BALLYMENA BOROUGH COUNCIL
Environmental Health Department

LOCAL AIR QUALITY PROGRESS REPORT

April 2008

Copies of this report are available from:

Environmental Health Department
Ballymena Borough Council
Ardeevin
80 Galgorm Road
BALLYMENA
BT42 1AB

Tel: 028 25 660 300

Copies are also available electronically by emailing, nicola.mccall@ballymena.gov.uk or env.health@ballymena.gov.uk or the Council website www.ballymena.gov.uk

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Report prepared and written by:-

Mrs Nicola McCall and Mrs Karen Bruce

Environmental Health Department
Ballymena Borough Council

1 INTRODUCTION

Local authorities in Northern Ireland have air quality management duties which are specified in Part III of The Environment (Northern Ireland) Order 2002. The aim of these duties is to deliver the national objectives as set out in the Air Quality Strategy for England, Wales and Northern Ireland.

In 2006 Ballymena Borough Council published its Updating and Screening Assessment of Local Air Quality this was followed by a progress report in 2007.

Local authorities in Northern Ireland are now required to prepare a further Progress Report as specified in Environment (Northern Ireland) Order 2002 Local Air Quality Management Progress Report Guidance LAQM.PRGNI (04). Some of the aims of the Progress Report are to provide a means of communicating air quality information to elected members and the public and providing information to assist in other policy areas such as transport and land planning. The overall aim of the report is to:

- Report progress on implementing local air quality management; and
- Report progress in achieving or maintaining concentrations below the air quality objectives.

1.4 In order to achieve this Ballymena Borough Council's progress report will focus on:

- Monitoring results
- New local developments likely to affect air quality

2 MONITORING RESULTS

2.1 Nitrogen Dioxide

2.1.1 Automatic Monitoring Results

From February 2003 the automatic monitoring of NO_2 has been undertaken at North Road, roadside location in the Borough using a chemiluminescent real time analyser.

The mean nitrogen dioxide concentration obtained from ratified data (AEA Technology) for 2007 (1/1/07-31/12-07) is shown below:

Location	**Annual Hourly Mean μgm^{-3}**	**Max Daily Mean μgm^{-3}**	**Maximum Hourly Mean μgm^{-3}**
North Road	113	76	189

The mean nitrogen dioxide concentrations for the period 1 January 2007 to 31 December 2007 at the North Road site was 24 μgm^{-3} therefore below the Annual Mean Air Quality Objective of 40 μgm^{-3}. Further no exceedences occurred of the daily or hourly means. (Air Quality Regulations (Northern Ireland) 2003)

QA/QC

The automatic monitoring stations are covered by a QA/QC contract with AEA Technology. The Data Quality Report by Netcen for 2007 is shown in Appendix I.

2.1.2 Passive Monitoring

Passive diffusion tubes are used to measure nitrogen dioxide at a number of roadside locations throughout the Borough. The tubes remain at the location for a four week exposure period and are then sent for analysis and to calculate the average NO_2 concentration at each location. Due to concerns regarding the accuracy of analytical data provided by Lambeth Scientific Services Limited, a decision was taken to change our service provider to Gradko Environmental, Winchester. As a result this report must address data from two laboratories.

Since November 2007 tubes were placed in triplicate at the North Road automatic monitoring site.

Results

Diffusion tube results for 2007 (without bias adjustment) are listed below.

Lambeth Scientific Services

Location	**No. of Tubes Averaged** (maximum 9)	**Average µgm^{-3}**
Leighinmohr Avenue	9	11
Galgorm Road	9	28
Main Street, Cullybackey	9	19
Cullybackey Road	9	24
Henry Street	9	20
Ballyloughan Avenue	9	10
George Street	9	38
Wellington Street	8	19
Ballymoney Street	9	21
Parkway	9	21
Lisnevenagh Road	7	18
Queen Street	9	21
North Road	9	22
North Road	9	23

Linenhall Street	9	36

Data provided by Lambeth Scientific Services cover only nine months of the year, however as can be seen above on several occasions tubes were missing from sites at the end of the measurement period. The means were therefore calculated over the appropriate shorter total exposure period.

A bias adjustment factor of 1.06 based on 10 co-location studies (obtained from Air Quality Consultants Ltd) was applied to the four sites with the highest average nitrogen dioxide concentrations as shown below:

Location	**Lambeth µgm^{-3}**	**Bias Adjusted Mean** (Factor 1.06 AQC Ltd)
Linenhall Street	36	38
George Street	38	40
Cullybackey Road	24	25
Galgorm Road	28	30

Gradko Environmental

Location	**No. of Tubes Averaged** (maximum2)	**Average µgm^{-3}**
Leighinmohr Avenue,	2	16
Galgorm Road	2	38
Main Street, Cullybackey	2	28
Cullybackey Road	2	38
Henry Street	2	34
Ballyloughan Road	2	14
George Street	2	58
Wellington Street	2	31
Ballymoney Street	2	39
Parkway	2	35
Lisnevenagh Road	2	29
Queen Street	2	40
North Road	2	34
North Road	2	34

North Road	2	32
Linenhall Street	2	60

Gradko began to collect and analyse data on behalf of Ballymena Borough Council in November 2007 therefore only two months data was available for 2007. A bias adjustment factor of 0.89 based on 17 co-location studies (obtained from Air Quality Consultants Ltd) was applied to the six sites with the highest average nitrogen dioxide concentrations as shown below:

Location	**Gradko µgm^{-3}**	**Bias Adjusted Mean** (Factor 0.89 AQC Ltd)
Linenhall Street	60	53
George Street	58	52
Queen Street	40	36
Ballymoney Street	40	36
Cullybackey Road	38	34
Galgorm Road	38	34

The diffusion tubes at each of the above sites are either on or adjacent to the facades of domestic properties (Queen Street and Galgorm Road), bus stop / pedestrian area (George Street), a hostel (Linenhall Street), retail outlet (Ballymoney Street) and a roundabout (Cullybackey Road, approx. 15m from dwellings). Further detail regarding tube locations are included in Appendix II. It is important to note however that neither George Street nor Ballymoney Street are residential areas, but are in fact major traffic routes in the town centres one-way system.

The national bias adjustment figure for Lambeth diffusion tubes concludes that the relevant objective for each location is being met. However this is not the case for the bias adjusted results of analytical data provided by Gradko Environmental. Since however only two months data was available for Gradko, in the interests of accuracy it was felt that the results obtained in the first quarter of 2008, although not subject to bias adjustment, should also be considered (Appendix III). The mean values to date (up to March 2008)

confirm that the Annual Mean Air Quality Objective of 40 μgm^{-3} of Nitrogen Dioxide is being exceeded at both Linenhall Street and George Street. Although George Street has no residential properties it is a continuation of Linenhall Street and can therefore be considered as one area.

Hence it is the intention of Ballymena Borough Council to carry out further detailed assessment in this area to check the accuracy of our data and determine whether it is necessary to declare an AQMA for nitrogen dioxide for Linenhall/George Street.

There are also three areas which are approaching the Mean Air Quality Objective of 40 μgm^{-3} of Nitrogen Dioxide and it is therefore intended to carry out detailed assessment in these additional areas i.e.

- Queen Street
- Galgorm Road
- Cullybackey Road

Sulphur Dioxide and PM10 (Particulate Matter)

In December 2005 the existing automatic chemiluminescent analyzer within the monitoring station at Ballykeel of SO_2 was complimented with a PM_{10} real time analyser known as a TEOM.

2.2.1 $\underline{PM_{10}}$

The mean PM_{10} (particulate matter) concentrations obtained from ratified data for 2007 are shown below.

Location	Max Daily Mean μgm^{-3}	Maximum Hourly Mean μgm^{-3}	Annual Mean μgm^{-3}

Ballykeel	56 (GRAV EQ)	390 (GRAV EQ)	17 (GRAV EQ)

The Ballykeel Air Quality Monitoring Station (AQMS) was relocated in August 2007, to a 'worst-case contour' within Ballykeel II and was inoperative for some time.

The Annual Mean for the Ballykeel site in 2007 is 17 μgm^{-3} (gravimetric concentration). This is below the annual objective of 40 μgm^{-3} (gravimetric concentration). The maximum daily mean of 50 μgm^{-3} was exceeded on one occasion, peaking at 56 μgm^{-3} (gravimetric concentration) during 2007. The maximum running 24 hour mean was 58 μgm^{-3} (gravimetric concentration).

Based on daily data recorded in 2007 the **90th** percentile is 28 $\mu gm^{-3,}$ this is below the daily objective value of 50μgm^{-3}, thus although the data capture didn't meet the 90% target for real time monitoring, the **90th** percentile indicates that the objective would not have been breached at this location.

2.2.2 $\underline{SO_2}$

The mean sulphur dioxide concentrations obtained from ratified data for 2007 are shown below:

Location	**Annual Hourly Mean μgm^{-3}**	**Max Daily Mean μgm^{-3}**	**Maximum Hourly Mean μgm^{-3}**
Ballykeel	6	17	122

The Ballykeel Air Quality Monitoring Station (AQMS) was relocated in August 2007, to a 'worst-case contour' within Ballykeel II and was inoperative for some time.

The mean values above are all below the objectives for sulphur dioxide. There were no exceedances in 2007 of the 15 minute, 1 hour or 24 hour value means.

Based on the SO_2 15 minute data recorded in 2007 the **99.9**th percentile is 82 μgm^{-3}, this is below the 15 minute objective value of 266 μgm^{-3}, thus although the data capture didn't meet the 90% target for real time monitoring, the **99.9th** percentile indicates that the objective would not have been breached at this location.

Based on the SO_2 hourly data recorded in 2007 the **99.7th** percentile is 43 μgm^{-3}, this is below the hourly objective value of 350 μgm^{-3}, thus although the data capture didn't meet the 90% target for real time monitoring, the **99.7th** percentile indicates that the objective would not have been breached at this location.

Based on the SO_2 daily data recorded in 2007 the **90th** percentile is 10μgm^{-3}, this is below the daily objective value of 125 μgm^{-3}, thus although the data capture didn't meet the 90% target for real time monitoring, the **90th** percentile indicates that the objective would not have been breached at this location.

<u>QA/QC</u>

The automatic monitoring station is covered by a QA/QC contract with Netcen. The Data Quality Report by Netcen for 2007 and 2008 (to date) is shown in Appendix 1.

Air Quality Management Area (AQMA)

In 2004 Ballymena Borough Council declared AQMAs in Ballykeel and Dunclug for a likely breach of the Particulate Matter (PM_{10}) objectives. Reverification modeling for the Council's Updating and Screening Assessment (August 2006) concluded that the objective for PM_{10} was unlikely to be exceeded at any location in Ballykeel or Dunclug, however it did predict exceedence of the 15 minute SO_2 objective in Ballykeel.

As a result the AQMS in Ballykeel was relocated to a "hotspot" where this exceedence was predicted to occur. The monitor received an FDMS upgrade to ensure the comparability of results however due to technical faults we are currently awaiting a replacement upgrade. It is our intention to delay any revocation/amendment to the AQMA in this area until 6-12 months results can be assessed. It is likely however that the Dunclug AQMA will be revoked in 2008.

3 NEW LOCAL DEVELOPMENTS

The following are new local developments since completion of the Updating and Screening Assessment (August 2006).

Part A, B and C Processes

New Part A, B or C processes within the borough are those which have previously existed, but were required to be permitted under the Pollution Prevention and Control regime for the first time, since the completion of the Updating and Screening Assessment.

2 New Retail Developments

There have been a number of retail developments within the Borough with the potential to increase traffic flow, particularly into the town centre.

- Debenhams, Fairhill Shopping Centre, Ballymena.
- Additional retail units at Braidwater Retail Park, Ballymena
- Tesco Superstore and Petrol Filling Station, Larne Road Link, Ballymena.
- Ballykeel Business Centre, Crebilly Road, Ballymena

In addition this department was consulted on a number of planning applications through the planning process on a number of large retail developments, including;

- Broughshane Street, Ballymena
- Fairhill Shopping Centre, Ballymena

3.3 New Road Schemes

Consultation exercises are completed / ongoing regarding new road schemes at the following locations;

- Ballee Road East dual carriageway – new design / road layout to include additional slip roads and underpass. Minimal impact on residential properties predicted.
- A26 dual carriageway at Frosses – an extension of dual carriageway towards Ballymoney, will bring existing residential properties closer to kerbside.
- Realignment of single carriageway on Sourhill / Tullygarley Road - will bring existing residential properties closer to kerbside.

3.4 Landfill Developments

The Council owned and managed Ballymacvea Landfill, off the A26 dual carriageway closed at the end of March 2007. A temporary waste transfer site now operates at this location. Council is currently seeking a permanent transfer facility in an alternative location. All planning applications are considered by the Environmental Health Department and, where necessary, air quality will be reviewed as part of that consultation process.

There is no licensed landfill operating within the Borough. Domestic waste collections by Council are taken outside of the Borough.

3.5 Residential Developments

This department was consulted on a number of planning applications through the planning process on a number of large residential developments, including;

- Galgorm Road, Ahoghill (3 separate development sites)
- Portglenone Road, Ahoghill
- Ballymoney Road, Ballymena (4 separate large development sites)
- Lands off Main Street, Cullybackey (2 development sites)
- Larne Road, Harryville, Ballymena (2 separate large development sites)
- Raceview Road, Broughshane
- Carnlough Road, Broughshane
- Sourhill Road / Dan's Road, Galgorm, Ballymena
- Galgorm Road, Ballymena
- Princes Street, Ballymena
- Grove Road/ Cushendall Road, Ballymena
- Cushendall Road, Ballymena (2 development sites)

Recently there has also been a substantial increase throughout the Borough in the sale of large detached properties as redevelopment sites for townhouses and apartments. This has the potential to substantially increase traffic flows in the Borough.

4 CONCLUSIONS

The main sources of pollutants in the Ballymena Borough continue to be nitrogen dioxide from road traffic and sulphur dioxide / particulate matter from domestic sources. Nitrogen dioxide, sulphur dioxide and particulate matter will continue to be monitored in key locations, with update to the department provided with reference to the objectives of relevance.

4.1 Nitrogen Dioxide

In using the **national** (1.06 Lambeth) bias adjustment factor all sites remain below the 40 μgm^{-3} objective, however the Gradko bias adjusted (0.89) levels show Linenhall Street and George Street are in exceedence. Four other sites are close to the 40 μgm^{-3} objective. Of these six sites two are not considered relevant as there are no residential properties in these locations, i.e.

- George Street
- Ballymoney Street

For the other four sites it is this departments intention to undertaken further detailed assessment to determine whether declaration of an AQMA(s) is necessary

4.2 Sulphur Dioxide and Particulate Matter (PM_{10})

The mean 2007 concentrations for both SO_2 and PM_{10} are below the annual air quality objectives for both these pollutants.

The Council has relocated the Ballykeel AQMS to a best-fit location within the Ballykeel AQMA and will continue to monitor SO_2 and PM_{10}

in this area. FDMS upgrade to the Ballykeel analyser is currently inoperative due to technical faults (awaiting replacement), once sufficient monitoring data comparable with that produced within the DEFRA National Network becomes available consideration will be given to either revocation / amendment of the Ballykeel AQMA as required.

It is likely that in light of the reverification modeling in relation to the 2006 Updating and Screening Assessment that the AQMA for Dunclug will be revoked in 2008.

Appendix One

Produced by AEA Energy & Environment on behalf of Ballymena BC

BALLYMENA NORTH ROAD
01 January to 31 December 2007

These data have been fully ratified by AEA Energy & Environment

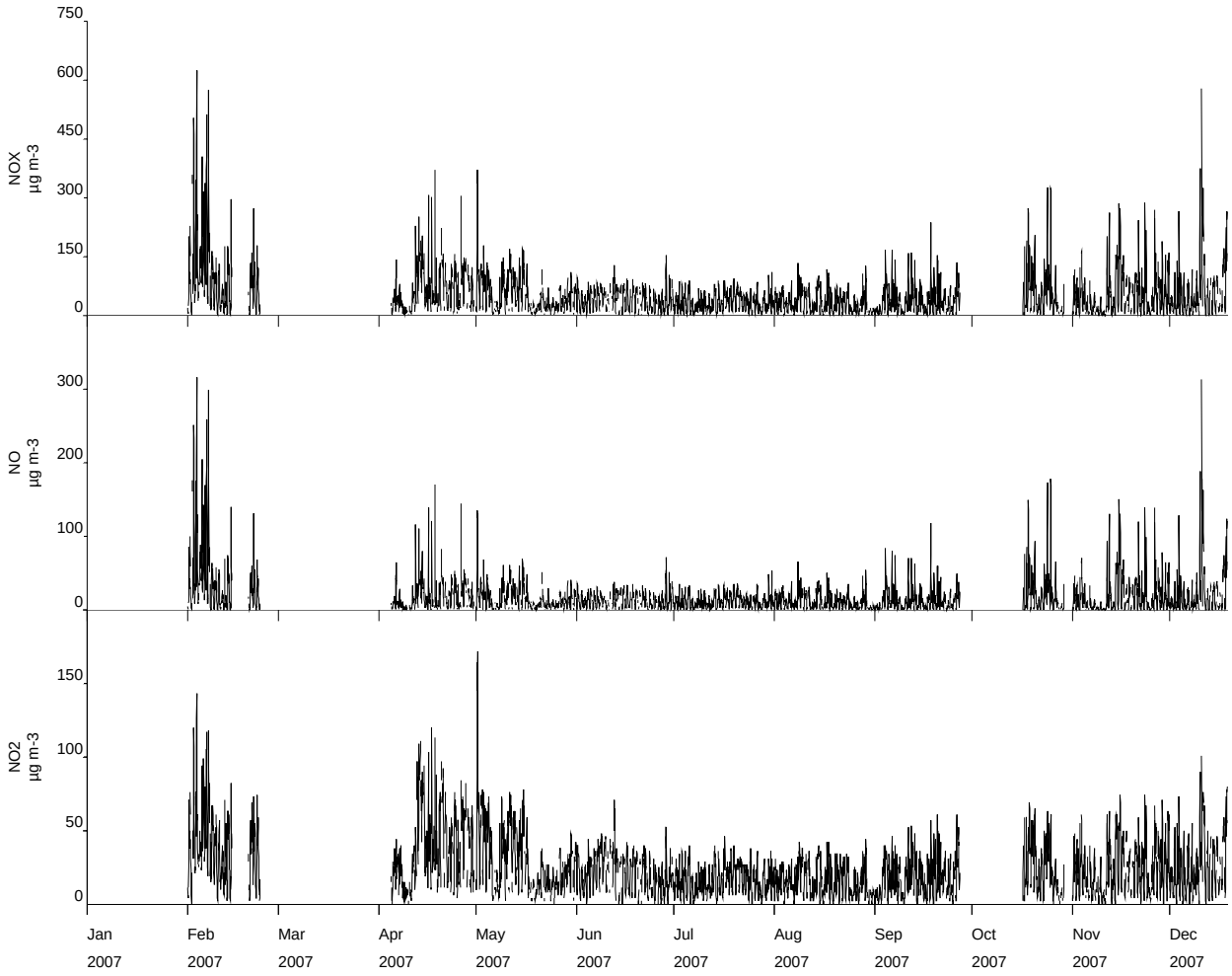
POLLUTANT	NO_X	NO	NO_2
Number Very High	-	-	0
Number High	-	-	0
Number Moderate	-	-	0
Number Low	-	-	5611
Maximum 15-minute mean	728 µg m^{-3}	375 µg m^{-3}	218 µg m^{-3}
Maximum hourly mean	626 µg m^{-3}	316 µg m^{-3}	172 µg m^{-3}
Maximum running 8-hour mean	352 µg m^{-3}	174 µg m^{-3}	117 µg m^{-3}
Maximum running 24-hour mean	254 µg m^{-3}	121 µg m^{-3}	84 µg m^{-3}
Maximum daily mean	218 µg m^{-3}	101 µg m^{-3}	72 µg m^{-3}
Average	50 µg m^{-3}	18 µg m^{-3}	24 µg m^{-3}
Data capture	64.1 %	64.1 %	64.1 %

All mass units are at 20'C and 1013mb
NO_X mass units are NO_X as NO_2 µg m-3

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Exceedences	Days
Nitrogen Dioxide	Annual mean > 40 µg m^{-3}	0	-
Nitrogen Dioxide	Hourly mean > 200 µg m^{-3}	0	0

Produced by AEA Energy & Environment on behalf of Ballymena BC

Ballymena North Road Air Monitoring
Hourly Mean Data for 01 January to 31 December 2007



For further information on air pollution monitoring please don't hesitate to contact:
David Madle Direct line 0870 190 6523
Environmental Quality Direct facsimile 0870 190 6377
AEA Energy & Environment e-mail David.Madle@aeat.co.uk
Building 551.11
Harwell
Didcot
Oxfordshire
OX11 0QJ

Produced by AEA Energy & Environment on behalf of Ballymena BC

BALLYMENA BALLYKEEL
01 January to 31 December 2007

These data have been fully ratified by AEA Energy & Environment

POLLUTANT	SO_2	PM_{10}*+
Number Very High	0	0
Number High	0	0
Number Moderate	0	0
Number Low	10339	3446
Maximum 15-minute mean	178 µg m^{-3}	1366 µg m^{-3}
Maximum hourly mean	122 µg m^{-3}	390 µg m^{-3}
Maximum running 8-hour mean	33 µg m^{-3}	113 µg m^{-3}
Maximum running 24-hour mean	17 µg m^{-3}	58 µg m^{-3}
Maximum daily mean	17 µg m^{-3}	56 µg m^{-3}
Average	6 µg m^{-3}	17 µg m^{-3}
Data capture	30.1 %	38.8 %

5 PM_{10} Indicative Gravimetric Equivalent µg m-3
+ PM_{10} as measured by a TEOM using a factor of 1.3 to give Indicative Gravimetric Equivalent
All mass units are at 20'C and 1013mb

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Exceedences	Days
Sulphur Dioxide	15-minute mean > 266 µg m^{-3}	0	0
Sulphur Dioxide	Hourly mean > 350 µg m^{-3}	0	0
Sulphur Dioxide	Daily mean > 125 µg m^{-3}	0	0
PM_{10} Particulate Matter (Gravimetric)	Daily mean > 50 µg m^{-3}	1	1
PM_{10} Particulate Matter (Gravimetric)	Annual mean > 40 µg m^{-3}	0	-

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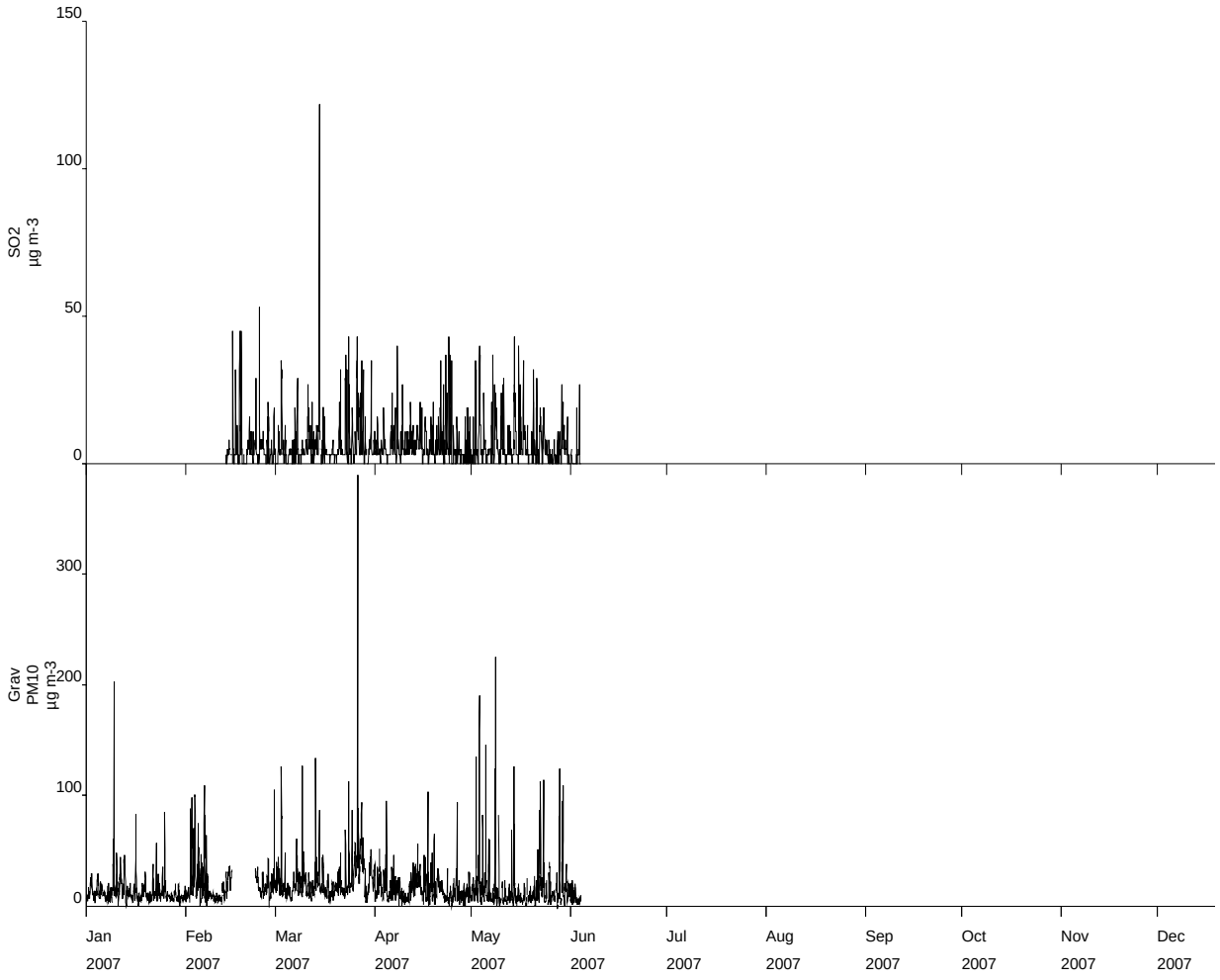
Ballymena Ballykeel Air Monitoring
Hourly Mean Data for 01 January to 31 December 2007



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Direct line 0870 190 6523
Direct facsimile 0870 190 6377
e-mail David.Madle@aeat.co.uk

Produced by AEA Energy & Environment on behalf of Ballymena BC

BALLYMENA NORTH ROAD
01 January to 31 March 2008

These data are provisional from 01/01/2008 and may be subject to further quality control

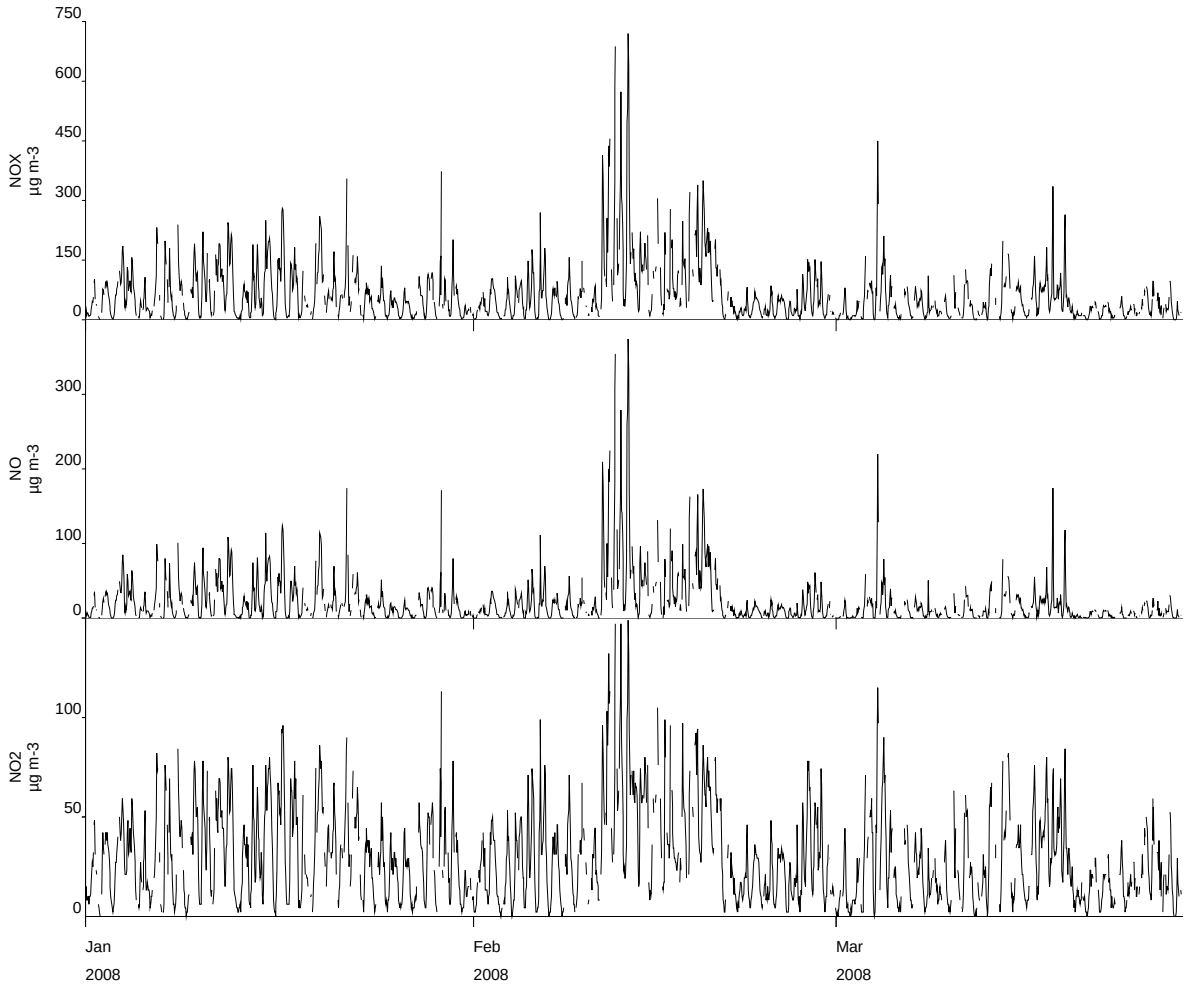
POLLUTANT	NO_X	NO	NO_2
Number Very High	-	-	0
Number High	-	-	0
Number Moderate	-	-	0
Number Low	-	-	1910
Maximum 15-minute mean	1077 µg m^{-3}	540 µg m^{-3}	294 µg m^{-3}
Maximum hourly mean	720 µg m^{-3}	374 µg m^{-3}	149 µg m^{-3}
Maximum running 8-hour mean	407 µg m^{-3}	203 µg m^{-3}	107 µg m^{-3}
Maximum running 24-hour mean	287 µg m^{-3}	135 µg m^{-3}	81 µg m^{-3}
Maximum daily mean	259 µg m^{-3}	122 µg m^{-3}	73 µg m^{-3}
Average	62 µg m^{-3}	22 µg m^{-3}	29 µg m^{-3}
Data capture	87.5 %	87.5 %	87.5 %

All mass units are at 20'C and 1013mb
NO_X mass units are NO_X as NO_2 µg m-3

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Exceedences	Days
Nitrogen Dioxide	Annual mean > 40 µg m^{-3}	-	-
Nitrogen Dioxide	Hourly mean > 200 µg m^{-3}	0	0

Produced by AEA Energy & Environment on behalf of Ballymena BC

Ballymena North Road Air Monitoring
Hourly Mean Data for 01 January to 31 March 2008



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BALLYMENA BALLYKEEL
01 January to 31 March 2008

These data are provisional from 01/01/2008 and may be subject to further quality control

POLLUTANT	SO_2	PM_{10}*+
Number Very High	0	0
Number High	0	0
Number Moderate	0	21
Number Low	7617	1451
Maximum 15-minute mean	136 µg m^{-3}	225 µg m^{-3}
Maximum hourly mean	69 µg m^{-3}	189 µg m^{-3}
Maximum running 8-hour mean	45 µg m^{-3}	129 µg m^{-3}
Maximum running 24-hour mean	25 µg m^{-3}	81 µg m^{-3}
Maximum daily mean	24 µg m^{-3}	77 µg m^{-3}
Average	11 µg m^{-3}	21 µg m^{-3}
Data capture	87.2 %	67.6 %

6 PM_{10} Indicative Gravimetric Equivalent µg m-3

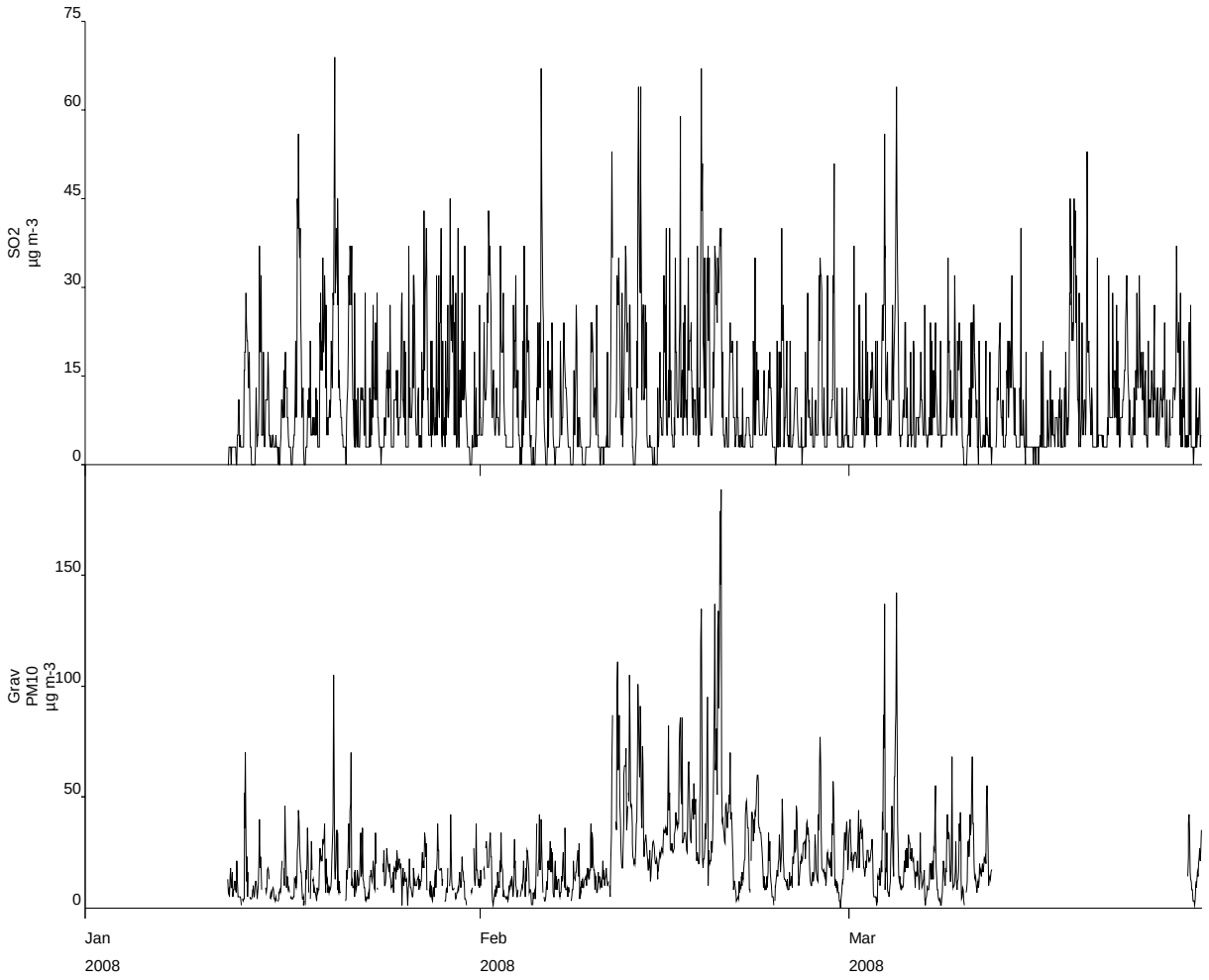
+ PM_{10} as measured by a TEOM using a factor of 1.3 to give Indicative Gravimetric Equivalent

All mass units are at 20'C and 1013mb

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Exceedences	Days
Sulphur Dioxide	15-minute mean > 266 µg m^{-3}	0	0
Sulphur Dioxide	Hourly mean > 350 µg m^{-3}	0	0
Sulphur Dioxide	Daily mean > 125 µg m^{-3}	0	0
PM_{10} Particulate Matter (Gravimetric)	Daily mean > 50 µg m^{-3}	1	1
PM_{10} Particulate Matter (Gravimetric)	Annual mean > 40 µg m^{-3}	-	-

Produced by AEA Energy & Environment on behalf of Ballymena BC

Ballymena Ballykeel Air Monitoring
Hourly Mean Data for 01 January to 31 March 2008



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e-mail David.Madle@aeat.co.uk

Appendix II

Diffusion Tube Location Details

Tube No	Location	Location Details
1	Leighinmohr Avenue	Residential area approximately 20m from nearest dwelling, 1.5 m from road
2	Galgorm Road	Major traffic route into/out of town centre, Junction, 10 m from nearest dwelling, 1.5 m from road
3	Main Street, Cullybackey	Only road through village, approximately 5m from nearest dwelling, 1.5m from road
4	Cullybackey Road	Roundabout on major traffic route, approximately 15m from nearest dwelling, 1.5m to road.
5	Henry Street	Mini Roundabout on major traffic route, equidistant between 2 sets of traffic lights, approximately 2m from road and 10m from hostel
6	Ballyloughan Avenue	Quiet residential cul-de-sac, approximately 5m from nearest dwelling on road side.
7	George Street	Commercial/non residential area, Main route in towns one-way system, at traffic lights 1.5m from road (becomes Linenhall street past traffic lights)
8	Wellington Street	Town centre one way system, non residential, approximately 1.5m from road
9	Ballymoney Street	Town centre one way system, non residential, approximately 1.5m from road
10	Parkway	Adjacent to pedestrian crossing close to (25m) roundabout on dual carriageway to rear of dwellings in Market Road, approximately 10m from nearest house, 1.5m from road
11	Lisnevenagh Road	A26 dual carriageway, approximately 1.5m from road at staggered road crossing approximately 30m from nearest dwelling.
12	Queen Street	Main traffic route into/out of town centre, adjacent to mini roundabout approximately 3m to nearest dwelling and 1.5m from road
13	North Road	Road junction on main through traffic route (3 lanes). Traffic merging from 3

		roads. Approximately 25m from pelican crossing. Nearest dwelling approximately 10m.
14	North Road	See tube 13
14b	North Road	See tube 13
15	Linenhall Street	Continuation of George Street. Commercial/ residential area, Main route in towns one-way system changing from 2 to 3 lanes approximately 50m from traffic lights, Tube at traffic lights 1.5m from road adjacent to flats and approximately 15m from hostel

Appendix III

Gradko Nitrogen Dioxide Diffusion Tube Results
January – March 2008

Tube Location	Month			Total	Mean
	January	February	March		
1 Leighinmohr Avenue	14.39	19.12	9.97	43.48	14.49
2 Galgorm Road	44.00	48.31	33.45	125.76	41.92
3 Main Street, Cullybackey	28.43	29.48	21.41	79.32	26.44
4 Cullybackey Road	36.01	40.39	20.82	97.22	32.41
5 Henry Street	35.19	39.94	24.71	99.84	33.28
6 Ballyloughan Avenue	16.15	17.03	8.83	42.01	14.00
7 George Street	53.99	61.67	47.92	163.58	54.53
8 Wellington Street	38.42	41.02	33.72	113.16	37.72
9 Ballymoney Street	42.65	37.79	31.15	111.59	37.20
10 Parkway	29.55	37.34	29.19	96.08	32.03
11 Lisnevenagh Road	33.60	38.24	17.60	89.44	29.81
12 Queen Street	51.40	43.17	36.56	131.13	43.71
13 North Road	37.30	38.58	22.51	98.39	32.80
14 North Road	28.42	35.30	23.29	97.01	32.34
14b North Road	40.89	40.45	25.81	107.15	35.72
15 Linenhall Street	65.21	64.95	44.34	174.50	58.17