2011 Air Quality Progress Report for *Angus Council*

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

May 2011

TSI Scotland

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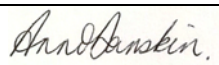
Signature	
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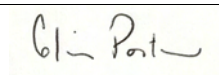
Signature	
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Executive Summary

The Local Air Quality Management process as set out in Part IV of the Environment Act (1995) (Ref.1) and the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 (Ref.2) requires all local authorities to complete a Progress Report due for submission in April 2011 in accordance with technical guidance LAQM.TG(09) (Ref.3). The progress report is intended to maintain continuity in the Local Air Quality Management (LAQM) process, and fill in the gaps between the three-yearly cycle of Review and Assessment.

This is the 2011 Progress Report for Angus Council which identifies all matters regarding impacts to local air quality that are new or have changed since the last Progress Report in 2010 and whether further consideration of such changes is required.

The Air Quality Strategy (AQS) details objective concentrations for the following pollutants:

- Benzene
- 1,3-Butadiene
- Carbon Monoxide (CO)
- Lead
- Sulphur Dioxide (SO_2)
- Nitrogen Dioxide (NO_2)
- Particles (PM_{10})

Further to the conclusions of the 2009 Updating and Screening Assessment and previous Review and Assessment reports, local monitoring has only been carried out for NO_2 and PM_{10} in recent years. The results of the monitoring program across Angus Council are as follows:

- Diffusion tube results indicate that annual average concentrations of nitrogen dioxide (NO_2) were below the AQS annual mean objective of 40µg/m^3 at all monitoring locations. The maximum recorded annual mean concentration was 26µg/m^3 at High Street, Monifieth.
- The annual average concentration of NO_2 was variable from year to year at each site but has decreased at 9 out of 12 sites since 2010.
- Continuous automatic monitoring of particulate matter (PM_{10}) was carried out at Chapelpark Primary School in Forfar for the full year, Glenisla Primary School, Glenisla, from January-May and Peel Farm Primary School, Glenisla from July-December. The results show that there has been no exceedence of the annual mean or 24-hour mean PM_{10} AQS objectives at Glenisla.
- The results from Forfar show an annual mean concentration of 16µg/m^3 and 5 exceedences of the 24-hour mean objective concentration using the gravimetric sampler. The results from the Filter Dynamics Measurement System (FDMS) give an annual mean concentration of 18µg/m^3 which meets the objective concentration and 4 exceedences of the 24-hour mean objective of 50µg/m^3 compared with an allowance of 7.

- Both methods recorded 24-hour mean concentrations greater than 50µg/m^3 during a period in March which corresponds with a dust storm across the Angus Council area.

Angus Council provided a summary of pending planning applications that are likely to have an impact on local air quality. One industrial operator, Monifieth Quarry, has submitted an application to extend the existing quarries. A PM_{10} and dust nuisance assessment has been included in the Environmental Impact Assessment (EIA).

Conditions requiring appropriate air quality assessments are proposed for pending planning applications for three residential/leisure developments.

No other planning applications were identified as having the potential to result in exceedences of the AQS objectives.

Consultation with SEPA has confirmed that there are no existing or new installations likely to cause an exceedence of the AQS objectives for any pollutant.

Angus Council and Transport Scotland confirmed that there were no new or significantly changed road developments with the potential to result in an exceedence of the AQS objectives.

Continuous monitoring of PM_{10} will continue at the current sites in Forfar (Gravimetirc and FDMS) and Glenisla (Gravimetric) during 2011-2012.

Angus Council owns a third gravimetric sampler which had previously been located in Carnoustie. It was not in use during 2010 due to the sale of the property where it was sited. The Council is actively seeking an appropriate site in Arbroath to relocate the monitor. It is expected that this will be operational during 2011.

A review of diffusion tube locations is underway in order to ensure that the data collected are from locations that continue to be representative of relevant sites of public exposure in the future.

It is concluded that Angus Council is not required to proceed to a Detailed Assessment for any pollutant. An Updating and Screening Assessment will be submitted in April 2012.

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1 Introduction

1.1 Description of Local Authority Area

The Angus Council area is located on the east coast of Scotland with Aberdeenshire Council to the north, Perth and Kinross Council to the west and Dundee City Council adjoined to the south.

The area is largely rural and mountainous, with low population in the north and west. The main population centres are Arbroath, Forfar and Montrose with the remaining population concentrated in Brechin City and the other towns of Monifieth, Carnoustie and Kirriemuir. The population is approximately 110,000.

The Angus Council boundary is shown in Figure 1 in Appendix A.

1.2 Purpose of Progress Report

Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment reports. Their purpose is to maintain continuity in the Local Air Quality Management process.

They are not intended to be as detailed as Updating and Screening Assessment Reports, or to require as much effort. However, if the Progress Report identifies the risk of exceedence of an Air Quality Objective, the Local Authority (LA) should undertake a Detailed Assessment immediately, and not wait until the next round of Review and Assessment.

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM in Scotland are set out in the Air Quality (Scotland) Regulations 2000 (Scottish SI 2000 No 97), the Air Quality (Scotland) (Amendment) Regulations 2002 (Scottish SI 2002 No 297), and are shown in Table 1-1. 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 Scotland

Pollutant	Concentration	Measured as	Date to be achieved by
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
	50 $\mu g/m^3$, not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	40 $\mu g/m^3$	Annual mean	31.12.2004
	18 $\mu g/m^3$	Annual mean	31.12.2010
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

Table 1-2 summarises the Air Quality Review and Assessment reports submitted by Angus Council since 2003 with the most recent report of 2010 listed first.

Table 1-2 Summary of Previous Air Quality Review and Assessment Reports 2003-2010

Report	Date Completed	Summary and Conclusions
Progress Report 2010 (Ref.4)	June 2010	The review of new monitoring data and new developments available for 2009 confirmed that the council did not need to proceed to a Detailed Assessment but that the monitoring programme should be maintained.
Updating and Screening Assessment 2009 (Ref.5)	November 2009	The report concluded that it was not necessary to proceed to a Detailed Assessment for NO_2 but that it was possible the PM_{10} annual mean objective could be exceeded in Forfar. It was recommended that the monitoring programme should be maintained. It was observed that further information was required to assess the combined effects of biomass schemes within the Council area.
Progress Report 2007/8 (Ref.6)	February 2009	The report concluded that it was not necessary to proceed to a Detailed Assessment for NO_2 or PM_{10} but that the monitoring programme should be maintained.
Detailed Assessment 2007 (Ref.7)	October 2007	The Detailed Assessment concluded that although the 2010 annual mean objective was exceeded during the period 1st June 2006-31st May 2007 in Forfar, it was predicted that levels would drop below but be close to this level by 2010. It was recommended that the monitoring programme should be maintained but that Angus Council were not required to declare an air quality management area (AQMA) for PM_{10}.
Updating and Screening Assessment 2006 (Ref.8)	July 2006	It was the view of The Scottish Government and SEPA that there was insufficient evidence to confidently predict that PM_{10} levels in Forfar would not exceed the 2010 annual mean objective and the Council should undertake a Detailed Assessment
Progress Report 2005 (Ref.9)	April 2005	New monitoring data and a review of all domestic and industrial emissions confirmed that there was no potential for exceedence of the AQS

		objectives for any of the AQS pollutants with the exception of PM_{10}. Based on Tapered Element Oscillating Monitor (TEOM) it was predicted that the annual mean objective for PM_{10} would be exceeded in 2010. It was decided to install a gravimetric Partisol sampler in Forfar to verify the TEOM results. The report also concluded that further assessment of Ethiebeaton Quarry was required due to PM_{10} emissions. The domestic fuel use survey was undertaken in Glamis, Newbigging and Auchmithie.
Review of Particulates (Ref.10)	Oct 2004	The review of emissions from domestic sources identified 24 communities where further investigation was required. Upon agreement with SEPA, a domestic fuel use survey was developed for Glamis, Newbigging and Auchmithie.
Updating and Screening Assessment 2003 (Ref.11)	April 2003	The USA concluded that is was unlikely that any AQS objectives would be exceeded. The Scottish Government and SEPA raised concerns over fuel types and quantities used in domestic properties and recommended an investigation.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

Further to the conclusions of the 2005 Progress Report and subsequent Review and Assessment reports, local monitoring has only been carried out for NO_2 and PM_{10} in recent years as these are the only pollutants considered to merit ongoing investigation. During 2010, Angus Council monitored NO_2 at 12 locations using passive diffusion tubes and PM_{10} at two locations using an FDMS TEOM automatic analyser and a Partisol gravimetric sampler at Forfar and Partisol only at GlenIsla. PM_{10} monitoring had been carried out in Carnoustie in previous years, however this ceased in 2010 due to the sale of the property where the monitor was located. Angus Council are actively seeking a new location for this monitor in Arbroath.

2.1.1 Automatic Monitoring Sites

The FDMS analyser was commissioned in July 2007 and is co-located with the Forfar gravimetric sampler at Chapelpark Primary School, (FOR2). The FDMS measures real-time 1-hour average PM_{10} concentrations and consists of a TEOM fitted with an FDMS unit measuring both core and volatile fractions of particles. The FDMS has been assessed to be equivalent to the EU reference method without the use of a correction factor. (Ref.3). This site is classified as a Roadside site.

During 2010 a second site was operational at Glenisla Primary School from January-May then relocated approximately 8 miles away at Peel Park Primary, Glenisla from July-December. Both sites are classified as Rural Background sites. The details of each site are shown in Table 2-1. A photograph of the unit at Forfar and a map showing the location of each monitoring site are shown in Figures 2 and 3 in Appendix A.

Table 2-1 Details of Automatic Monitoring Sites

Site Name	Site Type	OS Grid Ref		Pollutants Monitored	Monitoring Technique	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Does this location represent worst-case exposure?
Chaplepark Primary School, Forfar	Roadside	345914	750612	PM_{10}	Gravimetric	N	Y 0m	5m	N*
Chaplepark Primary School, Forfar	Roadside	345914	750613	PM_{10}	FDMS	N	Y 0m	6m	N*
Glenisla Primary School, Glenisla	Rural Background	321255	760411	PM_{10}	Gravimetric	N	Y 0m	20m	N
Peel Park Primary School, Glenisla	Rural Background	326515	754046	PM_{10}	Gravimetric	N	Y 0m	20m	N

* Worst case location would be at either end of the street where there is more congestion and idling traffic. However, chosen location is adjacent to school and bus stop and in secure site with required power supply and relevant public exposure.

2.1.2 QA/QC of Automatic Monitoring Sites

Angus Council change the filter cassettes on a two-weekly basis and the samplers are serviced annually by Air Monitors Ltd.

Data from the FDMS analyser are collected via automatic telemetry by Air Monitors Ltd and are checked daily by AEA. The analyser is also serviced on an annual basis and audited every six months. All data are ratified 6-monthly using procedures comparable to those used for national network monitoring data. Data are available on the Scottish air quality website **www.scottishairquality.co.uk**.

Personnel from Angus Council visit the site on a regular basis in order to change filters and check diagnostics.

Service and audit certificates are included in Appendix B.

2.1.3 Non-Automatic Monitoring Sites

Non-automatic monitoring of NO_2 was undertaken at 12 locations within Angus Council in 2010 using passive diffusion tubes. The location and description of each site is shown in Table 2-2. The sites are a mixture of Roadside, Kerbside, Industrial and Urban Background sites. A map showing the locations of the monitoring sites is shown in Figure 4 in Appendix A.

Table 2-2 Details of Non-Automatic Monitoring Sites

Site Name	Site ID	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?
Ethie Terrace, Arbroath	A1	Urban Background	364585	742349	NO_2	N	Y (0m)	1m	N
Inchcape Road, Arbroath	A2	Urban Background	362987	740642	NO_2	N	Y (0m)	2m	N
Abbey Path, Arbroath	A3	Roadside	364299	741225	NO_2	N	Y (1.5m)	<1m	N
22 Lordburn, Arbroath	A4	Roadside	364158	741122	NO_2	N	Y (3m)	<1m	N
High St, Carnoustie	CAR	Kerbside	356243	734526	NO_2	N	Y (3m)	2m	N
High St, Monifieth	M1	Kerbside	349759	732549	NO_2	N	Y (0m)	2m	N
High St, Montrose	M2	Kerbside	371418	757767	NO_2	N	Y (2m)	1m	Y
High St, Brechin	B1	Kerbside	359727	760170	NO_2	N	Y (2m)	1m	N
Sacone 1, Brechin	B2	Industrial	361216	759644	NO_2	N	N	8m	N
Sacone2, Brechin	B3	Industrial	361198	759600	NO_2	N	N	60m	N
High St, Forfar	FOR	Kerbside	345825	750674	NO_2	N	Y (3m)	<1m	N
Manse Cl, Forfar	KIR	Kerbside	338621	754032	NO_2	N	Y (3m)	6m	N

2.1.4 QA/QC of Non-Automatic Monitoring Sites

The diffusion tubes used by Angus Council are supplied and analysed by Tayside Scientific Services (TSS). The laboratory is UKAS accredited and participates in 3 schemes which ensure that the NO_2 tube results meet acceptable standards. These are:

- **The WASP scheme -** run by the Health & Safety Laboratory (HSL). Every 3 months TSS receives four diffusion tubes spiked with set amounts of nitrite. The tubes are analysed and results returned to HSL. Results are compared with the known spiking levels and with the results from other participating laboratories. Feedback on the performance is provided. The results from 2010 show that the laboratory achieved Z scores well within the range of ±2 which is classified as satisfactory for the scheme.
- **Field Intercomparison Study –** run by National Physical Laboratory (NPL) as part of the Support to Local Authorities for Air Quality Management Contract funded by the Scottish Government, DEFRA and the Devolved Administrations. Every 3 months, 3 tubes and a blank which have been exposed at a field intercomparison site are supplied to TSS for analysis. The results are compared with those from the automatic chemiluminescent analyzer at the site, which is defined as the reference method for measurement of NO_2 (Ref.3).
- **NO_2 Solution Test –** the laboratory perform an in-house check for analysis of NO_2 tubes every 21 NO_2 tube samples.

Angus Council does not carry out any co-location study of its own as it does not operate a chemiluminescent analyzer. Neighbouring local authority, Dundee City Council did carry out a co-location study during 2010 and submitted their results to the National Bias Correction Factor spreadsheet (Diffusion_Tube_Bias_Factors_v04_11_v6.xls) (Ref.12) available via the Review and Assessment Helpdesk. This spreadsheet also includes the results of the above field intercomparison study.

The average of the bias adjustment factors from the intercomparison study and relevant co-location studies is used as the overall factor to be applied to the diffusion tubes across the Angus Council monitoring network. Table 2-3 shows a summary of the results for tubes analysed by TSS. The bias adjustment correction factor for 2010 was 0.78.

Table 2-3 Calculated Laboratory Bias Adjustment Factors for NO_2 Diffusion Tubes for Tayside Scientific Services 2010

Method	Year	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m^3)	Automatic Monitor Mean Conc. (Cm) (µg/m^3)	Bias (B)	Tube Precision	Bias Adjustment Factor (A) (Cm/Dm)
20% TEA in Water	2010	Kerbside	Dundee City Council	12	64	54	18.1%	Good	0.85
20% TEA in Water	2010	Roadside	Dundee City Council	10	51	40	29.4%	Good	0.77
20% TEA in Water	2010	Kerbside	Dundee City Council	11	45	36	26.5%	Good	0.79
20% TEA in Water	2010	Kerbside	Field Intercomparison Study	12	127	93	36.8%	Good	0.73
								Overall Factor	**0.78**

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide

The AQS objectives for NO_2 are summarised in Table 2-4 below:

Table 2-4 AQS Objectives for NO_2

Pollutant	Definition of AQS
NO_2	Annual mean concentration of 40µg/m^3 to be achieved by 2005
	Hourly Mean concentration of 200µg/m^3 not to be exceeded more than 18 times in a year to be achieved by 2005.[1]

Diffusion Tube Monitoring Data

The bias adjusted diffusion tube results for 2010 are shown for each site in Table 2-5. The raw, unadjusted monthly results are summarised in Appendix B.

Table 2-5 Bias Adjusted Annual Mean Concentrations of NO_2 for 2010

Site Name	Site ID	Within AQMA?	Data Capture 2010	Bias Adjusted Annual Mean Concentration for 2010 (µg/m^3)
Ethie Terrace, Arbroath	A1	N	100%	9
Inchcape Road, Arbroath	A2	N	91.7%	13
Abbey Path, Arbroath	A3	N	100%	19
22 Lordburn, Arbroath	A4	N	100%	20
High St, Carnoustie	CAR	N	91.7%	23
High St, Monifieth	M1	N	100%	26
High St, Montrose	M2	N	100%	22
High St, Brechin	B1	N	91.7%	13
Sacone 1, Brechin	B2	N	100%	8
Sacone2, Brechin	B3	N	58.3%	14
High St, Forfar	FOR	N	100%	15
Manse Cl, Kirriemiur	KIR	N	100%	13

The highest annual mean concentration was 26µg/m^3 recorded at High Street, Monifieth and the lowest was 8µg/m^3 recorded at Sacone 1, Brechin. There were

[1] Corresponds to the 99.8th Percentile of hourly mean concentration measurements.

therefore no exceedences of the NO_2 annual mean AQS objective at any of the monitoring sites during 2010.

A summary of the bias corrected annual mean concentration at each site for the period 2005-2010 is shown in Table 2-6. A graph showing the annual variation at each site is shown in Figure 7 in Appendix C. The graph indicates that the concentrations are variable from year to year with no clear upward or downward trend. The concentration has decreased at 9 out of 12 sites between 2009-2010 with all sites remaining below the objective of 40µg/m^3.

Table 2-6 Bias Adjusted Annual Average NO_2 Concentrations from 2005-2010 (µg/m^3)

Site Name	2005 (0.73)	2006 (0.78)	2007 (0.91)	2008 (0.86)	2009 (0.77)	2010 (0.78)
Ethie Terrace, Arbroath	7	8	8	8	9	9
Inchcape Road, Arbroath	9	9	10	10	10	13
Abbey Path, Arbroath	14	15	17	17	19	19
22 Lordburn, Arbroath	20	21	23	23	24	20
High St, Carnoustie	19	20	24	21	24	23
High St, Monifieth	23	25	28	27	28	26
High St, Montrose	20	22	25	27	26	22
High St, Brechin	14	15	18	19	17	13
Sacone 1, Brechin	9	8	9	9	9	8
Sacone2, Brechin	9	8	7	8	9	14
High St, Forfar	19	23	26	25	23	15
Manse Cl, Kirriemiur	11	13	13	14	14	13

* Bias correction factor used for correcting raw diffusion tube data

A review of diffusion tube locations is underway in order to ensure that the data collected continue to be from locations representative of relevant sites of worst case public exposure in the future.

There is no continuous automatic monitoring of NO_2 within Angus Council. The Technical Guidance, LAQM.TG(09) document (Ref.3) also states that where the measured annual mean concentration is below 60µg/m^3, it is unlikely that the hourly mean NO_2 objective of 200µg/m^3 will be exceeded. It is therefore concluded that

there are no exceedences of the hourly mean objective for NO_2 at any of the Angus Council monitoring sites during 2010.

2.2.2 PM_{10}

Table 2-7 AQS Objectives for PM_{10} in Scotland

Pollutant	Definition of AQS
PM_{10}	Annual mean concentration of 18µg/m^3 to be achieved by 2010
	Daily mean concentration of 50µg/m^3 not to be exceeded more than 7 times in a year to be achieved by 2010

Angus Council monitored PM_{10} by gravimetric and FDMS samplers at Chapelpark Primary School in Arbroath and by gravimetric sampler at Glenisla Primary School for 5 months then Peel Farm Primary, Glenisla for 5 months during 2010. No monitoring was undertaken at Carnoustie during 2010.

Results of PM_{10} automatic monitoring compared with the annual mean objective for the period 2008-2010 are shown in Table 2-8. The results show that the annual mean concentration at the Forfar site for 2010 was 16µg/m^3 using the gravimetric method and 18µg/m^3 using the FDMS method. Both Glenisla sites are rural background sites. In each case a period mean has been calculated and projected to an annual mean concentration using the method outlined in the technical guidance (Ref.3).

Table 2-8 Results of PM_{10} Automatic Monitoring: Comparison with Annual Mean Objective

Site Location	Site ID	Within AQMA?	Data Capture for 2010 %	Annual Average Concentration (µg/m^3)		
				2008	2009	2010
Chapelpark Primary School, Forfar	FOR1*	N	97%	16	17	18
Chapelpark Primary School, Forfar	FOR2+	N	95%	17	16	16
Glenisla Primary School, Glenisla	G1	N	35%	6	6	6 (7.5^)
Peel Farm Primary School, Glenisla	G1	N	43%	–	–	6.7 (5.7^)

*FDMS Method
+Gravimetric Method
^Projected Annual Mean

The results of PM_{10} automatic monitoring compared with the 24-hour mean objective for the period 2008-2010 is shown in Table 2-9. The results show that for the FDMS method and gravimetric method there were 4 and 5 exceedences respectively of the 24-hour mean objective concentration of 50µg/m^3. This is compared with an allowance of 7 exceedences. It should be noted that the maximum recorded 24-hour concentration for each sampler at Forfar coincided with a dust storm over the region

on 19th March 2011. Photographs of sandy deposits at a site approximately 3km south-west of Forfar are shown in Figures 5 and 6 in Appendix A. A graph of the 24-hour mean concentrations from each sampler at Forfar is shown in Figure 8 in Appendix C. This incident is also reflected in the Air Pollution Report provided by AEA in Appendix B.

Table 2-9 Results of PM_{10} Automatic Monitoring: Comparison with the Daily Mean Objective

Site Location	Site ID	Within AQMA?	Data Capture for 2010 %	No. of Exceedences of the Daily Mean Objective of 50µg/m^3		
				2008	2009	2010
Chapelpark Primary School, Forfar	FOR1*	N	97%	0	2	4
Chapelpark Primary School, Forfar	FOR2+	N	95%	3	1	5
Glenisla Primary School, Glenisla	G1	N	35%	0	0	0 (16.3^)
Peel Farm Primary School, Glenisla	G1	N	43%	-	-	0 (18.8^)

*FDMS Method
+Gravimetric Method
^98th Percentile of available data for comparison with objective of 50µg/m^3

2.2.3 Summary of Compliance with AQS Objectives

Angus Council has examined the results from NO_2 and PM_{10} monitoring in the local authority area. NO_2 concentrations are all below the objective of 40µg/m^3. There are no exceedences of the PM_{10} 24-hour mean objective and the annual mean is below or equal to the objective at all locations. Therefore there is no need to proceed to a Detailed Assessment.

3 New Local Developments

This section examines any local development changes that have taken place since the last Progress Report which may affect air quality. The items included are:

- Road Traffic Sources;
- Other Transport Sources;
- Industrial Sources;
- Commercial and Domestic Sources;
- Biomass Boilers; and
- Fugitive and Uncontrolled Sources.

3.1 Road Traffic Sources

Angus Council confirms that there are no new road traffic developments which may have an impact on air quality within the Local Authority area.

Transport Scotland confirmed that there were no significant increases in traffic flow on the A90 trunk road.

3.2 Other Transport Sources

Angus Council confirms that there are no new or newly identified transport sources which are likely to have an impact on air quality within the Local Authority area.

3.3 Industrial Sources

Data obtained from the public registry in the SEPA Arbroath office confirmed that there were no new industrial sources which became operational during 2010 that would have a significant impact on local air quality.

The GSK site at Montrose has expanded by bringing new processes on line in 2010. However, this will not have an impact on air quality as the new processes tend to displace other ones and any emissions are very short term and the production processes intermittent. GSK carried out air quality modelling work to support the introduction of these new processes. This modelling demonstrated that there would be no significant impact on air quality.

Two new intensive agriculture installations were PPC authorised as Part A processes in 2010. These were Sandyford Farm, Kirriemuir, Angus and Lumgair Poultry Free Range Bird Houses. No air quality impact assessments were required or undertaken

other than SCAIL (Simple Impact of Ammonia Impact Assessment) modelling (Ref. 13).

One installation, Angus Horticulture in Polmood, Guthrie changed from a Part A to Part B installation.

There were no other variations in existing installations which would result in a negative impact on local air quality.

Angus Council provided a summary of pending planning applications that are likely to have an impact on local air quality. One industrial operator, Monifieth Quarry, has submitted an application to extend the existing quarries. A PM_{10} and dust nuisance assessment has been included in the EIA.

A pending application for a golf course and residential development at Kingennie Farm, Wellpark may give rise to air quality issues as the proposed site is close to an existing quarry. The site layout is not finalised however a condition requiring an appropriate air quality assessment is proposed by Angus Council.

Table 3-1 Pending Planning Applications Influenced by Emissions from Industrial Sources

Reference Number	Address	Description	Decision	Impact Assessment
10/01189/MINM	Monifieth Quarry	Extension of Existing quarries	Pending	PM_{10} and dust impact assessment included in the EIA.
09/00695/OUT	Kingennie Farm, Wellbank	160 houses and 18 hole golf course	Pending	Site layout plan not approved so risk of housing proposed close to existing quarry. Condition requiring an appropriate air quality assessment is proposed.

Angus Council and SEPA confirm that there are no new or significantly changed industrial developments which may have an impact on air quality within the Local Authority area.

A PM_{10} and dust nuisance assessment was included in the EIA prior to the planning consent being determined for an extension to existing quarries at Monifieth Quarry.

A condition requiring an air quality assessment is proposed for the planning application for Kingennie Farm, Wellpark.

3.4 Commercial and Domestic Sources

Angus Council provided a summary of pending planning applications for commercial and domestic sources that are likely to have an impact on local air quality. These are shown in Table 3-2.

Table 3-2 Pending Planning Applications for Commercial and Domestic Sources

Reference Number	Address	Description	Decision	Impact Assessment
10/01110/FULL	Seggieden Farm	4 houses and biomass boiler	Pending	PM_{10} and NO_2 screening assessment required.
10/01332/FULL	Care Home Kinloch St, Carnoustie	Care home and biomass boiler	Pending	PM_{10}, NO_2 and odour assessment required.

Angus Council confirms that there are no new or significantly changed commercial or domestic developments which may have an impact on air quality within the Local Authority area.

Appropriate AQ assessments are required for two new pending planning applications for commercial and domestic sources.

3.5 New Developments with Fugitive or Uncontrolled Sources

Angus Council confirms that there are no new or newly identified local developments with fugitive or uncontrolled sources which may have an impact on air quality within the Local Authority area. Applications for an extension to Monifieth Quarry and a residential/leisure development at Kingennie Farm, Wellbank are discussed in Section 3.3.

3.6 New Biomass Boilers

There were 9 biomass installations within the Angus Council area listed in the 2010 Progress Report. There were 6 council operated sites, mostly at primary schools and 3 privately owned boilers. A screening assessment in accordance with the technical guidance TG.(09) (Ref.3) was undertaken for the largest 300kW boiler at Kinnaird

Castle, Brechin as all others had been assessed previously. It was concluded that no further assessment was required with regard to air quality.

There are 3 new biomass boilers which have received planning permission since last year although their implementation dates are not known at the time of writing. These are listed in Table 3-3.

Table 3-3 New Biomass Boilers within the Angus Council Boundary

Location	Grid Reference	Operator	Boiler Details	Max Output
Montrose Sports Centre, DD8 8TR	371891,757576	Angus Council	Binder rrk 400-600 wood chip with Glosfume ceramic filters	500kW
Craigo Home Farm, DD10 9JT	368783,762842	Private	Ala-Talkkari Vet wood chip	220kW
Royal Jubilee Arms Hotel, Dykehead DD8 4QN	338664,760248	Private	Froling Binder or Broag wood chip	220kW

Each installation was assessed using the screening methodology in accordance with the technical guidance TG.(09) (Ref.3). If it is identified that the emission rate of a biomass installation is greater than the calculated threshold emission rate, a detailed assessment of the possible impacts of that installation is required. In order to calculate the threshold emission rates for each installation, the following information was used:

- Height of the highest building within 5 stack heights of the stack (m)
- Stack Diameter (m)
- Stack Height (m)
- Effective Stack Height (m)
- Background PM_{10} and NO_2 concentrations at each installation.

The background concentrations were taken from the 2010 UK background concentration maps provided on the national air quality website (www.airquality.co.uk/laqm/tools.php?tool=background06)

These data were input to the biomass calculator (www.airquality.co.uk/laqm/tools/biomass_calculator_tool6.xls)

The results of the assessment are shown in Tables 3-4 to 3-6 for the annual mean PM_{10} concentration, the annual mean NO_2 concentration and the hourly mean NO_2 concentration.

The results show that it is not necessary to proceed to a Detailed Assessment for either installation.

Table 3-4 Assessment of Individual Biomass Installations–Annual Mean PM_{10}

Annual mean PM_{10}	Building Height (m)	Stack diameter (m)	Stack height (m)	Effective stack height (m)	Background µg/m^3	Emission rate (g/s)	Target emission rate (g/s)	Detailed assessment required
Montrose sports centre	10.2	0.45	12.2	3.3	8.79	0.0035	0.0202	No
Home farm Craigo	5.5	0.3	7	2.5	9.99	0.0052	0.0279	No
Royal jubilee arms hotel Dykehead	7.5	0.25	8.75	2.1	8.76	0.0045	0.0261	No

Table 3-5 Assessment of Individual Biomass Installations–Annual Mean NO_2

Annual mean NO_2	Building Height (m)	Stack diameter (m)	Stack height (m)	Effective stack height (m)	Background µg/m^3	Emission rate (g/s)	Target emission rate (g/s)	Detailed assessment required
Montrose sports centre	10.2	0.45	12.2	3.3	9.67	0.0819	0.1913	No
Home farm Craigo	5.5	0.3	7	2.5	3.982	0.0262	0.1252	No
Royal jubilee arms hotel Dykehead	7.5	0.25	8.75	2.1	3.374	0.0459	0.1033	No

Table 3-6 Assessment of Individual Biomass Installations–Hourly Mean NO_2

Hourly mean NO_2	Building Height (m)	Stack diameter (m)	Stack height (m)	Effective stack height (m)	Background µg/m^3	Emission rate (g/s)	Target emission rate (g/s)	Detailed assessment required
Montrose sports centre	10.2	0.45	12.2	3.3	9.67	0.0819	0.2677	No
Home farm Craigo	5.5	0.3	7	2.5	3.982	0.0262	0.1606	No
Royal jubilee arms hotel Dykehead	7.5	0.25	8.75	2.1	3.374	0.0459	0.1314	No

4 Local Plans

4.1 Transport

Angus Council is a member of Tayside and Central Scotland Transport Partnership (TACTRAN) with Perth and Kinross Council, Dundee City Council and Stirling Council. TACTRAN is a statutory body established under the Transport (Scotland) Act 2005. Its role is to bring together the local authorities and other key regional stakeholders, to take a strategic approach to transport in the region. The Partnership's immediate priority is to create a Regional Transport Strategy (Ref.14), which sets out a Vision and Objectives for transport across the region for the next 10 – 15 years. The RTS vision is to deliver:

> *"a transport system, shaped by engagement with its citizens, which helps deliver prosperity and connects communities across the region and beyond, which is socially inclusive and environmentally sustainable and which promotes the health and well-being of all."*

Three specific objectives with regard for local air quality are identified in the report to:

- Contribute to the achievement of the Scottish national targets and obligations on greenhouse gas emissions
- Promote a transport system that respects both the natural and the built environment
- Promote a shift towards more sustainable modes.
- Help to meet or better all statutory air quality requirements in the TACTRAN area

4.2 Local Development Plan

Angus Council has commenced work to prepare a Local Development Plan (LDP) for the area. When adopted, this will replace the current Angus Local Plan Review (adopted 2009) (Ref.15).

The main purpose of the Angus Local Plan Review is to guide development and changes in land use, in a sustainable manner that can best serve the needs of communities throughout Angus. The Local Plan shows how policies and proposals for changes in land use and activities fit together with existing development as part of a coherent strategy in support of a Vision of Angus.

The new Local Development Plan will guide development in the county over the next 10 years and influence the scale and location of development across a range of land uses, including housing, shopping, business and employment. It will aim to guide development to the most appropriate locations while seeking to protect and enhance the areas high quality built and natural heritage. The LDP will be published alongside an Environmental Report, Habitats Regulations Appraisal and an Equality Impact Assessment.

The Angus Development Plan Scheme (Ref.16), which is reviewed annually (last reviewed March 2011) sets out the broad timetable and key stages in preparing the first Angus LDP. This envisages a Main Issues Report published in summer 2011, a Proposed Plan published the following year, with an Examination in Public likely in 2013, and the Local Development Plan adopted in summer 2014.

5 Conclusions and Proposed Actions

5.1 Conclusions from New Monitoring Data

The results of the NO_2 monitoring across Angus Council during 2010 confirm that there are no exceedences of the AQS objectives for this pollutant.

Analysis of NO_2 concentrations during the period 2005-2010 shows that the concentrations are variable from year to year with no clear upward or downward trend. The concentration has decreased at 9 out of 12 sites between 2009-2010 with all sites remaining below the objective of 40µg/m^3.

The results of the PM_{10} monitoring show that there are no exceedences of the PM_{10} 24-hour mean objective and the annual mean is below or equal to the objective at all locations.

The review of new monitoring data available for 2010 confirms that Angus Council does not need to proceed to a Detailed Assessment for any pollutant.

5.2 Conclusions relating to New Local Developments

Angus Council confirm that there are 4 pending planning applications for developments that have the potential to impact local air quality. The appropriate air quality impact assessments have been submitted or proposed as planning conditions for these developments. These will be considered in more detail in the USA in 2012.

5.3 Proposed Actions

The current PM_{10} monitoring at Peel Farm Primary School, Glen Isla and Chapelpark School in Forfar will continue during 2011. The third Partisol unit owned by Angus Council is expected to be relocated in Arbroath and be operational during 2011.

A review is being undertaken regarding the location of diffusion tubes across the Angus Council network. This will ensure that worst case locations for relevant public exposure will continue to be considered in future air quality reports.

Traffic flow data will continue to be recorded across the Angus Council area.

The results of these activities will be included in the Updating and Screening Assessment due for submission in April 2012.

6 References

1) The Environment Act (1995)- © Crown Copyright

2) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland - Department for Environment, Food and Rural Affairs in partnership with the Scottish Executive, Welsh Assembly Government and Department of the Environment Northern Ireland. July 2007

3) Local Air Quality Management Technical Guidance LAQM TG.(09) – DEFRA

4) 2010 Air Quality Progress Report for Angus Council, AEA, AEAT/ENV/R/2972/Issue_1, June 2010

5) 2009 Air Quality Updating and Screening Assessment for Angus Council, AEA, AEAT/ENV/R/2904, November 2009

6) LAQM Progress Report 2007/8: Angus Council, AEA,AEAT/ENV/R/2725/Issue_2, February 2009

7) Local Air Quality Management Detailed Assessment 2007, BMT Cordah Ltd, E_AGC_011/Report 2, October 2007

8) LAQM Updating and Screening Assessment 2006, BMT Cordah Ltd, E_AGC_010/2006, July 2006

9) LAQM Progress Report 2005, BMT Cordah Ltd, E_AGC_009/2005, May 2005

10) Review of Particulates, BMT Cordah Ltd, AGC.007/2004, October 2004

11) LAQM Updating and Screening Assessment 2006, BMT Cordah Ltd, E_AGC_005/2003, April 2003

12) http://laqm.defra.gov.uk/documents/Diffusion_Tube_Factors_v04_11_v6.xls

13) Simple Tool for Ammonia Impact Assessment www.scail.ceh.ac.uk

14) Regional Transport Strategy 2008-2023, TACTRAN, 2008, http://www.tactran.gov.uk/documents/TACTRANRTS-FinalNov2008.pdf

15) Angus Local Plan Review, February 2009, Angus Council, http://www.angus.gov.uk/localplan/review.htm

16) Angus Development Plan Scheme, Angus Council Planning & Transport, March 2011; http://www.angus.gov.uk/localplan/AngusDevelopmentPlanScheme.pdf

Appendices

Appendix A: Maps and Photographs

Appendix B: QA/QC

Appendix C: Monitoring Data

Appendix A: Maps and Photographs

Figure 1-Angus Council Boundary

Figure 2 – Automatic Monitoring Station at Chapelpark Primary School in Forfar

Figure 3 – Map Location of Automatic Monitoring Sites within Angus Council

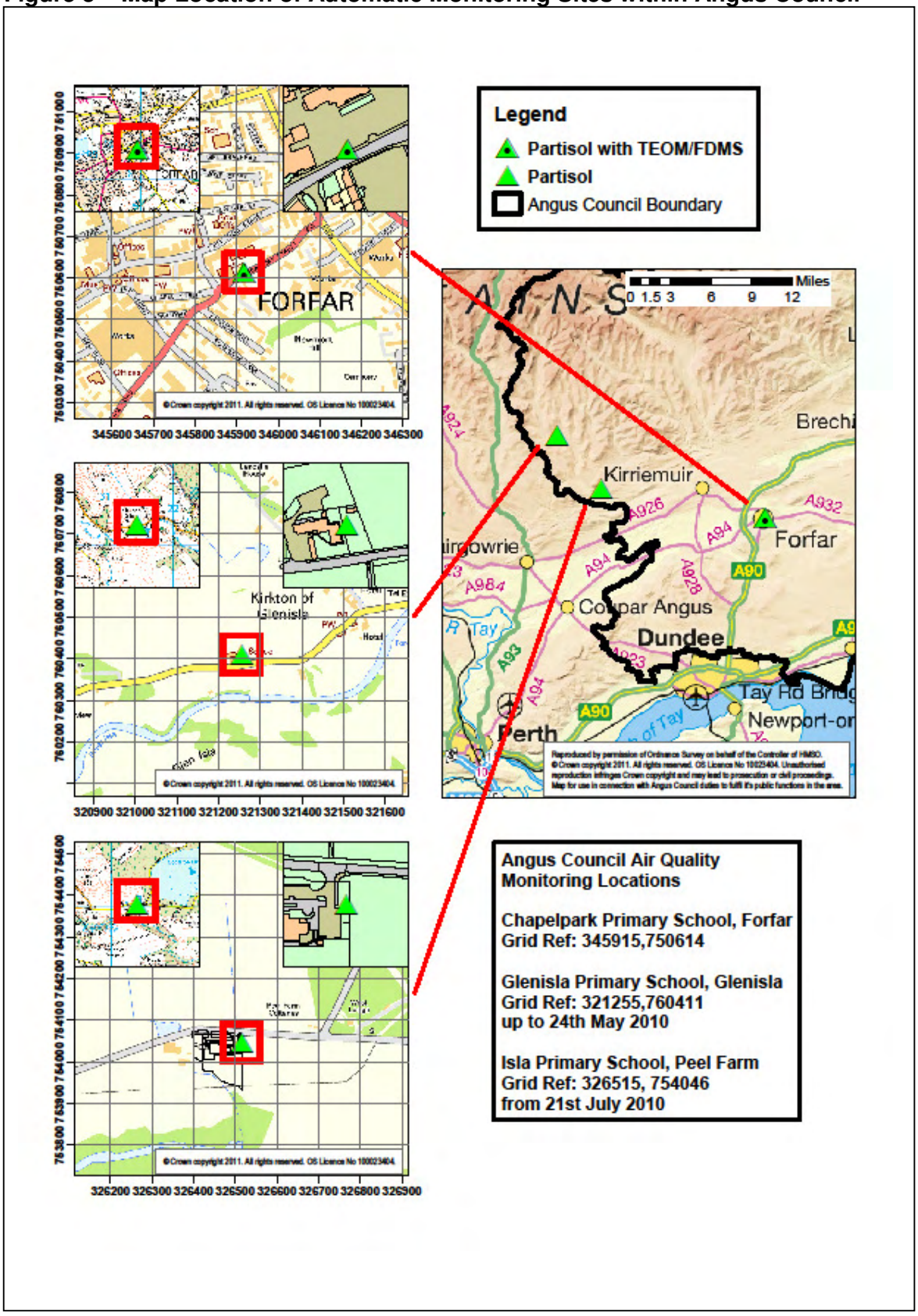


Figure 4- Map of NO_2 Monitoring Site Locations

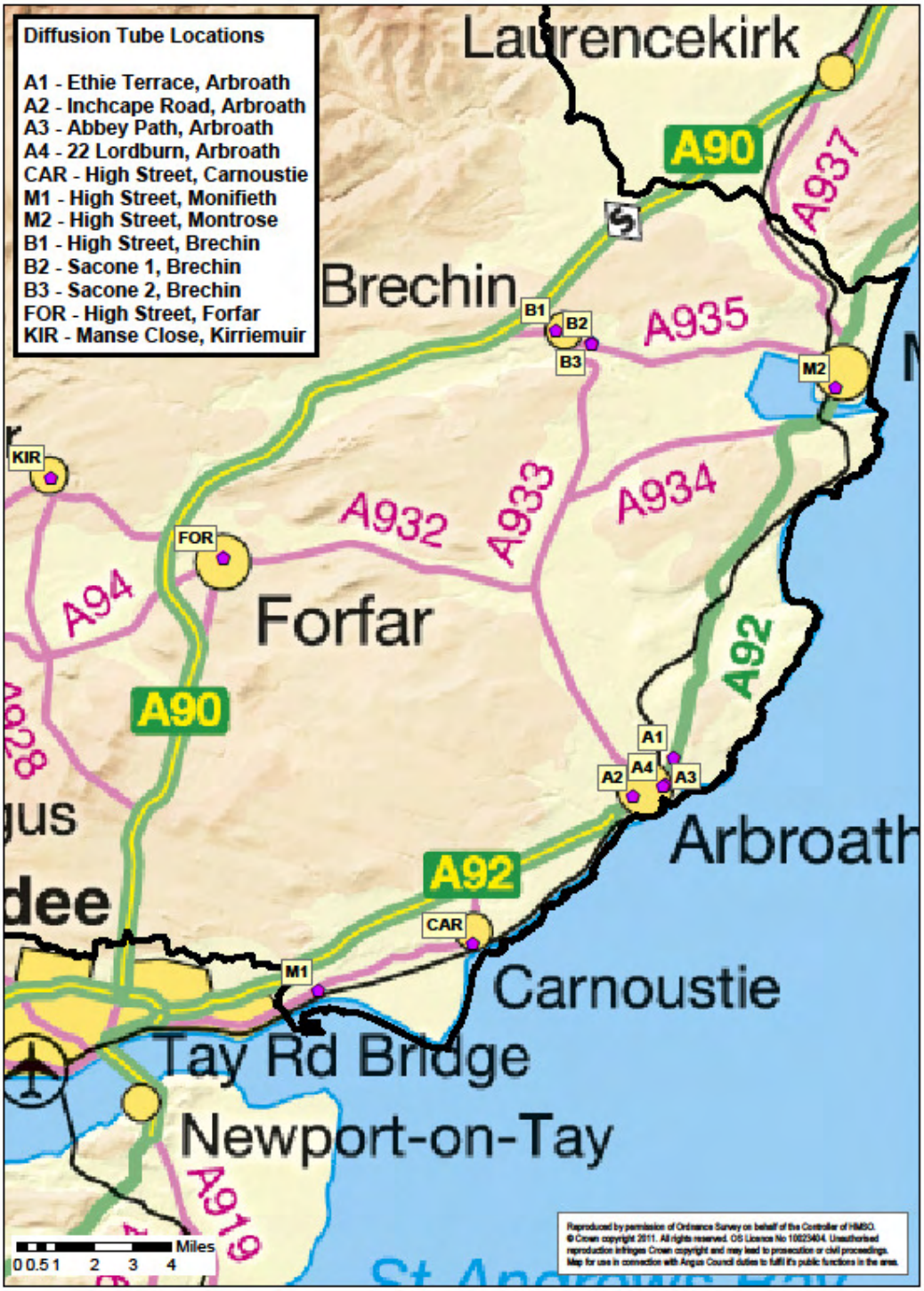


Figure 5- Dust Storm 19th March 2010

Figure 6- Dust Storm 19th March 2010

Appendix B: QA/QC

AEA

CERTIFICATE OF CALIBRATION

Glengarnock Technology Centre, Caledonian Road, Lochshore Business Park, Glengarnock, Ayrshire, KA14 3DD. Telephone 0870 1905269 Fax 0870 1905151

UKAS CALIBRATION 0401

Approved Signatories: K. Stevenson S. Stratton

Signed: Date: 18th November 2010

Date of issue: 19th November 2010
Cert No: 2319 Page 1 of 2

Customer Name and Address:
Scottish Government
Water, Air, Soils and Flooding Division
Environmental Quality Directorate
Scottish Government
Victoria Quay
Edinburgh
EH6 6QQ

Description: Calibration factors for Angus Council's Forfar air monitoring station.

AEA Identification Number: 46761/ANGUS/A3

Site / Date Test Carried Out	Species	Analyser Serial No.	Parameter	Specified Value	Measured Value	Deviation %
Forfar 10th June 2010	FDMS PM_{10}	26569	Main Flow[4]	3.00	3.02	0.7
			AuxFlow[4]	13.65		
			Total Flow[4]	16.67	15.48	-7.1
			k_0[5]	14313	14046	-1.9

Uncertainties:

FDMS PM_{10}	Main Flow	±2.2%
	Total Flow	±2.2%
	Aux Flow	±2.2%
	k_0	±1.0%

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2 providing a level of confidence of approximately 95% The uncertainty evaluation has been carried out in accordance with UKAS requirements.
This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to recognised national standards, and to units of measurement realised at the National Physical Laboratory or other recognised national standards Laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory

Date of issue: 19th November 2010
Cert No: 2319 Page 2 of 2
AEA Identification Number: 46761/ANGUS/A3

The gaseous ambient analysers listed above have been tested for zero response, calibration factor, linearity and converter efficiency (NO_x analysers only) by documented methods. The factors have been calculated using certified gas standards. The particulate analysers listed above have been tested for sample flow rates and k_0 (where appropriate) by documented methods. Note that the test results are valid on the day of test only, as analyser drift over time cannot be quantified. All results for gaseous species are given in ppb (parts per billion) mole fractions or ppm (parts per million) mole fractions.

[1]The zero response is the zero reading on the data logging system of the analyser when audit zero gas was introduced to the analysers under test.

[2]The calibration factor is the multiplying factor required to scale the reading on the data logging system of the analyser into reported concentration units (ppb for NO, NO_x, SO_2, O_3 and ppm for CO. Where 1 ppm = 1000 ppb). It should be used in conjunction with the zero response. A corrected concentration is calculated using the following equation:

Concentration = F (Output - Zero Response)

Where F = Calibration Factor provided on this certificate
Output = Reading on the data logging system of the analyser
Zero Response = Zero Response provided on this certificate

[3]Converter eff. is the measured efficiency of the NO_2 to NO converter within the oxides of nitrogen analyser under test.

[4]The measured main flow rate (where applicable) is the flow rate through the sensor unit of the TEOM particulate analyser under test. The measured aux flow rate (where applicable) is the flow rate through the bypass tubing of the TEOM particulate analyser under test. The measured total flow rate is the total flow rate through the particulate analyser under test. Units of flow are $l.min^{-1}$. Where flow rates are highlighted in bold, it indicates that measurements were not made at the analyser sample inlet. These measurements therefore may not accurately reflect analyser performance in normal operation.

FDMS analyser flow rate measurements are consistent with the TEOM's stated above.

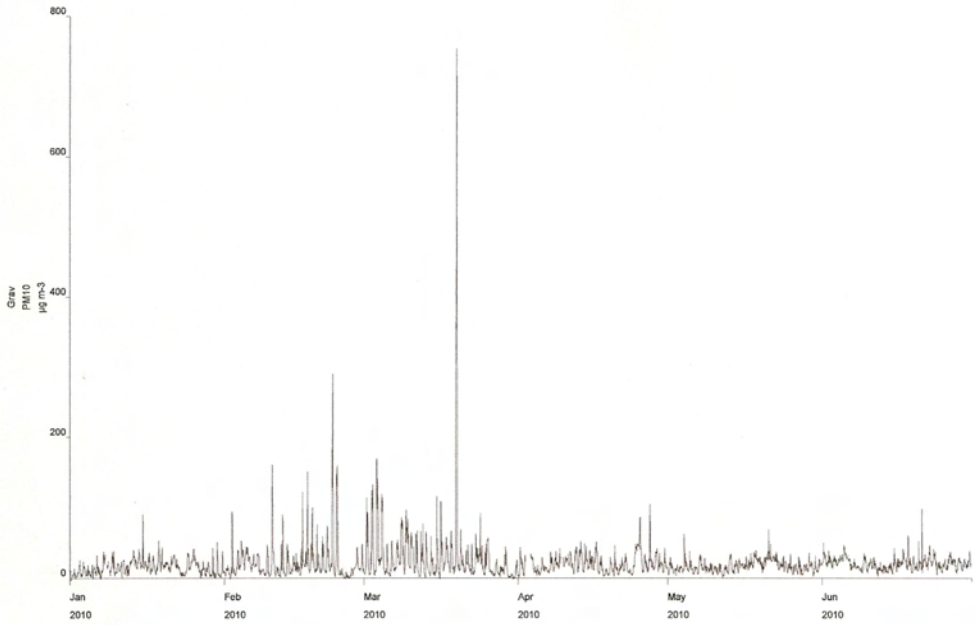
[5]The calculated k_0 value (TEOM analysers only) is the calculated k_0 spring constant based on tests undertaken with filters of known weight. The % deviation indicates the closeness of the calculated result to the manufacturer's specified k_0 value.

The calibration results shaded are those that fall within our scope of accreditation, all other results on this certificate are not UKAS accredited, but have been included for completeness.

Air Pollution Report

Produced by AEA on behalf of the Scottish Government

Angus Forfar Air Monitoring
Hourly Mean Data for 1st January to 30th June 2010



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AEA

Air Pollution Report

Produced by AEA on behalf of the Scottish Government

ANGUS FORFAR
1st January to 30th June 2010

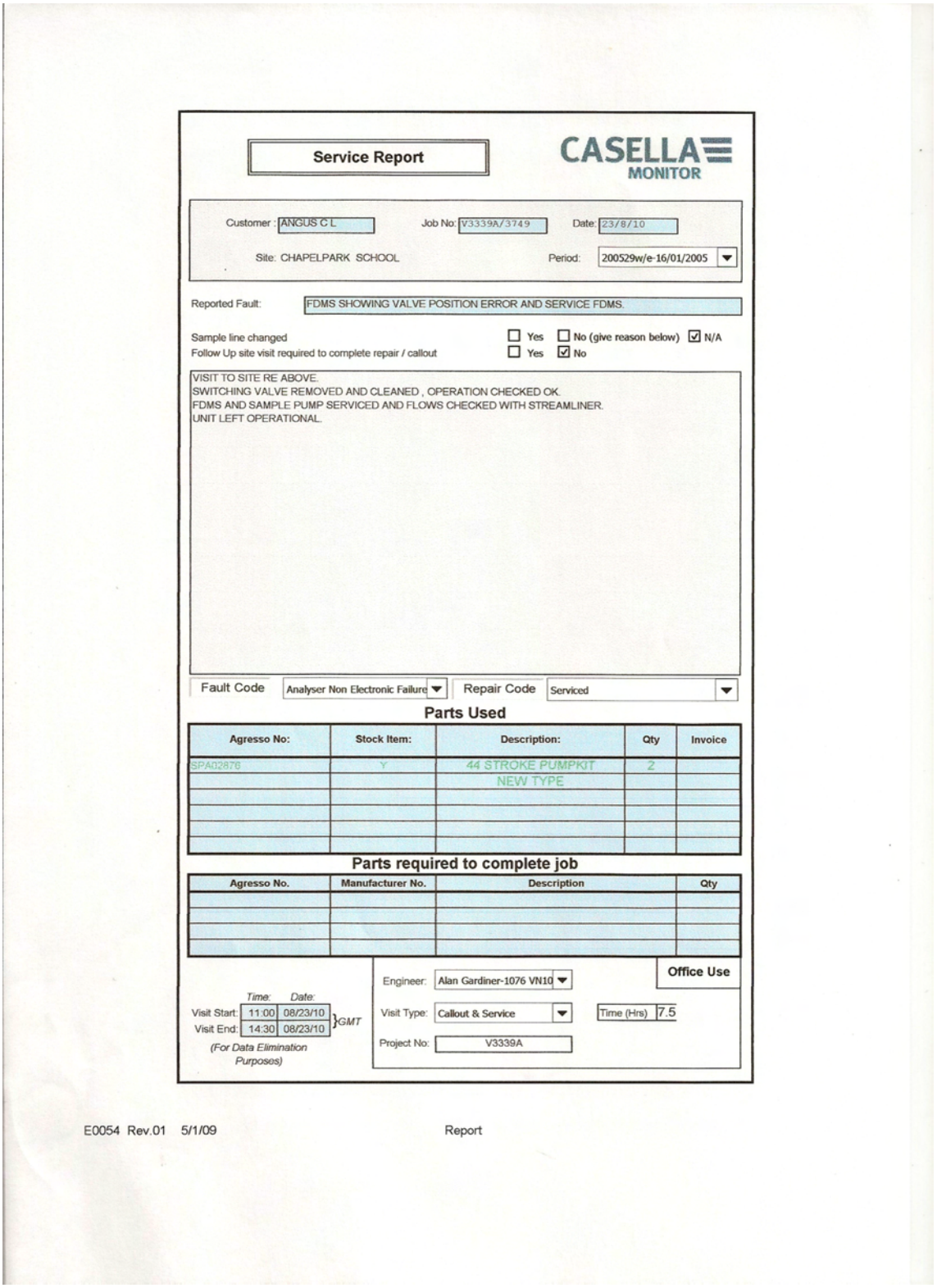
These data have been fully ratified by AEA

POLLUTANT	PM_{10}*+
Number Very High	0
Number High	22
Number Moderate	8
Number Low	4231
Maximum 15-minute mean	754 µg m^{-3}
Maximum hourly mean	754 µg m^{-3}
Maximum running 8-hour mean	321 µg m^{-3}
Maximum running 24-hour mean	120 µg m^{-3}
Maximum daily mean	118 µg m^{-3}
Average	21 µg m^{-3}
Data capture	98.3 %

+ PM_{10} instruments:
FDMS using a gravimetric factor of 1 from 1st January 2010
All mass units are at 20°C and 1013 mb

Pollutant	Air Quality Regulations (2000) and Air Quality (Scotland) Amendment Regulations 2002	Exceedences	Days
PM_{10} Particulate Matter (Gravimetric)	Daily mean > 50 µg m^{-3}	4	4

AEA



Service Report

CASELLA MONITOR

Customer : ANGUS C L Job No: V3339A/3749 Date: 23/8/10

Site: CHAPELPARK SCHOOL Period: 200529w/e-16/01/2005

Reported Fault: FDMS SHOWING VALVE POSITION ERROR AND SERVICE FDMS.

Sample line changed ☐ Yes ☐ No (give reason below) ☑ N/A

Follow Up site visit required to complete repair / callout ☐ Yes ☑ No

VISIT TO SITE RE ABOVE.
SWITCHING VALVE REMOVED AND CLEANED , OPERATION CHECKED OK.
FDMS AND SAMPLE PUMP SERVICED AND FLOWS CHECKED WITH STREAMLINER.
UNIT LEFT OPERATIONAL.

Fault Code: Analyser Non Electronic Failure Repair Code: Serviced

Parts Used

Agresso No:	Stock Item:	Description:	Qty	Invoice
SPA02878	Y	44 STROKE PUMPKIT NEW TYPE	2	

Parts required to complete job

Agresso No.	Manufacturer No.	Description	Qty

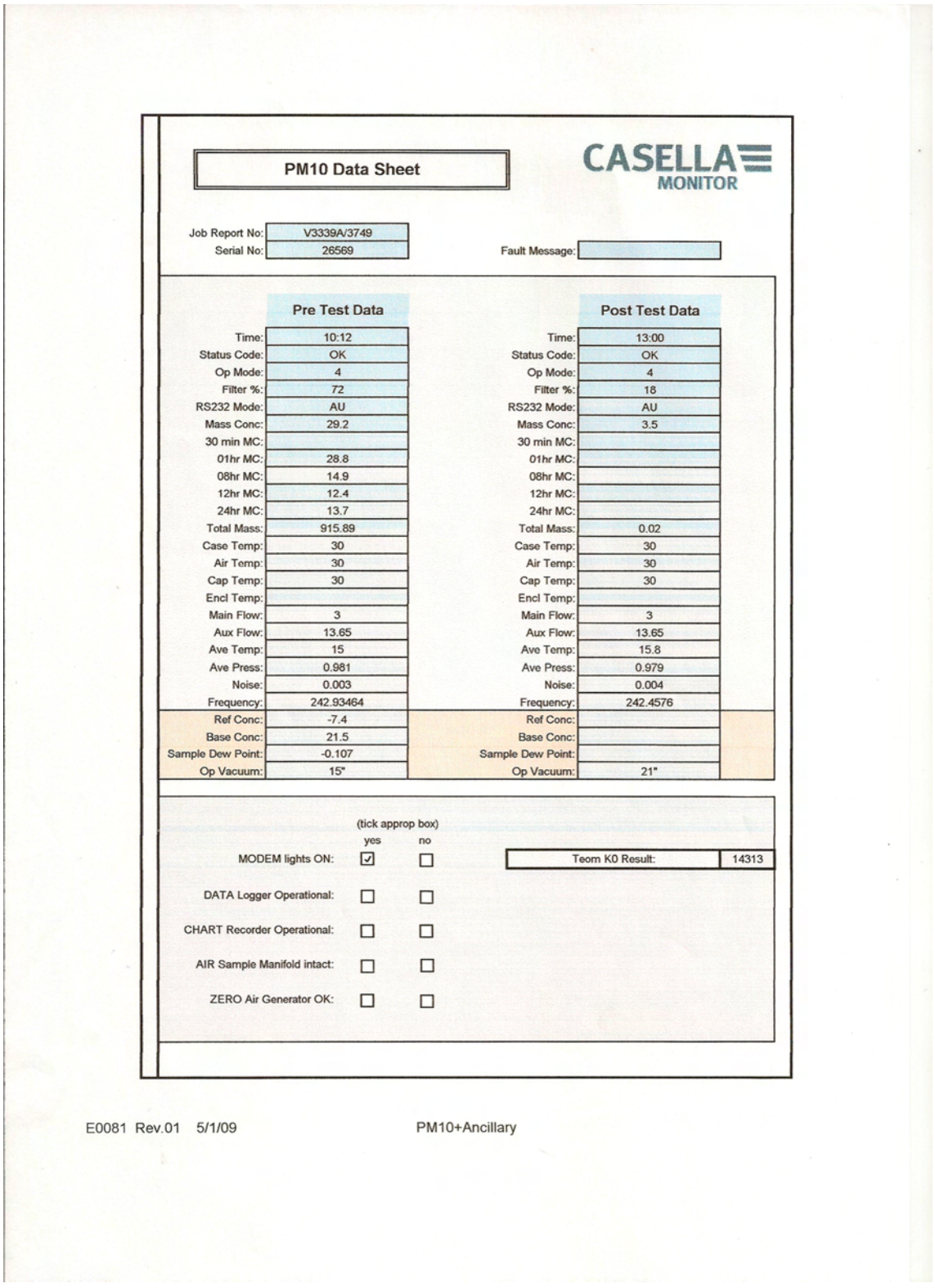
Time: Date:
Visit Start: 11:00 08/23/10 } GMT
Visit End: 14:30 08/23/10
(For Data Elimination Purposes)

Engineer: Alan Gardiner-1076 VN10 Office Use

Visit Type: Callout & Service Time (Hrs) 7.5

Project No: V3339A

E0054 Rev.01 5/1/09 Report



PM10 Data Sheet

CASELLA MONITOR

Job Report No:	V3339A/3749
Serial No:	26569
Fault Message:	

	Pre Test Data		Post Test Data
Time:	10:12	Time:	13:00
Status Code:	OK	Status Code:	OK
Op Mode:	4	Op Mode:	4
Filter %:	72	Filter %:	18
RS232 Mode:	AU	RS232 Mode:	AU
Mass Conc:	29.2	Mass Conc:	3.5
30 min MC:		30 min MC:	
01hr MC:	28.8	01hr MC:	
08hr MC:	14.9	08hr MC:	
12hr MC:	12.4	12hr MC:	
24hr MC:	13.7	24hr MC:	
Total Mass:	915.89	Total Mass:	0.02
Case Temp:	30	Case Temp:	30
Air Temp:	30	Air Temp:	30
Cap Temp:	30	Cap Temp:	30
Encl Temp:		Encl Temp:	
Main Flow:	3	Main Flow:	3
Aux Flow:	13.65	Aux Flow:	13.65
Ave Temp:	15	Ave Temp:	15.8
Ave Press:	0.981	Ave Press:	0.979
Noise:	0.003	Noise:	0.004
Frequency:	242.93464	Frequency:	242.4576
Ref Conc:	-7.4	Ref Conc:	
Base Conc:	21.5	Base Conc:	
Sample Dew Point:	-0.107	Sample Dew Point:	
Op Vacuum:	15"	Op Vacuum:	21"

	(tick approp box) yes	no
MODEM lights ON:	☑	☐
DATA Logger Operational:	☐	☐
CHART Recorder Operational:	☐	☐
AIR Sample Manifold intact:	☐	☐
ZERO Air Generator OK:	☐	☐

Teom K0 Result:	14313

E0081 Rev.01 5/1/09 PM10+Ancillary

Appendix C: Monitoring Data

Table C1 Raw Unadjusted Monthly NO_2 Diffusion Tube Results for 2010

Site Name	ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unadjusted Annual Mean
Ethie Terrace, Arbroath	A1	13	13	11	7	6	5	5	6	6	10	11	15	11
Inchcape Road, Arbroath	A2	18	18	14	9	7	7		15	8	12	17	19	17
Abbey Path, Arbroath	A3	28	21	25	19	14	18	17	20	19	24	22	27	24
22 Lordburn, Arbroath	A4	32	37	30	27	22	20	19	20	23	30	32	41	25
High St, Carnoustie	CAR	31	34	23		19	19	12	18	20	21	28	28	29
High St, Monifieth	M1	43	45	44	31	27	19	23	27	25	33	41	60	33
High St, Montrose	M2	40	40	36	30	30	23	23	26	20	37	37	40	28
High St, Brechin	B1	31	34	23		19	19	12	18	20	21	28	28	17
Sacone 1, Brechin	B2	18	14	11	9	7	6	5	6	8	12	15	19	11
Sacone2, Brechin	B3	17	16	12	8	7	7	5						18
High St, Forfar	FOR	31	29	24	20	17	16	12	15	16	24	31	26	19
Manse Cl, Kirriemiur	KIR	23	21	20	13	11	9	9	11	12	17	21	28	16

Figure 7 - Bias Adjusted Annual Mean Concentration of NO2 Across the Monitoring Network 2005-2010

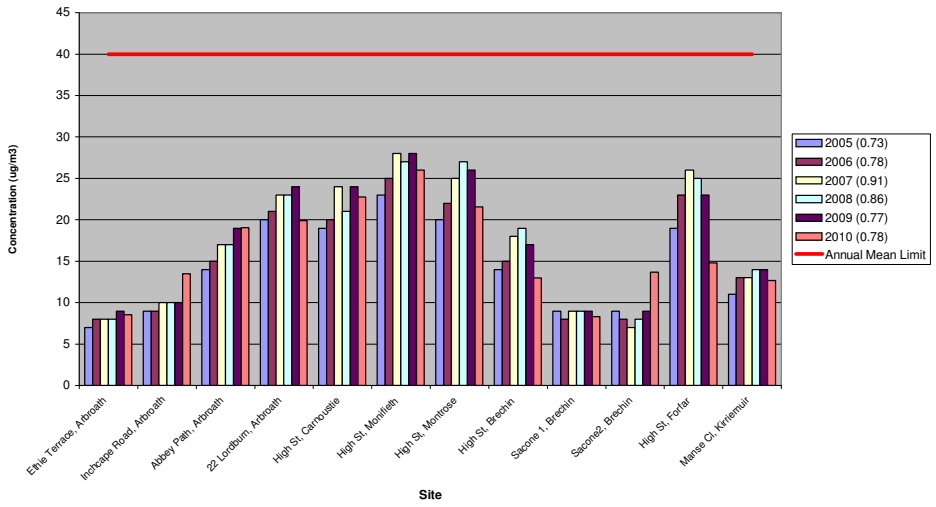


Figure 8 Daily Mean Concentration of PM10 (ug/m3) at Forfar Chapelpark Primary School, Forfar