2010 Air Quality Progress Report for Armagh City and District Council

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

May 2010

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Report Reference number	ArmaghPR2010
Date	May 2010

Executive Summary

Monitoring at 16 locations within Armagh City and District Council's area has demonstrated that there are 4 sites where NO_2 levels exceed the objective limit of 40ug/m^3. Based on the results for 2009, the council **will not** be revoking the current AQMA but will be completing a detailed assessment of NO_2 pollution at Dawson Street and Greenpark Terrace in Armagh due to exceedences of the objective limit at these sites during 2009.

No other pollutants were assessed to have an impact on air quality within the district at this time and therefore no AQMA's or detailed assessments are required for any other pollutants.

Armagh City and District Council has not seen any significant changes from any pollution sources since the last round of review and assessment and no other sources of pollution have been identified. Therefore the likely impact from such sources is negligible.

The next course of action to be taken by the council is to complete and submit a detailed assessment of NO_2 at Dawson Street and Greenpark Terrace. This will run concurrently with the Draft Action Plan for the current AQMA and a Progress Report in 2011.

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1 Introduction

1.1 Description of Local Authority Area

Armagh City and District is located in the geographical heartland of Northern Ireland, a beautiful rural, historic area served by the main motorway network in Northern Ireland, with major road links to the business capitals of Belfast and Dublin. Armagh City and District does not have a high level of heavy industry. The majority of the local work force is employed in the delivery of services such as local government, education authority, health and social services, retail and agriculture. Although there are a number of quarries providing graded stone & gravel as well as road-stone coating. The greatest contribution to air quality pollution in the district is from road traffic. Particularly in the city centre where the road network is quickly reaching it's maximum capacity due to the increase in car ownership. Given the size of the rural hinterland surrounding the city of Armagh, public transport resources are stretched and the reliance on the motor car is greatly exacerbated. Armagh City is regarded as a route hub to the border with the Republic Of Ireland and is main through-route between mid-Ulster and the south east of Northern Ireland and hence has a traffic flow higher than that which could be created by local traffic alone. Particulate Matter (PM_{10}) and NO_2 would be considered as the pollutants most at risk of breaching the objective limits in Armagh as a result of road traffic. Armagh City and District Council has already declared an AQMA in January 2009 for NO_2 on Railway Street, Lonsdale Road, Mall West and Barrack Street.

Domestic fuel usage throughout the District has historically been based on solid fuel but, as with the province generally, the use of coal is declining.

1.2 Purpose of Progress Report

Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment reports. Their purpose is to maintain continuity in the Local Air Quality Management process.

They are not intended to be as detailed as Updating and Screening Assessment Reports, or to require as much effort. However, if the Progress Report identifies the risk of exceedence of an Air Quality Objective, the Local Authority (LA) should undertake a Detailed Assessment immediately, and not wait until the next round of Review and Assessment.

1.3 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	Concentration	Measured as	Date to be achieved by
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 Assessments

Report Type	Date	Exceedences	Detailed Assessment Required	AQMA's Declared
Initial Review and Assessment	Jan 2001	None	No	None
Progress Report	April 2005	None	No	None
Updating & Screening Assessment	April 2006	None	No	None
Progress Report	April 2007	None	No	None
Detailed Assessment for NO_2	Nov 2007	None	No	None
Progress Report	April 2008	NO_2	No	Yes
Updating & Screening Assessment	April 2009	NO_2	No	In the previous year

Figure 1.1 Map of AQMA Boundaries (if applicable)

See Appendix C

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Armagh has one automatic monitoring station located in the district. This is at Lonsdale Road in Armagh City and monitors PM_{10} and NO_2 emissions. (This site is also a co-location site for NO_2 diffusion tubes).

Table 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)*	Worst-case Location ?
Lonsdale Road	Roadside	H 876 458	PM_{10} & NO_2	Y	Y (20m)	3m	Y

Figure 2.1 Map(s) of Automatic Monitoring Sites (if applicable)

See Appendix C

2.1.2 Non-Automatic Monitoring

During 2008 Armagh City and District Council carried out monitoring of NO_2 with diffusion tubes at eight sites within the city. The NO_2 diffusion tubes were prepared and analysed by Harwell Scientifics Limited. The tubes are prepared by coating the grids in a 50% v/v solution of the absorbent, triethanolamine (TEA) in Water. Analysis is carried out using a colorimetric technique.

One site at Lonsdale Road is co-located with an automatic NO_2 analyser. Details of the monitoring sites are given in Table 2.2.

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 ?
Lonsdale Road (x3)	Roadside	H 876 458	NO_2	Y	Y (20m)	3m	Y
Mallview Terrace (x3)	Roadside	H 879 452	NO_2	Y	Y(<1m)	4m	Y
25 Railway St	Roadside	H 875 458	NO_2	Y	Y(<1m)	2.5m	Y
1 Barrack St	Roadside	H 879 450	NO_2	Y	Y(<1m)	2m	Y
11 Desert Lane	Urban Background	H 865 457	NO_2	N	Y(10)	2m	Y
19 Folly Lane	Urban Background	H 882 458	NO_2	N	Y(<1m)	1.5m	Y
1 Green Park Terrace	Roadside	H 873 447	NO_2	N	Y(<1m)	2.5m	N
19 Portadown Road	Roadside	H 887 459	NO_2	N	Y(20)	2m	Y
80 Railway Street	Roadside	H 875 459	NO2	Y	Y(20)	2m	Y
20 Victoria St	Roadside	H 881 452	NO2	N	Y(<1m)	4.5m	Y
3 Barrack Hill	Roadside	H 881 451	NO2	N	Y(<1m)	2m	Y
44 Barrack Hill	Roadside	H 884 452	NO2	N	Y(<1m)	2m	Y
Drumadd House	Roadside	H 886 452	NO2	N	Y(<1m)	2m	Y
10 Orangefield	Roadside	H 888 451	NO2	N	Y(<1m)	4m	Y
Cathedral Terrace	Roadside	H 873 456	NO2	N	Y(<1m)	3m	Y
Dawson Street	Roadside	H 874 454	NO2	N	Y(<1m)	1m	Y

The bias factor used to adjust the diffusion tube results was taken from the UWE Review and Assessment Website. The bias factor used to adjust the diffusion tubes is 0.81

The details of Harwell Scientifics WASP results are provided in Appendix B.

See Appendix C for Map(s) of Non-Automatic Monitoring Sites (if applicable)

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide

In February 2009 Armagh City and District Council experienced a major technical fault with the NO2 Analyser situated a Lonsdale Road. Due to cost implications it was not possible to repair the analyser and **therefore no NO_2 data was collected for the duration of 2009**. A replacement monitor has since been received on loan from Bureau Veritas and is currently in operation at the site.

Nitrogen Dioxide Diffusion Tube Monitoring Data

Table 2.3 Results of Nitrogen Dioxide Diffusion Tubes

Site ID	Location	Within AQMA?	Data Capture for monitoring period[a] %	Data Capture for full calendar year 2009[b] %	Annual mean concentrations (µg/m^3)		
					2007 [c, d]	2008 [c,d]	2009 [c]
Lonsdale Road (x3)	Armagh City	Y	100	100	31	26	32
Mallview Terrace (x3)	Armagh City	Y	92	92	43	35	**43**
25 Railway St	Armagh City	Y	100	100	32	31	32
1 Barrack St	Armagh City	Y	100	100	34	29*	38
11 Desert Lane	Armagh City	N	100	100	10	9	14
19 Folly Lane	Armagh City	N	100	100	25	12	14
1 Green Park Terrace	Armagh City	N	100	100	31	25	**52**
19 Portadown Road	Armagh City	N	100	100	30	25	29
80 Railway Street	Armagh City	Y	100	100	N/A	N/A	**48**
20 Victoria St	Armagh City	N	100	100	N/A	N/A	28
3 Barrack Hill	Armagh City	N	100	100	N/A	N/A	32
44 Barrack Hill	Armagh City	N	100	100	N/A	N/A	25
Drumadd House	Armagh City	N	100	100	N/A	N/A	24
10 Orangefield	Armagh City	N	100	100	N/A	N/A	16
Cathedral Terrace	Armagh City	N	100	100	N/A	N/A	21
Dawson Street	Armagh City	N	100	100	N/A	N/A	**52**

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)
[c] Means should be “annualised” as in Box 3.2 of TG(09), if monitoring was not carried out for the full year.
[d] Annual mean concentrations for previous years are optional.

*The tube positioned at 1 Barrack Street was formerly used at Bridge House until it was moved to Barrack Street in January 2009.

2.2.2 PM_{10}

The PM_{10} monitoring site is located at Lonsdale Road in Armagh City. The site is on a main road which passes through the centre of Armagh. The inlet of the PM_{10} monitor is located approx 3m from the kerbside. The nearest relevant exposure is approx 15-20 metres from the sampling site. The PM_{10} unit is due to be upgraded to an FDMS inlet during 2010.

Table 2.4a Results of PM_{10} Automatic Monitoring: Comparison with Annual Mean Objective

Site ID	Location	Within AQMA?	Data Capture for monitoring period [a] %	Data Capture for full calendar year 2009 [b] %	Annual mean concentrations (μg/m^3)		
					2007 [c, d]	2008 [c,d]	2009 [c]
Lonsdale Road	Lonsdale Road	Y	99	99	**N/A**	**26**	**27**

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)
[c] Means should be "annualised" as in Box 3.2 of TG(09), if monitoring was not carried out for the full year.
[d] Annual mean concentrations for previous years are optional.

Table 2.4b Results of PM_{10} Automatic Monitoring: Comparison with 24-hour Mean Objective

Site ID	Location	Within AQMA?	Data Capture for monitoring period [a] %	Data Capture 2009 [b] %	Number of Exceedences of daily mean objective (50 μg/m^3) If data capture < 90%, include the 90th percentile of daily means in brackets.		
					2007 [c]	2008 [c]	2009 [c]
Lonsdale Road	Lonsdale Road	Y	99	99	N/A	10	17

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)
[c] Numbers of exceedences for previous years are optional.

Produced by AEA on behalf of DoE Northern Ireland

ARMAGH ROADSIDE
01 January to 31 December 2009

These data have been fully ratified by AEA

POLLUTANT	PM_{10}*	NO_2	NO_X
Number Very High	0	0	-
Number High	0	0	-
Number Moderate	107	0	-
Number Low	8554	2026	-
Maximum 15-minute mean	333 µg m^{-3}	197 µg m^{-3}	1215 µg m^{-3}
Maximum hourly mean	252 µg m^{-3}	151 µg m^{-3}	892 µg m^{-3}
Maximum running 8-hour mean	132 µg m^{-3}	101 µg m^{-3}	476 µg m^{-3}
Maximum running 24-hour mean	92 µg m^{-3}	77 µg m^{-3}	345 µg m^{-3}
Maximum daily mean	77 µg m^{-3}	73 µg m^{-3}	294 µg m^{-3}
Average	27 µg m^{-3}	38 µg m^{-3}	102 µg m^{-3}
Data capture	98.8 %	23.1 %	23.1 %

* PM_{10} measured by a TEOM - a correction factor of 1.3 has been applied to these TEOM data to provide Indicative Gravimetric Equivalent as µg m-3
All mass units are at 20'C and 1013mb
NO_X mass units are NO_X as NO_2 µg m-3

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Exceedences	Days
PM_{10} Particulate Matter (Gravimetric)	Daily mean > 50 µg m^{-3}	17	17
PM_{10} Particulate Matter (Gravimetric)	Annual mean > 40 µg m^{-3}	0	-
Nitrogen Dioxide	Annual mean > 40 µg m^{-3}	0	-
Nitrogen Dioxide	Hourly mean > 200 µg m^{-3}	0	0

2.2.3 Sulphur Dioxide

N/A

2.2.4 Benzene

N/A

2.2.5 Other pollutants monitored

N/A

2.2.6 Summary of Compliance with AQS Objectives

Armagh City and District Council has measured concentrations of **NO_2** above the annual mean objective at relevant locations outside of the AQMA , and **will need to proceed to a Detailed Assessment**, for Dawson Street and Greenpark Terrace in Armagh City.

3 New Local Developments

3.1 Road Traffic Sources

3.2 Other Transport Sources

3.3 Industrial Sources

3.4 Commercial and Domestic Sources

3.5 New Developments with Fugitive or Uncontrolled Sources

Armagh City and District Council confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

4 Local / Regional Air Quality Strategy

The Armagh City and District Council Local Air Quality Management Strategy 2006 – 2010 was launched in tandem with the 4 neighbouring councils (Banbridge, Craigavon, Dungannon & South Tyrone and Newry) in Southern Group in March 2006. It was issued for public consultation and Armagh City an District Council consulted the community, statutory consultees and key organisations that have an interest in local air quality affecting the District.

Since the launch of the Strategy the key responsibility of the Southern Group Local Air Quality Manager along with the corresponding council officers has been to implement the objectives outlined in Section 4 of the strategy document. The objectives served to act as a guide for the councils on how to minimise the impact of pollution on air quality from a variety of sources and details actions on how best to achieve these objectives.

The strategy highlights the lead role being played in the delivery of each objective and the relevant partners required to work together in order to achieve successful delivery of each objective aim and the respective cost of doing so.

The Council has found it difficult to implement the strategy due to budgetary constraints both within Council and with the strategic partner organisations, particularly since the beginning of the international economic downturn in late 2007. Other constraints include a lack of power or authority by the Council and its neighbouring LA's to encourage the uptake of the objectives contained within the strategy. However, the Council has had some success in delivering several actions. These are listed below;

To Promote and Maximise the use of public transport, car-sharing, walking and cycling as a means to get to School

- Launch of Walk to School Competition May 2006
- News article on Walk to School completed by Brian Black for UTV news November 2006
- Walk to School Competition and Presentation with Guest Speaker Brian Black (UTV environment correspondent) November 2006.
- Walk to School Competition photos and press release sent to main newspaper in each district.
- Schools Air Quality Conference programmed for April 2008 had to be cancelled due to low response from schools. New air quality conference scheduled for 24th September 2008. Broader in perspective but schools will still take part in some role.
- Walk to school, Cycle to School and use of public transport to school High visibility campaign launched to raise awareness at school level.

To Promote and Maximise the use of public transport, car-sharing, walking and cycling as a means to get to Work

- Questionnaire sent in payslip to all Council Staff about travel to work preferences. Questionnaire reported to council and agreement reached upon implementation of CarShare Scheme for council staff.
- Southern Group CarShare Scheme rolled out and promoted to each council within Southern Group during 2007.
- Launch of Southern Group CarShare Scheme promotional drive. Newly joined members entered into draw for 2 mountain bikes. Both bikes won by staff from Newry and Mourne District Council. Pictures and editorial of bike winners published in Newry newspapers. NOTE: No members of staff at Banbridge District Council are currently members of the CarShare Scheme. Issue to be tackled as part of STAQ campaign.

To* a*ctively target the population in general with relevant air quality messages and information.

- Completed under the STAQ campaign also. STAQ is being promoted by the Local Air Quality Management Officer as a project of high visibility with posters and banners, media and press releases throughout the entire southern group area with the aim of bringing the air quality agenda to everyone. It will be mostly demonstrated in areas where there is a higher risk of exceedences of the objective limits in the air quality legislation and guidance (LAQM TG03).

The Southern Group Local Air Quality Strategy is available upon request from the Council.

The Strategy will be reviewed at the end of 2010.

5 Planning Applications

N/A

6 Air Quality Planning Policies

N/A

7 Local Transport Plans and Strategies

N/A

8 Local Transport Plans and Strategies

Regional Transportation Strategy

The Regional Transportation Strategy (RTS) for Northern Ireland 2002- 2012 identifies strategic transportation investment priorities and considers potential funding sources and affordability of planned initiatives. The RTS focuses on three geographic areas and one overlying Network. These are as follows:

- Belfast Metropolitan Area (BMA), containing the continuous area comprising Belfast City Council and the built-up areas within the Council areas of Carrickfergus, Castlereagh, Lisburn, Newtownabbey and North Down;
-
- Other Urban Areas (OUAs): collectively those towns described as main or local hubs in the RDS (including Dungannon) and other towns outside the BMA with a population greater than 5,000);

- Rural Area – the remainder of Northern Ireland; and

- Regional Strategic Transport Network (RSTN) comprising the complete rail network and all motorway and trunk road links (including the Key Transport Corridors and Link Corridors).

The RTS is a “daughter document” of the Regional Development Strategy (RDS), which sets out the spatial development framework for Northern Ireland up to 2025. Implementation of the Strategy will be through three Transport Plans covering the Regional Strategic Transport Network (RSTN), the Belfast Metropolitan Area (BMA), and the Sub-Regional Transport Plan (SRTP). Transport studies undertaken to support the RSTN Transport Plan will take due account of current and future cross-border inter-urban transport demands and the roles of the gateway cities and towns, including Banbridge.

3.4 Regional Strategic Transport Network Transport Plan

The Regional Strategic Transport Network (RSTN) Transport Plan prepared by the Department for Regional Development (DRD) covers the complete rail network, five Key Transport Corridors (KTCs), four Link Corridors, the Belfast Metropolitan Transport Corridors and the remaining trunk network across Northern Ireland. The Plan is based on the guidance set out in the Regional Development Strategy (RDS) and the Regional Transportation Strategy (RTS), as described in Sections 3.2 and 3.3, above.

The RSTN Transport Plan consists of proposals for transport schemes and measures for the maintenance, management and development of the RSTN until 2015. The RSTN Transport Plan also includes a number of measures for rail, bus, roads, walking and cycling.

3.5 Sub-Regional Transport Plan 2015

The Sub-Regional Transport Plan (SRTP) was prepared by the Department for Regional Development (DRD) and completed in 2007. The SRTP is based upon the guidance provided by the Regional Development Strategy (RDS) and the Regional Transportation Strategy (RTS). Proposed public transport measures for Dungannon (within category of Other Urban Areas (OUA)) contained within the SRTP are as follows:

· Improved walk/cycle

· Improved local bus services

· Bus stop Improvement Strategy

· Bus based Park and Ride

· Increased parking at bus/rail station

· Taxi rank

· Transport Programme for People with Disabilities

Spatial Development Strategy for Northern Ireland

The Spatial Development Strategy (SDS) guides the physical development of the Region to 2025. The SDS will contribute to meeting a number of key regional challenges emerging from the significant local, national and international forces, which will drive change over the next 25 years, including:

Transport:

- Promote a change in travel culture and particularly manage the effects of a possible 100% growth in the number of vehicles by 2025;
- Contribute to the creation of a modern, sustainable, safe transportation system for the Region, meeting the travel needs of all groups in society;
- Accommodate the growing volume of freight moving to and from the regional gateways; and
- Strengthen the regional gateways to handle the increasing flow of people and goods in and out of the Region.

Environment:

- Accommodate future development growth while protecting and caring for the environment;
- Reduce the consumption of resources;
- Continue to maintain or, where needed, to improve the quality of air, water and land resources within the Region;
- Seek to maintain local landscape character and to conserve cultural assets; and
- Take particular care to sustain and, where required, to enhance the biodiversity of the Region, its natural habitats, high quality landscapes and built heritage.

Developing a Regional Transportation System

Creating an upgraded and integrated transport system, built around the Regional Strategic Transport Network of the key transport corridors with **t**heir main public transport services providing the framework for future development is recognised as one of the key assets to accommodate growth. Strategic planning guidelines relating to the development of a Regional Transport System (RTS) are as follows:

- **SPG-TRAN 1:** To develop a Regional Strategic Transport Network (RSTN), based on Key Transport Corridors (KTCs), to enhance accessibility to regional facilities and services. Two major roads within the Borough are identified in the RDS as part of the Key Transport Corridors in Northern Ireland: -
- A4 Dungannon - Fivemiletown Road: The South Western Corridor; and
- A5 Aughnacloy - Omagh Road: The Western Corridor.
- In addition, the A29 Cookstown to Moy Road is identified as part of one of three additional Link Corridors in the RTS.

- **SPG-TRAN 2:** To extend travel choice for all sections of the community by enhancing public transport. Including the strengthening of the regional bus network (including the promotion of public transport routes and Park and Ride schemes) and the regional rail system;

- **SPG-TRAN 3:** To integrate land use and transportation to provide a much better range of travel choices for all, and reduce the demand for travel; and

- **SPG-TRAN 4:** To change the regional travel culture and contribute to healthier lifestyles, such as giving greater priority to encouraging more walking and cycling.

9 Climate Change Strategies

N/A

10 Implementation of Action Plans

Armagh City and District Council is currently in the process of completing an Action Plan for the AQMA currently in operation in Armagh City. The due date for completion of the Action Plan is June 2010. Following consultation, the Action Plan will be implemented during 2010 – 2011.

11 Conclusions and Proposed Actions

11.1 Conclusions from New Monitoring Data

Monitoring at 16 locations within Armagh City and District Council's area has demonstrated that there are 4 sites where NO_2 levels exceed the objective limit of 40ug/m^3. Based on the results for 2009, the council **will not** be revoking the current AQMA but will be completing a detailed assessment of NO_2 pollution at Dawson Street and Greenpark Terrace in Armagh due to exceedences of the objective limit at these sites during 2009.

No other pollutants were assessed to have an impact on air quality within the district at this time and therefore no AQMA's or detailed assessments are required for any other pollutants.

Armagh City and District Council has not seen any significant changes from any pollution sources since the last round of review and assessment and no other sources of pollution have been identified. Therefore the likely impact from such sources is negligible.

The next course of action to be taken by the council is to complete and submit a detailed assessment of NO_2 at Dawson Street and Greenpark Terrace. This will run concurrently with the Draft Action Plan for the current AQMA and a Progress Report in 2011.

12 References

Local Air Quality Management Technical Guidance – LAQM.TG(09)

Appendices

Appendix A: QA/QC Data

Appendix B: Harwell Scientifics WASP Data

Appendix C: Diffusion Tube Site Maps

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

The NO_2 diffusion tubes were prepared and analysed by Harwell Scientifics. This laboratory takes part in the NO_2 Network QA/QC Field Intercomparison survey. Harwell Scientifics tubes are prepared by coating the grids in a 50% v/v solution of the absorbent, triethanolamine (TEA) in Water. Analysis is carried out using a colorimetric technique. Armagh City and District Council obtained the appropriate bias factor from the UWE Review and Assessment Website. A factor of 0.81 was taken from the drop down menus available on the excel spreadsheet matrix.

Factor from Local Co-location Studies (if available)

Armagh City and District Council did not use a bias factor from a local co-location site during 2009 as the NO_2 analyser at Lonsdale Road was not in use due to technical problems during most of 2009.

PM Monitoring Adjustment

All data sets for PM10 monitoring during 2009 were provided by AEA Netcen with the 1.3 adjustment already calculated.

QA/QC of diffusion tube monitoring

Please See Appendix B for Harwell Scientifics WASP Data.

Appendix B – Harwell Scientifics WASP Data

Year	WASP Round	Period	Samples Dispatched	Results Deadline	HSL Calculations (Pre-Sendout)		Harwell Analysis					
					Sample A		Tubes A					
					Calculated Spiked Value	Measured Value	Result Tube 1	Result Tube 2	Average	Standard Deviation	RSD	Z-Score
2011	112	Jan-Mar	17/01/2011	04/03/2011								
2010	111	Sept-Dec	25/10/2010	10/12/2010								
	110	Jul-Aug	05/07/2010	27/09/2010								
	109	Apr-Jun	26/04/2010	11/06/2010								
	108	Jan-Mar			1.92	1.91	1.921	1.896	1.910	0.018	0.9%	-0.1
2009	107	Oct-Dec			2.03	2.04	1.905	1.914	1.910	0.007	0.4%	-0.8
	106*	Jul-Sept			1.84	1.84	1.880	1.439	1.660	0.312	18.8%	-1.3
	106*	Jul-Sept			1.84	1.84	1.880	1.880	1.880	0.000	0.0%	0.0
	105	Apr-Jun			1.68	1.69	1.795	1.784	1.790	0.008	0.4%	0.8
	104	Jan-Feb			2.02	2.01	2.017	2.047	2.032	0.022	1.1%	0.0
2008	103	Sept-Dec			1.22	1.22	1.242	1.234	1.238	0.006	0.5%	0.1
	102	Jun-Aug			1.37	1.38	1.470	1.472	1.471	0.043	2.9%	0.5
	101	Apr-Jun			0.92	0.94	0.974	0.991	0.983	0.013	1.3%	0.5
	100	Jan-Mar			1.36	1.37	1.395	1.384	1.390	0.008	0.6%	0.2
2007	99	Oct-Nov			2.15	2.16	2.242	2.235	2.239	0.005	0.2%	0.3
	98	Jul-Sept			1.83	1.85	1.877	1.854	1.866	0.013	0.7%	0.2
	97	Apr-Jun			0.89	0.87	0.920	0.918	0.919	0.002	0.2%	0.2

HSL Calculations (Pre-Sendout)		Harwell Analysis					
Sample B		Tubes B					
Calculated Spiked Value	Measured Value	Result Tube 1	Result Tube 2	Average	Standard Deviation	RSD	Z-Score
1.47	1.47	1.409	1.422	1.420	0.009	0.6%	-0.5
2.20	2.20	2.049	2.046	2.048	0.003	0.1%	-0.9
1.42	1.44	1.880	1.429	1.655	0.319	19.3%	2.1
1.42	1.44	1.439	1.429	1.434	0.007	0.5%	
1.68	1.69	1.031	1.035	1.033	0.003	0.3%	0.9
1.22	1.19	1.269	1.230	1.252	0.024	1.9%	0.2
0.94	0.95	0.957	0.951	0.954	0.005	0.5%	0.1
2.28	2.3	2.435	2.386	2.411	0.035	1.5%	0.4
1.86	1.93	1.947	1.958	1.953	0.008	0.4%	0.4
1.47	1.45	1.511	1.516	1.514	0.004	0.3%	0.2
0.84	0.84	0.906	0.901	0.904	0.004	0.4%	0.6
1.19	1.2	1.229	1.223	1.226	0.005	0.4%	0.2
1.58	1.59	1.619	1.640	1.630	0.015	0.9%	0.2

Appendix C – Diffusion Tube Site Maps

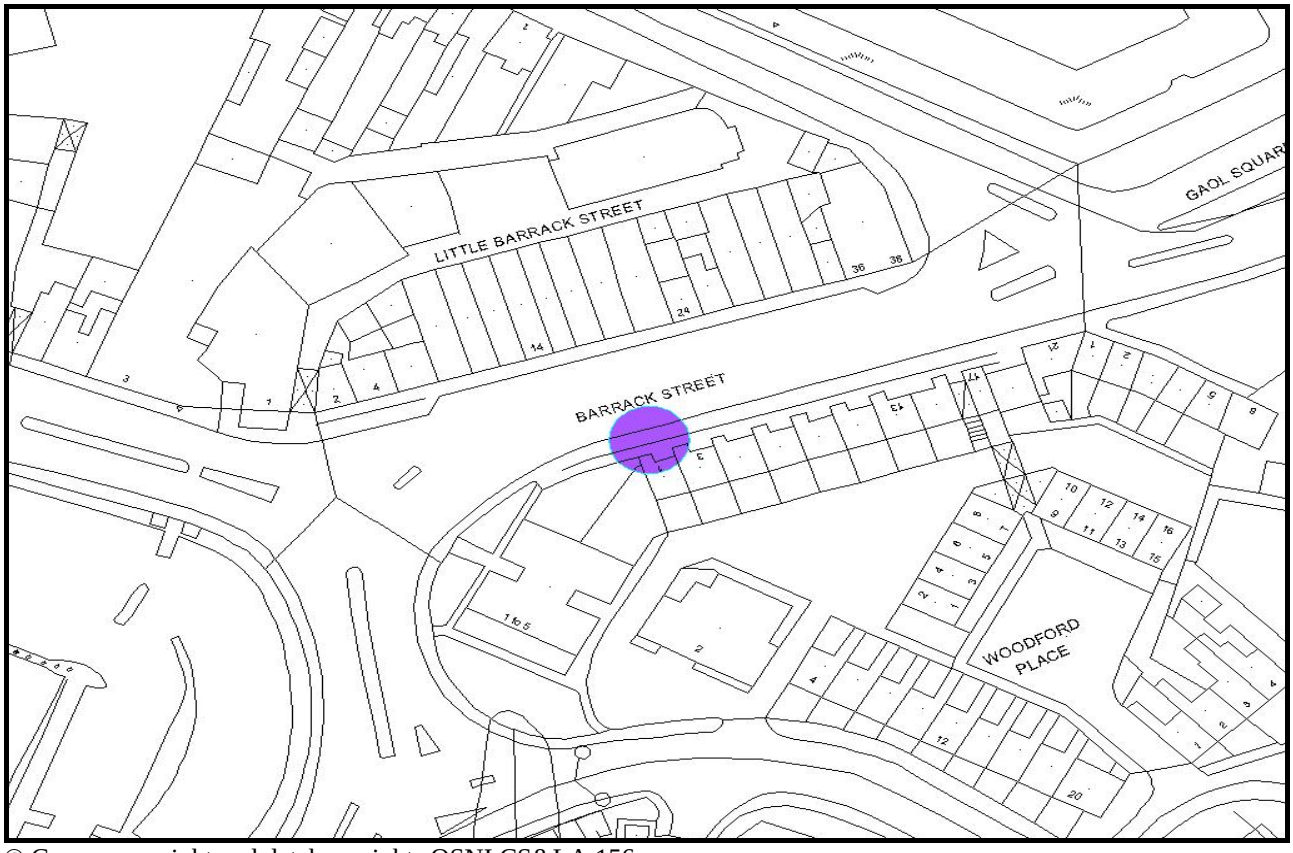
Title : Diffusion Tube Locations

Scale : Not to Scale

29/04/2009

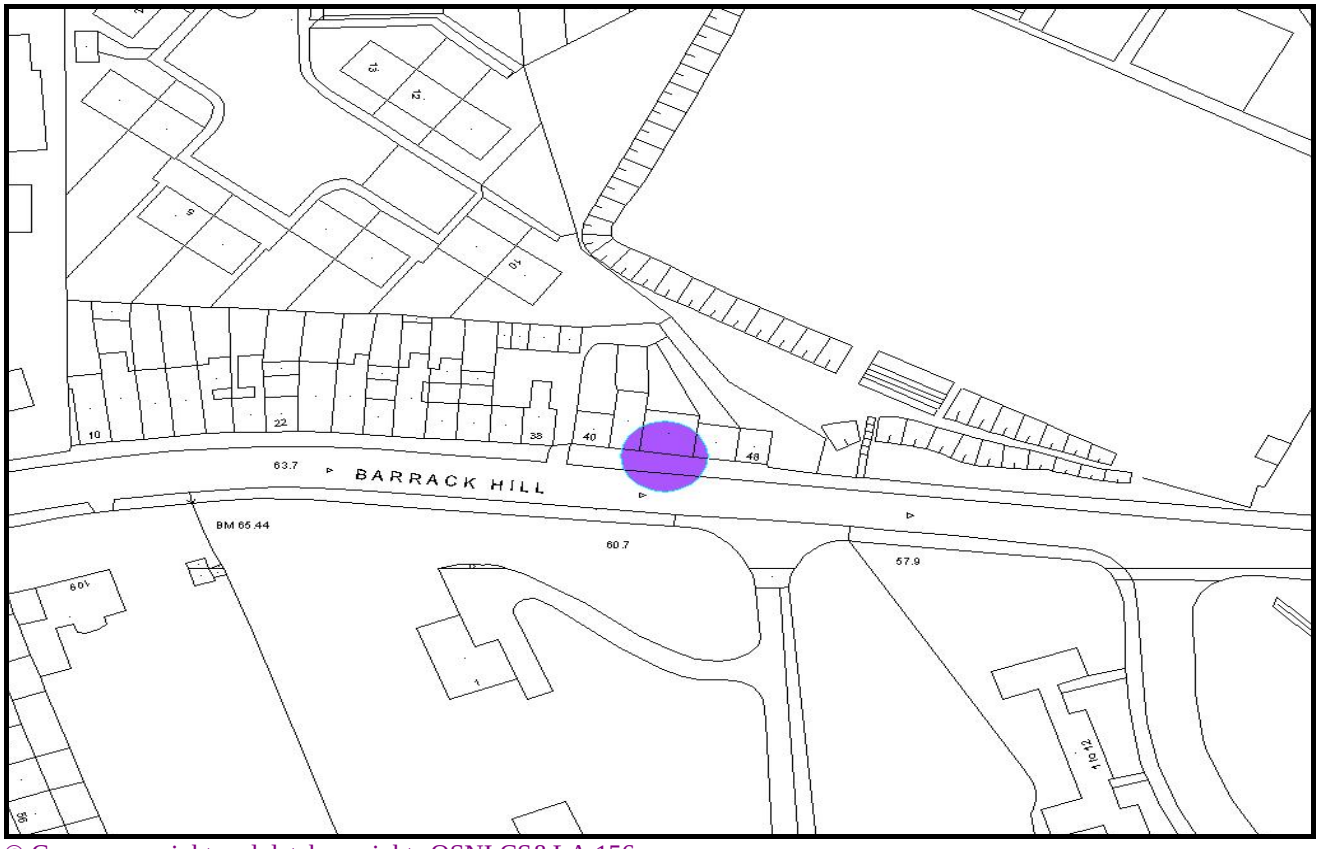
Armagh City and District Council...

1 Barrack Street



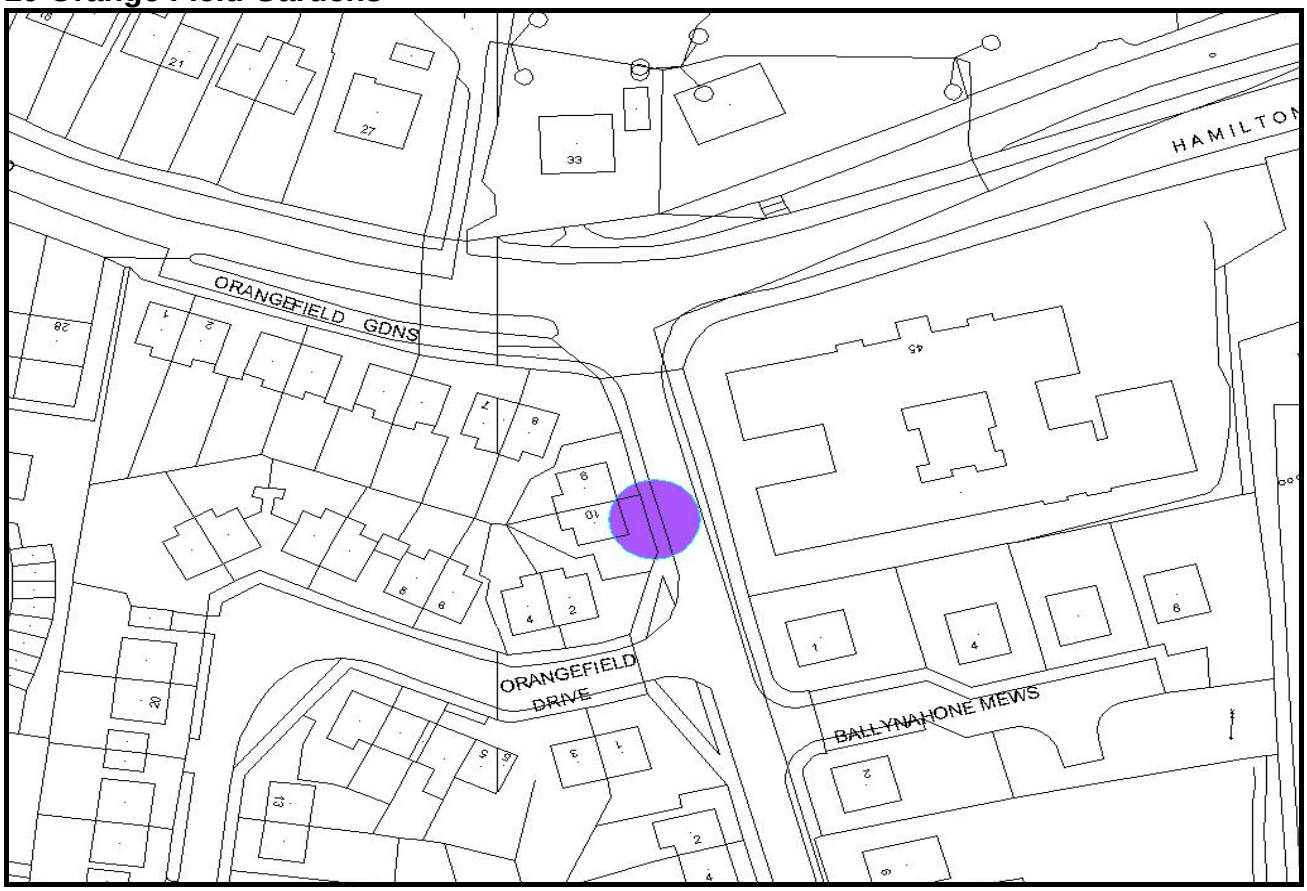
3 Barrack Hill

44 Barrack Hill

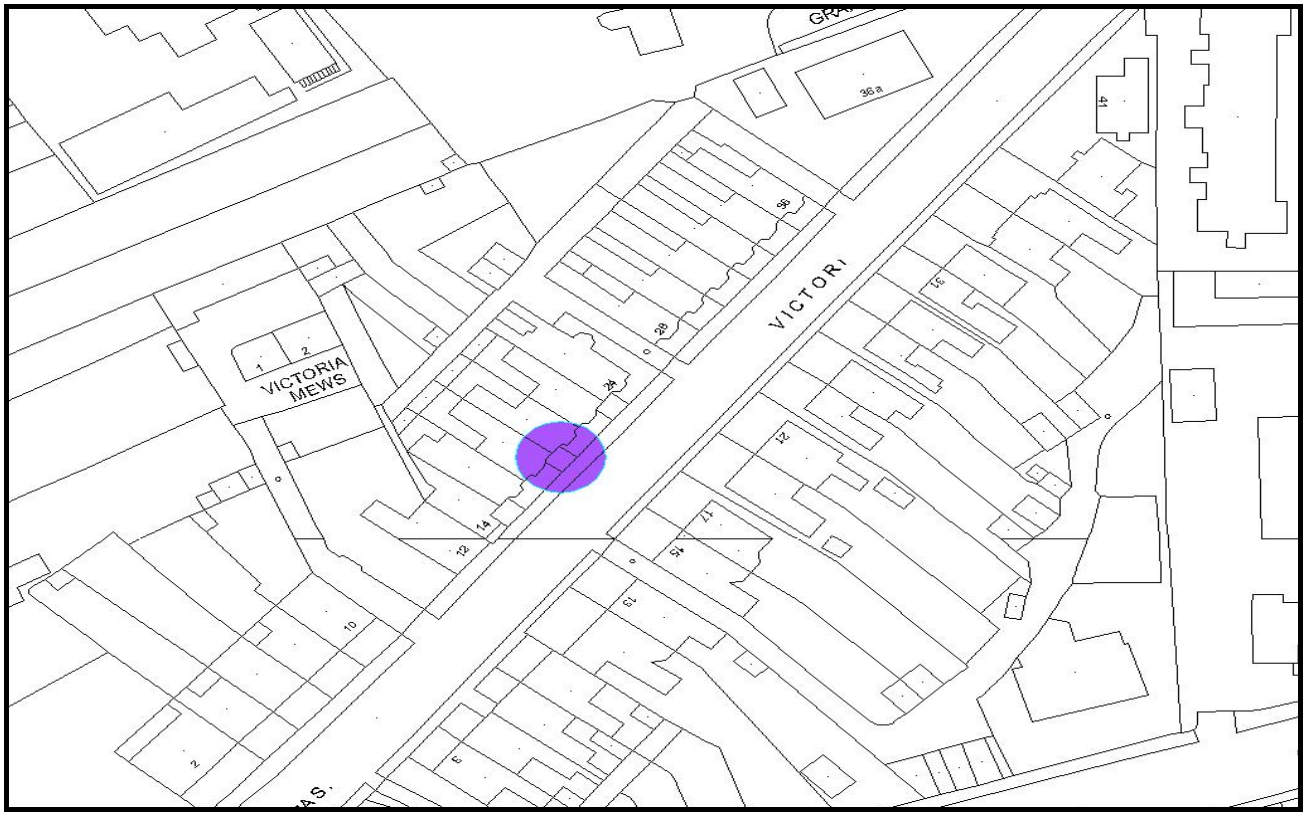


Drumadd House

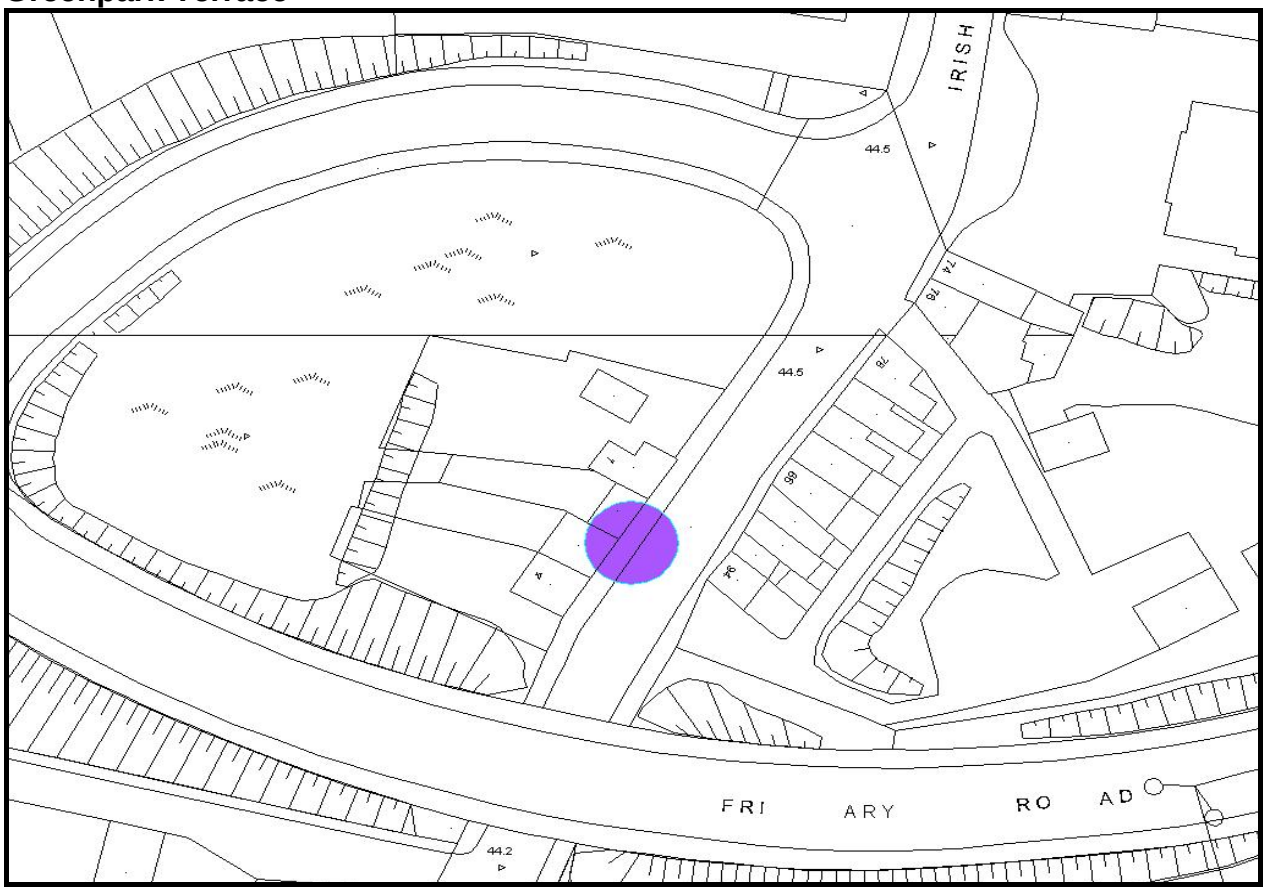
10 Orange Field Gardens



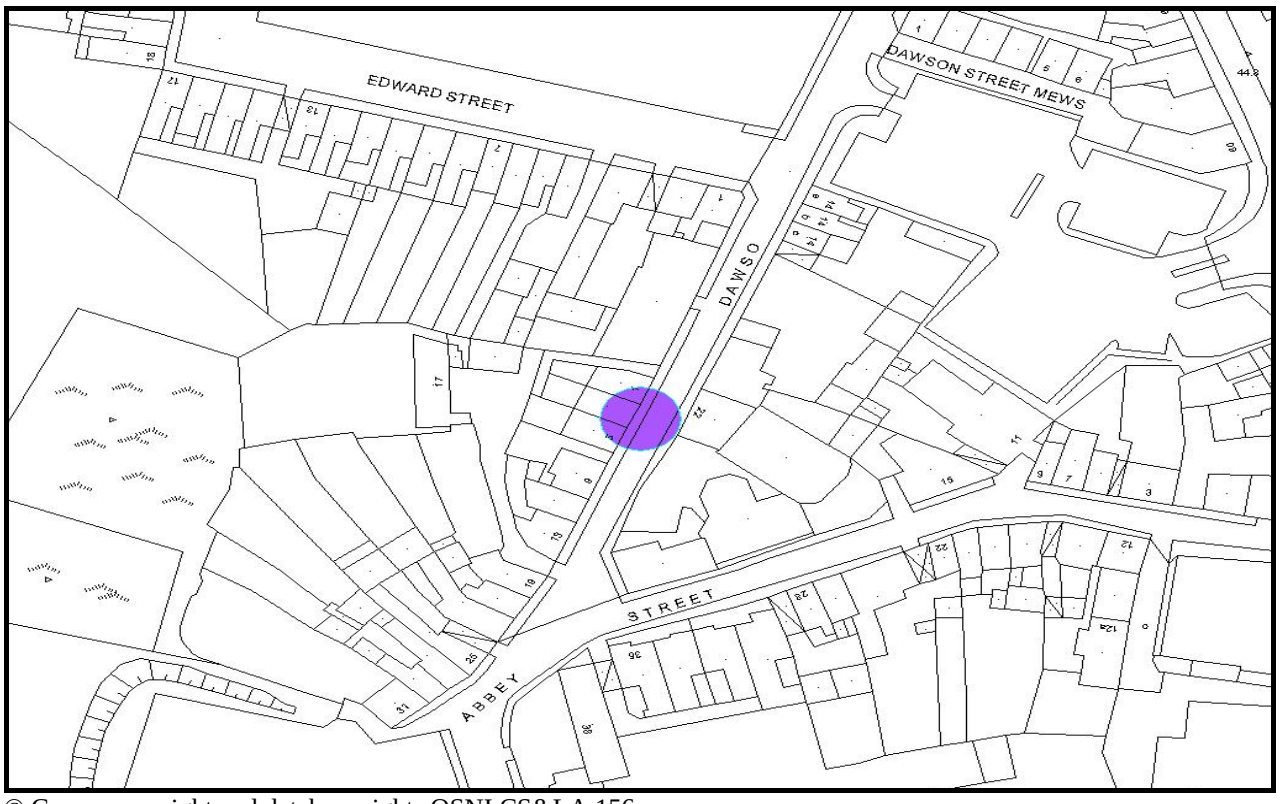
Victoria Street



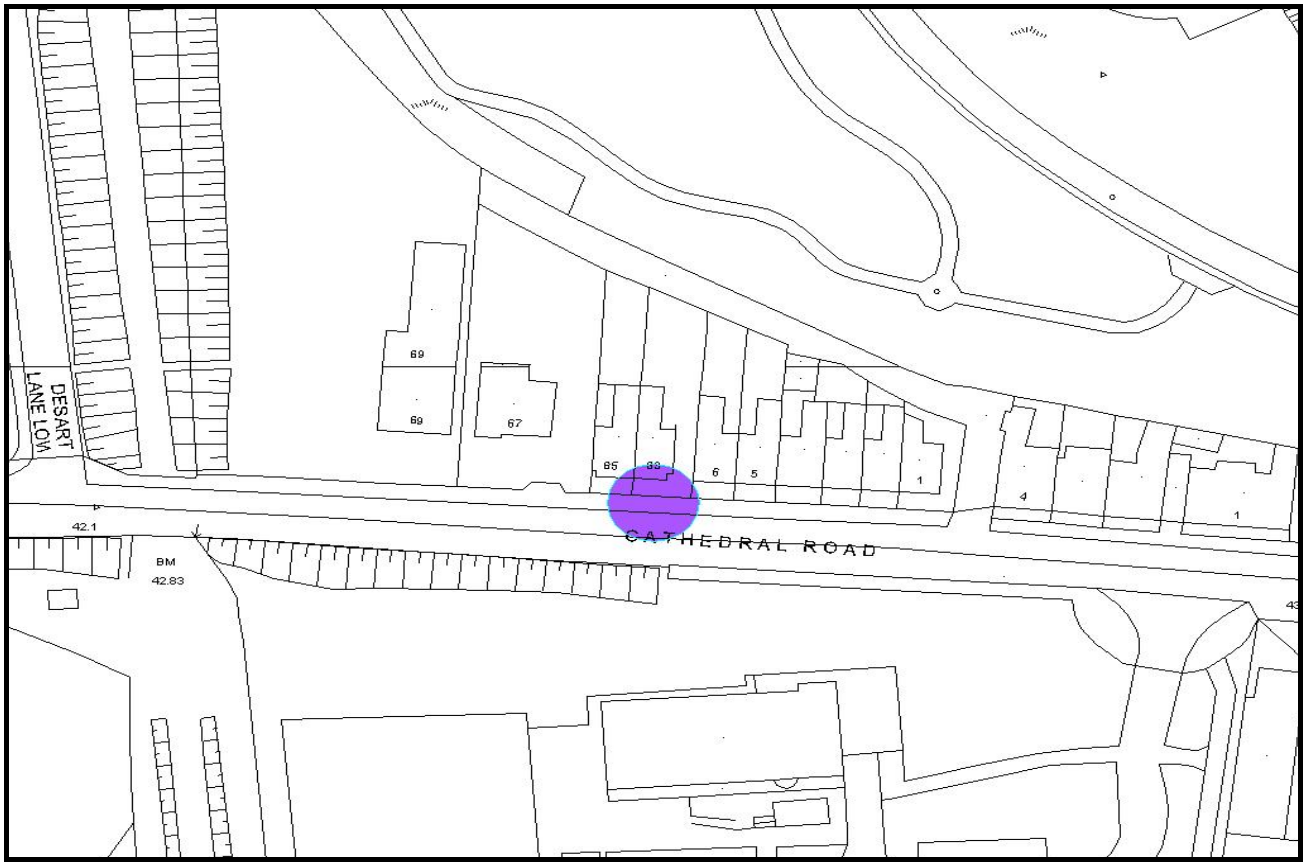
Greenpark Terrace



Dawson Street



Cathedral Road



Appendix D

Diffusion Tube Monitoring Data 2009

ARMAGH CITY AND DISTRICT COUNCIL - NO2 DIFFUSION TUBE RESULTS 2009 (ug/m3)									
	SITE 1	SITE 2	SITE 3	SITE 4	SITE 5	SITE 6	SITE 7	SITE 8	L RD A
	25 Railway St	1 Barrack St	11 Desart Lane	19 Folly Lane	80 Railway St	7 Mallview Terrace	1 Greenpark Terr	19 Portadown Rd	Lonsdale Rd
JANUARY	53	57	28	23	65	66	66	37	52
FEBRUARY	57	48	22	26	73	71	87	56	58
MARCH	45	45	17	19	59	52	59	43	39
APRIL	37	56	17	16	64	60	65	22	37
MAY	27	47	9	12	60	45	49	30	24
JUNE	25	46	13	12	35	48	54	37	27
JULY	26	38	9	11	49	42	49	26	23
AUGUST	31	36	10	11	56	39	48	22	31
SEPTEMBER	31	37	10	14	58	48	65	38	32
OCTOBER	43	47	17	17	61	58	58	40	41
NOVEMBER	47	45	19	17	62	0	67	30	43
DECEMBER	58	58	29	25	71	66	96	54	56
AVERAGE	40	47	17	17	59	54	64	36	39
Bias Ave	32	38	14	14	48	44	52	29	31

Lonsdale Average Bias Adj	32
Mallview Terrace Average Bias Adj	43

02/04/07 - SITE 5 MOVED FROM ST PATRICKS FOLD TO 84 RAILWAY ST

Bias Factor Derived from the UWE Review and Assessment Website
Bias factor = 0.81

L RD B	L RD C	MT A (Site6)	MT B (Site6)	SITE 9	SITE 10	SITE 11	SITE 12	SITE 13
Lonsdale Rd	Lonsdale Rd	Mallview Terr	Mallview Terr	20 Victoria Street	3 Barrack Hill	44 Barrack Hill	Drumadd House	10 Orangefield
53	49	64	64	38	50	35	38	26
60	56	63	69	38	50	35	38	26
43	43	53	60	40	45	36	29	22
40	36	60	55	34	41	31	32	19
25	26	37	52	31	39	26	27	14
27	30	49	42	25	28	26	30	14
29	25	42	36	24	27	19	19	11
31	30	43	41	25	28	23	17	10
35	36	51	44	36	39	30	25	16
40	41	73	53	36	43	33	33	19
40	47	0	0	37	44	35	28	22
57	54	65	56	52	46	47	41	32
40	39	55	52	35	40	31	30	19
32	32	44	42	28	32	25	24	16

SITE 14	SITE 15
Cathedral Terr	Dawson St
30	75
30	75
27	76
24	60
22	60
26	46
18	48
15	56
24	64
28	70
26	58
42	86
26	65
21	52