2009 Air Quality Updating and Screening Assessment for *Armagh City and District Council*

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

April 2009

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Executive Summary

Monitoring at eight locations within Armagh City and District Council's area has demonstrated that there are two sites where NO_2 levels exceed the objective limit of 40ug/m^3. These are at Mall West and Railway Street in Armagh City, where an AQMA has already been declared. Based on the results for 2008, the council will not be revoking the current AQMA. No other pollutants were assessed to have an impact on air quality within the borough at this time and therefore no further AQMA's or detailed assessments are required.

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.

Armagh City and District Council has not identified the requirement for any proposed actions at this time as a result of information identified in this Updating and Screening Assessment.
The next course of action to be taken by the council is to complete and submit a Draft Action Plan for the current AQMA on Church Street and then a Progress Report in 2010.

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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 provided graded stone & gravel as well as road-stone coating, the greatest contribution to air quality pollution 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 them 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 probably has a traffic flow higher than that which could be created by local traffic alone. Particulate Matter (PM10) and NO2 would be considered as the pollutants most at risk of breaching the objective limits in Armagh as a result of road traffic. Armagh already has declared an AQMA in January 2009 for NO2 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 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 microgram's per cubic metre $\mu g/m^3$ (milligram's 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 Assessments

Report Type	Date	Exceedences	Detailed Assessment Required	AQMA's Declared
Initial Review and Assessment	Jan 2001	None	No	None
Progress Report	Apr 2005	None	No	None
Updating & Screening Assessment	Apr 2006	None	No	None
Progress Report	Apr 2007	None	No	None
Detailed Assessment for NO2	Nov 2007	None	No	None
Progress Report	Apr 2008	NO2	No	Yes

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Armagh has one automatic monitoring location in the district. This is at Lonsdale Road in Armagh City. and monitors PM10 and NO2 emissions. (This site is also a co-location site for NO2 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

2.1.2 Non-Automatic Monitoring

During 2008 Armagh City and District Council carried out monitoring of NO_2 by 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	NO2	Y	Y(<1m)	4m	Y
Railway Street 1	Roadside	H 875 458	NO2	Y	Y(<1m)	2.5m	Y
Bridge House	Roadside	H 879 450	NO2	Y	Y(10)	2m	Y
Desert Lane	Urban Background	H 865 457	NO2	N	Y(10)	2m	Y
Folly Lane	Urban Background	H 882 458	NO2	N	Y(10)	1.5m	Y
Lower Irish Street	Roadside	H 873 447	NO2	N	Y(15)	2.5m	N
Portadown Road	Roadside	H 887 459	NO2	N	Y(20)	2m	Y

The bias factor used to adjust the diffusion tube results was taken from the co-location site at Lonsdale Road. Results from the NO2 automatic analyser at Lonsdale Road were ratified by AEA Energy and Environment. The annual average NO2 result for 2008 is 26 µg/m^3. The annual average

NO2 result from the triplicate diffusion tubes at Lonsdale Road for 2008 is 42 µg/m^3. Therefore the bias factor used to adjust the diffusion tubes is 0.62.

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

2.2 Comparison of Monitoring Results with AQ Objectives

2.2.1 Nitrogen Dioxide

None of the sites monitored in Armagh recorded an NO_2 result above the objective limit of 40µg/m^3 during 2008.

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

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 (µg/m^3)		
				2006 *	2007 *	2008
Lonsdale Road	Lonsdale Road	Y	99.4	30.1	25.1	26

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
Lonsdale Road	Lonsdale Road	Y	99.4	0	0	0

Diffusion Tube Monitoring Data

Table 2.4a Results of Nitrogen Dioxide Diffusion Tubes

Site ID	Location	Within AQMA?	Data Capture 2008 %	Annual mean concentrations
				2008 (µg/m^3) Adjusted for bias
Lonsdale Road (x3)	Lonsdale Road	Y	100	26
Mallview Terrace (x3)	Mallview Terrace	Y	100	35
Railway Street	Railway Street	Y	100	31

Bridge House	Bridge House	Y	100	29
Desert Lane	Desert Lane	N	100	9
Folly Lane	Folly Lane	N	100	12
Lower Irish Street	Lower Irish Street	N	100	25
Portadown Road	Portadown Road	N	100	25

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
Lonsdale Road (x3)	Lonsdale Road	**Y**	N/A	31	26
Mallview Terrace (x3)	Mallview Terrace	Y	53	43	35
Railway Street	Railway Street	Y	30	32	31
Bridge House	Bridge House	Y	35	34	29
Desert Lane	Desert Lane	N	11	10	9
Folly Lane	Folly Lane	N	15	25	12
Lower Irish Street	Lower Irish Street	N	30	31	25
Portadown Road	Portadown Road	N	30	30	25

2.2.2 PM_{10}

The PM10 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 PM10 ,monitor is located approx 3m from the kerbside. The nearest relevant exposure is approx 15-20 metres from the sampling site. The PM10 unit is due to be upgraded to an FDMS inlet during early 2009.

ARMAGH LONSDALE ROAD
01 January to 31 December 2008

These data have been fully ratified by AEA

POLLUTANT	PM_{10}*+
Number Very High	0
Number High	0
Number Moderate	56
Number Low	6921
Maximum 15-minute mean	326 μgm^{-3}
Maximum hourly mean	221 μgm^{-3}
Maximum running 8-hour mean	158 μgm^{-3}
Maximum running 24-hour mean	91 μgm^{-3}

Maximum daily mean	88 µgm^{-3}
Average	26 µgm^{-3}
Data capture	79.9 %

* PM_{10} Indicative Gravimetric Equivalent µgm^{-3}
\+ PM_{10} as measured by a TEOM using a gravimetric factor of 1.3 for Indicative Gravimetric Equivalent
All mass units are at 20'C and 1013mb
NO_X mass units are NO_X as NO_2 µgm^{-3}

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

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
Lonsdale Road	Lonsdale Road	Y	79.9	24	N/A	10

During 2007 PM10 data was lost for a significant part of the year. Therefore the level of exceedences of the 24hour objective can not be provided.

2.2.3 Sulphur Dioxide

Armagh City and District Council no longer monitors SO_2 emissions.

2.2.4 Benzene

Armagh City and District Council does not carryout monitoring for Benzene emissions.

2.2.5 Other pollutants monitored

Armagh City and District Council does not monitor for any other pollutants within the district

3 Road Traffic Sources

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Armagh City and District 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

Armagh City and District 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.

Armagh City and District 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

Armagh City and District 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

Armagh City and District Council confirms that there are no new/proposed roads.

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

3.6 Roads with Significantly Changed Traffic Flows

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

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

3.7 Bus and Coach Stations

Armagh City and District Council confirms that there are no relevant bus stations in the District.

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

4 Other Transport Sources

4.1 Airports

Armagh City and District Council confirms that there are no airports in the District.

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

4.2 Railways (Diesel and Steam Trains)

There are no railway stations within Armagh City and District.

4.2.1 Stationary Trains

Armagh City and District 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.

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

4.2.2 Moving Trains

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

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

4.3 Ports (Shipping)

Armagh City and District Council confirms that there are no ports or shipping that meet the specified criteria within the Local Authority area.

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

5 Industrial Sources

5.1 Industrial Installations

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

Armagh City and District 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.

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

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

Armagh City and District 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.

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

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

Armagh City and District 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.

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

5.2 Major Fuel (Petrol) Storage Depots

Delete whichever is not applicable:

There are no major fuel (petrol) storage depots within the Local Authority area.

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

5.3 Petrol Stations

Armagh City and District Council confirms that there are no petrol stations meeting the specified criteria**.**

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

5.4 Poultry Farms

Armagh City and District Council confirms that there are no poultry farms meeting the specified criteria.

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

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

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

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

6.2 Biomass Combustion – Combined Impacts

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

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

6.3 Domestic Solid-Fuel Burning

Armagh City and District Council confirms that there are no areas of significant domestic fuel use in the District.

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

7 Fugitive or Uncontrolled Sources

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

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

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

Monitoring at eight locations within Armagh City and District Council's area has demonstrated that there is two sites where NO_2 levels exceed the objective limit of 40ug/m^3. These are at Mall West and Railway Street in Armagh City, where an AQMA has already been declared. Based on the results for 2008, the council will not be revoking the current AQMA. No other pollutants were assessed to have an impact on air quality within the borough at this time and therefore no further AQMA's or detailed assessments are required.

8.2 Conclusions from Assessment of Sources

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.

8.3 Proposed Actions

Armagh City and District Council has not identified the requirement for any proposed actions at this time as a result of information identified in this Updating and Screening Assessment.
The next course of action to be taken by the council is to complete and submit a Draft Action Plan for the current AQMA on Church Street and then a Progress Report in 2010.

9 References

Local Air Quality Management Technical Guidance 2009 (Defra)

Local Air Quality Management Policy Guidance 2009 (Defra)

Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance for Laboratories and Users – AEA Energy & Environment (Report to Defra and Devolved Administrations).

Appendices

Appendix A: QA/QC Data

Appendix B: Harwell Scientifics WASP data

Appendix C: Map of Diffusion Tube, PM10 and SO2 Monitoring locations

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

During 2008 Armagh City and District Council carried out monitoring of NO_2 by diffusion tubes at eight sites within the district. 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

Factor from Local Co-location Studies (if available)

Armagh City and District Council has one co-location sites within the district at Lonsdale Road. This co-location study gave a bias factor for diffusion tube adjustment of 0.62 for 2008.

Discussion of Choice of Factor to Use

Armagh City and District Council chose to use the bias factor from the local co-location study as it best represented conditions experienced at a local site and took into consideration the generation of pollutants within the current AQMA.

QA/QC of automatic monitoring

QA/QC maintenance of the automatic monitoring equipment in Armagh is completed by EMS Environmental, Dublin, Ireland and AEA Environmental (UK). The on-site calibration of the equipment takes place every six months.

QA/QC of diffusion tube monitoring

See Appendix B below

Appendix B: Harwell Scientifics WASP data

Year	WASP Round	Period	Samples Dispatched	Results Deadline	Reported	HSL Calculations (Pre-Sendout) Sample A	
						Calculated Spiked Value	Measured Value
2010	108		18/01/2010	05/03/2010	22/03/2010		
2009	107		26/10/2009	11/12/2009	04/01/2010		
	106		06/07/2009	28/09/2009	14/09/2009		
	105		27/04/2009	12/06/2009	29/06/2009		
	104	Jan-Feb				2.02	2.01
2008	103	Sept-Dec				1.22	1.22
	102	Jun-Aug				1.37	1.38
	101	Apr-Jun				0.92	0.94
	100	Jan-Mar				1.36	1.37
2007	99	Oct-Nov				2.15	2.16
	98	Jul-Sept				1.83	1.85
	97	Apr-Jun				0.89	0.87

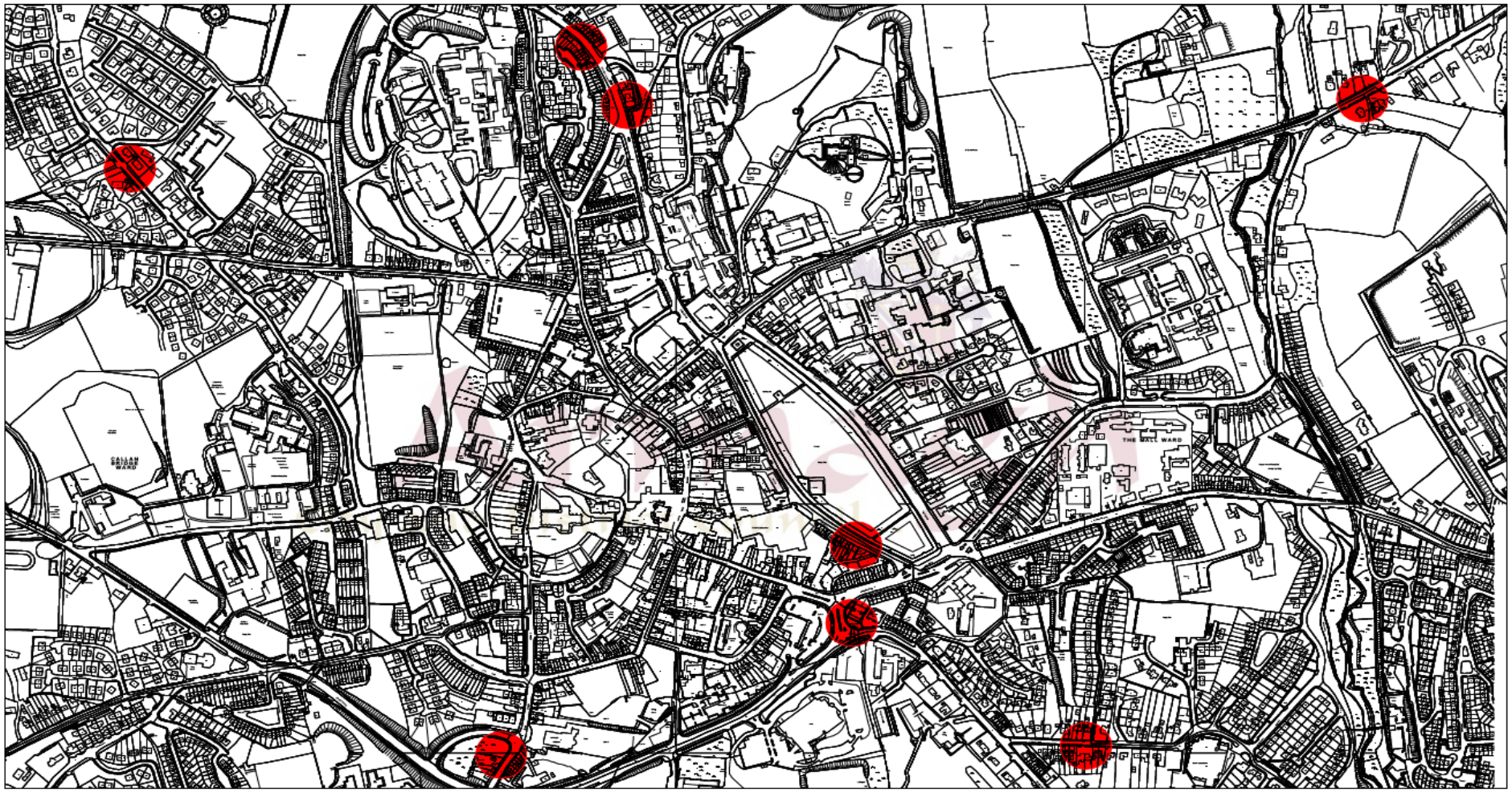
Harwell Analysis Tubes A						HSL Calculations (Pre-Sendout) Sample B	
Result Tube 1	Result Tube 2	Average	Standard Deviation	RSD	Z-Score	Calculated Spiked Value	Measured Value
2.017	2.047	2.032	0.022	1.1%	0.0	1.22	1.19
1.242	1.234	1.238	0.006	0.5%	0.1	0.94	0.95
1.47	1.472	1.471	0.043	2.9%	0.5	2.28	2.3
0.974	0.991	0.983	0.013	1.3%	0.5	1.86	1.93
1.395	1.384	1.39	0.008	0.6%	0.2	1.47	1.45
2.242	2.235	2.239	0.005	0.2%	0.3	0.84	0.84
1.877	1.854	1.866	0.013	0.7%	0.2	1.19	1.2
0.92	0.918	0.919	0.002	0.2%	0.2	1.58	1.59

Harwell Scientifics WASP Data cont'd

Harwell Analysis					
Tubes B					
Result Tube 1	Result Tube 2	Average	Standard Deviation	RSD	Z-Score
1.269	1.23	1.252	0.024	1.9%	0.2
0.957	0.951	0.954	0.005	0.5%	0.1
2.435	2.386	2.411	0.035	1.5%	0.4
1.947	1.958	1.953	0.008	0.4%	0.4
1.511	1.516	1.514	0.004	0.3%	0.2
0.906	0.901	0.904	0.004	0.4%	0.6
1.229	1.223	1.226	0.005	0.4%	0.2
1.619	1.64	1.63	0.015	0.9%	0.2

APPENDIX C

Maps of Diffusion Tube, PM10 and SO2 Monitoring locations



Title : Diffusion Tube Locations

Scale : Not to Scale

29/04/2009

Armagh City and District Council...