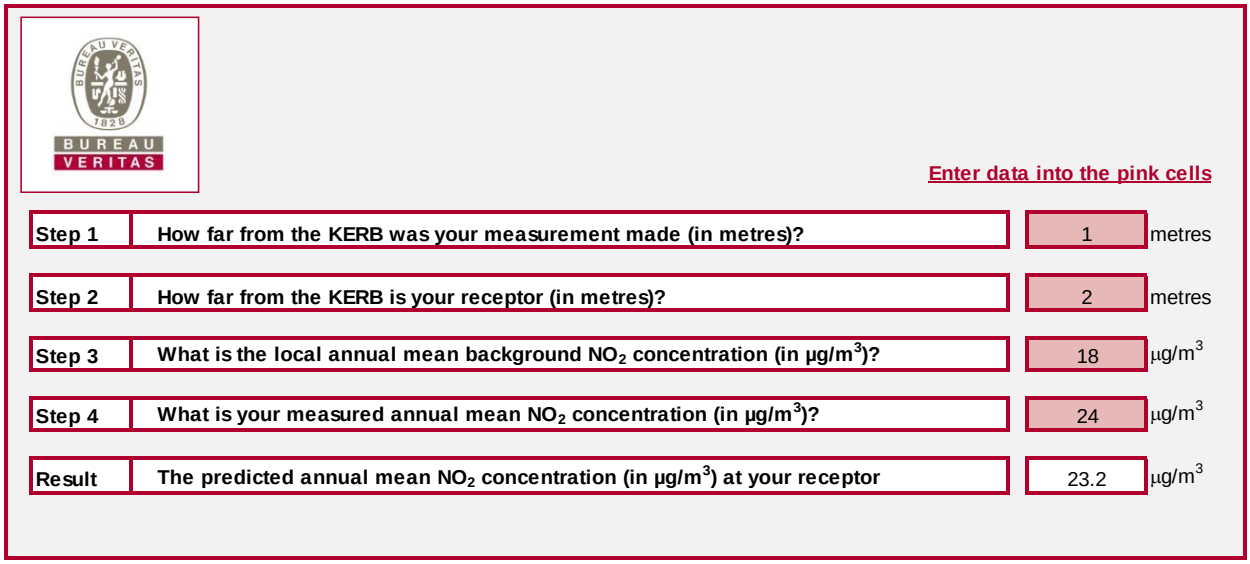
Diffusion tube precision was good for 32 of the 34 studies used to derive the national bias adjustment factor. Tube precision is categorised as “good” where the coefficient of variation (CV) of triplicate diffusion tubes for eight or more periods during the year is less than 20%, and the average CV of all monitoring periods is less than 10% (LAQM.TG(16)).

### Annualisation

As the data capture was not below 75%, it was not necessary for the data to be annualised.

## Distance Correction

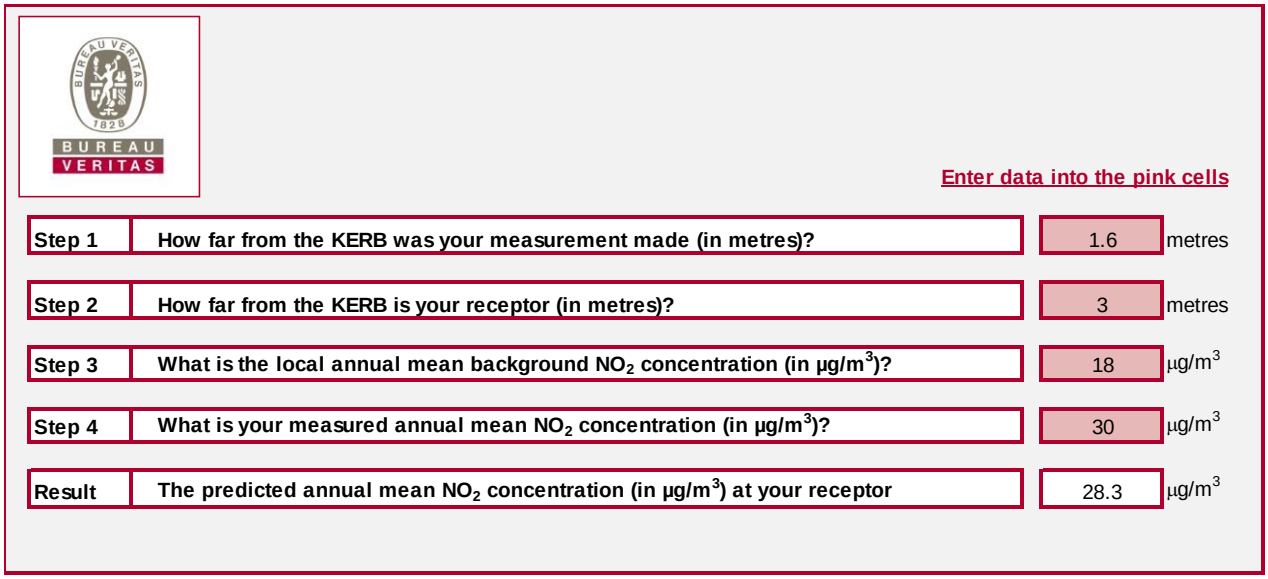
Two sites have been distance corrected to the nearest public exposure using the NO2 fall-off with distance calculator available on the LAQM website http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html . The two sites are Site 24 and Site 38.



Enter data into the pink cells

| | | | |
|---|---|---|---|
| Step 1 | How far from the KERB was your measurement made (in metres)? | 1 | metres |
| Step 2 | How far from the KERB is your receptor (in metres)? | 2 | metres |
| Step 3 | What is the local annual mean background $NO_2$ concentration (in $\mu g/m^3$)? | 18 | $\mu g/m^3$ |
| Step 4 | What is your measured annual mean $NO_2$ concentration (in $\mu g/m^3$)? | 24 | $\mu g/m^3$ |
| Result | The predicted annual mean $NO_2$ concentration (in $\mu g/m^3$) at your receptor | 23.2 | $\mu g/m^3$ |

**Figure D.1 - Road Calculation to nearest Receptor for Site 24.**



Enter data into the pink cells

| | | | |
|---|---|---|---|
| Step 1 | How far from the KERB was your measurement made (in metres)? | 1.6 | metres |
| Step 2 | How far from the KERB is your receptor (in metres)? | 3 | metres |
| Step 3 | What is the local annual mean background $NO_2$ concentration (in $\mu g/m^3$)? | 18 | $\mu g/m^3$ |
| Step 4 | What is your measured annual mean $NO_2$ concentration (in $\mu g/m^3$)? | 30 | $\mu g/m^3$ |
| Result | The predicted annual mean $NO_2$ concentration (in $\mu g/m^3$) at your receptor | 28.3 | $\mu g/m^3$ |

**Figure D.2 - Road Calculation to nearest Receptor for Site 38.**

## QA/QC Data for Non-Automatic Sites

### Broxtowe Borough Council

The QA/QC procedure's that are followed when deploying diffusion tubes are:

- The diffusion tubes on arrival are labelled (including the travel blank), put back in a sealed bag then stored in a fridge until they are deployed.
- The diffusion tubes (including the travel blank) are removed from the fridge 10 minutes before undertaking the changeover.
- All of the diffusion tubes are deployed vertically in a spacer at each location and the date and time of their removal is recorded. The travel blank is not exposed e.g. the end cap is not removed.
- After all of the diffusion tubes have been changed over, they are then put back into the fridge until they are sent to the laboratory.
- The paperwork is then filled in and the diffusion tubes and the associated paperwork are sent to the laboratory for analysis.

### Gradko

Gradko International (diffusion tube supplier and analyst) is United Kingdom Accreditation Service (UKAS) accredited; it is assessed annually for compliance to ISO 17025 and participates in other proficiency schemes.

Gradko International confirms that:

- Their procedures have been amended to follow the guidance issued on behalf of Defra (AWA Energy & Environment, Feb 2008) relating to the preparation, extraction, analysis and calculation procedures for passive $NO_2$ diffusion tubes. And
- That most of these procedures were in force before the guidance was introduced and any amendments necessary in achieving compliance were minimal

Gradko International also participates in a number of QA/QC monitoring systems to demonstrate satisfactory performance:

- The Workplace Analysis Scheme for Proficiency (WASP) programme to ensure uniformity of data throughout the year. Only laboratories that are in the WASP scheme are used for analysing tubes from the National Nitrogen Dioxide Diffusion Tube Network.
- The monthly field inter-comparison exercise with other laboratories to enable assessment of bias and precision undertaken by AEA Energy & Environment

An external QC scheme to check solutions is run by AEA Energy & Environment

# Appendix E: Map of All Monitoring Locations within the Borough of Broxtowe.

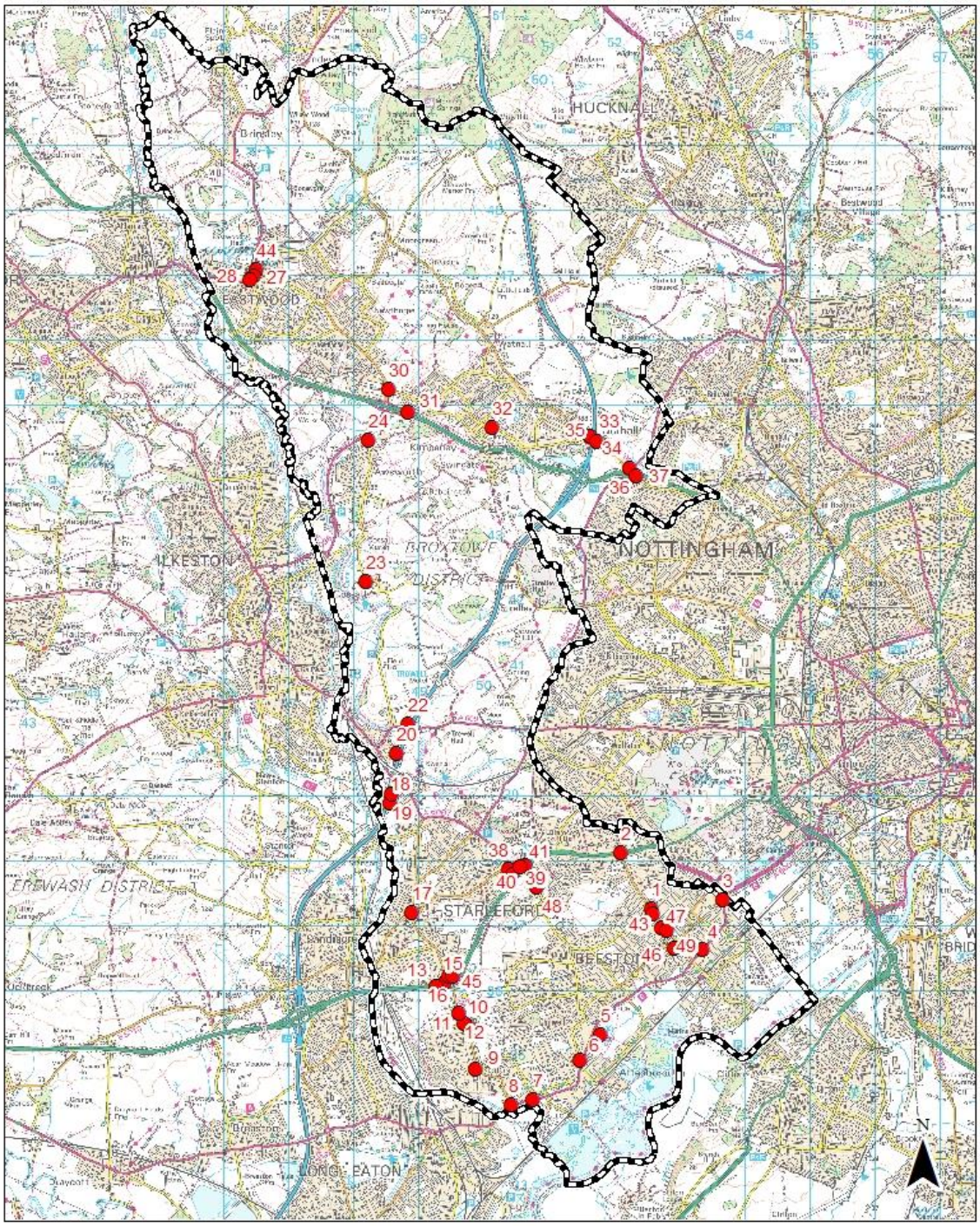



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**Figure E.1 – Diffusion Tube Locations**

# Appendix F: Map of AQMA in Trowell.

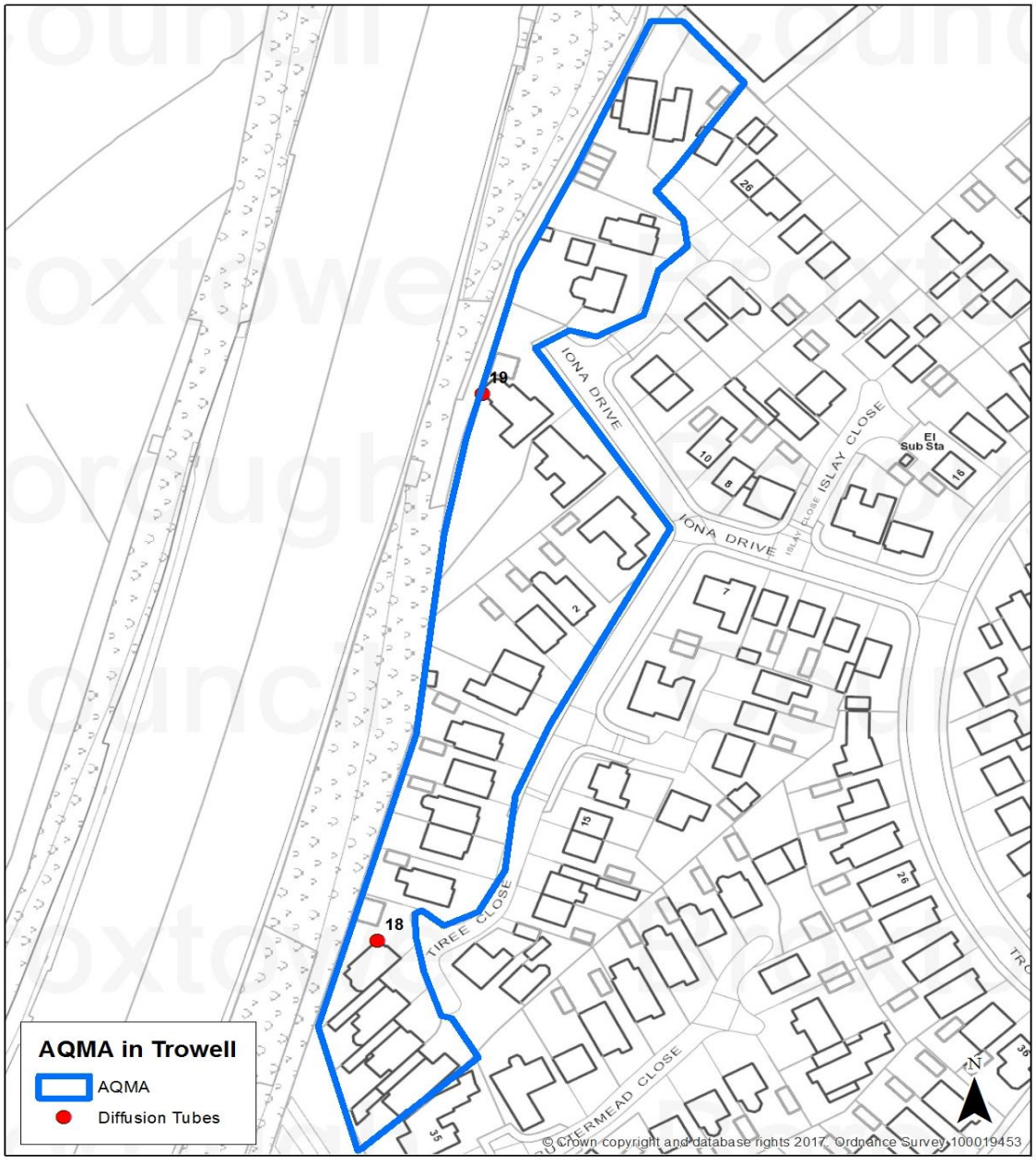


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**Figure F.1 - AQMA 1 encompassing twenty properties on parts of Iona Drive and Tiree Close next to the M1 motorway and the Trowell Park estate (boundary marked in blue).**

# Appendix G: Revocation Order for the former AQMA in Nuthall.

Broxtowe Borough COUNCIL

Environment Act 1995 Part IV Section 83(2)(b)

Broxtowe Borough Council

Order revoking an Air Quality Management Area

Broxtowe Borough Council, in exercise of the powers conferred upon it by Section 83(2)(b) of the Environment Act 1995, hereby makes the following Order:-

1. This Order shall revoke the area known as **Air Quality Management Area 4** for Nitrogen Dioxide (Annual Mean) objective as specified in the Air Quality Regulations (England) (Wales) 2000. This designated area incorporates 6 Nottingham Road, Nuthall Nottingham NG16 1DP, 17,19,19a,21a,23,27,18,20 Nottingham Road, Nuthall NG16 1DH, Northfield Farm, Back Lane, Nuthall, Nottingham NG16 1BT, 1,2, 3 Northfield Cottages, Back Lane, Nuthall, Nottingham, NG16 1BT and is shown in the attached map.

2. This Order shall come into force on 26th June 2017.

The Common Seal of Broxtowe Borough Council was hereto affixed on 8th September 2017 and signed in the presence of:

**THE COMMON SEAL** of **BROXTOWE BOROUGH COUNCIL** was hereunto affixed in the presence of:-

120670

H G Khaled Mayor

Duly Authorised Officer

**A Map showing Air Quality Management Area (AQMA) 4 in Nuthall outlined in red.**

# Appendix H: Map of the Borough showing the 2017 modelled background levels of $PM_{2.5}$.

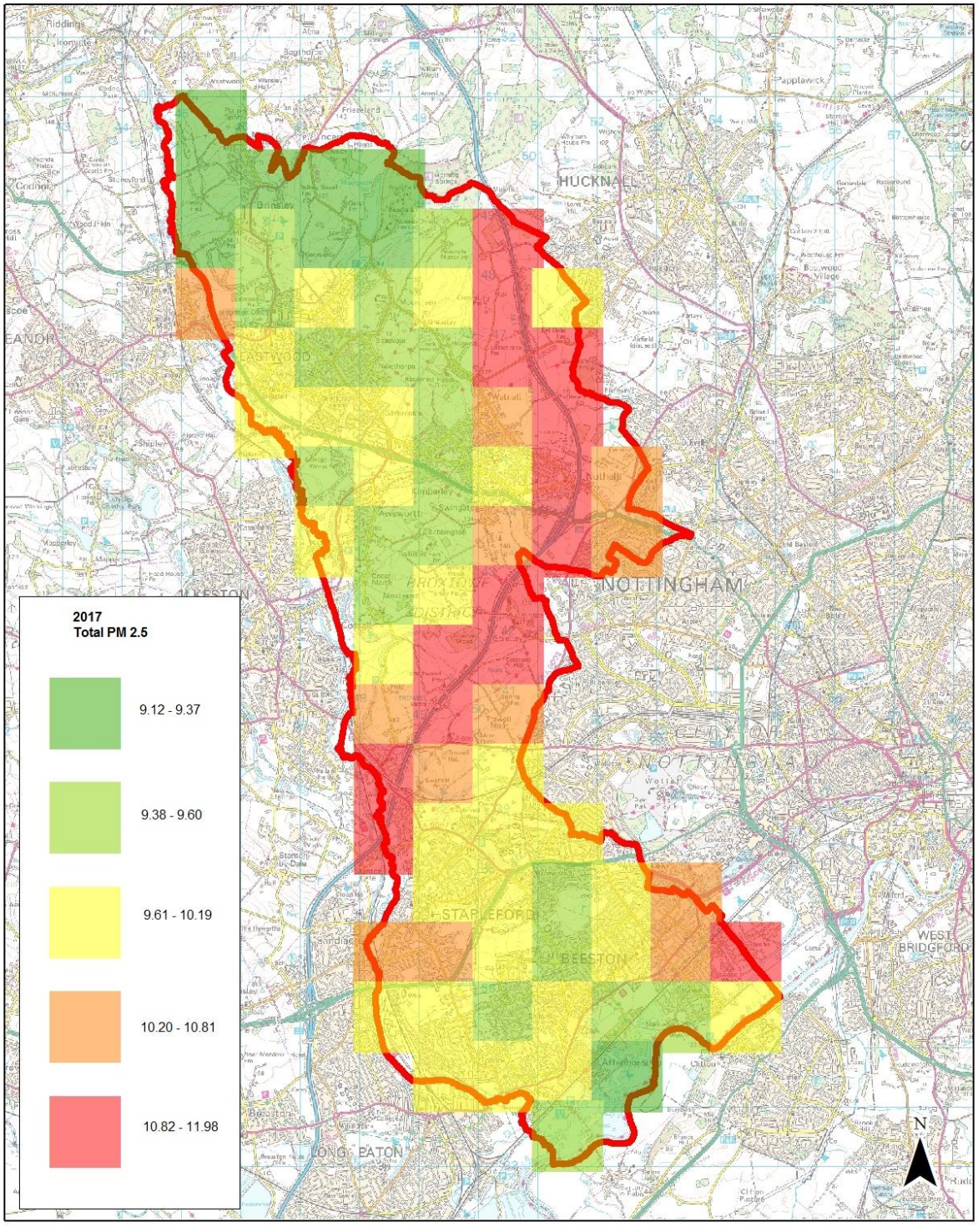


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**Figure H.1 - Map of the Borough showing the modelled background levels of $PM_{2.5}$.**

# Appendix I: Map of A610/B600 Nuthall Island showing the Monitoring Locations.


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**Figure I.1 – Nuthall Island and Diffusion Tube Location.**

# Appendix J: Map of Bramcote Island, Derby Road, Bramcote showing the Monitoring Locations.

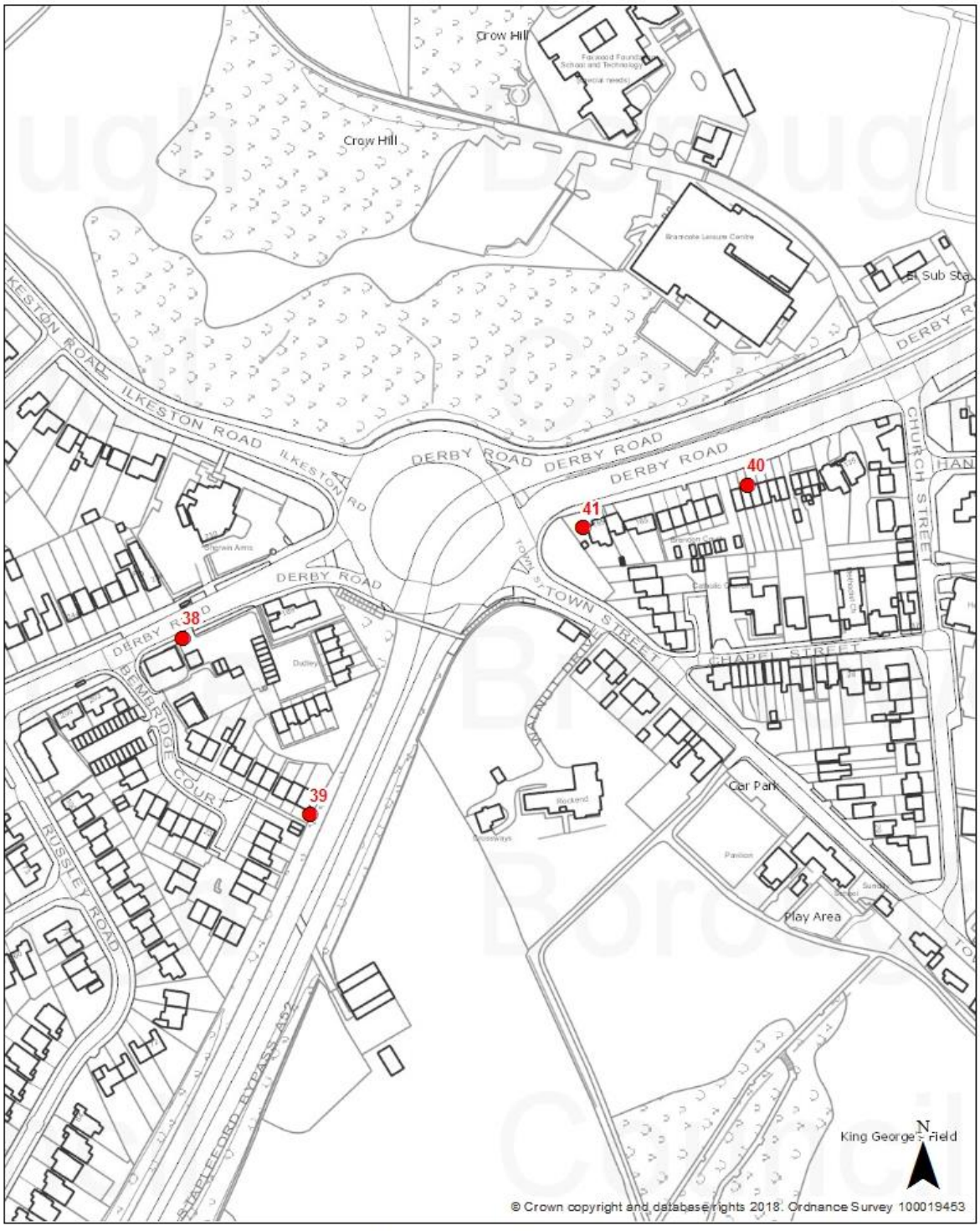


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**Figure J.1 – Bramcote Island and Diffusion Tube Location**

# Appendix K: Map of Town Street, Bramcote showing the Monitoring Location.


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**Figure K.1 – Map of Town Street, Bramcote and Diffusion Tube Location**

# Appendix L: Summary of Air Quality Objectives in England

**Table L.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 |
| Particulate Matter ($PM_{2.5}$) | Work towards reducing emissions/concentrations of fine particulate matter ($PM_{2.5}$) | 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 microgrammes of pollutant per cubic metre of air (µg/m$^3$).

# Glossary of Terms

| Abbreviation | Description |
|---|---|
| AQAP | Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values' |
| AQMA | Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives |
| ASR | Air Quality Annual Status Report |
| AURN | Automatic Urban and Rural Network |
| BBC | Broxtowe Borough Council |
| CAZ | Clean Air Zone |
| CV | Coefficient of Variation |
| Defra | Department for Environment, Food and Rural Affairs |
| DfT | Department for Transport |
| EMAQN | East Midlands Air Quality Network |
| EU | European Union |
| HE | Highways England |
| HGV's | Heavy Goods Vehicles |
| HS2 | High Speed Train 2 |
| ITSO | Integrated Transport Smartcard Organisation |
| LAQM | Local Air Quality Management |
| LAQM.PG(16) | LAQM Policy Guidance 2016 |
| LAQM.TG(16) | LAQM Technical Guidance 2016 |
| LGA | Local Government Association |
| LSTF | Local Sustainable Transport Fund |
| µg/m$^3$ | Microgrammes of pollutant per cubic metre of air |
| NEPWG | Nottinghamshire Environmental Protection Working Group |

| | |
|---|---|
| NET | Nottingham Express Transit |
| NCT | Nottingham City Transport |
| NO | Nitric Oxide |
| $NO_2$ | Nitrogen Dioxide |
| $NO_x$ | Nitrogen Oxides |
| Notts CC | Nottingham City Council |
| NCC | Nottinghamshire County Council |
| $O_3$ | Ozone |
| OLEV | Office for Low Emission Vehicles |
| PHE | Public Health England |
| PM | Particulate Matter |
| $PM_{10}$ | 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 |
| PTP | Personalised Travel Planning |
| QA/QC | Quality Assurance and Quality Control |
| R&A | Review and Assessment |
| SAFED | Safe And Fuel Efficient Driving |
| $SO_2$ | Sulphur Dioxide |
| SQPS | Statutory Quality Partnership Schemes |
| TEA | Triethanolamine |
| UK | United Kingdom |
| ULEVs | Ultra Low Emission Vehicles |
| WASP | Workplace Analysis Scheme for Proficiency |
| WHO | World Health Organisation |
| WPL | Workplace Parking Levy |

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