



# 2019 Air Quality Annual Status Report (ASR)

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

June 2019

**Rushcliffe Borough Council**

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## Executive Summary: Air Quality in Our Area

Rushcliffe Borough Council has two existing AQMA's for the exceedance of the NO<sub>2</sub> annual mean values. These are associated with major traffic routes and junctions into and out of the City of Nottingham and along a small section of the A52 at a busy junction. No other pollutants are now monitored or are above the objectives.

Monitoring in AQMA 1 Trent Bridge indicates that there have been continued slight decreases in levels within the AQMA area which are all below the Air Quality Standards (AQS).

The AQMA1/2011 at the Stragglethorpe A52 location has also indicated lower levels of NO<sub>2</sub>; there has now been four full years of monitoring with a real time monitor. Levels appear stable and are below the AQS.

This report contains a full data set of air quality monitoring undertaken in 2018 and trends for the last 5 years.

Table 2.2 in this report outlines the actions the Council (and its partners) has and will be taking in order to achieve continued compliance with the AQS.

## Air Quality in Rushcliffe Borough.

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<sup>1,2</sup>.

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

Rushcliffe currently has two active AQMAs in its area. The locations of the current AQMAs can be seen at [https://uk-air.defra.gov.uk/aqma/local-authorities?la\\_id=216](https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=216)

During 2018 there have been a number of new residential and commercial developments proposed where appropriate air quality assessments have been requested and reviewed. Most of these were submitted with the planning applications through the development control process. There were also applications for a number of large housing developments and air quality assessments were submitted by the applicants where necessary, e.g. larger developments that may impact on an AQMA. Some of these are currently under construction, e.g. Sharphill Woods and Wilford Fields. Proposals are still in place for 3000 dwellings at Clifton Pastures and this site has been subject to an air quality assessment. This development will be at a terminus of the NET Line 2 tram system which is now fully operational and passes through parts of Rushcliffe. The NET as a whole has the benefit of reducing traffic in the wider Nottingham area and will benefit commuter routes through Rushcliffe as well as the wider Nottingham City area. Proposals for minerals extraction at Barton-in-Fabis have also had an air quality impact carried out.

The air quality action plan is linked to the Local Transport Plan (LTP) which is implemented by the County Council. In addition Rushcliffe Borough Council considers air quality impacts for planning applications and developments in the borough. Applications that can impact on the meeting of AQS are assessed at the planning application stage. Construction impacts and operational impacts are considered and where appropriate conditions are applied or the application is amended to address any concerns found. Highways England is responsible for traffic management at the Stragglethorpe Rd AQMA.

A £1m strategic cycle network in West Bridgford has now been completed.

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

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

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

## **Rushcliffe Borough Council**

At the beginning of 2017 Rushcliffe Borough Council re-located its offices to the Rushcliffe Arena which has a limited desk capacity and has also enabled greater remote worker capability. This has resulted in lowered transport related impacts from our own office operations. Where practicable, it also promotes the use of walking, cycling and public transport for employees to get to work and to carry out their duties, e.g. pre-paid travel passes are available for employees to use in the greater Nottingham area, where practicable.

The Environmental Health Service also works with other local authorities in the area through the Nottinghamshire Pollution Working Group (NEPWG), the East Midlands Air Quality Network (EMAQN) (a body comprised primarily of local authorities and Public Health England) and works with other organisations to promote greener transport measures or measure to improve the air quality in the Nottingham urban area.

## Actions to Improve Air Quality

The core actions of the plan are the integration of measures with the LTP which is implemented via the Nottinghamshire County Council Transport Planners and Highways England. In addition Rushcliffe Borough Council reviews planning applications for potential adverse impacts and promotes air quality improvements within the borough boundary and wider by being a member of the NEPWG and more recently the EMAQN (East Midlands Air Quality Network).

In addition actions by the Nottingham City Council under their air quality action plan will have some impact on the traffic pollution levels in Rushcliffe. They are already using electric buses on some routes and moving towards only allowing low emission public transport vehicles into the city centre. This is expected to have beneficial effects on the Trent Bridge AQMA which is designated around two major routes into the city centre.

The NET has now fully operational and is reducing car vehicle journeys from the new tram stop and car park at Clifton which passes through and has stops in Rushcliffe before it enters the City Centre.

The individual measures are shown later in this report.

## Conclusions and Priorities

The location of AQMA 1 (on the approaches to Lady Bay Bridge and Trent Bridge) and the site constraints makes it difficult to remedy the problems with small-scale infrastructure improvements and therefore smarter choices measures (such as travel planning, and marketing and promotion of alternatives to the car) are more likely to provide improvements. Measures that facilitate and encourage walking, cycling and use of public transport will therefore be the priority actions in the foreseeable future.

Monitoring of the Local Transport Plan actions shows that the transport indicators are on target (with minor exceptions) across the county.

The County Council has concerns about potential cumulative impacts of proposed future development on the Trent Bridge AQMA as the Local Development documents have identified areas around the district for significant growth which may potentially impact on the AQMAs, and traffic growth will be above those that are forecast without the development occurring. Objection to such growth may be difficult and Section 38, 278 and 106 planning obligations will all be used to mitigate localised traffic impacts of individual developments as far as is possible and seek to ensure sustainable development takes place.

There is currently only planned mitigation of the cumulative traffic growth from proposed development on the strategic road network and the planning authority also has no plans to undertake air quality modelling of the cumulative impacts (particularly on the AQMAs) of the proposed developments.

The cumulative impacts of developments will, however, impact on the AQMA on Trent Bridge without significant sustainable transport measures being introduced and maintained at the developments (funded through the development control process); and the planning authority does not currently have any planned mitigation of the traffic growth at AQMA locations as part of the housing development proposals. Without significant mitigation at these locations to specifically address housing proposals (e.g. significant sustainable transport improvements), any measures subsequently included within an AQMA action plan would be very unlikely to mitigate this planned growth.

The top-slicing of 43% of the integrated transport block from 2015/16 onwards by the government and allocating it to the Local Growth Fund means that from 2015/16 the integrated transport funding allocated to Nottinghamshire County Council reduced by approximately £3.5m; significantly reducing the funding available for transport improvements that will deliver air quality improvements.

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.

## Local Engagement and How to get Involved

Any new planning proposal where air quality may cause an impact is available for consultation through the planning process. All air quality assessments are available for the public to view and comment on. Any changes or new permitted processes that may have an impact on air quality are subject to public consultation and the department will ensure that public engagement is undertaken as well as statutory consultee engagement.

Members of the public can also take actions that will improve air quality within the Rushcliffe area by using public transport or for shorter journeys walking, running or cycling.

To get involved in improving the air quality in our area the public are asked to contact the Environmental Health Service at Rushcliffe Borough Council. The contact details are at the front of this report. The LTP plan is implemented by the County Council Local Transport Planners and they can be contacted via the Nottinghamshire County Council Website [www.nottinghamshire.gov.uk](http://www.nottinghamshire.gov.uk) or

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# 1 Local Air Quality Management

This report provides an overview of air quality in Rushcliffe Borough during 2018. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

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

## 2 Actions to Improve Air Quality

### 2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

A summary of AQMAs declared by Rushcliffe Borough Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at [https://uk-air.defra.gov.uk/aqma/local-authorities?la\\_id=216](https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=216). Alternatively, see Appendix D: Map(s) of Monitoring Locations and AQMAs, which provides for a map of air quality monitoring locations in relation to the AQMA(s).

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)		Action Plan		
						At Declaration	Now	Name	Date of Publication	Link
AQMA No 1 Trent Bridge	01/09/2005	NO2 Annual Mean	West Bridgford	An area including Lady Bay Bridge, Radcliffe Road, Trent Bridge, Loughborough Road junctions	NO	47	36	Air Quality Action Plan for Rushcliffe updated 2010	04.02.2010	<a href="#">AQAP 2010</a>
AQMA No1 2011 Stragglethorpe Rd	01/10/2011	NO2 Annual Mean	Radcliffe on Trent	Land adjacent to A52 at Stragglethorpe Lane Junction	YES	50.5	39	Stragglethorpe Road AQAP 2013	30.01.2014	<a href="#">AQAP 2013</a>

Rushcliffe Borough Council confirm the information on UK-Air regarding their AQMA(s) is up to date

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

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

1. We welcome the integration of AQAP measures with the LTP, and co-operation with the County and Nottingham City Councils. The Action Plans are detailed and far reaching highlighting a strong commitment to deliver air quality improvements in the wider region.
2. The Action Plans were issued in 2010 for Rushcliffe, and 2013 for Stragglethorpe. There is no reference to any further plans to review and update the plans. AQAP's are normally expected to be subject to review on a 5 yearly cycle.
3. We note the revocation of AQMA2. There are now only marginal exceedances of air quality objectives at both remaining AQMAs, with a single monitoring point exceeding in each case.
4. Based upon recent monitoring evidence, it appears likely that unless there are local increases in traffic, that air quality objectives may be met in the next few years at both AQMAs.
5. The situation should be closely monitored, and consideration should be made to review the monitoring locations in these AQMAs to ensure the extent of the pollution hotspot is recorded accurately.
6. Monitoring locations should be recorded on a map that shows the AQMA boundary.

With regard to the above points:

1. No further action required.
2. At the time of writing this ASR the existing action plans are under review with a view to publish revised plans in Summer 2019. The intention is to produce one new action plan that covers both AQMAs.
3. A review of the monitored exceedance indicates that the single monitoring point that exceeded the AQS at the Trent Bridge AQMA is located a few metres outside of the AQMA boundary and is located on the façade of a commercial building with no relevant receptors. Whilst this location is a useful monitoring point it does not strictly indicate an exceedance of the AQS.
4. Agreed.

5. The location of diffusion tubes has been reviewed and some locations have been removed and some new sites added: -
  - a. One site at Trent Bridge has been discontinued because it is affected by longer term construction works. There is another co-located diffusion tube site nearby which is considered to be representative of this situation.
  - b. Two new sites have been added on a new housing estate at the junction of the A52 and A606 at Edwalton following concerns being raised by members of the public. The air quality impact assessment submitted with the planning application indicated that there should not be any exceedances. These results will be reported next year.
6. Monitoring locations are recorded on a map which will be updated as part of the AQAP review.

Rushcliffe Borough Council has continued to take forward a number of direct measures during the current reporting year of 2018 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

More detail on these measures can be found in their respective Action Plans and also within the third Local Transport Plan that consists of the Local Transport Plan Strategy and Implementation Plan. Key completed measures are:

- Awareness and training undertaken by the County Council amongst staff and works promoters to ensure that powers are used effectively and to make works promoters aware of their requirement to reduce traffic disruption and encourage alternative working methods that reduce peak period working/disruption on County Council managed roads;
- Upgrade and optimisation of traffic signals within the AQMA;
- Personalised travel planning undertaken with residents in areas adjoining the AQMA and along the NET route which could impact on people travelling through the AQMA which resulted in a 5% reduction of journeys to work by car amongst participants;
- Personalised travel planning travel clinics undertaken at major workplaces within the AQMA, including at the County Council;
- 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 in the borough and the introduction of mandatory area-wide 20mph speed limits in two areas of West Bridgford to encourage more people to walk and/or cycle;
- NET tram extensions to the south and west of the city (the line travelling to the south travels through part of West Bridgford which could potentially reduce vehicle journeys through the AQMA);
- The introduction of enhanced rail services which serve populations that may potentially otherwise have to travel through the Trent Bridge and Stragglethorpe AQMAs;
- Eco-Stars programme which ceased to be delivered when the Local Sustainable Transport Fund funding ceased (a total of 51 members had joined the scheme when LSTF funding expired);
- Review and upgrade of County Council fleet vehicles;
- Major transport scheme improvements such as the A453 trunk road and the A6514 ring road improvements.

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

- A review of our Air Quality Action Plans
- The introduction of clean fleet initiatives by Nottingham City Council as part of their air quality plan which will reduce emissions from public transport vehicles passing through the Trent bridge AQMA into the city, encourage the use of cleaner private vehicles and encourage the use of active travel.

Rushcliffe Borough Council's ongoing 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 roads within the AQMA) 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;
- Further investigation on the optimisation of traffic signals on A60/A6011 junction (south approach) utilising the AQ monitoring data from the permanent monitor installed on Trent Bridge during 2016/17;



- Travel planning such as personalised travel planning undertaken at major workplaces within the AQMA, travel planning at the County Council, and 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, small scale sustainable transport improvements (e.g. cycle parking facilities, cycling network enhancements) on County Council managed roads, 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, 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; RBC has submitted bids for funding for EV charging points at a number of public parking locations across the Borough.
- Enhancements to the local cycling network to improve links to local employment, training, shops, services and to link to wider cycling networks in Nottingham City.

The principal challenges and barriers to implementation that Rushcliffe Borough Council anticipates facing are:

- The location of AQMA 1 (on the approaches to Lady Bay and Trent bridges) and the site constraints makes it difficult to remedy the problems with small-scale infrastructure improvements and therefore smarter choices measures (such as travel planning, and marketing and promotion of alternatives to the car) are more likely to provide improvements. Measures that facilitate and encourage walking, cycling and bus use will therefore be the priority actions in the foreseeable future.
- The County Council has concerns about potential cumulative impacts of proposed future development on the Trent Bridge AQMA as the Local Development documents have identified areas around the district for significant growth which may potentially impact on the AQMAs, and traffic growth will be above those that are forecast without the development occurring. Objection to such growth may be difficult and section 38, 278 and 106 planning obligations will be used to mitigate localised traffic impacts of individual developments as far as is possible and seek to ensure sustainable development takes place; rather than the impacts further afield.

- There is currently only planned mitigation of the cumulative traffic growth from proposed development on the strategic road network and the planning authority also has no plans to undertake air quality modelling of the cumulative impacts (particularly on the AQMAs) of the proposed developments. Without significant sustainable transport measures being introduced and maintained at the developments (funded through the development control process) the cumulative impacts of developments will, however, impact on the AQMA on Trent Bridge. The planning authority does not currently have any planned mitigation of the traffic growth at AQMA locations as part of the development proposals. Without significant mitigation at development locations to specifically address their impacts on the AQMAs (e.g. significant sustainable transport improvements), any measures subsequently included within an AQMA action plan would be very unlikely to mitigate this planned growth.
- Ensuring funding is allocated to the above measures to continue their delivery. The top-slicing of 43% of the integrated transport block from 2015/16 onwards by the government and allocating it to the Local Growth Fund means that from 2015/16 the integrated transport funding allocated to Nottinghamshire County Council reduced by approximately £3.5m; significantly reducing the funding available for transport improvements that will deliver air quality improvements.

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

- Park and ride sites due to the lack of revenue funding available for undertaking the feasibility studies for such measures (and revenue running costs to support their implementation); as well as the lack of major scheme funding available for the delivery of such measures.
- Introduction of a car club in the county as this will only be introduced once the club in the City proves consistently successful/self-sufficient over a period of time (the Nottingham City car club was only introduced in April 2014).
- Expansion of the cycle hire scheme due to the lack of revenue funding available for such schemes. The County Council is currently working with Nottingham City Council to investigate potential methods of delivering a self-sufficient scheme which would not require revenue support by the authorities.

Rushcliffe Borough Council anticipates that the measures stated above and in Table 2.2 will achieve compliance in Trent Bridge and Stragglethorpe AQMAs.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Traffic control and information	Traffic Management	UTC, Congestion management, traffic reduction	Nottinghamshire County Council (NCC)/Via EM Ltd/Nottingham City Council (NCiC): NCC and NCiC revenue funding	N/A	Ongoing	Restrain average journey times in the morning peak to a 1% increase per year		Implementation ongoing	Ongoing	Potential barrier: Lack of future revenue funding
2	Contingency planning, and effective event and incident management	Traffic Management	UTC, Congestion management, traffic reduction	NCC/Via EM/NCiC/Highways England (HE): NCC, NCiC, HE revenue funding	N/A	Ongoing	Restrain average journey times in the morning peak to a 1% increase per year		Implementation ongoing	Ongoing	
3	Co-ordination of streetworks	Traffic Management	UTC, Congestion management, traffic reduction	NCC/Via EM/NCiC: NCC and NCiC revenue funding	N/A	Ongoing	Restrain average journey times in the morning peak to a 1% increase per year		Implementation ongoing	Ongoing	
4	Traffic signal upgrades	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high	NCC/Via EM; integrated transport block funding	N/A	2012/13	Restrain average journey times in the morning peak to a 1% increase per year		SCOOT/MOVA installed at signals within AQMA. A60/Bridgford Rd signals upgraded	2012/13	

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			vehicle occupancy lane								
5	Traffic signal re-phasing	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/Via EM; integrated transport block funding	Ongoing	Ongoing	Restrain average journey times in the morning peak to a 1% increase per year		Signals within AQMA re-phased. 24hr monitor installed in 2016/17 will be used to further inform signal modifications.	Ongoing	Potential barrier: Lack of future funding
6	Real time travel information	Public Information	Other	NCC/Via EM Ltd: NCC revenue funding	Ongoing	Ongoing	Restrain average journey times in the morning peak to a 1% increase per year		Information conveyed by all forms of media (press, radio, website, social media etc.). Implementation ongoing	Ongoing	Potential barrier: Lack of future revenue funding
7	Civil Parking Enforcement	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	NCC; NCC revenue funding	Pre-2008	Ongoing	Manage parking to improve journey time reliability		CPR introduced in 2008. Implementation ongoing	Ongoing	
8	Pocket park and ride	Alternatives to private vehicle use	Bus based Park & Ride	NCC; integrated transport block funding	2008-2010	2010	Increased public transport patronage		Scheme introduced 2010; still open	Construction completed 2011; operational	
9	Park and ride site to the east of Nottingham	Alternatives to private vehicle use	Bus based Park & Ride	NCC; no funding source secured	2016-2021	Not known, scheme progress dependent on determining a business case for any proposal, feasibility findings and securing	Increased public transport patronage		Consultants commissioned to look at potential improvements along A52 including most suitable general locations for a park & ride site	N/K	Scheme dependent on business case for any proposals, Identifying appropriate site and securing funding

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						necessary funding					
10	East Midlands Parkway station	Alternatives to private vehicle use	Rail based Park & Ride	Network Rail/East Midlands Trains		2007-2009	Restrain average journey times in the morning peak to a 1% increase per year			2009	
11	Nottingham City Workplace Parking Levy (WPL)	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	NCiC	Pre-2012	2012 and ongoing	Restrain average journey times in the morning peak to a 1% increase per year		NCiC introduced WPL within the city in 2012 and have used funding to make passenger transport improvements in the city	Introduced 2012 and ongoing	
12	NCC travel plan	Promoting Travel Alternatives	Workplace Travel Planning	NCC; integrated transport block funding	N/A	Ongoing	Restrain average journey times in the morning peak to a 1% increase per year		PTP travel clinics held at NCC buildings within the AQMA during 2016/17	Ongoing - operational for nearly 20 years	
13	Workplace travel plans	Promoting Travel Alternatives	Workplace Travel Planning	Rushcliffe BC planning/NCC; integrated transport block funding	N/A	Ongoing	Restrain average journey times in the morning peak to a 1% increase per year		Developed with businesses as part of planning conditions	Ongoing	
14	Personalised travel planning	Promoting Travel Alternatives	Personalised Travel Planning	NCC/AECOM; integrated transport block/Access Fund funding	2015/16	2015/16 and 2018/19	Restrain average journey times in the morning peak to a 1% increase per year		PTP undertaken in WB during 2016/16. Access Fund secured to undertake PTP in WB during 2018/19	Mar-19	
15	School travel plans	Promoting Travel Alternatives	School Travel Plans	NCC: DfT funding		2000-2011	Restrain average journey times in the morning peak to a 1% increase per year		STPs developed with all schools in Rushcliffe	Mar-11	

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16	Flexible working arrangements	Promoting Travel Alternatives	Encourage / Facilitate home-working	NCC/RBC		Ongoing	Restrain average journey times in the morning peak to a 1% increase per year		NCC operates flexible working arrangements for all its staff	Ongoing	
17	Eco-driver training sessions	Vehicle Fleet Efficiency	Driver training and ECO driving aids	NCC	2012	2012			Eco-driving training sessions held for NCC staff	2012	
18	NCC car pool vehicles	Alternatives to private vehicle use	Car Clubs	NCC		2016/17	Restrain average journey times in the morning peak to a 1% increase per year		NCC upgraded its pool vehicles to lower emission diesel vehicles	2016	
19	Car sharing scheme	Alternatives to private vehicle use	Car & lift sharing schemes	NCC	Pre-2006	Ongoing	Restrain average journey times in the morning peak to a 1% increase per year	490kg NOx reduction during 2016 through the carshare activities	2,999 members registered. Implementation ongoing	Ongoing	
20	Introduction of car club	Alternatives to private vehicle use	Car Clubs	NCC/NCiC	2014-2017	Dependent on success of Nottingham city scheme	Restrain average journey times in the morning peak to a 1% increase per year		Nottm city scheme introduced in 2014. Expansion of scheme into county dependent on its success	N/K	Funding for implementation to be determined
21	Cycle parking facilities	Transport Planning and Infrastructure	Cycle network	NCC; integrated transport block funding	2014	2015	Increased cycling trips		Cycle hub installed in 2015 to integrate with bus services	2015	
22	West Bridgford strategic cycling network	Transport Planning and Infrastructure	Cycle network	NCC; integrated transport block/Local Growth Fund/developer contributions	2015-2017	2017/2018	Increased cycling trips		LGF secured in December 2016; construction started in 2017	Completed 2018	

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23	Cycle maps	Promoting Travel Alternatives	Promotion of cycling	NCC	Ongoing	Ongoing	Increased cycling trips		Greater Nottingham cycling maps produced; to be reviewed once WB network complete	Completed 2018	
24	Cycle training	Promoting Travel Alternatives	Promotion of cycling	NCC; DfT funding	Ongoing	Ongoing	Increased cycling trips		8,609 people received cycle training in 2016/17. Implementation ongoing	Ongoing	
25	Marketing of cycling	Promoting Travel Alternatives	Promotion of cycling	NCC	Ongoing	Ongoing	Increased cycling trips		Implementation ongoing	Ongoing	
26	Marketing of walking	Promoting Travel Alternatives	Promotion of walking	NCC	Ongoing	Ongoing	Increased walking trips		Implementation ongoing	Ongoing	
27	Web based journey planners	Public Information	Via the Internet	NCC	Ongoing	Ongoing	Increased walking/cycling/ passenger transport trips		Implementation ongoing	Ongoing	
28	Cycle hire scheme	Transport Planning and Infrastructure	Public cycle hire scheme	NCiC/NCC; funding source to be determined	2017/18	2018/19 (dependent on model chosen and funding implications)	Increased cycling trips		Feasibility study commissioned by NCiC for a city scheme which potentially could include parts of the county such as WB	2018/19 (dependent on model chosen and funding implications)	
29	20mph speed limits outside schools	Traffic Management	Reduction of speed limits, 20mph zones	NCC; integrated transport block funding	2012/13	2013-2016	Increased walking/cycling trips		Advisory 20mph speed limits installed outside all feasible schools	2016/17	
30	Area-wide mandatory 20mph speed limits	Traffic Management	Reduction of speed limits, 20mph zones	NCC; integrated transport block funding	2014/15	2015/16	Increased walking/cycling trips		Two mandatory areawide 20mph limits introduced in WB	2016/17	
31	Bus infrastructure	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	NCC; integrated transport block funding	Ongoing	Ongoing	Increased bus patronage		Annual programme developed/delivered. Implementation ongoing	Ongoing	

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32	Light rail tram infrastructure	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	NCC/NCC; DfT/WPL funding		2013-2016	Increased passenger transport patronage		NET Phase 2 (with route through part of WB) opened 2015	Completed 2015	
33	Marketing and promotion of passenger transport	Promoting Travel Alternatives	Other	NCC/NCC/PT operators	Ongoing	Ongoing	Increased passenger transport patronage		Implementation ongoing	Ongoing	
34	Integrated ticketing	Transport Planning and Infrastructure	Other	NCC/NCC/PT operators	Ongoing	Ongoing	Increased passenger transport patronage		Integrated ticketing strategy developed in 2014/15. New smartcard platform introduced in 2014. Robin Hood card scheme introduced in 2015	Ongoing	
35	Concessory fare schemes	Transport Planning and Infrastructure	Other	NCC/NCC/PT operators	Ongoing	Ongoing	Increase passenger transport patronage		Implementation ongoing	Ongoing	
36	Bus service improvements	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	NCC/PT operators	Ongoing	Ongoing	Increased bus patronage		Implementation ongoing	Ongoing	
37	Nottingham to Lincoln rail line service improvements	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	NCC/district councils/East Midlands Trains; NCC/district councils/DfT revenue and LGF funding	Pre-2015	2015/16 to 2017/18	Increased rail patronage		NCC secured funding from a number of partners to increase services and enable faster peak service. Improvements to be sought permanently as part of franchise renewal	2018/19	
38	Encouragement of low-emission public transport fleets	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	NCC/NCC/PT operators; NCT (operator) and OLEV funding	Ongoing	Ongoing			SQBP in place affecting all buses travelling through AQMA. Operator NCT secured £4.4m OLEV funding and invested a further £12.4m to upgrade its	Ongoing	



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									facilities to enable running of a gas fleet, including two services which travel through the AQMA		
39	Eco-Stars programme	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	District councils/NCC/NCiC		2013-2015			Introduced 2013 but funding (LSTF) expired in 2015. Alternative funding sources being investigated	2015	
40	Nottingham Go-Ultra Low City bid	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	NCiC/NCC; OLEV funding	2015/16	2016-2021	Ongoing take-up of cleaner vehicles		£6.1m funding secured for 2016-2021. Implementation ongoing	2021	
41	Nottingham City Clean Air Zone	Promoting Low Emission Transport	Low Emission Zone (LEZ)	NCiC; DfT funding	2016-2019	2019/20			NCiC to undertake modelling to help inform extents of proposed scheme. Modelling to take approx. 18 months. Consultation likely to take place in July 2018	2020	
42	Development of a supplementary planning document	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	RBC					At present a Guidance Document is available to download from the Rushcliffe Website to assist Developers, but this has not as yet been developed into a SPG document		
43	A6514 Ring Road improvements	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management,	NCiC		2013-2016	Restrain average journey times in the morning peak to a 1% increase per year		£16.2m package of measures completed in 2016	2016	

			Selective vehicle priority, bus priority, high vehicle occupancy lane									
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## 2.3 PM<sub>2.5</sub> – 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<sub>2.5</sub> (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM<sub>2.5</sub> has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Rushcliffe Borough Council is taking the following measures to address PM<sub>2.5</sub>:

Rushcliffe Borough Council is working with the LTP and other stake holders to reduce transport impacts as a whole. This has a benefit not only for NO<sub>2</sub> but for all emissions from transport sources and CO<sub>2</sub>. As such the current measures will lead to a reduction in PM<sub>2.5</sub>.

In addition any planning applications for commercial wood/biomass burning plants are screened to determine whether an air quality assessment is required. One of the main aspects that will be considered within the air quality assessment will be the emissions of particulate matter.

Rushcliffe Borough Council are also working with Public Health England in order to consider the data on the Rushcliffe population in relation to respiratory illness in order to determine whether there is a correlation between the areas of high prevalence respiratory illness and the areas where the AQMAs are located. This work is in its infancy however will be developed over the next year. The principal application to be used will be the Strategic Health Asset Planning and Evaluation (SHAPE) tool which is a web-enabled, evidence-based application which informs and supports the strategic planning of services and physical assets across a whole health economy.

The SHAPE application:

- Links national datasets for clinical analysis, public health, primary care and demographic data with estates performance and facilities location;
- Enables interactive investigations by Local Area Teams, Providing Trusts, CCGs, GP practices and Local Authorities;
- Supports key policy initiatives such as QIPP, JSNA, Pharmaceutical Needs Assessment and Transforming Community Services;
- Provides you with a range of flexible capabilities; you drive it in the direction you want it to go.

SHAPE is available via <https://shape.phe.org.uk/>.

## 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 objectives.

#### 3.1.1 Automatic Monitoring Sites

Rushcliffe Borough Council undertook automatic (continuous) monitoring at two sites during 2018. Table A.1 in Appendix A shows the details of the sites. It should be noted that for 2017 a new continuous monitor was provided for the Trent Bridge AQMA and the previous one decommissioned. Monitoring data at the previous location indicated 4 consecutive years of levels around  $30\mu\text{g}/\text{m}^3$ . Diffusion tube data at other locations particularly around the Trent Bridge junctions suggested that this location was more relevant and monitoring at this location would provide better data to measure the effectiveness of the measures implemented as part of the Air Quality Action Plan. Rushcliffe also considers this new monitoring site the 'worst case' for air quality levels in the Trent Bridge AQMA and it is encouraging to see that the first 2 years' worth of full data is below the AQS.

National monitoring results are available at <https://uk-air.defra.gov.uk/>

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

Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

#### 3.1.2 Non-Automatic Monitoring Sites

Rushcliffe Borough Council undertook non-automatic (passive) monitoring of  $\text{NO}_2$  at 35 sites during 2018. Table A.2 in Appendix A shows the details of the sites.

Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. "annualisation" and/or distance correction), are included in Appendix C.

## 3.2 Individual Pollutants

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

### 3.2.1 Nitrogen Dioxide (NO<sub>2</sub>)

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

For diffusion tubes, the full 2018 dataset of monthly mean values is provided in Appendix B.

Table A.4 in Appendix A compares the ratified continuous monitored NO<sub>2</sub> hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m<sup>3</sup>, not to be exceeded more than 18 times per year. There have been no exceedances of the 200µg/m<sup>3</sup> at any site in the borough.

All other sites in this reporting period when bias adjusted, corrected for distance to receptor and annualised (where appropriate) are shown to be below the AQS for the relevant receptor except for one diffusion tube location at the Holme House AQMA. However the continuous analyser at this location indicated that levels are below the AQS.

Analysing all of the monitoring results it is very encouraging to see that in general NO<sub>2</sub> levels are either stable or continuously improving and are compliant with AQS.

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

Rushcliffe BC is not undertaking monitoring.

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

Rushcliffe BC is not undertaking monitoring.

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

Rushcliffe BC is not undertaking monitoring.

## Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Inlet Height (m)
Trent Bridge	Loughborough Road/Trent Bridge, West Bridgford AQMA1	Roadside	458256	338156	NO2	YES	Chemiluminescent	0	3.75	1.5
Holme House	Holme House, A52 Stragglethorpe junction, Radcliffe on Trent	Roadside	463005	338208	NO2	YES	Chemiluminescent	0	7.5	1.5

**Notes:**

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

(2) N/A if not applicable.

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

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube collocated with a Continuous Analyser?	Height (m)
WLR/2	39/41 WILFORD LANE	Kerbside	457873	337426	NO2	NO	0	9	NO	2.2
A52/SA	A52 SOUTH AVE, RADCLIFFE	Kerbside	465929	339543	NO2	NO	0	4.2	NO	2.9
NK	A60/A52 JUNCTION (Nott Knight)	Kerbside	457612	334813	NO2	NO	15	1.8	NO	2.1
CL	CLOVERLANDS	Kerbside	457223	335033	NO2	NO	0	16.3	NO	2.5
HR	HAMPTON ROAD	Urban Background	458326	336714	NO2	NO	0	5.4	NO	2.1
HH	HICKORY HOUSE	Kerbside	458049	337340	NO2	NO	0	10.5	NO	2
LR	LOUGHBOROUGH ROAD (RES)	Kerbside	458126	337727	NO2	YES	0	8.9	NO	1.9
37RR	RADCLIFFE ROAD	Kerbside	458457	338215	NO2	NO	-3.3	13.8	NO	4
PC	PEVERIL COURT	Kerbside	458399	337172	NO2	NO	0	8	NO	2
A52/RT	RADCLIFFE A52	Kerbside	464644	338730	NO2	NO	6.5	3.3	NO	2
RR	RADCLIFFE ROAD	Kerbside	458284	338150	NO2	YES	0	4	NO	2.3
SH	SWANS HOTEL.	Kerbside	458919	338120	NO2	YES	0	10	NO	2.1
BH	THE BEECHES HOTEL	Kerbside	457701	337342	NO2	NO	0	9.7	NO	2.1
TBLA	TRENT BOULEVARD A	Kerbside	458752	338278	NO2	YES	0	7.1	NO	2
TBLB	TRENT BOULEVARD B	Kerbside	458756	338267	NO2	YES	0	3.4	NO	2.4
TBI	TRENT BRIDGE INN	Kerbside	458274	338117	NO2	YES	0	6.6	NO	2.6
WL3	WILFORD LANE 3	Kerbside	458134	337581	NO2	NO	5.2	2.1	NO	2.9

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WW	WINDYWAYS	Kerbside	457651	334840	NO2	NO	0	12	NO	1.8
WW2	WINDYWAYS	Kerbside	457651	334840	NO2	NO	0	12	NO	1.8
A52/HHF1	A52 HOME HOUSE(façade) STRAGGLETHORPE	Kerbside	463011	338213	NO2	YES	0	6	YES	2.5
A52/HHF2	A52 HOME HOUSE(façade) STRAGGLETHORPE	Kerbside	463011	338213	NO2	YES	0	6	YES	2.5
A52/HHF3	A52 HOME HOUSE(façade) STRAGGLETHORPE	Kerbside	463011	338213	NO2	YES	0	6	YES	2.5
A52/HHF4	A52 HOME HOUSE(façade) STRAGGLETHORPE	Kerbside	463040	338232	NO2	YES	0	6	YES	2.5
1KH	1 KIRKHILL BINGHAM	Kerbside	470205	340020	NO2	NO	1	1	NO	2.5
4KH	4 KIRKHILL BINGHAM	Kerbside	470220	340051	NO2	NO	10	1	NO	2.5
15KHG	15 Kirkhill	Kerbside	470202	340092	NO2	NO	2	0.5	NO	2.5
SPC	Syon Park Close	Kerbside	457507	336343	NO2	NO	3	2	NO	2.5
RuRo	Rugby Road	Kerbside	458132	336462	NO2	NO	3.5	2	NO	2.5
Trent B1	trent buildings	Kerbside	458249	338167	NO2	YES	0	3.6	YES	2.5
Trent B2	trent buildings	Kerbside	458249	338167	NO2	YES	0	3.6	YES	2.5
Trent B3	trent buildings	Kerbside	458249	338167	NO2	YES	0	3.6	YES	2.5
1 LA	1 long acre, Bingham	Kerbside	470234	339846	NO2	NO	4	2.5	NO	2.6
2LA	2A Long Acre, Bingham	Kerbside	470248	339834	NO2	NO	0	1.2	NO	2.6
Sains	Sainsburys Wilford Road, Rudd	Kerbside	457303	333214	NO2	NO	0	2.2	NO	2.6
1HS	1 High Street, Rudd	Kerbside	457323	333124	NO2	NO	-1.1	2.8	NO	2.6



**Notes:**

- (1) 0m if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property).
- (2) N/A if not applicable.

Table A.3 – Annual Mean NO<sub>2</sub> Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2018 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
					2014	2015	2016	2017	2018
Trent Bridge	Roadside	Automatic		93.60%				37	36
Holme House	Roadside	Automatic		99.90%	<b>63</b>	39	<b>41</b>	38	39
Loughborough Road	Roadside	Automatic			32	28	30		
WLR/2	Roadside	Diffusion Tube		100%	26	24	26	23	26
A52/SA	Roadside	Diffusion Tube		100%	30	29	32	29	29
NK	Roadside	Diffusion Tube		100%	<b>47</b>	<b>45</b>	<b>43</b>	<b>41</b>	<b>41</b>
CL	Roadside	Diffusion Tube		100%	29	30	29	30	28
HR	Urban Background	Diffusion Tube		92%	18	17	19	17	15
HH	Roadside	Diffusion Tube		75%	26	25	25	23	26
LR	Roadside	Diffusion Tube		83%	31	31	29	26	28
37RR	Roadside	Diffusion Tube		100%	28	30	31	27	24
PC	Roadside	Diffusion Tube		100%	26	25	26	25	24
A52/RT	Roadside	Diffusion Tube		92%	33	29	33	32	28
RR	Roadside	Diffusion Tube		100%	35	31	33	30	31
SH	Roadside	Diffusion Tube		100%	26	28	29	27	23

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BH	Roadside	Diffusion Tube		100%	28	23	27	24	26
TBLA	Roadside	Diffusion Tube		100%	33	31	32	33	31
TBLB	Roadside	Diffusion Tube		100%	36	35	37	32	32
TBI	Roadside	Diffusion Tube		92%	<b>44</b>	<b>43</b>	<b>42</b>	<b>40</b>	<b>40</b>
THF	Roadside	Diffusion Tube			<b>40</b>	36	37	39	
WL3	Roadside	Diffusion Tube		100%	37	31	37	37	34
WW	Roadside	Diffusion Tube		100%	36	34	35	34	31
A52/HHF1	Roadside	Diffusion Tube		100%	<b>49</b>	38	38	37	38
A52/HHF4	Roadside	Diffusion Tube		100%	<b>41</b>	38	<b>40</b>	<b>41</b>	39
1KH	Roadside	Diffusion Tube		100%	25	23	23	22	22
4KH	Roadside	Diffusion Tube		100%	31	29	29	27	28
15KHG	Roadside	Diffusion Tube		100%	26	26	27	26	25
SPC	Roadside	Diffusion Tube		92%	25	23	25	25	23
RuRo	Roadside	Diffusion Tube		100%	31	30	30	29	29
Trent B1	Roadside	Diffusion Tube		100%		36	38	37	36
1 LA	Roadside	Diffusion Tube		100%		26	30	28	27
2LA	Roadside	Diffusion Tube		100%		37	37	36	31
Sains	Roadside	Diffusion Tube		92%		33	33	30	31

1HS	Roadside	Diffusion Tube		92%		30	30	28	27
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- Diffusion tube data has been bias corrected (confirm by selecting in box)
- Annualisation has been conducted where data capture is <75% (confirm by selecting in box)

**Notes:**

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

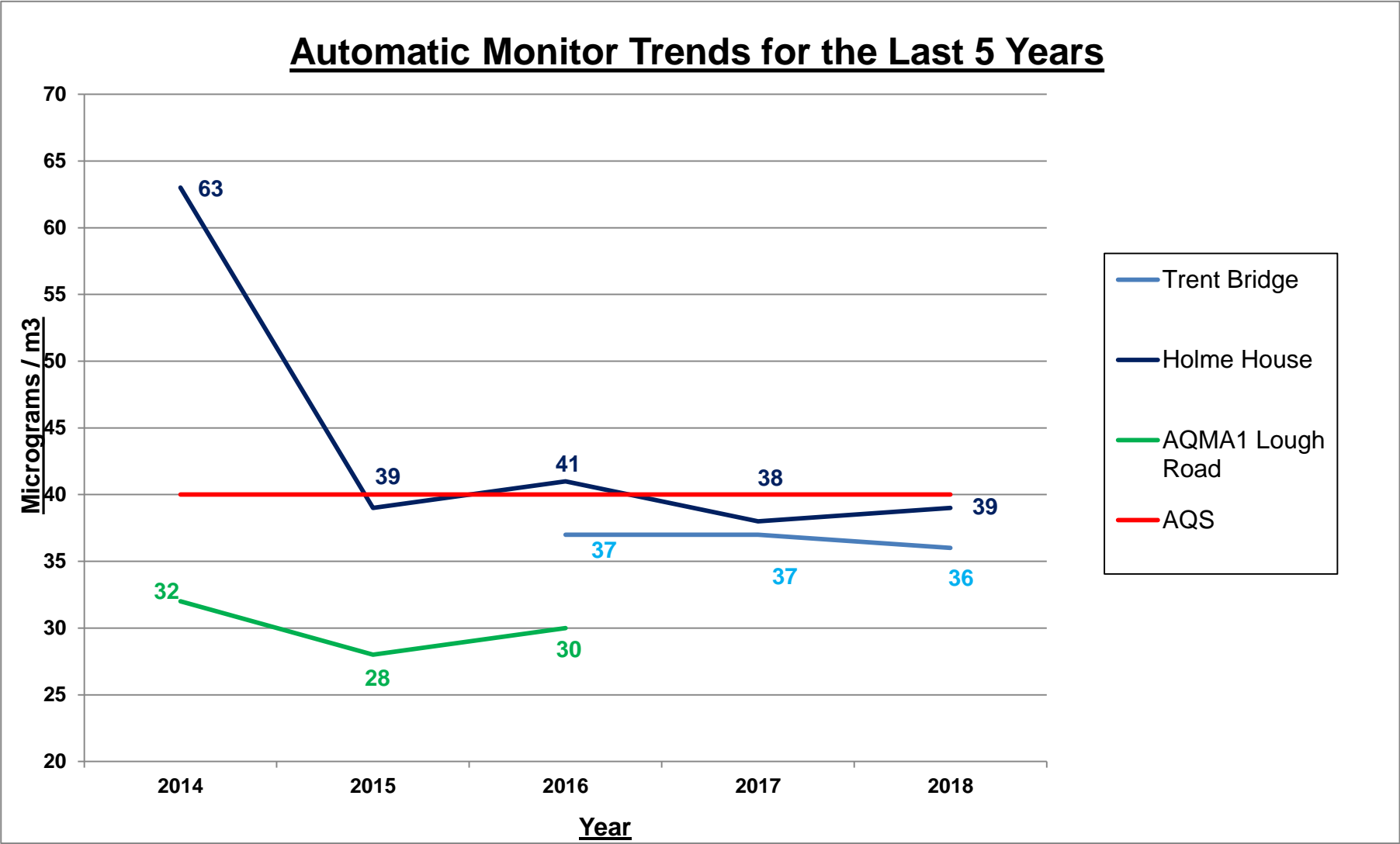
NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 1-hour mean objective are shown in **bold and underlined**.

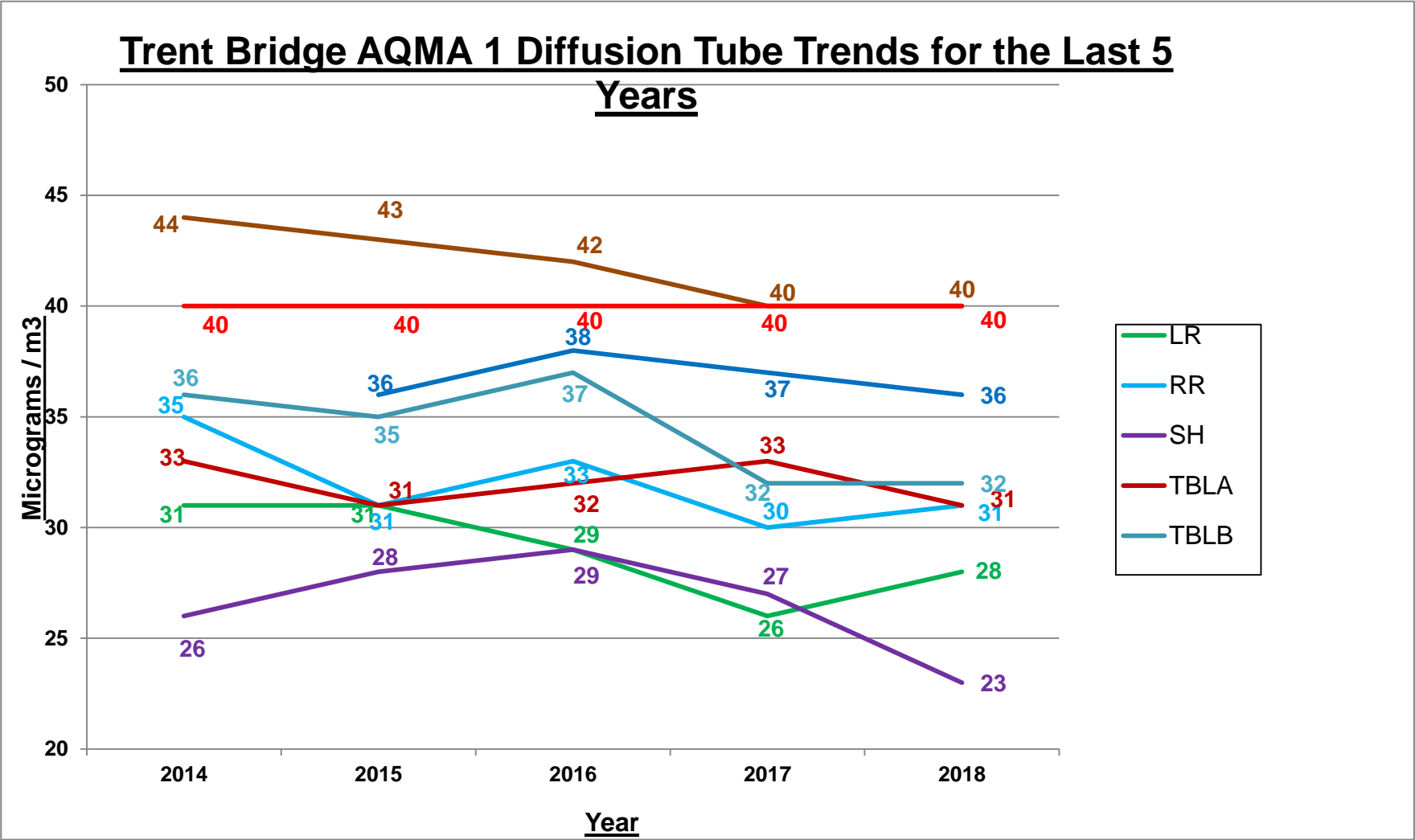
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

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

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

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





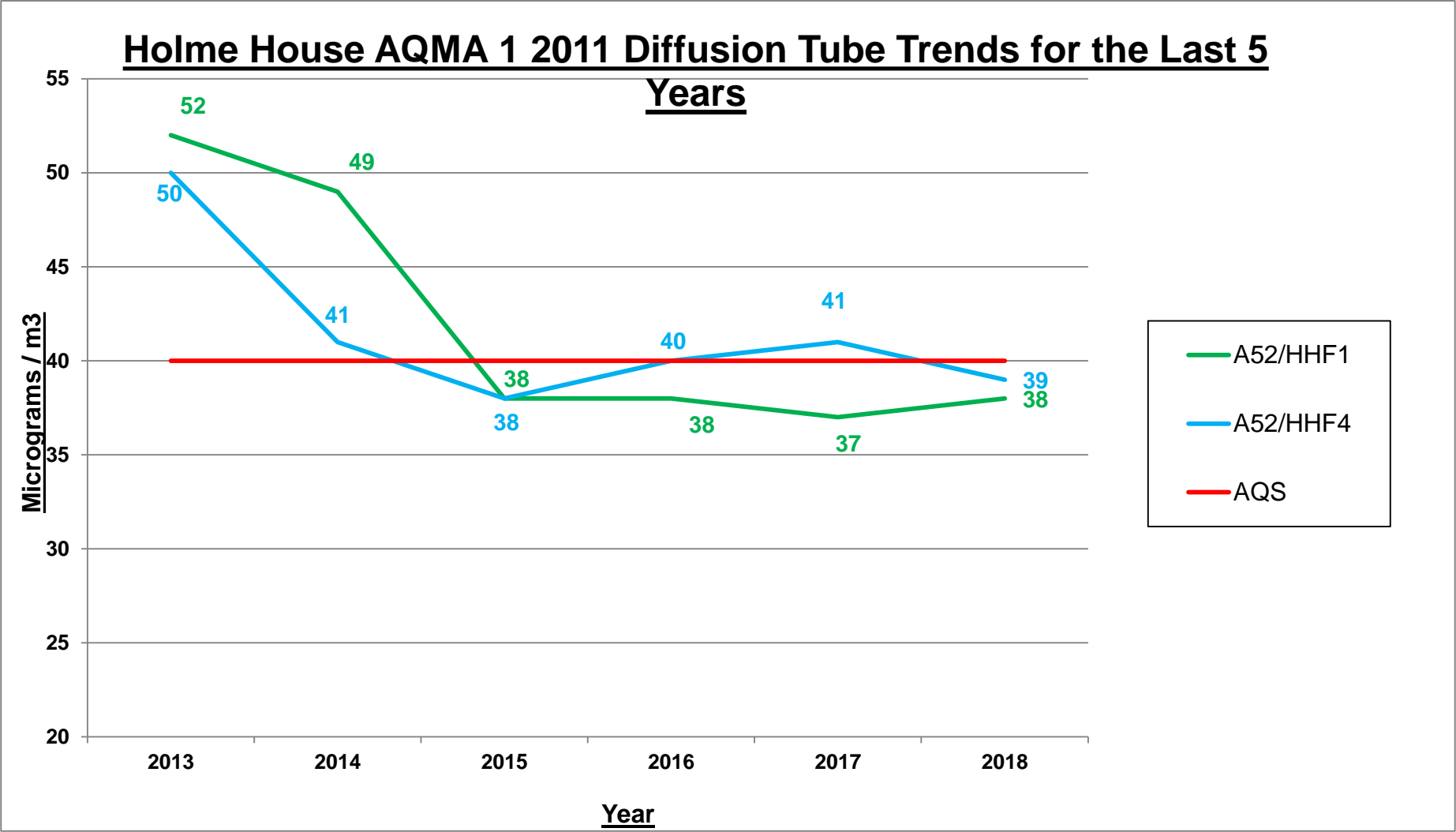


Table A.4 – 1-Hour Mean NO<sub>2</sub> Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2018 (%) <sup>(2)</sup>	NO <sub>2</sub> 1-Hour Means > 200µg/m <sup>3</sup> <sup>(3)</sup>				
					2014	2015	2016	2017	2018
Trent Bridge	Roadside	Automatic		93.6				0	0
Holme House	Roadside	Automatic		99.9		1	0	0	0
Loughborough Road	Roadside	Automatic			0	0	0		

**Notes:**

Exceedances of the NO<sub>2</sub> 1-hour mean objective (200µg/m<sup>3</sup> not to be exceeded more than 18 times/year) are shown in **bold**.

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

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

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



## Appendix B: Full Monthly Diffusion Tube Results for 2018

Table B.1 – NO<sub>2</sub> Monthly Diffusion Tube Results - 2018

Site ID	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )												Annual Mean		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (factor) and Annualised <sup>(1)</sup>	Distance Corrected to Nearest Exposure <sup>(2)</sup>
WLR/2	31	32	25	24	22	19	26	21	25	40	42	29	28	26	26
A52/SA	38	32	32	32	32	28	32	26	28	33	32	32	31	29	29
NK	40	47	48	51	45	40	48	41	37	37	54	46	44	41	28
CL	32	38	29	32	25	18	28	26	33	29	32	37	30	28	28
HR		23	17	14	12	10	13	14	16	20	19	25	17	15	15
HH			28	34	21	20	27	30	n/a	30	33	33	28	26	26
LR		31	28	31	28		29	24	31	33	35	35	31	28	28
37RR	30	28	28	24	23	18	23	21	25	28	30	36	26	24	25
PC	33	33	24	23	21	19	26	25	25	27	27	29	26	24	24
A52/RT	n/a	37	34	34	26	20	29	27	27	30	31	38	30	28	25
RR	39	31	32	33	33	25	35	28	34	36	36	38	33	31	31
SH	20	28	26	21	24	20	23	19	26	28	28	34	25	23	23
BH	35	29	25	27	25	20	23	23	32	34	30	29	28	26	26
TBLA	34	35	27	34	30	23	36	33	39	30	34	40	33	31	31
TBLB	38	40	33	36	37	29	38	29	31	31	29	39	34	32	32

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TBI	41	45	42	47		30	45	37	40	49	47	50	43	40	40
WL3	37	44	36	37	27	21	34	34	40	40	42	42	36	34	28
WW	34	34	30	37	30	21	37	31	34	32	29	36	32	30	30
WW2	37	33	32	40	30	23	37	38	31	29	33	39	33	31	31
A52/HHF1	54	52	47	42	48	37	44	31	30	37	40	44	42	39	39
A52/HHF2	42	41	29	42	42	34	48	38	33	37	42	43	39	37	37
A52/HHF3	41	44	42	40	44	36	46	32	32	40	44	43	40	37	37
A52/HHF4	50	40	38	43	40	34	47	42	42	44	39	47	42	39	39
1KH	29	27	25	23	25	21	22	19	20	22	26	28	24	22	22
4KH	36	31	32	29	32	28	32	21	22	32	32	30	30	28	22
15KHG	31	27	27	27	25	20	28	23	26	26	34	31	27	25	19
SPC	n/a	26	26	24	22	18	21	21	24	27	31	31	25	23	22
RuRo	35	34	29	30	28	24	35	28	28	31	36	37	31	29	28
Trent B1	38	36	39	39	45	39	37	31	37	39	39	40	38	36	36
Trent B2	39	38	42	43	44	37	40	31	36	47	44	45	40	38	38
Trent B3	40	37	42	41	45	35	42	30	37	41	38	41	39	36	36
1 LA	38	31	28	30	28	23	28	27	27	29	30	30	29	27	24
2LA	49	33	33	28	31	26	36	30	27	34	35	42	34	31	31
sains	34	29	39	28	36	32	36	26		32	36	39	33	31	31
1HS	32	31	34	28	29	21	31	23	24		33	32	29	27	29

- Local bias adjustment factor used (confirm by selecting in box)
- National bias adjustment factor used (confirm by selecting in box)
- Annualisation has been conducted where data capture is <75% (confirm by selecting in box)
- Where applicable, data has been distance corrected for relevant exposure (confirm by selecting in box)

**Notes:**

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

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

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

(2) Distance corrected to nearest relevant public exposure.

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

### Air Quality Operators

All monitoring and data management is undertaken by fully trained in house employees who have several years' experience in air quality monitoring and data management. Any new personnel undertake appropriate supervised training in line with the service's competency scheme prior to any unsupervised monitoring, calibration or data management. Currently two personnel are trained and competent to undertake such work.

### Nitrogen Dioxide Diffusion Tube Monitoring

Rushcliffe BC use Gradko diffusion tubes prepared using 20%Triethanolamine (TEA) in water to measure nitrogen dioxide at a number of sites in the borough. The diffusion tubes are stored in an airtight bag in a refrigerator upon receipt in the post and are used within 6 weeks of the preparation date displayed on the label.

Tube batches are exposed at selected sites to the atmosphere for approximately 4 weeks with the changeover date aiming to be +/- 1 day of the publicised diffusion tube change over date for the month to allow comparison with other Local Authority studies if necessary. The locations are reviewed periodically and all tubes are mounted using spacer brackets and grommets supplied through Gradko.

Each tube is labelled with a bar code and unique identification number. Each batch is supplied with a data collection form to record the location, date and time each tube is exposed in that period. The exposure period is calculated using an Excel spreadsheet and in addition Gradko recheck the calculated exposure period for each tube on receipt at the laboratory.

On the day of collection, the tubes are sent in an airtight bag to Gradko International Limited for analysis, together with a control blank that is stored unexposed in the sample fridge. The diffusion tubes are analysed within the scope of Gradko International Ltd Laboratory Quality Control Procedures utilising in-house method GLM7. Gradko is a UKAS accredited laboratory and undertakes diffusion tube monitoring on the same basis for a number of other local authorities and Environmental Consultants and now undertakes the monitoring for all local authorities in the Nottinghamshire Pollution Working Group.

Nitrogen dioxide absorbed as nitrite by triethanolamine (TEA) is determined by spectrophotometric measurement at 540 nanometres. Nitrite reacts with an added reagent to form a reddish purple azo dye and the optical density of this complex is measured using a Camspec UV/Visible Spectrophotometer. The concentrations of nitrogen dioxide are then calculated from a pre-calibrated response factor and exposure times. The values are not blank corrected using the blank "control" diffusion tube provided by Rushcliffe Borough Council.

The accuracy of the measurements made by Gradko are also monitored by participation in an external laboratory measurement proficiency scheme, the 'Workplace Analysis Scheme for Proficiency' (WASP), implemented by the Health and Safety Laboratory, Sheffield. The results of the WASP analysis are shown below. Gradko scored 100% in 2015. See [http://laqm.defra.gov.uk/documents/LAQM-WASP-Rounds-121--124-and-AIR-PT-Rounds-1-3-4-6-\(April-2013--February-2015\)-NO2-report.pdf](http://laqm.defra.gov.uk/documents/LAQM-WASP-Rounds-121--124-and-AIR-PT-Rounds-1-3-4-6-(April-2013--February-2015)-NO2-report.pdf)

### Data ratification

All diffusion tube data is checked on a monthly basis to identify any spurious data and compared with other local monitoring sites to further identify any suspect data.

Diffusion tube monitoring data reported in this document have been ratified and bias adjusted using the correction factor as stated which is either derived from the most up to date national bias factor.

## NOx Continuous Analysers

### Description of Analyser

The NOx continuous analyser is located at the façade of 43 Loughborough Road, West Bridgford and is a permanent site. The site is non-residential but provides a good assessment of NO<sub>2</sub>/NO<sub>x</sub> close to the main road along the building line. It is a ML9841B single chamber Chemiluminescence analyser and is approved by TUV, US EPA and NETCEN. A second analyser was installed in a Kaizen enclosure in early 2014 to the AQMA4 location at the A52/Stragglethorpe Road junction.

The analysers have a resolution of 0.001ppm and a reported lower detectable limit of <0.5ppb. The linearity error of the analyser is  $\pm 1\%$  of the full scale (from best line fit), and the precision is 0.5ppb or 1% of concentration reading (whichever is the greater).

## **Instruments Checks and Calibration of the Analyser**

### **Daily automatic calibration**

Zero air is generated by passing air through scrubbers and passed through the reaction cell. Span gas is generated by a permeation tube and passed to the reaction chamber to give the span calibration response. The daily automatic calibrations are used as a check on the instrument performance and drift.

### **Analyser inspection and manual calibration**

The analysers were covered by an annual service and maintenance contract. The service and maintenance contract covers calibration checks, flow and leak checks, cleaning of components, analyser diagnostic checks, replacement of faulty components and consumables and fault call out.

Manual calibration checks are carried out by RBC staff on a fortnightly basis using scrubbed zero air derived from the integrated scrubber column and a certificated NO/NO<sub>x</sub> calibration gas is supplied by BOC Gases. The BOC gas is changed when the certification expires.

The analyser is taken out of service and the inlet filter is changed prior to connecting the calibration gases. The zero air and NO/NO<sub>x</sub> gases are run through the analyser and the responses noted together with the instrument gain factor. The output of the analyser (e.g. the gain) is only reset or altered following equipment service or repair or if drift occurs necessitating a change of the gain setting. The calibration zero values, span values and gas certified values are used to rescale the raw data received from the analyser.

## **Data Handling and Ratification**

### **Data handling**

From early 2016 the data handling has been contracted to Geoff Broughton of Air Quality Data Management (AQDM) who is working closely with Envitec who provides the software platform for the data. See <http://www.aqdm.co.uk>. Fortnightly data calibration checks are undertaken by RBC officers and this information is used by AQDM to scale and validate the data.

## Data ratification

All raw data is examined for consistency and the existence of any spurious results. Negative values are examined and either removed or rescaled further and high values are interrogated to see if the readings are consistent with expectations or an equipment error may have occurred. Data, during calibration checks is automatically excluded from the database by a software service switch on the instrument panel which is used during calibration checks.

If any doubts exist as to the satisfactory status of any data the data is excluded from the data base calculations. Each data set that is excluded must have annotated against it a reason for the data exclusion to allow for traceability of data ratification. The most common reason for data being excluded is monitor breakdown leading to consistently low or very high readings. However, power failure can also be a cause as well as any specific events noted by officers during visits, e.g. trucks being run next to the monitor for maintenance of the building façade or similar.

Information from the other analysers on the system can also be accessed to compare any data that may be experiencing high or low readings to enable a decision to be made on the status of any data highlighted. This includes the AURN monitors operated by the Nottingham City.

## Discussion of Choice of Factor to Use

Whilst we had the option to use either own local factor derived from co-location studies with the NO<sub>x</sub> analyser or the National Bias Adjustment Factor, the national factor has been used for diffusion tube bias adjustment for the following reasons:

- the co-location sites are not typical of the locations in the diffusion tube study
- the previous reports have mostly used the national factor and continuing to use this factor will provide a consistent approach to bias adjustment year on year

A comparison of the national bias factor with the local bias factor (based on two, triplicate tube, co-location sites) indicated that they were the same.

The bias factor used in this report is 0.93. This is derived from the national bias figure for Gradko tubes, 20% TEA in water as shown in the screen clipping below.

National Diffusion Tube Bias Adjustment Factor Spreadsheet						Spreadsheet Version Number: 03/19				
<p>Follow the steps below in the correct order to show the results of relevant co-location studies</p> <p>Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods</p> <p>Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet</p> <p>This spreadsheet will be updated every few months, the factors may therefore be subject to change. This should not discourage their immediate use.</p>						<p>This spreadsheet will be updated at the end of June 2019</p> <p><a href="#">Local Authority Website</a></p>				
<p>The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners ARCOM and the National Physical Laboratory</p>				<p>Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.</p>						
Step 1:	Step 2:	Step 3:	Step 4:							
<p>Select the Laboratory that Analyses Your Tubes from the Drop-Down List</p> <p>If other sites are not shown, click on the link for the National Laboratory</p>	<p>Select a Preparation Method from the Drop-Down List</p> <p>Use the preparation method if you have used it before or have used the method on other sites</p>	<p>Select a Year from the Drop-Down List</p> <p>If you have a year, select it from the list</p>	<p>Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor shown in blue at the foot of the final column.</p> <p>If you have your own co-location study then see footnote 1. If uncertain what to do then contact the Local Air Quality Management Helpdesk at <a href="mailto:LAQMhelpdesk@uk.bureauveritas.com">LAQMhelpdesk@uk.bureauveritas.com</a> or 0800 0327953</p>							
Analysed By	Method	Year	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) ( $\mu\text{g}/\text{m}^3$ )	Automatic Monitor Mean Conc. (Dm) ( $\mu\text{g}/\text{m}^3$ )	Bias (B)	Tube Precision <sup>1</sup>	Bias Adjustment Factor (A) ( $\text{Dm}/\text{Dm}_{\text{auto}}$ )
Gradiol	20% TEA in water	2009	R	Ards and North Down Borough Council	11	35	29	27.4%	G	0.78
Gradiol	20% TEA in water	2009	R	Bedford Borough Council	12	32	32	5.6%	G	0.95
Gradiol	20% TEA in water	2009	R	Lisburn & Castlereagh City Council	12	32	24	22.1%	G	0.76
Gradiol	20% TEA in water	2009	R	Monmouthshire County Council	12	39	36	4.7%	G	0.96
Gradiol	20% TEA in water	2009	UB	Northampton Borough Council	12	76	13	26.8%	G	0.73
Gradiol	20% TEA in water	2009	R	Bedford Borough Council	11	32	29	9.2%	G	0.92
Gradiol	20% TEA in water	2009	R	Borough Council of King's Lynn and West Norfolk	12	26	24	6.0%	G	0.94
Gradiol	20% TEA in water	2009	R	Cheshire West and Chester	12	36	37	-2.5%	G	1.03
Gradiol	20% TEA in water	2009	R	Cheshire West and Chester	12	43	40	5.1%	G	0.94
Gradiol	20% TEA in water	2009	R	Farnham Borough Council	12	28	34	-17.5%	G	1.21
Gradiol	20% TEA in water	2009	R	Farnham Borough Council	12	37	34	8.3%	G	0.92
Gradiol	20% TEA in water	2009	R	Farnham Borough Council	12	32	28	12.5%	G	0.83
Gradiol	20% TEA in water	2009	R	NOTTINGHAM CITY COUNCIL	12	35	34	6.3%	G	1.00
Gradiol	20% TEA in water	2009	R	Rushwell Forest Borough Council	12	44	37	19.4%	G	0.84
Gradiol	20% TEA in water	2009	R	Rugby & Hove City Council	9	49	60	-1.7%	G	1.04
Gradiol	20% TEA in water	2009	R	Eastleigh Borough Council	11	29	32	-12.0%	G	1.14
Gradiol	20% TEA in water	2009	R	Eastleigh Borough Council	12	42	39	10.2%	G	0.91
Gradiol	20% TEA in water	2009	UB	Eastleigh Borough Council	12	27	28	-4.4%	G	1.05
Gradiol	20% TEA in water	2009	R	Gateshead Council	12	29	25	13.5%	G	0.88
Gradiol	20% TEA in water	2009	R	Gateshead Council	12	32	29	10.0%	G	0.90
Gradiol	20% TEA in water	2009	R	Gateshead Council	9	40	41	-1.0%	G	1.02
Gradiol	20% TEA in water	2009	R	Wokingham Borough Council	12	38	33	13.2%	G	0.88
Gradiol	20% TEA in water	2009	R	Bath & North East Somerset	12	43	39	4.0%	G	0.96
Gradiol	20% TEA in water	2009	R	Bedford Borough Council	10	30	27	6.0%	G	0.92
Gradiol	20% TEA in water	2009	KS	Marlborough Road Innescomparispe	11	93	85	9.2%	G	0.91
Gradiol	20% TEA in water	2009	R	South Gloucestershire Council	12	21	20	6.2%	G	0.94
Gradiol	20% TEA in water	2009	R	Thurrock Borough Council	12	63	62	2.3%	S	0.99
Gradiol	20% TEA in water	2009	R	Thurrock Borough Council	12	34	30	15.3%	G	0.87
Gradiol	20% TEA in water	2009	R	Thurrock Borough Council	12	31	24	20.0%	G	0.78
Gradiol	20% TEA in water	2009	UB	Thurrock Borough Council	12	27	25	9.2%	S	0.92
Gradiol	20% TEA in water	2009		<b>Overall Factor* (30 studies)</b>					<b>Use</b>	<b>0.93</b>



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

Figure 1 – Map of AQMA1 Boundary



Figure 2 – Map of AQMA1/2011 Boundary





Figure 3 – Map of AQMA1 Trent Bridge Monitoring Station

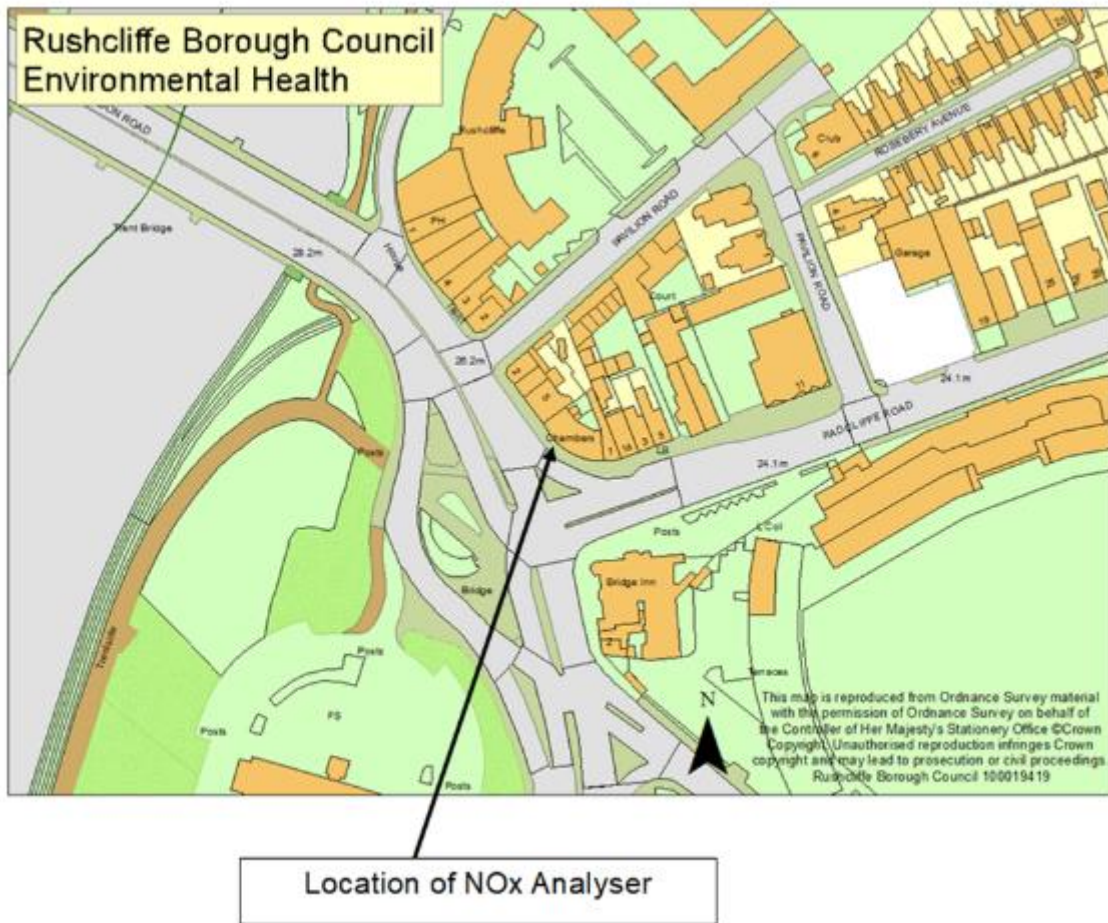


Figure 4 – Photo of AQMA1 Trent Bridge Monitoring Station



**Figure 5 Map of Automatic Monitoring Site Nox Analyser A52/Stragglethorpe Junction**



**Figure 6 Photographs of the NOX analyser and triplicate diff tube location at the A52/Stragglethorpe Junction**





Figure 7a – AQMA1 (Trent Bridge) Diffusion Tube Locations

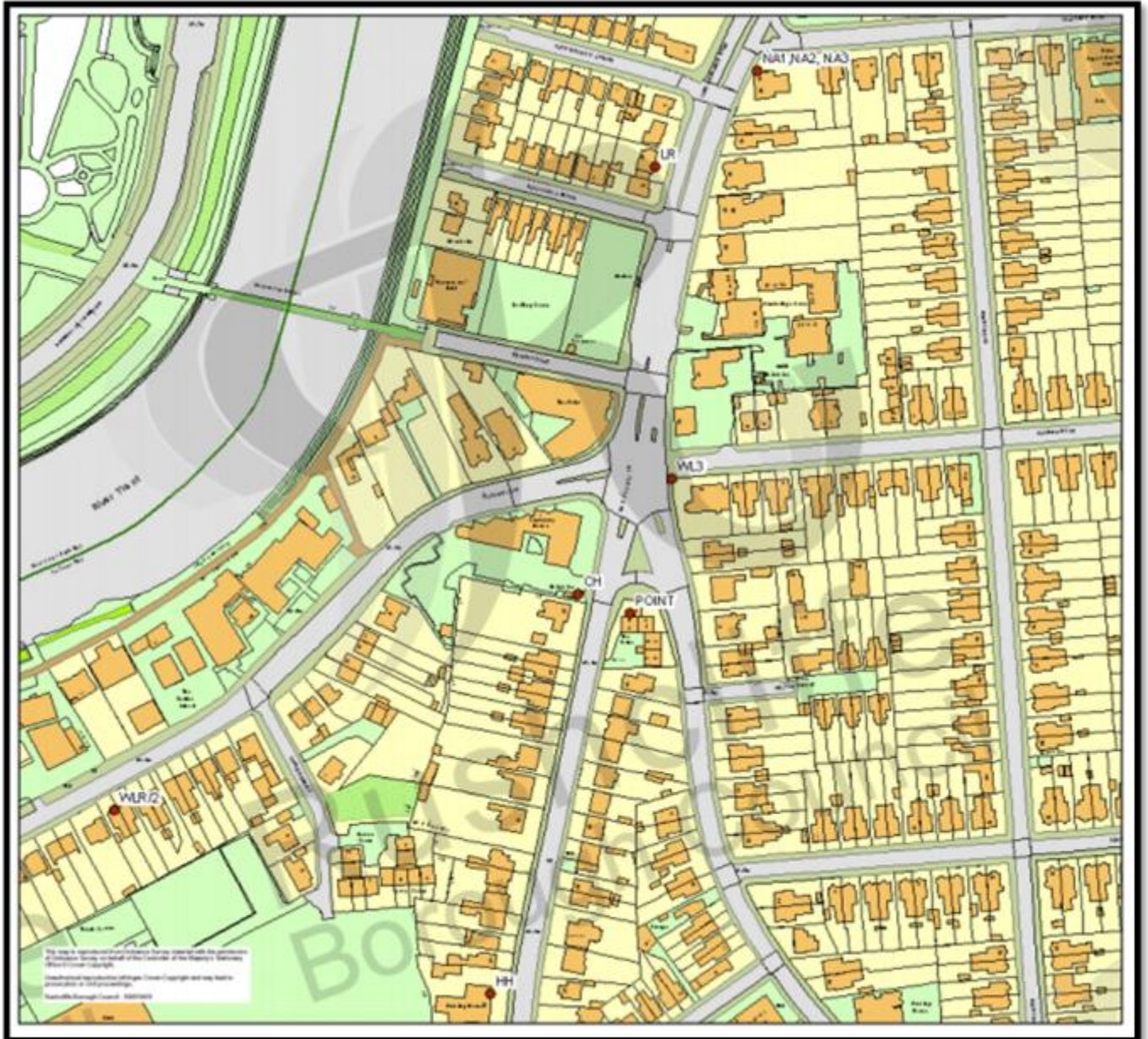




Figure 7b – AQMA1 (Trent Bridge) Diffusion Tube Locations

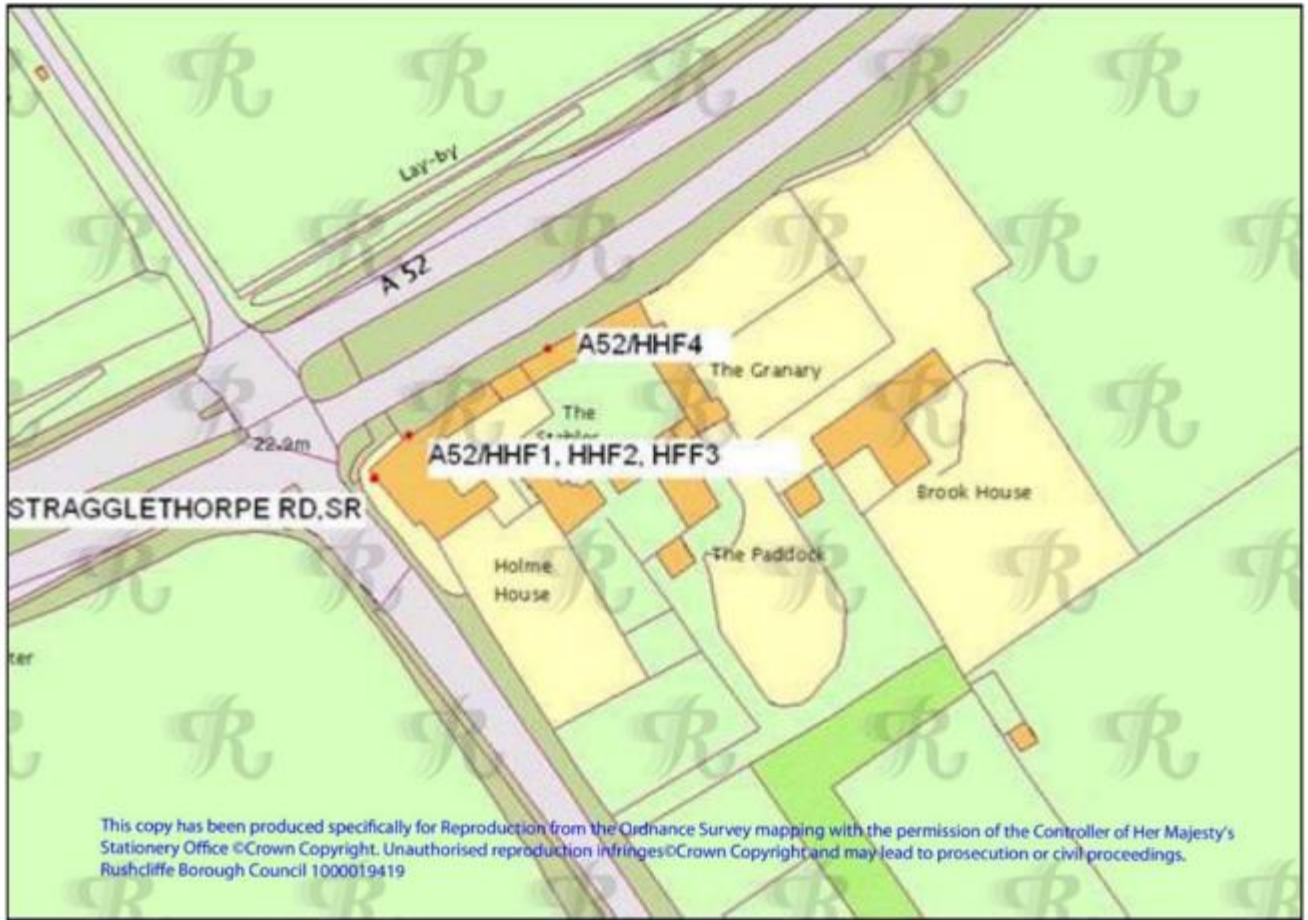


Figure 7c – AQMA1 (Trent Bridge) Diffusion Tube Locations





Figure 8 – AQMA 2011/1 (A52 / Stragglethorpe Road) Diffusion Tube Locations





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

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective <sup>4</sup>	
	Concentration	Measured as
Nitrogen Dioxide (NO <sub>2</sub> )	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Particulate Matter (PM <sub>10</sub> )	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Sulphur Dioxide (SO <sub>2</sub> )	350 µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean

<sup>4</sup> The units are in microgrammes of pollutant per cubic metre of air (µg/m<sup>3</sup>).

## Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM <sub>2.5</sub>	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO <sub>2</sub>	Sulphur Dioxide
...	...

## References

[Rushcliffe's Air Quality Annual Status Report 2018 \(ASR 2018\)](#)

[Air Quality Action Plan - Trent Bridge](#)

[Air Quality Action Plan – Stragglethorpe Road](#)

[Rushcliffe Borough Council Planning Policy](#)

[Planning Practice Guidance – Air Quality](#)

[Local Transport Plan - Nottinghamshire County Council](#)

[Air Quality Considerations for Developers, Rushcliffe Borough Council, 2010](#)

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