Ashfield
DISTRICT COUNCIL

2018 Air Quality Annual Status Report (ASR)

For Ashfield District Council
In fulfillment of Part IV of the
Environment Act 1995
Local Air Quality Management
June 2018

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Executive Summary - Air Quality in Our Area

Air Quality in Ashfield

Air Quality is an issue that is becoming one of an increasing concern for the general public and of increasing interest to news organisations. Most of the issues raised focus on how detrimental air quality can affect human health.

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].

Since 2003 Ashfield District Council has undertaken monitoring of the air quality within the district under the Local Air Quality Management regime and reports back to DEFRA. Fortunately, Ashfield District Council has been able to consistently meet the Air Quality Objectives set by National Government in relation to Local Air Quality Management. However, it is important to highlight that the Authority has had to undertake a feasibility study for DEFRA following a Ministerial direction in February 2018 due to an exceedance of an Air Quality Objective along a stretch of the A38. The exceedance is based on the roadside Nitrogen Dioxide concentration and was identified by the governments Climate Pollution Mapping Model.

[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

The District of Ashfield is a Smoke Control Area and the Environmental Protection Team at Ashfield District Council use the Clean Air Act Legislation to control the levels of air pollution from domestic, commercial and industrial combustion activities. In addition, air pollution within the district from key industrial processes is regulated by the Environmental Permitting (England and Wales) Regulations 2016.

The Trans-boundary nature of air pollution sources and episodes make it a prerequisite that Ashfield District Council works with partner organisations to control air pollution problems and develop strategies for reducing levels of detrimental air pollution. These partner organisations include the Environment Agency, Pubic Health England and the neighbouring Nottinghamshire Authorities through the work of the Nottinghamshire Environmental Protection Working Group and at the regional level through the work of the East Midlands Air Quality Network. We have also been working jointly with Bolsover District Council, Derbyshire County Council and Nottinghamshire County Council following an exceedance of an Air Quality Objective along a stretch of the A38 following a Ministerial direction in February 2018 based on the Climate Pollution Mapping Model.

This report focuses on monitoring data collected during 2017 and again the District of Ashfield continues to meet the air quality objectives set by National Government in relation to Local Air Quality Management. However, this is not the case nationally and now local authorities are also being asked to report on actions and initiatives they are undertaking to improve local and regional air quality.

Actions to Improve Air Quality

Ashfield District Council has not had to declare an AQMA but it is still important for the Council to take steps to address air quality within the District.

- Over the last year the new draft Nottinghamshire Air Quality Strategy has now been published and put out for comments by all consultees including the Health and Wellbeing Boards. The Strategy is currently waiting for approval from Nottinghamshire County Council

- As an Authority Ashfield District Council has promoted the use of more sustainable forms of transport within in its operational fleet, as a means of reducing the effects of detrimental Air Quality. The Council started to use electric bin lifts, fitted to its refuse collection vehicles in 2011 and now operates 14 vehicles, 70% of its refuse collection vehicles. The Council obtained its first full electric van in 2015 and continues to evaluate the opportunity to convert further vehicles to hybrid or full electric as they become widely available from the vehicle manufactures.

- The Council also operates a tax free bikes scheme for all employees to encourage cycle use for employees to get to work but also to encourage cycle use outside of work.

- As stated earlier the Council will continue to enforce all legislation aimed at reducing air pollution and it will continue to make assessments of all new commercial, industrial and large domestic housing projects that apply for planning approval.

Conclusions and Priorities

During 2017 the District of Ashfield continued to meet the air quality objectives set by National Government based on monitoring data, however this is not the case nationally and now local authorities are also being asked to report on actions and initiatives they are undertaking to improve local and regional air quality

Despite Ashfield District Council not having any AQMA's our priority is to continue working with partners such as Public Health England to develop public engagement in light of the health issues associated with detrimental air quality and with neighbouring Nottinghamshire Authorities and Nottinghamshire County Council to implement the updated Nottinghamshire Air Quality Strategy.

Promoting public awareness of air pollution and the actions that individuals can take to reduce air pollution should help to ensure that the levels of Air Pollution within the District of Ashfield continue to the meet National Air Quality Objectives. It is important that the health effects of detrimental air quality are conveyed to the public and highlight to the public that even lower levels of air pollutants can affect public health

In Hucknall the District borders the Nottingham Clean Air Zone and our engagement with Public Health England and the work with the Nottinghamshire Environmental Protection Working Group will help to address the issue. People commuting from neighbouring District Authority areas into Nottingham City can have an impact on their air pollution problems and it again highlights the importance of engaging with the public to promote sustainable transport options.

Local Engagement and How to Get Involved

Residents living or working in Ashfield and Business's based in Ashfield can take steps to improve local air quality by electing to adjust their life style choices. These changes centre on the increased use of sustainable transport and a reduction in personal car use.

Ashfield has good links to all forms of public transport. The Robin Hood railway line (which runs from Nottingham to Worksop) has stations at Kirkby-in-Ashfield, Sutton Parkway and Hucknall. Hucknall is also a terminus for the Nottingham Express Transit (NET) tram route to Nottingham.

Walking and cycling are both good for an individual's general health but it also makes a positive contribution to resolving the problems associated with detrimental air quality in congested areas. Contact your local school and enquire whether they operate any group cycling or walking schemes.

When the time comes to replacing your existing vehicle consider purchasing an electric or low emission vehicle. The Government are providing a number of different grant schemes and tax incentives to encourage the general public and business to switch to using electric and low emission vehicles. There are grants available that promote the use of plug in electric cars and vans. Coupled with 'feed in tariffs' that enable consumers to get money for generating their own electricity these incentives could help the domestic consumer to reduce the cost of running a car whilst also making a contribution to reducing the levels of anthropogenic air pollution.

There are also incentives through grants and tax incentives to encourage business to switch to electric or low emission vehicles. There is specific grant money available for public transport providers to purchase cleaner, greener buses. In addition to electric and hybrid vehicles the government is promoting the use of hydrogen fuelled fleet vehicles. For further information, you can visit the GOV.UK website.

The whole of the district of Ashfield has been designated a Smoke Control Area under the Clean Air Act 1993 and whilst this places restrictions on the burning of waste by business it does not completely prohibit the burning of waste by householders who can still burn garden waste provided they do not cause nuisance to other residents. All forms of combustion including bonfires can give rise to increases in the levels of particulate both PM_{10} and $PM_{2.5}$ which leads to increases in cardiovascular and respiratory diseases especially within vulnerable groups such as the elderly, children and asthma sufferers. Local residents can contribute to reducing particulates by recycling waste rather than burning it. Ashfield District Council currently offers a garden waste collection scheme using the fortnightly collection of brown/black lidded bins and large quantities of waste can be taken to the household waste recycling centres. They are located at Wigwam lane Hucknall, Sidings Road Kirkby in Ashfield and at Hermitage Lane Mansfield. It is important that Nottinghamshire residents register with Nottinghamshire County Council before using the household waste recycling centres.

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1 Local Air Quality Management

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

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

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.

Ashfield District Council currently does not have any Air Quality Management Areas. For reference, a map of Ashfield District Council's monitoring locations is available in Appendix D

2.2 Progress and Impact of Measures to address in Air Quality in Ashfield

The Report sets out the Annual Status Report, which forms part of the Review & Assessment process required under the Environment Act 1995 and subsequent Regulations.

Defra's appraisal of last year's ASR concluded 'The Local Authority monitors for nitrogen dioxide at a number of diffusion tube sites located close to roadsides. There are no measured exceedances of the annual mean objective and therefore no requirement to declare an Air Quality Management Area. There are increases in nitrogen dioxide annual mean concentrations at most of the monitoring sites, but no real trend, upwards or downwards, has been observed over the last five years.

The monitoring strategy was reviewed in 2016 and an extra monitoring location was added at Mansfield Road, where there was perceived to be an increase in HGVs. There have been no exceedances here but monitoring will continue for a further year to confirm this.

The local authority has outlined a number of measures that they are implementing alone or jointly with Nottingham City or County Councils to improve air quality including promoting Clean Air Day in 2018. In addition to this, the Nottinghamshire Air Quality Strategy has been updated in 2016 and is currently out for consultation.

The local authority intends to replace its current air quality monitoring station with an AQ mesh system which is more portable and enables $PM_{2.5}$ to be measured.

On the basis of the evidence provided by the local authority the conclusions reached are acceptable for all sources and pollutants.

Ashfield District Council has taken forward a number of measures during the current reporting Year of 2017 in pursuit of improving air quality. Details of the measures completed, in progress or planned are set out in Table 2.1.

Progress on measure one which was the development of an Air Quality Planning Guidance Document has not been moved forwards over the last year but the Environmental Protection Team have developed a closer working relationship with the Development Control Team and now both teams fall under the same management structure. The Development of an Air Quality Planning Guidance Document remains an option and Table 2.1 has been updated with a more realistic timescale'.

Ashfield District Council can confirm that Measure two which is the development of an updated Nottinghamshire Air Quality Strategy and measure four which is a promotional event around National Clean Air Day and which encourages public participation by highlighting sustainable transport options and highlights the health issues associated with detrimental air quality were not completed over the course of the previous year. The Nottinghamshire Environmental Protection Working Group are waiting for the approval of the Strategy document from Nottinghamshire County Council. A new timescale has now been scheduled into Table 2.1 and dependant upon timescales Clean Air day 2019 may still be the launch date or an alternative option may be developed for Clean Air Day.

Measure five which was the development of a Taxi Licencing Policy which encompassed incorporation of more stringent emission limits on new taxi licences was not achieved in 2016 and has not moved forwards during 2017. A new timescale has now been scheduled into Table 2.1 but the focus during 2017 has moved towards promotion of electric vehicles. ADC have been working with a company called Electric Blue that develops an electric charging infrastructure and also uses in vehicle telemetry to aid the promotion of electric vehicles for small fleet operators and taxi fleets.

Ashfield District Council are now looking to develop the electric charging infrastructure within Ashfield (Measure 7). This is at the planning stage and the Council will be exploring all options and trying to access available grant money.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
1	Work with development control to produce an Air Quality Planning Guidance Document	Air Quality Planning and Policy Guidance	Policy Guidance And Development	ADC	2018 - 2019	2019-2021	N/A	Not Known	None	2021	
2	Development of a Nottinghamshire Air Quality Strategy	Working with Regional Groups to develop Area Wide Strategies	Control	Nottingham City	Started	Started September 2016 following a Second Workshop with Development Control and Lead Councillors from Each Nottinghamshire Authority	N/A	Not Known	Draft Copy Completed	2018	Draft Copy is still out for consultation with NCC
3	Working with Public Health England to promote public involvement.	Working with Regional Groups to develop Area Wide Strategies	Control	Nottinghamshire County Council and Public Health England	Started	Ongoing	N/A	Not Known	Started	Ongoing	
4	Undertake a promotional event around Clean Air Day 2019	Public Information	Control & Promoting Low Emission Transport	ADC	Sept - Dec 2018	Spring 2019	N/A	Not Known	None	June 2019	
5	New Taxi Licencing Policy to include low emission vehicles	Taxi Licencing Conditions	Promoting Low Emission Transport	ADC	Started	2017-2018	N/A	Not Known	None	Not Known	Euro 5 for Petrol Euro 6 for Diesel
6	New Taxi Licencing Policy to include low emission vehicles	Taxi Licencing Conditions	Promoting Low Emission Transport	Newark and Sherwood	Started	2018-2019?	N/A	Yes in Some Nottinghamshire Authorities			Electric Vehicles
7	Developing the EV Charging infra structure within Ashfield	Promoting Low Emission Transport	EV Recharging	ADC	Discussions Started	2018 onwards	N/A	Not Known	Started	Ongoing	

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.

Ashfield District Council has not undertaken any continuous monitoring of $PM_{2.5}$ particulate matter during 2017 and does not have the continuous monitoring equipement available to monitor $PM_{2.5}$ particulate matter. Having reviewed the monitoring data from published background maps it does not identify any 'hot spot area's' located within Ashfield for $PM_{2.5}$ particulate matter.

Ashfield District Council is taking the following measures to address $PM_{2.5}$ particulates:

- It is important that we continue to enforce the Clean Air Act 1993 and the Environmental Permitting (England and Wales) Regulations 2016 to control particulate emissions from industrial processes including combustion processes and to ensure that domestic combustion is controlled.

- Where planning applications are received for new industrial and commercial processes that require an air quality assessment then the modelling of $PM_{2.5}$ particulate emissions will need to be assessed. Measure one of table 2.1 highlights the development of an air quality planning and guidance policy document and this needs to address the problem of $PM_{2.5}$ particulate emissions.

- Measure two of table 2.1 highlights the importance of working with partners to update the Nottinghamshire Air Quality Strategy. $PM_{2.5}$ particulate matter was considered when developing the new strategy. Working with Public Healh England through the East Midland Air Quality Network provided the opportunity to ensure that any guidance, measures and targets are based on up to date knowledge and provided the opportunity to link the Nottinghamshire Air Quality Strategy with the latest public health outcomes.

- Ashfield District Council was in the process of replacing our previous air quality monitoring station infavour off an AQ Mesh system which is easy to deploy on lamposts and as the capabilty to measuring $PM_{2.5}$ particulates. It was also hoped that this equipemt could be used in complaints, planning applications and to make assessments of particulate levels The replacement of the previous air quality monitoring station did not take place during 2017 and is currently being reviewed following internal restructures but is currently still an option for assessment of $PM_{2.5}$ Particulates.

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

3.1 Summary of Monitoring Undertaken

During 2017 the District of Ashfield continued to meet the air quality objectives set by National Government based on monitoring data.

There have been a number of changes to the monitoring strategy during 2017. Diffusion tube monitoring at both High Street and Beardall Street Hucknall was stopped due to the completion of the Hucknall Road Improvement Scheme which resulted in Hucknall High Street becoming a pedestrian only zone. This lead to the diffusion tubes being relocated to Ashgate Road Hucknall, and the deployment of triplicate tubes at this location was based on concerns that the completion of the Hucknall Road Improvement Scheme could lead to heavier traffic at this location.

Also during 2017 the Authority sold its aging continuous monitoring equipment which was sold to Birmingham University, the size of the trailer was making in difficult to deploy at many locations and the costs of running the equipment could not be justified considering that Ashfield District Council had not declared any Air Quality Management Areas. This resulted in the redeployment of the diffusion tubes co located with the monitoring trailer at Stoneyford Court, although one tube was kept at this location. Diffusion tube monitoring was resumed at Mansfield Road, Sutton in Ashfield to take account at of queuing traffic at the busing junctions on this stretch of road.

3.1.1 Automatic Monitoring Sites

Ashfield District Council undertook no automatic (continuous) monitoring at during 2017.

3.1.2 Non-Automatic Monitoring Sites

Ashfield District Council undertook non- automatic (passive) monitoring of NO_2 at 17 sites during 2017. Table A1 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, where relevant, adjusted for “annualisation” and bias. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A2 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

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

During 2017 there were no exceedances of the air quality objective of 40µg/m^3 and Ashfield District Council has not had to undertake a detailed assessment or declare an Air Quality Management Area.

3.2.2 Particulate Matter (PM_{10})

No monitoring of Particulate Matter (PM_{10}) was carried out within the district during 2016.

3.2.3 Particulate Matter ($PM_{2.5}$)

No monitoring of Particulate Matter (PM2.5) was carried out within the district during 2016.

3.2.4 Sulphur Dioxide (SO_2)

No monitoring of Sulphur Dioxide was carried out within the district during 2016.

Appendix A: Monitoring Results

Table A1 – 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) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
Tube 4	Outram Street Sutton	Urban Centre	449628	358967	NO_2	N	3	1.5	N	2
Tube 5	Dalestorth Street Sutton	Roadside	450062	359653	NO_2	N	1.7	1	N	2
Tubs 7	A38 Sutton	Other	448987	357610	NO_2	N	10	2.5	N	2
Tube 10/11/12	Church Hill Kirkby	Kerbside	448968	355816	NO_2	N	1.5	0.5	N	2
Tube 14	M1 Pinxton	Other	446492	355266	NO_2	N	28	22	N	2
Tubes 41,42,43	Ashgate Road	Roadside	454057	348989	NO_2	N	2.8	3.5	N	2

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
	Hucknall									
Tube 20	High Street Hucknall	Roadside	453477	349315	NO_2	N	5.3	2	N	2
Tube 22	Station Road Sutton	Other	450259	358512	NO_2	N	12.7	2.4	N	2
Tube 23	Common Road Huthwaite	Roadside	446827	358508	NO_2	N	2.4	2.4	N	2
Tube 27/28/ 29	Badger Box Annessly	Roadside	450844	353799	NO_2	N	9	2	N	2
Tube 31	Sutton Croft Primary	Kerbside	449850	358779	NO_2	N	4.5	2.5	N	2
Tube 32	Lowmoor Road	Roadside	450636	356279	NO_2	N	2	2	N	2

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
	Kirkby									
Tube 33	Kirkby Chapel Street	Roadside	449211	356192	NO_2	N	5	5	N	2
Tube 35	Sutton Stoneyford Court	Roadside	449812	359577	NO_2	N	6	3.5	N	2
Tube 37/38/ 39	Kirkby Cross	Roadside	449017	356204	NO_2	N	0.5	0.5	N	2
Tube 40	Mansfield Road Selston	Roadside	447037	353573	NO_2	N	2.8	1.5	N	2
Tube 44	Mansfield Road Sutton in Ashfield	Roadside	449923	359563	NO_2	N	1.6	0.5	N	2

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 2016 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2013	2014	2015	2016	2017
Tube 4 Outram Street Sutton	Urban Centre	Diffusion Tube		92%	29.8	29.0	27.8	31.2	29.6
Tube 5 Dalestorth Street Sutton	Roadside	Diffusion Tube		100%	33.1	33.3	31.9	33.8	30.4
Tube 7 A38 Sutton	Other	Diffusion Tube		100%	30.0	26.6	25.7	28.3	24.0
Tube 10/11/12 Church Hill Kirkby	Kerbside	Diffusion Tube		100%	38.3	39.0	37.1	40.6	35.3
Tube 14 M1 Pinxton	Other	Diffusion Tube		92%	28.2	28.7	27.6	28.0	29.3
Tubes 41,42,43 Ashgate Road	Roadside	Diffusion Tube		100%	25.7	24.8	24.3	24.5	26.3

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2013	2014	2015	2016	2017
Huchnall									
Tube 20 High Street Hucknall	Roadside	Diffusion Tube	25%		35.6	33.2	32.4	35.3	21.9
Tube 22 Station Road Sutton	Other	Diffusion Tube		83%	34.7	33.7	32.9	32.3	33.4
Tube 23 Common Road Huthwaite	Roadside	Diffusion Tube		92%	36.7	34.8	33.2	34.1	33.5
Tube 27/28/29 Badger Box Annesley	Roadside	Diffusion Tube		100%	–	33.6	32.9	34.9	34.7
Tube 31 Croft Primary Sutton	Kerbside	Diffusion Tube		100%	–	26.5	27.8	28.8	27.0
Tube 32 Lowmoor Road Kirkby	Roadside	Diffusion Tube		100%		29.2	25.7	27.4	25.5
Tube 33 Chapel	Roadside	Diffusion Tube		100%	–	_	29.0_	30.4	28.4

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2013	2014	2015	2016	2017
Street Kirkby									
Tube 35 Stoneyford Court Sutton	Roadside	Diffusion Tube		100%	35.0	29.4	28.8	30.9	28.6
Tube 37/38/39 Kirkby Cross	Roadside	Diffusion Tube		100%	–	–	31.6	34.6	33.1
Tube 40 Mansfield Road Selston	Roadside	Diffusion Tube		100%	–	–	–	29.0	24.7
Tube 44 Mansfield Road Sutton In Ashfield	Roadside	Diffusion Tube	58%		–	–	–	–	31.1

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2017

Table B.1 – NO_2 Monthly Diffusion Tube Results – 2017

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.89) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
Tube 4	42.3	36.6	32.5	30.6	25.9		23.8	26.2	31.1	30.9	44.4	41.5	33.3	29.6	27.5
Tube 5	48.7	46.5	33.7	27.5	31.7	24.2	28.6	27.6	30.3	36.1	39.1	36.5	34.2	30.4	28.8
Tube 7	39.9	33.7	27.5	27.8	27.0	18.4	18.7	20.1	23.7	23.1	33.3	31.0	27.0	24.0	19.2
Tubes 10/11/12	52.3	45.1	35.6	33.6	41.9	30.8	35.8	33.6	39.4	40.5	48.6	39.3	39.7	35.3	31.0
Tube 14	46.6	36.2		29.3	27.4	29.2	29.3	27.3	31.2	32.6	37.6	35.5	32.9	29.3	28.0
Tubes 41,42,43	45.1	31.0	27.0	22.5	22.0	35.7	21.3	22.3	25.1	30.6	36.0	36.0	29.5	26.3	23.9
Tube 20	38.4	31.9	25.0										31.8	21.9	20.3
Tube 22	43.6	45.0	39.3	32.1	36.8		29.4	29.6	33.3		43.0	42.6	37.5	33.4	27.2
Tube 23	49.7	45.1	35.8	32.3	38.1	28.4	34.4	33.3	34.6	40.2		41.4	37.6	33.5	N/A
Tubes 27/28/29	51.0	43.1	37.2	37.1	28.0	31.5	33.7	32.3	34.9	40.4	54.7	44.4	39.0	34.7	29.0
Tube 31	43.3	39.0	32.2	26.9	23.3	18.9	22.7	23.4	27.5	30.4	38.2	37.8	30.3	30.0	28.0
Tube 32	42.0	36.1	28.7	23.4	23.6	20.3	22.2	22.2	28.1	26.6	37.8	32.7	28.6	25.5	N/A
Tube 33	42.5	39.6	29.8	29.4	27.8	23.5	24.6	25.7	30.1	32.4	38.4	38.6	31.9	28.4	N/A

Tube 35	45.3	40.5	33.8	27.1	28.1	25.9	26.0	27.8	28.1	29.6	35.2	37.9	32.1	28.6	26.7
Tubes 37/38/39	48.0	43.7	54.1	47.8	32.5	23.2	27.3	23.3	33.1	31.1	48.6	34.1	37.2	33.1	N/A
Tube 40	46.2	36.8	23.6	24.8	26.4	19.9	20.8	19.5	27.2	26.2	32.3	30.1	27.8	24.7	24.1
Tube 44						28.0	29.1	31.9	32.0	35.9	43.2	44.4	34.9	34.0	30.7

✓ **National bias adjustment factor used**

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

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

Laboratory Used

Nottinghamshire Authorities agreed to employ a single laboratory to undertake the supply and analysis of diffusion tubes. All authorities have agreed to use Gradko Laboratories, utilising the 20% TEA in Water. This is to enable the authorities to effectively compare results over the whole of the county.

Consequently, Ashfield District Council started utilising Gradko Laboratories from April, 2008 and continues to do so.

Laboratory Performance

There can be considerable differences in diffusion tube performance due to a number of factors. One of the issues affecting diffusion tubes is the exposure procedures employed.

Such factors have been reduced as much as possible by Ashfield District Council implementing the Quality Assurance procedures, in the deployment, exposure and collection of the tubes. However, another factor in diffusion tube performance is related to the way in which the diffusion tubes are prepared and analysed. Accordingly, it is important the Council utilise the services of a Laboratory that operates its own QA/QC systems to ensure reliability and consistency of analysis results.

Ashfield District Council utilise the services of Gradko Laboratories for the supply and analysis of Nitrogen Dioxide diffusion tubes. Gradko is UKAS accredited for Nitrogen Dioxide diffusion tube analysis. Additionally, they participate in a centralised QA/QC scheme, namely the Workplace Analysis Scheme for Proficiency (WASP). WASP is an independent analytical performance testing scheme, operated by the Health and Safety Laboratory (HSL). It is recommended that diffusion tubes used for Local Air Quality Management should be obtained from laboratories that have demonstrated satisfactory performance in the WASP scheme. From the report *'Annual Performance Criteria for NO_2 Diffusion Tubes used in Local Air Quality Management (LAQM), 2008 onwards, and Summary of Laboratory Performance in Rounds 98-102' (February 2009)*, it is shown that Gradko's performance has been rated as **Good**.

Gradko Laboratories NO_2 diffusion tube procedures have been amended to follow the guidelines of the DEFRA document related to the preparation, extraction, analysis and calculation procedures for NO_2 passive diffusion tubes. These amendments are minimal

because they already carried out most of the procedures before the introduction of the Guidelines. Their internal analysis procedures are assessed by U.K.A.S. on an annual basis for compliance to ISO17025.

Bias Adjustment Factors

Diffusion tubes generally under or over-read when compared to a reference automatic analyser. This is referred to as bias. This bias can be corrected by applying a correction factor that is derived either from a local study or from a nationally derived database. Local Authorities are advised to report on both local and national adjustment factors and thereafter decide which to utilise, depending on a number of factors.

Ashfield District Council did not have suitable data to undertake a co-location study to calculate a local bias factor. Therefore, the bias adjustment factor derived from the national database has been utilised for the purpose of this report.

This report as used a **Bias Adjustment Factor of 0.89**

Table C.1 Diffusion Tube Bias Adjustment Factor

National Diffusion Tube Bias Adjustment Factor Spreadsheet												Spreadsheet Version Number: 03/18
Follow the steps below **in the correct order** to show the results of **relevant** co-location studies Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet This spreadhseet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.												This spreadsheet will be updated at the end of June 2018 LAQM Helpdesk Website
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.												Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.
Step 1:	**Step 2:**	**Step 3:**	**Step 4:**									
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	**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[3] shown in blue at the foot of the final column.**									
If a laboratory is not shown, we have no data for this laboratory.	If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data[2]	If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953									
Analysed By[1]	**Method** To undo your selection, choose (All) from the pop-up list	**Year**[2] To undo your selection, choose (All)	**Site Type**	**Local Authority**	**Length of Study (months)**	**Diffusion Tube Mean Conc. (Dm) (µg/m³)**	**Automatic Monitor Mean Conc. (Cm) (µg/m³)**	**Bias (B)**	**Tube Precision**[5]	**Bias Adjustment Factor (A) (Cm/Dm)**		
Gradko	20% TEA in water	2017		**Overall Factor**[3] **(34 studies)**				**Use**		**0.89**		

Nitrogen Dioxide – Distance Fall-Off Calculations

Sutton Outram Street (Tube 4)

Step 1		**How far from the KERB was your measurement made (in metres)?**	**(Note 1)**		**1.5**	**metres**
Step 2		**How far from the KERB is your receptor (in metres)?**	**(Note 1)**		**3**	**metres**
Step 3		**What is the local annual mean background NO_2 concentration (in µg/m³)?**	**(Note 2)**		**15.9**	**µg/m³**
Step 4		**What is your measured annual mean NO_2 concentration (in µg/m³)?**	**(Note 2)**		**29.6**	**µg/m³**
Result		**The predicted annual mean NO_2 concentration (in µg/m³) at your receptor**	**(Note 3)**		**27.5**	**µg/m³**

Sutton Dalestorth Street (Tube 5)

Step 1		**How far from the KERB was your measurement made (in metres)?**	**(Note 1)**		**1**	**metres**
Step 2		**How far from the KERB is your receptor (in metres)?**	**(Note 1)**		**1.7**	**metres**
Step 3		**What is the local annual mean background NO_2 concentration (in µg/m³)?**	**(Note 2)**		**15.3**	**µg/m³**
Step 4		**What is your measured annual mean NO_2 concentration (in µg/m³)?**	**(Note 2)**		**30.4**	**µg/m³**
Result		**The predicted annual mean NO_2 concentration (in µg/m³) at your receptor**	**(Note 3)**		**28.8**	**µg/m³**

Sutton A38 Fire Station (Tube 7)

Step 1		How far from the KERB was your measurement made (in metres)?	(Note 1)		2.5	metres
Step 2		How far from the KERB is your receptor (in metres)?	(Note 1)		10	metres
Step 3		What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	(Note 2)		16.1	$\mu g/m^3$
Step 4		What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	(Note 2)		24	$\mu g/m^3$
Result		The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	(Note 3)		19.2	$\mu g/m^3$

Kirkby Church Hill (10,11and 12)

Step 1		How far from the KERB was your measurement made (in metres)?	(Note 1)		0.5	metres
Step 2		How far from the KERB is your receptor (in metres)?	(Note 1)		1.5	metres
Step 3		What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	(Note 2)		13.1	$\mu g/m^3$
Step 4		What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	(Note 2)		35.3	$\mu g/m^3$
Result		The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	(Note 3)		31.0	$\mu g/m^3$

M1 Pinxton (Tube14)

Step 1		**How far from the KERB was your measurement made (in metres)?**	**(Note 1)**		**22**	**metres**
Step 2		**How far from the KERB is your receptor (in metres)?**	**(Note 1)**		**28**	**metres**
Step 3		**What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?**	**(Note 2)**		**19.0**	**$\mu g/m^3$**
Step 4		**What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?**	**(Note 2)**		**29.3**	**$\mu g/m^3$**
Result		**The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor**	**(Note 3)**		**28.0**	**$\mu g/m^3$**

Hucknall Ashgate Road (tube 19)

Step 1		**How far from the KERB was your measurement made (in metres)?**	**(Note 1)**		**0.5**	**metres**
Step 2		**How far from the KERB is your receptor (in metres)?**	**(Note 1)**		**1.5**	**metres**
Step 3		**What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?**	**(Note 2)**		**13.8**	**$\mu g/m^3$**
Step 4		**What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?**	**(Note 2)**		**26.3**	**$\mu g/m^3$**
Result		**The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor**	**(Note 3)**		**23.9**	**$\mu g/m^3$**

High Street Hucknall (Tube 20)

Step 1		How far from the KERB was your measurement made (in metres)?	(Note 1)		2	metres
Step 2		How far from the KERB is your receptor (in metres)?	(Note 1)		5.3	metres
Step 3		What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	(Note 2)		14.7	$\mu g/m^3$
Step 4		What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	(Note 2)		21.9	$\mu g/m^3$
Result		The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	(Note 3)		20.3	$\mu g/m^3$

Sutton Station Road (Tube 22)

Step 1		How far from the KERB was your measurement made (in metres)?	(Note 1)		2.4	metres
Step 2		How far from the KERB is your receptor (in metres)?	(Note 1)		12.7	metres
Step 3		What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	(Note 2)		18.1	$\mu g/m^3$
Step 4		What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	(Note 2)		33.4	$\mu g/m^3$
Result		The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	(Note 3)		27.2	$\mu g/m^3$

Common Road Huthwaite (Tube 23)

No Distance fall off

Annesley Badger Box (Tubes 27, 28 and 29)

Step 1		**How far from the KERB was your measurement made (in metres)?**	**(Note 1)**		**2**	**metres**
Step 2		**How far from the KERB is your receptor (in metres)?**	**(Note 1)**		**9**	**metres**
Step 3		**What is the local annual mean background NO_2 concentration (in µg/m^3)?**	**(Note 2)**		**18.4**	**µg/m^3**
Step 4		**What is your measured annual mean NO_2 concentration (in µg/m^3)?**	**(Note 2)**		**34.7**	**µg/m^3**
Result		**The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor**	**(Note 3)**		**29.0**	**µg/m^3**

Sutton Croft Primary Station Road (Tube 31)

Step 1		**How far from the KERB was your measurement made (in metres)?**	**(Note 1)**		**2.5**	**metres**
Step 2		**How far from the KERB is your receptor (in metres)?**	**(Note 1)**		**4.5**	**metres**
Step 3		**What is the local annual mean background NO_2 concentration (in µg/m^3)?**	**(Note 2)**		**15.9**	**µg/m^3**
Step 4		**What is your measured annual mean NO_2 concentration (in µg/m^3)?**	**(Note 2)**		**30.0**	**µg/m^3**
Result		**The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor**	**(Note 3)**		**28.0**	**µg/m^3**

Lowmoor Road Kirkby (Tube 32)

No Distance fall off

Chapel Street Kirkby (Tube 33)

No Distance fall off

Stoneyford Court Sutton (Tubes 34, 35 and 36)

Step 1		**How far from the KERB was your measurement made (in metres)?**	**(Note 1)**		**3.5**	**metres**
Step 2		**How far from the KERB is your receptor (in metres)?**	**(Note 1)**		**6**	**metres**
Step 3		**What is the local annual mean background NO_2 concentration (in µg/m^3)?**	**(Note 2)**		**15.3**	**µg/m^3**
Step 4		**What is your measured annual mean NO_2 concentration (in µg/m^3)?**	**(Note 2)**		**28.6**	**µg/m^3**
Result		**The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor**	**(Note 3)**		**26.7**	**µg/m^3**

Kirkby Cross (Tubes 37, 38 and 39)

No Distance fall off

Mansfield Road Selston (Tube 40)

Step 1		How far from the KERB was your measurement made (in metres)?	(Note 1)		1.5	metres
Step 2		How far from the KERB is your receptor (in metres)?	(Note 1)		2.8	metres
Step 3		What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	(Note 2)		20.3	$\mu g/m^3$
Step 4		What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	(Note 2)		24.7	$\mu g/m^3$
Result		The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	(Note 3)		24.1	$\mu g/m^3$

Mansfield Road Sutton in Ashfield (Tube 44)

Step 1		How far from the KERB was your measurement made (in metres)?	(Note 1)		1.8	metres
Step 2		How far from the KERB is your receptor (in metres)?	(Note 1)		2	metres
Step 3		What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	(Note 2)		15.3	$\mu g/m^3$
Step 4		What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	(Note 2)		31.1	$\mu g/m^3$
Result		The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	(Note 3)		30.7	$\mu g/m^3$

Short-term to Long-term Data Adjustment

The diffusion tube results for High Street Hucknall and Mansfield Road Sutton in Ashfield were annualised as Box 7.8 of TG 2016.

High Street Hucknall

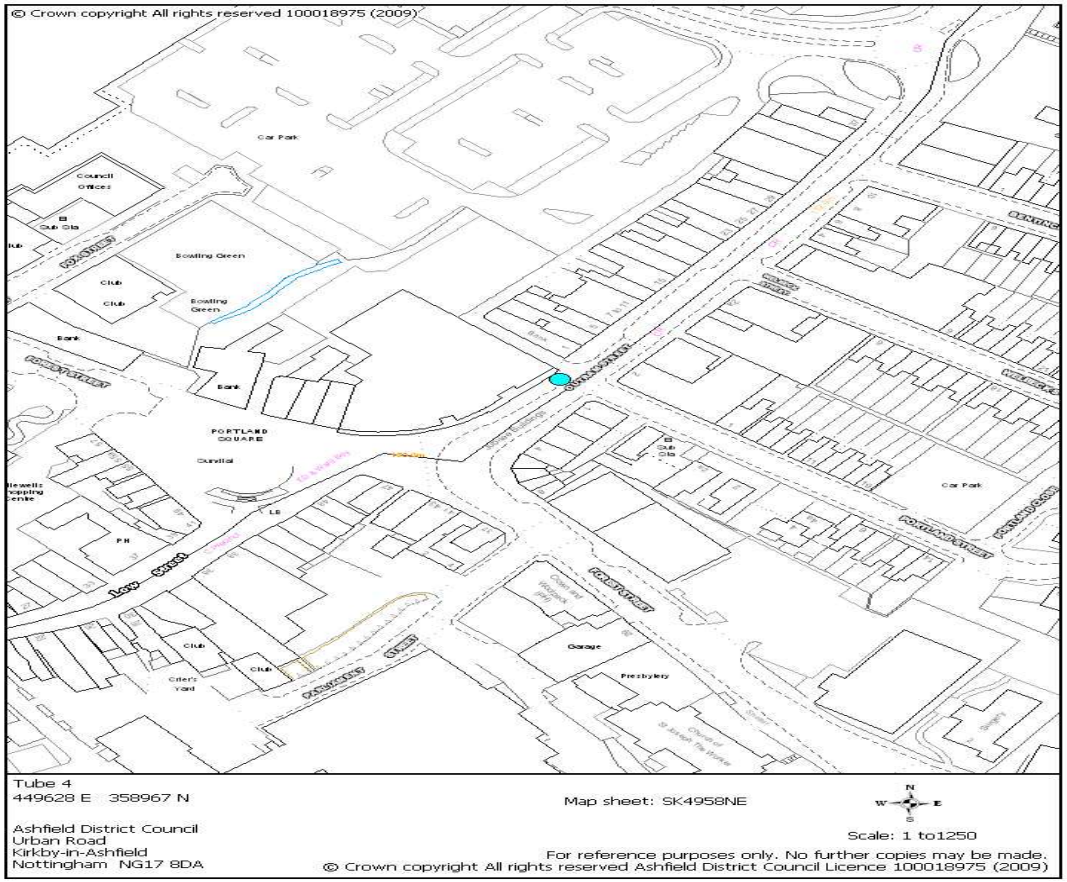
Long term site	Annual mean	Period mean	Ratio (Am/Pm)
Chesterfield Road Side	17.91	24.75	0.724
Nottingham Centre	29.62	36.02	0.822
Average (Ra)			0.773

Mansfield Road Sutton in Ashfield

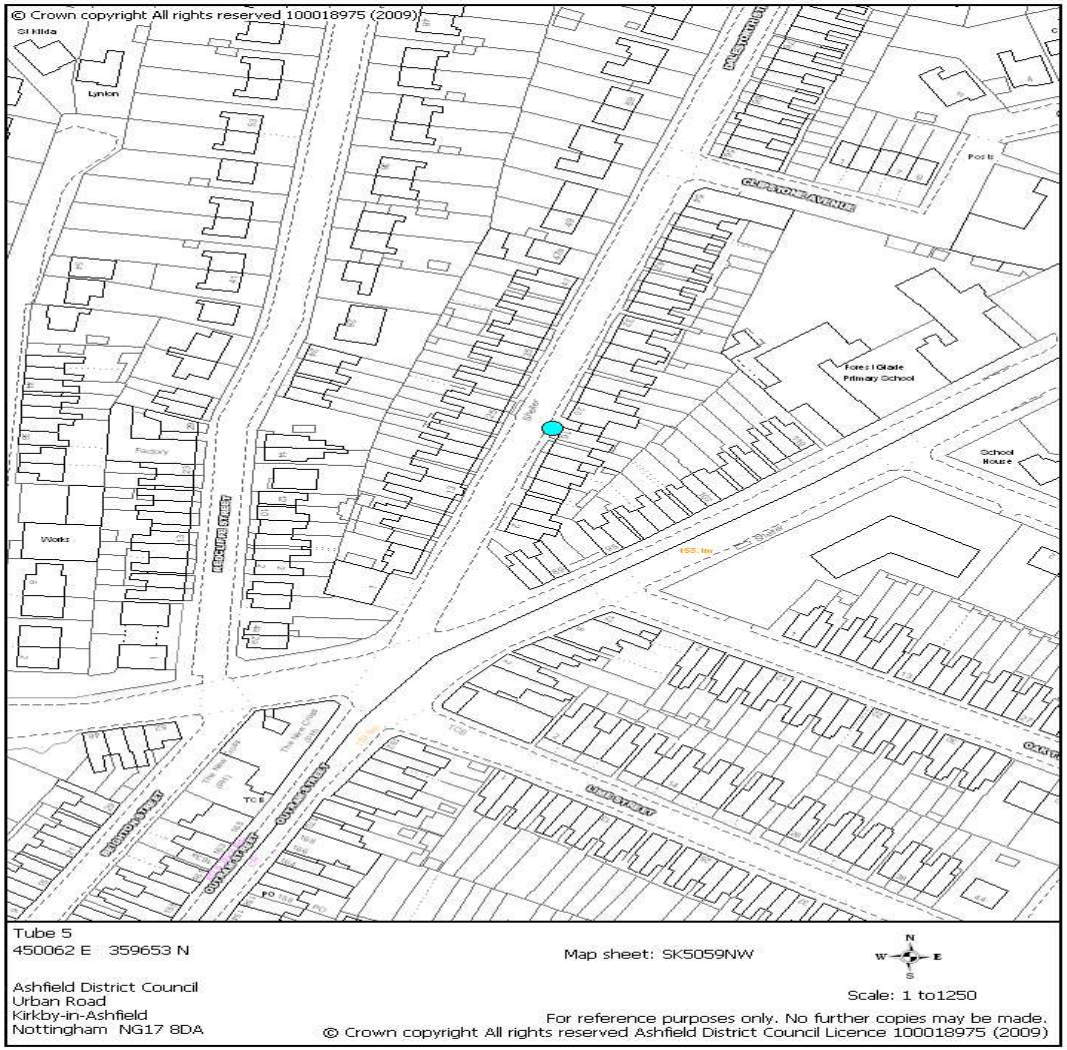
Long term site	Annual mean	Period mean	Ratio (Am/Pm)
Chesterfield Road side	17.91	16.20	1.106
Nottingham Centre	29.62	27.32	1.084
Average (Ra)			1.095

Appendix D: Maps of Monitoring Locations

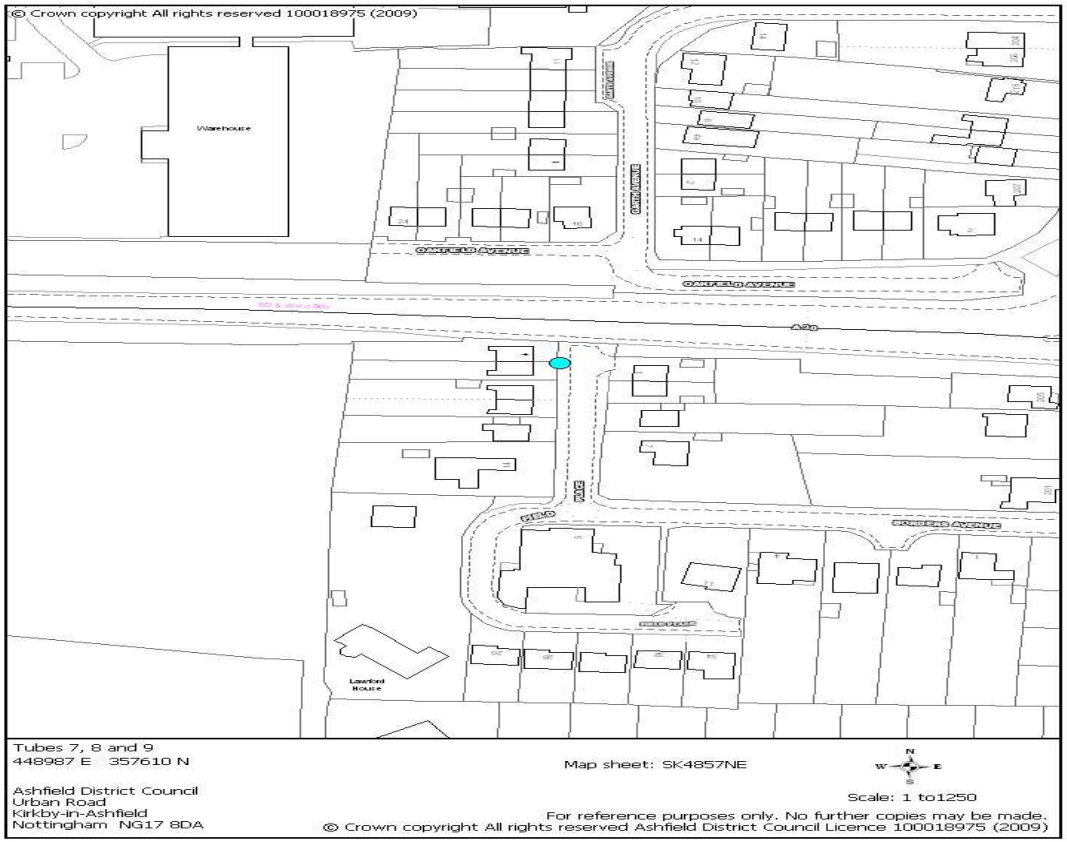
Location of Nitrogen Dioxide Diffusion Tube at Outram Street, Sutton



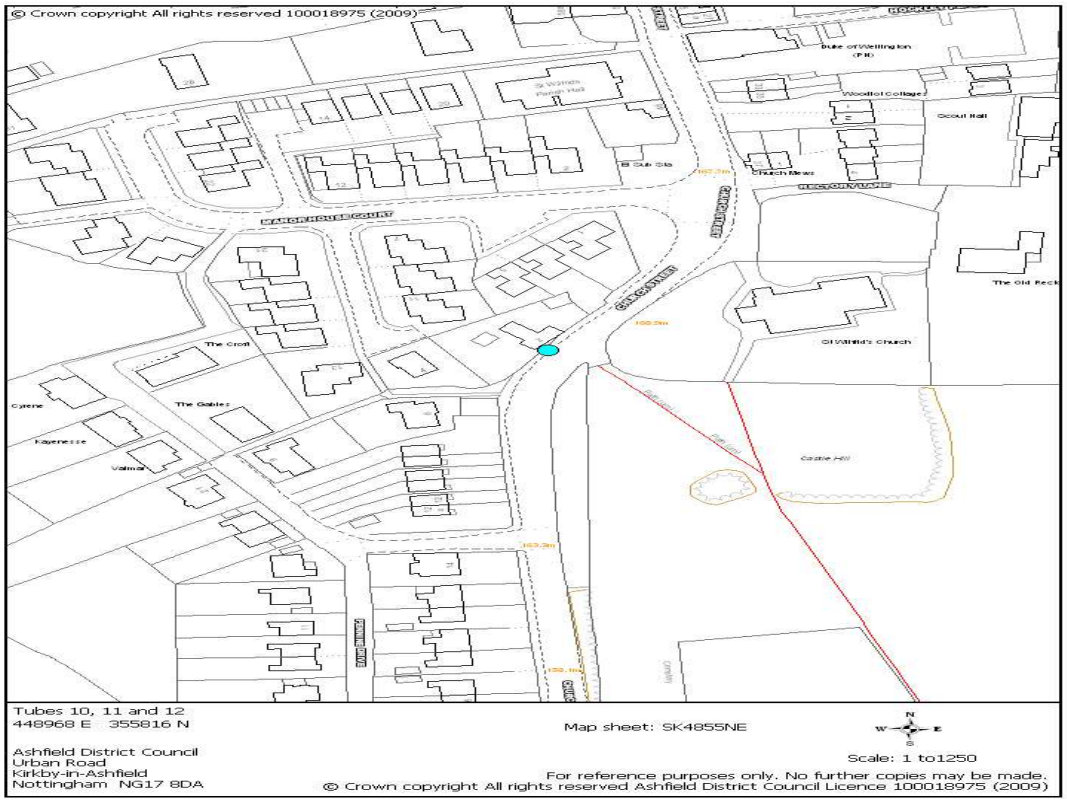
Location of Diffusion Tube at Dalestorth Street, Sutton



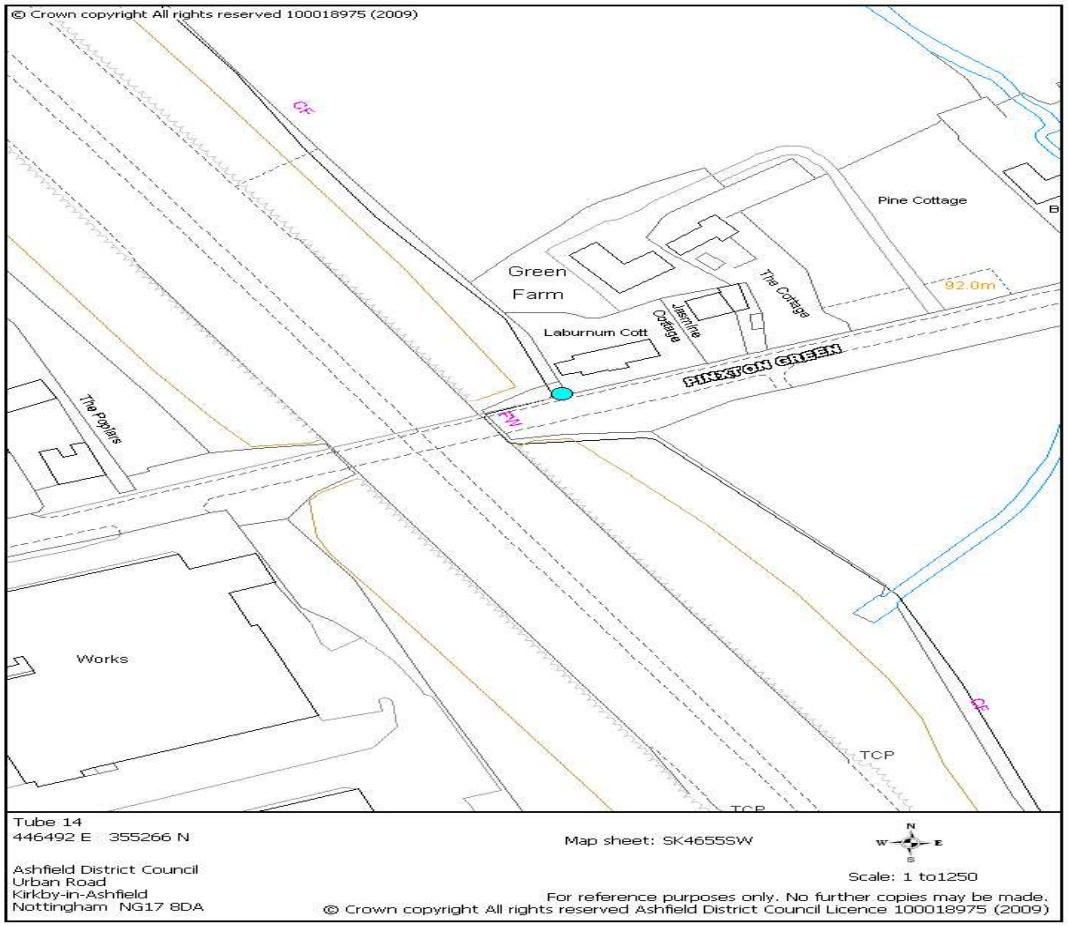
Location of Nitrogen Dioxide Diffusion Tubes at A38 Fire Station, Sutton



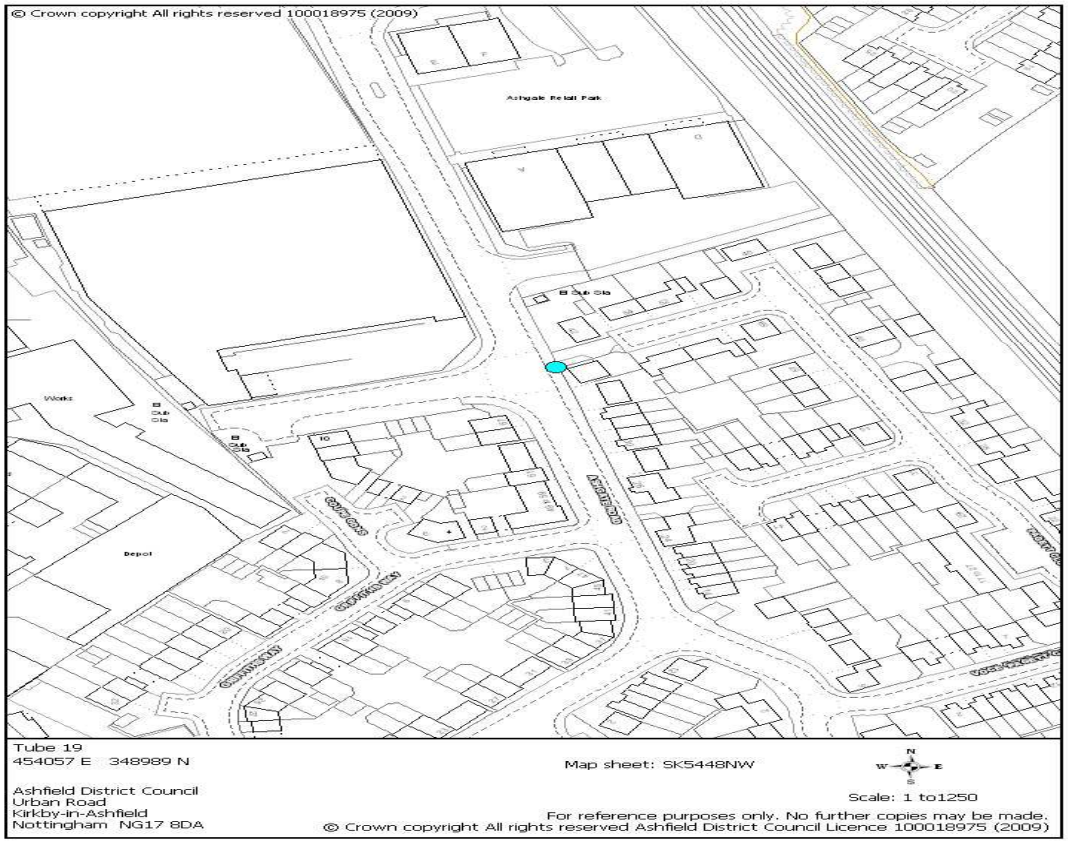
Location of Nitrogen Dioxide Diffusion Tubes at Church Hill, Kirkby



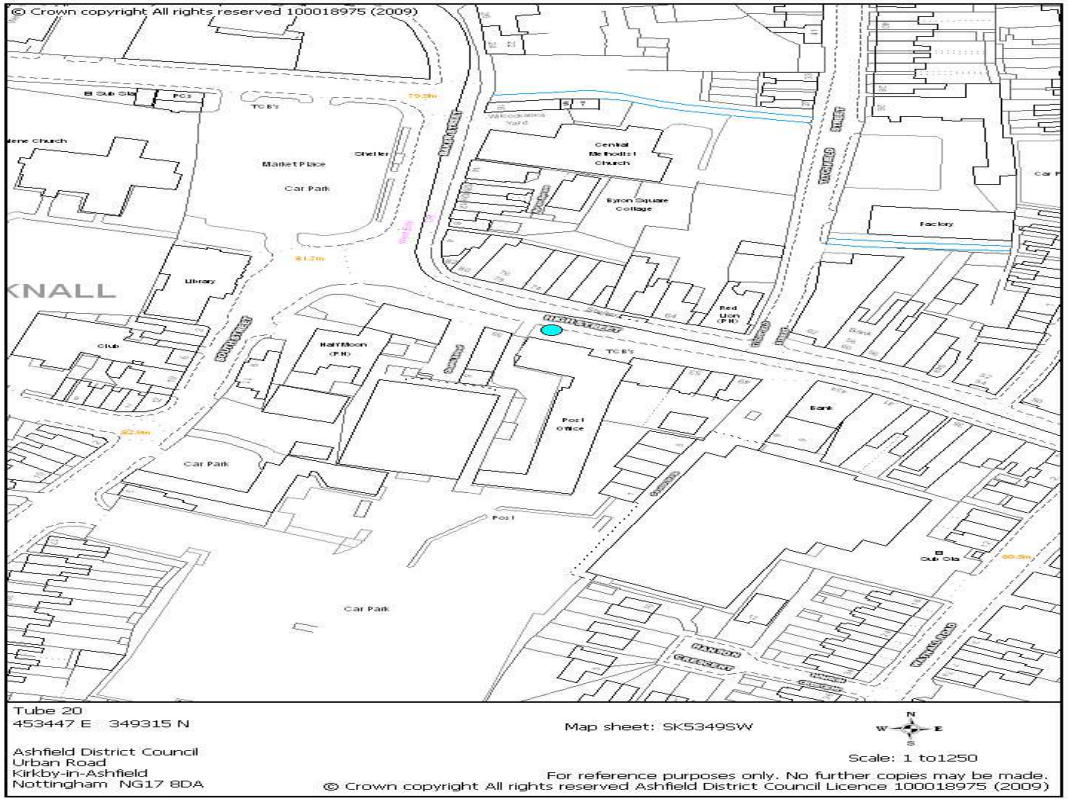
Location of Nitrogen Dioxide Diffusion Tube at M1 Pinxton



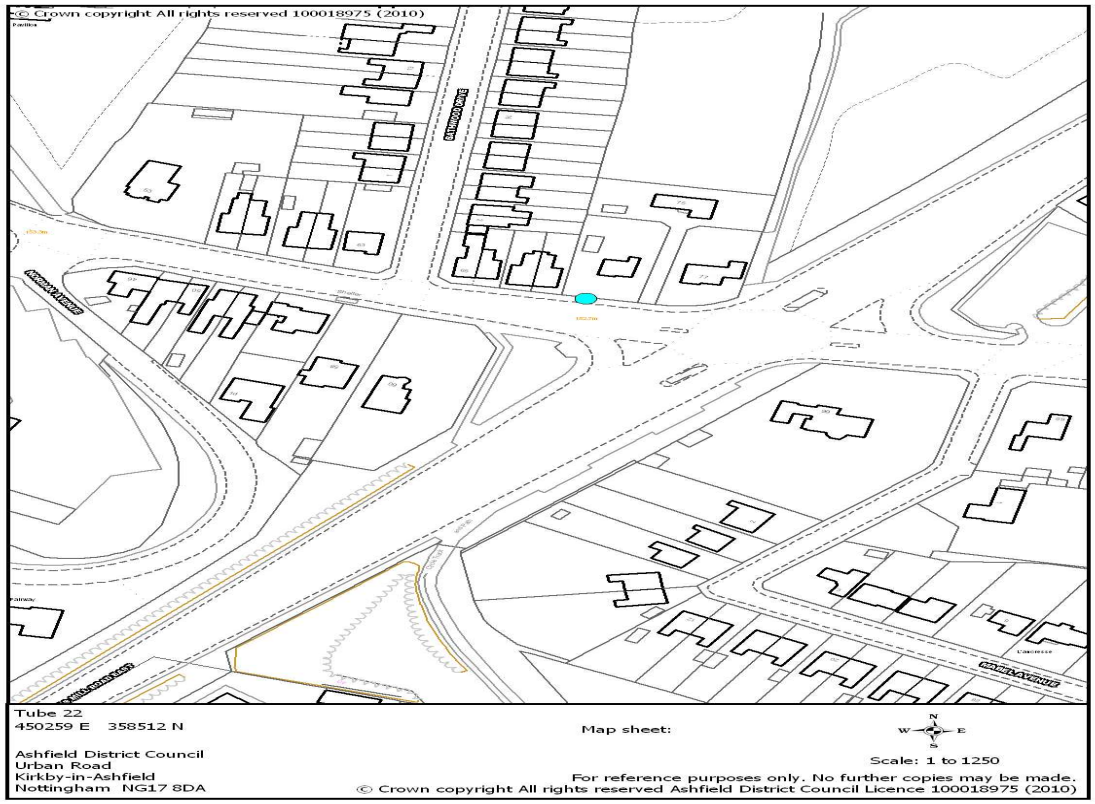
Location of Nitrogen Dioxide Diffusion Tube at Hucknall Ashgate Road



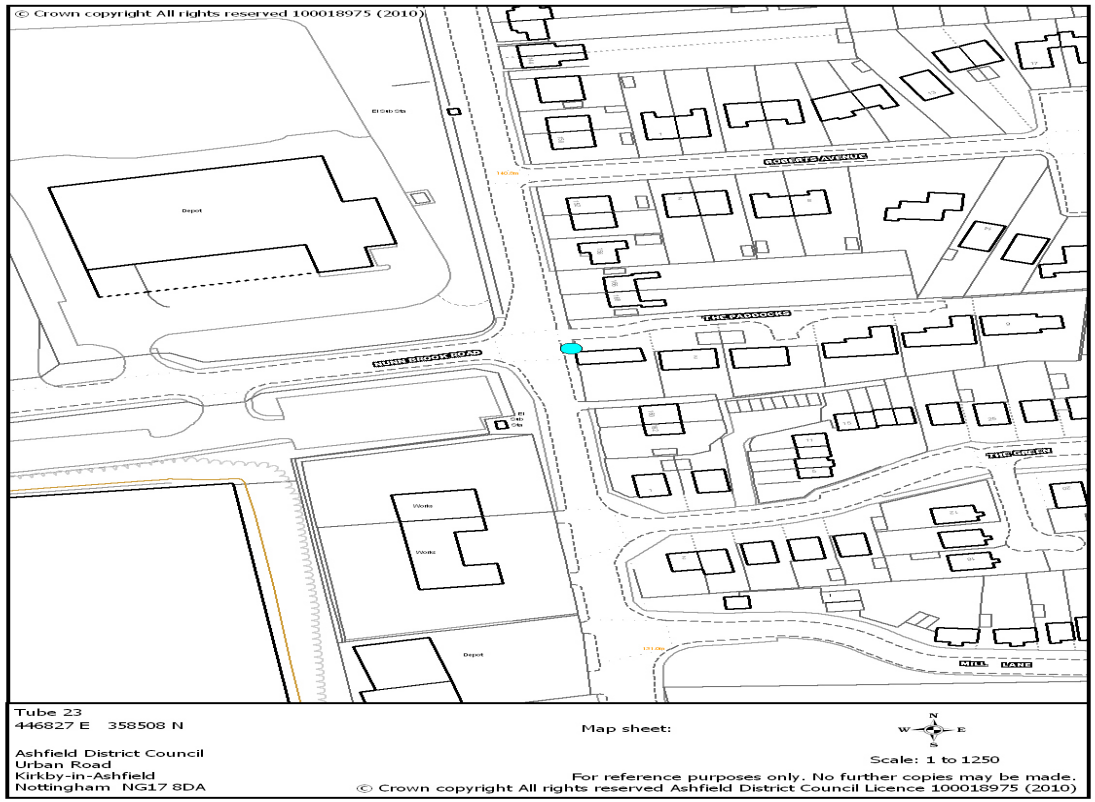
Location of Nitrogen Dioxide Diffusion Tube at Hucknall High Street



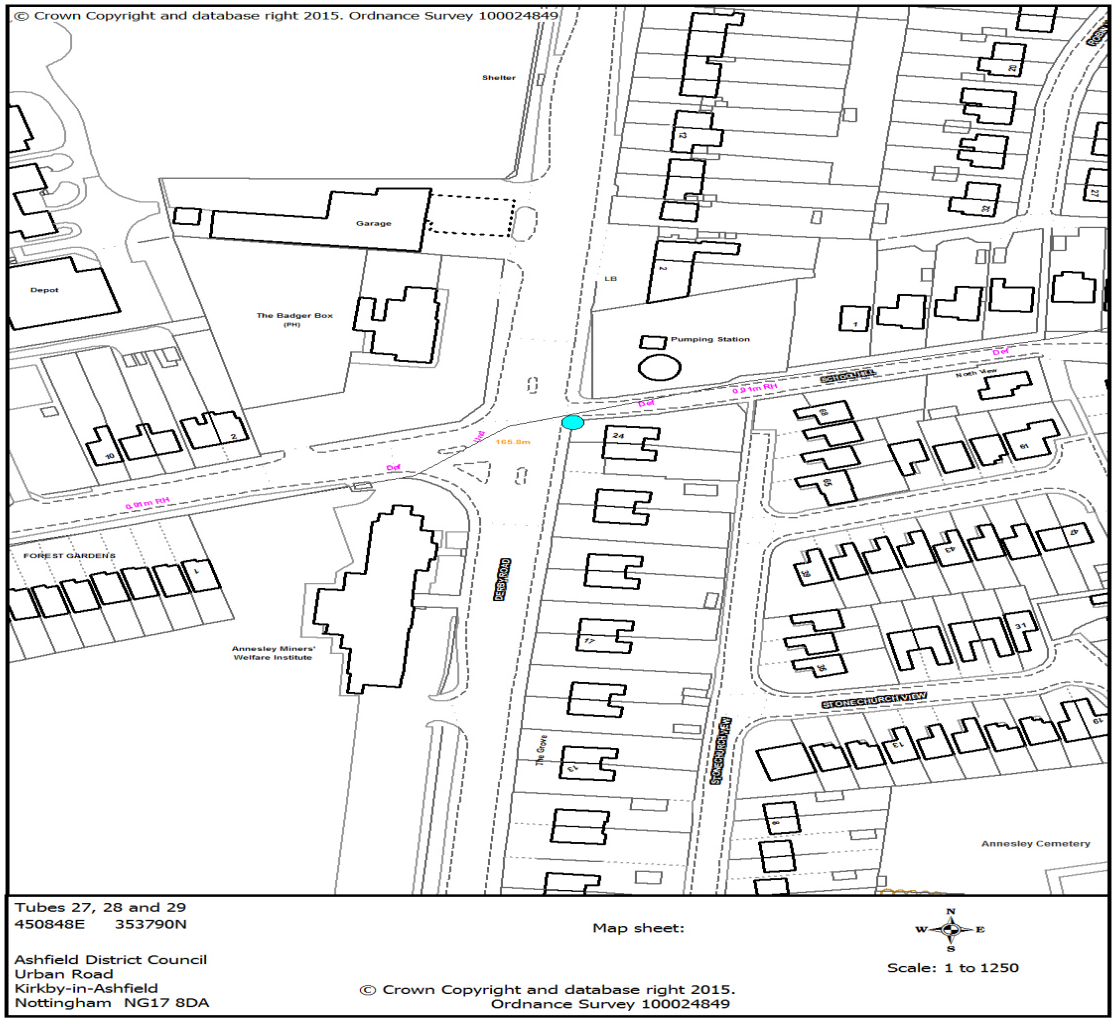
Location of Nitrogen Dioxide Diffusion Tube at Station Road, Sutton



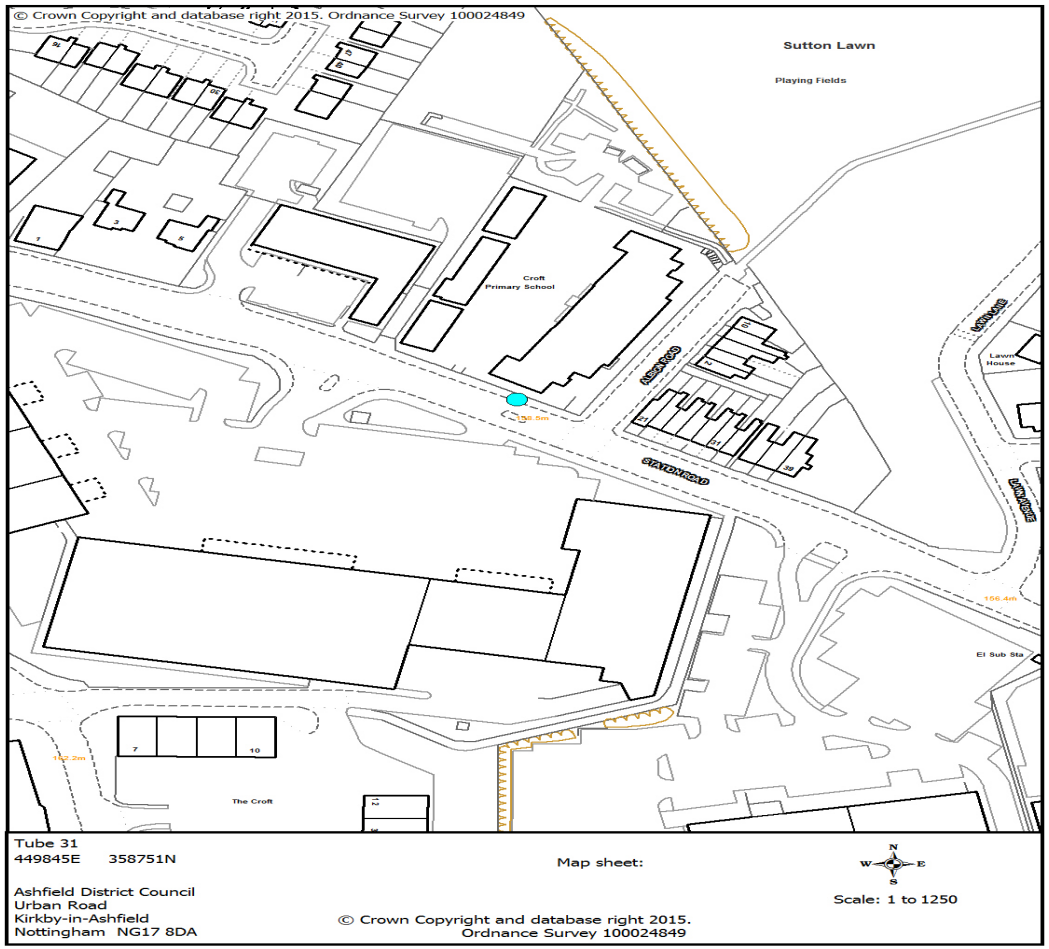
Location of Nitrogen Dioxide Diffusion Tube at Common Road, Huthwaite



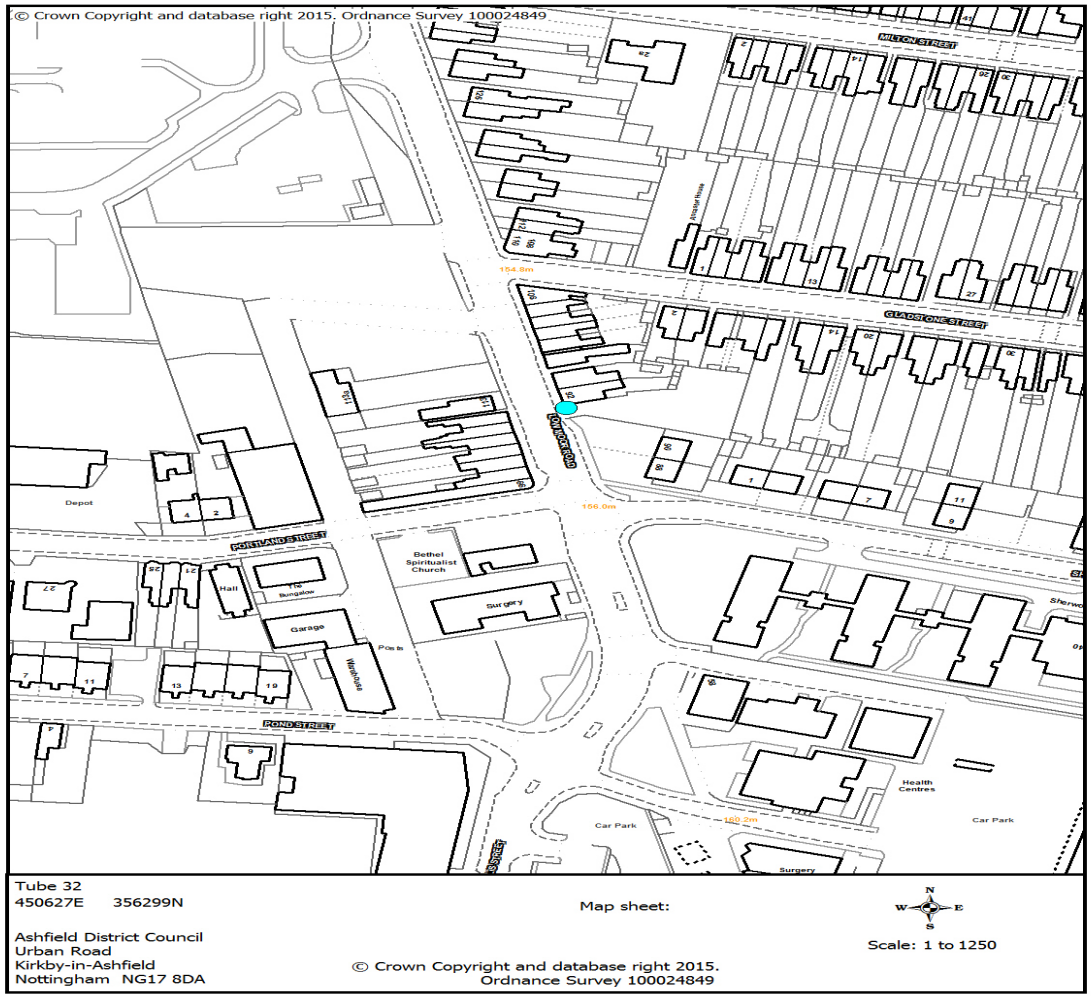
Location of Nitrogen Dioxide Diffusion Tube at the Badger Box, Annesley



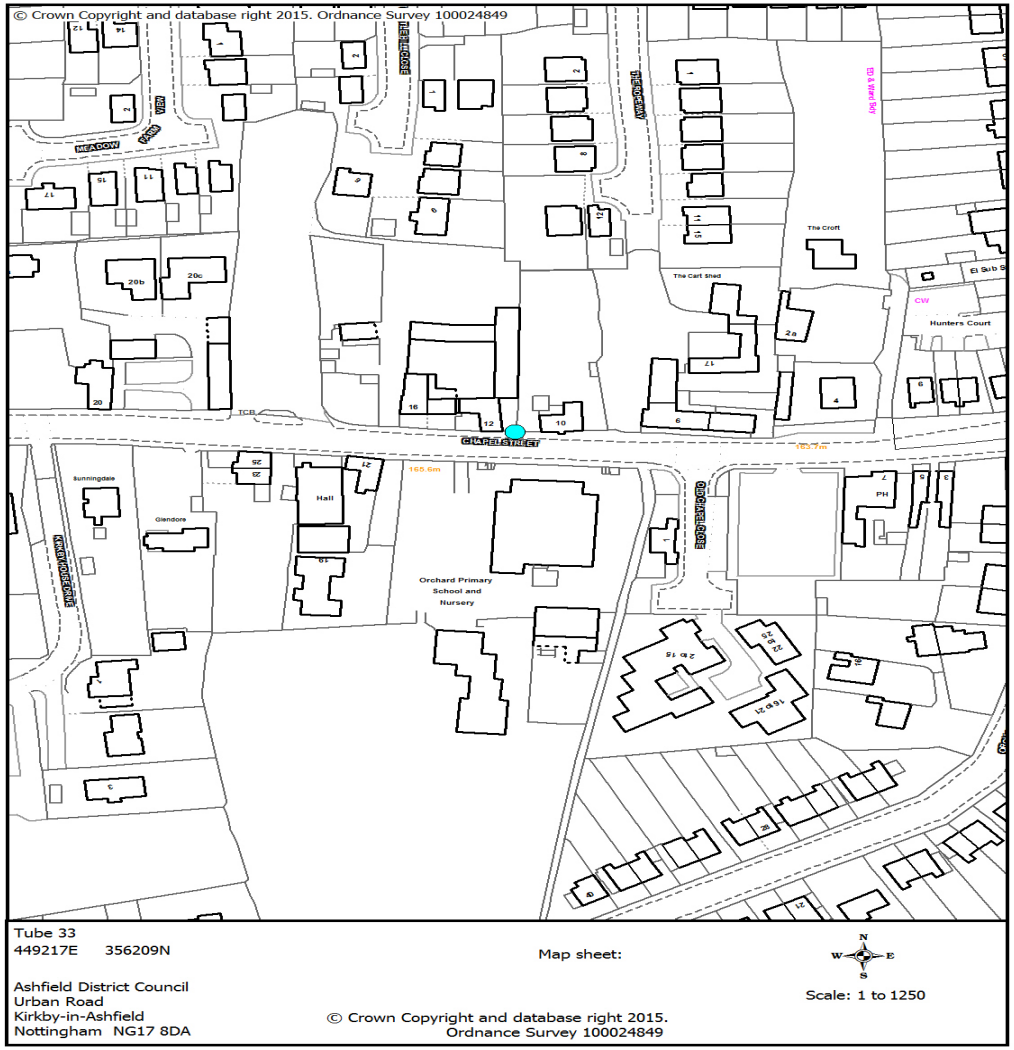
Location of Nitrogen Dioxide Diffusion Tube at Croft Primary School Sutton



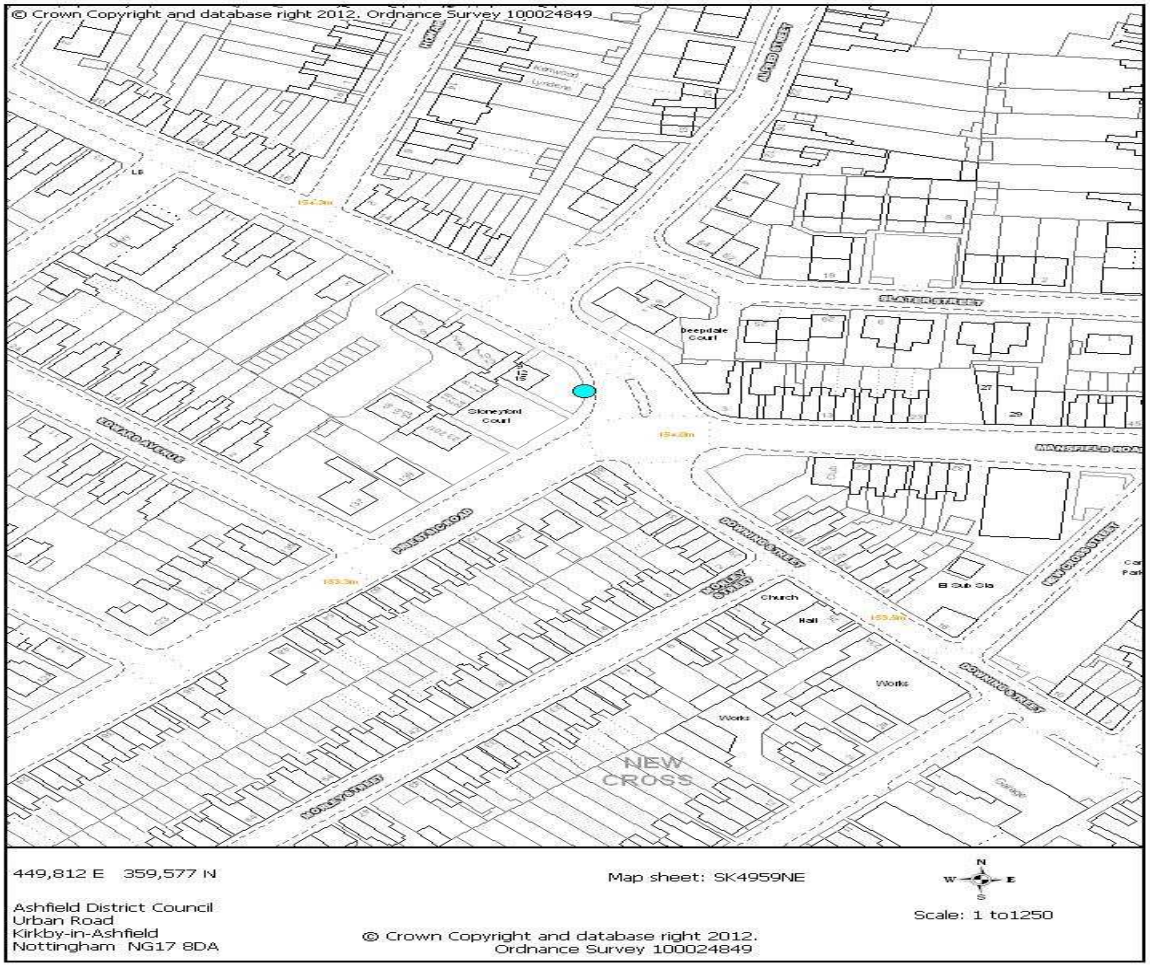
Location of Nitrogen Dioxide Diffusion Tube at Lowmoor Road Kirkby



Location of Nitrogen Dioxide Diffusion Tube at Chapel Street School Kirkby

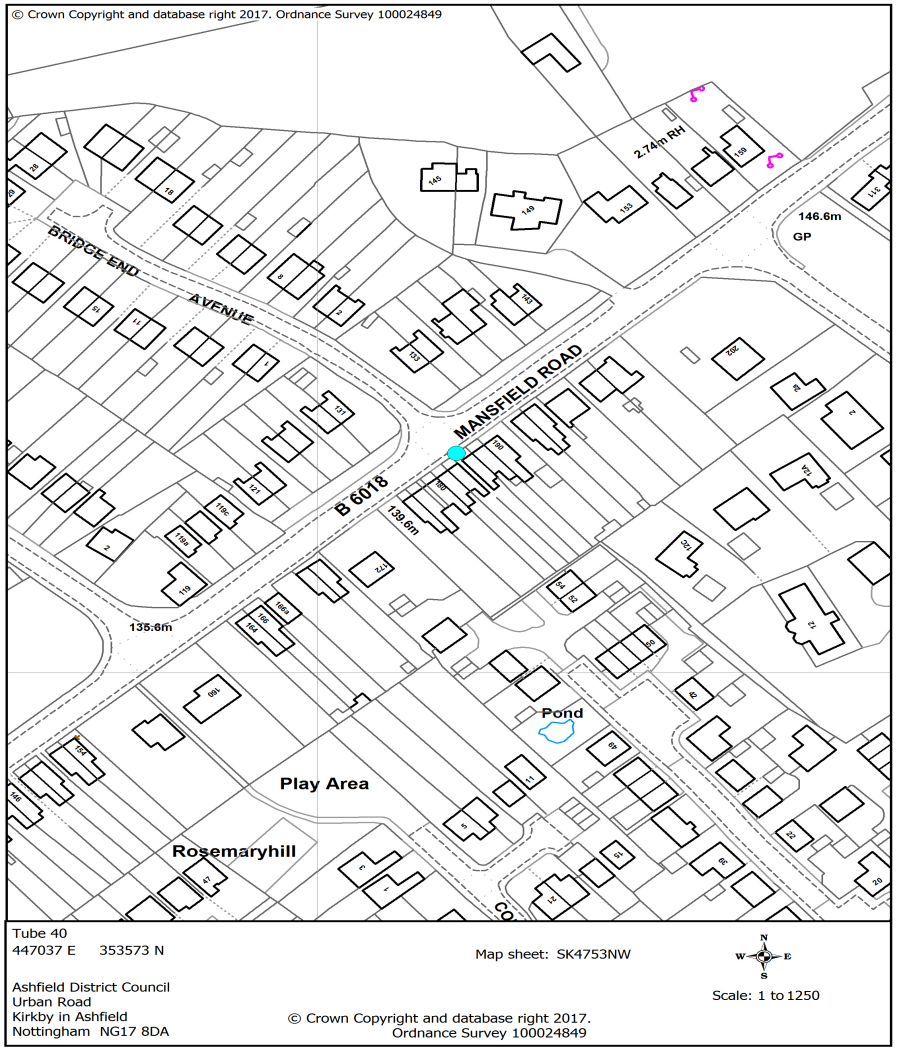


Location of Nitrogen Dioxide Diffusion Tube at Stoneyford Court Sutton

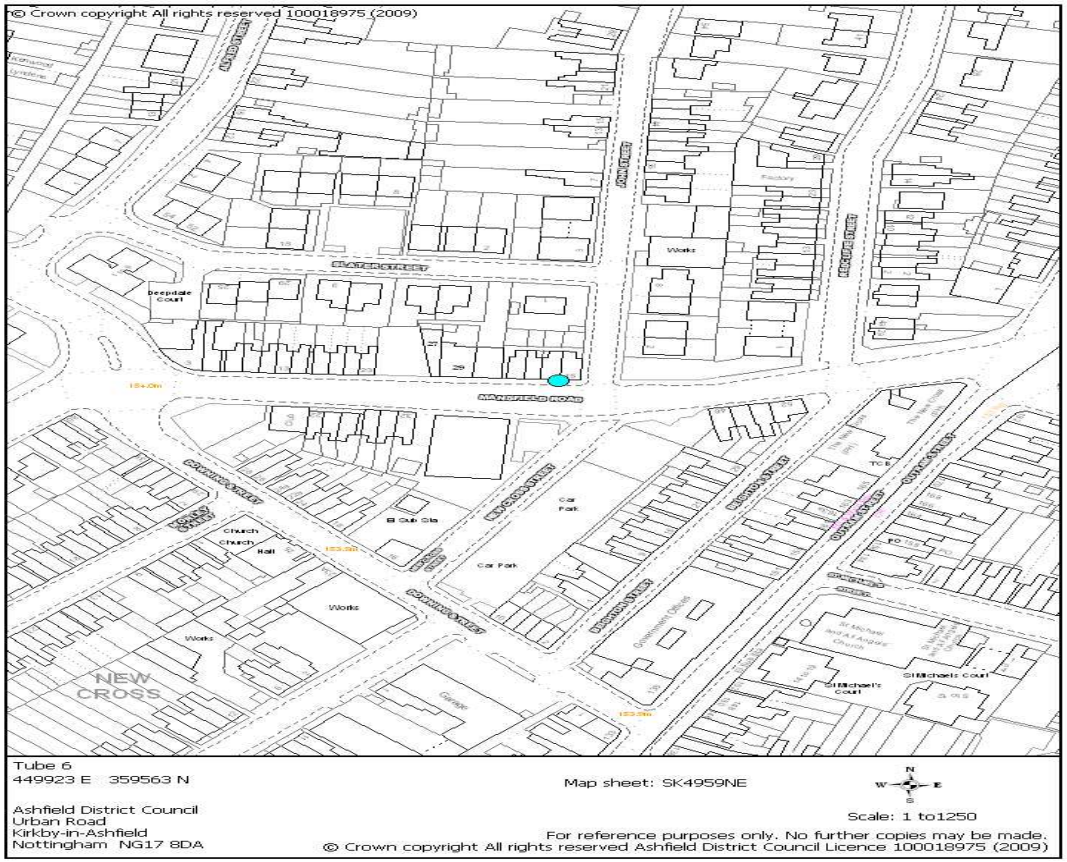


Location of Nitrogen Dioxide Diffusion Tube at Kirkby Cross

Location of Nitrogen Dioxide Diffusion Tube at Mansfield Road Selston



Location of Nitrogen Dioxide Diffusion Tube at Mansfield Road Sutton in Ashfield



Appendix E: Diffusion Tube Results Trend Analysis

Figure E.1 Trend Analysis for Nitrogen Dioxide Diffusion Tubes at Outram Street, Sutton in Ashfield

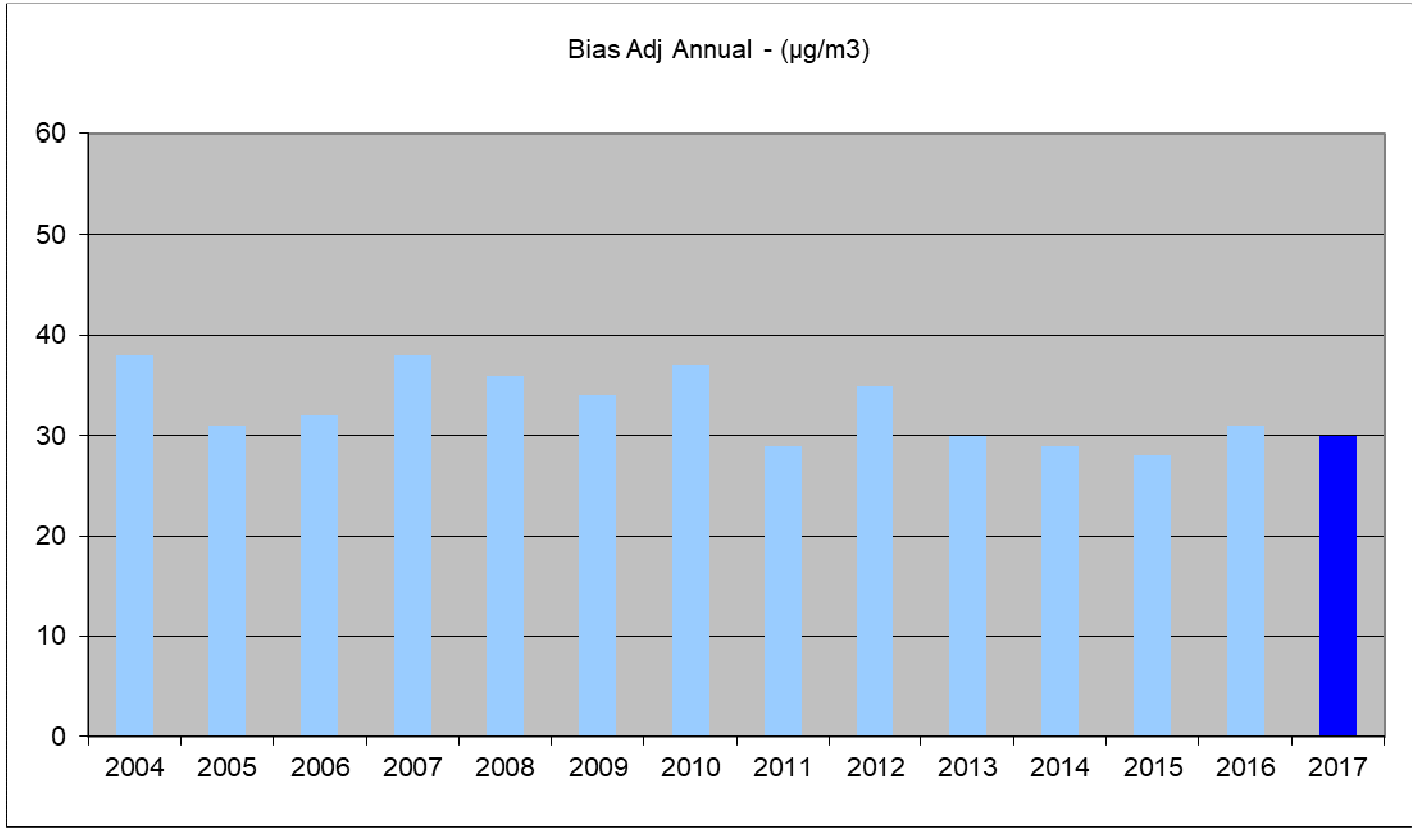


Figure E.2 Trend Analysis for Nitrogen Dioxide Diffusion Tube at Dalestorth Street, Sutton in Ashfield

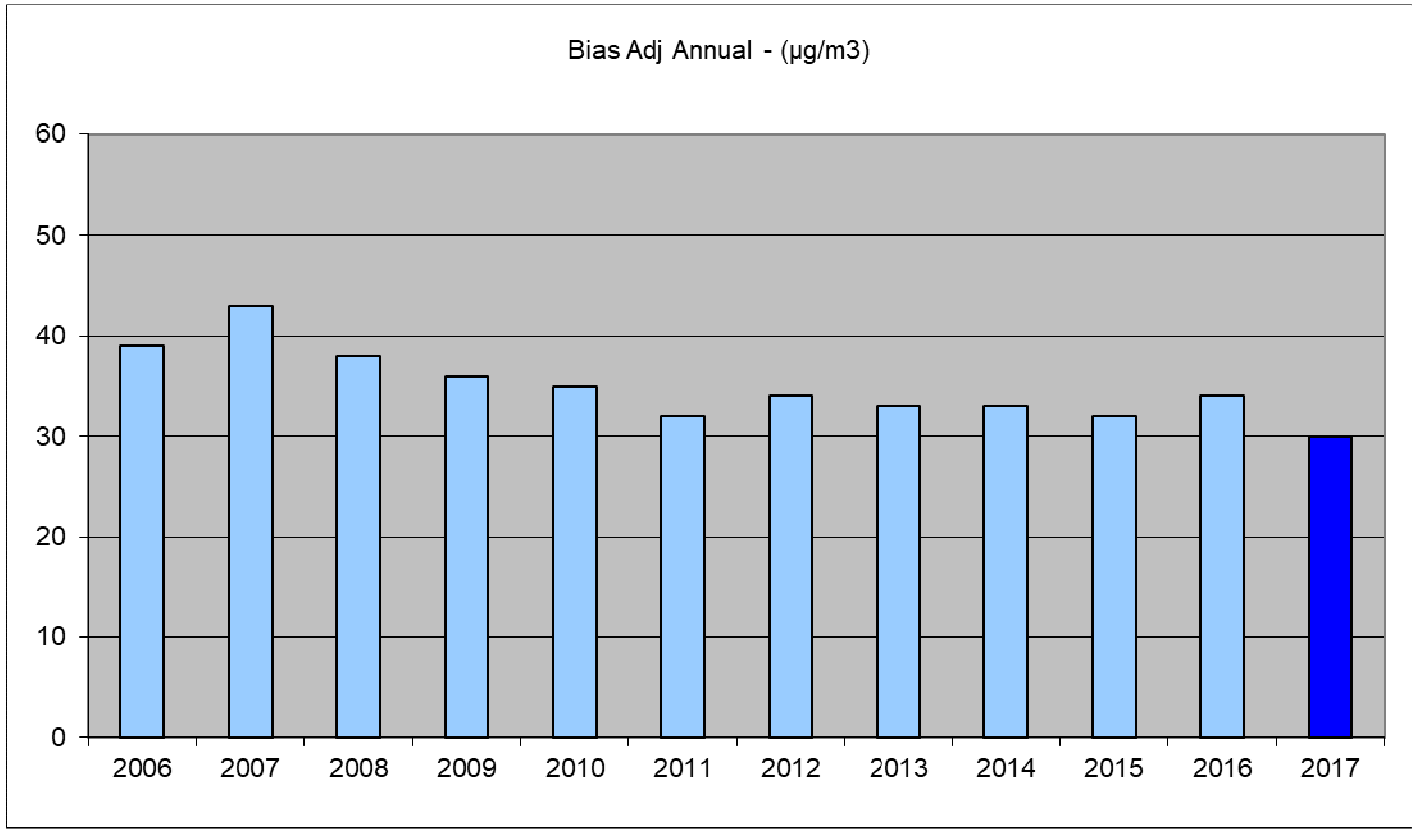


Figure E.3 Trend Analysis for Nitrogen Dioxide Diffusion Tubes at A38, Sutton in Ashfield

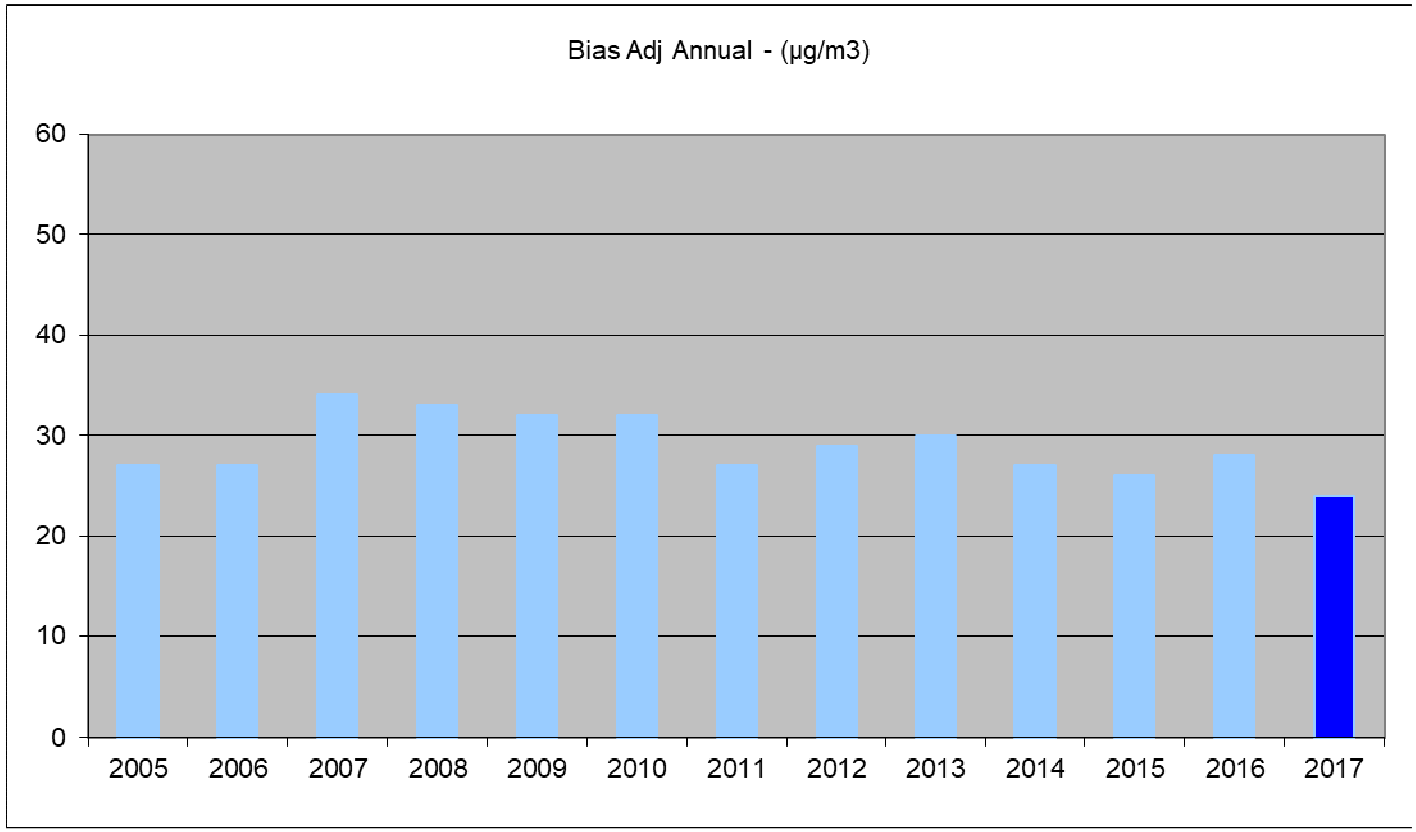


Figure E.4 Trend Analysis for Nitrogen Dioxide Diffusion Tubes at Church Hill, Kirkby

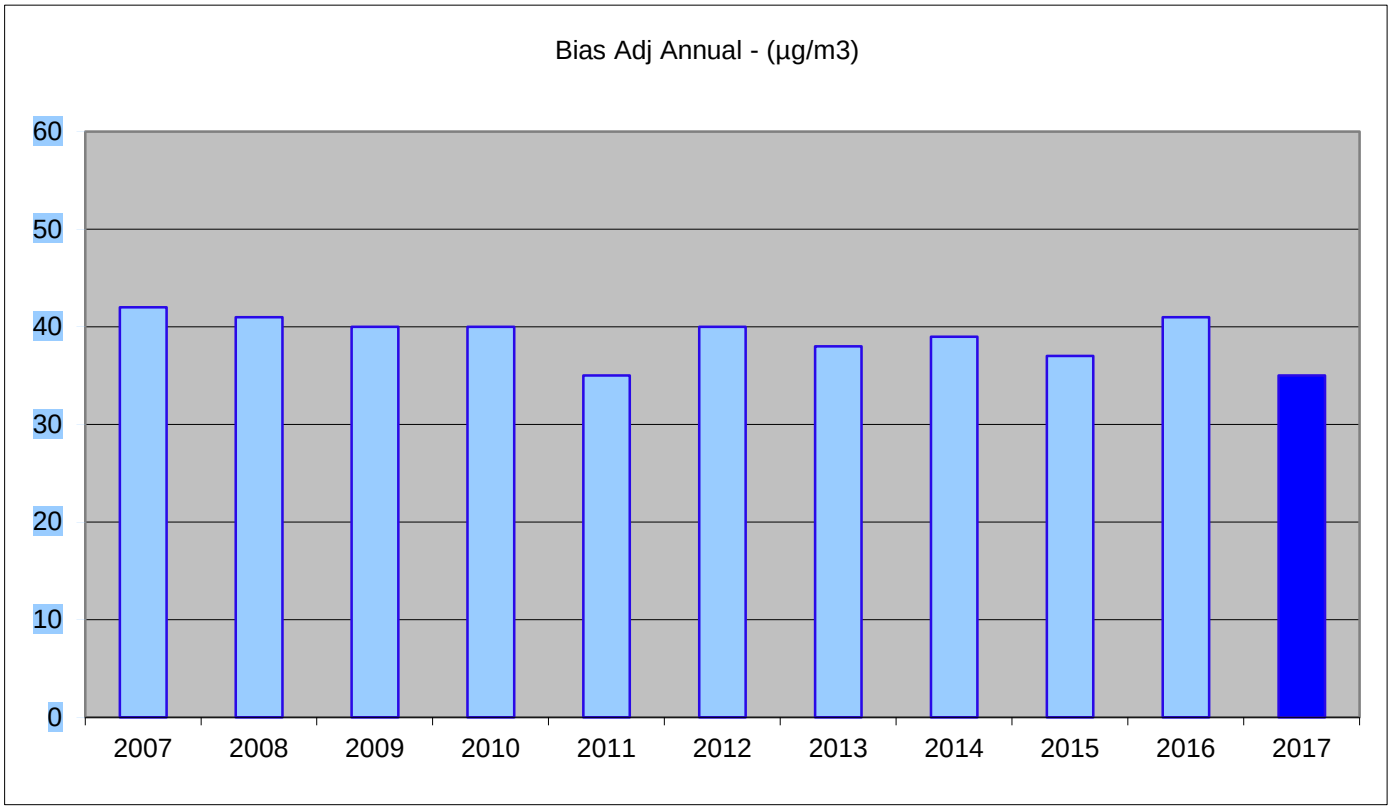


Figure E.5 Trend Analysis for Nitrogen Dioxide Diffusion Tubes at Pinxton

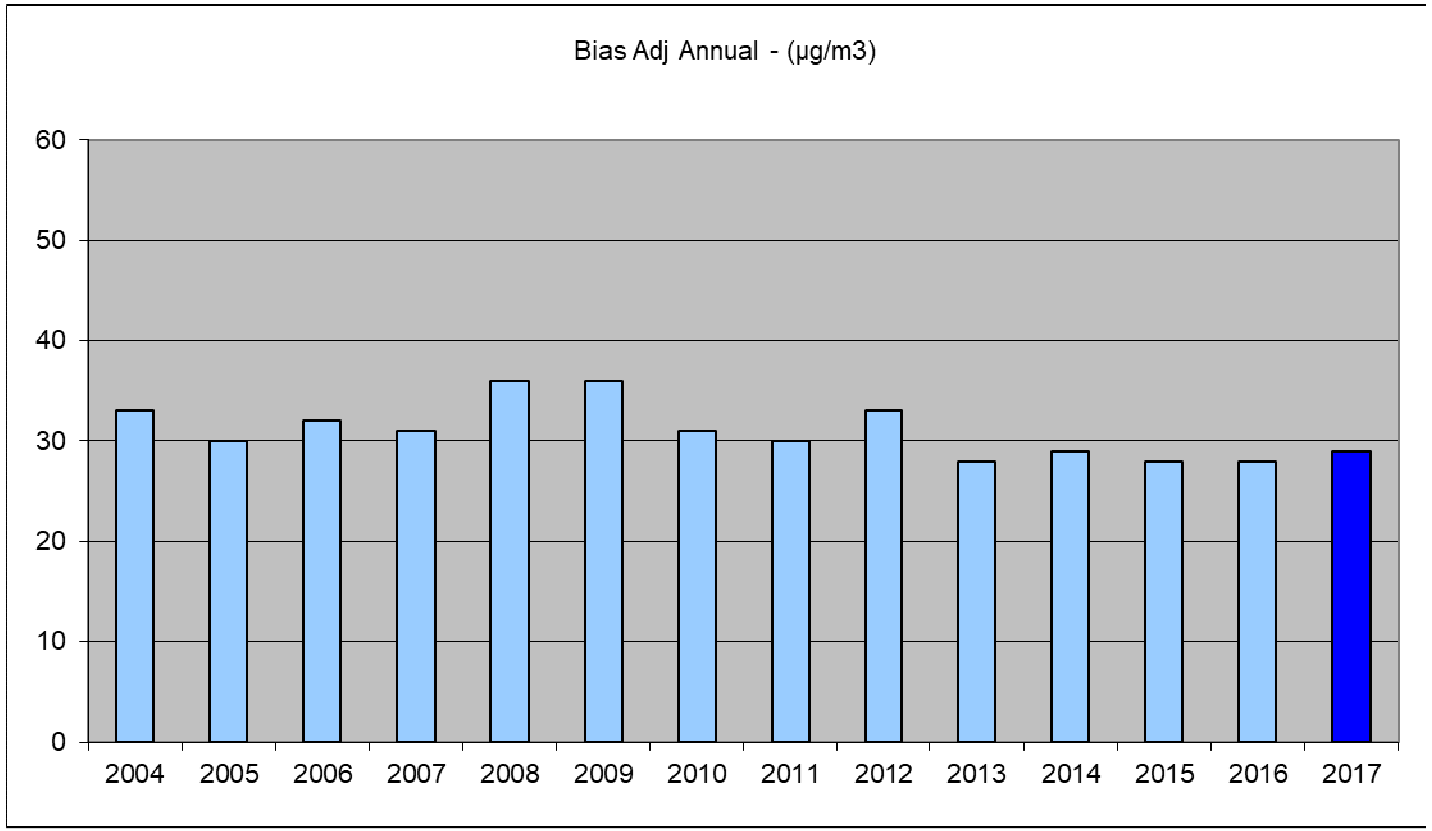


Figure E.6 Trend Analysis for Nitrogen Dioxide Diffusion Tubes at Ashgate, Hucknall

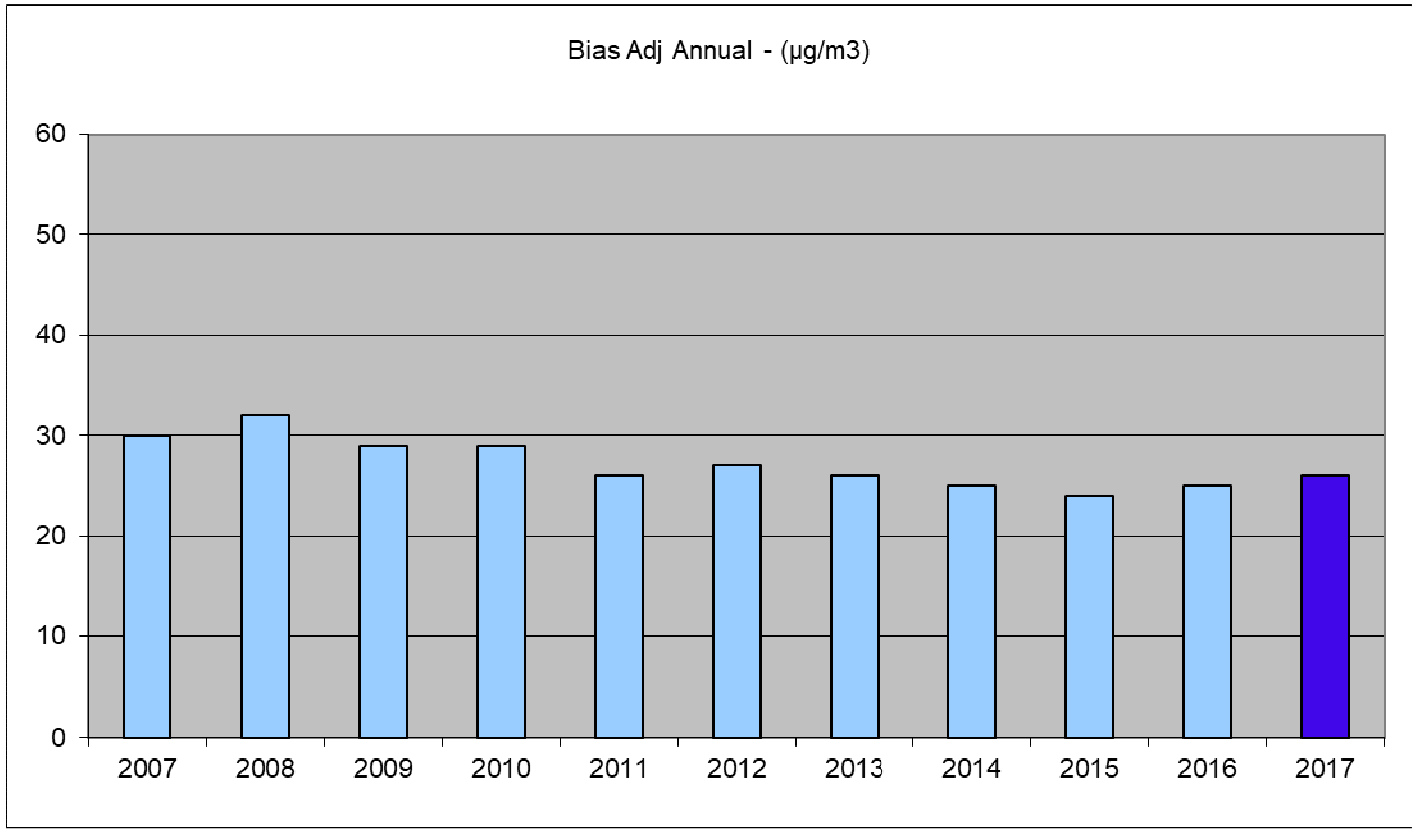


Figure E.7 Trend Analysis for Nitrogen Dioxide Diffusion Tubes at High Street, Hucknall

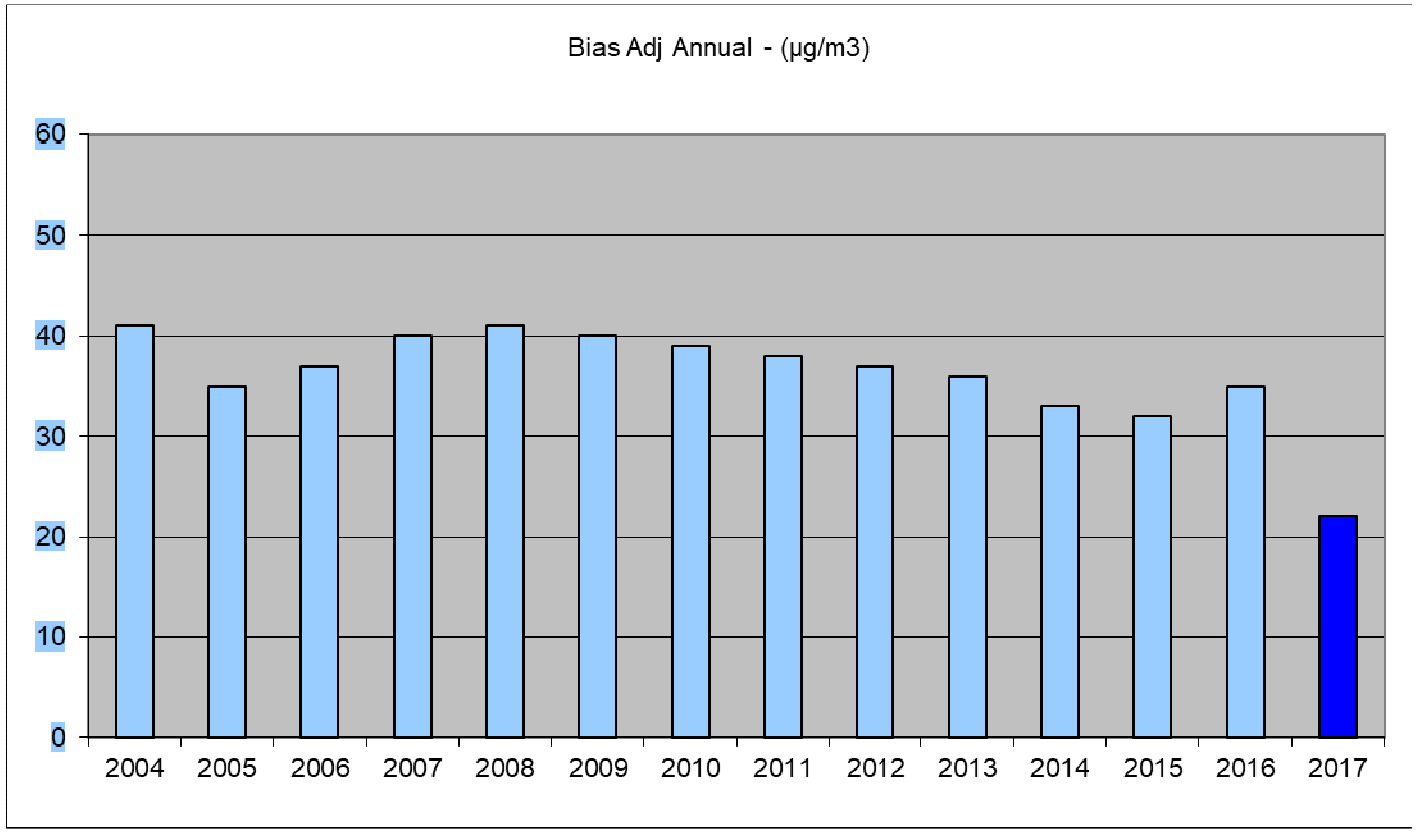


Figure E.8 Trend Analysis for Nitrogen Dioxide Diffusion Tubes at Station Road, Sutton in Ashfield

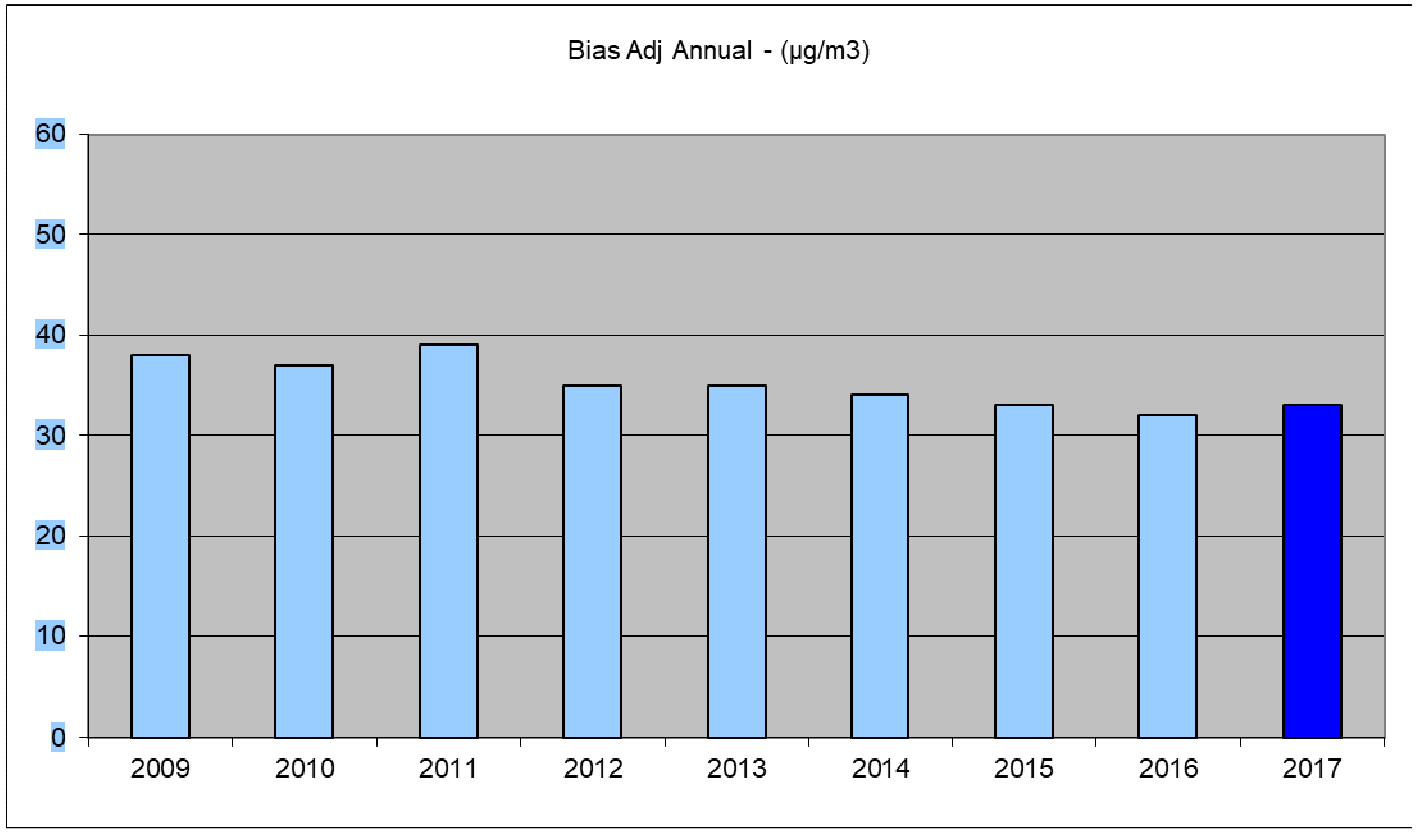


Figure E.9 Trend Analysis for Nitrogen Dioxide Diffusion Tubes at Common Road, Huthwaite

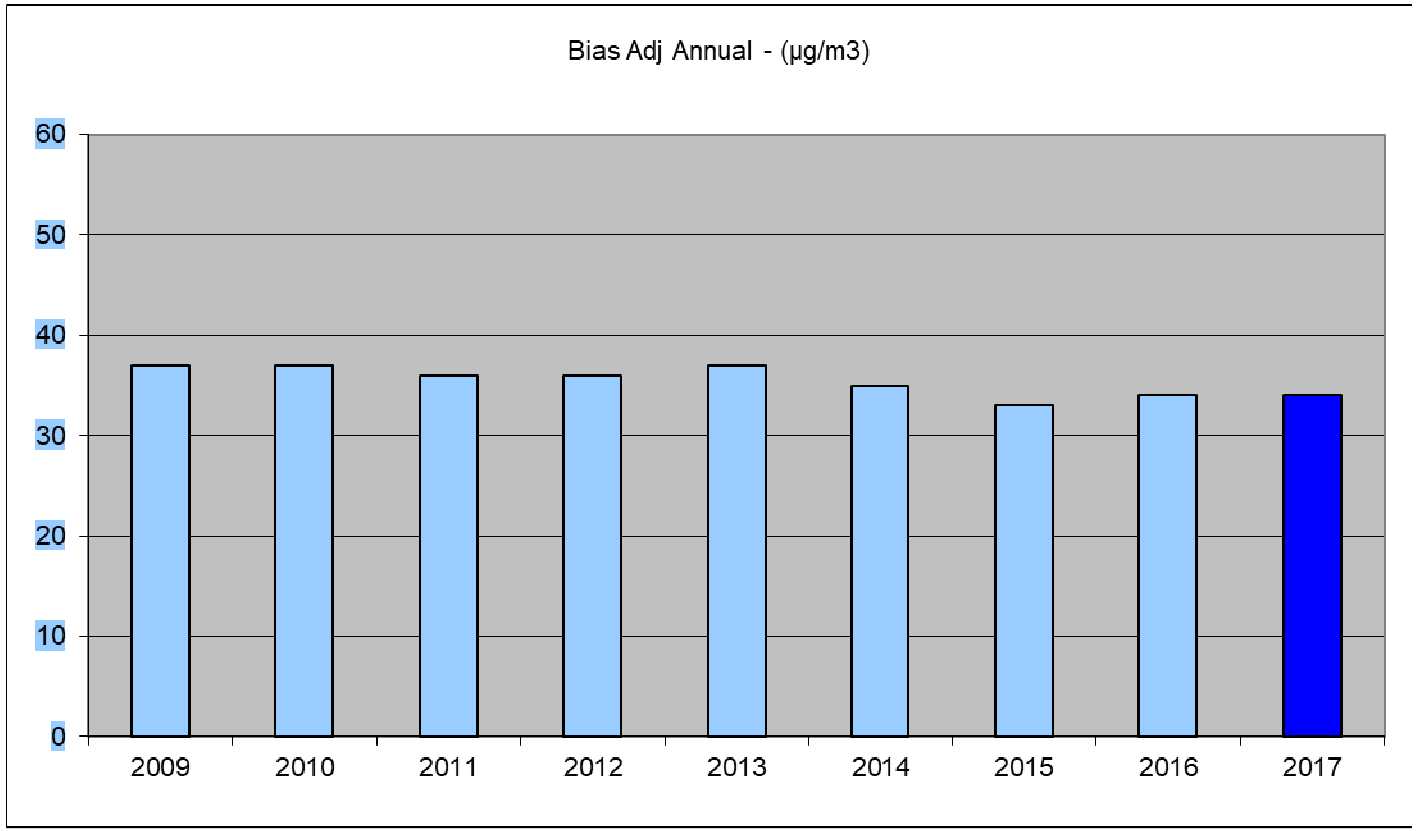


Figure E.10 Trend Analysis for Nitrogen Dioxide Diffusion Tubes at Badger Box, Annesley

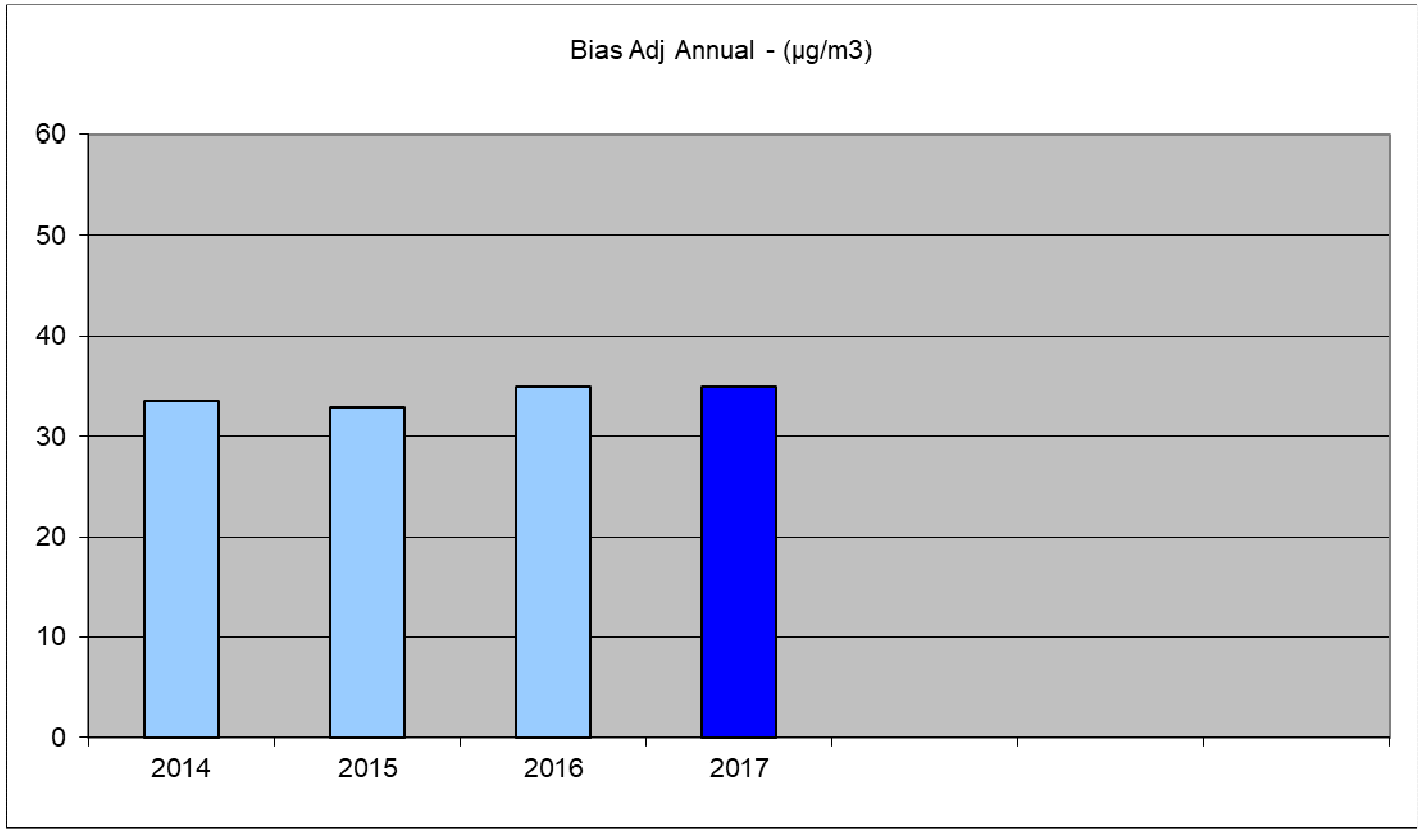


Figure E.11 Trend Analysis for Nitrogen Dioxide Diffusion Tubes at Croft Primary, Sutton in Ashfield

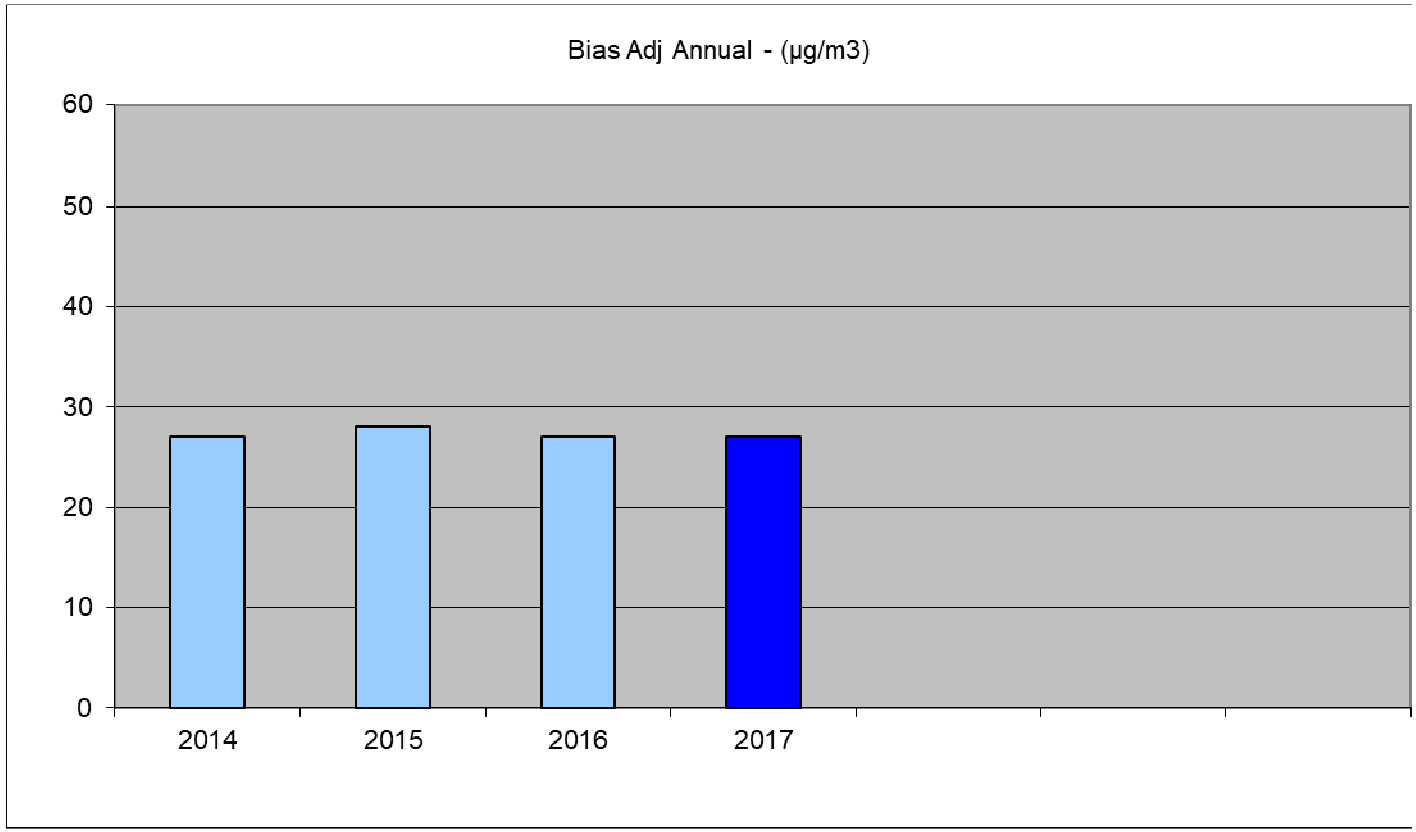


Figure E.12 Trend Analysis for Nitrogen Dioxide Diffusion Tubes at Lowmoor Road, Kirkby in Ashfield

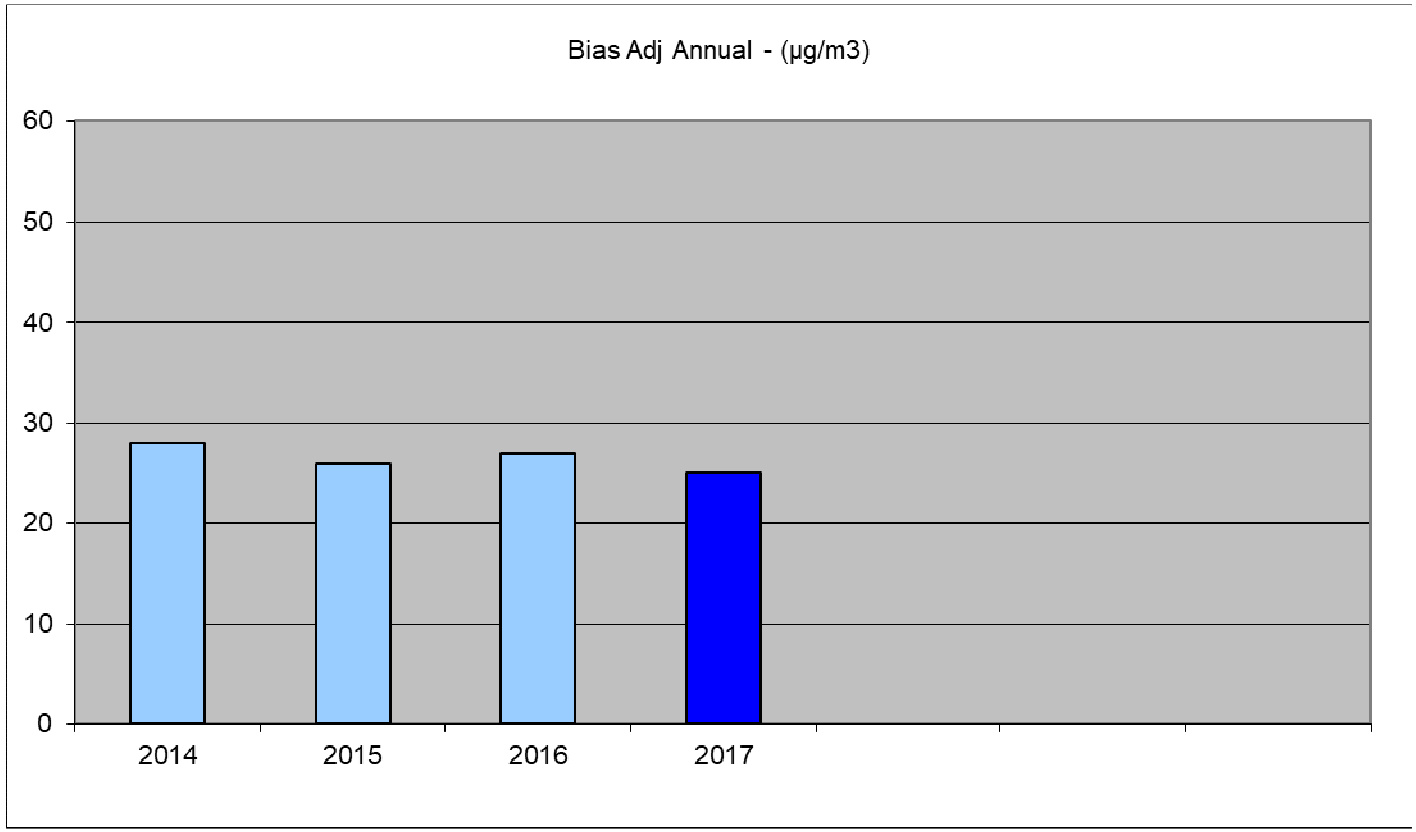


Figure E.13 Trend Analysis for Nitrogen Dioxide Diffusion Tubes at Chapel Street, Kirkby in Ashfield

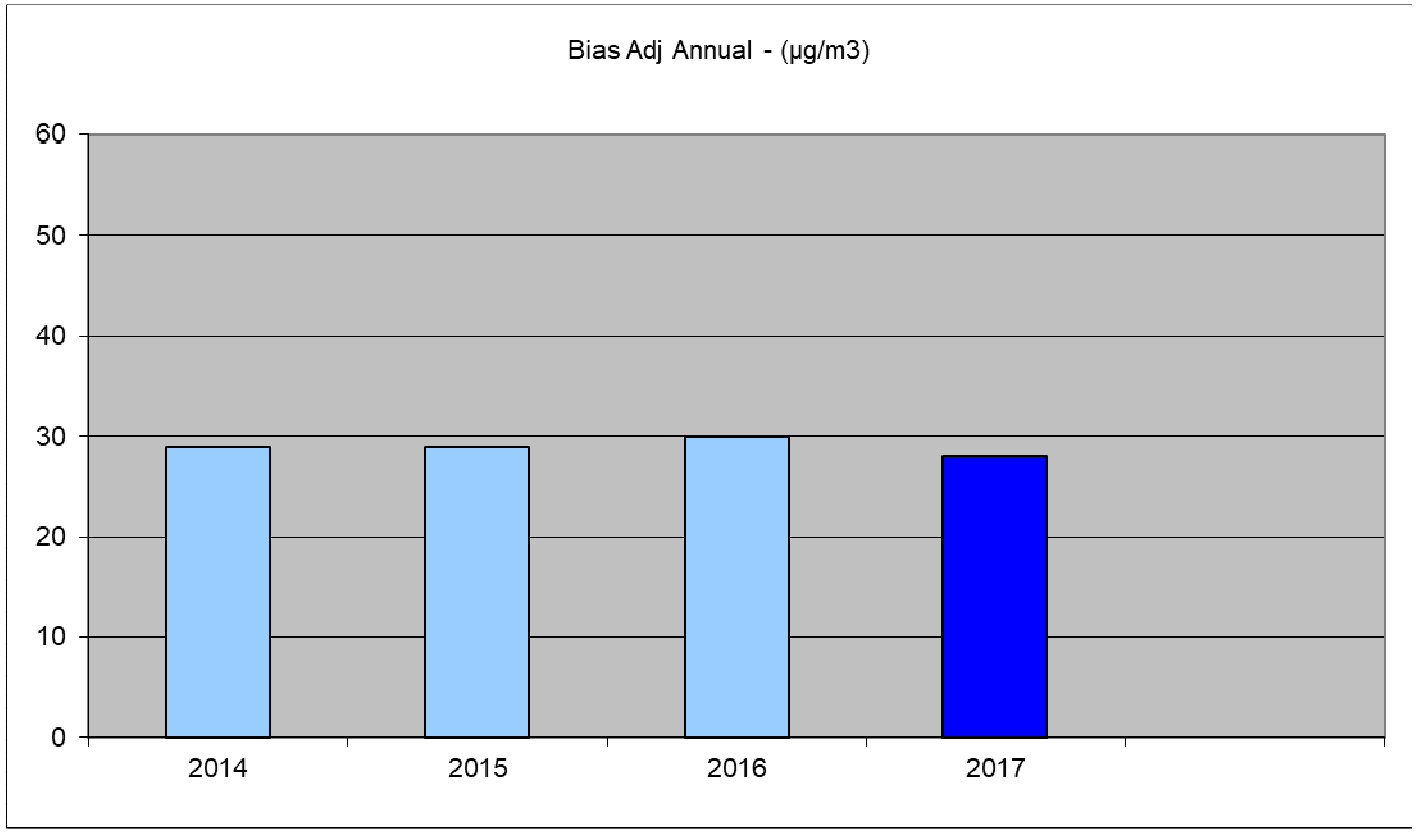


Figure E.14 Trend Analysis for Nitrogen Dioxide Diffusion Tubes at Stoneyford Court, Sutton in Ashfield

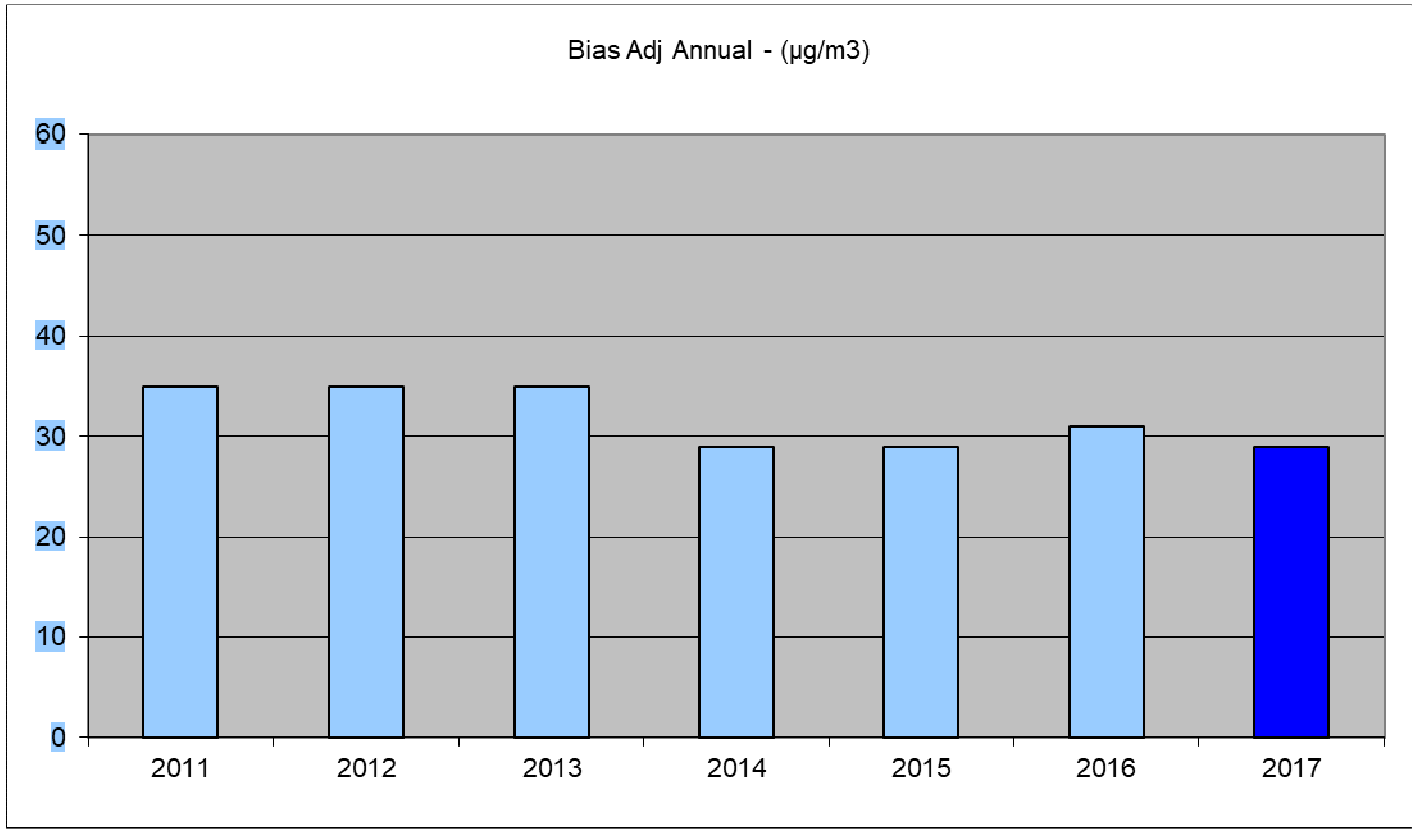


Figure E.15 Trend Analysis for Nitrogen Dioxide Diffusion Tubes at Kirkby Cross Kirkby

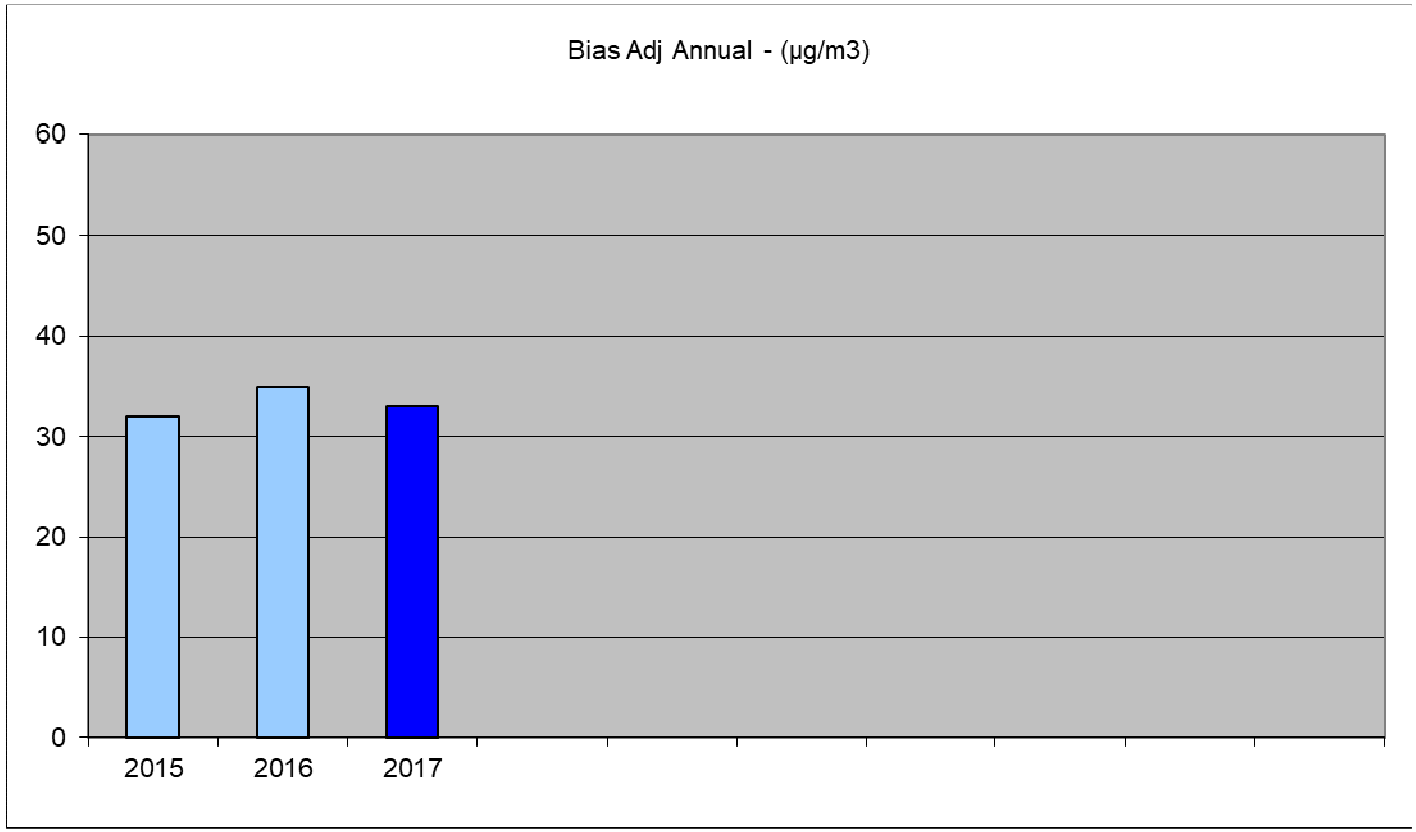
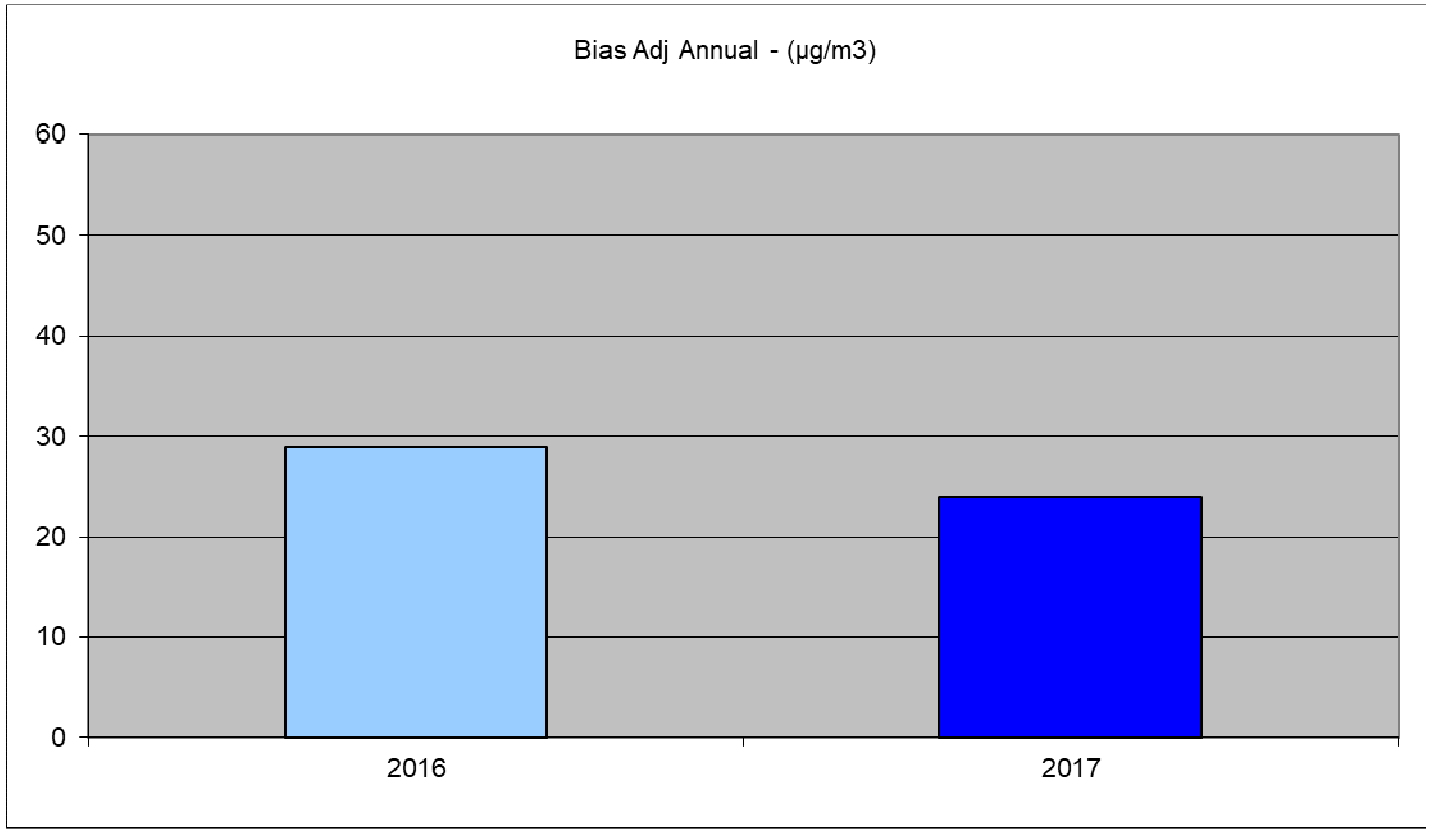


Figure E.16 Trend Analysis for Nitrogen Dioxide Diffusion Tubes at Mansfield Road Selston



Appendix F: Summary of Air Quality Objectives in England

Table F.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[4]	
	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

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

Glossary of Terms

.Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

References

None