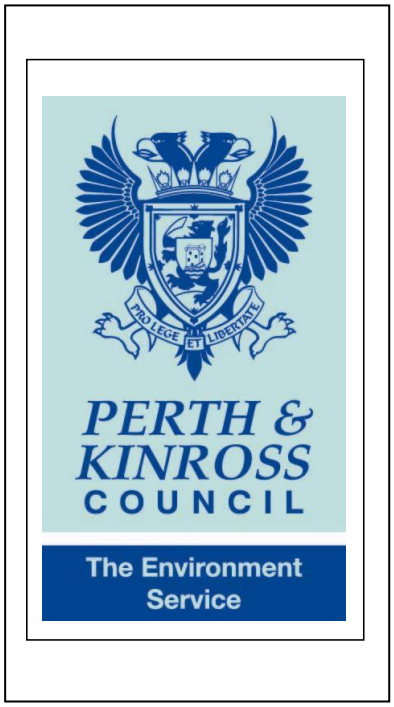

2012 Air Quality Updating and Screening Assessment for *Perth& Kinross Council*

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

April 2012

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Date	April 2012

Executive Summary

The report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environmental Act (1955), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedances are considered likely, the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives

Perth & Kinross Council declared the whole of Perth an AQMA in May 2006 after the Detailed Assessment in 2004 found that there would be areas of exceedances for NO_2 and PM_{10} where relevant exposure occurred. The 2007 Further Assessment confirmed the conclusions of the Detailed Assessment and recommended that Perth & Kinross Council retain their city wide Air Quality Management Area for NO_2 and PM_{10} and exceedances of these pollutants are due mainly to queuing and congested traffic specifically HDV traffic. The Progress Reports to date showed that all sites in Perth which are above or close to the objectives lie within the city centre or close to it on the main through routes and are within the existing AQMA, showing that there is a trend of a slight increase year on year at these sites.

This Updating and Screening Assessment considered monitoring data from 58 sites within Perth and Kinross and when assessing the bias corrected annual mean nitrogen dioxide concentrations against the national standard, there are exceedances at 15 sites, and 4 out with Perth (all in Crieff). The number of exceedances of the 1 hour standard was not exceeded at any of the 3 real time monitors however it came close in Atholl St with 17.

The annual mean PM_{10} standard was exceeded at both Perth real time monitors and the Crieff monitor and the 24 hour mean PM_{10} standard was breeched at Atholl St, however this was mostly down to one episode in February/March which was also part of a larger national episode.

Perth and Kinross Council has already commissioned a detailed assessment in Crieff due to exceedances in the diffusion tubes and the results of this will known in due course and a decision made as to whether declare an Air Quality Management Area or not. Perth and Kinross Council do not propose to proceed to a detailed assessment at Atholl St based on the daily mean $PM1_0$ standard being breeched as this is again considered to be episodic and declaring an AQMA for daily exceedances of PM_{10} offers little benefit when there is already an AQMA for PM_{10} annual average exceedance and an action plan in place, the measures of which will be of benefit to both the annual mean and daily PM_{10} standards.

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Appendices

1 Introduction

1.1 Description of Local Authority Area

The Perth and Kinross local authority area is made up of Perthshire and Kinrossshire, collectively the Perth and Kinross area was formerly known as Perthshire. Perth and Kinross is one of the 32 unitary council areas into which Scotland has been divided since 1996. Perth and Kinross is the 5th largest council area in Scotland, but is only the 14th largest in terms of population, reflecting its extensive rural and upland areas.

Important settlements in Perth and Kinross include Perth, Kinross, Auchterarder, Aberfeldy, Blairgowrie, Blair Atholl, Pitlochry, Coupar Angus and Crieff.

The 'Fair City 'Perth lays to the east, on the banks of the Tay, the largest river in Britain. Blairgowrie and East Perthshire have quiet glens, peaceful lochs and the mountains of Glenshee.

Known as the' big country', Perth & Kinross, is the gateway to the Highlands and home to around 147,000 people. The big country refers to not only its physical area, but to the diversity of towns and countryside. Perth & Kinross feature everything you associate with Scotland including lochs, mountains, forests and castles.

Perth and Kinross is bordered on its north by Highland and Aberdeenshire; on its east by Angus and the City of Dundee; and on its south by Fife, Clackmannanshire and Stirling.

It covers 5,406 sq km (includes fresh and tidal waters); land area is 5,311 sq km.

Perth is a hub for employment, commerce, leisure and tourism for the wider area of Perth and Kinross and this contributes to the traffic issues that arise within our designated, Air Quality Management Area.

The main and strategic roads within Perth & Kinross include the A90, A9, M90, A85, A827 and the two roads A93 and A94 which are the major road links associated with the proposed Cross-Tay Link Road (CTLR). Also four rail lines converge in the city of Perth.

1.2 Purpose of Report

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedances are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

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

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM in **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 micrograms per cubic metre $\mu g/m^3$ (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedances in each year that are permitted (where applicable).

Table 1.1 Air Quality Objectives included in Regulations for the purpose of LAQM in Scotland

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 $\mu g/m^3$	Running annual mean	31.12.2003
	3.25 $\mu g/m^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu g/m^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu g/m^3$	Annual mean	31.12.2004
	0.25 $\mu g/m^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu g/m^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu g/m^3$	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 $\mu g/m^3$, not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	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

Perth and Kinross Council has completed the following Review and Assessments of air quality to date:

- Stage 1 March 1999, Stage 1 (Revised)
- Stage 2 (September 2002)
- Upgrading and Screening Assessment (2003)
- Detailed Assessment (2004) NO_2 & PM_{10}
- Progress Report (2005)
- Air Quality Management Area Declared (May 2006) for NO_2 &PM_{10}
- Updating and Screening Assessment (2006)
- Progress Report (2007)
- Further Assessment (2007) NO_2 & PM_{10}
- Progress Report (2008)
- Updating and Screening Assessment (2009)
- Air Quality Action Plan adopted by council and approved by Scottish Government (2009)
- Progress Report (2010)
- Progress Report (2011)

The previous assessments of the air quality in Perth and Kinross concluded that there were likely exceedances of the annual mean objectives for NO_2 as a result of traffic sources in Perth. Projections also indicated likely exceedances of the annual mean objectives for PM_{10} in 2010.

Perth & Kinross Council declared the whole of Perth City centre an Air Quality Management Area (AQMA) for both pollutants in May 2006. Figure 1.4 shows the extent of the AQMA. The decision to designate the whole of Perth an AQMA was made to ensure that areas that are close to, but do not at present exceed, the

objectives are covered and also it allows the Action Plan to take in a wider area, thus avoiding moving problems to other parts of the city, while dealing with the areas which are exceeding the objectives. It also helped to ensure that the Air Quality Action Plan (AQAP) would be integrated with other council policies.

Perth & Kinross Council has taken account of the effect of the proposed Air Quality Action Plan on greenhouse gas emissions in accordance with Scottish Government guidance. To inform this process, AEA Energy & Environment was commissioned to undertake a study in terms of the effect of the Air Quality Action Plan on greenhouse gas emissions (GHG) for the whole of the Perth & Kinross Council area, rather than just the AQMA, this assessment was completed in May 2007.

The 2007 Progress Report, using 2006 data, concluded that nitrogen dioxide concentrations at 17 sites were breaching the 2005 annual mean objective of 40ug/m^3, and at 8 sites were between 35 – 39 ug/m^3, all close to Perth city centre, and levels of PM_{10} at both High Street and Atholl Street monitoring sites appear to be increasing by a small margin year on year.

The 2008 further assessment confirmed the conclusions of the 2007 detailed assessment and to test the city centre traffic management (CCTMR) scenarios to assess the likely impact they may have on pollutant concentrations. The report included an assessment of source apportionment and identified emissions from heavy duty vehicle and congested traffic as the main local contributors to elevated levels of nitrogen dioxide and PM_{10} in Perth.

The 2008 Progress Report, using 2007 data, concluded that nitrogen dioxide concentrations at 19 sites in Perth are above the annual mean objective of 40ug/m^3 and 4 are between 35-40ug/m^3. Also in Crieff, 1 site is now above 40ug/m^3 and 2 sites are between 35 – 40 ug/m^3. As the sites which are exceeding the standard are kerbside and not representative of exposure for the annual standard and the façade level tubes are below 40 ug/m^3, it was decided not to proceed to a Detailed Assessment this year, but instead to undertake automatic monitoring in Crieff.

Draft Air Quality Action Plan, Strategic Environmental Assessment Environmental Report (2008), Climate Change Implication of the Draft Air Quality Action Plan (2008) and the Further Assessment (2008) all went out for consultation June (2008).

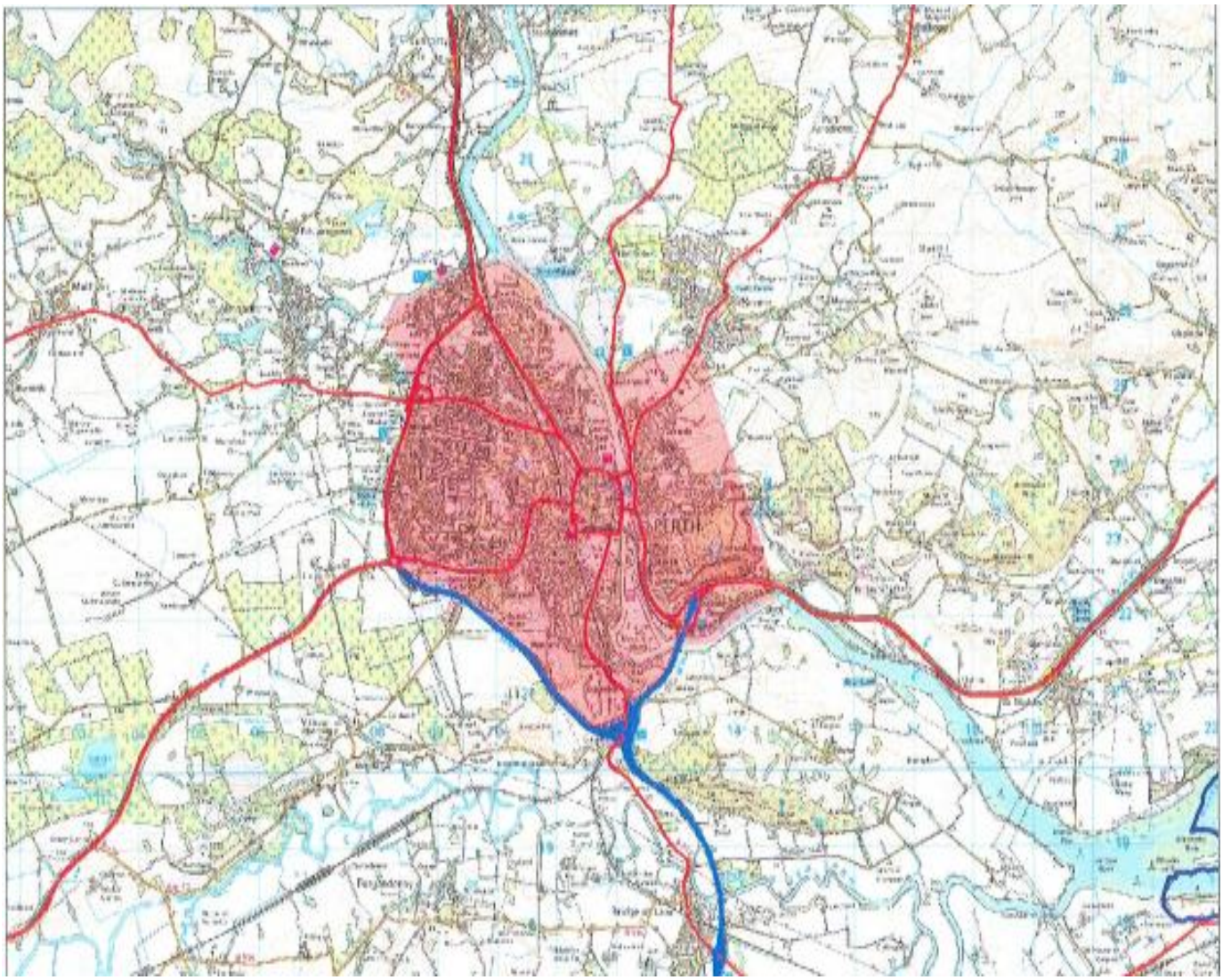
The 2009 Updating and Screening Assessment, using 2008 data, concluded that nitrogen dioxide concentrations at 23 sites within Perth's AQMA are above the annual mean objective of 40ug/m^3 and two sites in Crieff out with Perth's AQMA. Two additional monitoring sites at the façade of buildings were introduced at Crieff.

Perth & Kinross Council's Air Quality Action Plan was approved by The Scottish Government and Adopted as Council Policy in August 2009.

The 2010 progress report showed exceedances at 16 sites within the AQMA and a reduction at both High St and Atholl St real time monitors of 27 to 25 $\mu g/m^3$ and 60 to 56 $\mu g/m^3$. There was one site out with the AQMA (7 West High St Crieff) above the objective. This is a road side site with the corresponding façade level tubes being slightly below the objective.

The 2011 progress report recorded exceedances at 20 diffusion tube sites within the Perth AQMA and 3 outside (all in Crieff). The Atholl St real time monitor remained at an annual average of 56ugm^{-3}, whilst the High St Monitor saw an increase to 30ugm^{-3}.

Figure 1.1 Map of AQMA Boundaries



2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Figure 2.1a Map of Automatic Monitoring Site Crieff

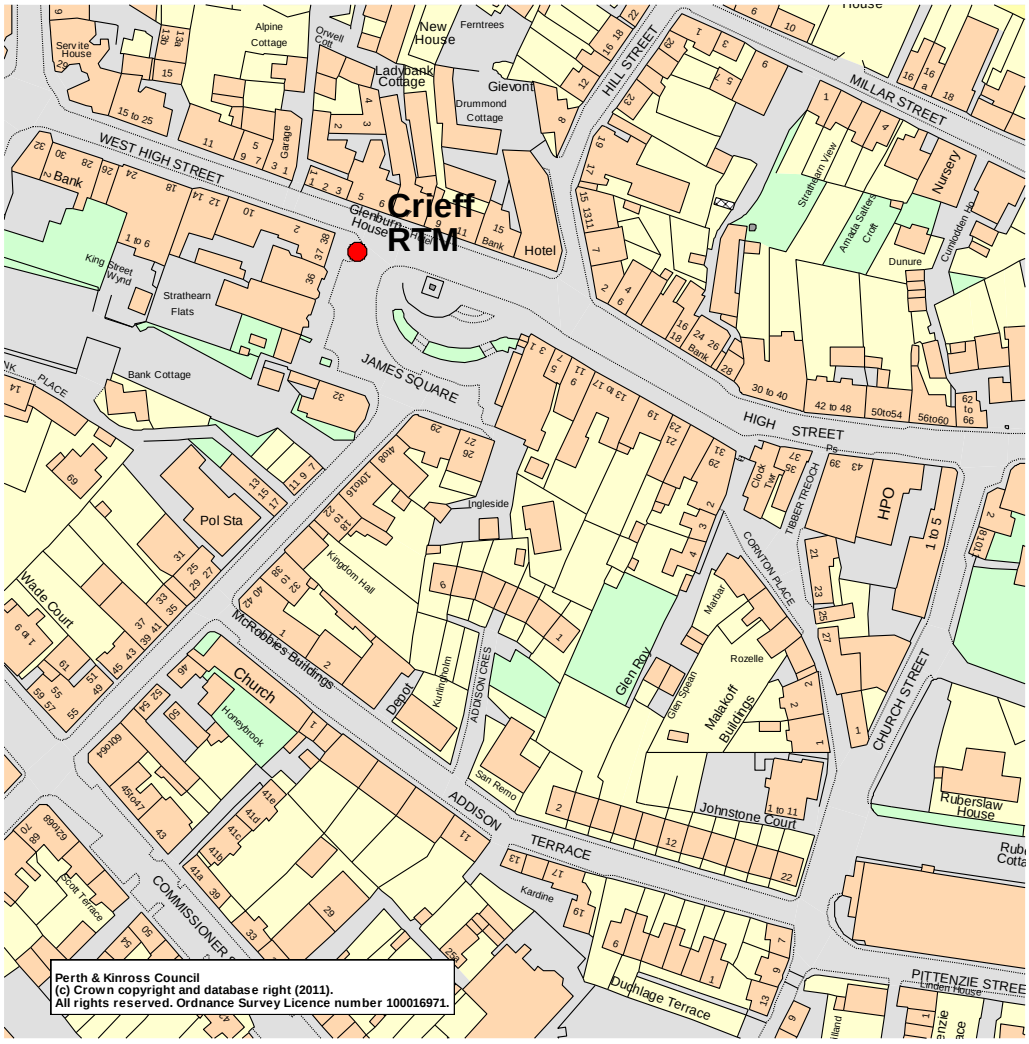


Figure 2.1b Map of Automatic Monitoring Perth

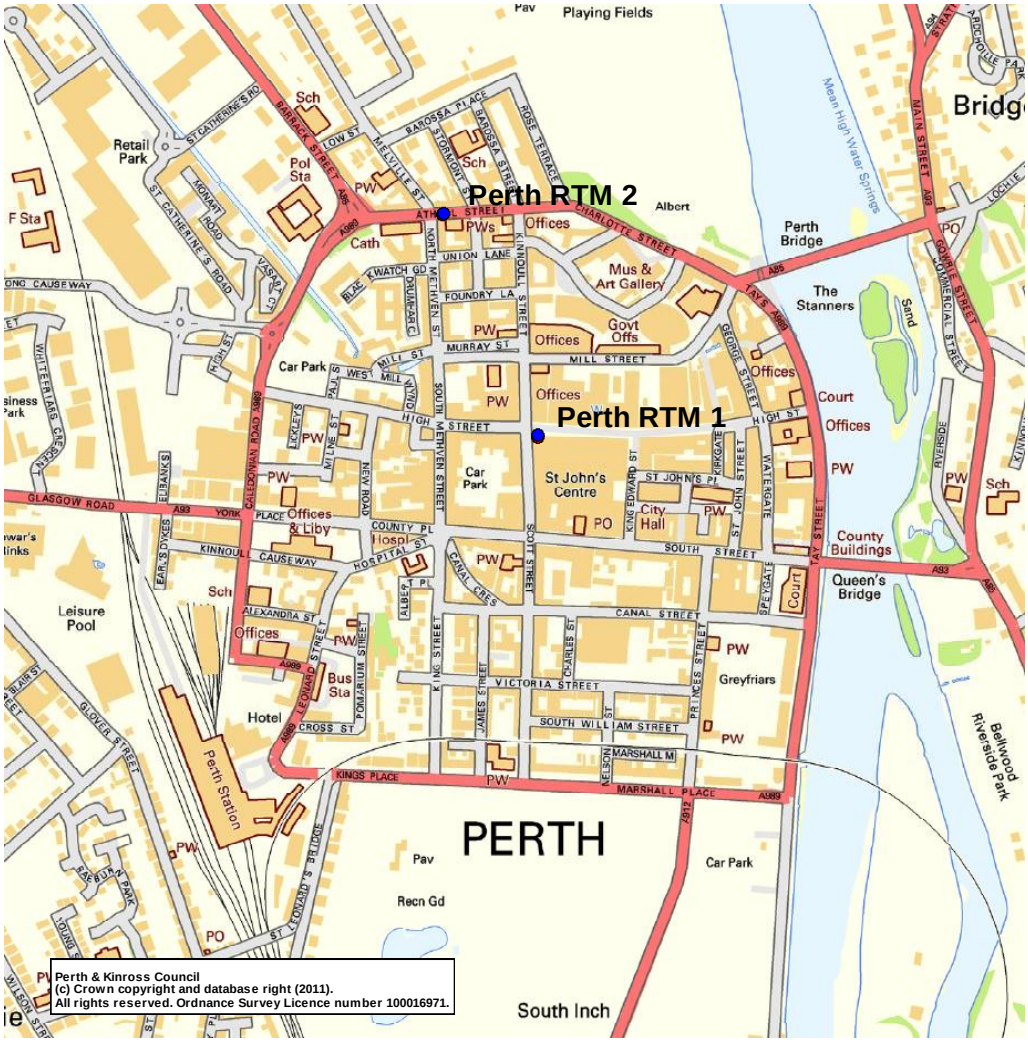


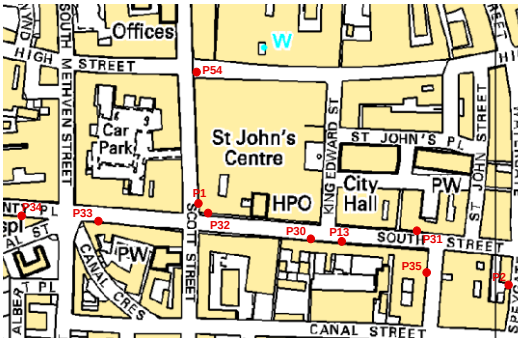
Table 2.1 Details of Automatic Monitoring Sites

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?
Perth 1-High Street	Roadside	311680	723624	NO_2 & PM_{10}	AP1 M200A chemiluminescent analyser for Oxides of Nitrogen & R&P TEOM analyser for PM_{10}	Y	Y (20.4m)	4.8m	Y
Perth 2- Atholl Street	Roadside	311575	723917	NO_2 & PM_{10}	AP1 M200A chemiluminescent analyser for Oxides of Nitrogen & R&P TEOM analyser for PM_{10}	Y	Y (22.3m)	2.3m	Y
Crieff- St James Sq	Roadside	286363	721614	NO_2 & PM_{10}	AP1 M200A chemiluminescent analyser for Oxides of Nitrogen & R&P TEOM analyser for PM_{10}	N	Y 19.5m)	5.3m	N

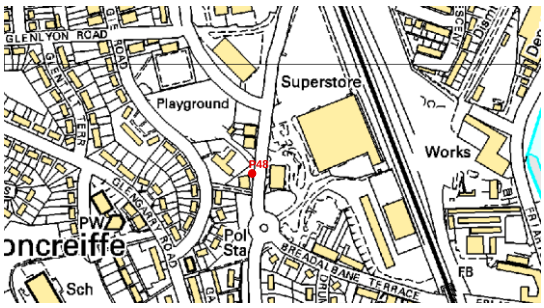
2.1.2 Non-Automatic Monitoring Sites

Figure 2.2a Maps of Non-Automatic Monitoring Sites Diffusion tube locations within AQMA

Atholl Street Area

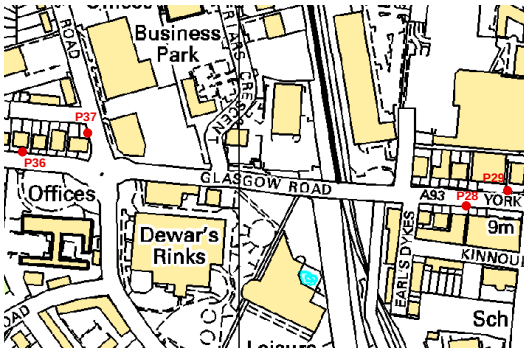


High Street Area

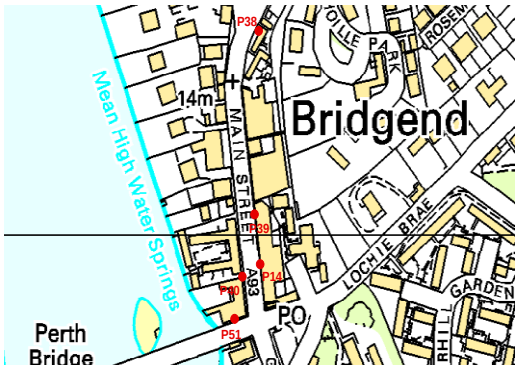


Edinburgh Road Area

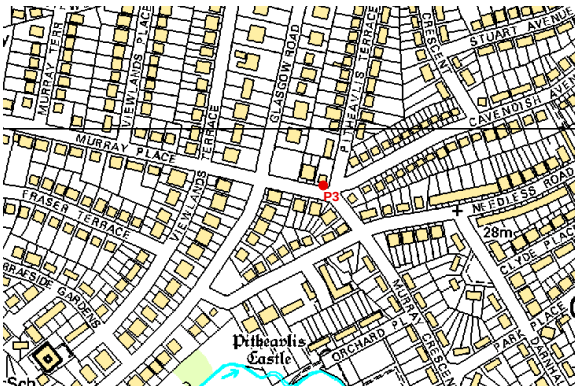
Lower Muirton Area



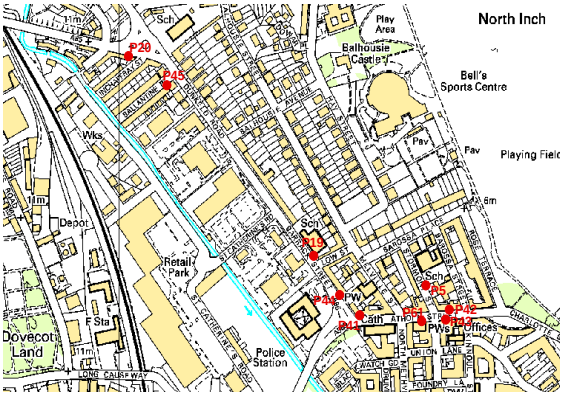
Glasgow Rd Area



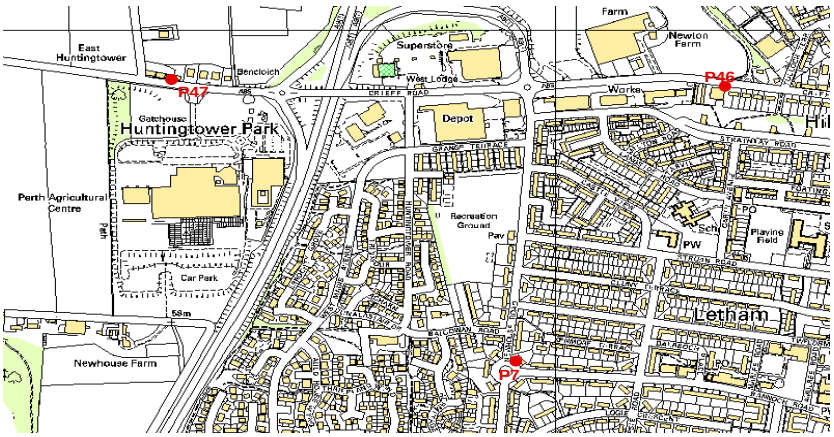
Bridgend



Murray Crescent



North Centre Perth

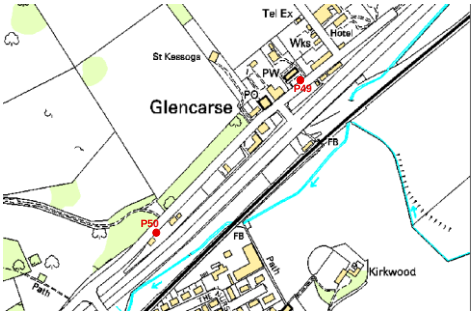


NW Perth Area

Non-Automatic Monitoring Sites

Figure 2.2b Maps of Non – automatic Monitoring Site Diffusion tube locations out with AQMA

Aberfeldy



Glencarse

Crieff

Table 2.2 Details of Non-Automatic Monitoring Sites

	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?
42 Scott St, Perth, PH1 5PH	R	NO117235	NO2	Y	Y(3)	2.5	Y
17 Speygate, Perth, PH2 8PJ	UC	NO120234	NO2	Y	Y(2.9)	2.05	Y
15 Murray Crescent, Perth, PH2 0HU	UB	NO105228	NO2	Y	Y(2.9)	2.05	N
8 Stormont Street, Perth, PH1 5NW	UC	NO116239	NO2	Y	Y(10)	1.7	Y
41 Mull Place, Perth, PH1 3DP	UB	NO105257	NO2	Y	Y(6)	1.7	N
257 Rannoch Rd/ Newhouse Rd Roundabout,Perth,PH1 2DW	UC	NO089244	NO2	Y	Y(8.3)	2.1	Y
86/88 South Street, Perth,PH2 8PD	R	NO118234	NO2	Y	Y(1)	2.6	Y
9 Main Street, Bridgend, Perth, PH2 7HD	R	NO122239	NO2	Y	Y(1)	2.3	Y
St Ninian's School, Dunkeld Rd, Perth,PH1 5RF	R	NO113241	NO2	Y	Y(3.4)	3.2	Y
2 Crieff Road, Perth, PH1 5RT	R	NO110243	NO2	Y	Y(1)	1.9	Y
28 York Place, Perth, PH2 8EH	R	NO111234	NO2	Y	Y(12)	2.4	Y
37 York Place, Perth, PH2 8EH	R	NO112235	NO2	Y	Y(8)	4.1	Y
104 South Street, Perth, PH2 8PA	R	NO117234	NO2	Y	Y(1)	2.4	Y
45-47 South Street, Perth, PH2 8PD	R	NO119234	NO2	Y	Y(5)	3.5	Y

135 South Street, Perth, PH2 8PA	R	NO117234	NO2	Y	Y(23)	4.6	Y
216 South Street, Perth, PH2 8NY	R	NO116234	NO2	Y	Y(5)	2.5	Y
10 County Place, Perth,PH2 8EE	R	NO115234	NO2	Y	Y(2)	3	Y
17 Princes Street, Perth, PH2 8NG	R	NO119234	NO2	Y	Y(1.5)	1.8	Y
51 Glasgow Road, Perth, PH2 0PE	R	NO107235	NO2	Y	Y(7.2)	2.6	Y
Riggs Road, Perth, PH1 1PR	R	NO108236	NO2	Y	Y(10)	1.9	Y
93-109 Main Street, Bridgend, Perth, PH2 7HE	R	NO122241	NO2	Y	Y(1)	7	Y
39 Main Street, Bridgend, Perth, PH2 7HD	R	NO122240	NO2	Y	Y(7)	2.1	Y
18 Main Street, Bridgend, Perth, PH2 7HB	R	NO122239	NO2	Y	Y(18)	2.4	Y
76 Atholl Street, Perth, PH1 5NL	R	NO114239	NO2	Y	Y(1)	2.5	Y
26-28 Atholl Street, Perth, PH1 6NP	K	NO116239	NO2	Y	Y(2)	0.3	Y
17 Atholl Street, Perth, PH1 5NH	R	NO116239	NO2	Y	Y(2)	3	Y
22 Barrack Street, Perth, PH1 5RD	K	NO114239	NO2	Y	Y(2.7)	0.3	Y
Ballantine Place, Perth, PH1 5RD	UC	N0110243	NO2	Y	Y(4)	1.7	Y
204 A Crieff Road, Perth, PH1 2PE	R	N0093248	NO2	Y	Y(11.5)	2	Y

East Huntingtower, Perth, PH1 3JJ	R	NO083248	NO2	Y	Y(5.5)	1.8	Y
30 Edinburgh Road, Perth, PH2 8BX	R	NO083248	NO2	Y	N(37)	2.5	Y
2 West Bridge Street, Perth, PH2 7HA	R	NO122239	NO2	Y	Y12.5)	3.7	Y
Real Time Monitor adjacent to 176 High Street, Perth,PH1 5EW	R	NO115239	NO2	Y	Y(20.4)	4.8	Y
Real Time Monitor, Atholl Street, Perth,PH1 5NH	R	NO117235	NO2	Y	Y(22.3)	2.3	Y
84 Dundee Road, Perth, PH2 7BA	R	NO125229	NO2	Y	Y(1)	1.7	Y
30 Dundee Road, Perth, PH2 7AQ	R	NO124232	NO2	Y	Y(1.3)	1.4	Y
The Lodge, Isla Road Bridgend PH2 7HG	R	NO122241	NO2	Y	Y(1)	1.4	Y
5-7 Charlotte Street, Perth, PH1 5LW	R	NO119238	NO2	Y	Y(3.3)	2	Y
1 Atholl Street, Perth, PH1 5NH	R	NO116239	NO2	Y	Y(1)	2.3	Y
2 Atholl Street, Perth, PH1 5NP	R	NO116239	NO2	Y	Y(2.5)	0.8	Y
United Free Church of Scotland, Kinnoull Street Perth PH1 5EZ	R	NO116239	NO2	Y	Y(3)	2.6	Y
Leith Buildings, 28 Dunkeld Road, Perth, PH1 5AJ	R	NO110244	NO2	Y	Y(5.1)	2.1	Y
134-140 Dunkeld Road Perth PH1 5AS	R	NO106249	NO2	Y	Y(7.8)	1.5	Y
82 Crieff Road, Perth PH1 2RP	R	NO103240	NO2	Y	Y(1)	2.4	Y

Opp Wood'n Garden, Glencarse, PH2 7XL	R	NO173235	NO2	N	Y(2.8)	2.8	Y
Linden Garden Centre, Glencarse, PH2 7LX	R	NO173235	NO2	N	Y(6)	2.1	Y
7 West High Street, Crieff PH7 3AF	UC	NN866215	NO2	N	Y(10)	0.4	N
39, High Street, Crieff PH7 3HT	UC	NN865215	NO2	N	Y(18)	1.2	N
The Highland Trading Company, 62, High Street, Crieff PH7 3BS	UC	NN865215	NO2	N	Y(1)	1	Y
9 East High Street, Crieff PH7 3AF	UC	NN866215	NO2	N	Y(5)	0.3	Y
12 Dunkeld Street, Aberfeldy PH15 2DA	UC	NN857491	NO2	N	Y(1)	2.3	Y
Highland Gift Shop, Bridgend, Aberfeldy PH15 2DF	UC	NN856490	NO2	N	Y(1.5)	2.3	Y
19 West High Street Crieff, PH7 4AU	UC	NN8629921649	NO2	N	Y(0)	2.5	Y
43 High Street Crieff, PH7 3HT	UC	NN8666721571	NO2	N	Y(0)	1.4	Y

2.2 Comparison of Monitoring Results with AQ Objectives

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

Table 2.3 Results of Automatic Monitoring of Nitrogen Dioxide: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring %[a]	Valid Data Capture 2011 % [b]	Annual Mean Concentration μg/m^3				
					2007*[c]	2008* [c]	2009* [c]	2010* [c]	2011 [c]
Perth 1	Roadside	Yes		94	29	27	25	30	27
Perth 2	Roadside	Yes		98	60	60	56	56	57
Crieff	Roadside	No		95				30	34

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)

[c] Means should be “annualised” as in Box 3.2 of TG(09), if monitoring was not carried out for the full year.

*Annual mean concentrations for previous years are optional.

Figure 2.3 Trends in Annual Mean Nitrogen Dioxide Concentrations measures at Automatic Monitoring Sites

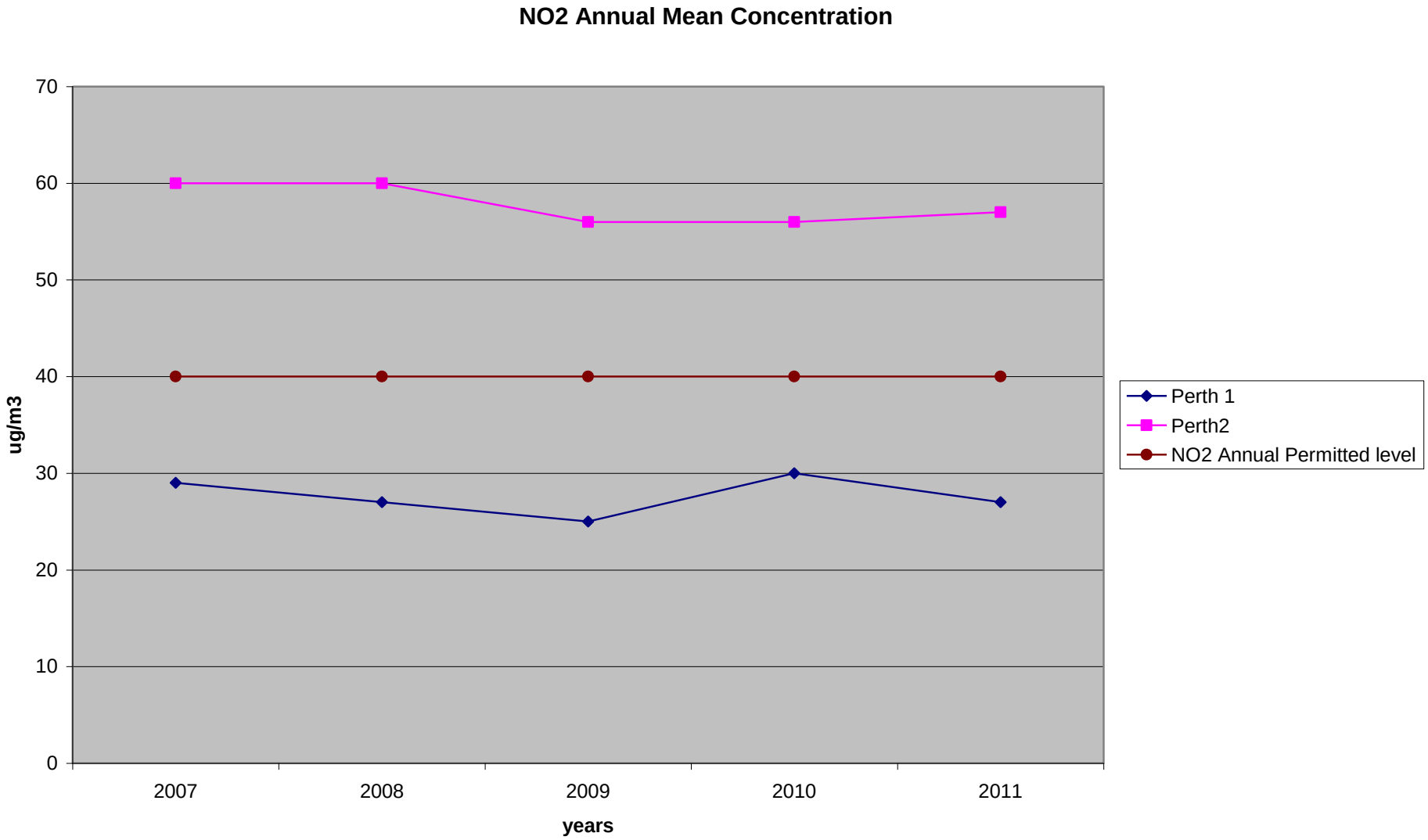


Table 2.4 Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring %[a]	Valid Data Capture 2011 % [b]	Number of Exceedances of Hourly Mean (200 μg/m^3)				
					2007*[c]	2008* [c]	2009* [c]	2010* [c]	2011 [c]
Perth1	Roadside	Yes		94	0	1	0	0	2
Perth 2	Roadside	Yes		98	0	25	3	10	17
Crieff	Roadside	NO		95					0

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)

[c] If the period of valid data is less than 90%, include the 99.8th percentile of hourly means in brackets

*Number of exceedances for previous years is optional.

Diffusion Tube Monitoring Data

Table 2.5a Results of Nitrogen Dioxide Diffusion Tubes in 2011 Perth

Site ID	Location	Site Type	Within AQMA ?	Triplicate or Collocated Tube	Data Capture 2011 (Number of Months or %)	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.92) 2011 ($\mu g/m^3$)
P1	42 Scott St	R	Y	Triplicate	100	N/A	N	**41**
P2	17 Speygate	UC	Y	N/A	100	N/A	N	23
P3	15 Murray Cr	UB	Y	Duplicate	100	N/A	N	20
P5	8 Stormont St	UC	Y	Duplicate	100	N/A	N	23
P6	41 Mull Pl	UB	Y	N/A	100	N/A	N	14
P7	257 Rannoch Rd	UC	Y	N/A	100	N/A	N	19
P13	86 South St	R	Y	Duplicate	100	N/A	N	37
P19	Dunkeld Rd	R	Y	N/A	92	N/A	N	34
P20	2 Crieff Rd	R	Y	N/A	100	N/A	N	29
P28	28 York Place	R	Y	N/A	100	N/A	N	**45**
P29	37 York Place	R	Y	N/A	100	N/A	N	39
P30	104 South St	R	Y	Triplicate	100	N/A	N	**41**

Site ID	Location	Site Type	Within AQMA ?	Triplicate or Collocated Tube	Data Capture 2011 (Number of Months or %)	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.92) 2011 (μg/m^3)
P31	45-47 South St	R	Y	N/A	92	N/A	N	30
P32	135 South St	R	Y	N/A	100	N/A	N	37
P33	216 South St	R	Y	N/A	100	N/A	N	**40**
P34	10 County Pl	R	Y	Duplicate	92	N/A	N	**52**
P35	17 Princes St	R	Y	N/A	100	N/A	N	29
P36	51 Glasgow Rd	R	Y	N/A	100	N/A	N	35
P37	Riggs Rd	R	Y	N/A	100	N/A	N	29
P38	93 Main St Bridgend	R	Y	N/A	100	N/A	N	31
P39	39 Main St Bridgend	R	Y	Duplicate	100	N/A	N	**48**
P40	18 Main St Bridgend	R	Y	Duplicate	100	N/A	N	**48**
P41	76 Atholl St	R	Y	Duplicate	83	N/A	N	**50**
P42	26-28 Atholl St	K	Y	N/A	100	N/A	N	**49**
P43	17 Atholl St	R	Y	Triplicate	100	N/A	N	**53**
P44	22 Barrack St	K	Y	Duplicate	96	N/A	N	**44**
P45	Ballantine Pl	UC	Y	N/A	100	N/A	N	24

Site ID	Location	Site Type	Within AQMA ?	Triplicate or Collocated Tube	Data Capture 2011 (Number of Months or %)	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.92) 2011 (μg/m^3)
P46	204 Crieff Rd	R	Y	N/A	100	N/A	N	31
P47	5 East Huntingtower	R	N	N/A	100	N/A	N	28
P48	30 Edinburgh Rd	R	Y	N/A	100	N/A	N	26
P51	2 West Bridge St	R	Y	N/A	100	N/A	N	30
P54	176 High St RTM	UC	Y	Collocated	100	N/A	N	27
P61	Atholl St RTM	R	Y	Collocated	100	N/A	N	**57**
P62	84 Dundee Rd	R	Y	N/A	100	N/A	N	34
P63	30 Dundee Rd	R	Y	N/A	100	N/A	N	37
P64	Isla Rd	R	Y	N/A	100	N/A	N	**49**
P65	5 Charlotte St	R	Y	N/A	100	N/A	N	31
P67	1 Atholl St	R	Y	N/A	100	N/A	N	**40**
P68	2 Atholl St	R	Y	N/A	100	N/A	N	33
P69	Church Kinnoull St	R	Y	N/A	100	N/A	N	36
P70	28 Dunkeld Rd	R	Y	N/A	100	N/A	N	30
P71	134 Dunkeld Rd	R	Y	N/A	100	N/A	N	18

Site ID	Location	Site Type	Within AQMA ?	Triplicate or Collocated Tube	Data Capture 2011 (Number of Months or %)	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.92)
								2011 (μg/m^3)
P72	82 Crieff Rd	R	Y	N/A	100	N/A	N	38
P79	17 Main St Bridgend	R	Y	N/A	66	Y	N	**46**

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)

[c] Means should be "annualised" as in Box 3.2 of TG(09), if monitoring was not carried out for the full year.

*Annual mean concentrations for previous years are optional.

Table 2.5b Results of Nitrogen Dioxide Diffusion Tubes in 2011 Out with Perth

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2011 (Number of Months or %)	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.92) 2011 ($\mu g/m^3$)
P49	Glencarse 1	R	N	N/A	100	N/A	N	23
P50	Glencarse 2	R	N	N/A	100	N/A	N	23
P55	7 West High St Crieff	R	N	N/A	100	N/A	N	**50**
P56	39 High St Crieff	R	N	Duplicate	92	N/A	N	39
P57	62 High St Crieff	R	N	N/A	100	N/A	N	31
P58	9 East High St Crieff	R	N	N/A	100	N/A	N	**41**
P59	12 Dunkeld St Aberfeldy	R	N	N/A	100	N/A	N	29
P60	Bridgend Aberfeldy	R	N	Duplicate	100	N/A	N	21
P73	19 West High St Crieff	R	N	N/A	83	N/A	N	**41**
P74	43 High St Crieff	R	N	N/A	100	N/A	N	35
P75	Crieff RTM	R	N	Collocated	100	N/A	N	26
P76	10 West High St Crieff	R	N	N/A	58	Y	N	**47**
P77	9 Comrie St Crieff	R	N	N/A	66	Y	N	25
P78	1 Lodge St Crieff	R	N	N/A	66	Y	N	30

2.2.2 PM_{10}

Table 2.6 Results of Automatic Monitoring of PM_{10}: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %[a]	Valid Data Capture 2011 %[b]	Confirm Gravimetric Equivalent (Y or NA)	Annual Mean Concentration μg/m^3				
						2007*[c]	2008* [c]	2009* [c]	2010* [c]	2011 [c]
Perth1	Roadside	Y		99		20	20	16	19	19
Perth2	Roadside	Y		99		27	26	21	24	25
Crieff	Roadside	No		92					17	19

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)

[c] Means should be “annualised” as in Box 3.2 of TG(09), if monitoring was not carried out for the full year.

Table 2.7 Results of Automatic Monitoring for PM_{10}: Comparison with 24-hour mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %[a]	Valid Data Capture 2011 %[b]	Confirm Gravimetric Equivalent	Number of Exceedances of 24-Hour Mean (50 μg/m^3)				
						2007*	2008*	2009*	2010*	2011
Perth1	Roadside	Y		99		5	0	2	3	3
Perth2	Roadside	Y		99		6	5	3	12	17
Crieff	Roadside	N		92						0

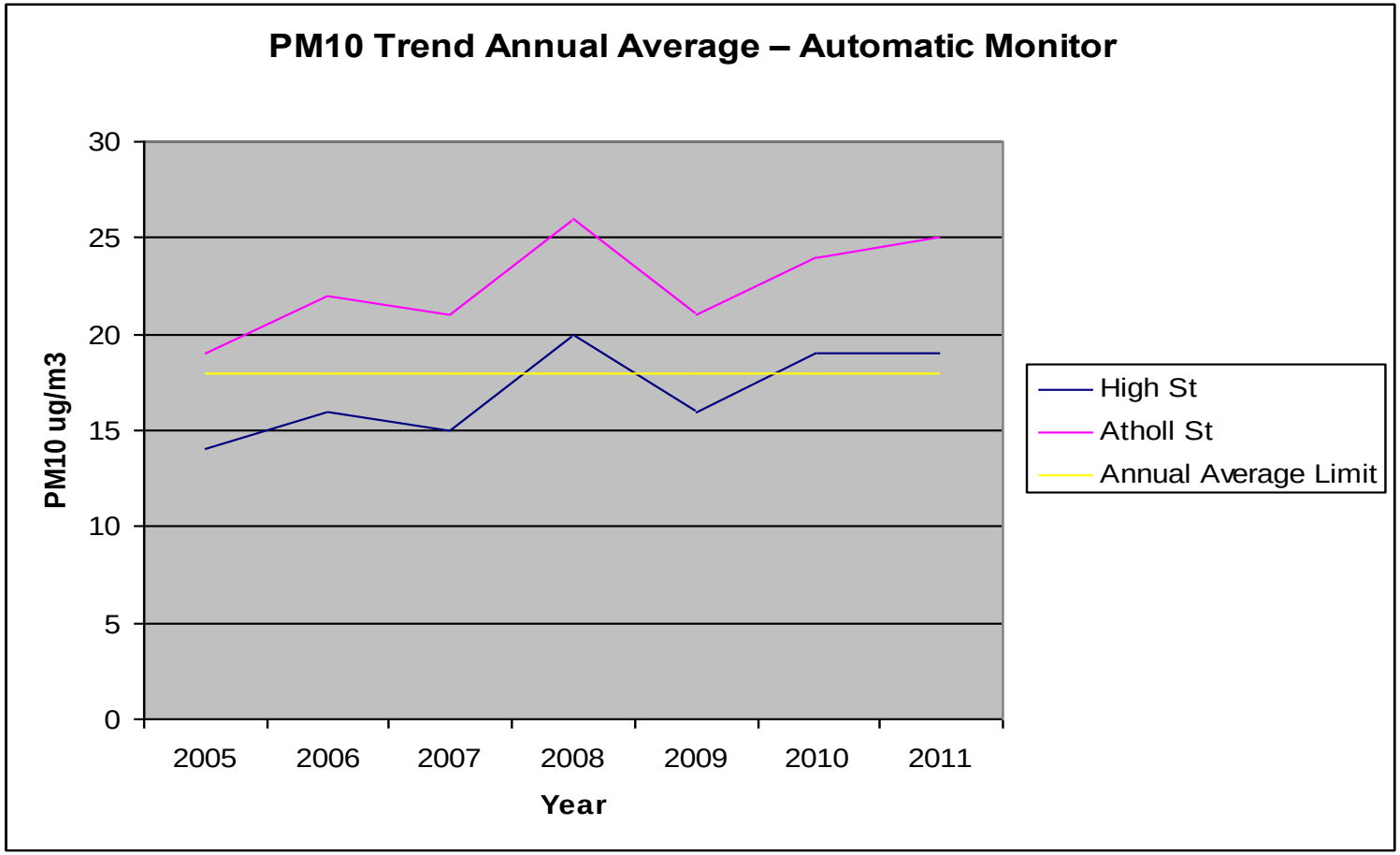
[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)

[c] if data capture is less than 90%, include the 90th percentile of 24-hour means in brackets

* Optional

Figure 2.5 Trends in Annual Mean PM_{10} Concentrations



2.2.3 Sulphur Dioxide

No monitoring is done for this pollutant.

2.2.4 Benzene

This pollutant is not monitored

2.2.5 Other pollutants monitored

No other pollutants are measured

2.2.6 Summary of Compliance with AQS Objectives

Exceedances of the annual average NO_2 standard have been detected by diffusion tube monitoring and last year the real time monitor located at James Square showed an exceedance of the annual average PM_{10} standard. A detailed assessment has been commissioned by Perth and Kinross Council the results of which should be known in a few weeks.

Perth and Kinross Council has measured concentrations of nitrogen dioxide above the annual mean at relevant locations outside of the AQMA, and **will need to proceed to a Detailed Assessment**, for High Street Crieff

3 Road Traffic Sources

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

A number of new locations were considered under this category, in line with advice in TG.09. Based on local knowledge, 5 minute traffic counts were taken at a number of outlying towns to estimate whether there could be a traffic flow greater than 5000 vehicles a day, the results of which were presented below. In some cases this has resulted in diffusion tubes being installed and in this case they have been erected during the April changeover.

Kinross

A five minute count was taken on Monday 12th of March at 11.45 am on the High St which resulted in 38 vehicles going past, which is just above the 35 stated in TG.09 as being indicative of a 5000 vehicles per day flow which could potentially lead to an exceedance on the NO_2 annual mean standard. Kinross High St is very narrow in points with sensitive receptors close to the road; therefore it has been decided to install 2 diffusion tubes to allow an informed decision on whether to proceed to a detailed assessment.

Dunkeld

Two 5 minute counts were conducted on Atholl Street Dunkeld on Tuesday 13th March at around 11.00 am, one at the south end, one at the north. These counts gave flows of 36 and 28 vehicles in five minutes respectively. This is a very narrow congested street which attracts a lot of tourist traffic in the summer, so it was decided to install another 2 diffusion tubes to better characterise the air quality here.

Auchterarder

Auchterarder High Street is comparatively long and not as narrow as the others, however the three 5 minute traffic counts all show higher flows than the other towns with levels of 46, 48 and 54 recorded. These were conducted on 23rd March around

12.00 pm, due to the higher flow of traffic it was again decided to install 2 diffusion tubes to inform any decision at this location.

Blairgowrie

A traffic count was done at Blairgowrie High St, as this is one of the larger towns in the area and has some narrow streets in the centre of town. A five minute count at 14.35 on 23rd of March showed 29 cars. This is below the 35 stated in TG.09 as being indicative of a 5000 vehicle per day flow, probably due to the use of a one-way system here. Due to this it was not deemed necessary to install tubes or proceed to a detailed assessment.

Crieff

The only newly identified narrow congested street with a flow above 5000 is High St Crieff, including the East and West sections. There has been a suspected issue here for some time; therefore diffusion tube and more recently real time monitoring has been installed. This has identified that there is indeed the possibility of a breech of the annual average NO_2 standard, therefore Perth and Kinross Council have commissioned AEA to carry out a detailed assessment here, to facilitate this extra diffusion tubes have been installed in the vicinity of West High St, the results of which are presented above.

Perth and Kinross Council has identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, new or not adequately considered in previous rounds of Review and Assessment, and **will need to proceed to a Detailed Assessment.**

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

Perth and Kinross Council has assessed new/newly identified busy streets where people may spend 1 hour or more close to traffic, that were not assessed in previous rounds of Review and Assessment, and concluded that it will not be necessary to proceed to a Detailed Assessment.

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

Perth and Kinross Council confirms that there are no new/newly identified roads with high flows of buses/HDVs.

3.4 Junctions

Perth and Kinross Council confirms that there are no new/newly identified busy junctions/busy roads.

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

There are 2 new proposed roads in Perth and Kinross, one in Kinross linking an industrial estate and an existing supermarket forming a bypass in the town. The other is a link to an upgraded junction between the A85 and A9 in Perth. This is deemed necessary to allow various developments at the western edge of the town.

In each instance, an air quality assessment was conducted which showed a negligible increase in NO_2 and PM_{10} concentration at a limited number of properties along the proposed routes. There was an overall improvement in air quality predicted as a result of these roads.

Perth and Kinross Council has assessed new/proposed roads meeting the criteria in Section A.5 of Box 5.3 in TG(09), and concluded that it will not be necessary to proceed to a Detailed Assessment.

3.6 Roads with Significantly Changed Traffic Flows

It is considered that the only roads in the Perth and Kinross area, out with Perth, which have flows greater than 10,000 vehicles per day are trunk roads therefore data from the Transport Scotland website was used to determine whether there has been a 25% increase in traffic on relevant roads with flows greater than 10,000. The roads within Perth AQMA are not considered as the whole city is already an AQMA.

The trunk roads with a high enough traffic levels to be considered are the M90/A90 and A9, which at points have average daily flows of between 20,000 and 30,000 in the main these roads have seen a decrease in traffic however at points there has been an increase since the last round of Review and Assessment but at most this

has been 5%, which is well below the 25% which TG.09 recommends requires a Detailed Assessment.

There was a pre-application in for a large mixed use development in the Broxden area of Perth, which has the potential to significantly change the traffic flow on the Glasgow Road. This application will be supported by an EIA, including an air quality section assessing this.

Perth and Kinross Council confirms that there are no new/newly identified roads with significantly changed traffic flows.

3.7 Bus and Coach Stations

The busiest bus station in the area is Perth Bus Station Leonard Street and this has less than 500 movements per day so is well short of the 2500 required to proceed to a detailed assessment.

Perth and Kinross Council confirms that there are no relevant bus stations in the Local Authority area.

4 Other Transport Sources

4.1 Airports

Perth and Kinross Council confirms that there are no applicable airports in the Local Authority area.

4.2 Railways (Diesel and Steam Trains)

4.2.1 Stationary Trains

Perth and Kinross Council confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

4.2.2 Moving Trains

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

4.3 Ports (Shipping)

Perth Harbour had only 118 movements last year so was therefore well below the 5000 threshold quoted in TG.09

Perth and Kinross Council confirms that there are no ports or shipping that meets the specified criteria within the Local Authority area.

5 Industrial Sources

5.1 Industrial Installations

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

There have been 2 gasification plants proposed in Perth and Kinross in the last year one was granted planning permission one was not.

Binn Farm Energy from Waste Plant

A Gasification plant was proposed at Binn Farm (10/01767/FLM) in an area with a number of waste management facilities including landfill and anaerobic digester. An air quality assessment was carried out for this proposal, and then a subsequent assessment was carried out considering the cumulative effects of the gasification plant, the landfill gas engines and the anaerobic digester. This assessment did show an exceedance of the annual average NO_2 level; however this occurred in the middle of a field with no valid receptors in the vicinity of the maximum impact. The predicted levels at sensitive receptors were well below the standard.

This gasification plant forms part of a larger development on the site with future waste management facilities and a large biomass boiler. This proposal is at the pre-application stage and the applicant is aware that a cumulative air quality assessment will be required as part of any EIA.

Shore Road Energy from Waste Plant

A large plasma arc gasification plant was also proposed at Shore Road in Perth (11/00788/AMM). This application was not supported by the Environmental Health Department based partially on air quality grounds and was subsequently refused at

the Development Control Committee, it is unknown at this stage whether the applicant will appeal.

The reason the Environmental Health Department objected to this application (as did SEPA) on air quality grounds was partially on lack of information and also due to the fact that the stack from this application would be adding over 1ugm^{-3} to the annual average NO_2 standard to an area on Dundee Road which was already exceeding the standard. The application also introduced 128 HGV journeys to our AQMA, in opposition to our efforts to remove HGV journeys from the AQMA by way of schemes such as the Freight Consolidation Centre.

Perth and Kinross Council has assessed new/proposed industrial installations, and concluded that it will not be necessary to proceed to a Detailed Assessment.

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

Perth and Kinross Council confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

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

South Cassochie; Sawdust Drying Plant.

This plant has been running since 2007 as a diversification of the farm business. Due to the number of complaints and objections it was given temporary 2 year consent. Once that consent ran out the applicant reapplied (11/00838/FLL), however in the intervening period there had been a number of dust complaints, which led to concerns that the original air quality assessment (which had been conducted using generic coal boiler PM_{10} emission factors) was not sufficient due to the fact a large portion of dust was being emitted from the stack. The applicant was asked to provide a more detailed PM_{10} and dust assessment and a dust management plan, which was provided.

Perth and Kinross Council has assessed new/proposed industrial installations, and concluded that it will not be necessary to proceed to a Detailed Assessment.

5.2 Major Fuel (Petrol) Storage Depots

Perth and Kinross Council confirms there are no major fuel (petrol) storage depots within the Local Authority area.

5.3 Petrol Stations

Perth and Kinross Council confirms that there are no petrol stations meeting the specified criteria**.**

5.4 Poultry Farms

The only new poultry farm in the area was at Mains of Duncrub 10/02059/FLM, which accommodates 90,000 birds, therefore is well below the 200,000 bird threshold. The application was accompanied by an air quality assessment and no exceedances were predicted.

Perth and Kinross Council confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

There have been a number of applications for biomass combustion devices but only 2 in the range of 50kW-20MW within the past year, but each of these has been of relatively small scale and the screening calculations have not indicated an issue. A brief list of these applications is provided below.

11/00789/FLL 50kW boiler Gloagburn Farm Shop, Tibbermore
11/01945/FLL 80kW boiler Care Home, Isla Road, Bridgend

Perth and Kinross Council has assessed the biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment.

6.2 Biomass Combustion – Combined Impacts

Perth and Kinross Council has assessed the biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment.

6.3 Domestic Solid-Fuel Burning

Perth and Kinross Council confirms that there are no areas of significant domestic fuel use in the Local Authority area.

7 Fugitive or Uncontrolled Sources

Perth and Kinross Council confirms that there are no potential sources of fugitive particulate matter emissions in the Local Authority area.

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

Perth

Diffusion tube data captured within Perth's AQMA show exceedances at 15 locations; this is a decrease from 20 identified in the 2011 Progress Report. The automatic monitor at Atholl St show a slight increase from 56 µg/ $m^{3\ to}$ 57 µg/ m^3 for the annual average; however the number of times the hourly limit was breeched increased from 3 to 17.

The Automatic Monitor located on High St shows a decrease from 30 µg/ m^3 to 27 µg/ m^3 for the annual mean NO_2 objective and the number of exceedances of the hourly limit increased to 2

PM_{10} data at both sites shows an increase with Atholl St increasing from 24 to 25 µg/m^3 and High St remaining at 19. The exceedances of the daily objective have remained at 3 for High St and from 12 to 17 at Atholl St.

The number of daily exceedances at Atholl Street is above the Scottish Objective of 7 for the second time. Further data analysis investigations were carried out for our Daily Mean PM_{10} results for Atholl Street which showed that 11 of the 17 exceedance happened over one month between 28/2/2011 and 29/3/2011 (Appendix C). Correspondence with consultants AEAT also indicated that the exceedances at Atholl Street where also noted nationally at other Scottish AQ sites during the same period. Therefore PKC have concluded that most of these exceedances are due to an Episodic Exceedance Occurrence possibly due to meteorological conditions.

PKC contact the LAQM helpdesk Reference Number code: 0407 for advice about incorporating the above analysis in our report and justifying our intention not to revoke and declare the AQMA order that PKC has in place. (Appendix D)

The AQMA in Perth is only declared for exceedances of NO_2 and PM_{10} annual average and not for any short term standard. Technically the AQMA order should be amended but this would be only a paper exercise, resulting in added expense and effort for absolutely no benefit, therefore we do not propose amending the order.

PKC intend to continue monitoring at Atholl Street with both Real Time Monitoring and Diffusion Tube Monitoring.

The only extra measures which could be of particular benefit to the short term objective are considered to be: a) low emissions zones, b) emissions testing and c) idling regulations. These are not considered to be effective at Atholl St because:

a) Recent HDV surveys in the area have shown that the number of Euro IV vehicles passing through is above the national average and there are fewer older engines.
b) Emissions testing apply only to cars and our Further Assessment in 2007 identified HDVs as the source of most of the PM_{10} pollution.
c) Idling regulations are not considered appropriate because there are double yellow lines up each side of Atholl St and no idling takes place here, other than when stationary at traffic lights.

Outwith Perth

Due to previous roadside exceedances at West High St, Crieff, a real time monitor was installed at St James Square in April 2010. This is a reasonably open area so does not represent a worst case scenario. The annual average NO_2 objective levels here were 34 $\mu g/m^3$ and no exceedances of the hourly limit. The PM_{10} annual average value was 19 $\mu g/m^3$. As noted above, this is not representative of a worst case scenario, therefore modelling will be required to ascertain whether there is an exceedance at relevant locations or not.

The numbers of tubes showing exceedances, out with Perth, is now at 4, all of which are in Crieff and now include new tubes to help with the upcoming detailed assessment.

8.2 Conclusions from Assessment of Sources

Upon conducting a number of traffic counts around the area it was decided to install diffusion tubes in Kinross, Auchterarder and Dunkeld. Tubes have been removed from Aberfeldy as they have for a number of years measured levels well below the NO_2 annual mean standard. All duplicate (but not triplicate) tubes have been reduced to singles as there is considered limited usefulness in duplicates. This has freed up a number of tubes for use in other locations as detailed above.

8.3 Proposed Actions

Perth

As discussed above, monitoring has shown there are still exceedances in and around Perth City Centre therefore the AQMA should stay in place. The Air Quality Action Plan is in effect and Perth and Kinross Council have received grant funding from the Scottish Government towards measures contained within the plan. PKC will continue to monitor for PM_{10} & $NO_{2.}$ As noted above the duplicate tubes have been reduced to singles, but the triplicates remain.

Crieff

There are exceedances in Crieff at 4 diffusion tube sites, one of which is façade level, but not first floor level where all the relevant receptors are in terms of the annual average; therefore modelling would be required to confirm any exceedance. To this end Perth and Kinross Council have placed 3 more tubes in and around West High St Perth.

We have to proceed to a Detailed Assessment which we have commissioned AEA to undertake. This should be complete by April this year, and we will then know whether or not we must declare an AQMA in Crieff.

Other Towns

Diffusion tubes have been installed in Kinross, Auchterarder and Dunkeld due to borderline 5 minute count traffic levels. This will inform any decision to proceed to a Detailed Assessment and subsequent AQMA declaration.

9 References

Part IV of the Environment Act 1995. Local Air Quality Management Technical Guidance LAQM.TG (03) January 2003.

The Air Quality Regulations (2000) and the Air Quality (Scotland) Amendment Regulations 2002

Department for Environment, Food and Rural Affairs, Air Quality Strategy for England, Scotland Wales and Northern Ireland, 2007

Department for Environment, Food and Rural Affairs, (2009) Local Air Quality Management Technical Guidance LAQM.TG (09)

Spreadsheet of Bias Adjustment Factors accessed at http://laqm.defra.gov.uk/documents/Diffusion_Tube_Bias_Factors_v04_11_v6.xls

UK National Air Quality Information Archive, accessed at http://uk-air.defra.gov.uk/

Air Quality Detailed Assessment. 2004, AEA Technology plc, Report AEAT/ENV/R1708 Issue 1

Air Quality Updating and Screening Assessment 2006, AEA Technology plc Report AEAT/ENV/R2256 issue 2

Further Assessment of Air Quality 2007 AEA Technology plc Report AEA/ED49360001 issue 1

Perth & Kinross Council Progress Report 2007, 2008, 2010 &2011

Regional Transport Strategy http://www.tactran.gov.uk/documents/TACTRANRTS-FinalNov2008.pdf

National Transport Strategy
http://www.scotland.gov.uk/Publications/2006/12/04104414/0

Scotland's Climate Change Declaration (SCCD) Perth and Kinross Council's first annual progress report http://www.sustainable-scotland.net/documents/6703_annual%20progress%20report.pdf

Perth and Kinross Local Climate Impacts Profile (LCLIP)
http://www.pkc.gov.uk/NR/rdonlyres/E590425C-2665-4D13-B8DD-B70C659B3080/0/PerthandKinrossLocalClimateImpactProfile2008_w.pdf

AEA (on behalf of Defra and the Devolved Administrators), WASP – Annual Performance Criteria for NO2 Diffusion Tubes used in Local Air Quality Management (LAQM), 2008 onwards, and Summary of Laboratory Performance in Rounds 103-107 (http://www.laqmsupport.org.uk/), January 2010

NO2 Diffusion Tubes used in Local Air Quality Management (LAQM), 2008 onwards, and Summary of Laboratory Performance in Rounds 104-108 http://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html), January 2010

AEA (on behalf of Defra and the Devolved Administrators), WASP – Annual Performance Criteria for NO2 Diffusion Tubes used in Local Air Quality Management (LAQM), 2008 onwards, and Summary of Laboratory Performance in Rounds 105-109 (http://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html)April 2010

Trunk Road transport data accessed at
http://www.transportscotland.gov.uk/road/technology/traffic-count/map-application

Appendices

Appendix A: QA/QC Data

Appendix B: Raw Diffusion Tube Data

Appendix C Daily Mean PM10 Graph

Appendix D Email Correspondence with LAQM Helpdesk

Appendix A: QA: QC Data

Annualised Automatic Monitoring Data

3 new tubes were installed in Crieff to inform an upcoming Detailed Assessment and triplicate tubes were moved slightly in Bridgend, each giving only 8 months of data so this had been annualised using the procedures set down in Box 3.2 of TG.09.

The 2 local real time monitors in Perth were used to gain a factor of 1.125 which was applied to the bias adjusted tube data for these sites

Diffusion Tube Bias Adjustment Factors

Diffusion tube monitoring has been undertaken at 44 locations within the Perth AQMA, and at 14 further locations within the Perth and Kinross Council area. The tubes are analysed by Dundee Scientific Services using a 20% TEA in water preparation method. Data capture at all of the sites was high, with at least eleven months data at all sites. The Bias adjustment for Tayside Scientific Services from the national database found at: http://laqm.defra.gov.uk/documents/Diffusion_Tube_Bias_Factors_v04_11_v6.xls was 0.78

Factor from Local Co-location Studies (if available)

Collocation studies have been carried out at all three of the automatic monitors in Perth and Kinross, where diffusion tubes have been exposed in triplicate and the measured concentrations compared with the monthly results from the automatic monitor. The precision and accuracy tool found at http://www.airquality.co.uk/laqm/tools was used to determine bias factors for each of the automatic monitors.

The results of the 3 co-location studies are below:

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	01/01/2011	31/01/2011	54.1	53	52.5	53	0.8	2	2.0	47	99	Good	Good
2	01/02/2011	28/02/2011	38.1	36.8	38.6	38	0.9	2	2.3	34	100	Good	Good
3	01/03/2011	31/03/2011	30.1	32.3	32.4	32	1.3	4	3.2	31	100	Good	Good
4	01/04/2011	30/04/2011	27.2	24.6	26.5	26	1.3	5	3.3	22	100	Good	Good
5	01/05/2011	31/05/2011	19.4	20.8	19.8	20	0.7	4	1.8	18	100	Good	Good
6	01/06/2011	30/06/2011	27.1	26.2	27.1	27	0.5	2	1.3	20	44	Good	or Data Captu
7	01/07/2011	31/07/2011	23.5	22.1	22.3	23	0.8	3	1.9	21	86	Good	Good
8	01/08/2011	31/08/2011	22.2	22.9	21.9	22	0.5	2	1.3	20	100	Good	Good
9	01/09/2011	30/09/2011		23.8	25	24	0.8	3	7.6	20	99	Good	Good
10	01/10/2011	31/10/2011	27.3	23.7	25.7	26	1.8	7	4.5	22	98	Good	Good
11	01/11/2011	30/11/2011	30.2	33.4	28.3	31	2.6	8	6.4	28	100	Good	Good
12	01/12/2011	31/12/2011	25.2	27.4	25.7	26	1.2	4	2.9	33	99	Good	Good
13													
											Overall survey -->	Good precision	Good Overall DC

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

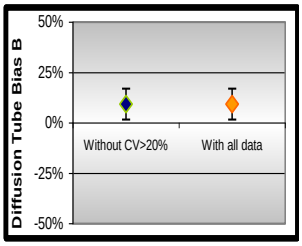
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	High St

Precision	12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 11 periods of data	
Bias factor A	0.92 (0.86 - 0.99)
Bias B	8% (1% - 16%)
Diffusion Tubes Mean:	29 μgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	27 μgm^{-3}
Data Capture for periods used:	98%
Adjusted Tubes Mean:	27 (25 - 29) μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 11 periods of data	
Bias factor A	0.92 (0.86 - 0.99)
Bias B	8% (1% - 16%)
Diffusion Tubes Mean:	29 μgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	27 μgm^{-3}
Data Capture for periods used:	98%
Adjusted Tubes Mean:	27 (25 - 29) μgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	01/01/2011	31/01/2011	79.4	86.2	84.5	83	3.5	4	8.8	75	100	Good	Good
2	01/02/2011	28/02/2011	70.6	66.2	70.1	69	2.4	3	6.0	64	100	Good	Good
3	01/03/2011	31/03/2011	66.3	63.4	70.1	67	3.4	5	8.3	62	100	Good	Good
4	01/04/2011	30/04/2011	65.3	62.7	58.8	62	3.3	5	8.1	55	100	Good	Good
5	01/05/2011	31/05/2011	51.2	55.8	57.4	55	3.2	6	8.0	48	100	Good	Good
6	01/06/2011	30/06/2011	58.8	60.9	58.9	60	1.2	2	2.9	49	96	Good	Good
7	01/07/2011	31/07/2011	49.6	53.8	51	51	2.1	4	5.3	40	100	Good	Good
8	01/08/2011	31/08/2011	55.2	57.6	53.4	55	2.1	4	5.2	44	100	Good	Good
9	01/09/2011	30/09/2011	60		62.2	61	1.6	3	14.0	49	85	Good	Good
10	01/10/2011	31/10/2011	62.3	65.6	63.8	64	1.7	3	4.1	53	98	Good	Good
11	01/11/2011	30/11/2011	61.8	66.9	67.6	65	3.2	5	7.9	62	100	Good	Good
12	01/12/2011	31/12/2011	51.9	58.3	55.6	55	3.2	6	8.0	79	100	Good	Good
13													
											Overall survey -->	Good precision	Good Overall DC

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

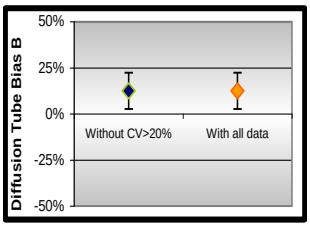
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Atholl St

Precision: 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 12 periods of data	
Bias factor A	0.91 (0.83 - 1)
Bias B	10% (0% - 20%)
Diffusion Tubes Mean:	62 μgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	57 μgm^{-3}
Data Capture for periods used:	98%
Adjusted Tubes Mean:	57 (52 - 62) μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 12 periods of data	
Bias factor A	0.91 (0.83 - 1)
Bias B	10% (0% - 20%)
Diffusion Tubes Mean:	62 μgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	57 μgm^{-3}
Data Capture for periods used:	98%
Adjusted Tubes Mean:	57 (52 - 62) μgm^{-3}



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Diffusion Tubes Measurements									
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	01/01/2011	31/01/2011	48.2	44.8	46.4	46	1.7	4	4.2
2	01/02/2011	28/02/2011	38.1	34.1	38.3	37	2.4	6	5.9
3	01/03/2011	31/03/2011	31.3	34.2	33.6	33	1.5	5	3.8
4	01/04/2011	30/04/2011	24.8	27	25.4	26	1.1	4	2.8
5	01/05/2011	31/05/2011	17	22.3	22.6	21	3.2	15	7.8
6	01/06/2011	30/06/2011	24.1	23.3	24.6	24	0.7	3	1.6
7	01/07/2011	31/07/2011	18.9	19	20.5	19	0.9	5	2.2
8	01/08/2011	31/08/2011	23.8	23.4	24.7	24	0.7	3	1.7
9	01/09/2011	30/09/2011	25.9	24.3	24.9	25	0.8	3	2.0
10	01/10/2011	31/10/2011	29.3	25	25.8	27	2.3	9	5.7
11	01/11/2011	30/11/2011	31.2	32.1	31.4	32	0.5	1	1.2
12	01/12/2011	31/12/2011	25.7	25.5	25.6	26	0.1	0	0.2
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method	
Period Mean	Data Capture (% DC)
52	91
44	99
44	86
37	99
29	99
27	88
22	99
26	97
28	99
29	98
33	84
38	98

Data Quality Check	
Tubes Precision Check	Automatic Monitor Data
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good precision	Good Overall DC

Overall survey -->

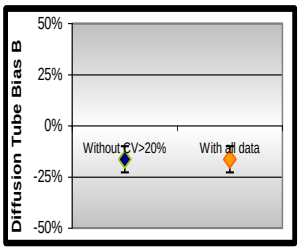
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Crieff

Precision: 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 12 periods of data	
Bias factor A	1.21 (1.12 - 1.31)
Bias B	-17% (-23% - -11%)
Diffusion Tubes Mean:	28 µgm^{-3}
Mean CV (Precision):	5
Automatic Mean:	34 µgm^{-3}
Data Capture for periods used:	95%
Adjusted Tubes Mean:	34 (32 - 37) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 12 periods of data	
Bias factor A	1.21 (1.12 - 1.31)
Bias B	-17% (-23% - -11%)
Diffusion Tubes Mean:	28 µgm^{-3}
Mean CV (Precision):	5
Automatic Mean:	34 µgm^{-3}
Data Capture for periods used:	95%
Adjusted Tubes Mean:	34 (32 - 37) µgm^{-3}



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Discussion of Choice of Factor to Use

The co-location studies gave factors of 0.92 High Street, 0.91 for Atholl St and 1.21 for Crieff. The factor given on the national database of co-location studies, found at: http://laqm.defra.gov.uk/documents/Diffusion_Tube_Bias_Factors_v04_11_v6.xls was 0.78. Based on advice given in Technical Guidance LAQM TG (09)), it was decided a local factor would be more appropriate. The middle value of the three was chosen and this value is the same as last years bias adjustment factor.

PM Monitoring Adjustment

TEOM data used by Perth and Kinross Council for the 2 Perth monitors was corrected using the Volatile Correction Model by AEA using daily average purge measurements from the 26 FDMS sites in Central Scotland.

The Crieff monitor is a BAM and is corrected using a gravimetric factor of 0.83333 for Indicative Gravimetric Equivalent.

QA/QC of automatic monitoring

AEA carries out the QA/QC for the automatic monitors and they are calibrated annually and meet the criteria for national network.

QA/QC of diffusion tube monitoring

The Workplace Analysis Scheme for Proficiency (WASP) is an independent analytical performance testing scheme, operated by the Health and Safety Laboratory (HSL). WASP formed a key part of the former UK NO2 Network's QA/QC, and remains an important QA/QC exercise for laboratories supplying diffusion tubes to Local Authorities for use in the context of Local Air Quality Management (LAQM). The laboratory participants analyse four spiked tubes, and report the results to HSL. HSL assign a performance score to each laboratory's result, based on their deviation from the known mass of nitrite in the analyte.

The outcomes of these QA/QC schemes are evaluated on a regular basis against a set of pre-defined performance criteria. The Performance criteria are due to be changed, at present the criteria are based on the z-score method, however from April 2009; the criteria will be based upon the Rolling Performance Index (RPI) statistic.

Dundee Scientific Services takes part in this scheme and in each of the rounds were scored as satisfactory

Short-term to Long-term Data adjustment

There were 3 locations in Crieff and 1 in Perth which required to be annualised due to there being less than 9 months data recorded. The calculation for this is presented below

Site	Site Type	Annual Mean	Period Mean	Ratio
High St	Roadside	27	23	1.17
Atholl St	Roadside	57	53	1.08
			Average	1.125

Appendix B: Raw Diffusion Tube Data

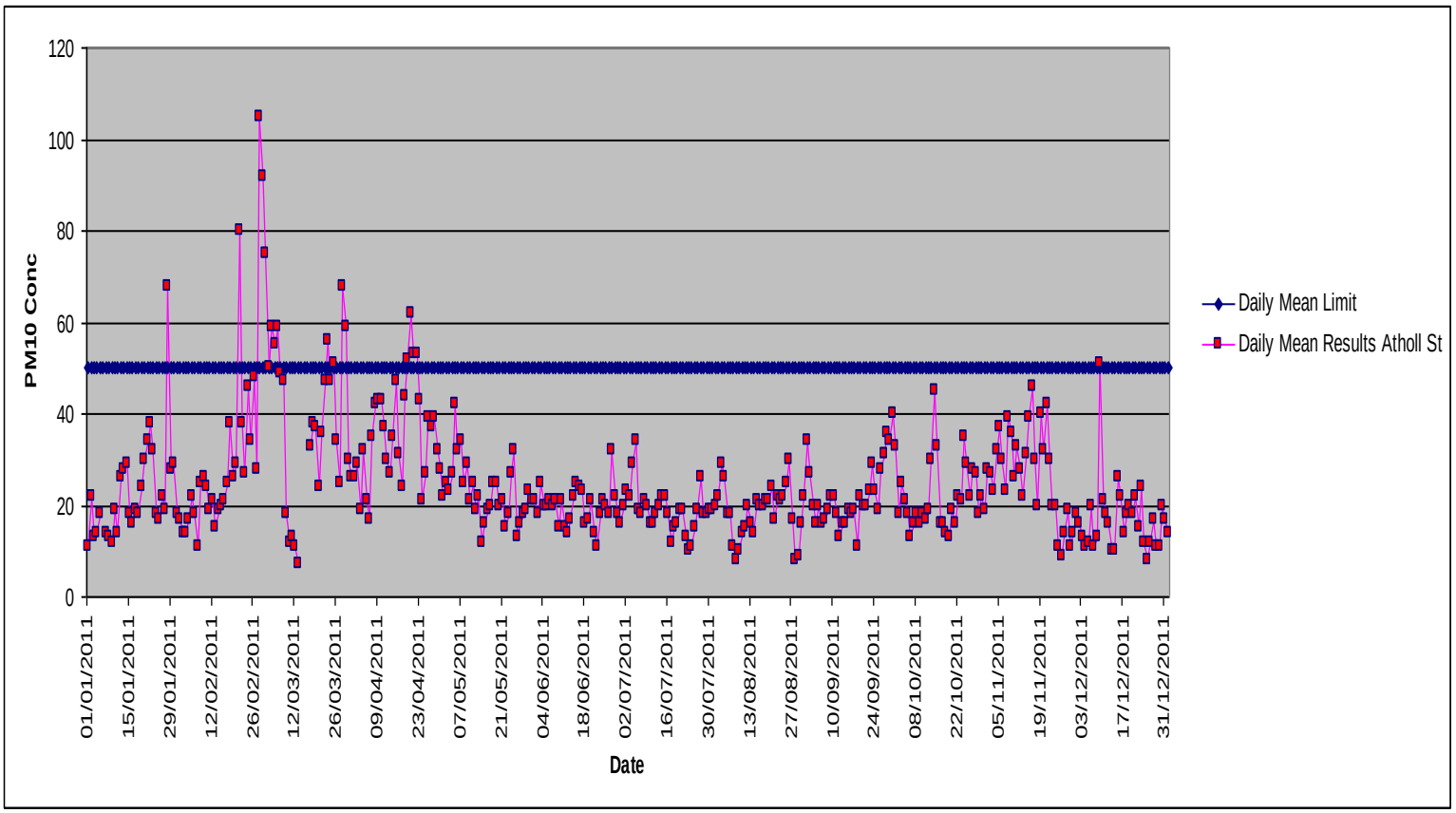
	Tube Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave
Perth 1 L	42 Scott St, Perth,	66.2	56.8	51.6	41.4	34.6	45.6	43	38.1	36	41.7	47.6	35.3	44.8
Perth 1 C	42 Scott St, Perth,	71.3	59	50.6	43.2	37.2	44.1	43.5	39.2	36.2	34.2	50.7	34.4	45.3
Perth 1 R	42 Scott St, Perth,	66.6	54.4	41.3	41.7	38.4	39.8	37.5	38	32.7	41	44	35.7	42.6
Perth 2	17 Speygate, Perth,	47.2	33.6	27.6	18.5	20.3	20.4	17	21.4	21.2	21.5	29.3	26.9	25.4
Perth 3 L	15 Murray Cres, Perth	43.5	31.8	24.7	16.2	13.4	16	12.6	16	17.8	18.9	27	19.6	21.5
Perth 3 R	15 Murray Cres, Perth,	44.2	32.6	23.1	17.2	13.5	17.1	13.6	15.9	16.3	18.9	26.6	19.1	21.5
Perth 5 L	8 Stormont St, Perth,	47.4	35.6	29.5	23.6	19.8	20.7	13.2	17.9	22.8	24.2	28.1	24.5	25.6
Perth 5 R	8 Stormont St, Perth	44.9	35.6	29.9	22.3	17.8	19.2	12	18.1	21.3	24	29	26.8	25.1
Perth 6	41 Mull Place, Perth,	34.4	22.6	15.9	11.7	8.4	8.8	7.7	8.6	12.1	15	21.2	14.4	15.1
Perth 7	257 Rannoch Rd	37.9	30.1	21.1	16.4	13.2	16.8	15	16.4	14.6	18.1	27.8	14.1	20.1
Perth 13 L	86/88 South Street Perth	56.6	48.9	49.1	41.9	28.8	35.8	28.3	34.4	38.8	37.7	45.3	43.8	40.8
Perth 13 R	86/88 South Street Perth	56.3	47.8	45.8	37	32.3	38.1	29.1	36	34.4	34.3	45.7	31.9	39.1
Perth14L	15 Main St, Bridgend, Perth,	59	48	42										
Perth 14 C	15Main St, Bridgend, Perth,	59.9	48.5	47.8										
Perth 14 R	15 Main St, Bridgend, Perth,	62.7	51.2	47.6										
Perth 19	St Ninian's School , , Perth,	62.7	46.3	34.3	33.7	29.2	30.7	31.1	35.6	33.2	31.2		33.3	36.5
Perth 20	2 Crieff Road Perth	57.3	41.8	31.2	26.4	23.7	25.8	26.3	25.7	25.6	28.3	38.2	28.2	31.5
P28	28 York Place Perth	77.7	56.9	43.4	50.3	40.8	46.5	39.9	41.1	46.4	48.5	56.5	33.9	48.5
P29	37 York Place Perth	74.1	52.5	47	38.1	34.3	38	36	37.6	35.6	36.2	49.3	30.5	42.4
P30 L	104 South St, Perth,	64.2	55.5	52.5	45.6	35.4	42.2	31.2	37.4	44.1	47.1	52.2	41.4	45.7
P30 C	104 South St, Perth,	65.5	53.1	51.6	47.4	36.5	40.4	32	38.7	41.5	40.6	47.6	46.8	45.1
P30 R	104 South St, Perth,	61.2	51.8	48.8	42.5	35.9	39.3	31.2	37.2	42	44.8	47.1	40.3	43.5
P31	45-47 South St, Perth,	51.6	43.4	35.8	29.8	24.8	28.9	27	30.5		24.7	37.5	29.8	33.1
P32	135 South St, Perth,	66.9	49.5	47.4	38.7	31.6	38.7	35.4	38.2	31.3	36.4	38.5	34.3	40.6

P33	216 South Street Perth	69	52.1	47	43.6	36.3	42.1	39.7	37.8	36.4	36.7	48.4	33.8	43.6
P34 L	10 County Place, Perth,	78.1	66.1	62	59.6	48.7	54	44	47.8	52.6	50.9	59.9	51.5	56.3
P34 R	10 County Place, Perth,	73.7	65.2	63			54.1	48.3	47.6	52.3	55.2	57.1	46.8	56.3
P35	17 Princes St, Perth,	56.9	41.9	35.7	27.1	19.7	25.1	22.9	27.1	25.9	30	34.5	27.9	31.2
P36	51 Glasgow Rd, Perth,	64	49.3	34.9	34.6	31.4	31.4	28.7	31.6	34.8	34	44	34.2	37.7
P37	Riggs Rd, Perth,	55.3	45.1	34.4	26.9	20.9	27	24.1	26.9	26.8	22.9	42.1	26.5	31.6
P38	93-109 Main St Bridgend,	47.8	42.5	37.2	32.9	27.2	34.5	30.3	28.5	28.5	29.4	38.1	23.3	33.4
P39 L	39 Main St, Bridgend,	70.6	62	60.1	47.1	45.4	57.8	54.1	46.8	47	48.4	57.2	35.9	52.7
P39 R	39 Main St, Bridgend,	66	62.9	58.7	54.3	41.7	53.4	58.3	56.2	45.4	46	60.2	38.6	53.5
P40 L	18 Main St, Bridgend,	74.8	59.2	63.2	55.7	45.9	48.1	40.6	50.6	49.1	48.4	51.9	43.8	52.6
P40 R	18 Main St, Bridgend,	75.6	55.6	59.7	55	46.2	51.8	42.4	48.8	47.7	49.6	49.1	46.2	52.3
P41 L	76 Atholl St, Perth,	78.2	67.9	52.4	52		52.9	48.6	53.3	42.1	46.5		36.1	53
P41 R	76 Atholl St, Perth,	83.8	68.4	59.4	48.5		54.1	54.6	51.6	40.3		58.4	38.4	55.8
P42	26-28 Atholl St, Perth,	83.9	66.1	58.9	52.5	39.8	50.7	45.8	53.5	42.9	45.2	55.1	45.4	53.3
P43 L	17 Atholl St, Perth,	79.5	69	58.6	62	53.5	58.8	49.1	54	49.8	47.1	64.8	48.2	57.9
P43 C	17 Atholl St, Perth,	78.1	71.4	63.9	54.4	50.4	59.1	39.8	54.5	55.2	50.3	57	53.5	57.3
P43 R	17 Atholl St, Perth	79.8	69.6	61.2	61.6	49.7	58.2	48.8	51.8	58.1	51.3	62.1	55.3	59
P44 L	22 Barrack St, Perth,	72.5	56.9	49.8	44.5	35.9	46.3	42.6	40.7	38.7	41.1	56.3	35.2	46.7
P44 R	22 Barrack St, Perth,	79.3	67.2	56.9	40.4	34.8		43.5	40.6	37.3	41.4	56.8	44.3	49.3
P45	Ballantine Place, Perth	55.2	39	29.2	21.6	16	18.8	20.8	19.9	17.9	21.1	30.4	22.8	26.1
P46	204 A Crieff Rd, Perth,	51	41.9	36.6	28.8	24	27.1	30.7	33.2	29.8	26.5	49.5	26.4	33.8
P47	5 East Huntingtower, Perth	48.7	42	32	28.9	19.4	27.4	24.6	24.8	23.1	25.7	39.2	23.5	29.9
P48	30 Edinburgh Rd, Perth,	48.2	41.7	31.6	23.7	19.8	25.4	21.7	24.2	23.4	29.5	36.7	19.6	28.8
P49	Opp Wood'n Garden, Glencarse,	37.3	28	28.2	20.8	21.9	24.5	22.7	21.6	22.2	23.9	32.2	17	25
P50	Linden Garden Centre, Glencarse,	41.2	31.8	29.5	23.4	20.6	23.6	20.7	22.1	20.7	19.7	30.2	15.8	24.9
P51	2 West Bridge St, Bridgend, Perth,	54.8	39.3	39.8	29.6	24.4	28.3	25.3	28.7	26.8	28.4	34.9	28.6	32.4
P54L	RTM 176 High St, Perth	54.1	38.1	30.1	27.2	19.4	27.1	23.5	22.2	0.5	27.3	30.2	25.2	27.1
P54C	RTM 176 High St, Perth	53	36.8	32.3	24.6	20.8	26.2	22.1	22.9	23.8	23.7	33.4	27.4	28.9
P54R	RTM 176 High St, Perth	52.5	38.6	32.4	26.5	19.8	27.1	22.3	21.9	25	25.7	28.3	25.7	28.8
P55	7 West High St, Crieff	72.4	68.8	60.9	47.8	44	53.6	54	56.1	50.1	50.3	54.5	38	54.2
P56	39, High St, Crieff	57	49.1	41.3	34	29.8	x	76.9	35.6	27.1	36.6	44.9	28.5	41.9
P57	, 62, High St, Crieff	53.2	42.4	37.5	30	24	35.1	35.5	31.8	26.2	28.8	36.3	29.2	34.2
P58 L	9 East High St, Crieff	61	54.1	45.9	42.4	34.8	48.7	51.2	43	38.4	43.8	45	42.3	45.9
P58R	9 East High St, Crieff	61	52.7	47.8	42.6	36.2	49.7	46.5	42.7	35.9	39.9	44.8	35	44.6
P59	12 Dunkeld Street, Aberfeldy	47.9	45.8	34.4	29.1	22	29.2	27.7	27.4	26.4	30.5	34.4	25.3	31.7

P60L	Highland Gift Shop, Bridgend, Aberfeldy	32.6	29.3	25.6	22.7	19.6	22.2	15.1	19.9	20.2	22.3	24.6	17.5	22.6
P60R	Highland Gift Shop, Bridgend, Aberfeldy	31.5	29.9	25	21.5	18.9	21.5	18.2	20.5	21.8	23.4	26	17.9	23
P61L	Atholl St, Perth real time monitor	79.4	70.6	66.3	65.3	51.2	58.8	49.6	55.2	60	62.3	61.8	51.9	61
P61C	Atholl St, Perth real time monitor	86.2	66.2	63.4	62.7	55.8	60.9	53.8	57.6	0.2	65.6	66.9	58.3	58.1
P61R	Atholl St, Perth real time monitor	84.5	70.1	70.1	58.8	57.4	58.9	51	53.4	62.2	63.8	67.6	55.6	62.8
P62	84 Dundee Rd,	58.8		96	34.8	28.8	37.7	36.5	36.4	29	31.9	39.4	17.9	40.7
P63	30 Dundee Rd, Perth	55.8	46.7	49.2	38.7	35.2	46.4	45	44.5	6.3	38.8	50.1	28.7	40.5
P64	The Lodge, Isla Rd, Bridgend,	79.7	63.6	60.2	51.4	41.3	53.5	48.6	52.5	50.5	45.7	50.3	46.2	53.6
P65	5-7 Charlotte Street, Perth PH1 5LW	55.8	43.3	37.5	30.4	25.9	30.1	30.8	29.2	26.4	29.2	39.3	28.1	33.8
P67	1 Atholl Street, Perth PH1 5NH	67	53.6	42.2	44.6	39.1	39.5	29.9	33	46.4	41.1	48.8	43	44
P68	2 Atholl Street, Perth PH1 5NP	60.6	42.1	41.1	34.5	24.7	30.1	24.8	32.1	31.3	32.7	37.4	34.5	35.5
P69	Church of Scotland, Kinnoull Street, Perth	57.4	54.8	49.1	41	28.9	33.8	28.2	36	30.4	31.4	41.5	40.7	39.4
P70	Leith Buildings, 28 Dunkeld Rd, Perth	60.9	46.3	35.3	19.8	22.2	29.7	25.4	30.2	26	25.9	38.5	32.2	32.7
P71	134-140 Dunkeld Road, Perth	42.6	30.9	21	15.2	11.6	14.3	12.5	14.7	13.6	16.1	26.4	15.9	19.6
P72	82 Crieff Road, Perth	65.3	50.4	45.3	38.7	35.1	35.2	31.3	34.5	40.8	36.8	43.4	36.9	41.1
P73	NEW 19 West High Street Crieff,	57.9	53.9	50.6	42.2	27.7	43.9	48.4	43.7	33.7	40.6			44.3
P74	NEW 43 High Street Crieff,	50.7	42.2	39.2	.0.3	50.1	35.9	34.3	33.3	31.9	33.2	36	27.7	37.7
P75L	Crieff RTM	48.2	38.1	31.3	24.8	17	24.1	18.9	23.8	25.9	29.3	31.2	25.7	28.2
P75C	Crieff RTM	44.8	34.1	34.2	27	22.3	23.3	19	23.4	24.3	25	32.1	25.5	27.9
P75R	Crieff RTM	46.4	38.3	33.6	25.4	22.6	24.6	20.5	24.7	24.9	25.8	31.4	25.6	28.7
P76	10/12 West High Street, Crieff					37.5	41.8		42.1	41.9	40.6	50.1	36.3	41.5
P77	9 Comrie Street, Crieff					21.2	22.7	23.6	22.3	17.4	23.1	29.1	16.4	22
P78	1 Lodge Street, Crieff					23.9	27.6	28.5	27.4	23.9	25	36.1	21.2	26.7
P79 L	17/19 Main Street Bridgend Perth					37.1	48.7	47.6	40	35.2	40.2	50.2	32.9	41.5

P79 C	17/19 Main Street Bridgend Perth					34.5	46.4	49	43.2	39	37	52.4	32.8	41.8
P79 R	17/19 Main Street Bridgend Perth					36.9	46.7	46.8	41.4	34.4	37.3	46.2	27.5	39.7

Appendix C: PM_{10} Daily Mean Standard



Appendix D: Email Correspondence with LAQM Helpdesk

Dear Lynne,
Thank you for contacting the LAQM Helpdesk. Your query has been allocated the unique reference code: 0407 and you should use this as a reference for any further follow up regarding this response.

The purpose of the Progress Reports is to provide information about the state of air quality based on the most recent data and help to identify any emerging issues that might influence the air quality. When a Progress Report identifies a risk of any air quality objective not being met, a Detailed Assessment is required to establish with reasonable certainty whether or not the objective is likely to be exceeded.

In this case the monitoring data has identified the risk of exceedance of daily PM10 objective. Hence, a Detailed Assessment will be needed. A Detailed Assessment is required to amend, declare or revoke an AQMA.

The pollutant concentrations show year-on-year variation. So if this years data is showing exceedances for example due to more prevalent episodic conditions, it is possible that next years data may show compliance. Therefore, rather then entering in to cycle of declaration and revocation, it will be appropriate to establish with reasonable certainty that the exceedances are specific to a particular year. In your Progress Report you could discuss the results and suggest, as you mentioned in your email, that the council would continue monitoring at this location to establish that whether or not the exceedances are associated with this single year due to meteorological conditions. The report will be appraised by relevant authority and you will be informed if your conclusions are accepted.

I hope it helps.
Kind regards
Kind regards
Lakhu Luhana
LAQM Helpdesk Team

Email: LAQMHelpdesk@uk.bureauveritas.com
Telephone: 0800 032 7953
To: LAQMHelpdeskmail@VERITAS
cc: Attn: Lakhu Luhana/GBR/VERITAS

Subject: 0407 Perth & Kinross Councils Progress Report 2011

Further data analysis of our Daily Mean PM10 results for Atholl Street and High Street has shown that the 12 Daily Exceedances we obtained for Atholl Street all fall within the Month of March and the 3 Daily Exceedances at High Street where also within the same month. Therefore thus suggesting an Episodic Exceedance Occurrence has occurred. Would it be therefore prudent for us to include the data

and a paragraph of script in our report justifying why we should not amend our air quality management order to include short term exceedances as this is the first year we have exceeded the limit of seven.

Regards

Lynne

Lynne Reid
Environmental Health Technical Officer
The Environment Service
Perth & Kinross Council