2009 Air Quality Updating and Screening Assessment for *Carlisle City Council*

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

April 2009

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Executive Summary

The Government prepared the Air Quality Strategy for England, Scotland, Wales and Northern Ireland for consultation in August 1999. It was originally published in January 2000. The Strategy has been revised since originally published. The latest Air Quality Strategy was published on 17 July 2007.

At the centre of the Air Quality Strategy is the use of air quality standards to enable air quality to be measured and assessed. These also provide the means by which objectives and timescales for the objectives to be achieved can be set. These standards and associated specific objectives have to be achieved between 2003 and 2010.

Local Authorities are required to review and assess the air quality in their areas from time to time to determine whether the air quality objectives are likely to be met. Where the likelihood of exceedences of air quality objectives has been identified in areas of significant public exposure, an Air Quality Management Area (AQMA) should have been declared, followed by a further Stage 4 review and assessment, and the formulation of an action plan to eliminate exceedences.

Carlisle City Council has previously undertaken 3 rounds of review and assessment. This review and assessment work has concluded that overall air quality within our local authority is good. There are however small pockets within the city where the annual mean objective level for nitrogen dioxide is being exceeded due to road traffic sources. As a consequence 6 Air Quality Management Areas have been declared between 2005 and 2008.

This report represents the first stage of the fourth round of updating and screening assessment of local air quality for the Carlisle City Council area.

The purpose of this updating and screening assessment is to identify any significant changes that may have occurred since the previous rounds of review and assessment were completed. This includes new monitoring data, new or changed emissions sources, or any other local changes that might affect air quality. In each case, these sources need only be considered if they are new, if they have not been considered previously, or if there have been significant changes since the last round of review and assessment. If significant new sources or changes are identified then the city council would need to proceed to a Detailed Assessment for that pollutant.

To aid local authorities in the completion of the assessment, revised Technical Guidance (TG(09)) was published by Defra in February 09. This guidance provides a checklist approach to assessing where specific sources of pollutant may, on a local level, lead to a risk of an air quality objective being exceeded and therefore require a more detailed assessment.

The Updating and Screening Assessment 2009 has not identified any new or modified sources which have been introduced into our district since the last round of review and assessment which may lead to an air quality objective being exceeded.

New monitoring data for existing sites indicates that locations within AQMA nos.1 - 5 remain above the annual mean objective level. There are also locations immediately outside the current AQMA no.3 boundary which exceeded the annual mean objective level in 2007 and 2008. 'Further Assessment' work has concluded that the boundary of AQMA no3 should be extended to the Caldewgate roundabout.

New monitoring data however also indicates that nitrogen dioxide levels have fallen at the majority of locations around the district from the previous year.

Monitoring within AQMA no.6 (London Rd) indicates that the nitrogen dioxide concentration fell below the objective level in 2008. If this remains the case over 2009 consideration will be give to revoking the AQMA in 2010.

The nitrogen dioxide levels along Currock St (AQMA no.2) are only just above the objective level. ‘Further assessment’ work in 2007predicted that levels would fall below the objective level by 2011 and this appears to be still on target.

Work is due to start imminently on the Carlisle Northern Development Route (CNDR). Previous ’Further Assessment’ work in 2007 indicates that the opening of the CNDR will have a major impact on nitrogen dioxide levels along A7 (AQMA No. 1) bringing levels to below the objective level.

‘Further Assessment’ work undertaken this year to aid the City Council and County Council in developing it’s Air Quality Action Plan to take account of the recently declared AQMA’s also indicates that the CNDR will have a significant positive impact on air quality along the A595 (this includes AQMA nos 3 and 4). A revised Air Quality Action Plan will be available early next year.

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1 Introduction

1.1 Description of Local Authority Area

Carlisle City Council is the most northerly of the 6 Cumbrian Authorities and covers more than 400 miles.

The City of Carlisle supports the highest population concentration in Cumbria with 70,000 people living within the urban area. The rural towns of Brampton and Longtown support the next two highest population concentrations, 4000 and 2000 respectively.

Carlisle is remote from other centres of population being 300 miles from London, more than 120 miles from Manchester, more than 90 miles from Glasgow and Edinburgh , and more than 50 miles from Newcastle Upon Tyne. Consequently Carlisle is the regional, commercial, administrative and retail centre serving a catchment population of around 450,000 who live within an hours travelling time of the city.

Today's economy is characterised by food processing, agricultural support,automotive component manufactures and engineering. The dominant sectors being branch operation in warehousing, retailing, manufacturing, public administration and health services.

Carlisle is also a significant transport hub for rail services and the national road transport network.

The Government Regional Planning Guidance for the North West indentifies Carlisle as one of the North West's key town and cities where development should be concentrated.

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

Table 1.1 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 $\mu g/m^3$ 5.00 $\mu g/m^3$	Running annual mean Running annual mean	31.12.2003 31.12.2010
1,3-Butadiene	2.25 $\mu g/m^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu g/m^3$ 0.25 $\mu g/m^3$	Annual mean Annual mean	31.12.2004 31.12.2008
Nitrogen dioxide	200 $\mu g/m^3$ not to be exceeded more than 18 times a year 40 $\mu g/m^3$	1-hour mean Annual mean	31.12.2005 31.12.2005
Particles (PM_{10}) (gravimetric)	50 $\mu g/m^3$, not to be exceeded more than 35 times a year 40 $\mu g/m^3$	24-hour mean Annual mean	31.12.2004 31.12.2004
Sulphur dioxide	350 $\mu g/m^3$, not to be exceeded more than 24 times a year 125 $\mu g/m^3$, not to be exceeded more than 3 times a year 266 $\mu g/m^3$, not to be exceeded more than 35 times a year	1-hour mean 24-hour mean 15-minute mean	31.12.2004 31.12.2004 31.12.2005

1.4 Summary of Previous Review and Assessments

Since 1996 Carlisle City Council has been monitoring pollution levels in Carlisle and comparing them with the national air quality objectives a process known as review and assessment.

Our review and assessment work has concluded that air quality within our local authority is generally very good. For the majority of pollutants the concentrations found in Carlisle are well below the governments health based objectives and are not of any concern. However there are small pockets within the city where the annual mean objective for nitrogen dioxide is not being met due to road traffic emissions. The local authority has subsequently declared six Air Quality Management Areas within the city. The maps showing the boundaries of the Air Quality Management Areas can be found in appendix A.

All of our Air Quality Assessment Reports are listed below and are available on the city councils website (www.carlisle.gov.uk):-

Stage 1 Report 1996 - concluded that a stage 2 assessment would be required for nitrogen dioxide and particulates

Stage 2 Report 1998 - concluded that a detailed stage 3 assessment would be required in respect to nitrogen dioxide and particulates.

Stage 3 Report 2000 - concluded that it was unlikely that an air quality objective would be exceeded.

Updating and Screening Assessment Report 2003 – concluded that a detailed assessment would be required for nitrogen dioxide and particulates.

Detailed Assessment 2004 – concluded that it was likely that the annual mean objective for nitrogen dioxide would be exceeded at location alongside the A7. As a consequence Air Quality Management Area No.1 was declared in 2005

Progress Report 2005 – concluded that it was likely that the annual mean objective for nitrogen dioxide would be exceeded at locations alongside Currock Street. As a consequence Air Quality Management Area No.2 was declared in Dec 2006

Updating and Screening Assessment Report 2006 - concluded that a detailed assessment would be required in respect to the annual mean nitrogen dioxide at 4 locations within the City i.e..Wigton Rd, Bridge St, London Rd and Dalston Rd.

Progress Report 2007 – update on air quality issues.

Detailed Assessment 2007 – concluded that it was likely that the annual mean objective for nitrogen dioxide would be exceeded at locations alongside Wigton Rd, Bridge St, London Rd and Dalston Rd. As a consequence Air Quality Management Areas Nos. 3, 4, 5 and 6 were declared in 2008.

Further Assessment Report 2007 – confirmed that AQMA boundaries for AQMA no1 and 2 were correct.

Progress Report 2008 – update on air quality issues

Further Assessment Report 2009 – confirmed that the boundaries AQMA's Nos. 4- 6 are correct. Recommends that the boundary of AQMA No.3 be extended to the bottom of Caldewgate roundabout.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

Air quality monitoring in Carlisle City Council is driven by the local air quality management process and in particular the review and assessment of air quality. Carlisle City Council currently monitors for 3 pollutants i.e. **nitrogen dioxide, particulates** and **benzene** and employs two principle methods of monitoring: diffusion tubes and continuous monitoring.

Nitrogen dioxide (NO2) and nitric oxide (NO) are both oxides of nitrogen and are collectively referred to as nitrogen oxides (NOx). All combustion processes produce NOx emissions, largely in the form of NO, which is then converted to NO2, mainly as a result of reaction with ozone in the atmosphere.

The principle source of nitrogen dioxide within the district is road transport.

Particulates are the fraction of airborne particles less than 10 ug/m3 in diameter. These small particles can be breathed into the lungs carrying with them a range of both natural and manmade substances.

PM10 comes from a wide range of sources known as primary (combustion processes such as vehicle exhausts), secondary (formed in the atmosphere) and course (from suspended soils, dust and construction etc). In Carlisle the dominating sources are likely to be:-

Local traffic
Resuspension of road dust
Agriculture
Background PM10 carried from other parts of the UK and continental Europe.

Benzene is a recognised genotoxic human carcinogen.

The main sources of benzene in the UK are petrol engined vehicles, petrol refining and the distribution and uncontrolled emissions from petrol station forecourts without vapour recovery systems.

Whilst the local authority does not have any sources within the area which are likely to exceed the objective levels Carlisle has been monitoring benzene since April 2008 as part of the Non Automatic Hydrocarbon Network. Monitoring is undertaken at the Paddy's Market monitoring station using sorbent tubes containing Carbopack X

2.1.1 Automatic Monitoring Sites

There are two continuous monitoring stations in Carlisle. These are located at Paddy's Market and Stanwix Bank.

Pollutant concentrations have been monitored at a roadside site at Paddy's Market in Caldewgate since 2005. The pollutants measured include oxides of nitrogen and particulate matter using a chemiluminescent analyser and a tapered oscillating element monitor (TEOM) respectively. The Paddy's Market site was operated and maintained by Bureau Veritas Ltd until February 2008. Since

then the site has been affiliated to the AURN and the network quality assurance and control procedures are implemented. The site is now entirely funded by Defra.

The Stanwix Bank site has been in operation since the beginning of 2007 and measures nitrogen dioxide with a chemiluminescent analyser. The site is operated and maintained by Bureau Veritas Ltd (BV).BV has defined quality system, which forms part of the UKAS accreditation that the laboratory holds.

In April 2009 an additional TEOM to measure even smaller sized particles (PM2.5) was installed in Paddy's Market monitoring station by Defra and both TEOMs were adapted to include an FDMS to allow better equivalence to the objective level.

Daily data from both monitoring stations is. available to the public on the city councils website.

2.1 Details of Automatic Monitoring Sites

Site Name	**Site Type**	**OS Grid Ref**	**Pollutants Monitored**	**In AQMA ?**	**Relevant Exposure?** *(Y/N with distance (m) to relevant exposure)*	**Distance to kerb of nearest road** *(N/A if not applicable) (m)*	**Worst-case Location ?**
Paddy's Market	Roadside	X 339467 Y 555974	NO2,PM 10 and PM2.5	N	N with 42m to relevant exposure	4m	N
Stanwix Bank	Roadside	X 340018 Y 557044	NO2	Y	N within 15m to relevant exposure	3m	N

2.1.2 Non-Automatic Monitoring

Nitrogen Dioxide

Carlisle City Council operates an extensive network of nitrogen dioxide tubes across the District. Up to the end of January 2009 the council utilised tubes prepared and analysed by Bureau Verita Labs using 10% triethanolamine (TEA) in water. In February 2009 the council changed suppliers and now utilises tubes prepared with 20% TEA in water prepared and analysed by Gradko Environmental Ltd. The locations of all the diffusion tubes are listed in the table below.

Details of Non- Automatic Monitoring Sites

SITE ID	SITE NAME	SITE TYPE	OS GRID REF	POLLUTANTS MONITORED	IN AQMA ?	RELEVANT EXPOSURE?	DISTANCE TO KERB OF NEAREST ROAD (m)	WORST CASE LOCATION?
A1	SCOTLAND RD	R	339995 557188	NO2	Y	N (4.5M)	1.5	Y
A10	STANWIX BANK	R	340008 556842	NO2	Y	1.5	1.5	Y

A12	ETTERBY ST	R	339935 557125	NO2	N	Y	3	Y
A5	KINGSTOW N RD	R	339758 558059	NO2	Y	Y	4	Y
A7	KINGSTOW N RD	R	339526 559285	NO2	Y	N (7.5m)	4	Y
A9	BRAMPTON RD	R	340028 556833	NO2	Y	Y	1.5	Y
B12	CHARLOTTE ST	K	339921 555406	NO2	N	N (0.5)	2.0	Y
B3	SHADDONMI LL	R	339537 556613	NO2	N	Y	9	Y
B4	DALSTON RD	R	339434 555638	NO2	Y	Y	3.5	Y
B5	JUNCTION ST	R	339613 555587	NO2	N	Y	2.5	Y
B6	CHARLOTTE ST	R	339731 555526	NO2	N	Y	2.5	Y
B7	CURROCK ST	R	340205 555198	NO2	Y	Y	3	Y
C1	LOWTHER ST	R	340216 556131	NO2	N	Y	3	Y
C2	TIC	UC	340216 556131	NO2	N	N		N
C3	DEVONSHIR E	R	340218 555768	NO2	N	Y	3	Y
C4	BAR SOLO	R	340286 555622	NO2	N	Y	9	Y
C5	GRIFFEN	R	340298 555589	NO2	N	Y	3	Y
D1	VICTORIA PLACE	R	341106 555954	NO2	N	N (8.5m)	3.7	Y
D10	WARWICK RD	R	342044 555907	NO2	N	Y	5	Y
D11	CARTREF	R	340426 556040	NO2	N	Y	4.5	Y
D12	WARWICK RD	K	340307 555718	NO2	N	N	5	Y
D3	WARWICK RD	R	341153 555896	NO2	N	Y	10	Y
D5	WARWICK RD	R	341310 555914	NO2	N	Y	9	Y
D7	WARWICK RD	R	341593 555893	NO2	N	Y	7	Y
D9	WARWICK RD	R	341426 555910	NO2	N	Y	8.5	Y
E22	FINKLE ST	R	339834 556137	NO2	N	Y	12	Y
E12	WIGTON RD	R	339225 555821	NO2	N	N (2)	2.5	Y
E15	WIGTON RD	R	339091 555736	NO2	N	Y	4.5	Y
E16	JOVIAL SAILOR	R	339141 555900	NO2	N	Y	2.5	Y
E19	WIGTON RD	R	338953 555610	NO2	Y	Y	2.5	Y
E20	WIGTON RD	R	339023 555692	NO2	Y	Y	5.5	Y
E4	JOHN ST	R	339396 555947	NO2	N	N(3m)	3	Y
E6	PADDY'S MARKET	R	339467 555974	NO2	N	24.5	9	Y
E6	PADDY'S MARKET	R	339467 555974	NO2	N	24.5	9	Y
E6	PADDY'S	R	339467	NO2	N	24.5	9	Y

	MARKET		555974					
E8	BRIDGE ST	R	339516 556024	NO2	Y	Y	4	Y
E9	CHURCH ST	R	339405 555996	NO2	N	Y	9	Y
E21	BURGH RD	R	337730 556118	NO2	N	N (8M)	3	Y
F1	TAIT ST	R	340482 555489	NO2	N	Y	3.5	Y
F10	BOTCHERG ATE	R	349597 555489	NO2	N	Y	3	Y
F5	STANLEY HOME	R	340534 555409	NO2	N	Y	3	Y
F7	LONDON RD	R	340708 555240	NO2	Y	Y	4.5	Y
F9	LONDON RD	K	341099 554931	NO2	N	Y	0.5	Y
H1	BRAMPTON	K	352824 561039	NO2	N	N (2.5M)	0.5	Y
H3	LONGTOWN	K	338052 568475	NO2	N	N (2.5M)	0.5	Y
H4	WARWICK BRIDGE	K	347411 556881	NO2	N	N (2.5M)	0.5	Y
H5	WIGTON RD	R	337643 554100	NO2	N	Y	1.5	Y
H6	PETER LANE	R	337962 553220	NO2	N	Y	4	Y
H7	DALSTON ROAD	R	338282 553396	NO2	N	Y	6.5	Y
H8	AIRPORT	R	561254 347874	NO2	N	Y	2	Y

Benzene

In addition to the above the council also operates a pumped tube benzene sampler as part of the UK Non-Automatic Hydrocarbon Network. The benzene station is located within the Paddy's Market Unit and has been in operation since April 2008. It is entirely funded by Defra.

2.2 Comparison of Monitoring Results with AQ Objectives

Results in red indicate an exceedence of the annual mean objective at a' relevant' location . Results in blue indicates an exceedence of the annual mean objective at a 'non relevant' location.

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

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

Site ID	Location	Within AQMA?	Proportion of year with valid data 2008 %	Annual mean concentrations ($\mu g/m^3$)		
				2006 *	2007 *	2008
	Paddy's Market	N	90	33.5	30.8	32
	Stanwix Bank	Y	90	-	41.3	38.8

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

Location	Within AQMA?	No of exceedences per year ($\mu g/m^3$)		
		2006 *	2007 *	2008
Paddy's Market	N	0	0	**0**
Stanwix Bank	Y	0	0	**0**

Results from both monitoring stations indicates that the objectives for nitrogen dioxide were not exceeded at either site during 2008. Pollutant levels at Stanwix Bank station have in fact fallen from the previous year. However at Paddy's Market the pollutant levels have slightly increased.

Diffusion Tube Monitoring Data

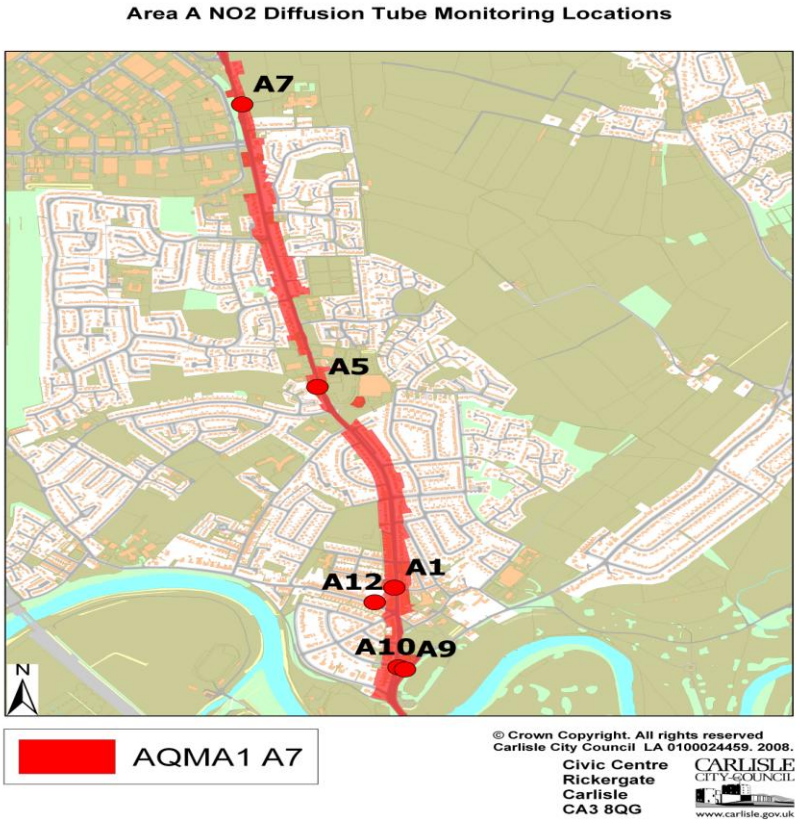
Table 2.4a Results of Nitrogen Dioxide Diffusion Tubes 2008

SITE ID	LOCATION	WITHIN AQMA?	DATA CAPTURE 2008 %	ANNUAL MEAN CONCENTRATIONS 2008 ADJUSTED FOR BIAS
A1	SCOTLAND RD	✓	100	46.1
A10	STANWIX BANK	✓	100	56.4
A12	ETTERBY ST	**x**	100	21.6
A5	KINGSTOWN RD	✓	100	42.4
A7	KINGSTOWN RD	✓	92	30.7
A9	BRAMPTON RD	✓	92	42.6
B12	CHARLOTTE ST	x	92	40.9
B3	SHADDONMILL	x	100	29.8
B4	DALSTON RD	✓	100	51
B5	JUNCTION ST	x	100	29.4
B6	CHARLOTTE ST	x	100	33.2

B7	CURROCK ST	✓	100	41.6
C1	LOWTHER ST	x	83	37.3
C2	TIC	x	75	16.2
C3	DEVONSHIRE	x	83	37.6
C4	BAR SOLO	x	100	39.1
C5	GRIFFEN	x	100	40.5
D1	VICTORIA PLACE	x	100	31.2
D10	WARWICK RD	x	83	31.6
D11	CARTREF	x	92	35.6
D12	WARWICK RD	x	92	42.6
D3	WARWICK RD	x	100	22.8
D5	WARWICK RD	x	92	24.1
D7	WARWICK RD	x	92	37.9
D9	WARWICK RD	x	100	27.7
E22	FINKLE STREET	x	92	37.6
E12	WIGTON RD	x	100	46.9
E15	WIGTON RD	x	100	42.5
E16	JOVIAL SAILOR	x	92	44.7
E19	WIGTON RD	✓	100	46.9
E20	WIGTON RD	✓	100	41.6
E4	JOHN ST	x	100	42.9
E6	PADDY'S MARKET	x	92	31.6
E6	PADDY'S MARKET	x	100	32.8
E6	PADDY'S MARKET	x	100	34.5
E8	BRIDGE ST	✓	92	55.8
E9	CHURCH ST	x	100	35.3
E21	BURGH RD	x	100	16.2
F1	TAIT ST	x	100	32.6
F10	BOTCHERGATE	x	100	35.2
F5	STANLEY HOME	x	100	38.1
F7	LONDON RD	✓	100	39.4
F9	LONDON RD	x	100	32.7
H1	BRAMPTON	x	75	20.9
H3	LONGTOWN	x	100	23.1
H4	WARWICK BRIDGE	x	92	35.7
H5	WIGTON RD	x	83	27.3
H6	PETER LANE	x	83	11.3
H7	DALSTON RD	x	92	15.8
H8	AIRPORT	x	100	9.84

Table 2.4b Results of Nitrogen Dioxide Diffusion Tubes

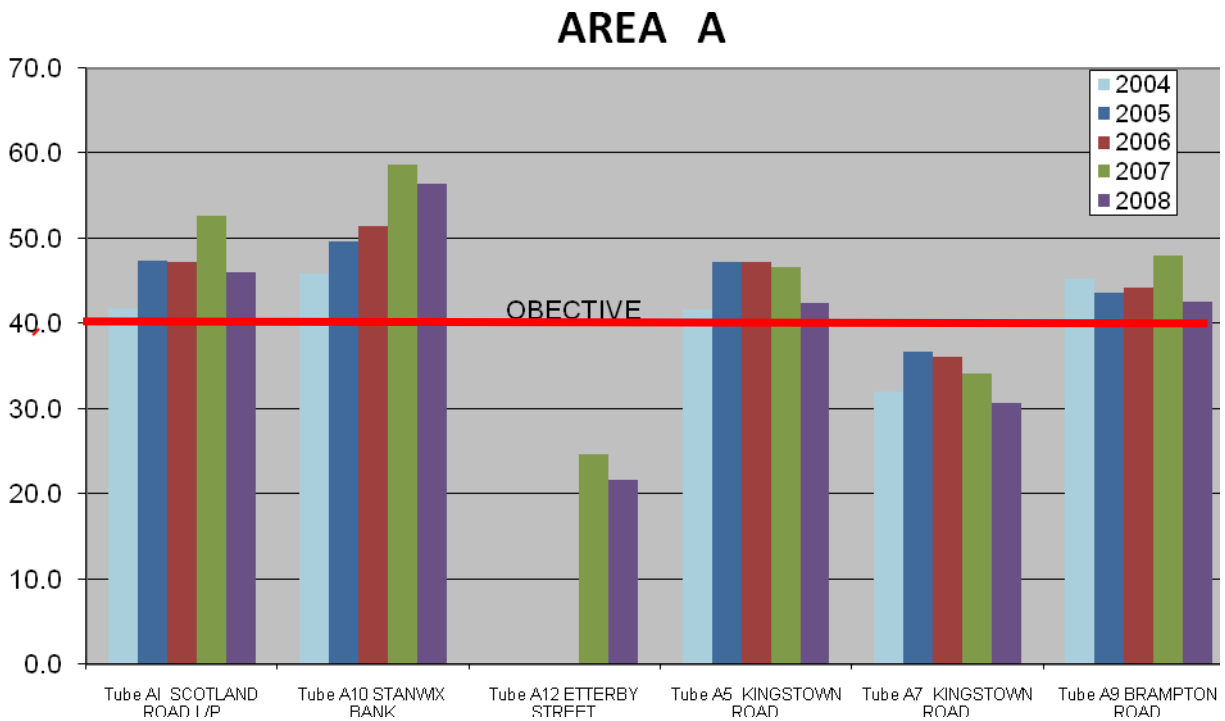
Area A – A7 Stanwix Bank, Scotland Rd and Kingstown Rd (AQMA No1)



SITE ID	LOCATION	WITHIN AQMA?	ANNUAL MEAN CONCENTRATIONS		
			2006 ADJUSTED FOR BIAS	2007 ADJUSTED FOR BIAS	2008 ADJUSTED FOR BIAS
A1	SCOTLAND RD	✓	47.3	52.1	46.1 (43.4)
A10	STANWIX BANK	✓	51.4	58.1	56.4
A12	ETTERBY ST	x	-	24.5	21.6
A5	KINGSTOWN RD	✓	47.3	46.1	42.4
A7	KINGSTOWN RD	✓	36.2	33.8	30.7 (28.3)
A9	BRAMPTON RD	✓	44.2	47.5	42.6

( ) NO2 concentration in brackets is calculated concentration at relevant receptor

2004 – 2008 Nitrogen Dioxide Trends



Results indicate that there are still sites within AQMA (No1) that remain above the NO2 annual mean objective level. There is therefore no proposal to amend this AQMA at this stage.

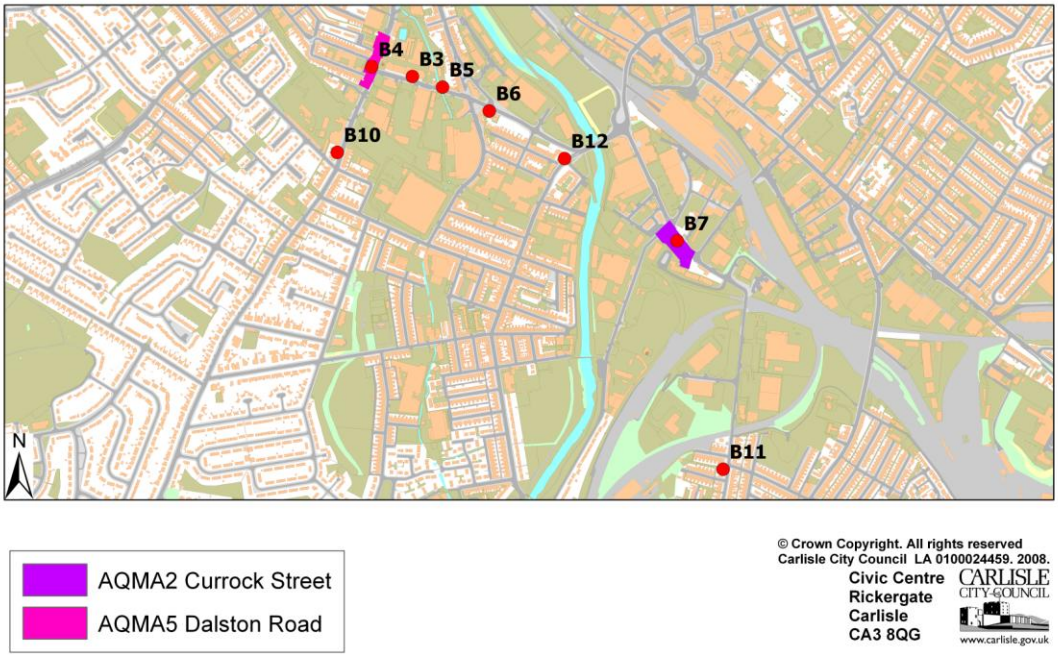
Results from both the continuous analyser and diffusion tubes however also indicate that the NO2 concentrations have fallen from the previous year at all locations.

The introduction of the CNDR in 2011/12 will bring about a substantial reduction in traffic flows along this route. Previous 'Further Assessment' work undertaken by consultants AEA Technology in 2007 (report is available on the council's website) has shown that as a result of the expected reduction in traffic nitrogen dioxide levels are likely to fall to below the objective level.

There were no exceedences of the 1 hour mean objective level for nitrogen dioxide at ant location along this route.

Area B – Currock St, Victoria Viaduct, Charlotte St, Junction St and Dalston Rd (Includes AQMA No2 and No5)

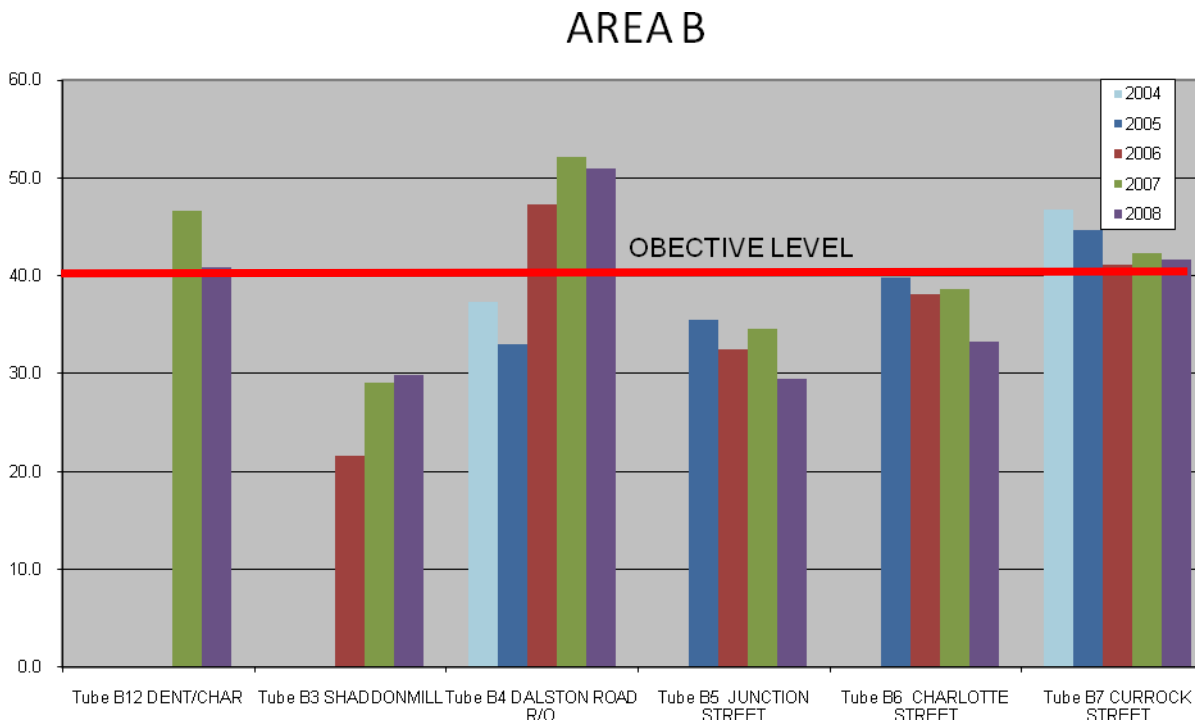
Area B NO2 Diffusion Tube Monitoring Locations



SITE ID	LOCATION	WITHIN AQMA?	ANNUAL MEAN CONCENTRATIONS		
			2006 ADJUSTED FOR BIAS	2007 ADJUSTED FOR BIAS	2008 ADJUSTED FOR BIAS
B12	CHARLOTTE ST	x	-	46.1	40.9 (25.9)
B3	SHADDONMILL	x	21.7	28.8	29.8
B4	DALSTON RD	✓	47.2	51.7	51
B5	JUNCTION ST	x	32.5	34.3	29.4
B6	CHARLOTTE ST	x	38.1	38.3	33.2
B7	CURROCK ST	✓	41.2	41.9	41.6

( ) NO2 concentration in brackets is calculated concentration at relevant receptor

2004 – 2008 Nitrogen Dioxide Trends



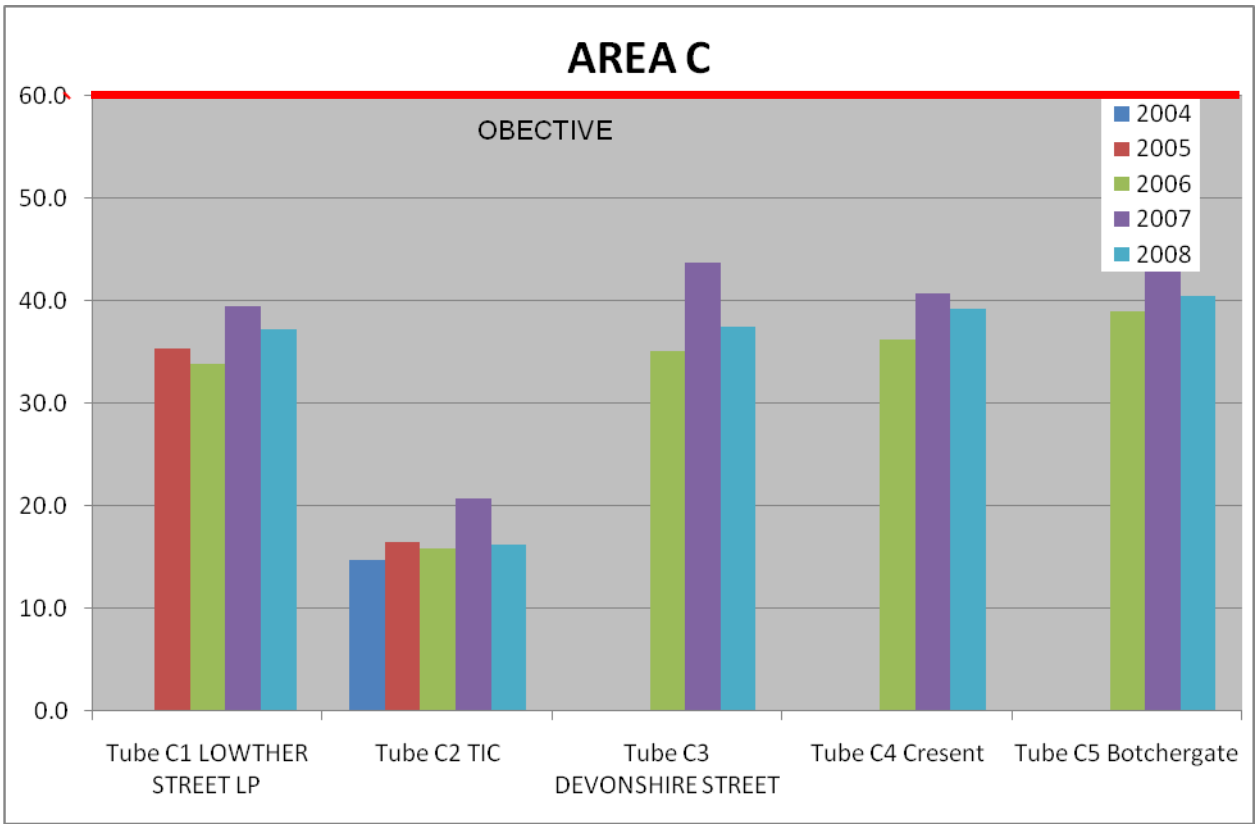
Results indicate that NO2 concentrations in 2008 have fallen from the previous year at all locations along this main traffic thoroughfare with the exception of Shaddonmill (this location is however well below the objective level).

'Further Assessment' work undertaken in 2007 by AEA consultants predicted that nitrogen dioxide levels along Currock St (AQMA No2) would fall below the annual mean objective level by 2010.The report is available on the council's website. This appears to still be on target.

The City Council and County Council are working together to introduce action measures that will reduce nitrogen dioxide levels along Dalston Rd (AQMA No5). The revised Action Plan will be available in early 2010.
There were no exceedences of the 1 hour mean objective level for nitrogen dioxide at any location along this route.

Area C – City Centre Locations

SITE ID	LOCATION	WITHIN AQMA?	ANNUAL MEAN CONCENTRATIONS		
			2006 ADJUSTED FOR BIAS	2007 ADJUSTED FOR BIAS	2008 ADJUSTED FOR BIAS
C1	LOWTHER ST	x	33.9	39.1	37.3
C2	TIC	x	15.9	20.5	16.2
C3	DEVONSHIRE	x	35.1	43.2	37.6
C4	BAR SOLO	x	36.2	40.2	39.1
C5	GRIFFEN	x	39	47.3	40.5

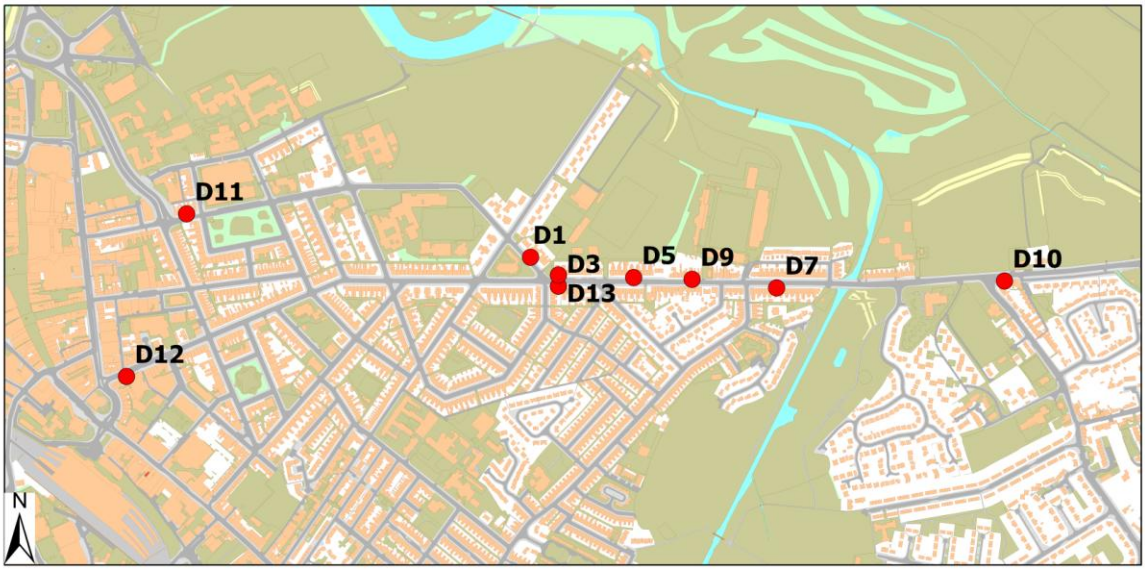


Tubes C1 – C5 cover the main shopping/outdoor cafe areas within the centre of Carlisle. Results from these tubes should only be compared to the 1 hour mean objective level for nitrogen dioxide which is equivalent to an annual mean of 60 $\mu g/m^3$

Results indicate that there are no locations within the city centre which are at risk of exceeding the 1 hour mean objective level for nitrogen dioxide.

Area D A69 – Warwick Rd

Area D NO2 Diffusion Tube Monitoring Locations



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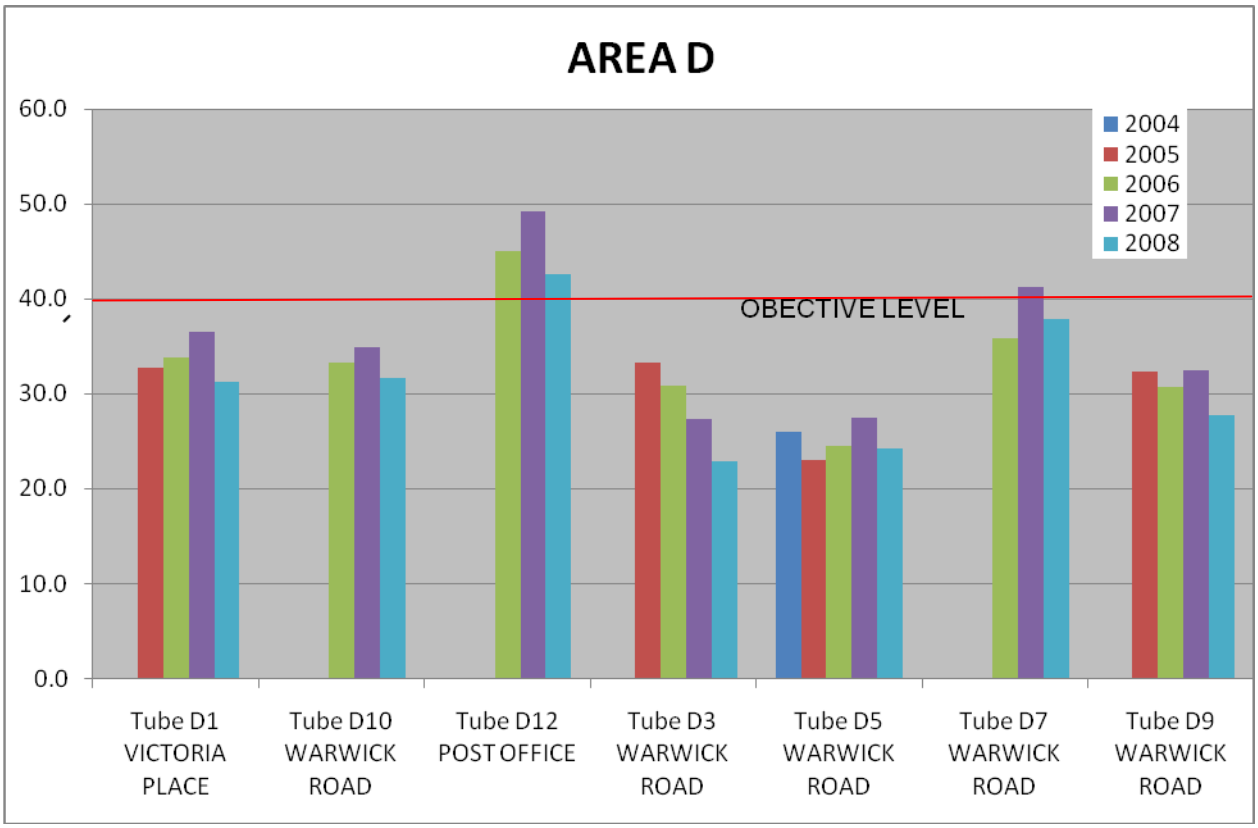
SITE ID	LOCATION	WITHIN AQMA?	ANNUAL MEAN CONCENTRATIONS		
			2006 ADJUSTED FOR BIAS	2007 ADJUSTED FOR BIAS	2008 ADJUSTED FOR BIAS
D1	VICTORIA PLACE	x	33.8	36.1	31.2 (29.5)
D10	WARWICK RD	x	33.2	34.5	31.6
D11	CARTREF	x	-	38.4	35.6
D12	WARWICK RD	x	45.1	48.7	42.6**
D3	WARWICK RD	x	30.8	27.1	22.8
D5	WARWICK RD	x	24.4	27.2	24.1
D7	WARWICK RD	x	35.8	40.7	37.9
D9	WARWICK RD	x	30.6	32.1	27.7

( ) NO2 concentration in brackets is calculated concentration at relevant receptor
** Tube D12 is located in a commercial area only. Site chosen in lieu of possible residential development.

2004 – 2008 Nitrogen Dioxide Trends



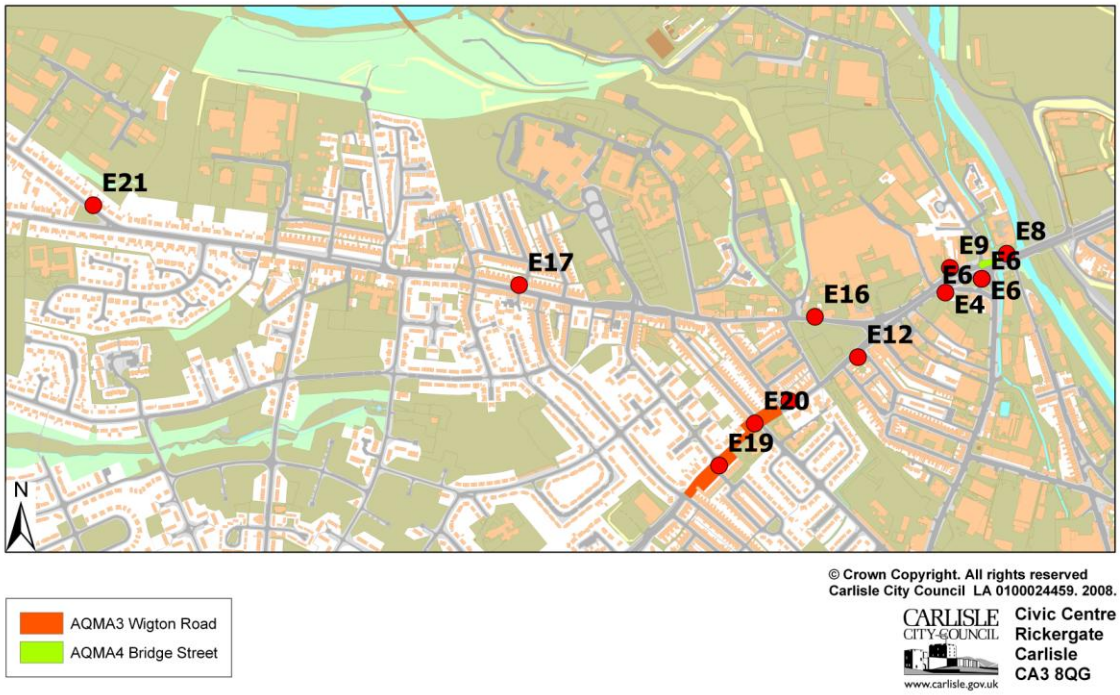
Again nitrogen dioxide levels in 2008 have fallen at all locations from the previous year.

Tube D12 continues to be above the annual mean objective. However this is not a 'relevant locations' i.e. it is not adjacent to residential property and there is therefore no need to go onto a 'Detailed Assessment'.

There were no exceedences of the 1 hour mean objective level for nitrogen dioxide at any location along this route.

Area E - A595 Caldewgate, Wigton Rd and Newtown Rd (includes AQMA No3 and AQMA No4)

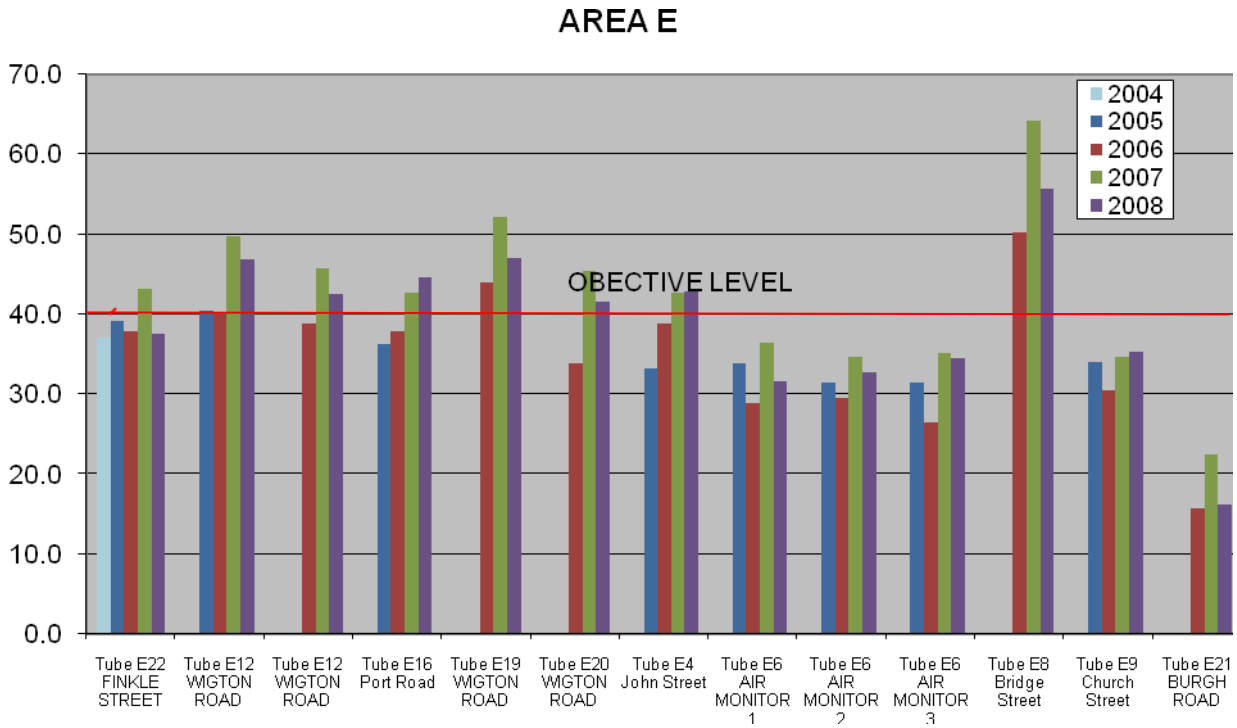
Area E NO2 Diffusion Tube Monitoring Locations



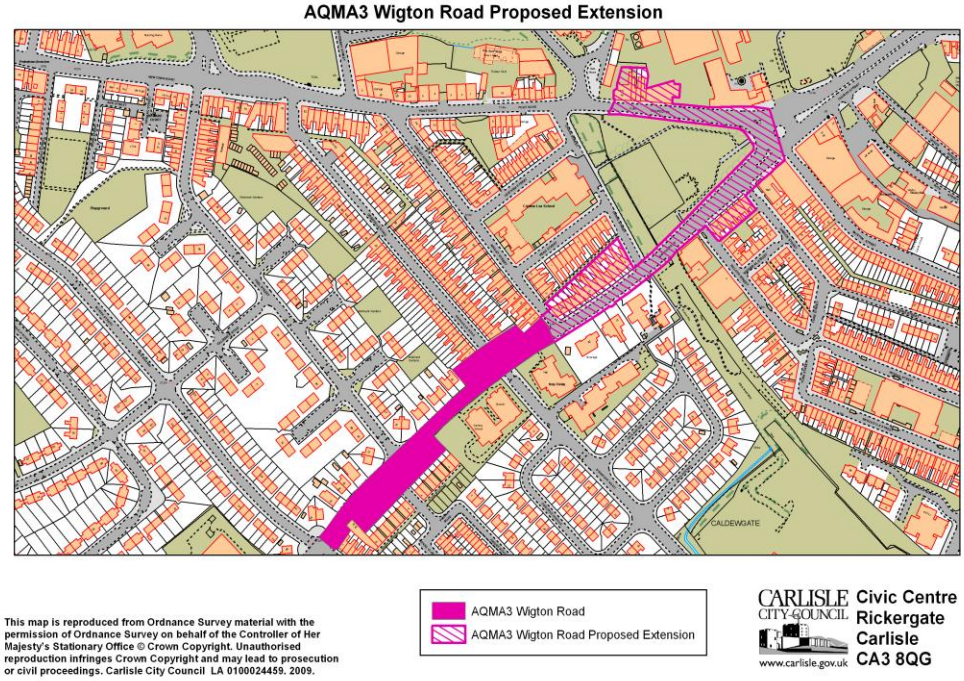
SITE ID	LOCATION	WITHIN AQMA?	ANNUAL MEAN CONCENTRATIONS		
			2006 ADJUSTED FOR BIAS	2007 ADJUSTED FOR BIAS	2008 ADJUSTED FOR BIAS
E22	FINKLE ST	x	37.9	42.7	37.6
E12	WIGTON RD	x	40.1	49.3	46.9 (41.5)
E15	WIGTON RD	x	38.8	45.3	42.5
E16	JOVIAL SAILOR	x	37.8	42.3	44.7
E19	WIGTON RD	✓	43.9	51.7	46.9
E20	WIGTON RD	✓	33.8	44.9	41.6
E4	JOHN ST	x	38.8	42.2	42.9 (37.8)
E6	PADDY'S MARKET	x	29	36.1	31.6 (28.6)
E6	PADDY'S MARKET	x	29.6	34.4	32.8 (29.6)
E6	PADDY'S MARKET	x	246.5	34.8	34.5 (31.0)
E8	BRIDGE ST	✓	50.3	63.6	55.8
E9	CHURCH ST	x	30.5	34.4	35.3
E21	BURGH RD	x	15.7	22.4	16.2 (15.5)

( ) NO2 concentration in brackets is calculated concentration at relevant receptor

2004 – 2008 Nitrogen Dioxide Trends



Again NO2 concentrations in 2008 along this main traffic route are lower than the previous year for the majority of locations. However locations within the AQMAs nos.3 and 4 still remain above the objective level. There are also several 'relevant' locations immediately outside the AQMA no3 on Wigton Rd and Caldcotes which were above the objective level in 07/08. These are essentially along the traffic routes leading up to the Caldewgate roundabout. 'Further Assessment' work recently undertaken has confirmed that it will be necessary to extend the AQMA No3 to cover these locations. A map showing the proposed extended area is shown below.

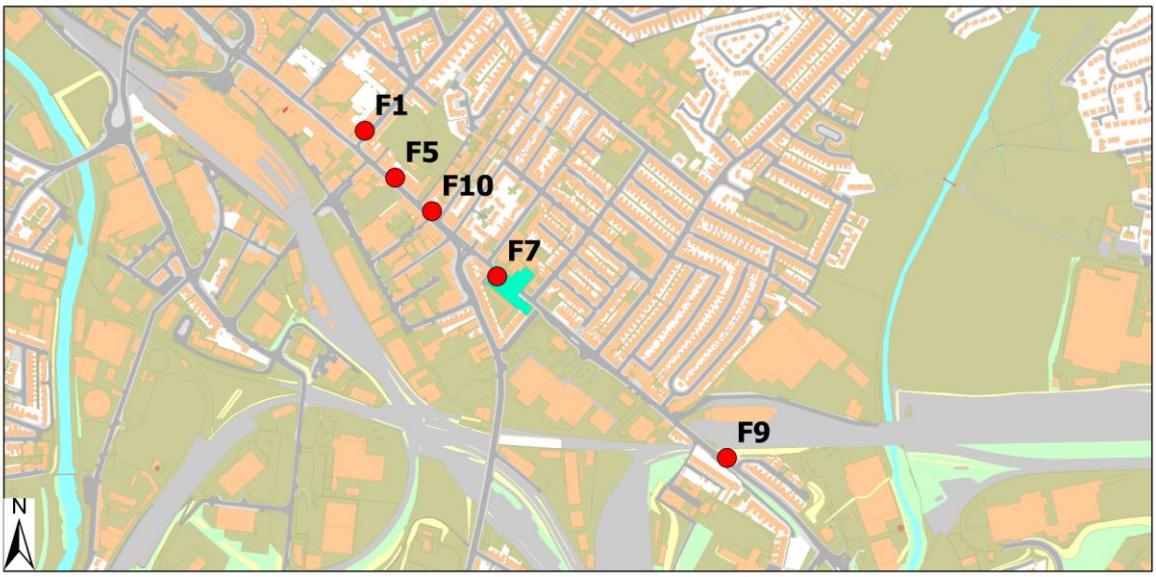


The City Council is working closely with the County Council to formulate action measures that will reduce pollutant concentrations within AQMA's nos. 3 and 4. A revised Air Quality Action Plan will be available in early 2010. It is however highly likely that with the introduction of the CNDR in 2011/12 there will be a significant reduction in vehicle flows along this route which is expected to have a positive impact on nitrogen dioxide levels within the AQMA's.

There were no exceedences of the 1 hour mean objective level at any location.

Area F – A6 London Road / Botchergate (AQMA No6)

Area F NO2 Diffusion Tube Monitoring Locations



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AQMA6 London Road

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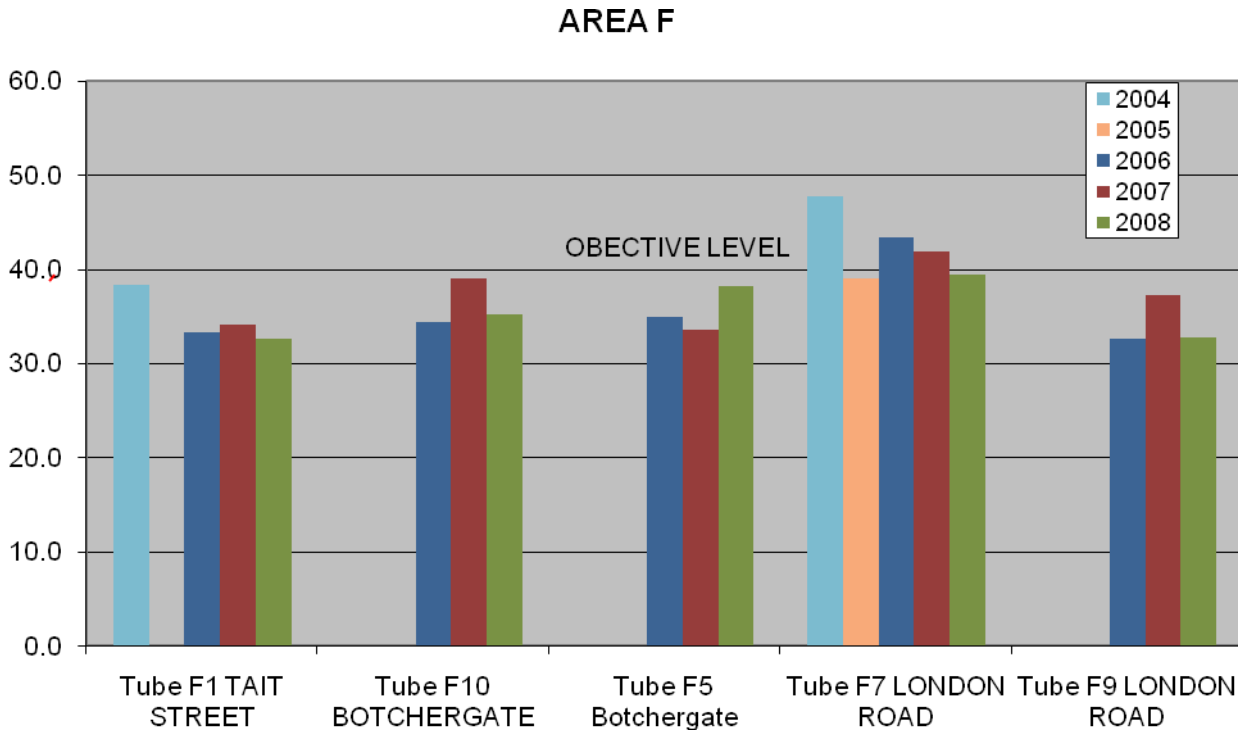
	LOCATION	WITHIN AQMA?	ANNUAL MEAN CONCENTRATIONS		
			2006 ADJUSTED FOR BIAS	2007 ADJUSTED FOR BIAS	2008 ADJUSTED FOR BIAS
F1	TAIT ST	x	33.2	33.8	32.6
F10	BOTCHERGATE	x	34.4	38.7	35.2
F5	STANLEY HOME	x	34.9	33.2	38.1
F7	LONDON RD	✓	43.3	41.4	39.4
F9	LONDON RD	x	32.6	36.8	32.7

2004 – 2008 Nitrogen Dioxide Trends



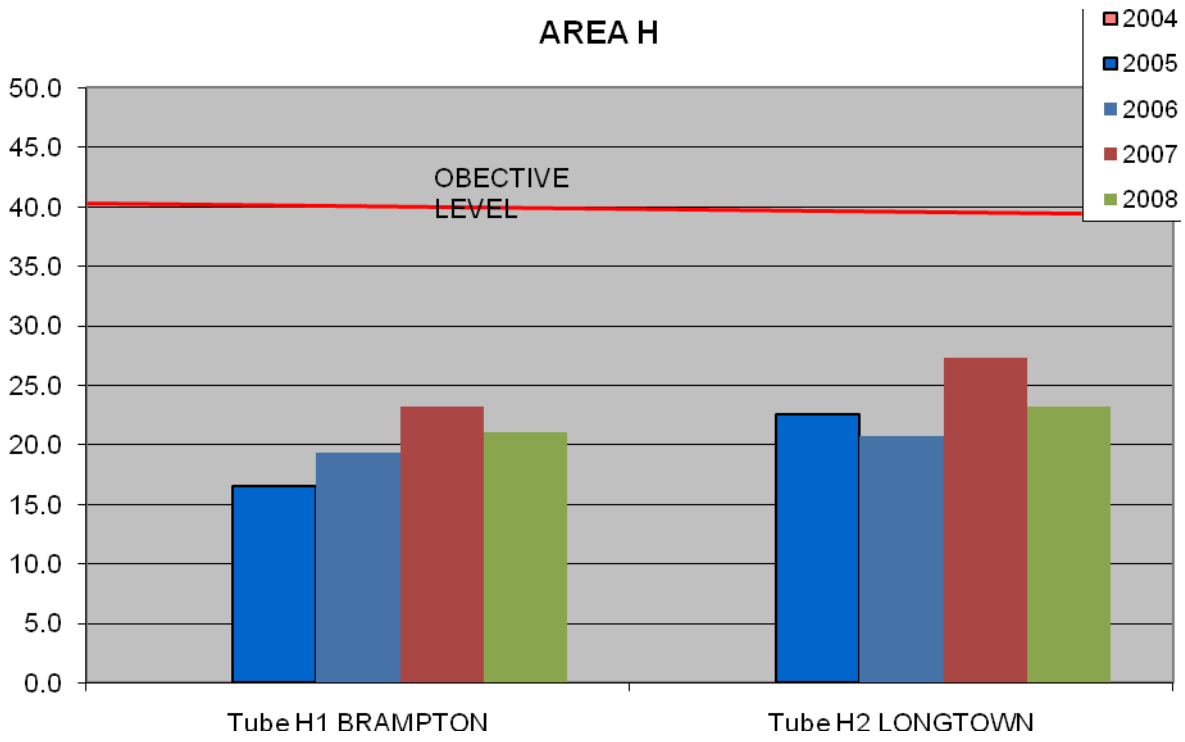
Results show that nitrogen dioxide levels in 2008 have fallen from the previous year with the exception of Tube 5 located in Botchergate. (this is however below the objective level.) Tube F7 is within AQMA No.6 and results indicate that nitrogen dioxide levels have fallen below the objective level at this site. Should nitrogen dioxide levels remain below the objective level over the next year consideration will be given to revoking the AQMA at this location.

There were no exceedences of the 1 hour objective for nitrogen dioxide at any location..

Area H – Outskirts of City, Townships and Airport

SITE ID	LOCATION	WITHIN AQMA?	ANNUAL MEAN CONCENTRATIONS		
			2006 ADJUSTED FOR BIAS	2007 ADJUSTED FOR BIAS	2008 ADJUSTED FOR BIAS
H1	BRAMPTON	x	19.3	23.9	20.9 (20.3)
H3	LONGTOWN	x	20.7	26.9	23.1 (22.4)
H4	WARWICK BRIDGE	x	-	-	35.7 (34.5)
H5	WIGTON RD	x	-	-	27.3
H6	PETER LANE	x	-	-	11.3
H7	DALSTON RD	x	-	-	15.8
H8	AIRPORT	x	-	-	9.84

( ) NO2 concentration in brackets is calculated concentration at relevant receptor



Tubes H1 – H3 are located in the next three largest centres populations outside Carlisle. Tubes H4 – H8 are located on the outskirts of the city.

Results from all of these sites indicate that the nitrogen dioxide levels are significantly below the objective levels for nitrogen dioxide.

2.2.2 Particulates

Table 2.5a Results of Paddys Market PM_{10} Automatic Monitoring: Comparison with Annual Mean Objective of 40μg/m^3

Year	Within AQMA?	Data Capture 2008 %	Annual mean concentrations (μg/m^3)
2006	N	88	***27.3**
2007	N	74	***27.2**
2008	N	92	****20.8**

` ***Data adjusted using a factor of 1.3**

****Data adjusted using the volatile correction model**

Table 2.5b Results of Paddys Market PM_{10} Automatic Monitoring: Comparison with 24-hour Mean Objective of 50μg/m^3 not to be exceeded more than 35 times in a year

Year	Within AQMA?	Data Capture 2008 %	Annual mean concentrations (μg/m^3)
2006	N	88	16
2007	N	74	11
2008	N	92	0

Results of PM10 monitoring indicates that there were no exceedences of the objectives for this pollutant at this location.

2.2.3 Benzene

Table 2.5c Results of Benzene Monitoring

Location	Within AQMA?	Data Capture 2008 %	Annual Mean Concentration
			2008
Paddy's Market	N	94.1	0.81

Results show that benzene levels are significantly below the objective level for this pollutant. There are no locations within the UK where the benzene objective is being exceeded.

2.2.4 Other pollutants monitored

Carlisle currently does not monitor for any other pollutants.

3 Road Traffic Sources

Updated traffic data has been supplied by Cumbria County Council from their Saturn model which was re-run in Nov 08 to take account of committed developments and recent traffic counts. Traffic flows are presented in Appendix E.

Previous assessment work by Carlisle City Council has relied on diffusion tube monitoring rather than the use of the Design Manual for Roads and Bridges screening model when considering road traffic sources. The City Council operates an extensive network of nitrogen dioxide diffusion tube monitoring designed to cover the busy routes, congested roads, narrow streets, city centre locations, and roads with high flows of buses and HGV's etc within the local authority. A map of our diffusion tube locations in respect to the road network is shown in Appendix F.

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Concentrations are often higher where traffic is slow moving with stop/start driving, and where buildings on either side impede dispersion. Previous review and assessments undertaken by Carlisle City Council, through the use of diffusion tube monitoring, has considered all narrow congested streets within the local authority area with residential properties within 5m of the kerb. Some of these routes now form part of the Air Quality Management Areas already declared.

New government guidance requests that local authorities reconsider and identify streets with more than 5000 vehicles per day, where residential properties are located within 2m of the kerb and buildings are on both sides of the road. Where identified and these are outside an AQMA, the local authority is requested to proceed to a detailed assessment

The situation has been reviewed.

There are very few streets within the local authority where residential property is located within 2m of a kerb. Those identified are :-

Stanwix Bank
Brampton Rd
Warwick Bridge
Front St, Brampton
Denton St
Albert St, Longtown
Caldcotes,
John St
Bridge St
London Rd

Monitoring is being or has been undertaken at all of these locations. Other than Stanwix Bank (which is located within an AQMA) no exceedences of the nitrogen dioxide objectives have been found.

Carlisle City 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

Guidance suggests that there will be some street locations where individuals may regularly spend 1 hour or more close to traffic, e.g. streets with many shops or outdoor cafes. Previous assessments undertaken by Carlisle City Council has identified several such street locations within the local authority area including Botchergate, the Town Centre, and Lowther St, Devonshire St, The Crescent and Warwick Rd. Nitrogen dioxide monitoring was subsequently undertaken at these locations, and still continues. Results are found in section 2. Monitoring to date has not found any locations which are likely to exceed the 1 hour objective level for nitrogen dioxide. There are no new/newly identified busy streets which were not considered in the last review & assessment where people may spend 1 hour or more and therefore there is no need to carry out a detailed assessment

Carlisle City 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.

This was considered during previous rounds of review and assessment but has been rechecked in response to updated traffic flow data from the Cumbria County Council. Data indicates that there are no new/newly identified roads with high flows of buses/HDV greater than 25% that have not been considered in previous review and assessment.

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

3.4 Junctions

Major junctions have been considered by this authority during previous rounds of review and assessment including;-

Dalston Rd/Junction St
Eden Bridge Junction
Botchergate/LondonRd Junction
Newtown Rd/Wigton Rd/Church St Junction
Charlotte St/Nelson Bridge Junction
James St/Currock Rd Junction

Warwick Rd/Victoria Place Junction
Victoria Place/Georgian Way Junction
Tait St/Botchergate Junction
Denton St/Victoria Viaduct
St Nicholas St/Botchergate
Some of these now form part of an Air Quality Management Area. There have been no new/newly identified junctions within our area since our last assessment.

Carlisle City Council confirms that there are no new/newly identified busy junctions/busy roads.

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

The proposed Carlisle Northern Development Route (CNDR) is the only new road which is proposed for our area. This has been previously considered during previous review and assessment work. The CNDR is the single major scheme in the Cumbria County Council's Local transport Plan (LTP2) and in the City Council's Air Quality Action Plan. The County Council and City Council are both fully committed to this project.

The CNDR addresses one of the key issues facing Carlisle i.e. enabling non Carlisle trips to miss the City and subsequently will reduce congestion on the radial routes into the City. The predicted reductions in NOx emissions along the A7 that will result from the opening of the CNDR have been modelled by AEA Technology. The data is presented in the City Councils Air Quality Action Plan.

The new road will be just over 5 miles long. It will pass by the west of the City from the A595 near Newby East to Junction 44 of the M6 near Kingmoor Park Business Park. Work is due to start imminently.

Carlisle City Council confirms that there are no new/proposed roads.

3.6 Roads with Significantly Changed Traffic Flows

Technical guidance advises that 'significant' should be taken to be roads with more than 10,000 vehicles per day which have experienced more than a 25% increase in traffic flow.

Updated and improved traffic data indicates that there are no existing roads within the authority that have experienced a 25% increase in traffic flow since the last round of review and assessment.

As air quality is now a material consideration within the planning regime, officers from Environmental Quality now assess planning applications for their air quality impact potential. Consequently several developers have been required to undertake air quality impact assessments. Cumbria County Council have also updated their Saturn model to take account of the impact of committed development on traffic flows and composition.

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

3.7 Bus and Coach Stations

Guidance issued by Defra indicates that there may be a risk of an air quality objective being exceeded at relevant locations adjacent to a bus station where there are more than 2,500 bus movements per day at the station.
Carlisle has only one bus station within its district. Updated information has been provided by the station a manager and confirms that the number of movements of buses at the station is presently 399, significantly less than 2,500. There are no current plans for extension.

Carlisle City Council confirms that there are no relevant bus stations in the Local Authority area.

4 Other Transport Sources

4.1 Airports

Aircraft are potentially significant sources of nitrogen oxides emissions, especially during takeoff. New information contained in Defra guidance produced since the last round of review & assessment has resulted in the criteria specified to trigger a Detailed Assessment being relaxed, while the requirement to assess PM10 has been removed. New guidance suggests that only nitrogen dioxide need to be considered in respect to aircraft.

Guidance suggests that there may be a risk of exceeding the objective levels for nitrogen dioxide where the annual throughput of passengers and tonnes of freight is more than 10 million passengers per annum (mppa)

(100,000 tonnes of freight is equivalent to 1 mppa)

There is one airport within our authority. Carlisle Airport is a small, privately operated site. The majority of aviation activity at the airport at present and over the last 20 years is and has been flying training, aviation club activities, private aviation, business aviation, air ambulance and military uses including fixed wing, and helicopter. These uses total approximately 20 – 30,000 air traffic movements (ATMS) per year.

Commercial (Scheduled, Public Transport Category) passenger flights were in operation until 1994 and charter public transport services continued until 2004. The aircraft was also used for commercial cargo operations but this operation has gradually decreased since 1995. These commercial aviation uses totalled up to approx 200-2,000 ATMS per year from previous years.

The Airport has recently been acquired by the parent company of Eddie Stobbart Ltd and substantial investment is planned.

In 2007 a planning application was received for the extensive development of the airport, including the realignment of runways and extensive building to include warehousing, hangers and a passenger terminal.

In terms of scheduled passenger flights, even using worse case estimates of future scheduled passenger numbers it was considered unlikely that the airport would support more than around 0.2 mppa by 2016. In terms of freight only aircraft it was considered likely that the types of aircraft to be used would be similar in size to the ATR 42 or AVRO RJ 146 aircraft. When used as passenger aircraft these aircraft can carry a maximum of 44 – 50 and 70 – 130 passengers respectively. Given the anticipated number of movement of these aircraft in 2016 freight only aircraft were unlikely to exceed an equivalent of 0.1 mppa. Light aircraft can effectively be discounted when assessing against TG(09) criterion. Thus an indicative worse case estimate of the effective operational size of the airport in 2016 was 0.3 mppa. It was concluded that airport sources would not have any significant local air quality impact.

The application was withdrawn after it was ‘called in’ by the Secretary of State. A substantially scaled down application was subsequently made in 2008 to develop the airport into a freight storage & distribution facility including a cross dock facility.

The development is likely to lead to an increase in air traffic movements but these are predicted to be substantially below the trigger level described above.

Carlisle City Council confirms that there are no airports in the Local Authority area which have an annual throughput of passengers and tonnes of freight of 10 mppa or more.

4.2 Railways (Diesel and Steam Trains)

Carlisle has a significant railway network. Government guidance suggests that stationary locomotives, both diesel and coal fired, can give rise to high levels of sulphur dioxide close to the point of emission. Recent evidence suggests that moving diesel locomotives, in sufficient numbers, can also give rise to high NO2 concentrations close to the track. These two potentially significant sources are considered below.

4.2.1 Stationary Trains

Whilst there are locations throughout the authority which are located within 15m of a railway track there were no locations identified during the last round of review and assessment where trains remain stationary for more than 15 minutes with engines idling at those locations.

The situation has been rechecked for the purposes of this updating and screening assessment.

Discussions and visits with the Railway Station Manager and Managers of the goods yards and sidings at Currock, Durranhill, Kingmoor and Upperby where trains are most likely to be stationary confirms that this is still the case.

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

4.2.2 Moving Trains

Updated guidance suggests that moving diesel locomotives, in sufficient numbers (in excess of 100 trains per day), can also give rise to high nitrogen dioxide concentrations close to the track (within 30m of the track) where the background annual mean is 25xxx

A survey of the Newcastle/Leeds line, west coast mainline and west Cumbria mainline together with the convergence of these lines adjacent to Carlisle Station indicates that there is no risk of exceeding the above criteria at any location within the local authority area.

Carlisle City 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)

There are no ports within the local authority area.

Carlisle City 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

A list of all the Part A, A1 and B permitted processes found within our local authority (including large industrial installations) are listed in appendix D

Guidance suggests industrial sources are unlikely to make a significant local contribution to annual mean concentrations, but that these could be significant in terms of the short term objectives.

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

There have been no new or proposed installations for which planning permission has been granted since the last review and assessment.

Carlisle 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

There have been no existing installations where emissions have increased substantially or new relevant exposure has been introduced since the last review and assessment.

Carlisle City 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

There have been no new or significantly changed industrial installations with no previous air quality assessment since the last round of review and assessment.

Carlisle City 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

There is some evidence that major petrol fuel depots could emit sufficient benzene to put the 2010 objective at risk of being exceeded, especially if combined with higher levels from nearby busy roads. There is one medium sized fuel storage depot within our area ”BP (Oil), Dalston within the local authority area. There are properties approx 170m away from the petrol storage tanks. BP (Oil) Dalston ltd was considered in the last review & assessment but has been rechecked for the purposes of this review & assessment. Using the nomogram in fig 5.16 (2010 objective) of the technical guidance the most recent modelled emissions data (taken from the NAEI website) for this point source is well below the threshold at which exceedences of the benzene objective could occur.

Carlisle City 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

Guidance suggests that petrol stations could well emit benzene to put the 2010 objective at risk of being exceeded, especially if combined with higher levels from nearby busy roads. Defra requests that local authorities identify all petrol stations with an annual throughput of more than 200m^3 of petrol (2million litres per annum), and with a busy road nearby and determine whether there is relevant exposure i.e. residential property within 10m of the pumps that have not been covered by previous review & assessment reports.

All petrol stations found within the local authority have been considered against the above criteria in previous rounds of review & assessment and none were found to meet the trigger levels. The situation has been reviewed and the situation remains the same.

Carlisle City Council confirms that there are no petrol stations meeting the specified criteria**.**

5.4 Poultry Farms

A small number of local authorities have identified potential exceedences of the PM10 objectives associated with emissions from poultry farms (defined as chickens (laying hens and broilers), turkeys, ducks and ginea fowl). Defra advises that there may be a risk.of a poultry farm exceeding an objective where it houses in excess of

400,000 birds if mechanically vented
200,000 birds if naturally vented
100,000 birds for any turkey farm.

There are 7 poultry farms on the integrated pollution, prevention and control register within our area (the register can be viewed at the civic centre) :-

- Grampian County Chickens, Walby
- Cairnholme Poultry Farm, Cumwhinton
- Lyne Moor Farm, Longtown
- Close Gap, Longtown
- Wreay Poultry Farm, Wreay
- Eden Ford Poultry Farm, Great Corby
- Randlawfoot Poultry Farm, Great Corby

. None of the farms house birds in excess of the above trigger criteria.

Carlisle City Council confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

Biomass burning can lead to an increase in PM10 emissions, due to the process of combustion – aerosol formation from volatile materials distilled from the wood is also an issue. Compared to conventional gas-burning, biomass burning can also result in an increase in the overall NOx emissions due to the fuel-derived portion that is not present in gas combustion. Guidance suggests that consideration needs to be given to biomass combustion installations in the range 50kW to 20MW thermal.

At present Carlisle City Council does not have large biomass plant which meets this criteria.

Carlisle City Council confirms that there are no large biomass combustion plants in the Local Authority area.

6.2 Biomass Combustion – Combined Impacts

There is the potential that many small biomass combustion installations, whilst individually acceptable, could, in conjunction, lead to unacceptably high PM10 concentrations, particularly in areas where PM10 concentrations are close to or above the objectives.

Guidance provides details of the minimum number of households per 500m by 500m area required to trigger the need for a Detailed Assessment based on the worst assumption that wood is burnt in an open fireplace as a primary source of heat and based on background PM10 concentrations.

Carlisle City Council currently does not have any housing estates which use biomass installations as a primary source of heat.

There are however a number of villages and a small town that do not have a mains gas supply and therefore use alternatives as a primary fuel. These are listed below.

Area	Max no. of dwellings in 500x500m grid
Hallbankgate	52
Thustonfield	83
Castle Carrock	77
Great Orton	66
Irthington	53
Longtown	353

Background PM10 concentrations do not exceed 10$\mu g/m^3$ in any of these areas. According to guidance provided there is a risk of exceeding the PM10 objectives where the minimum number of properties that burn solid fuel as its primary source of heating in areas where the background concentrations of less 10 $\mu g/m^3$ is over 500 for a village location and 380 for a small town location. None of the above locations meet this criteria.

In addition to more rural locations, consideration has also been give to more densely populated areas within the city which, although on mains gas, may have properties which burns solid fuel. These tend to be within the centre & includes victorian terraced properties. Background concentrations (taken from the national archive website) for these areas of Carlisle are estimated to be 12.9 $\mu g/m^3$. Again according to government guidance there is a risk of exceeding the PM10 objectives where the minimum number of properties which burn solid fuel as its primary source of heating in cities where the background concentrations of PM10 is less than 13$\mu g/m^3$ is approx 340. Officers regularly visit these locations and have not experienced/witnessed significant burning of solid fuel at any location. The City Council has also not received any reports of smoke nuisance in these locations. It is considered unlikely that this criteria would be met for any of these locations.

Carlisle City Council confirms that there are no biomass combustion plant in the Local Authority area which would lead to an exceedence of the PM10 objective.

6.3 Domestic Solid-Fuel Burning (sulphur dioxide emissions)

Previous rounds of review and assessment have identified that where the density of coal burning premises exceed 100 per 500x500m in area there may be a risk of the air quality objective being exceeded. As discussed in the previous section there are a number of villages and a small town that do not have a mains gas supply and therefore use alternatives as a primary fuel. These are listed below.

Area	Max no. of dwellings in 500x500m grid
Hallbankgate	52
Thurstonfield	83
Castle Carrock	77
Great Orton	66
Irthington	53
Longtown	353

Only Longtown is considered a possible location where there may be a risk of exceeding the air quality objective for SO2 and was considered in detail during previous review & assessments. Following a questionnaire sent to 350 households within a small housing estate located at the north eastern corner of the town it was estimated that the number of houses which use coal as the predominant source of heating was 70. This is below the threshold for exceeding the objective. It is not considered likely that there has been a significant increase beyond this figure.

Visits to each of these areas has not identified any significant smoke hanging over the areas over a winters evening. The city council has not received any complaints with regard to smoke nuisance from residence in the area.

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

7 Fugitive or Uncontrolled Sources

Dust emissions from a range of fugitive and uncontrolled sources can give to elevated PM10 concentrations.

Dust arises from the passage of vehicles over unpaved ground and from the passage of vehicles along public roads that have been affected by dust and dirt tracked out from dusty sites. It also arises from the handling of dusty materials, the cutting of concrete etc. There is also wind blown dust from stockpiles and dusty surfaces.

Potential sources of fugitive or uncontrolled dust within the local authority area were considered during the last round of review and assessment. Whilst there are a number of potential sources including quarries and concrete batching within the local authority it was found that there were no adjacent relevant locations. In addition these premises are permitted by the city council and are regularly inspected. No particular dust emissions have been noted during site visits. Complaints received by the Authority since the last review and assessment have also been considered. Records indicate that no dust complaints have been received since the last round of review and assessment.

There have been no new sources likely to emit fugitive or uncontrolled dust emissions since the last review and assessment.

Carlisle City 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

New monitoring data for existing sites indicates that locations within AQMA nos.1 - 5 remain above the annual mean objective level. There are also locations immediately outside the current AQMA no.3 boundary which exceeded the annual mean objective level in 2007 and 2008. 'Further Assessment' work has concluded that the boundary of AQMA no3 should be extended to the Caldewgate roundabout and include properties on Caldcotes.

New monitoring data however also indicates that nitrogen dioxide levels have fallen at the majority of locations around the district from the previous year.

Monitoring within AQMA no.6 (London Rd) indicates that the nitrogen dioxide concentration fell below the objective level in 2008. If this remains the case over 2009 consideration will be give to revoking the AQMA in 2010.

The nitrogen dioxide levels along Currock St (AQMA no.2) are only just above the objective level. 'Further assessment' work in 2007predicted that levels would fall below the objective level by 2011 and this appears to be still on target.

Work is due to start imminently on the Carlisle Northern Development Route (CNDR). Previous 'Further Assessment' work in 2007 indicates that the opening of the CNDR will have a major impact on nitrogen dioxide levels along A7 (AQMA No. 1), bringing levels to below the objective level.

'Further Assessment' work undertaken this year to aid the City Council and County Council in developing it's Air Quality Action Plan to take account of the recently declared AQMA's also indicates that the CNDR will have a significant positive impact on air quality along the A595 (this includes AQMA nos 3 and 4). A revised Air Quality Action Plan will be available early next year.

8.2 Conclusions from Assessment of Sources

The Updating and Screening Assessment 2009 has confirmed that there have been no new or significantly changed sources i.e. road transport, other transport, commercial/domestic, fugitive emissions or residential or commercial sources that have been introduced into the local authority since the last round or review and assessment. There is therefore no requirement for the city council to undertake a more detailed assessment for any source.

8.3 Proposed Actions

The Updating and Screening Assessment has not identified the need to proceed to a Detailed Assessment for any pollutant.

New monitoring data and recent 'Further Assessment' work concludes that that the existing boundary of AQMA no.3 on Wigton Rd will need to be extended to the Caldewgate roundabout and include properties on Caldcotes.

Revisions to the Air Quality Action Plan to take account of the new AQMA's declared in 2008 and any additional action measures that might be needed to reduce nitrogen dioxide levels to below the objective level are currently underway and the revised plan will be submitted in early 2010. As stated above the CNDR will have a significant role in reducing traffic emissions along the north and west arterial routes within the city.

A Progress Report will also be produced in April 2010 with an update on air quality matters including new monitoring data and new development commitments.

9 References

Carlisle City Council First Round Review and Assessment Reports; Stage 4 Report November 2006

Carlisle City Council Second Round Review and Assessment Reports;
Carlisle City Council Air Quality Updating & Screening Assessment 2003
Carlisle City Council Air Quality Detailed Assessment 2004
Carlisle City Council Air Quality Progress Report 2005

Carlisle City Council Third Round Review and Assessment Reports
Carlisle City Council Updating and Screening Assessment 2006
Carlisle City Council Detailed Assessment Report 2006

Carlisle City Council Further Assessment Report 2007

Carlisle City Council Progress Report 2007

Carlisle City Council Detailed Assessment 2007

Carlisle City Council Further Assessment Report 2007

Carlisle City Council Progress Report 2008

Carlisle City Council Further Assessment Report 2008

DETR(2000b) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland Department of the Environment, Transport and the Regions.

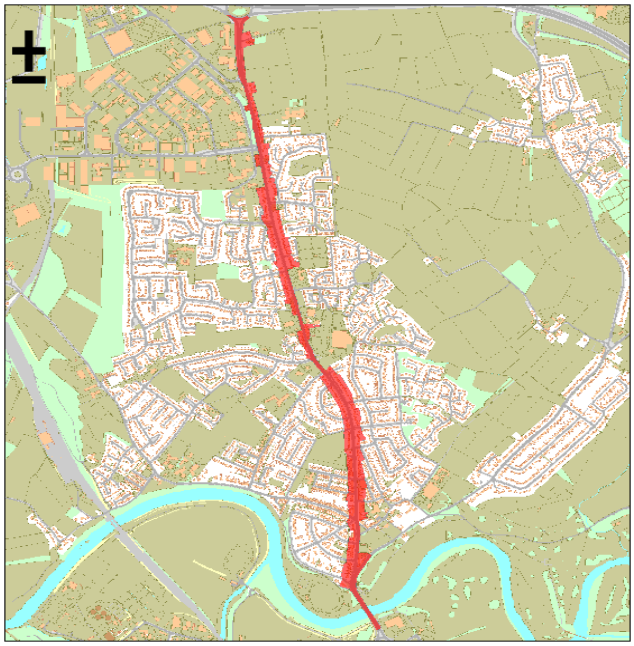
Maps of Estimated Ambient Air Pollution in 2004 and Projections for Other Years.

Part IV of the Environment Act 1995. Local Air Quality Technical Guidance. LAQM.TG(09). Feb 2009

The Air Quality Regulations 2000.as amended 2002

www.laqmsupport.org.uk

Appendix A: Map of Air Quality Management Areas in Carlisle



Air Quality Management Area 1
A7 Carlisle

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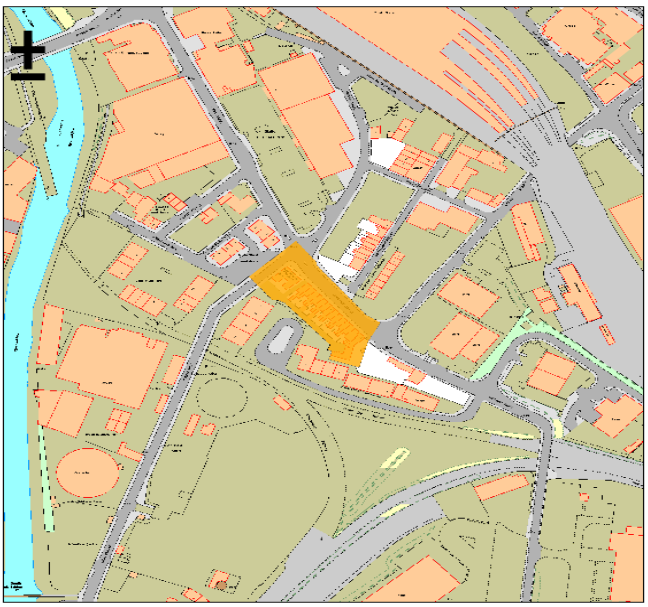

Air Quality Management Area 2
Currock Street

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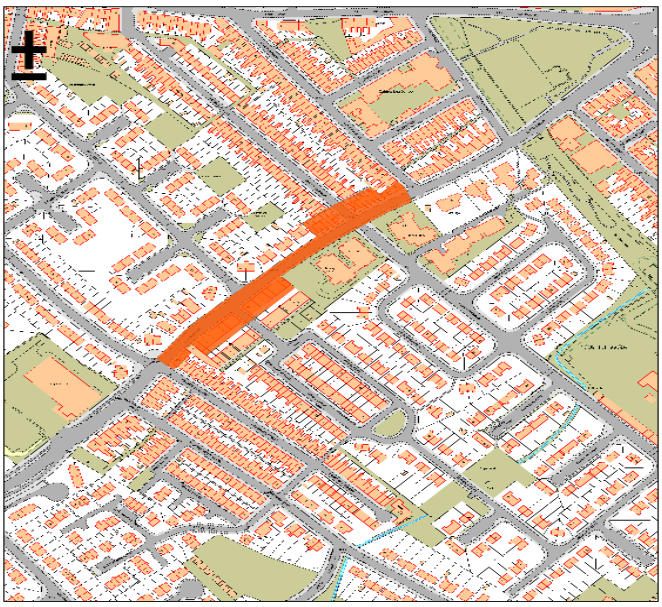

Air Quality Management Area 3
Wigton Road

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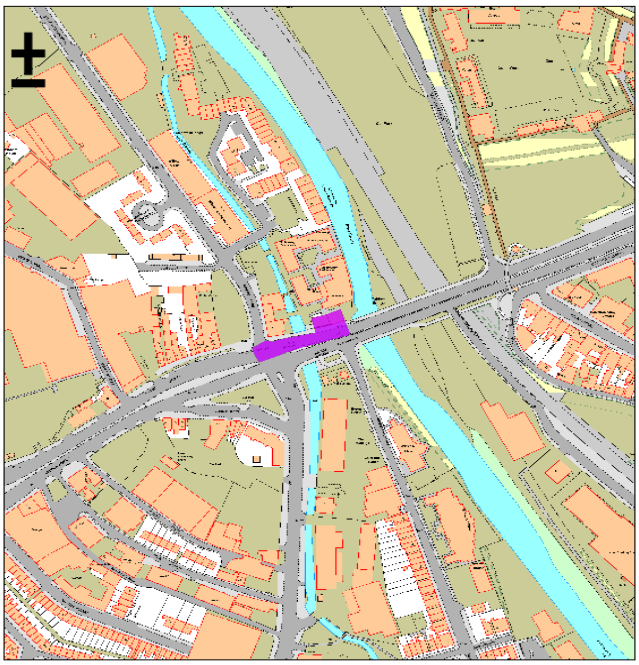

Air Quality Management Area 4
Bridge Street

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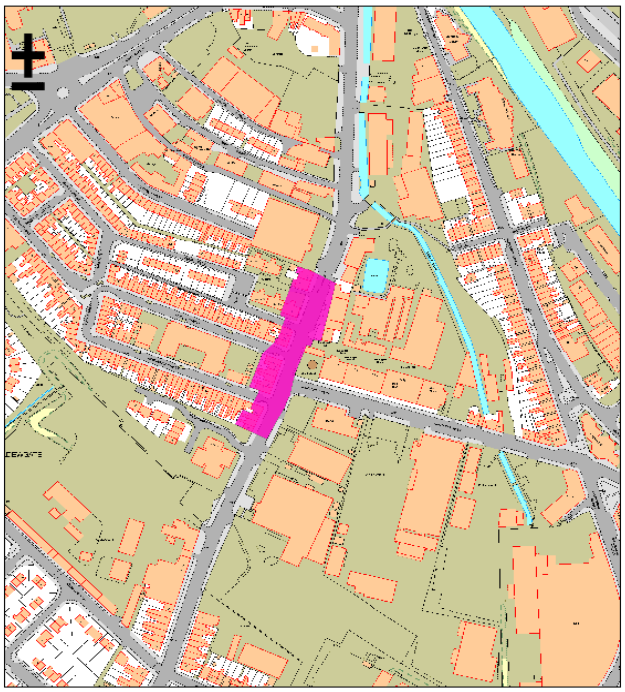

Air Quality Management Area 5

Dalston Road

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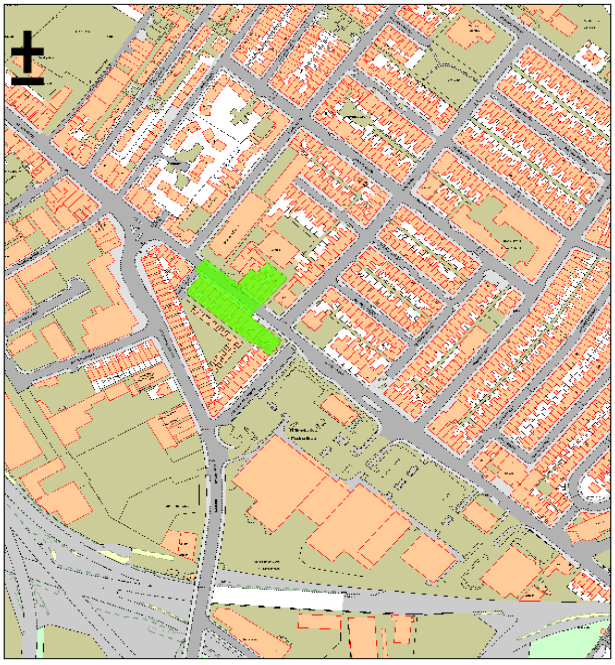

Air Quality Management Area 6

London Road

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Appendix B: QA:QC Data

Diffusion Tube Bias Adjustment Factors

Carlisle City Council operates a network of nitrogen dioxide diffusion tubes across the district. Up to February 2009 our diffusion tubes were supplied and prepared by Bureau Veritas Ltd using 10% TEA in water.

Carlisle City Council QA/QC of diffusion tube monitoring

Carlisle City Council follows the guidance set out in the 'Diffusion Tubes for Ambient NO2 Monitoring: Practical Guidance for Laboratories and User' which includes advise on selection of site the location of the samplers, instructions for exposure, and collocation with automatic analysers.

Laboratory QA/QC of diffusion tube monitoring

Bureau Veritas Labs (BV) has a defined quality system which forms part of the UKAS accreditation that the laboratory holds. All accredited methods are fully documented.

UKAS assessors visit on an annual basis and review all aspects of the analysis from the sample handling to analysis and reporting. As a condition of the accreditation the laboratory is required to participate in external proficiency schemes. BV participates in the WASP scheme organised by the Health and Safety Laboratory.

Any result from such a scheme that falls outside the relevant limits is immediately investigated and steps taken to rectify the situation. All proficiency scheme results are also assessed by the Quality Manager at BV.

Results from rounds 100 to 103 which covered the WASP scheme for 2008 show that BV's performance score falls into category 1 (good).

Calibration
The instrument is calibrated twice daily, using a series of calibration standards to ensure a satisfactory linear response is obtained. A standard check is analysed after every fifty samples to ensure that the calibration is still valid.

Quality Control
A quality control check is run after ten samples and is assessed against warning and action limits defined in the method. Quality control solutions are prepared from standards supplied by a different vendor to that of the calibration standards. Any AQC exceeding the action limit or two consecutive warning limits is internally assessed and is reported to the client as an AQC failure.

Travel Blank
The travelling blank is analysed at the same time as the samples, any blank exceeding the currently prescribed maximum is investigated and reported to the client.

Precision Vs Accuracy (Bias)

Diffusion tube precision can be described as the ability of a measurement to be consistently reproduced, i.e. how similar the results of duplicate or triplicate tubes are to each other. Accuracy represents the ability of the measurement to represent the 'true' value, which, in this case, is defined as the result from the automatic analyser. When averaged over a number of sets of results bias can be evident. This represents the overall tendency of the diffusion tubes to depart from the 'true' value, i.e. to systematically over-or underread when compared against the reference method. Once identified, bias can be adjusted for to improve the accuracy of diffusion tube results. This is done using bias adjustment factors, which have been found to be specific to a laboratory and tube preparation method .

As a result of the considerable difference in the performance of tubes prepared by different labs, government guidance recommends that a bias adjustment factor is determined and applied to the data. Technical guidance gives a method for this, which involves the collocation of these tubes with a chemiluminescent NOx analyser.

Authorities are asked to report the adjustment factor from both their own collocation (where available), and the national bias adjustment factor determined by Air Quality Consultants (AQC) who on behalf of Defra , collate and assess data from NO2 collocation studies across the UK. Full details of both the national and local bias adjustment factors used to adjust data and a comment on overall precision are provided below.

Bias Adjustment UWE spreadsheet

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	03.01.08	29.01.08	36.0	38.0	41.0	38	2.5	7	6.3			Good	
2	29.01.08	29.02.08	44.0	41.0	43.0	43	1.5	4	3.8	31.4	54.6	Good	or Data Capture
3	29.02.08	02.04.08	30.0	29.0	27.0	29	1.5	5	3.8	28.3	98	Good	Good
4	02.04.08	06.05.08	31.0	45.0	42.0	39	7.4	19	18.3	33	99.6	Good	Good
5	06.05.08	28.05.08	52.0	45.0	62.0	53	8.5	16	21.2	47	99.2	Good	Good
6	28.05.08	01.07.08	27.0	30.0	36.0	31	4.6	15	11.4	28	96	Good	Good
7	01.07.08	29.07.08	30.0	30.0	37.0	32	4.0	12	10.0	23	96.6	Good	Good
8	29.07.08	02.09.08	33.0	35.0	36.0	35	1.5	4	3.8	22	100	Good	Good
9	02.09.08	01.10.08		45.0	40.0	43	3.5	8	31.8	33	100	Good	Good
10	01.10.08	03.11.08	40.0	41.0	36.0	39	2.6	7	6.6	29	95.3	Good	Good
11	03.11.08	03.12.08	44.0	43.0	47.0	45	2.1	5	5.2	36.2	99.7	Good	Good
12	03.12.08	05.01.09	57.0	58.0	58.0	58	0.6	1	1.4	48.3	86.6	Good	Good
13													
											Overall survey -->	Good precision	Good Overall DC

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

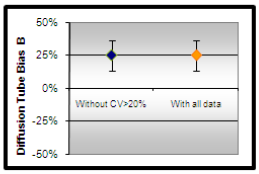
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	PADDY'S MARKET

Precision: 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 10 periods of data
Bias factor A 0.81 (0.74 - 0.9)
Bias B 23% (11% - 34%)
Diffusion Tubes Mean: 40 μgm^{-3}
Mean CV (Precision): 9
Automatic Mean: 33 μgm^{-3}
Data Capture for periods used: 97%
Adjusted Tubes Mean: 33 (30 - 36) μgm^{-3}

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 10 periods of data
Bias factor A 0.81 (0.74 - 0.9)
Bias B 23% (11% - 34%)
Diffusion Tubes Mean: 40 μgm^{-3}
Mean CV (Precision): 9
Automatic Mean: 33 μgm^{-3}
Data Capture for periods used: 97%
Adjusted Tubes Mean: 33 (30 - 36) μgm^{-3}



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Version 03 - November 2006

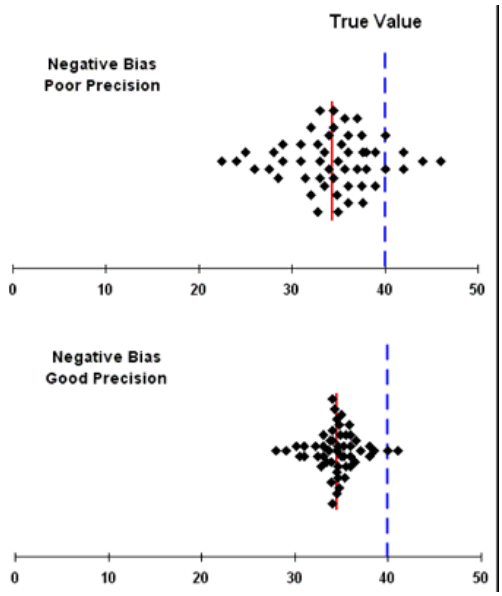
Discussion of Choice of Factor to Use

A bias adjustment factor of 0.82 was calculated using the diffusion tube spreadsheet tool, which used 13 studies for the method 10% TEA in water for 2007. A bias adjustment factor of 0.81 was calculated from the diffusion tubes co-located at the Paddy's Market site. This was done by using the AEA "Spreadsheet for calculating Precision, Accuracy and Bias Adjustment factors of Diffusion Tubes".

Using an overall correction factor derived from as many collocation studies as possible will provide the best estimate of the true annual mean concentration and therefore data had been adjusted using the national bias adjustment factor calculated from 13 collocation studies.

Unlike bias, poor precision cannot be adjusted for. It can only be improved by careful handling of the tubes in both the laboratory and the field. The two Figures below illustrate the difference between bias and precision. Both sets of results have the same calculated negative bias, shown by the vertical red line, compared with the true value. However, those in the top part of the Figure have poor precision, whereas those in the lower part have good precision (the vertical spread is just a way of displaying the large number of individual results).

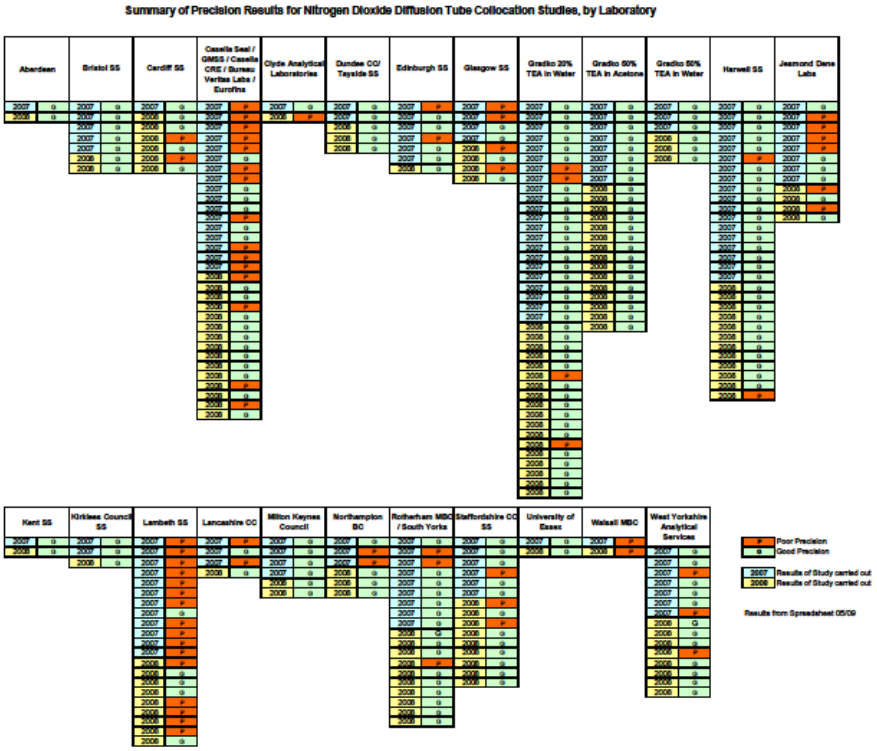
Good vs Poor Precision



Tube precision is separated into two categories Good or Poor as follows: tubes are considered to have Good precision where the coefficient of variation of duplicate or triplicate diffusion tubes for eight or more periods during the year is less than 20%, and the average CV of all monitoring periods is less than 10%. Tubes are considered to have Poor precision where the CV of four or more periods is greater than 20% and/or the average CV is greater than 10%.

The distinction between Good and Poor precision is an indicator of how well the same measurement can be reproduced. This precision will reflect the laboratories performance/consistency in preparing and analysing the tubes, as well as the subsequent handling of the tubes in the field. Any laboratory can show Poor precision for a particular period/collocation study, if this is due to poor handling of the tubes in the field. Therefore, when assessing the performance of a laboratory using the findings in the attached Figure, account should be taken of the proportion of Poor precision collocation results, not just the presence or absence of Poor precision collocation results.

Carlisle City Council



The precision results in the summary above for the individual laboratories are presented for two years, 2007 and 2008, as the performance of a laboratory may change from one year to another.

Results in 2008 from both the national collocation studies and our own local collocation study for Bureau Veritas Labs indicate good tube precision.

PM Monitoring Adjustment

Defra published the results of a study investigating the equivalence of various samplers and instruments for measuring PM10 in comparison with the European reference method (a gravimetric technique).

The study found that the TEOM did not meet the equivalence criteria of the European reference method within the UK, even with the 1.3 correction factor (as advised in previous guidance). The outcome of the equivalence study means that TEOM analysers cannot strictly be used to measure PM10 concentrations for comparison with the air quality objectives.

TEOM's are however widely used in LAQM work. Defra & the Devolved Administrations advice to local authorities using TEOM's is that it is generally not necessary to replace the instrument immediately, but when the time does come to replace it, the selected sampler should be a reference sampler, or one that meets the equivalence criteria.

In the meantime it is considered appropriate that TEOM analysers should remain suitable for the purpose of Review & Assessment, but data should be corrected wherever possible using the King's College London Volatile Correction Model (VCM) for PM10 (rather than by the application of a 1.3 correction factor).

The VCM has been used to correct data obtained during 2008 from our TEOM located at Paddy's Market. It should however be noted that the teom was replaced in 2009 with FDMS.

QA/QC of automatic monitoring

Both of our automatic stations are subject to stringent QA/QC procedures.

Paddy's Market, which monitors PM10, NO2 and more recently PM2.5, is part of the AURN and the network quality assurance and control procedures are implemented.

To ensure optimum data quality and capture, a three-tier system of calibration and analyser test procedures is employed in the AURN. The major components of this system are briefly described below.

a) Daily automatic IZS checks - these allow instrumental drifts to be examined, and act as a daily check on instrument performance.

b) Fortnightly manual calibrations - these are performed by the local site operators and are used by management unit to scale raw pollution data.

c) 6 – monthly network inter calibrations – These exercises are performed by the QA/Qc Unit every 6 months to ensure that all measurements from all network stations are completely representative and intercomparble. The inter calibrations will also act as an independant audit of the system at the site.

Data ratification is undertaken every 3 month intervals. This involves a critical review of all information relating to the data set to verify, amend or reject the data. When the data is ratified, they represent the final data set in the review & assessment process

Stanwix Bank, which monitors NO2 is data managed by Bureau Veritas Labs. Bureau Veritas Labs has a defined quality system that forms part of their UKAS accreditation that the laboratory holds.

Re-scaling relies on the LSO providing fortnightly calibration reports as a result of using calibration sources such as gas cylinders and zero air scrubbers. This data is used to calculate the true Analyser zero and response factor and is used to scale data for the following two weeks leading up to the next scheduled

Carlisle City Council

Appendix C Monthly NO2 Diffusion Tube Results

			AREA - A7 Scotland Rd															
					Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	months	AVE
A1	339995	557188	45 SCOTLAND ROAD	2	37	67	55	44	35	50	57	45	69	65	64	87	12	56.25
A10	340008	556842	STANWIX BANK	37	60	72	43	76	86	54	65	60	92	54	60	103	12	68.75
A12	339935	557125	14 ETTERBY ST	14	25	30	16	25	33	16	22	21	30	23	31	45	12	26.4167
A5	339758	558059	37 KINGSTOWN ROAD	34	45	59	52	44	34	45	50	44	58	54	58	78	12	51.75
A7	339526	559285	282 KINGSTOWN ROAD	29	30	48	34	34	25	39	31	39	43	42	48	a	11	37.5455
A9	340028	556833	BRAMPTON ROAD	31	44	51	25	54	52	47	50	50	60	a	60	78	11	51.9091
			AREA B CURROCK ST-DENTON ST															
B10	339347	555422	24 DALSTON ROAD	46	20												1	20
B11	340321	554621	6 CURROCK ROAD	47	17												1	17
B12	339921	555406	DENTON/CHAR	17	38	43	37	44	49	37	a	49	62	53	56	81	11	49.9091
B3	339537	555613	SHADDONMILL	12	30	38	23	25	24	27	26	26	35	31	41	111	12	36.4167
B4	339434	555638	DALSTON ROAD	24	62	69	57	55	46	53	51	61	58	61	72	101	12	62.1667
B5	339613	555587	8 JUNCTION ST	18	37	40	24	30	37	35	31	37	39	36	50	35	12	35.9167
B6	339731	555526	41 CHARLOTTE ST	33	45	46	33	30	27	33	39	38	43	40	45	67	12	40.5
B7	340205	555198	12 CURROCK STREET	25	45	54	38	44	37	41	37	56	58	56	59	84	12	50.75
			AREA C CITY CENTRE															
C1	340216	556131	LOWTHER STREET	19	25	50	38	37	52	36	a	a	51	49	46	70	10	45.4
C2	340069	555955	TIC	11	20	21	16	16	17	10	r	a	17	20	r	41	9	19.7778
C3	340218	555768	DEVONSHIRE STREET	13	38	49	43	46	57	30	a	r	51	46	28	70	10	45.8
C4	340286	555622	BAR SOLO	38	40	48	40	44	67	37	42	37	54	39	54	71	12	47.75
C5	340298	555589	GRIFFEN	48	45	53	46	45	38	45	45	45	50	51	54	76	12	49.4167

AREA D A69 WARWICK ROAD

D1	341106	555954	VICTORIA PLACE	1	32	39	30	28	39	26	33	37	49	38	51	55	12	38.0833
D10	342044	555907	368 WARWICK ROAD	3	35	r	28	21	32	28	a	39	33	51	48	71	10	38.6
D11	340426	556040	CARTEF	49	29	44	34	32	a	52	31	32	44	60	52	67	11	43.3636
D12	340307	555718	POST OFFICE	10	52	58	39	46	42	43	r	44	55	57	50	85	11	51.9091
D3	341153	555896	160 WARWICK ROAD	5	33	30	23	27	22	21	22	28	31	25	25	47	12	27.8333
D5	341310	555914	215 WARWICK ROAD	6	24	28	24	28	30	26	27	a	29	29	34	45	11	29.4545
D7	341593	555893	282 WARWICK ROAD	8	40	48	28	41	32	r	59	44	53	48	45	70	11	46.1818
D9	341426	555910	251 WARWICK ROAD	7	33	37	30	31	29	28	24	30	41	38	31	54	12	33.8333
D13			171 WARWICK ROAD	4	23												1	23

AREA E CALDEWGATE-WIGTON ROAD-NEWTOWN ROAD

E22	339834	556137	FINKLE STREET	30	45	52	43	42	29	35	46	a	55	43	48	67	11	45.9091
E12	339225	555821	3 WIGTON ROAD	32	46	59	43	43	82	45	58	56	68	57	58	71	12	57.1667
E15	339091	555736	WIGTON ROAD 22	26	45	59	51	38	50	42	44	54	53	56	63	67	12	51.8
E16	339141	555900	JOVIAL SAILOR	35	44	57	33	56	84	35	55	45	a	64	50	77	11	54.5455
E17	338562	6E+06	NEWTOWN RD	28														#DIV/0!
E19	338953	555610	49 WIGTON ROAD	44	49	73	43	47	67	35	52	62	59	51	56	93	12	57.25
E20	339023	555692	44 WIGTON ROAD	45	36	56	35	38	51	35	43	45	71	62	64	73	12	50.75
E4	339396	555947	JOHN STREET	36	43	54	42	47	56	40	43	43	37	84	76	63	12	52.3333
E6	339467	555974	AIR MONITOR 1	9	36	44	30	31	52	27	30	33	r	40	44	57	11	38.5455
E6	339467	555974	AIR MONITOR 2	15	38	41	29	45	45	30	30	35	45	41	43	58	12	40
E6	339467	555974	AIR MONITOR 3	16	41	43	27	42	62	36	37	36	40	36	47	58	12	42.0833
E8	339516	556024	IMPACT	23	64	71	53	59	94	60	58	a	79	61	51	98	11	68
E9	339405	555996	KC	20	27	47	34	47	39	29	44	40	46	52	45	66	12	43
E21	337730	556118	BURGH ROAD	42	17	27	15	18	13	11	14	19	24	14	21	44	12	19.75

AREA F BOTCHERGATE / LONDON ROAD

F1	340482	555489	3 TAIT STREET	39	40	45	35	36	31	34	32	34	45	44	47	55	12	39.8333
F10	349597	555351	155 BOTCHERGATE	43	35	41	31	36	59	32	32	42	50	39	46	72	12	42.9167
F5	340534	555409	STANLEY HALL	40	33	52	33	44	66	34	42	44	59	41	43	68	12	46.5833
F7	340708	555240	24 LONDON ROAD	41	42	52	43	45	35	48	42	50	56	48	49	67	12	48.0833
F9	341099	554931	129 LONDON ROAD	27	39	40	28	32	36	26	36	38	46	37	47	74	12	39.9167

AREA H TOWNS

H1	352824	561039	BRAMPTON	21	22	A	16	21	a	17	14	24	a	19	22	75	9	25.5556
H3	338052	568478	LONGTOWN	22	17	27	22	30	28	24	21	35	43	19	31	42	12	28.25
H4	347411	556881	WARWICK BRIDGE	50	31	40	26	50	57	36	35	56	a	52	39	56	11	43.4545
H5	337643	554100	WIGTON ROAD	4		35	23	20	22	14	a	79	26	39	29	46	10	33.3
H6	337962	553220	PETER LANE	47		18	7	8	17	8	11	c	20	9	18	27	10	14.3
H7	338282	553396	DALSTON ROAD	46		26	9	16	22	10	15	16	21	20	21	36	11	19.2727
			Airport	28	9	17	7	8	10	8	6	11	19	10	18	21	12	12

Appendix D

laref	name	address	desc	uwcode1
IPPC/111	West Scottish Lamb Limited	The Abattoir, Kingstown Industrial, Brunthill Road, CA3 0EH	Abattoir	
IPPC/036	Carrs Billington Ltd (A1 Pending)	Parkhill Road, Kingstown, CA3 0ER	Animal Feeds	626 PG6/26 Animal Feed Compoundin
EPA/024	Esk Building Products	Brisco, CA4 0QY	Brickmaking	314 PG3/14 Lime Slaking Processes
EPA/027	Tarmac Northern Limited	Willowholme Industrial Estate, CA3 5RT	Cement	301 PG3/1 Blending/Packing/Loadin
EPA/077	Lafarge Cement UK	Carlisle Railfreight Terminal, Brunthill Road, Kingstown Ind Estate	Cement	301 PG3/1 Blending/Packing/Loadin
EPA/113	Graeme Howe Fencing Limited	Unit 2 Marconi Road, Burgh Road Industrial Estate, CA2 7NA	Cement	301 PG3/1 Blending/Packing/Loadin
EPA/020	Hanson Quarry Products Europe	Willowholme Industrial Estate, CA2 4AF	Cement Process	301 PG3/1 Blending/Packing/Loadin
EPA/022	Cemex UK Materials Ltd	Kingstown Trading Estate, CA3 0EX	Cement Process	301 PG3/1 Blending/Packing/Loadin
EPA/051	Doves Limited	St. Nicholas Bridge, CA2 4AA	Chemical treatment of timber	603 PG6/3 Chemical Treatment Timb
EPA/038	J Foster & Son	Site 24, Brampton Road, Longtown, CA6 5TR	Coating Process	610 PG6/10 Coating Manufacture Pr
EPA/040	Crown Bevcan UK (A2)	Botcherby, CA1 2TL	Coating Process	607 PG6/7 Printing/Coating Metal
EPA/087	SPEEDY MORTAR LTD	Sandysike Industrial Estate, Longtown Industrial Estate, Longtown, Cum	Concrete and Cement Batching	301 PG3/1 Blending/Packing/Loadin
EPA/031	Bardon Concrete T/A Payne Mix	Stephensons Industrial Estate, CA2 5RN	Concrete Batching	301 PG3/1 Blending/Packing/Loadin
EPA/076	Bardon Concrete	The Peth, Graham Street, CA6 5NR	Concrete Batching	301 PG3/1 Blending/Packing/Loadin
EPA/092	Handy Concrete	Barras Lane Industrial Estate, Dalsotn Carlisle, CA5 7ND	Concrete Batching	301 PG3/1 Blending/Packing/Loadin
EPA/002	Carlisle Crematorium	Dalston Road, CA2 6AL	Crematoria	502 PG5/2 Crematoria
EPA/101	Lakeland Drycleaners	113 London Road, Carlisle, Cumbria, CA1 2LS	Dry Cleaners	643 PG6/46 - Dry Cleaners
EPA/102	Johnson Cleaners	1 Green Market, CA3 6JE	Dry Cleaners	643 PG6/46 - Dry Cleaners

Carlisle City Council

laref	name	address	desc	uwcode1
EPA/103	McKies Dry Cleaners	The Exchange, Lonsdale Street, Carlisle, Cumbria, CA1 1BD	Dry Cleaners	643 PG6/46 - Dry Cleaners
IPPC/084	McVities UK (A1)	52-54 Church Street, Caldewgate, CA2 5TG	Food Process	
IPPC/085	Nestle	Dalston Road, CA5 7NH	Food Process	
IPPC/086	Cavaghan & Gray Ltd (A1)	Brunel House, Brunel Way, CA1 3NQ	Food Process	
IPPC/083	Cumbria Waste Management (A1)	Hespin Wood, Landfill Site	Landfill	
IPPC/118	Seymour Plant Hire Ltd	Durranhill Railway Sidings, Durranhill, Calrisle, CA1 2RQ, CA1 2RQ	Landfill	
EPA/049	Alexandra Sawmills	Byron Street, CA2 5TB	Manufacture of Timber and Wood Based products	602 PG6/2 Manufacture Timber/Wood
EPA/091	JLT Plant Hire	Heads Nook, CA8 9EJ	Mobile Crusher	316 PG3/16 Mobile Crushing aand S
EPA/007	North Gas Networks Limited	Nr Wetheral	Natural Gas Odorisation	115 PG1/15 Odourising Natural Gas
EPA/035	G K Ford	Kingstown, CA3 0HE	Paint Spraying	634 PG6/34 Respray Road Vehicles
EPA/067	Lloyd Motors Ltd	Chandler Way, CA3 0JY	Paint Spraying	620 PG6/20 Paint Appl Vehic Manf
IPPC/110	Randlawfoot Poultry Farm	Randlaw Lane, Great Corby, CA8 9BZ	Poultry Farm	
IPPC/104	Grampian Country Chickens (Rearing) Limited	Fairholme, Walby, CA6 4QL	Poultry Farm	
IPPC/105	Cairnholme Poultry Farm	Whitehead Hill, Cumwhitton, CA8 9BZ	Poultry Farm	
IPPC/106	Lyne Moor Farm	Brampton Road, Longtown, CA6 5TR	Poultry Farm	
IPPC/107	Close Gap Poultry Farm	Close Gap Poultry Farm, Longtown, CA6 5NA	Poultry Farm	
IPPC/108	Wreay Poultry Farm	Chapel Hill Road, Wreay, CA4 0PR	Poultry Farm	
IPPC/109	Eden Ford Poultry Farm	Randlaw Lane, Great Corby, CA8 9BZ	Poultry Farm	
EPA/045	Thomson W & M (Quarries) Ltd	Hallbankgate, Brampton, CA8 2PE	Quarry	308 PG3/8 Quarry Processes Roadst
EPA/023	Carlisle Coated Stone	Carlisle Coating Plant, Stephenson Industrial Estate, Willowholme, CA2	Roadstone	308 PG3/8 Quarry Processes Roadst
EPA/039	Pirelli Limited (A2)	Pirelli Tyres Limited, Dalston Road, Carlisle, Cumbria, CA2 6AR	Rubber Process	628 PG6/28 Rubber Processes
EPA/081	R Hind Limited (Coulthard)	Kingstown Broadway, Kingstown, CA3 OHA	Spray Booth	634 PG6/34 Respray Road Vehicles
EPA/078	Cumbria Waste	Unit 5a, Wavell Drive, Rosehill Industrial	Storgae of Cement	301 PG3/1 Blending/Packing/Loadin

Carlisle City Council

laref	name	address	desc	uwcode1
	Management Limited	Estate, CA6 4BH		
!PPC/034	Stead McAlpin	Cummersdale, CA2 6BT	Textile Printing	608 PG6/8 Textile/Fabric/Finishing
EPA/011	Andersons Ltd	Denton Holme Sawmills, Denton Holme, CA2 5EQ	Timber	602 PG6/2 Manufacture Timber/Wood
EPA/004	BSW Timber	Carlisle Sawmill, Cargo, Rockliffe, CA6 4BA	Timber Process	603 PG6/3 Chemical Treatment Timb
EPA/001	Asda Carlisle Petrol Filling Station	Chandler Way, Parkhouse, Kingstown Industrial Estate, CA3 0JQ	Vapour Recovery	113 PG1/14 - Unloading of Petrol
EPA/006	Esso Harraby Green Service Station	London Road, CA1 2PR	Vapour Recovery	113 PG1/14 - Unloading of Petrol
EPA/009	Tuddenhams (Longtown) Ltd	Bridge Street Service Station, Bridge Street, Longtown, Longtown, CA6	Vapour Recovery	113 PG1/14 - Unloading of Petrol
EPA/010	Morrison Petrol Service Station	Kingstown Road, CA3 0BJ	Vapour Recovery	113 PG1/14 - Unloading of Petrol
EPA/021	BP Mobil, Morton Service Station	Wigton Road, CA2 6JS	Vapour Recovery	113 PG1/14 - Unloading of Petrol
EPA/032	Newby West Filling Station	Wigton Road, CA2 6QU	Vapour Recovery	113 PG1/14 - Unloading of Petrol
EPA/053	James Street Service Station	James Street, CA2 5AH	Vapour Recovery	113 PG1/14 - Unloading of Petrol
EPA/054	Currock Road Service Station	Currock Road, CA2 4AS	Vapour Recovery	113 PG1/14 - Unloading of Petrol
EPA/058	Tesco Filling Station	Warwick Road, CA1 2SB	Vapour Recovery	113 PG1/14 - Unloading of Petrol
EPA/059	BP Oil (terminal)	Barras Lane, Dalston, CA5 7ND	Vapour Recovery	113 PG1/14 - Unloading of Petrol
EPA/060	Whiteclosegate Filling Station	Brampton Old Road, CA3 0JN	Vapour Recovery	113 PG1/14 - Unloading of Petrol
EPA/061	Moss Filling Station	Todhills, CA6 4HA	Vapour Recovery	113 PG1/14 - Unloading of Petrol
EPA/062	Kingstown Filling Station	Kingstown Road, CA3 0BN	Vapour Recovery	113 PG1/14 - Unloading of Petrol
EPA/063	Corby Hill Garage	Corby Hill, CA4 8PL	Vapour Recovery	113 PG1/14 - Unloading of Petrol
EPA/064	Carleton Filling Station	London Road, CA4 0AA	Vapour Recovery	113 PG1/14 - Unloading of Petrol
EPA/065	Golden Fleece Filling Station	Exelby Services Ltd, Londonderry Garage, Londonderry, Northallerton, D	Vapour Recovery	113 PG1/14 - Unloading of Petrol
EPA/068	Hardwicke Filling Station	Hardwick Circus, CA3 1JE	Vapour Recovery	113 PG1/14 - Unloading of Petrol
EPA/069	Shell Carlisle North	A74, North Bound, Todhills, CA6 4HA	Vapour Recovery	113 PG1/14 - Unloading of Petrol
EPA/074	Low Row Service Station	Low Row, CA8 2JE	Vapour Recovery	113 PG1/14 - Unloading of Petrol
EPA/003	Rickerby Ltd	Carlisle Branch, Currock Road, Currock	Waste Oil Burner	101 PG1/1 Waste Oil Burn <0.4MW

Carlisle City Council

laref	name	address	desc	uwcode1
		Road, CA2 4AU		
EPA/005	Michael Douglas Auto Salvage	The Field, Etterby, Etterby, CA3 9QU	Waste Oil Burner	101 PG1/1 Waste Oil Burn <0.4MW
EPA/008	Armstrong & Denholm	South Henry Street, CA1 2AE	Waste Oil Burner	101 PG1/1 Waste Oil Burn <0.4MW
EPA/012	Solway Leyland DAF	Kingstown Broadway, CA3 0HD	Waste Oil Burner	101 PG1/1 Waste Oil Burn <0.4MW
EPA/013	Cuthberts Auto Repairs	Corby Hill Garage, Corby Hill, CA4 8PL	Waste Oil Burner	101 PG1/1 Waste Oil Burn <0.4MW
EPA/016	M & B Body Repairs	St. Nicholas Street, CA1 2EE	Waste Oil Burner	101 PG1/1 Waste Oil Burn <0.4MW
EPA/017	Fell View Garage	Hallbankgate, Brampton, CA8 2NJ	Waste Oil Burner	101 PG1/1 Waste Oil Burn <0.4MW
EPA/017	P & H Ferguson	Fell View Garage, Road Leading From South Of Mil, Hallbankgate, Cumbri	Waste Oil Burner	101 PG1/1 Waste Oil Burn <0.4MW
EPA/018	MGM Motors	Morton Street, Caldewgate, CA2 5UU	Waste Oil Burner	101 PG1/1 Waste Oil Burn <0.4MW
EPA/044	David Street Garage	3 David Street, CA1 2LR	Waste Oil Burner	101 PG1/1 Waste Oil Burn <0.4MW
EPA/046	Hawats Garage	Telford Road, Durranhill, CA1 3NW	Waste Oil Burner	101 PG1/1 Waste Oil Burn <0.4MW
EPA/079	Benfield Motors	Rosehill Estate, CA1 2UR	Waste Oil Burner	101 PG1/1 Waste Oil Burn <0.4MW
EPA/080	Cumbria Constaulary	Northern Traffic Unit, Hadrians Camp Houghton Road, CA3 8QL	Waste Oil Burner	101 PG1/1 Waste Oil Burn <0.4MW
EPA/088	BROADWAY AUTO REPAIR	Unit 4, Site 9, Kingstown Broadway, Kingstown, CA3 0HA	Waste Oil Burner	101 PG1/1 Waste Oil Burn <0.4MW
EPA/093	Port Road Garage	Port Road, CA2 7AJ	Waste Oil Burner	101 PG1/1 Waste Oil Burn <0.4MW
EPA/094	Newtown Garage	58 Port Road, CA2 7AJ	Waste Oil Burner	101 PG1/1 Waste Oil Burn <0.4MW
EPA/095	Mr N Casey	Infirmary Street Garage, Infirmary Street, Carlisle, Cumbria, CA2 7AA	Waste Oil Burner	101 PG1/1 Waste Oil Burn <0.4MW
EPA/096	K M Auto Repairs	Unit 6, Lorne Crescent, Carlisle, Cumbria, CA2 5XW	Waste Oil Burner	101 PG1/1 Waste Oil Burn <0.4MW
EPA/097	Kenneth Charles Irving	Woodvilla, Cargo Beck, CA6 4BB	Waste Oil Burner	101 PG1/1 Waste Oil Burn <0.4MW
EPA/100	Low Row Service Station	Low Row, Brampton, CA8 2JE	Waste Oil Burner	101 PG1/1 Waste Oil Burn <0.4MW
EPA/112	Alan Tuer Plant Hire	North View, Blackford, CA6 4EA	Waste Oil Burner	101 PG1/1 Waste Oil Burn <0.4MW
EPA/116	AUTO TECH (CARLISLE) LTD	30 Parkhill Road, Carlisle, Cumbria, CA3 0EX	Waste Oil Burner	101 PG1/1 Waste Oil Burn <0.4MW
EPA/117	Graham (Commercials) Ltd	Kingstown Broadway, Kinsstown Industrial Estate, Carlisle, CA3 0HA	Waste Oil Burner	101 PG1/1 Waste Oil Burn <0.4MW

Appendix E - Updated Traffic Data for Carlisle

2008 Flows					
LOCATION	EASTING	NORTHING	AM	PM	AADT
A7 Kingstown Road (Parkhouse Road to M6 Jct 44)	339430	559690	2769	2820	38560
A7 Kingstown Road (Kingstown Broadway to Parkhouse Road)	339500	559320	1943	1458	23472
A7 Kingstown Road (Morrisons to Kingstown Broadway)	339700	558330	1864	1379	22376
A7 Scotland Road (Morrisons to Etterby Street)	33980	557570	1843	1873	25641
A7 Stanwix Bank (Etterby Street to Brampton Road	340000	556950	2659	2493	35551
A7 Eden Bridge	340060	556570	4225	4069	57225
A7 Georgian Way	340270	556190	2632	2876	38006
Etterby Street	339750	557190	834	660	10306
B6264 Brampton Road	340920	557630	1165	1283	16886
Shaddongate	339480	555810	1382	1300	18500
Junction Street	339710	555550	1510	1531	20978
Denton Street	339790	555130	652	795	9985
Victoria Viaduct (East of James Street junction)	340080	555650	1010	1032	14091
James Street	340170	555290	1758	2315	28103
English Street/The Courts	340210	555680	379	523	6222
The Crescent	340290	555670	950	1133	14368
Lowther Street	340230	555940	1040	966	13843
West Tower Street/The Market	340040	556170	1505	1295	19319
A 595 Castle Way	339700	556100	4017	3639	52820
A 595 Church Street/Caldewgate	339350	555940	3602	3442	48602
A 595 Wigton Road (Dunmail Drive to Newtown Road)	338870	555530	1260	1509	19102
A 595 Wigton Road (South of Dunmail Drive)	338040	554830	1035	1199	15412
B 5307 Newtown Road	338160	556030	1043	1173	15289
B 5299 Dalston Road (Junction Street to Dunmail Drive)	339240	555240	1630	1557	21986
B 5299 Dalston Road (Dunmail Drive to Pirelli)	338800	554360	1349	1001	16214
Victoria Place (West of Georgian Way)	340300	556020	763	1062	12591
Victoria Place (East of Georgian Way)	340670	556090	836	1051	13018
A69 Warwick Road (Spencer Street to The Crescent)	340360	555770	854	1063	13225

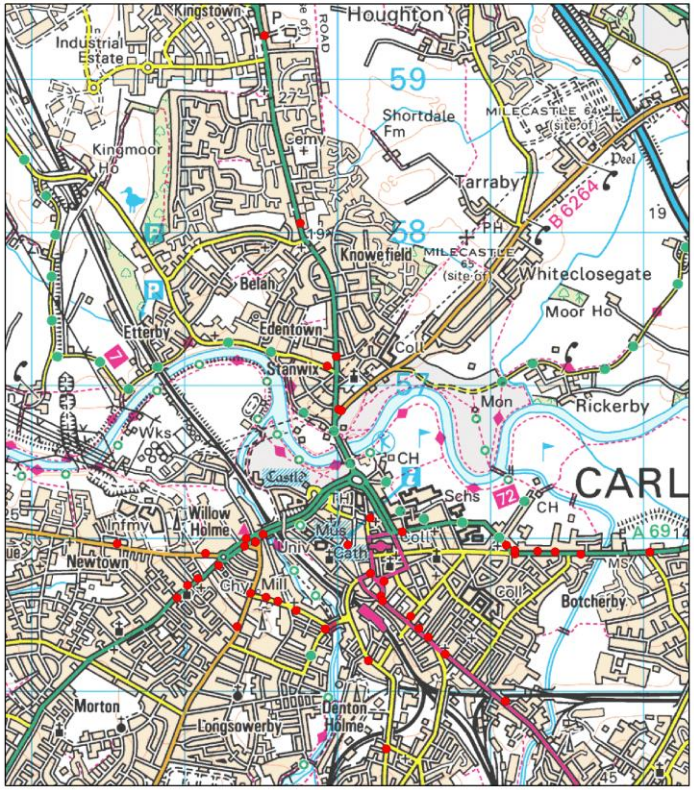
Carlisle City Council

A69 Warwick Road (Victoria Place to Spencer Street)	340900	555930	1096	1285	16424
A69 Warwick Road (East of Victoria Place)	341410	555910	1943	2258	28978
A69 Warwick Road (West of Eastern Way)	342170	555930	1766	2075	26497
A69 Warwick Road (East of Montgomery Way)	342860	555990	2192	2360	31403
A6 Botchergate	340420	555520	890	923	12514
A6 London Road	341610	554350	1357	1600	20402

Carlisle City Council

APPENDIX F

Location of NO2 Tubes within Carlisle City Council Area



NO2 Tube

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