2011 Progress Report for Moyle District Council

In fulfillment of Part IV of the Environment Act 1995
Local Air Quality Management 2011

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Report Reference number	PR11/MDC
Date	May 2011

Executive Summary

Local Air Quality Management was formalised as a statutory duty of district councils by the Environment (Northern Ireland) Order 2002. Air quality objectives were subsequently prescribed in the Air Quality Regulations (Northern Ireland) 2003. District Councils are therefore required to periodically review and assess air quality in their area.

The review and assessment process consists of Updating and Screening Assessments and Detailed Assessments. Updating and Screening Assessments identify those matters that have changed since earlier review and assessment work was completed and which may now require further assessment. Where an Updating and Screening Assessment identifies a risk that an air quality objective is likely to be exceeded a detailed assessment is undertaken to determine with reasonable certainty whether or not this will occur. Should a detailed assessment conclude that a relevant air quality objective will be exceeded then an Air Quality Management Area must be declared.

Progress Reports are intended to maintain continuity between the three-early cycle of Review and Assessment.

A combined Updating and Screening Assessment and Progress Report was completed in 2010 which identified two locations not previously assessed where diesel or steam trains were regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m. These findings prompted the need to proceed to a detailed assessment for sulphur dioxide. The first stage of this detailed assessment consisted of a desktop screening exercise which on completion in 2010 determined that it was not necessary to progress to a full detailed assessment for sulphur dioxide.

The monitoring data indicated that NO_2 levels in Moyle District met the air quality objectives in 2010.

For the remaining six pollutants, no significant changes have since occurred that would prompt the need to proceed to a detailed assessment and no significant development had occurred in the council area which was likely to have a significant effect on air quality.

The next round of air quality reviews and assessments will take the form of an Updating and Screening Assessment Report in April 2012.

Table of contents

Appendices

List of Tables

List of Figures

1 Introduction

1.1 Description of Local Authority Area

Moyle District is situated on the north east corner of Northern Ireland and incorporates 42 miles of the beautiful North Antrim Coastline. The area includes three of the best known features of Northern Ireland: the Giants Causeway, the Glens of Antrim and Rathlin Island. Rathlin Island is Northern Ireland's only inhabited island and lies 7 miles off the coast from Ballycastle. It has a population of 110 who are mostly employed in fishing, farming and tourism. Several parts of the Moyle area have been designated 'Areas of Outstanding Natural Beauty'.

Moyle District Council is the smallest local authority in Northern Ireland, with a low population density of 3.34 hectares per head of population compared to a Northern Ireland average of 0.9 hectares.

Moyle has a population of approximately 16,000 and covers almost 49,500 hectares. The district consists of three main settlements, Ballycastle, Bushmills, and Cushendall with approximately 46% of the district population living in these areas. Ballycastle is the largest settlement in the District, with 26% of the districts population living in it.

The main sources of income in the district are farming, tourism, and a small amount of light industry.

Traffic volumes in the area are low with the main route being the A2 Coast Road which runs the full length of the District following the coastline. Other A Class roads include the A43 leading from Glenariffe to Ballymena and the A44 which runs from Ballycastle to the A26 near Cloughmills.

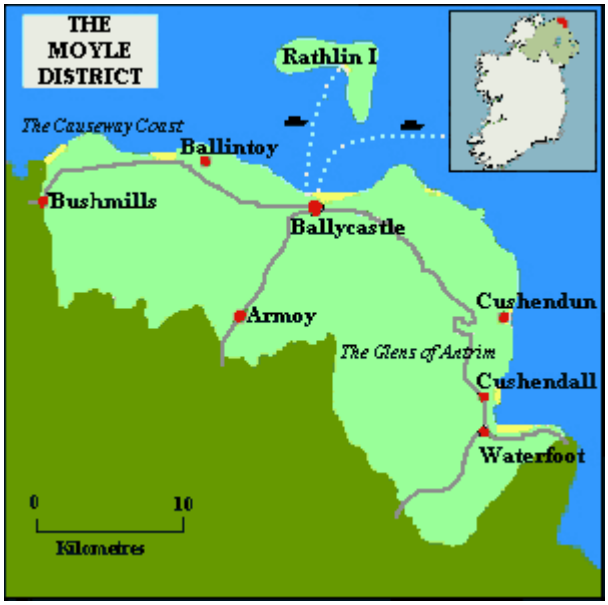


Figure 1: Map of Moyle District.

1.2 Purpose of Progress 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.

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	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

The stage 1 air quality review and assessment undertaken by Moyle District Council in 2001 suggested that:

(a) There was a need to progress to a second stage review of PM_{10} (particulate matter) emissions from road traffic and for SO_2 (sulphur dioxide) from emissions from one industrial combustion system.

Consultants were employed to investigate this matter further. The consultants also considered NO_2 (nitrogen dioxide) emissions from traffic. The consultants concluded that the air quality objectives for NO_2, PM_{10} and SO_2 are likely to be met and a third stage review was not required from vehicular and industrial sources.

(b) There was a need to carry out a third stage review of SO_2 and PM_{10} emissions from two areas of domestic coal burning.

The Council commissioned consultants to model PM_{10} and SO_2 for the two areas of domestic coal burning in Bushmills and Ballycastle. The modelling, which was corrected for bias, predicted that in both the areas of concern exceedences of the SO_2 and PM_{10} objectives are unlikely.

As a result of this Moyle District Council did not have to declare any air quality management areas. However the Council proposed to continue local monitoring to identify long term trends in air quality within the district and to ensure that the conclusions drawn in the first round review and assessment remained valid. The Council continued to monitor NO_2 and SO_2.

A Progress Report was completed in 2005. Assessment of the available monitoring data for nitrogen dioxide and sulphur dioxide indicated that air quality in Moyle District met the air quality objectives and no significant development had occurred in the council area which was likely to have a significant effect on air quality.

The Updating and Screening Assessment completed in 2006 identified those matters which had changed since the first round of review and assessment and concluded that it was unlikely that any of the national air quality objectives would be breached within the Council area. There was therefore no need to proceed to a detailed assessment for any of the seven pollutants reconsidered. Moyle District Council however continued to monitor NO_2 and SO_2.

A Progress report was completed in 2007. Assessment of the available monitoring data for nitrogen dioxide and sulphur dioxide indicated that air quality in Moyle District met the air quality objectives and no significant development had occurred in the council area which was likely to have a significant effect on air quality. In view of technical guidance monitoring of SO_2 using diffusion tubes which were located at eight sites throughout Moyle District was discontinued at the end of 2006.

A further Progress Report was completed in 2008. The NO_2 diffusion tube monitoring sites were relocated during 2007 hence there were incomplete data sets for all the sites during this period. No significant development had occurred in the council area which was likely to have a significant effect on air quality and no further action was necessary.

A combined Updating and Screening Assessment and Progress Report was completed in 2010. The available monitoring data for nitrogen dioxide confirmed that NO_2 diffusion tube monitoring sites have been relocated to more relevant areas. The monitoring data indicated that NO_2 levels in Moyle District met the air quality objectives.

No significant development had occurred in the council area which was likely to have a significant effect on air quality. Council however identified two locations not previously assessed where diesel or steam trains were regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m and which required Council to proceed to a detailed assessment for sulphur dioxide. The first stage of this detailed assessment was to consist of a desktop screening exercise to

gather further information on the actual length of time and frequency that the trains are stationary with its engine running at both stations and relevant exposure.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Moyle District Council does not have any automatic monitoring sites.

2.1.2 Non-Automatic Monitoring

Nitrogen oxide (NO) and Nitrogen dioxide (NO_2) are both oxides of nitrogen collectively referred to as NO_x. NO is oxidised to form NO_2. Combustion processes, including those in vehicle engines, give rise to this mixture of NO_x gases. High concentrations of NO_2 can irritate the respiratory system and affect human health.

Moyle District Council is currently monitoring nitrogen dioxide at 10 sites throughout the district using passive diffusion tubes. Diffusion tubes provide a low cost means of indicatively monitoring the level of NO_2 in the air. The passive diffusion tube is a clear plastic tube open at one end with the closed end containing an absorbent for the gas and absorbs the pollutant direct from the surrounding air. The tubes are exposed for either 4 or 5 weeks at a time. Results from analysis of the tubes can then be used to compare the level of NO_2 against the annual mean objective for NO_2.

The location of the monitoring sites was reviewed in 2007 in view of more recent traffic data, to ensure they were situated in the most relevant areas. Monitoring sites are chosen to provide data on locations that appear to be representative of likely residential exposure and where possible are closest to the nearest receptor to the busy road. As a result all monitoring sites were relocated in August 2007.

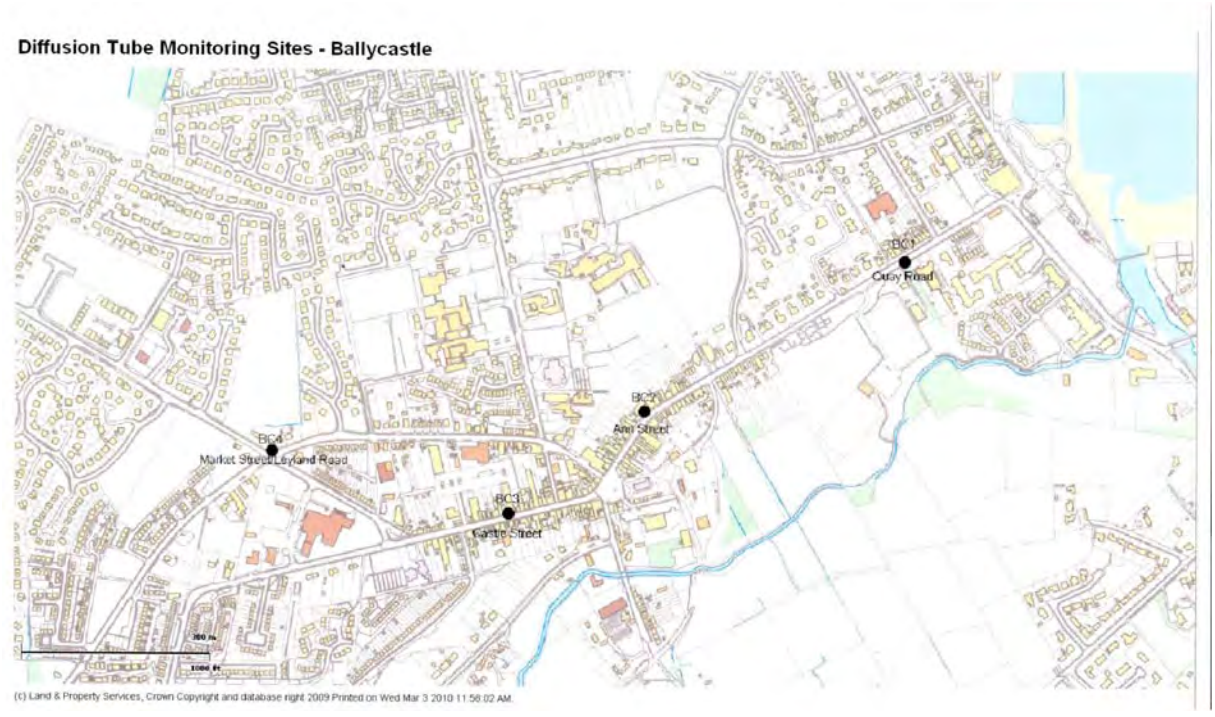
Council also reviewed the performance of the laboratory contracted for the supply and analysis of the diffusion tubes. As a result the supplier was changed from Lambeth Scientific Services to Gradko Environmental Ltd in December 2007.

Details of non-automatic monitoring sites are shown in table 2.1.on page 13.

Maps of Non-Automatic Monitoring Sites are shown in figure 2 over page.

QA/QC data is included in Appendix 1.

Figure 2 Maps of Non-Automatic Monitoring Sites



Diffusion Tube Monitoring Site - Bushmills

Diffusion Tube Monitoring Sites - Cushendall

Table 2.1 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?
Quay Road, Ballycastle	Roadside	E311978	N441022	NO_2	No	12	1.60	Y
Ann Street, Ballycastle	Roadside	E311505	N440828	NO_2	No	10	5.25	Y
Castle Street, Ballycastle	Roadside	E311290	N440659	NO_2	No	10	1.60	Y
Market Street/Leyland Road junction, Ballycastle	Roadside	E310912	N440761	NO_2	No	1	2.50	Y
Mill Street, Cushendall	Roadside	E323685	N427677	NO_2	No	15	1.40	Y
Coast Road, Cushendall	Roadside	E324177	N427237	NO_2	No	12	4.10	Y
The Diamond, Bushmills	Roadside	E294076	N440884	NO_2	No	20	1.30	Y
Main Street, Bushmills	Roadside	E294103	N440626	NO_2	No	8	1.20	Y
Priestland Road, Bushmills	Roadside	E293777	N440755	NO_2	No	14	2.80	Y
Main Street, Armoy	Roadside	E306815	N432830	NO_2	No	30	2.00	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

Moyle District Council has not declared any air quality management areas to date and currently monitors nitrogen dioxide only. NO_2 monitoring results are detailed below.

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

Moyle District Council does not operate automatic monitoring equipment.

Diffusion Tube Monitoring Data

The NO_2 diffusion tube monthly data for 2010 is shown in table 4 in appendix 2. Annual mean concentrations for 2010 are shown in tables 2.2. The annual mean air quality objective of 40 μg/m^3 was not exceeded at any of the monitoring sites

Table 2.2 Results of Nitrogen Dioxide Diffusion Tubes 2010

Site ID	Location	Within AQMA?	Data Capture 2010 %	Annual mean concentrations 2010 (μg/m^3) Adjusted for bias
BC1	Quay Road, Ballycastle	No	100	19.38
BC2	Ann Street, Ballycastle	No	92	34.87
BC3	Castle Street, Ballycastle	No	100	26.86
BC4	Market Street/Leyland Road junction, Ballycastle	No	100	19.21
CD1	Mill Street, Cushendall	No	92	18.34
CD2	Coast Road, Cushendall	No	100	11.10
BM1	The Diamond, Bushmills	No	100	16.48
BM2	Main Street, Bushmills	No	100	25.19
BM3	Priestland Road, Bushmills	No	100	12.68
BM4	Main Street, Armoy	No	100	13.32

Annual mean concentrations for the current monitoring sites for 2007 through to 2010 are shown in table 2.3 below.

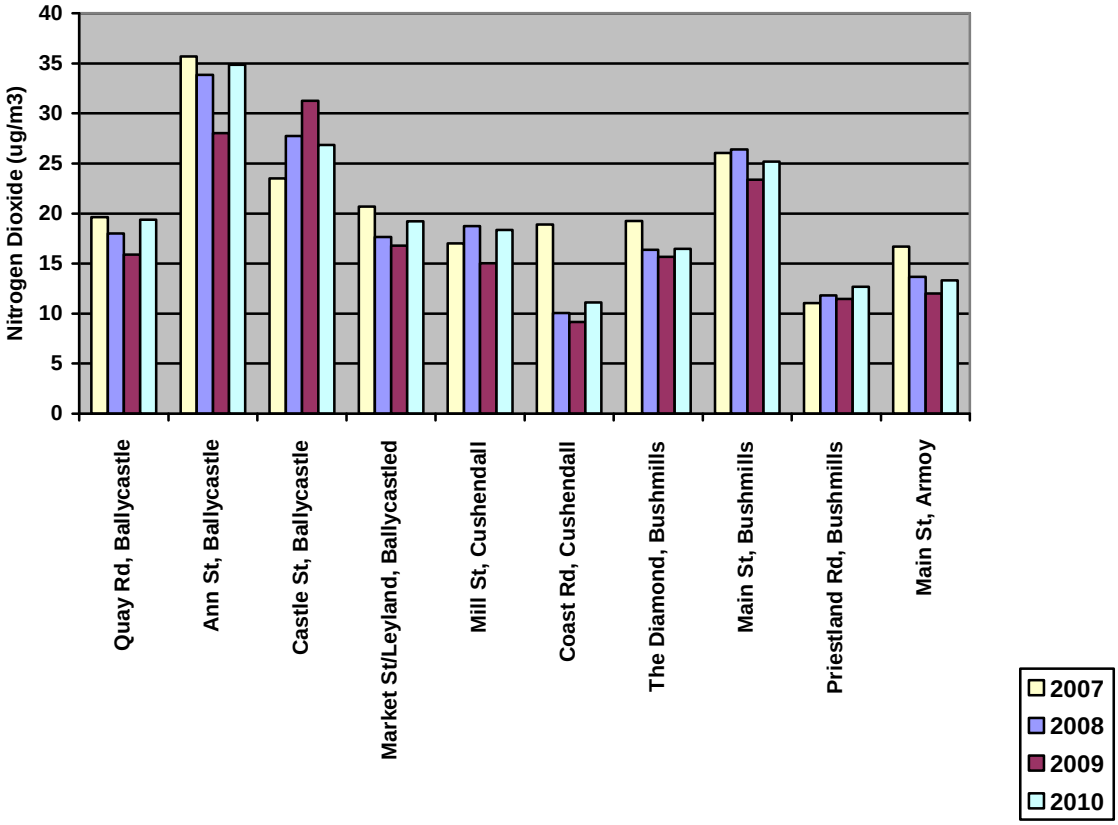
Table 2.3 Results of Nitrogen Dioxide Diffusion Tubes 2007 – 2010 (Current monitoring sites)

Site ID	Location	Within AQMA?	Estimated Annual Mean concentrations (μg/m^3) Adjusted for bias	Annual mean concentrations (μg/m^3) Adjusted for bias	Annual mean concentrations (μg/m^3) Adjusted for bias	Annual mean concentrations (μg/m^3) Adjusted for bias
			2007 (Lambeth SS)	2008 (Gradko)	2009 (Gradko)	2010 (Gradko)
BC1	Quay Road, Ballycastle	No	19.63	18.00	15.89	19.38
BC2	Ann Street, Ballycastle	No	35.70	33.83	28.03	34.87
BC3	Castle Street, Ballycastle	No	23.51	27.75	31.25	26.86
BC4	Market Street/Leyland Road junction, Ballycastle	No	20.68	17.65	16.80	19.21
CD1	Mill Street, Cushendall	No	17.00	18.75	15.02	18.34
CD2	Coast Road, Cushendall	No	18.89	10.06	9.17	11.10
BM1	The Diamond, Bushmills	No	19.26	16.39	15.67	16.48
BM2	Main Street, Bushmills	No	26.06	26.41	23.37	25.19
BM3	Priestland Road, Bushmills	No	11.05	11.82	11.45	12.68
BM4	Main Street, Armoy	No	16.71	13.67	11.99	13.32

In August 2007 the NO_2 diffusion tube monitoring sites were relocated to the current monitoring sites. The short term data from 2007 has been adjusted to an equivalent annual mean using the method described in appendix 1.

Four years of nitrogen dioxide monitoring results have been obtained for the above sites and are shown on the graph in figure 3 over page. Care should be exercised in drawing any conclusions regarding trends in the level of NO_2 as changes in concentrations can occur from year to year due to weather conditions. It is normal practice to only consider a trend as being significant when five years worth of data are available. Notwithstanding this the annual mean air quality objective of 40 μg/m^3 was not exceeded at any of the diffusion tube sites since monitoring commenced in 2007.

Figure 3 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites 2007 – 2010



2.2.2 PM_{10}

Moyle District Council does not undertake PM_{10} monitoring.

2.2.3 Sulphur Dioxide

Moyle District Council does not undertake sulphur dioxide monitoring.

2.2.4 Benzene

Moyle District Council does not undertake benzene monitoring.

2.2.5 Other pollutants monitored

Moyle District Council does not undertake monitoring of any other pollutants.

2.2.6 Summary of Compliance with AQS Objectives

Moyle District Council has examined the results from monitoring in the district. Concentrations are all below the objectives, therefore there is no need to proceed to a Detailed Assessment.

3 New Local Developments

3.1 Road Traffic Sources

Moyle District Council confirms that there are no new/newly identified congested streets with residential properties close to the kerb that have not been adequately considered in previous rounds of Review and Assessment.

Moyle District Council confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic; no new/newly identified roads with high flows of buses/HDVs; no new/newly identified busy junctions/busy roads; no new/proposed roads and no new/newly identified roads with significantly changed traffic flows no new relevant bus stations in the District.

3.2 Other Transport Sources

3.2.1 Airports

Moyle District Council confirms that there are no airports in the District.

3.2.2 Railways (Diesel and Steam Trains)

(i) Stationary Trains

Moyle District Council's Combined 2009 Air Quality Updating and Screening Assessment and 2010 Progress report identified locations not previously assessed where diesel or steam trains are regularly stationary for periods of 15 minutes or more with potential for relevant exposure within 15 metres at the Giants Causeway and Bushmills Railway.

Due to the seasonal nature of the railways timetable it was not possible to carry out a screening exercise before submission of said report in April 2010 so it was concluded that there was a need to proceed to a detailed assessment for this source. The first stage of this assessment was to consist of a screening exercise to gather further information on the actual length of time and frequency that trains were stationary and relevant exposure.

During 2010 a desktop screening exercise of the diesel and steam train sources was completed. Based on information gathered during a site visit and discussions with the Railway management it was determined that it was not necessary to progress to a full detailed assessment for sulphur dioxide on the following basis.

The railway operates a seasonal timetable therefore the number of trains is limited. Trains do not idle beyond a maximum of 15 minutes and there is the potential to switch off diesel trams while they wait at the stations. Any relevant exposure would take place at the picnic tables at the Giants Causeway station however the trains do not idle beyond 15 minutes and it is possible to maintain a distance of at least 15 metres between the idling train and the picnic tables. Also as the picnic tables will not be in continuous use by members of the public when the trains are running, exposure would not be considered regular.

In view of the above it is considered that a detailed assessment of the Giants Causeway and Bushmills Railway is not required.

Moyle District Council confirms that there are no other locations not previously assessed where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15 metres.

(ii) Moving Trains

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

3.2.3 Ports (Shipping)

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

3.3 Industrial Sources

Since the last Updating and Screening Assessment Moyle District Council confirms the following:

There are no new or proposed industrial installations for which an air quality assessment has been carried out within its area.

There are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area.

There are no new or significantly changed industrial installations with no previous air quality assessment.

There are no major fuel (petrol) storage depots within the district nor petrol stations or poultry farms meeting the specified criteria.

3.4 Commercial and Domestic Sources

Since the last Updating and Screening Assessment Moyle District Council confirms the following:

Moyle District Council confirms that there are no biomass combustion plant in the District and no combined impact from biomass combustions sources.

Moyle District Council has assessed areas of significant domestic solid fuel use in a previous review and assessment and concluded that it will not be necessary to proceed to a Detailed Assessment.

3.5 New Developments with Fugitive or Uncontrolled Sources

Since the last Updating and Screening Assessment Moyle District Council confirms that there are no new or newly identified potential sources of fugitive particulate matter emissions such as landfill sites, quarries, unmade haulage roads on industrial sites, waste transfer stations in the District which may have an impact on air quality within the Local Authority area.

3.6 Summary

Moyle 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

Moyle District Council has not had to designate any air quality management areas, does not expect to designate one in future and do not have areas close to exceedence levels. Moyle District Council therefore does not intend to draw up a local air quality strategy in 2011.

5 Planning Applications

Moyle District Council confirms that, to our knowledge, there are no planning applications for new developments which have not yet been approved but which could impact on air quality.

6 Air Quality Planning Policies

Land use planning is the remit of the Planning Service for Northern Ireland, an Agency within the Department of the Environment. Moyle District Council is however a statutory consultee for the planning process and as such has regard to the Development Plans for Northern Ireland and relevant air quality legislation in making recommendations to the Planning Service.

7 Local Transport Plans and Strategies

Moyle District Council is not aware of any major local transport plans or strategies which are likely to impact on air quality.

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

To date no Air Quality Management Areas have been declared in Moyle District.

Assessment of NO_2 diffusion tube monitoring data has shown that since the last Updating and Screening Assessment the annual mean air quality objective of 40 $\mu g/m^3$ was not exceeded at any of the monitoring sites. No significant upward or downward trend has been identified in the monitoring data for the sites from 2007 to 2010.

8.2 Conclusions relating to New Local Developments

The previous Updating and Screening assessment identified the need to progress to a detailed assessment for diesel and steam trains not previously assessed for sulphur dioxide. The first stage of this detailed assessment consisted of a desktop screening exercise which on completion in 2010 determined that it was not necessary to progress to a full detailed assessment for sulphur dioxide.

Moyle 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.

8.3 Proposed Actions

This Progress Report has not identified the need to proceed to a Detailed Assessment for any pollutant or identified any need for additional monitoring or changes to the existing monitoring programme. Moyle District council relocated monitoring sites during 2007 to ensure they were situated in the most relevant areas. Assessment of monitoring data at the new sites has in general measured higher levels of pollutants.

The next proposed action by Moyle District Council is to submit an Updating and Screening Assessment report in 2012.

9 References

Part IV of the Environment Act 1995

Environment (Northern Ireland) Order 2002 Part III

Local Air Quality Management Guidance Technical Guidance, (LAQM.TG(09)) defra 2009.

DOE Northern Ireland Air website http://www.airqualityni.co.uk/

Defra Local Air Quality Management (LAQM) Support website http://laqm.defra.gov.uk/

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2000)

Air Quality Regulations (Northern Ireland) 2003

Moyle District Council Review and Assessment of Air Quality Stage 1 Report 2001

Moyle District Council Review and Assessment of Air Quality Stage 2 & 3 Report 2004

Moyle District Council Progress Report 2005

Moyle District Council Update and Screening Report 2006

Moyle District Council Progress Report 2007

Moyle District Council Progress Report 2008

Moyle District Council Combined 2009 Air Quality Update and Screening Assessment and 2010 progress Report

2009 Air Quality Updating and Screening Assessment for Belfast City Council

2009 Air Quality Updating and Screening Assessment for Derry City Council

Appendices

Appendix 1 QA/QC Data

Diffusion Tube Bias Adjustment Factors

Nitrogen dioxide diffusion tubes were supplied and analysed by Gradko Environmental Ltd., St. Martins House, 77 Wales Street, Winchester, Hampshire, SO23 0RH during 2010. The preparation method is 20% TEA in water. Gradko Environmental Ltd is a UKAS accredited laboratory and follows Laboratory Quality Procedures. Analysis is carried out in accordance with documented in-house laboratory method GLM7.

Gradko Environmental Ltd has a bias adjustment factor of 0.92 for 2010. The corrected NO_2 concentration is obtained by multiplying the measured annual mean NO_2 concentration by the correction factor.

Factor from Local Co-location Studies (if available)

Not applicable for Moyle District Council.

Discussion of Choice of Factor to Use

The Council does not operate a continuous analyser and therefore a co-location study has not been undertaken to determine a specific local bias adjustment factor. The national bias adjustment factor was therefore used. This is available on the Defra website (**www.laqm.defra.gov.uk**) spreadsheet version April 2011 and based on 39 studies for the preparation method 20% TEA in water during 2010 the overall correction factor was determined to be 0.92.

PM Monitoring Adjustment

Not applicable to Moyle District Council.

Short-term to Long-term Data adjustment

To allow direct comparison against the air quality objectives, short-term to long term data adjustments have been carried out for 4 months NO_2 diffusion tube data in 2007. The need for this arose due to a 2007 council review of the diffusion tube locations in view of traffic data to ensure they were situated in the most relevant areas. As a result all monitoring sites were relocated in August 2007 to the monitoring sites currently in use. A review of the analysing laboratory performance followed which resulted in the analysing laboratory being changed from Lambeth Scientific Service to Gradko Environmental Ltd in December 2007. The 2007 NO_2 diffusion tubes results at the current monitoring sites are shown in table 5 in appendix 3.

The mean concentrations for the 4 month period August to November 2007 are shown in table 6 in appendix 4. The 2007 national bias adjustment factor 1.07 has been applied to the measured mean concentrations. The results for December 2007 are not included due to the change in the laboratory used.

The method described in Box 3.2 of the Local Air Quality Management Technical Guidance LAQM.TG (09) has been used to provide an estimation of annual mean concentrations from short-term monitoring data. Reference was made to two long term continuous monitoring sites namely; Belfast Centre which is located approximately 55 miles from Ballycastle and operated by Belfast City Council and Derry Brooke Park located approximately 50 miles from Ballycastle and operated by Derry City Council. There are no other closer continuous automatic monitoring sites in Northern Ireland.

Table 3 Estimation of Annual Mean Concentration from Short Term Monitoring Data – Ratio Calculation

Long Term Site	Annual Mean 2007 (Am)	Period Mean 2007 (Pm)	Ratio (Am/Pm)
Belfast Centre	32	29.2	1.096
Derry Brooke Park	12.6	12.33	1.022
		Average (R_a)	1.059

The ratio 1.059 has been applied to the measured mean concentration to provide an estimated annual mean for 2007 at the current monitoring sites and these are shown in table 6 in appendix 4. The estimated annual mean concentration at the current sites during 2007 did not exceed the objective for nitrogen dioxide of 40 µg/m^3.

QA/QC of automatic monitoring

No automatic monitoring is carried out by Moyle District Council.

QA/QC of diffusion tube monitoring

Gradko Environmental analytical laboratory is assessed annually by UKAS to establish conformance of the Laboratory Quality Procedures to the requirements of ISO/IEC 17025 Standard and have demonstrated good precision results for 2010 as detailed in the summary of precision results for the individual laboratories performance on the Defra websites. A summary of precision results for nitrogen dioxide for 2008 – 2010 by laboratory is shown in figure 4 appendix 5.

Gradko Environmental also demonstrated good performance in the WASP scheme for analysis of NO_2 diffusion tubes for April 2009 – April 2010.

Moyle District Council's QA/QC procedure is to ensure that diffusion tubes are handled and stored in accordance with Gradko's Diffusion Tube Instruction Manual for Exposure and location and LAQM Technical Guidance LAQM.TG (09).

Appendix 2

NO_2 Diffusion Tube Monthly Data for 2010

Table 4

	Average NO_2 Concentration ($\mu g/m^3$)									
	Location									
Month	**Quay Road Ballycastle BC1**	**Ann Street Ballycastle BC2**	**Castle Street Ballycastle BC3**	**Market Street/Leyland Road junction Ballycastle BC4**	**Mill Street Cushendall CD1**	**Coast Road Cushendall CD2**	**The Diamond Bushmills BM1**	**Main Street Bushmills BM2**	**Priestland Road Bushmills BM3**	**Main Street, Armoy**
January	23.13	35.81	30.94	23.88	23.87	14.77	21.00	30.81	19.45	17.43
February	26.50	44.93	38.54	28.79	13.90	27.27	22.15	34.93	19.18	15.10
March	22.81	45.69	31.68	25.22	23.05	12.58	20.29	28.78	15.44	16.44
April	22.43	40.91	37.51	20.56	20.24	11.11	19.44	30.33	11.09	14.56
May	20.55	38.82	28.71	12.72	-	8.32	14.44	25.57	10.54	11.30
June	17.83	28.40	27.33	12.30	17.26	6.73	11.17	24.14	7.77	10.94
July	16.82	-	21.34	14.74	17.22	7.33	14.40	20.70	8.49	10.61
August	19.71	46.24	26.87	20.08	20.47	9.30	18.17	28.65	11.81	14.33
September	20.69	33.97	26.12	19.51	18.69	10.36	16.42	16.50	14.08	14.89
October	19.29	30.03	22.96	21.59	19.60	10.72	17.91	27.01	15.59	15.80
November	20.99	32.65	30.36	25.66	21.61	11.79	18.05	29.70	17.01	14.94
December	21.92	39.50	28.07	25.48	23.44	14.52	21.52	31.47	14.96	17.47
Annual Mean	21.06	37.90	29.20	20.88	19.94	12.07	17.91	27.38	13.78	14.48
Annual Mean adjusted for bias (0.92)	19.38	34.87	26.86	19.21	18.34	11.10	16.48	25.19	12.68	13.32
% data capture	100	92	100	100	92	100	100	100	100	100

Appendix 3

NO_2 Diffusion Tube Monitoring Results August – December 2007

Table 5

	Average NO_2 Concentration ($\mu g/m^3$)									
	Location									
Month	**Quay Road Ballycastle**	**Ann Street Ballycastle**	**Castle Street Ballycastle**	**Market Street/Leyland Road junction Ballycastle**	**Mill Street Cushendall**	**Coast Road Cushendall**	**The Diamond Bushmills**	**Main Street Bushmills**	**Priestland Road Bushmills**	**Main Street, Armoy**
August	18	30	21	15	-	16	13	-	13	11
September	-	27	20	17	14	20	15	16	10	12
October	16	30	16	22	10	14	22	30	1	20
November	18	39	26	19	21	-	18	-	15	16
**December	16.85	27.85	25.78	19.25	20.82	14.52	21.4	28.58	15.73	13.58

** Supply and analysis changed to Gradko Environmental

Appendix 4

NO_2 Diffusion Tube Monitoring Results August to November 2007

Table 6

Location	Measured Mean for 4 month period Concentration µg/m^3	Mean Concentration for 4 month period adjusted for bias µg/m^3	Estimated annual mean µg/m^3
Quay Road, Ballycastle	17.33	18.54	19.63
Ann Street, Ballycastle	31.50	33.71	35.70
Castle Street, Ballycastle	20.75	22.20	23.51
Market Street/Leyland Road junction Ballycastle	18.25	19.53	20.68
Mill Street, Cushendall	15	16.05	17.00
Coast Road, Cushendall	16.67	17.84	18.89
The Diamond Bushmills	17	18.19	19.26
Main Street, Buhmills	23	24.61	26.06
Priestland Road, Bushmills	9.75	10.43	11.05
Main Street, Armoy	14.75	15.78	16.71

Appendix 5

Figure 4 Summary of precision results for nitrogen dioxide for 2008 – 2010 by laboratory.

Summary of Precision Results for Nitrogen Dioxide Diffusion Tube Collocation Studies, by Laboratory