



Broxtowe  
Borough  
COUNCIL

**DRAFT**

# **2020 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 2020

**Broxtowe Borough Council**

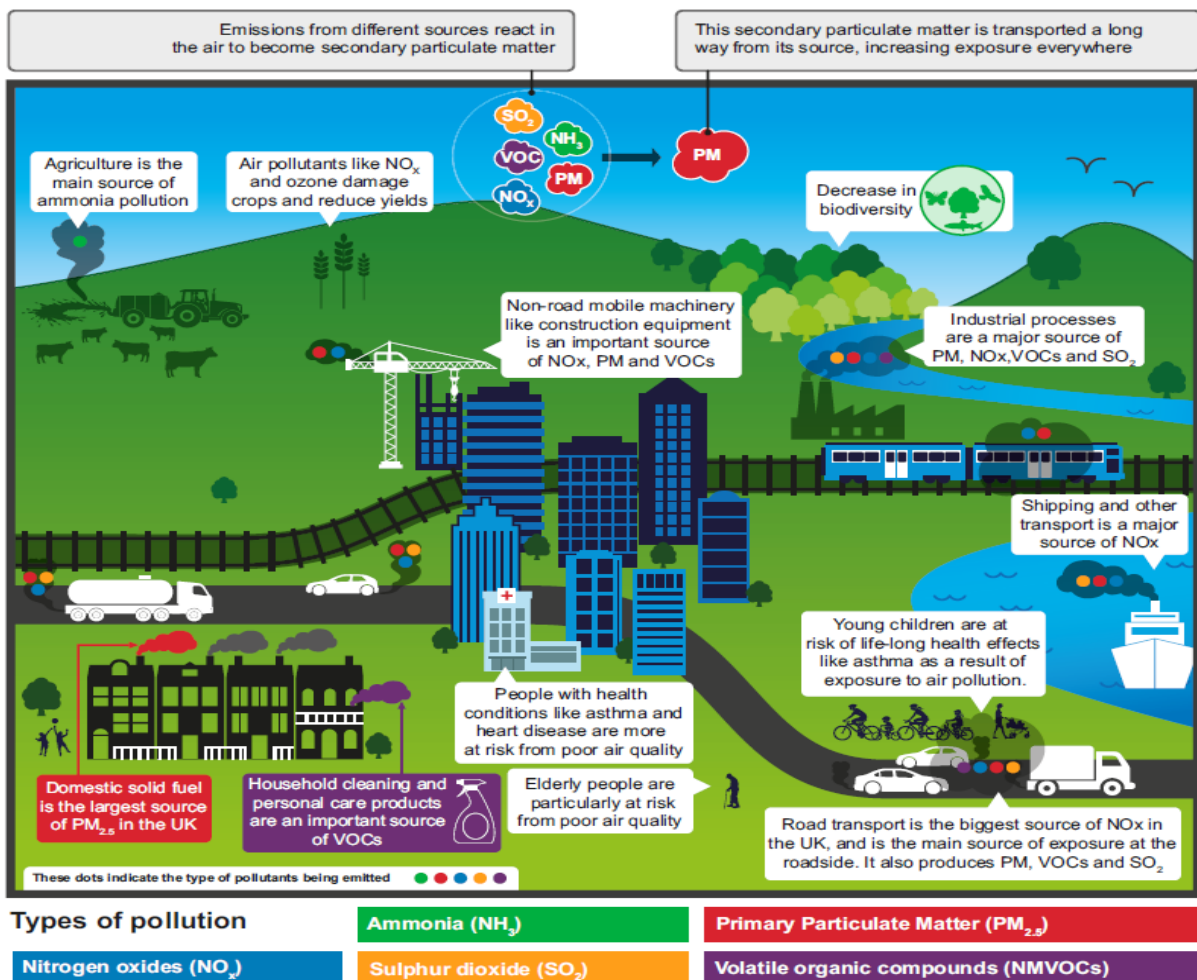
Local Authority Officer	Kate Ratcliffe
Department	Environmental Health
Address	Council Offices Foster Avenue Beeston Nottingham NG9 1AB
Telephone	0115 9177777
E-mail	health@broxtowe.gov.uk
Report Reference number	BBC/AQ/ASR/2020
Date	June 2020

# 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).

### The sources of air pollutants and their effects.



Source – Clean Air Strategy 2019, DEFRA

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/770715/clean-air-strategy-2019.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770715/clean-air-strategy-2019.pdf)

Poor air quality can affect people's health on a daily basis and can 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<sub>2</sub>) and Particulate Matter (PM<sub>10</sub> and PM<sub>2.5</sub>), 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, are being 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<sub>2</sub>. Nitrogen Monoxide is a colourless gas with the chemical formula NO. Collectively NO<sub>2</sub> and NO are known as Oxides of Nitrogen and the chemical formula is NO<sub>x</sub>.

As mentioned previously NO<sub>x</sub> is 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.

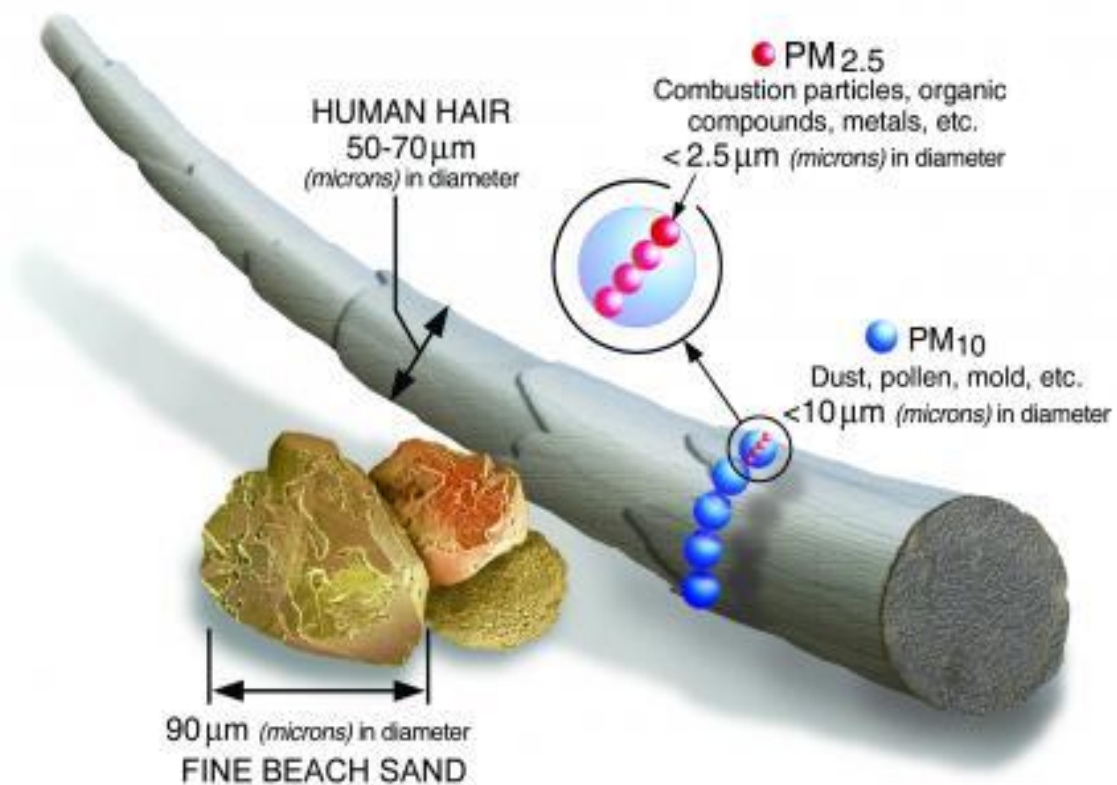
Some sources of NO<sub>x</sub> release NO<sub>x</sub> in the form of NO<sub>2</sub> into the atmosphere, these are known as primary sources of NO<sub>2</sub>, which are mainly emitted from vehicle exhausts. It was previously believed that it was petrol vehicles that were the main source of NO<sub>2</sub> however the use of diesel particulate filters within the exhaust systems of diesel vehicles have resulted in high concentrations of NO<sub>2</sub> being emitted into the atmosphere.

Another source of NO<sub>2</sub> in the atmosphere is due to a chemical reaction in the atmosphere between NO and Ozone (O<sub>3</sub>). This is classed as a secondary source of NO<sub>2</sub>. However, if concentrations of O<sub>3</sub> are low near to the source of NO then NO<sub>2</sub> 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.

### Size of Particulate Matter



Source: USEPA - <https://www3.epa.gov/pm/basic.html>

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 K 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<sub>2.5</sub>) or 'inhalable coarse particles' (PM<sub>10</sub>). The particles are measured in size and referred to as microns (µm). PM<sub>10</sub> are particles that are 10 microns to 2.5 microns in size, and PM<sub>2.5</sub> 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 both short term and long term. 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<sup>1,2</sup>.

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion<sup>3</sup>.

To be able to understand the full effects of poor air quality on humans an understanding of how the pollutants enter the body, where they go once they are within the body and the effects that they have are shown in the diagram below.

---

<sup>1</sup> Environmental equity, air quality, socioeconomic status and respiratory health, 2010

<sup>2</sup> Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

<sup>3</sup> Defra. Abatement cost guidance for valuing changes in air quality, May 2013

## Where air pollutants go in our bodies and what they do

A few hours of PM<sub>2.5</sub> over 35 µg/m<sup>3</sup> or NO<sub>2</sub> over 200 µg/m<sup>3</sup> irritates the eyes, nose and throat.

PM can cause strokes. Ultrafine PM has been found in samples of brain and central nervous system tissue.

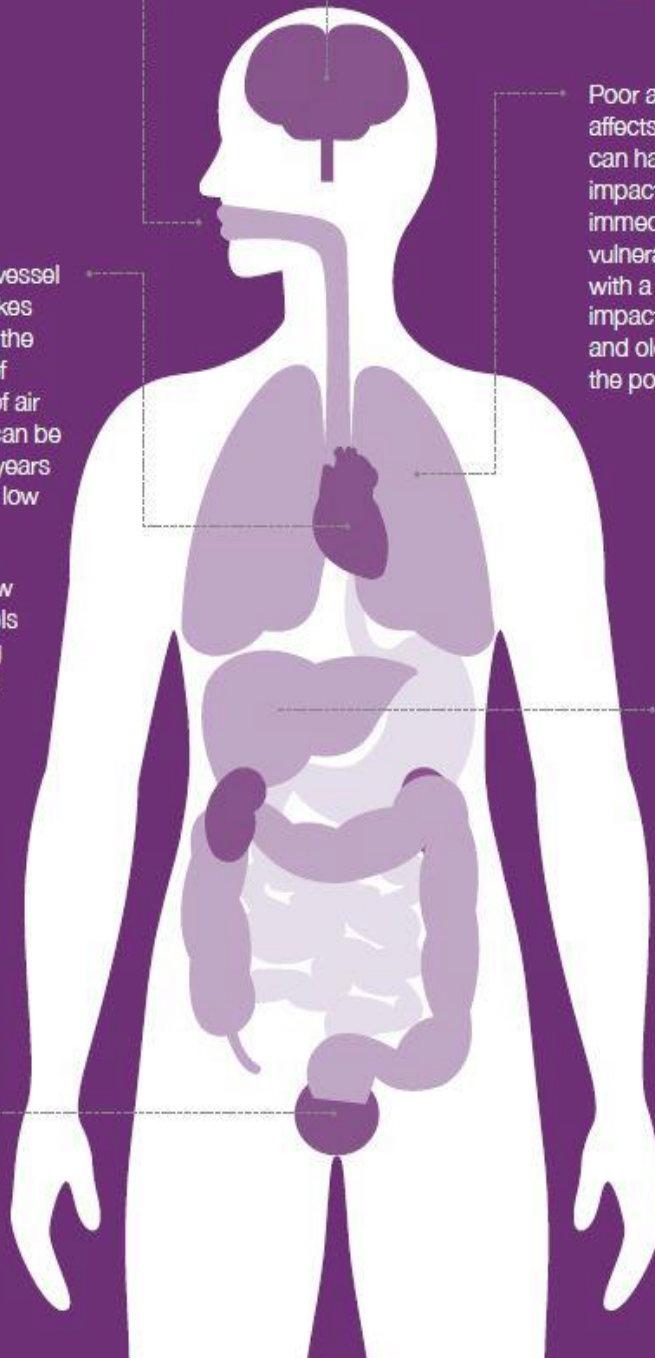
Heart and blood vessel diseases like strokes and hardening of the arteries are one of the main effects of air pollution. These can be caused by a few years exposure to even low levels of PM<sub>2.5</sub>.

Poor air quality affects everyone. It can have long term impacts on all and immediate effects on vulnerable people, with a disproportionate impact on the young and old, the sick and the poor.

Exposure for a few hours to high levels of PM<sub>2.5</sub> can bring on existing illness or strokes and heart attacks in ill people.

Ultrafine PM can get into the blood then throughout the body. Ultrafine particles have been found in body organs.

PM has been found in the reproductive organs and in unborn children.

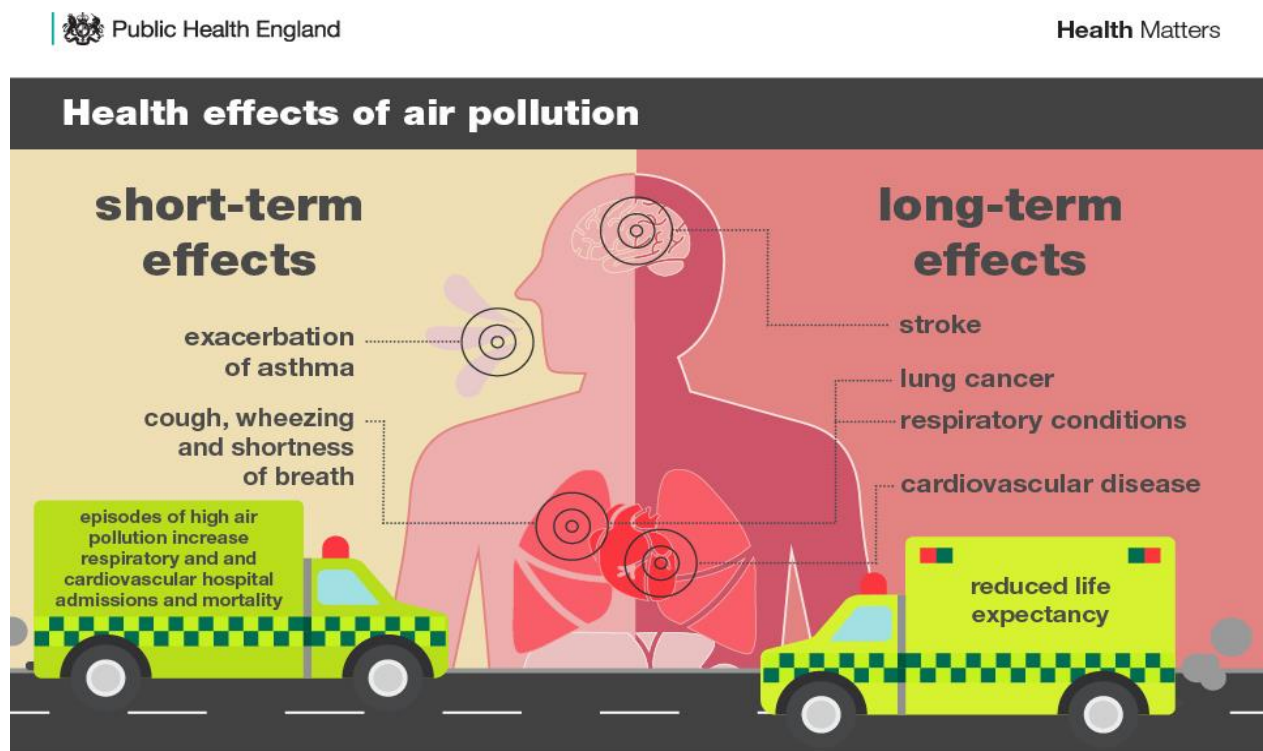


Source - Air Quality: A Briefing for Directors of Public Health, March 2017  
<https://laqm.defra.gov.uk/assets/63091defraairqualityguide9web.pdf>



When people are within an area of poor air quality the length of time they are there is called the 'exposure' time'. There are two types of exposure, short-term and long term. Short-term is when the person is subjected to poor air quality for a short time e.g. a couple of hours and the effects are called 'Short-term effects'. Long term exposure is when people are consistently living or working with in an area where there is poor air quality. The short- term and long-term effects on the body are shown in the diagram below.

### The short and long-term effects of air pollution



Source – Health Matters 2018, Public Health England

### 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.



## Broxtowe Borough Council

The Committee on the Medical Effects of Air Pollution (COMEAP) has produced estimates of the attributable deaths of people aged 25+ due to NO<sub>2</sub> and Particulate Matter based on 36,000 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, Nottinghamshire County Council, Nottingham City and all the District and Borough Councils within Nottinghamshire.

**Table i – Estimated Attributable Deaths in 2018 due to NO<sub>2</sub> and Particulate Matter based on 36,000.**

Area	Attributable deaths Age 25+ due to NO <sub>2</sub> and PM based on 36,000	Associated Life-years Lost based on 36,000
East Midlands	3,115	29,813
Nottinghamshire County Council	567	5,430
Nottingham City	181	1,734
Ashfield	94	913
Gedling	87	866
Newark and Sherwood	87	863
Bassetlaw	84	855
Broxtowe Borough Council	86	844
Mansfield	79	819
Rushcliffe	77	728

**Source:** COMEAP, Associations of long-term average concentrations of Nitrogen Dioxide with mortality, 2018.

Table i shows that in the Borough of Broxtowe out of 844 life years lost, 86 of these are attributable to NO<sub>2</sub> and Particulate Matter. However, the data also identifies that Broxtowe does not have the highest number of deaths that are attributable to air quality in comparison to other District and Borough authorities in Nottinghamshire

## **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<sup>4</sup>. Public Health England (PHE) 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 ii provides the results for Nottingham City and Broxtowe Borough Council.

**Table ii – Estimated Effects of Annual Mortality in 2018 of human-made PM<sub>2.5</sub> Air Pollution.**

<b>Area</b>	<b>Attributable fraction</b>	<b>Attributable * Deaths aged 30 and over</b>	<b>Associated life-years lost</b>
Nottingham City	5.2	121	<b>Work Out</b>
Broxtowe Borough Council	4.9	55	<b>Work Out</b>

**Source:** Estimating Local Mortality Burdens associated with particulate air pollution, PHE, 2019.

\*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.

### **Discuss Table ii**

<sup>4</sup>Gowers, A.M. et al Estimating Local Mortality burdens associated with Particulate Air Pollution, Public Health England, 2017.

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 on the AQMA is discussed in Chapter 2.1 of this report.

The 2019 nitrogen dioxide results show that the air quality levels are below the objective of  $40\mu\text{g}/\text{m}^3$  for all of the monitoring locations throughout the Borough. The results are discussed in greater detail in Chapter 3.2.1 of this report.

Since January 2013, there are only thirteen  $\text{NO}_2$  monitoring sites that have continued to be used for the past six years. Therefore, it is important to identify any trends in these sites. Out of the thirteen sites, twelve of the sites are showing a downward trend since 2013, The one remaining site has only shown a very slight downward trend but has increased in 2019 by  $3\mu\text{g}/\text{m}^3$  in comparison to 2018. The trends are discussed in greater detail in Chapter 3.2.1 of this report and Appendix C contains the trend graphs for the thirteen sites.

## Broxtowe Borough Council

In respect of particulates, the modelled background level provided by Defra for the Borough of Broxtowe is predicted to be between  $8\mu\text{g}/\text{m}^3$  and  $11\mu\text{g}/\text{m}^3$  for 2019, with the annual mean for 2019 being  $9.73\mu\text{g}/\text{m}^3$ . The World Health Organisation (WHO) guideline level for  $\text{PM}_{2.5}$  is  $10\mu\text{g}/\text{m}^3$ .

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.

#### **UPDATE ALL ACTIONS**

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 2019 nitrogen dioxide results show that the air quality levels are below the objective of  $40\mu\text{g}/\text{m}^3$  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  $\text{NO}_2$  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  $\text{NO}_2$  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 provide information on green travel e.g. walking, cycling by providing leaflets.

## Broxtowe Borough Council

- 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<sub>2</sub> and particulate matter.
- Broxtowe Borough Council is an active member in the Air Quality Strategy Task Group.
- **UPDATE ABOUT NAQS**
- Review the measures in Broxtowe Borough Councils Air Quality Action Plan and to continue to report on them in the next ASR as well as all the measures that are being implemented in the Borough to reduce air quality levels.
- **DISCUSS LOCAL PLAN ABOUT AQ AND EVCP**
- 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.

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<sub>10</sub> and PM<sub>2.5</sub> 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 2019 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 is run by Public Health England. 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). However, Nottingham City Council subsequently undertook air quality modelling of several potential CAZ options (charging and non-charging) alongside planned actions (e.g. measures to provide and promote sustainable transport infrastructure) to determine if they would deliver the required air quality objectives. This modelling has identified that air quality objectives are anticipated to be met without the introduction of a charging CAZ.

Broxtowe Borough Council was selected in 2018 to be in the Air Quality Task and Finish Group, which has been set up to update the Nottinghamshire Air Quality Strategy (NAQS). **UPDATE ABOUT NAQS**

## **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. In addition to printed materials, an integrated public transport planning tool detailing local bus, rail and tram networks, as well as for trips further afield can be found at <https://www.nottinghamshire.gov.uk/travelchoice/journey-planner> and <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/>
- 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.

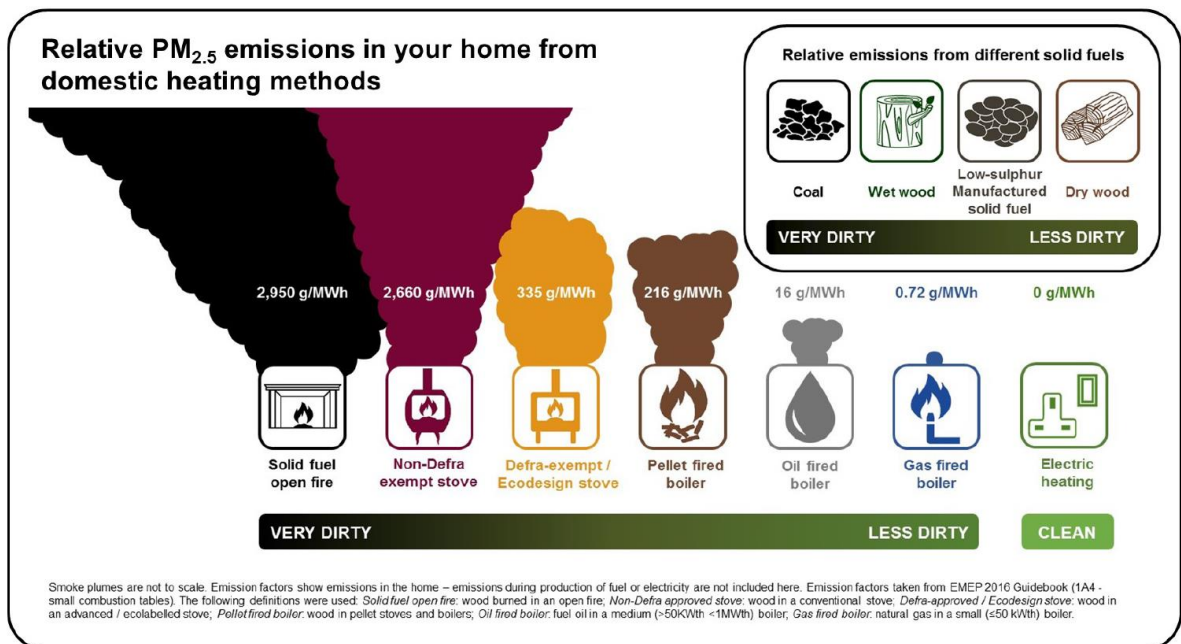
Walking -

- 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> Sustrans is also a charity that promotes sustainable travel and further information can be found at <http://www.sustrans.org.uk/>
- 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/>
- Bonfires – To not have bonfires at all and to compost all garden waste and recycle rubbish rather than burn it.
- Heating your home –
  - 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
  - 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



Source – Clean Air Strategy 2019, DEFRA

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/770715/clean-air-strategy-2019.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770715/clean-air-strategy-2019.pdf)

## Table of Contents -UPDATE

<b>Executive Summary: Air Quality in Our Area</b> .....	<b>i</b>
What is Air Pollution and where does it come from? .....	i
What is Nitrogen Dioxide? .....	ii
What is Particulate Matter? .....	iii
What are the Health Effects of Poor Air Quality?.....	iv
Health Effects of Nitrogen Dioxide .....	vi
Health Effects of Particulate Matter.....	viii
Air Quality in the Borough of Broxtowe .....	ix
Actions to improve Air Quality .....	x
Conclusions and Priorities .....	xi
Local Engagement.....	xiii
How to Get Involved.....	xiv
<b>Table of Contents</b> .....	<b>xvii</b>
<b>1 Local Air Quality Management</b> .....	<b>1</b>
<b>2 Actions to Improve Air Quality</b> .....	<b>2</b>
2.1 Air Quality Management Areas .....	2
2.2 Progress and Impact of Measures to address Air Quality in Broxtowe Borough .....	4
2.3 PM <sub>2.5</sub> – Local Authority Approach to Reducing Emissions and or Concentrations .....	24
2.4 Update on Air Quality Action Plan .....	27
<b>3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance</b> .....	<b>29</b>
3.1 Summary of Monitoring Undertaken.....	29
3.1.1 Automatic Monitoring Sites .....	29
3.1.2 Non-Automatic Monitoring Sites.....	29
3.2 Individual Pollutants .....	29
3.2.1 Nitrogen Dioxide (NO <sub>2</sub> ).....	29
3.2.2 Particulate Matter (PM <sub>10</sub> ).....	37
3.2.3 Particulate Matter (PM <sub>2.5</sub> ) .....	37
3.2.4 Sulphur Dioxide (SO <sub>2</sub> ) .....	37
<b>Appendix A: Monitoring Results</b> .....	<b>38</b>
<b>Figure A.1 – Trends in Annual Mean NO<sub>2</sub> Concentrations</b> .....	<b>51</b>
<b>Appendix B: Full Monthly Diffusion Tube Results for 2019</b> .....	<b>52</b>
<b>Appendix C: A Trend Graph for 13 Continuous Monitoring Sites from 2013 to 2019</b> .....	<b>56</b>

<b>Appendix D: Supporting Technical Information / Air Quality Monitoring</b>	
<b>Data QA/QC .....</b>	<b>57</b>
<b>Appendix E: Map of All Monitoring Locations within the Borough of</b>	
<b>Broxtowe. ....</b>	<b>60</b>
<b>Appendix F: Map of AQMA in Trowell.....</b>	<b>61</b>
<b>Appendix G: Map of the Borough showing the 2019 modelled background</b>	
<b>levels of PM<sub>2.5</sub>.....</b>	<b>62</b>
<b>Appendix H: Map of A610/B600 Nuthall Island showing the Monitoring</b>	
<b>Locations.....</b>	<b>63</b>
<b>Appendix I: Map of Bramcote Island, Derby Road, Bramcote showing the</b>	
<b>Monitoring Locations. ....</b>	<b>64</b>
<b>Appendix J: Map of Town Street, Bramcote showing the Monitoring</b>	
<b>Location.....</b>	<b>65</b>
<b>Appendix K: Air Quality Action Plan Email Conversation with LAQM</b>	
<b>Helpdesk.....</b>	<b>66</b>
<b>Appendix L: Summary of Air Quality Objectives in England.....</b>	<b>67</b>
<b>Glossary of Terms .....</b>	<b>68</b>
<b>References .....</b>	<b>71</b>



# 1 Local Air Quality Management

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

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

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.

Section 2.4 of this report provides an update on the Air Quality Action Plan.

Table 2.1 – Declared Air Quality Management Areas

AQ MA Na me	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 $\mu\text{g}/\text{m}^3$	Now $\mu\text{g}/\text{m}^3$	
AQ MA 1 Tro well	1 <sup>st</sup> February 2006	NO <sub>2</sub> 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	30	<a href="#">Action Plan 2008.</a>

## 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 Local Authority provide a very detailed discussion of the NO<sub>2</sub> trends within the borough. In addition to this they discuss the trends in relation to locations which is extremely useful and this approach to data discussion is encouraged in future reports. – BBC will continue to report data in this manner.*
  
- ❖ There have been no exceedances of national air quality objectives in 2018 and concentrations in the Trowell AQMA continue to fall. The Council have stated that they plan to implement measures to ensure NO<sub>2</sub> concentrations are below the AQOs and when long-term compliance is achieved they will revoke the AQMA. If current NO<sub>2</sub> trends continue and concentrations decline, then the revocation of the AQMA is strongly supported. – **See Section 2.4 of tis report for an update on the AQMA and AQAP.**
  
- ❖ It would be useful if Section 2.3 could make reference to the Public Health Outcomes Framework, and the local indicator for PM2.5 in the district. The Council may wish to consider comparing the '3.01 - Fraction of mortality attributable to particulate air pollution indicator' value for Broxtowe to nearby LAs and National indicator values. This can be found in the link below.  
<https://fingertips.phe.org.uk/profile/public-health-outcomesframework/data#page/0/gid/1000043/pat/6/par/E12000005/ati/101/-are/E07000194>. –**BBC has done this see Section 2.3 of this report**

Broxtowe Borough Council (BBC) and Nottinghamshire County Council (NCC) have taken forward a number of measures during the current reporting year of 2018/2019 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2 More detail on these measures can be found in 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: **UPDATE**

## **DISCUSS BARRIERS AND CHALLENGES**

## **DISCUSS HS2 CONSULTATION AND THE POSSIBLE EFFECTS ON AQMA**

**Table 2.2 - Progress on Measures to Improve Air Quality – UPDATE NON BBC MEASURES**

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisation involved and funding source	Key Performance Indicator and reduction in pollutant	Reduction in Pollutant/Emission from Measure	Progress to Date, comments / barriers of implementation	Estimated Completion Date
1	<b>Light rail tram infrastructure</b>	Transport Planning and Infrastructure	Public transport improvements - interchanges stations and services	2015	NCiC/NCC; DfT/WPL funding	Increased passenger transport patronage		<ul style="list-style-type: none"> <li>•NET Phase 2 (with route through Broxtowe) opened 2015</li> <li>•No further schemes other than a possible extension to the HS2 Terminus in Toton.</li> </ul>	<b>Complete</b>
2	<b>Car sharing scheme</b>	Alternatives to private vehicle use	Car & lift sharing schemes		NCC	In 2018: 1.69 tonnes reduction in NOx; 647.13kg reduction in CO2		<ul style="list-style-type: none"> <li>•3,351 current members.210 members in 2018</li> </ul>	On-going
3	<b>Introduction of car club</b>	Alternatives to private vehicle use	Car Clubs		NCC/NCiC	Restrain average journey times in the morning peak to a 1% increase per year		<ul style="list-style-type: none"> <li>•Nottm city scheme introduced in 2014.</li> <li>•Provider reviewed in 2018. Expansion of scheme into county dependent on its success which is still unclear</li> <li>•Funding for implementation to be determined</li> </ul>	On-going



Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisation involved and funding source	Key Performance Indicator and reduction in pollutant	Reduction in Pollutant/Emission from Measure	Progress to Date, comments / barriers of implementation	Estimated Completion Date
4	<b>Nottingham Go-Ultra Low programme - introduction of areawide EV charging network</b>	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2016	NCiC/NCC/ BBC; OLEV funding	On-going take-up of cleaner vehicles		<ul style="list-style-type: none"> <li>•£6.1m funding secured for 2016-2021</li> <li>•Site investigation to determine feasibility and installation of infrastructure underway.</li> <li>•To date 38 publicly-available charge points have been installed across the Borough. 28 are installed in BBC car parks in Beeston, Eastwood, Kimberley and Stapleford.</li> <li>•Grants also available to help businesses install charging infrastructure</li> </ul>	2021
5	<b>Nottingham Go-Ultra Low programme - promoting uptake of LEVs</b>	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2016	NCiC/NCC; OLEV funding	On-going take-up of cleaner vehicles		<ul style="list-style-type: none"> <li>•£6.1m funding secured for 2016-2021</li> <li>•Preferred partner to deliver EV charging infrastructure procured during 2018</li> <li>•Promotion events held for public, businesses and fleet operators including loans of LEVs for trial use in 2018</li> </ul>	2021

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisation involved and funding source	Key Performance Indicator and reduction in pollutant	Reduction in Pollutant/Emission from Measure	Progress to Date, comments / barriers of implementation	Estimated Completion Date
6	Nottingham City Clean Air Zone	Promoting Low Emission Transport	Low Emission Zone (LEZ) or Clean Air Zones (CAZ)	2019/20	NCiC; DfT funding	Reduced Emissions		<ul style="list-style-type: none"> <li>Nottingham City Council undertook air quality modelling of several potential CAZ options (charging and non-charging) alongside planned actions (e.g. measures to provide and promote sustainable transport infrastructure) to determine if they would deliver the required air quality objectives. This modelling has identified that air quality objectives are anticipated to be met without the introduction of a charging CAZ.</li> </ul>	2020
7	Joint Strategic Needs Assessment	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2017	NCC/NCiC/Borough and District councils	Raising awareness and reduced emissions		<ul style="list-style-type: none"> <li>Air Quality is now a chapter in the Joint Strategic Needs Assessment and part of the Health and wellbeing Board considerations.</li> <li>Currently being reviewed and updated in 2019.</li> </ul>	On-going
8	Nottinghamshire Air Quality Strategy	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2019	NCC/NCiC/Borough and District councils	Improving Air Quality, reduced Emissions and Raising awareness.		<ul style="list-style-type: none"> <li>Strategy reviewed and rewritten.</li> <li>Due to be approved at Nottinghamshire Health &amp; Wellbeing Board in June 2019</li> </ul>	2019
9	Planning and Policy Guidance	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2019	BBC	Reduced Emissions	0.2µg/m <sup>3</sup>	<ul style="list-style-type: none"> <li>Broxtowe Part 2 of the Local Plan (2018-2028), which includes Policy 20 on Air Quality, was adopted in 2019. This policy ensures 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.</li> </ul>	Complete

## Broxtowe Borough Council

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisation involved and funding source	Key Performance Indicator and reduction in pollutant	Reduction in Pollutant/Emission from Measure	Progress to Date, comments / barriers of implementation	Estimated Completion Date
10	<b>Developer requirements to provide of EV charging points at new development</b>	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2019	BBC	Reduced Emissions	0.2µg/m <sup>3</sup>	<ul style="list-style-type: none"> <li>Review of the Broxtowe Local plan includes Policy 26 that would require a Travel Plan to be submitted with any planning application for 10 or more dwellings or 1,000 square metres or more floorspace. This policy is was adopted in September 2019.</li> </ul>	<b>Complete</b>
11	<b>Inspection of Permitted Processes</b>	Environmental Permits	Introduction /increase of environment charges through permit systems and economic instruments	On-going	BBC	Reduced Emissions	Reduction in air borne pollutants from the various processes throughout the Borough.	<ul style="list-style-type: none"> <li>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 2019, and all permitted processes were fully compliant.</li> </ul>	On-going
12	<b>Encouragement of low-emission public transport fleets</b>	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	2018	NCC/operator s; NCC/OLEV - Green Bus Technology Fund	Reduced Emissions and On-going take-up of cleaner vehicles		<ul style="list-style-type: none"> <li>NCC secured £1.3m; and NCC secured £1.5m from the Green Bus Technology Fund in Feb 2018 to retrofit older buses</li> <li>This includes 21, 34, 35, Indigo, Rainbow 1 and Rapid 1 services in the Borough.</li> </ul>	2020
13	<b>Encouragement of low-emission public transport fleets</b>	Vehicle Fleet Efficiency	Promoting low emission public transport	2017	NCC; NCC/OLEV - Green Bus Fund	On-going take-up of cleaner vehicles		<ul style="list-style-type: none"> <li>NCC secured £527,000 OLEV funding and will match fund the scheme with £410,000 from its transport budget.</li> <li>Introduction of two electric buses (and their associated infrastructure) on route 510, serving communities in Beeston and Stapleford.</li> </ul>	On-going <b>Complete</b>

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisation involved and funding source	Key Performance Indicator and reduction in pollutant	Reduction in Pollutant/Emission from Measure	Progress to Date, comments / barriers of implementation	Estimated Completion Date
14	Encouragement of low-emission public transport fleets	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	On-going	NCC/NCiC/PT operators; NCT (operator) funding	Reduced Emissions		<ul style="list-style-type: none"> <li>The Statutory Quality Partnership Schemes (SQPSs), which includes fleet standards is in place affecting all buses travelling through AQMA.</li> </ul>	On-going
15	Review of on-street car parking in and around the AQMA	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	On-going	NCC	Restrain average journey times in the morning peak to a 1% increase per year		<ul style="list-style-type: none"> <li>Introduction of junction protection and targeted roadside parking restrictions (including bus stop clearways) along feeder corridors into the AQMA to help traffic flows/journey times.</li> <li>Parking restrictions already in place, no additional side-road/off-line locations currently identified as requiring restrictions to aid traffic flow</li> </ul>	On-going Implemented and On-going
16	Optimisation of traffic signals	Traffic Management	UTC, Congestion management, traffic reduction	2017	NCC/Via EM Ltd: NCC revenue funding	Restrain average journey times in the morning peak to a 1% increase per year	0.2µg/m <sup>3</sup>	<ul style="list-style-type: none"> <li>All traffic signalling equipment at A610 Nuthall Island were replaced during 2017/18.</li> <li>Also 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</li> <li>A review of the signal timings and linking at the signal junction was also undertaken during 2017/18</li> </ul>	Complete Complete Complete

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisation involved and funding source	Key Performance Indicator and reduction in pollutant	Reduction in Pollutant/Emission from Measure	Progress to Date, comments / barriers of implementation	Estimated Completion Date
17	Traffic control and information	Traffic Management	UTC, Congestion management, traffic reduction	On-going	Nottinghamshire County Council (NCC)/Via EM Ltd/Nottingham City Council (NCiC): NCC and NCiC revenue funding	Restrain average journey times in the morning peak to a 1% increase per year		<ul style="list-style-type: none"> <li>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</li> <li>Potential barrier: Lack of future revenue funding</li> </ul>	On-going  On-going
18	Co-ordination of street works	Traffic Management	UTC, Congestion management, traffic reduction	On-going	NCC/Via EM/NCiC: NCC and NCiC revenue funding	Restrain average journey times in the morning peak to a 1% increase per year		<ul style="list-style-type: none"> <li>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</li> <li>Street designations/network hierarchy review is on-going to improve data quality for works promoters and network managers and to prioritise works management</li> <li>Regular coordination meetings held between all works promoters and regional partners in addition to regular meetings between HE and regional partners to create a framework programme of planned works affecting strategic and local routes</li> <li>Detailed journey time monitoring undertaken annually since 2005/06</li> <li>Implementation on-going</li> </ul>	On-going  On-going  On-going  On-going

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisation involved and funding source	Key Performance Indicator and reduction in pollutant	Reduction in Pollutant/Emission from Measure	Progress to Date, comments / barriers of implementation	Estimated Completion Date
19	Real time travel information	Public Information	Other	On-going	NCC/Via EM Ltd: NCC revenue funding	Restrain average journey times in the morning peak to a 1% increase per year		<ul style="list-style-type: none"> <li>Information conveyed by all forms of media (press, radio, website, social media etc.).</li> <li>The Travelwise centre remains in operation 24hrs a day, every day.</li> <li>Implementation on-going</li> </ul>	<p>On-going</p> <p>On-going</p>
20	Contingency planning, and effective event and incident management	Traffic Management	UTC, congestion management, traffic reduction	On-going	NCC/Via EM/NCiC/Highways England (HE): NCC, NCiC, HE revenue funding	Restrain average journey times in the morning peak to a 1% increase per year		<ul style="list-style-type: none"> <li>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</li> <li>Key locations on the local network have been identified and associated diversion routes investigated in line with the developing network hierarchy</li> <li>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</li> <li>Detailed journey time monitoring undertaken annually since 2005/06.</li> <li>Implementation on-going</li> </ul>	<p>On-going</p> <p>On-going</p> <p>On-going</p> <p>On-going</p>



Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisation involved and funding source	Key Performance Indicator and reduction in pollutant	Reduction in Pollutant/Emission from Measure	Progress to Date, comments / barriers of implementation	Estimated Completion Date
21	<b>Bus service improvements</b>	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	On-going	NCC/PT operators	Increased passenger transport patronage		<ul style="list-style-type: none"> <li>•Review of all of the bus services in the county, including commercial, supported and specialist services.</li> <li>•The aim of this work is to review and design cost effective services that meet local needs.</li> </ul>	On-going
22	<b>Bus infrastructure</b>	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	On-going	BBC and NCC; integrated transport block funding	Increased bus patronage	Reduced emissions due to increased bus patronage.	<ul style="list-style-type: none"> <li>•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.</li> <li>•Implementation on-going</li> <li>•BBC provides 50% of the funds for the installation of new bus shelters and real time bus information at bus stops.</li> </ul>	On-going  On-going
23	<b>Sustainable Travel information for the Public</b>	Public Information	Via leaflets, internet, other	On-going	BBC	Increased use of public transport	Reduced Emissions of NO2 and PM	<ul style="list-style-type: none"> <li>•BBC have 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 the Council reception</li> <li>• Sustainable Travel methods are also available on the main council website.</li> </ul>	On-going
24	<b>Concessionary fare schemes</b>	Transport Planning and Infrastructure	Other	On-going	NCC/PT operators	Increased passenger transport patronage		<ul style="list-style-type: none"> <li>•Implementation on-going</li> </ul>	On-going

## Broxtowe Borough Council

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisation involved and funding source	Key Performance Indicator and reduction in pollutant	Reduction in Pollutant/Emission from Measure	Progress to Date, comments / barriers of implementation	Estimated Completion Date
25	<b>Nottingham city workplace parking levy (WPL)</b>	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	2012	NCiC	Restrain average journey times in the morning peak to a 1% increase per year		<ul style="list-style-type: none"> <li>•NCiC introduced WPL within the city in 2012 and have used funding to make passenger transport improvements in the city</li> </ul>	Introduced 2012 and on-going
26	<b>Public sector LEV procurement</b>	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	2015	NCC/BBC	Reduction in vehicle emissions due to less polluting vehicles replacing older more polluting vehicles		<ul style="list-style-type: none"> <li>•NCC upgraded its pool vehicles to lower emission diesel vehicles. 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</li> <li>•Dependant on whether funding from Central Government continues</li> </ul>	2024
27	<b>Vehicle emissions testing</b>	Vehicle Fleet Efficiency	Testing Vehicle Emissions	On-going	BBC	Reduced emissions	Reduction in NO2 and PM as regular serviced and maintained vehicles t ensure they are operating efficiently.	<ul style="list-style-type: none"> <li>•All BBC Fleet vehicles (98 road vehicles including 20 LGV's) are annually emission tested in house prior to MOT Emission testing.</li> <li>•BBC also undertakes additional emissions tests on all fleet vehicles if any new fuel or engine components have been changed. This is to ensure vehicle emission compliance.</li> </ul>	On-going  On-going
28	<b>Marketing and promotion of passenger transport</b>	Promoting Travel Alternatives	Other	On-going	NCC/NCiC/ PT operators	Increased passenger transport patronage		<ul style="list-style-type: none"> <li>•Various marketing campaigns undertaken in partnership with operators and Nottingham City Council.</li> <li>•Co-ordinated through the Greater Nottingham Bus Quality Partnership.</li> <li>•Network maps produced to coincide with route/timetable changes</li> </ul>	On-going  <b>Complete</b>

## Broxtowe Borough Council

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisation involved and funding source	Key Performance Indicator and reduction in pollutant	Reduction in Pollutant/Emission from Measure	Progress to Date, comments / barriers of implementation	Estimated Completion Date
29	<b>Taxi Licensing Conditions</b>	Promoting Low Emission Transport	Taxi Licensing Conditions	2011 and 2019	BBC	Reduced emissions	Reduction in NO2 and PM as cleaner vehicles	<ul style="list-style-type: none"> <li>No cars normally older than 8 years will be licensed as a taxi within the borough.</li> <li>A review of the taxi licensing conditions will be undertaken to establish a common policy of conditions throughout the County.</li> <li>From 13th June 2018, all petrol vehicles are required to meet Euro 5 standards, all new diesel vehicles are required to meet Euro 6 emissions.</li> <li>Hybrid and Electric Vehicles to be licensed as "Taxi's" by quoting minimum 70kW and reducing boot space requirement to allow for battery storage.</li> </ul>	<p>On-going</p> <p><b>Complete</b></p> <p><b>Complete</b></p> <p><b>Complete</b></p>
30	<b>Civil Parking Enforcement</b>	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	2008	NCC; NCC revenue funding	Manage parking to improve journey time reliability.		<ul style="list-style-type: none"> <li>Introduced on County roads in May 2008 to help ensure parking does not interfere with the free flowing traffic.</li> <li>Implemented and on-going</li> </ul>	Implemented and On-going
31	<b>CCTV enforcement vehicle</b>	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	2016 and 2019	NCC; NCC revenue funding	Manage parking to improve journey time reliability		<ul style="list-style-type: none"> <li>'Camera car' to enforce school keep clear and bus stop clearway markings became fully operational during 2016</li> <li>A second CCTV vehicle was purchased in 2018.</li> <li>Third CCTV vehicle planned to be purchased in 2019.</li> </ul>	<p>on-going</p> <p><b>Complete</b></p> <p>2019.</p>

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisation involved and funding source	Key Performance Indicator and reduction in pollutant	Reduction in Pollutant/Emission from Measure	Progress to Date, comments / barriers of implementation	Estimated Completion Date
32	Encouraging the use of emissions standards when procuring school bus contracts and supported bus services	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	On-going	NCC/PT operators	Reduced Emissions and On-going take-up of cleaner vehicles		<ul style="list-style-type: none"> <li>On-going take-up of LEVs</li> </ul>	On-going
33	20mph speed limits outside schools	Traffic Management	Reduction of speed limits, 20mph zones	2013	NCC; integrated transport block funding	Increased walking/cycling trips		<ul style="list-style-type: none"> <li>Advisory 20mph speed limits installed outside all feasible schools</li> </ul>	Complete
34	School travel plans	Promoting Travel Alternatives	School Travel Plans	2000	N/A	Restrain average journey times in the morning peak to a 1% increase per year		<ul style="list-style-type: none"> <li>STPs have been developed and approved at all but 3 schools in Broxtowe</li> <li>Update - Funding withdrawn by DfT in 2010; no pro-active STP work undertaken since that date. NCC considering the development of online advice tool for schools.</li> </ul>	Complete Complete
35	Cycling networks - development of Local Cycling and Walking Infrastructure Plan (LCWIP)	Transport Planning and Infrastructure	Cycle network	2019	NCC/NCiC/DC/DCiC/borough and district councils/Sustrans/other stakeholders ; DfT funding	Increased levels of cycling		<ul style="list-style-type: none"> <li>Funding secured to develop D2N2 wide LCWIP. Data collected, three stakeholder events held</li> <li>Prioritised list of improvements to be included in final LCWIP</li> </ul>	2019

## Broxtowe Borough Council

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisation involved and funding source	Key Performance Indicator and reduction in pollutant	Reduction in Pollutant/Emission from Measure	Progress to Date, comments / barriers of implementation	Estimated Completion Date
36	<b>Cycling networks</b>	Transport Planning and Infrastructure	Cycle network	2018/19	NCC/Via EM/NCiC: LGF, s106 funding	Increased cycling trips		<ul style="list-style-type: none"> <li>•Construction of improved cycle links between Beeston, Enterprise Zone and the City underway during 2018/19</li> <li>•Other cycling improvements are developed and delivered as part of the annual integrated transport programme and through developer funded improvements</li> </ul>	2018/19  Schemes dependent on funding being made available for such improvements
37	<b>Cycle hire scheme</b>	Transport Planning and Infrastructure	Public cycle hire scheme		NCiC/NCC; funding source to be determined	Increased cycling trips		<ul style="list-style-type: none"> <li>•Hire schemes at the nearby University of Nottingham in place</li> <li>•Feasibility study undertaken on a city based hire scheme which potentially could include parts of the county such as Beeston</li> <li>•Scheme dependent on commercial cycle hire scheme providers committing to, and delivering a scheme</li> </ul>	Not known - dependent on commercial cycle hire scheme providers
38	<b>Cycle training</b>	Promoting Travel Alternatives	Promotion of cycling		NCC; DfT funding/PH funding	Increased cycling trips		<ul style="list-style-type: none"> <li>•7,544 people received cycle training in 2018/19.</li> <li>•Scheme dependent on DfT funding being made available for Bikeability</li> <li>•Implementation on-going</li> </ul>	On-going
39	<b>Cycle parking facilities</b>	Transport Planning and Infrastructure	Cycle network	2015	NCC/BBC; integrated transport block/ developer contributions	Increased cycling trips		<ul style="list-style-type: none"> <li>•Cycle hub installed in 2015 to integrate with bus/rail services</li> <li>•Ad-hoc parking provided where required</li> </ul>	Complete  On-going

## Broxtowe Borough Council

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisation involved and funding source	Key Performance Indicator and reduction in pollutant	Reduction in Pollutant/Emission from Measure	Progress to Date, comments / barriers of implementation	Estimated Completion Date
40	Marketing of cycling	Promoting Travel Alternatives	Promotion of cycling	2010 and 2017	NCC	Increased cycling trips		<ul style="list-style-type: none"> <li>•Cycling in Nottinghamshire has increased by 10% between 2010 and 2017; and in Broxtowe district there has been a 12% increase in cycling between 2010 and 2017.</li> <li>•Marketing of cycling is undertaken in a variety of formats for both commute and leisure trips. Various NCC campaigns have been undertaken including 'cycling week', 'Notts Routes &amp; Rides'.</li> </ul>	<p>On-going</p> <p>On-going</p>
41	Cycle maps	Promoting Travel Alternatives	Promotion of cycling	2018 and 2019	NCC; DfT funding	Increased cycling trips		<ul style="list-style-type: none"> <li>•Greater Nottingham cycling maps reviewed during 2018, updated and available as a leaflet and online</li> <li>•Cycling maps to be reviewed again in 2019</li> </ul>	<p><b>Complete</b></p> <p>2019 and on-going</p>
?	Cycle to work Scheme	Promoting Travel Alternatives	Promotion of cycling	2018/19	BBC	Increased cycling trips	Reduced Emissions	<ul style="list-style-type: none"> <li>•Cycle to work Scheme – to assist and give tax relief on bike purchases for employees of BBC. <b>UPDATE ONCE GOT DAA FROM PAYROLL</b></li> </ul>	?
?	Encouraging the use of Hybrid or Electric vehicles for BBC staff	Promoting Low Emission Transport	Other	2018/19	BBC	On-going take up of cleaner vehicles	Reduced Emissions	<ul style="list-style-type: none"> <li>•To encourage employees of BBC to purchase hybrid vehicles and electric vehicles for their personal ad business use. <b>UPDATE ONCE GOT DATA FROM PAYROLL</b></li> </ul>	?

## Broxtowe Borough Council

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisation involved and funding source	Key Performance Indicator and reduction in pollutant	Reduction in Pollutant/Emission from Measure	Progress to Date, comments / barriers of implementation	Estimated Completion Date
42	<b>Marketing of cycling</b>	Promoting Travel Alternatives	Promotion of cycling	2010 and 2017	BBC	In Broxtowe district there has been a 30% increase in cycling between 2010 and 2014	Reduced Emissions of N02 and PM	<ul style="list-style-type: none"> <li>Cycling in Broxtowe has increased by 12% between 2010 and 2017.</li> <li><b>UPDATE</b></li> <li>New cycle stands were installed at Beeston Train station and in Eastwood and Beeston Town Centres. Improved more stands Kimberley Leisure Centre and Council Offices.</li> <li>Develop and promote the Broxtowe Cycle Quest 2016 and 2017, which includes 8 routes in Broxtowe. Promoted through social media and Broxtowe Matters to every household in the borough.</li> <li>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.</li> <li>Hi Vis slap bands and rucksack covers have been given out at events.</li> <li>Cycle security events and locks have been given away in Beeston</li> <li>Produce and promote Broxtowe Cycling Map.</li> </ul>	<p>On-going</p> <p><b>Complete</b></p> <p><b>Complete</b></p> <p><b>Complete</b></p> <p><b>Complete</b></p> <p><b>Complete</b></p>
43	<b>Marketing of walking</b>	Promoting Travel Alternatives	Promotion of walking	On-going	NCC	Increased walking trips		<ul style="list-style-type: none"> <li>Marketing of walking is undertaken in a variety of formats for both commute and leisure trips. Various NCC campaigns have been undertaken including 'walk week', 'Notts Routes &amp; Rides'.</li> </ul>	On-going
44	<b>Marketing of walking</b>	Promoting Travel Alternatives	Promotion of walking	On-going	BBC	Increased walking trips	Reduced Emissions of N02 and PM	<ul style="list-style-type: none"> <li>Develop Broxtowe Country Trail and promote it.</li> <li>BBC promote walking for health programmes</li> <li>Promotion of Erewash Valley Trail and other local walks.</li> </ul>	<p><b>Complete</b></p> <p><b>Complete</b></p> <p><b>Complete</b></p>

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisation involved and funding source	Key Performance Indicator and reduction in pollutant	Reduction in Pollutant/Emission from Measure	Progress to Date, comments / barriers of implementation	Estimated Completion Date
45	<b>Pedestrian infrastructure improvements</b>	Transport Planning and Infrastructure	Other	On-going	NCC/BBC	Increased walking trips	Reduction in NO2 and PM emissions	<ul style="list-style-type: none"> <li>• Pedestrian improvements developed and delivered as part of the annual integrated transport programme. Funding also secured to deliver improvements through the planning process.</li> <li>• Potential barrier: Lack of future funding</li> </ul>	On-going
46	<b>Review of off-street car parking charging</b>	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	2019	BBC	Restrain average journey times in the morning peak to a 1% increase per year	Reduction in NO2 and PM emissions	<ul style="list-style-type: none"> <li>• BBC is currently consolidating all of their Off-Street Parking Orders into one Order which will be made legal in 2020</li> <li>• Charges will also be reviewed on an adhoc basis with the next review being due in 2020 for the 2020/21 charges. This review will also include the use of electric vehicle charging points.</li> </ul>	2020 2020
47	<b>Flexible working arrangements</b>	Promoting Travel Alternatives	Encourage / Facilitate home-working	2010 and 2019	NCC/BBC	Restrain average journey times in the morning peak to a 1% increase per year	Reduction in NO2 and PM due to employees not commuting	<ul style="list-style-type: none"> <li>• NCC operates flexible working arrangements for all its staff</li> <li>• BBC New Ways of Working was introduced in 2019, which allows and encourages employees to work from home when practical to do so.</li> </ul>	On-going <b>Complete</b>



Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisation involved and funding source	Key Performance Indicator and reduction in pollutant	Reduction in Pollutant/Emission from Measure	Progress to Date, comments / barriers of implementation	Estimated Completion Date
48	<b>Workplace travel plans</b>	Promoting Travel Alternatives	Workplace Travel Planning	On-going	BBC planning/ NCC	Restrain average journey times in the morning peak to a 1% increase per year	0.2µg/m <sup>3</sup>	<ul style="list-style-type: none"> <li>•Broxtowe Part 2 of the Local Plan (2018-2028), which includes Policy 26 on Travel Plans, was adopted in 2019. It is expected in this policy that all planning applications for large development sites (10 or more dwellings or 1,000 square metres or more gross floor space) must include a travel plan.</li> <li>•BBC and NCC have a travel plan</li> <li>•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.</li> </ul>	<p><b>Complete</b></p> <p><b>Complete</b></p> <p><b>Complete</b></p>
49	<b>NCC car pool vehicles</b>	Alternatives to private vehicle use	Car Clubs	2016/17	NCC	Restrain average journey times in the morning peak to a 1% increase per year	0.2µg/m <sup>3</sup>	<ul style="list-style-type: none"> <li>•NCC upgraded its pool vehicles to lower emission diesel vehicles</li> </ul>	<b>Complete</b>

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisation involved and funding source	Key Performance Indicator and reduction in pollutant	Reduction in Pollutant/Emission from Measure	Progress to Date, comments / barriers of implementation	Estimated Completion Date
50	Low emission vehicle procurement	Promoting Low emission transport	Company vehicle Procurement - prioritising uptake of low emission vehicles	2017, 2019 and 2020	BBC	Reduced emissions	Reduction in NO2 and PM due to cleaner vehicle technology and the procurement of two electric fleet vehicles.	<ul style="list-style-type: none"> <li>All new fleet vehicles at BBC are Euro6 emissions compliant. There are 90+ fleet vehicles and they are on a 10 year replacing rolling programme.</li> <li>BBC has purchased three new Euro 6 vehicles in 2017/2018 replacing three older vehicles.</li> <li>Two new Euro 6 vehicles purchased in 2019 / 2020</li> <li>BBC have procured two electric vans in 2019</li> <li>Subject to satisfactory trials another two vehicles will be purchased in 2020.</li> </ul>	<p>2024</p> <p><b>Complete</b></p> <p><b>Complete</b></p> <p><b>Complete</b></p> <p>2020</p>
51	Eco-driver training sessions	Vehicle Fleet Efficiency	Driver training and ECO driving aids	2012	NCC	Reduced emissions	Reduction in NO2 and PM due to improved driving efficiency.	<ul style="list-style-type: none"> <li>Eco-driving training sessions held for NCC staff</li> </ul>	<b>Complete</b>
52	Fleet vehicle tracking system	Vehicle Fleet Efficiency	Driver Training and ECO driving aids	2015-2017	BBC/NCC	Reduced emissions	Reduction in NO2 and PM due to improved driving efficiency and efficient routes.	<ul style="list-style-type: none"> <li>All BBC and NCC fleet vehicles are fitted with a vehicle tracking system, which records vehicle speed and idling time.</li> <li>A review of the journeys undertaken will ensure that if necessary measures can be implemented e.g. staff training, to improve fleet efficiency.</li> </ul>	<p><b>Complete</b></p> <p><b>Complete</b></p>
53	Zoning of refuse collections	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	2016-2017	BBC	Reduced emissions	Reduction in NO2 and Particulate Matter as there is one less fleet vehicle used.	<ul style="list-style-type: none"> <li>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.</li> <li>Update - The Refuse round restructure is now complete and we have reduced the fleet size by one vehicle.</li> </ul>	<b>Complete</b>

## Broxtowe Borough Council

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisation involved and funding source	Key Performance Indicator and reduction in pollutant	Reduction in Pollutant/Emission from Measure	Progress to Date, comments / barriers of implementation	Estimated Completion Date
54	<b>Integrated ticketing</b>	Transport Planning and Infrastructure	Other	2014/15	NCC/NCiC/PT operators	Increased passenger transport patronage		<ul style="list-style-type: none"> <li>• Integrated ticketing strategy developed in 2014/15.</li> <li>• New smartcard platform introduced in 2014. Robin Hood card scheme introduced in 2015</li> <li>• Further smartcard/contactless improvements being developed</li> </ul>	On-going
55	<b>Personalised travel planning</b>	Promoting Travel Alternatives	Personalised Travel Planning	2016/17	NCC/AECOM	Restrain average journey times in the morning peak to a 1% increase per year		<ul style="list-style-type: none"> <li>• Personalised Travel Planning undertaken in Beeston during 2016/17</li> <li>• No DfT funding currently available</li> </ul>	<b>Complete</b> On-hold.
56	<b>Web based journey planners</b>	Public Information	Via the Internet		NCC	Increased walking/cycling/ passenger transport trips		<ul style="list-style-type: none"> <li>• 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.</li> <li>• Implementation on-going</li> </ul>	On-going

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

## 2.3 PM<sub>2.5</sub> – Local Authority Approach to Reducing Emissions and or Concentrations

**NOTE - MAKE REFERENCE TO THE PUBLIC HEALTH OUTCOMES FRAMEWORK, AND THE LOCAL INDICATOR FOR PM<sub>2.5</sub> IN THE DISTRICT. THE COUNCIL MAY WISH TO CONSIDER COMPARING THE '3.01 - FRACTION OF MORTALITY ATTRIBUTABLE TO PARTICULATE AIR POLLUTION INDICATOR' VALUE FOR BROXTOWE TO NEARBY LAS AND NATIONAL INDICATOR VALUES**

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.

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

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

The nearest AURN site is in Nottingham City and for 2019 the annual mean concentration is 10.84µg/m<sup>3</sup>. The modelled background level provided by Defra for the Borough of Broxtowe are predicted to be between 8µg/m<sup>3</sup> and 11µg/m<sup>3</sup> for 2019, with the annual mean for 2019 being 9.73µg/m<sup>3</sup>. The modelled background concentrations are shown to be in the higher range along the M1 Motorway, The background maps are shown in Appendix G.

The Air Quality Objective (AQO) for PM<sub>2.5</sub> is an annual mean of 25µg/m<sup>3</sup>. However, the World Health Organisation guideline value are more stringent for PM<sub>2.5</sub>, as it is currently 10µg/m<sup>3</sup> (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 WHO guideline but meeting the AQO . Therefore, BBC are working towards reducing the PM<sub>2.5</sub> 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.

## **Broxtowe Borough Council**

- 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.

## 2.4 Update on Air Quality Action Plan

**NOTES: DISCUSS THE AQMA, SMART NETWORKS DATES, OUT OF OUR CONTROL ETC..**

**COMMENTS FROM DEFRA FROM PREVIOUS REPORTS MENTION THESE**

- ❖ THE BOROUGH HAS MADE SOME GOOD PROGRESS TOWARDS DEVELOPING THEIR AQAP AND IMPLEMENTING AQAP MEASURES IN THE LAST YEAR, WHICH IS COMMENDED.**
- ❖ THE BOROUGH HAS STATED THAT THEY WILL CONTINUE TO MONITOR AND KEEP THE AQMA UNDER REVIEW WHILST THE EFFECTS OF THE SMART MOTORWAY SCHEME ARE BEING DETERMINED, AND UNTIL A SIGNIFICANT DECREASING TREND CAN BE DEMONSTRATED. THIS IS SUPPORTED, AND IT IS SUGGESTED THAT THE AQMA COULD BE CONSIDERED FOR REVOCATION AFTER DEMONSTRATING COMPLIANT NO<sub>2</sub> CONCENTRATIONS BELOW 36 µG/M<sup>3</sup> FOR THREE CONSECUTIVE YEARS. – BBC WILL CONTINUE MONITORING AT THIS SITE AND WILL CONSIDER REVOCATION OF THE AQMA IF IT IS CONSISTENTLY BELOW THE ANNUAL MEAN FOR FIVE OR MORE CONSECUTIVE YEARS. SEE CHAPTER 3.2.1 OF THIS REPORT FOR THE RESULTS.**
- ❖ THERE HAVE BEEN NO EXCEEDANCES OF NATIONAL AIR QUALITY OBJECTIVES IN 2018 AND CONCENTRATIONS IN THE TROWELL AQMA CONTINUE TO FALL. THE COUNCIL HAVE STATED THAT THEY PLAN TO IMPLEMENT MEASURES TO ENSURE NO<sub>2</sub> CONCENTRATIONS ARE BELOW THE AQOS AND WHEN LONG-TERM COMPLIANCE IS ACHIEVED THEY WILL REVOKE THE AQMA. IF CURRENT NO<sub>2</sub> TRENDS CONTINUE AND CONCENTRATIONS DECLINE, THEN THE REVOCATION OF THE AQMA IS STRONGLY SUPPORTED.**

**NOTE: PUT IN TABLE OF FIGURES HERE**

**NOTE: TALK ABOUT EMAIL CONVERSATION WITH LAQM, SAY UPDATING  
LAQM ON FIGURES.**

**MEASURES WE ARE CURRENTLY DOING FOR THE BOROUGH**



## **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 currently utilise any automatic air quality monitoring within the Borough

#### **3.1.2 Non-Automatic Monitoring Sites**

BBC undertook non- automatic (passive) monitoring of NO<sub>2</sub> at 43 sites during 2019. Table A.1 in Appendix A shows the details of the sites. There were no changes to the site locations in 2019.

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<sub>2</sub>)**

Table A.2 in Appendix A compares the ratified and adjusted monitored Nitrogen Dioxide (NO<sub>2</sub>) annual mean concentrations for the past 5 years with the air quality objective of 40µg/m<sup>3</sup>.

For diffusion tubes, the full 2019 dataset of monthly mean values are provided in Table B.1 of Appendix B.

### **Nitrogen Dioxide Diffusion Tube Monitoring Results**

The results from the bias corrected NO<sub>2</sub> diffusion tube monitoring have shown that there are no exceedences of the 40µg/m<sup>3</sup> air quality objective at any of the 43 monitoring locations within the Borough for 2019.

Although there are no exceedences of the NO<sub>2</sub> 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.

As well as discussing the results from the recently revoked AQMA in Nuthall 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 likelihood 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<sub>2</sub> are consistently below the objective of 40µg/m<sup>3</sup> for all three sites.

**Table 3.1 – Results for the Revoked AQMA in Nuthall 2012 – 2019.**

Site ID	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> )							
	2012	2013	2014	2015	2016	2017	2018	2019
BX01 or 33	31	33	29	28	29	29	23	25
BX05 or 34	32	33	32	29	29	27	28	26
BX13 or 35	35	33	34	34	32	34	30	30

Monitoring will continue to be undertaken at these three sites and the results will be reported in the 2021 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<sub>2</sub> 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 2019 are shown below.

**Table 3.2 – Results for AQMA in Trowell 2012 – 2019.**

Site ID	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> )							
	2012	2013	2014	2015	2016	2017	2018	2019
18	-	-	-	-	34	33	28	28
BX11 or 19	<b>42</b>	39	38	<b>42</b>	38	37	32	31

Although the 2016 and the 2017 NO<sub>2</sub> results for both sites in the AQMA are below the air quality objective, the 2015 data did show an increase in NO<sub>2</sub>. 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<sub>2</sub> levels have reduced by 6µg/m<sup>3</sup> from 2016 to 2019 for site 18 and 7µg/m<sup>3</sup> from 2016 to 2019 for site 19. BBC will continue to monitor NO<sub>2</sub> levels in this area and work alongside

Highways England to improve air quality levels. Please view Section 2.4 of this report on an Update on the Air Quality Action Plan for this AQMA.

**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 original 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 representation 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 H 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<sub>2</sub> 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 2015 are shown for the 'old' site and the 2016 to 2019 results for the 'new' sites are shown below.

**Table 3.3 – Results for Nuthall Island 2012 – 2019.**

Site ID	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> )							
	2012	2013	2014	2015	2016	2017	2018	2019
BX 22	42	41	39	41	-	-	-	-
36	-	-	-	-	35	35	33	32
37	-	-	-	-	32	30	29	26

The results above show that that the original site did not provide a true representation of NO<sub>2</sub> levels at the façade of the properties. However, the two 'new' sites are showing that the levels are below the air quality objective by 8µg/m<sup>3</sup> for site 36 and 14µg/m<sup>3</sup> for site 37 in 2019 and are showing a decreasing trend.

BBC will continue to monitor NO<sub>2</sub> levels at these sites and provide an update in the 2021 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 original site showing exceedances of the air quality objective of 40µg/m<sup>3</sup>. 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 chosen 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 I 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 – 2019.**

Site ID	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> )							
	2012	2013	2014	2015	2016	2017	2018	2019
BX 04	42	38	42	41	-	-	-	-
40	-	-	-	-	38	33	34	32
41	-	-	-	-	37	36	34	31

The table above shows that in 2019 Site 40 is 32µg/m<sup>3</sup>, which is a reduction of 2µg/m<sup>3</sup> and Site 41 is 31µg/m<sup>3</sup>, which is a reduction of 3µg/m<sup>3</sup> in comparison to the 2018 results.

Although this is an overall downward trend for both sites from 2016 and they are below the objective level. There is a slight increase by 1µg/m<sup>3</sup> at Site 40 in 2018. This

could have been due to localised roadworks that were taking place on the A52, which has resulted in an increase in stationary traffic near to this site. However, in 2019 this site has a measured reduction of  $2\mu\text{g}/\text{m}^3$  in comparison to 2018 figures which further indicates that the slight increase was due to localised roadworks which were completed in 2018.

BBC will continue to monitor and report on the  $\text{NO}_2$  levels in this area, to note any works that are being undertaken and to continue to work alongside Highways England to improve the air quality levels in this area.

**Town Street, Bramcote.**

In December 2016 a review was undertaken of the monitoring 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 residents parking outside their properties, which tends to cause a ‘bottle neck’ situation in rush hour (See Appendix J for the Map identifying the monitoring location). The siting of the tube has been chosen 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 2016 – 2019.**

Site ID	$\text{NO}_2$ Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ )			
	2016	2017	2018	2019
48	-	38	36	30
56	-	-	25	23

Above is the result for the sites for 2017 to 2019. The result for 2017 is  $38\mu\text{g}/\text{m}^3$ . The result at site 48 for 2019 is  $30\mu\text{g}/\text{m}^3$  which is a reduction of  $8\mu\text{g}/\text{m}^3$  in comparison to the 2017 results, which shows a downward trend.

Due to the result in 2017, a decision was made to start monitoring at a second location on Town Street (Site 56) in 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 was 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 result at site 56 for 2019 is  $23\mu\text{g}/\text{m}^3$  which is a reduction of  $2\mu\text{g}/\text{m}^3$  in comparison to the 2018 result. This enforces the theory that the results are higher on site 48 due to the 'Bottle neck' situation.

BBC will continue to monitor  $\text{NO}_2$  levels at these sites and provide an update in the 2021 ASR. BBC will continue to work alongside Nottinghamshire County Council to improve air quality levels.

### **The Results and Trends for the Thirteen Monitoring Sites 2013 - 2018.**

As mentioned previously in Chapter 2.2 of this report. Defra requested that trend graphs and comparisons are made for the thirteen sites that have been continuously 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, twelve of the sites are showing an overall downward trend since 2013 (Sites 1, 5, 7, 19, 20, 22, 33, 34, 35, 38,39 and 43). The one remaining site (site 31) has only shown a very slight downward trend. Site 31 will therefore be discussed in greater detail below.

Since 2013, Sites 1 & 33 have shown an overall downward trend but in 2019 both of these sites have shown a slight increase between  $1\mu\text{g}/\text{m}^3$  and  $2\mu\text{g}/\text{m}^3$  in comparison to 2018 results. Therefore these sites will be discussed in greater detail below.

#### **Site 1 – Near 113 Wollaton Road, Beeston.**

Since 2013, Site 1 has shown a downward trend until 2016 when there was a slight increase of  $1\mu\text{g}/\text{m}^3$  in comparison to 2015 result. Then it has continued to reduce in 2017 and again in 2018. However in 2019 there has been a slight increase of  $1\mu\text{g}/\text{m}^3$  in comparison to 2018 result. Overall since 2013 there has been a decrease

of  $6\mu\text{g}/\text{m}^3$  with the highest concentration being  $32\mu\text{g}/\text{m}^3$  it is currently  $27\mu\text{g}/\text{m}^3$ , which is comfortably below the air quality objective of  $40\mu\text{g}/\text{m}^3$ . This is one of the main roads into Beston town centre and is a busy road that is used by commuters. Road works have been undertaken on this road to improve the road surface which may have resulted in a localised slight increase of  $\text{NO}_2$ .

### **Site 31 – 15 Hayley Close, Kimberley**

Since 2013, Site 31 has shown a slight downward trend overall between 2013 and 2019 as there has been a decrease of  $6\mu\text{g}/\text{m}^3$  with the highest concentration being  $32\mu\text{g}/\text{m}^3$  and the lowest concentration being  $26\mu\text{g}/\text{m}^3$  in 2018. There have been fluctuations at this site where the concentrations have increased or decreased slightly throughout this monitoring period. Although it must be noted that even with these fluctuations the concentrations are below the air quality objective of  $40\mu\text{g}/\text{m}^3$ .

In 2019 there has been an increase of  $3\mu\text{g}/\text{m}^3$  in comparison to 2018 result. It is thought that this increase is due to the increased activity and vehicle movements on the former Beamlight site that is currently undergoing development and is situated near to this location.

This site will be closely monitored and an update will be provided in the ASR in 2021.

### **Site 33 – 19a Nottingham Road, Nuthall.**

Since 2013, Site 33 has shown a downward trend until 2019 when there has been a slight increase of  $2\mu\text{g}/\text{m}^3$  in comparison to 2018 result. Overall since 2013 there has been a decrease of  $10\mu\text{g}/\text{m}^3$  with the highest concentration being  $33\mu\text{g}/\text{m}^3$  and the lowest being  $23\mu\text{g}/\text{m}^3$  it is currently  $25\mu\text{g}/\text{m}^3$  which is below the air quality objective of  $40\mu\text{g}/\text{m}^3$ .

The reason for the slight increase is unknown as this is a co-location study with Site 34 which has not shown an increase. However, this site will be closely monitored and an update will be provided in the ASR in 2021.

The breakdown of the annual figures for each year from 2013 to 2019 can be viewed in Appendix A, Table A.2 of this report.



**3.2.2 Particulate Matter (PM<sub>10</sub>)**

BBC does not currently monitor PM<sub>10</sub> within the Borough. However, discussions are currently taking place with Nottinghamshire District and Borough Authorities and Nottinghamshire County Council, to collectively buy and maintain particulate monitors in the future. The outcome of this will be discussed in the air quality report for 2020.

**3.2.3 Particulate Matter (PM<sub>2.5</sub>)**

BBC does not currently monitor PM<sub>2.5</sub> within the Borough. However, discussions are currently taking place with Nottinghamshire District and Borough Authorities and Nottinghamshire County Council, to collectively buy and maintain particulate monitors in the future. The outcome of this will be discussed in the air quality report for 2020.

**3.2.4 Sulphur Dioxide (SO<sub>2</sub>)**

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 (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQM A?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube co-located with a Continuous Analyser?	Height (m)
1	113 Wollaton Road, Beeston	R	452527	337313	NO <sub>2</sub>	N	0	1^	N	1.9
50	309 Wollaton Road, Beeston	R	452114	338018	NO <sub>2</sub>	N	0	16^	N	1.7
2	166 Derby Road, Beeston	R	452091	338122	NO <sub>2</sub>	N	0	7^	N	1.8
3	8 Queens Road East, Beeston	R	453659	337412	NO <sub>2</sub>	N	0	12^	N	1.8
4	226 Queens Road, Beeston	R	453361	336627	NO <sub>2</sub>	N	0	6^	N	1.8
51	36 Meadows Road, Beeston	R	453537	336100	NO <sub>2</sub>	N	0	4^	N	1.7

Broxtowe Borough Council

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube co-located with a Continuous Analyser?	Height (m)
52	228 Station Road Beeston	R	453287	336349	NO <sub>2</sub>	N	0	4^	N	1.7
5	Chilwell Olympia School, Beeston	UB	451782	335320	NO <sub>2</sub>	N	0	104^	N	1.9
7	31 Hickton Drive, Chilwell	R	450756	334328	NO <sub>2</sub>	N	0	10^	N	1.9
53	1 Calverton Close, Chilwell	R	450360	334982	NO <sub>2</sub>	N	0	5^	N	1.7
8	The Manor Pub, 350 Nottingham Road, Toton	R	450422	334243	NO <sub>2</sub>	N	0	5^	N	1.8
9	Toton branch Surgery, 2 Banks Road, Toton	R	449876	334804	NO <sub>2</sub>	N	0	8^	N	1.8

Broxtowe Borough Council

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube co-located with a Continuous Analyser?	Height (m)
10	1 Katherine Drive, Toton	R	449748	335472	NO <sub>2</sub>	N	0	13^	N	1.7
11	269 Stapleford Lane, Toton	R	449694	335501	NO <sub>2</sub>	N	0	7^	N	1.8
12	Lamppost, Stapleford Lane, Toton	R	449615	335664	NO <sub>2</sub>	N	0	2^	N	1.9
45	209 Toton Lane, Stapleford	R	449467	336220	NO <sub>2</sub>	N	0	16^	N	1.8
15	George Spencer Academy, Stapleford	R	449406	336135	NO <sub>2</sub>	N	0	9^	N	1.9
13	George Spencer Lower School, Toton	R	449266	336075	NO <sub>2</sub>	N	0	16^	N	1.8

Broxtowe Borough Council

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube co-located with a Continuous Analyser?	Height (m)
16	24 Brampton Drive, Stapleford	R	449516	336216	NO <sub>2</sub>	N	0	11^	N	1.7
54	195 Derby Road, Stapleford	R	448467	336591	NO <sub>2</sub>	N	0	4^	N	1.8
17	Lampost Church Street, Stapleford	R	448890	337190	NO <sub>2</sub>	N	0	3^	N	1.8
55	12 Ilkeston Road, Stapleford	R	449814	338471	NO <sub>2</sub>	N	0	11^	N	1.8
18	20 Tiree Close, Trowell	R	448560	338889	NO <sub>2</sub>	Y	0	26	N	1.7
19	15 Iona Drive, Trowell	R	448586	339023	NO <sub>2</sub>	Y	0	23	N	1.9
20	30 Derbyshire Avenue, Trowell	R	448652	339652	NO <sub>2</sub>	N	0	39	N	1.9

Broxtowe Borough Council

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube co-located with a Continuous Analyser?	Height (m)
22	81 Nottingham Road, Trowell	R	448832	340098	NO <sub>2</sub>	N	0	33	N	1.8
44	32 Mansfield Road, Eastwood	R	446509	347091	NO <sub>2</sub>	N	0	2^	N	1.8
27	Sun Inn Pub, 6 Derby Road, Eastwood	R	446465	346985	NO <sub>2</sub>	N	0	6^	N	1.8
30	560 Nottingham Road, Giltbrook	R	448544	345241	NO <sub>2</sub>	N	0	3^	N	1.9
31	15 Hayley Close, Kimberley	R	448826	344883	NO <sub>2</sub>	N	0	11^	N	1.9
32	59b Main Street, Kimberley	R	450122	344658	NO <sub>2</sub>	N	0	5^	N	1.8
33	19a Nottingham Road, Nuthall*	R	451631	344526	NO <sub>2</sub>	N	0	42	N	1.7

Broxtowe Borough Council

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube co-located with a Continuous Analyser?	Height (m)
34	19a Nottingham Road, Nuthall*	R	451631	344526	NO <sub>2</sub>	N	0	42	N	1.7
35	20 Nottingham Road, Nuthall	R	451728	344440	NO <sub>2</sub>	N	0	32	N	1.9
36	113 Nottingham Road, Nuthall	R	452232	344033	NO <sub>2</sub>	N	0	20^	N	1.7
37	114 Nottingham Road, Nuthall	R	452331	343910	NO <sub>2</sub>	N	0	27^	N	1.7
38	Opp Sherwin Arms, Derby Road, Bramcote	R	450389	337866	NO <sub>2</sub>	N	2	1^	N	1.8
39	9 Bembridge Court, Bramcote	R	450434	337781	NO <sub>2</sub>	N	0	6^	N	1.6
56	10 Town Street, Bramcote	R	450570	337851	NO <sub>2</sub>	N	0	10^	N	1.9

Broxtowe Borough Council

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube co-located with a Continuous Analyser?	Height (m)
40	153 Derby Road, Bramcote	R	450632	337929	NO <sub>2</sub>	N	0	14 <sup>^</sup>	N	1.7
41	169 Derby Road, Bramcote	R	450555	337909	NO <sub>2</sub>	N	0	11 <sup>^</sup>	N	1.8
48	Near 73 Town Street, Bramcote	R	450817	337592	NO <sub>2</sub>	N	0	2	N	1.8
43	Broxtowe Borough Council Offices	UB	452733	336962	NO <sub>2</sub>	N	0	10 <sup>^</sup>	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.

(<sup>^</sup>) All distance to kerb to nearest road relate to the M1 which is the primary source of NO<sub>2</sub> throughout the borough unless indicated using the <sup>^</sup> symbol

(\*) Co-located tubes



Table A.2 – Annual Mean NO<sub>2</sub> Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2019 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3) (4)</sup>				
							2015	2016	2017	2018	2019
1	452527	337313	R	DT	100	100	29	30	28	26	27
50	452114	338018	R	DT	100	100	-	-	-	28	29
2	452091	338122	R	DT	100	100	-	31	29	27	27
3	453659	337412	R	DT	100	100	-	26	22	22	23
4	453361	336627	R	DT	100	100	-	30	28	26	26
51	453537	336100	R	DT	83	83	-	-	-	18	16
52	453287	336349	R	DT	100	100	-	-	-	23	24
5	451782	335320	UB	DT	92	92	20	20	19	17	16

**Broxtowe Borough Council**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2019 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3) (4)</sup>				
							2015	2016	2017	2018	2019
6	451482	334936	R	DT	-	-	-	26	25	-	-
7	450756	334328	R	DT	100	100	26	27	26	23	23
53	450360	334982	R	DT	100	100	-	-	-	19	20
8	450422	334243	R	DT	92	92	-	31	29	27	24
9	449876	334804	R	DT	100	100	-	24	21	22	22
10	449748	335472	R	DT	92	92	-	26	26	21	22
11	449694	335501	R	DT	100	100	-	30	29	26	28
12	449615	335664	R	DT	83	83	-	29	25	24	20
13	449266	336075	R	DT	100	100	-	31	34	26	25

Broxtowe Borough Council

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2019 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3) (4)</sup>				
							2015	2016	2017	2018	2019
45	449467	336220	R	DT	100	100	-	28	29	26	27
15	449406	336135	R	DT	92	92	-	36	26	28	29
16	449516	336216	R	DT	100	100	-	28	26	26	25
54	448467	336591	R	DT	100	100	-	-	-	30	30
17	448890	337190	R	DT	92	92	-	37	35	33	33
55	449814	338471	R	DT	100	100	-	-	-	25	24
18	448560	338889	R	DT	100	100	-	34	33	28	28
19	448586	339023	R	DT	100	100	<b>42</b>	38	37	32	31
20	448652	339652	R	DT	100	100	26	26	24	34	23

Broxtowe Borough Council

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2019 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3) (4)</sup>				
							2015	2016	2017	2018	2019
22	448832	340098	R	DT	100	100	26	27	24	24	24
23	448195	342287	R	DT	-	-	-	24	22	-	-
24	448230	344446	R	DT	-	-	-	26	24	-	-
44	446509	347091	R	DT	100	100	-	36	33	34	32
27	446465	346985	R	DT	92	92	-	26	24	24	20
28	44601	346920	R	DT	-	-	-	25	21	-	-
30	448544	345241	R	DT	92	92	-	27	28	23	22
31	448826	344883	R	DT	100	100	30	30	32	26	29
32	450122	344658	R	DT	100	100	-	30	29	29	29

Broxtowe Borough Council

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2019 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3) (4)</sup>				
							2015	2016	2017	2018	2019
33	451631	344526	R	DT	100	100	28	29	29	23	25
34	451631	344526	R	DT	100	100	29	29	27	28	26
35	451728	344440	R	DT	100	100	34	32	34	30	30
36	452232	344033	R	DT	100	100	-	35	35	33	32
37	452331	343910	R	DT	100	100	-	32	30	29	26
38	450389	337866	R	DT	100	100	31	34	30	30	27
39	450434	337781	R	DT	100	100	28	31	26	27	25
56	450570	337851	R	DT	100	100	-	-	-	25	23
40	450632	337929	R	DT	100	100	-	38	33	34	32

**Broxtowe Borough Council**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2019 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3) (4)</sup>				
							2015	2016	2017	2018	2019
41	450555	337909	R	DT	100	100	-	37	36	34	31
48	450817	337592	R	DT	100	100	-	-	38	36	30
43	452733	336962	UB	DT	100	100	21	21	18	19	18

**Notes:** Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 1-hour mean objective are shown in **bold and underlined**.

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

<sup>(2)</sup> 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%).

<sup>(3)</sup> 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

**R** = Roadside

**UB** = Urban Background

**DT** = Diffusion Tube

**Diffusion tube data has been bias corrected**

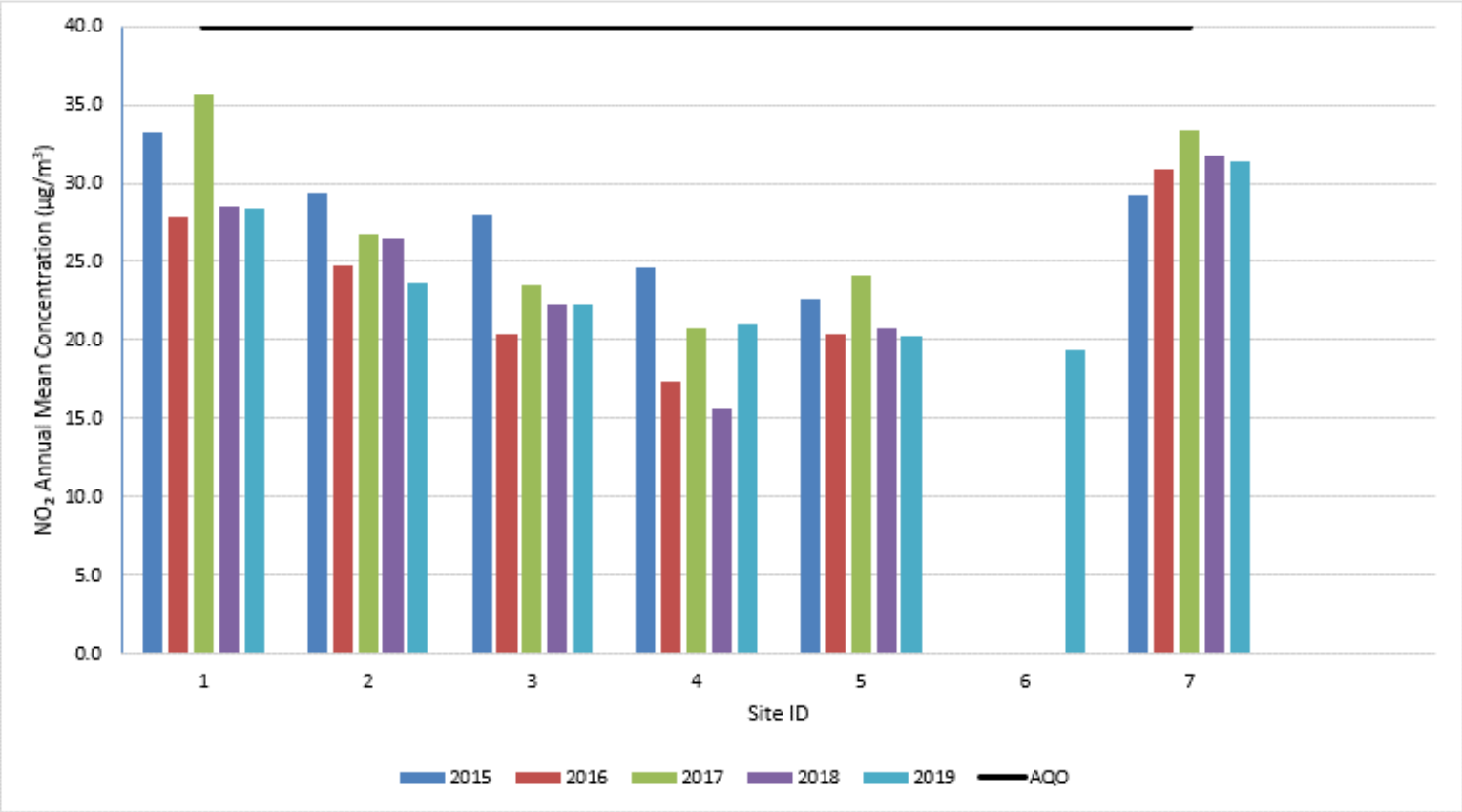
**Annualisation has been conducted where data capture is <75%**

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

# Figure A.1 – Trends in Annual Mean NO<sub>2</sub> Concentrations

Example Trend Chart illustrated below. It is recommended that, where an AQMA is present, separate charts are provided for each AQMA. Sites outside of AQMAs also to be shown. Delete if not required>

**NOTE: DO TREND CHARTS FOR ALL SITES**



## Appendix B: Full Monthly Diffusion Tube Results for 2019

Table B.1 – NO<sub>2</sub> Monthly Diffusion Tube Results - 2019

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.93) and Annualised <sup>(1)</sup>	Distance corrected to Nearest Exposure <sup>(2)</sup>
1	452527	337313	32	42	32	25	24	23	22	26	28	28	32	32	29	27	-
50	452114	338018	54	57	34	24	24	22	16	18	24	34	30	38	31	29	-
2	452091	338122	35	42	25	27	22	22	22	29	25	30	29	34	28	27	-
3	453659	337412	33	31	22	28	21	21	15	18	23	27	35	24	25	23	-
4	453361	336627	38	40	31	21	21	19	20	25	21	29	34	33	28	26	-
51	453537	336100	31	28			17	18	16	21	24	26	32	25	17	16	-
52	453287	336349	40	36	27	22	17	19	18	17	23	25	37	33	26	24	-
5	451782	335320		25	19	14	12	13	12	15	18	20	29	25	17	16	-
7	450756	334328	35	35	24	23	18	18	16	20	22	26	37	28	25	23	-
53	450360	334982	31	26	21	18	18	16	14	16	20	22	30	24	21	20	-
8	450422	334243	37	36	30		23	23	22	26	29	29	32	28	26	24	-
9	449876	334804	31	30	23	25	20	17	16	17	22	23	31	23	23	22	-



Broxtowe Borough Council

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.93) and Annualised <sup>(1)</sup>	Distance corrected to Nearest Exposure <sup>(2)</sup>
10	449748	335472		38	29	16	20	20	19	25	26	26	31	31	23	<b>22</b>	-
11	449694	335501	36	37	34	24	28	27	24	26	30	29	32	31	30	<b>28</b>	-
12	449615	335664	38	36	21	25		20	16	18	24	27		25	22	<b>20</b>	-
13	449266	336075	36	31	27	31	23	23	18	19	26	27	34	24	29	<b>27</b>	-
45	449467	336220	36	<b>41</b>	26	24	23	23	22	22	29	31	35	33	35	<b>29</b>	-
15	449406	336135	38	<b>42</b>	33	32	31		29	36	36	<b>41</b>	38	38	31	<b>25</b>	-
16	449516	336216	34	39	25	28	21	22	19	25	25	30	35	26	27	<b>25</b>	-
54	448467	336591	38	<b>41</b>	<b>48</b>	35	26	24	21	25	25	34	39	29	32	<b>30</b>	-
17	448890	337190	<b>44</b>	<b>47</b>	<b>43</b>	24	27	23	27	34	39	36	<b>42</b>		35	<b>33</b>	-
55	449814	338471	33	38	24	22	20	21	16	22	25	28	35	23	26	<b>24</b>	-
18	448560	338889	39	37	38	21	27	21	25	32	31	29	35	30	31	<b>28</b>	-
19	448586	339023	<b>42</b>	<b>45</b>	38	19	30	29	27	35	36	32	36	32	33	<b>31</b>	-
20	448652	339652	28	30	22	30	24	23	20	19	20	26	31	26	25	<b>23</b>	-
22	448832	340098	26	36	22	30	20	25	23	24	24	28	28	25	26	<b>24</b>	-
44	446509	347091	39	<b>43</b>	38	28	32	27	28	28	37	36	<b>41</b>	31	34	<b>32</b>	-

Broxtowe Borough Council

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.93) and Annualised <sup>(1)</sup>	Distance corrected to Nearest Exposure <sup>(2)</sup>
27	446465	346985	32	30	24	27	23	22	20	19		27	37	40	22	<b>20</b>	
30	448544	345241	39	36	30	23	21	21	20	23		30	38	26	24	<b>22</b>	-
31	448826	344883	38	37	37	23	23	27	28	32	30	29	34	31	31	<b>29</b>	-
32	450122	344658	38	38	34	36	28	26	25	24	29	32	38	25	31	<b>29</b>	-
33	451631	344526	31	37	25	30	24	25	25	23	26	27	35	31	27	<b>25</b>	-
34	451631	344526	32	36	32	27	20	23	22	26	26	32	38	28	28	<b>26</b>	-
35	451728	344440	36	40	39	19	27	26	29	35	34	34	33	30	32	<b>30</b>	-
36	452232	344033	39	<b>49</b>	40	25	26	25	34	37	33	39	39	37	34	<b>32</b>	-
37	452331	343910	34	32	34	29	29	23	22	23	29	29	35	21	28	<b>26</b>	-
38	450389	337866	36	37	30	34	23	24	22	23	28	26	37	25	29	<b>27</b>	<b>26</b>
39	450434	337781	32	34	25	36	25	25	21	21	28	28	31	23	27	<b>25</b>	-
56	450570	337851	35	30	27	20	22	23	17	23	24	25	34	22	25	<b>23</b>	
40	450632	337929	<b>41</b>	40	34	36	34	28	30	29	37	38	<b>46</b>	32	34	<b>32</b>	-
41	450555	337909	40	38	36	36	32	28	26	26	36	35	39	33	33	<b>31</b>	-
48	450817	337592	<b>42</b>	32	22	27	32	31	30	37	<b>41</b>	<b>43</b>	43	32	33	<b>30</b>	-

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.93) and Annualised <sup>(1)</sup>	Distance corrected to Nearest Exposure <sup>(2)</sup>
43	452733	336962	27	26	21	18	15	13	12	12	18	22	30	22	20	<b>18</b>	-

**Notes:**

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 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

**(b)** Result not valid

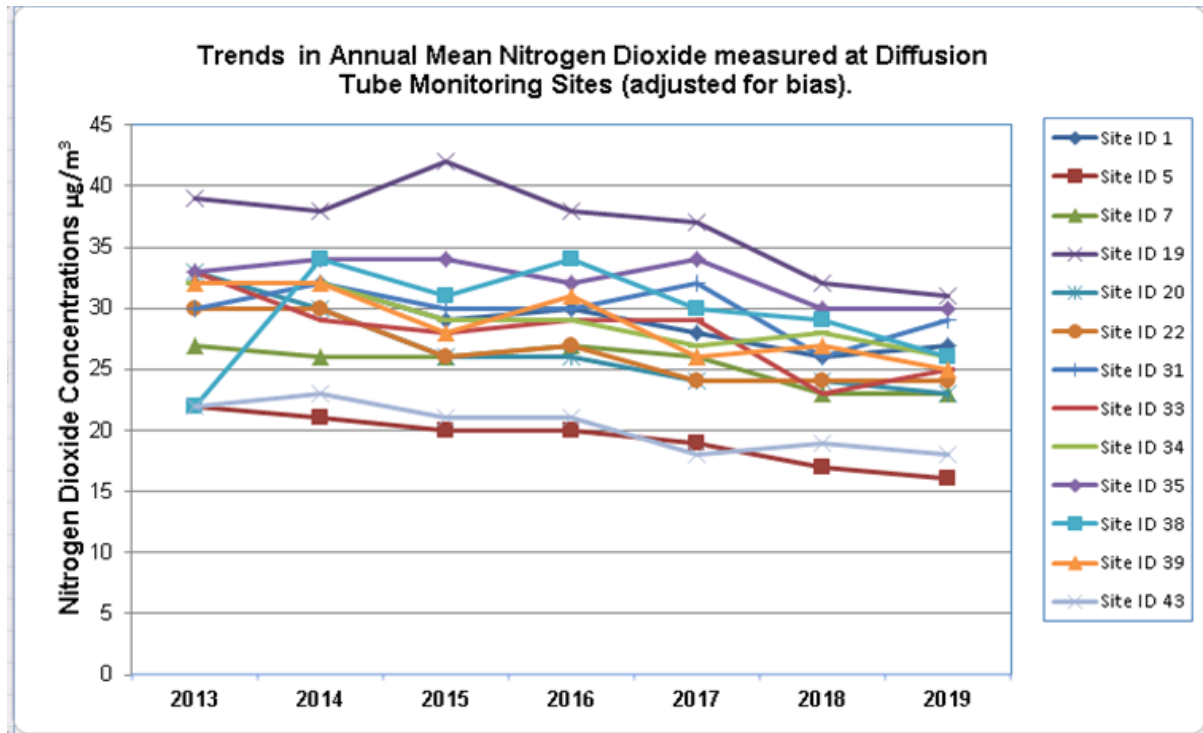
Local bias adjustment factor used

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 2019



**Figure C.1 – Trend Graph of 13 Sites 2013 to 2019.**

**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.

### **2019 Figures**

The Review and Assessment (R&A) Helpdesk Database 2019 bias adjustment factor for Gradko 20% TEA in water tubes = 0.93. This figure is the average of 27 studies and was taken from Spreadsheet Version Number: 03/20.

Diffusion tube precision was good for 25 of the 27 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

One site (Site 38) has been distance corrected to the nearest public exposure using the NO<sub>2</sub> fall-off with distance calculator available on the LAQM website <http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html> .

**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 <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	18	µg/m <sup>3</sup>
Step 4	What is your measured annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	27	µg/m <sup>3</sup>
Result	The predicted annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> ) at your receptor	25.7	µg/m <sup>3</sup>

Figure D.1 - 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<sub>2</sub> 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

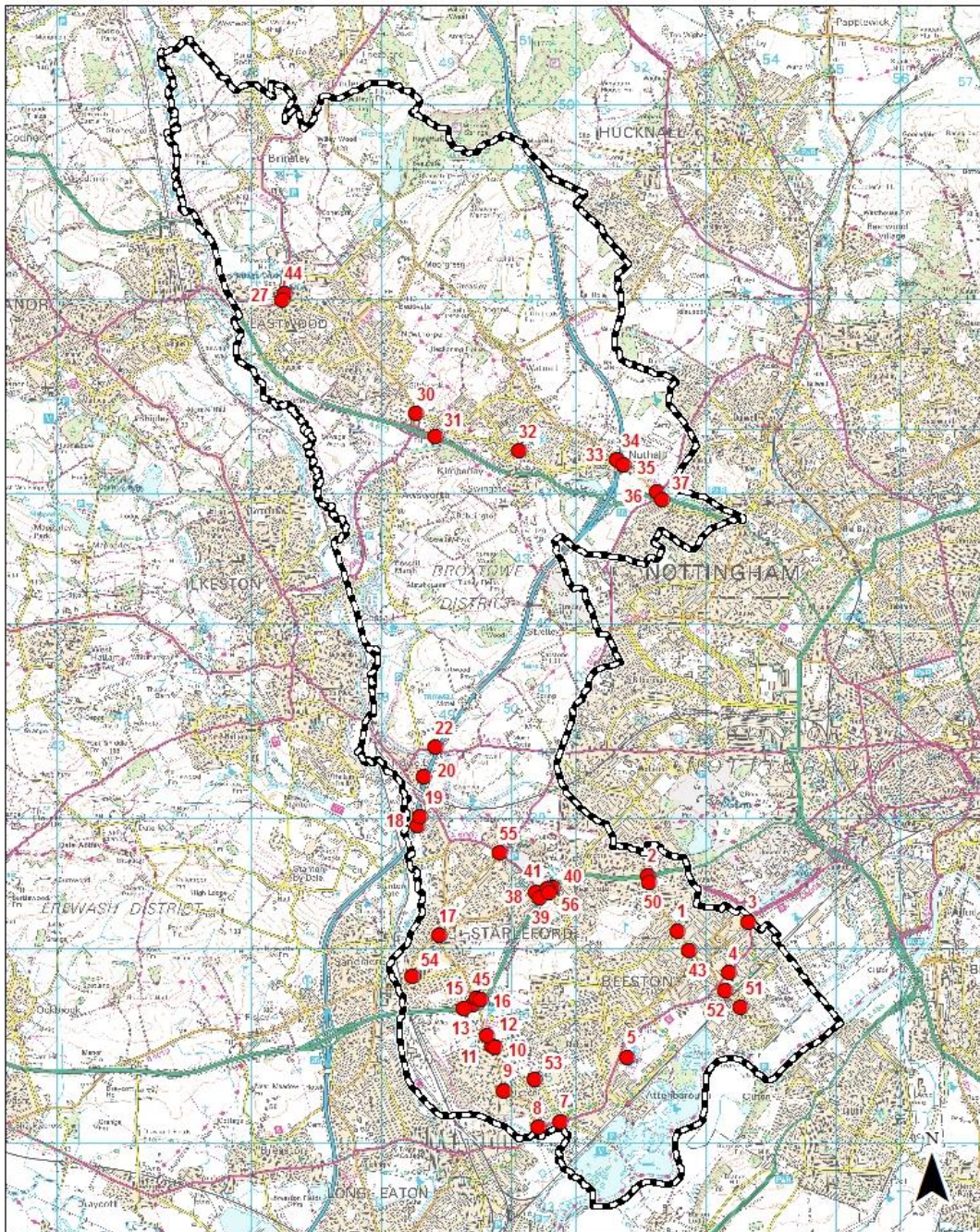
Gradko International also participates in a number of QA/QC monitoring systems to demonstrate satisfactory performance:

- 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.

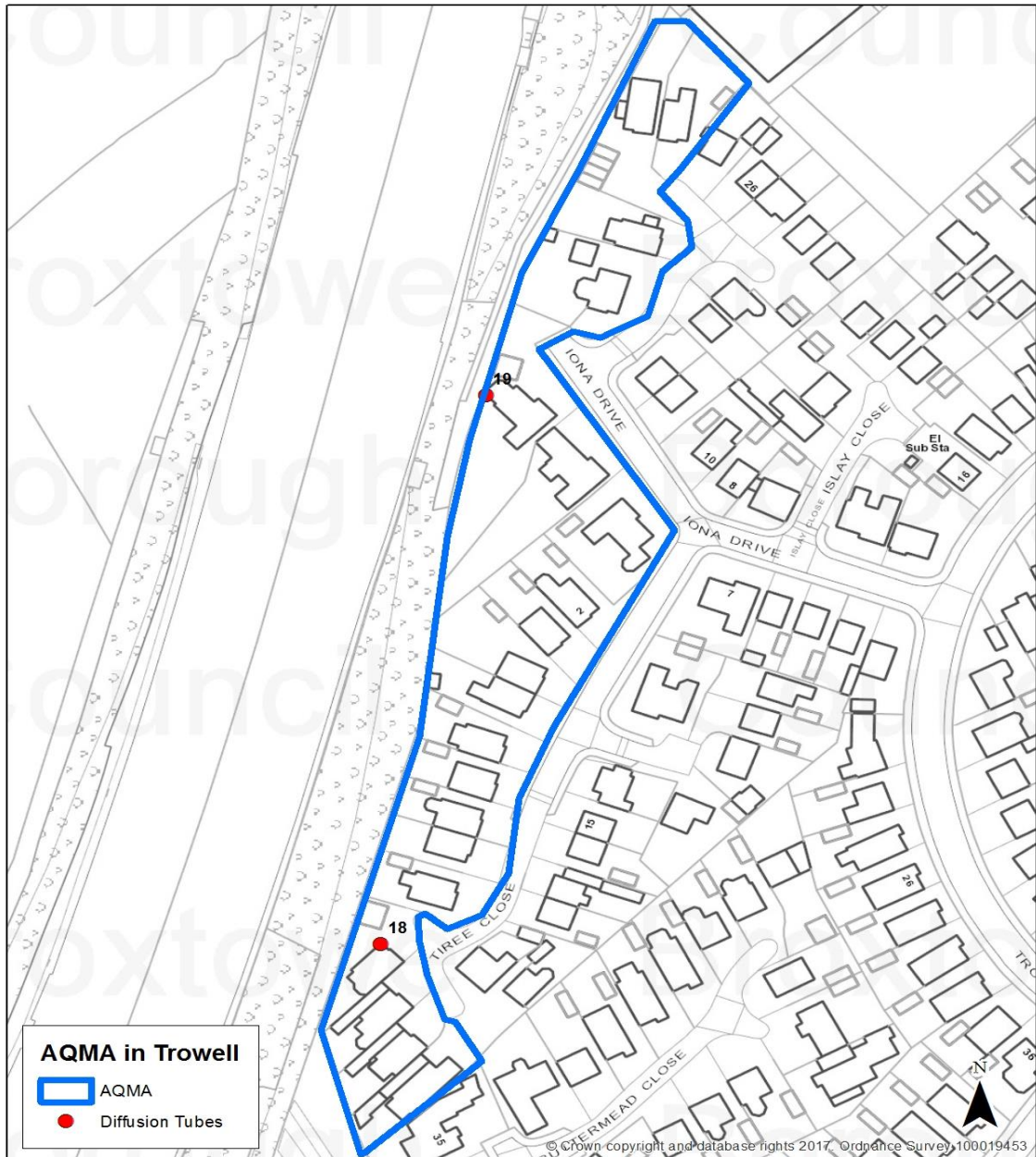


© Crown copyright and database rights 2020. Ordnance Survey 100019453  
You are not permitted to copy, sub-licence, distribute or sell any of this data to third parties in any form

Figure E.1 – 2019 Diffusion Tube Locations



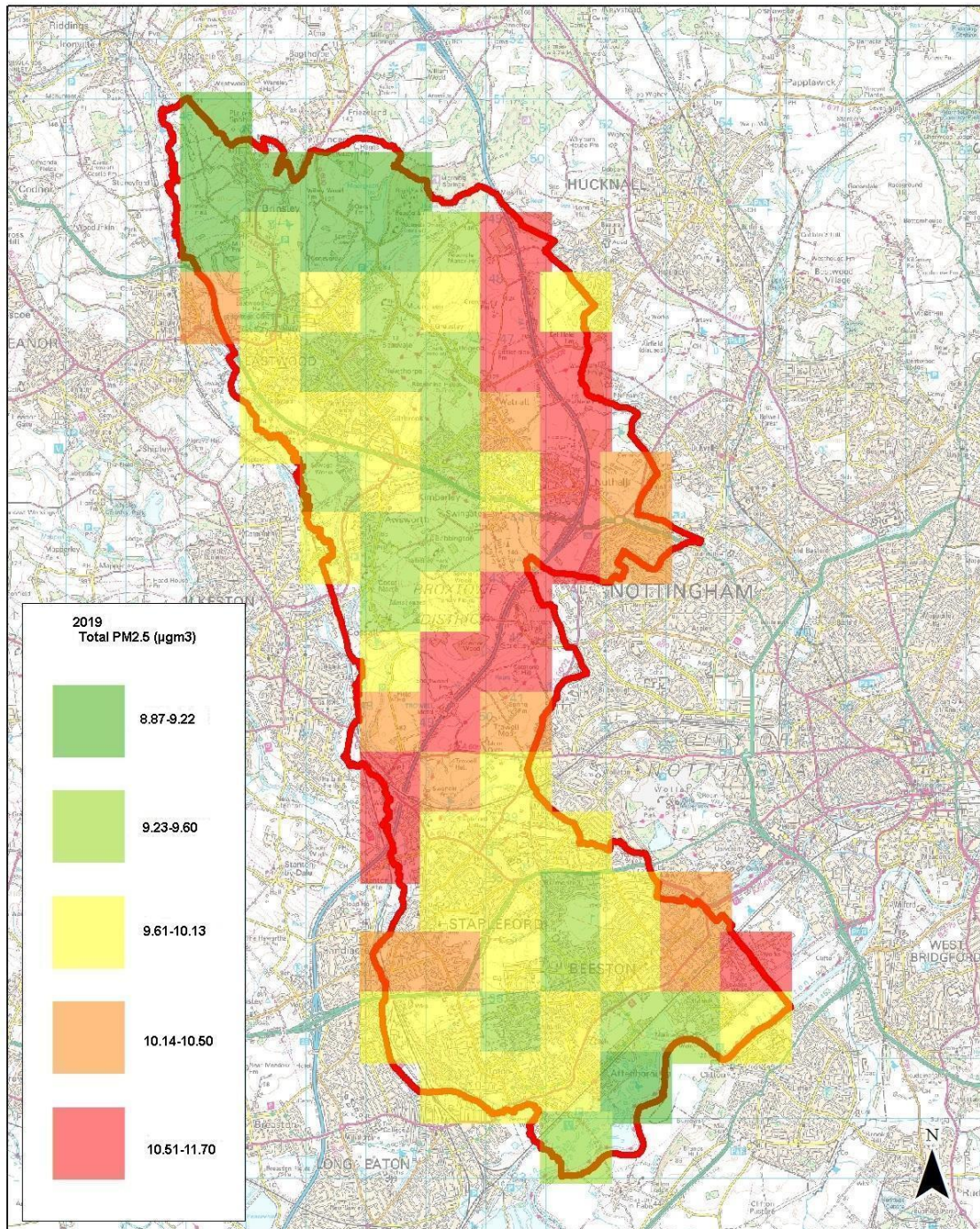
## Appendix F: Map of AQMA in Trowell.



**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: Map of the Borough showing the 2019 modelled background levels of PM<sub>2.5</sub>.



**Figure G.1 - Map of the Borough showing the modelled background levels of PM<sub>2.5</sub>.**



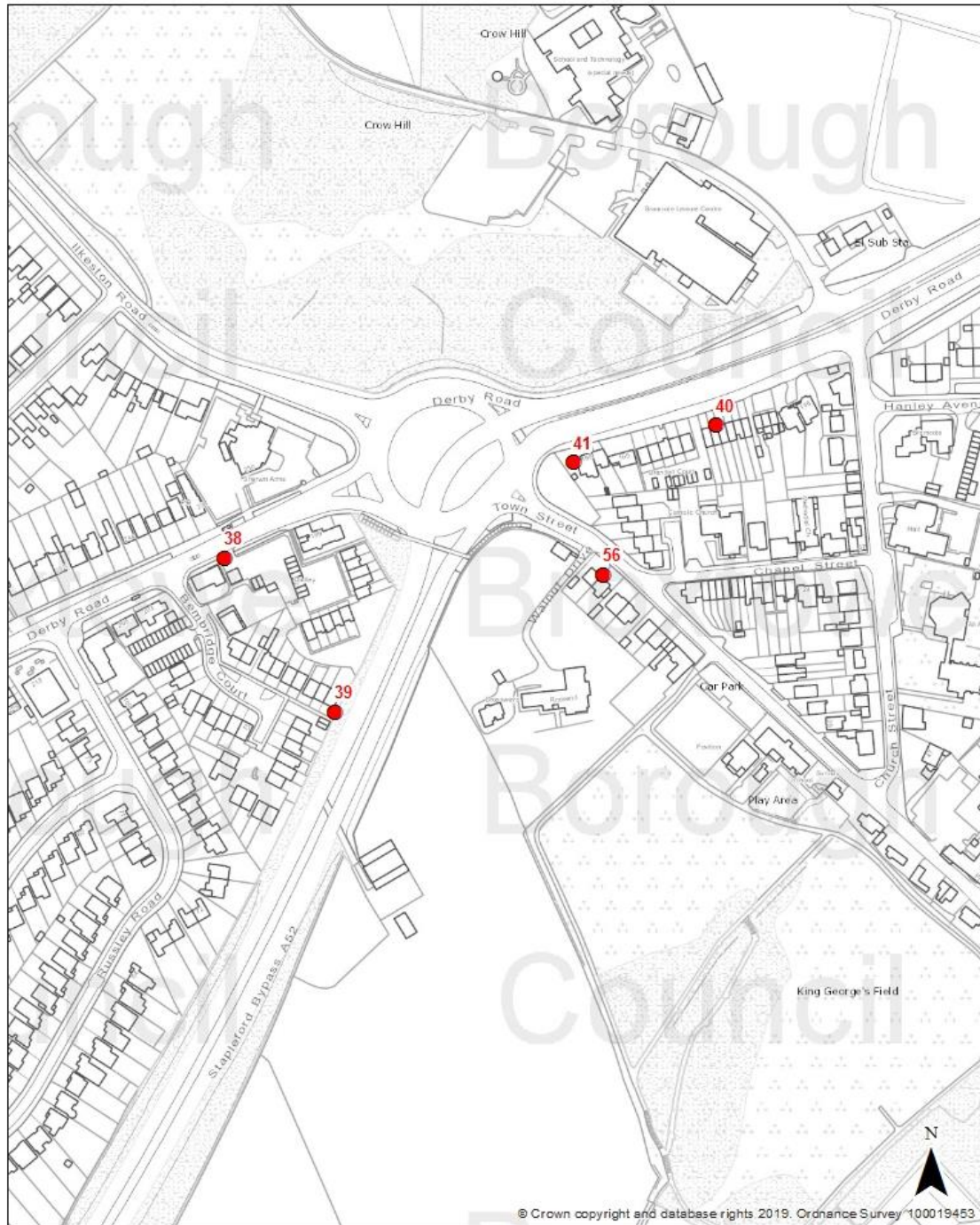
## Appendix H: Map of A610/B600 Nuthall Island showing the Monitoring Locations.



© Crown copyright and database rights 2018. Ordnance Survey 100019453  
You are not permitted to copy, sub-licence, distribute or sell any of this data to third parties in any form

Figure H.1 – Nuthall Island and Diffusion Tube Location.

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

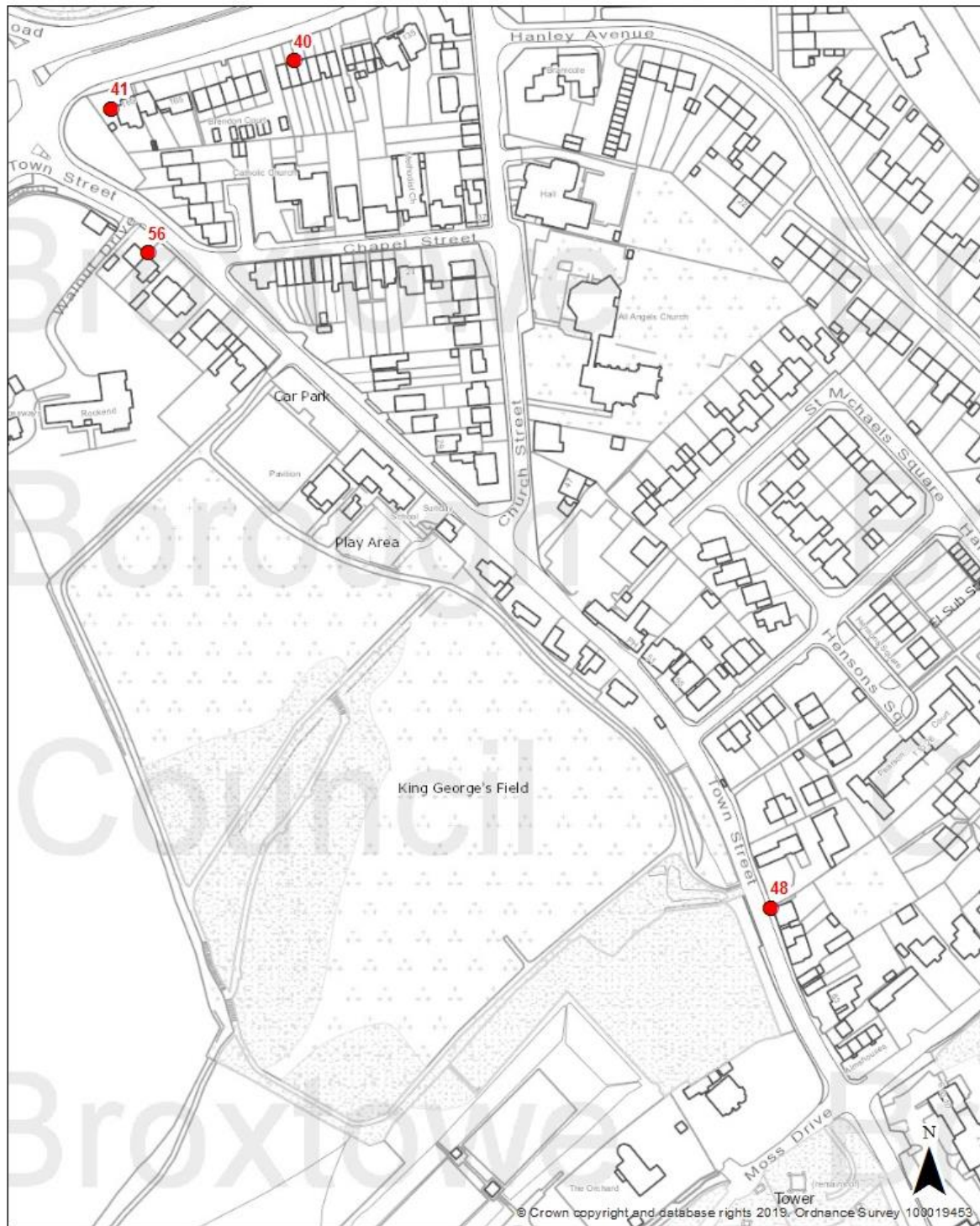


© Crown copyright and database rights 2020. Ordnance Survey 100019453  
You are not permitted to copy, sub-licence, distribute or sell any of this data to third parties in any form

Figure I.1 – Bramcote Island and Diffusion Tube Location



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



© Crown copyright and database rights 2020. Ordnance Survey 100019453  
You are not permitted to copy, sub-licence, distribute or sell any of this data to third parties in any form

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

## Appendix K: Air Quality Action Plan Email Conversation with LAQM Helpdesk

**NOTE: PUT IN EMAILS WITH LAQM IN HERE**

## Appendix L: Summary of Air Quality Objectives in England

Table L.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective <sup>5</sup>	
	Concentration	Measured as
Nitrogen Dioxide (NO <sub>2</sub> )	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Particulate Matter (PM <sub>10</sub> )	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Particulate Matter (PM <sub>2.5</sub> )	Work towards reducing emissions/concentrations of fine particulate matter (PM <sub>2.5</sub> )	Annual mean
Sulphur Dioxide (SO <sub>2</sub> )	350 µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean

<sup>5</sup> The units are in microgrammes of pollutant per cubic metre of air (µg/m<sup>3</sup>).

## 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
COMEAP	Committee on the Medical Effects of Air Pollution
CV	Coefficient of Variation
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
D2N2	Local Enterprise Partnership for Derby, Derbyshire, Nottingham and Nottinghamshire
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
LCWIP	Local Cycling and Walking Infrastructure Plan



## Broxtowe Borough Council

LGA	Local Government Association
LSTF	Local Sustainable Transport Fund
$\mu\text{g}/\text{m}^3$	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 <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
Notts CC	Nottingham City Council
NCC	Nottinghamshire County Council
O <sub>3</sub>	Ozone
OLEV	Office for Low Emission Vehicles
PHE	Public Health England
PM	Particulate Matter
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10 $\mu\text{m}$ (micrometres or microns) or less
PM <sub>2.5</sub>	Airborne particulate matter with an aerodynamic diameter of 2.5 $\mu\text{m}$ 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 <sub>2</sub>	Sulphur Dioxide
SQPS	Statutory Quality Partnership Schemes
TEA	Triethanolamine
UK	United Kingdom

**Broxtowe Borough Council**

ULEVs	Ultra Low Emission Vehicles
WASP	Workplace Analysis Scheme for Proficiency
WHO	World Health Organisation
WPL	Workplace Parking Levy

## References

COMEAP, Associations of long-term average concentrations of nitrogen dioxide with mortality, 2018. Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/734799/COMEAP\\_NO2\\_Report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/734799/COMEAP_NO2_Report.pdf) (Accessed May 2020).

Defra, Abatement cost guidance for valuing changes in air quality, May 2020.

Defra, *Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006*. Department for Environment Food and Rural Affairs.

Defra, *Clean Air Strategy, 2019* Department for Environment Food and Rural Affairs, Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/770715/clean-air-strategy-2019.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770715/clean-air-strategy-2019.pdf) (Accessed 20th May 2020).

Defra, PHE and LGA, *Air Quality – A Briefing for Directors of Public Health 2017* Department for Environment Food and Rural Affairs, Public Health England and Local Government Association Available at :

<https://laqm.defra.gov.uk/assets/63091defraairqualityguide9web.pdf> (Accessed 14<sup>th</sup> May 2020).

Defra, *Environmental equity, air quality, socioeconomic status and respiratory health, 2010*. Department for Environment Food and Rural Affairs.

Defra, *Local Air Quality Management Technical Guidance (TG16)*: Department for Environment Food and Rural Affairs: 2016.

Defra, *Nitrogen Dioxide Fall off with Distance 2018* Department for Environment Food and Rural Affairs, Available at : <https://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html> (Accessed 14<sup>th</sup> May 2020).

Gowers, A.M. et al *Estimating Local Mortality Burdens associated with Particulate Air Pollution*, Public Health England: 2014.

LTP3, *3<sup>rd</sup> Local Transport Plan for Nottingham, 2011-2026*: Nottingham County Council: 2011.

## Broxtowe Borough Council

Public Health England, *Public Health Matters: Air pollution – sources, impacts and actions*. Available at: <https://publichealthmatters.blog.gov.uk/2018/11/14/health-matters-air-pollution-sources-impacts-and-actions/> (Accessed 20<sup>th</sup> May 2020).

Public Health England, Local Alcohol Profiles for England, 2016/7 Available at <https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/0/gid/1000043/pat/6/par/E12000004/ati/201/are/E06000018> (Accessed 14<sup>th</sup> May 2020).

Public Health England, Tobacco Control Profiles 2014-2016 Available at <http://fingertipsreports.phe.org.uk/health-profiles/2017/e06000018.pdf> (Accessed 14<sup>th</sup> May 2020).