2016 Perth and Kinross Progress Report

2016 Air Quality Annual Progress Report (APR) for
Perth and Kinross Council

In fulfilment of Part IV of the
Environment Act 1995

Local Air Quality Management

Date June 2016

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Executive Summary: Air Quality in Our Area

Air Quality in Perth and Kinross

Air Quality within Perth and Kinross is generally good; however there are a few hot spot areas within Perth City Centre and Crieff High Street. The main pollutants of concern are NO_2 and PM_{10} from vehicle emissions, which cannot escape within streets that have high buildings either side causing a canyon effect.

Perth and Kinross Council (PKC) have declared two air quality management areas (AQMA), one for the whole of Perth City and one for a corridor area of Crieff High Street.

The decision to declare the whole of Perth City an AQMA was made so that the air quality issues could be addressed holistically throughout the city.

The Crieff AQMA has the trunk road A85 going through it which Transport Scotland (TS) adopt and maintain, therefore PKC are working closely with TS to develop an Air Quality Action Plan (AQAP).

Actions to Improve Air Quality

The main core actions for Crieff have been setting up the AQAP Steering Group and Improvements in Bus Town Services and Bus Shelter infrastructure. The further assessment indicated that the proportion of emissions are mostly from cars and HGVs and queuing traffic within the AQMA, so the key actions and implementing measures should be those targeting the reduction of car use and to encourage the up take towards more sustainable modes of transport such as improving local bus services and improving bus shelter infrastructures.

Public Transport Interchange Work carried out at Crieff

Perth and Kinross Council have on going actions to encourage green travel plans within local schools and businesses. The Scottish Government and Smarter Choices and Smarter Places grant funding allowed the Council to employ a full time Bikeability and Cycle Monitoring Officer to expand the programme of cycling training within schools and to improve the collation of data for cycling within Perth and Kinross. Other measures that were taken forward are the Living Streets' Travel Tracker and WoW programme within all Perth Primary schools which will assist schools with their Travel Plans and provide accurate data.

WoW Perth and Kinross

Local Priorities and Challenges

The main challenge is the projected growth of Perth City over the coming years and therefore PKC are addressing issues such as traffic congestion and Air Quality through the Perth City Plan and Perth Transport Future Reports: http://www.pkc.gov.uk/smartgrowth and http://www.pkc.gov.uk/transportfutures

The main priority for Crieff is to develop AQAP and have a final draft AQAP available for consultation.

How to Get Involved

For further information on air quality within Perth and Kinross visit the PKC air quality website at http://www.pkcairquality.org.uk/ , however please note this website is under review and some of the links may be unavailable at this time.

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1. Local Air Quality Management

This report provides an overview of air quality in Perth and Kinross Council during 2015 It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) 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 an exceedance is 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. This Annual Progress Report (APR) summarises the work being undertaken by Perth and Kinross Council to improve air quality and any progress that has been made.

Table 1.1 – Summary of Air Quality Objectives in Scotland

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Nitrogen dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m^3	Annual mean	31.12.2005
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	18 µg/m^3	Annual mean	31.12.2010
Particulate Matter ($PM_{2.5}$)	10 µg/m^3	Annual mean	31.12.2020
Sulphur dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005
Benzene	3.25 µg/m^3	Running annual mean	31.12.2010
1,3 Butadiene	2.25 µg/m^3	Running annual mean	31.12.2003
Carbon Monoxide	10.0 mg/m^3	Running 8-Hour mean	31.12.2003

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Lead	0.25 µg/m^3	Annual Mean	31.12.2008

2. Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12 months, setting out measures it intends to put in place in pursuit of the objectives.

A summary of AQMAs declared by Perth and Kinross Council can be found in

Table 2.1. Further information related to declared AQMAs, including maps of AQMA boundaries are available online at

https://uk-air.defra.gov.uk/images/aqma_maps/Perth.pdf for Perth and for Crieff, which is not available on Defra site, but on Scottish Air Quality site at http://www.scottishairquality.co.uk/assets/aqma-maps/Perth02.pdf

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City / Town	Description	Action Plan
Perth AQMA	• NO_2 annual mean • PM_{10} annual mean	Perth	The whole area of Perth City was designated an AQMA	Perth and Kinross Air Quality Action Plan 2009 http://www.pkcairquality.org.uk/documents/PerthandKinrossAirQualityActionPlan.pdf
Crieff	• NO_2 annual	Crieff	From the point at the Y-	In progress of

AQMA Name	Pollutants and Air Quality Objectives	City / Town	Description	Action Plan
AQMA	mean • PM_{10} annual mean		Junction at Perth Road and Dollerie Terrace, follow the A85 east to East High Street, the Cross, High Street, James Square then on to West High Street stopping at the junction of Galvemore Street and Lodge Street and north up to Comrie Street to the Y-Junction at Coldwells Road and mid-point of Comrie street. The AQMA takes in the whole buildings along East High Street/High Street/West High Street and Comrie Street.	developing Action Plan. Steering Group has been established with Transport Scotland being a member.

2.2 Progress and Impact of Measures to address Air Quality in Perth and Kinross Council

The Scottish Government (SG) agreed with PKC that a combined Annual Action Plan Report could be submitted for 2015 and 2016; this was due to delays in submitting the 2015 Perth AQAP Progress Report.

Perth and Kinross Council has taken forward a number of measures during the reporting years of 2014/ 2015 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. More detail on these measures can be found in the air quality Action Plan relating to each AQMA Key completed measures are:

Crieff

PKC have now contracted consultants Ricardo Energy & Environment to develop the Crieff AQAP and the first Steering group meeting was held with representative from Transport Scotland in attendance.

Although the AQAP for Crieff is still being developed, PKC have been proactive and have taken forward several measures within Crieff, all with grant funding from SG.

- **Social Marketing Campaign** – The Crieff on the Go Campaign involved workshops within two primary schools in Crieff. The workshops included AQ, sustainable modes of transport and travel planning as well as walk to school week and other competitions. Bus Time tables and Cycling and Walking routes were delivered to residents, including the new Town Bus Service.

- **Public Transport Provision-** Crieff is linked throughout Strathearn and further afield (including Perth and Stirling) by a mixed network of commercial and subsidised bus services operated in the main by Stagecoach Perth. Within Crieff there is also a Council subsidised Crieff Town bus service, operated by Sweeney's Garage, linking the main residential areas with the central retail area, Cottage Hospital and Strathearn Community Campus.
  This Service was enhanced through the frequency and routing with the addition of a second bus, this will allow the Crieff Town bus service to serve a number of new locations within Crieff. This improved Town bus service provides an enhanced sustainable travel option serving central Crieff for the remainder of the local population – thus reducing dependency on car use.

Perth

- **Social Marketing Campaign –** Perth on the Go, covered several schools within Perth City looking at the subject of AQ, health and sustainable modes of transport and travel planning. Funding has been an issue with trying to keep this campaign going year on year.
- **Green Travel Planning Measures -** Walking and cycling, school initiatives and projects such as school travel plans, school challenge fund, walk to school week and cycle training initiatives such as IBike and Bikeability, which

are measures that are taken forward by PKC year on year, depending on funding available.

- **Public Transport Interchange-** Bus Shelter Improvement for Crieff, PKC received Scottish Government (SG) Funding 2014/15; however some of the funding was carried over 15/16 with agreement from SG due to unpredicted delays and additional costs, due to infrastructure works required by Transport Scotland and contractors. The improvement of the four bus stop facilities within Crieff and on Crieff High Street in the vicinity of James Square was for the upgrading of the boarding/alighting areas and installing larger Disability Discrimination Act 1995 compliant passenger waiting shelter facilities and the interchange between the various bus services that serve the High Street. Thus reducing bus layover times and improving traffic flows within these areas, the upgrades of the shelters also means the ability to eventually introduce Real Time Information to passengers.

- **Cross Tay Link** – PKC are progressing with STAG 2 to define the final route and thereafter will submit a planning application. However there is still the issue of how PKC are going to fund the project.

Perth and Kinross expects the following measures to be completed over the course of the next reporting year:

- **Regional Model for Perth and Kinross Area** – Utilising Scottish Government funding for 2016/17 PKC have engaged consultants Ricardo Energy & Environment to prepare a regional scale model which will include all the main road transport emission sources in Perth, Crieff and other areas of interest within PKC region. This approach will allow a more consistent air quality evidence base for determining planning applications for developers and for Environmental Health as internal consultees to planning.
- **AQ Supplementary Planning Guidance** – Perth and Kinross Local Development Plan (LDP) 2010 is under review at the moment and any supplementary AQ planning guidance being developed now would not be a

statutory document until the approval of the 2019 LDP. Therefore the intention is to develop AQ Planning Guidance at the moment to be used as a guidance document for planners/developers, which can thereafter be adopted with the 2019 LDP and become a statutory document. That will mean that AQ must be considered for the whole of Perth and Kinross region and not just areas that have AQMA orders.

- **Air Quality Strategy for Perth and Kinross Council** –Environmental Health has prepared a committee report, outlining the proposal of developing an AQ Steering Group consisting of the relevant head of Services (Development Planning, Transport, Transport Planners, Roads and Networks, Environmental Health, Procurement and Sustainability). The report will advise the committee of the Scottish Governments Cleaner Air for Scotland recommendations and to seek the commitment from members for the development of an AQ Steering Group.
- **Better Access to Public Transport -** For 2016/17 the Public Transport Unit (PTU) would like to focus on the provision of real time information (RTI) at key interchange points in central Perth and Crieff, taking advantage of the RTI data that is now available for the vast majority of local bus services in Perth and Kinross. The Council also looks to install roadside signage at up to twenty locations. The two main bus stops on Crieff (High Street) will be provided with signage, together with a number of key interchange points in Perth City Centre (Mill Street and South Street).

Table 2.2 – Progress on Measures to Improve Air Quality -2014/2015

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
1.	Cross Tay Link Road (CTLR)	Transport planning and Infrastructure	New crossing of the Tay linking the A9 to the A94 north of Scone, including package of associate bus priority, cycle and pedestrian measures 'locking in the benefits' to Perth city centre	PKC Tactran Transport Scotland		2009- ongoing to circa 2020	It is not possible at this stage to assign a quantitative indicator. We will report outputs of feasibility work/air quality assessments as they arise and update timescales as appropriate	High	The draft DMRB2 was held back until the Bertha Park Planning application was submitted, as part of the spine road for this development will be a part of the CTLR route. The DMRB Stage 2 has now been implemented which will define the final route. This process is anticipated to be completed by the end of 2016. Then the final DMRB2 will then go to committee for approval and then a Planning Application submitted	2020	Awaiting Formal Financial Commitment

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
2	Integrate AQ into Regional Transport Strategy (RTS)	Policy guidance and development control	Ensure that this AQAP is integrated into the delivery of the RTS	PKC Tactran	2009/10	2009/10 and as RTS is delivered	We will report annually on our meetings with Tactran and provide a discussion as to how the AQAP is influencing delivery of the RTS	Medium - High	AQ considerations are influencing RTS delivery, in the past 5 years PKC and Tactran continue to work in conjunction to ensure AQ is considered in the RTS and projects such as freight consolidation, park and ride, liftshare, walking and cycling initiatives. The RTS was refreshed in 2015 Regional Transport Strategy 2015-2036	Ongoing	

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
3.	Integrate AQ into Local Transport Strategy (LTS)	Policy and guidance development control	Ensure that the AQAP is integrated into the delivery of the LTS	PKC	LTS published in 2010 on going implementation of the schemes	ongoing	We will comment on any specific air quality provisions contained in the LTS	Medium - High	Transport Strategy for Perth Shaping Perth's Transport Future Shaping Perth's Transport Future 2011 and the wider region document published The LTS preferred strategy is one of an integrated approach and air quality is one of the Strategy objectives. To work towards meeting national air quality standards and prevent further breach/exceedances and to reduce transport emissions	Environmental Health continue to attend meetings with PKC transport planning team for project such as Perth City Centre Traffic, Shaping Perth's Transport Future and Perth Public Transport Interchange Study.	Transport Colleagues have acknowledged that the LTS needs to be reviewed in line of CAFS.

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
4.	Park & Ride	Transport planning and infrastructure	Operate existing Park & Ride Schemes Perth Park and Ride (Broxden) Scone Park & Ride Kinross Park and Ride And maintain high levels of usage. We will carry out intermittent surveys to assess vehicles using the sites	PKC	2009 - ongoing	Ongoing	Annual usage statistics A calculator of avoided NOx /PM10 will be provided	Medium	Passenger waiting facility constructed at the Broxden P&R site, has been well received by the general public. Electric car charging points have been installed at Broxden and Kinross P&R sites Timetable was amended to reflect demand and fares revised: passengers now benefit by being able to use Stagecoach network tickets (Dayrider and Megarider) Planning Permission 15/01808/FLM has been approved for a new Park & Ride at Walnut Grove	Ongoing	No data from Stagecoach as have been advised that there has been problems with data collection

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
5	Bus Quality Improvements	Transport planning and infrastructure	Bus Strategy 7 Quality Bus Partnerships	Tactran PKC	2009-2040	More specific timescales are available in Tactran's RTS Delivery plan/capital and revenue programmes	Shift to alternative modes- this will be monitored by Tactran as part of the evaluation process of their RTS Delivery Plan	Medium	Timetables have been amended to reflect demand and fares revised: passengers now benefit by being able to use Stagecoach network tickets(Dayrider and Megarider) Continued corridor improvements involving PKC, Tactran and bus operators And improvements on bus shelter facilities and interchanges. New link road to Gleneagles was installed for the Ryder Cup, which now provides a continual bus-rail interchange for local communities long after the Ryder Cup. Undertook the planning phase prior to the introduction of an innovative Demand Responsive Transport (DRT) scheme in West Kinross-shire	Ongoing	

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
6.	Freight Improvements	Freight and delivery management	Establish a Tactran – wide Freight Quality Partnership, in liaison with freight interests and Councils drawing upon established guidance, to help deliver cost effective packages of freight related interventions across the region.	Tactran PKC	Ongoing to 2024	Ongoing to 2024 More specific timescales are available in Tactran's RTS delivery plan/capital and revenue programmes	PKC will seek regular updates from Tactran on progress and report on these annually	High	A Tactran – wide freight quality partnership has been formed including members from PKC, Scottish Enterprise and the private freight sector. PKC and Dundee's EH managers are members of the Freight Quality Partnership. AQ is integrated into the Freight Quality partnership	EH continue to attend meetings to ensure AQ is integrated into FQP	

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
		Freight and delivery management	Development of a freight consolidation scheme or commercial delivery strategy	Tactran PKC	Feasibility work subject to funding, will be carried out in Years 1 and 2 of this AQAP	2015	Initially we will report on feasibility work as and when it is carried out. If developed we could use the number of vehicle km avoided to calculate emission savings	Medium-High	Feasibility 2010 recommended trial scheme EU & SG Funding secured 2012 Tendering failed to identify a suitable private sector operator. Meetings held to establish a local business to take up scheme. A Dundee Social Enterprise company is currently developing a detailed business plan to introduce a consolidation centre within the Perth and Dundee area to hopefully be completed within 2016	Not know at this time	Tactran have taken the lead on this project.

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
7.	Travel Planning	Promoting travel alternatives	PKC Staff Travel Plan; including encouraging Flexible working, car/lift sharing/ alternative modes, salary sacrifice bicycle scheme	PKC	Initiated year two of this AQAP	On going	Activity data will be collected by survey to support the working of the PKC GTP. A base survey of staff travel habits will also be carried out. We will estimate vehicle km avoided in the AQMA and report emissions of NOx and PM10	Medium	Staff Travel Plan was launched in September 2010; a staff travel plan summary leaflet was produced along with a staff travel Plan web page. Events such as Walk to Work Week and Family bike events in Perth Promoted via PKC staff intranet Lift share website and salary sacrifice bike to work schemes are still available to staff		Due to budget restraints, cuts were made in general sustainable transport budget. Therefore although the staff travel plan has been approved at SPR in 2010, no additional promotional work has been carried out .

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
		Promoting travel alternatives	We will work with regional partners to further encourage development and employee use of Green Travel Plans in our large employers within Perth& Kinross	Tactran (through the sustainable Travel Liaison Group) PKC	2009	2009 then ongoing	Activity data will be sought from the main employers as to the journeys avoided from their GTPs. If this is provided will estimate vehicle km avoided in the AQMA and report reduction in emissions of NOx and PM10	Medium	Tactran has been represented on SSE's Travel Plan Steering group and provided advice and promotional material. Perth College has also been given information and support of use of liftshare. Aviva, PRI and Murray Royal Hospitals have been given advice and guidance in travel planning process and PRI provided with grants for travel planning measures Promotion of travel plan implementation software, Tactran travel knowhow to support businesses developing and implementing travel plans	Ongoing	No base line has been developed

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
		Promoting travel alternatives	We will continue to support schools developing Green Travel Plans through our school co-ordinator and collect activity data to assess their use through our school co-ordinators	PKC	2009 then ongoing	Ongoing	Survey data will be requested from PKC schools as to the journeys avoided from their GTPs. We will estimate vehicle km avoided in the AQMA and report reduction in emissions of NOx and PM10	Medium	SG grant funding allows for the continued support for school green travel plans. Road network Team promote Cycling, walking, WoW initiatives.	Ongoing	PKC post for a Bikeability Officer to allow data to be collated, with the intention of in the future developing a base line. The percentage of pupils regularly[1] cycling to school in 2014/15 increased from 18.2% to 22.3% after one year
		Promoting travel alternatives	Regional/PKC car and Lift Share schemes- there is both a wider scheme, and one specific to PKC employees. We will improve use of PKC scheme through our own GTP	Tactran PKC	2009 then ongoing	Ongoing	Activity data will be collected annually from both schemes and we will estimate vehicle km avoided in the AQMA and report reduction in emission of NOx and PM10	Small-Medium	Continued promotion of Liftshare including PKC and PRI, SSE and Aviva with stalls within workplaces. Participation in national Liftshare week and leaflet promotion through employers	Ongoing	A baseline has still to be established

[1] Once a week or more

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
		Promoting travel alternatives	Green Travel Plans for new development. We will continue to seek travel plans from large development under existing planning arrangements	PKC	2009 then ongoing	Ongoing	Number of GTPs and estimation of specified in reporting year	Low	This is a continual process through planning and is requested by Transport Planning Team who are internal consultees for planning	Ongoing	In 2015 ten GTP were requested through the planning process.
8.	Traffic Management	Traffic management	Keep "City Traffic Management Review" under continual review our traffic and Environmental teams will liaise regularly to discuss the effects of component measures of CCTMR on Air Quality	PKC	Ongoing as required	Ongoing	We will report annually on any changes to the CCTMR and how we anticipate this effecting air quality	Medium	20 Motes and 3 gateways were installed by Envirowatch. However there has been an issue with regards to data quality A new Stratos UTM Common database was installed and a main link has been secured. However the data from the Motes is unusable and PKC have decided, after engaging further advice (Strathclyde University) on the reliability and formatting of data, to discontinue with the Mote System.	Ongoing	We will continue to review traffic management within our AQMA.

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
9.	Planning and Air Quality	Policy guidance and development control	Consider air quality as an issue for the Local Development Plan	PKC	2014	2014-2024	It is not possible to assign a quantitative indicator. We will report on delivery of the Local Development Plan, and provide evidence that air quality considerations have been formalised within it.	Medium	PKC Local Development Plan PDF [27Mb]. Was adopted in February 2014 to be reviewed every 5 years. The LDP is under review at moment and AQ will be considered within the plan for the whole region, not just AQMAs. The review will be in line with CAFS . The LDP review should be completed by 2019 and then will be sent to committee before it is adopted.	2019-24	

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
		Policy guidance and development control	Investigate development of supplementary planning guidance (SPG) on Air Quality This will include results of regional air quality modelling currently being undertakne by Ricardo E&E	PKC	2014	2017 Non Statutory	It is not possible to assign a qualitative indicator. We will report progress on the development of new guidance.	Small	A draft SPG on AQ was developed but never adopted. PKC are to develop new SPG which will be linked with the new revised LDP and therefore become a statutory document. However the SPG will be developed before the LDP is adopted and will be a non-statutory document , in the interim	2019 to be adopted in line with new LDP and become a statutory document	In consultation with climate change colleagues

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
		Policy guidance and development control	Consider air quality in planning decisions and formalise decision making process/interaction with Environmental Health. This can relate not only to new transportation sources, but also new biomass installations or industrial sources	PKC	Ongoing	Ongoing as required	It is not possible to assign a qualitative indicator. We will report on cases where air quality was a consideration in the reporting period, and any outcomes of any decisions made.	Low	Environmental Health will continue to check the weekly planning list and comment on applications which may adversely impact on local air quality 2014/15 EH commented on 14 biomass installations. The AEA /EPUK screening tools are used to assess applications.	Ongoing	

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
10.	Procurement and Air Quality	Vehicle fleet efficiency	Air Quality will be formally considered in tender process for new PKC vehicles. PKC currently specify stringent Euro Standards than necessary. A fleet survey will be necessary in the short term to establish the baseline for improvement	PKC	Fleet Survey in year1 of AQAP, then ongoing as tenders arise as part of the standards specification	Ongoing	If vehicles are replaced like for like, the number will be reported annually, with Euro standards and that of the vehicle replaced. This will feed into an emissions calculation and the saving in NOx and Pm10 will be reported annually. If additional vehicles bought, Euro Standards will be reported and an estimation of impact of specifying a more stringent standard will be reported	Small-Medium	PKC have installed electric point's at all council operation depots. 2014 14 x Euro 3 Minibuses replaced with 14 x Euro 5 3 x Euro 4 Minibuses replaced with 3 x Euro 5 80 x Euro4 Cars replaced with 80 x Euro 5 Cars 19 x Euro 5 Cars replaced with 19 x Euro 6 cars 1 x Euro 4 Light Goods Vehicle replaced with 1 X Euro 6 Light Goods Vehicle 9 x Euro 5 Light Goods Vehicles replaced with 9 x Euro 6 Light Goods vehicle 19 Euro4 HGV's replaced with 19 x Euro 5 HGV's	ongoing	

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
									2015 Disposed of 7 minibuses @ euro 3 replaced with 5 minibuses euro 5 Disposed of 10 diesel cars @ euro 5 replaced with 9 diesel cars @ euro 6 Disposed of 14 light vehicles @ euro 5 replaced with 16 light vehicles @ euro 5b Disposed of 10 HGV's @ euro 4 replaced with 12 HGV's (7 @ euro 5 and 5 @ euro 6)		

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11	Eco –driver training	Vehicle fleet efficiency	PKC will seek to expand the existing provision of eco-driver training utilising formed training team to develop and add an eco-training course into existing modular training syllabus. The eco-driving module will become part of our regular driver CPC training package which will be delivered on an ongoing basis	PKC	Expanded programme by 2011 then ongoing	2011	PKC intend to assess drivers after they have completed the training. The outcomes of these assessments (i.e. the fuel saving per driver) will allow simple calculation of avoided emissions of NOx and PM10	Small	Out of the 30 allocated spaces, 29 individual PKC employees successfully completed the eco driving training The eco-module also forms part of future training for all council drivers as part of the driver assessment programme, which will also cover the driver's responsibilities on legislation and what pre-use vehicle checks need to be carried out and documented.	Ongoing	PKC have 4 Trainers to deliver Drivers CPC Programme. PKC now run an in house, Service need, LGV Training Centre. PKC now have a Qualified LGV driving instructor to deliver LGV Training to staff PKC continues to deliver Drivers CPC Programme to PKC Staff and Angus.

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	Set up vehicle group MPG indicators	Vehicle fleet efficiency	MPG KPI's	PKC	2016/17	2017/19	MPG KPI'S	Small	Cleansing database and fuel information cultural change to ensure accurate mileages and machine hours are accurately recorded at each fuelling event	2018/19	Difficulty in getting accurate figures due to improper mileage readings
	Better utilisation of the small vehicle fleet by installing telematics	Vehicle fleet efficiency	Small Vehicle Fleet	PKC	2016/17	2017 to 2019	Less grey fleet mileage better use of Council pool vehicles	Small	Completed the transformation project OBC for funding	2020	Dependant on funding and resources

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
12	Provision of Travel Information	Public information	Develop, promote and maintain a comprehensive Travel Information System, covering all modes and users and make this information available in on-line formats. Delivered through Tactran's Regional Travel Information Strategy	Tactran PKC	Study/develop strategy by 2011 specific measures ongoing to circa 2018	2018	We will liaise with Tactran and report annually on the findings of the feasibility work. As initiatives are implemented we will report progress on these individually	Medium	A web-based regional travel information database and journey planner (Tactran connect) developed in May 2010. Further developments have included provision of information for logistics sector/lorry drivers. The website went under a branding, public awareness and modernisation review in 2014 Traveline Scotland in partnership with PKC continue to develop the website and apps to provide enhance public transport information Scotland-wide	Ongoing	

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
13	Signage	Public information	Investigate the potential of variable message signage linked to pollution monitoring system	PKC	Feasibility work by 2011	2016/17	We will report annually the findings of any feasibility work that is carried out and develop the measure further based on their findings	Medium	Public Transport Team have carried out a feasibility study to install the provision of RTI and signage at certain locations with Perth & Kinross area	2017	The RTI and signage will not be link up to pollution monitoring system, but will give RTI on travel information.

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
14	Alternative Modes	Promoting travel alternatives	Work closely with Tactran to aid delivery of the Walking and Cycling Strategy for the region to ensure walking and cycling are part of an integrated transport system	Tactran PKC	Initial study – 2009-10 Ongoing liaison/review	Ongoing liaison/review	We will liaise with Tactran annually and report progress with individual measures implemented under the Strategy	Medium	Cycle training provided to staff and production of walking and cycling maps has been undertaken. SG grant funding attained this year again for a number of walking/cycling initiatives including training and safety events PKC helps fund The IBike Project and Hand up Survey within Perth &Kinross SchoolsPerth on the Go delivers cycle/walking route maps and bus timetables to local residents and travel planning through school initiatives. Bikabilty officer employed	Ongoing	

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
15	Better access to public transport(note: access to services, not person access to individual buses)	Transport planning and infrastructure	Work with planning colleagues to assess provision of public transport at new and existing developments.	PKC	2009 - Ongoing	Ongoing	We will report on findings of reviews and any improvements made to the existing public transport network and on new developments that have given public transport facilities	Small	Improvement of operation of Service 11 which operates between Murray Royal and Perth City Centre has been completed, with the addition of two bus shelters along the route at Bridgend/Dundee Road and to support public transport access to major employers such as SSE and Aviva. Worked with Ryder Cup Europe on local transport access to both the Ryder Cup at Gleneagles and Junior Ryder Cup at Blairgowrie	Ongoing	
16	Idling Emission Reduction	Promoting low emission transport	Enforce Vehicle Idling Regulations	PKC	Feasibility study 2010	No progress	Number of vehicles subject to enforcement.	Small	No progress	No Progress	
17	Roadside Emission Testing	Promoting low emission transport	Authorised Personnel to carry out roadside testing	PKC initially	Feasibility study involving surrounding Local authorities By end 2010	No Progress	Number of vehicles subject to enforcement	Small	No Progress	No Progress	

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
18	LAQM Marketing	Public information	Enhance existing provisions of publicity materials and ensure they reach their target audience. Organise publicity initiatives in schools, large employers, public sector	PKC		Commence 2009-Ongoing	Publication of materials, events held website statistics	Small - Medium	The AQ website has had over 5,000hits over the year. PKC are constantly updating data and improving the site when possible. PKC website was contracted to Ricardo to maintain and update, but PKC EH are now taking this over due to financial restraints. www.pkcairquality.org.uk/ SG funding for the Perth on the Go social marketing campaign , allowed further schools within Perth such as North Muirton and Tulloch and Crieff which PKC declared an AQMA in April 2014	Ongoing	We are in the process of Ricardo handing over the domain for the website, so there will be a transition stage as PKC take over the updating and maintaining the PKC AQ website.

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
19	LAQM monitoring and reporting	Statutory Duties LAQM	PKC will continue to monitor air pollution in the City and will meet its statutory reporting	PKC	Ongoing	Ongoing	Monitoring data will be provided in annual progress reports to track the overall effect of the AQAP.	Small	USA 2015 Completed PKC continue to monitor AQ in Perth	Ongoing	Investigating into the provision of PM2.5 Monitoring

3. Air Quality Monitoring Data and Comparison with Air Quality Objectives

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how local concentrations of the main air pollutants compare with the objectives.

Perth and Kinross Council undertook automatic (continuous) monitoring at 4 sites during 2015 Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at http://www.scottishairquality.co.uk/

Maps showing the location of the monitoring sites are provided at the above link. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

Perth and Kinross Council undertook non- automatic (passive) monitoring of NO_2 at 66 sites during 2015 Table A.2 in Appendix A shows the details of the sites.

Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C. Co-ordinates of these sites are within Table A.2 below.

3.2 Individual pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for annualisation and bias. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

For diffusion tubes, the full 2015 dataset of monthly mean values is provided in Appendix B.

Table A.4 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

The automatic monitor located in Atholl St continues to show an exceedance of the annual mean standard with a concentration of 49 µg/m^3 an increase from 45 µg/m^3 in 2014. This was not enirely unexpected due to the weather conditions in 2015, the 5 year trend here is still downward as shown in Figure 1 and the first 6 months of 2016 look much lower than the first 6 in 2015 so far. There was once again no exceedances of the hourly mean in 2015.

The other automatic monitors were below the annual mean standard and the hourly standard for 2015.

Diffusion tube monitoring showed exceedances at 8 locations in Perth, and 1 in Crieff in 2015, as in 2014. The exceedances were all within the Perth and Crieff AQMAs.

3.2.2 Particulate Matter (PM_{10})

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of

18µg/m^3.

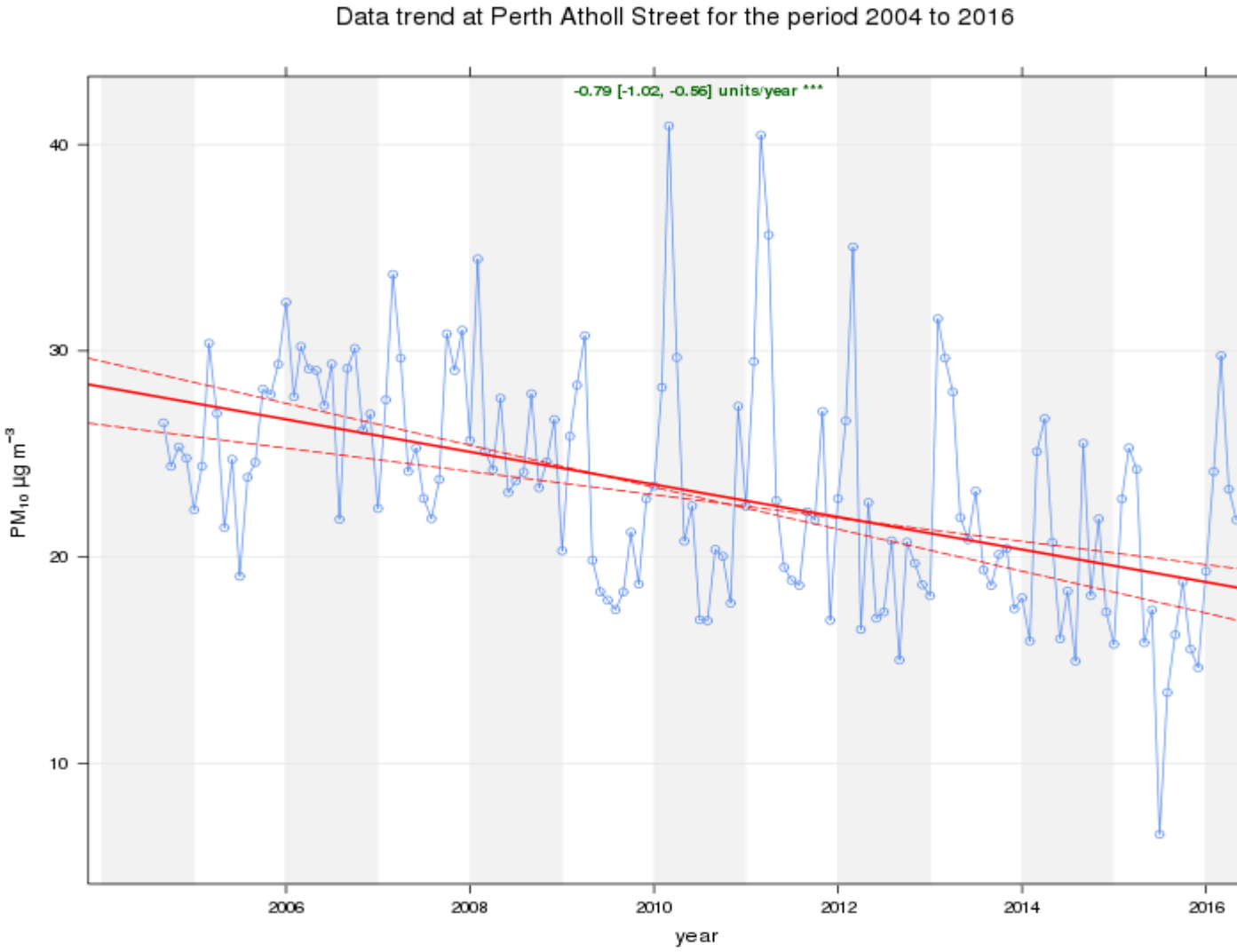


Figure **5 Annual Mean PM_{10} Trend at High St**

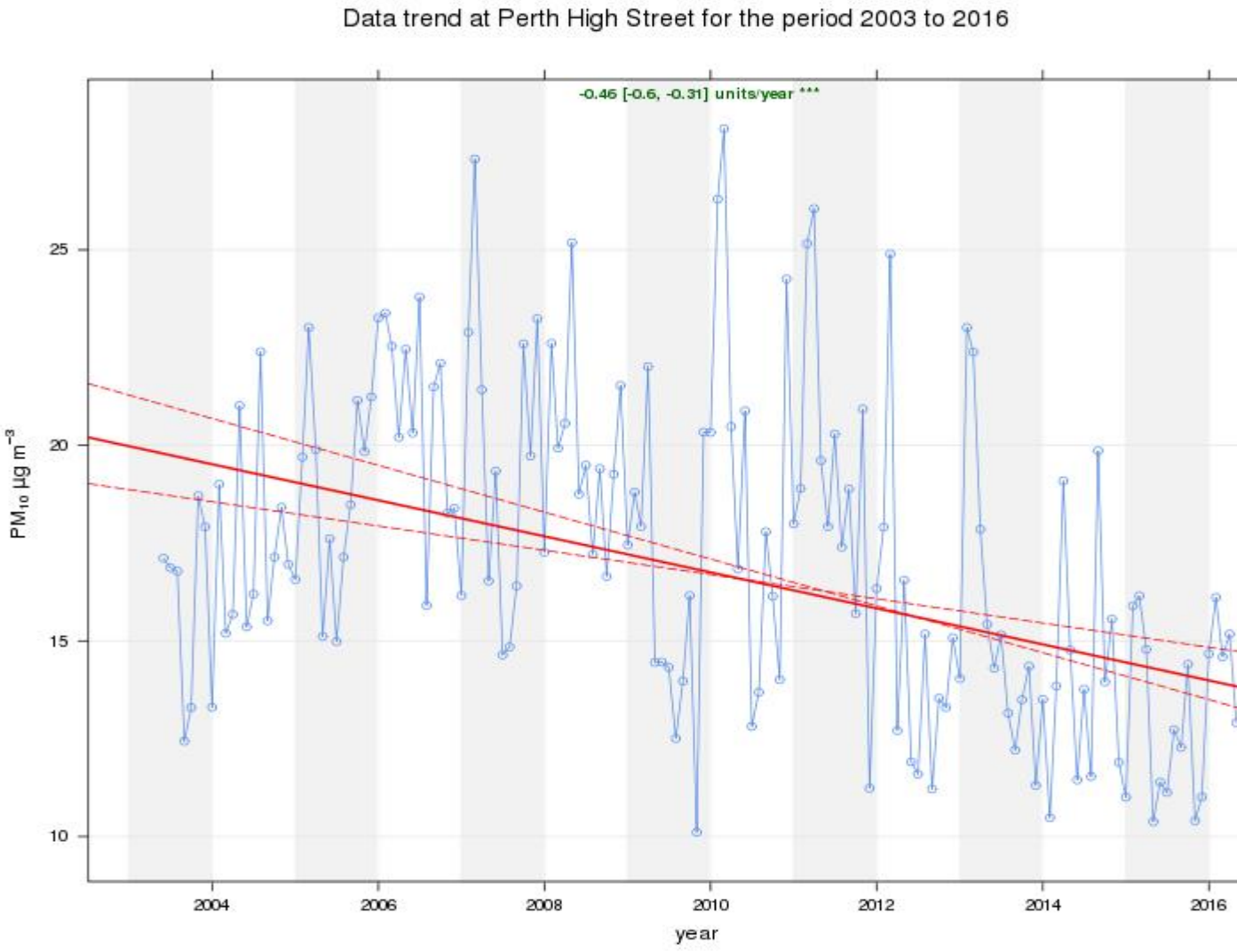


Figure **6 Annual Mean Trend for PM_{10} at Crieff**

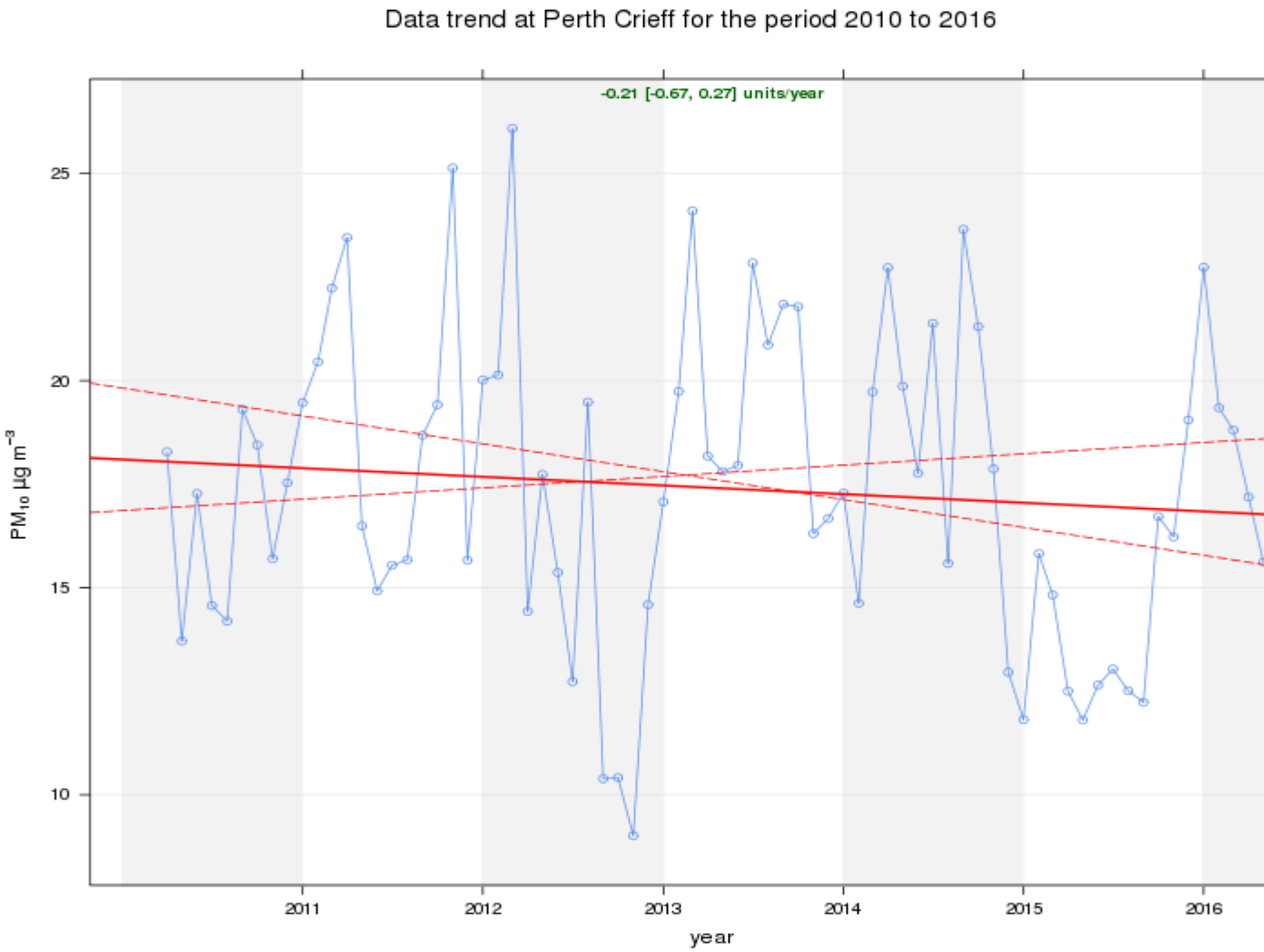


Table A.6 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the air quality objective of 50µg/m^3, not to be exceeded more than 7 times per year.

The annual mean standard was exceeded at only the Atholl St monitor for PM_{10}, however this levels of this pollutant dropped from 20µg/m^3 to 18µg/m^3 from 2014 to 2015. The daily mean PM_{10} exceedances increased form 1 to 6 at Atholl St and 0 to 1 at High St. This is thought to be episodic in manner however is still below the standard of no more than 7 exceedances in a year.

3.2.3 Particulate Matter ($PM_{2.5}$)

Perth and Kinross Council do not currently monitor $PM_{2.5}$ but have 4 monitoring sites for PM_{10}, it is our intention to seek funding in order to allow us to carry this out in the future.

Based upon method 2 of Annex B within TG.16, the undernoted table shows the derivation of $PM_{2.5}$ from PM_{10} .

Table 3.1 PM_{10} to $PM_{2.5}$ conversion at monitoring sites

PM_{10} to $PM_{2.5}$ Conversion		
Monitoring Site	Annual Mean (ugm-3)	TG.16 adjustment (0.7)
Atholl St	**18**	**12.6**
High St	13	9.1
Muirton	9	6.3
Crieff	14	9.8

Exceedance of the Annual Mean Standard in Bold

This shows a predicted exceedance at Atholl St and a probable exceedance in Crieff as the monitor is not located in a worst case location.

These AQMAs are currently declared for breaches of the annual mean standards for NO_2 and PM_{10}, but not $PM_{2.5}$ therefore it is our intention to amend our AQMA order, to include this pollutant for both Crieff and Perth

3.2.4 Sulphur Dioxide (SO2)

This pollutant is not monitored and there are no plans to do so.

3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene

These pollutants are not monitored and there are no plans to do so.

4. New Local Developments

4.1 Road Traffic Sources

There are new road traffic sources at this time

4.2 Other Transport Sources

No new sources identified

4.3 Industrial Sources

SEPA have confirmed that there are no new industrial sources, email attached in Appendix D.

4.4 Commercial and Domestic Sources

The Table below shows planning applications for biomass boilers between the size of 50kW and 20MW. No areas of significant solid fuel burning or CHP plants were identified.

Table 4.1 approved biomass boiler planning applications

Biomass Developments				
Planning Ref	Location	Thermal Output (kW)	In AQMA	FA required
14/02227/FLL	Inchture	199	N	N
14/02195/FLL	Forgandenny	199	N	N
15/00015/FLL	Forteviot	995	N	N
15/00154/FLL	Crieff	199	N	Y
15/01373/FLL	Blairgowrie	990	N	N
15/01380/FLL	Methven	195	N	N
15/02009/FLL	Scotlandwell	80	N	N

One biomass boiler required a more detailed assessment, this was 15/00154/FLL in Crieff (not AQMA), this showed no predicted exceedance.

4.5 New Developments with Fugitive or Uncontrolled Sources

Nothing identified.

5. Planning Applications

There are several large scale planning applications within Perth and Kinross which could have an impact on air quality within Perth and Crieff. In particular the Local Development Plan identified 3 large mixed use sites to the North and West with provision for thousands of houses to meet demand within Perth. These developments require significant infrastructure, including a Cross Tay Link Road (CTLR) which connects them to the A9 the A93 and A94 via a new crossing over the River Tay.
These are at varying stages of progress in the planning system and are detailed below.

Perth Area
15/01112/IPM and 15/01109/FLM were applications for the Bertha Park development the first, an in principle application for mixed use including 3000 houses, the second was a detailed application for the first phase of the 3000 and included around 1000 houses. Each were accompanied by the same air quality assessment, which assessed air quality locally. It was requested by Environmental Health that air quality impacts be considered into Perth City centre to account for our worst affected hot spots. This was done and impacts were found to be acceptable for the whole development, but only if the provision of the CTLR was included within the predictions.

15/01157/IPM was an application for around 1300 houses at Huntingtower which borders the Bertha Park application and was also accompanied by an air quality assessment. Once more this did not go far enough or consider city centre roads therefore this was requested, however this application has since been refused and is at appeal.

15/00953/SCOP was a scoping for a future planning application for around 600 houses near Huntingtower and borders the above application. An air quality

assessment will be included as part of the Environmental Statement for this application.

Taken cumulatively, this is a large number of houses, potentially increasing the traffic into Perth which could have a major negative impact on congestion and air quality. There could also be a detrimental effect to the existing roads around the area of these applications, and for this reason, Transport Scotland have stated only 440 houses should be built between these 3 developments prior to the CTLR being delivered. This will prevent an unacceptable impact on traffic in the immediate vicinity but also prevent unacceptably high impacts to air quality in the centre of Perth.

There are other applications in Luncarty, Stanley and Scone at a less advanced stage, which each have the potential to impact on air quality within Perth. These will be considered in future reports as more detail becomes available.

15/01808/FLM was a planning application for the Walnut Grove Park and Ride. This is part of our Perth Air Quality Action Plan and it is hoped this will help remove traffic from the centre of Perth.

Crieff

15/01237/IPM for 300 houses on Brioch Road Crieff was approved in 2015. The air quality assessment predicted a slight increase in PM_{10} in the Crieff AQMA. Environmental Health supported this application based on the condition that mitigation be considered at the Approval of Matters stage.

15/01354/IPL was an application for a supermarket adjacent to the above housing development. A generic air quality assessment was submitted in support of this application, a Crieff specific assessment was requested, however this application has since been refused and is at appeal.

Other

15/01515/FLM was for 300 houses at Lathro Park, Kinross and was supported by an air quality assessment. There are no air quality issues in Kinross and no future exceedances were predicted.

15/01972/FLL was for a barite mine at Duntanlich, an air quality assessment was undertaken, focussing on particulate matter, no issues were identified.

15/01637/FLL was for a new rail interchange servicing the Highland Spring bottled water plant in Blackford. No air quality issues were identified locally however air quality improvements could be expected further afield.

6. Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

Perth and Kinross Councils air quality monitoring continued to show exceedances around the city centre for NO_2. Whilst there was an increase at Atholl St, the overall trend is still strongly downward here.

PM_{10} levels decreased at monitors in both Perth and Crieff so that the worst affected street, Atholl Street is at the same level as the annual mean objective, 18ugm^{-3}. We have no $PM_{2.5}$ monitoring as yet in the area, therefore the 0.7 conversion factor has been applied and this shows exceedance of this standard in both Perth and Crieff

6.2 Conclusions relating to New Local Developments

As detailed above there are several large housing and mixed use developments on the outskirts of Perth, which have the potential to exacerbate the situation in Perth. Modelling has shown that the CTLR should alleviate the issues but it is important that each application is assessed and mitigation put in place to prevent any worsening or extension of the AQMA.

6.3 Proposed Actions

There are still exceedances of NO_2 and PM_{10} within Perth and Crieff, therefore it is proposed to continue with the Perth AQAP and continue to develop the Crieff plan this year.

$PM_{2.5}$ would also appear to be above the new 10ugm^{-3} based upon the ratio given in TG.16. Due to this we propose amending our AQMA Order for both Perth and Crieff to include this pollutant. This may require some alteration of the AQAP for Perth, however measures tackling this pollutant will be broadly similar as exist for NO_2 and PM_{10}

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
Perth 1	High St	Roadside	311680	723624	NO_2; PM_{10}	Y	Chemiluminescent; TEOM	20.4	4.8	1.5
Perth 2	Atholl St	Roadside	311575	723917	NO_2; PM_{10}	Y	Chemiluminescent TEOM	22.3	2.3	1.5
Perth 3	Muirton	Background	310658	725658	PM_{10}	Y	FDMS	N/A	N/A	2
Crieff 1	James Sq	Roadside	286363	721614	NO_2; PM_{10}	Y	Chemiluminescent FDMS	9.5	5.3	1.5

(1) 0 if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable.

Table A.2 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?
P1	42 Scott St Perth	R	311690	723500	NO_2	Y	3	2.5	N
P2	17 Speygate Perth	R	312020	723411	NO_2	Y	2.9	2.05	N
P3	5 Murray Cr Perth	UB	310534	722926	NO_2	Y	2.9	2.05	N
P5	8 Stormont Street	UC	311586	723993	NO_2	Y	10	1.7	N
P6	41 Mull Place	UB	310510	725767	NO_2	Y	6	1.7	N
P7	257 Rannoch Road	UC	308925	724287	NO_2	Y	8.3	2.1	N
P13	86 South Street	R	311847	723453	NO_2	Y	0	2.6	N
P19	Dunkeld Road	R	311370	724050	NO_2	Y	3.4	3.2	N
P20	2 Crieff Road	R	311057	724395	NO_2	Y	0	1.9	N
P28	28 York Place	R	311186	723506	NO_2	Y	12	2.4	N

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?
P29	37 York Place	R	311253	723517	NO_2	Y	8	4.1	N
P30	104 South Street	R	311798	723457	NO_2	Y	0	2.4	N
P31	45-47 South Street	R	311917	723466	NO_2	Y	0	3.5	N
P32	135 South Street	R	311698	723483	NO_2	Y	0	4.6	N
P33	216 South Street	R	311582	723475	NO_2	Y	0	2.5	N
P34	10 County Place	R	311510	723480	NO_2	Y	2	3	N
P35	17 Princes Street	R	311932	723422	NO_2	Y	1.5	1.8	N
P36	51 Glasgow Road	R	310776	723556	NO_2	Y	7.2	2.6	N
P37	Riggs Road	R	310856	723581	NO_2	Y	10	1.9	N
P38	93 Main Street,	R	312263	724167	NO_2	Y	1	7	N
P39	39 Main Street,	R	312253	724019	NO_2	Y	7	2.1	N

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?
P40	18 Main Street	R	312244	723965	NO_2	Y	1	2.4	N
P41	76 Atholl Street	R	311465	723941	NO_2	Y	1	2.5	N
P42	26-28 Atholl Street	K	311635	723950	NO_2	Y	2	0.3	N
P43	17 Atholl Street	R	311635	723950	NO_2	Y	2	3	N
P44	22 Barrack Street	K	311422	723977	NO_2	Y	2.7	0.3	N
P45	Ballantine Place	UC	311097	724358	NO_2	Y	4	1.7	N
P46	204 Crieff Road	R	309328	724878	NO_2	Y	11.5	2	N
P47	5 East Huntingtower	R	308274	724895	NO_2	N	5.5	1.8	N
P48	30 Edinburgh Road	R	311496	721862	NO_2	Y	37	2.5	N
P51	2 West Bridge St	R	312235	723927	NO_2	Y	12.5	3.7	N
P62	84 Dundee Road	R	312504	722929	NO_2	Y	1	1.7	N

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?
P63	30 Dundee Road	R	312413	723252	NO_2	Y	1.5	1.4	N
P64	Isla Road	R	312228	724118	NO_2	Y	1	1.4	N
P65	5 Charlotte Street	R	311943	723865	NO_2	Y	3.3	2	N
P67	1 Atholl Street	R	311691	723939	NO_2	Y	1	2.3	N
P68	2 Atholl Street	R	311720	723955	NO_2	Y	2.5	0.8	N
P69	Church, Kinnoull St	R	311660	723908	NO_2	Y	3	2.6	N
P70	28 Dunkeld Road	R	311010	724484	NO_2	Y	5.1	2.1	N
P71	134 Dunkeld Road	R	310615	724958	NO_2	Y	7.8	1.5	N
P72	82 Crieff Road	R	310331	724552	NO_2	Y	1	2.4	N
P79	17 Main Street,	R	312262	723976	NO_2	Y	0	3.3	N
P86	2 Friarton Road	R	311790	721398	NO_2	Y	4.5	2.0	N

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?
P88	202 Glasgow Road	R	310158	722635	NO_2	Y	5.5	1.5	N
P89	59 South Methven St	R	311547	723544	NO_2	Y	0	3.2	N
P90	22 North Methven St	R	311539	723797	NO_2	Y	0	3	N

(1) 0 if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property).

(2) N/A if not applicable.

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?
P55	7 West High Street, Crieff, PH7 3AF	UC	286321	721639	NO_2	Y	0	0.4	N
P56	39, High Street, Crieff, PH7 3HT	UC	286509	721555	NO_2	Y	0	1.2	N
P57	62, High Street, Crieff,	UC	286542	721563	NO_2	Y	0	1	N

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?
	PH7 3BS								
P58	9 East High Street, Crieff, PH7 3AF	UC	286575	721553	NO_2	Y	5	0.3	N
P73	19 West High Street, Crieff, PH7 4AU	UC	286302	721651	NO_2	Y	0	2.5	N
P74	43 High Street, Crieff, PH7 3HT	UC	286517	721553	NO_2	Y	0	1.4	N
P76	10/12 West Street, Crieff, PH7 4DL	UC	286324	721632	NO_2	Y	0	2	N
P77	9 Comrie Street, Crieff, PH7 4AX	UC	286271	721553	NO_2	Y	0	2.7	N
P78	1 Lodge Street, Crieff, PH7 4AX	UC	286195	721691	NO_2	Y	0	2.2	N
P87	Background Hollybush Rd	UB	287028	721485	NO_2	N	40	N/A	N

(1) 0 if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property).
(2) N/A if not applicable

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?
P81	76 High Street, Kinross, KY13 8JA	R	311936	702187		N	0.5	1.3	N
P82	66 High Street, Auchterarder, PH3 1BN	R	294569	712888		N	1.7	0.5	N
P83	176 High Street, Auchterarder, PH3 1AS	R	294268	712730		N	3	0.5	N
P91	Main St, Glenfarg, PH2 9NT	R	313584	739915		N	25	1	N
P92	Main Road, Ballinluig PH9 0LG	R	297753	752576		N	30	1	N
P93	26 Allan St, Blairgowrie, PH10 6AD	UC	317898	745319		N	2	1	N
P94	Queen St Coupar Angus	UC	322232	739915		N	3	2	N

(1) 0 if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property).
(2) N/A if not applicable

Table A.3 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2011	2012	2013	2014	2015
Perth 1 (High St)	Roadside	Automatic	N/A	98%	27	26	22	22	22
Perth 2 (Atholl St)	Roadside	Automatic	N/A	92%	**57**	**54**	**48**	**45**	**49**
Crieff (St James Sq)	Roadside	Automatic	N/A	97%	34	23	26	23	23

Notes: Exceedances of the NO_2 annual mean objective of 40µg/m3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG(16) if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2015 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2011	2012	2013	2014	2015
P1 (42 Scott St)	R	Diffusion	N/A	89%	**41**	**44**	**41**	**40**	36
P2 (17 Speygate)	UC	Diffusion	N/A	100%	23	25	22	21	22
P3 (15 Murray Cr)	UB	Diffusion	N/A	100%	20	21	18	17	16
P5 (8 Stormont St)	UC	Diffusion	N/A	100%	23	23	20	20	21
P6 (41 Mull Pl)	UB	Diffusion	N/A	83%	14	14	13	11	12
P7 (257 Rannoch Rd)	UC	Diffusion	N/A	92%	19	20	19	18	15
P13 (86 South St)	R	Diffusion	N/A	100%	37	39	35	30	32
P19 (School Dunkeld Rd)	R	Diffusion	N/A	100%	34	36	32	31	30
P20 (2 Crieff Rd)	R	Diffusion	N/A	100%	29	30	28	27	26
P28 (28 York Pl)	R	Diffusion	N/A	100%	**45**	**44**	**44**	38	34
P29 (37 York Pl)	R	Diffusion	N/A	100%	39	39	39	**40**	**40**
P30 (104 South St)	R	Diffusion	N/A	100%	**41**	**41**	37	34	35
P31 (45-47 South St)	R	Diffusion	N/A	100%	30	31	30	29	27

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2015 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2011	2012	2013	2014	2015
P32 (135 South St)	R	Diffusion	N/A	100%	37	39	36	29	33
P33 (216 South St)	R	Diffusion	N/A	100%	**40**	**40**	38	35	35
P34 (10 County Pl)	R	Diffusion	N/A	100%	**52**	**51**	**46**	**45**	**44**
P35 (17 Princes St)	R	Diffusion	N/A	100%	29	29	27	26	26
P36 (51 Glasgow Rd)	R	Diffusion	N/A	100%	35	35	33	30	28
P37 (Riggs Rd)	R	Diffusion	N/A	100%	29	30	30	27	26
P38 (93 Main St)	R	Diffusion	N/A	100%	31	31	31	30	27
P39 (39 Main St)	R	Diffusion	N/A	100%	**48**	**48**	**46**	**44**	**40**
P40 (18 Main St)	R	Diffusion	N/A	100%	**48**	**47**	**44**	**42**	**43**
P41 (76 Atholl St)	R	Diffusion	N/A	100%	**50**	**55**	**47**	**42**	37
P42 (26-28 Atholl St)	K	Diffusion	N/A	93%	**49**	**52**	**47**	**43**	**41**
P43 (17 Atholl St)	R	Diffusion	N/A	100%	**53**	**55**	**51**	**49**	**47**
P44 (22 Barrack St)	K	Diffusion	N/A	100%	**44**	**47**	**43**	34	34

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2015 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2011	2012	2013	2014	2015
P45 (Ballantine Pl)	UC	Diffusion	N/A	100%	24	26	23	21	19
P46 (204 Crieff Rd)	R	Diffusion	N/A	100%	31	35	33	30	29
P47 (5 East Huntingtower)	R	Diffusion	N/A	100%	28	25	28	25	23
P48 (30 Edinburgh Rd)	R	Diffusion	N/A	100%	26	26	25	24	21
P51 (2 West Bridge St)	R	Diffusion	N/A	100%	30	32	30	27	27
P62 (84 Dundee Rd)	R	Diffusion	N/A	92%	34	34	33	31	28
P63 (30 Dundee Rd)	R	Diffusion	N/A	100%	37	39	39	37	**40**
P64 (Isla Rd)	R	Diffusion	N/A	100%	**49**	**49**	**45**	**43**	**46**
P65 (Charlotte St)	R	Diffusion	N/A	100%	31	33	33	34	30
P67 (1 Atholl St)	R	Diffusion	N/A	100%	**40**	**41**	36	35	35
P68 (2 Atholl St)	R	Diffusion	N/A	100%	33	33	30	30	30
P69 (Church Kinnoull St)	R	Diffusion	N/A	100%	36	37	34	31	32
P70 (28 Dunkeld Rd)	R	Diffusion	N/A	83%	30	36	30	28	28

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2015 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2011	2012	2013	2014	2015
P71 (134 Dunkeld Rd)	R	Diffusion	N/A	100%	18	19	18	28	18
P72 (134 Dunkeld Rd)	R	Diffusion	N/A	100%	38	**40**	37	16	37
P79 (17 Main St)	R	Diffusion	N/A	100%	**46**	**40**	**42**	**40**	36
P86 (2 Friarton Rd)	R	Diffusion	N/A	100%	N/A	30	28	28	26
P88 (202 Glasgow Rd)	R	Diffusion	N/A	100%	N/A	**41**	**40**	37	34
P89 (59 South Methven St)	R	Diffusion	N/A	100%	N/A	**41**	39	37	37
P90 (22 North Methven St)	R	Diffusion	N/A	100%	N/A	**45**	33	34	30

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2011	2012	2013	2014	2015
P55 7 West High St Crieff	UC	Diffusion	N/A	100%	**50**	**52**	**47**	**44**	**40**
P56 39 High St Crieff	UC	Diffusion	N/A	100%	39	35	33	29	25
P57 62 High St Crieff	UC	Diffusion	N/A	100%	31	31	29	28	25
P58 9 East High St Crieff	UC	Diffusion	N/A	93%	**41**	**41**	**41**	39	36
P73 19 West High St Crieff	UC	Diffusion	N/A	100%	**41**	**42**	**41**	39	38
P74 43 High St Crieff	UC	Diffusion	N/A	100%	35	32	31	31	28
P76 10 West High St Crieff	UC	Diffusion	N/A	100%	**47**	39	39	36	35
P77 9 Comrie St Crieff	UC	Diffusion	N/A	100%	25	21	22	21	19
P78 1 Lodge St Crieff	UC	Diffusion	N/A	100%	30	26	26	25	21
P87 Near Hollybush Rd Crieff	UB	Diffusion	N/A	93%	N/A	N/A	8	7	6

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2011	2012	2013	2014	2015
P81 76 High St Kinross	R		N/A	100%	N/A	N/A	26	25	23
P82 66 High St Auchterarder	R		N/A	100%	N/A	29	28	27	29
P83 176 High St Auchterarder	R		N/A	100%	N/A	24	23	22	20
P91 Main St Glenfarg	R		N/A	100%	N/A	N/A	N/A	14	18
P92 Ballinluig	R		N/A	100%	N/A	N/A	N/A	N/A	17
P93 26 Allan St Blairgowrie	UC		N/A	100%	N/A	N/A	N/A	N/A	14
P94 Queen St Coupar Angus	UC		66%	58%	N/A	N/A	N/A	N/A	26*

*Annualised

Figure 1 Annual Mean Trend for NO_2 at Atholl Street

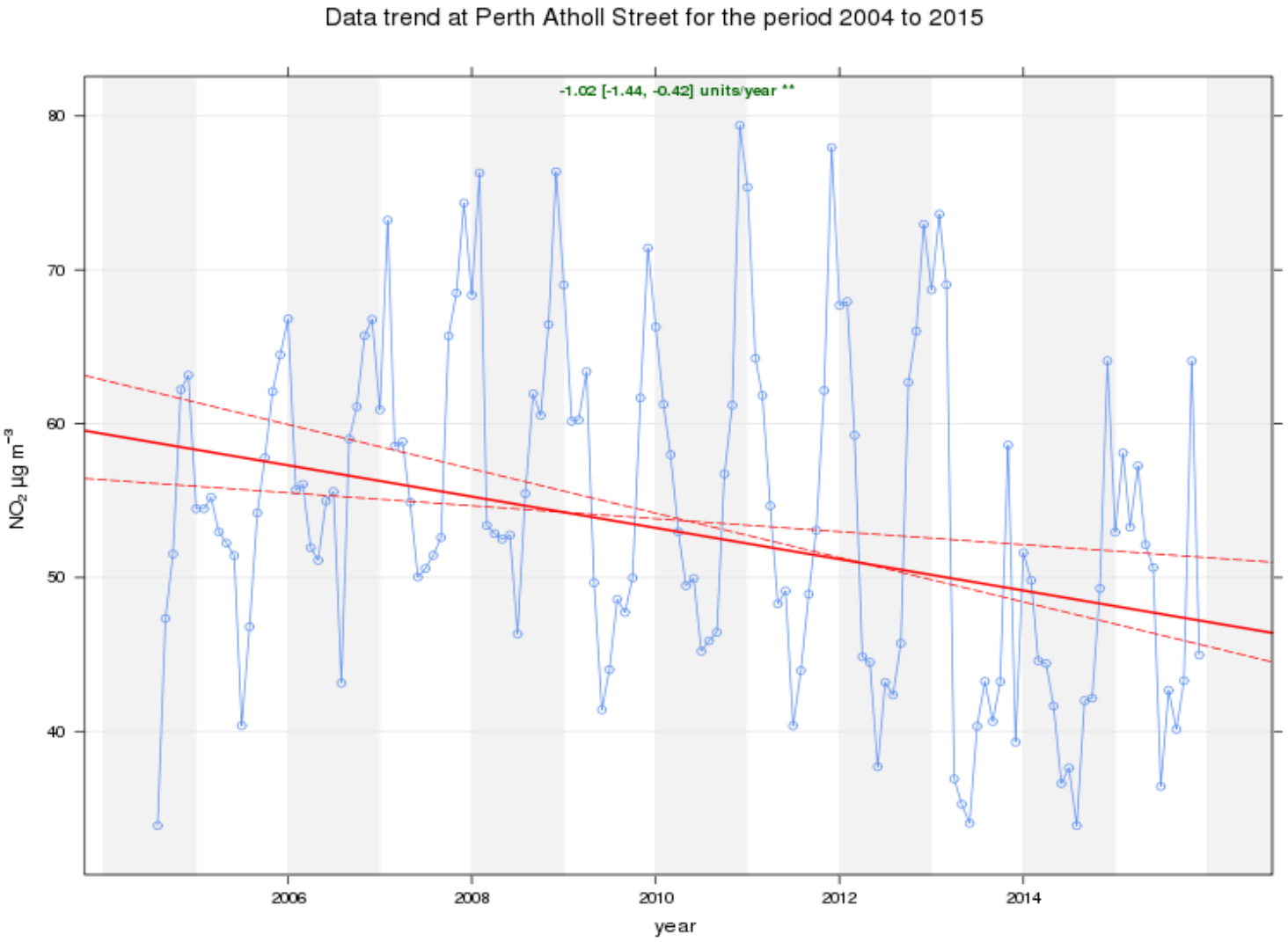


Figure 2 Annual Mean Trend for NO_2 at High Street

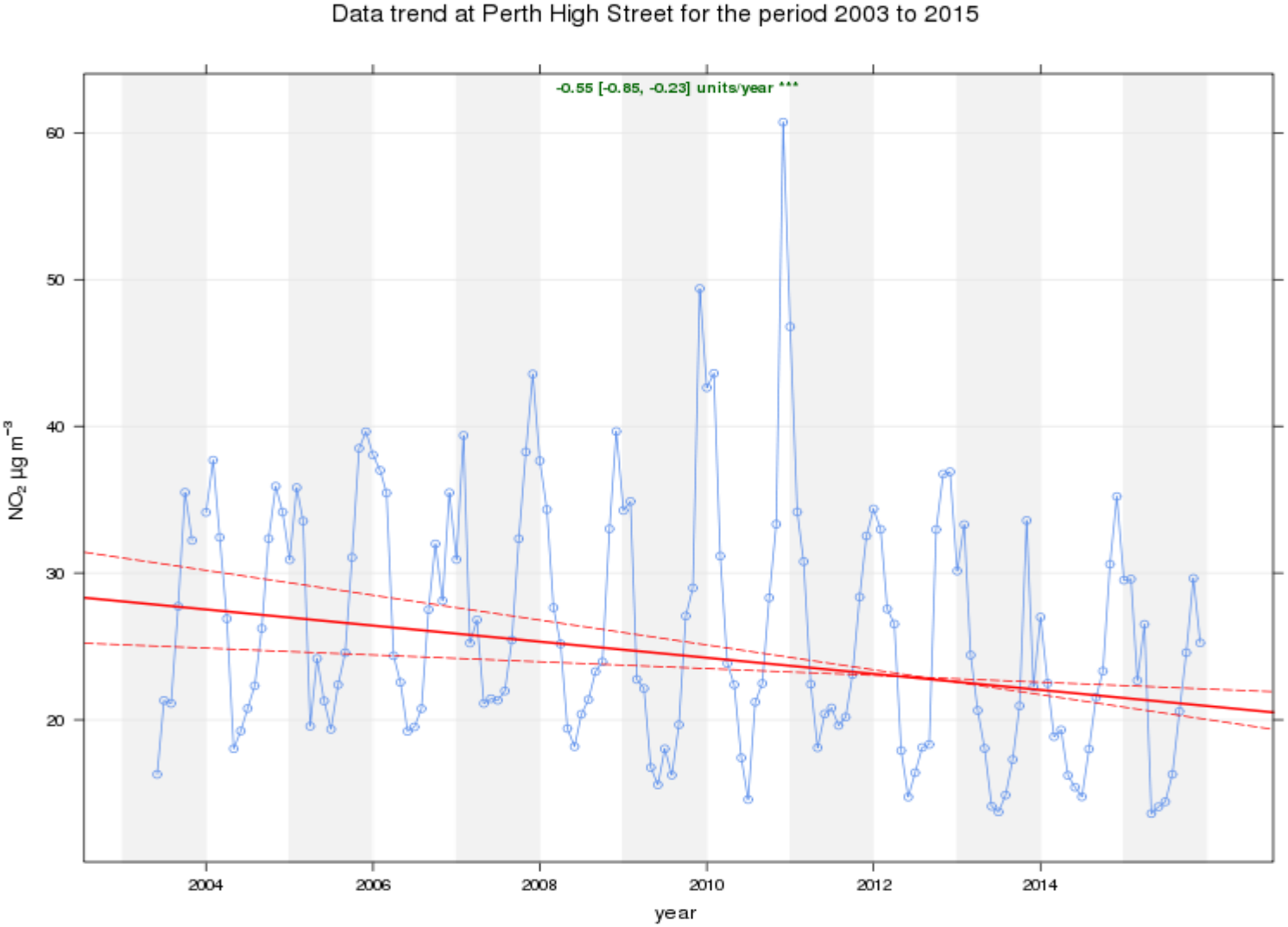


Figure 3 Annual Mean Trend for NO_2 in Crieff

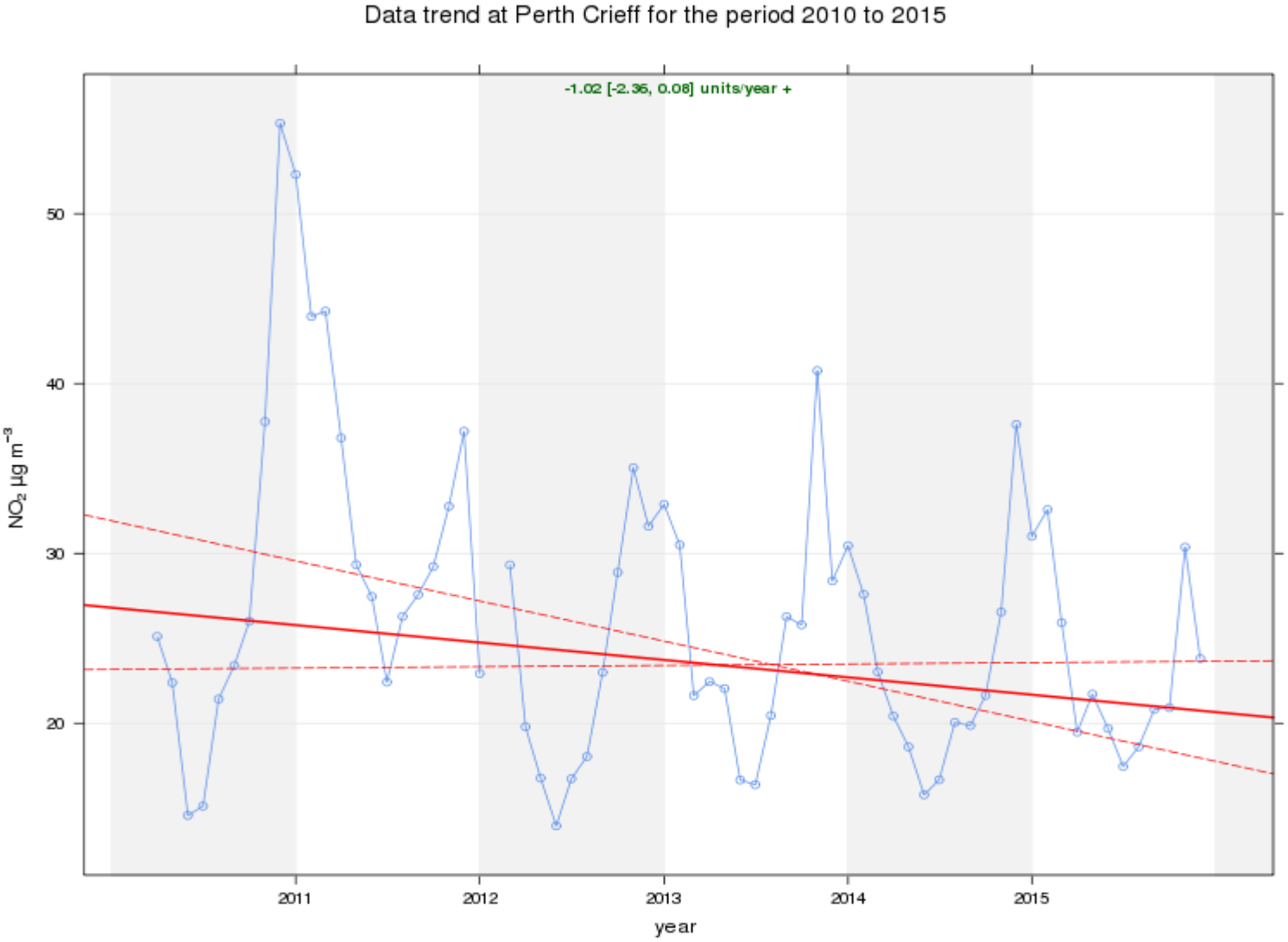


Table A.4 – 1-Hour Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2011	2012	2013	2014	2015
Perth 1 (High St)	Roadside	Automatic	100%	98%	2	0	0	0	0
Perth 2 (Atholl St)	Roadside	Automatic	100%	92%	17	**25**	13	0	0
Crieff (St James Sq)	Roadside	Automatic	100%	97%	0	0	0	0	0

Notes: Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold.**

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) If the period of valid data is less than 90%, the 99.8th percentile of 1-hour means is provided in brackets.

Table A.5 – Annual Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	PM_{10} Annual Mean Concentration (µg/m^3) (3)				
				2011	2012	2013	2014	2015
Perth 1 (High St)	Roadside	100%	98%	**19**	15	16	14	13
Perth 2 (Atholl St)	Roadside	100%	84%	**25**	**21**	**22**	**20**	**18**
Perth 3 (Muirton)	Background	100%	93%	N/A	8	10	10	9
Crieff (St James Sq)	Roadside	100%	96%	17	19	16	**20**	14

Notes: Exceedances of the PM_{10} annual mean objective of 18µg/m^3 are shown in **bold.**

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) All means have been "annualised" as per LAQM.TG(16), valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure 4 Annual Mean Trend for PM_{10} at Atholl St

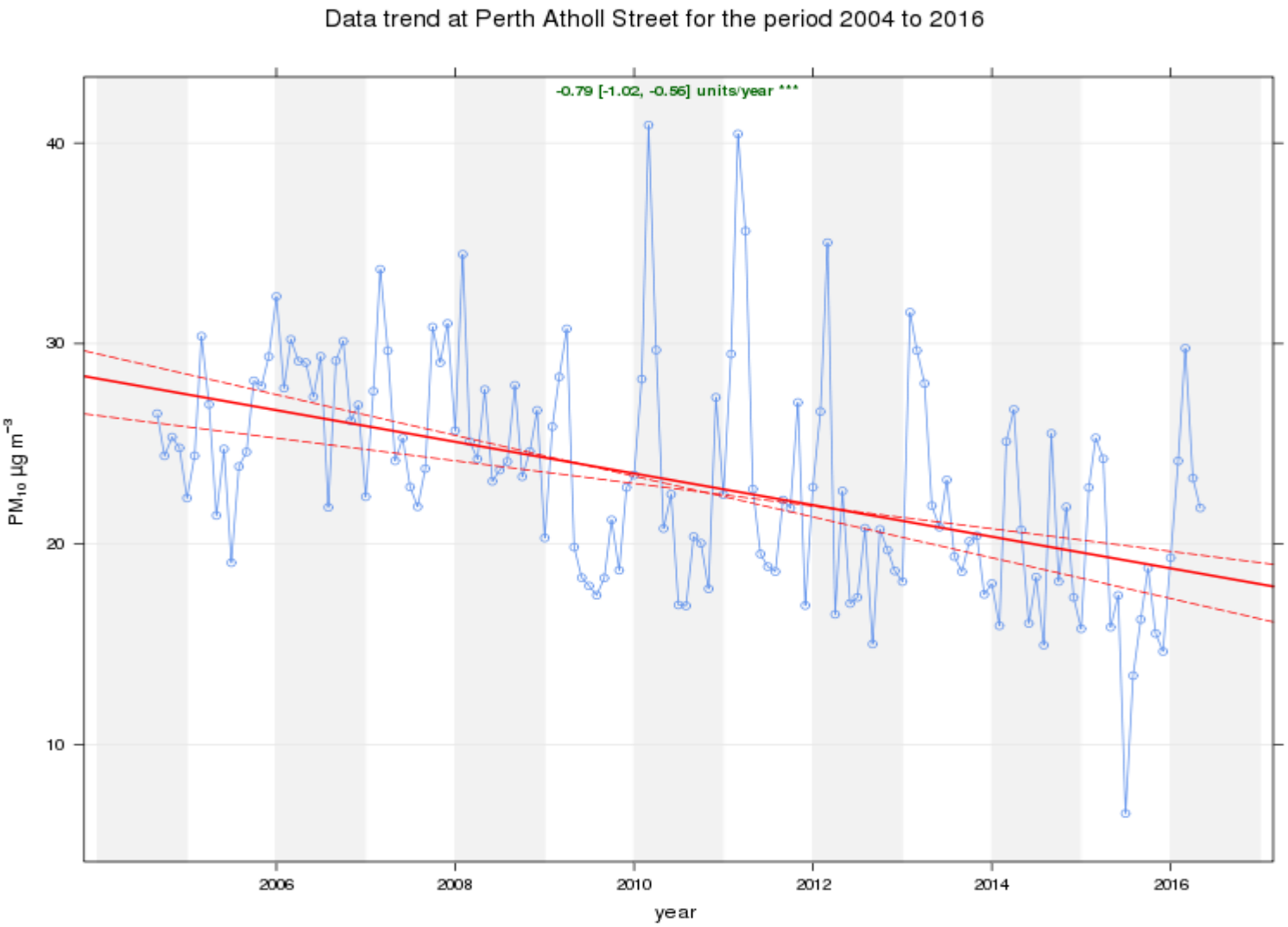


Figure 5 Annual Mean PM_{10} Trend at High St

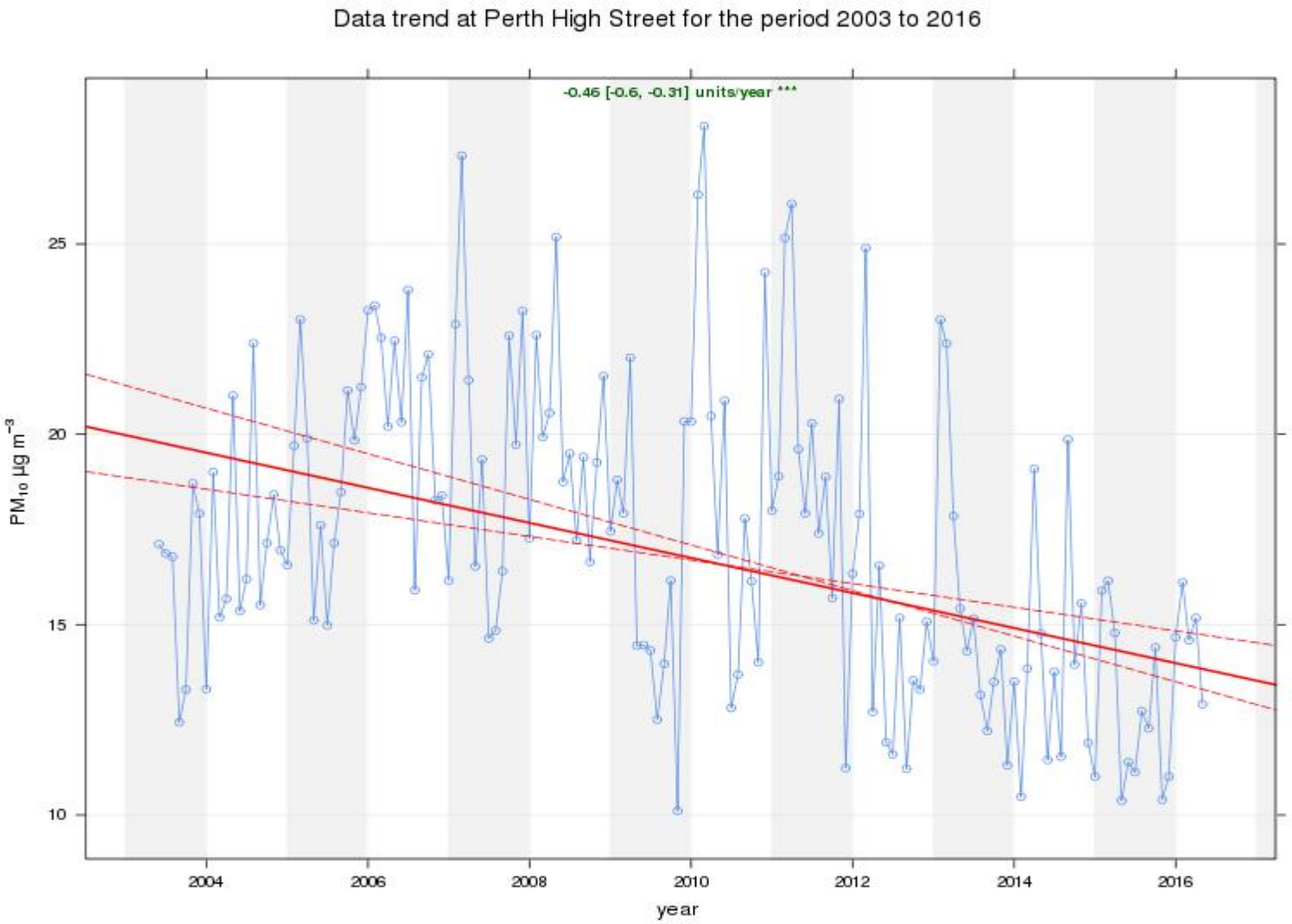


Figure 6 Annual Mean Trend for PM_{10} at Crieff

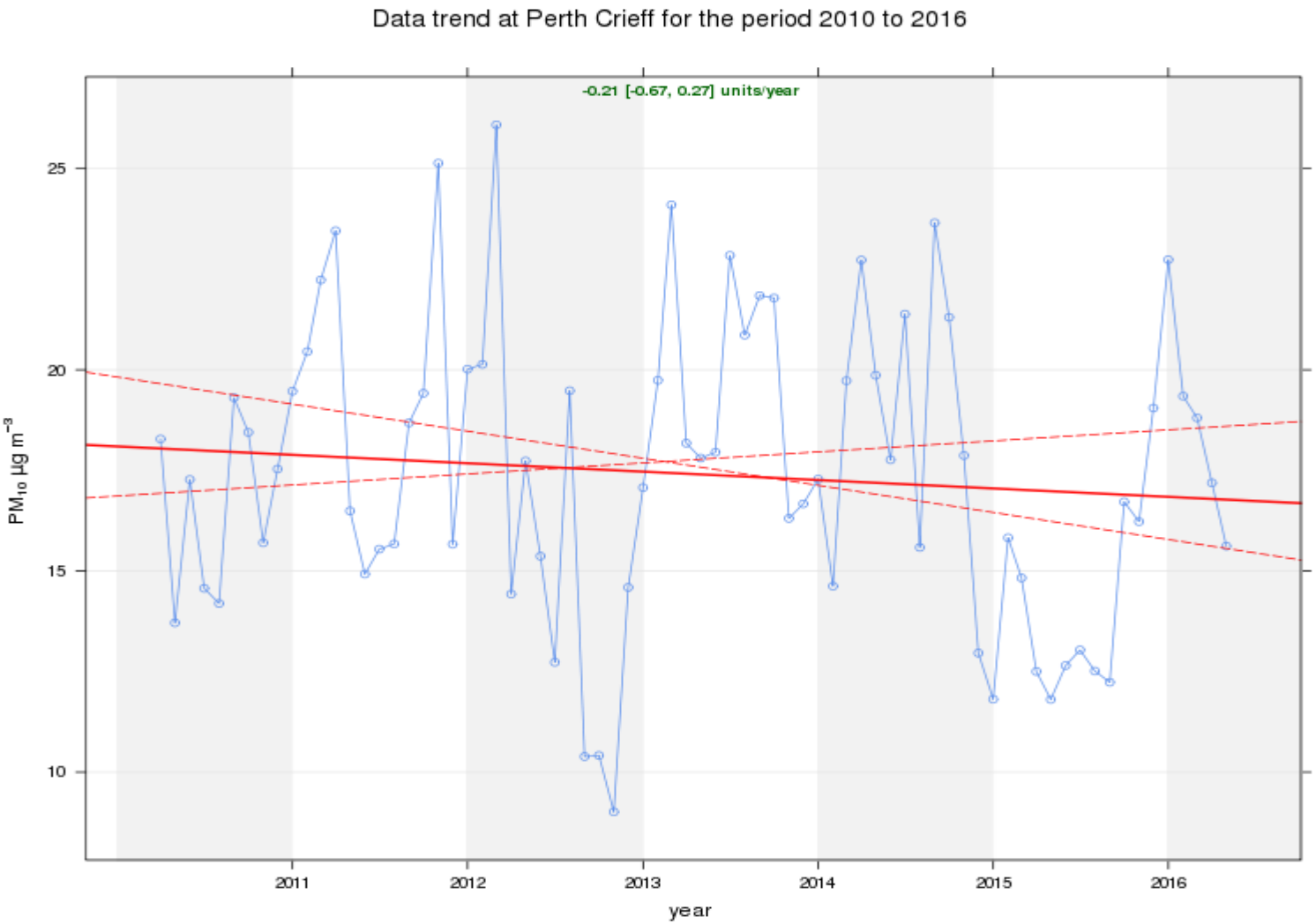


Table A.6 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
				2011	2012	2013	2014	2015
Perth 1 (High St)	Roadside	100%	98%	3	2	0	0	1
Perth 2 (Atholl St)	Roadside	100%	84%	**17**	**11**	7	1	6
Perth 3 (Muirton)	Background	100%	93%	N/A	0	0	0	0
Crieff (St James Sq)	Roadside	100%	96%	0	1	0	1	0

Notes: Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 7 times/year) are shown in **bold.**

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) If the period of valid data is less than 90%, the 90.4th percentile of 24-hour means is provided in brackets.

Appendix B: Full Monthly Diffusion Tube Results for 2015

Table B.1 – NO_2 Monthly Diffusion Tube Results for 2015

	NO_2 Mean Concentrations ($\mu g/m^3$)													
Site ID	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Raw Mean	**Bias Adjusted Annual Mean**
P 1 L	x	45	42.9	37	32.6	x	12.1	35.9	35.1	42.1	45	39.9		
P 1 C	43.5	42.5	45.8	36.2	36.2	33.5	36.1	35.3	39.1	45.8	47.3	38.6		
P 1 R	42.2	44.7	44.8	33.1	32.8	31.5	0.6	36.3	38.6	41	47.9	41.2	38.4	35 (32 - 39)
P 2	32.8	29.1	26	21.4	16.8	17.6	16.8	18.9	21.7	25.6	31	23.5	23.4	22 (20 - 24)
P 3	25.9	22.9	18.5	16.5	11.3	12.1	11.3	12.5	16.1	21.3	20.2	21.5	17.5	16 (15 - 18)
P 5	30.3	29.2	24.3	21.4	16.4	16.9	15.6	19.5	19.5	23	29.5	27.9	22.8	21 (19 - 23)
P 6	18.7	17.3	12.2	x	7.5	15.8	7	9.2	10.7	X	18.4	16.1	13.3	12 (11 - 13)
P 7	20.5	20.4	18.7	12.1	12	11.2	14.4	13.5	17.1	X	23	16.4	16.3	15 (14 - 16)
P 13	42.4	42.8	37.1	34.9	27.4	30.5	29.5	30.2	33.2	35.7	40.1	34.8	34.9	32 (29 - 35)
P 19	42.5	36.5	35.2	32.6	24.6	27.6	26.3	32.8	32.2	34.1	35.8	36.6	33.1	30 (28 - 33)
P 20	33.9	29.7	29	22.1	22.8	21.7	23.8	27.3	27.7	30	35.9	32.7	28.1	26 (24 - 28)
P28	45.3	45.2	40	31.3	33.2	26.3	28.7	30.6	38.2	43.7	40.4	36.9	36.7	34 (31 - 37)
P29	46.2	46.9	46.6	36.8	38.5	39.6	39	43.1	42.5	44.5	44.6	49.2	43.1	**40 (36 - 44)**
P30 L	50.5	51.6	43.6	40	30.3	34.5	31.6	31.8	34.8	35.5	43	35.9		
P30 C	47.8	46.7	40.3	38.4	32.3	32.8	30.4	32.2	35.1	37.8	43.7	40.5		
P30 R	56.7	47.1	42.8	34.2	34.5	33	30	34.3	33.5	34.1	38.7	36.9	38.2	35 (32 - 39)
P31	34.2	33.1	28.9	25.4	21	21.8	23.6	24.4	28.4	32.4	46	28.6	29.0	27 (24 - 29)
P32	42	39.1	37.8	36	30.9	29.7	29.1	29.5	35.9	38.2	43.2	33.5	35.4	33 (30 - 36)
P33	40.3	46.2	40.4	37.2	33.6	32.2	34.7	35.5	36.3	38.4	45.8	35.8	38.0	35 (32 - 38)
P34 L	55.5	55.9	48.9	50.3	40.3	46.8	44.1	43.1	44.8	46.6	56.1	47.8	48.4	**44 (41 - 49)**
P35	37.1	38.8	28.6	26.7	18.4	22.8	20.7	23.8	26.6	30.6	36.4	28.9	28.3	26 (24 - 29)
P36	28.4	37.6	34.6	29.6	27.4	27.4	26.5	29.1	31.8	27.3	29.7	33.5	30.2	28 (25 - 31)
P37	32.5	28.5	29.5	25.6	20.9	22	24.4	26.1	28.6	33.4	34.6	31.5	28.1	26 (24 - 28)

P38	29.3	31.3	33.4	28.4	29.1	26.4	30.6	27.3	30.9	26.5	36.1	24.8	29.5	27 (25 - 30)
P39	45	46.8	48.6	43.8	35.7	39.2	46.2	43.5	43.5	42.9	49.2	34	43.2	**40 (36 - 44)**
P40	50.3	51.7	49.9	47.7	41.9	45.5	44.1	45.3	47.4	46	52.5	37.6	46.7	**43 (39 - 47)**
P41	47.4	37.1	49.7	38.8	34.3	33.5	40.2	38.2	43	44.9	38.6	40.4	40.5	37 (34 - 41)
P42	50.3	45.2	48	46.7	39.2	37.8	42.7	40.4	43.8	51.1	47.9	x	44.8	**41 (38 - 45)**
P43 L	36	60.5	58.9	53.5	41.5	49.9	47.8	49.9	54.8	51.3	56.5	52.9		
P43 C	58	62.7	56.3	46.6	47.1	48.9	50.7	52.5	52.2	49.2	61.4	54.8		
P43 R	55.9	53.6	55.1	55.9	41.1	49.6	46.6	49.9	45.8	50.3	57.5	39.6	51.5	**47 (43 - 52)**
P44	42.6	43.9	36	33.1	30	27.2	31.2	33.9	37.4	38.8	54.5	40.2	37.4	34 (31 - 38)
P45	27.8	29.4	23.8	19.4	16.4	12.6	17.6	17	21	25.2	15.9	23.8	20.8	19 (17 - 21)
P46	33.8	34.4	35.4	27.9	28.3	26.3	29.1	26.9	32.3	36.9	33.8	34.8	31.7	29 (27 - 32)
P47	26.4	27.5	27.9	21.7	19	19.1	23.6	25	26.3	33.9	16.4	27.7	24.5	23 (21 - 25)
P48	25.1	27.4	24.9	21.8	16.3	17.9	20.7	22.6	23.1	27.3	21	26.4	22.9	21 (19 - 23)
P51	38.7	32.6	32	26.3	25	23.1	24.4	25	30.7	31.8	34.6	29.1	29.4	27 (25 - 30)
P55	39.8	48.1	47.2	42.8	37.6	36.3	45.8	45.3	52.9	51.5	35.9	39.9	43.6	**40 (37 - 44)**
P56	27.2	31.8	31.8	26.6	22.8	23.1	25.4	26.1	28.6	0.4	59.7	27.2	27.6	25 (23 - 28)
P57	30.8	28.5	29	26.6	23.6	22	24	24.8	28.7	31.2	32.3	27.7	27.4	25 (23 - 28)
P58	42.4	38.8	40.6	34.7	32.2	34.5	X	36.9	40.4	47.4	42.2	38.6	39.0	36 (33 - 39)
P62	30.6	32.9	29.9	30.3	23.5	27.9	X	30.2	33.8	32.8	36.6	29.5	30.7	28 (26 - 31)
P63	46.7	44.7	43.8	40.8	41.7	36.6	43.9	43.5	45.6	46	47.4	38.7	43.3	**40 (36 - 44)**
P64	56.9	49.8	46.3	48.3	48.5	47.9	47.2	44.1	55.2	49.9	55.2	45.1	49.5	**46 (42 - 50)**
P65	38.9	40.6	37.8	27.8	28.9	25.1	32	31.4	32.7	31.8	29.2	35.5	32.6	30 (27 - 33)
P67	44.3	48.8	38.8	37.4	34.4	32.7	34.9	38.4	34.3	35.7	38.7	39.1	38.1	35 (32 - 39)
P68	40.2	41.8	34.5	31.9	28.5	27.4	26.7	25.9	31.5	30.8	43	31.5	32.8	30 (28 - 33)
P69	44	40.2	37.5	34.7	31.9	28.6	27.3	30.2	34	34.3	39.7	36.4	34.9	32 (29 - 35)
P70	32.1	40.5	34.3	32.1	25.2	24.6	X	X	26.3	25.6	31.2	29.5	30.1	28 (25 - 30)
P71	18.7	22.1	17.5	12.4	10.8	34.1	34.5	12.3	15.8	19.5	14	18.7	19.2	18 (16 - 19)
P72	41.3	49.4	45.5	41.1	35.8	35.9	35.1	36.5	38.9	41.4	47.4	40.1	40.7	37 (34 - 41)
P73	34.1	44.1	44.4	37.1	33	35.3	45.8	41.2	47.8	49.2	47.4	37.9	41.4	38 (35 - 42)
P74	33.1	X	x (66.5)	29.1	26.1	26	27.9	30	29.2	30.4	36.8	29.4	30.4	28 (26 - 31)
P76	37.4	39.7	37.5	40.3	34.4	34.8	37.1	38.4	37.9	42.9	46.5	35.8	38.6	35 (32 - 39)
P77	25.6	21.7	24	18	16.6	16.7	20.9	16.8	18.7	24	21.5	22.5	20.6	19 (17 - 21)

P78	21.9	24.6	24.4	21	20	18.4	22.6	21.3	24.9	26.5	29.1	24.3	23.3	21 (20 - 23)
P79 L	38.5	42.4	41.6	32.4	39.7	36.4	42.1	37.5	43	43.7	33	37.6		
P79 C	40.7	43.2	44.8	35.5	34.6	24.9	41.9	39.8	43	44.3	37.1	35.1		
P79 R	37	41.2	39.7	x	x (66.4)	34.8	41.2	37.3	41	41.4	37.9	35.8	38.6	36 (32 - 39)
P81	32.5	30.4	26.6	25.2	25.8	28.7	16.4	14	20.8	28.7	30.7	24.6	25.4	23 (21 - 26)
P82	31.8	32.9	x	x (61.4)	23.5	23.5	25.2	25.2	29.7	33.6	33.6	32.2	29.1	27 (24 - 29)
P83	21.9	20.5	x	x (41.2)	13.8	16.1	17.6	16.8	20.7	22.2	22.8	22	19.4	18 (16 - 20)
P86	36.3	31.3	31.6	24.9	21	22.2	22.4	25	29.4	32.8	33.2	27.7	28.2	26 (24 - 28)
P87	9.5	9.9	7.3	5.4	3.2	3.5	3.5	3.9	5.4	0.8	8.4	9.8	5.9	5 (5 - 6)
P88	46.6	44.2	42.2	38.5	28.7	31.4	32.4	31.2	37.9	43.3	29.1	40.1	37.1	34 (31 - 38)
P89	46.1	49.8	46.5	34.5	35.2	32.8	33.2	39	39.7	39.8	46.1	40.9	40.3	37 (34 - 41)
P90	41.6	38.2	34.4	31.5	28.2	25.9	27.3	30.2	30	35.5	34.5	35.8	32.8	30 (28 - 33)
P91	20.7	21.8	19.9	19.7	14.4	16.3	18.1	18.3	19.4	27.3	19.4	21.7	19.8	18 (17 - 20)
P92	23.3	24.5	18.2	15	13.7	15	15.2	18.3	18.9	20.1	23.3	20.8	18.9	17 (16 - 19)
P93	20.1	19.3	15.2	13.2	10.9	12.8	11.1	12.9	12.6	18.1	18.5	18.1	15.2	14 (13 - 15)
P94					18.1	x	23.2	21.1	25.9	34.7	30.5	23.3	25.3	23 (21 - 26)

(1) See Appendix C for details on bias adjustment

Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

Diffusion Tube Bias Adjustment Factors

The national bias adjustment figure found at http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html for the 20% TEA in water preparation method was given as 0.77. Based on advice in TG.16, it was decided a local figure would be more robust.

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.

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	01/01/2015	31/01/2015	30.3	24.5	27.7	28	2.9	11	7.2
2	01/02/2015	28/02/2015	30.8	36.6	28.9	32	4.0	12	10.0
3	01/03/2015	31/03/2015	25.4	27.7	24.7	26	1.6	6	3.9
4	01/04/2015	30/04/2015	23.8	24.4	24.4	24	0.3	1	0.9
5	01/05/2015	31/05/2015	19.2	19.1	17.8	19	0.8	4	1.9
6	01/06/2015	30/06/2015	18.9	18.4	18.1	18	0.4	2	1.0
7	01/07/2015	31/07/2015	17.6	19.7	17.6	18	1.2	7	3.0
8	01/08/2015	31/08/2015	21.7	21.3	18.5	21	1.7	9	4.3
9	01/09/2015	30/09/2015	23.6	23.5	24.6	24	0.6	3	1.5
10	01/10/2015	31/10/2015	27.3	27.3	26.5	27	0.5	2	1.1
11	01/11/2015	30/11/2015	31.5	33.8	24.8	30	4.7	16	11.6
12	01/12/2015	31/12/2015	22.5	26.6	27.2	25	2.6	10	6.4
13									

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

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
30	100	Good	Good
30	99	Good	Good
23	100	Good	Good
27	89	Good	Good
14	100	Good	Good
14	100	Good	Good
14	95	Good	Good
16	99	Good	Good
21	99	Good	Good
25	99	Good	Good
30	99	Good	Good
25	99	Good	Good
Overall survey -->		Good precision	Good Overall DC

(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 12 periods of data

Bias factor A: 0.92 (0.84 - 1.01)

Bias B: 9% (-1% - 19%)

Diffusion Tubes Mean: 24 μgm^{-3}

Mean CV (**Precision**): 7

Automatic Mean: 22 μgm^{-3}

Data Capture for periods used: 98%

Adjusted Tubes Mean: 22 (20 - 25) μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA

Bias calculated using 12 periods of data

Bias factor A: 0.92 (0.84 - 1.01)

Bias B: 9% (-1% - 19%)

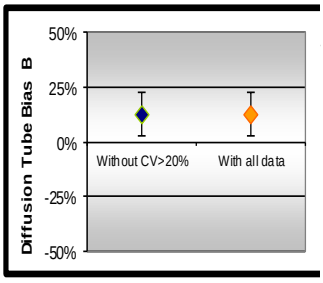
Diffusion Tubes Mean: 24 μgm^{-3}

Mean CV (**Precision**): 7

Automatic Mean: 22 μgm^{-3}

Data Capture for periods used: 98%

Adjusted Tubes Mean: 22 (20 - 25) μgm^{-3}



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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	01/01/2015	31/01/2015	53.3	53.6	54	54	0.4	1	0.9	53	100	Good	Good
2	01/02/2015	28/02/2015	43.9	57.4	57.6	53	7.9	15	19.5	58	100	Good	Good
3	01/03/2015	31/03/2015	56.1	54.1	48.1	53	4.2	8	10.3	53	99	Good	Good
4	01/04/2015	30/04/2015	50.9	50.4	53	51	1.4	3	3.4	57	100	Good	Good
5	01/05/2015	31/05/2015	44.4	42.6	40.7	43	1.9	4	4.6	52	100	Good	Good
6	01/06/2015	30/06/2015	43.7	45.5	45.5	45	1.0	2	2.6	51	100	Good	Good
7	01/07/2015	31/07/2015	46.2	48.2	45.3	47	1.5	3	3.7	36	99	Good	Good
8	01/08/2015	31/08/2015	49	50.9	46.6	49	2.2	4	5.4	43	77	Good	Good
9	01/09/2015	30/09/2015	46	42.5	47.1	45	2.4	5	6.0	40	100	Good	Good
10	01/10/2015	31/10/2015	44.5	46.4	45.5	45	1.0	2	2.4	43	83	Good	Good
11	01/11/2015	30/11/2015	54.2	54.2	57.1	55	1.7	3	4.2	64	48	Good	or Data Captu
12	01/12/2015	31/12/2015	46.5	48.8	48.4	48	1.2	3	3.1	45	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:	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 11 periods of data

Bias factor A 1 (0.91 - 1.1)

Bias B 0% (-9% - 9%)

Diffusion Tubes Mean: 48 µgm^{-3}

Mean CV (**Precision**): 5

Automatic Mean: 48 µgm^{-3}

Data Capture for periods used: 96%

Adjusted Tubes Mean: 48 (44 - 53) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA

Bias calculated using 11 periods of data

Bias factor A 1 (0.91 - 1.1)

Bias B 0% (-9% - 9%)

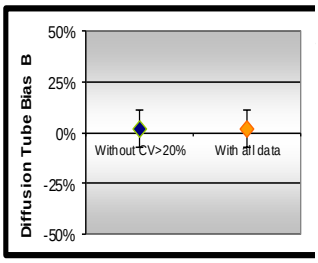
Diffusion Tubes Mean: 48 µgm^{-3}

Mean CV (**Precision**): 5

Automatic Mean: 48 µgm^{-3}

Data Capture for periods used: 96%

Adjusted Tubes Mean: 48 (44 - 53) µgm^{-3}



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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	01/01/2015	31/01/2015	32.7	33.5	32.3	33	0.6	2	1.5	31	99	Good	Good
2	01/02/2015	28/02/2015	27.5	33.7	30.1	30	3.1	10	7.7	33	98	Good	Good
3	01/03/2015	31/03/2015	26.7	26.1	28.8	27	1.4	5	3.5	26	98	Good	Good
4	01/04/2015	30/04/2015	23.4	21.9	22.7	23	0.8	3	1.9	19	99	Good	Good
5	01/05/2015	31/05/2015	20	22	21.3	21	1.0	5	2.5	22	93	Good	Good
6	01/06/2015	30/06/2015	21.5	21.1	20.8	21	0.4	2	0.9	20	99	Good	Good
7	01/07/2015	31/07/2015	17.4	19.5	18.9	19	1.1	6	2.7	17	98	Good	Good
8	01/08/2015	31/08/2015	20.1	20.7	21.1	21	0.5	2	1.3	19	98	Good	Good
9	01/09/2015	30/09/2015	22.2	22	21.3	22	0.5	2	1.2	21	97	Good	Good
10	01/10/2015	31/10/2015	20.9	22.6	22.2	22	0.9	4	2.2	21	98	Good	Good
11	01/11/2015	30/11/2015	33.2	28.2	31.8	31	2.6	8	6.4	30	88	Good	Good
12	01/12/2015	31/12/2015	25.3	23.8	24.6	25	0.8	3	1.9	24	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

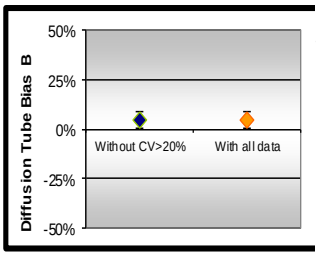
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	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	0.96 (0.92 - 1)
Bias B	4% (0% - 8%)
Diffusion Tubes Mean:	24 µgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	24 µgm^{-3}
Data Capture for periods used:	97%
Adjusted Tubes Mean:	24 (23 - 24) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 12 periods of data	
Bias factor A	0.96 (0.92 - 1)
Bias B	4% (0% - 8%)
Diffusion Tubes Mean:	24 µgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	24 µgm^{-3}
Data Capture for periods used:	97%
Adjusted Tubes Mean:	24 (23 - 24) µgm^{-3}



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Based upon the 3 co-location studies above, a factor of 0.92, corresponding to the median value between 0.91, 0.92 and 0.96 for Atholl St, High St and Crieff respectively. This is very similar to previous years.

- **QA/QC of Automatic Monitoring**

Ricardo E & E 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.

This has been replaced by the AIR-PT scheme and only AR006 January to February 2015 has data available, this was 100% satisfactory.

Appendix D SEPA response for Industrial Emissions

Hi Martin

This arrived just after I sent your response….

The following questions only relate to changes that have occurred since May 2015.

1. Are you aware of any changes that have been made to any Part A or B processes that will result in a positive or negative effect on the local air quality? (this includes: change of fuel, increased or decreased emissions rates, changes to stack heights, the introduction of a new process etc.). NO.

2. Are you aware of any SEPA regulated process that has increased its emissions to air by more than 30%. NO.

3. Are you aware of any new industrial or new commercial developments that are likely to have a significant impact on the local air quality? NO.

4. Are you aware of any Part A or B processes that have ceased to operate?

   Grosvenor Grains surrender PPC/B/1000080 – storing and unloading of fishmeal.

   Ladyston Poultry Farm, Auchterarder surrender, PPC/A/1017044 – Poultry Farm

5. Are you aware of any new petrol stations with an annual throughput of over 2000 cubic metres of petrol? NO.

6. Are you aware of any new mineral extraction processes that are likely to have a significant impact on the local air quality? NO.

7. Are there any sources that you would like to see included in the Council's assessment? NO

If I can be of any further assistance, please do not hesitate to contact me.

Regards

John Lamb

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National Air Quality and Energy Unit

Scottish Environment Protection Agency
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Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the LA intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
APR	Air quality Annual Progress Report
AURN	Automatic Urban and Rural Network (UK air quality monitoring network)
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

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Perth & Kinross Council Progress Report 2007, 2008, 2010 2011 & 2013

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

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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.keepscotlandbeautiful.org/sustainability-climate-change/sustainable-scotland-network/climate-change-reporting/201415-submitted-reports/?cid=15383

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

HSL (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 117-124 (http://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html) April 2015

Smart Growth for Perth http://www.pkc.gov.uk/smartgrowth

Perth Transport Futures http://www.pkc.gov.uk/transportfutures