

Annual Progress Report (APR)



ORKNEY
ISLANDS COUNCIL

2018 Air Quality Annual Progress Report (APR) for
Orkney Island Council

In fulfilment of Part IV of the
Environment Act 1995

Local Air Quality Management

June 2018

Local Authority Officer	Nick Blowfield
Department	Environmental Health
Address	School Place, Kirkwall, KW15 1NY
Telephone	01856 873535
E-mail	Env.health@orkney.gov.uk
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Executive Summary: Air Quality in Our Area

Air Quality in Orkney

The Orkney Islands is an archipelago of over 70 islands and skerries located some seven miles north of the Scottish mainland and covering an area of just under 100,000 hectares. The county has a population in the region of 21,500 with over 80% of the population inhabiting the main island (called The Mainland). Orkney's two main towns of Kirkwall (population approximately 9,000+) and Stromness (population approximately 2,200) are situated on The Mainland.

The main traffic routes in Orkney are a series of 'A' roads that link the west mainland to the east, through Kirkwall and southwards across the barriers to South Ronaldsay. The highest volume of traffic can be found within Kirkwall, with very light levels of traffic found across the mainland and the Outer Isles. The islands are linked to mainland Scotland via its airport situated 2 miles outside Kirkwall, and via ferry services across three routes. Other smaller air and ferry links serve the outer isles and link to 'The Mainland'.

Because of the islands predominantly rural nature and the lack of large scale industrial processes the main potential source of pollution that may impact on human health is that produced by motor vehicles with Nitrogen Dioxide the main pollutant of concern. However, traffic flows are low and reflect Orkney's small population. A network of diffusion tubes is maintained to monitor those areas deemed to be subject to higher concentrations. Recently acquired monitoring data clearly shows that Orkney is currently meeting the air quality objectives and that pollutant levels remain at consistently low levels with no significant risk of Orkney exceeding these objectives.

Actions to Improve Air Quality

As indicated above air quality in Orkney is considered very good. The Council has not identified any areas where there is a risk of exceeding the air quality objectives and where consequent action is required to improve air quality.

Local Priorities and Challenges

Although no specific priorities or challenges have been identified, Orkney Islands Council will continue to monitor nitrogen dioxide at existing locations unless there becomes reason to do otherwise. These monitoring results will be discussed in the 2019 Progress Report. Despite having no significant issues with air quality in the county, Orkney Islands Council is in the process of developing an Air Quality Strategy for Orkney and it is hoped that this will be adopted by the end of 2018. It is felt that this will ensure that the county continues to enjoy very low levels of air pollution.

How to Get Involved

Copies of reports relating to air quality including monitoring results may be found at:

<http://www.orkney.gov.uk/Service-Directory/A/Air-Pollution.htm>

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1. Local Air Quality Management

This report provides an overview of air quality in Orkney Islands Council during 2017. 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 Orkney Islands 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
Lead	0.25 µg/m ³	Annual Mean	31.12.2008

2. Actions to Improve Air Quality

2.1 Air Quality Management Areas

Orkney Islands Council currently does not have any AQMAs, and from this report and previous annual reporting it is unlikely that there will be reason to declare any AQMAs in the future. Furthermore, Orkney Islands Council at present does not have an Air Quality Strategy or similar document to address air quality issues, although this is being addressed and an Air Quality Strategy is to be published by the end of the 2018.

2.2 Cleaner Air for Scotland

Cleaner Air for Scotland – The Road to a Healthier Future (CAFS) is a national cross-government strategy that sets out how the Scottish Government and its partner organisations propose to reduce air pollution further to protect human health and fulfil Scotland’s legal responsibilities as soon as possible. A series of actions across a range of policy areas are outlined, a summary of which is available at <http://www.gov.scot/Publications/2015/11/5671/17>. Progress by Orkney Islands Council against relevant actions within this strategy is demonstrated below.

2.2.1 Transport – Avoiding travel – T1

All local authorities should ensure that they have a corporate travel plan (perhaps within a carbon management plan) which is consistent with any local air quality action plan (AQAP). Orkney Islands Council does not have an AQAP although it does have a Carbon Management Plan¹ which has put focus on the reduction of carbon emissions from its building stock with little focus on emissions from transportation. In addition to this the Council has a Green Travel Plan² with its primary focus on the reducing the reliance on cars for commuting and to adopt greener modes of transport that would improve health and wellbeing. This document does not specifically address air quality, but the measures that the plan encourages will help maintain or improve air quality within the county.

Orkney’s Local Transport Strategy³ was published in 2007, and is in need of updating. Orkney Islands Council’s Transportation section have advised that they will not be able to update this strategy until after the National Transport strategy (NTS) has been updated. Given Transport Scotland’s timetable for publication of a

finalised NTS to be adopted in Summer 2019, a new local transport strategy is unlikely to appear before 2020.

2.2.2 Climate Change – Effective co-ordination of climate change and air quality policies to deliver co-benefits – CC2

Scottish Government expects any Scottish local authority which has or is currently developing a Sustainable Energy Action Plan to ensure that air quality considerations are covered. Orkney Islands Council in partnership with the Orkney Renewable Energy Forum, Community Energy Scotland and Highlands and Islands Enterprise published the Orkney Sustainable Energy Strategy 2017-2025 in October 2017. Although the strategy clearly defines visions for reducing carbon emissions to mitigate the threat of climate change, air quality has not been addressed directly, despite the fact that the lack of air quality consideration was raised during the consultation process. The Strategy clearly states that the next step will be the development of an action plan although at present there has been no date set for this. Hopefully, this future sustainable energy action plan will address air quality issues as expected by Scottish Government.

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

3.1 Summary of Monitoring Undertaken

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

3.1.1 Automatic Monitoring Sites

Orkney Islands Council does not undertake automatic (continuous) monitoring for the national air quality objectives.

3.1.2 Non-Automatic Monitoring Sites

Orkney Islands Council undertook non- automatic (passive) monitoring of NO₂ at 7 sites during 2017. Table A.1 in Appendix A shows the details of the sites.

A map showing the location of the monitoring sites are provided in Appendix D.

Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

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 (NO₂)

Table A. in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³.

For diffusion tubes, the full 2017 dataset of monthly mean values is provided in Appendix B.

As stated previously, there is no automatic monitoring data with regards to Nitrogen dioxide. The installation of an automatic monitoring station has been deemed unnecessary due to the islands rural landscape and low population levels. Therefore all monitoring data is obtained through the placement of diffusion tubes.

The County has been monitored for a number of years through the placement of diffusion tubes. Orkney Islands Council is continuously assessing its diffusion tube network with regards to the appropriateness of the localities and revised if necessary. As can be seen from the results in Table A.2 in Appendix A, in 2017 there has been

no significant change in levels of NO₂. The graphs in Appendix A show that the general trend in NO₂ concentrations continue to remain steady.

This is clearly seen in the data from the county's two main towns Kirkwall and Stromness. As expected, Kirkwall as Orkney's largest settlement and home to over 40 percent of the population continues to experience the highest levels of NO₂ in the County. However the levels of NO₂ within Kirkwall are currently at 36 percent of the objective.

It is unlikely that levels will ever exceed the NAQS objective of 40 mg/m³.

3.2.2 Particulate Matter (PM₁₀)

Orkney Islands Council does not monitor PM₁₀. However, previous reports have referred to the background concentration maps⁵. In consideration of this data it has been concluded that there is no expected exceedance of the objective (18µg/m³) in Orkney. Orkney Islands Council has no immediate plans to monitor PM₁₀ in the future.

3.2.3 Particulate Matter (PM_{2.5})

Orkney Islands Council does not monitor PM_{2.5} and has no plans to do so in the future.

3.2.4 Sulphur Dioxide (SO₂)

Orkney Islands Council does not monitor SO₂ and has no plans to do so in the future.

3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene

Orkney Islands Council does not monitor Carbon Monoxide, Lead and 1,3-Butadiene and has no plans to do so in the future.

4. New Local Developments

4.1 Road Traffic Sources

Orkney Islands Council confirms that there are no new/newly identified:

- Narrow congested streets with residential properties close to the kerb.
- Busy streets where people may spend one hour or more close to traffic.
- Roads with a high flow of buses and/or HGVs.
- Junctions.
- Roads with significantly changed traffic flows.
- Bus or coach stations.

that require further assessment.

4.2 Other Transport Sources

Orkney Islands Council confirms that there are no new/newly identified:

- Airports.
- Locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.
- Locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.
- Ports for shipping.

that require further assessment.

4.3 Industrial Sources

Orkney Islands Council confirms that there are no new/newly identified:

- Industrial installations: new or proposed installations for which an air quality assessment has been carried out.
- Industrial installations: existing installations where emissions have increased substantially or new relevant exposure has been introduced.
- Industrial installations: new or significantly changed installations with no previous air quality assessment.
- Major fuel storage depots storing petrol.
- Petrol stations.
- Poultry farms

that require further assessment.

4.4 Commercial and Domestic Sources

As previously reported due to Orkney's rural nature there are a number of properties in and out with the towns that use domestic solid fuels. However, the number of domestic biomass combustion installations is not known.

It is envisaged that the number of domestic biomass combustion installations will be low and likely to be in low density or individual developments, and would not cause significant risk to PM₁₀ levels in Orkney.

Other domestic solid fuel sources are present on a greater scale; however, this is usually supplementary to rather than the primary source of heating. Considering the size of the towns and villages in Orkney they are not considered a significant risk to the NAQS objectives ever being exceeded, and therefore no further assessment is required.

4.5 New Developments with Fugitive or Uncontrolled Sources

Orkney Islands Council confirms that there are no new potential sources of fugitive or uncontrolled particulate matter that require further assessment.

5. Conclusions and Proposed Actions

5.1 Conclusions from New Monitoring Data

The recently acquired monitoring data included in this report clearly shows that Orkney continues to meet the air quality objectives. Comparing historic data against the current data clearly shows that pollutant levels have remained at a consistently low level and that there is no significant risk of Orkney exceeding the air quality objectives.

5.2 Conclusions relating to New Local Developments

There have been no new developments which would be likely to significantly affect air quality and where an air quality assessment as part of an Environmental Statement would be required.

5.3 Proposed Actions

The current monitoring regime for Nitrogen Dioxide within Orkney will continue to ensure that the high standard of air quality in the county continues.

As reported within the last progress report in 2017 despite the continued low levels of pollutants and that there is no significant risk of Orkney exceeding the air quality objectives the creation of an air quality strategy was being considered. It can now be confirmed that Orkney Islands Council is in the process of developing an Air Quality Strategy for Orkney and it is hoped that this will be adopted by the end of 2018. It is felt that this will ensure that the county continues to enjoy very low levels of air pollution.

The results of the continued monitoring and other work addressing air quality will be contained in the next Annual Progress Report due in 2019.

Appendix A: Monitoring Results

Table A.1 – 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?
KW	Kirkwall	Roadside	344812	1011017	NO ₂	N	0m	1m	N
SN	Stromness	Roadside	325590	1009553	NO ₂	N	1m	1m	N
SM	St Mary's	Roadside	347140	1001235	NO ₂	N	10m	1m	N
WM	Waulkmill	Rural	339525	1006985	NO ₂	N	N/A	1m	N
HE	Herston	Rural	341995	991999	NO ₂	N	10m	1m	N
MH	St Margarets Hope	Roadside	344598	993509	NO ₂	N	0m	3m	N
FT	Finstown	Roadside	335993	1013893	NO ₂	N	0m	1m	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.2 – Annual Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2017 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2013	2014	2015	2016	2017
KW	Roadside	Diffusion Tube	100	100	15.2	11.6	13.0	15.1	14.3
SN	Roadside	Diffusion Tube	100	100	9.6	7.7	8.2	9.9	8.7
SM	Roadside	Diffusion Tube	100	100	3.7	1.7	3.5	4.3	4.4
WM	Rural	Diffusion Tube	100	100	2.3	2.1	3.1	3.0	2.6
HE	Rural	Diffusion Tube	92	92	2.1	3.0	2.8	2.6	2.6
MH	Roadside	Diffusion Tube	100	100	-	-	-	4.1	3.9
FT	Roadside	Diffusion Tube	100	100	-	-	-	8.4	7.9

Notes: (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.

Figure 1 - Chart showing the trend of annual NO₂ levels in the County's main population centres of Kirkwall and Stromness

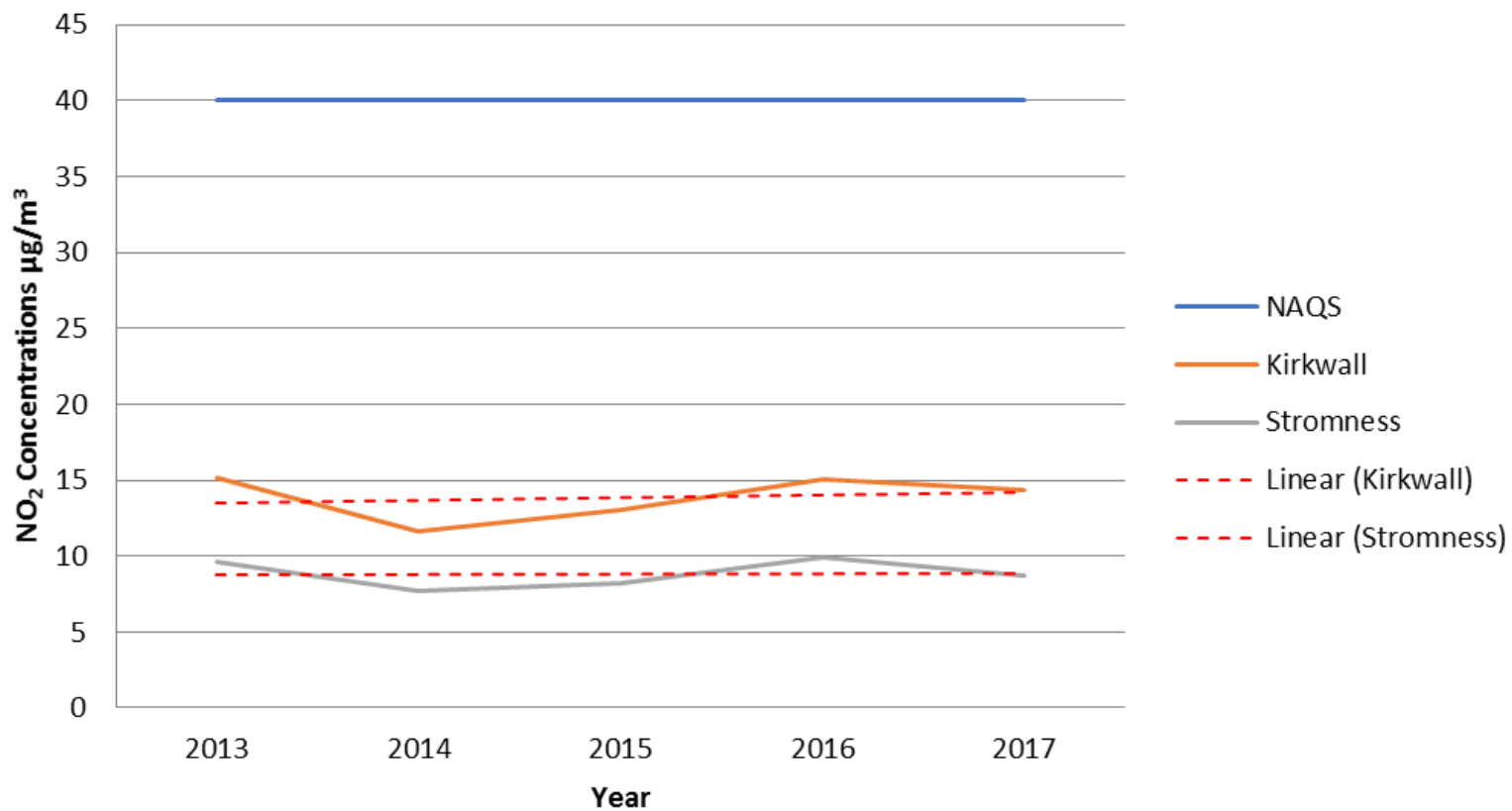
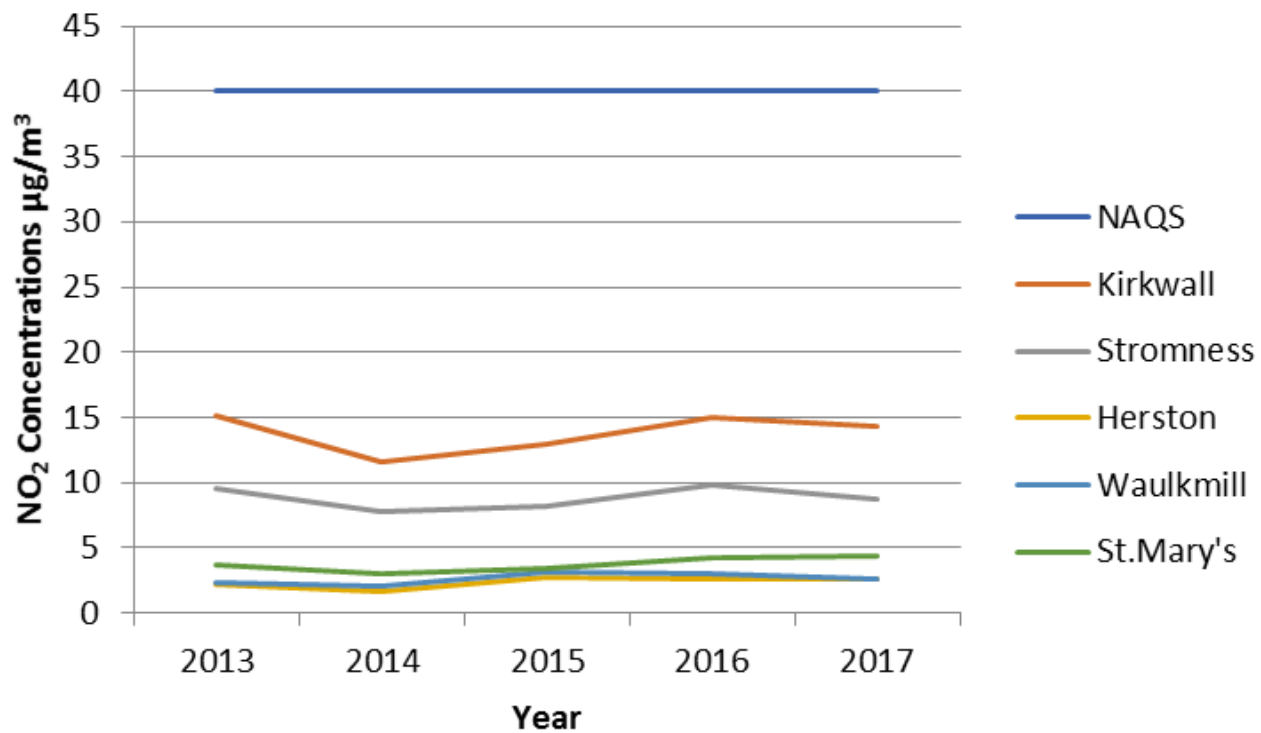


Figure 2 – Chart Showing Average Annual NO₂ Concentrations for individual Monitoring Stations



Appendix B: Full Monthly Diffusion Tube Results for 2017

Table B.1 – NO₂ Monthly Diffusion Tube Results for 2017

Site ID	NO ₂ Mean Concentrations (µg/m ³)												Annual Mean	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted ⁽¹⁾
	KW	25.2	16.1	15.9	13.1	15.4	12.7	15.5	13.2	17.4	15.2	15.3		
SN	16.5	11.8	11.9	7.4	10.8	9.8	7.2	7.8	10.3	10.2	7.6	6.1	9.8	8.7
SM	15.0	6.3	3.4	2.8	5.3	3.7	4.2	3.5	4.9	4.4	1.7	3.7	4.9	4.4
WM	4.4	6.4	3.0	2.2	2.4	2.2	<1.0	2.6	2.4	3.1	1.3	1.7	2.9	2.6
HE	10.6	2.2	1.1	<1.0	1.6	1.3	2.8	-	3.0	2.6	1.2	<1.0	2.9	2.6
MH	7.2	5.6	3.9	3.3	4.8	3.1	5.3	3.8	4.3	6.0	2.9	2.6	4.4	3.9
FT	12.3	10.5	8.6	6.1	11.1	7.3	9.1	7.8	10.9	9.2	7.0	6.8	8.9	7.9

(1) See Appendix C for details on bias adjustment

Appendix C: Map of diffusion tube sites.



Figure 3 – Map showing location of diffusion tubes

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

Diffusion Tube Bias Adjustment Factors

All diffusion tubes are analysed by Edinburgh Scientific Services.

For 2017 data, a Bias Adjustment of 0.89 was used. This was taken from the National Diffusion Tube Bias Adjustment Spreadsheet (version March 2018)

Discussion of Choice of Factor to Use

The national bias adjustment factor was used as there have been no local bias adjustment factors calculated through a co-location study.

Short-term to Long-term Data adjustment

No adjustment is required for short term monitoring as all monitoring data is conducted on a monthly basis over the entire year.

QA/QC of diffusion tube monitoring

Bias and Precision taken from data supplied on R & A website.

NO₂ Fall-Off with Distance Calculator

The following comment was made in the Annual Progress Report Appraisal Report for 2017. *‘Although the results are very low, it should still be noted that some monitoring sites do require distance correction, where sites are not representative of relevant exposure.’*

Following this comment Orkney Islands Council has used the *‘NO₂ Fall-Off with Distance Calculator (Version 4.2)’*, results detailed in table below. The data for concentrations monitored are those before any bias adjustment was undertaken, furthermore the background concentrations for 2017 have come from the national maps published at <http://www.scottishairquality.co.uk/data/mapping?view=data>.

As can be seen from the results, due to Orkney’s low levels of NO₂, both errors and warnings are recorded within these calculations. It could be argued given the low concentrations whether this process is necessary for predicting NO₂ concentrations at the receptor when applied to Orkney.

Site Name/ID	Distance (m)		NO ₂ Annual Mean Concentration (µg/m ³)			Comment
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor	
KW	1.0	1.0	7.5	16.1	16.1	
SN	1.0	3.0	5.9	9.8	8.9	
SM	1.0	4.0	6.4	4.9	-	Error: Measured concentration must be above background concentration.
WM	1.0	1.0	5.0	2.9	-	Error: Measured concentration must be above background concentration.
HE	1.0	1.0	3.8	2.9	-	Error: Measured concentration must be above background concentration.
MH	3.0	3.0	3.8	4.4	4.4	Warning: Background NO ₂ concentrations <5µg/m ³ or >50µg/m ³ are rare in the UK - this calculation will still work, but please check your data.
FT	1.0	1.0	4.3	8.9	8.9	Warning: Background NO ₂ concentrations <5µg/m ³ or >50µg/m ³ are rare in the UK - this calculation will still work, but please check your data.

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
Defra	Department for Environment, Food and Rural Affairs
LAQM	Local Air Quality Management
NO ₂	Nitrogen Dioxide
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

References

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