



# 2012 Air Quality Updating and Screening Assessment for *Gedling Borough Council*

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

May 2012

**Gedling Borough Council - England**

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## **Executive Summary**

Part IV of the Environment Act 1995 requires local authorities to review and assess the current and future air quality in their areas against objectives set out for eight key air pollutants, under the provisions of the National Air Quality Regulations 2000 and the Air Quality (Amendment) Regulations 2002.

A review and assessment of air quality is the first step in the Local Air Quality Management (LAQM) process. Part IV of the Act requires each local authority to review air quality 'from time to time'. The National Air Quality Regulations 2000 and the Air Quality (Amendment) Regulations 2002 prescribe air quality objectives and the dates for meeting them.

Local Authorities should only undertake a level of assessment that is commensurate with the risk of an air quality objective being exceeded.

The timetable for LAQM review and assessment process stipulates that Local Authorities conduct an "Updating and Screening Assessment" (USA) every three years. This is based on a checklist used to identify those matters that have changed since the last review was completed, and which may now require further assessment.

Where the USA has identified a risk that an air quality objective will be exceeded at a location with relevant public exposure, the Local Authority is required to undertake a "Detailed Assessment". The aim being to identify with reasonable certainty, whether or not a likely exceedence will occur.

This USA Report reviews data collected from 2011 and concludes that:

- Gedling Borough Council has examined the results from monitoring in the Borough. Concentrations for all pollutants except NO<sub>2</sub> are below the objectives, therefore there is no need to proceed to a Detailed Assessment.
- Gedling Borough Council has measured concentrations of NO<sub>2</sub> above the annual mean objective at relevant locations within the AQMA (A60 Mansfield Road); therefore it is not proposed to proceed to a Detailed Assessment.

Gedling Borough Council proposes no further action as a result of this Updating and Screening Assessment Report. The Council is currently producing an Action Plan for the A60 Mansfield Road AQMA.

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# **1 Introduction**

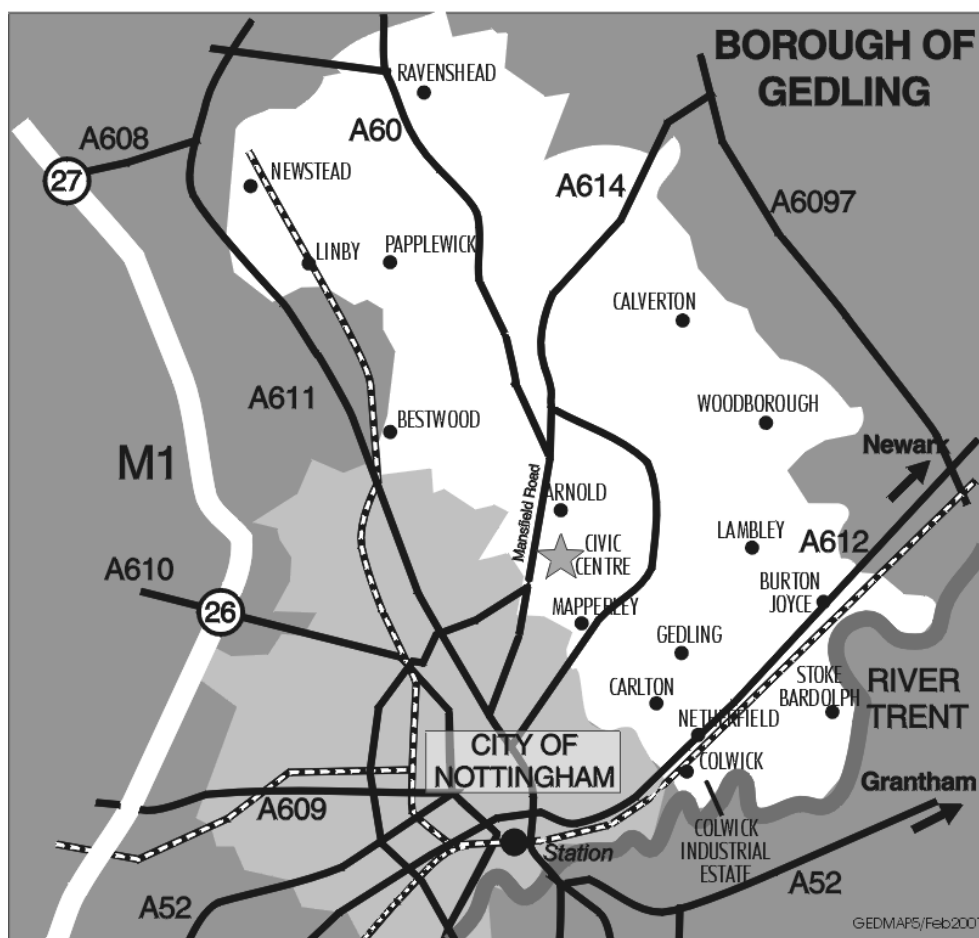
## **1.1 Description of Local Authority Area**

Established in 1974, the Borough of Gedling is home to 112,000 people and covers an area of 46.3 square miles. It borders Sherwood Forest to the north, the River Trent to the south-east and the City of Nottingham to the south-west.

The main urban areas of Arnold, Carlton, Gedling, Netherfield and Mapperley form part of the Nottingham conurbation and contain the largest proportion of population and industry. The other major villages are Ravenshead, Calverton, Burton Joyce, Newstead Village and Woodborough.

The major area for industry lies to the south of the Borough at the Colwick Industrial Estate, an assortment of other light industry occurs throughout the Borough. Agriculture is also an important industry, particularly to the north.

The local authorities bordering Gedling are Ashfield District Council, Newark and Sherwood District Council, Nottingham City Council and Rushcliffe Borough Council.



**Figure 1.1 Gedling Borough Location Plan**

## **1.2 Purpose of 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 exceedences 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.

## **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 microgrammes per cubic metre  $\mu\text{g}/\text{m}^3$  (milligrammes per cubic metre,  $\text{mg}/\text{m}^3$  for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

<b>Pollutant</b>	<b>Air Quality Objective</b>		<b>Date to be achieved by</b>
	<b>Concentration</b>	<b>Measured as</b>	
<b>Benzene</b>	16.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	5.00 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2010
<b>1,3-Butadiene</b>	2.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
<b>Carbon monoxide</b>	10.0 $\text{mg}/\text{m}^3$	Running 8-hour mean	31.12.2003
<b>Lead</b>	0.5 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	0.25 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2008
<b>Nitrogen dioxide</b>	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
<b>Particles (PM<sub>10</sub>) (gravimetric)</b>	50 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
<b>Sulphur dioxide</b>	350 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

**Table 1.1 Air Quality Objectives included in Regulations for the purpose of Local Air Quality Management in England.**



## 1.4 Summary of Previous Review and Assessments

Table 1.2 Summary of LAQM Reports 2003 – 2011

Report	Conclusions/Actions
2003 Updating and Screening Assessment	No further assessment required
2004 Progress Report	No further assessment required
2005 Progress Report	Progress to DA for NO <sub>2</sub> A60 Mansfield Rd. Daybrook
2006 Detailed Assessment	<p><b><u>"A60 Mansfield Road, Daybrook</u></b></p> <p><i>The results from the monitoring and modelling carried out to date would tend to indicate that Nitrogen Dioxide levels along the A60 Mansfield Road are below the annual objective of 40µg/m<sup>3</sup>.</i></p> <p><i>The area is however, of continual concern and therefore Gedling Borough will continue to monitor levels along this road. Gedling Borough will also review the configuration of the co-located diffusion tubes, which may be a contributing factor to the large differences between national and local bias adjustment studies."</i></p>
2006 Updating and Screening Assessment	<p>Progress to DA for NO<sub>2</sub></p> <p>A60 Mansfield Rd. B684 Woodborough Rd/Plains Rd C168 Victoria Road</p>
2007 Detailed Assessment	<p><b><u>"A60 Mansfield Road, Daybrook</u></b></p> <p><i>Overall results from the monitoring and modelling carried out to date would tend to indicate that Nitrogen Dioxide levels along the A60 Mansfield Road are below the annual objective of 40µg/m<sup>3</sup>. Therefore we do not consider it necessary to declare an Air Quality Management Area at this time. The area is however, of continual concern and therefore Gedling Borough will continue to monitor levels along this road.</i></p> <p><b><u>B684 Woodborough/Plains Road, Mapperley</u></b></p> <p><i>Results from the additional monitoring and modelling carried out to date would tend to indicate that Nitrogen Dioxide levels along the B684 Woodborough/Plains Road, Mapperley are below the annual objective of 40µg/m<sup>3</sup>. Therefore we do not consider it necessary to declare an Air Quality Management Area at this time. The area is however, of continual concern and therefore Gedling Borough will continue to monitor levels along this road.</i></p> <p style="text-align: right;"><i>contd.</i></p>

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Report	Conclusions/Actions
2007 Detailed Assessment contd.	<p><b><u>C168 Victoria Road, Netherfield</u></b></p> <p><i>Results from the additional monitoring and modelling carried out to date would tend to indicate that Nitrogen Dioxide levels along the C168 Victoria Road, Netherfield are below the annual objective of 40µg/m<sup>3</sup>. Therefore we do not consider it necessary to declare an Air Quality Management Area at this time. The area is however, of continual concern and therefore Gedling Borough will continue to monitor levels along this road."</i></p>
2008 Progress Report	No further assessment required
2009 Updating and Screening Assessment	Progress to DA for NO <sub>2</sub> - A60 Mansfield Rd.
2010 Progress Report	No further assessment required
2010 Detailed Assessment	<p><i>It is considered that, on balance, the objective for Nitrogen Dioxide is likely to be exceeded along the A60 Mansfield Road between its junction with Thackerays Lane and Oxclose Lane. Based on the contour models this would equate to approximately 50 residential properties exposed to pollutant concentrations above the objective.</i></p> <p><i>Therefore, it is proposed that GBC declare an Air Quality Management Area (AQMA) for Nitrogen Dioxide</i></p>
2011 Progress Report	<i>No further assessment required; above and beyond ongoing work regarding the A60 Mansfield Road</i>
2011 Further Assessment	<p><i>It is recommended that the current extent of the AQMA is maintained, based on continued monitoring with the area.</i></p> <p><i>When assessing the options for the Action Plan consideration should be given to targeting reductions in emissions from the commercial fleet (HGVs, Buses and LGVs) as these make up a large proportion of the emissions. However, actions to tackle the remaining 37% of emissions, from private cars (petrol &amp; diesel), should also be included to ensure the maximum reductions in emissions possible.</i></p>

## **2 New Monitoring Data**

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

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

Gedling Borough has one analyser measuring NO<sub>x</sub> and NO to calculate a value of NO<sub>2</sub>.

During 2001-2007 the analyser was housed in the basement of the Daybrook Baptist Chapel, Daybrook Square (see maps in appendix A). This site provided a safe and secure, dry location with a constant temperature and electrical supply. In January of 2008 however, the analyser was moved to a Casella ROMON enclosure on the opposite side of the A60 Mansfield Road, still in Daybrook Square.

The new enclosure is situated approximately 5 metres from the kerb to best represent the receptors located 75 metres further along the road, given the constraints for siting.



**Figure 2.1 Location of ROMON enclosure, Daybrook Square**

**Table 2.1 Details of Automatic Monitoring Sites**

Site Name	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA?	Relevant Exposure?	Distance to kerb of nearest road	Worst-case Location?
Daybrook Square	Roadside	X 457944 Y 344596	NO <sub>x</sub> / NO <sub>2</sub>	Y	N (75m)	5 metres	N

### **2.1.2 Non-Automatic Monitoring**

#### Nitrogen Dioxide Diffusion Tubes

Gedling Borough has 23 diffusion tubes spread along the key areas of concern, which are mainly commuter routes into Nottingham City Centre. The Borough also has three urban background and one rural background tube(s).

In 2004 most of the tubes were moved to new locations that better reflected the “receptor” based risk assessment criteria of guidance. The three tubes, Daybrook Analyser I, II and III, are located at the sampling head of the continuous automatic analyser. (See location maps in Appendix A)

Following the recommendations of the 2009 USA report three additional tubes were placed at relevant locations along the critical section through Daybrook Square, from July 2009.

Details of the co-location study and subsequent bias adjustment can be found in Appendix B, along with full monitoring results. QA/QC procedures and laboratory details can be found in Appendix C.

#### Benzene Diffusion Tubes

Gedling Borough Council does monitor for Benzene using a small number of BTex passive diffusion tubes. BTex tubes are small metal tubes open at one end with a pollutant-absorbing chemical matrix at the closed end. At site, the tube is exposed, by removal of the end cap, for a period of one month. After the month the tube is resealed and sent to an analytical laboratory.

BTex tube results are for benzene, toluene, ethyl-benzene and xylene. The concentrations of the other pollutants can be used to validate the benzene results as local conditions may effect the results i.e. high levels of solvents from industrial processes. Benzene concentrations measured in micrograms per cubic metre ( $\mu\text{gm}^3$ ).

Tubes are located around the TotalFinaElf Storage Depot, Private Road No. 3, Colwick Industrial Estate and also Chaworth Road and Bourne Mews which have been identified as a possible receptors for exceedence of the 2010 objective. A single tube is also placed in the north of the Borough as a rural background site. (See Maps in Appendix A)

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**Table 2.2 Details of Non- Automatic Monitoring Sites**

Site Name	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA?	Relevant Exposure?	Distance to kerb of nearest road	Worst-case Location?
Marion Murdoch Court	Urban Background	X 461294 Y 342826	NO <sub>2</sub>	N	N/A	N/A	N/A
Hastings Street	Urban Background	X 460391 Y 341413	NO <sub>2</sub>	N	N/A	N/A	N/A
856 Plains Road	Receptor	X 458898 Y 343139	NO <sub>2</sub>	N	Y	8m	Y
Morley Mills Building	Receptor	X 457969 Y 344780	NO <sub>2</sub>	Y	Y	3m	Y
Mansfield Road, Redhill	Near Receptor	X 457899 Y 345637	NO <sub>2</sub>	Y	N (25m)	10m	N
Daybrook Dental Surgery	Receptor	X 457867 Y 345388	NO <sub>2</sub>	Y	N (30m)	2.3m	Y
19 Victoria Road	Receptor	X 461995 Y 341175	NO <sub>2</sub>	N	Y	4m	Y
36 Victoria Road	Roadside	X 462002 Y 341097	NO <sub>2</sub>	N	N (4.5m)	1.5m	Y
47 Plains Road	Receptor	X 459244 Y 343549	NO <sub>2</sub>	N	Y	7m	Y
Daybrook Analyser	Reference to Analyser	X 457974 Y 344632	NO <sub>2</sub>	Y	N/A	5m	N/A
Burton Rd/Shearing Hill	Near Receptor	X 462422 Y 341972	NO <sub>2</sub>	N	N (9m)	16m	N
The Vale PH	Roadside	X 457929 Y 344335	NO <sub>2</sub>	Y	N (14m)	3.5m	N
The Grove PH	Near Receptor	X 457947 Y 344651	NO <sub>2</sub>	Y	N (16m)	3.5m	Y
Ricket Lane	Rural Background	X 456621 Y 355935	NO <sub>2</sub>	N	N/A	N/A	N/A
Wickes Store, Daybrook	Near Receptor	X 458364 Y 345280	NO <sub>2</sub>	Y	N (50m)	3m	N
Civic Centre, Arnold	Urban Background	X 458662 Y 345618	NO <sub>2</sub>	N	N/A	N/A	N/A
Mile End Road	Near Receptor	X 461103 Y 340086	NO <sub>2</sub>	N	Y	10m	Y
Daybrook Chip Shop	Near Receptor	X 457947 Y 344713	NO <sub>2</sub>	Y	Y	3m	Y
T&S Heating, Daybrook	Near Receptor	X 457950 Y 344748	NO <sub>2</sub>	Y	Y	3m	Y
Frank Keys, Daybrook	Near Receptor	X 457969 Y 344827	NO <sub>2</sub>	Y	Y	3m	Y
Private Road No3	Urban Industrial	X 462142 Y 340384	BTex	N	N/A	N/A	N/A
Bourne Mews	Urban Background	X 462125 Y 340874	BTex	N	Y	N/A	Y
Ricket Lane	Rural	X 456621 Y 355935	BTex	N	N/A	N/A	N/A
Hollyoake Villas	Receptor	X 461795 Y 340703	BTex	N	Y	N/A	Y



## 2.2 Comparison of Monitoring Results with AQ Objectives

The results of 2011 monitoring for nitrogen dioxide and benzene have been compared against air quality objectives.

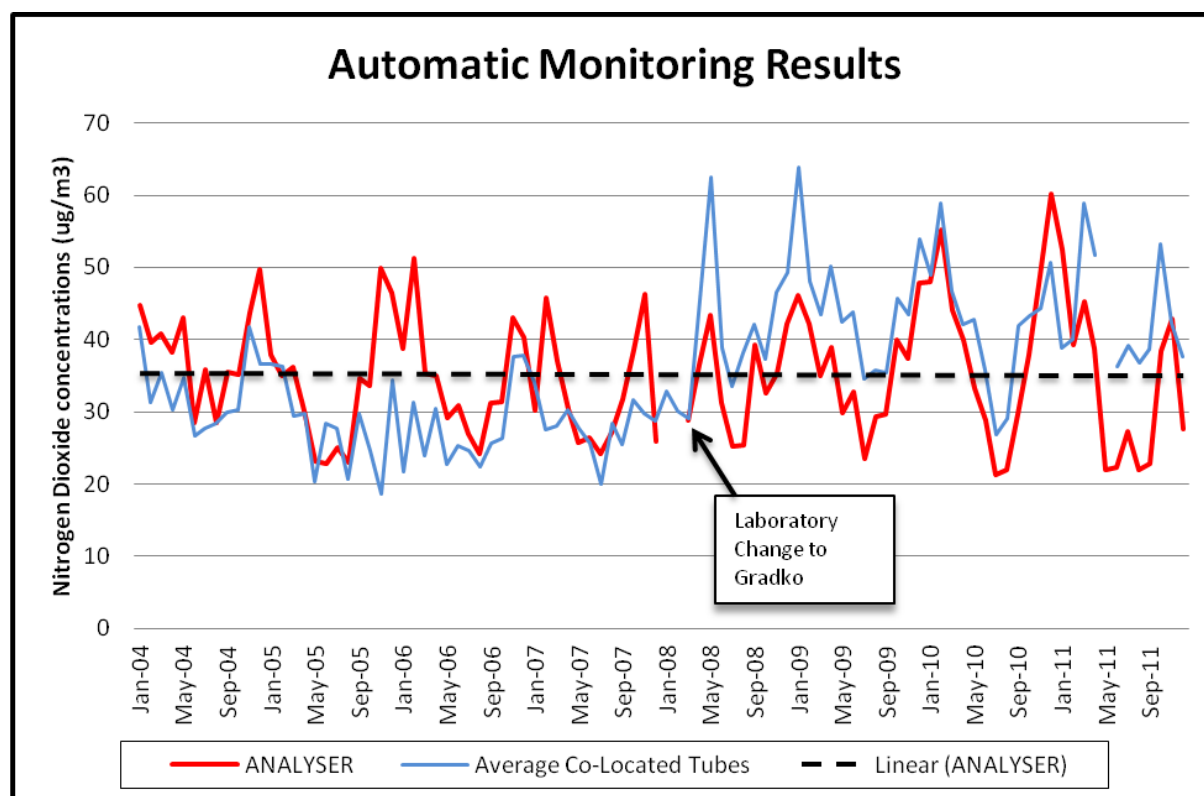
### 2.2.1 Nitrogen Dioxide

#### Automatic Monitoring Data

Results for automatic monitoring for 2011 show no exceedences of the air quality objectives for NO<sub>2</sub>. Figure 2.3 shows little change in NO<sub>2</sub> levels over the eight year period (2004-2011).

**Table 2.3a Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with Annual Mean Objective**

Location	Within AQMA?	Data Capture for full calendar year 2011 %	Annual mean concentrations (µg/m <sup>3</sup> )				
			2007	2008	2009	2010	2011
Daybrook Square	Y	92	32	34	36	39	33



**Figure 2.3 Trends in Monthly Mean Nitrogen Dioxide Concentration Daybrook Square.**

**Table 2.3b Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour Mean Objective**

Location	Within AQMA?	Data Capture 2011 %	Number of Exceedences of hourly mean (200 µg/m <sup>3</sup> ) <i>If the period of valid data is less than 90% of a full year, include the 99.8<sup>th</sup> %ile of hourly means in brackets.</i>		
			2009	2010	2011
Daybrook Square	Y	92	0	1	0

### Diffusion Tube Monitoring Data

The results of diffusion tube monitoring for 2011 (Table 2.4) show some exceedences of the air quality objectives at receptors along the A60 Mansfield Road: Full diffusion tube monitoring dataset, including details of bias and location adjustments are available in Appendix B.

**Table 2.4 Results of Nitrogen Dioxide Diffusion Tubes (adjusted for bias and location)**

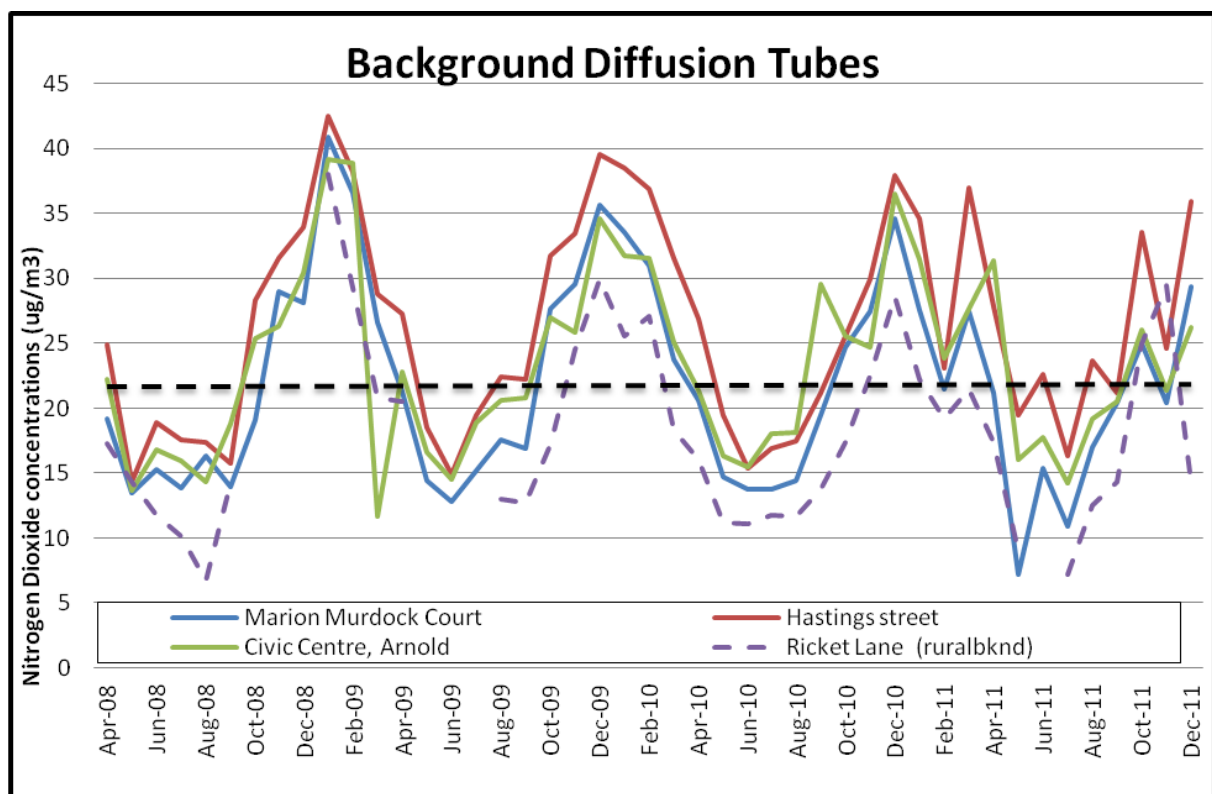
Site ID	Location	Within AQMA?	Data Capture for 2011 %	Annual mean concentrations (µg/m <sup>3</sup> )			
				2008 <sup>†</sup>	2009	2010	2011
G1	Marion Murdoch Court	N	100	19	21	21	18
G2	Hastings Street	N	100	23	24	24	24
G3	856 Plains Road	N	100	31	30	31	29
G4	Morley Mills Building	Y	100	<b>40</b>	<b>40</b>	38	38
G5	Mansfield Road, Redhill	Y	100	27	32	29	29
G6	Daybrook Dental Surgery	Y	100	37	37	37	36
G7	19 Victoria Road	N	75	32	33	32	31
G8	36 Victoria Road	N	83	35	33	33	35
G9	47 Plains Road	N	100	31	32	32	32
G13	Burton Rd/Shearing Hill	N	100	24	26	27	25
G14	The Vale PH	Y	92	34	34	31	34
G15	The Grove PH	Y	100	<b>40</b>	38	<b>42</b>	<b>40</b>
G16	Ricket Lane	N	92	18	19	16	16
G17	Wickes Store, Daybrook	Y	100	34	36	35	35
G18	Civic Centre, Arnold	N	100	20	21	23	20
G19	Mile End Road	N	100	27	27	30	26
G20	Daybrook Chip Shop	Y	92	-	<b>48<sup>††</sup></b>	<b>44</b>	<b>45</b>
G21	T&S Heating, Daybrook	Y	92	-	<b>49<sup>††</sup></b>	<b>45</b>	<b>47</b>
G22	Frank Keys, Daybrook	Y	100	-	<b>43<sup>††</sup></b>	<b>41</b>	<b>41</b>

<sup>†</sup> 9 months of data.

<sup>††</sup> 6 month data has been “annualised” using Box 3.2 of TG(09).

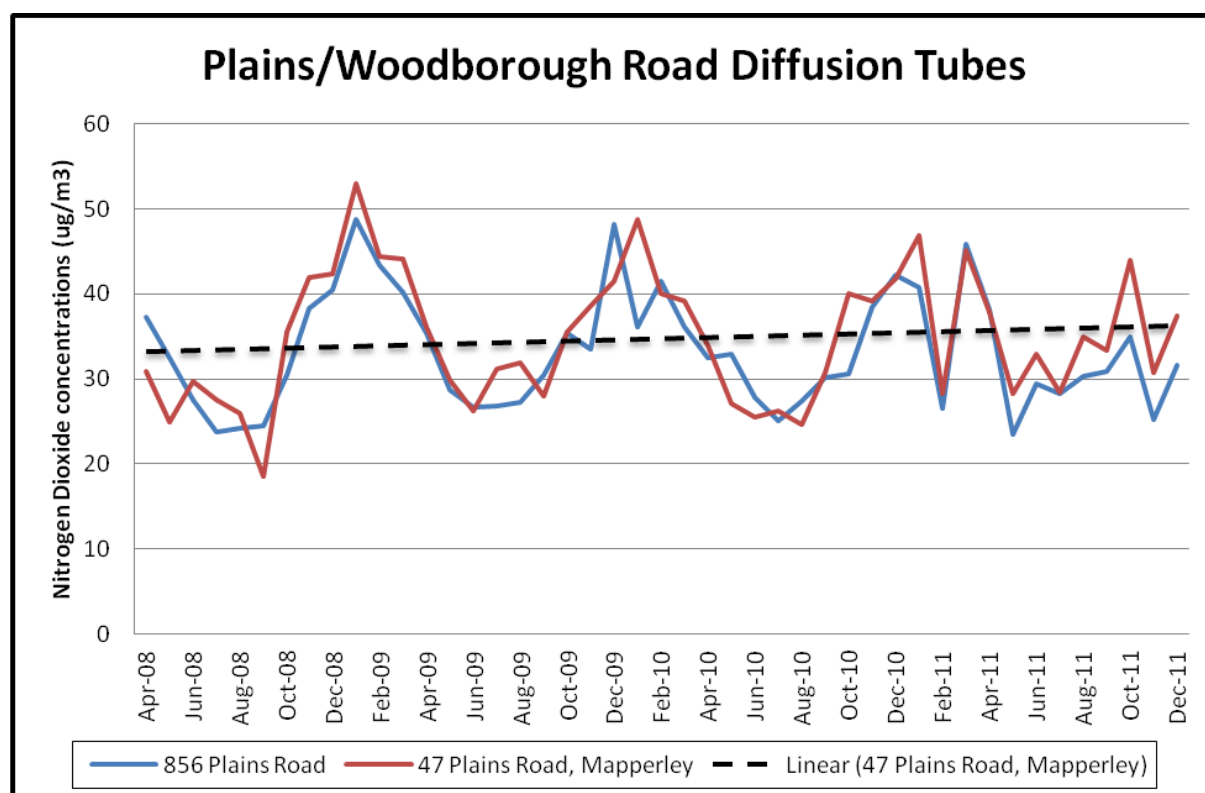
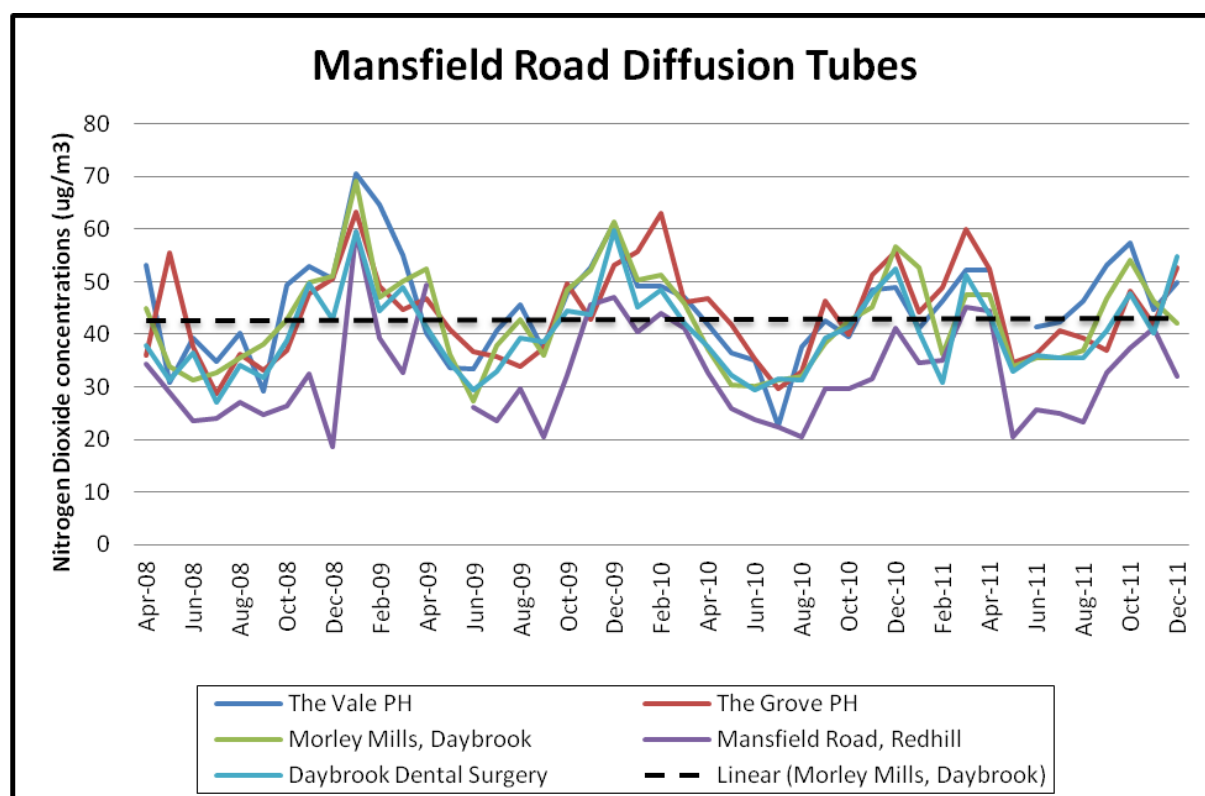
Figure 2.4 shows a series of graphs plotting diffusion tube results over a 3 year 9 month period (2008 – 2011), the results since the change to Gradko laboratory. These graphs are split into urban/background sites, Mansfield Road sites and Plains/Woodborough Road sites and show:

- The trendline for the indicative urban background site shows a flat trend over time in the levels of NO<sub>2</sub>.
- The trendline for the indicative Mansfield Road site shows a flat trend over time in the levels of NO<sub>2</sub>.
- The trendline for the indicative Plains Road site shows a slight increasing trend over time in the levels of NO<sub>2</sub>.



**Figure 2.4 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites.**





**Figure 2.4 contd. Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites.**

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### **2.2.2 PM<sub>10</sub>**

Gedling Borough Council does not monitor for PM<sub>10</sub>.

### **2.2.3 Sulphur Dioxide**

Gedling Borough Council does not monitor for Sulphur Dioxide.

### **2.2.4 Benzene**

Table 2.5 shows monitoring results for the past three years, no exceedences of the benzene air quality objective were measured (5.00 µg/m<sup>3</sup>).

**Table 2.5 Results of BTex Diffusion Tubes**

<b>Location</b>	<b>Annual mean concentrations (µg/m<sup>3</sup>)</b>		
	<b>2009</b>	<b>2010</b>	<b>2011</b>
Private Road No3	0.90	0.66	0.49
Bourne Mews	0.49	0.76	0.57
Ricket Lane	0.59	0.79	0.49
Hollyoake Villas	0.79	0.89	0.57

### **2.2.5 Other pollutants monitored**

No other pollutants monitored.

## **3 Road Traffic Sources**

### **3.1 Narrow Congested Streets with Residential Properties Close to the Kerb**

A review of all streets with flows over 5000 AADT was conducted. Traffic data was plotted on GIS and all streets affected were reviewed to confirm if any meet the criteria. (Box 5.3: A1) No newly identified locations failed to meet the new criteria.

Gedling Borough Council confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

### **3.2 Busy Streets Where People May Spend 1-hour or More Close to Traffic**

An assessment of traffic flow data has revealed that there are no newly identified areas that would meet the criteria.

Gedling Borough Council confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

### **3.3 Roads with a High Flow of Buses and/or HGVs.**

A review of the traffic data did not reveal any new roads which meet the criteria; greater than 20% HDV flows.

Gedling Borough Council confirms that there are no new/newly identified roads with high flows of buses/HDVs.

### **3.4 Junctions**

There have been no fundamental changes to traffic flows since the last review and assessment. Traffic data from Nottinghamshire County Council indicate a reduction in traffic flows generally within the Borough (approx. 0.6% between 2010-2011)

Gedling Borough Council confirms that there are no new/newly identified busy junctions/busy roads.

### **3.5 Roads Constructed or Proposed Since the Last Round of Review and Assessment**

In the summer of 2008 plans were submitted to Gedling Borough Council for the redevelopment of the former Gedling Colliery (ref's 2008/0459 & 2008/0460). The development plans submitted, [including a new relief road (GAR)], included an Environmental Statement, including an assessment of air quality impacts. (see plan Appendix A). At the time of writing the air quality assessment has been considered by the LA and comments made to the applicant. No further information has been forthcoming since that time.

Gedling Borough Council has assessed new/newly identified junctions meeting the criteria in Section A.5 of Box 5.3 in TG(09), and concluded that it will not be necessary to proceed to a Detailed Assessment.

### **3.6 Roads with Significantly Changed Traffic Flows**

There have been no fundamental changes to traffic flows since the last review and assessment. Traffic data from Nottinghamshire County Council indicate a reduction in traffic flows generally within the Borough (approx. 0.6% between 2010-2011)

Gedling Borough Council confirms that there are no new/newly identified roads with significantly changed traffic flows.

### **3.7 Bus and Coach Stations**

Gedling Borough Council confirms that there are no relevant bus stations in the Local Authority area.

## **4 Other Transport Sources**

### **4.1 Airports**

Gedling Borough Council confirms that there are no airports in the Local Authority area.

### **4.2 Railways (Diesel and Steam Trains)**

#### **4.2.1 Stationary Trains**

Gedling Borough Council confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

#### **4.2.2 Moving Trains**

Gedling Borough Council confirms that there are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

### **4.3 Ports (Shipping)**

Gedling Borough Council confirms that there are no ports or shipping that meet the specified criteria within the Local Authority area.

## **5 Industrial Sources**

### **5.1 Industrial Installations**

#### **5.1.1 New or Proposed Installations for which an Air Quality Assessment has been Carried Out**

Gedling Borough Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

#### **5.1.2 Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been introduced**

Gedling Borough Council confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

#### **5.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment**

Gedling Borough Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

### **5.2 Major Fuel (Petrol) Storage Depots**

Gedling Borough has one large scale storage depot for petroleum product, which is located in the Colwick Industrial Estate.

- TotalFinaElf Ltd., Private Road Number 3, Colwick Industrial Estate. Handles approximately 600 million litres per year.

As a whole the installation falls within Sections 6.4(B) of Schedule 1 of the Pollution Prevention and Control (England and Wales) Regulations 2000 (as amended) as cited in Environmental Protection (Prescribed Processes and Substances Etc.) (Amendment) (Petrol Vapour Recovery) Regulations 1996. As such the Local Authority permitted the process in 2007 (Ref. PPC/07/3).

### ***Gedling Borough Council - England***

The TotalFinaElf storage facility appears in a table of Petrol Terminals (major fuel storage depots) required for consideration, in Annex 2, Appendix E (page A2-58) of the guidance.

Using mapping the nearest relevant receptor is 275m to the north, Holyoake Villas on Chaworth Road, a residential property. (See Appendix 1)

Ongoing monitoring (Table 2.5) around the TotalFinaElf Storage Depot indicates no exceedences of the objective. There have been no other changes within the Borough that would indicate exceedence at any other location.

Gedling Borough Council has assessed a major petrol storage depot, and concluded that it will not be necessary to proceed to a Detailed Assessment.

## **5.3 Petrol Stations**

A review of the public register has confirmed that no new petrol filling stations, that meet the assessment criteria, have been opened since the last review.

Gedling Borough Council confirms that there are no petrol stations meeting the specified criteria.

## **5.4 Poultry Farms**

A review of the public register has confirmed that Gedling Borough does not have any poultry farms meeting the criteria.

Gedling Borough Council confirms that there are no poultry farms meeting the specified criteria.

## **6 Commercial and Domestic Sources**

### **6.1 Biomass Combustion – Individual Installations**

Gedling Borough Council has not received any biomass combustion plant applications since the last review. Therefore it will not be necessary to proceed to a Detailed Assessment.

### **6.2 Biomass Combustion – Combined Impacts**

Limited information is available regarding small scale (domestic) wood/solid fuel burners within the Borough. Based on experience of enquiries from prospective purchasers and complaints regarding smoke nuisance it is considered that use of 'biomass' is limited. This coupled with the results of surveys (see Section 6.3) would lead us to believe that there is limited scope for air quality impacts from biomass at this time.

Gedling Borough Council has assessed the biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment. The Council will continue to review this potential impact.



## **6.3 Domestic Solid-Fuel Burning**

An assessment of data from two sources has been used to assess fuel usage throughout the Borough: -

- The Home Energy Conservation Act (HECA) questionnaires and,
- a NI187 fuel poverty survey, using redacted data (personal information removed).

Both surveys were small (600 responses on each) they do however show the make up of primary fuel use within the Borough:

<b>NI 187 Fuel Poverty Survey</b>		<b>HECA Survey</b>	
Mains Gas	84.4%	Mains Gas	95%
Electricity	13.5%	Oil	1.5%
Wood	0.2%	No Answer	3.5%
Coal (inc Smokeless)	1.7%		
LPG	0.2%		

Based on the above percentages a 500m x 500m square of residential properties (approx 900 dwellings) equates to 15 properties burning coal/smokeless fuel as the primary source of heat; well below the threshold of 50 in Section D.2 of TG(09).

Whilst the surveys were carried out over 3 years ago it is not considered that there has been any fundamental change in the proportions of primary fuel uses above.

The above data and local knowledge information has therefore been used to conclude that:

Gedling Borough Council confirms that there are no areas of significant domestic fuel use in the Local Authority area.

## **7 Fugitive or Uncontrolled Sources**

A review of the Borough inline with the guidance has revealed no new sources.

Gedling Borough Council confirms that there are no potential sources of fugitive particulate matter emissions in the Local Authority area.

## **8 Conclusions and Proposed Actions**

### **8.1 Conclusions from New Monitoring Data**

#### Nitrogen Dioxide

Gedling Borough Council has examined the results from monitoring in the Borough. Concentrations for all pollutants except NO<sub>2</sub> are below the objectives, therefore there is no need to proceed to a Detailed Assessment.

Gedling Borough Council has measured concentrations of NO<sub>2</sub> above the annual mean objective at relevant locations within the AQMA (A60 Mansfield Road); therefore it is not proposed to proceed to a Detailed Assessment.

#### Benzene

Continued BTex monitoring confirms that levels of benzene around the major petroleum storage facility remain at acceptable levels well below the objective.

### **8.2 Conclusions from Assessment of Sources**

Largely, there have been no significant changes to sources throughout the Borough.

Therefore, no new or significantly changed sources identified have the potential to lead to exceedences of the air quality objectives.

### **8.3 Proposed Actions**

Gedling Borough Council proposes no further action as a result of this Updating and Screening Assessment Report. The Council is currently producing an Action Plan for the A60 Mansfield Road AQMA.

Gedling Borough Council will next submit a 2013 Progress Report.

## **9 References**

*Part IV of the Environment Act 1995 - Local Air Quality Management: Policy Guidance*; LAQM.PG(09); Department for Environment and Food and Rural Affairs; 2009.

*Part IV of the Environment Act 1995 - Local Air Quality Management; Technical Guidance*; LAQM.TG(09); Department for Environment and Food and Rural Affairs; 2009.

*The Air Quality Strategy for England, Scotland, Wales and Northern Ireland*, 2007. Department for Environment and Food and Rural Affairs.

*ML®9841B Nitrogen Oxides Analyser Operational and Service Manuals*; Monitor Labs; Rev H; October 1998.

*Diffusion Tubes for Ambient NO<sub>2</sub> Monitoring: Practical Guidance for Laboratories and Users*, 2008. AEA Energy & Environment.

*A Breath of Fresh Air for Nottinghamshire*; The Nottinghamshire Environmental Protection Working Group, 2008

*Technical Guidance: Screening assessment for biomass boilers*; 2008, AEA Energy & Environment.

# **Appendices**

Appendix A: Maps

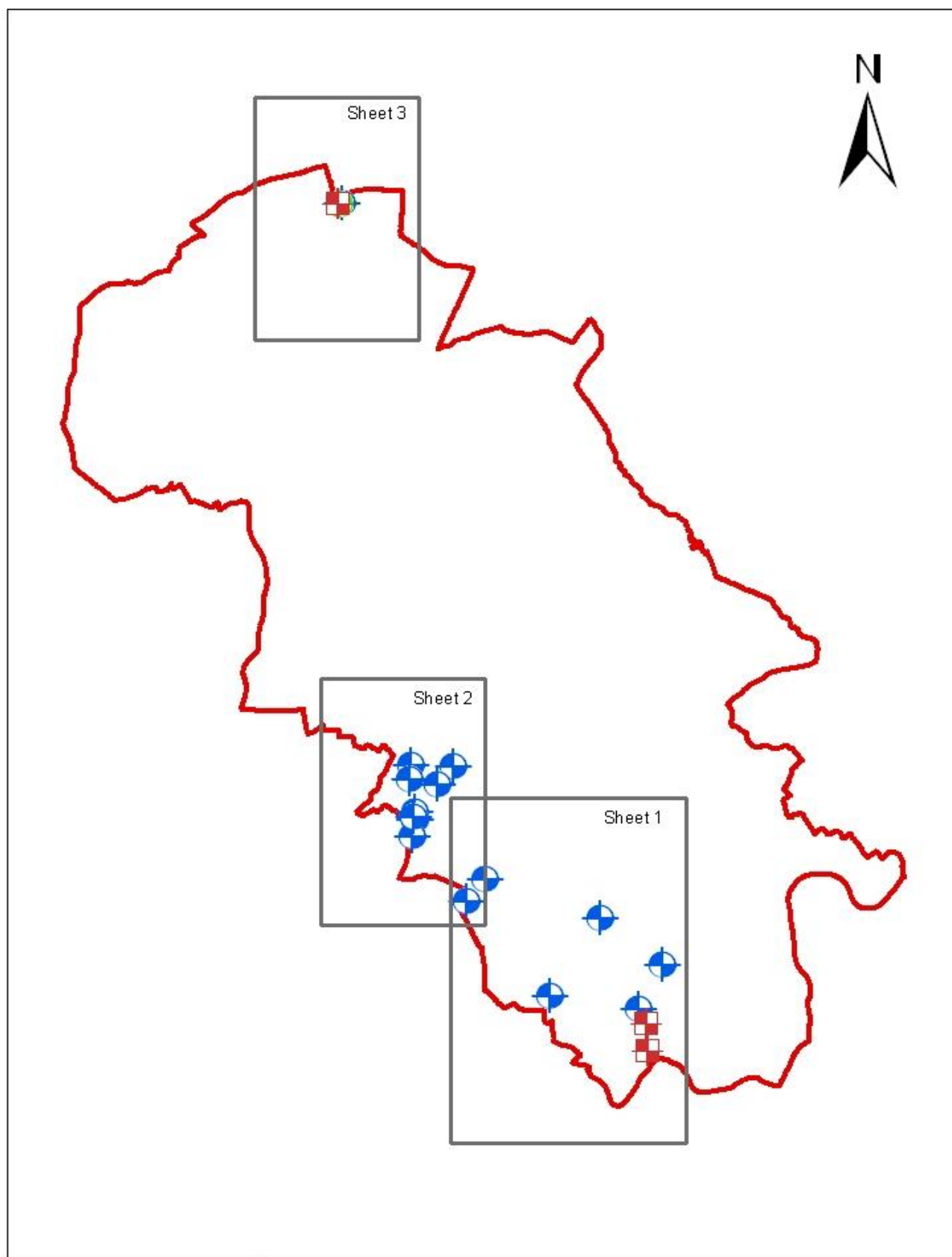
Appendix B: Nitrogen Dioxide Diffusion Tube Results and  
Bias Adjustment Details

Appendix C: QA/QC Data



## **Appendix A**

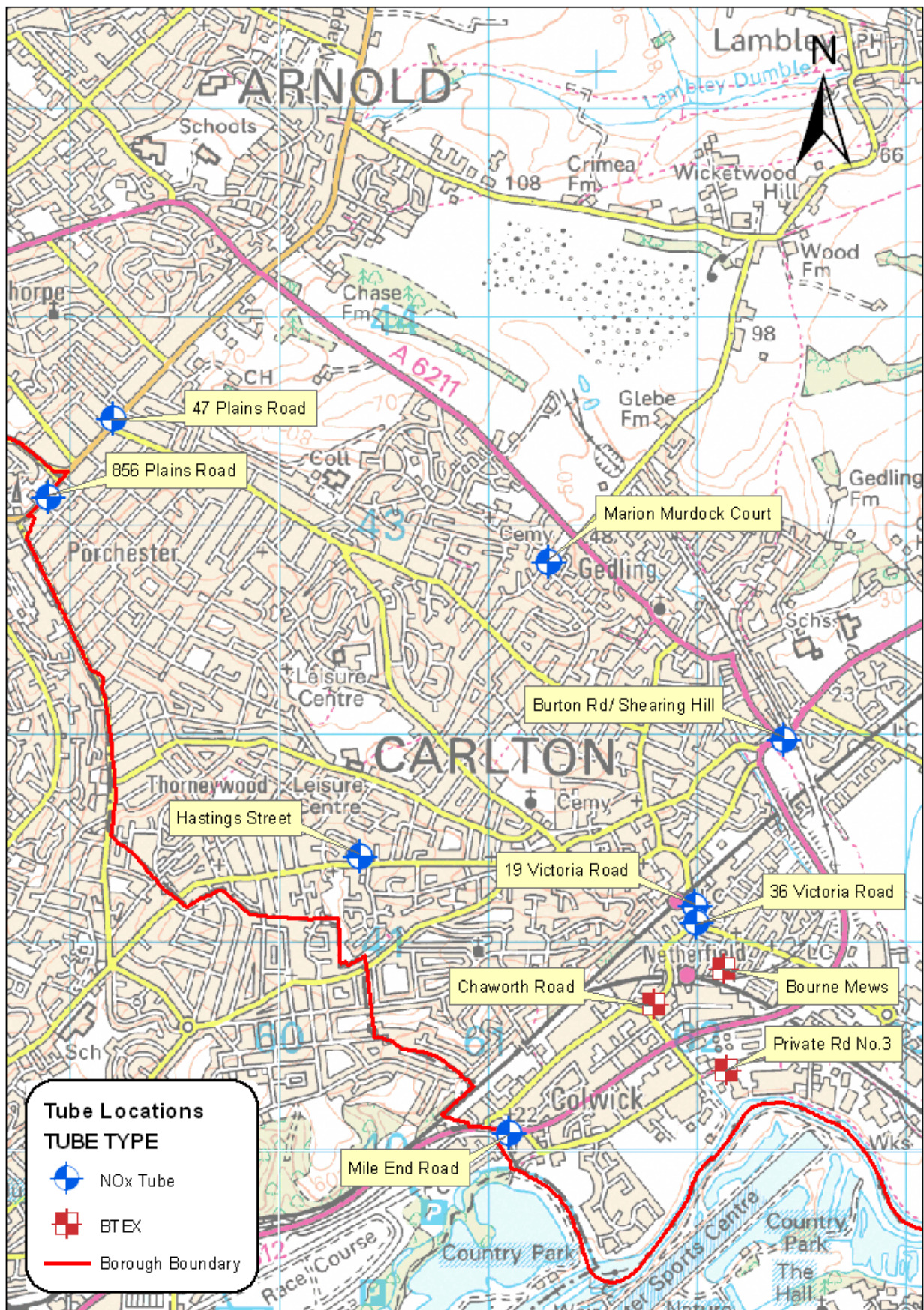
### **Maps**



*The Ordnance Survey mapping included within this publication is provided by Gedling Borough Council under licence (Licence No. LA 100021246)*

Title:	April 2012
<b>Sheet Locations</b>	Scale: nts





The Ordnance Survey mapping included within this publication is provided by Gedling Borough Council under licence (Licence No. LA 100021246)

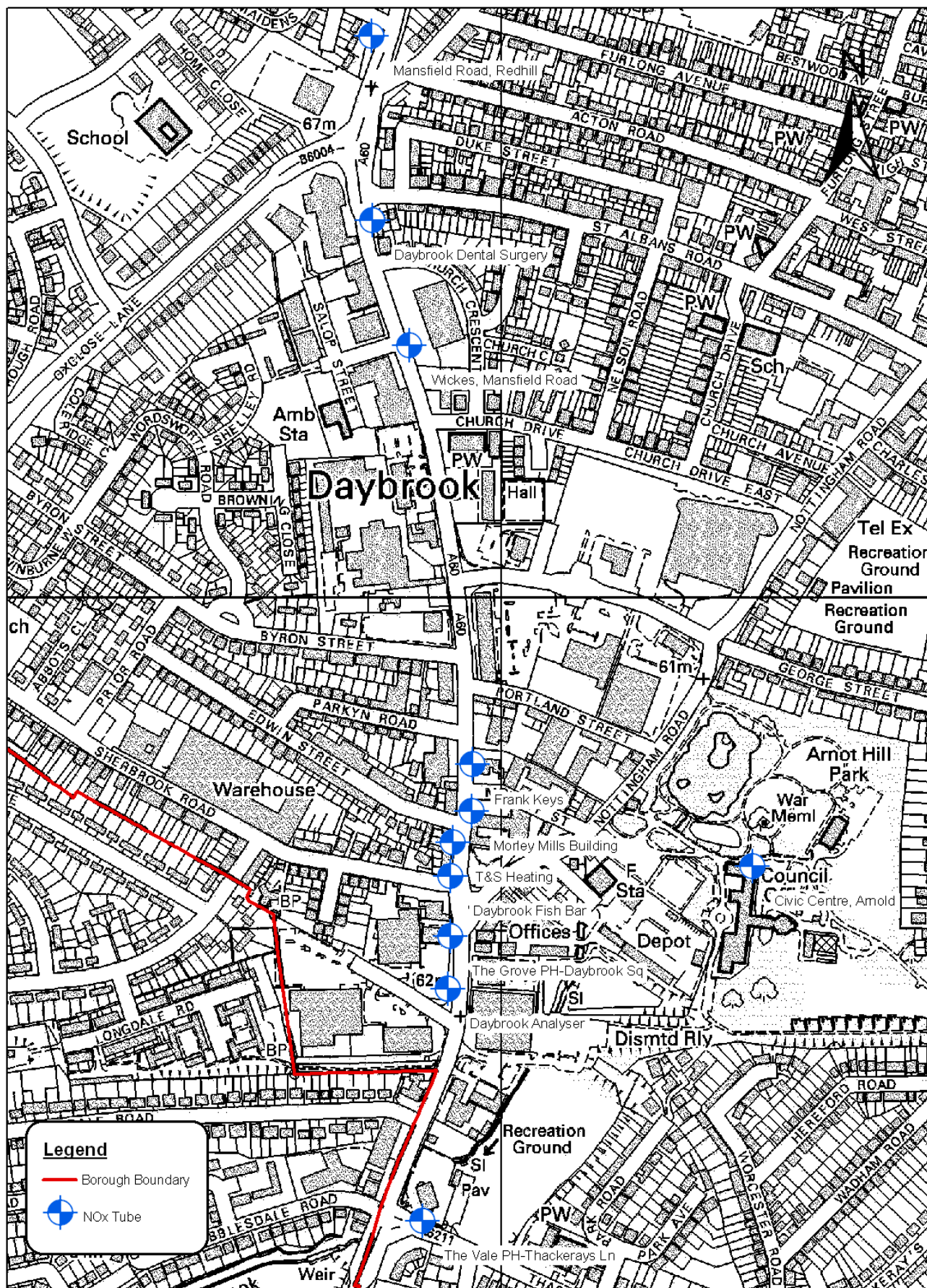
Title:

**Diffusion Tube Locations – sheet 1**

April 2012

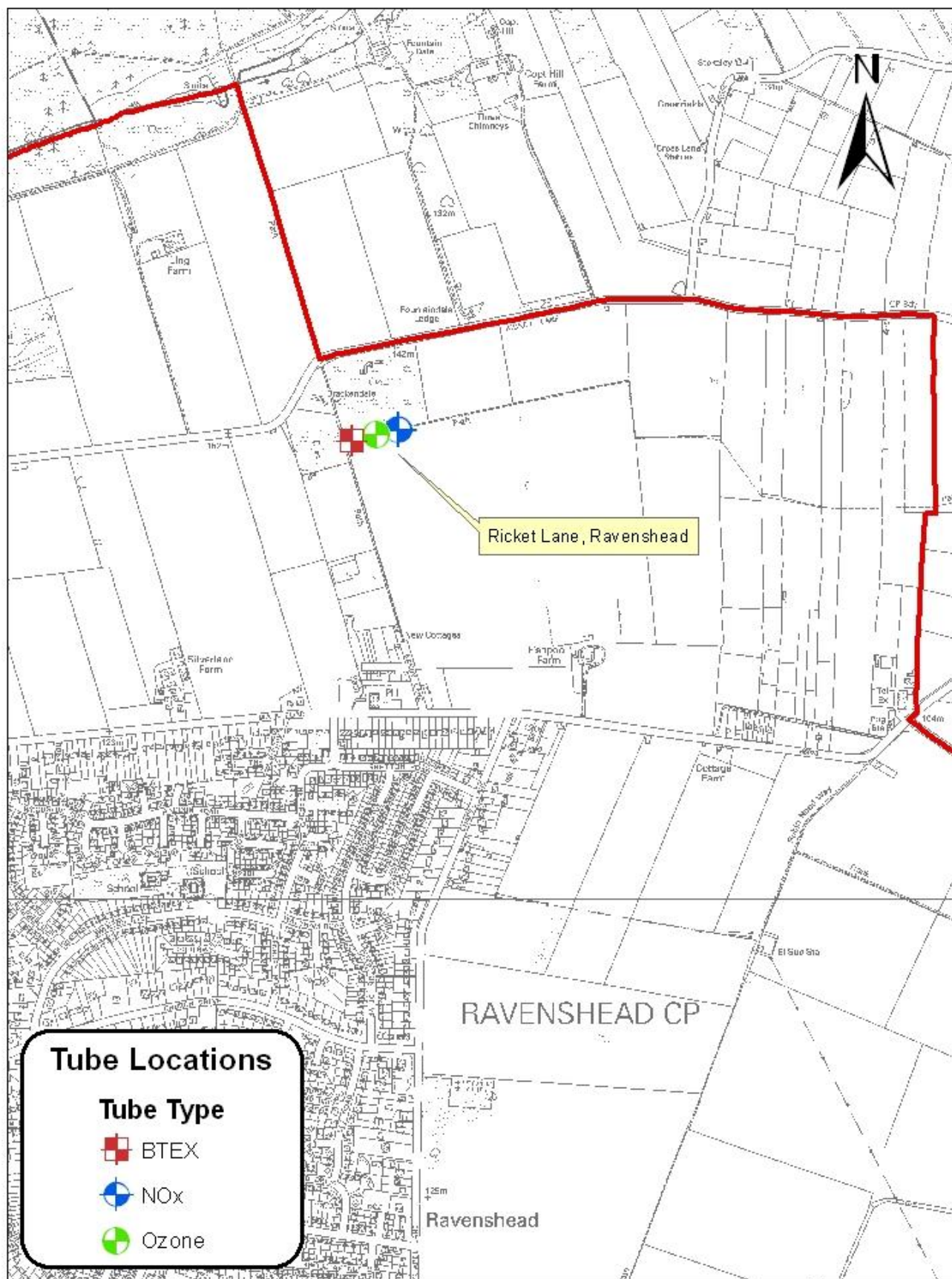
Scale: nts





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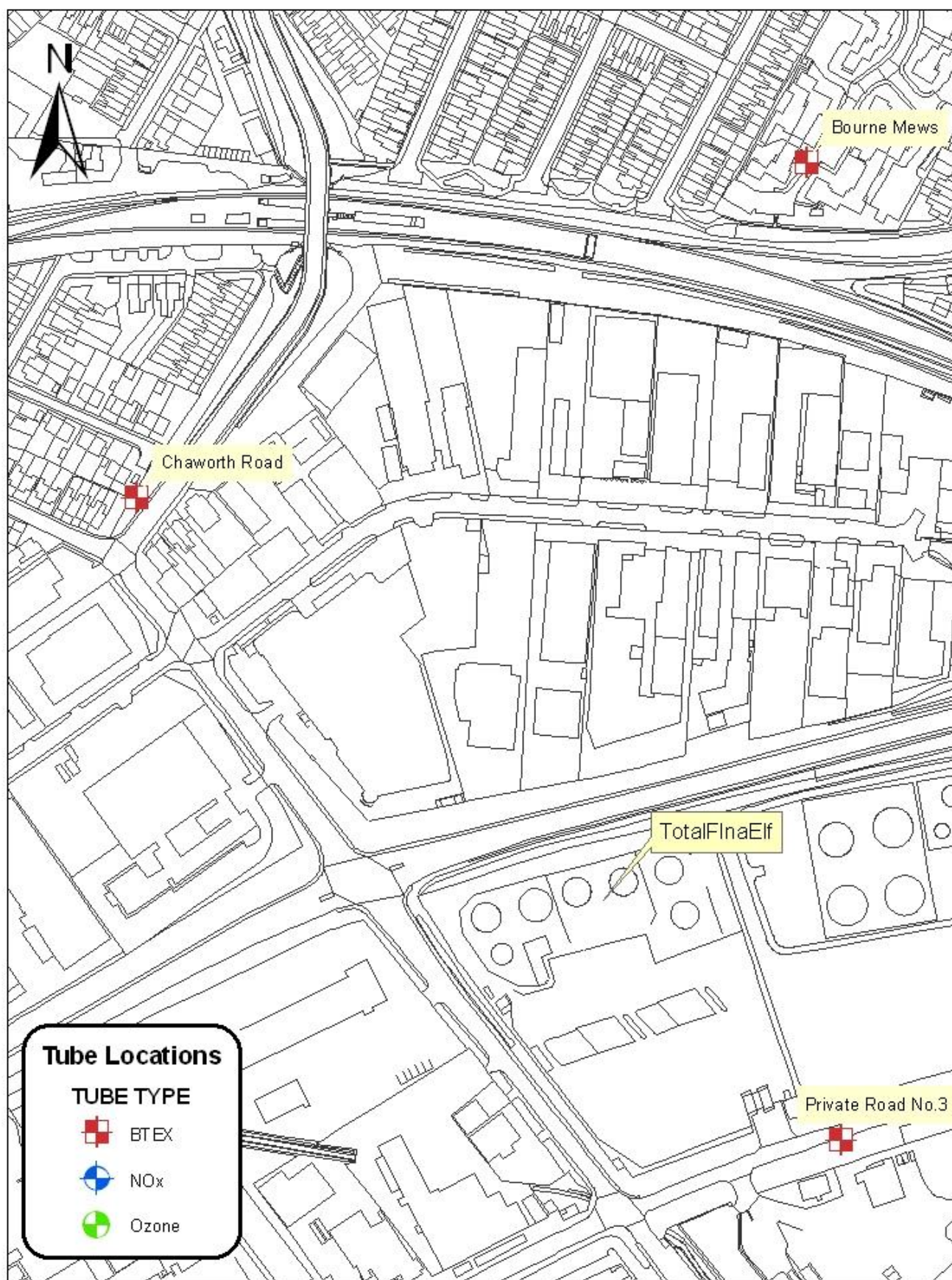
Title: <b>Diffusion Tube Locations – sheet 2</b>	April 2012 Scale: nts
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Title: <b>Diffusion Tube Locations – sheet 3</b>	April 2012 Scale: nts
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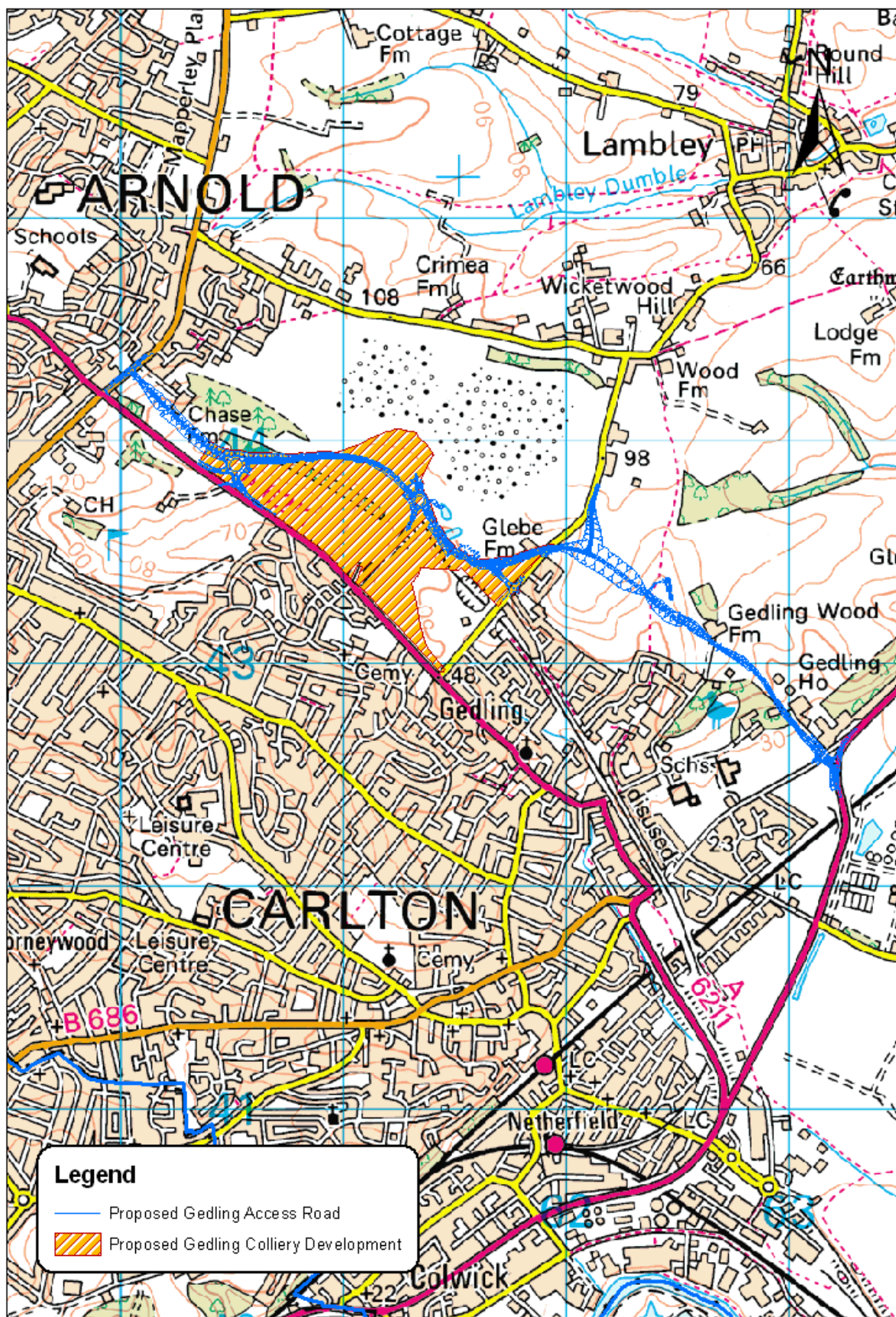
Title:

**Btex Diffusion Tubes around TotalFinaElf**

April 2012

Scale: nts





The Ordnance Survey mapping included within this publication is provided by Gedling Borough Council under licence (Licence No. LA 100021246)

Title: <b>Proposed Gedling Colliery Development</b>	April 2012 Scale: nts
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## **Appendix B**

### **Nitrogen Dioxide Diffusion Tube Results And Bias Adjustment Details**

## Diffusion Tube Bias Adjustment Factors

National Bias Adjustment Factors (BAF) have been obtained using the co-location studies spreadsheet available at <http://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html>

The Gradko national BAF 2011 for 20% TEA in water is given as **0.89** from 26 studies of various types. (see screen shot in this appendix)

## Factor from Local Co-location Studies

A co-location study has been carried out with the GBC NOx analyser.

Attached to this appendix the AEA spreadsheet for calculating bias, precision and accuracy of triplicate tubes. The bias factor calculated is **0.80**.

## Discussion of Choice of Factor to Use

Based on guidance supplied by the Review and Assessment Helpdesk (<http://laqm.defra.gov.uk/laqm-faqs/faq69.html>) GBC has used the **national** bias adjustment factor when adjusting diffusion tube results.

## Adjustment for Receptor Distance

Two of the diffusion tube locations are not representative of the receptors concerned:

1. 36 Victoria Road
2. The Vale PH

Due to site constraints the tubes are located as close as possible to the receptors. The two results have therefore been adjusted using the 'NO<sub>2</sub> with distance from roads' spreadsheet; available at <http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>

Background concentrations have been taken from the nearest urban background diffusion tube; The Vale PH uses the "Civic Centre" UB tube (20µg/m<sup>3</sup>) and 36 Victoria Rd uses the average of Marion Murdock Court and Hastings Street UB tubes. (21µg/m<sup>3</sup>)

Screen shots of these spreadsheets are attached to this appendix.



## 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	95% CI of mean
1	05/01/2011	02/02/2011	37.5	40.2	39.0	39	1.4	4	3.4
2	02/02/2011	02/03/2011	43.9	39.5	36.9	40	3.6	9	8.9
3	02/03/2011	31/03/2011	54.6	59.9	62.3	59	4.0	7	9.9
4	31/03/2011	27/04/2011	51.2	52.6	51.5	52	0.7	1	1.8
5	27/04/2011	01/06/2011							
6	01/06/2011	29/06/2011	36.8	37.3	34.6	36	1.4	4	3.6
7	29/06/2011	03/08/2011	39.7	39.1	38.9	39	0.4	1	1.0
8	03/08/2011	31/08/2011	37.2	36.7	36.6	37	0.3	1	0.8
9	31/08/2011	28/09/2011	38.1	38.6	39.1	39	0.5	1	1.3
10	28/09/2011	02/11/2011	54.9	54.9	49.9	53	2.9	5	7.1
11	02/11/2011	30/11/2011	47.0	36.9	42.9	42	5.1	12	12.7
12	30/11/2011	04/01/2012	35.7	37.7	39.5	38	1.9	5	4.7
13									

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

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
52	96	Good	Good
39	94	Good	Good
45	95	Good	Good
39	93	Good	Good
22	80		Good
22	90	Good	Good
27	92	Good	Good
22	90	Good	Good
23	95	Good	Good
38	95	Good	Good
43	95	Good	Good
28	94	Good	Good
		Good precision	Good Overall

Overall survey →

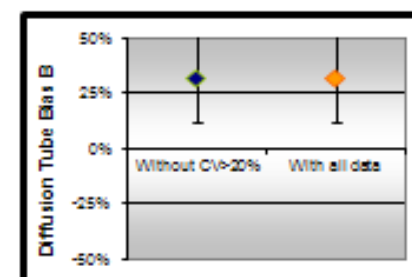
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Daybrook Square
----------------	-----------------

Accuracy (with 95% confidence interval)	
without periods with CV larger than 20%	
Bias calculated using 11 periods of data	
Bias factor A	0.8 (0.69 - 0.96)
Bias B	25% (5% - 45%)
Diffusion Tubes Mean:	43 $\mu\text{gm}^{-3}$
Mean CV (Precision):	5
Automatic Mean:	34 $\mu\text{gm}^{-3}$
Data Capture for periods used:	94%
Adjusted Tubes Mean:	34 (30 - 41) $\mu\text{gm}^{-3}$

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	0.8 (0.69 - 0.96)
Bias B	25% (5% - 45%)
Diffusion Tubes Mean:	43 $\mu\text{gm}^{-3}$
Mean CV (Precision):	5
Automatic Mean:	34 $\mu\text{gm}^{-3}$
Data Capture for periods used:	94%
Adjusted Tubes Mean:	34 (30 - 41) $\mu\text{gm}^{-3}$



Jaume Targa, for AEA  
Version 04 - February 2011

## Adjustment of SINGLE Tubes

Diffusion Tube Measurements															
Site Name/ID	Periods													Raw Mean	Valid periods
	1	2	3	4	5	6	7	8	9	10	11	12	13		
Marion Murdock Court	27.6	21.5	27.4	21.2	7.2	15.4	10.9	17.0	20.5	25.0	20.5	29.4		20.3	12
Hastings Street	34.6	23.1	37.0	27.8	19.4	22.6	16.3	23.7	21.2	33.5	24.6	36.0		26.6	12
856 Plains Road	40.7	26.5	45.9	38.1	23.4	29.5	28.3	30.2	30.9	35.0	25.2	31.7		32.1	12
Morley Mills, Daybrook	52.8	36.2	47.6	47.6	33.8	35.5	35.4	37.0	46.7	54.2	46.3	42.1		42.9	12
Mansfield Road, Redhill	34.5	35.1	45.1	44.6	20.6	25.7	24.9	23.2	32.7	37.4	41.2	31.9		33.1	12
Daybrook Dental Surgery	40.6	30.8	51.3	43.7	32.9	36.0	35.5	35.5	40.7	47.8	40.3	54.9		40.8	12
Victoria Road, Netherfield 1	30.3	34.7	49.8	40.5	28.8	28.4	28.5	-	-	-	33.1	34.9		34.3	9
Victoria Road, Netherfield 2	51.3	44.4	53.3	47.6	31.3	38.1	38.8	-	-	51.2	43.4	52.1		45.1	10
47 Plains Road	46.9	28.2	45.2	37.8	28.2	32.9	28.5	34.9	33.4	44.0	30.7	37.4		35.7	12
Burton Rd/Shearing Hill	23.0	30.4	37.6	32.5	18.3	24.2	25.9	27.7	25.2	33.1	26.3	35.5		28.3	12
Vale PH - Thackerays Ln	41.1	46.4	52.3	52.1	-	41.4	42.3	46.4	53.2	57.3	44.8	49.8		47.9	11
Grove PH - Daybrook Sq	44.1	48.9	60.0	52.5	34.5	36.3	40.8	39.2	36.9	48.2	41.8	52.6		44.7	12
Ricket Lane	22.2	19.2	21.5	17.4	9.0	-	7.2	12.5	14.4	25.0	29.5	14.3		17.5	11
Wickes Store, Daybrook	46.9	32.4	49.3	41.2	27.0	32.6	32.2	38.3	38.8	46.1	40.8	51.5		39.7	12
Civic Centre, Arnold	31.5	23.9	27.7	31.4	16.0	17.8	14.2	19.2	20.5	26.0	21.4	26.2		23.0	12
Mile End Road	31.3	36.4	41.7	33.9	20.2	24.6	23.7	26.5	22.4	31.3	27.1	31.3		29.2	12
Daybrook Chip Shop	45.2	-	63.3	55.0	34.8	46.8	47.0	50.6	49.4	60.9	53.1	47.8		50.3	11
T&S Heating, Daybrook	58.3	-	56.2	57.2	42.4	48.8	48.5	52.4	56.8	65.8	53.3	44.6		53.1	11
Frank Keys, Daybrook	47.0	49.3	60.3	47.7	32.6	36.7	28.3	39.9	48.6	54.1	44.7	58.3		45.6	12

Adjusted measurement (95% confidence interval) with all the data 11 periods used in this calculations	
Bias Factor A 0.8 (0.69 - 0.96) Bias B 25% (5% - 45%)	
Tube Precision: 5	Automatic DC: 94%
Adjusted with 95% CI	16 ( 14 - 19 )
Adjusted with 95% CI	21 ( 18 - 26 )
Adjusted with 95% CI	26 ( 22 - 31 )
Adjusted with 95% CI	34 ( 30 - 41 )
Adjusted with 95% CI	26 ( 23 - 32 )
Adjusted with 95% CI	33 ( 28 - 39 )
Adjusted with 95% CI	27 ( 24 - 33 )
Adjusted with 95% CI	36 ( 31 - 43 )
Adjusted with 95% CI	29 ( 25 - 34 )
Adjusted with 95% CI	23 ( 20 - 27 )
Adjusted with 95% CI	38 ( 33 - 46 )
Adjusted with 95% CI	36 ( 31 - 43 )
Adjusted with 95% CI	14 ( 12 - 17 )
Adjusted with 95% CI	32 ( 27 - 38 )
Adjusted with 95% CI	18 ( 16 - 22 )
Adjusted with 95% CI	23 ( 20 - 28 )
Adjusted with 95% CI	40 ( 35 - 48 )
Adjusted with 95% CI	42 ( 37 - 51 )
Adjusted with 95% CI	36 ( 31 - 44 )

*The bias adjustment factor used in these calculations include all the data and no screening of data due to poor precision has been applied.*

### 2011 Diffusion Gradko Analysed Tube Results

National Diffusion Tube Bias Adjustment Factor Spreadsheet								Spreadsheet Version Number: 03/12					
<p>Follow the steps below <u>in the correct order</u> to show the results of <u>relevant</u> co-location studies</p> <p>Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods</p> <p>Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet</p> <p>This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.</p>								<p>This spreadsheet will be updated at the end of September 2012</p> <p><a href="#">LAQM Helpdesk Website</a></p>					
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.							
<b>Step 1:</b>		<b>Step 2:</b>		<b>Step 3:</b>		<b>Step 4:</b>							
Select the Laboratory that Analyses Your Tubes from the Drop-Down List		Select a Preparation Method from the Drop-Down List		Select a Year from the Drop-Down List		Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor <sup>2</sup> shown in blue at the foot of the final column.							
If a laboratory is not shown, we have no data for this laboratory.		If a preparation method is not shown, we have no data for this method at this laboratory.		If a year is not shown, we have no data <sup>2</sup>		If you have your own co-location study then see footnote <sup>4</sup> . If uncertain what to do then contact the Local Air Quality Management Helpdesk at <a href="mailto:LAQMHelpdesk@uk.bureauveritas.com">LAQMHelpdesk@uk.bureauveritas.com</a> or 0800 0327953							
Analysed By <sup>1</sup>		Method <small>To add your selection, choose (All) from the pop-up list</small>		Year <sup>5</sup> <small>To add your selection, choose (All)</small>		Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) ( $\mu\text{g}/\text{m}^3$ )	Automatic Monitor Mean Conc. (Cm) ( $\mu\text{g}/\text{m}^3$ )	Bias (B)	Tube Precision <sup>6</sup>	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in Water	2011	R	Dudley MBC	9	50	51	-1.5%	G	1.02			
Gradko	20% TEA in water	2011	K	Marylebone Road Intercomparison	12	111	100	11.4%	G	0.90			
Gradko	20% TEA in water	2011	R	Boston Borough Council	11	57	36	59.6%	P	0.63			
Gradko	20% TEA in water	2011	UB	Luton Borough Council	11	39	35	11.1%	G	0.90			
Gradko	20% TEA in water	2011	R	Exeter City Council	11	37	33	15.1%	S	0.87			
Gradko	20% TEA in water	2011	UB	Belfast City Council	12	36	29	23.5%	G	0.81			
Gradko	20% TEA in water	2011	R	Bromsgrove District Council (W)	10	56	53	6.0%	G	0.94			
Gradko	20% TEA in water	2011	R	Monmouthshire County Council	11	47	40	17.9%	S	0.85			
Gradko	20% TEA in water	2011	K	New Forest District Council	10	49	42	16.7%	G	0.86			
Gradko	20% TEA in water	2011	R	New Forest District Council	12	34	26	29.9%	G	0.77			
Gradko	20% TEA in water	2011	R	Fareham Borough Council	12	39	33	17.4%	G	0.85			
Gradko	20% TEA in water	2011	R	Rushcliffe BC	11	35	39	-9.5%	G	1.10			
Gradko	20% TEA in Water	2011	R	Carlisle City Council	12	35	28	24.8%	G	0.80			
Gradko	20% TEA in Water	2011	O	North Warwickshire Borough Council	12	48	39	23.0%	G	0.81			
Gradko	20% TEA in water	2011	R	Wokingham Borough Council	11	41	38	8.6%	G	0.92			
Gradko	20% TEA in water	2011	<b>Overall Factor<sup>2</sup> (26 studies)</b>					<b>Use</b>	<b>0.89</b>				

### Gradko 20%TEA in Water Co-location Studies 2011

This calculator allows you to predict the annual mean NO<sub>2</sub> concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.



Enter data into the yellow cells

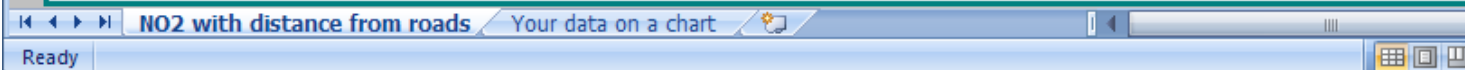
Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	1.5	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	4.5	metres
Step 4	What is the local annual mean background NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	(Note 2)	21	µg/m <sup>3</sup>
Step 3	What is your measured annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	(Note 2)	40	µg/m <sup>3</sup>
Result	The predicted annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> ) at your receptor	(Note 3)	35.4	µg/m <sup>3</sup>

Note 1: This should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at [www.airquality.co.uk](http://www.airquality.co.uk), or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.2 of LAQM TG(08). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

Issue 1: 30/06/08. Created by Dr Ben Marner; Approved by Prof Duncan Laxen. Contact: [benmarner@aqconsultants.co.uk](mailto:benmarner@aqconsultants.co.uk)



### 36 Victoria Road Calculation for Distance to Receptor

This calculator allows you to predict the annual mean NO<sub>2</sub> concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.



Enter data into the yellow cells

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	3.5	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	14	metres
Step 4	What is the local annual mean background NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	(Note 2)	20	µg/m <sup>3</sup>
Step 3	What is your measured annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	(Note 2)	43	µg/m <sup>3</sup>
Result	The predicted annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> ) at your receptor	(Note 3)	34.4	µg/m <sup>3</sup>

Note 1: This should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at [www.airquality.co.uk](http://www.airquality.co.uk), or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.2 of LAQM TG(08). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

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## Vale PH Calculation for Distance to Receptor



Site	NO2 /ugm-3 2011												Annual	Adjusted	Distance	Data
	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	Mean	for bias	Adjmnt	Capture
Marion Murdock Court	28	21	27	21	7	15	11	17	20	25	20	29	20	18		100
Hastings Street	35	23	37	28	19	23	16	24	21	34	25	36	27	24		100
856 Plains Road	41	27	46	38	23	29	28	30	31	35	25	32	32	29		100
Morley Mills, Daybrook	53	36	48	48	34	35	35	37	47	54	46	42	43	38		100
Mansfield Road, Redhill	34	35	45	45	21	26	25	23	33	37	41	32	33	29		100
Daybrook Dental Surgery	41	31	51	44	33	36	35	35	41	48	40	55	41	36		100
19 Victoria Road, Netherfield	30	35	50	40	29	28	29	-	-	-	33	35	34	31		75
36 Victoria Road, Netherfield	51	44	53	48	31	38	39	-	-	51	43	52	45	40	35	83
47 Plains Road	47	28	45	38	28	33	28	35	33	44	31	37	36	32		100
Burton Rd/Shearing Hill	23	30	38	32	18	24	26	28	25	33	26	36	28	25		100
The Vale PH - Thackerays Ln	41	46	52	52	-	41	42	46	53	57	45	50	48	43	34	92
The Grove PH - Daybrook Sq	44	49	60	53	35	36	41	39	37	48	42	53	45	40		100
Ricket Lane	22	19	21	17	9	-	7	13	14	25	29	14	17	16		92
Wickes Store, Daybrook	47	32	49	41	27	33	32	38	39	46	41	52	40	35		100
Civic Centre, Arnold	31	24	28	31	16	18	14	19	21	26	21	26	23	20		100
Mile End Road	31	36	42	34	20	25	24	26	22	31	27	31	29	26		100
Daybrook Chip Shop	45	-	63	55	35	47	47	51	49	61	53	48	50	45		92
T&S Heating, Daybrook	58	-	56	57	42	49	48	52	57	66	53	45	53	47		92
Frank Keys, Daybrook	47	49	60	48	33	37	28	40	49	54	45	58	46	41		100
Analyser in ppb	27.5	20.6	23.7	20.3	11.5	11.6	14.3	11.5	12.0	20.0	22.4	14.5	17			
ANALYSER IN ug/m-3	52	39	45	39	22	22	27	22	23	38	43	28	33			
DATA CAPTURE %	96	94	95	93	80	90	92	90	95	95	95	94	92	%		

Bias Adjustment Factors (BAF) gradko **0.89** 26 National (various)

### Nitrogen Dioxide Diffusion Tube Monitoring 2011 - Adjusted for Bias

## **Appendix C**

### **QA / QC Data**

## Quality Assurance and Quality Control – Nitrogen Dioxide Diffusion Tubes

### Overview

Diffusion tubes are small clear plastic tubes open at one end with a pollutant-absorbing chemical matrix or gel at the closed end. The tubes are prepared and sealed before being transported to the monitoring site. At site, the tube is exposed, by removal of the end cap, for a period of one month. After the month the tube is resealed and sent to an analytical laboratory.

The laboratory analysis measures the quantity of pollutant absorbed and then calculates an average ambient pollutant concentration over the exposure period. Diffusion tube results are for NO<sub>2</sub>, concentrations measured in parts per billion (ppb) and micrograms per cubic metre (µgm<sup>3</sup>).

Tubes are exposed on a monthly basis, following the timetable prescribed by the Diffusion Tube Network in which tubes are replaced generally on the first Wednesday of the month.

Historical, Walsall Metropolitan Borough Council Laboratory have supplied and analysed GBC NO<sub>2</sub> diffusion tubes, using 50% solution TEA in acetone.

From April 2008 GBC entered into a Countywide contract with Gradko Ltd. for the supply and analysis of NO<sub>2</sub> diffusion tubes. At the same time it was agreed to use the same preparation method (20% solution of TEA in water). This harmonisation of laboratory and method for the county will allow easier comparisons of results across LA boundaries.

### QA/QC Procedures

#### Gradko

The European Union Daughter Directive for NO<sub>2</sub> sets out data quality objectives for overall accuracy. Annual average NO<sub>2</sub> concentration results must comply with the objective of  $\pm 25\%$  of the reference concentration therefore, average diffusion tube measurements should comply with this objective.

The precision of analytical measurements is also an important consideration, as it is possible to arrive at an average bias of less than  $\pm 25\%$  with very imprecise measurements. Following previous intercomparisons of laboratory results an arbitrary guideline figure of 3ppb for acceptable precision has been adopted.

Gradko's NO<sub>2</sub> diffusion tube procedures follow the Defra guideline document<sup>1</sup> related to the preparation, extraction, analysis and calculation procedures for NO<sub>2</sub> passive diffusion tubes. Their internal analysis procedures are assessed by U.K.A.S. on an annual basis for compliance to ISO17025.

Results from the ongoing Workplace Analysis Scheme for Proficiency (WASP) programme for Gradko generally show a "Satisfactory" performance classification.

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<sup>1</sup> Diffusion Tubes for Ambient NO<sub>2</sub> Monitoring: Practical Guidance for Laboratories and Users



### Gedling Borough Council

Tubes are stored in a refrigerator until the day of exposure. On site, when the tubes are collected the date, site and time are recorded, referenced to the tube numbers assigned by the laboratory. The tubes are then forwarded to Gradko for analysis on the day of collection, along with a 'blank' trip diffusion tube.

The Council has conducted a co-location study, details are found in Appendix B.

### **Quality Assurance and Quality Control – BTex Diffusion Tubes**

The tubes used are Perkin Elmer thermal desorption (ATD) tubes packed, with nominally 100mg of Chromosorb 106. They are analysed using a Perkin Elmer ATD 400 automatic thermal system; Perkin Elmer 8700 gas chromatography with an ion trap detector. The uptake rate for benzene onto Chromosorb 106 is 0.54cm<sup>3</sup> /min. Tubes were analysed by Walsall Metropolitan Borough Council Laboratory (WMBCL) from 1997 until 2003. However, WMBCL were unable to continue processing Btex tubes and so Harwell Scientifics took over with supply and analysis from April 2003.

Tubes are stored in a refrigerator until the day of exposure. On site, when the tubes are collected the date, site and time are recorded, referenced to the tube numbers assigned by the laboratory. The tubes are then forwarded to Scientific Ltd for analysis on the day of collection.

Tubes are exposed on a monthly basis, following the timetable prescribed by NETCEN in which tubes are replaced generally on the first Wednesday of the month.

### **Chemiluminescent Monitor Data**

#### **Overview**

The automatic monitoring system used (Monitor Labs ML®9841B) uses gas-phase chemiluminescence detection to perform continuous analysis of nitric oxide (NO), total oxides of nitrogen (NO<sub>x</sub>), and nitrogen dioxide (NO<sub>2</sub>). The instrument consists of a pneumatic system, an NO<sub>2</sub>-to-NO converter (molycon), a reaction cell, photomultiplier tube (PMT) detector, and processing electronics.

During 2001-2007 the analyser was housed in the basement of the Daybrook Baptist Chapel. This site provides a safe and secure, dry location with a constant temperature and electrical supply. In January of 2008 the analyser was moved to a Casella ROMON enclosure on the opposite side of the A60 Mansfield Road.

The analyser has been operational since August 2000; data capture levels are: -

96% 2001	96% 2005	95% 2009
95% 2002	93% 2006	95% 2010
97% 2003	83% 2007	92% 2011
98% 2004	81% 2008	

The ML®9841B analyser has a quoted detection of  $\pm 0.5$ ppb and a precision of  $\pm 0.5$ ppb or 1% of reading, whichever is largest. Accuracy of the analyser is dependent on the calibration and the calibration gases used.

## **QA/QC Procedures**

The analyser is subject to a fortnightly two point manual calibration, by a suitably trained site operative, which is conducted in accordance with the manufacturers quality control procedures. Filters at the sample head are changed concurrently with calibration. The equipment is serviced twice a year by the manufacturers accredited engineers. In addition the National Physical Laboratory (NPL) audited the site in 2002 and 2005.

Calibration gases (Air and NO) used during the fortnightly calibration are supplied by BOC, who have demonstrated compliance with relevant quality control procedures in the preparation of gas mixtures. Gas cylinders are replaced before use by dates or when the gas levels fall below 50 bar.

## **Data Validation and Ratification**

A process of data validation is carried out by GBC on a fortnightly basis after application of the calibration factors. Validation is carried out in accordance with good practise [Annex 1.164 of LAQM TG(09)].

Then every quarter the data undergoes a process of ratification; assessing for drift, removing spurious data etc. Again this process is carried out in accordance with good practise [Annex 1.164 of LAQM TG(09)].