

# 2010 Air Quality Progress Report for Shetland Islands Council

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

April 2010

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## **Executive Summary**

This report considers local air quality management in Shetland, taking into account relevant policy and technical guidance documents.

No significant changes to air pollution sources have been identified, although some proposed future changes are noted. Further information on these will be included in annual progress reports and updating and screening assessments as and when the developments take place.

An automatic air quality monitoring site for NO<sub>x</sub> and SO<sub>2</sub> came on line in December 2008. There is data for the majority of 2009 and no exceedences of air quality objectives have been recorded.

This progress report concludes that detailed assessments are not required for any pollutant.

# Table of contents

<b>1</b>	<b>Introduction</b>	<b>5</b>
1.1	Description of Local Authority Area	5
1.2	Purpose of Progress Report	5
1.3	Air Quality Objectives	6
1.4	Summary of Previous Review and Assessments	6
<b>2</b>	<b>New Monitoring Data</b>	<b>7</b>
2.1	Summary of Monitoring Undertaken	7
2.2	Comparison of Monitoring Results with Air Quality Objectives	9
<b>3</b>	<b>New Local Developments</b>	<b>11</b>
3.1	Road Traffic Sources	11
3.2	Other Transport Sources	11
3.3	Industrial Sources	11
3.4	Commercial and Domestic Sources	11
3.5	New Developments with Fugitive or Uncontrolled Sources	11
<b>4</b>	<b>Conclusions and Proposed Actions</b>	<b>12</b>
4.1	Conclusions from New Monitoring Data	12
4.2	Conclusions relating to New Local Developments	12
4.3	Proposed Actions	12

# 1 Introduction

## 1.1 Description of Local Authority Area

### 1.1.1 Geography

Shetland is an archipelago, about 400 miles from the Arctic Circle. The 60°N latitude line passes through Mainland. The southern tip of Mainland is about 100 miles from the nearest point on mainland Scotland & almost 400 miles north of Edinburgh.

Including Fair Isle, Shetland stretches about 100 miles north to south. There are over 100 islands in the group, 15 of which are inhabited. The highest point is Ronas Hill, rising to 1,475 feet. Nowhere in Shetland is more than 3 miles from the sea.

### 1.1.2 Population

After decades of decline, the population of Shetland, which had fallen to nearly 17,000 in the mid-1960s, rose significantly between 1971 and 1981 as a direct result of oil related activity. Based on recent population estimates since the 2001 Census, the population has been relatively stable at around 22,000.

### 1.1.3 Air Pollution Sources

#### a) Road Traffic

Traffic density, is very low in comparison to motorway and city traffic. There are very few roads and junctions where traffic is in excess of 5,000 and 10,000 vehicles per day.

#### b) Other Transport

There are no trains Shetland, however there are air and sea ports. The main airports are Sumburgh & Scatsta and the main seaport is Lerwick.

#### c) Industrial

The key industry sectors in Shetland are Fisheries, Oil Production Operations and Agriculture. A (small) major fuel storage depot is located in Lerwick.

## 1.2 Purpose of Progress Report

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

They are not intended to be as detailed as Updating and Screening Assessment Reports, or to require as much effort.

This Progress Report does not identify any risk of exceedence of an Air Quality Objective; therefore Shetland Islands Council is not undertaking any Detailed Assessment.

The next progress report will be carried out in 12 months time.

### 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 Local Air Quality Management in Scotland.**

Pollutant	Concentration	Measured as	Date to be achieved by
Benzene	16.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	3.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 $\text{mg}/\text{m}^3$	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	0.25 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2005
Particles (PM <sub>10</sub> ) (gravimetric)	50 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	50 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	18 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2010
Sulphur dioxide	350 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

### 1.4 Summary of Previous Review and Assessments

Previous rounds of Review and Assessment have not determined the need for detailed assessment and no air quality management areas have been declared in Shetland Islands Council's area.

## 2 New Monitoring Data

### 2.1 Summary of Monitoring Undertaken

#### 2.1.1 Automatic Monitoring Sites

Figure 2.1 Location Map of Automatic Monitoring Site

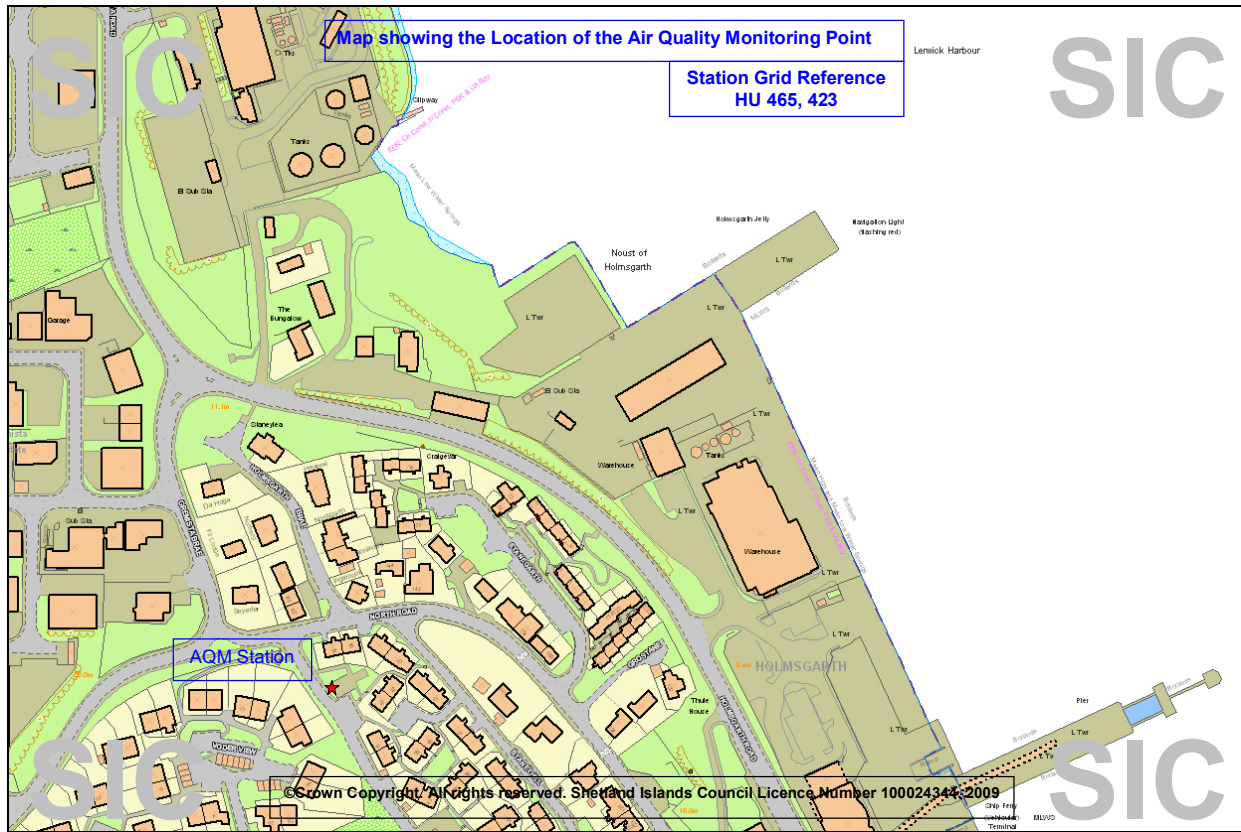


Table 2.1 Details of Automatic Monitoring Site

Site Name	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to kerb of nearest road	Worst-case exposure?
LER 3	Urban Background	HU 465 423	NO <sub>x</sub> SO <sub>2</sub>	N	1.5m	Y

**Figure 2.2 Details of Ratified Data Produced by AEA on behalf of the Scottish Government**

<b>LERWICK STANEY HILL</b>			
<b>1<sup>st</sup> January to 31<sup>st</sup> December 2009</b>			
These data have been fully ratified by AEA			
POLLUTANT	NO <sub>2</sub>	NO <sub>x</sub>	SO <sub>2</sub>
Number Very High	0	-	0
Number High	0	-	0
Number Moderate	0	-	0
Number Low	6766	-	33676
Maximum 15-minute mean	105 µg m <sup>-3</sup>	701 µg m <sup>-3</sup>	253 µg m <sup>-3</sup>
Maximum hourly mean	78 µg m <sup>-3</sup>	562 µg m <sup>-3</sup>	207 µg m <sup>-3</sup>
Maximum running 8-hour mean	55 µg m <sup>-3</sup>	387 µg m <sup>-3</sup>	147 µg m <sup>-3</sup>
Maximum running 24-hour mean	42 µg m <sup>-3</sup>	308 µg m <sup>-3</sup>	117 µg m <sup>-3</sup>
Maximum daily mean	33 µg m <sup>-3</sup>	237 µg m <sup>-3</sup>	88 µg m <sup>-3</sup>
Average	8 µg m <sup>-3</sup>	18 µg m <sup>-3</sup>	4 µg m <sup>-3</sup>
Data capture	77.2 %	77.2 %	94.9 %

All mass units are at 20°C and 1013mb  
NO<sub>x</sub> mass units are NO<sub>x</sub> as NO<sub>2</sub> µg m<sup>-3</sup>

Pollutant	Air Quality Regulations (2000) and Air Quality (Scotland) Amendment Regulations 2002	Exceedences	Days
Nitrogen Dioxide	Annual mean > 40 µg m <sup>-3</sup>	0	-
Nitrogen Dioxide	Hourly mean > 200 µg m <sup>-3</sup>	0	0
Sulphur Dioxide	15-minute mean > 266 µg m <sup>-3</sup>	0	0
Sulphur Dioxide	Hourly mean > 350 µg m <sup>-3</sup>	0	0
Sulphur Dioxide	Daily mean > 125 µg m <sup>-3</sup>	0	0

### 2.1.2 Non-Automatic Monitoring

Some short-term diffusion tube monitoring of SO<sub>2</sub> was carried out at the two busiest road traffic areas to determine whether any further monitoring would be required. The results, while only a spot-check, indicate that no further monitoring is required. Indeed levels were below the limit of detection in 3 of the 4 results.

**Table 2.2 Details of Non- Automatic Monitoring Sites**

Monitoring Location	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA ?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location ?
North Lochside	Roadside	HU 468 417	SO <sub>2</sub>	N	Y, 5m	1m	Y
Church Road	Roadside	HU 478 412	SO <sub>2</sub>	N	Y, 2m	1m	Y



**Figure 2.3 Details of Diffusion Tube Data****Number of Hours the Diffusion Tubes were Sampling**

Site Name	Date out	Date in	Hrs	Date out	Date in	Hrs
North Lochside	05/06/2009	29/06/2009		13/11/2009	09/12/2009	
	20:15	14:00	569.75	17:15	16:45	623.5
Church Road	05/06/2009	29/06/2009		13/11/2009	09/12/2009	
	20:30	16:00	571.5	17:00	16:30	623.5

**Results of Diffusion Tube Sampling**

Monitoring Location	Pollutant SO <sub>2</sub> (vppb)	
	Jun-09	Dec-09
North Lochside	<LOD	<LOD
Church Road	<LOD	0.29

## 2.2 Comparison of Monitoring Results with Air Quality Objectives

Monitoring results do not indicate any breaches of air quality objectives.

### 2.2.1 Nitrogen Dioxide

The annual mean concentration has not exceeded the 40 µg/m<sup>3</sup> objective.

The 99.8<sup>th</sup> percentile of 1-hour mean concentrations does not exceed 200 µg/m<sup>3</sup>.

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

Location	Within AQMA?	Data Capture for full calendar year	Annual mean concentrations
Staney Hill	N	77.2 %	8 µg m <sup>-3</sup>

Air Quality Regulations 2000 and Air Quality (Scotland) Amendment Regulations 2002	Exceedences	Days
Annual mean > 40 µg m <sup>-3</sup>	0	-

**Table 2.3b Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour Mean Objective**

Location	Within AQMA?	Data Capture for full calendar year	Maximum Hourly Mean Concentration
Staney Hill	N	77.2 %	78 µg m <sup>-3</sup>

Air Quality Regulations 2000 and Air Quality (Scotland) Amendment Regulations 2002	Exceedences	Days
Hourly mean > 200 µg m <sup>-3</sup>	0	0

### 2.2.2 PM<sub>10</sub>

No monitoring for PM<sub>10</sub> has been carried out for the purposes of this report.

### 2.2.3 Sulphur Dioxide

There are:

- no 15-minute means greater than 266 µg/m<sup>3</sup>,
- no 1-hour means greater than 350 µg/m<sup>3</sup> and
- no 24-hour means greater than 125 µg/m<sup>3</sup>

**Table 2.6 Results of SO<sub>2</sub> Automatic Monitoring: Comparison with Objectives**

Location	Within AQMA?	Data Capture 2009	Number of Exceedences of:		
			15-minute Objective (266 µg/m <sup>3</sup> )	1-hour Objective (350 µg/m <sup>3</sup> )	24-hour Objective (125 µg/m <sup>3</sup> )
Staney Hill	N	94.9%	0	0	0

### 2.2.4 Benzene

No monitoring for Benzene has been carried out for the purposes of this report.

### 2.2.5 Other pollutants monitored

No monitoring for other pollutants has been carried out for the purposes of this report.

### 2.2.6 Summary of Compliance with AQS Objectives

Shetland Islands Council has examined the results from monitoring in the Shetland Islands Council's area. Concentrations are all below the objectives; therefore there is no need to proceed to a Detailed Assessment.

## **3 New Local Developments**

### **3.1 Road Traffic Sources**

There are no newly identified road traffic sources in Shetland Islands Council's area.

### **3.2 Other Transport Sources**

There are no new/newly identified other transport sources in Shetland.

### **3.3 Industrial Sources**

Planning Permission has been granted for a new gas processing plant adjacent to Sullom Voe Oil Terminal in the north mainland of Shetland. Air quality was considered in the Environmental Statement and during the planning process.

Information to date does not indicate that this new development will result in breaches of any air quality objectives. However, a planning condition has been included requiring that detailed air quality modelling be carried out with respect to the actual plant to be installed. Should this detailed modelling indicate that any air quality objectives may be breached then the developer will be required to carry out actual monitoring. The detailed modelling, any monitoring and the air quality management plan must be agreed prior to commissioning of the system.

The plant is expected to become operational in 2014.

### **3.4 Commercial and Domestic Sources**

There are no new/newly identified commercial and domestic sources in Shetland.

### **3.5 New Developments with Fugitive or Uncontrolled Sources**

The Energy Consents Unit is currently considering an application for a large wind farm in the central mainland of Shetland. Fugitive emissions from quarrying operations and traffic on unmade roads were considered in the application process.

Consent has not yet been given for this development.

Shetland Islands Council has identified the following new or previously unidentified local developments which may impact on air quality in the Local Authority area.

- Gas Processing Plant, North Mainland
- Wind Farm, Central Mainland

These will be taken into consideration in the next Updating and Screening Assessment, scheduled for 2012.

## **4 Conclusions and Proposed Actions**

### **4.1 Conclusions from New Monitoring Data**

No exceedences were identified. Therefore no detailed assessment is required.

### **4.2 Conclusions relating to New Local Developments**

Two new local developments will required more detailed consideration in the next updating and screening assessment. Neither of these appear to give rise to the need for detailed assessment.

### **4.3 Proposed Actions**

Monitoring data has not identified the need to proceed to a Detailed Assessment for any pollutant, nor has it identified any need for additional monitoring, or changes to the existing monitoring programme

The next action of Shetland Islands Council will be to submit the 2011 Progress Report.