2010 Air Quality Progress Report for *North Down Borough Council*

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

17 May 2010

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Report Reference number	North Down Progress Report 2010
Date	17/05/2010

Glossary

QA/QC	**Quality Assessment Quality Control.**
AQMA	**Air Quality Management Area**
UWE	**University of the West of England**
WASP	**Workplace Analysis Scheme for Proficiency**

Executive Summary

The Environment (Northern Ireland) Order 2002, requires North Down Borough Council to undertake Air Quality Reviews and Assessments in their local areas and to meet the local air quality targets and objectives set out in the UK National Air Quality Strategy (2000). The production of an annual air quality report is now a statutory duty for all local authorities. The process is set out in the Department of Environment's Local Air Quality Management Policy Guidance LAQM PGNI (03).

This report is prepared by the North Down Borough Council to meet its statutory obligations under the above regime and has been prepared using the recommended template. The report has been prepared in accordance with the policy guidance mentioned above and with the relevant technical guidance Local Air Quality Management (LAQM.TG(09)

The Borough of North Down is geographically one of the smallest Council areas in Northern Ireland, but is regarded as economically one of the wealthiest. Population has increased steadily over recent years and is now in the region of 78,900. Air Quality in North Down is generally good as there is good ventilation from sea breezes. There are few industrial processes in the area that are significantly detrimental to air quality and heavy fuel oil is not widely used for heat generation.

However, there are a number of very busy trunk roads in the area the busiest being the A2 commuter route from Bangor to Belfast with average daily traffic flows of 44,000 vehicle movements per day at Holywood. Much of the monitoring work in the area is in relation to NO_2 and PM_{10} at relevant locations particularly in relation to the A2 Belfast Bangor road between Ballyrobert and Holywood where a number of properties are located very close to the roadside.

This monitoring indicates that the objectives in the air quality strategy are not currently being exceeded in the area and that detailed assessments or the declaration of Air Quality Management Areas are not required.

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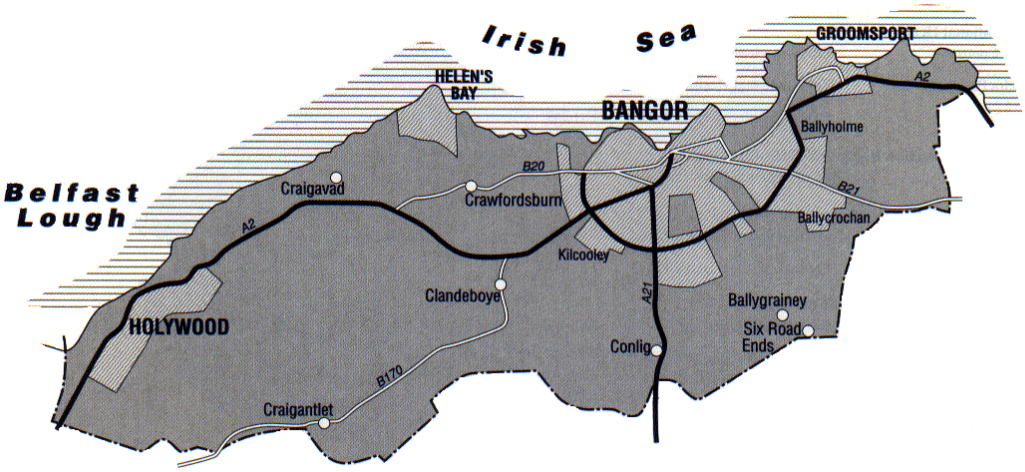
1 Introduction

1.1 Description of Local Authority Area

The Borough of North Down is geographically one of the smallest Council areas in Northern Ireland, but is regarded as economically one of the wealthiest. Population has increased steadily over recent years and is now in the region of 78,000.



Air Quality in North Down is generally good as there is good ventilation from sea breezes. There are few industrial processes in the area that are significantly detrimental to air quality and heavy fuel oil is not widely used for heat generation.

There is still significant use of solid fuel within the Borough for domestic heating. Solid Fuel use was subjected to evaluation in accordance with DETR guidance. In addition, there is over 25 years of data from smoke and SO_2 bubbler sites that have been located in Bangor and Holywood. Studies in relation to solid fuel use were carried out in 2002 to assess the risk of exceeding the air quality objectives in relation to SO_2 and PM_{10}.

There are a number of very busy trunk roads in the area as indicated on the above map. Much of the monitoring work in the area is in relation to NO_2 and PM_{10} at relevant locations particularly in relation to the A2 to Belfast between Ballyrobert and Holywood.

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 microgram's per cubic metre μg/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 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 μg/m^3	Running annual mean	31.12.2003
	3.25 μg/m^3	Running annual mean	31.12.2010
1,3-Butadiene	2.25 μg/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 μg/m^3	Annual mean	31.12.2004
	0.25 μg/m^3	Annual mean	31.12.2008
Nitrogen dioxide	200 μg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 μg/m^3	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 μg/m^3, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 μg/m^3	Annual mean	31.12.2004
Sulphur dioxide	350 μg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 μg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 μg/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

Table 2 Previous reports

Stages Completed	*Exceedences Identified / Predicted*	*Areas Affected*	*AQMA's Declared*
Stage 1 2001	PM10, SO2, NO2	A2 Bangor to Belfast Road, Clandeboye Road Area.	No
Stage 2&3 2004	PM10, SO2, NO2	A2 Bangor to Belfast Road, Clandeboye Road Area.	No
Progress Report 2005	None	A2 Bangor to Belfast Road, Clandeboye Road Area.	No
USA 2006	None	A2 Bangor to Belfast Road, Clandeboye Road Area	No
Progress Report 2007	None	A2 Bangor to Belfast Road, Clandeboye Road Area	No
Progress Report 2008	NO2	A2 Bangor to Belfast Road,	No
USA 2009	None	A2 Bangor to Belfast Road,	No

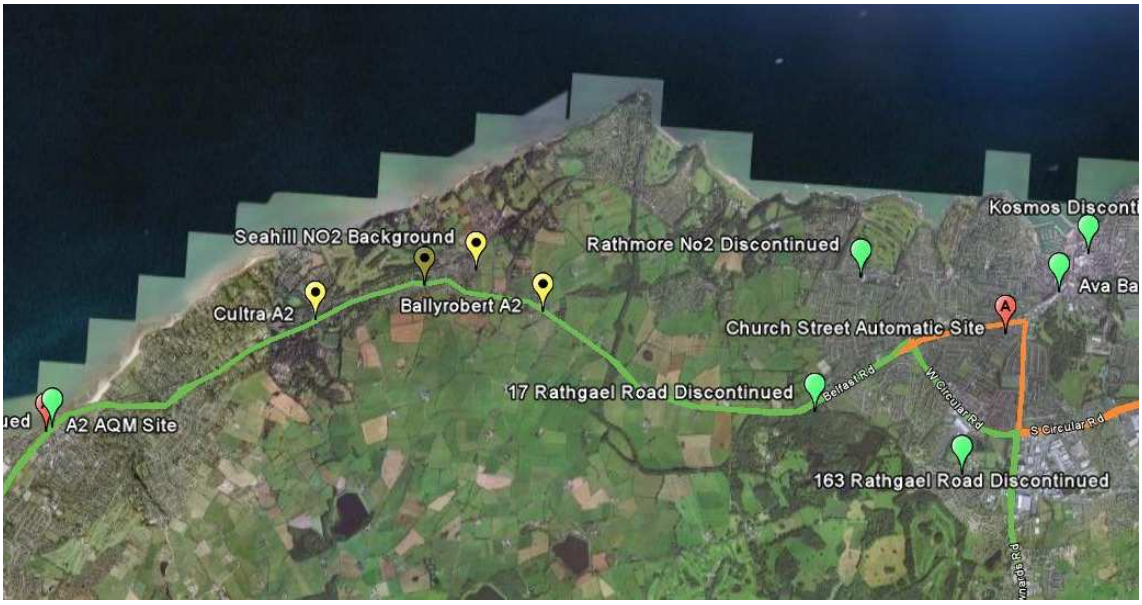
2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

The map below indicates the location of all the monitoring sites that have been in place over the past few years.

Figure 1 Map of North Down Borough Council Air Quality Monitoring Sites.



The following sites were all discontinued at the beginning of 2008. The reason that they were discontinued was that the results indicated that the NO2 levels were well below the objectives. In addition, some of the discontinued tubes were old kerbside network locations with no relevant exposure.

Table 3 Discontinued monitoring Sites

Site Name	Pollutants Monitored	OS Grid Ref (Irish 1964)
Ava Bar Bangor	NO2	350402 381521
Kosmos Bangor	NO2	350707 381905
Rathmore Road Bangor	NO2	348300 381526
17 Rathgael Road Bangor	NO2	347872 380052
163 Rathgael Road Bangor	NO2	349491 379505
Marine Parade Bangor	NO2	339600 379229

2.1.1 Automatic Monitoring Sites

North Down Borough Council has contracted AEA technology to carry out the QA/QC for the automatic monitoring sites. This includes data handling, ratification of data and 6monthly site visits. The Eastern Group Air Quality technical officer visits the

sites on a on a weekly basis and calibrates the equipment on a fortnightly programme.

Figure 2 Marine Parade A2 Automatic AQM Site.

Figure 3 Church Street Automatic Monitoring Site.

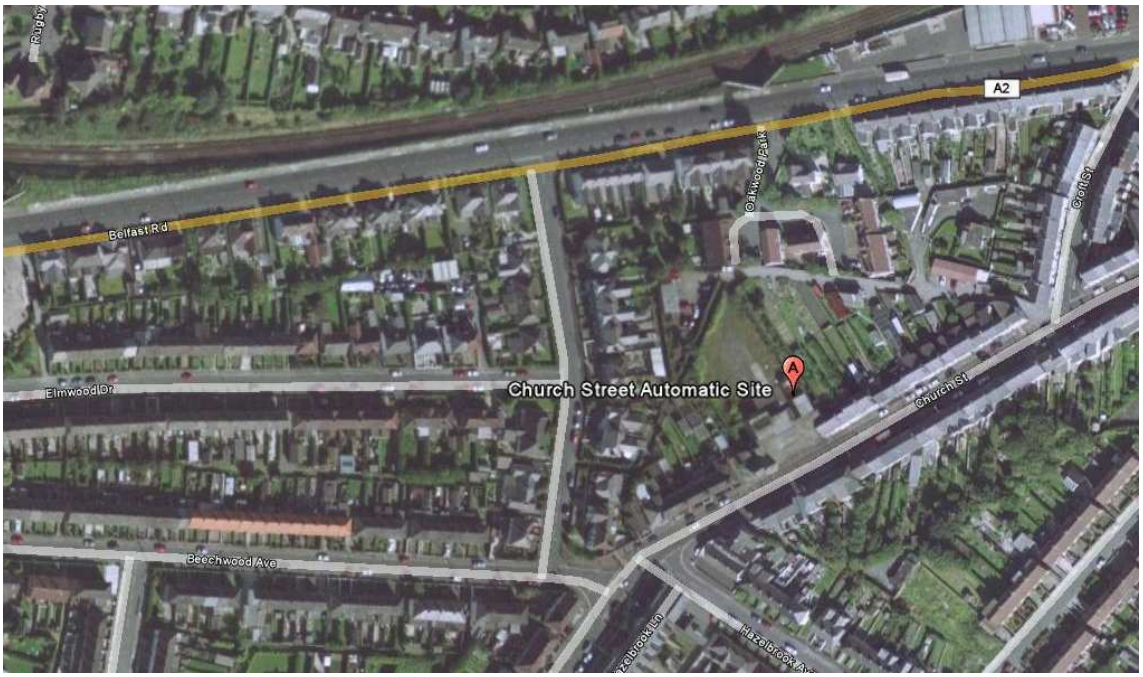


Table 4 Details of Automatic Monitoring Sites

Site Name	**Site Type**	**OS Grid Ref**		**Pollutants Monitored**	**Monitoring Technique**	**In AQMA?**	**Relevant Exposure?** (Y/N with distance (m) to relevant exposure)	**Distance to kerb of nearest road** (N/A if not applicable)	**Does this location represent worst-case exposure?**
Marine Parade Holywood A2	Roadside	X339481	Y379328	No2, PM10	Chemiluminescence TEOM	NO	Y 30M	4.6M	Y
Church Street Bangor	Urban	X349855	Y381044	So2, PM10	UV TEOM	NO	Y 30M	N/A	Y

2.1.2 Non-Automatic Monitoring

The NO_2 diffusion tubes are supplied by Bureau Veritas. Preparation method is 20% TEA in water. A co-location study is carried out at the automatic sites in Holywood, and the bias adjustment factor applied to the results is from this study.

Figure 2.2 Map(s) of Non-Automatic Monitoring Sites (if applicable)

Included in Fig 1 above.

Table 5 Details of Non- Automatic Monitoring Sites

Site Name	Site Type	OS Grid Ref (Irish 1964)	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 ?
Ballyrobert A2	Roadside	X345002 Y380823	NO_2 Tubes	N	Y (<1m)	3m	Y
Seahill Background	Urban B'Ground	X344128 Y381294	NO_2 Tubes	N	N\A	250m	N\A
Seahill A2	Roadside	X343545 Y381102	NO_2 Tubes	N	Y (<1m)	10m	Y
Cultra A2	Roadside	X342475 Y380672	NO_2 Tubes	N	Y (<1m)	6.3m	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

No Objectives for NO2 have been exceeded.

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

Table 6 Results of Automatic Monitoring for Nitrogen Dioxide: 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]
Marine Parade Holywood	X339481 Y379328	N		98.1	31	32	**35**

Figure 4 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Automatic Monitoring Sites.

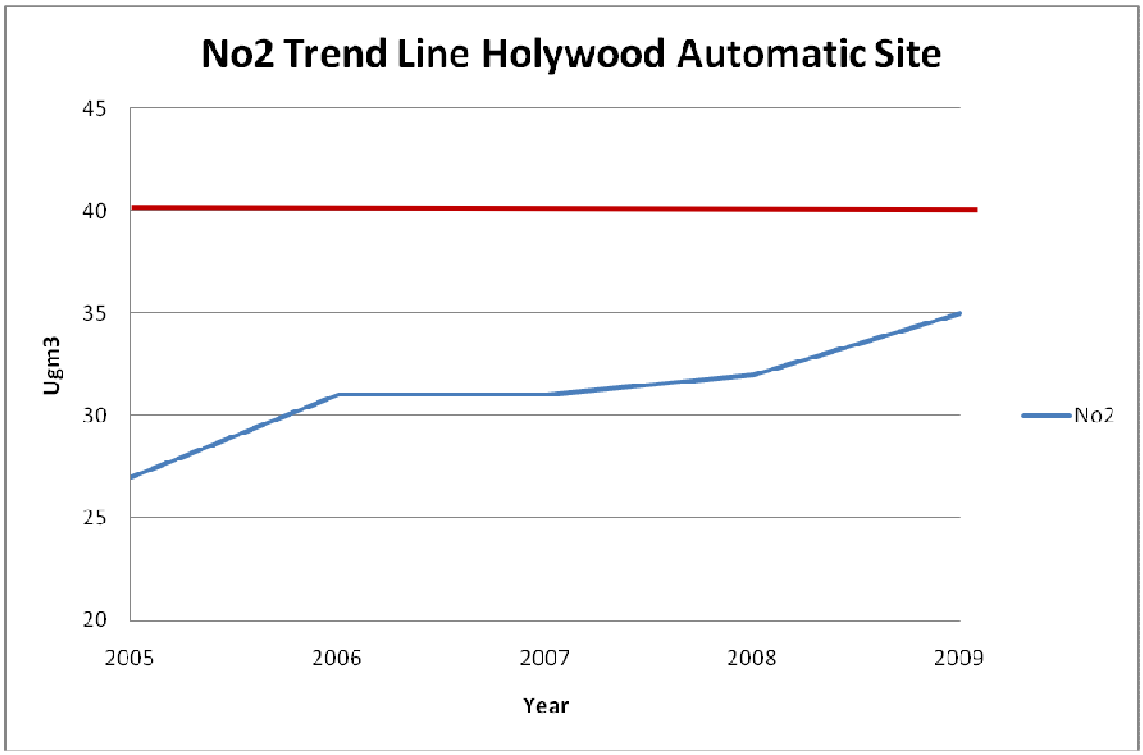
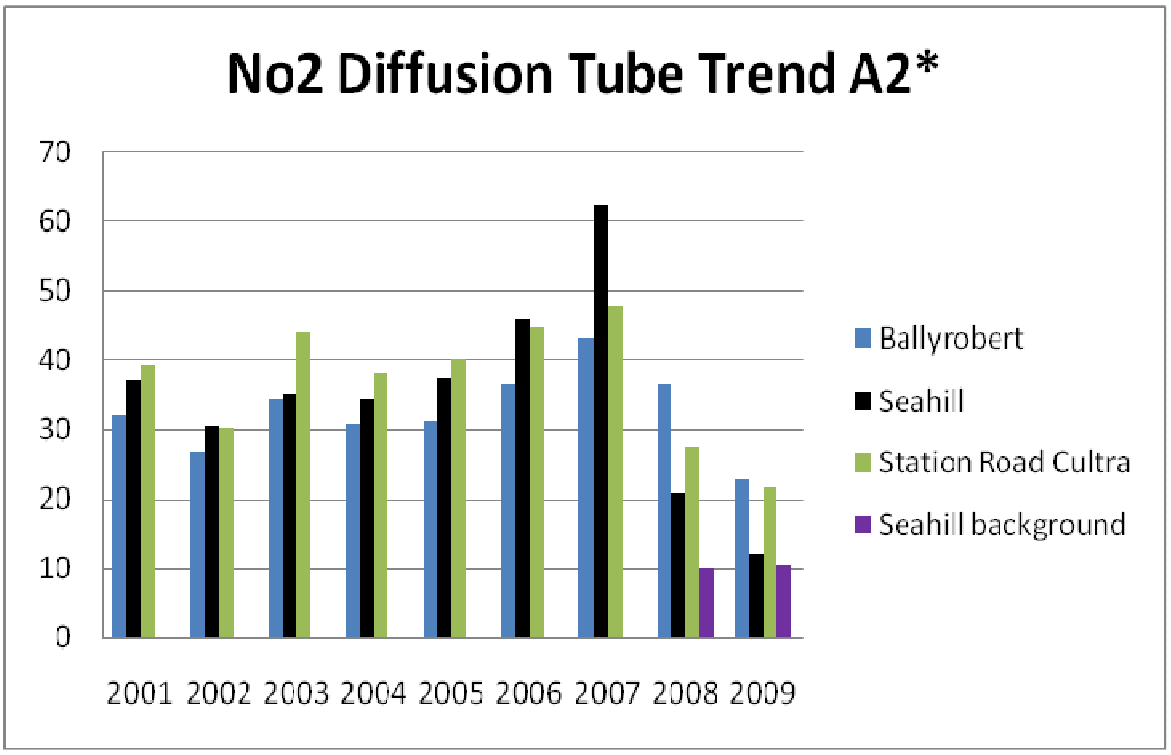


Table 7 Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour Mean Objective

Site ID	Location	Within AQMA?	Data Capture for monitoring period [a] %	Data Capture for full calendar year 2009 [b] %	Number of Exceedences of hourly mean (200 µg/m^3)		
					2007 [c]	2008 [c]	2009
Marine Parade Holywood	X339481 Y379328	N		98.1	0	**0**	**4**

Figure 5 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites.



***Diffusion tubes were moved in 2008 to the façades of dwellings comprising the relevant exposure**

Diffusion Tube Monitoring Data

The following is a table of NO2 diffusion tube data. It should be noted that there is a drop in measured NO2 as a result of moving the tubes from roadside sites to the facades of the nearest relevant exposure on the A2 .

Table 8 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]
Ballyrobert	A2	N		100%	43	36	23
Seahill	A2	N		100%	62	21	12
Station Road Cultra	A2	N		100%	48	28	22
Seahill background	A2	N		100%		10	10

2.2.2 PM_{10}

The monitoring data from Bangor and Holywood remains below the objective.

Table 9 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]
Marine Parade Holywood	A2	N		94.7	26	24	**18**
Church Street Bangor	Town Residential	N		99.2	22	22	16

Table 10 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)		
					2007 [c]	2008 [c]	2009 [c]
Marine Parade Holywood	A2	N		94.7	13	**9**	**0**
Church Street Bangor	A2	N		99.2	8	9	0

2.2.3 Sulphur Dioxide

SO2 levels have continued to be insignificant and the site has been decommissioned at the end of March 2010

2.2.4 Summary of Compliance with AQS Objectives

North Down Borough Council has examined the results from monitoring in the borough. Concentrations are all below the objectives, therefore there is no need to proceed to a Detailed Assessment.

3 New Local Developments

North Down Borough 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 Planning Applications

During the past year planning applications for approximately 900 dwellings have been approved for the Rathgael Road in Bangor. This will have an impact on the A2 route into Belfast.

5 Conclusions and Proposed Actions

5.1 Conclusions from New Monitoring Data

There are no exceedences of the Air quality Objectives in North Down Borough Council area. However, there appears to be a trend toward increased NO2 levels at Holywood A2 site. Therefore, funding permitting automatic monitoring will continue at this site.

5.2 Proposed Actions

Monitoring will continue at the existing sites and a progress report will be submitted in 2011

6 References

EG (2007) **Eastern Group Air Quality Progress Report**. Annual report on air quality in the Eastern group of local authorities in Northern Ireland, April 2008.

EG (2008) **Eastern Group Air Quality Progress Report**. Annual report on air quality in the Eastern group of local authorities in Northern Ireland, April 2008.

TG (2003) **Part IV of the Environment Act 1995. Local Air Quality Management: Technical Guidance LAQM.TG(03)**. Guidance prepared by the Department for Environment, Food and Rural Affairs and the Devolved Administrations, January 2003.

TG (2009) **Part IV of the Environment Act 1995. Local Air Quality Management: Technical Guidance LAQM.TG(09)**. Guidance prepared by the Department for Environment, Food and Rural Affairs and the Devolved Administrations, February 2009.

7 Appendices

Appendix A: QA/QC Data

Diffusion Tube Bias Adjustment Factors
The tubes are supplied by Casella/Bureau Veritas labs and the preparation method is 20% TEA in water. The bias adjustment factor from the R&A helpdesk database is 0.81
http://www.uwe.ac.uk/aqm/review/R&Asupport/diffusiontube310310.xls

Factor from Local Co-location Studies (if available)

The bias adjustment factors from the Holywood co-located study is 0.73

This was calculated using the R&A support precision and accuracy spreadsheet.

Appendix B:

2009 Diffusion Tube results with bias adjustment factor applied.

NorthDown 11	Ballyrobert	21.7	32.1	21.9	21.7	27.7	29.4	21.4	13.9	20.9	20.0	17.3	26.5
NorthDown 12	Seahill	14.6	19.7	12.4	9.0	10.5	13.6	7.8	8.5	9.5	13.4	9.5	18.7
NorthDown 13	StationRoad Cultra	32.1	29.7	21.2	23.6	21.7	17.5	14.4	20.0	15.8	20.9	21.2	23.6
NorthDown 15	Seahill background	19.0	15.3	11.0	8.0	8.0	6.6	5.1	0.0	8.0	10.2	10.2	13.1

Discussion of Choice of Factor to Use

North Down Borough Council used the local factor as it was more specific to the location. The bias factor is 0.73

PM Monitoring Adjustment

The PM10 was measured using TEOM the results are reported as gravimetic equivalent using a factor of 1.3

Produced by AEA on behalf of North Down Borough Council

NORTH DOWN HOLYWOOD A2
01 January to 31 December 2009

These data have been fully ratified by AEA

POLLUTANT	NO	NO_2	NO_X	PM_{10}+
Number Very High	-	0	-	-
Number High	-	0	-	-
Number Moderate	-	0	-	-
Number Low	-	8591	-	-
Maximum 15-minute mean	428 μgm^{-3}	260 μgm^{-3}	886 μgm^{-3}	253 μgm^{-3}
Maximum hourly mean	385 μgm^{-3}	216 μgm^{-3}	802 μgm^{-3}	145 μgm^{-3}
Maximum running 8-hour mean	252 μgm^{-3}	172 μgm^{-3}	525 μgm^{-3}	86 μgm^{-3}
Maximum running 24-hour mean	192 μgm^{-3}	131 μgm^{-3}	409 μgm^{-3}	57 μgm^{-3}
Maximum daily mean	135 μgm^{-3}	122 μgm^{-3}	323 μgm^{-3}	42 μgm^{-3}
Average	27 μgm^{-3}	35 μgm^{-3}	77 μgm^{-3}	18 μgm^{-3}
Data capture	98.1 %	98.1 %	98.1 %	94.7 %

+ PM_{10} as measured by a TEOM
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
Nitrogen Dioxide	Annual mean > 40 μgm^{-3}	0	-
Nitrogen Dioxide	Hourly mean > 200 μgm^{-3}	4	2

Produced by AEA on behalf of North Down Borough Council

NORTH DOWN BANGOR
01 January to 31 December 2009

These data have been fully ratified by AEA

POLLUTANT	PM_{10}+	SO_2
Number Very High	-	0
Number High	-	0
Number Moderate	-	0
Number Low	-	34250
Maximum 15-minute mean	214 μgm^{-3}	77 μgm^{-3}

Maximum hourly mean	153 µgm^{-3}	67 µgm^{-3}
Maximum running 8-hour mean	107 µgm^{-3}	44 µgm^{-3}
Maximum running 24-hour mean	56 µgm^{-3}	26 µgm^{-3}
Maximum daily mean	47 µgm^{-3}	19 µgm^{-3}
Average	16 µgm^{-3}	3 µgm^{-3}
Data capture	99.2 %	99.8 %

+ PM_{10} as measured by a TEOM
All mass units are at 20'C and 1013mb

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Exceedences	Days
Sulphur Dioxide	15-minute mean > 266 µgm^{-3}	0	0
Sulphur Dioxide	Hourly mean > 350 µgm^{-3}	0	0
Sulphur Dioxide	Daily mean > 125 µgm^{-3}	0	0

QA/QC of automatic monitoring

North Down Borough Council commissioned AEA Technology to provide the QA/QC of the automatic measurements of NO2-SO2 and PM10 from the two sites. AEA Technology is the current QA/QC contractor for the national automatic urban and rural network (AURN) operated by the Department for Environment, Food and Rural Affairs and the Devolved Administrations. Local authority staff act as the local site operator and visit the sites on a fortnightly basis carrying out any manual calibration or filter changes required. Audits of the two sites are carried by AEA Technology on a six monthly basis.

QA/QC of diffusion tube monitoring

The tubes are supplied by Casella/Bureau Veritas labs and the preparation method is 20% TEA in water. Bureau Veritas Laboratories that have demonstrated satisfactory performance in the WASP scheme for analysis of NO2 diffusion tubes.
http://www.laqmsupport.org.uk/Summary_of_Laboratory_Performance_in_WASP_R103-107.pdf