
# Local Air Quality Management Progress Report

# 2008

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## EXECUTIVE SUMMARY

Local air quality management was introduced by the first air quality strategy in 1997. Following review the UK National Air Quality Strategy was published in 2000, with the aim of improving air quality in the UK.

Local authorities have a major role in this process, which was formalised as a statutory duty in the Environment (Northern Ireland) Order 2002.

This Progress Report essentially brings air quality work up to date by determining whether air quality objectives continue to be met in Moyle and will identify if any further measures are required to improve air quality.

Since the last round of review and assessment there have been no new local developments that would have a significant, detrimental effect on air quality. Assessment of recent monitoring data indicates that it will not be necessary for Moyle District Council to declare any Air Quality Management Areas.

The next round of air quality reviews and assessments will take the form of an Updating and Screening Assessment to be carried out in 2009.

# 1. Introduction

The Environment (Northern Ireland) Order 2002 introduced a statutory obligation on councils to carry out a review and assessment of their local air quality known as local air quality management (LAQM). The process requires the current and likely future quality of air to be assessed and compared against nationally prescribed air quality objectives (see appendix 1).

An evaluation of the first round of review and assessments found the process to be too 'stop-start' and recommended that to provide continuity within the process, councils should be required to provide an annual report which would provide both a review and update on air quality issues, including information on developments that might affect air quality and the results of monitoring. These reports are known as progress reports. Guidance on the content of progress reports, and timescales for submission of these and other LAQM reports is contained in Department of the Environment guidance document LAQM.PRGNI(04).

It is considered that progress reports will, amongst other things, help retain the profile of LAQM within the council, provide a mechanism to communicate information on LAQM to the public and provide a source of information which may be used to inform policies on matters such as transport and land use planning.

The overall aim of a progress report is to document progress on implementing local air quality management and report progress in achieving or maintaining concentrations of pollutants below air quality objectives.

The report contains details of new monitoring results and new local developments that might affect local air quality.

# 2. Summary of Findings from Previous Review and Assessment Work

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 PM10 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 remain 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 affect 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. Eight $SO_2$ diffusion tubes were located throughout Moyle District, however in view of technical guidance, this monitoring was discontinued at the end of 2006.

# 3. New Monitoring Results

## 3.1 Nitrogen Dioxide $NO_2$

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.

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 tubes was reviewed in 2007 in view of more recent traffic data, to ensure they were situated in the most relevant areas. 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 in December 2007.

The analysis of diffusion tubes carried out by Lambeth Scientific Services was by 50%TEA in acetone. The tubes were exposed for 4 or 5 weeks at a time before being sent to the laboratory for analysis. The results from the laboratory for the diffusion tubes were then corrected for possible over or under reading. Known as a bias adjustment, this factor is obtained by comparing the results from diffusion tubes and the results from a real time analyser which are co-located. Moyle Council does not operate a real time analyser therefore the bias adjustment factor is obtained from other co-location studies in which Lambeth Scientific Services diffusion tubes have been co-located. Ten such studies were carried out in 2006 giving a bias of 1.28 compared to concentrations obtained from co-located automatic analysers. Another ten studies carried out in 2007 gave a bias of 1.06. Due to concerns about precision the bias factor of 1.28 has therefore been applied to the measured result to take account of the variance. This was also the highest bias adjustment found since 2000 and therefore will give a worst-case scenario results.

Monitoring of Nitrogen Dioxide was carried out at the eight sites in table 1.0 over page until July 2007. The table also contains a brief description of the character of the location.

## Table 1.0 Location of Nitrogen Dioxide Diffusion Tubes until July 2007

| Location | Grid Reference | Description Of Location | Distance to Road In metres (approx) | Distance to nearest residential dwelling (metres) |
|---|---|---|---|---|
| Middle Park Rd Cushendall | D239272 | Lamppost at roadside adjacent to housing | 2.5 | 4 |
| Dunluce Rd Bushmills | C937408 | Lamppost at roadside location adjacent to housing | 2.5 | 10 |
| Lower Main St. Bushmills | C942409 | Lamppost at roadside location adjacent to housing | 3 | 5 |
| Main St Bushmills | C947406 | Church adjacent to roadside housing in close proximity | 2.5 | 3 |
| Mary Street Ballycastle | D122421 | Lamppost in Council office car park | 30 | 10 |
| Mill St Car Park Cushendall | D243252 | Lamppost in car park | 15 | 15 |
| Leyland Road Ballycastle | D101415 | Lamppost at roadside in mixed commercial / residential area | 5 | 5 |
| Garron Road Glenariffe | D243252 | St Patricks Primary School | 5 | 10 |

Table 2.0, overpage, summarises the measured $NO_2$ diffusion tube monitoring results for the first seven months of 2007 and the corrected results taking into account the bias adjustment factor. As monitoring at these locations ended in July 2007 the results are an average of the 7 months data only.

**Table 2.0 Nitrogen Dioxide Diffusion Tube Monitoring Results January to July 2007**

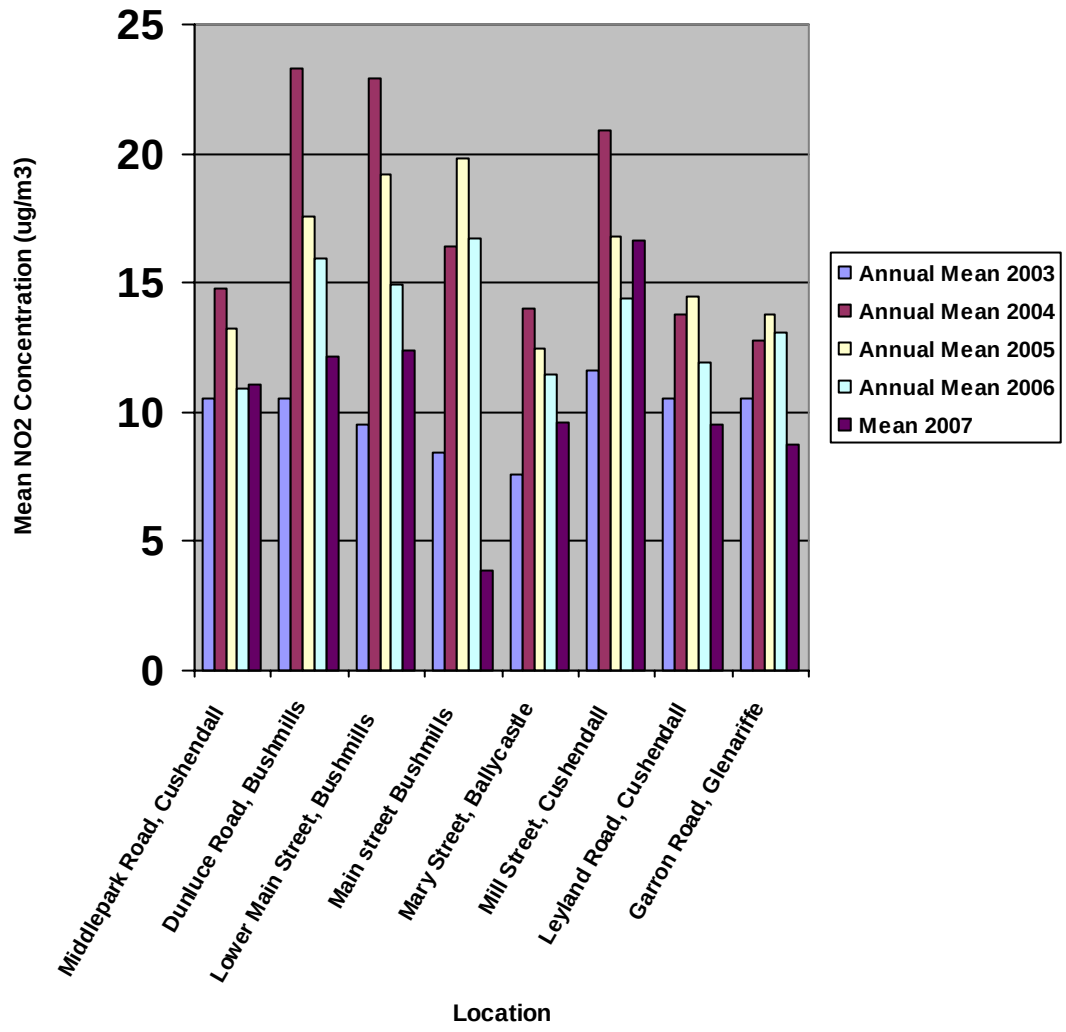
| Location | Measured Mean for 7 month period Concentration µg/m$^3$ | Corrected Mean Concentration for 7 month period µg/m$^3$ |
|---|---|---|
| Middle Park Rd Cushendall | 8.67 | 11.10 |
| Dunluce Rd Bushmills | 9.5 | 12.16 |
| Lower Main St. Bushmills | 9.67 | 12.38 |
| Main St Bushmills | 3 | 3.84 |
| Mary Street Ballycastle | 7.5 | 9.6 |
| Mill St Car Park Cushendall | 13 | 16.64 |
| Leyland Road Ballycastle | 7.43 | 9.51 |
| Garron Road Glenariffe | 6.86 | 8.78 |
| | | **Annual Mean Objective for $NO_2$ 40 µg/m$^3$** |

## 3.1.1 Annual $NO_2$ Mean Concentration Trends

Almost five complete years of monitoring results for the nitrogen dioxide diffusion tubes at the above location have been obtained and they are shown on the graph on the next page for 2003 to 2007. Historical data is very limited. Extreme 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. The results for 2007 should also be treated with extreme caution as the mean results are not for a full 12 month data set.

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 1 and it is for illustrative purposes only.

**Figure 1 Mean Nitrogen Dioxide Concentrations Trends 2003 - 2007**




## 3.1.2 New Monitoring Sites

Council reviewed the location of the tubes in view of recent traffic data to ensure they were situated in the most relevant areas. As a result all monitoring sites were relocated and monitoring of nitrogen dioxide was carried out at the ten sites in table 3.0, overpage, from August 2007 onwards. The table also contains a brief description of the character of the location.

## Table 3.0 Location of Nitrogen Dioxide Diffusion Tubes from August 2007 (New Sites)

| Location | Grid Reference | Description Of Location | *Distance to Road In metres (approx) | *Distance to nearest residential dwelling (metres) |
|---|---|---|---|---|
| Quay Road Ballycastle | E311978 N441022 | Lamppost at roadside adjacent to housing, school and playing fields | 2.5 | 12 |
| Ann Street Ballycastle | E311505 N440828 | Lamppost at roadside in mixed commercial / residential area | 2.5 | 10 |
| Castle Street, Ballycastle | E311290 N440659 | Lamppost at roadside in mixed commercial / residential area | 2.5 | 10 |
| Market Street/Leyland Road junction Ballycastle | E310912 N440761 | Lamppost adjacent to roadside mixed commercial/residential area | 2.5 | 1 |
| Mill Street Cushendall | E323685 N427677 | Lamppost at crossroads in mixed commercial/residential area | 2.5 | 15 |
| Coast Road Cushendall | E324177 N427237 | Lamppost at roadside adjacent to school | 2.5 | 12 |
| Diamond Bushmills | E294076 N440884 | Lamppost at roadside | 2.5 | 20 |
| Main Street Bushmills | E294103 N440626 | Lamppost at roadside | 2.5 | 8 |
| Priestland Road Bushmills | E293777 N440755 | Lamppost at roadside | 2.5 | 14 |
| Main Street Armoy | E306815 N432830 | Lamppost at roadside in mixed commercial / residential area | 2.5 | 30 |

***** Measurements are desktop estimations and subject to verification

Table 4.0, overpage, summarises the measured $NO_2$ diffusion tube monitoring results for the first four months at the new sites i.e August to November and the corrected results taking into account the bias adjustment factor.

The laboratory supplying and analysing the diffusion tubes changed from Lambeth Scientific Services to Gradko Environmental in December 2007 following a review of laboratory performance. The analysis of diffusion tubes carried out by Gradko Environmental was by 20%TEA in water analysed by

U.V. spectrophotometry. The tubes were exposed for over a month before being sent to the laboratory for analysis. The results for December 2007 are shown in appendix 2 but have not been included in the mean concentration calculation due to the change in laboratory used.

**Table 4.0 Nitrogen Dioxide Diffusion Tube Monitoring Results August to November 2007**

| Location | Measured Mean for 4 month period Concentration µg/m$^3$ | Corrected Mean Concentration for 4 month period µg/m$^3$ |
|---|---|---|
| Quay Road, Ballycastle | 17.33 | 22.18 |
| Ann Street, Ballycastle | 31.50 | 40.32 |
| Castle Street, Ballycastle | 20.75 | 26.56 |
| Market Street/Leyland Road junction Ballycastle | 18.25 | 23.36 |
| Mill Street, Cushendall | 15 | 19.20 |
| Coast Road, Cushendall | 16.67 | 21.33 |
| The Diamond Bushmills | 17 | 21.76 |
| Main Street, Buhmills | 23 | 29.44 |
| Priestland Road, Bushmills | 9.75 | 12.48 |
| Main Street, Armoy | 14.75 | 18.88 |
| | | **Annual Mean Objective for $NO_2$ 40 µg/m$^3$** |

## 3.1.3 New Monitoring Sites Results

The monitoring results for the initial 4 months at the new sites should be treated with caution as relevant technical guidance states that to draw comparisons with an annual mean objective, diffusion tubes monitoring should encompass at least three summer months and three winter months consecutively. Furthermore there were concerns about the precision of the analysing laboratory.

As a result the results for this 4 month period at the new monitoring sites should be treated with extreme caution and no inference should therefore be drawn.

### 3.1.4 Conclusion

The levels measured by the diffusion tubes for the first 7 months of 2007 at the original monitoring sites did not exceed the objective for nitrogen dioxide of 40$\mu g/m^3$ and therefore the areas monitored are predicted to remain within the nitrogen dioxide objectives.

The levels measured by the diffusion tubes at the new monitoring sites for the following 4 months of 2007 suggested that one site, namely Ann Street, Ballycastle had reached the annual mean objective for nitrogen dioxide of 40$\mu g/m^3$. As stated in 3.1.3 these results should be treated with caution. No conclusion will be drawn until further monitoring data is available over a longer period.

The remaining sites were did not exceed the objective and therefore the areas monitored are predicted to remain within the nitrogen dioxide objectives

## 3.2 Sulphur Dioxide $SO_2$

Sulphur dioxide is formed during the combustion of fuels such as coal, oil and gas that contain sulphur. Sulphur dioxide is a respiratory irritant and at high concentrations can be toxic. Monitoring of $SO_2$ within the Moyle District Council area was carried out using diffusion tubes until the end of 2006.

The use of passive diffusion tube samplers developed for sulphur dioxide are not recommended for review and assessment according to LAQM TG(03). These diffusive samplers are only able to measure concentrations over a relatively long averaging period, which cannot easily be compared with short-term objectives.

Eight $SO_2$ diffusion tubes were located throughout Moyle District, however in view of technical guidance, this monitoring was discontinued at the end of 2006. There is therefore no $SO_2$ monitoring data for Moyle District during 2007.

Both the stage 2 review and assessment and Updating and Screening Assessments concluded that it was unlikely that the air quality objective for sulphur dioxide would be exceeded. The Council will however review the need to monitor this pollutant during the next update and screening assessment.

## 3.3 Other Pollutants

National air quality objectives are also in place for the following pollutants

Carbon monoxide
Benzene
1,3 Butadiene
Lead

Both the stage 1 review and assessment and Updating and Screening Assessments concluded that it was unlikely that the air quality objectives for these pollutants would be exceeded and no monitoring has been carried out in respect of these. The Council will review the need to monitor these pollutants during the next update and screening assessment.

$PM_{10}$

A quarry is located outside Ballycastle on the Magheramore Road. The Updating and Screening Assessments carried out in 2006 concluded that it was unlikely that the air quality objective for this pollutant would be exceeded and no monitoring has been carried out.

Two complaints of dust emissions from the site were however received by Moyle District Council in June 2007 and April 2008. The site is regulated and a permit for the crushing operations is in place. The complaints were referred to the regulator, the Environment and Heritage Service (EHS). EHS have indicated that the site may be coming under new ownership and therefore the future use of the site as a quarry is uncertain. This source will be reviewed in further detail when the update and screening assessment is completed in April 2009.

# 4.0 New Local Developments

## 4.1 New Industrial Processes

No industrial processes, prescribed for control under the Industrial Pollution Control (Prescribed Processes and Substances) Regulations (N.I.) 1998 or the Pollution Prevention and Control Regulations (N.I.) 2003 commenced operation or changed operation significantly during the reporting period.

## 4.2 New Developments with an impact on air quality, especially those that will significantly change traffic flow, that have been granted planning permission.

None identified.

## 4.3 New landfill sites, quarries that have been granted planning permission and which have nearby relevant exposure.

None identified.

## 4.4 Planning Applications that have the potential to affect local air quality.

One major development for which planning permission decision notices have not, to our knowledge, been issued which may give rise to an increase in road traffic on some roads in the Cushendall area are shown in table 5 below.

**Table 5**

| Location | Description | Relevant Pollutant | Planning Reference |
|---|---|---|---|
| Lands South of Dalriada Crescent/Dalriada Park | Erection of a Marina Incorporating Office, Shop and Managers Accommodation, Extension to Pier, Car Parking, Breakwater Wall, Pontoons for 200 Boats | $NO_2$ | E/2007/0422/F |

The Council is a statutory consultee with respect to planning applications submitted to Planning Service. The Environmental Health Department is therefore afforded the opportunity to consider the possible air pollution impact

from proposed developments. Where it is considered that a development may result in a reduction of air quality then an air quality impact assessment, which may also identify mitigation measures, can be required. In this way the Council can positively contribute to the development control process and air quality. In the case of the plan application detailed above no request for an air quality impact assessment has been made but council will consider any subsequent increases in traffic flow associated with this proposed development during future review and assessments.

### 4.5 Transportation Measures Implemented or Proposed in Accordance with the Regional Transportation Strategy for Northern Ireland

No specific measures identified for the Council area.

# 5.0 Additional Information

It has not been necessary for Moyle District Council to declare any Air Quality Management Areas in the district and therefore we cannot report progress on implementation of action plans.

To make a positive contribution to improving air quality Moyle District Council intends to draw up a local air quality strategy in 2008.

Moyle District Council does not monitor ozone, polycyclic aromatic hydrocarbons (PAHs). These pollutants are not currently covered by the regulations.

No complaints regarding odour from regulated industrial sources have been received in recent years.

# 6.0 Conclusions

The first round of review and assessment suggested that it is unlikely that any of the national air quality objectives will be breached within the Council area and this continues to be the case.

The Council monitored nitrogen dioxide during 2007 and the levels measured by the diffusion tubes for the first 7 months of 2007 at the original monitoring sites did not exceed the objective for nitrogen dioxide of 40$\mu g/m^3$ and therefore the areas monitored are predicted to remain within the nitrogen dioxide objectives.

The levels measured by the diffusion tubes at the new monitoring sites for the following 4 months of 2007 suggested that one site had reached the annual mean objective for nitrogen dioxide of 40$\mu g/m^3$. The remaining sites were did not exceed the objective and therefore the areas monitored are predicted to remain within the nitrogen dioxide objectives

Due to the relatively short monitoring period and concerns about the precision of the analysing laboratory the results should be treated with caution and no conclusion will be drawn until further monitoring data is available over a longer period.

No significant development has occurred in the Council area in the reporting period which is likely to have a significant affect on air quality.

The Council will review the need to carry further monitoring when it completes the update and screening assessment, due to be completed in April 2009.

# Appendix 1

**(National Air Quality Objectives)**

**Table 6 Objectives included in the Air Quality Regulations (NI) 2003 for the purpose of Local Air Quality Management.**

| Pollutant | Air Quality Objective | | Date to be achieved by |
|---|---|---|---|
| | Concentration | Measured as | |
| **Benzene** | 16.25 $\mu gm^{-3}$<br>3.25 $\mu gm^{-3}$ | Running annual mean<br>Running annual mean | 31.12.2003<br>31.12.2010 |
| **1,3 Butadiene** | 2.25 $\mu gm^{-3}$ | Running annual mean | 31.12.2003 |
| **Carbon Monoxide** | 10.0 $mgm^{3}$ | Maximum daily running 8-hour mean | 31.12.2003 |
| **Lead** | 0.5 $\mu gm^{-3}$<br>0.25 mgm3 | Annual mean<br>Annual mean | 31.12.2003<br>31.12.2008 |
| **Nitrogen Dioxide**[1] | 200 $\mu gm^{-3}$ no to be exceeded more than 18 times a year<br>40 $\mu gm^{-3}$ | 1 hour mean<br><br>annual mean | 31.12.2005<br><br>31.12.2005 |
| **Particles ($PM_{10}$)**[2] **Gravimetric**[3] | 50 $\mu gm^{-3}$ not to be exceeded more than 35 times a year<br>40 $\mu gm^{-3}$ | 24 hour mean<br><br>annual mean | 31.12.2004<br><br>31.12.2004 |
| **Sulphur Dioxide** | 350 $\mu gm^{-3}$ not to be exceeded more than 24 times per year<br>125 $\mu gm^{-3}$ not to be exceeded more than 3 times per year<br>266 $\mu gm^{-3}$ not to be exceeded more than 35 times per year | 1 hour mean<br><br>24 hour mean<br><br>15 minute mean | 31.12.2004<br><br>31.12.2004<br><br>31.12.2005 |

Notes

There are likely to be new particles objectives for 2010, not in regulation at present, expected after the review of the EU's first Air Quality Daughter Directive (2004).

Measured using the European gravimetric transfer standard or equivalent.

# Appendix 2

**(Nitrogen Dioxide Diffusion Tubes)**

## $NO_2$ Diffusion Tube Monitoring Results January – July 2007

**Table 7**

| | Average $NO_2$ Concentration ($\mu g/m^3$) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Location | | | | | | | |
| **Month** | **Garron Road, Glenariffe** | **Mill Street Car Park** | **Middlepark Road, Cushendall** | **Mary Street, Ballycastle** | **Leyland Road, Bllycastle** | **Main Street, Bushmills** | **Dunluce Road, Bushmills** | **Lower Main Street, Bushmills** |
| January | 7 | 16 | 14 | 14 | 9 | - | 13 | 12 |
| February | 8 | 12 | - | 7 | 5 | 3 | - | 12 |
| March | 3 | 9 | 1 | 1 | 6 | - | 4 | 4 |
| April | 5 | 11 | 7 | - | 4 | - | 6 | 10 |
| May | 3 | 3 | 6 | 4 | 4 | - | 5 | - |
| June | 5 | 7 | 7 | 7 | 6 | - | 11 | 7 |
| July | 17 | 33 | 17 | 12 | 18 | - | 18 | 13 |

**$NO_2$ Diffusion Tube Monitoring Results August – December 2007**
**(New Sites)**

**Table 8**

| | 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 by Gradko Environmental