



**ORKNEY**  
ISLANDS COUNCIL

# 2013 Air Quality Progress Report for **Orkney Islands Council**

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

**June 2013**

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## Executive Summary

The 2013 Progress Report has concluded that there is no need to proceed to a detailed assessment for any pollutant.

Recently acquired monitoring data clearly shows that Orkney is currently meeting the 2010 air quality objectives. Pollutant levels have remained at a consistently low level and there is no significant risk of Orkney exceeding the air quality objectives.

Due to the predominantly rural nature of Orkney, and the continued lack of large scale industrial processes, as things stand do not pose a risk to the air quality objectives.

The current monitoring regime for NO<sub>2</sub> within Orkney will continue to ensure that the high standard of air quality in the county continues. Having ceased monitoring benzene for a year, the monitoring of benzene has resumed via the placement of diffusion tubes as was previously used. Preliminary results have indicated no change since the monitoring in 2011.

There have been no significant changes that would indicate an increase in the risk of SO<sub>2</sub>, However a program of monitoring has been agreed and will commence in the autumn of 2013 in collaboration with SEPA.

The next course of action for Orkney Island Council will be to submit the 2014 Progress Report.

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# **1 Introduction**

## **1.1 Description of Local Authority Area**

The Orkney Islands are situated between 5 and 50 miles north of mainland Scotland (59°N, 3°W). There are approximately 70 islands and 20 skerries in the island group. 17 of the islands are inhabited with a population of around 20,000. The largest town is Kirkwall with a population of around 7500.

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 main airport is situated at Grimsetter, 2 miles outside Kirkwall. There are smaller airports across the Outer Isles providing links to Orkney mainland. Large ferry services link Orkney to the Scottish mainland and Shetland with other numerous smaller inter-island links throughout Orkney. Other shipping activity is present within Orkney water's and tends to be concentrated around Scapa Flow.

The county is overwhelmingly rural in character and there are few significant industrial processes in Orkney. The main industrial process comes from the oil activities at Flotta. There are other smaller industrial processes i.e. fish processing and quarrying.

The last update and screening assessment in 2009 concluded that there were no locations in Orkney where the air quality objectives were likely to be exceeded.

## **1.2 Purpose of Progress Report**

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

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

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

### **1.3 Air Quality Objectives**

The air quality objectives applicable to LAQM in **Scotland** are set out in the Air Quality (Scotland) Regulations 2000 (Scottish SI 2000 No 97), the Air Quality (Scotland) (Amendment) Regulations 2002 (Scottish SI 2002 No 297), and are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre  $\mu\text{g}/\text{m}^3$  (milligrammes per cubic metre,  $\text{mg}/\text{m}^3$  for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

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

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 µg/m <sup>3</sup>	Running annual mean	31.12.2003
	3.25 µg/m <sup>3</sup>	Running annual mean	31.12.2010
1,3-Butadiene	2.25 µg/m <sup>3</sup>	Running annual mean	31.12.2003
Carbon monoxide	10 mg/m <sup>3</sup>	Running 8-hour mean	31.12.2003
Lead	0.50 µg/m <sup>3</sup>	Annual mean	31.12.2004
	0.25 µg/m <sup>3</sup>	Annual mean	31.12.2008
Nitrogen dioxide	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m <sup>3</sup>	Annual mean	31.12.2005
Particulate Matter (PM <sub>10</sub> ) (gravimetric)	50 µg/m <sup>3</sup> , not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	18 µg/m <sup>3</sup>	Annual mean	31.12.2010
Sulphur dioxide	350 µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

## 1.4 Summary of Previous Review and Assessments

The First stage review and assessment for Orkney Islands Council was published in December 1998 and revised in May 1999. This concluded that because Orkney is predominantly a rural island community with few significant industrial processes in the islands, and road traffic volumes are low. The risk of the air quality objectives for benzene, 1,3 butadiene, carbon monoxide, lead, nitrogen dioxide, sulphur dioxide and particulates being exceeded are considered negligible. It also concluded that there was not a requirement for a second stage review.

Further Updating and Screening Assessment of local air quality were published in October 2003 and April 2009 respectively. These reports concluded that air quality was currently meeting the national objectives and that it was not necessary to undertake a Detailed Assessment or to declare an Air Quality Management Area (AQMA).

The latest update and screening assessment was published in April 2012 and again it was concluded that there was no need to proceed to a detailed assessment for any pollutant and that the levels of pollutants monitored are way below the NAQS objectives.

The Council has also published Progress Reports on Air Quality, in July 2004, September 2005, November 2006, April 2008, April 2010 and April 2011. These reports have confirmed that a Detailed Assessment for air quality within Orkney is not required for any pollutants, and further concluded that levels of pollutants in Orkney are way below the NAQS objectives and Orkney is not at risk of exceeding these objectives.

## 2 New Monitoring Data

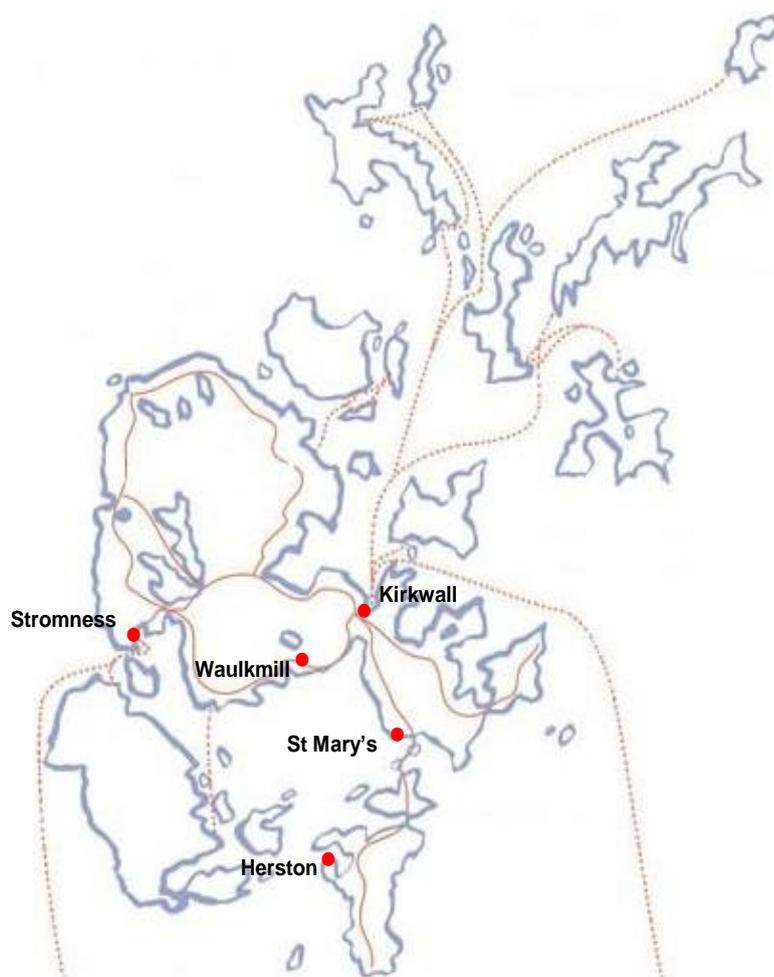
### 2.1 Summary of Monitoring Undertaken

#### 2.1.1 Automatic Monitoring Sites

There are no automatic monitoring sites with in Orkney.

#### 2.1.2 Non-Automatic Monitoring Sites

New data for 2012 has been gathered by Orkney Islands Council via a network of five diffusion tubes for Nitrogen Dioxide (NO<sub>2</sub>) concentrations. The tubes are exposed on a monthly basis throughout the year and sent for analysis at Edinburgh Scientific Services. The locations of the tubes are presented in Figure 2.2.



**Figure 2.2 Map(s) of Non-Automatic Monitoring Sites (if applicable)**

Table 2.2 Details of Non- Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
DT1	Kirkwall	Roadside	344812	1011017	2.8	NO <sub>2</sub>	N	N	Y (1m)	1m	Y
	Stromness	Roadside	325590	1009553	2.8	NO <sub>2</sub>	N	N	Y (1m)	1m	Y
	St Mary's	Roadside	347140	1001235	2.3	NO <sub>2</sub> , Benzene	N	N	Y (2m)	1m	Y
	Waulkmill	Rural	339525	1006985	1.4	NO <sub>2</sub> , Benzene	N	N	N	1.5m	Y
	Herston	Rural	341995	991999	2.6	NO <sub>2</sub> , Benzene	N	N	Y (10m)	2m	Y

## **2.2 Comparison of Monitoring Results with Air Quality Objectives**

### **2.2.1 Nitrogen Dioxide (NO<sub>2</sub>)**

As stated previously, there is no automatic monitoring data with regards to Nitrogen dioxide, as it has been deemed unnecessary due to the islands rural landscape and low population. Therefore all monitoring data is obtained through the placement of diffusion tubes. As diffusion tubes cannot detect short term fluctuations in pollutant concentrations, it is not possible to compare the monitoring results against all NAQS objectives for NO<sub>2</sub>. As can be seen from the data below, this is justified due to the County's very low NO<sub>2</sub> levels.

#### **Diffusion Tube Monitoring Data**

The annual mean concentrations for NO<sub>2</sub> are shown in Table 2.5. The full data set of results for 2012 can be seen in Appendix A

As can be seen from the results in Table 2.6 below, in 2012 there has been no significant change in levels of NO<sub>2</sub>. Kirkwall experiences the highest levels of NO<sub>2</sub> which is understandable considering it is Orkney's largest town and has the highest traffic flows.

Table 2.6 below shows Kirkwall had an upward trend in its annual mean concentrations of NO<sub>2</sub> before dropping off slightly to present. It has already been noted in previous reports that this reflected the, re-location of the monitoring point within Kirkwall, to a busy crossroads, part way through 2009. This new location was deemed more indicative of the worst case in Kirkwall, due to the monitoring point's location outside residential properties and on a main route within the town. The local bus station is also located adjacent to the crossroads, with all out going traffic movements from the bus station having to leave through this junction. The previous reports envisaged that the results for in Kirkwall would continue this upward trend of mean concentrations to stabilise and level out. Following the latest results for 2012 this can be clearly seen. The levels in Kirkwall are currently at 43% of the objective. Elsewhere in Orkney annual mean concentrations of NO<sub>2</sub> remain significantly unchanged.

Figure 2.4 below displays the trends of NO<sub>2</sub> concentrations within Orkney over the last 5 years. It is unlikely that levels will ever exceed the NAQS objective of 40 mg/m<sup>3</sup>.

Table 2.5 Results of NO<sub>2</sub> Diffusion Tubes 2012

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2012 (Number of Months or %) <sup>a</sup>	2012 Annual Mean Concentration (µg/m <sup>3</sup> ) - Bias Adjustment factor = 0.84 <sup>b</sup>
KW	Kirkwall	Roadside	N	N	12	17.3
SN	Stromness	Roadside	N	N	11	9.9
SM	St Mary's	Roadside	N	N	12	4.1
WM	Waulkmill	Rural	N	N	12	3.3
HE	Herston	Rural	N	N	12	2.7

Table 2.6 Results of NO<sub>2</sub> Diffusion Tubes (2008 to 2012)

Site ID	Site Type	Within AQMA?	Annual Mean Concentration (µg/m <sup>3</sup> ) - Adjusted for Bias <sup>a</sup>				
			2008 (Bias Adjustment Factor = 1.05)	2009 (Bias Adjustment Factor = 0.93)	2010 (Bias Adjustment Factor = 0.95)	2011 (Bias Adjustment Factor = 1.02)	2012 (Bias Adjustment Factor = 0.84)
KW	Kirkwall	N	12.6	14.0	18.9	18.4	17.3
SN	Stromness	N	9.6	10.3	10.6	12.6	9.9
SM	St Mary's	N	4.4	6.8	5.0	4.6	4.1
WM	Waulkmill	N	3.3	4.8	4.0	3.8	3.3
HE	Herston	N	2.8	2.6	2.8	3.1	2.7

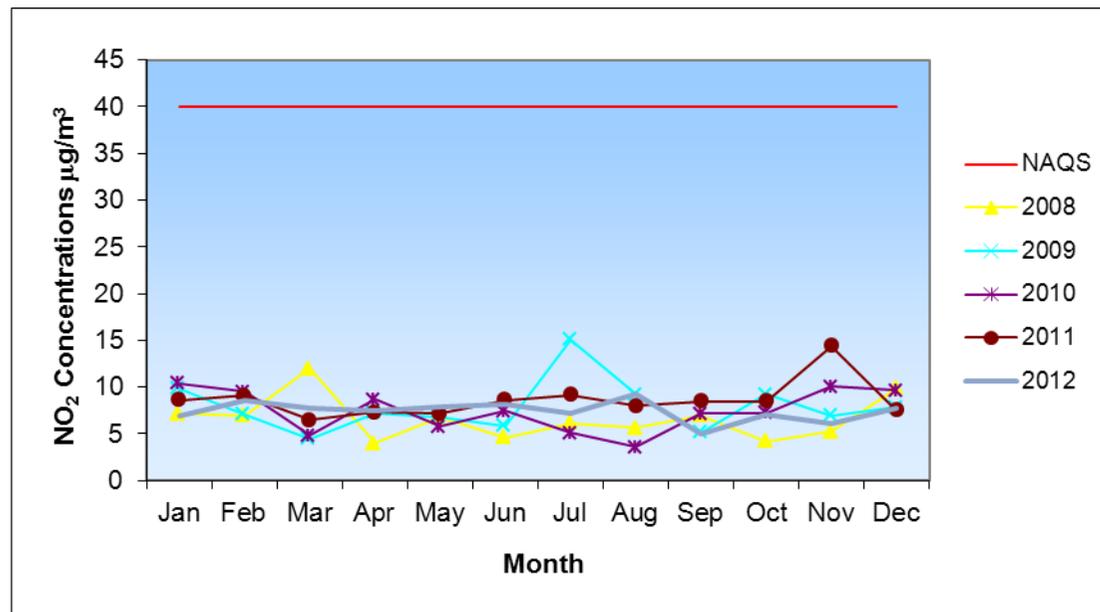


Figure 2.4 Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites

### **2.2.2 Particulate Matter (PM<sub>10</sub>)**

Orkney Islands Council does not undertake monitoring for PM<sub>10</sub>. In previous reports background concentration maps were used and predicted that PM<sub>10</sub> pollution levels in Orkney will not exceed 15µg/m<sup>3</sup>. Current background maps show Orkney to have PM<sub>10</sub> levels of approximately 9-10 µg/m<sup>3</sup>. Taking these facts into consideration it is concluded that there is no expected exceedance of the 2010 objective (18µg/m<sup>3</sup>) in Orkney

### **2.2.3 Sulphur Dioxide (SO<sub>2</sub>)**

There is no new monitoring data for SO<sub>2</sub> in Orkney.

The last time data was collected was in 2005 when real time data for SO<sub>2</sub> was collected to measure ambient levels of SO<sub>2</sub> in Kirkwall, with the assistance of SEPA.

The resulting report from SEPA concluded that the 'ambient air levels of SO<sub>2</sub> in Kirkwall never exceeded the limits set out by the air quality objectives'.

Since these findings were published by SEPA and reported on in the Orkney Islands Council 2005 Progress Report and commented on in subsequent reports, there have been no significant changes within Kirkwall that would influence ambient SO<sub>2</sub> concentrations in the town.

It was reported in the 2012 update and screening assessment that it was the intention to conduct short term monitoring of SO<sub>2</sub> in Kirkwall in order to substantiate that SO<sub>2</sub> levels are still unlikely to exceed the air quality objectives. This monitoring didn't take place due to delays but have been programmed to start in Autumn 2013 in collaboration with SEPA. The results from this monitoring will be reported in the 2014 progress report.

Despite no further monitoring data it is still concluded that SO<sub>2</sub> levels within Orkney are not likely to exceed the air quality objectives set out by NAQS.

#### **2.2.4 Benzene**

As indicated in the 2012 Update and screening assessment it was Orkney Islands Council decision to cease benzene monitoring for 2012, via its diffusion tube network.

Therefore there is no new data for benzene levels in Orkney. For 2013 benzene monitoring via a network of diffusion tubes has recommenced and initial results indicate no change to levels of benzene in Orkney. 2013 monitoring data will be discussed fully in the next progress report due in 2014.

At present it has been concluded that benzene levels within Orkney are not likely to exceed the NAQS air quality objectives.

#### **2.2.5 Other Pollutants Monitored**

Orkney Islands Council does not monitor any other pollutants

#### **2.2.6 Summary of Compliance with AQS Objectives**

Orkney Islands Council has examined the results from monitoring in the Isles. Concentrations are all below the objectives, therefore there is no need to proceed to a Detailed Assessment.

### 3 New Local Developments

Orkney Islands Council confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

Orkney Islands Council confirms that all the following have been considered:

- **Road traffic sources**
- **Other transport sources**
- **Industrial sources**
- **Commercial and domestic sources**
- **New developments with fugitive or uncontrolled sources.**

## **4 Local / Regional Air Quality Strategy**

Orkney Islands Council does not have a Local Air Quality Strategy in place. This is because Orkney Islands Council has not had to declare an AQMA and is unlikely to in the future. Results also indicate that levels are considerably lower than the levels set out in the AQS objectives.

## **5 Planning Applications**

There has been no planning applications approved or in the process of being assessed that are deemed to have a possible impact on air quality in Orkney.

## 6 Air Quality Planning Policies

Orkney Islands Council existing Local Plan addresses the importance of air quality through the planning process.

Local Plan Policies LP/DC1 – Criteria for Development and;  
LP/DC6 – Development Impact Assessments:  
address requirements with regards to air quality.

Planning policy is currently being updated and the Local Plan 2004 is to be replaced.

The Orkney Local Development Plan, Modified Proposed Plan, with minor modifications December 2012 is the emerging Local Development Plan for Orkney. Currently the plan is being prepared for Submission to the Scottish Government for the examination process. It is anticipated the Plan will be approved by Orkney Islands Council at the end of 2013.

These changes in policy will not affect how requirements for air quality is addressed Orkney.

## **7 Local Transport Plans and Strategies**

Orkney Islands Council existing local transport strategy is for 2007 - 2010

The Local Transport Strategy is a framework for how the Council intends to deliver on its own and national objectives at a local level. The Local Transport Strategy 2007-2010 is available along with related documents at;

<http://www.orkney.gov.uk/Service-Directory/L/Local-Transport-Strategy.htm>

The Local Transport Strategy is currently being reviewed.

## **8 Conclusions and Proposed Actions**

### **8.1 Conclusions from New Monitoring Data**

The recently acquired monitoring data that has been included in this report clearly shows that Orkney is currently meeting the 2010 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.

It has therefore been concluded that there is no need to proceed to a Detailed Assessment for any pollutant.

### **8.2 Proposed Actions**

The Progress Report has concluded that there is no need to proceed to a detailed assessment for any pollutant.

The current monitoring regime for NO<sub>2</sub> within Orkney will continue to ensure that the high standard of air quality in the county continues. Having ceased monitoring benzene for a year, the monitoring of benzene has resumed via the placement of diffusion tubes as was previously used. Preliminary results have indicated no change since the monitoring in 2011.

As stated in the report the monitoring of SO<sub>2</sub> has not been carried out in the County since 2005. Although there has been no significant changes that would indicate an increase in the risk of SO<sub>2</sub>, a program of monitoring has been agreed and will commence in the autumn of 2013 in collaboration with SEPA. It is envisaged that the results of this monitoring will confirm that there has been no significant change to levels of SO<sub>2</sub> in Orkney and that levels within the county are meeting the NAQS objectives.

The next course of action for Orkney Island Council will be to submit the 2014 Progress Report.

## 9 References

DEFRA Local Air Quality Management Technical Guidance LAQM.TG(09) 2009

Orkney Islands Council Update and Screening Assessment Report 2012

Orkney Islands Council Progress Report 2011

# Appendices

Appendix A: QA/QC Data and 2012 Monitoring Results

## **Appendix A: QA:QC Data**

### **Diffusion Tube Bias Adjustment Factors**

All diffusion tubes are analysed by Edinburgh Scientific Services.

A Bias Adjustment of 0.84 was used. This was taken from the National Diffusion Tube Bias Adjustment Spreadsheet (version September 2012)

### **Factor from Local Co-location Studies (if available)**

There has been no co-location studies conducted in Orkney.

### **Discussion of Choice of Factor to Use**

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

### **PM Monitoring Adjustment**

There has been no recent PM monitoring within Orkney

### **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 automatic monitoring**

There are no automatic monitoring sights in Orkney

### **QA/QC of diffusion tube monitoring**

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

**Nitrogen Dioxide Results**

Concentrations expressed in microgrammes per cubic metre (ug/m3)

2012													Annual Average (with bias adjustment)
Site / Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1 Kirkwall (control)	<1.0	<1.0	2.0	1.9	2.8	1.8	1.3	2.6	1.2	<1.0	<1.0		
2 Kirkwall	18.7	19.6	16.6	20.7	21.4	23.3	20.7	22.3	14.1	22.2	21.7	25.8	17.3
3 Stromness	11.8	13.5	14.6	11.5	11.7		8.6	14.6	9.5	10.4	11.4	11.8	9.9
4 Herston	2.5	5.3	4.2	3.2	3.7	3.9	3.6	4.6	1.7	1.8	1.0	2.4	2.7
5 Waulkmill	4.0	5.6	5.7	4.0	4.2	4.9	4.5	5.5	2.2	3.2	1.0	2.9	3.3
6 St.Mary's	4.3	6.9	5.3	4.7	6.3	7.0	5.4	7.9	2.5	4.2	1.2	3.5	4.1
Monthly Averages	8.3	10.2	9.3	8.8	9.5	9.8	8.6	11.0	6.0	8.4	7.3	9.3	Annual Average 8.9
Bias Adjustment (0.84 for Edinburgh Scientific Services)	6.9	8.6	7.8	7.4	7.9	8.2	7.2	9.2	5.0	7.0	6.1	7.8	7.4