2016 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 2016

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Executive Summary: Air Quality in Our Area

Air Pollution

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. When the air quality is poor this can affect people"s health on a daily basis and can also result in a premature death.

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

Nitrogen Dioxide

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

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

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

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

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.

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

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

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

Health Effects of Poor Air Quality

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

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

Health Effects of Nitrogen Dioxide

The main health effect of breathing in raised levels of Nitrogen Dioxide is the increased likelihood of respiratory problems, as Nitrogen Dioxide inflames the lining of the lungs, and it can reduce immunity to lung infections. This can cause problems such as wheezing, coughing, colds, flu and bronchitis and can exasperate pre-existing conditions like asthma and Chronic Obstructive Pulmonary Disease.

Health Effects of Particulate Matter

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

[1] Environmental equity, air quality, socioeconomic status and respiratory health, 2010
[2] Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006
[3] Defra. Abatement cost guidance for valuing changes in air quality, May 2013
[4]Gowers, A.M. et al Estimating Local Mortality burdens associated with Particulate Air Pollution, Public Health England, 2014.

Table i – Estimated Effects of Annual Mortality in 2010 of human-made $PM_{2.5}$ Air Pollution.

Area	Attributable fraction	Attributable * Deaths aged 25+	Associated life years lost
East Midlands	5.7	2,314	24,016
Nottingham City	6.4	150	1,559
Nottinghamshire County Council	5.7	430	4,270
Broxtowe Borough Council	**6.1**	**62**	**612**

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

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

Although the figures in Table i show that in Broxtowe Borough Council there are believed to be 62 deaths attributable to human-made air pollution, this figure needs to be put into context as deaths that are attributable to smoking and alcohol consumption are far higher. For example Nottingham City had 150 deaths attributable to human-made air pollution, but there are 420 deaths attributable to smoking[5] and 115 deaths related to alcohol consumption[6].

However, it must also be noted that it is now known that there is significant harm to health at concentrations of Particulate Matter well below the current EU and UK limit values.

[5] Tobacco Control Profiles 2011-2013, Public Health England. http://www.tobaccoprofiles.info/
[6] Local Alcohol Profiles for England, 2010. http://www.lape.org.uk/

Air Quality Issues in Broxtowe Borough

The main air quality issue within the borough is due to the M1 running through the Borough and also 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 23 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 two existing air quality management areas, which are situated in Nuthall and Trowell. Monitoring is still being undertaken in the two revoked air quality management areas to ensure that the concentrations remain below the air quality objective. Further information of the air quality management areas is discussed in Chapter 2.1 of this report.

The nitrogen dioxide results for 2015 show that at 20 of the 23 monitoring locations throughout the Borough the air quality levels are below the objective of 40µg/m^3 for nitrogen dioxide. However the air quality objective is exceeded at 3 of the monitoring locations, which are:

- 41 µg/m^3 at Derby Road, Bramcote
- 42 µg/m^3 at Iona Drive, Trowell
- 41 µg/m^3 at A610/B600 Nuthall Island

The results are discussed in greater detail in Chapter 3.2.1 of this report.

Background levels of $PM_{2.5}$ within the Borough are modelled by Defra to be between 10 μm^3 and 13 μm^3 for 2015. The World Health Organisation guideline level for $PM_{2.5}$ is 10 μm^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 managements areas and to provide yearly air quality reports. By working together actions are implemented 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.

Completion of Tram extension to Toton Lane – this was completed in August 2015 and has proved to be a success as it is used regularly by commuters, people living within the Borough and people visiting the Borough.

Improvements to the A453 - were completed in July 2015. These improvements were to ease congestion and improve road safety.

Optimisation of traffic signals at A610 Nuthall Island – this was implemented in 2014/2015 and it provides real time traffic control to ease congestion and respond to peak travel fluctuations.

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

Local Priorities and Challenges

The priorities for Broxtowe Borough Council in addressing air quality for the coming year are to:

- Increase the number of NO_2 diffusion tubes within the borough to ensure that locations where there is the potential for elevated levels of NO_2 are being monitored. Extensive monitoring will allow Broxtowe Borough Council to identify and focus on „problem" areas.
- Reduce the levels of NO_2 in the Borough by working with Highways England and Nottinghamshire County Council.
- Continue to be a member of the 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.
- Present the findings of this report to the Broxtowe Partnership Board on the 5th October 2016 and to also send this report to the Broxtowe Borough Council representative for the Nottinghamshire Health and Wellbeing Board.
- Assist in re-writing the Nottinghamshire Air Quality Strategy that was published in 2008 by the Nottinghamshire Environmental Protection Working Group as it is now out dated and under used. The group will be assisted by Public Health England, local Public Health officers, local Transport officers and local Planners; this will ensure that it is once more a valuable working document.

- Review Broxtowe Borough Councils Air Quality Action Plan and update the document to ensure that it is still relevant and that the measures are suitable to reduce air quality within the Borough.
- Liaise with the Planning department at Broxtowe to decide on a suitable planning condition that would ensure that the developer has to install Electric Vehicle Charging Points on any planning consent for large commercial or large housing developments within the borough. This is to promote sustainable travel within the borough. Currently Electric Vehicle Charging Points has been only been a recommendation in planning applications for large developments but it is not a planning condition.

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.

In 2010 Highways England competed a road widening scheme for the M1 between junctions 25 and 28 (Junctions 25 to 26 are within the Borough of Broxtowe); the widening scheme widened the carriageway from three lanes to four and introduced a „controlled motorway" system that improves the control of traffic flow. Highways England predict that air quality will improve as there are lower observed traffic flows and heavy goods vehicles.

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. Therefore there are several challenges associated with this. The first challenge is that Broxtowe Borough Council is unable to impose or make any changes to the structure or flow of the roads. The second challenge is that the allocated County

Council integrated transport funding has been reduced by approximately £3.5m from 2015/16 onwards. This significantly reduces the funding available for transport improvements that will deliver air quality improvements.

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

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

How to Get Involved

Residents and Businesses living or working in the Borough of Broxtowe 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.

- Public transport – To use all means of public transport whenever possible e.g. trams, buses and trains. You can find your best journey options at http://www.triptimes.co.uk/ and the tram timetable at http://www.thetram.net/. The Big Wheel promotes sustainable travel within the Borough; it assists people and businesses with journey planning and advice. Further information can be found at http://www.thebigwheel.org.uk/ . Sustrans is also a charity that promotes sustainable travel and further information can be found at http://www.sustrans.org.uk/
- Cycling – To use the extensive cycle routes that are available throughout the Borough. Maps of cycle routes are available at

http://www.nottinghamcity.gov.uk/cycling. There are also three cycle centres within the Borough 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 .

- Car sharing schemes - Nottinghamshire have a Car share scheme at http://beta.nottinghamcity.gov.uk/transport-parking-and-streets/public-transport/park-and-ride/car-care-sheme/ but all businesses can produce their own.
- Park and Ride – There are a variety of Park and Ride parks within Nottinghamshire, but within the borough of Broxtowe there are two Park and Ride sites e.g. Phoenix Park and Ride in Nuthall and Toton Lane Park and Ride in Toton, which serve the Nottingham Tram. The information for these Park and Rides are found at http://beta.nottinghamcity.gov.uk/transport-parking-and-streets/public-transport/park-and-ride/
- Walking – To walk short distances rather than drive, this also has the benefit of improving your health as well.
- Walking and cycling to school – School travel plans promote group cycling and walking for pupils to safely get to school. Contact your local school to find out further information.
- Car- Drive efficient low polluting vehicles and have regular maintenance checks on your vehicle and ensure that the tyres are properly inflated and aligned.
- Smoke Control Area – Most of the Borough in Broxtowe 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. 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.
- Bonfires – To not have bonfires at all and to compost all garden waste and recycle rubbish rather than burn it.

- House Boilers – Ensure that boilers are serviced regularly and kept in good working order. If a boiler needs replacing then purchase one that has a low NOx emission rating.

Further information can be found on the Broxtowe Borough Council website and in paper format at all libraries within the Borough.

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1 Local Air Quality Management

This report provides an overview of air quality in Broxtowe Borough Council during 2015. 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 exceedence 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 G.1 in Appendix G.

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.

A summary of AQMAs 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 Defra webpages.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City / Town	One Line Description	Action Plan
AQMA 1 Trowell	NO_2 annual mean	Trowell, Nottingham	AQMA 1 encompasses twenty properties on parts of Iona Drive and Tiree Close next to the M1 motorway in Trowell	Action Plan 2008.
AQMA 4 Nuthall	NO_2 annual mean	Nuthall, Nottingham	AQMA 4 encompassing fourteen properties next to the M1 Motorway on parts of Nottingham Road and Back Lane, Nuthall next to the M1 Motorway in Nuthall, Nottingham.	

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

Broxtowe Borough Council (BBC), Highways England (HE) and Nottinghamshire County Council (NCC) have taken forward a number of measures during the current reporting year of 2015 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 HE 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:

- Completion of Tram extension to Toton Lane.
- Improvements to the A453.
- Optimisation of traffic signals at A610 Nuthall island
- School travel plans developed by the County Council at schools in the Borough
- Eco-driver training amongst County Council employees
- The introduction of advisory 20mph speed limits outside all schools within the Borough to encourage more people to walk and/or cycle to school
- Eco-Stars programme (which ceased to be delivered when the Local Sustainable Transport Fund funding ceased).
- The County Council have provided training to staff and works promoters, to ensure that they are aware of their requirement to reduce traffic disruption and encourage alternative working method. This is to try and ensure that there is minimum disruption on County Council managed roads

Progress on the introduction of a car club in the County have been slower than expected as this will only be introduced once the club in Nottingham City proves consistently successful over a period of time (the Nottingham City car club was only introduced in April 2014).

BBC‟s priorities for the coming year are predominantly through measures to make the best use of the transport networks and through smarter travel measures that will encourage people to travel more sustainably. These include:

- Traffic control and information provision to minimise disruption and delay on County Council managed roads (including the A610) such as contingency planning, the effective co-ordination of works and the provision of real-time travel information

- Parking enforcement on County Council managed roads to ensure that the traffic keeps moving
- Travel planning such as the development of new travel plans at businesses across the county through planning conditions
- Measures to reduce the need to travel at peak times such as the provision and encouragement of flexible working arrangements
- The facilitation of smarter travel behaviour such as the provision of a car sharing scheme and integrated and concessionary ticketing schemes
- The encouragement of smarter travel behaviour such as the marketing and promotion of passenger transport, walking and cycling, provision of cycling and walking route maps, cycle training programmes, and web-based journey planners
- The encouragement of the uptake of low-emission vehicles through the delivery of the Nottingham Go Ultra Low City bid funding.

Table 2.2 - Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Progress to Date	Estimated Completion Date
1a	**Car sharing scheme**	Alternatives to private vehicle use	Car & lift sharing schemes	NCC and BBC	2006	On-going	Increase the no. of people car sharing / Restrain average journey times in the morning peak to a 1% increase per year	• A countywide car sharing scheme (nottinghamshare.com) was launched in April 2006 and continues to be promoted across the county • Whilst Nottinghamshare is promoted throughout the year additional activities and promotion was held during liftshare week including features in the local press and other publications. The number of current registered users on the website has increased to 2,788 in 2016 (an increase of 484 from 2015).	On-going
1b	**Introduction of car club**	Alternatives to private vehicle use	Car clubs	NCC	2014 -2017	Dependant on monitoring of Nottm scheme	Restrain average journey times in the morning peak to a 1% increase per year	• Feasibility study undertaken by consultants on the merits of introducing such a scheme in the wider Nottingham area concluded that the greatest benefits would be seen by a scheme evolving out of a car share club introduced in the City • A car club was introduced in Nottingham City in April 2014. The scheme was funded through the Local Sustainable Transport Fund and the Nottingham City workplace parking levy. The contract for the scheme allows for the expansion of the car club in to the county at a later date if the club proves consistently successful over a period of time. The possibility of expanding the existing scheme with electric vehicles into the county is also being considered for inclusion as part of the successful Nottingham Go-Ultra Low City OLEV funding bid.	Dependant on Monitoring of Nottingham scheme

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Progress to Date	Estimated Completion Date
2	**Inspection of Permitted Processes**	Environmental Permits	Introduction /increase of environment charges through permit systems and economic instruments	BCC		On-going	Reduced Emissions	Annual Inspections of permitted processes were undertaken; all permitted processes were risk rated with the higher risk processes incurring a higher annual subsistence fee. The risk rating did not change in 2015, and all permitted processes were fully compliant.	On-going
3a	**Planning and Policy Guidance**	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	All Notts County Authorities BBC	2013-2014 2015-2016	2014 2016	Reduced Emissions	• The „Greater Nottingham Aligned Core Strategy" was adopted in 2014, which sets out an overall strategy of urban concentration in regeneration, which negates the need to rely on cars for transport and that any new development must include a sufficient package of measures to ensure that journeys by non-private car modes are encouraged. BBC will continue to be involved in consultations when the strategy is reviewed. • Review of the Broxtowe Local Plan to ensure that air quality remains an important consideration when granting planning permission and to encourage developers to include sustainable travel measures as part of the planning application.	On-going On-going

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Progress to Date	Estimated Completion Date
3b	**County Groups and Strategies to improve air quality**	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop area wide Strategies to reduce emissions and improve air quality	All Notts County Authorities	2016-2017 2014-2015	2017 2015	Increased awareness of the effects of air quality on health and to promote sustainable travel.	• Nottinghamshire Environmental Protection Working Group produced the „Nottinghamshire Air Quality Strategy in 2008", which was reviewed in 2015 and will be re-drafted in 2016-2017. BBC will be attending all working group meetings and assisting in the re-drafting of the AQ strategy • Engagement with the Nottinghamshire Health and Wellbeing Board has led to air quality being included in the „Joint Strategic Needs Assessment" for the County. Broxtowe will continue to promote air quality and to work with Public Health.	2017 **Complete**
4a	**Nottingham Low Emission Zone**	Promoting low emission transport	Low Emission Zone (LEZ)	Notts CC	2016-2018	2018	Reduced emissions	Nottingham City Council are currently investigating the introduction of a low emission zone within the City Centre to help meet its 2020 air quality targets. The scheme would initially be applicable to buses, coaches and taxis. The scheme may also be introduced in neighbouring authorities.	Dependent on feasibility and being granted powers to enact the scheme
4b	**Low emission vehicle procurement**	Promoting Low emission transport	Company vehicle Procurement - prioritising uptake of low emission vehicles	BBC	2015	2015-2024	Reduced emissions	All new fleet vehicles at BBC are Euro6 emissions complaint. There are 90+ fleet vehicles and they are on a 10 year replacing rolling programme.	2024

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Progress to Date	Estimated Completion Date
4c	**Nottingham Go-Ultra Low City bid**	Promoting low emission transport	Company vehicle Procurement - prioritising uptake of low emission vehicles/ priority parking for LEVs/ procuring alternative refuelling infrastructure to promote LEV recharging/ public vehicle procurement - prioritising uptake of low emission vehicles	NCC NCC	2015-2016	2016-2021	On-going take-up of cleaner vehicles	• Nottinghamshire County Council, in partnership with Nottingham City and Derby City Councils has been successful in securing £6.1m OLEV funding for the period April 2016 - March 2021to accelerate the take-up of electric vehicles. The bid will include • Grants, loans and advice to support businesses to introduce low-emission vehicles and electric charging at workplaces • Expansion of the Council"s electric vehicle fleet (e.g. pool cars and vans and associated charging facilities at County Council sites) • Expansion of the public electric vehicle charging infrastructure to create an area-wide network of charging infrastructure • Expansion of the existing car club into the county • A programme of targeted promotional events in areas where data highlights the residents and/or businesses are more likely to transfer to ULEVs.	2021
4d	**Taxi Licensing Conditions**	Promoting Low Emission Transport	Taxi Licensing Conditions	BBC	2016-2019	2011 2019	Reduced emissions	• No cars normally older than 8 years will be licensed as a taxi within the borough. • A review of the taxi licensing conditions will be undertaken to establish a common policy of conditions throughout the County.	On-going 2019

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Progress to Date	Estimated Completion Date
5a	**Workplace travel plans**	Promoting Travel Alternatives	Workplace travel planning	Businesses/ developers BBC		On-going	No. of travel plans developed / Restrain average journey times in the morning peak to a 1% increase per year	• Workplace travel plans are developed with businesses as part of planning conditions and through voluntary arrangements. • During 2015/16 a further 3 travel plans have been developed in Broxtowe borough although only 1 of these has been approved by the County Council.	On-going
5b	**Personalised travel planning**	Promoting Travel Alternatives	Personalised travel planning; Intensive active travel campaign & infrastructure	NCC BBC		2015/16 On-going	No. of people travelling by sustainable transport / Restrain average journey times in the morning peak to a 1% increase per year	• Requests for funding from developers for travel planning at new residential developments are made to the planning authority by the County Council through the planning process where necessary • Future PTP will be dependent on the outcome of funding bids such as the 2016/17 Sustainable Transport Transition Year Funding which was unsuccessful.	On-going Dependent on availability of Central Govt funding
5c	**School travel plans**	Promoting Travel Alternatives	School travel planning	Schools NCC		2000-2011	Restrain average journey times in the morning peak to a 1% increase per year	School travel plans have been developed and approved at all but 3 schools in Broxtowe Borough. Completed March 2011	**Completed**

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Progress to Date	Estimated Completion Date
5d	**Flexible working arrang-ements**	Promoting Travel Alternatives	Encourage / facilitate home-working	NCC and BBC		On-going	Restrain average journey times in the morning peak to a 1% increase per year	Flexible working arrangements for staff are operated by Broxtowe and County Council including provision of equipment to allow them to work from home. All office-based Broxtowe and County Council employees are able to work from home or from „touch down" offices nearer to home and are provided with remote access facilities. Arrangements remain in place and are on-going	On-going
5e	**Web based journey planners**	Promoting Travel Alternatives Public Information	Promotion of cycling and Walking Promotion of bus and rail services Via leaflets /via other mechanisms /via radio /via television /via the internet / other	NCC		On-going	Increases in cycle trips / Increases in passenger transport trips / Restrain average journey times in the morning peak to a 1% increase per year	• Web based journey planners are used to help people plan and make walking, cycling and passenger transport journeys • 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 • In addition to this, links to all of the area"s public transport operators" journey planner information are also available from NCC"s website • Further enhancements to web based journey planners in the county will be developed as part of the emerging Integrated Passenger Transport Strategy which was approved in 2015.	On-going

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Progress to Date	Estimated Completion Date
5f	**Marketing and promotion of passenger transport**	Promoting Travel Alternatives Public Information	Promotion of cycling and walking Via leaflets /via other mechanisms /via radio /via television /via the internet / other	Operators NCC		On-going	Increased public transport patronage / Restrain average journey times in the morning peak to a 1% increase per year	• Various marketing campaigns undertaken in partnership with operators and Nottingham City Council, co-ordinated through the Greater Nottingham Bus Quality Partnership • Marketing of new Robin Hood smartcard integrated ticketing scheme to replace Kangaroo ticket.	On-going
5g	**Workplace Travel Planning**	Promoting Travel Alternatives	Workplace travel planning	BBC		On-going	Increased use of public transport and encouraging sustainable travel	BBC has undertaken a review of the Councils travel plan by: • Reviewing Lease cars, car allowances and work place parking. • Develop 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.	**Complete** **Complete** **Complete**
5h	**Cycle training**	Promoting Travel Alternatives	Promotion of cycling	NCC		On-going	Increases in cycle trips / Restrain average journey times in the morning peak to a 1% increase per year	• Cycle training continues to be offered free of charge. The County Council continues to offer nationally accredited cycle training to people of all ages and abilities. Cycle training is offered free of charge to children in the county and adult training is also available free to members of the public; whilst training is offered at workplaces at a cost to employers. In 2015/16 6,026 children received cycle training.	On-going

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Progress to Date	Estimated Completion Date
5i	**Marketing of walking and cycling**	Promoting Travel Alternatives Public Information	Promotion of cycling / promotion of walking Via leaflets /via other mechanisms /via radio /via television /via the internet / other	NCC			Increases in cycle trips / Increased footfall in town centre / Restrain average journey times in the morning peak to a 1% increase per year	• Marketing of walking and cycling is undertaken in a variety of formats. Various campaigns have been undertaken • The Big Wheel marketing organisation was established to deliver year round marketing campaigns in the Greater Nottingham area • Various campaigns undertaken including marketing of bike week, walk week, walk to school week. Nottinghamshire County Council, in partnership with Nottingham City Council, held a Greater Nottingham cycle forum during Bike Week and Cycle Live (including mass participation cycle rides and activities such as the Great Notts Bike Ride) was held in June to promote cycling • Involvement in Walk Week during May includes guided walks, a chance to try out activities. Media campaigns were held internally with members of staff and externally to promote walk week. Activities included organised lunchtime walks. National walk to school week was also promoted by the County Council in schools across the county. It is hoped that the events in Walk Week will encourage people to continue walking and lead healthier lifestyles • All of the work undertaken by the officers undertaking travel planning duties (e.g. Publicity campaigns, personalised travel planning etc.), aim to deliver increases in the walking and cycling mode share. Cycling in the Nottingham built-up area part of the county has increased by 23% between 2010 and 2014 (latest available data); and in Broxtowe district there has been a 30% increase in cycling between 2010 and 2014. It is not possible to analyse these figures at a more local level.	On-going

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Progress to Date	Estimated Completion Date
5j	**Promotion of walking and cycling and promoting sustainable travel**	Promoting Travel Alternatives	Promotion of Cycling Promotion of Walking Promoting Sustainable Travel	BBC	2012-2017		In Broxtowe district there has been a 30% increase in cycling between 2010 and 2014.	• BBC has attended every festival and event within the Borough to promote sustainable travel to the public. • TravelRight Broxtowe was created as part of a local sustainable travel fund bid. It is a free initiative to support the local community to travel to jobs, training or education. The project included three cycle centres in the Borough. • Since April 2015 the three cycle centres based in Beeston, Stapleford and Eastwood have provided free cycle training, led group leisure ride, put on maintenance courses for cyclists, provided travel planning and gave out public transport discounts/free cycles/free travel cards to job seekers. This was delivered by Ridewise Ltd. • Hi Vis slap bands and rucksack covers have been given out at events. • Cycle security events and locks have been given away at Beeston Train Station. • Promote safe cycling on tram lines at events/social media and leaflets. • Review of installing new cycle stands at Beeston square, Bramcote Leisure Centre and the Council Offices. • Produce and promote Broxtowe Cycling Map. • Develop Broxtowe Country Trail and promote it.	On-going On-going On-going **Complete** On-going **2016** **Complete** & On-going **2016**

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Progress to Date	Estimated Completion Date
6a	**Real time travel information** on the local road networks	Public Information	Via radio, television, internet, other	NCC		On-going	Restrain average journey times in the morning peak to a 1% increase per year	• Information conveyed onto the local media and disseminated via NCC"s web site, the internet, mobile phones, satellite navigation and radio broadcasting. The existing Travelwise web site was completely rebuilt and developed to become the central real time information hub for reporting road conditions, congestion, road works, events, incidents, travel information and useful advice for the travelling public • The Travelwise centre remains in operation 24hrs a day, every day.	On-going On-going
6b	**Sustainable Travel Information for the Public**	Public Information	Via leaflets, internet, other	BBC		On-going	Increased use of public transport	• BBC provide leaflets on safe cycling on the tram lines, bus routes, Broxtowe cycling map, Broxtowe Country and Erewash Valley routes and walking leaflets. These are all available in Council owned buildings. All of the leaflets are also available on the internet and given out at all events and festivals. • Broxtowe Matters is a pamphlet that goes out to all households in the Borough and this has information in about sustainable travel and directs the public to further information. • Social media is used to message the public and provide them with information about events and sustainable travel methods. • Sustainable Travel is also promoted in the reception on the TV at the Council buildings to increase public awareness.	On-going

<table>
<tr><th>Measure No.</th><th>Measure</th><th>EU Category</th><th>EU Classification</th><th>Lead Authority</th><th>Planning Phase</th><th>Implementation Phase</th><th>Key Performance Indicator</th><th>Progress to Date</th><th>Estimated Completion Date</th></tr>
<tr><td>7a</td><td>Traffic control and information undertaken to minimise traffic disruption and unnecessary congestion on the County Council"s highway network as part of NCC"s network management duty.</td><td>Traffic Management</td><td>UTC, congestion management, traffic reduction</td><td>NCC</td><td></td><td>On-going</td><td>Restrain average journey times in the morning peak to a 1% increase per year</td><td>• Provided through the jointly (County and City Councils) funded 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
• The Travelwise centre remains in operation 24hrs a day, every day.

Detailed journey time monitoring is undertaken to determine the impacts of highways work programmes on the highway network. This monitoring shows that between 2010/11 and 2014/15 there has been an increase in journey times per mile on the A610 between Nottingham Road and Nuthall Island, which corresponds with the significant increase in traffic volume in the county in 2013/14 as well as 2014/15. However, between 2013/14 and 2014/15 journey times per mile have decreased. The table below shows the journey time per mile in the morning peak on the A610 between Nottingham Road and Nuthall Island.
<table>
<tr><td>2010/11</td><td>2011/12</td><td>2012/13</td><td>2013/14</td><td>2014/15</td></tr>
<tr><td>7mins 26secs</td><td>6mins 31secs</td><td>7mins 31secs</td><td>9mins 21secs</td><td>9mins 16secs</td></tr>
</table></td><td>On-going

On-going</td></tr>
</table>

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Progress to Date	Estimated Completion Date
7b	**Contingency planning, and effective event and incident management** on the County Council"s highway network undertaken to minimise traffic disruption and unnecessary congestion as part of NCC"s network management duty. These are managed through the joint County/City control centre and travelwise web site.	Traffic Management	UTC, congestion management, traffic reduction	NCC		On-going	Restrain average journey times in the morning peak to a 1% increase per year	• The local operating agreement between the authority and HE has been comprehensively reviewed to identify the relevant parts of the network which have interaction on each authority and to put in place appropriate communication channels for management of incidents and dissemination of information • Key locations on the local network have been identified and associated diversion routes investigated in line with the developing network hierarchy • 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 • Detailed journey time monitoring undertaken annually since 2005/06.	On-going On-going On-going On-going

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Progress to Date	Estimated Completion Date
7c	**Co-ordination of streetworks** undertaken to minimise traffic disruption and unnecessary congestion on the County Council"s highway network as part of NCC"s network management duty.	Traffic Management	UTC, congestion management, traffic reduction	NCC		On-going	Restrain average journey times in the morning peak to a 1% increase per year	• Systems for notice management and coordination have been upgraded to enhance noticing handling, monitoring of works proposals, coordination of works and directing timing of works • Staff awareness and training undertaken to ensure that powers are used effectively • Street designations/network hierarchy review is on-going to improve data quality for works promoters and network managers and to prioritise works management • Regular coordination meetings held between all works promoters and regional partners in additional to regular meetings between HE and regional partners to create a framework programme of planned works affecting strategic and local routes • Workshops held with major works promoters incl. utility companies to raise awareness of their requirements to reduce traffic disruption, to promote good practice and encourage alternative working methods that reduce peak period working/disruption • Detailed journey time monitoring undertaken annually since 2005/06.	On-going **Complete** On-going On-going **Complete** On-going

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Progress to Date	Estimated Completion Date
7d	**Civil Parking Enforcement**	Traffic Management	Strategic highway improvements, re-prioritising road space away from cars, including access management, selective vehicle priority, bus priority, high vehicle occupancy lane	NCC		On-going	Manage parking to improve journey time reliability	Introduced on County roads in May 2008 to help ensure parking does not interfere with the free flowing traffic.	On-going
7e	**The workplace parking levy (WPL)**	Traffic Management	Workplace Parking Levy, parking enforcement on highway	Notts CC		On-going	Restrain average journey times in the morning peak to a 1% increase per year	• Aiming to reduce traffic volumes entering the City Centre the WPL scheme became fully operational in Nottingham City in April 2012 • There are no plans to extend the scheme outside the City centre • The WPL provided funding for NET Phase 2; redevelopment of Nottingham Railway Station; and is also intended to support the Link Bus network, all of which may positively impact on the AQMA.	On-going
7f	**20mph speed limits**	Traffic Management	Reduction of speed limits, 20mph zones	NCC		2013-2016	Increases in cycle trips / Restrain average journey times in the morning peak to a 1% increase per year	Advisory 20mph speed limits are being introduced outside all schools in the County where feasible to improve safety around schools and to encourage more pupils to walk and cycle to school. The advisory 20mph speed limits programme outside Broxtowe schools was completed during 2015/16.	**Complete**

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Progress to Date	Estimated Completion Date
7g	**Optimisation of traffic signals**	Traffic Management	Strategic highway improvements, re-prioritising road space away from cars, including access management, selective vehicle priority, bus priority, high vehicle occupancy lane	NCC		On-going	Restrain average journey times in the morning peak to a 1% increase per year	The traffic signals at Nuthall Island run on „cableless linking facility" allowing the signals to be optimised to favour differing peak periods/traffic flows. Nuthall Island is, however, one of the busiest junctions in the county and the signals already operate over capacity.	On-going
7h	**A453 improve-ments**	Traffic Management	Strategic highway improvements, re-prioritising road space away from cars, including access management, selective vehicle priority, bus priority, high vehicle occupancy lane	HE		2013-2015	Average journey times in the morning peak	The £149.7m scheme aims to improve the A453 trunk road between the M1 J24 and the A52 Nottingham, to ease existing highway congestion and improve road safety. The project started in Jan 2013 and was completed in July 2015. These improvements could potentially reduce the numbers of vehicles travelling north to other M1 junctions and using alternative routes such as the A610 to access Nottm.	**Complete**

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Progress to Date	Estimated Completion Date
8a	**Cycle parking facilities**	Transport Planning and Infrastructure	Cycle network	NCC		On-going 2015	Increases in cycle trips / Restrain average journey times in the morning peak to a 1% increase per year	• Cycle parking facilities are provided at various locations throughout the borough and elsewhere in the County and city to encourage cycling for short journeys • Additional secure cycle parking was installed at Beeston rail station in 2015 to provide better integration for cyclists to make longer distance journeys by train.	On-going **Complete**
8b	**Public Cycle Hire Scheme**	Transport Planning and Infrastructure	Public Cycle Hire Scheme	Notts CC		On-going	Increases in cycle trips / Restrain average journey times in the morning peak to a 1% increase per year	Nottingham City Council have a „Citycard Cycle Hire Scheme", there are two stands that cycles can be hired from in Beeston at a low cost. BBC is promoting this scheme as it is beneficial to commuters and residents within the Borough.	On-going

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Progress to Date	Estimated Completion Date
8c	**Bus infras-tructure**	Transport Planning and Infrastructure	Public transport improvements -interchanges stations and services	NCC		On-going	Increased public transport patronage / Restrain average journey times in the morning peak to a 1% increase per year	• Timetable cases carrying commercial bus operator and NCC supported service timetables are provided at stops. 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 • At-stop timetable cases are used to promote public transport journey planners, traveline, apps and other sources of information. NCC also displays area network maps showing bus and tram routes in bus shelter information display cases wherever these exist. The County Council"s website provides information on local bus networks and links to operators" websites, the traveline journey planner and bus timetables • Bus stops along strategic corridors in the borough are upgraded to feature real time information • Automatic vehicle detection, bus lanes etc. is provided at a number of key signal junctions in the borough to make bus travel more reliable and attractive to the public. Public transport patronage in the County has increased by 4% between 2005/06 and 2014/15.	On-going On-going On-going **Complete**

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Progress to Date	Estimated Completion Date
8d	**Light rail (tram) infra-structure**	Transport Planning and Infrastructure	Public transport improvements -interchanges stations and services	NCC		2013-2016	Increased public transport patronage / Restrain average journey times in the morning peak to a 1% increase per year	• NET line 1 opened in March 2004 • A feasibility study has been undertaken looking at the possibility of extending NET line 1 to Kimberley (beyond Nuthall Island). • Construction of NET Phase 2 is being delivered by Nottingham City Council. NET Phase 2 extends the tram system to incorporate two new lines to the south and west of Nottingham city centre totalling 17km in length, commenced in early 2013; and opened in 2015. The line to the west of the City travels to Beeston. Completed in August 2015.	2004 2016 **Complete**
8e	**Bus service improve-ments**	Transport Planning and Infrastructure	Public transport improvements -interchanges stations and services	NCC Bus Operators		On-going	Increased public transport patronage / Restrain average journey times in the morning peak to a 1% increase per year	• NCC periodically undertakes a review of all of the bus services in the county, including commercial, supported and specialist services. The aim of this work is to review and design cost effective services that meet local needs • Increased capacity at peak times and introducing feeder services to high quality bus routes serving key towns in Nottinghamshire are considered when identified through the periodic service reviews and through the on-going Bus Quality Partnership work with operators • Capacity increases will be considered should passenger information demonstrate that there is insufficient capacity on existing services. „Double decker" bus services already operate along some of the routes travelling through and within the AQMA where capacity had been highlighted as an issue.	On-going

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Progress to Date	Estimated Completion Date
8f	**Integrated ticketing**	Transport Planning and Infrastructure	Public transport improvements -interchanges stations and services	NCC Operators		On-going	Increased public transport patronage / Restrain average journey times in the morning peak to a 1% increase per year	• An integrated ticketing strategy for the county was developed during 2014/15 and will inform the future development of ITSO smartcard ticketing options as well as the use of contactless ticketing etc. • A new smartcard platform was introduced in April 2014 allowing passengers to have a more robust ticket than the paper alternative. In 2013/14 over 600,000 day tickets were sold and over 10,000 smartcards were issued. MANGO smartcards were also expanded in April 2014 to include use on NET tram network • The long-running kangaroo integrated ticket scheme was replaced by the Robin Hood card scheme in 2015. The Robin Hood card scheme offers customers an all-operator ticket.	On-going
8g	**Broxtowe Transport Sub Group**	Transport Planning and Infrastructure	Other	BBC		On-going		• BBC facilitates a transport sub group that meets several times a year to bring together partners and stakeholders to discuss transport issues and share information in the Borough. Partners include NCC, NCT buses, Barton buses, PEDALS(local cycling pressure group) and Sustrans.	On-going

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Progress to Date	Estimated Completion Date
8h	**Concessio-nary Fare schemes**	Transport Planning and Infrastructure	Public transport improvements -interchanges stations and services	NCC		On-going	Increased public transport patronage / Restrain average journey times in the morning peak to a 1% increase per year	• A countywide off-peak concessionary fare scheme for elderly and disabled residents has been in place since 1985. This has undergone significant changes in subsequent years and is now part of the English National Concessionary Travel Scheme. Nottinghamshire offers additional discretionary travel entitlements for pass holders which allows travel on the Nottingham tram network. 2014 saw the enhancement of travel entitlement of tram travel with the removal of the evening peak restriction and the extension of the scheme to cover new NET lines. A further facility is offered which allows a companion to travel without charge for residents with severe mobility issues • Concessionary fares for young people continue through the under 16 Travel Assistance scheme for school pupils which offers free bus passes to eligible children, and season passes to those who are not eligible. Nottinghamshire County Council refers pupils to all available bus operators for their route to promote the use of public transport. A continued Post 16 Travel Assistance scheme for further education pupils which offers either a half-fare pass or season pass. 23,618 elderly/disabled people living in the Broxtowe area have a concessionary travel pass. There are approximately 8,000 valid home to school transport passes currently in circulation in the county. In 2015 2,212 free under-16 home to school transport passes were issued in Nottinghamshire; 415 under-16 home to school season passes were issued in Nottinghamshire; 132 pupils received an under-16 waived season pass in Nottinghamshire; and 461 post-16 travel passes were issued in Nottinghamshire.	On-going

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Progress to Date	Estimated Completion Date
9a	**Increase proportion of bio-fuels to public transport fleet**	Vehicle Fleet Efficiency	Promoting low emission public transport	NCC		Dependent on outcome of OLEV bid	On-going take-up of cleaner vehicles	• NCC plan to continually improve the emission standards of their fleet vehicles. The majority of the Council"s bus fleet is now Euro V standard • NCC has submitted an OLEV bid to accelerate bringing in low emission vehicles within its own passenger transport fleet.	Dependent on outcome of OLEV bid
9b	**Eco-Stars programme**	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	NCC		2013-2015	Reduced emissions	Eco-Stars was introduced in the Greater Nottingham area in March 2013 as part of the LSTF programme – SAFED driver training is included as part of the scheme. A total of 51 members have joined the scheme. Funding expired in March 2015 (when LSTF funding expired).	2015
9c	**Zoning of refuse collections**	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	BBC		2016-2017	Reduced emissions	A review of the refuse collection areas at BBC to enable the areas to be zoned to ensure that the collection rounds are within the designated zone which reduces the amount of non-productive travelling time.	On-going
9d	**Fleet vehicle tracking system**	Vehicle Fleet Efficiency	Driver Training and ECO driving aids	BBC		2015-2017	Reduced emissions	All BBC fleet vehicles are fitted with a vehicle tracking system, which records vehicle speed and idling time. A review of the journeys undertaken will ensure that if necessary measures can be implemented e.g. staff training, to improve fleet efficiency.	On-going
9e	**Eco-driver training sessions**	Vehicle Fleet Efficiency	Driver training and ECO driving aids	NCC		2012	Improve air quality within the AQMA	Eco-driver training sessions to enable County Council employees to drive more efficiently and sustainably have been provided free to NCC staff.	**Complete**

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Progress to Date	Estimated Completion Date
9f	**Encouragement of low-emission public transport fleets**	Vehicle Fleet Efficiency	Promoting low emission public transport	Operators NCC Notts CC NCC		On-going On-going On-going Dependent on outcome of OLEV bid	On-going take-up of cleaner vehicles	• Operators are encouraged to take-up cleaner vehicles through partnership working. Due to the sustained high level of investment by the two main operators the average age of the bus fleet operating in the AQMA was already less than six years old and by the end of 2007 all of the two main operators" fleet were low-emission Euro2, 3 or 4 standards • Partnerships with all of the major bus operators are on-going including the transport development group which is held every two months; and the Greater Nottingham Bus Quality Partnership which meets quarterly. The groups help determine future service and public transport scheme improvements • Vehicle emissions standards included in procurement of contracted services operating within AQMAs • The Statutory Quality Partnership Schemes (SQPSs) ensure that services operating into the city centre and Beeston meet a minimum standard for emissions with many vehicles operating at higher standards. Monitoring of operator standards and operation of the SQPSs is on-going • NCC plan to continually improve the emission standards of their fleet vehicles. The majority of the Council"s bus fleet is now Euro V standard • NCC has submitted an OLEV bid to accelerate bringing in low emission vehicles.	On-going On-going On-going Dependent on outcome of OLEV bid

BBC= Broxtowe Borough Council, **NCC**= Nottinghamshire County Council, **HE** = Highways England, **Notts CC**= Nottingham City Council

2.3 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and or Concentrations

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

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

The nearest AURN site is in Nottingham City and for 2015 the annual mean concentration is 11.55 μm^3. The modelled background level provided by Defra for the Borough of Broxtowe are predicted to be between 10 μm^3 and 13 μm^3 for 2015. The modelled background concentrations are shown to be in the higher range along the M1 Motorway, The background maps are shown in Appendix F.

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

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

„trackout". Also minimise dust generating activities on dry windy days and if there are stockpiles ensure they are covered to prevent wind-whipping.

- Ensuring that developers are carrying out dust suppression monitoring on site at large development sites.
- Ensuring that water suppressants are in use when Nibblers and mobile crushers are on site.
- Educating the public in matters that contribute to air quality e.g. not having bonfires and using exempt appliances with the correct fuel for that appliance in 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.

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

3.1 Summary of Monitoring Undertaken

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

3.1.1 Automatic Monitoring Sites

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

3.1.2 Non-Automatic Monitoring Sites

BBC undertook non- automatic (passive) monitoring of NO_2 at 23 sites during 2015. Table A.1 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are adjusted for bias, but the diffusion tubes have not been annualised as there are more than 9 months of data for all 23 sites. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

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

For diffusion tubes, the full 2015 dataset of monthly mean values is provided in Appendix B.

Nitrogen Dioxide Diffusion Tube Monitoring Results

The results from the bias corrected NO_2 diffusion tube monitoring within the Borough, have shown that there are three exceedences of the 40µg/m^3 air quality objective for 2015. The remaining 20 sites within the Borough are showing no exceedances of the air quality objective, which includes the diffusion tubes sited within the AQMA in Nuthall.

The three sites that showed an exceedance of the annual mean are;

- 41µg/m^3 at Derby Road, Bramcote
- 42µg/m^3 at Iona Drive, Trowell
- 41µg/m^3 at A610/B600 Nuthall Island

These sites, the exceedences and influences on the annual mean will be discussed in greater detail below.

AQMA in Nuthall

There are three diffusion tube sites located on Nottingham Road in Nuthall that are within an existing AQMA in Nuthall. The results below show that since 2011 the levels of NO_2 are consistently below the objective of 40µg/m^3 for all three sites.

Site	NO_2 Annual Mean Concentration (µg/m^3)				
	2011	2012	2013	2014	2015
BX01	32	31	33	29	28
BX05	29	32	33	32	29
BX13	36	35	33	34	34

It is deemed as normal practice to revoke an AQMA after five years of data that is consistently below the objective level of 40µg/m^3. However when the results for 2011 to 2015 are averaged for each site, site BX01 has an average of 31µg/m^3, site BX05 has an average of 32µg/m^3 and site BX13 has an average of 34µg/m^3. The results are still in the early thirties to middle thirties range rather than in the twentys which would be comfortably below the air quality objective. Therefore, a decision has been made to continue monitoring at these locations, to not revoke the AQMA within the next year (2016) and to continue to review the results on a yearly basis until BBC are

satisfied that the results are sufficeintly below the objective level to revoke the AQMA in Nuthall.

Iona Drive, Trowell

The site with the highest annual mean of 42µg/m^3 NO_2 is Iona Drive in Trowell. The diffusion tube is located on the rear façade of a residential property that runs parallel with the M1 Motorway. The site is within an existing AQMA in Trowell and is situated between Junction 25 and 26 of the M1.

As mentioned previously in this report, HE are responsible for the M1 and extensive works in the form of a road widening scheme between junctions 25 to 28 has been undertaken by them to improve the flow of the traffic. Construction began in October 2007 and the scheme was opened to traffic in May 2010. The scheme combined the physical widening of the M1 from three lanes to four by converting the hard shoulder into a permanent running lane and providing a new, discontinous hard shoulder. The scheme also invloved the introduction of a „controlled motorway" system that improves the control of traffic flow and reduces incidents on the road by displaying variable speed limits and information to drivers.

The widening scheme was undertaken as congestion was a problem on this section of the motorway because the volume of traffic using it was much higher than the road was designed for and traffic forecasts showed that the problem was going to get worse in the future.

A report on the post opening evaluation study was completed in August 2012 to see whether there have been improvements in the air quality within the area, the report was unable to determine that air quality had improved due to the small amount of yearly data that had been obtained since the scheme was finished and the writing of their report. However, HE predict that air quality will improve as there are lower observed traffic flows and HGV"s.

BBC has continued to monitor NO_2 levels in this area throughout the construction scheme and the diffusion tube monitoring results from 2011 to 2015 are shown below.

Site	Site Type	NO_2 Annual Mean Concentration (µg/m^3)				
		2011	2012	2013	2014	2015
Iona Drive, Trowell	Roadside	39	**42**	39	38	**42**

The results show that there is not a significant increasing or decreasing trend in the air quality levels, although the results indicate that the annual mean fluctuates between 38µg/m^3 and 42µg/m^3, which is a difference of 4µg/m^3. It must be noted that the Smart Motorway scheme on the M1 between junctions 28 and 31 has just opened at the time of writing this report, therefore the impact of the scheme may have caused congestion further South, which could have had an effect on increasing the air quality levels in 2015. BBC is increasing the number of NO_2 monitoring locations within this area in 2016 and will continue to work closely with HE to try and reduce air quality levels.

A610/B600 Nuthall Island

The A610/B600 Nuthall Island site has a result of 41µg/m^3 for 2015, which is over the air quality objective of 40µg/m^3 by 1µg/m^3. The diffusion tube is located less than 1m from Nottingham Road very near to the A610/B600 Nuthall Island and it is not within the AQMA in Nuthall. The results from 2011 to 2015 are shown below.

Site	Site Type	NO_2 Annual Mean Concentration (µg/m^3)				
		2011	2012	2013	2014	2015
A610/ B600 Nuthall Island	Kerbside	49	42	41	39	41

The results show that since 2011 there has been a general downward trend in the levels, although the result for 2015 has shown an increase of 2µg/m^3. However, there have been many traffic schemes in the Borough that were running or completed in

2015, which would have resulted in traffic volumes changing due to traffic diversions and re-routing.

Since 2015 a review of the NO_2 diffusion tube network has been undertaken and as a result there have been additional monitoring locations added and the location of this site was also changed in 2016 from less than 1metre to Nottingham Road (kerbside) where there are no receptors, to the façade of a resdiential property on Nottingham Road nearest to the A610/B600 roundabout. The results for this new location will be analysed and discussed in the next Air quality Annual Status Report (ASR) in 2017.

Due to the reasons discussed above a decision has been made not to declare an AQMA at this location currently, due to the unsuitability of the monitoring site. However if the results from the new site, which is on the façade of a residential property, show a consistent exceedence of the air quality objective then a AQMA may need to be declared at this site in the future.

Derby Road, Bramcote

The Derby Road monitoring site in Bramcote has a result of 41µg/m^3 for 2015, which is over the air quality objective of 40µg/m^3 by 1µg/m^3. The diffusion tube is located on the façade of a residential property that is near to Bramcote Island. Bramcote Island is a „burger" style roundabout with the A52 going through the roundabout, the A52 links Derby City and Nottingham City. HE are responsible for the A52. The roundabout also provides a route to Stapleford, Bramcote Village and Ilkeston.

When reviewing the exceedence of the air quality objective for Bramcote Island in 2015 consideration must be given to a number of parallel traffic schemes which were being undertaken during 2015, these schemes would have affected the results. The details of these schemes are:

- The A453 widening (M1 Junction to A52 Nottingham) – construction started on this scheme in January 2013 and was completed in August 2015. Between

these dates diversionary routes were set up to spread the traffic, one of which was utiling the A52 corridor.

- Nottingham Tram Works – extending the tram network to Toton Lane which is South of the A52 at the B6003 Bardills Junction. Works started in early 2012 and were completed on the 25th August 2015 when the tram came into service. The tram works caused a number of impacts due to long term road enclosures, which had a significant effect on traffic patterns:
    - The greatest impact of the A52 scheme was during the very extensive construction works on the A6005. This included junction works at A6005 Queens Road West/ Meadow Lane and then along the University Boulevard. This work took place from early 2012 to May 2015.
    - Works on Abbey Street, the extension of the A6005 East of the A52 Dunkirk Roundabout caused disruption with a long period of shuttle working. It is suspected this deterred drivers from using the A6005 corridor.
    - Closure of Chilwell Road B6464 to through traffic – this is a well used commuter route parallel to the A52, and was closed for 2 years from December 2012 to December 2014, but was subjected to disruption until May 2015.
    - Bramcote Lane, which links A52 at Sherwin Arms to A6005 was closed for at least 6 months and had shuttle working lights until May 2015.
    - Toton Lane, linking the A52 at Bardills Roundabout to A6005 was affected by works at Bardills and the new Park and Ride access for the tram.
    - There were closures of other minor links that also disrupted local traffic. These tended to focus traffic going to Beeston from the North into using the B6006 Wollaton Road which consequently became very congested.

Therefore due to all of the traffic schemes that were in operation in the Borough and within Nottingham City during 2015, it would not be appropriate to declare an AQMA

for Bramcote Island at this stage as the data would have been affected by all of the traffic shemes. However, increased monitoring is being undertaken in 2016 which will provide results that should not be affected by extensive changes to road networks and this will be reported in the ASR in 2017. A decision will be made in the future as to whether Bramcote Island should be an AQMA.

3.2.2 Particulate Matter (PM_{10})

Previous air quality reports have shown there are no relevant sources of PM_{10} within the Borough. Subsequently, the Council does not monitor for this pollutant.

3.2.3 Particulate Matter ($PM_{2.5}$)

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

3.2.4 Sulphur Dioxide (SO_2)

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

Appendix A: Monitoring Results

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

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m)	Tube collocated with a Continuous Analyser?	Height (m)
BX01	19 Nottingham Road, Nuthall*	R	451631	344527	NO_2	Y	0	42	N	1.7
BX02	560 Nottingham Road, Eastwood	R	448538	345244	NO2	N	0	3^	N	1.9
BX03	Chilwell Olympia School	UB	451782	335320	NO2	N	0	104^	N	1.9
BX04	167 Derby Road, Bramcote	R	450559	337913	NO2	N	0	8^	N	2.5
BX05	19 Nottingham Road, Nuthall*	R	451631	344527	NO2	Y	0	42	N	1.7
BX07	31 Hickton Drive, Chilwell	R	450757	334328	NO2	N	0	10^	N	1.9

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m)	Tube collocated with a Continuous Analyser?	Height (m)
BX08	Village Hall, Trowell	R	448450	339656	NO2	N	0	40^	N	1.9
BX09	Nuthall Methodist Church	R	451820	344351	NO2	N	40	142	N	2.0
BX10	14 Great Northern Road, Eastwood	R	445886	346712	NO2	N	0	3^	N	2.1
BX11	15 Iona Drive, Trowell	R	448586	339023	NO2	Y	0	23	N	1.9
BX12	71 Nottingham Road, Nuthall	R	448772	340084	NO2	N	0	81	N	1.7
BX13	20 Nottingham Road, Nuthall	R	451728	344440	NO2	Y	0	32	N	1.9

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m)	Tube collocated with a Continuous Analyser?	Height (m)
BX14	49 Main Street, Awsworth	R	448254	344358	NO2	N	0	5^	N	1.9
BX15	9 Bembridge Court, Stapleford	R	450434	337781	NO2	N	0	6^	N	1.6
BX16	18 Roehampton Drive, Trowell	R	448656	338679	NO2	N	0	209	N	1.9
BX17	15 Hayley Close, Kimberley	R	448826	344883	NO2	N	0	11^	N	1.9
BX20	Opp Sherwin Arms, Derby Road, Bramcote	R	450389	337866	NO2	N	3	1^	N	1.8
BX22	A610/ B600 Roundabout, Nuthall	K	452182	344045	NO2	N	25	>1^	N	1.9

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m)	Tube collocated with a Continuous Analyser?	Height (m)
BX23	Broxtowe Borough Council Offices	UB	452733	336962	NO2	N	0	10^	N	1.8
BX24	113 Wollanton Road, Beeston	R	452662	337266	NO2	N	3	1^	N	1.8
BX31	170 Derby Road, Beeston	R	452065	338110	NO2	N	4	3^	N	1.8
BX32	30 Derbyshire Avenue, Trowell	R	448652	339652	NO2	N	0	39	N	1.9
BX33	81 Nottingham Road, Trowell	R	448832	340098	NO2	N	0	33	N	1.8

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

^ All distance to kerb to nearest road relate to the M1 which is the primary source of NO_2 throughout the borough unless indicated using the ^ symbol
*Co-located tubes

Table A.2 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2015 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2011	2012	2013	2014	2015
BX01	Roadside	Diffusion Tube	92	92	32	31	33	29	28
BX02	Roadside	Diffusion Tube	92	92	-	31	28	27	28
BX03	Urban Background	Diffusion Tube	92	92	21	22	22	21	20
BX04	Roadside	Diffusion Tube	92	92	-	**42**	38	**42**	**41**
BX05	Roadside	Diffusion Tube	92	92	29	32	32	32	29
BX07	Roadside	Diffusion Tube	92	92	-	25	27	26	26
BX08	Roadside	Diffusion Tube	92	92	-	24	25	25	22
BX09	Roadside	Diffusion Tube	92	92	28	26	27	27	27
BX10	Roadside	Diffusion Tube	92	92	-	22	24	21	21

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2015 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2011	2012	2013	2014	2015
BX11	Roadside	Diffusion Tube	83	83	39	**42**	39	38	**42**
BX12	Roadside	Diffusion Tube	92	92	26	26	27	33	25
BX13	Roadside	Diffusion Tube	92	92	36	35	33	34	34
BX14	Roadside	Diffusion Tube	92	92	-	20	21	21	18
BX15	Roadside	Diffusion Tube	92	92	-	31	32	32	28
BX16	Roadside	Diffusion Tube	92	92	25	24	25	22	23
BX17	Roadside	Diffusion Tube	92	92	-	27	30	32	30
BX20	Roadside	Diffusion Tube	92	92	33	31	22	34	31
BX22	Kerbside	Diffusion Tube	83	83	**49**	**42**	**41**	39	**41**

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2011	2012	2013	2014	2015
BX23	Urban Background	Diffusion Tube	92	92	-	22	22	23	21
BX24	Roadside	Diffusion Tube	92	92	-	34	32	32	29
BX31	Roadside	Diffusion Tube	92	92	-	37	39	37	38
BX32	Roadside	Diffusion Tube	92	92	30	29	33	30	26
BX33	Roadside	Diffusion Tube	92	92	31	27	30	30	26

Notes: Exceedances of the NO_2 annual mean objective of $40\mu g/m^3$ are shown in **bold**.

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

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

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2015

Table B.1 – NO_2 Monthly Diffusion Tube Results - 2015

Site ID	NO_2 Mean Concentrations (µg/m^3)													
	Jan	Feb	Mar	Apr	May	Jun	Jul (2)	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
BX01	32	30	34	31	20	25		29	31	36	28	39	31	28
BX02	40	36	35	28	24	23		28	29	35	30	29	31	28
BX03	28	26	26	21	13	14		18	21	26	24	20	22	20
BX04	49	46	49	47	36	39		42	46	48	46	45	5	**41**
BX05	29	34	35	25	24	26		29	31	38	34	39	31	29
BX07	37	36	33	29	21	21		26	22	31	27	33	29	26
BX08	28	29	27	26	20	17		22	24	29	18	25	24	22
BX09	39	36	34	19	24	22		29	26	26	37	37	30	27
BX10	31	25	27	22	16	17		21	23	24	26	24	23	21
BX11	66	47	52	(a)	36	34		41	41	46	46	55	46	**42**
BX12	29	28	29	29	21	21		25	27	29	24	37	27	25
BX13	41	41	41	37	35	33		41	33	34	36	39	37	34

(1) See Appendix C for details on bias adjustment

(2) Data lost due to error in laboratory when carrying out the analysis

(a) Tube Missing

Table B.2 – NO_2 Monthly Diffusion Tube Results – 2015 Continued

Site ID	NO_2 Mean Concentrations (µg/m^3)													
	Jan	Feb	Mar	Apr	May	Jun	Jul (2)	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
BX14	26	24	23	19	13	12		17	19	22	22	22	20	18
BX15	28	32	36	35	21	25		28	30	39	29	33	31	28
BX16	34	29	31	23	19	19		22	23	30	22	23	25	23
BX17	43	40	37	32	25	25		32	28	33	34	38	33	30
BX20	40	40	32	40	26	26		31	37	41	31	30	34	31
BX22	54	49	55	47	36	37		41	(a)	43	39	49	45	**41**
BX23	27	30	24	23	15	14		16	24	28	24	24	23	21
BX24	36	36	37	32	26	25		30	32	36	31	31	32	29
BX31	47	46	45	49	29	31		43	37	44	41	42	41	38
BX32	25	33	34	33	20	24		25	30	33	25	35	29	26
BX33	16	20	32	30	25	25		26	27	30	30	51	29	26

(1) See Appendix C for details on bias adjustment

(2) Data lost due to error in laboratory when carrying out the analysis

(a) Tube Missing

Appendix C: 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.

2015 Figures

The Review and Assessment (R&A) Helpdesk Database 2015 bias adjustment factor for Gradko 20% TEA in water tubes = 0.91. This figure is the average of 29 studies and was taken from Spreadsheet Version Number: 03/16.

Diffusion tube precision was good for 24 of the 29 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)).

2014 Figures

The R&A Helpdesk Database 2014 bias adjustment factor for Gradko 20% TEA in water tubes = 0.91. This figure is the average of 16 studies and was taken from Spreadsheet Version Number: 03/15.

Diffusion tube precision was good for all 16 of the 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(09)).

2013 Figures

The R&A Helpdesk Database 2013 bias adjustment factor for Gradko 20% TEA in water tubes = 0.95. This figure is the average of 24 studies and was taken from Spreadsheet Version Number: 03/14.

Diffusion tube precision was good for 23 of the 24 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(09)).

2012 Figures

The R&A Helpdesk Database 2012 bias adjustment factor for Gradko 20% TEA in water tubes = 0.94. This figure is the average of 40 studies and was taken from Spreadsheet Version Number: 06/13.

Diffusion tube precision was good for 37 of the 40 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(09)).

2011 Figures

The R&A Helpdesk Database 2011 bias adjustment factor for Gradko 20% TEA in water tubes = 0.89. This figure is the average of 26 studies and was taken from Spreadsheet Version Number: 03/12.

Diffusion tube precision was good for 22 of the 26 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(09)).

QA/QC Data for Non-Automatic Sites

Broxtowe Borough Council

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

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

Gradko

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

Gradko International confirms that:

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

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

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

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

Appendix D: Map(s) of Monitoring Locations

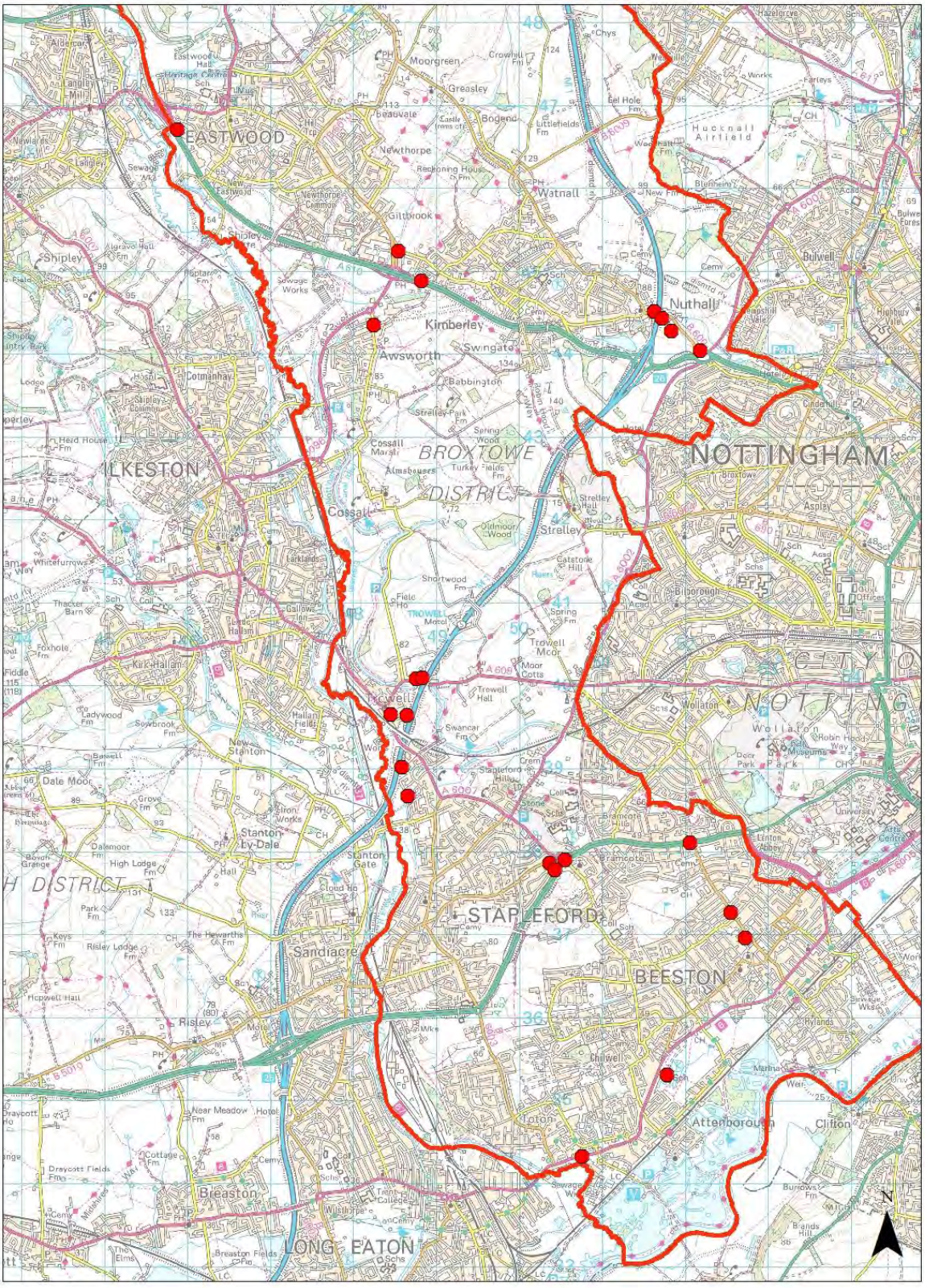

Figure D.1 – Diffusion Tube Locations

Appendix E: Maps of AQMA's

Figure E.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 red)

Appendix E: Maps of AQMA's Continued

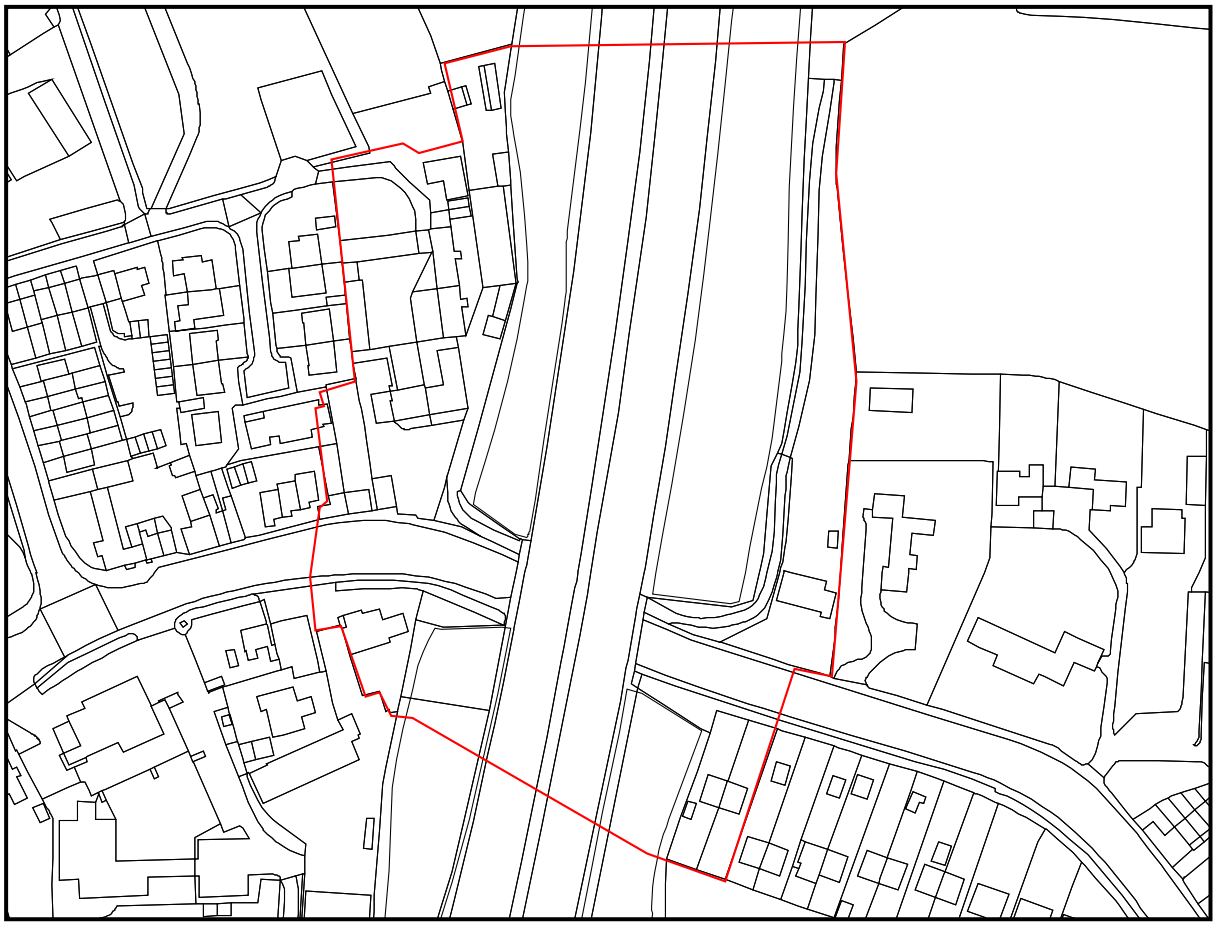

Figure E.2 - AQMA 4 encompassing fourteen properties next to the M1 motorway on parts of Nottingham Road, Nottingham, and Nottingham Road and Back Lane, Nuthall (boundary marked in red).

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

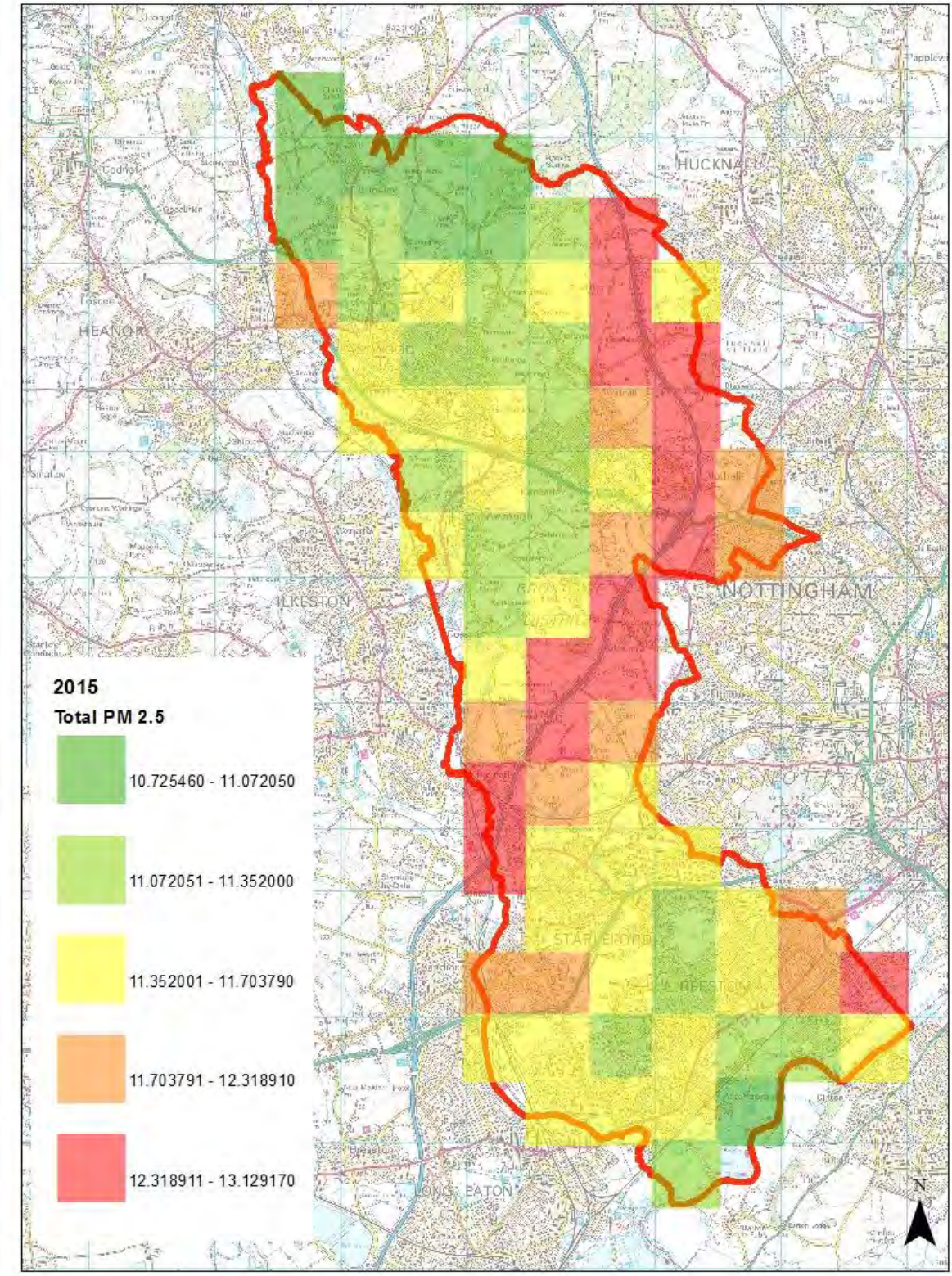

Figure F.1 - Map of the Borough showing the modelled background levels of $PM_{2.5}$.

Appendix G: Summary of Air Quality Objectives in England

Table G.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[7]	
	Concentration	Measured as
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

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

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values"
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air Quality Annual Status Report
AURN	Automatic Urban and Rural Network
BBC	Broxtowe Borough Council
CV	Coefficient of Variation
Defra	Department for Environment, Food and Rural Affairs
HE	Highways England
HGV"s	Heavy Goods Vehicles
ITSO	Integrated Transport Smartcard Organisation
LAQM	Local Air Quality Management
LAQM.PG(16)	LAQM Policy Guidance 2016
LAQM.TG(16)	LAQM Technical Guidance 2016
LSTF	Local Sustainable Transport Fund
µg/m^3	Microgrammes of pollutant per cubic metre of air
NEPWG	Nottinghamshire Environmental Protection Working Group
NET	Nottingham Express Transit
NCT	Nottingham City Transport
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides

Notts CC	Nottingham City Council
NCC	Nottinghamshire County Council
O_3	Ozone
OLEV	Office for Low Emission Vehicles
PHE	Public Health England
PM	Particulate Matter
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
PTP	Personalised Travel Planning
QA/QC	Quality Assurance and Quality Control
R&A	Review and Assessment
SAFED	Safe And Fuel Efficient Driving
SO_2	Sulphur Dioxide
SQPS	Statutory Quality Partnership Schemes
TEA	Triethanolamine
ULEVs	Ultra Low Emission Vehicles
WASP	Workplace Analysis Scheme for Proficiency
WPL	Workplace Parking Levy

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