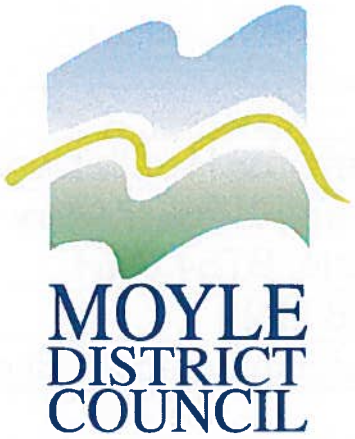


# 2012 Air Quality Updating and Screening Assessment Report for Moyle District Council

In fulfillment of Environment (Northern Ireland) Order 2002

Local Air Quality Management

**Moyle District Council – Northern Ireland**

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|---|---|
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|---|---|
| **Report Reference number** | USA12/MDC |
| **Date** | March 2014 |

# 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.

This Updating and Screening Assessment Report reviews monitoring data and seeks to identify any significant changes since the last review and assessment and which might lead to a risk of an air quality objective for one of the seven key pollutants referred being exceeded.

The monitoring data indicates that $NO_2$ levels in Moyle District met the air quality objectives in 2011. For the remaining six pollutants, no significant changes have since occurred that would prompt the need to proceed to a detailed assessment. There is therefore no requirement for a detailed assessment for any of the pollutants for which air quality objectives have been set.

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# 1 Introduction

## 1.1 Description of Local Authority Area

Moyle District is situated on the north east corner of Northern Ireland, the area 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 17,000 and covers almost 49,500 hectares. The district consists of three main settlements, Ballycastle, Bushmills, and Cushendall with approximately 46 percent 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 Report

This report fulfils the requirements of the Local Air Quality Management process as set out in the Environment (Northern Ireland) Order 2002, 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.

The objective of this Updating and Screening Assessment is to identify any matters that have changed which may lead to risk of an air quality objective being exceeded. A checklist approach and screening tools are used to identify significant new sources or changes and whether there is a need for a Detailed Assessment. The USA report should provide an update of any outstanding information requested previously in Review and Assessment reports.

## 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 over page. This table shows the objectives in units of microgrammes 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 potentially for periods of 15 minutes or more, with potential for

relevant exposure within 15m and which prompted Council to proceed to a detailed assessment for sulphur dioxide. The first stage of this detailed assessment consisted of a desktop screening exercise to gather further information which on completion in 2010 determined that it was not necessary to progress to a full detailed assessment for sulphur dioxide.

A Progress Report was completed in 2011. Assessment of the available monitoring data for nitrogen dioxide indicated that air quality in Moyle District met the relevant air quality objective and no significant development had occurred in the council area which was likely to have a significant effect on air quality.

# 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.

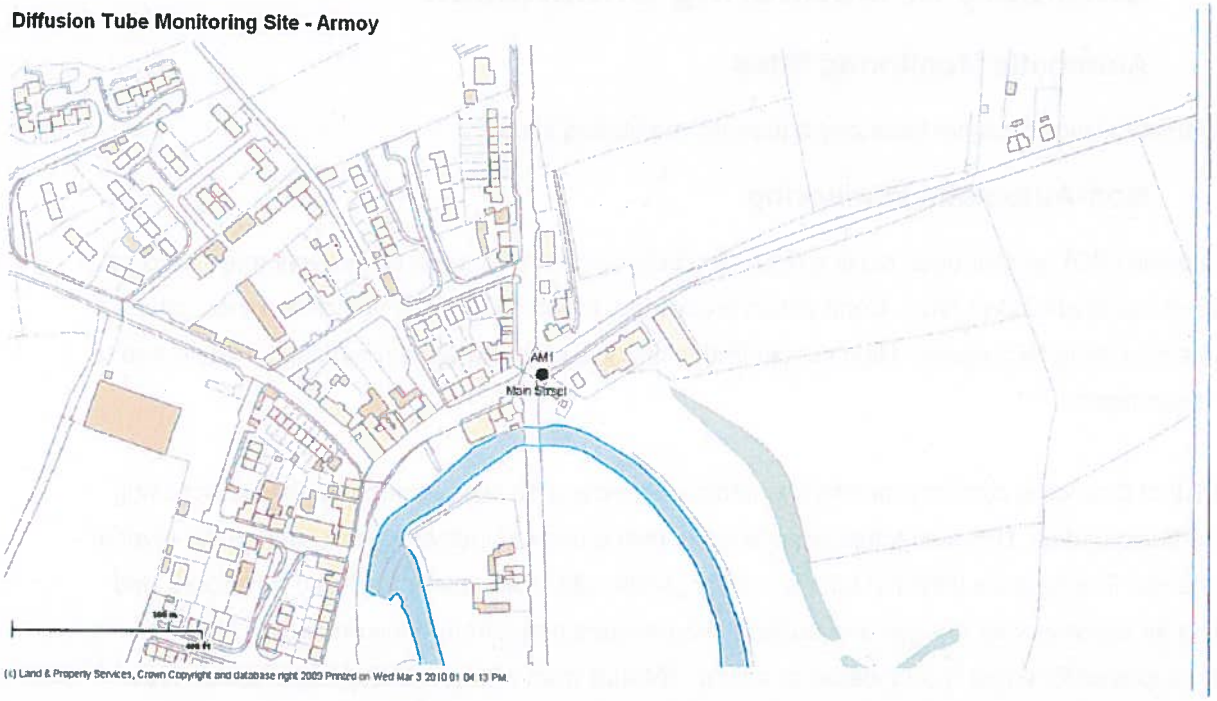
Maps of Non-Automatic Monitoring Sites are shown in figure 2 over page.

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

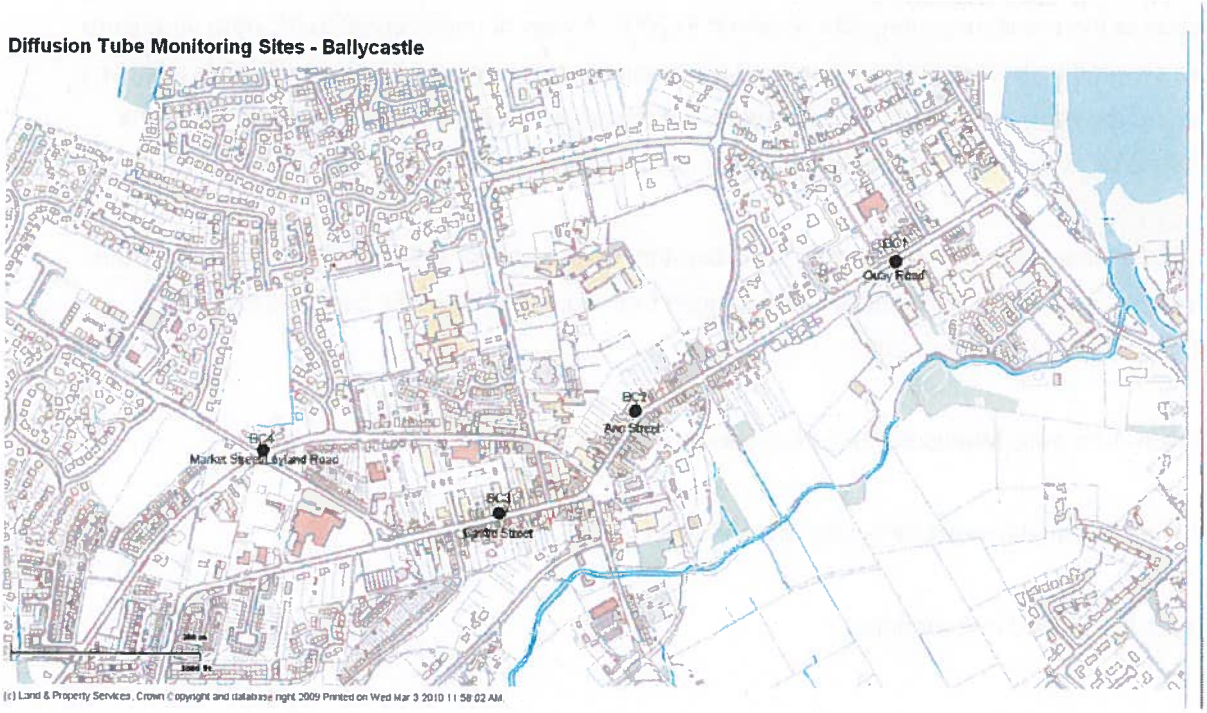
QA/QC data is included in Appendix 1.

## Figure 2 Maps of Non-Automatic Monitoring Sites

**Diffusion Tube Monitoring Site - Armoy**

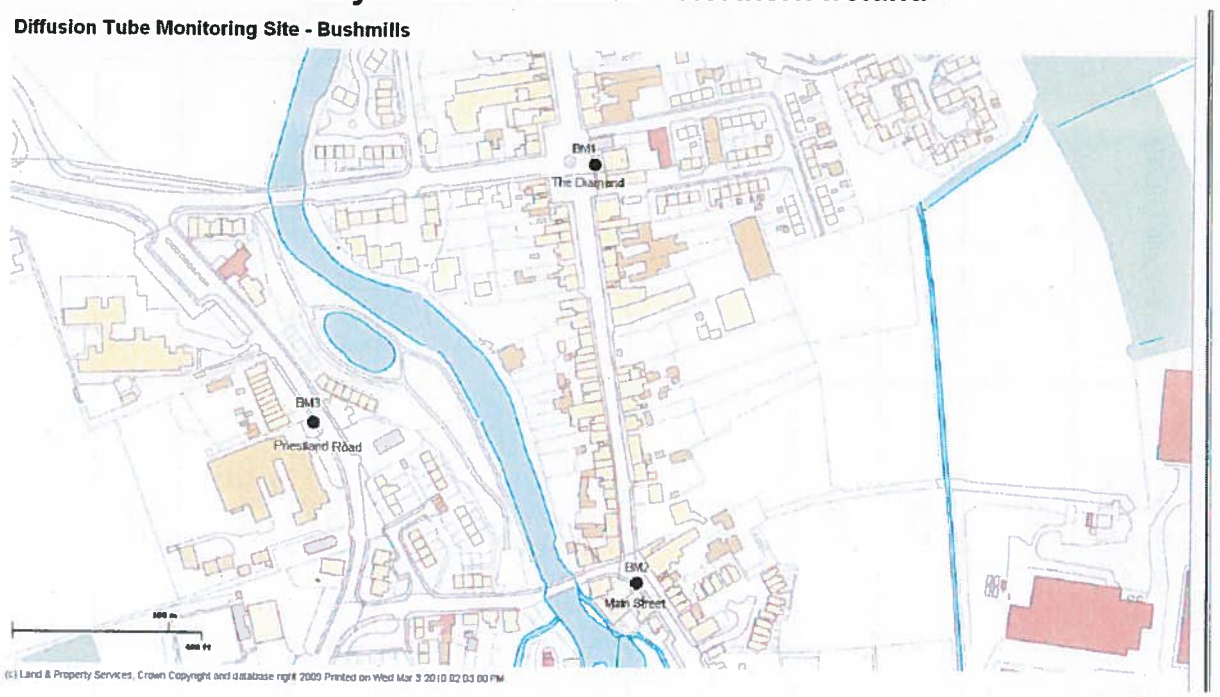



**Diffusion Tube Monitoring Sites - Ballycastle**



# Moyle District Council – Northern Ireland

**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 | Y(12m) | 1.60 | Y |
| Ann Street, Ballycastle | Roadside | E311505 N440828 | $NO_2$ | No | Y(10m) | 5.25 | Y |
| Castle Street, Ballycastle | Roadside | E311290 N440659 | $NO_2$ | No | Y(10m) | 1.60 | Y |
| Market Street/Leyland Road junction, Ballycastle | Roadside | E310912 N440761 | $NO_2$ | No | Y(6m) | 2.50 | Y |
| Mill Street, Cushendall | Roadside | E323685 N427677 | $NO_2$ | No | Y(15m) | 1.40 | Y |
| Coast Road, Cushendall | Roadside | E324177 N427237 | $NO_2$ | No | Y(12m) | 4.10 | Y |
| The Diamond, Bushmills | Roadside | E294076 N440884 | $NO_2$ | No | Y(20m) | 1.30 | Y |
| Main Street, Bushmills | Roadside | E294103 N440626 | $NO_2$ | No | Y(8m) | 1.20 | Y |
| Priestland Road, Bushmills | Roadside | E293777 N440755 | $NO_2$ | No | Y(14m) | 2.80 | Y |
| Main Street, Armoy | Roadside | E306815 N432830 | $NO_2$ | No | Y(30m) | 2.00 | Y |

## 2.2 Comparison of Monitoring Results with AQ 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

Annual mean concentrations for 2011 are shown in table 2.2. The annual mean air quality objective of 40 $\mu g/m^3$ was not exceeded at any of the monitoring sites.

Annualising data for sites were less than 9 months data was captured was not carried as per the methodology laid out in box 3.2 of the technical guidance LAQM.TG (09) due to the absence of continuous monitoring sites within a suitable distance. However, as all the diffusion tube sites are roadside sites, the sites with low data capture have been annualised against those with 100 % data capture. The full set of $NO_2$ diffusion tube monitoring results data for 2011 is shown in table 2.5 in appendix 2. An example of the methodology used to annualise the data is detailed in table 2.6 appendix 2.

Annual mean concentrations for the monitoring sites for 2008 through to 2011 are shown in table 2.3.overpage. The annual mean air quality objective of 40 $\mu g/m^3$ was not exceeded at any of the monitoring sites.

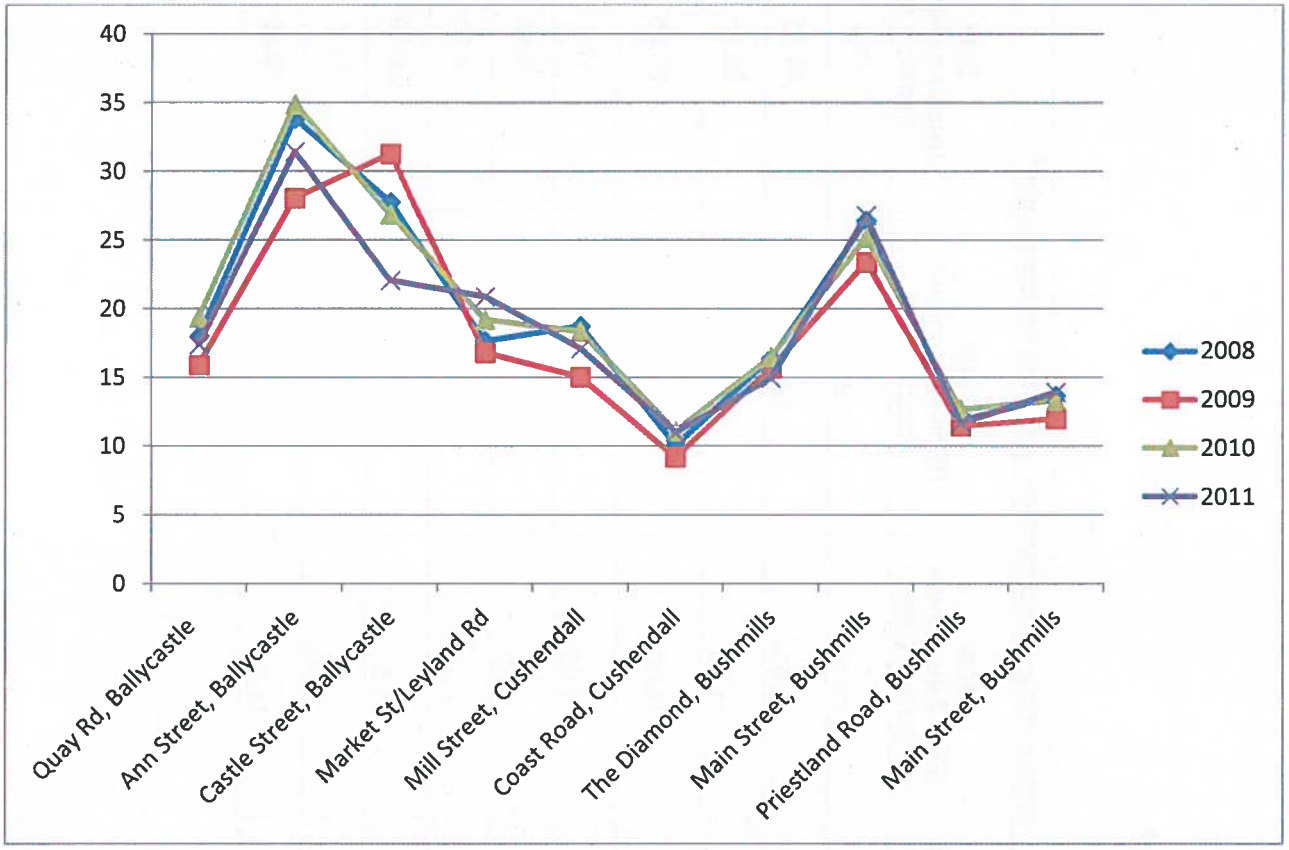
**Table 2.2 Results of Nitrogen Dioxide Diffusion Tubes in 2011**

| Site ID | Location | Site Type | Within AQMA? | Triplicate or Collocated Tube | Data Capture 2011 (Number of Months) | Data with less than 9 months has been annualised (Y/N) | Confirm if data has been distance corrected (Y/N) | Annual mean concentration (Bias Adjustment factor = 0.90) 2011 (µg/m$^3$) |
|---|---|---|---|---|---|---|---|---|
| BC1 | Quay Road, Ballycastle | Roadside | No | No | 8 | Yes | No | 17.4 |
| BC2 | Ann Street, Ballycastle | Roadside | No | No | 8 | Yes | No | 31.41 |
| BC3 | Castle Street, Ballycastle | Roadside | No | No | 9 | N/A | No | 22.05 |
| BC4 | Market Street/Leyland Road junction, Ballycastle | Roadside | No | No | 9 | N/A | No | 20.88 |
| CD1 | Mill Street, Cushendall | Roadside | No | No | 12 | N/A | No | 17.1 |
| CD2 | Coast Road, Cushendall | Roadside | No | No | 9 | N/A | No | 10.98 |
| BM1 | The Diamond, Bushmills | Roadside | No | No | 12 | N/A | No | 14.94 |
| BM2 | Main Street, Bushmills | Roadside | No | No | 7 | Yes | No | 26.78 |
| BM3 | Priestland Road, Bushmills | Roadside | No | No | 9 | N/A | No | 11.7 |
| AM1 | Main Street, Armoy | Roadside | No | No | 8 | Yes | No | 13.92 |

**Table 2.3 Results of Nitrogen Dioxide Diffusion Tubes (2008 to 2011)**

| Site ID | Site Type | Within AQMA? | Annual mean concentration (adjusted for bias) µg/m$^3$ | | | |
|---|---|---|---|---|---|---|
| | | | 2008* (Bias Adjustment Factor = 0.91) | 2009* (Bias Adjustment Factor = 0.86) | 2010* (Bias Adjustment Factor = 0.92 | 2011 (Bias Adjustment Factor = 0.9) |
| BC1 | Roadside | No | 18.00 | 15.89 | 19.38 | 17.4 |
| BC2 | Roadside | No | 33.83 | 28.03 | 34.87 | 31.41 |
| BC3 | Roadside | No | 27.75 | 31.25 | 26.86 | 22.05 |
| BC4 | Roadside | No | 17.65 | 16.80 | 19.21 | 20.88 |
| CD1 | Roadside | No | 18.75 | 15.02 | 18.34 | 17.1 |
| CD2 | Roadside | No | 10.06 | 9.17 | 11.10 | 10.98 |
| BM1 | Roadside | No | 16.39 | 15.67 | 16.48 | 14.94 |
| BM2 | Roadside | No | 26.41 | 23.37 | 25.19 | 26.78 |
| BM3 | Roadside | No | 11.82 | 11.45 | 12.68 | 11.7 |
| AM1 | Roadside | No | 13.67 | 11.99 | 13.32 | 13.92 |

**Figure 3 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites 2008 – 2011**




Caution 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. Inference should therefore not be drawn from the graph in figure 3 and it is for illustrative purposes only.

### 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 Road Traffic Sources

## 3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Moyle 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.

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

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

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

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

## 3.4 Junctions

Moyle District Council confirms that there are no new/newly identified busy junctions/busy roads.

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

Moyle District Council confirms that there are no new/proposed roads.

## 3.6 Roads with Significantly Changed Traffic Flows

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

## 3.7 Bus and Coach Stations

Moyle District Council confirms that there are no relevant bus stations in the District.

## 3.8 Summary

Moyle District Council confirms that there are no new or newly identified local road traffic source which may have an impact on air quality within the Local Authority area.

# 4 Other Transport Sources

## 4.1 Airports

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

## 4.2 Railways (Diesel and Steam Trains)

### 4.2.1 Stationary Trains

Moyle District Council confirms that there are no 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 15m.

### 4.2.2 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 30m.

## 4.3 Ports (Shipping)

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

## 4.4 Summary

Moyle District Council confirms that there are no other new or newly identified transport sources which may have an impact on air quality within the Local Authority area.

# 5 Industrial Sources

## 5.1 Industrial Installations

### 5.1.1 New or Proposed Installations for which an Air Quality Assessment has been carried out

Moyle 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.

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

Moyle 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.

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

Moyle 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.

## 5.2 Major Fuel (Petrol) Storage Depots

There are no major fuel (petrol) storage depots within Moyle District.

## 5.3 Petrol Stations

Moyle District Council confirms that there are no petrol stations meeting the specified criteria.

## 5.4 Poultry Farms

Moyle District Council confirms that there are no poultry farms meeting the specified criteria.

## 5.5 Summary

Moyle District Council confirms that there are no new or newly identified industrial sources which may have an impact on air quality within the Local Authority area.

# 6 Commercial and Domestic Sources

## 6.1 Biomass Combustion – Individual Installations

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

## 6.2 Biomass Combustion – Combined Impacts

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

## 6.3 Domestic Solid-Fuel Burning

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

## 6.4 Summary

Moyle District Council confirms that there are no new or newly identified commercial and domestic sources which may have an impact on air quality within the Local Authority area.

# 7 Fugitive or Uncontrolled Sources

Moyle District Council confirms that there are no new or newly identified potential sources of fugitive particulate matter emissions in the District which may have an impact on air quality within the Local Authority area.

# 8 Local 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 2012.

# 9 Conclusions and Proposed Actions

## 9.1 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 Progress Report 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 2011.

## 9.2 Conclusions from Assessment of Sources

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

Moyle District Council has not identified any new road transport, other transport, industrial installations, commercial/domestic sources, fugitive emissions, residential or commercial developments not previously assessed which may lead to any exceedence of air quality objectives.

## 9.3 Proposed Actions

This Updating and Screening Assessment 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.

The next proposed action by Moyle District Council is to submit a Progress Report in 2013.

# 10 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.

Air Quality Review and Assessment website – Spreadsheet of Bias Adjustment Factors http://www.uwe.ac.uk/aqm/review

Local Authority Air Quality Support website http://www.laqmsupport.org.uk/index.php

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

Combined 2009 Air Quality Updating and Screening Assessment and 2010 Progress Report for Moyle District Council

2011 Progress Report for Moyle District 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 41 studies for the preparation method 20% TEA in water during 2010 the overall correction factor was determined to be 0.90.

### 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 sites at which there is less than 9 months $NO_2$ diffusion tube data in 2010. The reduction in valid data during 2011 was due to some results being excluded for various reason reasons including being below the limit of detection; void results due to sampler error; diffusion tubes not available for analysis and results with low concentrations ($3\mu g/m^3$ or below) being rejected as being untypical of the sampling sites and therefore unreliable in accordance with Defra Guidance on $NO_2$ Diffusion Tubes for LAQM. These results have not been included in the % data capture or the annual mean calculation.

As detailed in section 2.2.1 annualising $NO_2$ diffusion tube data for sites were less than 9 months valid data was captured was not carried as per the methodology laid out in box 3.2 of the technical guidance LAQM.TG (09) due to the absence of continuous monitoring sites within a suitable distance. However, as all the diffusion tube sites are roadside sites, the sites with low data capture have been annualised against those with 100 % data capture. An example of the methodology used to annualise the data is detailed in appendix 2.

## 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 website http://laqm.defra.gov.uk/diffusion-tubes/precision.html . A summary of precision results for nitrogen dioxide for 2008 – 2011 for the Gradko laboratory is shown below in table 2.4.

Gradko Environmental also demonstrated good performance in the WASP scheme for analysis of $NO_2$ diffusion tubes for January 2010 – December 2011.

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).

**Table 2.4 Summary of Precision Results For Nitrogen Dioxide Tube Collocation Studies for Gradko Laboratory**

| 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|
| Good | Good | Good | Good |
| Poor | Good | Good | Good |
| Good | Good | Good | Good |
| Good | Good | Good | Good |
| Good | Good | Good | Good |
| Good | Good | Good | Good |
| Good | Good | Good | Good |
| Poor | Good | Good | Good |
| Good | Good | Good | Good |
| Good | Poor | Good | Good |
| Good | Good | Good | Good |
| Good | Good | Good | Good |
| Good | Good | Good | Good |
| Good | Good | Poor | Good |
| Poor | Good | Good | Good |
| Good | Good | Good | Good |
| Good | Poor | Poor | Good |
| Good | Good | Good | Good |
| Good | Poor | Good | Good |
| Good | Poor | Good | Good |
| | Good | Good | Good |
| | Good | Good | Good |
| | Good | Good | Good |
| | Good | Good | Good |
| | Good | Good | Good |
| | Good | Poor | Good |
| | Good | Good | Good |
| | Good | Good | Good |
| | Good | Good | Good |
| | Good | Good | Good |
| | | Good | Good |
| | | Good | Good |
| | | Good | Good |
| | | Good | Good |
| | | Good | Good |
| | | Good | Good |
| | | Good | Good |
| | | | Poor |
| | | | Poor |

# Appendix 2

**Table 2.5 $NO_2$ Diffusion Tube Monitoring Results 2011**

| | Average $NO_2$ Concentration ($\mu g/m^3$) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Monitoring Site 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 AM1 |
| January | 24.96 | 40.25 | 26.04 | 45.42 | 23.14 | 12.84 | 21.65 | <L.O.D | 15.68 | 15.68 |
| February | 21.49 | 33.78 | 25.91 | 34.20 | 23.34 | 14.10 | 20.90 | 42.96 | 19.46 | 34.25 |
| March | 18.18 | 32.42 | 25.25 | 22.07 | 22.24 | 20.35 | 16.45 | 27.46 | 12.45 | 14.98 |
| April | 27.31 | 44.59 | 39.77 | 19.67 | 24.91 | 10.67 | 16.92 | 34.82 | 15.08 | 15.26 |
| May | 15.52 | 26.57 | 19.02 | 17.57 | 14.76 | - | 14.06 | 20.70 | 10.43 | 10.61 |
| June | 21.27 | 40.53 | 27.86 | 17.61 | 19.62 | 10.69 | 16.94 | 30.64 | 12.92 | - |
| July | 17.55 | 39.53 | 24.37 | 14.68 | 18.57 | 9.27 | 15.32 | 30.38 | 12.73 | 11.61 |
| August | 16.92 | 37.00 | 22.08 | 16.23 | 17.19 | 9.78 | 14.36 | 26.77 | 11.01 | - |
| September | <L.O.D* | <L.O.D* | 1.29[a] | <L.O.D* | 14.75 | <L.O.D* | 14.43 | <L.O.D* | 7.71 | 12.90 |
| October | 0.42[a] | 0.22[a] | 0.25[a] | 0.25 | 18.13 | 0.41[a] | 17.10 | 0.29[a] | 0.37[a] | 13.75 |
| November | <L.O.D* | 0.44 | VOID | VOID** | 20.50 | 14.76 | 18.63 | 0.42[a] | <L.O.D.* | - |
| December | VOID** | VOID** | 10.14 | 21.69 | 10.66 | 7.48 | 12.36 | VOID** | 0.49 | <L.O.D.* |
| % valid data capture (see notes below) | 66.6 | 66.6 | 75 | 75 | 100 | 75 | 100 | 58 | 75 | 66.6 |
| No. months of valid data | 8 | 8 | 9 | 9 | 12 | 9 | 12 | 7 | 9 | 8 |
| Mean | 20.4 | 36.83 | 24.5 | 23.2 | 19 | 12.2 | 16.6 | 30.5 | 13 | 16.13 |
| Annual Mean[b] | 19.33 | 34.90 | 24.5 | 23.2 | 19 | 12.2 | 16.6 | 29.75 | 13 | 15.47 |
| Annual mean adjusted for bias (0.9) | 17.4 | 31.41 | 22.05 | 20.88 | 17.1 | 10.98 | 14.94 | 26.78 | 11.7 | 13.92 |

Notes: *<L.O.D. means below the limit of detection; .**VOID Sample result void due to sampler error; - Diffusion tube not available for analysis

[a] In accordance with Defra Guidance on $NO_2$ Diffusion Tubes for LAQM results with low concentrations ($3\mu g/m^3$ or below) are untypical of the sampling sites and have been rejected as being unreliable. These results have not been included in the % data capture or the annual mean calculation.

[b] Annual mean has been calculated using valid data only and excludes void, <L.O.D. and rejected low concentration results. For sites with data capture of less than 9 months the mean has been annualised.

**Table 2.6 Methodology to Annualise $NO_2$ Diffusion Tube Data**

| Month | Mill Street Cushendall CD1 | The Diamond Bushmills BM1 | Main Street, Armoy AM1 | Average of sites with 100 % data capture | Average of sites with 100 % data capture for the 8 months when AM1 has good data | |
|---|---|---|---|---|---|---|
| January | 23.14 | 21.65 | 15.68 | 22.40 | 22.40 | |
| February | 23.34 | 20.90 | 34.25 | 22.12 | 22.12 | |
| March | 22.24 | 16.45 | 14.98 | 19.35 | 19.35 | |
| April | 24.91 | 16.92 | 15.26 | 20.92 | 20.92 | |
| May | 14.76 | 14.06 | 10.61 | 14.41 | 14.41 | |
| June | 19.62 | 16.94 | | 18.28 | | |
| July | 18.57 | 15.32 | 11.61 | 16.95 | 16.95 | |
| August | 17.19 | 14.36 | | 15.78 | | |
| September | 14.75 | 14.43 | 12.9 | 14.59 | 14.59 | |
| October | 18.13 | 17.10 | 13.75 | 17.62 | 17.62 | |
| November | 20.50 | 18.63 | | 19.57 | | |
| December | 10.66 | 12.36 | | 11.51 | | |
| | | | | | | |
| | | | 8 Month Mean for AM1 | Annual Mean for sites with 100 % data capture | 8 Month Mean for background sites | Annualised Mean for AM1 |
| | | | 16.13 | 17.79 | 18.54 | 15.47 |
| | | | | | | |
| | | | | | | |