



## **2013 Air Quality Progress Report for Gateshead Council**

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

**April 2013**

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<b>Report Reference number</b>	GCPR/13
<b>Date</b>	April 2013

# Executive Summary

The Borough of Gateshead has one of the worst health profiles in the UK. Gateshead Council is committed to improving the health of its residents through its Community Strategy – Vision 2030 and aspires to have the best health nationally by 2030.

Poor Air Quality has a significant impact on Public Health and it is important that we recognise and understand the impact that poor air quality in Gateshead has directly on its residents. This report for the first time highlights those that are exposed as residents but it is recognised that further work with public health professionals will be required to understand the true health impact on these residents.

This report fulfils the requirements of the Local Air Quality Management 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 objective of this progress report has been to review new monitoring data and any new developments which may lead to risk of an air quality objective being exceeded. The Progress Report concludes whether there is a need to progress to a Detailed Assessment for any pollutant within the borough.

Gateshead Council declared an Air Quality Management Area (AQMA) in April 2005 within Gateshead Town Centre. This was extended in April 2008. The AQMA was required as a result of measured levels of Nitrogen Dioxide (NO<sub>2</sub>) exceeding the annual objective level.

The review of 2012 monitoring data has shown that following a fall in 2011, NO<sub>2</sub> levels have again risen and are again exceeding the annual mean objective level within the AQMA at one location. There are no exceedances of the annual mean objective level outside of the AQMA.

During 2012, no developments were granted planning permission which required mitigation for adverse air quality impacts.

The draft report of the Low Emission Zone (LEZ) joint feasibility study with Newcastle City Council has been produced by Newcastle University. The report confirms that a LEZ will not be required in Gateshead as NO<sub>2</sub> concentrations are predicted to fall as a result of modelled changes in engine technology. The final report is expected to be published in the coming months. This position will be kept under review in future years.

The Current AQMA boundary remains appropriate for now but will be subject to review. There is no need to progress to a Detailed Assessment for any pollutant or source following this Progress Report. Gateshead Council will publish a further Progress Report in April 2014.

Gateshead Council recognises the impact that poor air quality has on health and it will endeavour to do everything in its powers to improve and protect air quality in the borough.

## Table of Contents

**Executive Summary**

<b>1</b>	<b>Introduction</b>	<b>5</b>
1.1	Air Quality & Health	5
1.2	Description of Local Authority Area	5
1.3	Purpose of Progress Report	7
1.4	Air Quality Objectives	7
1.5	Summary of Previous Review and Assessments	9
<b>2</b>	<b>New Monitoring Data</b>	<b>11</b>
2.1	Summary of Monitoring Undertaken	11
2.2	Comparison of Monitoring Results with Air Quality Objectives	17
<b>3</b>	<b>New Local Developments</b>	<b>29</b>
3.1	Road Traffic Sources	29
3.2	Other Transport Sources	29
3.3	Industrial Sources	29
3.4	Commercial and Domestic Sources	29
3.5	New Developments with Fugitive or Uncontrolled Sources	29
<b>4</b>	<b>Local / Regional Air Quality Strategy</b>	<b>30</b>
<b>5</b>	<b>Planning Applications</b>	<b>31</b>
<b>6</b>	<b>Air Quality Planning Policies</b>	<b>32</b>
<b>7</b>	<b>Local Transport Plans and Strategies</b>	<b>33</b>
<b>8</b>	<b>Climate Change Strategies</b>	<b>34</b>
<b>9</b>	<b>Implementation of Action Plans</b>	<b>35</b>
<b>10</b>	<b>Conclusions and Proposed Actions</b>	<b>38</b>
10.1	Conclusions from New Monitoring Data	38
10.2	Conclusions relating to New Local Developments	38
10.3	Other Conclusions	38
10.4	Proposed Actions	38
<b>11</b>	<b>References</b>	<b>39</b>

**List of Tables**

Table 1	Air Quality Objectives included in Regulations for the purpose of Local Air Quality Management in England
Table 2	Summary of Previous Review and Assessments
Table 3	Details of Automatic Monitoring Sites
Table 4	Details of Non- Automatic Monitoring Sites (NO <sub>2</sub> Diffusion Tubes)
Table 5	Results of Automatic Monitoring for NO <sub>2</sub> : Comparison with Annual Mean Objective
Table 6	Results of Automatic Monitoring for NO <sub>2</sub> : Comparison with 1-hour Mean Objective
Table 7	Results of NO <sub>2</sub> Diffusion Tubes 2012

Table 8	Results of NO <sub>2</sub> Diffusion Tubes (2008 to 2012)
Table 9	Historical Results of Automatic Monitoring for PM <sub>10</sub> : Comparison with Annual Mean Objective
Table 10	Historical Results of Automatic Monitoring for PM <sub>10</sub> : Comparison with 24-hour Mean Objective
Table 11	Results of PM <sub>2.5</sub> monitoring 2012
Table 12	Action Plan Progress

**List of Figures**

Figure 1	Map of the North East Region
Figure 2	Map of Town Centre AQMA Boundaries and Monitoring Locations
Figure 3	Map of A1 Dunston Monitoring Location
Figure 4	Trends in Annual Mean NO <sub>2</sub> Concentrations Measured at Automatic Monitoring Sites
Figure 5	Trends in Annual Mean NO <sub>2</sub> Concentrations Measured at Diffusion Tube Monitoring Sites

**Appendices**

Appendix A	Monthly NO <sub>2</sub> Diffusion Tube Results 2012
Appendix B	QA/QC Data
Appendix D	AEA DifTPAB v04 spreadsheet Checking Precision and Accuracy of Triplicate Tubes – Lychgate Court, Bottle Bank, A1 Dunston

# 1 Introduction

## 1.1 Air Quality & Health

Poor air quality is a significant risk to public health and is estimated to be contributing to up to 200,000 premature deaths nationally per year. This is not acceptable and more needs to be done locally and nationally to prevent this.

Air pollution began to have an impact on the health of the population from the start of the industrial revolution due to our increasing need for energy and reliance on the burning of fossil fuels.

The resulting smoke from the burning of fossil fuels coupled with poor weather conditions often resulted in Urban Smog's. Particularly serious smog's in the 1950's and 60's caused thousands of premature deaths and resulted in public outcry and decisive government action to control air pollution.

The Government introduced the first Clean Air Act in 1956 and in 1961 it introduced the National Survey. This was the world's first coordinated national air pollution monitoring network. It monitored black smoke and sulphur dioxide at around 1200 sites in the UK.

Within the UK and Europe, focus has shifted to the monitoring of pollutants generated (directly or indirectly) from vehicular emissions, which include ozone, nitrogen dioxide and fine particulate matter.

Progressively the pollutants that we monitor in Gateshead have changed but the damage that they cause to public health has not. Improving air quality in Gateshead can have one of the single greatest impacts on health improvement. Air Quality must therefore be considered and dealt with as a public health priority.

## 1.2 Description of Local Authority Area

Gateshead is a unitary authority with a population of just over 200,000 in the heart of North East England, bordering the cities of Newcastle and Sunderland and the unitary authorities of South Tyneside, Northumberland and Durham, see Figure 1. Covering 142 square kilometres and stretching 21 kilometres along the south bank of the River Tyne it is the largest of the Tyneside Districts, with a mix of large urban and rural areas. Over half of the borough is classed as green belt or countryside but most of this is located away from built up Tyneside in the South and West of the Borough.

A substantial road and rail network covers the region which includes the A1(M) at Portobello, Birtley and the A1, which passes Metrocentre, one of the largest out of town retail and leisure complexes in Europe. This section of the A1 is the third most congested stretch of major road in the UK. A comprehensive network of bus services and regional and national rail systems operate within the

Gateshead area, as well as a Metro light rail network. There are rail and road bridge crossings over the River Tyne, the roads suffering high traffic flows and congestion.

As with most areas in the UK heavy industry has disappeared. There are though a total of 90 industrial processes registered under the Environmental Permitting Regulations 2010, 20 Part A1's, 3 Part A2's, and 67 Part B's.

There are significant areas of deprivation within the borough and overall the area has one of the poorest health profiles in the country. Based on 2008 – 10 life expectancy data, men can expect to live 8.9 years longer and women 9.4 years longer in the most affluent part of Gateshead than those in the poorest. The distance between these two areas is less than 5 miles.

Gateshead town centre is currently undergoing substantial redevelopment some of which is due for completion in spring 2013. The works are phased over a number of years but on completion the site will include a large supermarket, around 40 retail units, a cinema and student accommodation.

This redevelopment takes place centrally within an Air Quality Management Area (AQMA). The AQMA was declared in April 2005 and included much of the town centre, for exceedances of the nitrogen dioxide mean annual average air quality objective notably from road traffic. It was amended to include a southward extension along the A167 road in April 2008. Based on recent census data, it is estimated that the number of residents within the AQMA is in the region of 1900, this is expected to increase by around 1000 when the student accommodation is completed and occupied.



**Figure 1 Map of the North East Region**

### 1.3 Purpose of Progress Report

This report fulfils the requirements of the Local Air Quality Management 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 Local Air Quality Management 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 exceedances 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.

### 1.4 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. This table shows the objectives in units of microgram's per cubic metre  $\mu\text{g}/\text{m}^3$  (milligram's per cubic metre,  $\text{mg}/\text{m}^3$  for carbon monoxide) with the number of exceedances in each year that are permitted (where applicable).

**Table 1: Air Quality Objectives included in Regulations for the purpose of Local Air Quality Management in England**

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	5.00 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
Carbon monoxide	10 $\text{mg}/\text{m}^3$	Running 8-hour mean	31.12.2003
Lead	0.50 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	0.25 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2005



Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Particulate Matter (PM <sub>10</sub> ) (gravimetric)	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 µg/m <sup>3</sup>	Annual mean	31.12.2004
Sulphur dioxide	350 µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

## 1.5 Summary of Previous Review and Assessments

Previous Reviews and Assessments are summarised in Table 2.

**Table 2: Summary of Previous Review and Assessments**

Date	R&A Round	Stage/Report	Outcome/Comment
April 1999	1	R&A Stage 1 Tyne & Wear	Proceeded to Stage 3 for all pollutants except 1-3 butadiene
November 2000	1	R&A Stage 3 Gateshead	No exceedances of any of 6 pollutants investigated, therefore no AQMA's
May 2003	2	Updating & Screening Assessment	Exceedances of annual mean objective for NO <sub>2</sub> at 2 busy road junctions predicted by DMRB modelling. Proceeded to DA for NO <sub>2</sub> . Further investigations required for benzene - reported in 2005 Progress Report
January 2005	2	Detailed Assessment of NO <sub>2</sub>	AQMA required due to slight exceedances of NO <sub>2</sub> annual mean objective at Trinity Court in town centre (junction of A167 & A184)
April 2005	2	Air Quality Management Order	AQMA declared for whole of Gateshead town centre
April 2005	2	Annual Progress Report	Benzene & PM <sub>10</sub> assessed - AQO's found to be achieved at all relevant locations. Ref made to DA for NO <sub>2</sub> . No further NO <sub>2</sub> hotspots identified
March 2006	2	Further Detailed Assessment	AQMA declared for NO <sub>2</sub> found to still be justified, with no need to amend AQO exceedances areas
April 2006	3	Updating & Screening Assessment	AQO's found to be achieved for all pollutants, except for annual mean NO <sub>2</sub> - 3 exceedances found at locations outside of existing AQMA - one south of AQMA on A167, and 2 in Birtley.
April 2007	3	Detailed Assessment of NO <sub>2</sub> for Town Centre AQMA & Portobello	AQMA as declared found still be justified. AQMA's also found to be required at A167 Durham/Dryden Road junction, south of AQMA, and at Portobello, Birtley
January 2008	2	Air Quality Action Plan	For Town Centre AQMA
April 2008	3	Air Quality Management Orders	Variation Order to extend existing Town Centre AQMA southwards along A167 to include Durham/Dryden Road junction. AQMA declared for PortobelloTce, Birtley.
April 2008	3	Annual Progress Report	AQO's found to be achieved for all pollutants, except for annual mean NO <sub>2</sub> - Ref made to DA, Further DA and AQAP
April 2009	3	Further Detailed Assessment of NO <sub>2</sub>	Extension to Town Centre AQMA, and declaration of Portobello AQMA confirmed.
April 2009	4	Updating & Screening Assessment	A few exceedances of annual mean NO <sub>2</sub> AQO found within Town Centre AQMA only.

## Gateshead Council

			None at Portobello, but AQMA not revoked. No exceedances of any of the other AQO's, therefore DA not required for any pollutant.
April 2010	4	Annual Progress Report & AQMA Action Plan Update	A few exceedances of annual mean NO2 AQO found within Town Centre AQMA only. No exceedances of any of the other AQO's, therefore DA not required for any pollutant.
April 2011	4	Annual Progress Report	All Air Quality Objectives met Including NO2 in town centre AQMA. 3rd consecutive year of NO2 reduction in Portobello AQMA.
May 2011 (resubmitted October 2011)	4	Detailed Assessment of NO2	For Portobello, with a view to revocation of AQMA, due to no exceedances of NO2 AQO for 2 years, & downward trend in NO2 concentrations over 3 years. Document revised and resubmitted in October 2011 to demonstrate minimum data capture rate of 75%.
April 2012	5	Updating & Screening Assessment	All Air Quality Objectives met Including NO2 in town centre AQMA.

## **2 New Monitoring Data**

### **2.1 Summary of Monitoring Undertaken**

This report provides a summary of all of the monitoring data for 2012 which has been obtained either from an automatic monitoring station or through Non-Automatic Monitoring methods such as NO<sub>2</sub> Diffusion Tubes. The data is provided in a format suitable for comparison with the relevant Air Quality Objectives

#### **2.1.1 Automatic Monitoring Sites**

During 2012 Gateshead Council continued to measure nitrogen dioxide concentrations using real-time chemiluminescent monitors at three roadside sites. Two of these were within the Town Centre AQMA (Lychgate and Bottle Bank) and one on the A1 South slip road at Dunston. Their locations are shown in Figs 2 & 3. All of the sites are roadside and situated closer to the road traffic pollution source than the nearest relevant receptors which are residential properties.

Gateshead Council has continued to measure PM<sub>2.5</sub> rather than PM<sub>10</sub> concentrations using TEOM samplers at Lychgate Court and at the A1 Dunston site. This report sees the first annual data for PM<sub>2.5</sub> at the two locations.

QA/QC procedures for automatic monitoring are outlined in Appendix B.

Figure 2 Map of Town Centre AQMA Boundaries and Monitoring Locations

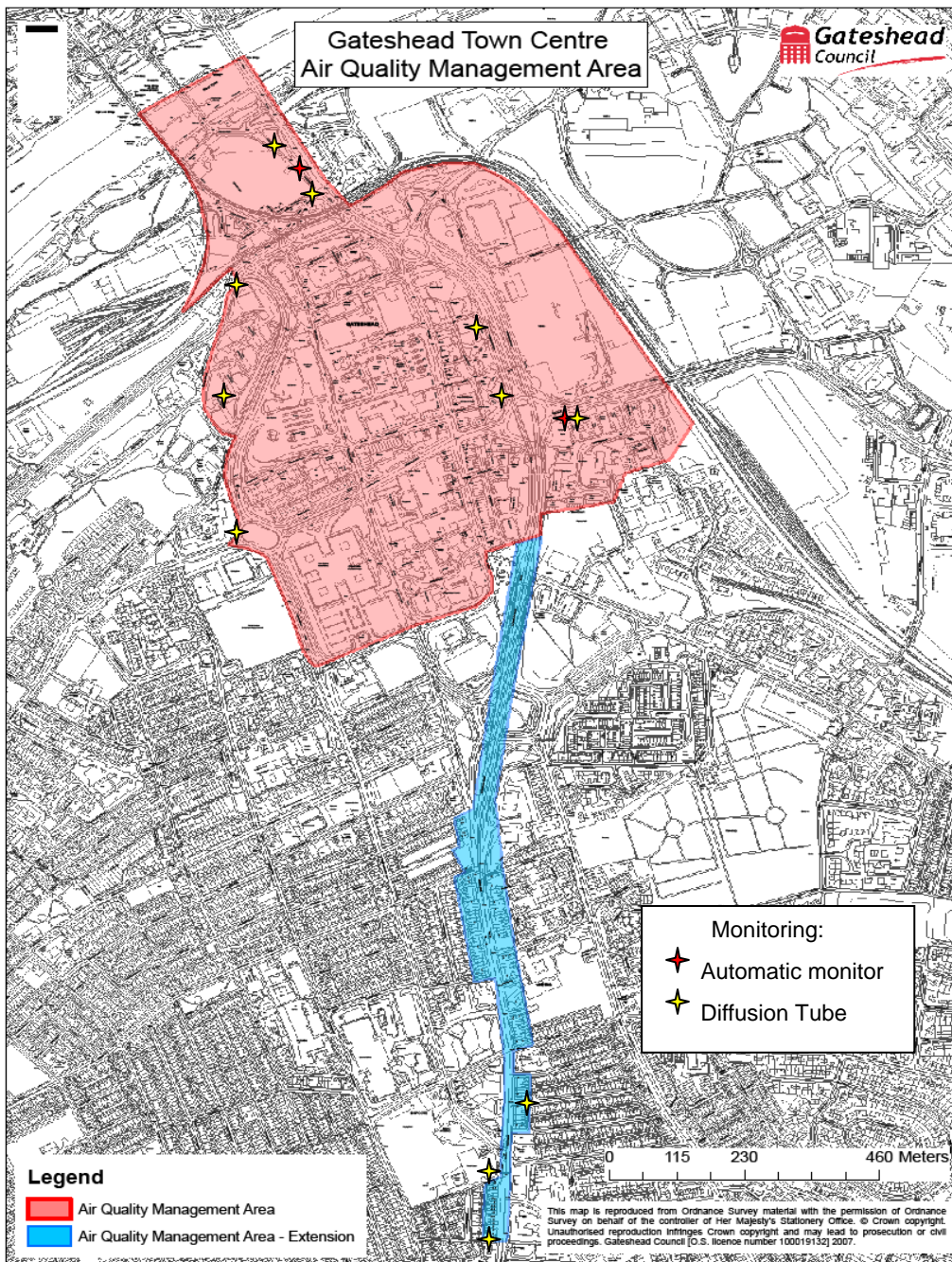


Figure 3 Map of A1 Dunston Monitoring Location

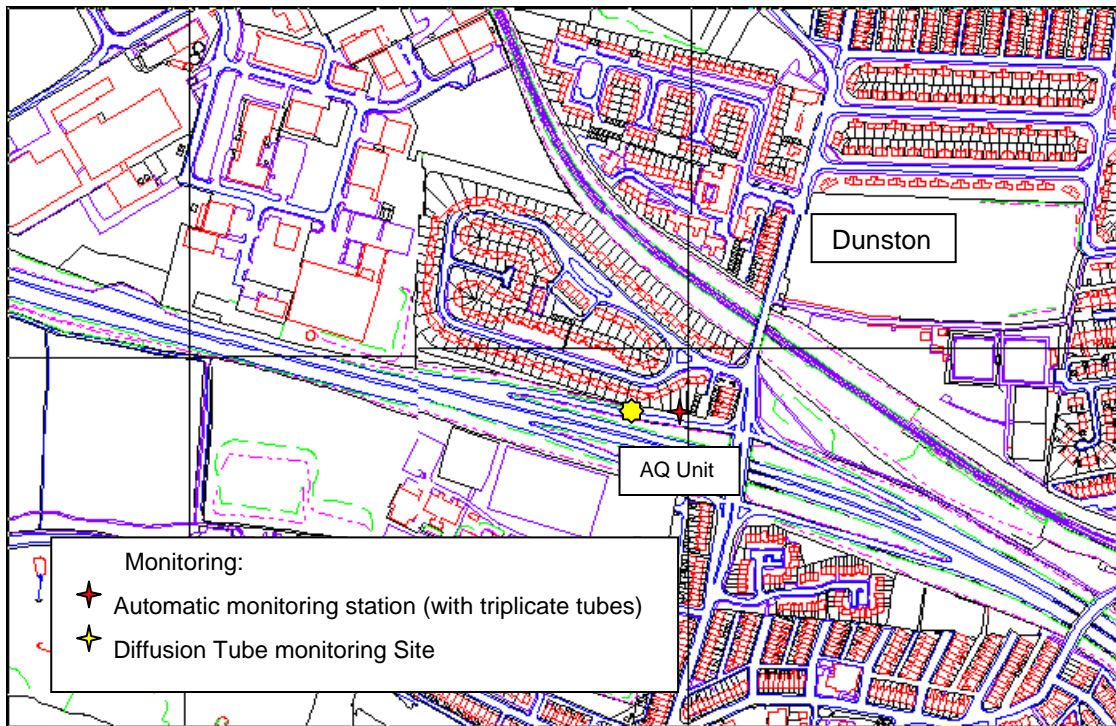


Table 3 Details of Automatic Monitoring Sites

Site Name	Site Type	OS Grid Ref	Pollutants Monitored	Monitoring Technique	In AQMA?	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to kerb of nearest road (m)	Does this location represent worst-case exposure?	Summary
Lychgate Court	Roadside	X 425912 Y 563108	NO2	Chemiluminescent	Y	Y (6m)	7m	Y	PM10 monitoring ceased 30.05.2011
			PM2.5	TEOM					PM2.5 commenced 01.06.2011
Hill Street, Bottle Bank	Roadside	X 428265 Y 554970	NO2	Chemiluminescent	Y	Y (8m)	2.5m	Y	Remains unchanged
A1 Dunston	Roadside	X 422510 Y 561928	NO2	Chemiluminescent	N	N (16M)	9m	Y	PM10 monitoring ceased 31.03.2011
			PM2.5	TEOM					PM2.5 commenced 01.04.2011

### 2.1.2 Non-Automatic Monitoring Sites

Monthly average nitrogen dioxide concentrations are measured at a large number of sites in Gateshead using passive diffusion tubes. The current monitoring sites are detailed in Table 4. Monitoring sites in the AQMA and the A1 Dunston site are shown in Figures 2 & 3. Most of the sites are located roadside, and represent residential exposure. The majority of the tubes are located on the property façade of the nearest relevant receptors, or are sets of triplicate tubes co-located with automatic monitors.

All of the monitoring sites exceeded the 75% data capture requirement and therefore negates the requirement to calculate annualised data (TG 09 section 3 Box 3.1). Data for tubes exposed in July 2012 were invalid due to a fault in preparation/analysis at Gradko which resulted in data capture being typically 91.6%.

The full data set of results (monthly mean values) are shown in Appendix A.

Five diffusion tubes were discontinued in March 2012 and their results have not been reported.

G42 was located on residential premises at Trinity Court. This estate has now been demolished. There are now no receptors. G55 was located on the air quality monitoring station also at Trinity Court which is no longer in operation.

G43 showed consistently low results (below  $30 \mu\text{g}/\text{m}^3$ , well below the AQO of  $40 \mu\text{g}/\text{m}^3$ ).

G61 was located on Monk Court, a block of flats. It showed consistently low results. All occupiers were moved out in 2012 and the building is now being demolished. There will be no receptors.

G16 this was a duplicate tube to G10.

QA/QC procedures for non automatic monitoring are outlined in Appendix B.



Table 4 Details of Non- Automatic Monitoring Sites (NO<sub>2</sub> Diffusion Tubes)

Site ID	Site Name	Site Type	OS Grid Ref		In AQMA?	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to kerb of nearest road	Worst-case Location?
G2	Priory Court	Roadside	425737	563251	Y	Yes (0m)	10m	Y
G3	Melbourne Court	Roadside	425333	563303	Y	Yes (19m)	28m	Y
G59	Peareth Ct	Roadside	425770	563135	Y	Yes (0m)	10m	Y
G42	Trinity Ct	Roadside	425781	563055	Y	Yes (0m)	7m	Y
G55	Trinity Ct, AQ Unit	Roadside	425753	563061	Y	Yes (8m)	10m	Y
G37	Lychgate Ct, AQ Unit*	Roadside	425883	563103	Y	Yes (6m)	8.5m	Y
G60	Lychgate Court	Roadside	425912	563108	Y	Yes (0m)	13m	Y
G43	Regent Court	Roadside	425553	562965	Y	Yes (0m)	9m	N
G45	Brisbane Court	Roadside	425306	563093	Y	Yes (0m)	15m	N
G61	Monk Ct	Urban background	425855	562994	Y	Yes (0m)	20m	N
G47	Dryden Rd	Roadside	425760	561641	Y	Yes (0m)	6m	Y
G83	Durham Rd Gateshead 2	Roadside	425788	561966	Y	Yes (0m)	7m	N
G71	Durham Rd Low Fell	Roadside	425759	561612	Y	Yes (0m)	5m	N
G53	Hill St, Bottle Bank	Roadside	425447	563528	Y	Yes (1.5m)	3.5m	Y
G63	Bottle Bank AQ Unit*	Roadside	425425	563555	Y	Yes (8m)	3m	Y
G46	Mulgrave Villas	Urban background	425297	562886	N	Yes (0m)	12m	N
G52	Bensham / Coatsworth Road	Roadside	425034	562736	N	Yes (0m)	6m	N
G12	Coach Road	Urban background	423765	560510	N	Yes (0m)	8.5m	N
G31	Westway, Dunston	Urban background	423086	561543	N	Yes (0m)	20m	N
G35	A1 Dunston AQ Unit*	Roadside	422513	561925	N	No (16m)	4m	Y
G4	North Dene Birtley	Urban background	427187	557230	N	Yes (0m)	8.5m	N
G10	Portobello Terrace	Roadside	428254	554988	Y	Yes (0m)	1.5m	Y
G16	Portobello Terrace	Roadside	428254	554988	Y	Yes (0m)	1.5m	Y
G74	Penshaw View Portobello	Roadside	428259	555077	Y	Yes (0m)	1.5m	N
G87	A1 Houses	Urban background	422518	561933	N	Yes (0m)	11m	Y
	= Tube Discontinued							

## 2.2 Comparison of Monitoring Results with Air Quality Objectives

Monitoring results for Automatic and Non-Automatic monitoring are provided below in Table 5 to Table 10. Exceedances of the air quality objectives, and borderline cases, are highlighted in bold.

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

Monitoring results for Nitrogen Dioxide are shown in Tables 5 to 8. Exceedances of the air quality objectives, and borderline cases, are highlighted in bold.

#### Automatic Monitoring Data

The results from the 12 months from January to December 2012 of automatic monitoring data for Nitrogen Dioxide are given in Table 5 and Table 6.

The results show that there were no exceedances of either the annual mean or the hourly air quality objectives, with annual mean concentrations well below the 40µg/m<sup>3</sup> objective level and no exceedances of the 200µg/m<sup>3</sup> hourly mean concentration at any of the monitoring locations.

Figure 4 shows a trend chart providing NO<sub>2</sub> annual mean results over the past 7 years.

Table 5 Results of Automatic Monitoring for NO<sub>2</sub>: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring % <sup>a</sup>	Valid Data Capture 2012 % <sup>b</sup>	Annual Mean Concentration µg/m <sup>3</sup>				
					2008* <sup>c</sup>	2009* <sup>c</sup>	2010* <sup>c</sup>	2011 <sup>c</sup>	2012 <sup>c</sup>
Trinity Court	Roadside	Y	Discontinued	Discontinued	31	31	<b>39.5</b>	Discontinued	Discontinued
Lychgate Court	Roadside	Y	99.5	99.5	33	33	<b>40.2</b>	31.8	32.4
Hill Street, Bottle Bank	Roadside	Y	99.5	99.5	34	32	36.1	35.9	35.2
A1 Dunston	Roadside	N	99.6	99.6	34	38	38.4	36.8	33.3

In bold, exceedances of the NO<sub>2</sub> annual mean AQS objective of 40µg/m<sup>3</sup>

<sup>a</sup> i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

<sup>b</sup> 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%)

<sup>c</sup> 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%

**Figure 4 Trends in Annual Mean NO<sub>2</sub> Concentrations Measured at Automatic Monitoring Sites**

A trend chart providing NO<sub>2</sub> annual mean results over the past 7 years

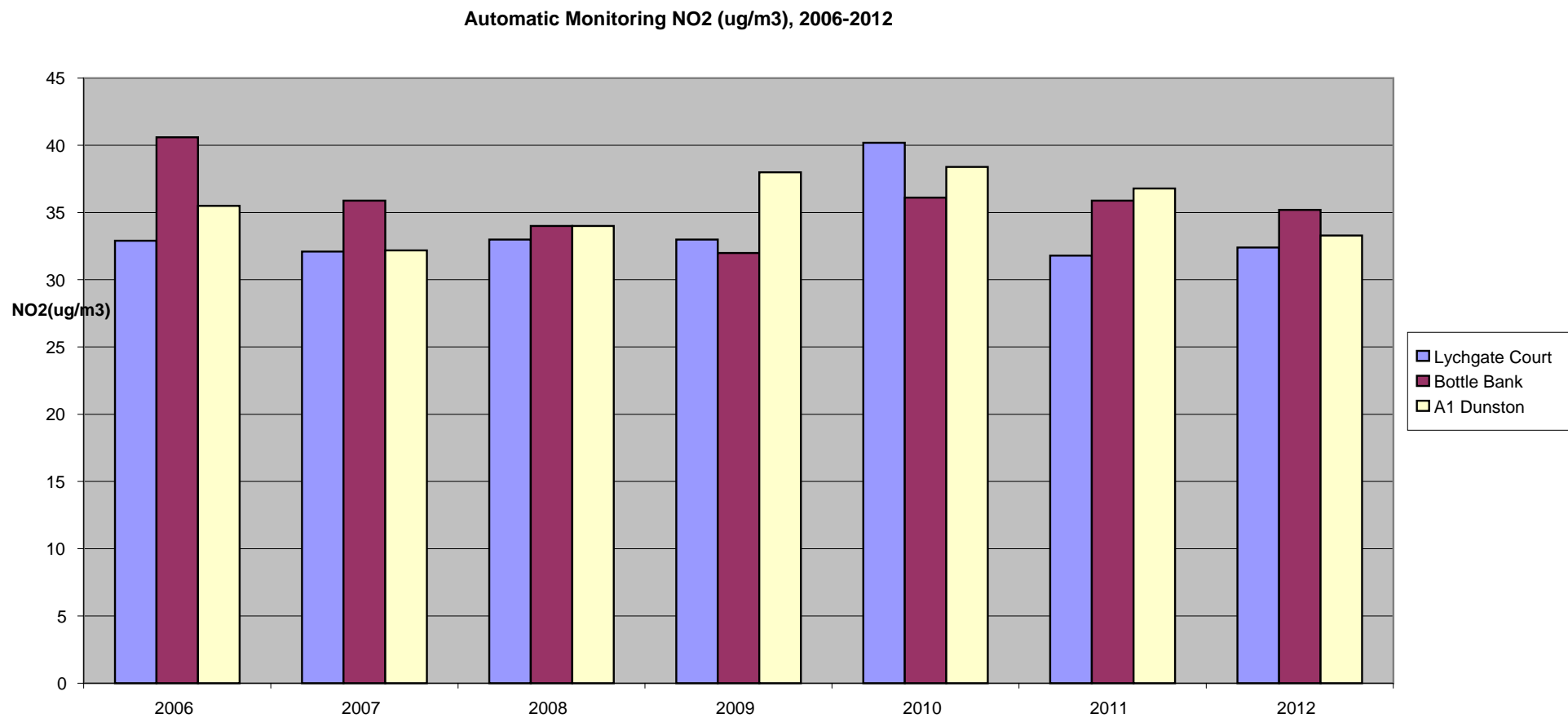


Table 6 Results of Automatic Monitoring for NO<sub>2</sub>: Comparison with 1-hour Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring % <sup>a</sup>	Valid Data Capture 2012 % <sup>b</sup>	Number of Exceedances of Hourly Mean (200 µg/m <sup>3</sup> )				
					2008* <sup>c</sup>	2009* <sup>c</sup>	2010* <sup>c</sup>	2011* <sup>c</sup>	2012* <sup>c</sup>
Trinity Court	Roadside	Y	Discontinued	Discontinued	0	0	0	Discontinued	Discontinued
Lychgate Court	Roadside	Y	99.5	99.5	0	0	1	0	0
Hill Street, Bottle Bank	Roadside	Y	99.5	99.5	0	0	0	0	0
A1 Dunston	Roadside	N	99.6	99.6	0	0	0	0	0

In bold, exceedances of the NO<sub>2</sub> hourly mean AQS objective (200µg/m<sup>3</sup> – not to be exceeded more than 18 times per year)

<sup>a</sup> i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

<sup>b</sup> 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%)

<sup>c</sup> If the data capture for full calendar year is less than 90%, include the 99.8<sup>th</sup> percentile of hourly means in brackets

## Diffusion Tube Monitoring Data

Diffusion tube monitoring results for the 12 month monitoring period from January to December 2012 are provided in Tables 7 & 8. Exceedances of the air quality objectives, and borderline cases, are highlighted in bold.

The monthly NO<sub>2</sub> Diffusion tube results for 2012 including the national and local bias adjustment factor and calculation can be found in Appendix A

Tube G3 located at Melbourne Court shows an exceedances of the Annual Mean (47 & 49.4µg/m<sup>3</sup>, after application of the national & local bias factors). Since the location of this tube is not representative of public exposure, the procedure specified in Box 2.3 of LAQM.TG(09) has therefore been used to estimate the concentration at the nearest receptor. The resultant level of NO<sub>2</sub>, with national bias factor applied is 42.4 µg/m<sup>3</sup> and remains above the annual Air Quality Objective. Applying the Gateshead bias factor to the procedure specified in Box 2.3 of LAQM.TG(09) gives a concentration of 44.0 µg/m<sup>3</sup> .

Tube G47 located on Dryden Road falls just below the annual mean air quality objective when the national bias factor is applied and exceeds it when the local factor is applied.

Tube G53 located on Hill Street, Bottle bank is very close to exceeding the annual mean air quality objective with either bias factors applied.

All three of these tubes are located within the current air quality management area.

Figure 5 shows a trend chart providing NO<sub>2</sub> annual mean results over the past 8 years from diffusion tube monitoring.

Table 7 Results of NO<sub>2</sub> Diffusion Tubes 2012

Site ID	Location	Site Type	Within AQMA ?	Triplicate or Collocated Tube	Full Calendar Year Data Capture 2012 (Number of Months or %) <sup>a</sup>	2012 Annual Mean Concentration (µg/m <sup>3</sup> )	2012 Annual Mean Concentration (µg/m <sup>3</sup> )
						National Bias Adjustment factor = 0.97 <sup>b</sup>	Gateshead Bias Adjustment factor = 1.02 <sup>b</sup>
G2	Priory Court	Roadside	Y	Single	91.6	31.9	33.5
G3	Melbourne Court	Roadside	Y	Single	91.6	<b>47.0</b>	<b>49.4</b>
G59	Peareth Ct	Roadside	Y	Single	91.6	32.9	34.6
G42	Trinity Ct	Roadside	Y	Single	Discontinued 2012		
G55	Trinity Ct AQUnit	Roadside	Y	Single	Discontinued 2012		
G37, G38, G39	Lychgate Ct AQ Unit*	Roadside	Y	Triplicate	91.6	31.3	32.9
G60	Lychgate Crt	Roadside	Y	Single	91.6	27.7	29.1
G43	Regent Crt	Roadside	Y	Single	Discontinued 2012		
G45	Brisbane Crt	Roadside	Y	Single	91.6	23.8	25.0
G61	Monk Ct	Urban bkground	Y	Single	Discontinued 2012		
G47	Dryden Rd	Roadside	Y	Single	91.6	<b>38.3</b>	<b>40.3</b>
G83	Durham Rd Gateshead 2	Roadside	Y	Single	91.6	31.2	32.8
G71	Durham Rd, Low Fell	Roadside	Y	Single	91.6	33.9	35.7
G53	Hill St, Bottle Bank	Roadside	Y	Single	91.6	<b>37.8</b>	<b>39.7</b>
G63, G65, G66	Bottle Bank AQ Unit*	Roadside	Y	Triplicate	91.6	34.4	36.2
G46	Mulgrave Villas	Urban bkground	N	Single	91.6	30.0	31.5
G52	Bensham / Coatsworth Road	Roadside	N	Single	91.6	29.1	30.6
G12	Coach Road	Urban bkground	N	Single	91.6	27.3	28.7
G31	Westway, Dunston	Urban bkground	N	Single	91.6	28.1	29.6
G35, G40, G41	A1 Dunston AQ Unit*	Roadside	N	Triplicate	91.6	32.7	34.4
G4	North Dene Birtley	Urban bkground	N	Single	91.6	26.7	28.1
G10	Portobello Terrace	Roadside	Y	Co located	91.6	36.6	38.5
G16	Portobello Terrace	Roadside	Y	Co located	Discontinued 2012		
G74	Penshaw Vw Portobello	Roadside	Y	Single	91.6	34.5	36.3
G87	A1 Houses	Roadside	N	Single	83.3	30.2	31.7

In bold, exceedances of the NO<sub>2</sub> annual mean AQS objective of 40µg/m<sup>3</sup>

<sup>a</sup> 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 full calendar year data capture is less than 75%

<sup>b</sup> If an exceedance is measured at a monitoring site not representative of public exposure, NO<sub>2</sub> concentration at the nearest relevant exposure should be estimated based on the “NO<sub>2</sub> fall-off with distance” calculator (<http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>), and results should be discussed in a specific section. The procedure is also explained in Box 2.3 of Technical Guidance LAQM.TG(09) (<http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=30>).

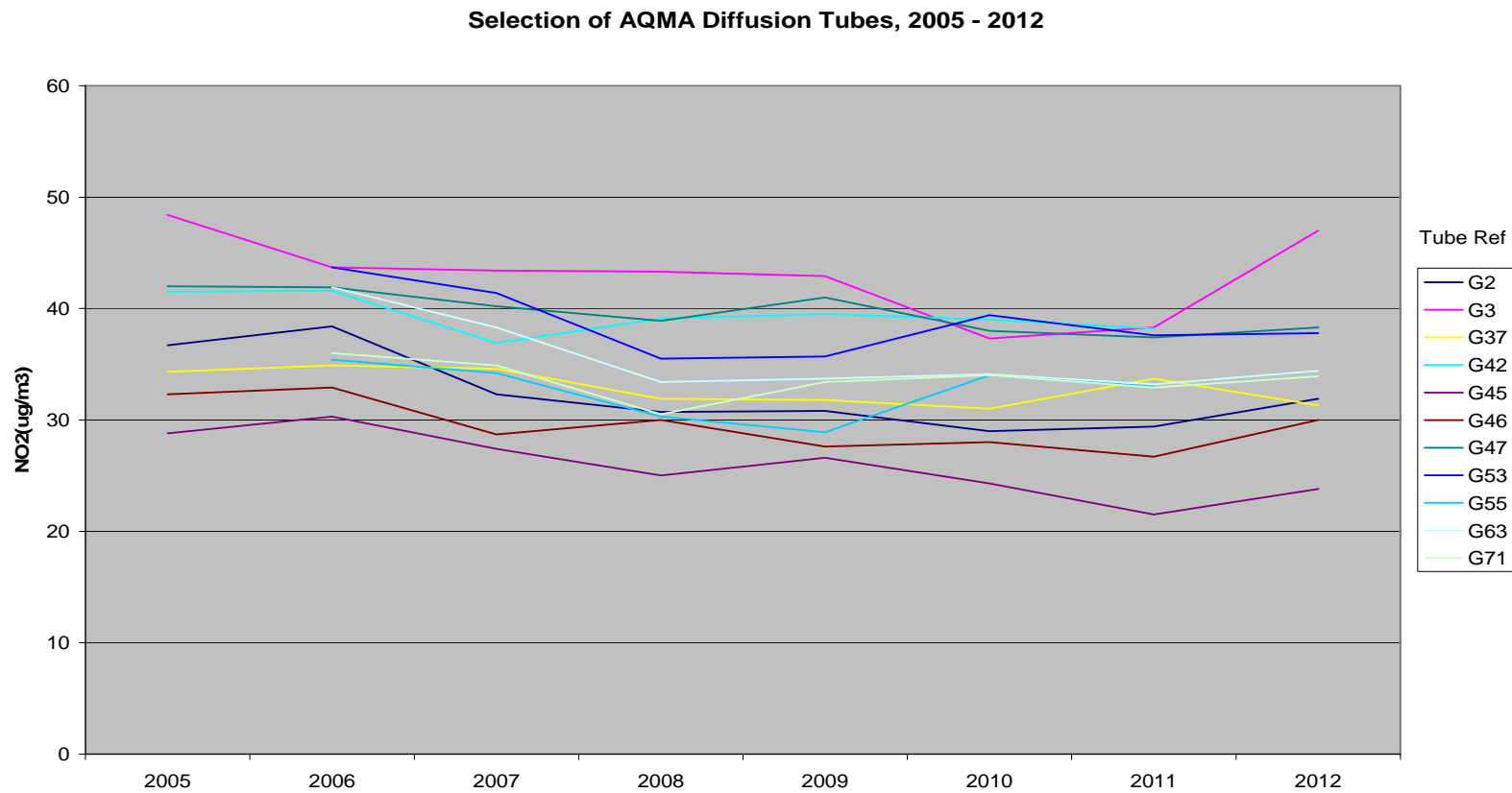
Table 8 Results of NO<sub>2</sub> Diffusion Tubes (2008 to 2012)

Site ID	Site Type	Within AQMA?	Annual Mean Concentration (µg/m <sup>3</sup> ) - Adjusted for National Bias <sup>a</sup>				
			2008 (Bias Adjustment Factor = 0.77)	2009 (Bias Adjustment Factor = 0.81)	2010 (Bias Adjustment Factor = 0.92)	2011 (Bias Adjustment Factor = 0.89)	2012 (Bias Adjustment Factor = 0.97)
G2	Priory Court	Y	31	31	29	29	31.9
G3	Melbourne Court	Y	<b>43.3</b>	<b>42.9</b>	37.3	38	<b>47.0</b>
G59	Pearreth Ct	Y	29	31	29	30	32.9
G42	Trinity Court	Y	39.7	40	38	38	Discontinued
G55	Trinity Court AQ Unit	Y	31	29	29	27	Discontinued
G37,38,39	Lychgate Court AQ Unit*	Y	33	32	31	30	31.4
G60	Lychgate Court	Y	28	30	Relocated as part of study	27	27.7
G43	Regent Court	Y	26	24	Relocated as part of study	24	Discontinued
G45	Brisbane Court	Y	25	27	Less than 75% data capture	22	23.8
G61	Monk Court	Y	26	25	24	23	Discontinued
G47	Dryden Road	Y	39.4	<b>41</b>	Less than 75% data capture	37	38.3
G83	Durham Road Gateshead 2	Y	31	32	29	31	31.2
G71	Durham Rd Low Fell	Y	31	33	Less than 75% data capture	33	33.9
G53	Hill Street, Bottle Bank	Y	36	36	Less than 75% data capture	38	37.8
G63,65,66	Bottle Bank AQ Unit*	Y	36	34	32	33	34.5
G46	Team Vale Villas,	N	31	28	28	27	30.0
G52	Bensham / Coatsworth Road	N	27	28	Less than 75% data capture	29	29.1
G12	Coach Road	N	24	26	28	25	27.3
G31	Westway, Dunston	N	26	25	29	26	28.1
G35,40,41	A1 Dunston AQ Unit*	N	33	34	35	35	32.8
G4	North Dene Birtley	N	27	27	28	25	26.7
G10	Portobello Terrace	Y	38	36	37	35	36.6
G16	Portobello Terrace	Y	37.7	36.2	37.7	35	Discontinued
G74	Penshaw View Portobello	Y	33	32	32	32	34.5
G87	A1 Houses	N	29.2	32.7	Relocated as part of study	30	30.2

In bold, exceedance of the NO<sub>2</sub> annual mean AQS objective of 40µg/m<sup>3</sup>



Figure 5 Trends in Annual Mean NO<sub>2</sub> Concentrations Measured at Diffusion Tube Monitoring Sites



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

Gateshead Council ceased monitoring PM<sub>10</sub> in 2011. Monitoring data from the preceding 4 years demonstrated that concentrations of PM<sub>10</sub> were consistently and significantly below the Air Quality Objectives in Gateshead.

The Results of Automatic Monitoring for PM<sub>10</sub> providing a comparison to the Annual Mean Objective are detailed in Table 9. The Results of Automatic Monitoring for PM<sub>10</sub> providing a comparison to the 24-hour Mean Objective are detailed in Table 10.

Evidence suggests that the smaller fraction of particulate matter, PM<sub>2.5</sub> has a greater impact on public health and Gateshead Council started to monitor PM<sub>2.5</sub> in 2011 rather than PM<sub>10</sub>. This report provides the first annual figures for PM<sub>2.5</sub> in Gateshead. They are reported in section 2.2.5.

Table 9 Historical Results of Automatic Monitoring for PM<sub>10</sub>: Comparison with Annual Mean Objective

Site Name	Site Type	Within AQMA?	Confirm Gravimetric Equivalent (Y or NA)	Annual Mean Concentration $\mu\text{g}/\text{m}^3$ ( $40\mu\text{g}/\text{m}^3$ )				
				2007* <sup>c</sup>	2008* <sup>c</sup>	2009* <sup>c</sup>	2010* <sup>c</sup>	2011 <sup>c</sup>
Lychgate Court	Roadside	Y	Y	25	23	20	21	Discontinued
A1 Dunston	Roadside	N	Y	22	22	21	21	Discontinued

Table 10 Historical Results of Automatic Monitoring for PM<sub>10</sub>: Comparison with 24-hour Mean Objective

Site ID	Site Type	Within AQMA?	Confirm Gravimetric Equivalent	Number of Exceedances of 24-Hour Mean ( $50\mu\text{g}/\text{m}^3$ )				
				2007*	2008*	2009*	2010*	2011
Lychgate Court	Roadside	Y	Y	0	3	1	1	Discontinued
A1Dunston	Roadside	N	Y	6	6	2	3	Discontinued

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

Gateshead Council does not monitor Sulphur Dioxide as there are no significant sources or likelihood of the relevant air quality objectives being exceeded in the Gateshead area.

### 2.2.4 Benzene

Gateshead Council does not monitor Benzene as there are no significant sources or likelihood of the relevant air quality objectives being exceeded in the Gateshead

### 2.2.5 Other Pollutants Monitored

In 2010 the Committee on the Medical Effects of Air Pollution (COMEAP) estimated that for the year 2008 the burden of particulate air pollution (as PM<sub>2.5</sub>) in the UK was an effect equivalent to about 29,000 deaths at typical ages (and an associated loss of life to the population of 340,000 life-years), or a loss of life expectancy from birth of 6 months (as an average across all births).

COMEAP considered that the two extremes – that 29,000 people had died in 2008 solely as a result of exposure to fine particles, or that everybody who died during that year died, in some part, as a result of exposure to fine particles – were unlikely. COMEAP speculated that it was more reasonable to consider that air pollution may have made some contribution to the earlier deaths of up to 200,000 people (the number dying of cardiovascular causes) with an average loss of life of about two years per death affected, though that actual amount would vary between individuals. In short substantial progress has been made in quantifying and understanding the health impacts of air pollution.

The public health impact of particulate air pollution has been recognised by the UK Government. An air pollution indicator as measured by PM<sub>2.5</sub> has been included in the Public Health Outcomes Framework. The Public Health Outcomes Framework published in January 2012 sets out a new strategic framework for public health at national and local levels, based on the evidence of where the biggest challenges are for health and well-being, and the wider factors that drive it.

This is intended to raise awareness of air quality as a public health issue with local authorities and Directors of Public Health, in their oversight of public health in their areas, as well as with the NHS at the local level. As the strategic leader for public health in the borough we require our Director of Public Health to lead and galvanise action on air quality improvement.

Particles in the PM<sub>2.5</sub> size range are able to travel deeply into the respiratory tract, reaching the lungs. Exposure to fine particles can cause short-term health effects such as eye, nose, throat and lung irritation, coughing, sneezing, runny nose and shortness of breath. Although the nose filters some of the PM<sub>10</sub> particles out of the air, the fine PM<sub>2.5</sub> particles are unaffected by these filters and may lodge deeply in the lungs and even enter the blood stream. Therefore fine particles affect lung function and

worsen medical conditions such as asthma and heart disease. Scientific studies have linked increases in daily PM<sub>2.5</sub> exposure with increased respiratory and cardiovascular hospital admissions, emergency department visits and deaths. Recent studies suggest that long term exposure to particulate matter may be associated with increased rates of chronic bronchitis and reduced lung function. People with breathing and heart problems, children and the elderly may be particularly sensitive to PM<sub>2.5</sub>.

Gateshead Council commenced monitoring PM<sub>2.5</sub> in 2011. This report provides the first annual figures for PM<sub>2.5</sub> in Gateshead.

There are currently no air quality objectives set within the UK Air Quality Strategy for PM<sub>2.5</sub>. The World Health Organisation (WHO) Guidelines state a maximum **10 µg/m<sup>3</sup> annual mean and 25 µg/m<sup>3</sup> 24-hour mean**.

**Table 11 Results of PM2.5 monitoring 2012**

Site ID	Site Type	Within AQMA?	Confirm Gravimetric Equivalent	24hr max	Annual Mean Concentration µg/m <sup>3</sup>	Data Capture
Lychgate Court	Roadside	Y	Y	29.6	9.2	100%
A1 Dunston	Roadside	N	Y	30.1	10.0	98%

### Summary of Compliance with AQS Objectives

Gateshead Council has examined the results from monitoring in the borough.

Despite a reduction of Nitrogen Dioxide to levels below the annual mean air quality objective in 2011, concentrations have increased in 2012 and again exceed the annual average objective for NO<sub>2</sub> and the AQMA should remain.

Concentrations outside of the AQMA are all below the objectives at relevant locations, therefore there is no need to proceed to a Detailed Assessment.

## **3 New Local Developments**

This section deals with any changes in the Gateshead Borough that may affect air quality. Only locations which have not been assessed during the earlier rounds of assessment or where there has been a change or new development have been considered.

### **3.1 Road Traffic Sources**

No new sources of traffic emissions have been identified. However the opening of the redeveloped town centre in the near future is expected to lead to changes in traffic on a number of routes to and within the town centre which may need further consideration in future.

### **3.2 Other Transport Sources**

There are no relevant other new transport sources in Gateshead which may have an impact on air quality and which have not previously been assessed.

### **3.3 Industrial Sources**

There are no new or newly identified industrial sources in Gateshead which may have an impact on air quality.

### **3.4 Commercial and Domestic Sources**

Gateshead Council currently operates 2 x 100KW wood pellet boilers at Blaydon Leisure and Primary Care Centre commissioned in 2010, 1 x 100KW wood pellet boiler at Heworth Leisure Centre commissioned in 2010, 1 x 500Kw wood chip boiler at Thomas Hepburn School commissioned 2011/12 and 1 x 500Kw wood chip boiler at Heworth Grange School commissioned 2011/12.

All of the appliances that have been installed comply with the Smoke Control Areas (Exempted Fireplaces) England (No.2) Order 2011. None of the current or proposed sites are located in the current town centre AQMA. The impact of these biomass facilities on PM<sub>10</sub> and NO<sub>2</sub> have been assessed and considered in accordance with the procedure set out in Technical Guidance LAQM TG(09) Section D.1a of chapter 5. TG (09).

### **3.5 New Developments with Fugitive or Uncontrolled Sources**

There are no new developments with fugitive or uncontrolled sources other than that identified in section 5.

## 4 Local / Regional Air Quality Strategy

The Tyne and Wear Air Quality Delivery Plan was produced by the Tyne and Wear Local Transport Plan Core Team. Progress with the Delivery Plan is ongoing. The plan is available at:

<http://www.tyneandwearltp.gov.uk/documents/air-quality-delivery-plan/>

## 5 Planning Applications

Environmental health reviews a number of validated planning applications each year particularly where there is likely to be an adverse impact on air quality or public health. This may be due to the type and size of development proposed or where it appears that sensitive receptors will be introduced within the town centre AQMA or around its boundaries.

Where the review requires further clarification, an air quality impact assessment will be required from the developer which provides further detail of the impact on air quality and/or public health as well as detailing mitigation measures.

In 2012 planning permission was granted for the redevelopment of the former Gateshead College site with the introduction of 175 further residential dwellings. The development site is located 55 metres away from the end of the Gateshead Town centre AQMA on the A167 Durham Road and as such is subject to elevated pollutant concentrations due to road vehicle exhaust emissions. An air quality assessment was therefore undertaken to quantify pollution levels across the site and assess the suitability for residential end use.

The proposals also had the potential to result in air quality impacts as a result of dust emissions during construction and exhaust emissions from vehicle trips generated during the operational phase. Potential impacts were therefore assessed at sensitive locations in the vicinity of the site. The findings were deemed to be negligible in terms of EPUK guidance.'



## 6 Air Quality Planning Policies

Gateshead Council is currently determining its framework for future spatial development jointly with Newcastle City Council in the emerging Local Development Framework (LDF). The LDF consists of the One Core Strategy and Urban Core Area Action Plan. This provides the opportunity to consider land use and transport in a co-ordinated fashion especially in and around the City Centre/Quays and river crossings. Gateshead Council is also producing its own Development Management Document; Making Spaces for Growing Places.

Air Quality is addressed within these three documents and they include new or amended policies deliberately designed to restrict the significant adverse impact that development can have on public health or the environment in either locality.

## 7 Local Transport Plans and Strategies

Local Transport plans are statutory documents that outline strategies for improving all forms of local transport in a given area.

The third Local Transport Plan for Tyne & Wear has been in place since March 2011 and runs until 2021. It is produced by the Tyne & Wear Integrated Transport Authority, a joint body representing the five councils in Tyne & Wear (Gateshead, Newcastle, Sunderland, North Tyneside and South Tyneside) as well as Nexus, the organisation that helps to promote and deliver local public transport services.

The LTP consists of a detailed Strategy Document setting out policies for the next 10 years and an associated three year delivery plan. <http://www.tyneandwearltp.gov.uk/documents/ltp3/>

The LTP has five local goals, which are:

- To support local economic growth
- To reduce carbon emissions
- To make our communities healthier and safer
- To create a fairer Tyne & Wear
- To protect and improve the environment.

Progress with the implementation of specific measures that will help reduce congestion and emissions are reported in section 9.

## 8 Climate Change Strategies

Gateshead Council published its Climate Change Strategy in April 2010

<http://www.gateshead.gov.uk/Environment%20and%20Waste/climatechange/home.aspx>

Gateshead Strategic Partnership recognises that climate change is the most serious threat to the environment and the future development of the human race. We need to reduce our carbon pollution and protect our communities from the detrimental effects of climate change.

Partners in Gateshead have agreed a long term vision for the borough called Vision 2030. One of the Big Ideas to come out of this is 'Sustainable Gateshead'. The Climate Change Strategy contributes to the targets set out in this Big Idea.

This strategy aims to set the direction and identify priorities to meet the needs of those who live in, work in or visit Gateshead. It identifies the challenges and focuses energies and resources.

There is a need for strong co-ordination between partners of the Gateshead Strategic Partnership through the Gateshead Agreement. The Climate Change Strategy seeks to harness the efforts of all partners, local people and businesses in Gateshead to address this major issue.

## 9 Implementation of Action Plans

An action plan was produced in 2007 to address air quality in the town centre. The action plan described the processes that were in place and set out the measures that were considered at the time necessary to deliver improvements in air quality. As road transport has the greatest impact on air quality in Gateshead, the action plan has now been incorporated into the Tyne & Wear Local Transport Plan (LTP3).

Table 12 Action Plan Progress

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
1	Parking strategy	Reduce attractiveness of car use	Gateshead Council	2013/14	Post 2014	Level and extent of charging	Not known	Car parking charges introduced in civic Centre car park. New town centre car park to be charged, albeit with various exclusions.	See progress to date	Ongoing	Traffic to/from Newcastle City Centre also of major importance. Draft LDF includes commitment to developing joint strategy.
2	Public transport infrastructure	Improve attractiveness of alternatives to the car	Gateshead Council	Ongoing	Ongoing	Implementation of improvements	Not known	Improvements to Durham Road and journey time monitoring	Further phase of Durham Road BRT scheme. Installation of journey time monitoring equipment	Ongoing	Also important in providing access to/from Newcastle city centre. Metro reinvigoration project to upgrade Gateshead Interchange
3	Pedestrian priority	Improve attractiveness of alternatives to the car	Gateshead Council	Ongoing	Ongoing	Implementation of improvements	Not known	Removal of town centre subways and replacement by at-grade crossings.	Improvements associated with town centre redevelopment	Ongoing	Investigation of flyover removal and pedestrian priority in Tyne Bridgeheads/ Askew Road area underway.

Gateshead Council

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
4	Cycle improvements	Improve attractiveness of alternatives to the car	Gateshead Council	Ongoing	Ongoing	Implementation of improvements	Not known	Upgrading of cycle routes	Improvements associated with town centre redevelopment	Ongoing	Newcastle cycle city ambition bid contains proposals for further improvements.
5	Bus operation	Improve attractiveness of alternatives to the car	Tyne and Wear ITA	2013	2014 onwards	New approach to planning and management of bus network	Not known	Quality Contract or bus partnership options under consideration	Proposals prepared for consideration	2014	ITA decision on preferred option awaited.
6	Intelligent transport systems	Better management of traffic flows and congestion	Tyne and Wear UTMC project	Ongoing	Ongoing	Levels of congestion and delay	Not known	Co-ordination of existing information sources.	Funding secured for journey time monitoring on main corridors from Better Bus Area fund	Ongoing	SCOOT upgrade in progress.
7	Park and ride	Improve attractiveness of alternatives to the car	North Eastern Local Transport Board	2013-2015	2015-2016	Use of park and ride	Not known	Initial proposals developed	Eighton Lodge and Lobley Hill proposals put forward as proposals to Local Transport Board	2018	
8	Travel planning	Increase use of alternatives to the car	Gateshead Council	Ongoing	Ongoing	Reduced car mode share	Not known	Funding secured for additional activity in schools/workplaces to 2015.	Local Sustainable Transport Fund project initiated	Ongoing	
9	Low emission zone	Reduced access to polluting vehicles	Gateshead Council	N/a	N/a	N/a	N/a	Investigated jointly with Newcastle CC	Unlikely to be progressed in Gateshead	N/a	Limited benefits identified for Gateshead.

## **10 Conclusions and Proposed Actions**

### **10.1 Conclusions from New Monitoring Data**

The review of 2012 monitoring data has shown that there are no exceedances of the objective levels outside of the town centre AQMA.

Within the AQMA there have been increases in NO<sub>2</sub> concentrations from those reported in 2011 which have resulted in exceedances of the annual average mean air quality objective.

On the basis of the monitoring data obtained, it is not considered necessary to undertake a further detailed assessment.

### **10.2 Conclusions relating to New Local Developments**

During 2012, there were no new developments granted planning permission that require more detailed consideration in the next Updating and Screening Assessment.

### **10.3 Other Conclusions**

In 2011, Gateshead Council in partnership with Newcastle City Council was awarded funding from DEFRA to examine the feasibility of introducing Low Emission Zones (LEZs) in the respective local authority areas particularly within the town centre AQMA's. This project was completed and the final report confirms that a LEZ will not be required in Gateshead as NO<sub>2</sub> concentrations are predicted to fall as a result of modelled changes in engine technology. This position will be kept under review in future years.

### **10.4 Proposed Actions**

This Progress Report has not identified a need to proceed to a Detailed Assessment for any pollutant, or any need for additional monitoring, changes to the existing monitoring programme or AQMA boundary.

Monitoring of both Nitrogen Dioxide and PM<sub>2.5</sub> will continue at the automatic sites.

A further annual Progress Report will be submitted to DEFRA in 2014.

# 11 References

## Gateshead Council Reports

1. Progress Report, 2011
2. Updating and Screening Assessment, 2012
3. Gateshead Council Gazetteer
4. Census 2011 data

## Guidance and LAQM Tools

5. DEFRA, Local Air Quality Management Technical Guidance LAQM.TG(09)
6. DEFRA, Local Air Quality Management
7. DEFRA, R&A helpdesk: spreadsheet version 03/13
8. AEA Energy & Environment, Technical Guidance: Screening assessment for biomass boilers, 2008

## External Reports

9. Keep Tyne and Wear Moving - The Third Local Transport Plan for Tyne and Wear 2011-21  
Summary Document, March 2013  
<http://www.tyneandwearltp.gov.uk/documents/ltp3/attachment/ltp-rev7-final-4/>
10. Tyne & Wear Local Transport Plan  
<http://www.tyneandwearltp.gov.uk/>
11. World Health Organisation, Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulphur dioxide Global update 2005
12. DEFRA, Air Quality written evidence submitted to parliament, June 2012  
<http://www.publications.parliament.uk/pa/cm201213/cmselect/cmenvfru/writev/air/m05.htm>
13. 2008-2010 pooled life expectancy data, NHS South Of Tyne & Wear.



# APPENDICES

Appendix A: Monthly NO<sub>2</sub> Diffusion Tube Results 2012

Nitrogen Dioxide (NO <sub>2</sub> ) µg/m <sup>3</sup>																
Tube No.		jan	feb	march	april	may	june	july	aug	sept	oct	nov	dec	Survey Average	National bias x0.97	Ghead bias x1.02
2	priory crt	35.1	34.1	38.7	32.4	25.3	31.4		33.4	29.7	28.8	33.8	39.3	32.90909	31.92182	33.56727
3	melb crt	63.8	58.3	56.8	46.1	39.1	36.2		45.5	36.2	41.8	62.8	46.5	48.46364	47.00973	49.43291
4	north dene	26.4	27.6	27.2	29.9	29	28.3		26.4	20.7	28.1	27.8	31.7	27.55455	26.72791	28.10564
10	portobello tce	44.4	45.5	45.3	38.5	31.5	31.6		33.2	27.6	32.8	43.7	41.3	37.76364	36.63073	38.51891
12	coach rd	25.8	27.2	27.7	31.9	37.9	32.8		28	19.2	27	25.3	27.2	28.18182	27.33636	28.74545
31	west way	29.6	29.8	28.6	31.6	32.7	33.1		26.8	19	28.7	28	31.3	29.01818	28.14764	29.59855
35	A1 Dunston	39.9	40.9	41.1	28.9	19.5	30.7		33.6	27.2	28	39.7	40.9	33.67273	32.66255	34.34618
37	lychgate hog	38.4	35.1	36.3	34.5	28.2	25.4		24.6	27.9	29.6	34.27	38.5	32.07	31.1079	32.7114
38	lychgate hog	37.7	39.7	35.4	31.5	31.6	26.1		25.7	27.6	37.9	27.7	37.8	32.60909	31.63082	33.26127
39	lychgate hog	38.5	37.1	36.7	30.8	32.2	25.4		27.3	26.1	33.9	29.5	39.2	32.42727	31.45445	33.07582
40	A1 Dunston	41.3	39.6	39.6	28.1	25.7	27.2		34.9	28	34.2	36.2	41	34.16364	33.13873	34.84691
41	A1 Dunston	39.1	41.2	39.7	29.7	20.1	28.3		36	23.3	29.3	42.2	40.6	33.59091	32.58318	34.26273
45	brisbane	24.3	24.2	22.6	19.7	23.8	25		25.9	20.3	28.8	28.1	27.9	24.6	23.862	25.092
46	mulgrave villas	32.6	33.1	32.8	27.6	30.9	30.1		32.9	24.6	33.3	31.6	31	30.95455	30.02591	31.57364
47	dryden rd	55.9	48.1	49.5	41.3	29.3	26.6		39	29	37.4	38.2	40.89	39.56273	38.37585	40.35398
52	bensham rd	36.1	35.6	35.2	22	27.5	29.9		27.7	22.9	28.2	31.3	34	30.03636	29.13527	30.63709
53	curzon 1	44.9	46	44.7	39.4	30.8	34.2		39.1	34	33.3	42.4	40	38.98182	37.81236	39.76145
59	peareth crt	43.5	39.9	43.3	32.7	27	31.5		34.7	25.3	29	33.37	33.8	34.00636	32.98617	34.68649
60	lychgate crt2	36.1	37.1	27.5	25.6	25.6	25.2		23.4	24.9	30.2	28.7	30.3	28.6	27.742	29.172
63	bottle bank	35.8	37	37.8	26.7	32.5	31.6		36.5	30.9	34.2	43.4	35.2	34.69091	33.65018	35.38473
65	bottle bank	34.4	36	39.3	34.3	31.9	35.7		35.6	30.8	30.7	40.6	32.8	34.73636	33.69427	35.43109
66	bottle bank	37.5	39.4	41.4	35.2	33.2	39.8		36.8	29.8	33.7	45.8	36.8	37.21818	36.10164	37.96255
71	low fell d rd 2	38.8	40.5	40.1	37.1	24.3	27.3		31.6	33.5	38.3	36.9	37	35.03636	33.98527	35.73709
74	penshaw vw	41.3	36.3	40.4	34.12	27.7	31.3		37.4	29.2	36.1	37.9	39.8	35.59273	34.52495	36.30458
83	durham rd Bhsm	36.3	35.7	38.8	29.3	25.6	32.2		31.8	26.2	27.6	34.3	36	32.16364	31.19873	32.80691
87	A1 houses	35.7	37.4	34		19.7	26.9		30.4	22.8	28.5	37.8	38	31.12	30.1864	31.7424

Error with Tubes provided by Gradko

## Appendix B: QA:QC Data

### Factor from Local Co-location Studies

As TG (09) suggests in Box 3.3 details of the Local bias adjustment factor have been provided. The data is derived from the AEA DifTPAB v04 spreadsheet and excludes all periods with a Coefficient of Variation (CV) larger than 20%. The mean bias adjustment factor from Gateshead's 3 co-location studies for 2012 is 1.02. The NO<sub>2</sub> annual mean concentrations and the correction factor for each site are shown in Table 2.9 below. Details of the Bias calculation for the three sites are included in Appendix C.

**Table 2.10: Local Bias Adjustment Factor**

Site Name	Site Type	Diffusion Tube Mean (µg/m <sup>3</sup> )	Diffusion Tube Data Capture%	Adjusted Automatic Monitor Mean (µg/m <sup>3</sup> )	Mean CV Precision	Adjusted Tubes Mean (µg/m <sup>3</sup> )	Automatic Data Capture %	Bias Adjustment Factor A
Lychgate Court	Roadside	32	92	33	5	33	99	1.03
Hill Street Bottle Bank	Roadside	36	92	37	6	37	99	1.03
A1 Dunston	Roadside	34	92	34	6	34	99	1.01

### Diffusion Tube Bias Adjustment Factors

All of the data presented in this report have been adjusted to account for diffusion tube bias, using the correction factor on the R&A website helpdesk for the relevant years or the locally determined figure. For the 2012 Progress Report a factor of 0.97 from the R&A helpdesk: spreadsheet version 03/13 was used for the monitoring period January 2012 to December 2012. Details of the corrected figures are provided in Appendix A.

### Discussion of Choice of Factor to Use

The locally determined bias factor is higher than the national figure thus representing a worse case situation. The bias figures from the three local co – location studies are all very close, which gives confidence in the locally derived factor. For completeness the results have been presented with both factors applied.

## **PM Monitoring Adjustment**

PM<sub>2.5</sub> concentrations are measured using TEOM samplers. Unlike the measurement of PM<sub>10</sub>, there is no default factor to apply to data to estimate gravimetric concentrations.

## **QA/QC of automatic monitoring**

The automatic monitors are operated by a suitably trained officer and are serviced twice per year in accordance with manufacturer's instructions. Services and repairs are carried out by Casella (divested to ET in July 2012). Measurement, Calibrations and filter changes are carried out at two-week intervals, and Lychgate Court, and the A1 Dunston monitors also have an automatic daily calibration feature. Ratification of the monitoring data is carried out by Casella, and the ratified data is made available on the Tyne & Wear air quality website: [www.dataview247.com](http://www.dataview247.com)

## **QA/QC of diffusion tube monitoring**

The diffusion tubes are exposed for a month at a time in accordance with the DEFRA Local Authority Air Quality support programme calendar of suggested exposure periods, before being returned to Gradko International Ltd laboratory, which participates in the Workplace Analysis Scheme for Proficiency (WASP) QA/QC procedure, for analysis using the 20% TEA in water method.

The precision and accuracy of the triplicate NO<sub>2</sub> diffusion tubes co-located with the automatic monitors was checked using the AEA DifTPAB v04 (1) spreadsheet.

# Appendix C: AEA DifTPAB v04 spreadsheet Checking Precision and Accuracy of Triplicate Tubes – Lychgate Court, Bottle Bank, A1 Dunston

### Checking Precision and Accuracy of Triplicate Tubes

Diffusion Tubes Measurements									
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 $\mu\text{g m}^{-3}$	Tube 2 $\mu\text{g m}^{-3}$	Tube 3 $\mu\text{g m}^{-3}$	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	03/01/2012	31/01/2012	38.4	37.7	38.5	38	0.4	1	1.1
2	31/01/2012	29/02/2012	35.2	39.7	37.2	37	2.3	6	5.6
3	29/02/2012	27/03/2012	36.3	35.4	36.7	36	0.7	2	1.7
4	27/03/2012	24/04/2012	34.5	31.5	30.8	32	2.0	6	4.9
5	24/04/2012	29/05/2012	28.3	31.6	32.2	31	2.1	7	5.2
6	29/05/2012	27/06/2012	25.4	26.1	25.4	26	0.4	2	1.0
7	27/06/2012	30/07/2012							
8	30/07/2012	23/08/2012	24.6	25.7	27.3	26	1.4	5	3.4
9	23/08/2012	25/09/2012	27.9	27.6	26.1	27	1.0	4	2.4
10	25/09/2012	29/10/2012	29.6	37.9	33.9	34	4.2	12	10.3
11	29/10/2012	28/11/2012	34.3	27.7	29.5	31	3.4	11	8.5
12	28/11/2012	04/01/2013	38.5	37.8	39.1	38	0.7	2	1.6
13									

**It is necessary to have results for at least two tubes in order to calculate the precision of the measurements**

**AEA Energy & Environment**  
From the AEA group

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
38	100	Good	Good
36.8	100	Good	Good
38.6	100	Good	Good
37.9	100	Good	Good
30.9	100	Good	Good
22	100	Good	Good
28	82		Good
29.1	92	Good	Good
26.7	100	Good	Good
32.8	100	Good	Good
36.1	100	Good	Good
36.6	100	Good	Good

Overall survey → **Good precision** **Good Overall DC**  
(Check average CV & DC from Accuracy calculations)

Site Name/ID: **Lychgate Court**

**Accuracy (with 95% confidence interval) without periods with CV larger than 20%**  
Bias calculated using 11 periods of data  
Bias factor A **1.03 (0.96 - 1.1)**  
Bias B **-3% (-9% - 4%)**  
Diffusion Tubes Mean: **32  $\mu\text{g m}^{-3}$**   
Mean CV (Precision): **5**  
Automatic Mean: **33  $\mu\text{g m}^{-3}$**   
Data Capture for periods used: **99%**  
Adjusted Tubes Mean: **33 (31 - 36)  $\mu\text{g m}^{-3}$**

**Precision** **11 out of 11 periods have a CV smaller than 20%**

**Accuracy (with 95% confidence interval) WITH ALL DATA**  
Bias calculated using 11 periods of data  
Bias factor A **1.03 (0.96 - 1.1)**  
Bias B **-3% (-9% - 4%)**  
Diffusion Tubes Mean: **32  $\mu\text{g m}^{-3}$**   
Mean CV (Precision): **5**  
Automatic Mean: **33  $\mu\text{g m}^{-3}$**   
Data Capture for periods used: **99%**  
Adjusted Tubes Mean: **33 (31 - 36)  $\mu\text{g m}^{-3}$**

Jaume Targa, for AEA  
Version 04 - February 2011

### Checking Precision and Accuracy of Triplicate Tubes

Diffusion Tubes Measurements									
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 $\mu\text{g m}^{-3}$	Tube 2 $\mu\text{g m}^{-3}$	Tube 3 $\mu\text{g m}^{-3}$	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	03/01/2012	31/01/2012	35.8	34.4	37.5	36	1.6	4	3.9
2	31/01/2012	29/02/2012	37	36	39.4	37	1.7	5	4.3
3	29/02/2012	27/03/2012	37.9	39.3	41.4	40	1.8	4	4.4
4	27/03/2012	24/04/2012	26.7	34.3	35.2	32	4.7	15	11.6
5	24/04/2012	29/05/2012	32.5	31.9	33.2	33	0.7	2	1.6
6	29/05/2012	27/06/2012	31.6	35.7	39.8	36	4.1	11	10.2
7	27/06/2012	30/07/2012							
8	30/07/2012	23/08/2012	36.5	35.6	36.8	36	0.6	2	1.6
9	23/08/2012	25/09/2012	30.9	30.8	29.8	31	0.6	2	1.5
10	25/09/2012	29/10/2012	34.2	30.7	33.7	33	1.9	6	4.7
11	29/10/2012	28/11/2012	43.4	40.6	45.8	43	2.6	6	6.5
12	28/11/2012	04/01/2013	35.2	32.8	36.8	35	2.0	6	5.0
13									

**It is necessary to have results for at least two tubes in order to calculate the precision of the measurements**

**AEA Energy & Environment**  
From the AEA group

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
36.6	100	Good	Good
37.3	100	Good	Good
42.2	92	Good	Good
38.4	100	Good	Good
34.9	100	Good	Good
33.3	100	Good	Good
29.1	100		Good
33.5	100	Good	Good
28.2	100	Good	Good
36.8	100	Good	Good
45.2	100	Good	Good
37.4	100	Good	Good

Overall survey → **Good precision** **Good Overall DC**  
(Check average CV & DC from Accuracy calculations)

Site Name/ID: **Hill Street, Bottle Bank**

**Accuracy (with 95% confidence interval) without periods with CV larger than 20%**  
Bias calculated using 11 periods of data  
Bias factor A **1.03 (0.98 - 1.09)**  
Bias B **-3% (-9% - 2%)**  
Diffusion Tubes Mean: **36  $\mu\text{g m}^{-3}$**   
Mean CV (Precision): **6**  
Automatic Mean: **37  $\mu\text{g m}^{-3}$**   
Data Capture for periods used: **99%**  
Adjusted Tubes Mean: **37 (35 - 39)  $\mu\text{g m}^{-3}$**

**Precision** **11 out of 11 periods have a CV smaller than 20%**

**Accuracy (with 95% confidence interval) WITH ALL DATA**  
Bias calculated using 11 periods of data  
Bias factor A **1.03 (0.98 - 1.09)**  
Bias B **-3% (-9% - 2%)**  
Diffusion Tubes Mean: **36  $\mu\text{g m}^{-3}$**   
Mean CV (Precision): **6**  
Automatic Mean: **37  $\mu\text{g m}^{-3}$**   
Data Capture for periods used: **99%**  
Adjusted Tubes Mean: **37 (35 - 39)  $\mu\text{g m}^{-3}$**

Jaume Targa, for AEA  
Version 04 - February 2011

**Checking Precision and Accuracy of Triplicate Tubes**

Diffusion Tubes Measurements									
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 $\mu\text{gm}^{-3}$	Tube 2 $\mu\text{gm}^{-3}$	Tube 3 $\mu\text{gm}^{-3}$	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	03/01/2012	31/01/2012	35.8	34.4	37.5	36	1.6	4	3.9
2	31/01/2012	29/02/2012	37	36	39.4	37	1.7	5	4.3
3	29/02/2012	27/03/2012	37.9	39.3	41.4	40	1.8	4	4.4
4	27/03/2012	24/04/2012	26.7	34.3	35.2	32	4.7	15	11.6
5	24/04/2012	29/05/2012	32.5	31.9	33.2	33	0.7	2	1.6
6	29/05/2012	27/06/2012	31.6	35.7	39.8	36	4.1	11	10.2
7	27/06/2012	30/07/2012							
8	30/07/2012	23/08/2012	36.5	35.6	36.8	36	0.6	2	1.6
9	23/08/2012	25/09/2012	30.9	30.8	29.8	31	0.6	2	1.5
10	25/09/2012	29/10/2012	34.2	30.7	33.7	33	1.9	6	4.7
11	29/10/2012	28/11/2012	43.4	40.6	45.8	43	2.6	6	6.5
12	28/11/2012	04/01/2013	35.2	32.8	36.8	35	2.0	6	5.0
13									

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
36.6	100	Good	Good
37.3	100	Good	Good
42.2	92	Good	Good
38.4	100	Good	Good
34.9	100	Good	Good
33.3	100	Good	Good
29.1	100	Good	Good
33.5	100	Good	Good
28.2	100	Good	Good
36.8	100	Good	Good
45.2	100	Good	Good
37.4	100	Good	Good

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Overall survey -->

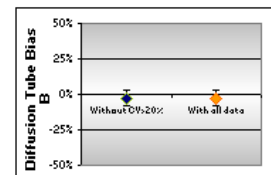
**Good precision** **Good Overall DC**  
(Check average CV & DC from Accuracy calculations)

Site Name/ ID: **Hill Street, Bottle Bank**

**Precision 11 out of 11 periods have a CV smaller than 20%**

<b>Accuracy (with 95% confidence interval)</b>	
without periods with CV larger than 20%	
Bias calculated using 11 periods of data	
Bias factor A	1.03 (0.98 - 1.09)
Bias B	-3% (-.9% - 2%)
Diffusion Tubes Mean:	36 $\mu\text{gm}^{-3}$
Mean CV (Precision):	6
Automatic Mean:	37 $\mu\text{gm}^{-3}$
Data Capture for periods used:	99%
Adjusted Tubes Mean:	37 (35 - 39) $\mu\text{gm}^{-3}$

<b>Accuracy (with 95% confidence interval)</b>	
WITH ALL DATA	
Bias calculated using 11 periods of data	
Bias factor A	1.03 (0.98 - 1.09)
Bias B	-3% (-.9% - 2%)
Diffusion Tubes Mean:	36 $\mu\text{gm}^{-3}$
Mean CV (Precision):	6
Automatic Mean:	37 $\mu\text{gm}^{-3}$
Data Capture for periods used:	99%
Adjusted Tubes Mean:	37 (35 - 39) $\mu\text{gm}^{-3}$



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