Belfast City Council - Northern Ireland

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

In fulfillment of the Environment (Northern Order) Order 2002
Local Air Quality Management

April 2009

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Executive Summary

In accordance with Environment (NI) Order 2002 Belfast City Council has carried out an Updating and Screening Assessment with the intention of identifying changes that have occurred since the previous round of Review and Assessment. This assessment was undertaken in compliance with the criteria outlined in LAQM-TG(09), and focused on new sources, sources that have changed significantly, sources where new exposure has been identified and new source types which have been introduced into the updated guidance.

The findings of this assessment would indicate it is necessary to conduct a 'Detailed Assessment' in the following areas:

- City Centre for nitrogen dioxide based on exceedences monitored at city centre diffusion tube monitoring sites and new residential receptors.
- Ormeau Road AQMA for nitrogen dioxide with a view of revoking this AQMA.
- M1/Westlink Corridor AQMA for both nitrogen dioxide and particulate matter to identify the effectiveness of extensive road works which have been undertaken

It is not deemed necessary to carry out a 'Detailed Assessment' of the Upper Newtownards Road or Cromac Street to AlbertBridge Road AQMAs as the situation in these areas has not changed significantly since the previous round of R&A. Improving air quality in these areas is continually tackled through our Air Quality Action Plan.

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1 Introduction

1.1 Description of Local Authority Area

Air quality in Belfast today is generally considered to be of good quality although in some areas certain pollutants remain a concern. Belfast experienced significant improvements with the introduction of the Clean Air Act and Smoke Control programme in the late 1960s which targeted domestic particulate and sulphur dioxide emissions. The impact of this programme was further augmented by widespread availability of natural gas within both the commercial and domestic sectors, which has had a beneficial effect on particulate and sulphur dioxide emissions. Industrial emissions are principally controlled via industrial Pollution control permitting legislation. Currently the predominant sources of air pollution in Belfast are from vehicle exhausts. Our heavy reliance on road transport produces fine particulate matter (PM_{10} and $PM_{2.5}$) and nitrogen dioxide which contribute to the formation of low level ozone.

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 Northern Ireland** are set out in the Air Quality Regulations (Northern Ireland) 2003, Statutory Rules of Northern Ireland 2003, no. 342, and are shown in Table 1.1. This table shows the objectives in units of micrograms 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 Northern Ireland.

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene			
	16.25 $\mu g/m^3$	Running annual mean	31.12.2003
	3.25 $\mu g/m^3$	Running annual mean	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 $\mu g/m^3$	Annual mean	31.12.2004
	0.25 $\mu g/m^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu g/m^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu g/m^3$	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 $\mu g/m^3$, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu g/m^3$	Annual mean	31.12.2004
Sulphur dioxide	350 $\mu g/m^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu g/m^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu g/m^3$, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessment

As part of the review and assessment process Belfast City Council conducted a Second and Third Stage Review and Assessment of air quality throughout its area in 2004. This concluded that modelled exceedences of the nitrogen dioxide and particulate matter were occurring in the city and would continue to do so after 2010. Consequently, in August 2004 four Air Quality Management Areas (AQMA) were declared, comprising the M1 Motorway and Westlink corridor, Cromac Street to the junction of Short Strand, Woodstock Link and the Albertbridge Road, the Upper Newtownards Road and the Ormeau Road. The M1-Westlink AQMA was declared on the basis that the annual mean and hourly mean nitrogen dioxide concentrations would exceed the 2005 Objective. Particulate matter (annual and 24-hour means) was also predicted to exceed the relevant objectives for this area. The three other areas were declared on the grounds that they would exceed the annual mean nitrogen dioxide objective. These areas are defined in Figures 1 to 4, a larger scale map showing AQMAs location is provided in Appendix C.

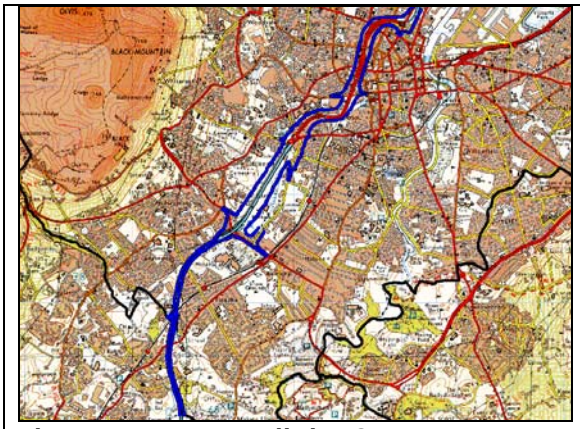

Figure 1: M1-Westlink AQMA

Figure 2: Cromac Street and Albertbridge Street AQMA

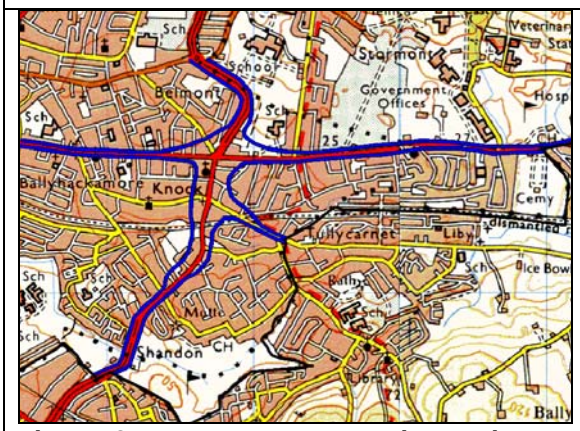

Figure 3: Upper Newtownards Road AQMA

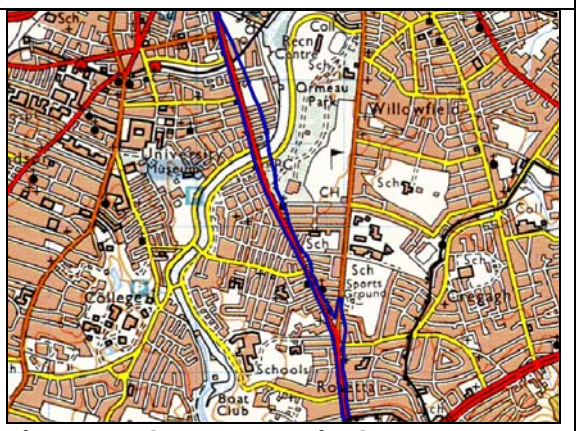

Figure 4: Ormeau Road AQMA

In May 2006, Belfast City Council and 11 other parties published an Air Quality Action Plan setting out how air quality in these areas and across the city as a whole was to be tackled. In April 2006, Belfast City Council published their Updating and Screening Assessment that concluded that five further areas within the city required consideration. These areas underwent a detailed dispersion modelling exercise in 2007. With the exception of the city centre and the four existing AQMAs no other areas were found to be exceeding the relevant objectives. The city centre was highlighted as being particularly sensitive to potential exceedences of the nitrogen dioxide annual mean objective and consequently Belfast City Council increased their monitoring infrastructure in this area and continually review the situation. In the same year, Belfast City Council published the first progress report relating to the Action Plan. This found that good progress on the majority of the 164 identified actions was

being made with only 4% of the actions having had no progress within the first year. Following the 2007 Detailed Assessment an Air Quality Progress Report was produced in April of 2008. This report covered air quality monitoring data carried out throughout Belfast, all new developments that had the potential to impact on air quality, progress with the implementation of the Action Plan and Transportation Strategies. Conclusions from this report noted decreasing trends in both concentrations of background nitrogen dioxide and particular matter (PM_{10}), however despite this decrease it is still unlikely the M1/Westlink Corridor AQMA would meet the objectives.

The current stage in the Review and Assessment process is to conduct an Update and Screening Assessment. This report follows Guidance LAQM.TG(09) issued by DEFRA and intends to identify any significant changes that have occurred since the previous stage of R&A which may have the potential to affect the localised air quality.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Continuous nitrogen dioxide concentrations have been monitored at the Belfast Centre site since 1992. This continuous real time nitrogen dioxide monitoring equipment is part of Defra's Automatic Urban and Rural Network (AURN). In April 2002, Belfast City Council established a roadside continuous monitoring location on the Upper Newtownards Road (Belfast Roadside site) and on the Westlink. In 2006, due to the major road rebuilding scheme along the M1-Westlink corridor the Westlink site was closed and relocated to the Stockman's Lane Site. In May 2006, a roadside continuous nitrogen dioxide monitoring station was established on the Ormeau Rd. Location maps for the monitoring sites can be found in appendix B, and further site details are provided in table 2.1.

These council operated sites are calibrated and operated under the same principles as Defra's Automatic Urban and Rural Network, they undergo regular independent audits and the data is independently collated, scaled and verified before disseminating, further details on the QA/QC procedures can be found in appendix A.

Table 2.1 Details of Belfast City Council 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)*	Worst-case Location ?
Belfast Centre	Urban Centre	X 333898 Y374358	NO2	N	Y (6.8m)	30m	Y
Belfast Ormeau Road	Roadside	X 334272 Y 373012	NO2	Y	Y(10m)	3m	Y
Belfast Ballyhackamore	Roadside	X 337911 Y 373972	NO2	Y	Y(10m)	3m	Y
Belfast Stockman's Lane	Roadside	X 331004 Y371230	NO2	Y	Y(20m)	2m	Y

2.1.2 Non-Automatic Monitoring

In addition to the continuous monitoring stations, Belfast City Council utilise nitrogen dioxide diffusion tubes to monitoring throughout the city. Further site specific details on these tube locations are provided in Table 2.2, while the tube data is presented in Table 2.4a. These locations provide indicative annual mean concentrations of nitrogen dioxide throughout the city and are bias adjusted against co-located tubes at the Belfast Centre site in accordance with LAQM.TG(09). Diffusion tube QA/QC details which include the bias adjustment factor and adjusted tube data for 2008 is reported in appendix A. In 2007, Belfast City Council maintained 27 tube locations. Following a review of these locations and based on information from the Detailed Assessment (Belfast City Council, 2007), in April of 2008 the number of locations was increased to 40. These new locations focus on monitoring receptors near busy roads. They are used to evaluate any potential exceedences outside of the declared AQMAs and to highlight potential areas of concern for future investigation. This is particularly relevant in the City Centre where the potential for exceedences was highlighted in the 2007 Detailed Assessment.

Table 2.2 Details of Non- 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)	Worst-case Location?
Royal Victoria Hospital	Urban Background	X 332521 Y 374488	NO_2	N	1.93	N/A	Y
Black's Road	Roadside	X 329782 Y 374408	NO_2	Y	>60	2.42	Y
61 Cromac Street	Roadside	X 334220 Y 371253	NO_2	Y	13	2.7	Y
Ravenhill Road	Roadside	X 335014 Y 373972	NO_2	Y	4.7	5.5	Y
Queen's Bridge	Urban Background	X 334547 Y 380450	NO_2	N	13	N/A	Y
North Road	Urban Background	X 337550 Y 373122	NO_2	N	On School Wall	>300	Y
Donegall Square South	Roadside	X 333837 Y 373877	NO_2	N	25	5.15	Y
Milner Street	Roadside	X 332476 Y 372519	NO_2	Y	>100	2.8	Y
Short Strand	Roadside	X 334980 Y 376602	NO_2	N	30	1.14	Y
301 Ormeau Road	Roadside	X 334503 Y 375493	NO_2	Y	0	8.63	Y
400 Ormeau Road	Roadside	X 335006 Y 369850	NO_2	Y	0	10	Y
Knock Road	Roadside	X 338718 Y 373772	NO_2	Y	30	1.48	Y
Great George's Street	Kerbside	X 333981 Y 374240	NO_2	Y	25	0.5	Y
Lisburn Road	Kerbside	X 332441 Y 374123	NO_2	N	1	0.9	Y
Shaftesbury Square	Roadside	X 333594 Y 373529	NO_2	N	20	4.4	Y
Lombard Street	Urban Centre	X 333898 Y 373100	NO_2	N	6.8	30	Y

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Albert Clock	Roadside	X 334212 Y 373988	NO_2	N	3.6	2.4	Y
Victoria Street	Roadside	X 334200 Y 371342	NO_2	N	2.44	3.87	Y
Stockman's Lane	Roadside	X 331006 Y 374232	NO_2	Y	20	1.75	Y
Ballyhackamore	Roadside	X 337911 Y 375279	NO_2	Y	9.4	2.91	Y
Whitewell Road	Roadside	X 333562 Y 376121	NO_2	N	35	13	Y
Donegall Road	Kerbside	X 333021 Y 378045	NO_2	N	1.96	0.82	Y
Grosvener Road and Falls Road	Roadside	X 332251 Y 376383	NO_2	N	0.03	3.06	Y
Falls Road and Andersonstown	Roadside	X 330715 Y 378199	NO_2	N	15	2.8	Y
Knocknagoney Road (Sydenham Bypass)	Suburban	X 338298 Y 374488	NO_2	N	10	40.43	Y
Station Road	Roadside	X 337181 Y 374408	NO_2	N	20.1	2.41	Y
House of Sport	Roadside	X 332373 Y 371253	NO_2	N	2	7.7	Y
Great Victoria Street	Roadside	X 333547 Y 373972	NO_2	N	1	3	Y
College Square East	Roadside	X 333498 Y 380450	NO_2	N	1.5	2	Y
Chichester Street	Roadside	X 334147 Y 373122	NO_2	N	1	2	Y
Cromac & Ormeau Avenue	Kerbside	X 334114 Y 373877	NO_2	Y	2.5	0.75	Y
M1 end of Donegall Road	Roadside	X 332190 Y 372519	NO_2	Y	2	2	Y
Creche on M1/Westlink	Suburban	X 333049 Y 376602	NO_2	Y	7	20	Y

Ormeau Road (junction with Ravenhill Road)	Roadside	X 334942 Y 375493	NO_2	Y	3	2	Y
Upper Newtownards Road & Hollywood Road	Roadside	X 336518 Y 369850	NO_2	N	2	3	Y
Crumlin Road	Roadside	X 333195 Y 373772	NO_2	N	2	2	Y
228 Antrim Road	Roadside	X 333280 Y 374240	NO_2	N	1.5	2	Y
Shore Road (M2 Junction 1 end)	Kerbside	X 334163 Y 374123	NO_2	N	30	0.7	Y
Shore Road (Ivan Street end)	Roadside	X 334173 Y 373529	NO_2	N	2	4	Y
North Circular	Kerbside	X 333166 Y 373100	NO_2	N	17	0.7	Y

2.2 Comparison of Monitoring Results with AQ Objectives

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

Table 2.3a provides all nitrogen dioxide continuous monitoring data collected since 2006. Data capture was above 90% at all the monitoring sites, therefore the 99.8th percentile was not included. Exceedences of the 40 µg/m^3 annual mean NO_2 objective and cases where there are more than the permitted 18 exceedences of the 200 µg/m^3 1-hour mean NO_2 objective are highlighted in bold. Concentrations at Belfast Centre site have remained stable over the last three year and are not close to the objectives, therefore based on the criteria for reviewing a site outside of an AQMA it is not necessary to proceed to a Detailed Assessment in this area. Monitoring data from 2008 at Belfast Roadside site indicates there has been little change since the previous round of R&A. Concentrations continue to exceedence the annual mean objective which supports the AQMA designation, which is being tackled through our action plan. Low annual mean concentrations identified at the Ormeau Road site would suggest it is appropriate to proceed to a detailed assessment with a view to revoking this AQMA. This decision is further justified on the basis of relevant exposure diffusion tube monitoring along the Ormeau Road, which also report annual mean's below the objective. Stockman's Lane site is within an AQMA declared on exceedences of both the annual and hourly NO_2 objective; based on the LAQM-TG(09) criteria it would not be considered necessary to proceed to a Detailed Assessment as the Action Plan is already in place to improve AQ in this area. However, extensive road work which was included in our Action Plan has been undertaken in this area and for these reasons it is

considered that a Detailed Assessment will be required which would enable effectiveness of these road works to be determined over a period of time.

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 (μg/m^3)		
				2006	2007	2008
	Belfast Centre	N	92	34	32	32
	Belfast Ormeau Road	Y	90	-	34	34
	Belfast Ballyhackamore	Y	92	**43**	**45**	**44**
	Belfast Stockman's Lane	Y	90	**63**	**64**	**62**

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

Site ID	Location	Within AQMA?	Data Capture 2008 %	Number of Exceedences of hourly mean (200 μg/m^3) *If the period of valid data is less than 90% of a full year, include the 99.8th %ile of hourly means in brackets.*		
				2006	2007	2008
	Belfast Centre	N	92	5	0	3
	Belfast Ormeau Road	Y	90	-	1	0
	Belfast Ballyhackamore	Y	92	-	0	0
	Belfast Stockman's Lane	Y	90	-	15	**21**

Diffusion Tube Monitoring Data

All diffusion tube monitoring has been bias-adjusted using the co-location study and the continuous monitoring station at Belfast Centre, further details on calculations used to generate adjusted results and information on QA/QC procedures in place are provided in appendix A while appendix C provided a map of diffusion tube locations. As previously mentioned the diffusion tube network was increased in April 2008 to provide monitoring data in areas of concern as identified in previous rounds of R&A. These new locations are numbered as 33 to 45 in Table 2.4a and 2.4b, as they only started in April of 2008 all have a valid data period of less than 90%. A recent review of the tube network has highlighted that the chosen location in some of these new site may not be appropriate in that some tubes are frequently removed, therefore a number of tubes are to be placed in more suitable locations in compliance with the guidance.

The monitoring sites at Cromac Street, Donegall Square South, Short Strand, Victoria Street, Great George Street, Albert Clock, Great Victoria Street and Chichester Street have all experienced means in excess of the 40 μg m^{-3} annual mean objective. Since previous rounds of R&A there has been residential development in number of these city centre locations, therefore based on relevant exposure as these locations are outside of existing AQMAs a Detailed Assessment will be required. Locations within existing AQMAs continue to indicate a breach of the objectives based on this evidence is it not deemed appropriate to proceed to a Detailed Assessment. An exception to this is the Ormeau Road AQMA which warrants a Detailed Assessment on evidence from both automatic and passive monitoring.

Table 2.4a Results of Nitrogen Dioxide Diffusion Tubes

Site ID	Location	Within AQMA?	Data Capture 2008 %	Annual mean concentrations 2008 ($\mu g/m^3$) Adjusted for bias
1	Royal Victoria Hospital	N	100	21
2	Black's Road	Y	100	36
3	61 Cromac Street	Y	100	**45**
4	Ravenhill Road	Y	100	33
5	Queen's Bridge	N	42	31
6	North Road	N	92	18
7	Donegall Square South	N	100	**42**
8	Milner Street	Y	75	35
9	Short Strand	N	75	**42**
10	301 Ormeau Road	Y	100	35
11	400 Ormeau Road	Y	100	27
12	Knock Road	Y	91	**47**
13	Great George's Street	Y	100	**51**
14	Lisburn Road	N	100	34
15	Shaftesbury Square	N	100	38
16,19,20	Lombard Street	N	100	**41**
17	Albert Clock	N	100	**43**
18	Victoria Street	N	100	**42**
21,22,56	Stockman's Lane	Y	100	**60**
23,24,32	Ballyhackamore	Y	100	**47**
25	Whitewell Road	N	91	21
26	Donegall Road	N	83	34
27	Grosvener Road and Falls	N	91	36
28	Falls and Andersonstown	N	75	30
29	Knocknagoney Road(Sydenham Bypass)	N	100	29
30	Station Road	N	91	24
31	House of Sport	N	100	21
33	Great Victoria Street	N	75	**41**
34	College Square East	N	67	37
35	Chichester Street	N	75	**40**
36	Cromac & Ormeau Avenue	Y	67	39
37	M1 end of Donegall Road	Y	50	37
38	Creche on M1/Westlink	Y	33	25
39	Ormeau Road (junction with Ravenhill Road)	Y	58	25
40	Upper Newtownards Road & Hollywood Road	N	67	27
41	Crumlin Road	N	75	31

42	228 Antrim Road	N	25	34
43	Shore Road (M2 Junction 1 end)	N	75	26
44	Shore Road (Ivan Street end)	N	75	35
45	North Circular	N	67	22

Table 2.4b Results of Nitrogen Dioxide Diffusion Tubes

Site ID	Location	Within AQMA?	Annual mean concentrations ($\mu g/m^3$) Adjusted for bias		
			2006	2007	2008
1	Royal Victoria Hospital	N	23	21	21
2	Black's Road	Y	39	**40**	36
3	61 Cromac Street	Y	**45**	**42**	**45**
4	Ravenhill Road	Y	35	31	33
5	Queen's Bridge	N			31
6	North Road	N	21	15	18
7	Donegall Square South	N	**41**	**42**	**42**
8	Milner Street	Y	**41**	39	35
9	Short Strand	N	39	22	42
10	301 Ormeau Road	Y	**40**	33	35
11	400 Ormeau Road	Y	33	25	27
12	Knock Road	Y			47
13	Great George's Street	Y	**49**	**40**	**51**
14	Lisburn Road	N	34	33	34
15	Shaftesbury Square	N	**46**	38	38
16,19,20	Lombard Street	N	34	33	**41**
17	Albert Clock	N			**43**
18	Victoria Street	N	**48**	38	**42**
21,22,56	Stockman's Lane	Y	**53**	**44**	**60**
23,24,32	Ballyhackamore	Y	37	33	**47**
25	Whitewell Road	N	24	23	21
26	Donegall Road	N	33	31	34
27	Grosvener Road and Falls	N		29	36
28	Falls and Andersonstown	N		29	30
29	Knocknagoney Road (Sydenham Bypass)	N		29	29
30	Station Road	N		23	24

31	House of Sport	N		27	21
33	Great Victoria Street	N			**41**
34	College Square East	N			37
35	Chichester Street	N			**40**
36	Cromac & Ormeau Avenue	Y			39
37	M1 end of Donegall Road	Y			37
38	Creche on M1/Westlink	Y			25
39	Ormeau Road (junction with Ravenhill Road)	Y			25
40	Upper Newtownards Road & Hollywood Road	N			27
41	Crumlin Road	N			31
42	228 Antrim Road	N			34
43	Shore Road (M2 Junction 1 end)	N			26
44	Shore Road (Ivan Street end)	N			35
45	North Circular	N			22

PM_{10}

Stockman's Lane site is within an AQMA declared on exceedences of both the annual mean and 24-hour objective; based on the LAQM-TG(09) criteria it would not be considered necessary to proceed to a Detailed Assessment as the Action Plan is already in place to improve AQ in this area. However, extensive road work which was included in our Action Plan has been undertaken in this area and for these reasons it is considered that a Detailed Assessment will be required which would enable effectiveness of these road works to be determined over a period of time.

Table 2.5a Results of PM_{10} Automatic Monitoring: Comparison with Annual Mean Objective

Site ID	Location	Within AQMA?	Data Capture 2008 %	Annual mean concentrations (μg/m^3)		
				2006	2007	2008
	Belfast Centre	N	93	18	19	18
	Belfast Stockman's Lane	Y	99	-	**43**	36

Table 2.5b Results of PM_{10} Automatic Monitoring: Comparison with 24-hour Mean Objective

Site ID	Location	Within AQMA?	Data Capture 2008 %	Number of Exceedences of daily mean objective (50 μg/m^3) *If data capture < 90%, include the 90th %ile of daily means in brackets.*		
				2006	2007	2008
	Belfast Centre	N	93	7	5	7
	Belfast Stockman's Lane	Y	99	-	**114**	**49**

2.2.2 Sulphur Dioxide

Previous rounds of R&A have concluded based on monitoring data that there is no evidence to suggest that there will be any exceedence of the 15minute, the 1-hour mean and the 24-hour mean objective for sulphur Dioxide within Belfast. Therefore a Detailed Assessment is not considered necessary.

2.2.3 Benzene

Previous rounds of R&A have concluded based on monitoring data that there is no evidence to suggest that there will be any exceedence of the running annual of 3.25 μg m^{-3} by the year 2010 within Belfast. Therefore a detailed Assessment is not considered necessary.

3 Road Traffic Sources

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Belfast 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.

DELETE BOX IF NOT APPLICABLE. OTHERWISE ADD LOCAL AUTHORITY NAME AND LEAVE IN.

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

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

DELETE BOX IF NOT APPLICABLE. OTHERWISE ADD LOCAL AUTHORITY NAME AND LEAVE IN.

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

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

DELETE BOX IF NOT APPLICABLE. OTHERWISE ADD LOCAL AUTHORITY NAME AND LEAVE IN.

3.4 Junctions

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

DELETE BOX IF NOT APPLICABLE. OTHERWISE ADD LOCAL AUTHORITY NAME AND LEAVE IN.

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

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

3.6 Roads with Significantly Changed Traffic Flows

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

3.7 Bus and Coach Stations

Belfast City Council confirms that there are no relevant bus stations in the District which have not been considered in previous round of R&A, and concluded that it will not be necessary to proceed to a Detailed Assessment.

4 Other Transport Sources

4.1 Airports

Belfast City Council has assessed the new criteria for airports, and concluded that it will not be necessary to proceed to a Detailed Assessment.

4.2 Railways (Diesel and Steam Trains)

4.2.1 Stationary Trains

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

4.2.2 Moving Trains

Belfast 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)

Belfast 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

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

Belfast 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.

5.1.2 Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been Introduced

Belfast 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

Belfast 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 are no major fuel (petrol) storage depots within the Local Authority area that have not been reviewed in previous rounds of R&A.

5.3 Petrol Stations

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

5.4 Poultry Farms

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

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

Belfast City Council confirms that there are no biomass combustion plant in the District.

6.2 Biomass Combustion – Combined Impacts

Belfast City Council confirms that there are no biomass combustion plant in the District.

6.3 Domestic Solid-Fuel Burning

Belfast City Council confirms that there are no areas of significant domestic fuel use in the District to cause concern.

7 Fugitive or Uncontrolled Sources

Belfast City Council confirms that there are no potential sources of fugitive particulate matter emissions in the District.

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

New monitoring data presented in the 2009 Updating and Screening Assessment would indicate it is necessary to conduct a 'Detailed Assessment' of nitrogen dioxide throughout the city centre. This is based on exceedences at city centre diffusion tube monitoring sites in relation to relevant exposure. The Ormeau Road AQMA will also be considered in relation to the nitrogen dioxide annual mean with a view to revoke this AQMA. It is considered that a 'Detailed Assessment' to consider both nitrogen dioxide and particulate matter (PM_{10}) will be required along the M1/Westlink corridor AQMA as a result of extensive road works which were undertaken. This will enable the effectiveness of these road works to be determined over a period of time.

It is not deemed appropriate to carry out a 'Detailed Assessment' of the Upper Newtownards Road or Cromac Street to AlbertBridge Road AQMAs as there is sufficient monitored evidence to indicate that air quality in these areas has not improved enough to consider revoking them.

8.2 Conclusions from Assessment of Sources

Previous rounds of R&A identified and assessed all sources within Belfast and the surrounding boundaries and concluded that none were considered to have a significant impact or have the potential to cause an exceedence outside of an existing AQMA. No new sources with relevant exposure have been identified through this Update and Screening Assessment. It is therefore not considered necessary to proceed to a 'Detailed Assessment' based on potential sources.

8.3 Summary of Proposed Actions

Based on the updating and Screening Assessment for nitrogen dioxide and particulate matter, it is considered appropriate to progress to a 'Detailed Assessment' in 2010 for the following areas and pollutants:

Table 2.6 Summary of the areas requiring a Detailed Assessment

Area	Reason	Pollutant
City Centre	Exceedences monitored at city centre diffusion tube monitoring sites and new residential receptors	Nitrogen dioxide
Ormeau Road AQMA	Monitored data indicated annual mean nitrogen dioxide are below the objective	Nitrogen dioxide
M1/Westline Corridor AQMA	Extensive road works undertaken throughout this AQMA.	Nitrogen dioxide Particulate matter

9 References

Belfast City Council, 2007. Belfast City Detailed Air Quality Assessment, 2007, Final Version, April 2007. Available at: www.airqualityni.co.uk/laqm

List of Part A and Part B processes in the Belfast area regulated by IPRI. Available at: www.ni-environment.gov.uk/pollution-home/ippc/ipc-public-registers/listofpartabprocessesppc.

Local Air Quality Management – Technical Guidance (09). 2009. Available at: www.defra.gov.uk/environment/airquality/index

National Society for Clean Air, 2006. *Development Control: Planning for Air Quality, 2006 Update.* Available at www.environmental-protection.org.uk/publications

Appendices

Appendix A: QA/QC Data

Appendix B: Belfast City Council Air Quality Management Area Locations

Appendix C: Belfast City Council Air Quality Monitoring Locations

Appendix A: QA:QC Data

Diffusion Tube Monitoring

Belfast City Council use Gradko International for the supply and analysis of diffusion tubes. The laboratory constantly delivers high performance both in terms of results and service, it operates in accordance with LAQM-TG(09), and participates in the WASP scheme.

2008 Bias-adjusted Results and Factor from Local Co-location Study

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	02/01/2008	30/01/2008	55.8	54.9	56.0	56	0.6	1	1.4	40.7	100	Good	Good
2	30/01/2008	27/02/2008	49.9	50.2	53.6	51	2.0	4	5.0	43.2	97	Good	Good
3	27/02/2008	02/04/2008	39.0	40.4	39.4	40	0.7	2	1.9	29.12	92	Good	Good
4	02/04/2008	30/04/2008	34.3	34.8	41.2	37	3.9	11	9.6	28.55	100	Good	Good
5	30/04/2008	28/05/2008	42.5	41.1	41.7	42	0.7	2	1.7	29	55	Good	or Data Capture
6	28/05/2008	25/06/2008	33.4	34.1	34.6	34	0.6	2	1.6	26	95	Good	Good
7	25/06/2008	30/07/2008	28.8	30.5	30.9	30	1.1	4	2.8	23	98	Good	Good
8	30/07/2008	03/09/2008	31.2	30.9	34.6	32	2.0	6	5.1	27	93	Good	Good
9	03/09/2008	01/10/2008	31.7	43.7	42.5	39	6.6	17	16.5	31	99.7	Good	Good
10	01/10/2008	29/10/2008	45.6	41.4	40.1	42	2.8	7	7.1	36	99.7	Good	Good
11	29/10/2008	03/12/2008	46.3	47.3	46.2	47	0.6	1	1.5	36.3	99.7	Good	Good
12	03/12/2008	07/01/2009	48.1	44.6	50.1	48	2.8	6	6.9	43.46	99.4	Good	Good
13													
												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

Overall survey -->

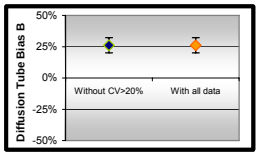
Site Name/ ID:	Lombard Str (16, 19, 20)

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

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 11 periods of data	
Bias factor A	0.8 (0.76 - 0.84)
Bias B	25% (19% - 31%)
Diffusion Tubes Mean:	41 μgm^{-3}
Mean CV (Precision):	5
Automatic Mean:	33 μgm^{-3}
Data Capture for periods used:	98%
Adjusted Tubes Mean:	33 (31 - 35) μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 11 periods of data	
Bias factor A	0.8 (0.76 - 0.84)
Bias B	25% (19% - 31%)
Diffusion Tubes Mean:	41 μgm^{-3}
Mean CV (Precision):	5
Automatic Mean:	33 μgm^{-3}
Data Capture for periods used:	98%
Adjusted Tubes Mean:	33 (31 - 35) μgm^{-3}



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Version 03 - November 2006

Adjustment of SINGLE Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tube Measurements																
Site Name/ID	Periods													Raw Mean	Valid periods	Adjusted measurement (95% confidence interval) with all the data 11 periods used in this calcuations
	1	2	3	4	5	6	7	8	9	10	11	12	13			Bias Factor A 0.8 (0.76 - 0.84) Bias B 25% (19% - 31%) Tube Precision: 5 Automatic DC: 98%
1. RVH	39.3	37.2	22.6	20.4	23.7	21.2	15.3	17.3	20.2	27.4	28.4	35.9		25.7	12	Adjusted with 95% CI 21 (20 - 22)
2. Blacks Rd	59.7	55.4	51.9	43.7	31.7	46.2	39.6	48.5	36.2	26.0	52.6	47.9		44.9	12	Adjusted with 95% CI 36 (34 - 38)
3. 61 Cromac Str	68.1	62.3	56.5	63.6	49.3	57.2	44.0	45.8	51.2	48.4	63.2	59.3		55.7	12	Adjusted with 95% CI 45 (42 - 47)
4. Ravenhill Rd	53.6	43.9	35.5	40.7	38.1	40.7	30.7	33.9	37.0	39.5	53.4	42.6		40.8	12	Adjusted with 95% CI 33 (31 - 34)
5. Queens Bridge	55.1	34.4	42.5	30.5						32.4				39.0	5	Adjusted with 95% CI 31 (30 - 33)
6. North Road	28.4	22.5	20.3	17.2	7.4	16.2	11.9	49.0	19.9		20.0	31.0		22.1	11	Adjusted with 95% CI 18 (17 - 19)
7. Donegal Sq. South	62.2	51.9	47.6	50.6	55.4	55.3	45.1	50.6	47.7	51.7	55.6	61.8		52.9	12	Adjusted with 95% CI 42 (40 - 44)
8. Milner Str	61.5	54.5	45.5	51.8	49.1	38.1	26.9	21.3			46.0			43.9	9	Adjusted with 95% CI 35 (33 - 37)
9. Short Strand	75.7	68.5	52.6	58.8	41.4	54.7	39.5	14.3	63.2					52.1	9	Adjusted with 95% CI 42 (40 - 44)
10. 301 Ormeau Rd	60.6	53.5	41.3	43.7	32.9	43.2	29.7	40.4	36.6	48.2	46.0	51.3		43.9	12	Adjusted with 95% CI 35 (33 - 37)
11. 400 Ormeau Rd	40.6	34.8	33.1	37.6	37.9	35.7	22.9	30.2	25.4	29.3	38.6	42.1		34.0	12	Adjusted with 95% CI 27 (26 - 29)
12. Knock Rd	75.7	64.1	48.8	59.5	54.4	56.8		50.7	52.1	54.8	64.8	68.3		59.1	11	Adjusted with 95% CI 47 (45 - 50)
13. Gr Georges Str	69.3	55.1	47.8	75.8	####	57.7	50.1	56.2	64.5	45.9	68.9	70.4		63.5	12	Adjusted with 95% CI 51 (48 - 53)
14. Lisburn Rd	61.8	54.6	49.8	41.9	30.4	36.5	29.1	25.6	32.5	46.2	50.3	51.8		42.5	12	Adjusted with 95% CI 34 (32 - 36)
15. Shaftesbury Sq	55.5	52.8	46.0	46.3	45.6	49.4	38.9	37.3	51.3	47.6	50.9	55.5		48.1	12	Adjusted with 95% CI 38 (37 - 40)
17. Albert Clock	75.5	68.4	49.5	57.3	67.2	44.8	42.4	33.3	48.0	54.7	57.8	53.0		54.3	12	Adjusted with 95% CI 43 (41 - 46)
18. Victoria Str	64.6	64.0	46.2	47.3	71.8	53.0	43.9	30.9	39.4	44.7	73.5	56.0		52.9	12	Adjusted with 95% CI 42 (40 - 44)
25. Whitewell Rd	26.7	28.5	19.7	37.3	45.3	27.2	26.5	19.8	18.7	15.1		23.9		26.2	11	Adjusted with 95% CI 21 (20 - 22)
26. Donegal Rd	49.5	49.2	52.6	47.8	39.9		33.7	35.4	35.0		41.1	40.3		42.4	10	Adjusted with 95% CI 34 (32 - 36)
27. Grovesner Rd	60.6	48.1	43.5	52.2	36.6		29.8	29.3	30.2	50.2	52.7	58.7		44.7	11	Adjusted with 95% CI 36 (34 - 38)
28. Falls and Andytown	49.1	44.3	29.7	38.8	46.3		26.1	33.5		31.1		41.3		37.8	9	Adjusted with 95% CI 30 (29 - 32)
29. Sydenham Bypass	61.9	39.0	56.9	29.5	14.4	32.5	28.0	31.0	25.2	40.6	40.9	42.1		36.8	12	Adjusted with 95% CI 29 (28 - 31)
30. Station Rd	42.4	36.0	34.7	27.7		25.8	17.9	22.0	20.1	32.3	38.6	38.5		30.5	11	Adjusted with 95% CI 24 (23 - 26)
31 House of Sport	38.2	35.2	25.3	24.4	31.7	22.7	15.7	19.0	23.1	18.1	31.8	29.1		26.2	12	Adjusted with 95% CI 21 (20 - 22)
																Adjusted with 95% CI #VALUE!

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

Adjustment of SINGLE Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tube Measurements

Site Name/ID	Periods													Raw Mean	Valid periods	Adjusted measurement (95% confidence interval) with all the data, 11 periods used in this calcuations. Bias Factor A 0.8 (0.76 - 0.84); Bias B 25% (19% - 31%); Tube Precision: 5; Automatic DC: 98%	
	1	2	3	4	5	6	7	8	9	10	11	12	13				
33 Great Victoria Street				52.7	45.5	55.9	31.9	40.8	47.8	52.2	67.3	61.9		50.7	9	Adjusted with 95% CI	**41 (39 - 43)**
34 College Square East				40.1	52.6	39.2		46.8	31.0	57.3	58.1	42.1		45.9	8	Adjusted with 95% CI	**37 (35 - 39)**
35 Chichester Street				52.5	48.2	52.2	41.6	51.8	51.9	44.4	47.5	61.8		50.2	9	Adjusted with 95% CI	**40 (38 - 42)**
36 Cromac/Ormeau Avenue				50.1	57.7	51.9	28.5	54.7	41.3		54.4	52.9		48.9	8	Adjusted with 95% CI	**39 (37 - 41)**
37 M1 End Donegall Road				43.8	39.3				44.3	52.5	49.3	46.8		46.0	6	Adjusted with 95% CI	**37 (35 - 39)**
38 Creche on M1/Westlink					38.8	26.6		31.0		29.7				31.5	4	Adjusted with 95% CI	**25 (24 - 26)**
39 Ormeau Rd/Ravenhill Rd				31.2	32.9	37.2	24.8	27.1		30.2	39.7			31.9	7	Adjusted with 95% CI	**25 (24 - 27)**
40 Upper Newtownards Rd/Hollywood Rd				25.9	34.1	27.4		30.0	37.7	38.7	38.3	41.1		34.1	8	Adjusted with 95% CI	**27 (26 - 29)**
41 Crumlin Rd				41.5	55.3	38.9	23.7	34.0	36.1	30.9	40.8	42.7		38.2	9	Adjusted with 95% CI	**31 (29 - 32)**
42 228 AntrimRd				39.6	44.5					42.8				42.3	3	Adjusted with 95% CI	**34 (32 - 36)**
43 Shore Rd (M2 End)				28.2	36.7	29.7	24.8	30.7	27.3	28.5	37.0	47.6		32.3	9	Adjusted with 95% CI	**26 (25 - 27)**
44 Shore Rd (Ivan St. End)				45.3	48.3	35.7	34.8	40.0	39.8	40.0	47.6	59.8		43.5	9	Adjusted with 95% CI	**35 (33 - 37)**
45 North Circular Rd				29.9	33.8	27.2	19.9	26.7	25.1	26.7		34.2		27.9	8	Adjusted with 95% CI	**22 (21 - 23)**
																Adjusted with 95% CI	**#VALUE!**
																Adjusted with 95% CI	**#VALUE!**
																Adjusted with 95% CI	**#VALUE!**
																Adjusted with 95% CI	**#VALUE!**
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																Adjusted with 95% CI	**#VALUE!**
																Adjusted with 95% CI	**#VALUE!**

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

Discussion of Choice of Factor to Use

In deciding the appropriate bias-adjustment factor to use Belfast City Council considered a number of factors and came to the conclusion co-location bias-adjustment was the preferred choice. This decision was based on the most suitable approach as outlined in LAQM-TG(09) Box 3.3 on the grounds that the co-location site used generally has "good" precision for the diffusion tubes with high quality results. In addition, this method was also chosen for constancy reasons as the site has been used for co-location bias-adjustment in previous rounds of R&A.

PM Monitoring Adjustment

Both the Belfast Centre and Stockman's Lane site during 2008 used a TEOM for particulate matter monitoring. Belfast City Council do not make any adjustments to the PM_{10} data as AEA Energy & Environment have been appointed to undertake all data management. AEA have confirmed a default correction of 1.3 has been applied to all Belfast TEOM data in order to generate a nominal "gravimetric-equivalent result".

QA/QC of Automatic Monitoring

Belfast City Council staff carry-out regular calibrations of all the automatic monitoring stations, and aim to carry-out a calibration every two weeks, however this is not always possible due to staff constraints.

In addition to the routine in-house calibrations BCC have appointed AEA Energy & Environment to undertake quality control audits to all monitoring stations. The quality control programme employed by this independent organisation is based on that outlined within LAQM.TG(09).
The audits provide valuable information on equipment performance and also a six-monthly assessment of all station calibration cylinder concentrations, ensuring that the concentrations remain stable and are thus suitable for data scaling purposes.

To ensure high quality data and uninterrupted data dissemination BCC appointed AEA Energy & Environment to undertake data management services to all monitoring stations.

This service provides:

- Daily data collection
- Screening, scaling and data ratification

- Fault notification to facilitate engineering support call out
- Data reporting (via the Northern Ireland Air Quality Archive)

QA/QC of Diffusion Tube Monitoring

Gradko International WASP results for 01.08 to 01.09 were as follows :

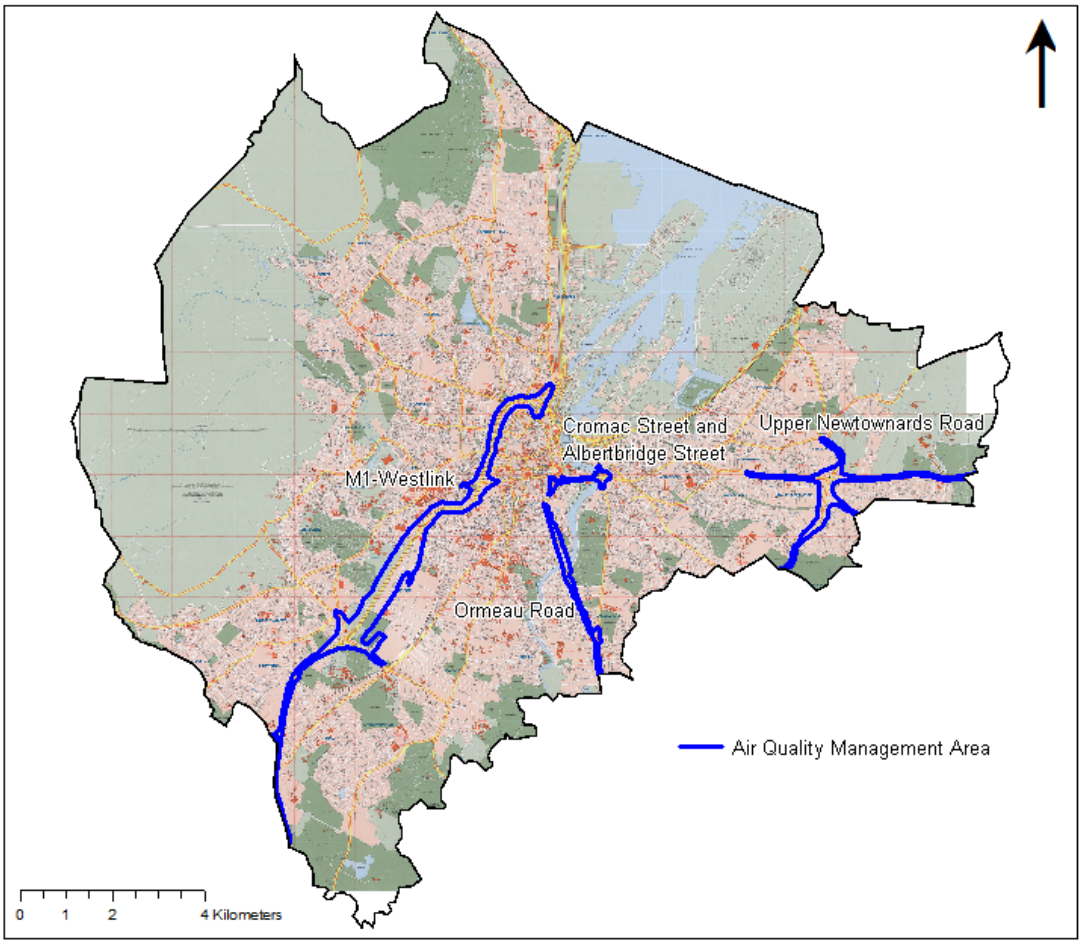
Jan08 Round 100: Ref Value :1.36ugNO2 Measured Value: 1.34 ugNO2 Z score -0.1 Satisfactory
Ref Value: 1.47ugNO2 Measured Value: 1.50 ugNO2 Z score 0.2 Satisfactory

March08 Round 101: Ref Value : 0.92ug NO2 Measured Value: 0.95ugNO2 Z Score 0.2 Satisfactory
Ref Value : 1.86ugNO2 Measured Value: 1.85ugNO2 Z Score 0 Satisfactory

July08 Round 102: Ref Value : 1.37ugNO2 Measured Value: 1.42ugNO2 Z Score 0.3 Satisfactory
Ref value :2.28ugNO2 Measured Value: 2.21ugNO2 Z score -0.2 Satisfactory

Jan09 Round 104: Ref Value : 2.02ugNO2 Measured Value: 1.85ugNO2 Z Score -0.7 Satisfactory
Ref Value : 1.22ug NO2 Measured Value: 1.21ugNO2 Z Score - 0.1 Satisfactory

Appendix B: Belfast City Council Air Quality Management Area Locations



Appendix C: Belfast City Council Air Quality Monitoring Locations

Note: All locations are approximate and for reference purposes only.