2014 Air Quality Progress Report for
Newcastle-under-Lyme Borough Council

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

July 2014

Newcastle-under-Lyme Borough Council

Local Authority Officer	Darren Walters
Department	Environmental Protection Team
Address	Environmental Health Division Newcastle under Lyme Borough Council Civic Offices Merrial Street Newcastle under Lyme ST5 2AG
Telephone	01782 717717
e-mail	envprotection@newcastle-staffs.gov.uk
Report Reference number	LAQM/PR2014
Date	July 2014

Executive Summary

This latest Local Air Quality Management Progress Report for the 2013 calendar year demonstrates that with the exception of the nitrogen dioxide annual mean objective which is being exceeded at seven locations monitored by passive diffusion tubes, that air quality is continuing to meet the statutory air quality objectives prescribed in the Air Quality (England) Regulations 2000 and the Air Quality (England) (Amendment) Regulations 2002.

Nitrogen dioxide diffusion tube monitoring undertaken in 2013 has identified seven sites which exceeded the annual mean nitrogen dioxide objective in two geographic areas of the Borough. These are:-

- **Kidsgrove (A50 Liverpool Road)**
    - Site 6 – 106 Liverpool Road
- **Newcastle Town Centre**
    - Site 84 – 102 King Street
    - Site 85 – 106 King Street
    - Site 87 – 1 King Street
    - Site 95 – 76 London Road
    - Site 11 – 11 to 34 London Road
    - Site K1 – A34 Holy Trinity

A Detailed Assessment was undertaken in 2013 with relation to the above sites and also nearby locations. Work is currently underway on the consultation of the AQMA boundaries in these areas and also a further 2 locations in Madeley (a single property adjacent to the M6 motorway) and Maybank High Street through to Porthill.(Porthill Bank) It is anticipated that AQMA's will be declared in winter of 2014/15. There were a further thirteen sites which were showing annual mean values at or above 36µgm3 and these will continued to be monitored in 2014.

Trends in annual mean levels of nitrogen dioxide at the majority of sites monitored since at least 2007 have also shown a general increase in nitrogen dioxide exposure at relevant locations whilst background sites are showing a slight decrease.

Table of Contents

List of Tables

List of Figures

APPENDICES

1 Introduction

1.1 Description of Local Authority Area

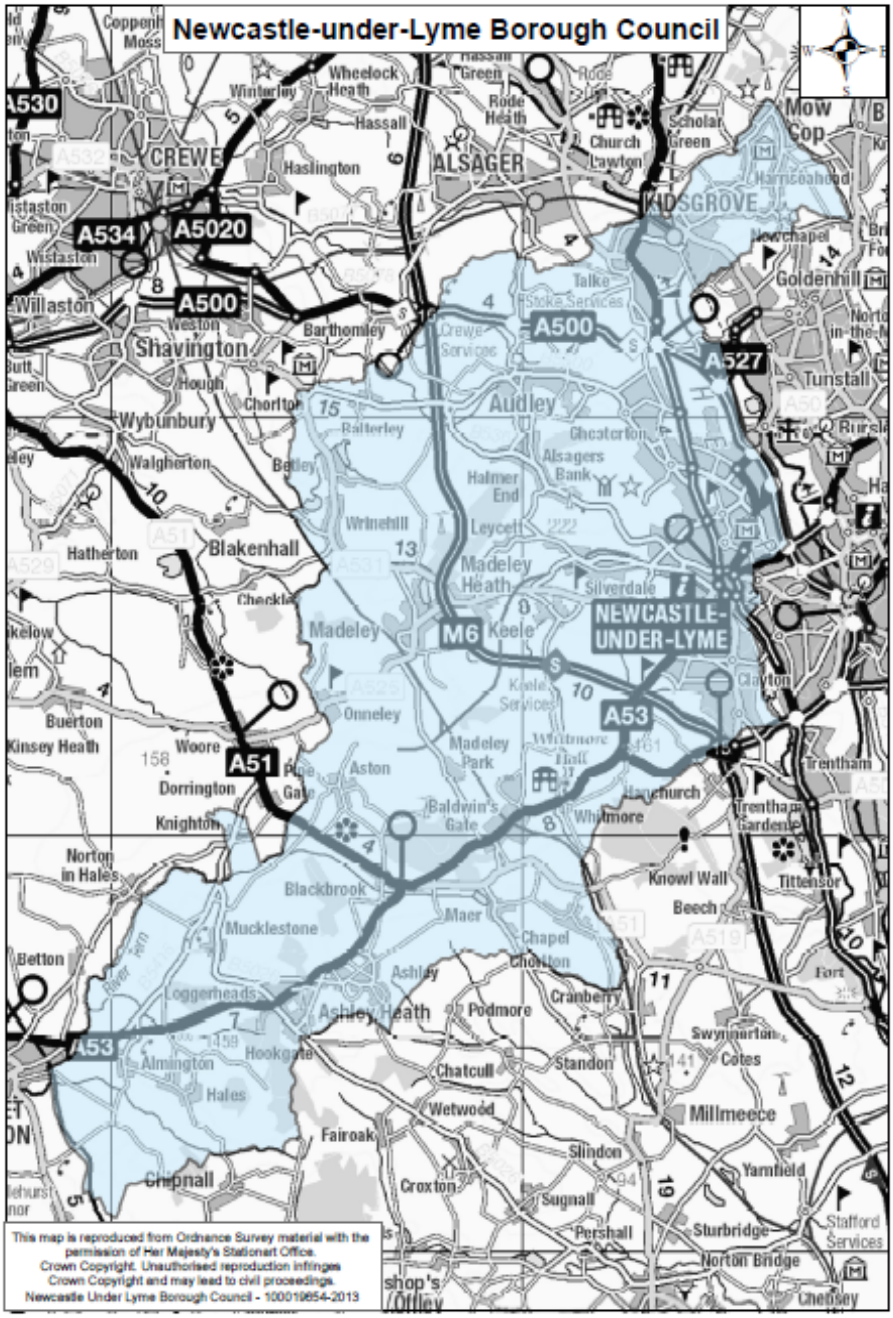
The Borough is located in North Staffordshire and covers an area of 21,096 hectares (81 square miles), with a population of approximately 123,000. Newcastle's strategic location at the important junction between the roads running north from London to Carlisle and west to Chester has ensured that transport has played a major part in its growth. In addition to these historical routes, modern trunk roads also pass through the Borough. These include the M6, which is currently one of the most heavily trafficked and congested roads in the country along with the A500, which is a major route linking many areas of Newcastle under Lyme and Stoke on Trent with junctions 15 and 16 of the M6. Both of these junctions are adjacent to the Borough boundary and thus contribute to the traffic congestion in the area. A number of main roads converge on the two main towns in the Borough, notably Newcastle under Lyme and Kidsgrove. The A34, A52, A525, A527 and the A53 pass through Newcastle and the A50, A5011 and A34 pass though Kidsgrove.

Traffic on these roads is a significant source of air pollutants affecting the air quality of the Borough. The other sources are industry and domestic properties. Particular industries with the greatest potential to cause air pollution have been prescribed for air pollution control under the Environmental Permitting (England and Wales) Regulations 2010[1]. Some processes are regulated by the Environment Agency (these are referred to as Part A1 processes) and others regulated by local authorities (these are referred to as Part A2 and Part B processes). Within the Borough there are two Part A1 processes, three Part A2 processes and forty-six Part B processes holding a permit.

[1] As amended by S.I. 2013 No 675. Environmental Permitting (England & Wales) Regulations 2013

Newcastle-under-Lyme Borough Council

Figure 1: **Newcastle Borough Council area**



1.2 Purpose of Progress Report

This report fulfils the requirements of the Local Air Quality Management (LAQM) process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 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 exceedances are considered likely, the local authority must then 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.

Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment reports. Their purpose is to maintain continuity in the LAQM process.

They are not intended to be as detailed as Updating and Screening Assessment Reports, or to require as much effort. However, if the Progress Report identifies the risk of exceedance of an Air Quality Objective, the Local Authority (LA) should undertake a Detailed Assessment immediately, and not wait until the next round of Review and Assessment.

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM in England are set out in the Air Quality (England) Regulations 2000 (SI 928), The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 1.1. This table shows the objectives in units of micrograms per cubic metre μg/m^3 (milligrams per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedances in each year that are permitted (where applicable).

Table 1.1 Air Quality Objectives included in Regulations for the purpose of LAQM in England

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 µg/m^3	Running annual mean	31.12.2003
	5.00 µg/m^3	Annual mean	31.12.2010
1,3-Butadiene	2.25 µg/m^3	Running annual mean	31.12.2003
Carbon monoxide	10 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.50 µg/m^3	Annual mean	31.12.2004
	0.25 µg/m^3	Annual mean	31.12.2008
Nitrogen dioxide	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m^3	Annual mean	31.12.2005
Particulate Matter (PM_{10}) (gravimetric)	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 µg/m^3	Annual mean	31.12.2004
Sulphur dioxide	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

The Council completes air quality reports on a regular basis as part of its statutory duties for managing local air quality under Part IV of the Environment Act 1995. Details of the completed air quality reports and a summary of their findings are given in Table 1.

Table 1 Summary of findings of previous air quality reports for Newcastle under Lyme Borough Council 1999 to 2013

Air Quality Reports	Description
2013 Progress Report DEFRA's appraisal report for the 2013 Progress Report	The report identified exceedance locations of the $N0_2$ annual mean objective in five geographic areas of the borough at Newcastle-under-Lyme Town Centre, Kidsgrove and Porthill. These areas were considered in the 2013 Combined Detailed and Further Assessment to determine the AQMA boundaries. The AQMA boundaries are currently being consulted upon prior to formal declaration by the Borough Council expected in Autumn 2014.
2013 Combined Detailed and Further Assessment Technical summary DEFRA's appraisal report for the 2013 Combined Detailed and Further Assessment	A combined Detailed Assessment with Further Assessment was undertaken based on results from 2012 to determine the AQMA boundaries for exceedances of the $N0_2$ annual mean objective. The AQMA boundaries are currently being consulted upon prior to formal declaration by the Borough Council expected in Autumn 2014
2012 Update and Screening Assessment(PDF4.31MB) DEFRA's Appraisal Report for 2012 Update and Screening Assessment (PDF 84.5KB)	This report has identified exceedances of the annual mean nitrogen dioxide objective at Madeley (M6 motorway) Kidsgrove (A50 – Liverpool Road) Newcastle Town Centre (A34 Northbound - London Road); Newcastle Town Centre (A53 – King Street) Therefore, detailed assessments are required in these locations to inform the minimum extent of the required Air Quality Management Areas.
2011 Progress Report (PDF 5.4MB) DEFRA's Appraisal of the 2011 Report Progress (PDF68KB)	The report has identified exceedances of the annual mean nitrogen dioxide objective in four areas of the Borough in Newcastle town centre, Kidsgrove, Madeley, Porthill. Therefore, detailed assessments are required in these locations to inform the minimum extent of the required Air Quality Management Areas.

Newcastle-under-Lyme Borough Council

2010 Detailed Assessment (PDF 11.53 MB) DEFRA's appraisal of the 2010 Detailed Assessment (PDF 24 Kb)	The assessment concluded that Air Quality Management Areas should be declared in Kidsgrove and Newcastle.
2010 Progress Report (PDF 3012 Kb) DEFRA's appraisal of the 2010 Progress Report (PDF 27Kb)	The report concluded that monitoring had identified a risk of exceeding the Nitrogen Dioxide annual mean objective at Kidsgrove and Newcastle. Therefore Detailed Assessments were required at these locations.
2009 Updating and Screening Assessment (PDF 6.4mb) DEFRA's appraisal of the 2009 Updating and Screening Assessment (PDF 28Kb)	The assessment concluded that monitoring had identified a risk of exceeding the Nitrogen Dioxide annual mean objective at Madeley, Kidsgrove, Newcastle and Shraleybrook. Modelling predicted a risk of exceeding the Nitrogen Dioxide annual mean objective at the Church Street/ Wolstanton Link Road Junction. Therefore detailed assessments were required at these locations.
2007 Progress Report (PDF 2.47Mb) DEFRA's appraisal of the 2007 Progress Report (PDF 20Kb)	The report concluded that there were no exceedances of the air quality objectives.
2007 Detailed Assessment (PDF 2.97mb) DEFRA's appraisal of the 2007 Detailed Assessment (PDF 18Kb)	The assessment concluded that no Air Quality Management Area should be declared.
2006 Updating and Screening Assessment (PDF 685Kb)	The assessment identified a risk of exceeding the Nitrogen Dioxide annual mean objective at Madeley, Kidsgrove, Porthill Bank, Shraleybrook, London Road and Barracks Road. Therefore Detailed Assessments were required at these locations.
2005 Progress Report (PDF 1.38Mb)	The report concluded that there were no exceedances of the air quality objectives.
2004 Progress Report (PDF 1.38Mb)	The report concluded that there were no exceedances of the air quality objectives.
2003 Updating and Screening Assessment (PDF 1.83Mb)	The assessment concluded that no air quality objectives were exceeded at sensitive receptors and there was no need to proceed to a Detailed Assessment.
3rd Round Review and Assessment – April 2001 (PDF 2.51Mb)	The report concluded that no Air Quality Management Area should be declared.
2nd Round Review and Assessment – February 2001 (PDF 1.89Mb)	The report concluded that it was necessary to proceed to Stage Three in order to assess the likelihood of exceedances of the Nitrogen Dioxide and Particulate Matter objectives.
1st Round Review and assessment – January 1999 (PDF 3.46Mb)	The report concluded that it was necessary to proceed to Stage Two to assess Nitrogen Dioxide, Particulate Matter, Sulphur Dioxide, Carbon Monoxide and Lead. Benzene and 1,3 Butadiene were expected to meet the air quality objectives.

Updating and Screening Assessments are required on a three yearly basis and review air quality as a whole to determine whether there is a risk of any air quality objectives being exceeded.

Progress Reports are required annually unless an Updating and Screening Assessment is carried out. They are intended to maintain continuity in the local air quality management process and highlight new monitoring results and update on specific changes.

Detailed Assessments are required when a problem pollutant has been identified and there is a risk of exceeding an air quality objective. The reports provide an accurate assessment of the likelihood of the air quality objective being exceeded.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

The Borough Council currently has one automatic monitoring station located at Queen's Gardens, Newcastle-under-Lyme. Full details of this site are given in Table 2 whilst the location of this site is shown in Figure 2.

This site is equipped with an API M200e NOx Analyser which is used to measure Nitrogen Dioxide, and a Met One BAM 50.5 PM10 analyser. Both instruments were fully operational throughout 2013.

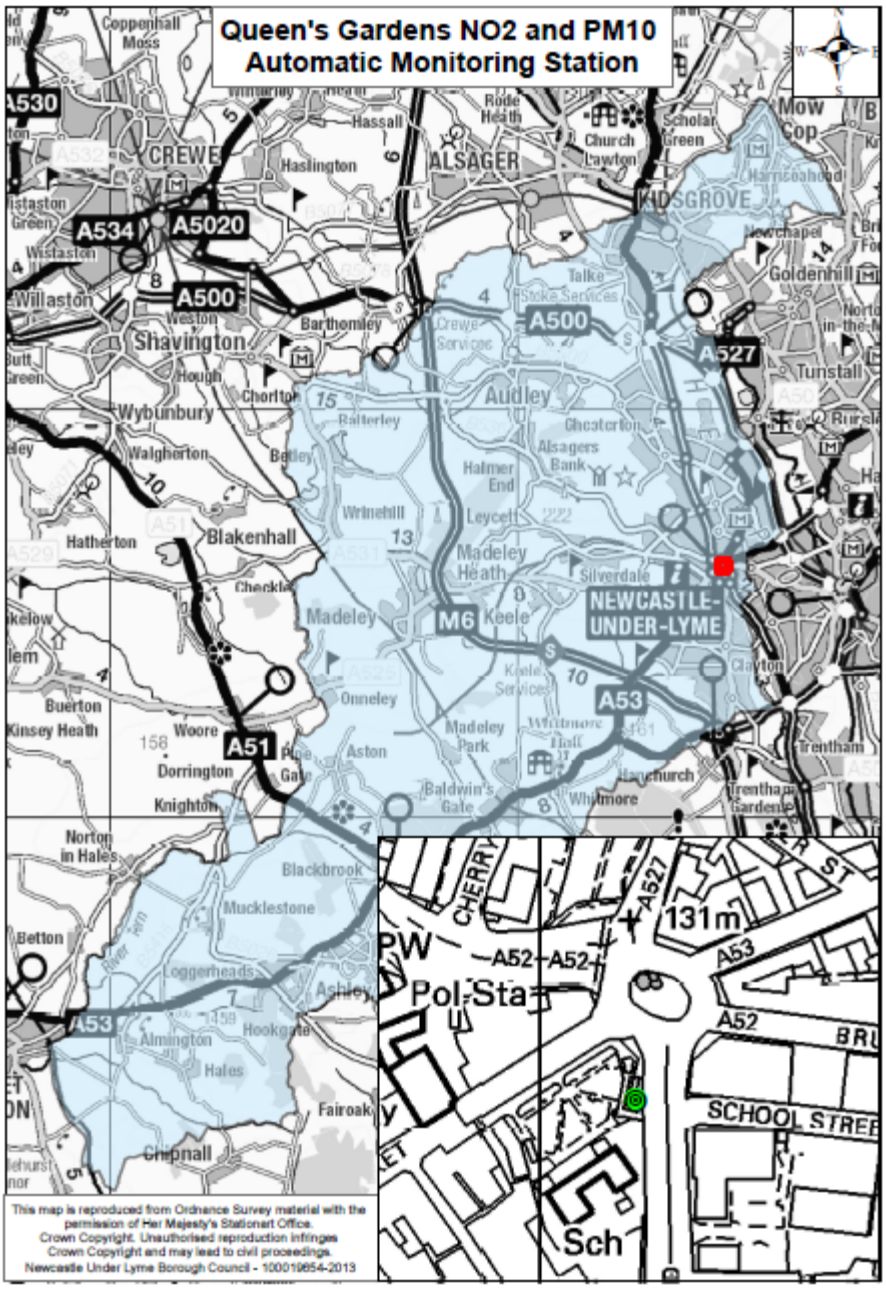
Table 2 Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	OS Grid Reference	Inlet Height (m)	Pollutants Monitored	In AQMA?	Monitoring Technique	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
CM1	Queens Gardens	Road-side	385046 346147	2.0	PM_{10}	N	Beta Attenuation	Y (2M)	3	y
					$N0_2$	N	Chemilumi-nescence	Y(2M)	3	y

2.1.2. Automatic monitoring sites – quality assurance and quality control procedures

Details of the QA/QC procedures for this site are given in Appendix 1.

Figure 2: Location of automatic monitoring station



2.1.1 Non-Automatic Monitoring Sites

During 2013, the Borough Council operated a Nitrogen Dioxide diffusion tube network consisting of 51 sites principally located near to major highways or traffic congested areas. Sites have been chosen based on local knowledge and are in the main representative of relevant worst case exposure.

Figure 3: Map of non-automatic monitoring sites

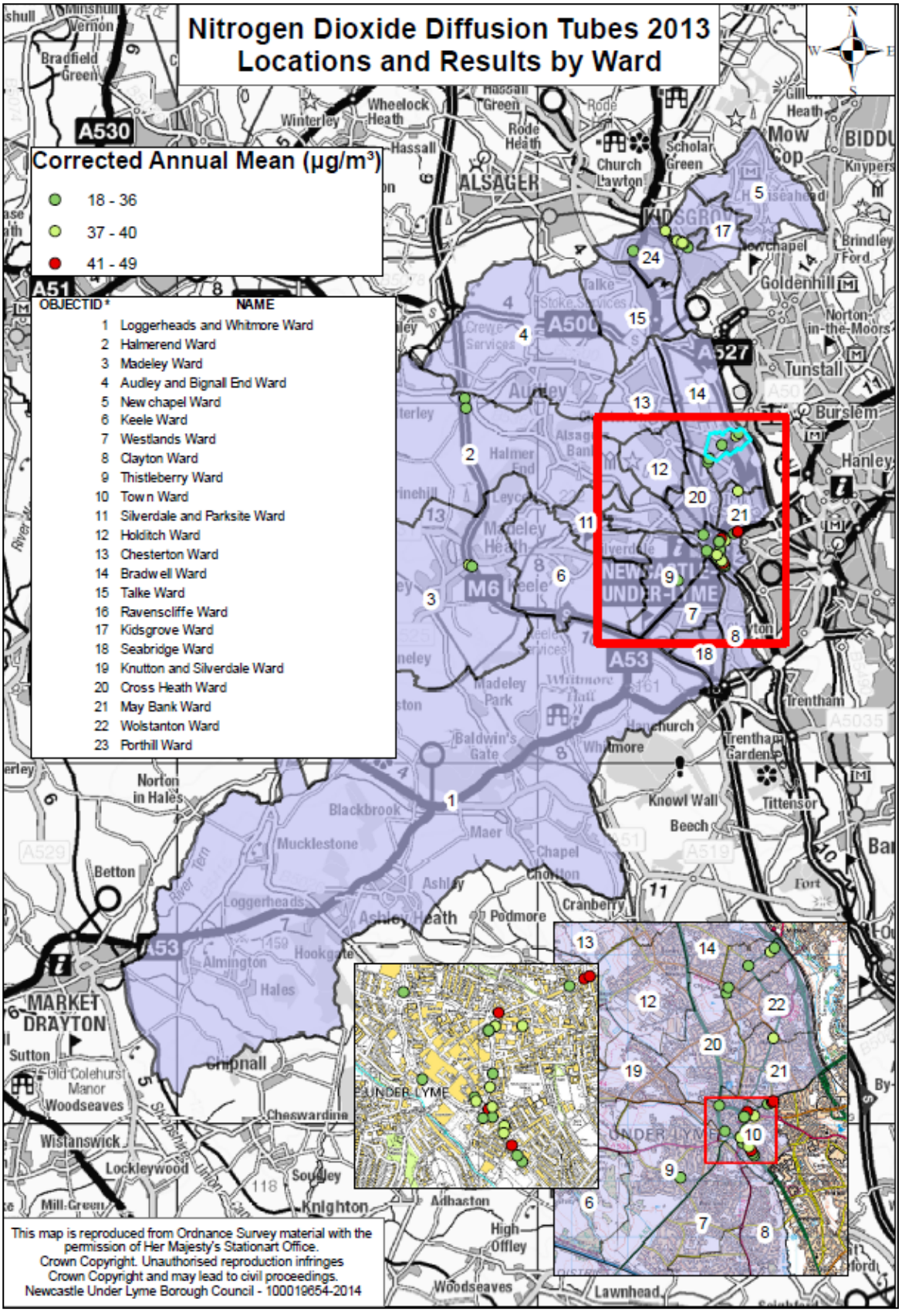


Figure 3 shows the monitoring locations across the Borough whilst Table 4 gives the details of these sites.

During 2013, the supply and analysis of the nitrogen dioxide diffusion tubes was undertaken by Gradko International Ltd. Officers from the Council are responsible for deploying and retrieving diffusion tubes with handling procedures following relevant guidance detailed in LAQM.TG(09). Diffusion tubes are typically exposed for either 4 or 5 whole weeks in accordance with the calendar published by DEFRA.

2.1.2 QA / QC Procedures for Diffusion Tubes

Details of the QA/QC procedures for the nitrogen dioxide diffusion tubes used in 2013 are given in Appendix 2.

Table 4: Details of Non- Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
DTK 1	A34 Holy Trinity	Kerbside	385051	345726	3	NO_2	No	N	N (22)	3	Y
DTK 2	76 King St, N/C	Urban Centre	385469	346362	2	NO_2	No	N	N (0.2)	3	Y
DTU B1	Wolstanton (Haritngton St)	Kerbside	384739	348326	3	NO_2	No	N	N (7)	2	Y
DTU B2	Westlands (4Sneyd Cr)	Kerbside	383916	345059	3	NO_2	No	N	N (23)	2	Y
DT3	Madeley (Collingwood 3 Newcastle Rd)	Rural	378116	345488	-2	NO_2	No	N	Y (0.2)	128	Y
DT6	Kidsgrove (106 Liverpool Rd)	Suburban	384014	354429	3	NO_2	No	N	Y (0.2)	4	Y
DT9	32 Porthill Bank	Suburban	385519	349055	3	NO_2	No	N	Y (0.2)	6	Y
DT11	34 London Road, N/C	Suburban	385112	345636	3	NO_2	No	N	Y (0.3)	3	Y
DT15	218 Congleton Road	Suburban	382660	354191	3	NO_2	No	N	Y (0.2)	4	Y
DT24	26 High St, May Bank	Roadside	385574	347530	3	NO_2	No	N	Y (0.2)	3	Y
DT28	Limbrick Cottage Shraleybrook	Rural	377994	350105	6	NO_2	No	N	Y (0.3)	45	Y
DT31	02 London Road	Suburban	385224	345453	2	NO_2	No	N	Y (0.2)	4	Y
DT32	139 Dims Parade West	Suburban	384773	348430	2	NO_2	No	N	Y (0.2)	3	Y
DT33	9 Hart Court, N/C	Suburban	384611	346330	3	NO_2	No	N	Y (0.3)	10	Y

Table 4: Details of Non- Automatic Monitoring Sites (continued)

DT34	15 Barracks Road	Urban Centre	385059	345840	3	NO_2	No	N	Y (1)	4	Y
DT39	4/6 Liverpool Road, Kidsgrove	Suburban	383560	354739	3	NO_2	No	N	Y (0.2)	2	Y
DT40	Banktop Court, Porthill	Suburban	385128	348811	5	NO_2	No	N	Y (0.2)	20	Y
DT41	Jubilee Baths, Newcastle	Urban Centre	385086	346155	3	NO_2	No	N	N (0.2)	4	Y
DT42	Jubilee Baths, Newcastle	Urban Centre	385086	346155	3	NO_2	No	N	N (0.2)	4	Y
DT43	Jubilee Baths, Newcastle	Urban Centre	385086	346155	3	NO_2	No	N	N (0.2)	4	Y
DT46	1 London Road (Trinity Court)	Urban Centre	385073	345685	3	NO_2	No	N	Y (0.3)	5	Y
DT47	1 London Rd (Brook La)	Urban Centre	385023	345678	3	NO_2	No	N	Y (0.3)	6	Y
DT49	2 Vale View, Porthill	Urban Centre	385595	349129	10	NO_2	No	N	Y (0.2)	10	Y
DT50	London Road, Newcastle	Suburban	385199	345487	2	NO_2	No	N	Y (0.2)	10	Y
DT52	Agricon House Madeley	Rural	378200	345452	-2	NO_2	No	N	Y (0.3)	86	Y
DT53	2 Knowle Bank Road Audley	Rural	378028	349830	-6	NO_2	No	N	Y (0.2)	64	Y
DT62	79 Liverpool Road Kidsgrove	Roadside	384030	354390	3	NO_2	No	N	Y (0.2)	9	Y
DT63	9-11 The Avenue Kidsgrove	Roadside	383958	354403	3	NO_2	No	N	Y (0.2)	3	Y
DT64	Kidsgrove Carpets 57 - 59 Liverpool Road	Roadside	383950	354445	3	NO_2	No	N	Y (0.2)	3	Y
DT72	134 High Street Newcastle	Roadside	384980	345787	3	NO_2	No	N	Y (0.2)	4	Y
DT73	21 London Road Newcastle	Roadside	385070	345738	3	NO_2	No	N	Y (0.2)	4	Y

Table 4: Details of Non- Automatic Monitoring Sites (continued)

DT74	39 London Road Newcastle	Roadside	385132	345640	3	NO_2	No	N	Y (0.2)	2	Y
DT76	11 Brunswick Street Newcastle	Roadside	385226	346156	3	NO_2	No	N	Y (0.2)	2	Y
DT77	68 Liverpool Road Kidsgrove	Urban Centre	383895	354475	4	NO_2	No	N	Y (0.2)	4	Y
DT78	140 Liverpool Road Kidsgrove	Urban Centre	384156	354333	2.5	NO_2	No	N	Y (0.2)	17	Y
DT79	89 Liverpool Road Kidsgrove	Urban Centre	384176	354279	3	NO_2	No	N	Y (0.2)	2	Y
DT84	102 King Street Newcastle	Urban Centre	385548	346400	3	NO_2	No	N	Y (0.2)	5	Y
DT85	106 King Street Newcastle	Urban Centre	385575	346413	2	NO_2	No	N	Y (0.2)	5	Y
DT86	Hassell C.P. School Barracks Road N/C	Urban Centre	385075	345910	3	NO_2	No	N	Y (0.2)	5	Y
DT87	Blue Chilli 1 King Street Newcastle	Urban Centre	385105	346225	2	NO_2	No	N	Y (0.2)	5	Y
DT88	27 Lower Street Newcastle	Urban Centre	384709	345881	3	NO_2	No	N	Y (0.2)	5	Y
DT89	Queens Gardens Newcastle	Urban Centre	385054	346134	1	NO_2	No	N	Y (1)	5	Y
DT90	Queens Gardens Newcastle	Urban Centre	385054	346134	1	NO_2	No	N	Y (1)	5	Y
DT91	Queens Gardens, Newcastle	Urban Centre	385054	346134	1	NO_2	No	N	Y (1)	5	Y
DT92	41/43 Liverpool Road Kidsgrove	Urban Centre	383890	354461	3	NO_2	No	N	Y (0.2)	2	Y
DT93	118 Liverpool Road Kidsgrove	Urban Centre	384056	354393	4	NO_2	No	N	Y (0.2)	3	Y
DT94	116 Liverpool Road Kidsgrove	Urban Centre	384030	354416	4	NO_2	No	N	Y (0.2)	4	Y
DT95	76 London Road Newcastle	Roadside	385171	345539	4	NO_2	No	N	Y (0.2)	2	Y

Table 4: Details of Non- Automatic Monitoring Sites (continued)

DT96	52/54 London Road Newcastle	Roadside	385131	345601	3	NO_2	No	N	Y (0.2)	3	Y
DT97	Blackfriars/ Lower Street	Roadside	384795	345796	2	NO_2	No	N	N (0.2)	2	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

During 2013, the Council undertook monitoring across the Borough to assess compliance with the objective standards for nitrogen dioxide ($N0_{2)}$ and particulate matter up to 10 microns in size (PM_{10}). This section discusses the findings of this monitoring.

2.2.1 Nitrogen Dioxide (NO_2) Automatic Monitoring Data

Automatic monitoring of nitrogen dioxide was undertaken throughout 2013 at Queens Gardens, Newcastle under Lyme.

The data capture for this site for 2013 was 98.3%. As this site yielded data capture of greater than 90%, it has not been necessary to annualise the results.

The results of this monitoring are presented in Table 3 for the annual mean objective and Table 4 for comparison with the 1-hour Mean Objective. There were no exceedances of the hourly mean objective or annual mean objective in this location.

Table 3 Results of Automatic Monitoring for NO_2: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % [a]	Valid Data Capture 2013 % [b]	Annual Mean Concentration (µg/m^3)				
					2009* [c]	2010* [c]	2011* [c]	2012 [c]	2013[b]
Queens Gardens	Roadside	N	100	98.3%	32.53	35.86	Data not available	31.92	28.8

In bold, exceedance of the NO_2 annual mean AQS objective of 40µg/m^3
[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year
[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)
[c] Means have been annualised for April to December be "annualised" as in Box 3.2 of TG(09) (http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=38), if valid data capture is less than 75%

Table 4 Results of Automatic Monitoring for NO_2: Comparison with 1-hour Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % [a]	Valid Data Capture 2013 % [b]	Number of Hourly Means > 200µg/m^3				
					2009* [c]	2010* [c]	2011* [c]	2012 [c]	2013[b]
Queens Gardens	Roadside	N	100	98.3%	0	0	-	0 **(76.77)**	0

In bold, exceedance of the NO_2 hourly mean AQS objective (200µg/m^3 – not to be exceeded more than 18 times per year)
[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year
[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)
[c] If the data capture for full calendar year is less than 90%, include the 99.8th percentile of hourly means in brackets

2.2.2 Nitrogen Dioxide (NO_2) Diffusion Tube Monitoring Data

The Nitrogen dioxide diffusion tube results for 2013 are shown in Table 5 with the full dataset for the year given in Appendix B. Detailed maps showing the results at local level are shown in Figure4, Figure5, Figure 6, Figure 7 and Figure 8.

All results have been bias corrected by a factor of 0.95 for the Gradko Laboratory. The bias correction factor was obtained from the National Bias Adjustment Factors page of the Defra website.[1] A copy of the bias correction study is included in Appendix A.

With the exception of sites K1, K2, UB1 and UB2 which are diffusion tube sites forming part of the national diffusion tube network, all sites are considered to be representative of relevant exposure and accordingly it has not been necessary to undertake any distance correction of the measured results.

As all sites have yielded greater than nine months' worth of data, it has not been necessary to annualise any of the results.

There are seven locations in two geographic areas of the Borough which are representative of relevant exposure and which have yielded results at or above the annual mean objective of 40 µg/m^3 and these are highlighted in red. These locations are:-

- Kidsgrove (A50 Liverpool Road)
    - Site 6 – 106 Liverpool Road
- Newcastle Town Centre
    - Site 84 – 102 King Street
    - Site 85 – 106 King Street
    - Site 87 – 1 King Street
    - Site 95 – 76 London Road
    - Site 11 – 11 to 34 London Road
    - Site K1 – A34 Holy Trinity

There are a further 13 sites in three geographic locations which have yielded bias adjusted results which although below the annual mean objective are showing results within 10% of the annual mean objective (at or above 36µgm^3) and these locations may be at risk of exceeding the annual mean in future years. These sites have been the subject of a

[1] http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html

Newcastle-under-Lyme Borough Council

Combined Detailed and Further Assessment study in 2013 and will be incorporated into appropriate AQMA's as result. These sites are:-

- Madeley
    - Site 3 - Collingwood, 3 Newcastle Road
- Newcastle Town Centre
    - Site 34 - 15 Barracks Road
    - Site 41 - Jubilee Baths, Brunswick Street
    - Site 43 - Jubilee Baths, Brunswick Street
    - Site 76 - 11 Brunswick Street
    - Site 74 - 39 London Road
    - Site 96 - 52-54 London Road, Newcastle
    - Site 97 - The Blackfriar Lower Street
- Kidsgrove
    - Site 39 - 4/6 Liverpool Road
    - Site 92 - 41/43 Liverpool Road
    - Site 94 - 116 Liverpool Road
    - Site 64 - Kidsgrove Carpets, 57-59 Liverpool Road

- May Bank
    - Site 24 - 24-26 High street May Bank

There are no locations which have shown results in excess of 60 µg/m^3, accordingly this can be taken as a positive indication that the 1 hourly objective standard of 200 µg/m^3 is not being breached.

Figure 4: Map of the Borough showing nitrogen dioxide diffusion tube annual mean results for 2013

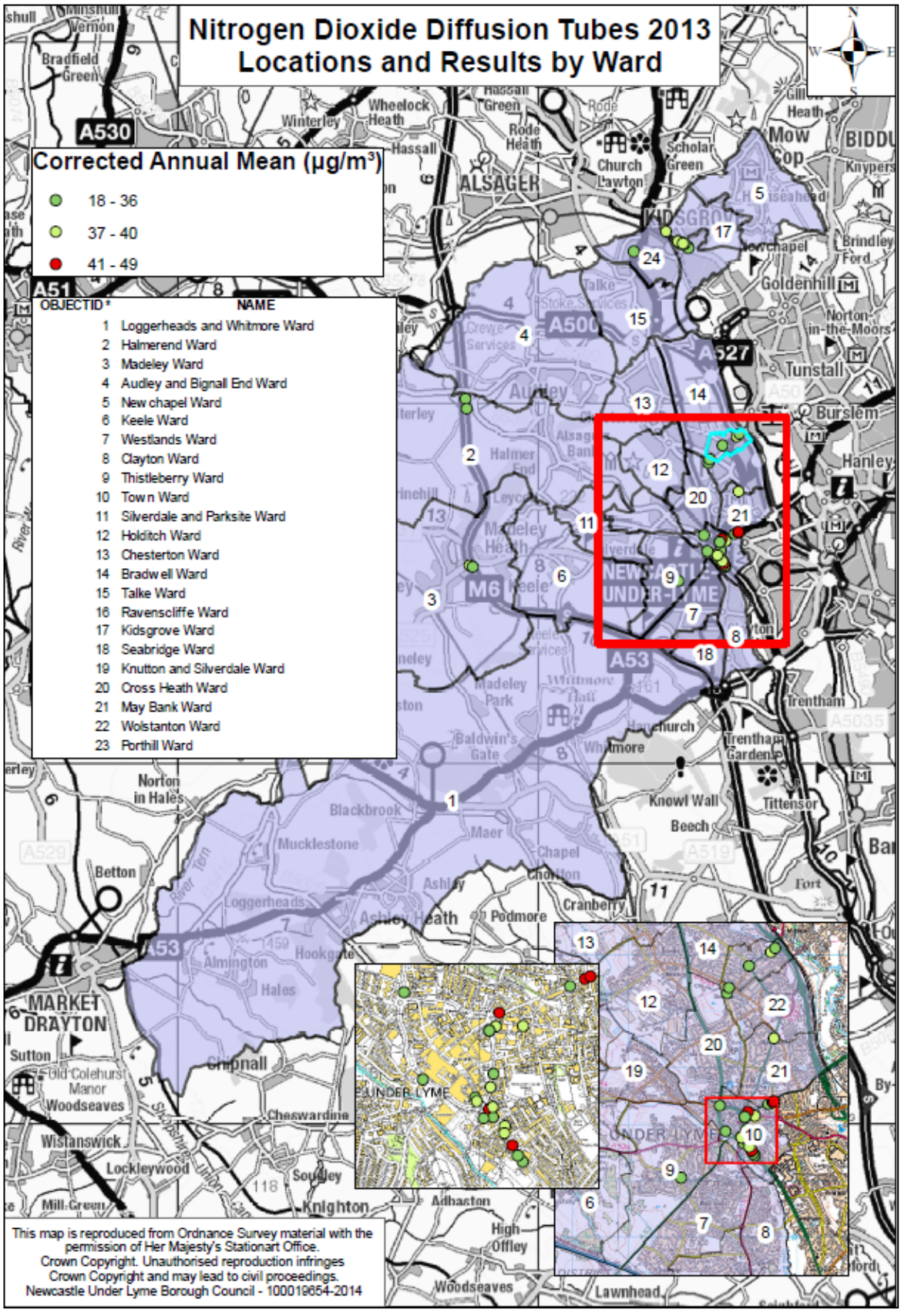


Table 5 Results of NO2 Diffusion Tubes 2013

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2013 (Number of Months or %) [a]	2013 Annual Mean Concentration (µg/m^3) - Bias Adjustment factor = 0.95 [b]
DTK1	A34 Holy Trinity	Kerbside	N	N	12	45.0
DTK2	76 King St, N/C	Urban Centre	N	N	12	32.9
DTUB1	Wolstanton (Haritngton St)	Kerbside	N	N	11	21.4
DTUB2	Westlands (4Sneyd Cr)	Kerbside	N	N	12	18.5
DT3	Madeley (Collingwood 3 Newcastle Rd)	Rural	N	N	12	36.4
DT6	Kidsgrove (106 Liverpool Rd)	Suburban	N	N	12	42.4
DT9	32 Porthill Bank	Suburban	N	N	12	35.6
DT11	34 London Road, N/C	Suburban	N	N	11	52.1
DT15	218 Congleton Road	Suburban	N	N	11	29.6
DT24	26 High St, May Bank	Roadside	N	N	12	37.0
DT28	Limbrick Cottage Shraleybrook	Rural	N	N	12	35.3
DT31	102 London Road	Suburban	N	N	12	30.2
DT32	139 Dims Parade West	Suburban	N	N	12	28.9
DT33	9 Hart Court, N/C	Suburban	N	N	12	32.1
DT34	15 Barracks Road	Urban Centre	N	N	10	37.7
DT39	4/6 Liverpool Road, Kidsgrove	Suburban	N	N	11	38.3
DT40	Banktop Court, Porthill	Suburban	N	N	12	34.8
DT41	Jubilee Baths, Newcastle	Urban Centre	N	y	12	37.0
DT42	Jubilee Baths, Newcastle	Urban Centre	N	y	12	35.7
DT43	Jubilee Baths, Newcastle	Urban Centre	N	y	12	36.7
DT46	1 London Road (Trinity Court)	Urban Centre	N	N	12	31.5
DT47	1 London Rd (Brook La)	Urban Centre	N	N	12	33.1
DT49	2 Vale View, Porthill	Urban Centre	N	N	12	33.3
DT50	84 London Road, Newcastle	Suburban	N	N	12	28.1
DT52	Agricon House Madeley	Rural	N	N	12	29.3
DT53	2 Knowle Bank Road Audley	Rural	N	N	12	31.1
DT62	79 Liverpool Road Kidsgrove	Roadside	N	N	12	28.0
DT63	9-11 The Avenue Kidsgrove	Roadside	N	N	12	30.9

Newcastle-under-Lyme Borough Council

Table 5 Results of NO2 Diffusion Tubes 2013						
Site ID	**Location**	**Site Type**	**Within AQMA?**	**Triplicate or Co-located Tube**	**Full Calendar Year Data Capture 2013 (Number of Months or %) [a]**	**2013 Annual Mean Concentration (µg/m^3) - Bias Adjustment factor = 0.95 [b]**
DT64	Kidsgrove Carpets 57 - 59 Liverpool Road	Roadside	N	N	12	37.6
DT72	134 High Street Newcastle	Roadside	N	N	10	30.4
DT73	21 London Road Newcastle	Roadside	N	N	12	35.7
DT74	39 London Road Newcastle	Roadside	N	N	12	38.9
DT76	11 Brunswick Street Newcastle	Roadside	N	N	12	36.3
DT77	68 Liverpool Road Kidsgrove	Urban Centre	N	N	12	28.5
DT78	140 Liverpool Road Kidsgrove	Urban Centre	N	N	12	23.1
DT79	89 Liverpool Road Kidsgrove	Urban Centre	N	N	12	31.1
DT84	102 King Street Newcastle	Urban Centre	N	N	12	40.1
DT85	106 King Street Newcastle	Urban Centre	N	N	12	45.1
DT86	Hassell C.P. School Barracks Road N/C	Urban Centre	N	N	12	34.8
DT87	Blue Chilli 1 King Street Newcastle	Urban Centre	N	N	12	40.3
DT88	27 Lower Street Newcastle	Urban Centre	N	N	12	34.0
DT89	Queens Gardens Newcastle	Urban Centre	N	y	11	34.9
DT90	Queens Gardens Newcastle	Urban Centre	N	y	11	33.5
DT91	Queens Gardens, Newcastle	Urban Centre	N	y	11	32.5
DT92	41/43 Liverpool Road Kidsgrove	Urban Centre	N	N	12	36.9
DT93	118 Liverpool Road Kidsgrove	Urban Centre	N	N	12	33.8
DT94	116 Liverpool Road Kidsgrove	Urban Centre	N	N	12	38.1
DT95	76 London Road Newcastle	Roadside	N	N	12	40.3
DT96	52/54 London Road Newcastle	Roadside	N	N	12	39.2
DT97	Blackfriars/ Lower Street	Roadside	N	N	12	36.7

In RED, exceedance of the NO_2 annual mean AQS objective of 40µg/m^3
Underlined, annual mean > 60µg/m^3, indicating a potential exceedance of the NO_2 hourly mean AQS objective

Newcastle-under-Lyme Borough Council

Table 6 Results of NO2 Diffusion Tubes (2007 to 2013)

Newcastle under Lyme Borough Council Local Air Quality Management
Nitrogen Dioxide Diffusion Tube Annual Mean Results by year and location 2007 to 2013
(red = exceedance of annual mean objective of 40µgm^3,orange= at risk or within 10% of annual mean objective, green= compliant)

Site ID	Location	Site Type	Within AQMA?	2007 (Bias Adjustment Factor = 0.88)	2008 (Bias Adjustment Factor = 0.98)	2009 (Bias Adjustment Factor = 0.81)	2010 (Bias Adjustment Factor = 0.85)	2011 (Bias Adjustment Factor = 0.88)	2012 Bias Adjustment Factor =0.97	2013 Bias Adjustment Factor = 0.95
DTK1	A34 Holy Trinity	Kerbside	N	**43**	**43.3**	**44.1**	**48.6**	**44.8**	**47.1**	**45.0**
DTK2	76 King St, N/C	Urban Centre	N	28.7	31.8	31	**42.8**	37.8	34.2	32.9
DTUB1	Wolstanton (Haritngton St)	Kerbside	N	20	21	19.8	24.7	21.1	23.7	21.4
DTUB2	Westlands (4Sneyd Cr)	Kerbside	N	17.7	17.5	18.3	21.1	18.7	18.6	18.5
DT3	Madeley (Collingwood 3 Newcastle Rd)	Rural	N	37.7	**40.5**	38.2	**40**	**40.3**	39.6	36.4
DT6	Kidsgrove (106 Liverpool Rd)	Suburban	N	37.5	**42.5**	**42.2**	**46**	**43.4**	**45.3**	**42.4**
DT9	32 Porthill Bank	Suburban	N	35.8	37.8	36	**41.1**	39.3	**40.4**	35.6
DT11	34 London Road, N/C	Suburban	N	39.9	**42**	**40.4**	**47.9**	**42.4**	**44.7**	**52.1**
DT15	218 Congleton Road	Suburban	N	27.8	28.4	29.5	34.3	31.4	32.2	29.6
DT24	26 High St, May Bank	Roadside	N	34.3	37	36.9	39.3	38.8	**40.9**	37.0
DT28	Limbrick Cottage Shraleybrook	Rural	N	38	**41.2**	36.5	39.5	37.6	36.8	35.3
DT31	102 London Road	Suburban	N	32.2	31.2	32.4	36.7	32.1	33.8	30.2
DT32	139 Dims Parade West	Suburban	N	27.4	29.7	30.8	33.9	31.3	32.3	28.9
DT33	9 Hart Court, N/C	Suburban	N	28.8	26.9	31.8	35.1	33.2	33.6	32.1
DT34	15 Barracks Road	Urban Centre	N	32.4	35	35.4	39.3	37.1	38.7	37.7
DT39	4/6 Liverpool Road, Kidsgrove	Suburban	N	33.7	37.3	36.3	**44.1**	39.8	39.9	38.3
DT40	Banktop Court, Porthill	Suburban	N	30.8	31.1	32.5	35.8	34.7	33.8	34.8

Newcastle-under-Lyme Borough Council

Site ID	Location	Site Type	Within AQMA?	2007 (Bias Adjustment Factor = 0.88)	2008 (Bias Adjustment Factor = 0.98)	2009 (Bias Adjustment Factor = 0.81)	2010 (Bias Adjustment Factor = 0.85)	2011 (Bias Adjustment Factor = 0.88)	2012 Bias Adjustment Factor =0.97	2013 Bias Adjustment Factor = 0.95
DT41	Jubilee Baths, Newcastle	Urban Centre	N	32.2	35.9	35.7	**40.9**	39	38.9	37.0
DT42	Jubilee Baths, Newcastle	Urban Centre	N	32.9	36.9	36.9	**40.1**	39.5	38.4	35.7
DT43	Jubilee Baths, Newcastle	Urban Centre	N	33.1	35.6	35.8	**40.7**	38.6	37.6	36.7
DT46	1 London Road (Trinity Court)	Urban Centre	N	31.4	39.5	31.6	36.2	33.4	35.3	31.5
DT47	1 London Rd (Brook La)	Urban Centre	N	33.8	35.9	34.3	37.6	32.3	34.4	33.1
DT49	2 Vale View, Porthill	Urban Centre	N	30.2	31.3	32.8	37.8	34.9	35.6	33.3
DT50	84 London Road, Newcastle	Suburban	N	29.3	32.1	28.9	32.9	30.2	30.2	28.1
DT52	Agricon House Madeley	Rural	N	27.2	32.5	31.2	32.2	32.9	31.1	29.3
DT53	2 Knowle Bank Road Audley	Rural	N	32.4	35	32.5	33.4	34.8	34.0	31.1
DT62	79 Liverpool Road Kidsgrove	Roadside	N	-	38.1	27.9	30.7	29.6	30.1	28.0
DT63	911 The Avenue Kidsgrove	Roadside	N	-	**40**	28.8	33.2	30.5	31.9	30.9
DT64	Kidsgrove Carpets 57 59 Liverpool Road	Roadside	N	-	**48.4**	38.9	**41.6**	**40.1**	**41.1**	37.6
DT72	134 High Street Newcastle	Roadside	N	-	-	32.1	35.8	34.1	34.4	30.4
DT73	21 London Road Newcastle	Roadside	N	-	-	33.1	**41.2**	36.1	37.6	35.7
DT74	39 London Road Newcastle	Roadside	N	-	-	35.2	**43**	37.6	38.8	38.9
DT76	11 Brunswick Street Newcastle	Roadside	N	-	-	37.4	**42.2**	37	37.0	36.3
DT77	68 Liverpool Road Kidsgrove	Urban Centre	N	-	-	26.9	31.4	28.8	28.4	28.5

Newcastle-under-Lyme Borough Council

Site ID	Location	Site Type	Within AQMA?	2007 (Bias Adjustment Factor = 0.88)	2008 (Bias Adjustment Factor = 0.98)	2009 (Bias Adjustment Factor = 0.81)	2010 (Bias Adjustment Factor = 0.85)	2011 (Bias Adjustment Factor = 0.88)	2012 Bias Adjustment Factor =0.97	2013 Bias Adjustment Factor = 0.95
DT78	140 Liverpool Road Kidsgrove	Urban Centre	N			21.9	25.2	22.5	24.3	23.1
DT79	89 Liverpool Road Kidsgrove	Urban Centre	N			30.4	35.6	33.5	33.5	31.1
DT84	102 King Street Newcastle	Urban Centre	N				**46.8**	**41.2**	**43.9**	**40.1**
DT85	106 King Street Newcastle	Urban Centre	N				**54.9**	**52.1**	**49.1**	**45.1**
DT86	Hassell C.P. School Barracks Road N/C	Urban Centre	N				**43.3**	33.6	37	34.8
DT87	Blue Chilli 1 King Street Newcastle	Urban Centre	N				**52.2**	**42**	**43.4**	**40.3**
DT88	27 Lower Street Newcastle	Urban Centre	N				**44.8**	33.6	37.7	34.0
DT89	Queens Gardens Newcastle	Urban Centre	N				**43.8**	34.2	34.9	34.9
DT90	Queens Gardens Newcastle	Urban Centre	N				**42.5**	34.4	37	33.5
DT91	Queens Gardens, Newcastle	Urban Centre	N				**44.7**	34.2	36.6	32.5
DT92	41/43 Liverpool Road Kidsgrove	Urban Centre	N					35.8	39	36.9
DT93	118 Liverpool Road Kidsgrove	Urban Centre	N					35.2	37.8	33.8
DT94	116 Liverpool Road Kidsgrove	Urban Centre	N					36.3	39.2	38.1
DT95	76 London Road Newcastle	Roadside	N					37.1	**40.8**	**40.3**
DT96	52/54 London Road Newcastle	Roadside	N					**40.5**	**44.9**	39.2
DT97	Blackfriars/ Lower Street	Roadside	N					35.2	39.6	36.7

In RED, exceedance of the NO2 annual mean AQS objective of 40µg/m3 Underlined, annual mean > 60µg/m3, indicating a potential exceedance of the NO2 hourly mean AQS objective

Figure 5: Map of Kidsgrove and Butt Lane showing NO_2 diffusion tube results for 2013

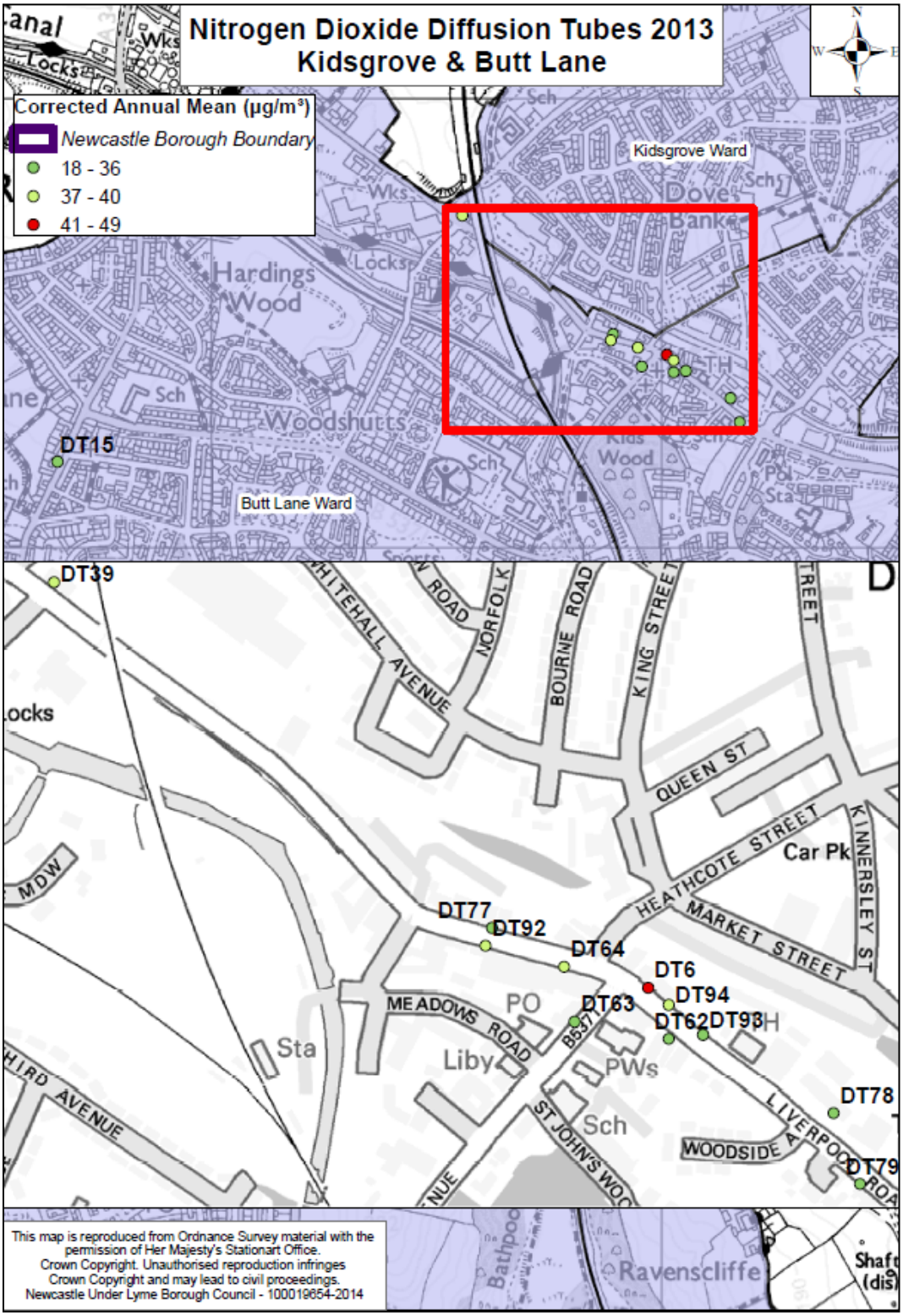


Figure 6: Map of Shraleybrook and Madeley showing NO_2 diffusion tube results for 2013

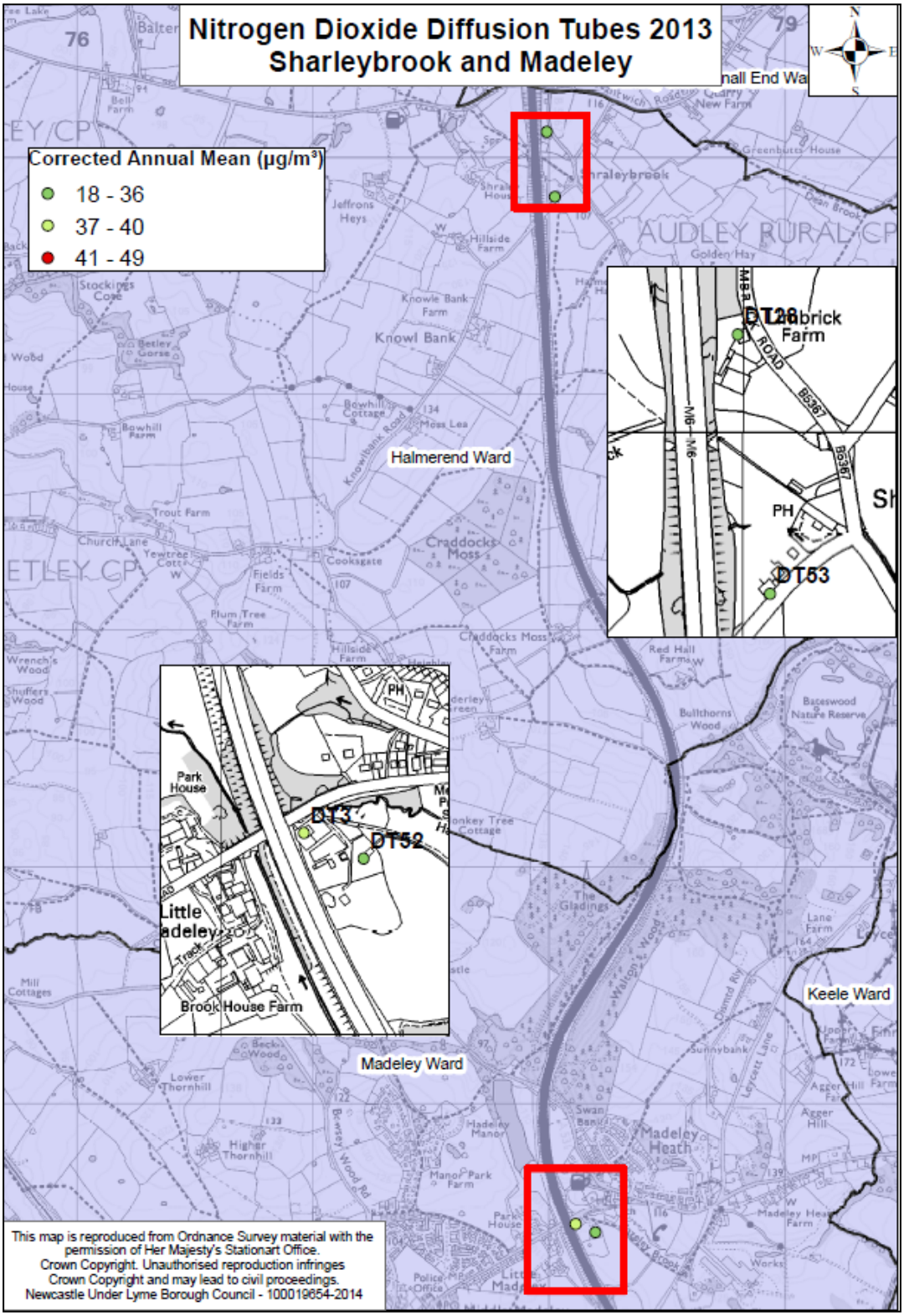


Figure 7: Map of Newcastle Town Centre showing NO_2 diffusion tube results for 2013

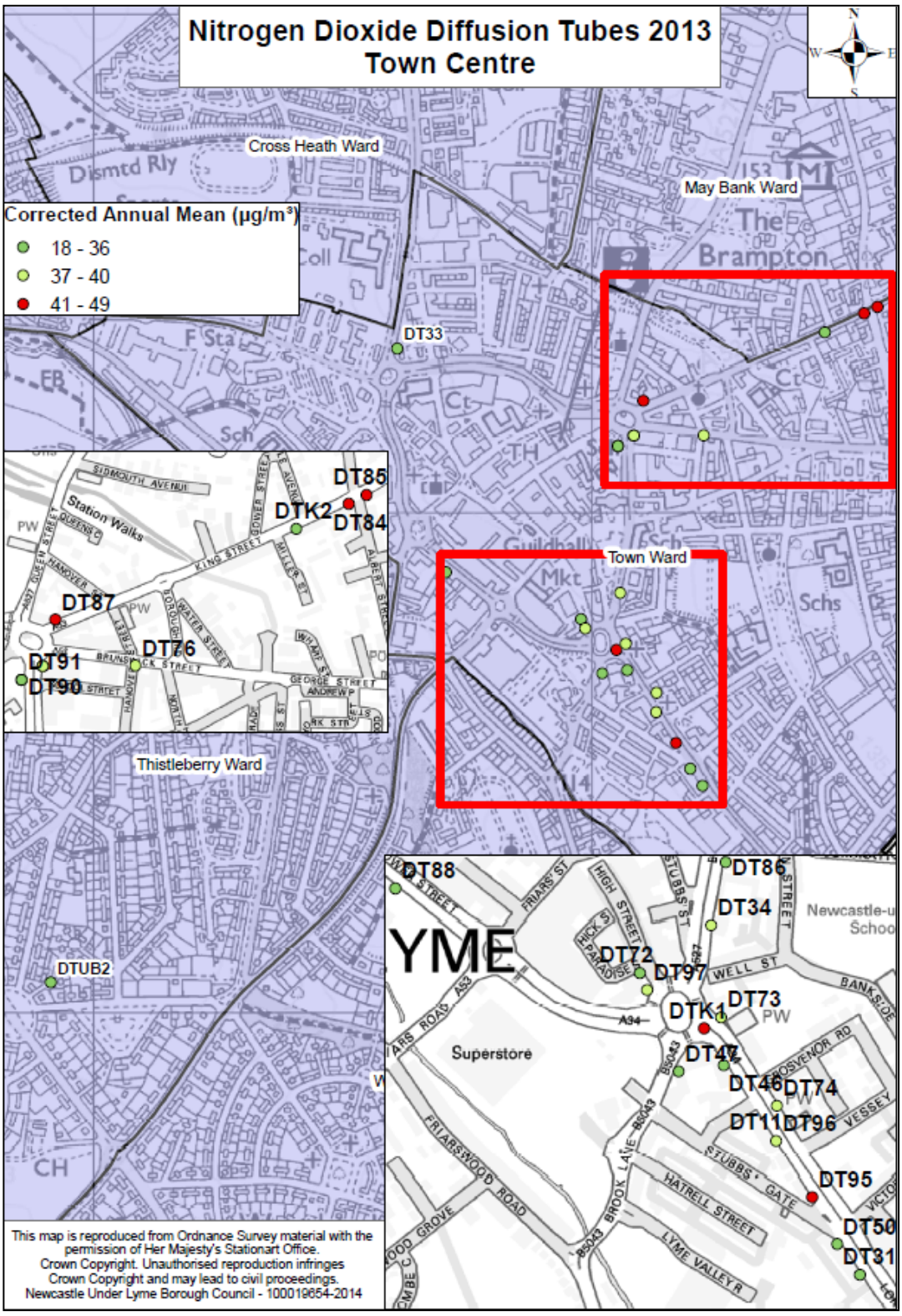
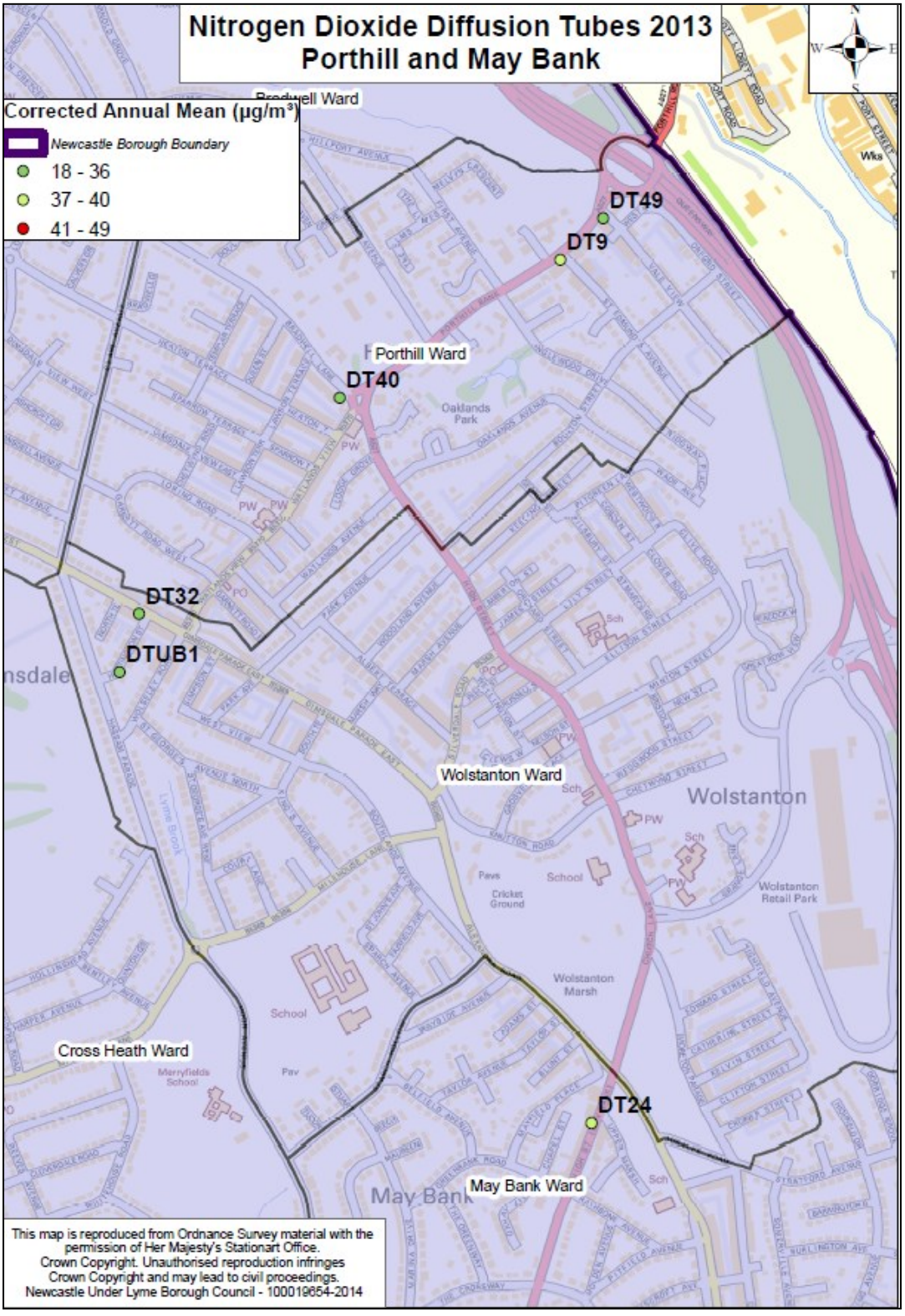


Figure 8: Map of Porthill and Maybank showing NO_2 diffusion tube results for 2013



2.3 Trends in annual mean $N0_2$ exposure

The results obtained for 2013 have been compared with previous year's results as far back as 2007 and these are reproduced in Table 6. For sites which have been monitored since at least 2008, trends have been plotted and these are shown in **Figures 9** to **33** together with appropriate comments.

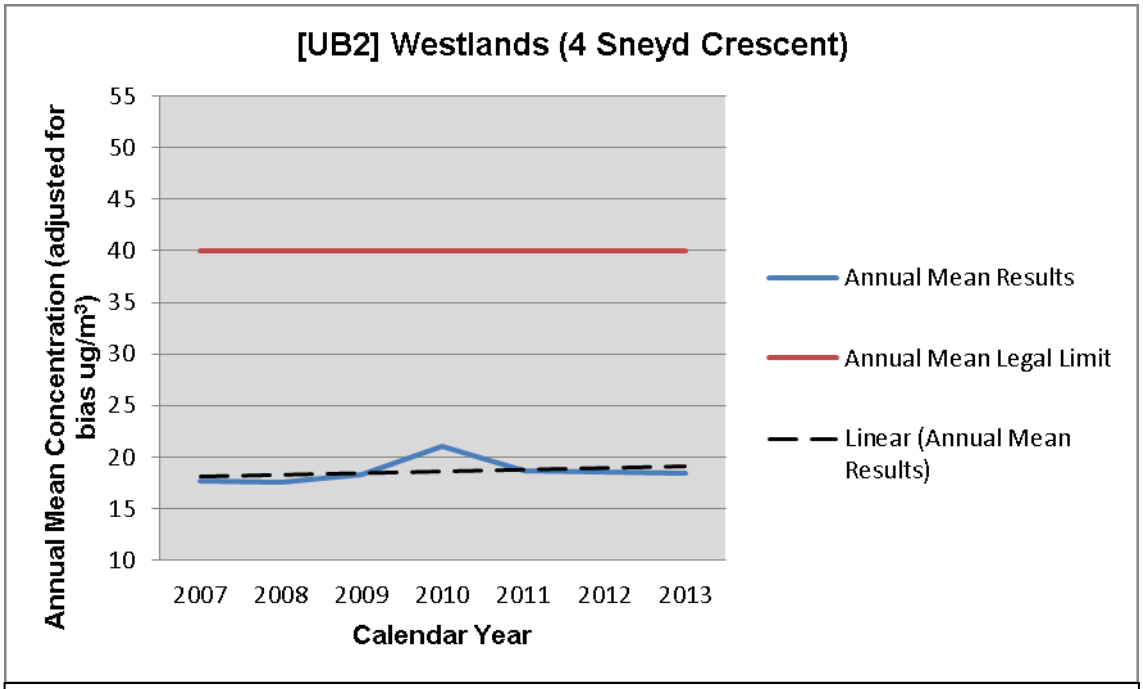


Figure 9 Long term annual mean $N0_2$ trends at urban background site DT UB2 4 Sneyd Crescent, Westlands

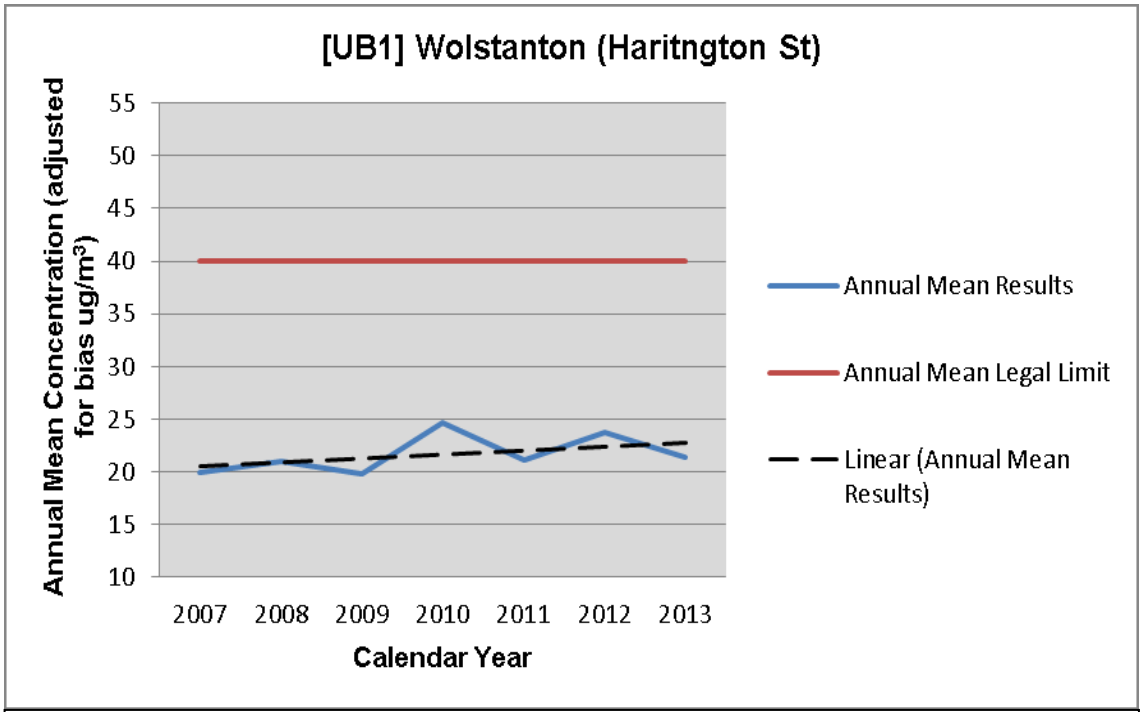


Figure 10 Long term annual mean $N0_2$ trends at urban background site DTUB1, Hartington Street, Wolstanton

Long term trends in urban background concentrations of $N0_2$, represented here by Figure 9 and Figure 10, show a slight increasing trend in $N0_2$ concentrations.

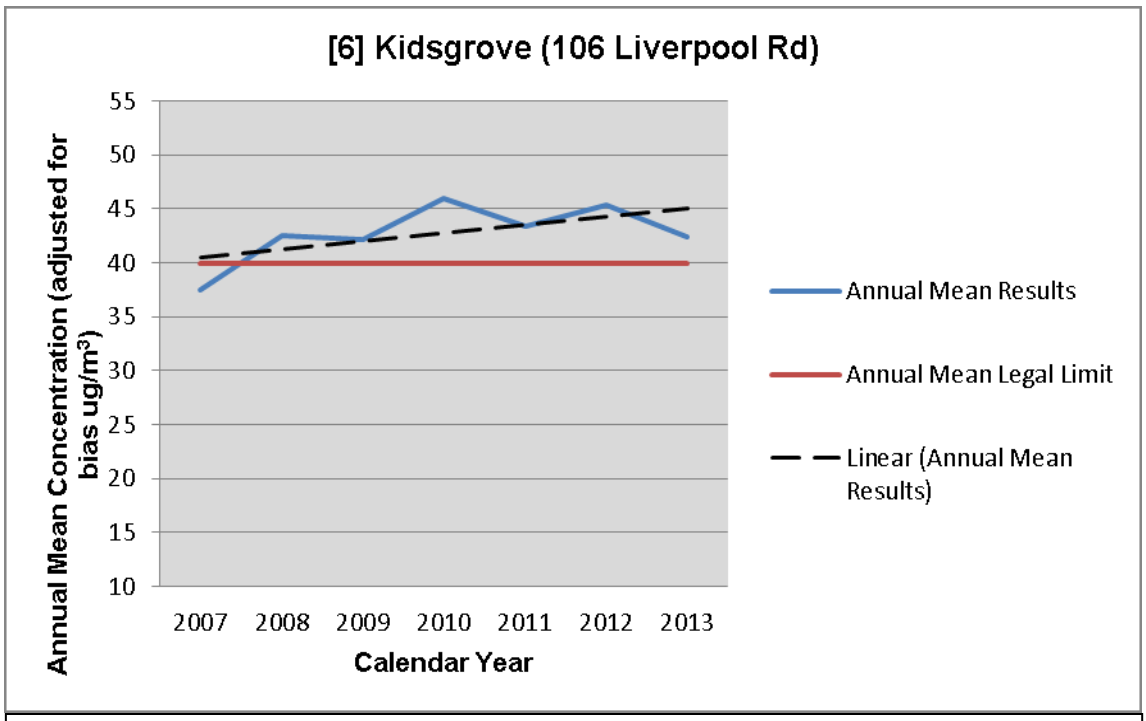


Figure 11 Long term annual mean $N0_2$ trends at site DT6, 106 Liverpool Road, Kidsgrove

Diffusion tube site 6, (Figure 11), is representative of relevant exposure, being located on the façade of a dwelling. This site is also adjacent to a traffic lighted junction and is located on the A50 Liverpool Road which is a heavily trafficked main road in this area. The annual mean level of nitrogen dioxide exposure in this location is exhibiting an upward trend, with exceedances of the relevant objective in each of the last five years.

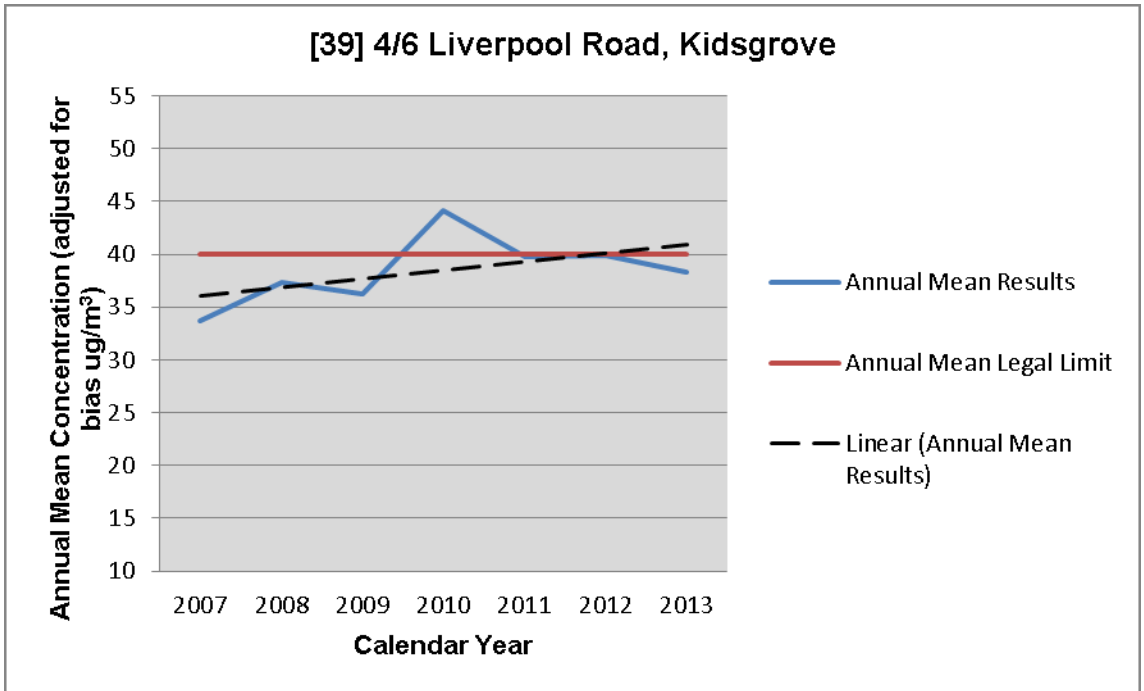


Figure 12 Long term annual mean $N0_2$ trends at site DT39, 4-6 Liverpool Road, Kidsgrove

Newcastle-under-Lyme Borough Council

Diffusion tube site 39 (*Figure 12*) is representative of relevant exposure, being located on the façade of a dwelling backside of the pavement edge. This site is located on the A50 Liverpool Road which is a heavily trafficked main road in this area. The annual mean level of nitrogen dioxide exposure in this location is exhibiting a gradual upward trend, with an exceedance of the relevant objective in 2010 and a slight reduction below the annual mean objective from 2011 to 2013.

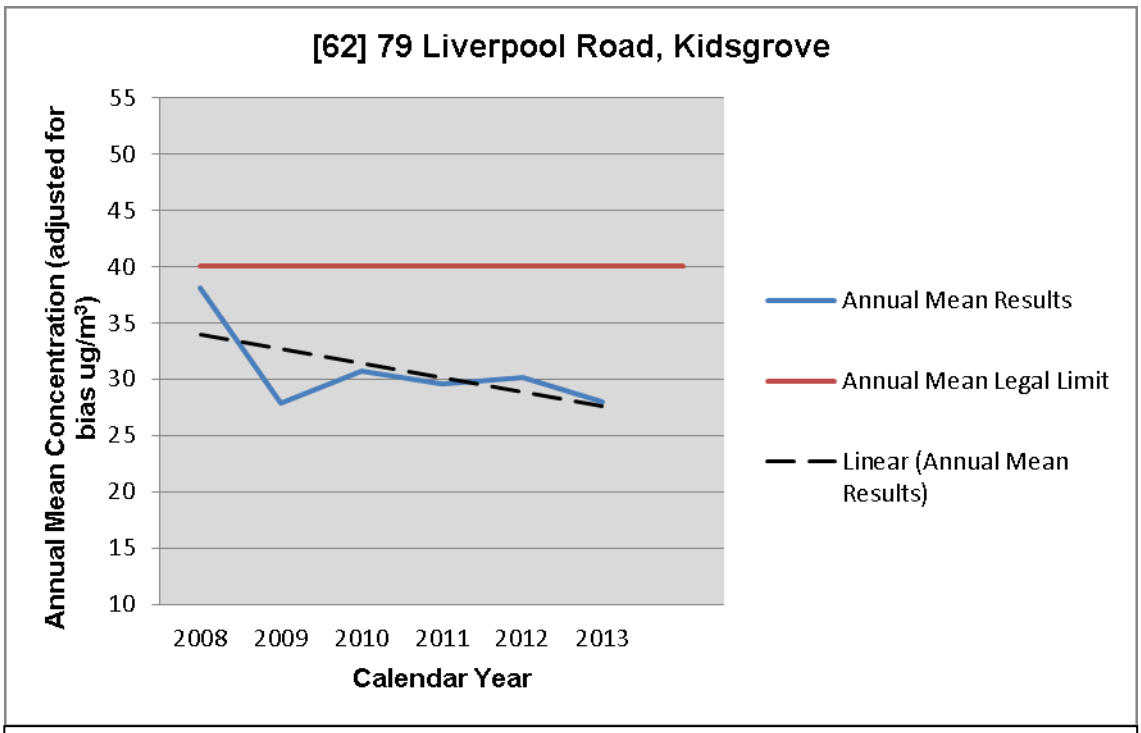


Figure 13 Long term annual mean $N0_2$ trends at site DT62, 79 Liverpool Road, Kidsgrove

Diffusion tube site 62 (Figure 13) is representative of relevant exposure, being located on the façade of a dwelling which is located on an incline. This site is located on the A50 Liverpool Road which is a heavily trafficked main road in this area. The annual mean level of nitrogen dioxide exposure in this location is exhibiting a gradual downward trend, with no exceedances of the relevant objective having been observed in the last five years.

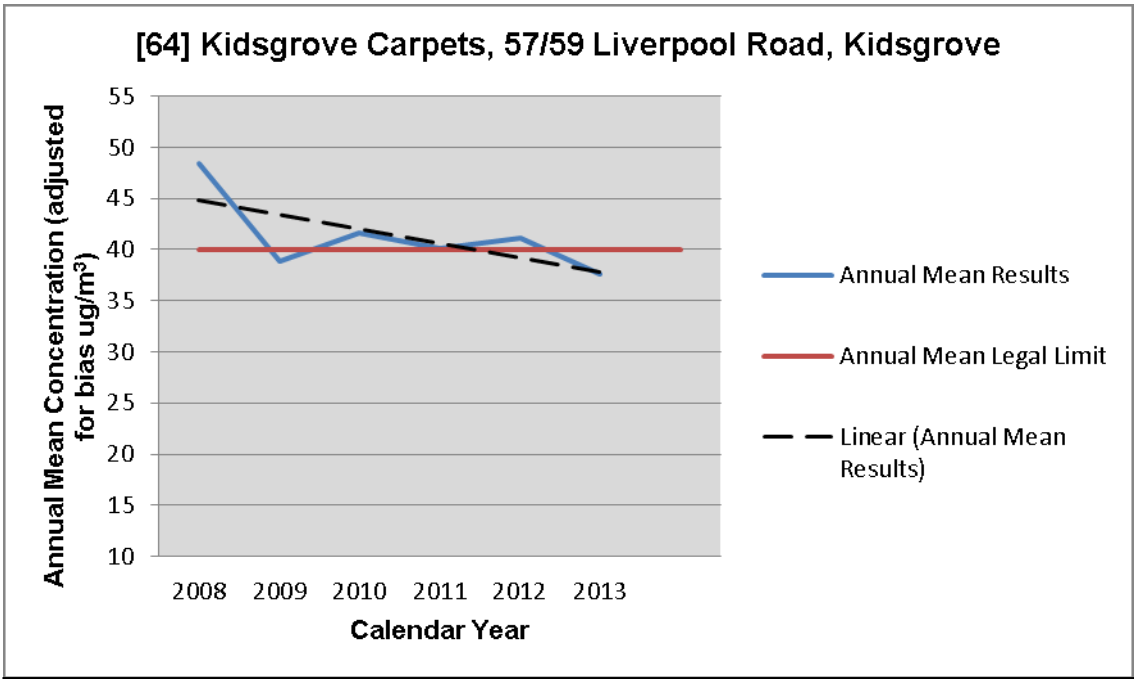


Figure 1 Long term annual mean $N0_2$ trends at site DT64, 57-59 Liverpool Road, Kidsgrove

Diffusion tube site 64 (Figure 144) is representative of relevant exposure, being located on the façade of a dwelling which is located on an incline. This site is located on the A50 Liverpool Road, which is a heavily trafficked main road in this area and in close proximity to a signalised traffic junction. The annual mean level of nitrogen dioxide exposure in this location is exhibiting a gradual downward trend, with exceedances of the relevant objective having been observed in four of the last five years.

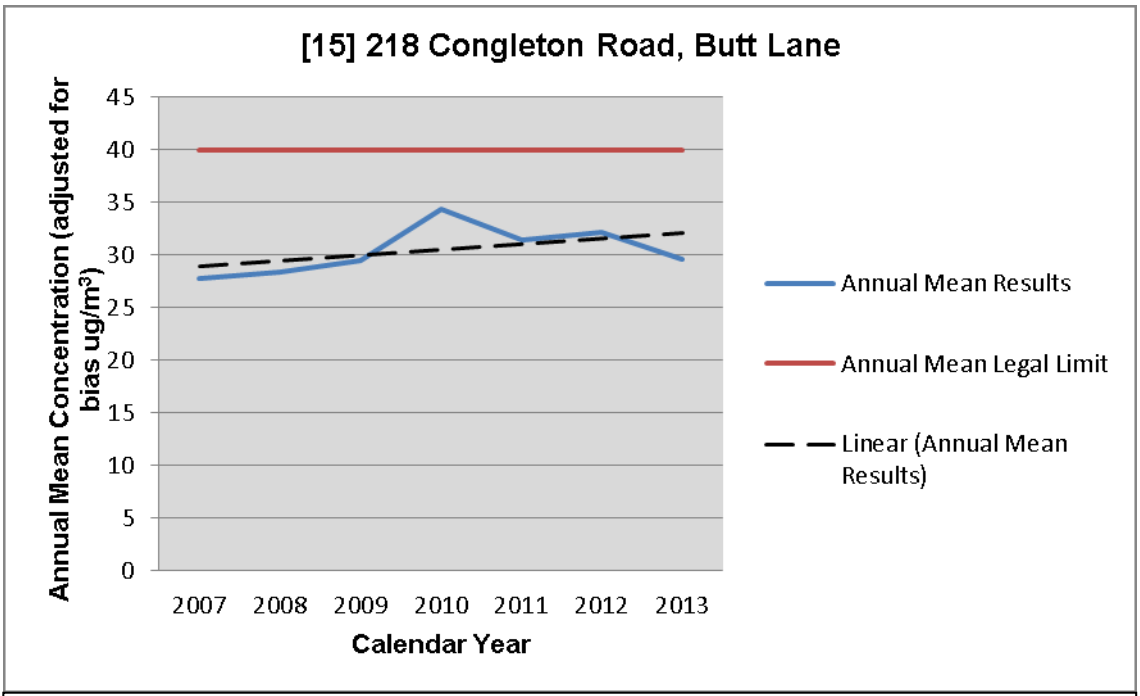


Figure 2 Long term annual mean $N0_2$ trends at site DT15, 218 Congleton Road, Butt Lane

Newcastle-under-Lyme Borough Council

Diffusion tube site 15 (Figure 155) is representative of relevant exposure and is representative of potential worst case exposure in Congleton Road, being sited on a gradient and in close proximity to a traffic lighted junction and slow moving traffic. This site is exhibiting a gradual upward trend in annual mean NO_2 concentrations.

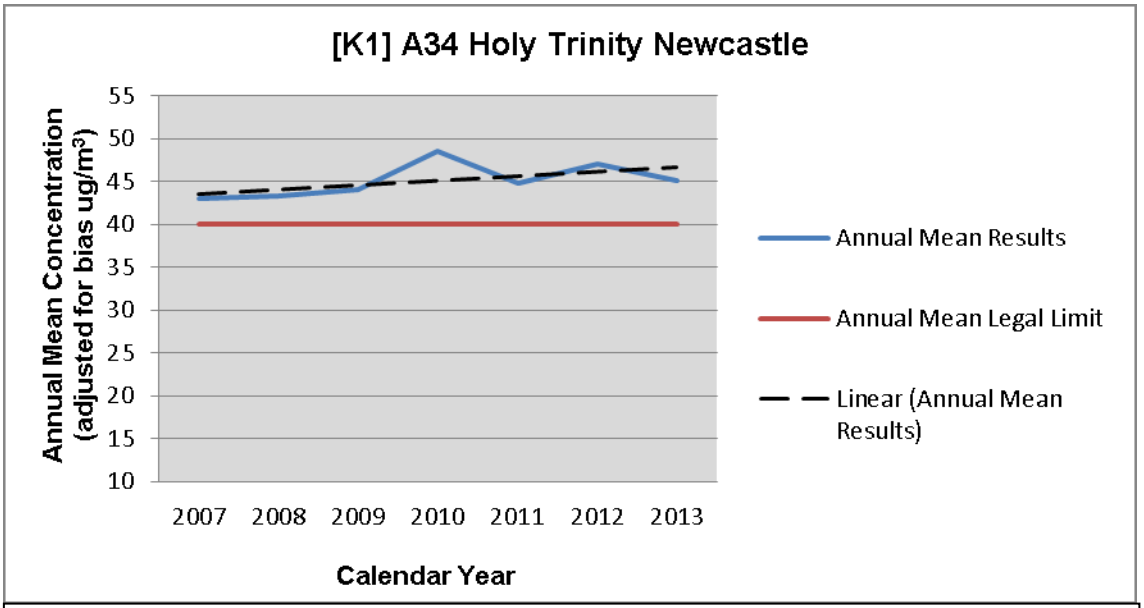


Figure 3 Long term annual mean $N0_2$ trends at site DTK1, A34 Holy Trinity

Diffusion tube site K1 (Figure 166) is not representative of relevant exposure being sited on a lamppost adjacent to the A34 dual carriageway. This site does however form part of the national $N0_2$ diffusion tube monitoring network. This site is exhibiting a moderate upward trend in annual mean $N0_2$ concentrations.

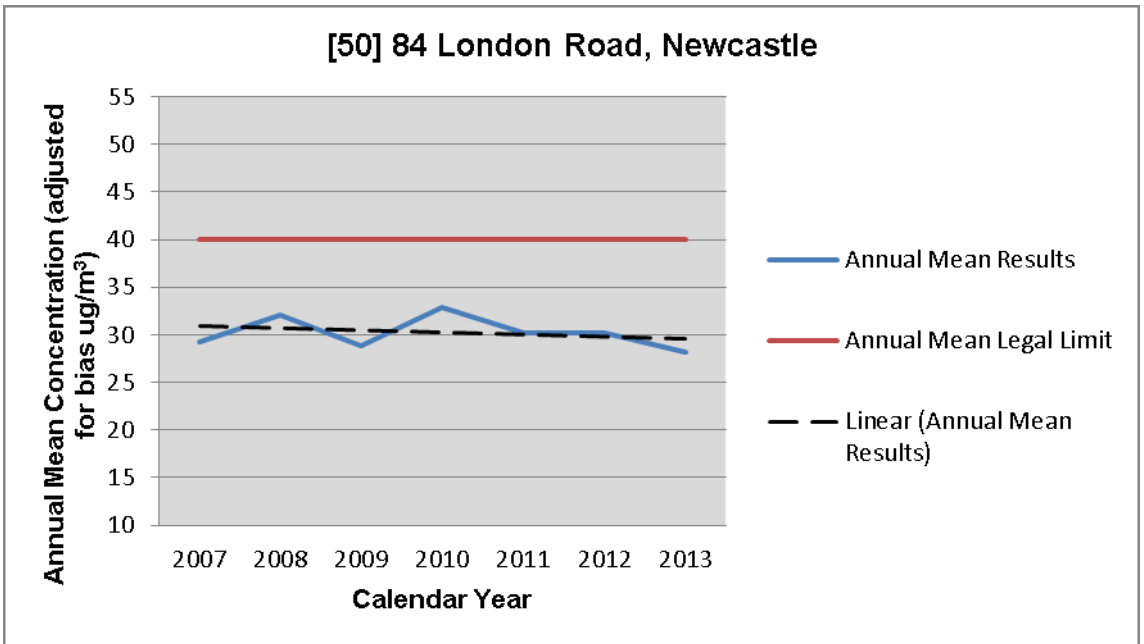


Figure 4 Long term annual mean $N0_2$ trends at site DT50, 84 London Road, Newcastle

Newcastle-under-Lyme Borough Council

Diffusion tube site 50 (Figure 177) is representative of relevant exposure being sited on the façade of a terraced property which sits on the backside of the footway adjacent to the A34. This is one of the major routes into the Borough and is heavily used by HGV's throughout the day. Traffic outside this property tends to be free flowing. This site is exhibiting a neutral trend in annual mean NO_2 concentrations.

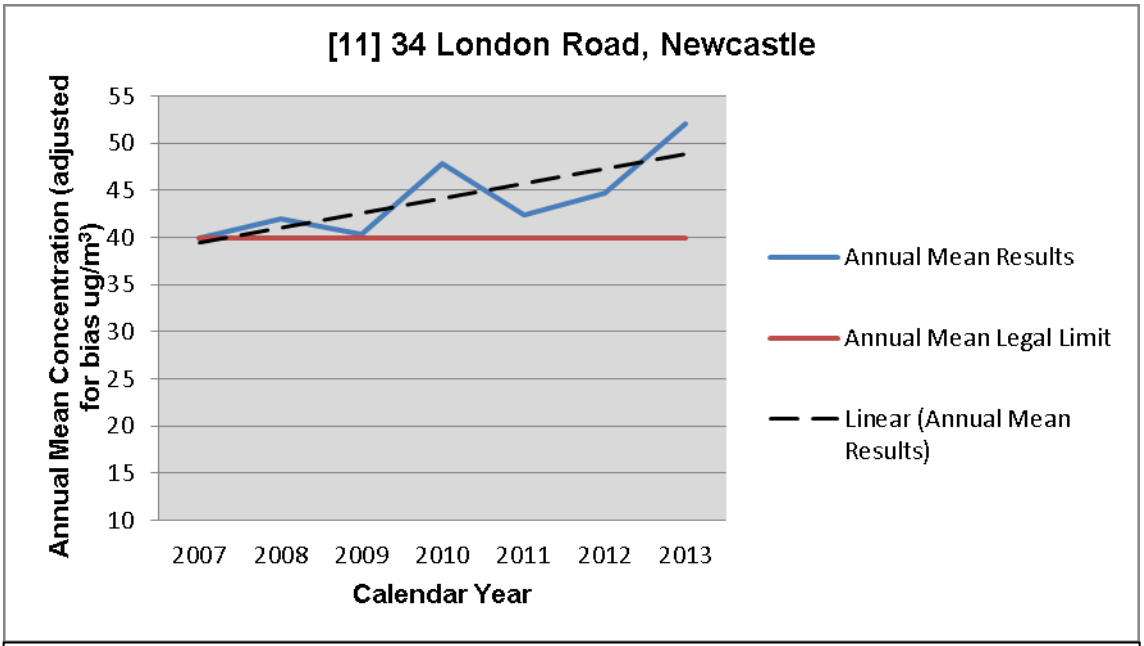


Figure 5 Long term annual mean $N0_2$ trends at site DT11, 34 London Road, Newcastle

Diffusion tube site 11 (Figure 188) is representative of relevant exposure being sited on the façade of a house in a row of terraced properties which site on the footway adjacent to the A34. This is one of the major routes into the Borough and is heavily used by HGV's throughout the day. This site has exceeded the annual mean objective in five of the past six years and is showing an upward trend in NO_2 exposure.

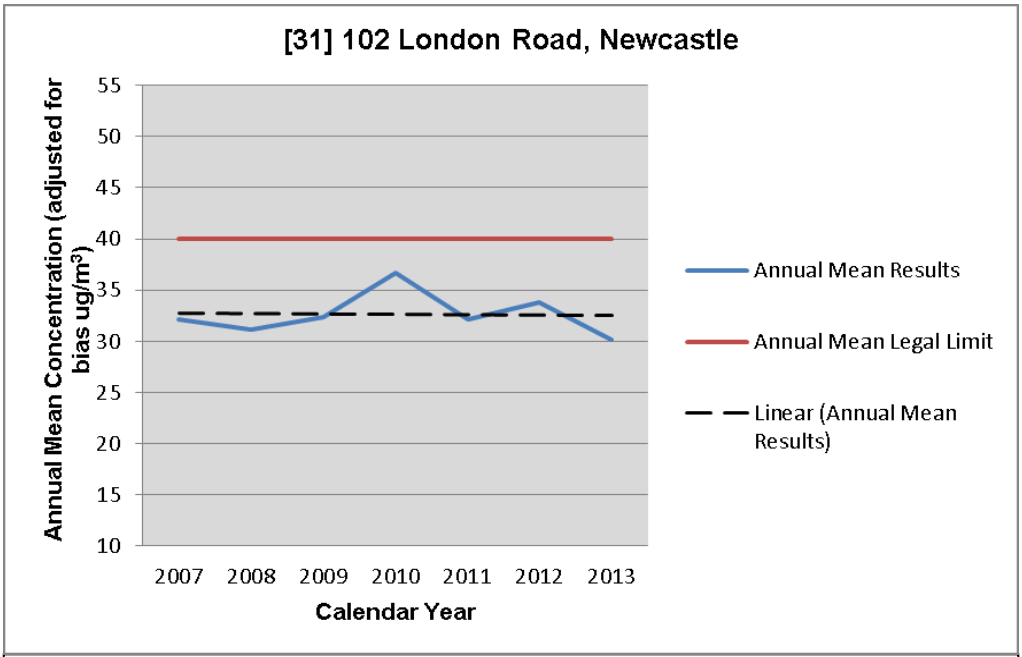


Figure 19 Long term annual mean $N0_2$ trends at site DT11, 34 London Road, Newcastle

Diffusion tube site 31 (Figure 9) is representative of relevant exposure being sited on the façade of a house in a row of terraced properties which site on the footway adjacent to the A34. This is one of the major routes into the Borough and is heavily used by HGV's throughout the day. This site is exhibiting a slight downward trend in NO_2 exposure.

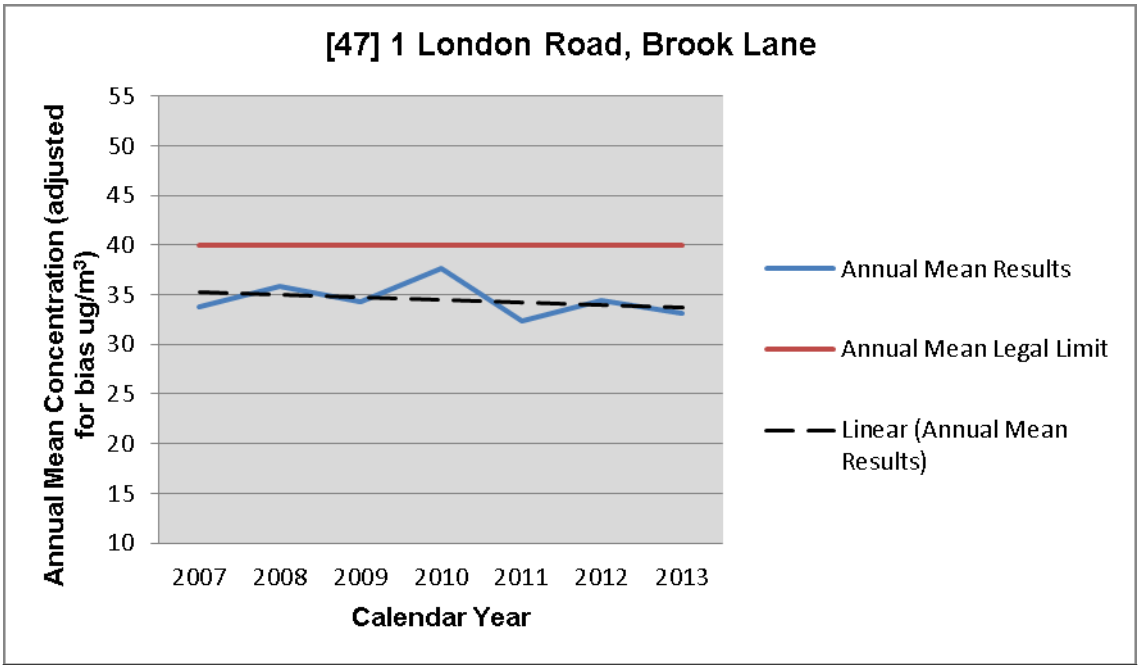


Figure 6 Long term annual mean $N0_2$ trends at site DT47, 1 London Road (Brook Lane Façade), Newcastle

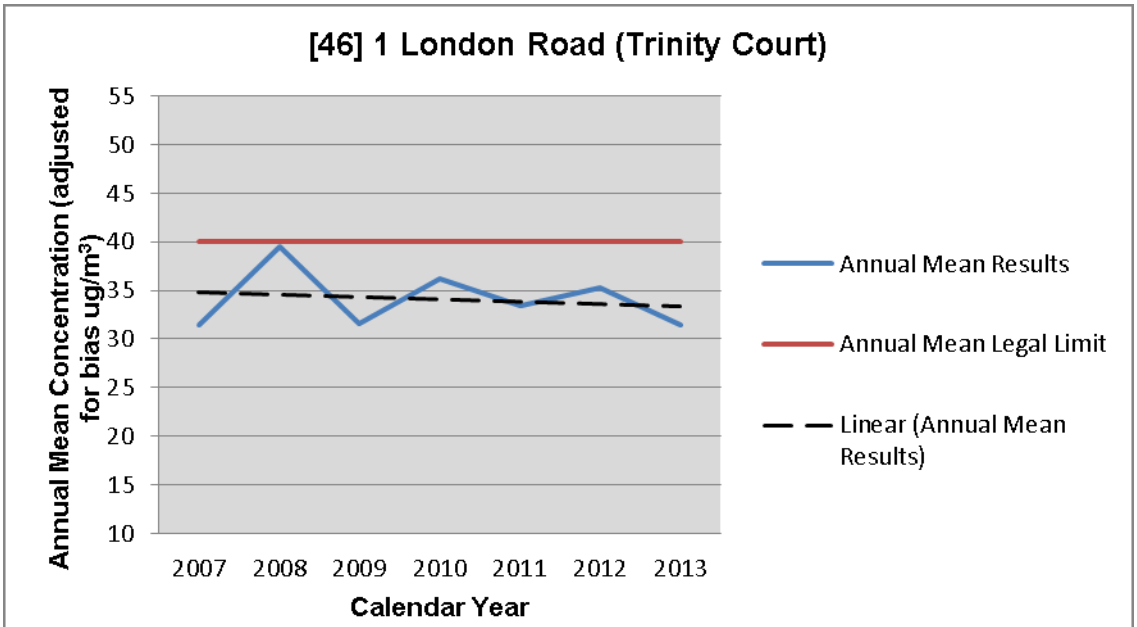


Figure 7 Long term annual mean $N0_2$ trends at site DT46, 1 London Road, (London Road Façade) Newcastle

Diffusion tube sites 46 and 47 (Figure ***20***20 and 21) are representative of relevant exposure being located on the façade of a block of flats which sit on a footway adjacent to a major roundabout on the A34 and town centre ring road. This forms one of the major routes into the town centre. Traffic around this location tends to flow freely. There is a neutral trend in NO_2 exposure in this location.

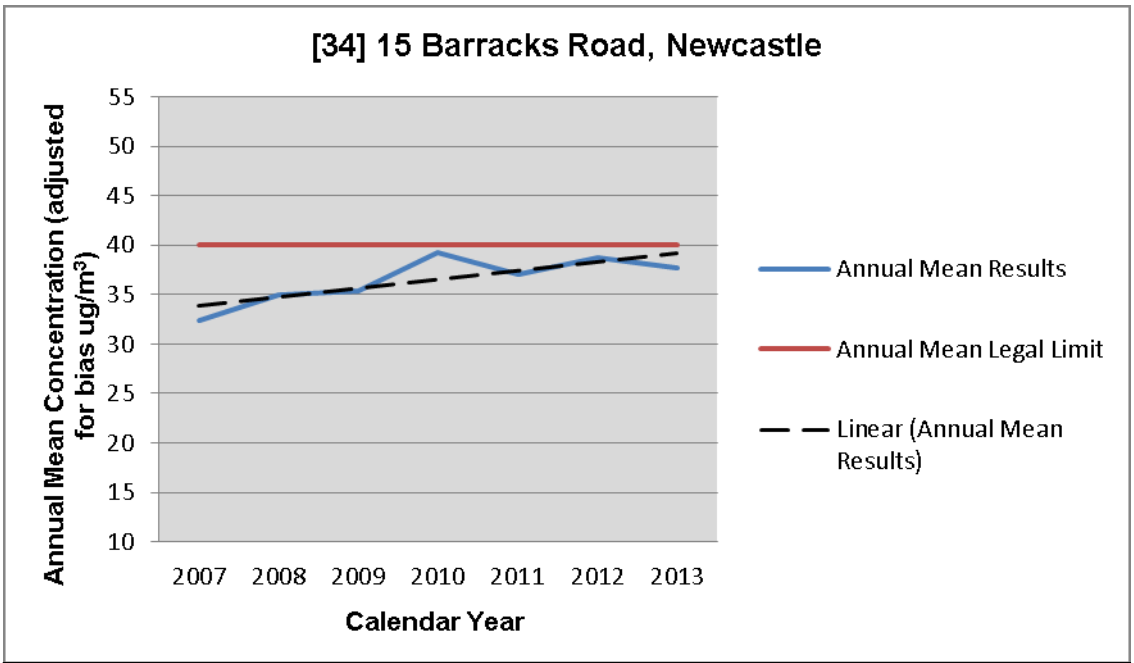


Figure 22 Long term annual mean $N0_2$ trends at site DT34, 15 Barracks Road, Newcastle

Diffusion tube site 34 (Figure 22) is representative of relevant exposure being sited on the façade of a terraced property which sits on the footway adjacent to the town centre ring road. At peak times there is quite often slow moving and queuing traffic in this location. This site is exhibiting a gradual upward trend in $N0_2$ exposure and there is a risk of breaching the annual mean objective in future years.

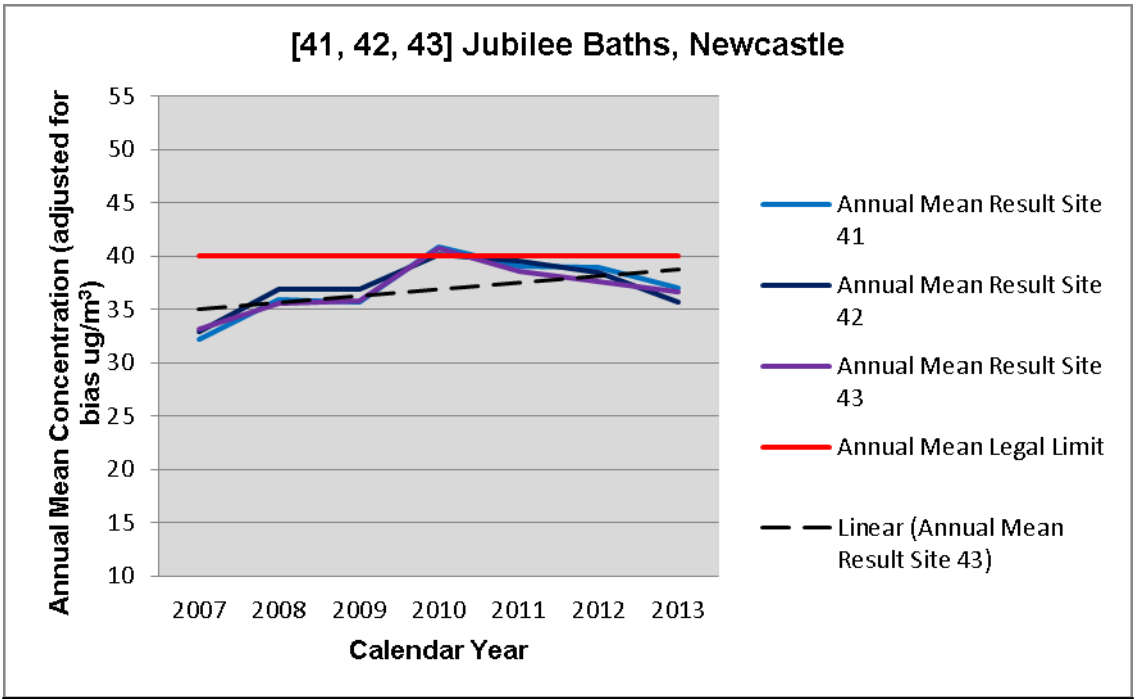


Figure 23 Long term annual mean $N0_2$ trends at site DT41-43, Jubilee Baths, Newcastle

Diffusion tube sites 41-43 (Figure 23) is not currently representative of relevant exposure being located on the site of the former Jubilee Pool. This site sits adjacent to the town centre ring road and the Nelson Place Roundabout which is an important junction for traffic entering and leaving the Borough and travelling around the town centre. This site is currently up for sale with proposal for residential use being considered. At peak times there is quite often slow moving and queuing traffic in this location. This site is exhibiting a gradual upward trend in $N0_2$ exposure and there is a risk of breaching the annual mean objective in future years.

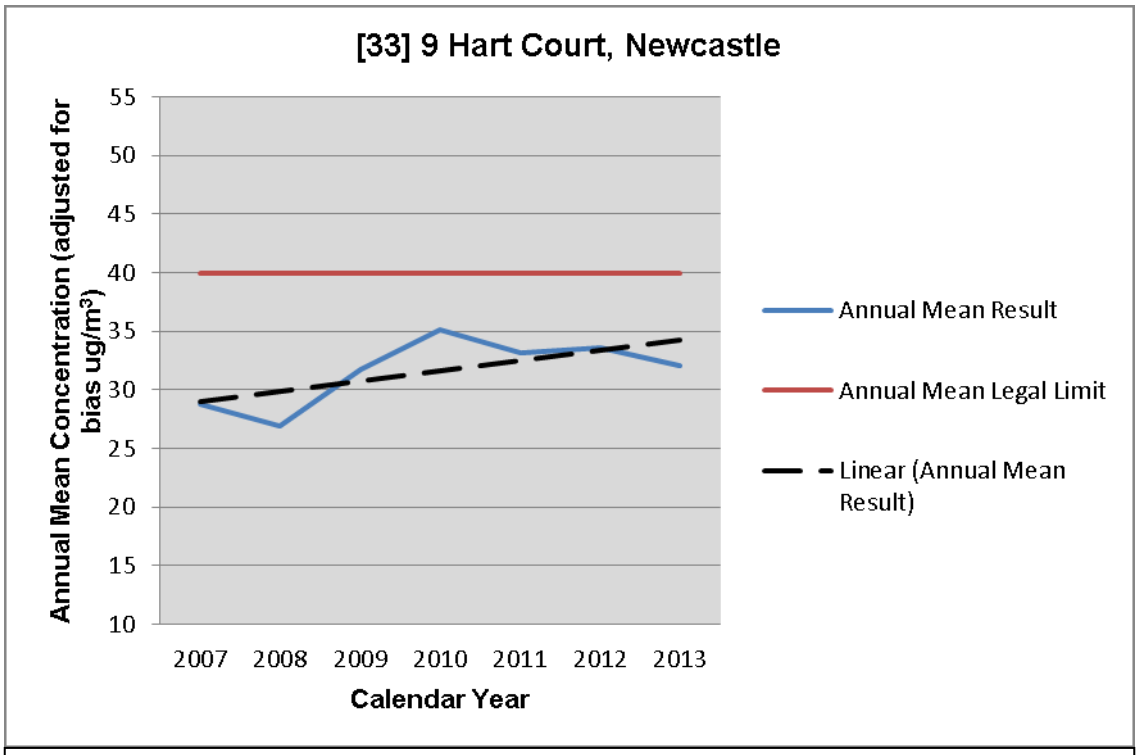


Figure 24 Long term annual mean $N0_2$ trends at site DT33- 9 Hart Court, Newcastle

Diffusion tube site 33 (Figure 4) site is representative of relevant exposure being located on the façade of a flat in proximity to one of the major roundabouts on the town centre ring road. At peak times there is quite often queuing traffic on the roundabout and the adjoining roads. There is an increasing trend in trend in $N0_2$ exposure at this site.

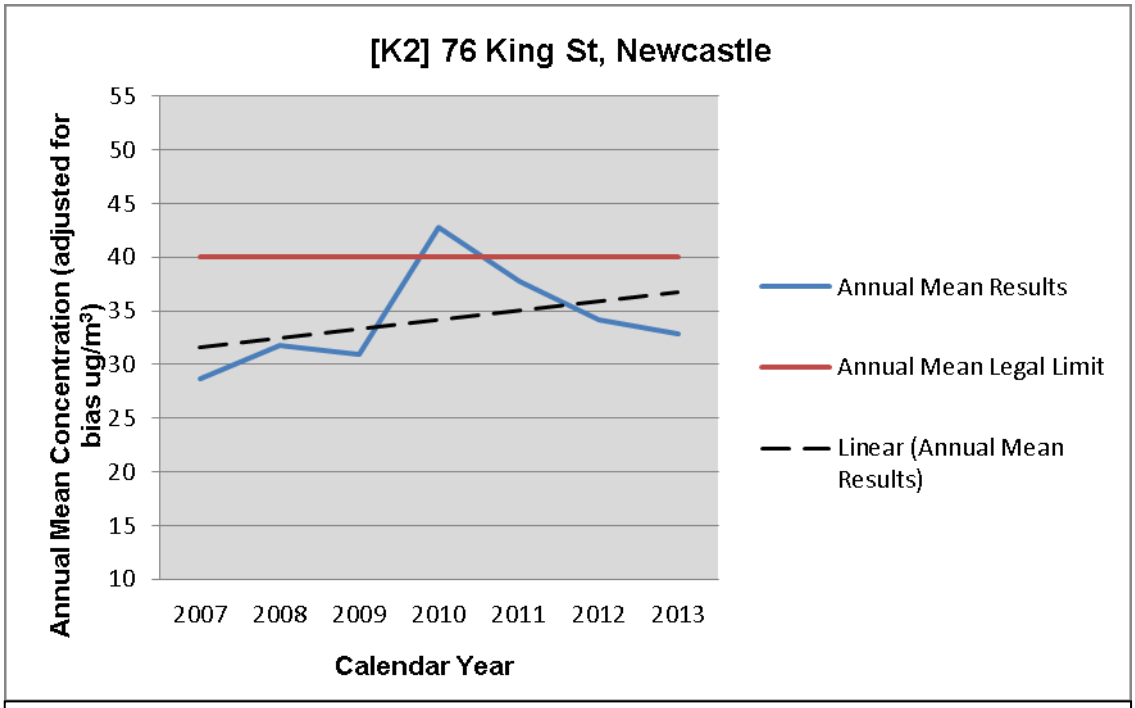


Figure 8 Long term annual mean $N0_2$ trends at site K2- 76 King Street, Newcastle

Diffusion tube site K2 (Figure 255) site is representative of relevant exposure being located on the façade of a house located on the A53 which is forms one of the major routes between Newcastle and Stoke on Trent. At peak times there is quite often queuing traffic on the road. This site is exhibiting an increasing trend in $N0_2$ exposure.

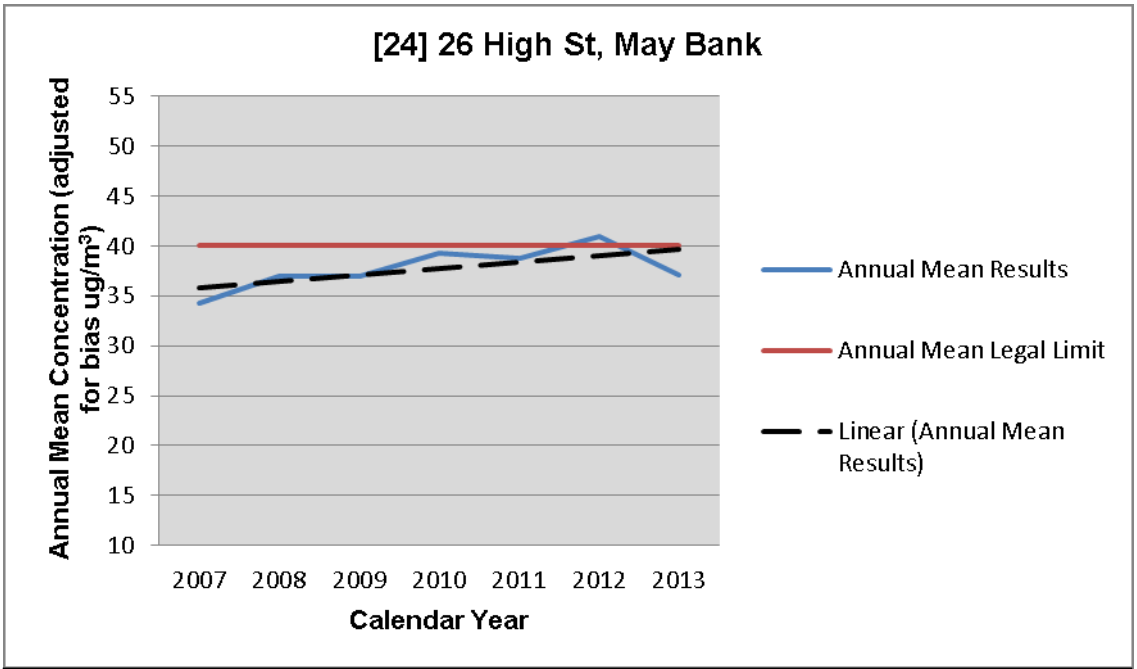


Figure 9 Long term annual mean $N0_2$ trends at site 24- 26 High Street May Bank

Diffusion tube site 24 (Figure 266) is representative of relevant exposure being located on the façade of a house located adjacent to a zebra crossing and a traffic lighted junction. At peak times there is quite often queuing traffic on the road. This site had previously exhibited an increasing trend in NO2 exposure; however the annual mean of NO_2 at this site reduced in 2013 and is now below the annual mean objective. However, there is an overall increasing trend in this location.

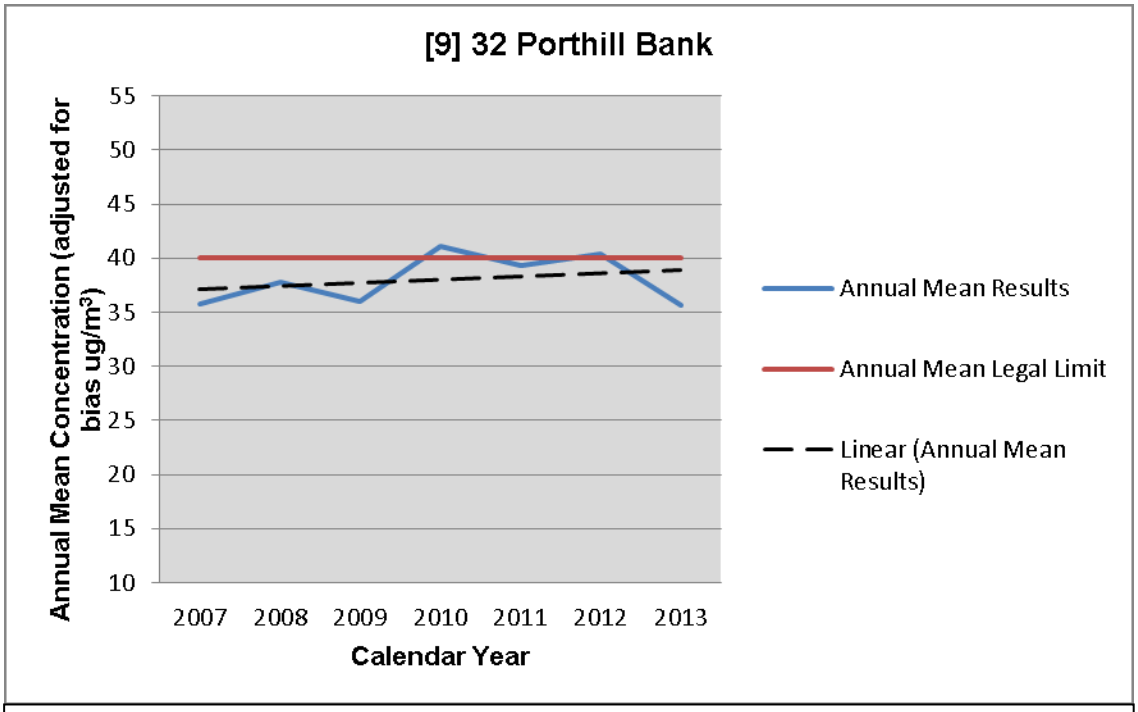


Figure 10 Long term annual mean $N0_2$ trends at site 9 - 32 Porthill Bank

Diffusion tube site 9 (Figure 27) is representative of relevant exposure being located on the façade of a house located on an incline adjacent to one of the main routes between this area of Newcastle and Stoke on Trent. At peak times there is quite often queuing traffic on the road. This site is exhibiting an increasing trend in $N0_2$ exposure and exceeded the annual mean objective in 2010 and 2012.

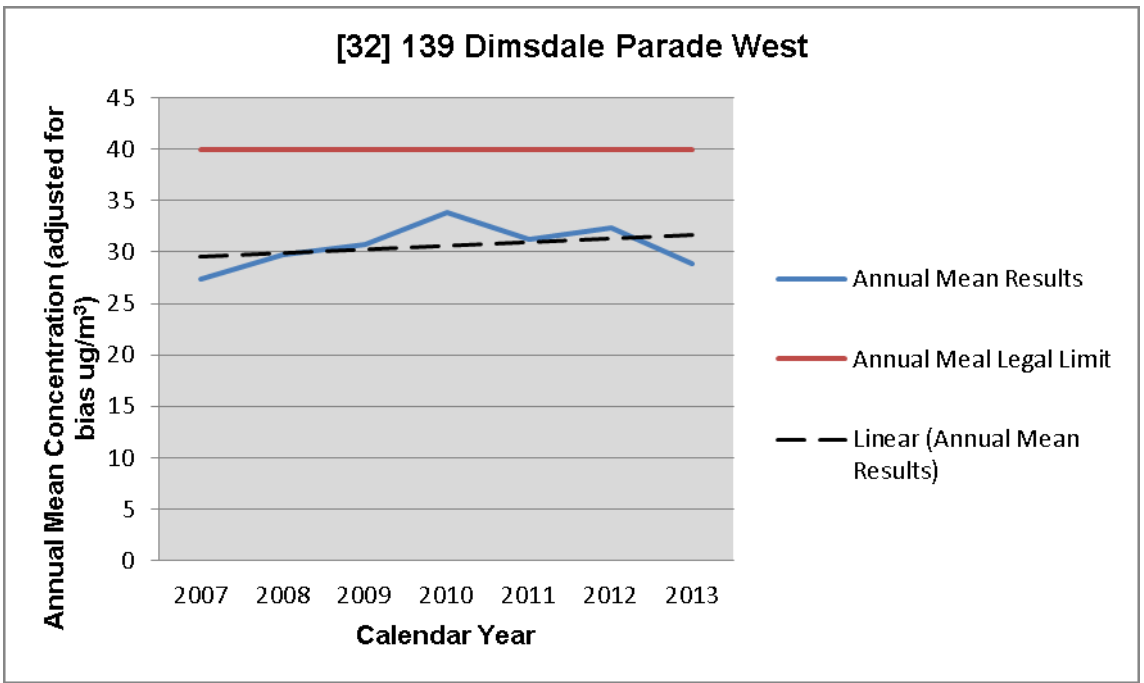


Figure 11 Long term annual mean $N0_2$ trends at site 32 – 139 Dimsdale Parade West

Diffusion tube site 32 (Figure 288) is representative of relevant exposure being located on the façade of a terraced dwelling. This site is exhibiting an increasing trend in $N0_2$ exposure.

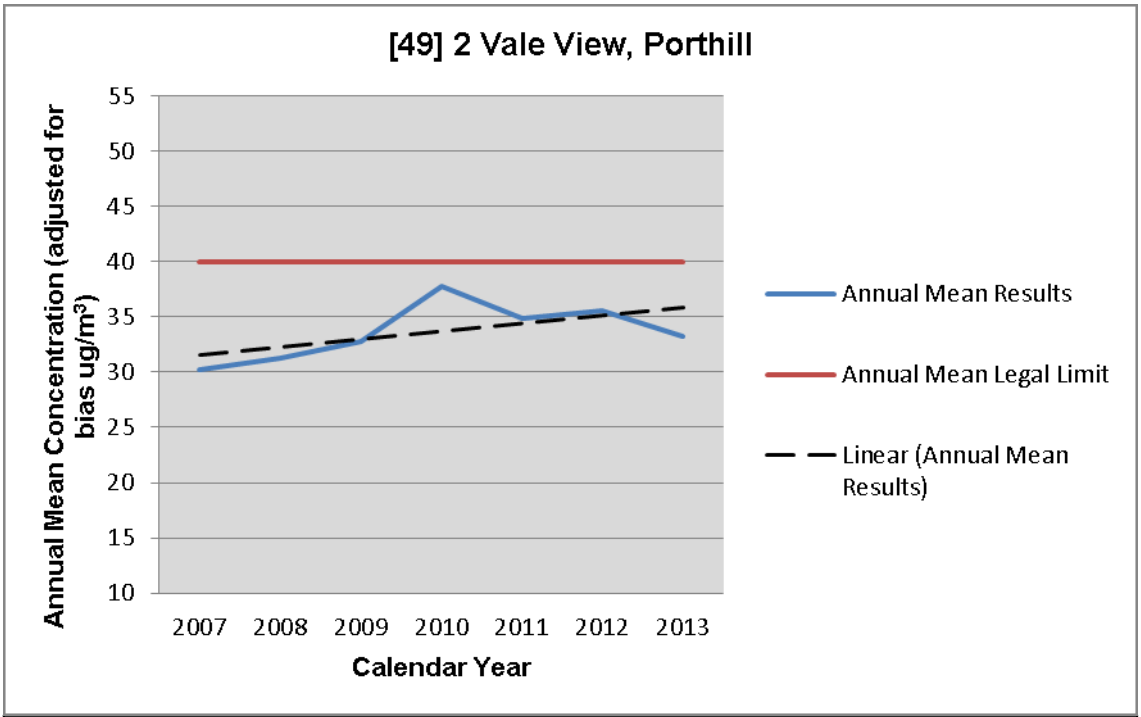


Figure 12 Long term annual mean $N0_2$ trends at site 49 – 2 Vale View, Porthill

Diffusion tube site 49 (Figure 299) is representative of relevant exposure and is situated on the façade of a terraced property which sits on the footway adjacent to one of the principal routes between this area of Newcastle and Stoke on Trent. The property is in close proximity to a roundabout and is situated on an incline. This site is exhibiting an increasing trend in $N0_2$ exposure.

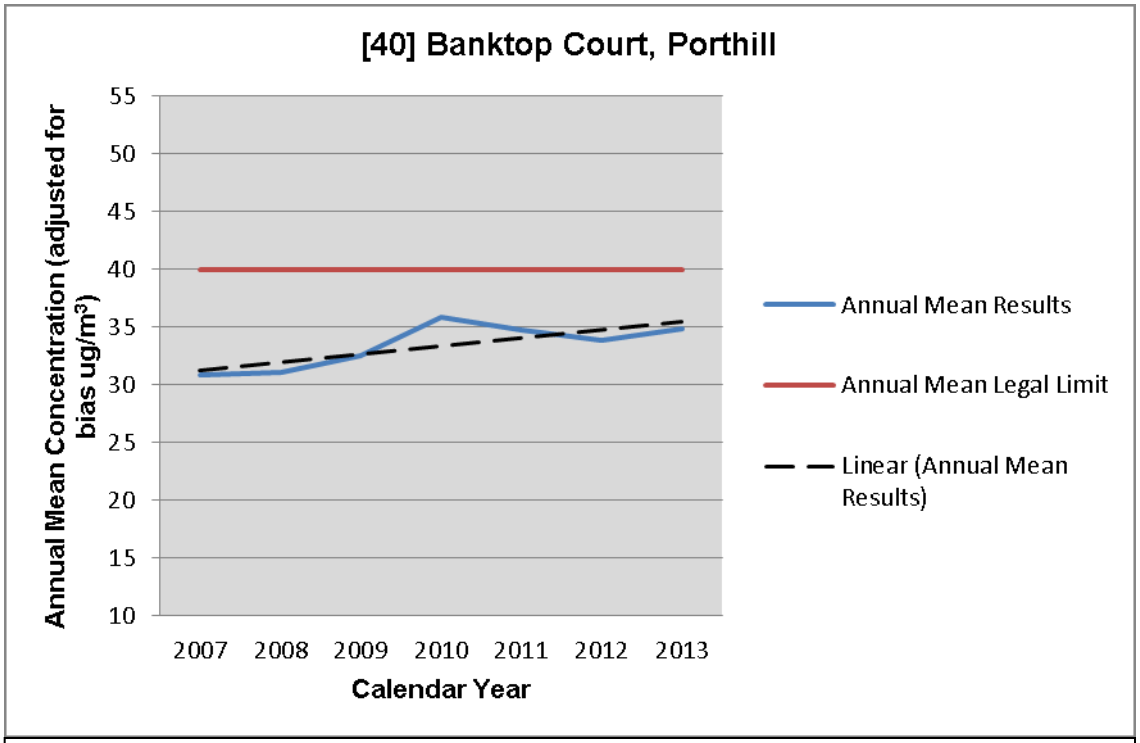


Figure 13 Long term annual mean $N0_2$ trends at site 40 – Banktop Court, Porthill

Diffusion site 40 (Figure ***30*** 30) is representative of relevant exposure and is situated on the façade of a block of flats in close proximity to a roundabout which forms one of the principal routes between this part of the Borough and Stoke-on-Trent. This site is exhibiting an increasing trend in $N0_2$ exposure.

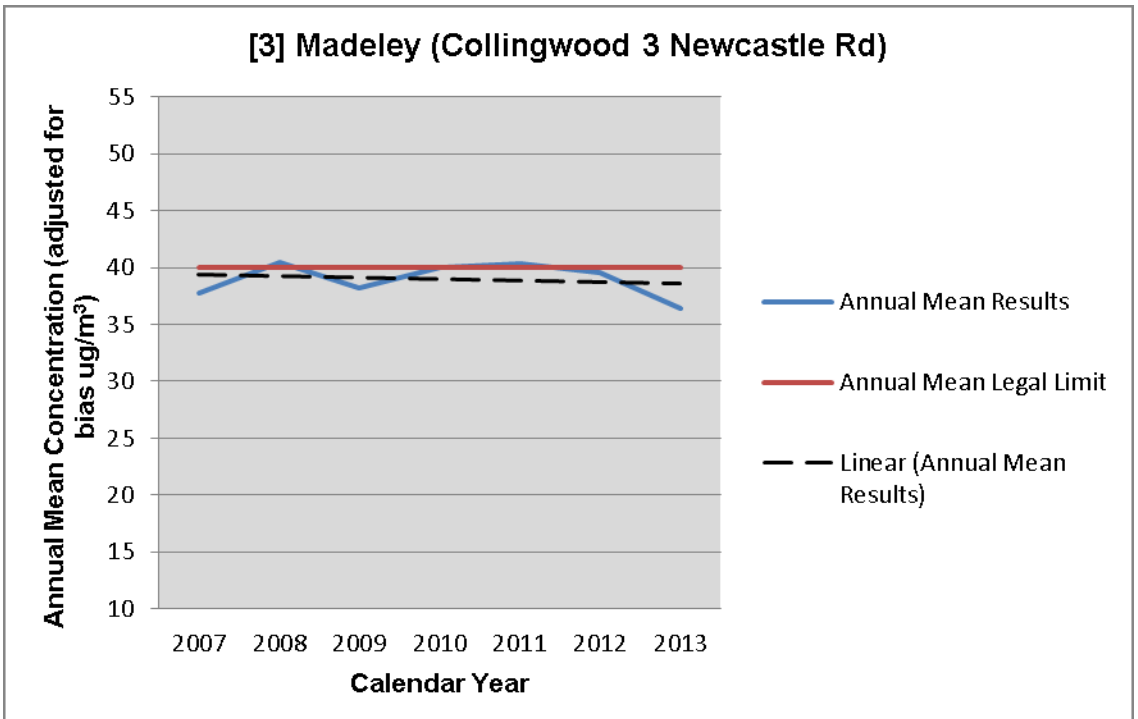


Figure 31 Long term annual mean $N0_2$ trends at site 3 – Collingwood, Madeley

Diffusion tube site 3 (Figure 31) represents exposure at a single dwelling adjacent to the southbound carriageway of the M6 motorway between junctions 15 and 16. This site is currently exhibiting a decreasing trend in nitrogen dioxide exposure, however had exhibited an upward trend in nitrogen dioxide exposure from 2009 to 2012 and had previously exceeded the annual mean objective.

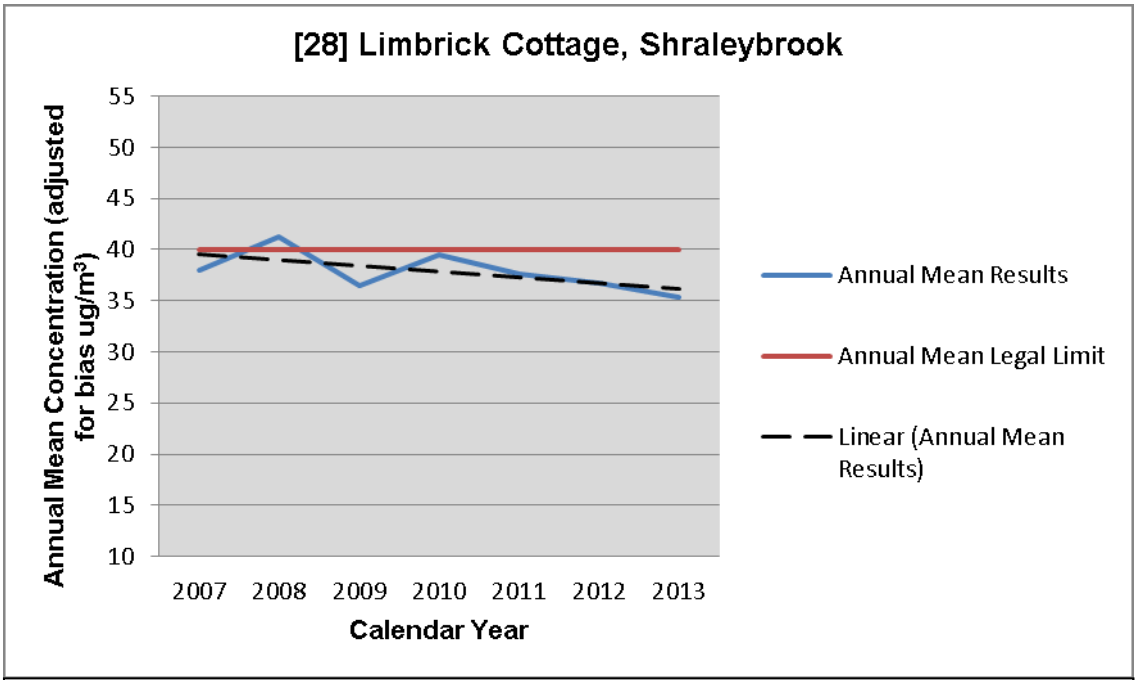


Figure 14 Long term annual mean $N0_2$ trends at site 28 – Limbrick Cottage, Shraley Brook

Diffusion tube site 28 (Figure ***32***32) represents exposure at a single dwelling adjacent to the southbound carriageway of the M6 motorway between junctions 15 and 16. This site is exhibiting a downward trend in nitrogen dioxide exposure; however it has exceeded the annual mean objective in three of the last six years.

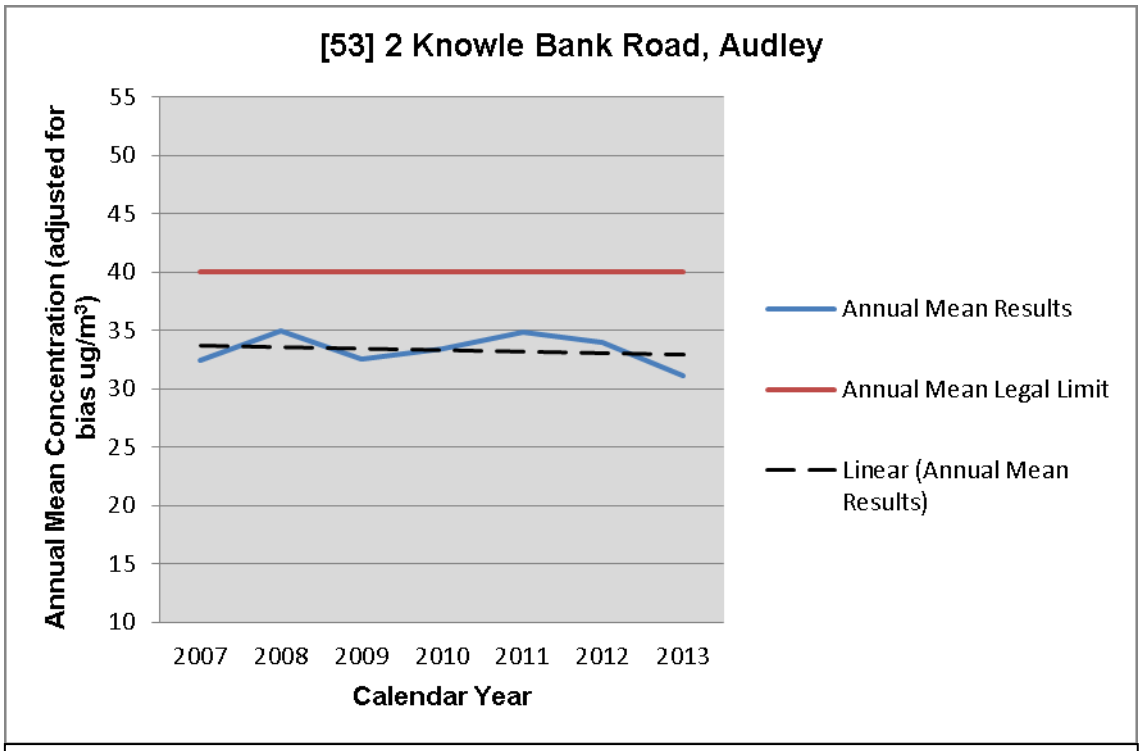


Figure 15 Long term annual mean $N0_2$ trends at site 53 – 2 Knowle Bank Road, Audley

Diffusion tube site 53 (Figure ***33***33) represents exposure at a single dwelling in close proximity to the southbound carriageway of the M6 motorway between junctions 15 and 16. This site is exhibiting a moderate downward trend in nitrogen dioxide exposure.

2.2.1 Particulate Matter (PM_{10})

Table 2.7 Results of Automatic Monitoring for PM_{10}: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % [a]	Valid Data Capture 2013 % [b]	Confirm Gravimetric Equivalent (Y or N/A)	Annual Mean Concentration (µg/m^3)				
						2009* [c]	2010* [c]	2011* [c]	2012 [c]	2013
Queens Gardens	Roadside	N	90.4	88.8	Y		26.25	-	14.19	22.5

In bold, exceedance of the PM_{10} annual mean AQS objective of 40µg/m^3
[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year
[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)
[c] Means should be "annualised" as in Box 3.2 of TG(09) (http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=38), if valid data capture is less than 75%

Table 2.8 Results of Automatic Monitoring for PM_{10}: Comparison with 24-hour Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % [a]	Valid Data Capture 2013 % [b]	Confirm Gravimetric Equivalent (Y or N/A)	Number of Daily Means > 50µg/m^3				
						2009 [c]	2010 [c]	2011 [c]	2012 [c]	2013
Queens Gardens	Roadside	N	90.4	88.8	Y		13	-	3 **(28.1)**	7 (31.2)

In bold, exceedance of the PM_{10} daily mean AQS objective (50µg/m^3 – not to be exceeded more than 35 times per year)
[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year
[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)
[c] if data capture for full calendar year is less than 90%, include the 90.4th percentile of 24-hour means in brackets

2.2.2 Summary of Compliance with AQS Objectives

There are no exceedances of the relevant objectives for PM_{10} identified.

There are no exceedances of the relevant hourly mean objective for Nitrogen Dioxide.

However, in respect of the annual mean objective there are seven exceedances locations identified by diffusion tube monitoring which exceed the objective in relevant locations and there are a further thirteen locations which are at risk of exceeding in future years.

Newcastle under Lyme Borough Council has measured concentrations of Nitrogen Dioxide above the annual mean objective at the following seven relevant locations in 2013.

- Kidsgrove (A50 Liverpool Road)
    - Site 6 – 106 Liverpool Road
- Newcastle Town Centre
    - Site 84 – 102 King Street
    - Site 85 – 106 King Street
    - Site 87 – 1 King Street
    - Site 95 – 76 London Road
    - Site 11 – 11 to 34 London Road
    - Site K1 – A34 Holy Trinity

A combined Detailed Assessment and Further Assessment study has been completed for the following areas identified in this report and a consultation exercise is currently underway to determine the extent of the AQMA boundaries in the affected areas;

- Kidsgrove (A50 Liverpool Road)
    - Site 6 – 106 Liverpool Road
    - Site 39 - 4/6 Liverpool Road
    - Site 64 Kidsgrove Carpets, 57-59 Liverpool Road
- Newcastle Town Centre
    - Site 84 – 102 King Street
    - Site 85 – 106 King Street
    - Site 87 – 1 King Street

- Site 95 – 76 London Road
- Site 96 – 52-54 London Road

- May Bank
  - Site 24 – 26 High Street, Maybank
- Porthill
  - Site 9 – Porthill Bank

Those sites which are showing an increasing trend in NO_2 concentrations and which are potentially at risk of exceeding the $N0_2$ annual mean objective in future years will continue to be monitored and assessed in future reports.

3 New Local Developments

3.1 Road Traffic Sources

There have been no newly identified road traffic sources since the last Updating and Screening Assessment.

3.2 Other Transport Sources

There are no airports in this or the neighbouring local authority areas. There are no areas where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m. There are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m. There are no ports for shipping in the local authority area.

3.3 Industrial Sources

There are no further new or significantly changed installations in the local authority area. There are no major fuel depots storing petrol in the local authority area. There are no new petrol stations in the local authority area. There are no poultry farms in the borough or in the neighbouring local authority areas.

3.4 Commercial and Domestic Sources

The local authority has not identified any new biomass combustion plant – individual installations, areas where biomass combustion sources may be relevant or areas where domestic fuel burning may be relevant.

Given that there is an increasing trend towards domestic solid fuel use as a result of increasing gas and electricity prices, the Council will undertake a further survey of domestic solid fuel use in the areas of highest demand (Silverdale, Bignall End and Kidsgrove) to inform the findings of the next USA.

In the meantime, as the whole of the urban area of the Borough is covered by Smoke Control Areas, an ongoing campaign of education of householders and solid fuel distributors is underway. This is supplemented by appropriate advice and enforcement action under the

Clean Air Act 1993 in respect of non-exempt appliances and unauthorised fuels and the Building Act 1984 in respect of chimney heights.

3.5 New Developments with Fugitive or Uncontrolled Sources

The local authority has not identified any new developments with fugitive or uncontrolled sources which are likely to impact on local air quality.

Newcastle under Lyme Borough Council confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

Newcastle under Lyme Borough Council confirms that all the following have been considered:

- **Road traffic sources**
- **Other transport sources**
- **Industrial sources**
- **Commercial and domestic sources**
- **New developments with fugitive or uncontrolled sources.**

3.6 Local Air Quality Strategy for Newcastle-under-Lyme

Work is currently underway to prepare a Borough wide Air Quality Strategy. The Borough Council does not currently have an air quality strategy (AQS). It is recognised that the adoption of an air quality strategy will be of valuable assistance to the Council in helping to maintain and improve air quality across the whole Borough. It is anticipated that the strategy will link to current and future council and regional polices which have the potential to impact on air quality. It is anticipated that the AQS consultation process will follow current best practice in this area and will lead to the production of a document which will help guide the Borough Council and its partners for a five to ten year period following its publication. It is expected that the AQS will include appropriate outcome focussed indicators against which performance against the AQS can be quantified.

4 Planning Applications

All planning applications, including EIA scoping and screening opinions received in 2013 were assessed for impacts on air quality. Those applications which involved a consideration of air quality are detailed in Table 7.

There were no planning applications which were recommended for refusal on air quality grounds. Where appropriate, conditions were recommended and these principally related to construction air quality control measures.

Officers also enter into pre-application discussions with developers and attend a monthly development team with planning colleagues. Where appropriate this helps to ensure that air quality is raised at an early stage in the development process and helps in ensuring that applications are accompanied by appropriate air quality assessments.

Newcastle-under-Lyme Borough Council

Table 7 **Planning applications assessed in 2013 for which air quality was considered**					
Address	**Application Number & Planning Authority**	**Description of Development**	**Findings of assessment**	**Divisional recommendation related to air quality**	**Planning Authority Decision**
Linley Trading Estate Linley Road Talke ST7 1XS	13/00625/OUT Newcastle under Lyme BC	Residential development of 139 dwellings and associated works	Air Quality assessment concluded that there would be no exceedance of any air quality objective at the proposed development. Impact of the proposed development upon air quality within the area would be negligible. Standard mitigation measures and best practice methods	Prior to the commencement of any works, a Construction Method Statement shall be submitted and complied with	Approved but pending completion of S106 agreement by developer.
Great Oak, Bignall End Newcastle under Lyme	N.14/03/2013 M Staffordshire County Council	Surface coal mining scheme to extract up to 450,000 tonnes of coal and fireclay and restoration to agriculture, nature conservation, woodland and public access over a two and a half year period (within that period coal extraction to be completed within 15 months)	Baseline monitoring being undertaken to establish levels of PM_{10}, $PM_{2.5}$. Experience of works undertaken at a similar site in Derbyshire has not identified any breaches of AQO's Road traffic emissions from HGV's PM_{10} and NO_2 assessed and not identified as a concern (Applicant has also promised a Health Impact Assessment summarising issues of noise, dust vibration etc on health which has not been submitted at the time of this report)	**Conditions likely** to require ongoing real time and publicly accessible data to monitor and assess compliance with relevant objectives for PM10 and PM2.5 for duration of activities. In accordance with details to be approved by the MPA –in consultation with the Council's Environmental Health Division. To require details of dust management and monitoring arrangements to be approved by the MPA – in consultation with the Council's Environmental Health Division.	Pending approval

5 Air Quality Planning Policies

5.1 Current planning polices operating in the Borough

As well as the policies contained within the National Policy Framework (March 2012) which apply to all development applications since April 2012 which replaced PPS23 and the National Planning Policy Framework Technical Guidance which contains guidance tailored towards mineral extraction operations, there are a number of planning polices in operation within the Borough and County which are concerned with minimising poor air quality. These polices are summarised in Table 8:

Newcastle-under-Lyme Borough Council resolved on the 11 December, 2013, to withdraw the Newcastle-under-Lyme Site Allocations and Policies Local Plan and to instead proceed with the preparation of new joint full Local Plan in partnership with Stoke-on-Trent City Council. This is scheduled to replace the current Local Plan in 2018. In the meantime, the current plan remains in force and the Planning Policy Development Team has been fully informed of the issues surrounding air quality in the Borough and these will be taken into account in the plan preparation.

Table 8 Current air quality planning polices relevant to Newcastle under Lyme

Current Air Quality Planning Polices relevant to Newcastle under Lyme		
Document	**Policy Title**	**Relevant extract from policy**
The Staffordshire and Stoke on Trent Structure Plan[2]	D1 - Sustainable Forms of Development	*D1 Sustainable forms and patterns of new development will be sought which:* *(d) create communities where there is a balanced mix of land uses which will reduce the need to travel, the distance travelled and the adverse effects of transportation;* *(i) have regard to the location and effects of existing nearby land uses with the potential to generate pollution which could have an unacceptably detrimental effect on the proposed development.*
	D2 The Design and Environmental Quality of Development	*D2 Development should generally conserve and, where possible, improve the quality of life and the environment and should:* *(c) minimise pollution of land, water and air, waste generation, nuisance from noise, and pollution by artificial sources of light;*
	MW6 - Minerals	*Mineral and/or waste development proposals will be assessed in terms of their social, environmental*

[2] http://www.staffordshire.gov.uk/Resources/Documents/s/st/StructurePlanExplanatoryMemorandum7802savedpolicie.pdf

		and economic effects in relation to the ability to safeguard, enhance and sustain environmental resources and amenity. The applicant will need to demonstrate that the proposal does not have an unacceptable adverse impact, either on its own or in conjunction with other developments, upon people, transportation systems or the environment.
Staffordshire and Stoke-on-Trent Joint Waste Core Strategy 2010 – 2026[3]	Policy 4.2 Protection of Environmental Quality	*The development of waste management facilities will be supported provided that the proposals would not give rise to materially harmful impacts, except where the material planning benefits of the proposals outweigh the material planning objections.* *Where proposals have an unavoidable adverse effect on these natural and cultural assets, impacts should be minimised by design and layout. Residual impacts should be mitigated or compensated for, either on or off site. In determining the impact of the proposed development, consideration will be given to the effect of the proposals on the following:* *xiii. Protection of air, soil and water and reduction of flood risk*
The Newcastle under- Lyme and Stoke-on-Trent Core Spatial Strategy 2006 to 2026[4]	SP3 Spatial Principles of Movement and Access	*2. Maximising the accessibility of new residential, employment, retail, development, health and education centres, green open space, leisure and sport facilities as well as strategic transport interchanges, such as railway stations, by walking, cycling and public transport.* *4. Promoting travel awareness and encouraging the production of Green Travel Plans and the latest information and communication technologies.* *6. Progressive development of Park and Ride facilities* *7. Encouraging the use of waterways as lines of communication and enhancing and safeguarding rail travel.* *8. Addressing the environmental impacts of travel including congestion, air quality and noise pollution.* *9. Secure developer contributions towards the delivery of schemes that support the key objectives of the Staffordshire and North*

[3] http://www.staffordshire.gov.uk/environment/planning/policy/thedevelopmentplan/wastelocalplan/Staffordshire-and-Stoke-on-Trent-Joint-Waste-Local-Plan-(2010-to-2026)-(adopted-March-2013).pdf

[4] https://www.newcastle-staffs.gov.uk/planning_content.asp?id=SXF3D3-A7809BD5&cat=1363

		Staffordshire Local Transport Plans.
	ASP5 – Newcastle and Kidsgrove Urban Neighbourhoods Area Spatial Policy	*9. In accordance with the North Staffs Local Transport Plan actions will be taken to improve accessibility, road safety, and to promote sustainable modes of travel.*
	ASP6 – Rural Area Spatial Policy	*In accordance with the Staffordshire Local Transport Plan a positive approach will be taken towards practical measures to improve accessibility by public transport. Such measures could include:* *• Subsidised bus services* *• Community transport schemes* *• Developing practical transport solutions to assist members of the community in special need to access employment opportunities*
Newcastle-under-Lyme and Stoke-on-Trent Urban Design Guidance[5]	3.6.4 The place - Environment Pollution	*The nature and form of any development should also be influenced by any bad-neighbour uses or environmental problems located close to the site, including certain types of industrial uses, major roads or railways, etc. The analysis should identify and map any potential issues, including any potential sources of:* *a. Air pollution;*

5.2 Local list validation and air quality

Different types and scale of application requires different levels of information and supporting documentation to be submitted in support of the application. The required information for a valid application to be submitted falls into two categories;

- The 'national list' – national mandatory information
- The 'local list' – additional information required by local planning authorities necessary to make a decision on the application.

The purpose of the validation arrangements is to:

- provide a guide to the information that may be required at the outset;
- enable the local planning authority to provide applicants with certainty as to the information required;
- enable the local planning authority to have all the necessary information to determine the application and to draft the planning permission and all conditions;

[5] http://www.newcastle-staffs.gov.uk/Documents/Regeneration%20and%20Planning/5217%20Stoke%20Interactive%20web%2020-12-10.pdf

- minimise the need for further submission of additional information in order to allow local planning authorities a reasonable opportunity to determine applications within the target period; and
- ensure consistency in the approach taken by different local planning authorities in registering and validating applications whilst recognising the need for variation appropriate to local circumstances.

If an application submitted lacks the necessary information specified on the local list, the Council will be entitled to invalidate the application and so decline to determine it. The Council will still need to take a **proportionate** approach when validating, however, so that applications are not rendered invalid by the omission of an item of information that would add little to the Council understands of the development proposal. Pre-application discussion is strongly encouraged to enable discussion and hopefully agreement as to what additional information is necessary and proportionate for the particular development proposed.

The current local validation list is detailed in Table 9.

Table 9 Current Planning Application Validation requirements related to air quality

INFORMATION ITEM	POLICY DRIVER	TYPES OF APPLICATIONS AND GEOGRAPHIC LOCATION(S) THAT REQUIRE THIS INFORMATION	WHAT INFORMATION IS REQUIRED	WHERE TO LOOK FOR FURTHER ASSISTANCE
3 Air Quality Assessment 3 Air Quality Assessment (continued)	NPPF – paragraphs 109, 120 and 124. To view click here CSS Policy SP1, SP3 and CSP1. To view click here	There are three types of development of relevance: - major development that may its own bring about on new or increased air quality problems; - specific types of development where impact should be understood in case they bring about an air quality problem; and - Small to medium sized development proposed for an area already with an existing air quality problem. These three types are described below. All planning applications which involve development **within the Borough** (should provide the relevant information by way of an Air Quality assessment): • Large residential development. (>100 dwellings or 10K square metres floor space) • Major commercial development (e.g. superstore, commercial development). • Industrial development requiring PPC registration. • Schools and hospitals.	A demonstration of the likely changes in air quality or exposure to air pollutants, as a result of a proposed development (including preparation, construction, and demolition phase). Where possible these changes will be quantified, although in some instances a qualitative assessment may be sufficient (in consultation with the Environmental Protection team). Ultimately the planning authority has to use this information to decide the "significance" of the air quality impacts, including cumulative impacts in the locality, and thereby the priority given to air quality concerns in determining the application. The assessment therefore needs to provide sufficient information to allow this decision to be made. The proposed assessment methodology should be agreed with the LPA. If a quantitative approach is taken then this will be either a screening or detailed assessment. The basis of the assessment should be to compare the air quality following completion of the development with that expected at that time without the development. Applications within the AQMA will need to consider air quality, both in terms of any increase in levels and in terms of the effect of the exiting levels of air quality on the residents or users of the development itself. A development, particularly one within the AQMA, could be designed to mitigate the impact on, and from, air quality.	The Newcastle Under Lyme Air Quality Management areas, Action Plan and AQS. (To be added when confirmed) IAQM construction dust guidance (and mitigation guidance) – To view click here. Chimney Height Approval Form. To view click here • Planning Circular 15/97: Air Quality. To access click here Development Control: Planning for Air Quality (2010 update). Environment Act 1995. To access click here The Air Quality Strategy 2007. To view click here

3 Air Quality Assessment (continued)		The following types of planning applications also require an assessment of air quality, following consultation with the Environmental Protection team: • Proposals that include biomass boilers or CHP plant (there is no established criterion for the size of plant that might require assessment. Reference should be made to the Environmental Protection UK's guidance on biomass); • Smaller industrial process (those falling under PCC registration thresholds); • Proposals that include quarrying/extraction of minerals or landfill; In addition, if the following planning application is **within** an Air Quality Management Area the following developments **also** require an air quality assessment: • Small and medium sized residential development (1-99 dwellings and 0 - 10K square metres floor space); • Schools, hospitals and care homes.		

6 Local Transport Plans and Strategies

6.1 Staffordshire Local Transport Plan 2011 & Newcastle under Lyme Borough Integrated Transport Strategy 2011-2026

Staffordshire County Council is the Highways Authority for Newcastle under Lyme and they have responsibility for developing Local Transport Plans.

The County Council have published a County based Local Transport Plan[6] supplemented by district strategies. The district strategy for Newcastle under Lyme[7] has identified potential AQMA's in Newcastle under Lyme Town Centre and Kidsgrove Town Centre as Key Strategic Issues with measures including the installation of smart traffic control systems which are intended to reduce congestion and smooth out traffic flow having been identified. Further strategic aims include reducing reliance on cars by improving, walking, cycling and the bus infrastructure across the Borough.

6.2 Newcastle-under-Lyme (urban) Transport and Development Strategy (NTADS) 2008/2009 - 2012/2013

Staffordshire County Council, in partnership with the Newcastle under Lyme Borough Council as the Local Planning Authority, has developed an urban transport and development strategy for Newcastle-under-Lyme to:

- Promote accessibility to urban centres by all modes
- Improve safety for all users of the transport network
- Improve the efficiency of the highway network to reduce congestion and air quality problems
- Support regeneration of urban centres

All of the Urban Area Transport Strategies are funded by the LTP capital programme and Developer Contributions.

The overall aim of NTADS for 2008/09 to 2012/13 is to help;

- Reduce congestion, accessibility and safety problems currently experienced within the Newcastle Urban Area;

[6] http://www.staffordshire.gov.uk/transport/transportplanning/localtransportplan/staffordshirelocaltransportplan2011-strategyplan.pdf

[7] http://www.staffordshire.gov.uk/transport/transportplanning/localtransportplan/draftnewcastleboroughtransportstrategy2011.pdf

- Reduce pressures that new developments are placing on local transport infrastructure;
- Increase the opportunities to travel by sustainable modes of transport;
- Support the regeneration of the area

NTADS was scheduled to be replaced by a Borough wide Community Infrastructure Levy (CIL) in April 2013, however as progress on the CIL has stalled, NTADS remains in place.

7 Climate Change Strategies

In May 2011, the Borough Council published the second edition of its Energy Efficiency and Climate Change Strategy 2011 - 2016[8].

The objectives of this strategy are to:

- deliver energy cost reductions to the Council through an energy efficiency programme.
- reduce CO2 levels from the Council's buildings and operations by 30% from its 2009/10 baseline by April 2015.
- increase the resilience of the Council's buildings and operations to the impacts of climate change.
- raise public awareness of climate change and communicate to the community (including businesses) how individuals can reduce their own carbon footprint and save money.
- reduce carbon dioxide emissions from domestic dwellings and commercial premises by promoting energy efficiency.
- use planning and building control powers to ensure energy efficiency and climate change adaptation measures are included within the development of land and buildings.

[8] http://www.newcastle-staffs.gov.uk/documents/housing/microsoft%20word%20-%20newcastle%20under%20lyme%20energy%20efficiency%20and%20climate%20change%20strategy%20may%2011.v2.pdf

8 Implementation of Action Plans

8.1 Conclusions from New Monitoring Data

8.1.1 Nitrogen Dioxide Annual Mean Objective

Nitrogen dioxide diffusion tube monitoring undertaken in 2013 has identified seven sites which exceeded the annual mean nitrogen dioxide objective in two geographic areas of the Borough. These are:-

- Kidsgrove (A50 Liverpool Road)
    - Site 6 – 106 Liverpool Road
- Newcastle Town Centre
    - Site 84 – 102 King Street
    - Site 85 – 106 King Street
    - Site 87 – 1 King Street
    - Site 95 – 76 London Road
    - Site 11 – 11 to 34 London Road
    - Site K1 – A34 Holy Trinity

A Detailed Assessment was undertaken in 2013 with relation to the above sites and work is currently underway on the consultation of the AQMA boundaries in these areas. It is anticipated that AQMA's will be declared in winter of 2014/15. There were a further thirteen sites which were showing annual mean values at or above 36µgm^3 and these will continued to be monitored in 2014.

Trends in annual mean levels of nitrogen dioxide at the majority of sites monitored since at least 2007 have also shown a general increase in nitrogen dioxide exposure at relevant locations whilst background sites are showing a slight decrease.

8.1.2 Nitrogen Dioxide short term objective

There have been no exceedances of the short term objective identified in the Borough.

8.1.3 PM_{10} annual mean objective

Analysis of the results of real time continuous monitoring has shown that this objective is not currently being exceeded and there is little risk of exceedance in future years.

8.1.4 PM_{10} short term objective

Analysis of the results of real time continuous monitoring has shown that this objective is not currently being exceeded and there is little risk of exceedance in future years

8.2 Conclusions relating to New Local Developments

No additional new local developments have been identified as being of concern or requiring a Detailed Assessment.

8.3 Proposed Actions

Monitoring undertaken during 2013 has identified the need to undertake a Detailed and Further Assessment for exceedances of the Nitrogen Dioxide annual mean objective in and around the following areas of the Borough.

- Kidsgrove Town Centre
- Newcastle under Lyme Town Centre

This work was completed in 2013 and reported to DEFRA. Work is now underway to consult on the AQMA's in the affected areas identified in the 2013 Detailed and Further Assessment and it is anticipated that AQMA's will be formally declared in the winter of 2014/15.

The Council will continue to monitor those sites which have either exceeded or are at risk of exceeding the annual mean nitrogen dioxide objective. No new locations for monitoring have been identified based on the findings of this report.

The Council will continue to maintain and operate an automatic air quality monitoring station at Queen's Gardens to monitor levels of nitrogen dioxide and PM_{10}.

The Council also hopes to develop an air quality strategy and guidance for developers on air quality in 2013/14 and progress on this work will be reported in the 2014 USA.

The Council also expects to submit its next Update and Screening Assessment Report in April 2015.

9 References

"Local Air Quality Management – Technical Guidance LAQM.TG(09)", Department for Environment, Food and Rural Affairs, London, 2009.

"CLIENT PROJECT REPORT CPR2631 -Newcastle Under Lyme Air Quality Detailed and Further Assessment , In fulfilment of Newcastle Under Lyme Borough Council's Local Air Quality Management duties ", A Savage, K Turpin, Transport Research Laboratories, 2009

Appendices

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

Since January 2012, diffusion tubes have been supplied and analysed by Gradko Laboratories using the 20% TEA in water method.

Results were bias adjusted for 2013 by utilising the bias adjustment from the National Diffusion Tube Bias Adjustment Factor Spreadsheet Version 03/14 (Figure A2) which yielded a bias adjustment factor of 0.95 for Gradko Laboratories 20% TEA in water.

Figure A2 **Bias adjustment factor spreadsheet version 03/14 for Gradko Laboratories**

National Diffusion Tube Bias Adjustment Factor Spreadsheet — **Spreadsheet Version Number: 03/14**

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 2014
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: Select the Laboratory that Analyses Your Tubes from the Drop-Down List

If a laboratory is not shown, we have no data for this laboratory.

Step 2: Select a Preparation Method from the Drop-Down List

If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down List

If a year is not shown, we have no data[2]

Step 4:

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 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 make your selection, choose (All) from the pop-up list)	Year[5] (To make 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[6]	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in water	2013	R	Cheshire West and Chester	12	39	41	-4.4%	G	**1.05**
Gradko	20% TEA in Water	2013	R	Dudley MBC	12	38	31	23.1%	G	**0.81**
Gradko	20% TEA in Water	2013	UB	Dudley MBC	10	25	25	-1.7%	G	**1.02**
Gradko	20% TEA in Water	2013	R	Dudley MBC	11	41	39	5.4%	G	**0.95**
Gradko	20% TEA in water	2013	R	East Herts Council	10	35	30	19.4%	G	**0.84**
Gradko	20% TEA in water	2013	R	Fareham Borough Council	9	34	34	2.0%	G	**0.98**
Gradko	20% TEA in water	2013	R	Fareham Borough Council	12	42	45	-6.2%	G	**1.07**
Gradko	20% TEA in water	2013	R	Gateshead Council	11	34	37	-8.7%	G	**1.10**
Gradko	20% TEA in water	2013	R	Gateshead Council	11	35	33	6.3%	G	**0.94**
Gradko	20% TEA in water	2013	R	Gateshead Council	10	33	32	2.1%	G	**0.98**
Gradko	20% TEA in water	2013	R	Borough Council of King's Lynn & West Norf	12	29	26	12.5%	G	**0.89**
Gradko	20% TEA in water	2013	R	Gedling Borough Council	10	37	35	7.2%	G	**0.93**
Gradko	20% TEA in water	2013	R	The Highland Council	12	24	21	14.1%	G	**0.88**
Gradko	20% TEA in Water	2013	R	Dudley MBC	12	52	59	-12.0%	P	**1.14**
Gradko	20% TEA in water	2013	R	NOTTINGHAM CITY COUNCIL	12	43	44	-2.2%	G	**1.02**
Gradko	20% TEA in water	2013	R	NOTTINGHAM CITY COUNCIL	10	41	39	6.4%	G	**0.94**
Gradko	20% TEA in water	2013	R	NOTTINGHAM CITY COUNCIL	11	43	42	1.9%	G	**0.98**
Gradko	20% TEA in water	2013	R	Brighton & Hove City Council	11	62	60	1.9%	G	**0.98**
Gradko	20% TEA in water	2013	R	Brighton & Hove City Council	11	41	30	37.5%	G	**0.73**
Gradko	20% TEA in water	2013	KS	Marylebone Road Intercomparison	12	101	81	25.8%	G	**0.80**
Gradko	20% TEA in Water	2013	R	Brighton & Hove City Council	9	54	45	19.6%	G	**0.84**
Gradko	20% TEA in water	2013	R	Wiltshire Council	12	40	36	10.1%	G	**0.91**
Gradko	20% TEA in water	2013	R	Wiltshire Council	11	41	37	11.6%	G	**0.90**
Gradko	20% TEA in water	2013	R	Wiltshire Council	12	39	49	-20.0%	G	**1.25**
Gradko	20% TEA in water	2013		**Overall Factor[3] (24 studies)**				**Use**		**0.95**

[1] For Casella Stanger/Bureau Veritas (NOT Bureau Veritas Labs) use Gradko 50% TEA in Acetone.
For Casella Seal/GMSS/Casella CRE/Bureau Veritas Labs/Eurofins/ use Environmental Scientific Groups.

Factor from Local Co-location Studies (if available)

No co-location studies were carried out.

Discussion of Choice of Factor to Use

There are no local correction factors therefore the national adjustment factors have been used. This is consistent with previous reports

PM Monitoring Adjustment

PM_{10} monitoring was completed using an un-heated MetOne1020 BAM monitor. To ensure gravimetric equivalence, data has been bias-adjusted by dividing by a factor of 1.2. This follows the advice given by DEFRA[9].

Table A10 Queen's Gardens $N0_2$ Automatic monitor data for 2013

Month	% Data Capture	Monthly Average (µg/m^3)
Jan – 2013	100	31.9
Feb – 2013	82.1	35.5
Mar – 2013	100	34.0
Apr – 2013	100	29.5
May – 2013	100	23.2
Jun- 2013	100	22.3
Jul – 2013	96.8	28.8
Aug – 2013	100	21
Sep – 2013	100	25.8
Oct -2013	100	26.5
Nov -2013	100	37.7
Dec - 2013	100	31.9
Average	98.24	29.01

[9] http://www.google.co.uk/url?q=http://uk-air.defra.gov.uk/reports/cat05/0607131440_FAQ_PM_monitoring_v2PQ.doc&sa=U&ei=cMI-Uq67G-eU0AXYrYGoBw&ved=0CBsQFjAA&usg=AFQjCNHxxJkMHnP8oe7I5s3V7WVz_1YeMQ

Table A14 Queen's Gardens PM_{10} Automatic monitor data for 2013

Queens Gardens PM_{10} BAM Scaled data 2013					
	Date	PM_{10}µg/m³		Date	PM_{10}µg/m³
January 2013	01/01/13	/	February 2013	01/02/13	17.2
	02/01/13	/		02/02/13	16.9
	03/01/13	/		03/02/13	10.4
	04/01/13	12.9		04/02/13	16.2
	05/01/13	19.3		05/02/13	10.9
	06/01/13	20.5		06/02/13	13.3
	07/01/13	24.3		07/02/13	15.7
	08/01/13	25.8		08/02/13	23.6
	09/01/13	27.8		09/02/13	16.2
	10/01/13	24		10/02/13	11
	11/01/13	35.3		11/02/13	29.2
	12/01/13	25.9		12/02/13	/
	13/01/13	28.6		13/02/13	/
	14/01/13	19.9		14/02/13	17.7
	15/01/13	26.9		15/02/13	29.2
	16/01/13	28.9		16/02/13	44.7
	17/01/13	31.1		17/02/13	34
	18/01/13	27.6		18/02/13	58
	19/01/13	25.4		19/02/13	58.2
	20/01/13	20		20/02/13	29.9
	21/01/13	21.5		21/02/13	19.9
	22/01/13	32.2		22/02/13	20.5
	23/01/13	32.3		23/02/13	24.3
	24/01/13	38.2		24/02/13	19.8
	25/01/13	23.9		25/02/13	/
	26/01/13	19.3		26/02/13	/
	27/01/13	14.2		27/02/13	36.1
	28/01/13	22.4		28/02/13	37.5
	29/01/13	19.5			
	30/01/13	14.8			
	31/01/13	17.5			

Queens Gardens PM_{10} BAM Scaled data 2013					
Date		PM_{10}µg/m³	Date		PM_{10}µg/m³
March 2013	01/03/13	/	April 2013	01/04/13	18.3
	02/03/13	/		02/04/13	/
	03/03/13	/		03/04/13	/
	04/03/13	/		04/04/13	23.5
	05/03/13	84.4		05/04/13	22.4
	06/03/13	74.4		06/04/13	35.8
	07/03/13	60.6		07/04/13	46.1
	08/03/13	44.3		08/04/13	38.1
	09/03/13	17.2		09/04/13	49.5
	10/03/13	15.9		10/04/13	73.5
	11/03/13	17.6		11/04/13	65.9
	12/03/13	19.4		12/04/13	35.1
	13/03/13	23.9		13/04/13	21.5
	14/03/13	21.6		14/04/13	18.6
	15/03/13	14.3		15/04/13	21.8
	16/03/13	13.8		16/04/13	20.5
	17/03/13	18.8		17/04/13	26.2
	18/03/13	31.7		18/04/13	19.3
	19/03/13	40.5		19/04/13	/
	20/03/13	31.1		20/04/13	/
	21/03/13	24.3		21/04/13	/
	22/03/13	26.4		22/04/13	/
	23/03/13	21.2		23/04/13	/
	24/03/13	31.7		24/04/13	14.3
	25/03/13	28.3		25/04/13	21.3
	26/03/13	25.7		26/04/13	17.4
	27/03/13	34.9		27/04/13	14.9
	28/03/13	35.7		28/04/13	13.1
	29/03/13	27.4		29/04/13	16.7
	30/03/13	30.6		30/04/13	22.9
	31/03/13	26.5			

Newcastle-under-Lyme Borough Council

Queens Gardens PM_{10} BAM Scaled data 2013					
Date		PM_{10}µg/m³	Date		PM_{10}µg/m³
May 2013	01/05/13	21.7	June 2013	01/06/13	15.4
	02/05/13	26		02/06/13	13.6
	03/05/13	16.9		03/06/13	23.8
	04/05/13	14.7		04/06/13	18.2
	05/05/13	16.1		05/06/13	23.6
	06/05/13	18.2		06/06/13	19.6
	07/05/13	36.9		07/06/13	22.2
	08/05/13	24.5		08/06/13	21.3
	09/05/13	17.1		09/06/13	21.2
	10/05/13	13.1		10/06/13	22.7
	11/05/13	12.3		11/06/13	24.1
	12/05/13	13.9		12/06/13	14.4
	13/05/13	12		13/06/13	17.7
	14/05/13	13.8		14/06/13	18.6
	15/05/13	16.8		15/06/13	12.6
	16/05/13	21.5		16/06/13	16
	17/05/13	22.5		17/06/13	29.9
	18/05/13	19.6		18/06/13	40.2
	19/05/13	20.9		19/06/13	30.5
	20/05/13	29.4		20/06/13	31.7
	21/05/13	22		21/06/13	28.2
	22/05/13	18.2		22/06/13	15.6
	23/05/13	13.9		23/06/13	15.4
	24/05/13	14.5		24/06/13	16.6
	25/05/13	19.8		25/06/13	20.3
	26/05/13	19.9		26/06/13	22
	27/05/13	20.6		27/06/13	18.3
	28/05/13	23.7		28/06/13	/
	29/05/13	24.6		29/06/13	/
	30/05/13	20.9		30/06/13	/
	31/05/13	26.3			

Queens Gardens PM_{10} BAM Scaled data 2013					
Date		PM_{10}µg/m³		Date	PM_{10}µg/m³
July 2013	01/07/13	/	August 2013	01/08/13	21.7
	02/07/13	23		02/08/13	16.1
	03/07/13	12.4		03/08/13	13.1
	04/07/13	15.3		04/08/13	15
	05/07/13	24.3		05/08/13	13.3
	06/07/13	26.4		06/08/13	15.7
	07/07/13	18		07/08/13	21.1
	08/07/13	24.1		08/08/13	22.7
	09/07/13	25.1		09/08/13	12.7
	10/07/13	31.7		10/08/13	12
	11/07/13	28		11/08/13	9.9
	12/07/13	34.1		12/08/13	12
	13/07/13	36.3		13/08/13	13.7
	14/07/13	21.2		14/08/13	14.5
	15/07/13	23.3		15/08/13	11.9
	16/07/13	23.5		16/08/13	13.1
	17/07/13	27.2		17/08/13	14.2
	18/07/13	30.3		18/08/13	12
	19/07/13	25.3		19/08/13	13
	20/07/13	19.5		20/08/13	19.9
	21/07/13	19.8		21/08/13	15.4
	22/07/13	33.3		22/08/13	22.2
	23/07/13	28.6		23/08/13	35.2
	24/07/13	19.7		24/08/13	19.7
	25/07/13	16.6		25/08/13	25
	26/07/13	16.9		26/08/13	27.9
	27/07/13	22.9		27/08/13	28.6
	28/07/13	12.4		28/08/13	23.9
	29/07/13	13.1		29/08/13	14.6
	30/07/13	13.4		30/08/13	12.5
	31/07/13	13.3		31/08/13	19.8

Queens Gardens PM_{10} BAM Scaled data 2013					
	Date	PM_{10}µg/m³		Date	PM_{10}µg/m³
September 2013	01/09/13	16	October 2013	01/10/13	40.8
	02/09/13	14.3		02/10/13	39.3
	03/09/13	14.9		03/10/13	27.7
	04/09/13	25.6		04/10/13	17.7
	05/09/13	/		05/10/13	12.6
	06/09/13	/		06/10/13	15.1
	07/09/13	/		07/10/13	13.6
	08/09/13	/		08/10/13	13.7
	09/09/13	/		09/10/13	14
	10/09/13	17		10/10/13	11.7
	11/09/13	17.1		11/10/13	19.5
	12/09/13	16.7		12/10/13	13.8
	13/09/13	21.9		13/10/13	18.5
	14/09/13	18		14/10/13	17.5
	15/09/13	13		15/10/13	25.3
	16/09/13	14		16/10/13	22.3
	17/09/13	18.2		17/10/13	24.6
	18/09/13	14.8		18/10/13	33.5
	19/09/13	15.5		19/10/13	25.1
	20/09/13	16.4		20/10/13	22.8
	21/09/13	19.2		21/10/13	16.1
	22/09/13	11.9		22/10/13	17.1
	23/09/13	24.8		23/10/13	15.4
	24/09/13	34.3		24/10/13	24.3
	25/09/13	47.8		25/10/13	22.7
	26/09/13	21.8		26/10/13	15.8
	27/09/13	24		27/10/13	19.3
	28/09/13	34.3		28/10/13	12
	29/09/13	28.8		29/10/13	11.5
	30/09/13	33.1		30/10/13	18.6
				31/10/13	15.9

Queens Gardens PM_{10} BAM Scaled data 2013					
	Date	PM_{10}µg/m³		Date	PM_{10}µg/m³
November 2013	01/11/13	21.3	December 2013	01/12/13	16.5
	02/11/13	20.2		02/12/13	25.9
	03/11/13	17.3		03/12/13	26.2
	04/11/13	/		04/12/13	16.4
	05/11/13	/		05/12/13	15.5
	06/11/13	/		06/12/13	15.3
	07/11/13	14.5		07/12/13	10.4
	08/11/13	16.3		08/12/13	10.1
	09/11/13	14.8		09/12/13	20.9
	10/11/13	20.1		10/12/13	30.2
	11/11/13	15.8		11/12/13	32.8
	12/11/13	21.4		12/12/13	41.3
	13/11/13	/		13/12/13	26.8
	14/11/13	/		14/12/13	17.7
	15/11/13	/		15/12/13	16.9
	16/11/13	/		16/12/13	16.2
	17/11/13	/		17/12/13	25.2
	18/11/13	/		18/12/13	17.1
	19/11/13	/		19/12/13	16.2
	20/11/13	/		20/12/13	18.2
	21/11/13	/		21/12/13	19.4
	22/11/13	/		22/12/13	11.8
	23/11/13	32.9		23/12/13	13.6
	24/11/13	24.4		24/12/13	15.3
	25/11/13	31.2		25/12/13	14.8
	26/11/13	29.6		26/12/13	17.3
	27/11/13	18.9		27/12/13	19.4
	28/11/13	21.3		28/12/13	12.4
	29/11/13	15.4		29/12/13	13.9
	30/11/13	21.6		30/12/13	12.5
				31/12/13	16.9

Queens Gardens PM_{10} BAM Annual Results	
Uncorrected Mean	27.2 µg/m^3
Annualised Mean	22.5 µg/m^3
Daily Mean exceedances >50 µg/m^3	7
90.4th percentile of daily means	34.1µg/m^3

QA/QC of Automatic Monitoring

Calibration Checks

The Chemiluminescence nitrogen oxide analyser has fortnightly calibration checks and maintenance visits which followed documented procedures.

These procedures were drawn up in accordance with equipment manuals and the manufacturer's instructions. During the calibration checks, a two point calibration is carried out using a zero air scrubber and Nitric Oxide calibration gas, supplied by Air Liquide, to quantify the analyser 'zero' and 'span' response. The 'zero' response is the response of the analyser when the pollutant species being measured is not present in the sample air stream.

The 'span' response is the response of the analyser to a gas mixture of accurately known concentration. In addition to the fortnightly checks EnviroTechnology carried out six monthly reference calibrations.

Equipment service and maintenance

The Council has an ongoing service and maintenance contract with Supporting U for the analysers. The contract provides the following cover:

- Routine six monthly service visits in accordance with the manufacturers'
- instructions
- Guaranteed breakdown call out response
- Written report showing work carried out and status of instrumentation
- All work and documentation is carried out in accordance with a BS ISO 9002 accredited system
- Dedicated telephone support in normal working hours

Data processing

Data management and ratification is handled by Supporting U with regular data downloads during the day.

The raw data collected has to be converted to more useful pollutant concentrations and this conversion is achieved using the 'zero' and 'span' responses that are recorded during the fortnightly visits. The 'zero' response, Vz, is the response in measurement units of the analyser when the pollutant species being measured is not present in the sample air stream.

The 'span' response, Vs, is the response of the analyser to an accurately known concentration, c, in ppb (parts per billion) of the pollutant species. The instrument 'zero' and 'span' factors are then calculated using these data as follows:

Instrument zero = Vz
Instrument span, F = c/(Vs-Vz)

Ambient pollution data are then calculated by applying these factors to logged output signals as follows:

Pollutant concentration (ppb) = F(Va-Vz)

Where Va is the recorded signal from the analyser sampling ambient air. The fortnightly calibration factors applied to the raw data are then filed.

Data validation and ratification

Once the calibration factors have been applied to the raw data, the data is screened, by visual examination to see if they contain any spurious and/or unusual measurements. Any suspicious data, such as large spikes or spurious high concentrations can be 'flagged' and investigated more fully.

This process is known as validation. Data validation is followed by data ratification, which is carried out at 3 – 6 month intervals. Steps in the ratification process include:

- Examination of calibration records to ensure correct application of calibration factors
- Examination of data for other pollutants and monitoring sites to highlight any anomalies
- Deletion of data shown i.e. spikes generated by the analyser
- Correction of any baseline drift as indicated by examination of daily calibration records
- Examination of any local scale changes to the site environment

When data verification has been completed then the data is ready for further statistical and critical examination for reporting purposes.

QA/QC of Diffusion Tube Monitoring

The use of diffusion tubes follows the guidance produced by AEA Energy & Environment, in their publication Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance for Laboratories and Users[10]

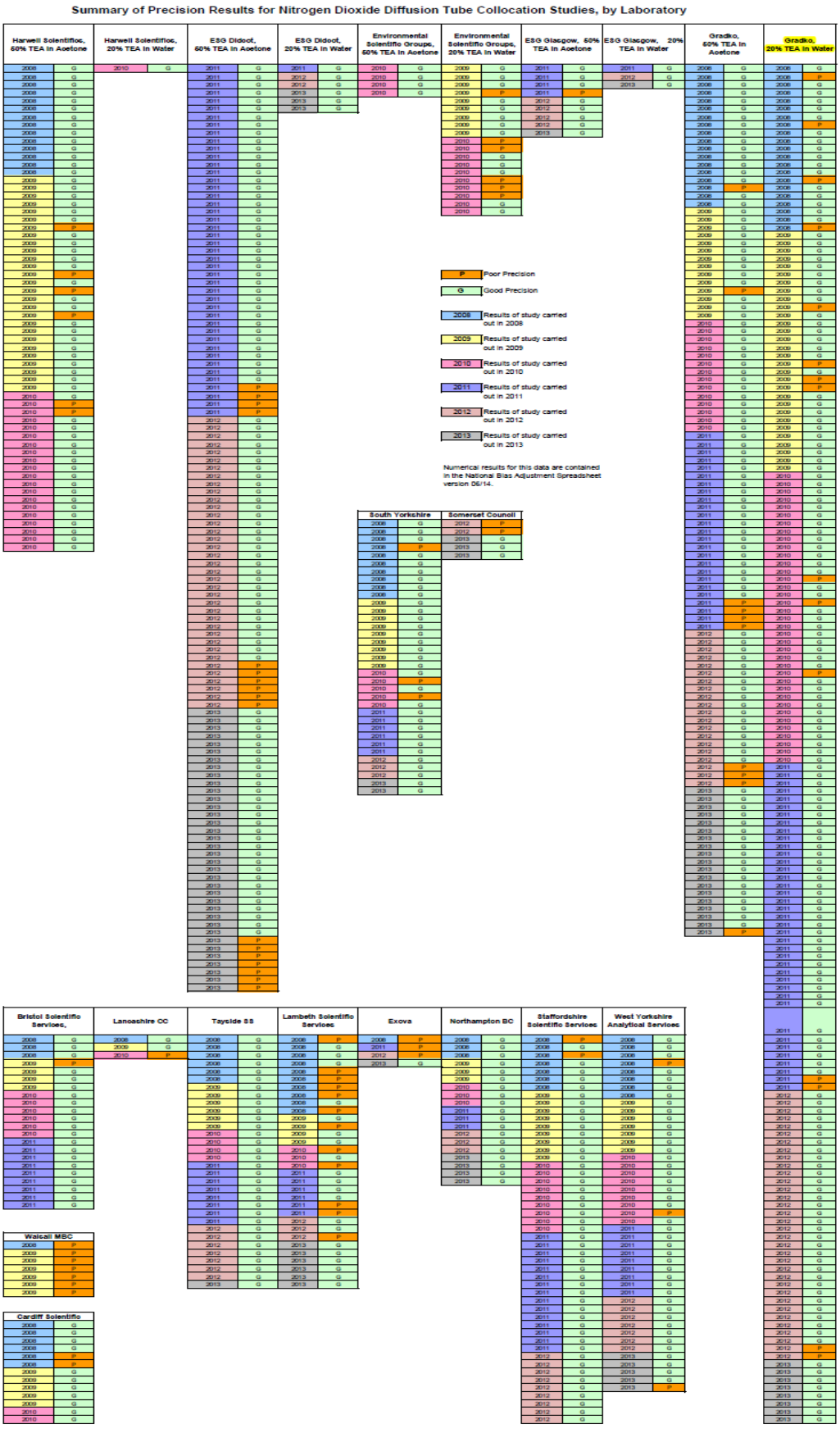
Diffusion tubes are supplied and analysed by Gradko Laboratories. They have confirmed that they employ the AEA Technology and Environment NO_2 QC solution to check the validity of their calibration curves derived from internal standards prepared from NIST certified nitrite standards.

Gradko's general statement on Defra Guidance Document that has been supplied to Local Authorities is as follows:

> *'Our NO2 diffusion tube procedures have been amended to follow the guidelines of the DEFRA Harmonisation document related to the preparation, extraction, analysis and calculation procedures for NO2 passive diffusion tubes. These amendments are minimal because we already carried the out most of the procedures before the introduction of the Guidelines. Our internal analysis procedures are assessed by U.K.A.S. on an annual basis for compliance to ISO17025'*

[10] http://uk-air.defra.gov.uk/reports/cat05/0802141004_NO2_WG_PracticalGuidance_Issue1a.pdf

Figure A3 Precision results for NO_2 Diffusion collocation results by laboratory



Source DEFRA http://laqm.defra.gov.uk/documents/Tube_Precision_2014_version_06_14-Final.pdf

Figure A4 WASP NO_2 PT rounds 117-124

Table 1: Laboratory summary performance for WASP NO_2 PT rounds 117 - 124

The following table lists those UK laboratories undertaking LAQM activities that have participated in recent HSL WASP NO_2 PT rounds and the percentage (%) of results submitted which were subsequently determined to be **satisfactory** based upon a z-score of ≤ ± 2 as defined above.

WASP Round	WASP R117	WASP R118	WASP R119	WASP R120	WASP R121	WASP R122	WASP R123	WASP R124
Round conducted in the period	April – June 2012	July – September 2012	October – December 2012	January – March 2013	April – June 2013	July – September 2013	October – December 2013	January – March 2014
Aberdeen Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	NR [2]	75 %
Cardiff Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Edinburgh Scientific Services	100 %	100 %	100 %	100 %	100 %	75 %	100 %	100 %
Environmental Services Group, Didcot [1]	100 %	100 %	100 %	100 %	100 %	100 %	100 %	
Exova (formerly Clyde Analytical)	0 %	100 %	25 %	75 %	NR [2]	NR [2]	NR [2]	50 %
Glasgow Scientific Services	50 %	100 %	100 %	50 %	25 %	100 %	100 %	100 %
Gradko International [1]	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Kent Scientific Services	100 %	75 %	100 %	50 %	75 %	100 %	100 %	100 %
Kirklees MBC	100 %	75 %	100 %	100 %	100 %	100 %	100 %	100 %
Lambeth Scientific Services	100 %	0 %	100 %	100 %	0 %	50 %	75 %	25 %
Milton Keynes Council	100 %	75 %	100 %	50 %	100 %	75 %	75 %	75 %
Northampton Borough Council	100 %	100 %	100 %	0 %	100 %	100 %	100 %	100 %
Somerset Scientific Services	100 %	100 %	100 %	100 %	100 %	75 %	100 %	100 %
South Yorkshire Air Quality Samplers	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Staffordshire County Council	100 %	75 %	100 %	50 %	100 %	100 %	100 %	100 %
Tayside Scientific Services (formerly Dundee CC)	100 %	100 %	100 %	75 %	100 %	100 %	100 %	100 %
West Yorkshire Analytical Services	75 %	50 %	100 %	100 %	100 %	50 %	100 %	75 %

[1] Participant subscribes to two sets of test samples (2 x 4 test samples) in each WASP PT round.
[2] NR Not reported

Source DEFRA http://laqm.defra.gov.uk/documents/LAQM-WASP-Rounds-117-124-(April-2012--March-2014)-NO2-report.pdf

Appendix B: NO_2 Diffusion tube results 2013

Figure B1 NO2 Diffusion tube monitoring results 2013

Newcastle under Lyme Borough Council Local Air Quality Management Nitrogen Dioxide Diffusion Tube Monitoring Programme 2013 Calendar Year (51 sites)

Analysing Laboratory : Gradko

Bias Adjustment Factor: 0.95

Source: National Diffusion Tube Bias Factors Spreadsheet version 03/14

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Uncorrected Mean (mg/m3)	Corrected Mean (Bias Adjustment factor applied) (mg/m3)	Easting	Northing	Tube height from road (m)	Distance tube to kerb (m)	Distance tube to receptor (m)	Relevant Exposure Y/N according to LAQM. TG(09) Box 1.4	Site Type TG(09)
K1-A34 Holy Trinity	51.35	56.56	45.50	36.55	47.02	44.61	43.25	46.91	51.71	47.97	58.53	38.97	**47.4**	**45.0**	385051	345726	3	3	22	N	Kerbside
K2-76 King St, N/C	46.22	35.68	44.00	36.78	27.81	30.26	29.81	31.10	32.34	32.62	37.62	31.31	34.6	32.9	385469	346362	2	3	0.2	N	Urban Centre
UB1-Wolstanton (Haritington St)	33.98	No Tube	26.76	20.10	16.19	17.45	16.95	16.22	20.88	23.39	32.14	23.70	22.5	21.4	384739	348326	3	2	7	N	Kerbside
UB2-Westlands (4 Sneyd Crescent)	33.06	26.42	24.25	6.59	14.44	14.06	15.91	14.80	18.31	16.14	27.95	21.52	19.5	18.5	383916	345059	3	2	23	N	Kerbside
3-Madeley (Collingwood 3 Newcastle Rd)	48.39	40.36	25.37	33.14	44.12	35.19	33.40	39.02	38.49	35.76	43.09	44.00	38.4	36.4	378116	345488	-2	128	0.2	Y	Rural
6-Kidsgrove (106 Liverpool Rd)	53.84	48.41	57.11	39.76	38.76	41.69	46.37	41.54	40.08	41.94	50.63	34.85	**44.6**	**42.4**	384014	354429	3	4	0.2	Y	Suburban
9-32 Porthill Bank	44.79	40.36	36.64	42.14	36.03	31.62	33.70	36.56	35.08	29.22	43.59	40.25	37.5	35.6	385519	349055	3	6	0.2	Y	Suburban
11-34 London Road, N/C	No Tube	88.22	75.24	82.72	36.93	36.44	44.35	46.66	47.89	40.61	51.83	52.14	**54.8**	**52.1**	385112	345636	3	3	0.3	Y	Suburban
15-218 Congleton Road	41.09	No Tube	31.40	25.40	29.13	25.43	28.91	30.41	33.23	28.63	40.94	28.64	31.2	29.6	382660	354191	3	4	0.2	Y	Suburban
24-26 High St, May Bank	46.38	32.47	42.28	34.37	34.83	31.06	37.48	33.69	42.96	35.74	49.55	46.86	39.0	37.0	385574	347530	3	3	0.2	Y	Roadside
28-Limbrick Cottage Shraleybrook	44.52	40.22	38.14	31.28	37.32	27.04	32.01	38.98	39.25	32.88	46.02	38.21	37.2	35.3	377994	350105	6	45	0.3	Y	Rural
31-102 London Road	37.66	35.90	30.83	26.72	30.59	26.80	29.09	29.77	32.77	31.12	39.00	31.20	31.8	30.2	385224	345453	2	4	0.2	Y	Suburban
32-139 Dimi Parade West	42.90	42.86	33.60	28.51	25.80	29.36	8.99	25.55	32.79	27.01	40.25	27.53	30.4	28.9	384773	348430	2	3	0.2	Y	Suburban
33-9 Hart Court, N/C	42.83	40.71	36.71	34.51	27.19	28.54	28.43	26.69	33.59	31.64	39.50	34.60	33.7	32.1	384611	346330	3	10	0.3	Y	Suburban
34-15 Barracks Road	No Tube	36.74	No Tube	77.14	23.79	38.65	33.95	35.10	35.54	36.42	43.02	36.65	39.7	37.7	385059	345840	3	4	1	Y	Urban Centre
39-4/6 Liverpool Road, Kidsgrove	48.49	No Tube	53.21	38.83	31.99	40.95	44.20	34.16	37.56	38.61	45.55	30.22	**40.3**	38.3	383560	354739	3	2	0.2	Y	Suburban
40-Banktop Court, Porthill	45.72	41.38	46.22	37.96	28.56	36.14	31.08	29.47	33.45	34.50	40.36	35.16	36.7	34.8	385128	348811	5	20	0.2	Y	Suburban
41-Jubilee Baths, Newcastle	45.43	44.48	51.14	32.79	34.86	37.88	37.69	33.89	34.33	36.40	41.31	36.60	38.9	37.0	385086	346155	3	4	0.2	N	Urban Centre
42-Jubilee Baths, Newcastle	45.11	40.40	41.88	34.65	36.21	32.16	35.63	31.64	34.52	39.19	43.20	35.87	37.5	35.7	385086	346155	3	4	0.2	N	Urban Centre
43-Jubilee Baths, Newcastle	46.50	42.25	36.99	38.72	37.95	35.84	38.82	32.31	31.81	41.76	45.30	35.38	38.6	36.7	385086	346155	3	4	0.2	N	Urban Centre
46-1 London Road (Trinity Court)	40.63	35.81	34.15	27.40	33.24	28.69	31.14	32.90	37.40	19.80	44.03	32.14	33.1	31.5	385073	345685	3	5	0.3	Y	Urban Centre
47-1 London Rd (Brook Ls)	41.46	42.74	44.61	35.20	27.65	34.11	32.92	28.12	31.50	31.52	40.19	28.60	34.9	33.1	385023	345678	3	6	0.3	Y	Urban Centre
49-2 Vale View, Porthill	41.50	39.41	33.22	31.17	30.87	28.03	31.01	33.95	37.37	34.12	45.41	34.18	35.0	33.3	385595	349129	10	10	0.2	Y	Urban Centre
50-84 London Road, Newcastle	36.81	36.77	35.06	25.68	23.66	23.32	23.85	24.23	23.70	32.58	38.95	30.59	29.6	28.1	385199	345487	2	10	0.2	Y	Suburban
52-Agricon House Madeley	41.32	27.23	31.03	27.53	29.48	23.72	27.06	30.80	31.20	29.29	36.77	34.61	30.8	29.3	378200	345452	-2	86	0.3	Y	Rural
53-2 Knowle Bank Road Audley	42.42	32.78	22.51	26.98	29.14	25.99	29.08	36.16	34.83	32.75	43.79	36.88	32.8	31.1	378028	349830	-6	64	0.2	Y	Rural
62-79 Liverpool Road Kidsgrove	38.13	30.18	33.61	27.53	23.39	25.05	25.72	24.79	28.37	28.99	37.84	30.22	29.5	28.0	384030	354390	3	9	0.2	Y	Roadside
63-9-11 The Avenue Kidsgrove	40.50	39.17	33.86	26.33	28.45	26.83	30.20	39.74	33.03	21.17	41.88	28.84	32.5	30.9	383958	354403	3	3	0.2	Y	Roadside
64-Kidsgrove Carpets 57-59 Liverpool Road	50.74	39.70	41.50	34.63	37.25	36.33	38.63	26.03	41.59	27.39	52.32	48.27	**39.5**	37.6	383950	354445	3	3	0.2	Y	Roadside
72-134 High Street Newcastle	No Tube	No Tube	38.03	30.45	24.16	28.45	31.27	24.21	31.81	36.76	44.47	30.76	**32.0**	30.4	384980	345787	3	4	0.2	Y	Roadside
73-21 London Road Newcastle	43.15	44.42	43.22	28.63	31.53	33.43	37.29	33.26	36.61	36.46	48.30	34.18	**37.5**	35.7	385070	345738	3	4	0.2	Y	Roadside
74-39 London Road Newcastle	46.07	45.79	50.00	37.91	32.09	35.65	38.63	34.46	43.23	39.42	54.27	33.87	**40.9**	38.9	385132	345640	3	2	0.2	Y	Roadside
76-11 Brunswick Street Newcastle	48.38	44.83	45.84	15.20	30.64	36.97	33.68	35.03	41.04	40.41	47.27	39.65	**38.2**	36.3	385226	346156	3	2	0.2	Y	Roadside
77-68 Liverpool Road Kidsgrove	35.58	35.36	35.35	28.27	25.62	27.85	28.07	23.23	26.30	28.92	40.72	24.77	30.0	28.5	383895	354475	4	4	0.2	Y	Urban Centre
78-140 Liverpool Road Kidsgrove	32.85	28.00	22.70	16.67	20.51	17.16	18.58	20.07	25.71	21.76	34.24	33.62	24.3	23.1	384156	354333	2.5	17	0.2	Y	Urban Centre
79-89 Liverpool Road Kidsgrove	40.09	35.76	30.01	28.75	30.70	31.26	32.33	33.02	36.80	27.17	40.36	26.98	**32.8**	31.1	384176	354279	3	2	0.2	Y	Urban Centre
84-102 King Street Newcastle	53.47	45.39	48.89	36.61	31.51	40.59	37.61	37.65	39.79	39.75	51.96	45.43	**42.2**	**40.1**	385548	346400	3	5	0.2	Y	Urban Centre
85-106 King Street Newcastle	56.30	52.00	51.56	44.56	39.72	45.64	44.49	39.11	47.87	47.31	50.47	51.17	**47.5**	**45.1**	385575	346413	2	5	0.2	Y	Urban Centre
86-Hassell CP. School Barracks Road N/C	45.15	42.75	42.08	33.88	34.56	36.59	31.62	31.63	38.68	29.61	41.53	32.04	36.7	34.8	385075	345910	3	5	0.2	Y	Urban Centre
87-Blue Chilli 1 King Street Newcastle	48.73	45.80	44.69	36.60	42.46	29.33	42.73	38.83	45.68	37.70	49.13	47.50	**42.4**	**40.3**	385105	346225	2	5	0.2	Y	Urban Centre
88-27 Lower Street Newcastle	41.47	39.33	39.53	28.93	27.81	29.50	30.55	32.69	37.13	40.88	46.83	35.43	35.8	34.0	384709	345881	3	5	0.2	Y	Urban Centre
89-Queens Gardens Newcastle	No Tube	45.25	45.06	34.49	27.59	35.32	35.56	27.60	32.25	39.13	43.69	38.36	36.8	34.9	385054	346134	1	5	1	Y	Urban Centre
90-Queens Gardens Newcastle	No Tube	45.17	43.11	34.11	28.31	32.68	35.55	29.51	31.59	33.27	40.91	35.74	35.3	33.5	385054	346134	1	5	1	Y	Urban Centre
91-Queens Gardens, Newcastle	No Tube	42.01	39.27	34.33	27.73	33.46	32.40	28.29	31.32	34.96	39.06	33.59	34.2	32.5	385054	346134	1	5	1	Y	Urban Centre
92-41/43 Liverpool Road Kidsgrove	52.64	44.62	41.26	40.16	27.57	32.40	30.96	33.62	36.05	40.04	49.93	37.48	38.9	36.9	383890	354461	3	2	0.2	Y	Urban Centre
93-118 Liverpool Road Kidsgrove	43.79	40.89	40.94	30.23	29.63	35.54	26.54	29.42	36.55	31.40	46.75	35.47	35.6	33.8	384056	354393	4	3	0.2	Y	Urban Centre
94-116 Liverpool Road Kidsgrove	43.21	45.83	40.80	33.47	37.22	40.09	36.80	35.33	39.97	38.58	53.55	36.88	**40.1**	38.1	384030	354416	4	4	0.2	Y	Urban Centre
95-76 London Road Newcastle	49.06	44.69	41.18	34.51	39.96	33.41	38.90	39.06	49.75	40.89	58.35	39.87	**42.5**	**40.3**	385171	345539	4	2	0.2	Y	Roadside
96-52/54 London Road Newcastle	46.39	46.88	39.71	32.03	34.50	36.36	34.33	36.03	45.29	35.98	59.70	49.48	**41.2**	39.2	385131	345601	3	3	0.2	Y	Roadside
97-Blackfriars/ Lower Street	44.01	48.42	43.40	35.39	32.50	32.64	38.90	31.03	35.33	41.08	45.22	35.40	38.6	36.7	384795	345796	2	2	0.2	N	Roadside
98-Newcastle Taxis Brunswick Street	54.85	42.98	45.36	34.55	34.66	36.77	43.06	40.96	42.98	48.56	55.42	50.03	44.2	42.0	385274	346124	4	6	0.2	Y	RoadSide