

Updating and Screening Assessment 2006

City of Durham Council

Executive Summary

An Updating and Screening Assessment (USA) has been performed for the seven UK criteria pollutants in the City of Durham. The aim of this assessment is to determine whether there is the potential for exceedences of any of the UK national air quality objectives. If this potential is identified a Detailed Assessment should be recommended.

The monitoring for NO₂ at several locations in the City indicates a likely exceedence of the annual mean objective. A new park and ride scheme has recently been implemented, so it has been recommended that a full twelve months of monitoring is collected before a Detailed Assessment is considered. None of the other UK Air Quality Objectives are likely to be exceeded in the City of Durham.

The results of his USA indicate that a Detailed Assessment will not be required for any of the seven pollutants assessed.

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1 Introduction

This report constitutes the second Updating and Screening Assessment (USA) of the air quality Review and Assessment requirements of the Durham City Council. A previous USA was completed in 2004.

The Durham City administrative area is the City of Durham and the surrounding outlying areas. There are a number of Part B but no Part A industrial processes. The main transport routes through the area are the A1(M), A690, A691 and the East Coast Mainline rail link.

1.1 Overview of Air Quality Legislation and Policy

1.1.1 *Overview of Recent Air Quality Legislation and Policy*

The provisions of Part IV of the Environment Act 1995 establish a national framework for air quality management, which requires all local authorities in England, Scotland and Wales to conduct local air quality reviews. Section 82(1) of the Act requires these reviews to include an assessment of the current air quality in the area and the predicted air quality in future years. Should the reviews indicate that the standards prescribed in the National Air Quality Strategy (NAQS) and the Addendum to the Strategy will not be met, the local authority is required to designate an Air Quality Management Area (AQMA). Action must then be taken at a local level to ensure that air quality in the area improves. This process is known as 'local air quality management'.

1.1.2 *The Phased Approach to Review and Assessment*

The second round of the Review and Assessment process has been split into two phases: an Updating and Screening Assessment and a Detailed Assessment.

The first phase, the Updating and Screening Assessment, has been designed to review the changes in air quality issues that have occurred within each local authority since the first round of review and assessment. These changes are assessed using appropriate screening methods. Therefore, it should cover:

- new monitoring data
- new objectives
- new sources of pollution
- significant changes to existing sources of pollution.

The Updating and Screening Assessment also re-examines locations and sources, e.g. road junctions, bus stations, domestic burning, fugitive sources, etc., that have been highlighted as issues during the previous round of review and assessment.

Where the Updating and Screening Assessment has identified a risk that an air quality objective may be exceeded, the local authority must undertake a Detailed Assessment. The aim of this assessment is to determine with as much certainty as is possible whether or not an air quality objective will be exceeded. If an exceedence is predicted, the local authority should designate an AQMA to cover the area of the exceedence.

1.1.3 *National Air Quality Strategy (NAQS)*

The NAQS identifies eight ambient air pollutants that have the potential to cause harm to human health. These pollutants are associated with local air quality problems, with the exception of ozone, which is instead considered to be a regional problem.

The Air Quality Regulations set standards for the seven pollutants that are associated with local air quality. These objectives aim to reduce the health impacts of the pollutants to negligible levels. The standards stated in the Air Quality Regulations are listed in Table 1.

The revised objectives for benzene, carbon monoxide and suspended particulate matter (PM₁₀), as detailed in the 'Air Quality (England)(Amendment) Regulations 2002', are included.

Table 1: UK Objectives included in the Air Quality Regulations 2000 and (Amendment) Regulations 2002

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 $\mu\text{g}/\text{m}^3$ <i>All authorities</i>	running annual mean	31.12.2003
	5.0 $\mu\text{g}/\text{m}^3$ <i>Authorities in England and Wales only</i>	annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu\text{g}/\text{m}^3$	running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3 <i>Authorities in England, Wales and N. Ireland.</i>	maximum daily running 8-hour mean	31.12.2003
Lead	0.5 $\mu\text{g}/\text{m}^3$	annual mean	31.12.2004
	0.25 $\mu\text{g}/\text{m}^3$		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
Particles (PM ₁₀) (gravimetric) <i>All authorities</i>	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
Particles (PM ₁₀) (gravimetric) <i>Provisional objectives for England (not London) and Wales</i>	50 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 7 times a year	24 hour mean	31.12.2010
	20 $\mu\text{g}/\text{m}^3$	annual mean	31.12.2010
Sulphur dioxide	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

1.2

Changes Since 2003 Updating and Screening Assessment

There have been no significant changes relevant to this assessment in the City of Durham since the previous Updating and Screening Assessment.

The park and ride traffic control scheme has recently been established in the first quarter of 2006. This scheme is expected to make a tangible difference to the traffic flows in the City of Durham, although there is no traffic flow data available at the time of writing.

1.3

Review of Previous Assessments

The 2004 Updating and Screening Assessment determined that the UK Air Quality Objectives were not likely to be exceeded within the City of Durham administrative area.

The Air Quality Progress Report 2005 recommended that a detailed assessment should be produced with regards NO₂ based on results from new diffusion tube sites. However, following consultation with DEFRA, an enhanced diffusion tube monitoring programme was agreed that would better determine the requirement for a detailed assessment.

2 Pollutant Checklists

Pollutant checklists for each of the seven pollutants are provided in this section. The checklist items have been taken from the appropriate 'box' in LAQM.TG(03) (January 2006 update).

2.1

Carbon Monoxide

Checklist Item (from Box 2.2)	Updating and Screening Assessment
Monitoring Data A) Monitoring data	Carbon monoxide is not monitored within the City of Durham.
Road Traffic- B) Very busy roads or junctions in built-up areas	There are no very busy roads or junctions in the City of Durham (i.e. single carriageway roads where the AADT>80,000, or dual carriageway roads where the AADT>120,000, or motorways where the AADT>140,000). The busiest road in the authority is the A690 Milburngate Bridge, which has an AADT of 43,800 in 2005.
Conclusion	The assessment has indicated that the CO objective is unlikely to be exceeded at any location in the District, and therefore a Detailed Assessment for this pollutant will not be required.

2.2

Benzene

Checklist Item (from Box 3.2)	Updating and Screening Assessment
Monitoring Data A) Monitoring data outside an AQMA	Benzene is not monitored within the City of Durham; there is no AQMA within the district.
B) Monitoring data within an AQMA	
Road Traffic- C) Very busy roads or junctions in built-up areas	There are no very busy roads or junctions in the City of Durham (i.e. single carriageway roads where the AADT>80,000, or dual carriageway roads where the AADT>120,000, or motorways where the AADT>140,000). The busiest road in the authority is the A690 Milburngate Bridge, which has an AADT of 43,800 in 2005.
Industrial Sources D) New industrial sources	There are no petroleum processes or other industrial processes that emit sufficient quantities of benzene within the district, or in neighbouring authorities, to consider for the purpose of this assessment.
E) Industrial sources with substantially increased emissions, or new relevant exposure.	
Other Sources F) Petrol stations	There are no petrol filling stations with an annual throughput of more than 2 million litres per year, near to a busy road (>30,000 vehicles per day), and within 10m of a sensitive receptor.
G) Major fuel storage depots (petrol only)	There are no major fuel depots within the authority
Conclusion	The assessment has indicated that the benzene objectives are unlikely to be exceeded at any location in the District, and therefore a Detailed Assessment for this pollutant will not be required.

2.3

1,3-butadiene

Checklist Item (from Box 4.2)	Updating and Screening Assessment
Monitoring Data A) Monitoring data	1,3-butadiene is not monitored within the City of Durham.
Industrial Sources B) New industrial sources C) Industrial sources with substantially increased emissions, or new relevant exposure.	There are no new industrial processes within the City of Durham or within neighbouring authorities, nor are there any industrial sources with increased emissions, or new relevant exposure to consider for the purpose of this assessment.
Conclusion	The assessment has indicated that the 1,3-butadiene objective is unlikely to be exceeded at any location in the District, and therefore a Detailed Assessment for this pollutant will not be required.

2.4

Lead

Checklist Item (from Box 5.1)	Updating and Screening Assessment
Monitoring Data A) Monitoring data	Lead is not monitored within the City of Durham.
Industrial Sources B) New industrial sources C) Industrial sources with substantially increased emissions, or new relevant exposure.	There are no new industrial processes within the City of Durham or within neighbouring authorities, nor are there any industrial sources with increased emissions, or new relevant exposure to consider for the purpose of this assessment.
Conclusion	The assessment has indicated that the lead objectives are unlikely to be exceeded at any location in the District, and therefore a Detailed Assessment for this pollutant will not be required.

2.5

Nitrogen Dioxide

Checklist Item (from Box 6.2)	Updating and Screening Assessment
Monitoring Data A) Monitoring data from outside an AQMA	Nitrogen dioxide is monitored at thirteen locations with the City of Durham using diffusion tubes. There are no AQMAs declared in the District.
B) Monitoring data within an AQMA	Four of the monitoring sites, Millburngate, Highgate North, North Road and Highgate South exceed the UK annual mean objective of 40 µg/m ³ in 2005 (The results from Highgate North and Highgate South have been seasonally biased due to an incomplete data set). Monitoring data are shown in Appendix C.
Road Traffic- C) Narrow congested streets with residential properties close to the kerb	There has been no change since the previous USA; there are no narrow congested streets with residential properties close to the kerb where there is an AADT flow <10,000.
D) Junctions	Since the previous USA, no new junctions with an AADT <10,000 and with relevant exposure within 10 m of the kerb have been identified. The previous USA predicted a maximum concentration, at a sensitive receptor near to a junction, of 34.4 µg/m ³ in 2005. The 2005 traffic data (see Appendix B) indicates that the predicted flows were overestimated in 2003. This combines with the revised lower background concentrations to make it likely that the modelled predictions at the specific receptors will now be lower than predicted.
E) Busy streets where people may spend 1 hour or more close to traffic	There has been no change since the previous USA; there are no busy streets where people may spend 1 hour or more close to traffic where there is an AADT flow of above 10,000.
F) Road with high flow of buses and/or HGVs	There has been no change since the previous USA; there are no roads with unusually high flows of buses and/or HGVs (i.e. greater than 25%)
G) New roads constructed or proposed since the previous round of R &A	There have been no new roads constructed or proposed since the previous USA.
H) Roads with significantly changed traffic flows, or new relevant exposure.	No roads with an AADT of >10,000 have shown a significant increase (>25%) in traffic flow. There is no new relevant exposure.
I) Bus stations	There is one bus station in the City of Durham, with approximately 1800 movements per day. This was assessed during the last round of review and assessment and it was determined that the UK air quality objectives would not be exceeded.
Industrial Sources J) New industrial sources K) Industrial sources with substantially increased emissions, or new relevant exposure.	There are no new industrial processes within the City of Durham or within neighbouring authorities, nor are there industrial sources with increased emissions, or new relevant exposure to consider for the purpose of this assessment.
Other Sources L) Aircraft	There are no airfields or airports in the district.
Conclusion	The guidelines for USA recommend that if any monitoring location exceeds the UK Objective Limits then a Detailed Assessment must be undertaken. The results of the diffusion

	<p>tube monitoring indicate that four locations exceeded the 2005 UK objective. A Detailed Assessment for NO₂ was recommended in the 2005 Progress Report based on diffusion tube monitoring data.</p> <p>It is anticipated that the situation will improve due to the new park and ride scheme and changes to City Centre parking charges, both of which were introduced during December 2005. The effect of these changes will require a full year of monitoring to determine. It has been agreed with DEFRA that the Detailed Assessment is postponed until the impact of the changes can be properly assessed.</p>
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2.6

Sulphur Dioxide

Checklist Item (from Box 7.2)	Updating and Screening Assessment
Monitoring Data A) Monitoring data from outside an AQMA B) Monitoring data within an AQMA	Sulphur dioxide is not monitored within the City of Durham; there is no AQMA within the District.
Industrial Sources C) New industrial sources D) Industrial sources with substantially increased emissions, or new relevant exposure.	There are no new industrial processes within the District or within neighbouring authorities, nor are there industrial sources with increased emissions, or new relevant exposure to consider for the purpose of this assessment.
Domestic Sources E) Areas of domestic coal burning	The City of Durham is under a smoke control order. The Progress Report 2005 determined that there are no known areas where >100 houses are burning solid fuel within a 500x500m area.
Boilers F) Small boilers >5MW _(thermal)	There are no known boilers of greater than 5MW that burn coal or oil in the district.
Other Sources G) Shipping	None. The city is land-locked, and there are no busy waterways.
H) Railway :Locomotives	There are no locations where diesel locomotives are regularly stationary for 15 minutes. The East Coast Mainline passes through the city, but this has previously been assessed and determined as not significant in this context.
Conclusion	The assessment has indicated that the sulphur dioxide objectives are unlikely to be exceeded at any location in the District, and therefore a Detailed Assessment for this pollutant will not be required.

2.7

PM₁₀	
Checklist Item (from Box 8.4)	Updating and Screening Assessment
Monitoring Data	PM ₁₀ is not monitored within the City of Durham; there is no AQMA within the District.
A) Monitoring data from outside an AQMA	
B) Monitoring data within an AQMA	
Road Traffic-	N/A
C) Busy roads or junctions in Scotland	
D) Junctions	Since the previous USA, no new junctions with an AADT of over 10,000 and with relevant exposure within 10 m of the kerb have been identified. The previous USA predicted a maximum annual mean concentration, at a sensitive receptor near to a junction, of 30.2 µg/m ³ in 2004.
E) Roads with high flow if buses and/or HGVs	There has been no change since the previous USA; there are no roads with unusually high flows of buses and/or HGVs (i.e. greater than 20%)
F) New roads constructed or proposed since last round of R&A	There have been no new roads constructed or proposed since the previous USA.
G) Roads with significantly changed traffic flows, or new relevant exposure	No roads with an AADT of >10,000 have shown a significant increase (>25%) in traffic flow. There is no new relevant exposure.
H) Roads close to the objective during the second round of R&A	There were no roads close to the objective during the previous USA. The background concentrations have been reduced since the previous assessment, so it has become less likely that the number of exceedences of the daily mean will exceed the objective.
Industrial Sources	There are no new industrial processes within the City of Durham or within neighbouring authorities, nor are there industrial sources with increased emissions, or new relevant exposure to consider for the purpose of this assessment.
I) New industrial sources	
J) Industrial sources with substantially increased emissions, or new relevant exposure.	
Domestic Sources	The City of Durham is under a smoke control order. The Progress Report 2005 determined that there are no known areas where >100 houses are burning solid fuel within a 500x500m area.
K) Areas of domestic fuel burning	
Other Sources	There is one landfill licensed by the Environment Agency, and four quarries listed under the Part B authorisations in the District. These operations are all in remote areas more than 200 metres from any sensitive receptor and will therefore not be considered further for this assessment.
L) Quarries/ landfill / opencast coal / handling of dusty cargo at ports etc	
M) Poultry Farms	There is one broiler unit within the District, although a problem with particulates has never been identified and it is thought unlikely that emissions of PM ₁₀ from this site could contribute to exceedences of the PM ₁₀ objectives.
N) Aircraft	There are no airfields or airports in the District.
Conclusion	The assessment has indicated that the PM ₁₀ objectives are unlikely to be exceeded at any location in the District, and therefore a Detailed Assessment for this pollutant will not be required.

3 Conclusions

Each of the seven pollutants has been assessed according to the guidance contained within LAQM.TG(03), and its January 2006 update. It is concluded that the national air quality objectives for carbon monoxide, benzene, 1,3-butadiene, lead, sulphur dioxide and PM₁₀ are unlikely to be exceeded at any location in the City of Durham administrative area.

The monitoring results for NO₂, however, indicate that the UK objective of 40 µg/m³ annual mean will be exceeded at four of the monitored locations. This would normally require the production of a Detailed Assessment, however a park and ride scheme has recently been instigated that is expected to reduce vehicle movements within the city. It has been agreed with DEFRA that a Detailed Assessment of NO₂ shall be postponed until the impact of this new scheme can be properly assessed using a full twelve-month set of monitoring data.

4 References

- Defra, The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, 2000, <http://www.defra.gov.uk/environment/airquality/strategy/index.htm>
- Defra, the Air Quality Strategy for England, Scotland, Wales and Northern Ireland: Addendum, 2003, <http://www.defra.gov.uk/environment/airquality/strategy/abbedndum/index.htm>
- Defra, Local Air Quality Management, Policy Guidance LAQM.PG (03), 2003
- Defra, Local Air Quality Management, Technical Guidance LAQM.TG (03), 2003
- Defra, Local Air Quality Management, Technical Guidance LAQM.TG (03) Update, 2006
- Defra, Local Air Quality Management, Technical Guidance LAQM.TG (03) Update Checklist, 2006
- Durham City Council, Updating and Screening Assessment, 2004
- Durham City Council, Air Quality Progress Report, 2005

Appendix A: Traffic Data

Table 2: Traffic Flow Data, 2005

All roads with a daily flow of more than 20000 vehicles.		
Road Name	AADT	%HGV
A690 Nevilles Cross Bank (between junctions B6302 & A167)	21528	14%
A690 Milburngate Bridge (between junctions A691 & Unc)	43800	7%
A690 Leazes Rd Durham (between junctions C98 & A181)	38808	6%
A690 Carrville Link West (between junctions A181 & C13)	25608	6%
A690 Carrville Link East (between junctions TA1M & C13)	24648	9%
A690 Ramside Hall (between junctions TA1M & C12a)	24408	10%
A690 West Rainton Sth (between junctions C12a & C59)	26880	10%
A691 Durham Co Hall R/BT (between junctions B6532 & UDUR1)	27576	7%
A691 Framwellgate Peth (between junctions UDUR1 & A690)	25152	5%
A167 Sniperley Durham (between A691 and C17)	24024	10%
A167 Pot and Glass Durham (between C17 and A690)	21840	10%
Narrow, congested streets with residential properties close to the kerb with a daily flow of more than 10000 vehicles.		
Road Name	AADT	%HGV
None		
Busy streets with a daily flow of more than 10000 vehicles where people may spend 1 hour or more within 5 metres of the kerb.		
Road Name	AADT	%HGV
A181 Front Street Gilesgate (between junctions Unc & Unc)	14496	8%
A181 Dragonville Durham (between junctions Unc & B1283)	14904	11%
C12 Finchale Road Framwellgate Moor (between junctions C100 & c12)	14928	5%
C98 New Elvet Bank Durham (between junctions Unc & C98b)	20112	6%
C98 New Elvet Durham (between junctions A690 & Unc)	20184	8%
Roads with high flows of buses and/or HGV's (proportion >20%) and with a HGV + bus flow of >2000 vehicles per day.		
Road Name	AADT	%HGV
None		
New roads with a daily flow of more than 10000 vehicles.		
Road Name	AADT	%HGV
None		
Roads previously identified as nearly having exceedances near new roads, which has increased Flow.		
Road Name	AADT	%HGV
None		
Roads with a daily flow of more than 10000 vehicles, which have seen an increase in traffic flow of >25%.		
Road Name	AADT	%HGV
None		
Bus Stations. (Incl. Depots)		
Road Name	AADT	%HGV
A690 Castle Chare Durham (between junctions Unc & A691)	16008	8%

Appendix B: Background Concentrations

Table 3: Background Concentrations

Pollutant	Year	2003 Concentration Predictions	2005 Concentration Predictions
NO _x	2005	23.8	13.3
	2010	-	11.2
NO ₂	2005	17.1	10.4
	2010	-	8.76
PM ₁₀	2004	16.6	14.9
	2005	-	14.8
	2010	15.5	13.9

Note: These values were taken from the LAQM website, and apply to the 1 km square centred at grid reference 423500,544500.

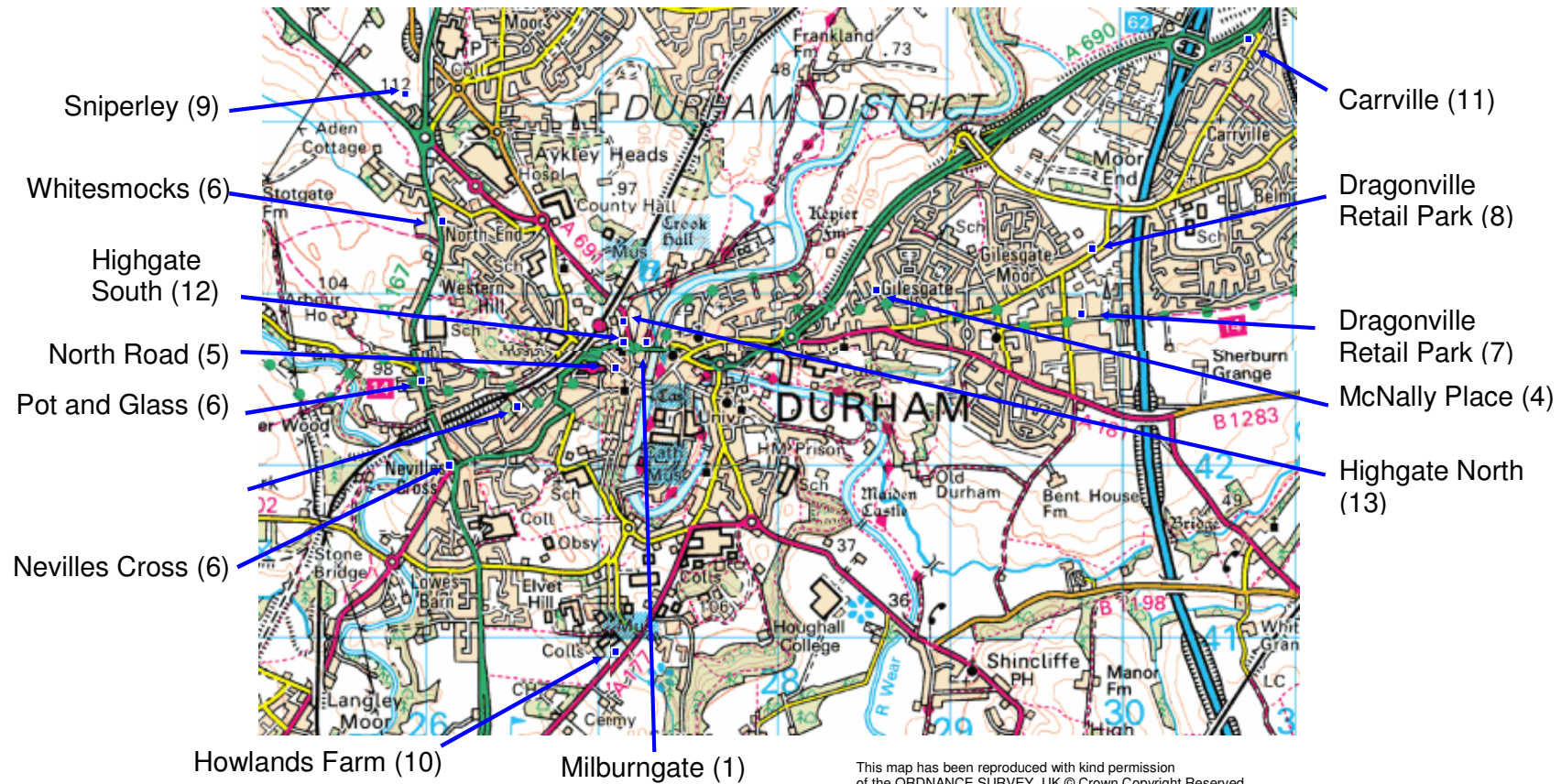
Appendix C: Monitoring Data

Table 4: NO₂ Diffusion Tube Monitoring Data, 2005

	Location	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Mean	Seasonally Adjusted Mean
1	Milburngate	54.4	55.9	57.7	53.9	31.8	35.0	24.8	40.8	42.7	73.0	52.1	51.8	47.8	NA
3	Byland Lodge	15.8	20.2	27.1	10.0	13.2	10.4	12.3	12.9	15.1	25.1	19.3	21.2	16.9	NA
4	McNally Place	18.5	22.5	0.0	17.1	11.8	7.6	9.8	11.8	15.2	30.8	20.9	25.9	16.0	NA
5	North Road	46.8	44.8	57.0	18.9	22.4	33.4	43.5	35.7	32.5	50.6	50.3	46.8	40.2	NA
6	A167	27.4	29.2	34.0	13.5	7.8	16.7	13.3	18.5	15.9	33.9	25.5	33.5	22.4	NA
7	Rennys Lane	-	30.6	31.4	26.8	17.8	17.7	15.7	17.8	20.1	37.7	26.6	31.4	24.9	NA
8	Alma Place	-	26.8	36.2	29.6	17.8	21.0	16.5	21.1	29.4	29.7	31.5	37.1	27.0	NA
9	Snipperly	-	24.3	35.0	17.9	15.0	14.1	19.0	22.7	-	44.5			24.1	22.6
10	Howlands Farm	-	17.0	25.9	16.9	11.4	17.8	14.8	13.7	15.5	37.2	24.6	26.2	20.1	NA
11	Ramside	-	32.2	37.6	22.9	19.8	10.0	16.4	25.3	26.9	48.3	39.9	44.4	29.4	NA
12	Highgate South	-	-	-	-	-	-	-	28.7	26.8	46.8	52.1	49.5	40.8	44.8
13	Highgate North	-	-	-	-	-	-	-	47.1	39.6	66.0	50.3	66.0	53.8	59.2

Note: Tube results have been bias adjusted using the Jesmond Dene bias correction factor for 2005 of 1.07. Tube locations 9, 12 and 13 seasonally adjusted using urban background AURN at Stockton-on-Tees Yarm and Sunderland Silkworth using guidance in TG.03 Box 6.5. The

Figure 1: Map of Diffusion Tube Locations



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Updating and Screening Assessment 2006

Rev No	Comments	Date
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