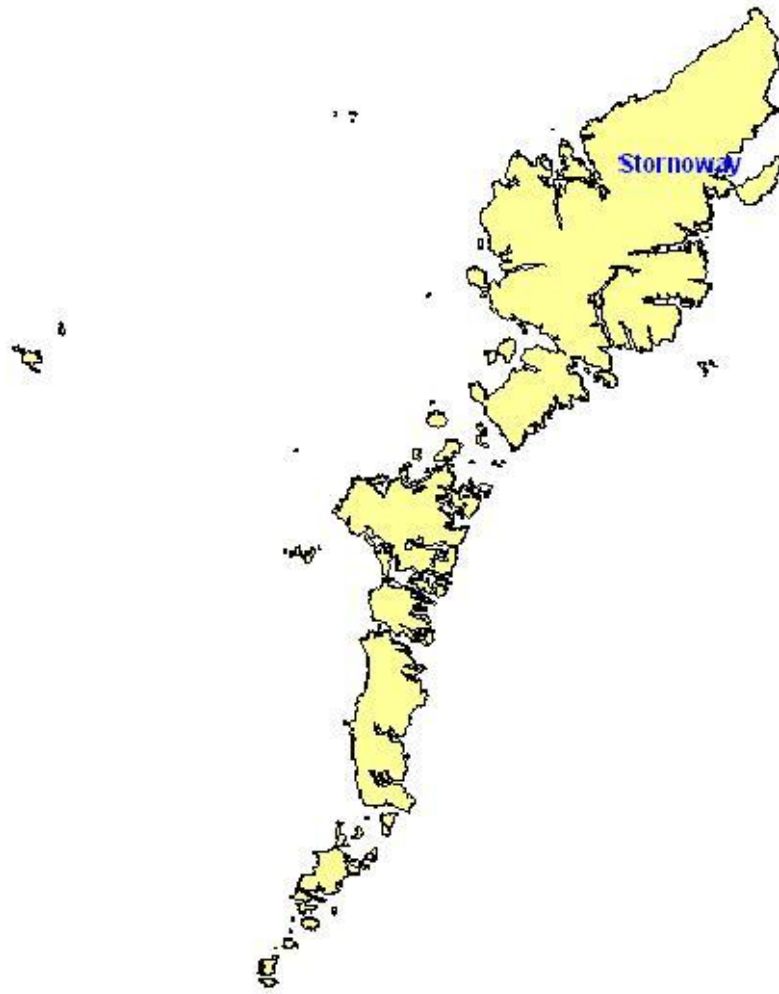


Comhairle Nan Eilean Siar

Air Quality in the Western Isles



Local Air Quality
Updating and Screening Assessment 2003

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2 Executive Summary and Conclusions

Part IV of the Environment Act 1995 introduced Local Air Quality Management, whereby local authorities have a statutory duty to carry out reviews and assessments of local air quality as prescribed. Local Air Quality Management has an important role in helping to deliver the air quality objectives, which are set out in the Air Quality Strategy for Scotland (January 2000) and the Air Quality (Scotland) Regulations 2000 (as amended).

The first review and assessment in the Western Isles was completed in 1999.

The purpose of this report, the Comhairle Nan Eilean Siar Updating and Screening Assessment 2003 report, is to update the findings in the previous report and assess whether any of the air quality objectives will be exceeded in the Western Isles by 2010.

There are seven air pollutants, which each local authority must assess. The assessment must have regard to technical guidance, “The Local Air Quality Management Technical Guidance LAQM. TG (03)”, and is referred to throughout this report.

Where an Updating and Screening Assessment identifies a risk that an air quality objective will be exceeded at a location with relevant public exposure, the local authority will be required to undertake a Detailed Assessment following the directions in the Technical Guidance LAQM.TG (03) document.

The main finding of the Update and Screening Assessment are summarised below:

Pollutant	Conclusions
1,3-Butadiene Benzene Carbon Monoxide Lead (Pb) Nitrogen Dioxide PM10 (small particles) Sulphur Dioxide	The Screening assessment indicates that the air quality for these seven pollutants are likely to be met. Comhairle Nan Eilean Siar will not be required to proceed to a Detailed Assessment

3 Introduction

The Department of the Environment, Transport and the Regions Air Quality Strategy for England, Scotland, Wales and Northern Ireland establishes the framework for air quality improvements.

3.1 Local Air Quality Management

Measures agreed at the national and international level are the foundations on which the strategy is based. It is recognised, however, that despite these measures, areas of poor air quality will remain, and that these will best be dealt with using local measures implemented through the Local Air Quality Management regime.

The role of the local authority review and assessment process is to identify these areas, where it is considered likely that the Air Quality Objectives will be exceeded. The experience gained from such reviews carried out throughout the UK has shown that such areas may range from single residential properties to whole town centres.

The Department for the Environment Food and Rural Affairs, Local Air Quality Management, Technical Guidance LAQM.TG(03), February 2003 builds upon the phased approach to review and assessment established in previous technical guidance, LAQM.TG4(00). The intention is that local authorities should only undertake a level of assessment that is commensurate with the risk of an air quality objective being exceeded. Not every authority will, therefore, need to proceed beyond the first step in the second round of review and assessment.

3.2 Updating and Screening Assessments

The first step of the review and assessment process is an Updating and Screening Assessment, which is to be undertaken by all authorities. This is based on a checklist to identify those matters that have changed since the first round was completed, and which may now require further assessment. This Updating and Screening Assessment should cover:

- new monitoring data;
- the new air quality objectives;
- new sources or significant changes to existing sources, either locally or in neighboring authorities; and
- any other local changes that might affect air quality.

If there is a risk that these changes may be significant, then a simple screening assessment should be carried out. Nomograms and similar tools are provided to in the Technical Guidance to help with this screening assessment.

3.3 Detailed Assessments

Where the Updating and Screening Assessment has identified a risk that an air quality objective will be exceeded at a location with relevant public exposure, the authority will be required to undertake a Detailed Assessment following the guidance set out in the Technical Guidance. The aim of this Detailed Assessment should be to identify with reasonable certainty whether or not a likely exceedence will occur. The assumptions within the Detailed Assessment will need to be considered in depth, and the data that are collected or used, should be quality-assured to a high standard. This is to ensure that authorities are confident in the decisions they reach.

Where a likely exceedence is identified, then the assessment should be sufficiently detailed to determine both its magnitude and geographical extent.

The Detailed Assessment report, if required, should be completed by the end of April 2004. It is expected that local authorities will then undertake reviews and assessments of air quality every three years.

3.4 Future Assessments

A Detailed Assessment report will not be required from Comhairle Nan Eilean Siar. Updating and Screening Assessments will be submitted during the first four months of 2006 and 2009.

If required, Detailed Assessments to be submitted by the end of April 2007 and 2010 respectively.

3.5 Reference publications

Full details of the Air Quality Strategy and the role of Local Air Quality Management can be found in the following publications:

1. Department of the Environment, Transport and the Regions, The Air Quality Strategy for England, Scotland, Wales and Northern Ireland: Working Together for Cleaner Air, January 2000

www.scotland.gov.uk/environment/airquality/publications/2000/strategy/aqs2000.asp

2. Department for the Environment, Food and Rural Affairs, The Air Quality Strategy for England, Scotland, Wales and Northern Ireland: Addendum, February 2003

www.scotland.gov.uk/environment/airquality/addweb.pdf

3. Department for the Environment Food and Rural Affairs, Part IV of the Environment Act 1995, Local Air Quality Management, Technical Guidance LAQM.TG(03), February 2003

www.scotland.gov.uk/environment/airquality/laqm.pdf

4. Scottish Executive, Part IV the Environment Act 1995, Local Air Quality Management, Revised Policy Guidance, February 2003

www.scotland.gov.uk/library5/environment/laqmg.pdf

3.6 Consultations

The Updating and Screening Assessment has been forwarded to the following organisations:

- • The Scottish Executive, Air Quality Team,
1-H North Victoria Quay, Edinburgh, EH6 6QQ
- • The Scottish Environment Protection Agency, Graesser House, Fodderty Way,
Dingwall Business Park, Dingwall IV15 9XB

3.7 Contacts for further information

Further copies of the Updating and Screening Assessment will be available via the Comhairle's website at: <http://www.cne-siar.gov.uk>
Or by contacting Andy Mclements or Colm Fraser at Health and Consumer Services, Department for Sustainable Communities, Comhairle Nan Eilean Siar, Sandwick Road, Stornoway. Tel: 01851 709396

4 Updating Report -changes which may have an impact on air quality

4.1 Proposed Developments

The Planning department has indicated that there are no proposed developments that will impact or influence traffic flows within the Western Isles

4.2 Industrial Processes

The Scottish Environment Protection Agency (SEPA) has regulatory responsibility for certain prescribed processes and for landfill sites in Scotland. In order to assist authorities in the compilation of data related to these processes, SEPA have committed to provide information on any changes that may affect emissions from existing processes, and any new processes that have been, or will be, authorised. On Friday 30th May 2003, the Scottish Environment Protection Agency (SEPA) published emissions data to a new section of its website, at <http://www.sepa.org.uk/data/eper/mainpage.htm>

This is the first stage in SEPA's contribution to the European Pollutant Emission Register (EPER), which aims to provide an easily accessible, consistent and comprehensive view of what emissions are being made to the environment. Guidance on the European Pollutant Emission Register can be found at:

http://www.sepa.org.uk/data/eper/pdf/ec_guidance_eper_implementation.pdf.

From August this year SEPA will expand the service to provide an easy-to-use search facility for this information using maps and postcodes. The Agency will also be collecting more information from a much wider list of industrial activity next year, including data on water quality, SEPA's aim is to provide fair and open regulation of industry so Scotland's economy can prosper whilst the ensuring environment is safeguarded and improved. Providing information to the public about this is an essential part of achieving that aim and the development of EPER is a big step in that direction.

EPER is a factual reporting of data, required by European legislation. Inclusion in the Register does not imply that companies have breached their limits for emissions.

SEPA regulates sites under Pollution Prevention Control (PPC) legislation, sets conditions and limits for emissions for individual sites and will take appropriate enforcement action if authorisations are breached.

Notes:

- EPER contains data on the reporting thresholds of 50 chemical totals released in 2002, as part of regulated processes.
- SEPA believes making EPER available to the public will build awareness of the importance of a clean environment, and help to indicate and enhance industries' transparency and comparability.

Figure 4.1 Air Quality Pollutants, which are reported in EPER

List of Air Quality Strategy pollutants to be reported in the European Pollutant Emission Register if the threshold value is exceeded.	
Pollutants	Thresholds for emissions to air in kg/yr
Carbon Monoxide	500,000
NOx as Nitrogen Dioxide	100,000
SOx as Sulphur Dioxide	150,000
Benzene	1,000
PM10	50,000

There are no EPER registered companies in the Western Isles that emit “air quality strategy” pollutants above the threshold value.

5 Carbon monoxide (CO)

5.1 Where does it come from?

The main source of carbon monoxide in the United Kingdom is road transport, which accounted for 67% of total releases in 2000 (the most recent year for which estimates are available). Annual emissions of carbon monoxide have been falling steadily since the 1970s, and are expected to continue to do so. Current projections indicate that road transport emissions will decline by a further 42% between 2000 and 2005.

5.2 How can it affect our health?

The main threats to human health from exposure to carbon monoxide are the formation of carboxyhaemoglobin, which substantially reduces the capacity of the blood to carry oxygen and deliver it to the tissues, and blockage of important biochemical reactions in cells. People who have an existing disease which affects the delivery of oxygen to the heart or brain (e.g. coronary artery disease (angina)) are likely to be at particular risk if these delivery systems are further impaired by carbon monoxide.

5.3 The Air Quality Objective for Carbon monoxide

The Scottish Executive is committed to meeting people’s right to clean air. Their primary objective is to make sure that everyone can enjoy a level of ambient air quality in public places which poses no significant risk to health or quality of life. The air quality objectives are generally based on the recommendations of the Expert Panel on Air Quality Standards (EPAQS). The standards are set purely on the basis of medical and scientific evidence of how each pollutant affects human health. The air quality objective for Carbon monoxide is shown in Figure 5.1.

Figure 5.1 Air Quality Objective for Carbon monoxide

Applies to	Objective	Measured as	Date to be achieved by
Scottish Local Authorities	10 mg/m ³	Running 8-hour mean	31 December 2003

5.4 Estimated Background Concentrations of Carbon monoxide

Estimated annual mean background concentrations for 2001 have been mapped for the UK, and can be accessed from the Internet at the following address (www.airquality.co.uk/archive/laqm/tools.php).

In Comhairle nan Eilean Siar’s area, the estimated annual mean background concentrations for Carbon monoxide are shown in Figure 5.2

Figure 5.2

Carbon Monoxide	Estimated annual mean background concentration (mg/m ³)		
	Minimum	Maximum	Average
2001	0.1	0.14	0.1

5.5 Where should the air quality objectives for Carbon Monoxide apply?

Likely exceedences of the objectives should be assessed in relation to the quality of the air at locations which are situated outside of buildings or other natural or man- made structures, above or below ground, and where members of the public are regularly present. Reviews and assessments should be focused on those relevant locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Exceedences of the objectives at any location where relevant public exposure would not be realistic should not be considered.

“Relevant locations” are listed in Figure 5.3

Figure 5.3 Relevant Locations for Carbon monoxide

Carbon monoxide running 8-hour mean	
Relevant locations	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, libraries etc. Gardens of residential properties.
Objective should generally not apply at:	Kerbside sites (as opposed to locations at the building facade), or any other location where public exposure is expected to be short term.

5.6 The updating and screening checklist

The Local Air Quality Management Technical Guidance LAQM. TG(03) requires local authorities to have regard to the checklists in the guidance when carrying out screening assessment.

For Carbon monoxide, the checklist comprises:-

Figure 5.4 Updating and screening checklist for Carbon Monoxide

Section reference	Source, location or data that needs to be assessed
A	Monitoring data
B	Very Busy Roads

In undertaking the updating and screening assessment, the aim has been to maximise and build upon the data collation and assessments completed during the Comhairle's Air Quality Review and Assessment in September 1999.

A MONITORING DATA

A.1 Local monitoring

No Carbon monoxide monitoring is undertaken by Comhairle Nan Eilean Siar. Studies at a national level, based on both measured and modelling data, suggest that there is little likelihood of the new objective for carbon monoxide being exceeded by 2003. There is no need to monitor this pollutant at a local level.

B VERY BUSY ROADS

B.1 Busy roads and junctions

Local authorities are required to consider Carbon monoxide emissions at busy roads and junctions where the 2003 background concentration is likely to exceed 1 mg/m³.

The maximum 2003 background concentration has been calculated in the Western Isles from data, which has been downloaded from (www.airquality.co.uk/archive/laqm/tools.php) as a comma separated (csv) file. This includes estimated 2001 annual mean background concentrations for Carbon monoxide. The 2001 background concentrations range from 0.1 to 0.14 mg/m³ with an average value of 0.10 mg/m³. The background concentration has been corrected to 2003 by multiplying the 2001 concentration by 0.826 (as per the Technical Guidance). Thus, the maximum background concentration of Carbon monoxide in the Western Isles in 2003 is estimated to be 0.12 mg/m³, which is considerably less than the 1 mg/m³, which is the trigger for an assessment of very busy roads and junctions.

Moreover, in this context, a “very busy” road is defined as:

- Single carriageway roads with daily average traffic flows which exceed 80,000 vehicles per day.
- Dual carriage way (2 or 3-lane) roads with daily average traffic flows, which exceed 120,000 vehicles per day.
- Motorways with daily average traffic flows, which exceed 140,000 vehicles per day. When junctions are considered, the flows of each part of the junction are added.

Information and forecasts provided by the Comhairle’s Technical Services department indicate that there are no roads or junctions in the Western Isles, which meet the above criteria.

5.7 Conclusions for the screening of Carbon Monoxide

In Comhairle Nan Eilean Siar’s area, background concentrations of Carbon monoxide are very low. Traffic flows on roads in the area are such that there is little likelihood of the air quality objective being exceeded.

There is no need to proceed to a Detailed Assessment.

6 Benzene

6.1 Where does it come from?

The main sources of benzene emissions in the UK are petrol-engined vehicles, petrol refining, and the distribution and uncontrolled emissions from petrol station forecourts without vapour recovery systems. A number of policy measures already in place, or planned for future years, will continue to reduce emissions of benzene. Since January 2000, EU legislation has reduced the maximum benzene content of petrol to 1%, from a previous upper limit of 5%. The European Auto-Oil programme will further reduce emissions for cars and light-duty vehicles, and emissions of benzene from the storage and distribution of petrol are controlled by vapour recovery systems.

6.2 How can it affect our health?

Benzene is a recognised genotoxic human carcinogen. Studies of industrial workers exposed in the past to high levels of benzene have demonstrated an excess risk of leukemia, which increased in relation to their working lifetime exposure. Because it is a

genotoxic carcinogen, no absolutely safe level can be specified for ambient air concentrations of benzene. In their 1994 report, the Expert Panel On Air Quality Standards (EPAQS) recommended an air quality standard of 5ppb ($16.25\mu\text{g}/\text{m}^3$) as a running annual mean, a level which they concluded represents an exceedingly small risk to health. In their report, EPAQS considered the advice of the Department of Health's Committee on Carcinogenicity, that exposure to benzene should be kept as low as practicable, and recommended a target of 1ppb ($3.25\mu\text{g}/\text{m}^3$), also as a running annual mean.

6.3 The Air Quality Objectives for Benzene

The Scottish Executive is committed to meeting people's right to clean air. Their primary objective is to make sure that everyone can enjoy a level of ambient air quality in public places which poses no significant risk to health or quality of life. The air quality objectives are generally based on the recommendations of the Expert Panel on Air Quality Standards (EPAQS). The standards are set purely on the basis of medical and scientific evidence of how each pollutant affects human health. The air quality objectives for Benzene are shown below.

Figure 6.1 Air Quality Objectives for Benzene

Applies to		Objective	Measured as	Date to be achieved by
All Authorities	Local	$16.25\mu\text{g}/\text{m}^3$	Running annual mean	31 December 2003
Scottish Authorities	Local	$3.25\mu\text{g}/\text{m}^3$	Running annual mean	31 December 2003

6.4 Estimated Background Concentrations

Estimated annual mean background concentrations for 2001, 2003 and 2010 have been mapped for the UK, and can be accessed from the internet at:

www.airquality.co.uk/archive/laqm/tools.php

In Comhairle nan Eilean Siar's area, the estimated annual mean background concentrations for Benzene are shown in Figure 6.2.

Figure 6.2 Estimated Annual Mean Background Concentration for Benzene in the Western Isles.

Benzene	Estimated annual mean background concentration ($\mu\text{g}/\text{m}^3$)			
	Year	Minimum	Maximum	Average
	2001	0.01	0.19	0.02
	2003	0.01	0.18	0.02
	2010	0.01	0.16	0.02

6.5 Where should the air quality objectives for Benzene apply?

Likely exceedences of the objectives should be assessed in relation to the quality of the air at locations which are situated outside of buildings or other natural or man- made structures, above or below ground, and where members of the public are regularly present. Reviews and assessments should be focussed on those relevant locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Exceedences of the objectives at any location where relevant public exposure would not be realistic should not be considered.

“Relevant locations” are described in Figure 6.3.

Figure 6.3 Relevant locations for Benzene

Benzene running mean	
Relevant locations	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, libraries etc.
Objective should generally not apply at:	Building facades of offices or other places of work where members of the public do not have regular access. Gardens of residential properties. Kerbside sites (as opposed to locations at the building facade), or any other location where public exposure is expected to be short term.

6.6 The updating and screening checklist

In undertaking the updating and screening assessment, the aim has been to maximise and build upon the data collation and assessments completed during the Comhairle’s Air Quality Review and Assessment September 1999.

The Local Air Quality Management Technical Guidance LAQM. TG(03) requires local authorities to have regard to the checklists in the guidance when completing the updating and screening assessment.

In the case of Benzene, the checklist comprises:-

Figure 6.4 Updating and screening checklist for Benzene

Section reference	Source, location or data that needs to be assessed
A	Monitoring data
B	Very busy roads or junctions in built- up areas
C	Industrial sources
D	Petrol stations
E	Major fuel storage depots (petroleum only)

A MONITORING DATA

A.1 National monitoring

There are no Automatic Urban and Rural Network monitoring stations in Comhairle Nan Eilean Siar's area at which Benzene is monitored.

A.2 Local monitoring

The Comhairle undertakes no Benzene monitoring.

B VERY BUSY ROADS OR JUNCTIONS IN BUILT-UP AREAS

Local authorities are required to consider Benzene emissions at busy roads and junctions where the 2003 background concentration is likely to exceed $2 \mu\text{g}/\text{m}^3$. The maximum background concentration of Benzene in the Western Isles in 2003 is estimated to be ($0.18 \mu\text{g}/\text{m}^3$), which is considerably less than the $2 \mu\text{g}/\text{m}^3$ which is the trigger for an assessment of very busy roads and junctions. Moreover, in this context, "very busy" is defined as:

- Single carriageway roads with daily average traffic flows which exceed 80,000 vehicles per day.
- Dual carriageway (2 or 3-lane) roads with daily average traffic flows which exceed 120,000 vehicles per day.
- Motorways with daily average traffic flows which exceed 140,000 vehicles per day. (Flows are added at junctions in each case.)

There are no roads or junction in the Western Isles that meet the above criteria. **In the Western Isles, the low background concentrations of Benzene and the very low traffic flows indicate that no further screening of Benzene emissions from road traffic is necessary.**

C INDUSTRIAL SOURCES

There are no new industrial sources, which are likely to have a significant effect on air quality in the Comhairle's area. However, the Technical Guidance advises that local authorities may also wish to consider checking information derived from their first round of review and assessment if there were any doubts regarding their validity.

Additional screening is not necessary for Benzene as there are no industrial process operator's registered on the European Pollutant Emission Register with any threshold limit exceedences. **Therefore the Comhairle will not proceed to a Detailed Assessment.**

D PETROL STATIONS

D.1 Impact of Petrol Stations

The potential impact of emissions arising from petrol stations has been recently investigated by DEFRA and the Devolved Administrations. There are two possible major sources of benzene from evaporative emissions at petrol stations. The first when petrol vapour is displaced when filling underground storage tanks and termed Stage 1 emissions. The second when petrol vapour is displaced from vehicle petrol tanks during refueling and termed Stage 2 emissions.

All petrol stations with a petrol throughput of greater than 1000m³ /annum were required to fit Stage 1 vapour recovery before 1 January 1999. Petrol stations with a throughput of less than 1000 m³ /annum are very unlikely to have any significant effect on the local concentrations of benzene. Stage 1 emissions are therefore, unlikely to have any significant influence on concentrations of benzene in the vicinity of petrol stations. As yet there are no legal requirements to fit Stage 2 vapour recovery systems at petrol stations. A 12-month study of concentrations of benzene in the vicinity of petrol stations concluded that the presence of a petrol station is **unlikely** to have a significant influence on the concentrations of benzene close to residential properties, where:

- the petrol throughput is less than 2000m³ /annum (2 million litres per annum)
- the petrol distribution pumps are more than 10m from residential properties, either horizontally or vertically. Petrol stations located immediately below residential properties may result in elevated concentrations of benzene in the vicinity of the residential property. (The presence of a canopy seems to have little effect on the concentration of benzene in the immediate vicinity of petrol stations.)

D.2 Screening criteria for Petrol Stations

Local authorities are required to identify all petrol stations with an annual throughput of more than 2,000 m³ of petrol (2 million litres per annum) and with a busy road nearby. A busy road can be taken to be one with more than 30,000 vehicles per day. Thereafter, the local authority must determine whether there is a relevant exposure i.e. residential property within 10m of the pumps.

D.3 Petrol stations in the Western Isles

Information was collected from the business operators and the petroleum-licensing officer of the Comhairle, on the throughput of petrol per annum at petrol stations in the Western Isles. **No petrol stations had an annual throughput in excess of 1.5 million litres per annum.**

Therefore, there is no need to proceed to a Detailed Assessment for petrol stations.

E MAJOR FUEL STORAGE DEPOTS (PETROLEUM ONLY)

In Scotland, the Scottish Environment Protection Agency regulates the storage transport, loading and unloading of petrol at terminals. Petrol terminals are required to control emissions by technical measures, which include vapour recovery systems – “Stage 1” controls. Stage I petrol vapour recovery concerns the control of volatile organic compounds (VOC) emissions, which include benzene, during the storage, transport, loading and unloading of petrol at terminals and service stations. Stage I controls, are implemented in the UK in accordance with EU Directive EC/94/63 as prescribed processes under Part 1 of the Environment Protection Act 1990. The Directive applies to terminals, transport containers (road, rail and inland waterway) and petrol service stations. It requires the establishment of a closed system under which petrol vapour is recovered and regenerated back into petrol. Implementation of the Directive is in four stages spreading a period of nine years to the final deadline of 31 December 2004.

There are no major fuel storage depots in the Western Isles which are listed in Annex 2 of Technical Guidance LAQM.TG(03)

6.7 Conclusions for the screening of Benzene

In the Comhairle area, background concentrations of Benzene are very low. There is little likelihood of the air quality objective being exceeded in most areas.

There is no need to proceed to a Detailed Assessment for Benzene.

7 1,3-butadiene

7.1 Where does it come from?

The main source of 1,3-butadiene in the United Kingdom is emissions from motor vehicle exhausts. 1,3-butadiene is also an important industrial chemical and is handled in bulk at a small number of industrial premises. The increasing numbers of vehicles equipped with three way catalysts will significantly reduce emissions of 1,3-butadiene in future years. Recently agreed further reductions in vehicle emissions and improvements to fuel quality, including those as part of the Auto-Oil programme, are expected to further reduce emissions of 1,3-butadiene from vehicle exhausts.

7.2 How can it affect our health?

The health effect, which is of most concern in relation to 1,3-butadiene exposure, is the induction of cancers of the lymphoid system and blood-forming tissues, lymphomas and leukemia's. Like benzene, 1,3-butadiene is a genotoxic carcinogen, and so no absolutely safe level can be defined. The Expert Panel On Air Quality Standards nevertheless believed that a standard could be set at which any risks to the health of the population are exceedingly small.

7.3 Air Quality Objective for 1,3-Butadiene

The Scottish Executive is committed to meeting people's right to clean air. Their primary objective is to make sure that everyone can enjoy a level of ambient air quality in public places, which poses no significant risk to health or quality of life. The air quality objectives are generally based on the recommendations of the Expert Panel on Air Quality Standards (EPAQS). The standards are set purely on the basis of medical and scientific evidence of how each pollutant affects human health. The air quality objective for 1,3-Butadiene is shown in below.

Figure 7.1 The Air Quality Objective for 1,3-Butadiene

Applies to	Objective	Measured as	Date to be achieved by
All Local Authorities	2.25 µg/m ³	Running annual mean	31 December 2003

7.4 Estimated Background Concentrations

Estimated annual mean background concentrations for 2001 and 2003 have been mapped for the UK, and can be accessed from the Internet at www.airquality.co.uk/archive/laqm/tools.php.

In the Western Isles, the estimated annual mean background concentrations for 1,3-butadiene are shown in Figure 7.2.

Figure 7.2 Estimated Annual Mean Background Concentration for 1,3-butadiene in the Western Isles

1,3-butadiene	Estimated annual mean background concentration (µg/m ³)		
	Minimum	Maximum	Average
Year			
2001	0.0	0.04	0.01
2003	0.0	0.04	0.01

7.5 Where should the air quality objectives for 1,3-Butadiene apply?

Likely exceedences of the objectives should be assessed in relation to the quality of the air at locations which are situated outside of buildings or other natural or man-made structures, above or below ground, and where members of the public are regularly present. Reviews and assessments should be focussed on those relevant locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Exceedences of the objectives at any location where relevant public exposure would not be realistic should not be considered.

“Relevant locations” are listed below.

Figure 7.3 Relevant locations for 1,3-butadiene

1,3-butadiene running annual mean	
Relevant locations	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, libraries etc.
Objective should generally not apply at:	Building facades of offices or other places of work where members of the public do not have regular access. Gardens of residential properties. Kerbside sites (as opposed to locations at the building facade), or any other location where public exposure is expected to be short term.

7.6 The updating and screening checklist

In undertaking the updating and screening assessment, the aim has been to maximise and build upon the data collation and assessments completed during the Comhairle's Air Quality Review and Assessment in September 1999. The Local Air Quality Management Technical Guidance LAQM. TG(03) requires local authorities to have regard to the checklists in the guidance when completing the updating and screening assessment. In the case of 1,3-Butadiene, the checklist comprises:-

Figure 7.4 Updating and screening checklist for 1,3-butadiene

Section reference	Source, location or data that needs to be assessed
A	Monitoring data
B	New industrial sources
C	Existing industrial sources with significantly increased emissions

A MONITORING DATA

A.1 National monitoring

1,3-butadiene is not monitored at national level within the Comhairle area.

A.2 Local monitoring

The Comhairle undertakes no 1,3-butadiene monitoring.

B NEW INDUSTRIAL SOURCES

There are no new industrial sources that are likely to have a significant effect on air quality in the Western Isles.

C INDUSTRIAL SOURCES WITH SIGNIFICANTLY INCREASED EMISSIONS

The Scottish Environment Protection Agency has advised that, in respect of the processes that it regulates, there have been no changes since the last review and assessment that may adversely affect the quality of the air in the Western Isles.

7.7 Conclusions for the screening of 1,3-butadiene

In the Western Isles area, background concentrations of 1,3-butadiene are very low. There is little likelihood of the air quality objective being exceeded.

There is no need to proceed to a Detailed Assessment for 1,3-butadiene.

8 Lead

8.1 Where does it come from?

As the compound tetraethyl lead, it has been used as a petrol additive to enhance the octane rating. The agreement reached between the European Parliament and the Environment Council on the Directive on the Quality of Petrol and Diesel Fuels (part of the Auto-Oil Programme) has led to the ban on sales of leaded petrol in the United Kingdom with effect from 1 January 2000. Emissions of lead are now restricted to a variety of industrial activities, such as battery manufacture, pigments in paints and glazes, alloys, radiation shielding, tank lining and piping.

8.2 How can it affect our health?

Exposure to high levels of lead may result in toxic biochemical effects in humans, which in turn cause problems in the synthesis of haemoglobin, effects on the kidneys, gastrointestinal tract, joints and reproductive system, and acute or chronic damage to the nervous system. The possible effect of lead on brain development in children, and hence their intellectual development, is the greatest cause for concern.

8.3 The Air Quality Objectives for Lead

The Scottish Executive is committed to meeting people's right to clean air. Their primary objective is to make sure that everyone can enjoy a level of ambient air quality in public places, which poses no significant risk to health or quality of life. The air quality objectives are generally based on the recommendations of the Expert Panel on Air Quality Standards (EPAQS). The standards are set purely on the basis of medical and scientific evidence of how each pollutant affects human health. The air quality objectives for Lead are shown in Figure 8.1.

Figure 8.1 The Air Quality Objectives for Lead

Applies to	Objective	Measured as	Date to be achieved by
All Local Authorities	0.5 µg/m ³	annual mean	31 December 2004
	0.25 µg/m ³	annual mean	31 December 2008

8.4 Estimated Background Concentrations

No estimated annual mean background concentrations for Lead (Pb) have been mapped for the UK.

8.5 Where should the air quality objectives for Lead apply?

Likely exceedences of the objectives should be assessed in relation to the quality of the air at locations which are situated outside of buildings or other natural or man- made structures, above or below ground, and where members of the public are regularly present. Reviews and assessments should be focussed on those relevant locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Exceedences of the objectives at any location where relevant public exposure would not be realistic should not be considered.

“Relevant locations” are described in Figure 8.2.

Figure 8.2

Lead annual mean	
Relevant locations	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, libraries etc.
Objective should generally not apply at:	Building facades of offices or other places of work where members of the public do not have regular access. Gardens of residential properties. Kerbside sites (as opposed to locations at the building facade), or any other location where public exposure is expected to be short term.

8.6 The updating and screening checklist

In undertaking the updating and screening assessment, the aim has been to maximise and build upon the data collation and assessments completed during the Comhairle’s Air Quality Review and Assessment in September 1999.

The Local Air Quality Management Technical Guidance LAQM. TG(03) requires local authorities to have regard to the checklists in the guidance when completing the updating and screening assessment.

In the case of Lead, the checklist comprises:-

Figure 8.3 Updating and screening checklist for Lead

Section reference	Source, location or data that needs to be assessed
A	Monitoring data outside an Air Quality Management Area
B	New industrial sources
C	Existing industrial sources with significantly increased emissions

A MONITORING DATA OUTSIDE AN AIR QUALITY MANAGEMENT AREA

A.1 National monitoring

Lead is not monitored at national level within the Western Isles.

A.2 Local monitoring

The Comhairle undertakes no lead (Pb) monitoring.

B NEW INDUSTRIAL SOURCES

There are no new industrial sources, which are likely to have a significant effect on air quality in Comhairle nan Eilean Siar's area.

C INDUSTRIAL SOURCES WITH SIGNIFICANTLY INCREASED EMISSIONS

The Scottish Environment Protection Agency has advised that, in respect of the processes that it regulates, there have been no changes since the last review and assessment that may adversely affect the quality of the air in the Western Isles.

8.7 Conclusions for the screening of Lead (Pb)

In the UK, background concentrations of Lead are very low. There is little likelihood of the air quality objective being exceeded in the Western Isles.

A Detailed Assessment of lead (Pb) is not required.

9 Nitrogen dioxide (NO₂)

9.1 Where does it come from?

Nitrogen dioxide (NO₂) and nitric oxide (NO) are both oxides of nitrogen, and are collectively referred to as nitrogen oxides (NO_x). All combustion processes produce NO_x emissions, largely in the form of nitric oxide, which is then converted to nitrogen dioxide, mainly as a result of reaction with ozone. Nitrogen dioxide is produced both directly as a primary and indirectly as a secondary pollutant owing to the spontaneous conversion of NO to NO₂ in the presence of ozone or oxygen. It is nitrogen dioxide (NO₂) that is associated with adverse effects upon human health. The principal source of nitrogen oxides emissions is road transport, which accounted for about 49% of total UK emissions in 2000. Major roads carrying large volumes of high-speed traffic (such as motorways and other primary routes) are a predominant source, as are conurbations and city centres with congested traffic. Within most urban areas, the contribution of road transport to

local emissions will be much greater than for the national picture. As an example, road transport is estimated to account for more than 75% of nitrogen oxides emissions in London. The contribution of road transport to nitrogen oxides emissions has declined significantly in recent years as a result of various policy measures, and further reductions are expected up until 2010 and beyond. For example, urban traffic nitrogen oxides emissions are estimated to fall by about 20% between 2000 and 2005, and by 46% between 2000 and 2010. Other significant sources of nitrogen oxides emissions include the electricity supply industry and other industrial and commercial sectors, which accounted for about 24% and 23% respectively in 1999. Emissions from both sources have also declined dramatically, due to the fitting of low nitrogen oxides burners, and the increased use of natural gas plant. Industrial sources make only a very small contribution to annual mean nitrogen dioxide levels, although breaches of the hourly nitrogen dioxide objective may occur under rare, extreme meteorological conditions, due to emissions from these sources.

9.2 How can it affect our health?

At relatively high concentrations, nitrogen dioxide causes inflammation of the airways. There is evidence to show that long-term exposure to nitrogen dioxide may effect lung function and that exposure to nitrogen dioxide enhances the response to allergens in sensitised individuals.

9.3 The Air Quality Objectives for Nitrogen dioxide

The Scottish Executive is committed to meeting people’s right to clean air. Their primary objective is to make sure that everyone can enjoy a level of ambient air quality in public places, which poses no significant risk to health or quality of life.

The air quality objectives are generally based on the recommendations of the Expert Panel on Air Quality Standards (EPAQS). The standards are set purely on the basis of medical and scientific evidence of how each pollutant affects human health. The air quality objective for Nitrogen dioxide is shown in Figure 9.1.

Figure 9.1 The Air Quality Objectives for Nitrogen dioxide

Applies to	Objective	Measured as	Date to be achieved by
All Local Authorities	200 µg/m ³ not to be exceeded more than 18 times a year	1-hour mean	31 December 2005
	40 µg/m ³ (21ppb)	annual mean	31 December 2005

9.4 Estimated Background Concentrations

Estimated annual mean background concentrations for 2001, 2005 and 2010 have been mapped for the UK, and can be accessed from the internet at www.airquality.co.uk/archive/laqm/tools.php.

In Comhairle Nan Eilean Siar’s area, the estimated annual mean background concentrations for Nitrogen dioxide are shown in Figure 9.2.

Figure 9.2 Estimated Annual Mean Background Concentration for Nitrogen dioxide in the Western Isles.

Nitrogen Dioxide	Estimated annual mean background concentration ($\mu\text{g}/\text{m}^3$)		
	Minimum	Maximum	Average
Year			
2001	0.93	4.91	1.54
2005	0.79	4.18	1.31
2010	0.67	3.43	1.10

Estimated annual mean background concentrations for 2001, 2005 and 2010 have also been mapped for NO_x (as NO₂). There is no air quality objective for the oxides of nitrogen other than NO₂. However, Nitrogen dioxide is produced indirectly as a secondary pollutant owing to the spontaneous conversion of NO to NO₂ in the presence of ozone or oxygen. For this reason, the estimated background levels of NO_x are included in prediction models for levels such as the Design Manual for Roads and Bridges (DMRB).

Figure 9.3 Estimated Annual Mean Background Concentration for Nitrogen oxides in the Western Isles

Nox (as NO ₂)	Estimated annual mean background concentration ($\mu\text{g}/\text{m}^3$)		
	Minimum	Maximum	Average
Year			
2001	1.18	6.27	1.96
2005	1.01	5.33	1.67
2010	0.85	4.38	1.40

9.5 Where should the air quality objectives for Nitrogen dioxide apply?

Likely exceedences of the objectives should be assessed in relation to the quality of the air at locations which are situated outside of buildings or other natural or man-made structures, above or below ground, and where members of the public are regularly present. Reviews and assessments should be focussed on those relevant locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Exceedences of the objectives at any location where relevant public exposure would not be realistic should not be considered.

“Relevant locations” are described in Figure 9.4.

Figure 9.4 Relevant locations for Nitrogen dioxide

Nitrogen Dioxide 1-hour mean	
Relevant locations	<p>All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, libraries etc.</p> <p>Kerbside sites (e.g. pavements of busy shopping streets)</p> <p>Those parts of car parks, bus stations etc. which are not fully enclosed, where the public might reasonably be expected to spend 1-hour or more.</p> <p>Any outdoor locations to which the public might reasonably be expected to spend 1-hour or longer.</p> <p>Gardens of residential properties. (Such locations should represent parts of the garden where relevant public exposure is likely, for example where there are seating or play areas. It is unlikely that relevant public exposure would occur at the extremities of the garden boundary, or front gardens)</p>
Objective should generally not apply at:	Kerbside sites (as opposed to locations at the building facade), or any other location where public exposure is expected to be short term.

Nitrogen dioxide annual mean

Relevant locations	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, libraries etc.
Objective should generally not apply at:	<p>Building facades of offices or other places of work where members of the public do not have regular access.</p> <p>Gardens of residential properties.</p> <p>Kerbside sites (as opposed to locations at the building facade), or any other location where public exposure is expected to be short term.</p>

9.6 The updating and screening checklist

In undertaking the updating and screening assessment, the aim has been to maximise and build upon the data collation and assessments completed during the Comhairle’s Air Quality Review and Assessment in September 1999.

The Local Air Quality Management Technical Guidance LAQM. TG(03) requires local authorities to have regard to the checklists in the guidance when completing the updating and screening assessment. In the case of Nitrogen dioxide, the checklist comprises:-

Figure 9.5 Updating and screening checklist for Nitrogen dioxide

Section reference	Source, location or data that needs to be assessed
A	Monitoring data outside an Air Quality Management Area
B	Monitoring data inside an Air Quality Management Area
C	Narrowly congested streets with residential properties close to the kerb
D	Junctions
E	Busy streets where people may spend 1-hour or more close to busy traffic
F	Roads with high flows of buses and/or HGVs
G	New roads constructed since the first review and assessment
H	Roads close to the objective during the first review and assessment
I	Roads with significantly changed traffic flows
J	Bus stations
K	New industrial sources
L	Industrial sources with significantly increased emissions
M	Aircraft

A MONITORING DATA OUTSIDE AN AIR QUALITY MANAGEMENT AREA

A.1 National monitoring - Automatic Urban Network Monitoring Site

In order to fulfil the requirements of the EC Directive on ambient air quality assessment and management and the 1st Air Quality Daughter Directive the Scottish Executive is required to have a minimum number of automatic air quality monitoring sites within Scotland. In 2000, work was undertaken to assess the number of sites that will be required by the Directives and where these sites should be situated. The assessment identified that a number of new monitoring sites were required in Scotland. None of these would be located in Western Isles.

A.2 Local monitoring – NO₂ diffusion tubes

Nitrogen dioxide has been monitored using passive diffusion tubes at sites in Western Isles since (1993). The four in Stornoway are historically, part of the UK Nitrogen Dioxide Survey.

A.3 Laboratory analysis of NO₂ diffusion tubes

From May 2002 Gradko International Ltd has undertaken the provision and analysis of nitrogen dioxide diffusion tubes. The Gradko International Ltd Analytical Laboratory has UKAS accreditation to the requirements of ISO/IEC 17025. Its “Statement Of Quality Assurance And Quality Control In Relation To The Supply And Analysis Of Nitrogen Dioxide Passive Diffusion Tubes” is appended at **Annex 2**. The diffusion tubes are prepared with 20% Triethanolamine/Water. The percentage bias for the tubes was as follows:

October 2001 to October 2002 - (2.9%)

November 2002 to March 2003 – (14 to 27%)

The recent report entitled “Compilation of Diffusion Tube Collocation Studies Carried out by Local Authorities” showed good performance by Gradko. The report, prepared by Professor Duncan Laxen and Penny Wilson on behalf of DEFRA and the devolved administrations in November 2002 can be accessed at:

[http://www.airquality.co.uk/archive/reports/cat06/NO2DiffusionTubePerformance\(Final\).pdf](http://www.airquality.co.uk/archive/reports/cat06/NO2DiffusionTubePerformance(Final).pdf)

A.4 Handling of Nitrogen dioxide diffusion tubes

The methodology and procedures, which have been adopted, follow the UK Nitrogen Dioxide Diffusion Tube Network Instruction Manual which can be accessed at:

<http://airquality.co.uk/reports/no2man/no2man.html>.

All diffusion tubes are stored under refrigeration prior to use and used within expiry dates. The tubes are mounted at their locations in accordance with the guidance in the Instruction Manual. They are exposed for monthly periods as per the UK Nitrogen Dioxide Survey calendar. Upon collection of the tubes, the site and exposure dates and times are recorded on them and they are stored in sealed bags. They are sent to Gradko for analysis on the day of collection, along with an unexposed tube, which has been stored in a desk drawer for the monitoring period.

The results of the analysis, which Gradko perform, are “blank subtracted”.

A.5 Location of Nitrogen dioxide tubes

Monitoring of nitrogen dioxide has been carried out at a number of locations as indicated in figure 9.7 below, in the Western Isles, including urban background sites since 1993 using diffusion tube samplers.

Figure 9.7 Locations of NO₂ diffusion tubes in Stornoway

Site Reference	Town	Street	Site Category	Easting	Northing
K1	Stornoway	Cromwell Street	Kerbside	142341.4	932863.1
K2	Stornoway	Bank Street	Kerbside	142264.3	932802.2
B3	Stornoway	MacMillan Brae	Background	142075.1	934195.7
B4	Stornoway	Barony Square	Background	143135.6	933503

* The kerbside sites make use of street furniture such as lampposts, which are stationed at the kerb i.e. within 1m of the road. The UK Nitrogen Dioxide Diffusion Tube Network Instruction Manual advises that diffusion tubes should be sited between 1-5 m from the kerb edge. However, the alternative is to mount them on the side of a building, ideally, on some projection 0.5 - 1m horizontal distance from the face of the building. They must not be placed in any form of recess, to avoid the possibility of sampling stagnant air. A compromise had to be reached to avoid the effects of stagnant air and vandalism and kerbside locations presented the best solution at these locations.

A.6 NO₂ diffusion tube

Results indicate that no urban background locations exceeded the annual mean concentration of 40 µg/m³. The concentrations for urban background sites are low, ranging from 3.5 to 6.3 µg/m³. The highest NO₂ concentration levels (22.6 µg/m³) are found in the pedestrian area of Bank Street, Stornoway. This to a large extent can be explained by parked vehicles loading and off-loading commercial goods to the local traders.

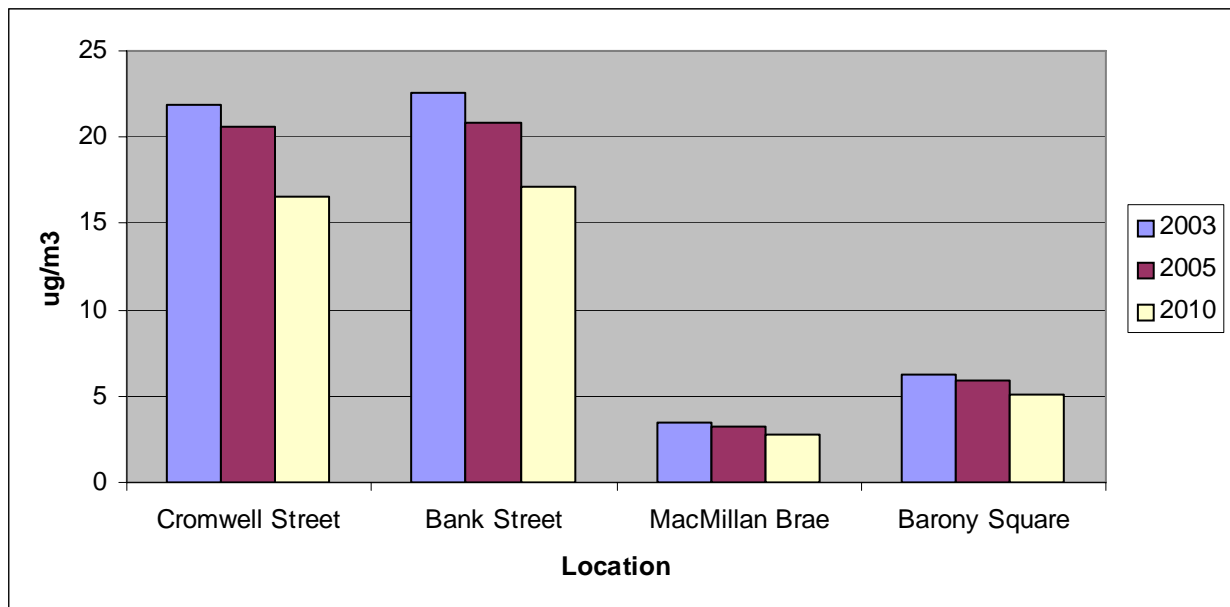
A.8 Predicted NO₂ concentrations in 2005 and 2010 at sites in Stornoway

The concentrations of NO₂, which were measured between January 2002 and December 2002, have been used to predict levels in, 2003, 2005 and 2010. The resulting predicted levels are shown below for each site. The contribution of road transport to nitrogen oxides emissions have declined significantly in recent years as a result of the declining population in the Western Isles, and further reductions are expected up until 2010 and beyond.

Figure 9.8 Predicted NO₂ concentrations in Stornoway in 2003, 2005 and 2010

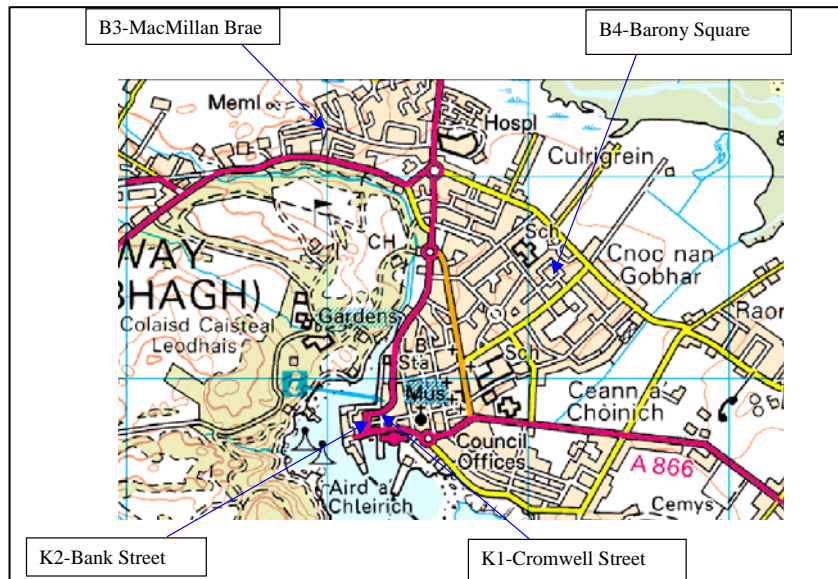
Site Reference	Town	Street	Site Category	Easting	Northing	2003	2005	2010
K1	Stornoway	Cromwell Street	Kerbside	142341.4	932863.1	21.9	20.6	16.59
K2	Stornoway	Bank Street	Kerbside	142264.3	932802.2	22.6	20.80	17.12
B3	Stornoway	MacMillan Brae	Background	142075.1	934195.7	3.5	3.27	2.8
B4	Stornoway	Barony Square	Background	143135.6	933503	6.3	5.88	5.04

Graph 9.1 - Predicted NO₂ concentrations in Stornoway in 2003, 2005 and 2010



A.9 Significance of the NO₂ concentrations predicted from the diffusion tube survey

A map of the area showing the NO₂ diffusion tube locations is shown below



It is said that if a location can meet the annual mean air quality objective then it will also meet the 1-hour mean air quality objective (200 µg/m³ - not to be exceeded more than 18 times a year). As this is the case an assessment of whether people are likely to be present on the pavement for more than 1 hour at a time when pollution from traffic is at its peak has not been undertaken.

However, should the situation change it is recognized that the implementation of new regulations would make a positive contribution to the air quality in this area. The Road Traffic (Vehicle Emissions) (Fixed Penalty) (Scotland) Regulations 2003 enable local authority “Authorised Persons” to request vehicle users to switch off engines when parked and to issue Fixed Penalty Notices to those who refuse to co-operate. It is a requirement of Regulation 98 of the Road Vehicles (Construction and Use) Regulations 1986, as amended, that drivers switch off engines in parked vehicles. The offence is an existing one but local authorities have only since 1 April 2003 been given the power to carry out enforcement of the offence in an effort to address the growing concerns about pollution and the environment.

Full details of the scheme entitled “Local Authority Powers To Require Drivers To Switch Off Engines When Parked”, Guidance Issued Under Section 88 of the Environment Act 1995, April 2003, Paper 2003/16 can be accessed at <http://www.scotland.gov.uk/library5/environment/soeg-01.asp#b1>

Paragraph 1.2 of Paper 2003/16 explains:

“It is not the intention to target motorists who leave engines running when parked for no more than a few seconds; rather, action will be targeted towards more serious offenders (e.g. coaches which park in busy town centres with their engines running). The scheme is designed to encourage all motorists to have due regard to the local environment when parking. Good public relations and effective publicity will be vitally important to ensure that the scheme is understood, accepted and supported by the majority of motorists.” The

purpose of the scheme is to provide local authorities with an additional tool for managing air quality in their areas.

A.10 Conclusion – Local Monitoring of Nitrogen dioxide by diffusion tubes.

In view of the considerations in the previous paragraphs, it can be concluded that air quality objectives for Nitrogen dioxide will be met in all areas by 2005 and will also meet the 2010 objectives.

There is no need to proceed to a Detailed Assessment.

B MONITORING DATA INSIDE AN AIR QUALITY MANAGEMENT AREA

There are no Air Quality Management Areas designated in the Western Isles area.

C NARROWLY CONGESTED STREETS WITH RESIDENTIAL PROPERTIES CLOSE TO THE KERB

C.1 Characteristics of the centre of Stornoway

A few of the streets in and around the centre of Stornoway have been identified as meeting some of the criteria, which will require screening by using the DMRB screening model, for example Matheson street and Cromwell street.

They possess the following features which Technical Guidance suggests should merit screening:

- the traffic is slow moving with a lot of stop/start driving
- the average speed of traffic is less than 50 kph
- there are buildings on either side which reduce the dispersion of exhaust fumes
- there are residential properties within 5 m of the kerb
- the carriageway is less than 10m wide

However, the Comhairle's Technical Services section have advised that traffic flows in these street(s) are in the order of 3,000 vehicles, whereas the Technical Guidance suggests that only roads with flows greater than 10,000 need be screened.

D JUNCTIONS

D.1 Choice of junctions - NO₂

There are no junctions in the Western Isles with significant traffic flows. It is therefore extremely unlikely that the predicted annual mean will exceed 40 µg/m³ in 2005 or 2010. It is unlikely that there is the potential for road traffic to cause an exceedance of the air quality objective in 2005 or in 2010 in the Comhairle Nan Eilean Siar's area.

E BUSY STREETS WHERE PEOPLE MAY SPEND 1-HOUR OR MORE CLOSE TO BUSY TRAFFIC

From local knowledge about the layout and use of the centre of Stornoway there are no 'busy streets' (as specified in the Technical Guidance) within Stornoway or the Western Isles as a whole, where people may spend 1-hour or more close to traffic.

F ROADS WITH HIGH FLOWS OF BUSES AND/OR HGVS

In the centre of Stornoway, the traffic flow for all vehicles will never approach the screening threshold of 20,000 because of the physical limitations of the streets and the traffic controls that are in place. The percentage of buses and/or HGVs is not unusually high i.e. greater than 25% as specified in the Technical Guidance

G NEW ROADS CONSTRUCTED OR PROPOSED SINCE THE FIRST REVIEW AND ASSESSMENT

There are no new roads in this category.

H ROADS CLOSE TO THE OBJECTIVE DURING THE FIRST REVIEW AND ASSESSMENT

There are no roads in this category.

I ROADS WITH SIGNIFICANTLY CHANGED TRAFFIC FLOWS

There are no roads, which exceed the screening threshold. The screening threshold is for roads with AADT traffic flows in excess of 10,000 and which have experienced a 25% increase in traffic since the last review and assessment. **Thus, there is no need to proceed to a Detailed Assessment.**

J BUS STATIONS

The bus station at South Beach Street in Stornoway is the largest in the Western Isles. It is situated close to the centre of Stornoway. Buses enter and leave the bus station from South Beach Street. On a weekday basis 348 buses pass through the bus station. The screening threshold for bus stations in the Technical Guidance is 1,000 bus movements per day. It also states that a bus coming into a bus station then going out again should be treated as two movements. Thus the number of bus movements at the bus station is 696. As the number of bus movements is much less than 1,000 there is no requirement to consider relevant exposure or to carry out screening by the DMRB method.

K NEW (AND EXISTING) INDUSTRIAL SOURCES

There are no new industrial sources, which are likely to have a significant effect on air quality in the Western Isles area. However, the Technical Guidance advises that local authorities may also wish to consider checking information derived from their first round of review and assessment if there were any doubts regarding their validity. In view of the information that is available on mass emissions in the European Pollutant Emission Register (see 4.5 above) additional screening has not been undertaken as there is no process operator, which emits significant quantities of NO₂.

L INDUSTRIAL SOURCES WITH SIGNIFICANTLY INCREASED EMISSIONS

The Scottish Environment Protection Agency has advised that, in respect of the processes, which it regulates, there have been no changes since the last review and assessment that may adversely affect the quality of the air in the Western Isles.

M AIRCRAFT

M.1 Technical Guidance LAQM.TG(03)

The Technical Guidance advises:

“An airport with a throughput of 5 million passengers per annum (mppa) may contribute up to about 25 µg/m³ NO_x at the nearest receptor location. Some airports have a substantial freight component which also needs to be taken into account; it may be assumed for the purpose of this screening assessment that 100,000 tonnes of freight is equivalent to 1 mppa . (For example, an airport with 3.5 mppa, and an annual freight movement of 300,000 tonnes, is assumed to be 6.5 mppa equivalent). Authorities need only consider airports that exceed 5 mppa or equivalent (in 2005 or 2010) and/or where the 2005 NO_x background concentration exceeds 25 µg/m³. Where these criteria are exceeded, the authority will need to proceed to a Detailed Assessment.

M.2 Stornoway Airport

The estimated background NO_x concentration at the airport in 2005 is 4.44 µg/m³. The airport manager has provided estimates of the expected future movements at Stornoway airport.

Figure 9.9 Stornoway Airport – Throughput of passengers and freight

Year	Tonnes of Freight transported by non-passenger aircraft	Passenger equivalents (mppa)	Number of Passengers	Total passenger equivalents (mppa)
2001	1615 tonnes	0.01615	90,000	0.09
2004	1750 tonnes	0.01750	112,000	0.11
2010	2100 tonnes	0.02100	142,000	0.14

As can be seen from Figure 9.9 above, the number of “passenger equivalents” per annum is expected to rise to 0.11 mppa in 2004 and 0.14 mppa in 2010. **Thus, there is no need to proceed to a Detailed Assessment for aircraft.**

9.7 Conclusions for the screening of Nitrogen dioxide

Of all the sources of Nitrogen dioxide in the Western Isles, it is road traffic, which has the most significant impact on air quality. However, this impact is limited to a small area of Stornoway. Screening has shown that road traffic in the Western Isles is unlikely to cause exceedences of the air quality objectives either in 2005 or 2010. Other sources such as shipping and aircraft do not pose a challenge to air quality in the Western Isles.

There is no need to proceed to a Detailed Assessment. The Comhairle will continue to monitor NO₂ by diffusion tubes.

10 Sulphur dioxide (SO₂)

10.1 Where does it come from?

The main source of sulphur dioxide in the United Kingdom is power stations, which accounted for more than 71% of emissions in 2000. There are also significant emissions from other industrial combustion sources. Domestic sources now only account for 4% of emissions, but can be locally much more significant. Road transport currently accounts for less than 1% of emissions. Local exceedences of the objectives (principally the 15-minute mean objective) may occur in the vicinity of small combustion plant (less than 20 MW), which burn coal or oil, in areas where solid fuels are the predominant form of domestic heating, and in the vicinity of major ports.

10.2 How can it affect our health?

Sulphur dioxide causes constriction of the airways by stimulating nerves in the lining of the nose, throat and airways of the lung. The latter effect is particularly likely to occur in those suffering from asthma and chronic lung disease.

10.3 The Air Quality Objectives for Sulphur dioxide

The Scottish Executive is committed to meeting people’s right to clean air. Their primary objective is to make sure that everyone can enjoy a level of ambient air quality in public places, which poses no significant risk to health or quality of life.

The air quality objectives are generally based on the recommendations of the Expert Panel on Air Quality Standards (EPAQS). The standards are set purely on the basis of medical and scientific evidence of how each pollutant affects human health. The air quality objectives for Sulphur dioxide are shown in Figure 10.1 below.

Figure 10.1 The Air Quality Objectives for Sulphur dioxide

Applies to	Objective	Measured as	Date to be achieved by
All Local Authorities	350 µg/m ³ not to be exceeded more than 24 times a year	1 hour mean	31 December 2004
	0.5 µg/m ³ not to be exceeded more than 3 times a year	24 hour mean	31 December 2004
	266 µg/m ³ not to be exceeded more than 35 times a year	15 minute mean	31 December 2008

10.4 Estimated Background Concentrations

Estimated annual mean background concentrations for 2001 have been mapped for the UK, and can be accessed from the internet at

www.airquality.co.uk/archive/laqm/tools.php. In Comhairle nan Eilean siar's area, the estimated annual mean background concentrations for Sulphur dioxide are shown in Figure 10.2 below.

Figure 10.2 Estimated Annual Mean Background Concentration for Sulphur dioxide in the Western Isles.

Sulphur Dioxide	Estimated annual mean background concentration (µg/m ³)		
	Minimum	Maximum	Average
2001	0.48	5.87	0.63

10.5 Where should the air quality objectives for Sulphur Dioxide apply?

Likely exceedences of the objectives should be assessed in relation to the quality of the air at locations which are situated outside of buildings or other natural or man- made structures, above or below ground, and where members of the public are regularly present. Reviews and assessments should be focussed on those relevant locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Exceedences of the objectives at any location where relevant public exposure would not be realistic should not be considered. "Relevant locations" are listed below.

Figure 10.3 Relevant locations for Sulphur dioxide 1-hour mean

Sulphur Dioxide 1-hour mean	
Relevant locations	<p>All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, libraries etc.</p> <p>Kerbside sites (e.g. pavements of busy shopping streets)</p> <p>Those parts of car parks, bus stations etc. which are not fully enclosed, where the public might reasonably be expected to spend 1-hour or more.</p> <p>Any outdoor locations to which the public might reasonably be expected to spend 1-hour or longer.</p> <p>Gardens of residential properties. (Such locations should represent parts of the garden where relevant public exposure is likely, for example where there are seating or play areas. It is unlikely that relevant public exposure would occur at the extremities of the garden boundary, or front gardens)</p>
Objective should generally not apply at:	Kerbside sites (as opposed to locations at the building facade), or any other location where public exposure is expected to be short term.

Figure 10.4 Relevant locations for Sulphur dioxide 24-hour mean

Sulphur Dioxide 24-hour mean	
Relevant locations	<p>All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, libraries etc.</p> <p>Kerbside sites (e.g. pavements of busy shopping streets)</p> <p>Those parts of car parks, bus stations etc. which are not fully enclosed, where the public might reasonably be expected to spend 1-hour or more.</p> <p>Any outdoor locations to which the public might reasonably be expected to spend 1-hour or longer.</p> <p>Gardens of residential properties. (Such locations should represent parts of the garden where relevant public exposure is likely, for example where there are seating or play areas. It is unlikely that relevant public exposure would occur at the extremities of the garden boundary, or front gardens)</p>
Objective should generally not apply at:	Kerbside sites (as opposed to locations at the building facade), or any other location where public exposure is expected to be short term.

Figure 10.5 Relevant locations for Sulphur dioxide 15 minute mean

Sulphur dioxide 15 minute mean	
Relevant locations	All locations where members of the public might be regularly exposed for a period of 15 minutes or longer.

10.6 The updating and screening checklist

In undertaking the Updating and screening assessment, the aim has been to maximise and build upon the data collation and assessments completed during the Comhairle’s Air Quality Review and Assessment September 1999.

The Local Air Quality Management Technical Guidance LAQM. TG(03) requires local authorities to have regard to the checklists in the guidance when completing the updating and screening assessment. In the case of Sulphur dioxide, the checklist comprises:-

Figure 10.6 Updating and screening checklist for Sulphur dioxide

Section reference	Source, location or data that needs to be assessed
A	Monitoring data outside an Air Quality Management Area
B	Monitoring data inside an Air Quality Management Area
C	New industrial sources
D	Industrial sources with substantially increased emissions
E	Areas of domestic coal burning
F	Small boilers (>5MW(thermal) burning coal or oil
G	Shipping

A MONITORING DATA OUTSIDE AN AIR QUALITY MANAGEMENT AREA

A.1 National monitoring

SO₂ is not monitored at national level within Comhairle Nan Eilean Siar’s area.

A.2 Local monitoring

The Comhairle undertakes no SO₂ monitoring.

B MONITORING DATA WITHIN AN AIR QUALITY MANAGEMENT AREA

There are no Air Quality Management Areas designated in Comhairle Nan Eilean Siar’s area.

C NEW (AND EXISTING) INDUSTRIAL SOURCES

There are no new industrial sources, which are likely to have a significant effect on air quality in Comhairle Nan Eilean Siar’s area.

D INDUSTRIAL SOURCES WITH SUBSTANTIALLY INCREASED EMISSIONS

The Scottish Environment Protection Agency has advised that, in respect of the processes, which it regulates, there have been no changes since the last review and assessment that may adversely affect the quality of the air in the Western Isles.

E AREAS OF DOMESTIC COAL BURNING

E.1 Previous review of domestic coal burning in Western Isles based on LAQM.TG4(00)

The previous review was based on Pollutant Specific Guidance LAQM.TG4(00) May 2000. That guidance advised that the risk of exceedence of the air quality objective for SO₂ within an area could be considered significant where the **density of coal burning (or solid smokeless fuel burning) houses exceeds 300 properties per 1 km².**

There are very few settlements in the Western Isles that are likely to have more than 300 houses in a 1 x 1 km square as the majority are linear settlements in a rural environment. It is therefore estimated that there are no settlements in the Western Isles that have more than 300 properties burning coal in a 1 x 1 km square.

On this basis, it was concluded that there would be no significant risk of exceeding the air quality objectives for SO₂ in 2005.

E.2 SO₂ screening assessment of domestic coal burning required by Local Air Quality Management Technical Guidance LAQM. TG(03)

The Technical Guidance LAQM.TG(03) states:

“Coal and smokeless fuel burning for domestic heating has now largely been replaced by alternative fuels throughout most of the UK. However, there are a few areas remaining where it is still predominant, and which may have the potential to cause exceedences of the objectives. Evidence from the first round of review and assessment has indicated that coal burning tends to be concentrated into small areas or estates, which are generally less than 1 km². **The risk of exceedence in an area can be considered significant where the density of coal burning (including coal, anthracite and smokeless fuels) houses exceeds 100 properties per 500m by 500m area.**

In such cases, the authority will need to proceed to a Detailed Assessment.”

E.3 Domestic Fuel Survey in Western Isles

If it is assumed that 25% of domestic properties burn coal, then many settlements in the Western Isles will exceed the criterion, which is described above. In the absence of statistics on local coal burning, a domestic fuel survey, as recommended in the Technical Guidance, was carried out in Stornoway, on the Isle of Lewis. Preliminary screening was carried out for this area of the Western Isles by using the MapInfo GIS system. The GIS system allowed the number of domestic properties to be counted in the most densely populated 500m x 500m area of each settlement. An example of the 500 x 500 m square map for the Manor Area is found in **Annex.2** The survey forms (see **Annex 3** were sent to the occupiers together with a freepost envelope for the return of the completed questionnaire. The response to the postal survey is shown below.

Figure 10.8 Response to domestic fuel survey

Domestic Fuel Survey	Manor Park Area of Stornoway
Number of dwellings sampled	252
Number of responses	145
Percentage response	58

The results of this exercise are shown in Figure 10.9.

Figure 10.9 Domestic Fuel Survey results – main fuel used for heating the home

Main Fuel for heating the home	Manor Park Area -%
Gas (Bottle or tank)	80
Electricity	17
Oil	1
Coal	2
Anthracite	0
Smokeless	0
Wood	0
Houses using solid fuel	2

E.4 Estimated coal burning dwellings in 500m x 500m squares

Stornoway is the only populated area in the Western Isles where it is likely to get well over 100 houses in a 500 x 500 m square grid, therefore this representative area was chosen for the survey..

E.5 Consideration of the SO₂ screening threshold for solid fuel burning houses in Technical Guidance LAQM.TG(03)

Details of the contribution, which each solid fuel makes to SO₂ and PM₁₀ concentrations, can be downloaded from the National Atmospheric Emissions Inventory at <http://www.naei.org.uk/>. Taking coal as having a factor of 1, the contribution which each solid fuel to the pollutant concentration is shown below.

Figure 10.12 Effective Coal burning factors (2000) from NAEI database

Pollutant	Coal	Anthracite	Smokeless Fuel	Wood
SO ₂	1	0.65	0.8	0
PM ₁₀	1	0.395	0.56	0.79

If the above factors for SO₂ were applied to the domestic fuel survey figures for the “Manor area” then the number of “ effective coal burning houses” would remain at 2.

E.6 Conclusion - Areas Of Domestic Coal Burning

From the screening assessment it would appear that there is not a risk that the 15 minute mean air quality objective for SO₂ could be exceeded in the Manor area of Stornoway as a result of the density of dwellings which burn solid fuel in that settlement.

Thus, a Detailed Assessment will not be required.

F SMALL BOILERS (>5MW(THERMAL)) BURNING COAL

Combustion plant which have a greater thermal rating than 20MW are regulated by the Scottish Environment Protection Agency.

In May 2000, Entec UK Ltd reported to the Scottish Executive on “Emissions of Sulphur dioxide from Small Combustion Plants of 5 to 20MW.” Entec carried out screening of these boilers in each Scottish local authority. The air quality objective used for

comparison in the survey was the 15-minute mean objective. There has been no change since the first review and assessment, except that one company has ceased trading.

In the light of the Entec report it can be concluded that, in the case of SO₂ emissions from Small Combustion Plants of 5 to 20MW, the risk of exceeding the air quality objectives is insignificant.

G SHIPPING

G.1 Technical Guidance LAQM.TG(03)

The Technical Guidance advises:

“Shipping movements may also give rise to emissions of sulphur dioxide, and where there are significant movements within a major port, there is the potential for the objectives to be exceeded. The authority should determine whether there is relevant public exposure within 1 km of the main berths and manoeuvring areas. If there are more than 5000 shipping movements per year (restricted to large ships, such as cross-Channel ferries, container ships etc) the authority will need to proceed to a Detailed Assessment.”

G.2 Ports in the Comhairle’s area

There are no major ports in the Western Isles in terms of the number of shipping movements that are likely to impinge on the air quality objective. Each visit by a ship to a port will generate two movements. The main seaport into the Western Isles has been considered:

Stornoway Harbour

The port caters for gas tankers, coal, and commercial ferry traffic. There are around 1517 shipping movements per annum. This figure includes general vessels (360), fishing boats (707) and local fishing boats (450).

Stornoway harbour serves the ferry link to the Ullapool. In 2002 there were 3034 movements. This is a very conservative figure as it has included all vessel movements in and out of Stornoway harbour.

In future years, shipping movements are not expected to increase significantly at the ports. **Thus, there is no need to proceed to a Detailed Assessment.**

10.7 Conclusions for the screening of Sulphur dioxide

From the screening assessment it would appear that there is not a risk that the 15 minute mean air quality objective for SO₂ will be exceeded in the Manor area of Stornoway, as a result of the density of dwellings which burn solid fuel in that settlement. **The Comhairle will not need to proceed to a Detailed Assessment.**

11 PM₁₀ (Particulate matter)

11.1 Where does it come from?

Unlike the individual gaseous pollutants which are single, well-defined substances, particles (PM₁₀) are composed of a wide range of materials arising from a variety of sources. There is a wide range of emission sources that contribute to PM₁₀

concentrations in the UK. Primary particle emissions are derived directly from combustion sources, including road traffic, power generation, industrial processes etc. Secondary particles are formed by chemical reactions, and comprise principally of sulphates and nitrates. Coarse particles comprise of emissions from a wide range of sources, including re-suspended dusts from road traffic, construction works, mineral extraction processes, wind-blown dusts and soils, sea salt and biological particles.

11.2 How can it affect our health?

Particulate air pollution is associated with a range of effects on health including effects on the respiratory and cardiovascular systems, asthma and mortality. The Expert Panel on Air Quality Standards concluded that particulate air pollution episodes are responsible for causing excess deaths among those with pre-existing lung and heart disease, and that there is a relationship between concentrations of PM₁₀ and health effects, such that the higher the concentration of particles, the greater the effect on health.

11.3 The Air Quality Objectives for PM₁₀

The Scottish Executive is committed to meeting people's right to clean air. Their primary objective is to make sure that everyone can enjoy a level of ambient air quality in public places which poses no significant risk to health or quality of life. The air quality objectives are generally based on the recommendations of the Expert Panel on Air Quality Standards (EPAQS). The standards are set purely on the basis of medical and scientific evidence of how each pollutant affects human health. The air quality objectives for PM₁₀ are shown below.

Figure 11.1 The Air Quality Objective for PM₁₀ (gravimetric)

Applies to	Objective	Measured as	Date to be achieved by
All Local Authorities	50 µg/m ³ not to be exceeded more than 35 times a year	24 hour mean	31 December 2004
	40 µg/m ³	annual mean	31 December 2004
Scottish Local Authorities	50 µg/m ³ not to be exceeded more than 7 times a year	24 hour mean	31 December 2010
	18 µg/m ³	annual mean	31 December 2010

11.4 Where should the air quality objectives for PM₁₀ apply?

Likely exceedences of the objectives should be assessed in relation to the quality of the air at locations which are situated outside of buildings or other natural or man-made structures, above or below ground, and where members of the public are regularly present. Reviews and assessments should be focussed on those relevant locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Exceedences of the objectives at any location where relevant public exposure would not be realistic should not be considered. “Relevant locations” are listed below.

Figure 11.2 Relevant locations for PM₁₀

Particles (PM₁₀) annual mean	
Relevant locations	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, libraries etc.
Objective should generally not apply at:	Building facades of offices or other places of work where members of the public do not have regular access. Gardens of residential properties. Kerbside sites (as opposed to locations at the building facade), or any other location where public exposure is expected to be short term.
Particles (PM₁₀) 24-hour mean	
Relevant locations	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, libraries etc. Gardens of residential properties. (Such locations should represent parts of the garden where relevant public exposure is likely, for example where there are seating or play areas. It is unlikely that relevant public exposure would occur at the extremities of the garden boundary, or front gardens)
Objective should generally not apply at:	Kerbside sites (as opposed to locations at the building facade), or any other location where public exposure is expected to be short term.

11.5 Estimated Background Concentrations

Estimated annual mean background concentrations for 2001, 2004 and 2010 have been mapped for the UK, and can be accessed from the Internet at www.airquality.co.uk/archive/laqm/tools.php.

In the Western Isles area, the estimated annual mean background concentrations for PM₁₀ are shown Figure 11.3 below.

Figure 11.3 Estimated annual mean background concentrations for PM₁₀

PM ₁₀	Estimated annual mean background concentration (µg/m ³ gravimetric)		
	Year	Minimum	Maximum
2001	10.9	12.7	11.07
2004	10.7	12.3	10.9
2010	10.4	11.7	10.58

11.6 The updating and screening checklist

In undertaking the updating and screening assessment, the aim has been to maximise and build upon the data collation and assessments completed during the Comhairle's Air Quality Review and Assessment September 1999. The Local Air Quality Management Technical Guidance LAQM. TG(03) requires local authorities to have regard to the checklists in the guidance when completing the updating and screening assessment.

In the case of PM₁₀, the checklist comprises:-

Figure 11.4 Updating and screening checklist for PM₁₀

Section reference	Source, location or data that needs to be assessed
A	Monitoring data outside an Air Quality Management Area
B	Monitoring data inside an Air Quality Management Area
C	Busy roads and junctions in Scotland
D	Junctions
E	Roads with high flows of buses and/or HGVs
F	New roads constructed since the first review and assessment
G	Roads close to the objective during the first review and assessment
H	Roads with significantly changed traffic flows
I	New Industrial sources
J	Industrial sources with significantly increased emissions
K	Areas of domestic fuel burning
L	Quarries, landfill sites, opencast coal handling of dusty at ports etc.
M	Aircraft

A MONITORING DATA OUTSIDE AN AIR QUALITY MANAGEMENT AREA

A.1 National Monitoring

No PM₁₀ national monitoring is carried out in the Western Isles.

A.2 Local Authority Monitoring

No PM₁₀ monitoring is carried out in the Western Isles.

B MONITORING DATA INSIDE AN AIR QUALITY MANAGEMENT AREA

There are no Air Quality Management Areas designated in the Comhairle's area.

C BUSY ROADS AND JUNCTIONS IN SCOTLAND

The Technical Guidance LAQM.TG(03) requires that the DMRB screening tool be used to predict annual mean PM₁₀ concentrations in 2010. As there are no classified 'busy' roads in the Western Isles or ever likely to be it can be assumed that the annual mean concentrations of PM₁₀ will not be exceeded.

C.1 Conclusions – Busy Roads

Annual mean concentrations of PM₁₀ are not predicted to exceed 18 µg/m³ in 2010 and so there is no need to proceed to a Detailed Assessment.

D JUNCTIONS

D.1 Choice of junctions

There are no junctions in the Western isles that have a joint flow in excess of 5,000, which is the Technical Guidance screening criteria for busy junctions. In other words, there are no road junctions in the Western Isles that could be classified as busy.

D.2 Conclusion – Junctions - PM₁₀

As there are no road junctions categorized as busy in the Western Isles, it is unlikely that there is the potential for road traffic at junctions to cause an exceedence of the air quality objectives in 2004 or in 2010 in the Comhairle's area.

E ROADS WITH HIGH FLOWS OF BUSES AND/OR HGVS

Although the centre of Stornoway has the highest flow of buses in the Western Isles it still falls short of the criteria set by the Technical Standard. This is set at 20% of AADT traffic flow and by comparing this with local knowledge it can be concluded that they will not significantly affect the quality of air in the Western Isles

E.1 Conclusions - Roads With High Flows Of Buses And/Or HGVs

As indicated above a detailed assessment for PM₁₀ is not required.

F NEW ROADS CONSTRUCTED OR PROPOSED SINCE THE FIRST REVIEW AND ASSESSMENT

There are no roads in this category.

G ROADS CLOSE TO THE OBJECTIVE DURING THE FIRST REVIEW AND ASSESSMENT

There are no roads in this category.

H ROADS WITH SIGNIFICANTLY CHANGED TRAFFIC FLOWS

There are no roads, which exceed the screening threshold. The screening threshold is roads with AADT traffic flows in excess of 10,000 and which have experienced a 25% increase in traffic since the last review and assessment. Thus, there is no need to proceed to a Detailed Assessment.

I NEW INDUSTRIAL SOURCES

There are no new industrial sources, which are likely to have a significant effect on air quality in the Comhairle's area.

J INDUSTRIAL SOURCES WITH SIGNIFICANTLY INCREASED EMISSIONS

The Scottish Environment Protection Agency has advised that, in respect of the processes, which it regulates, there have been no changes since the last review and assessment that may adversely affect the quality of the air in the Western Isles.

K AREAS OF DOMESTIC COAL BURNING

K.1 PM₁₀ screening assessment of domestic coal burning required by Local Air Quality Management Technical Guidance LAQM. TG(03)

The screening method described in the Technical Guidance is similar to that described for SO₂ in the previous section. However, there are refinements that include:

- calculating the density of 'effective' coal-burning houses (solid fuels other than coal are weighted to give a 'coal equivalent')
- taking account of the annual mean background concentrations

The screening threshold for PM₁₀ is that the risk of exceedence in an area can be considered significant where the density of coal burning (including coal, anthracite and smokeless fuels) houses exceeds 50 properties per 500m by 500m area.

In such cases, the authority will need to proceed to a Detailed Assessment.

K.2 Estimated coal burning dwellings in 500m x 500m squares in Stornoway

Based on the results from the Domestic Fuel survey it can be concluded that coal burning from domestic premises will not significantly affect air quality in the Western Isles.

K.3 Conclusion - Areas Of Domestic Coal Burning

The areas of domestic coal burning in Western Isles are unlikely to exceed the air quality objectives for PM₁₀ in 2004 and 2010.

L QUARRIES, LANDFILL SITES, OPENCAST COAL, HANDLING OF DUSTY CARGOES AT PORTS ETC

L.1 Screening by estimated background concentrations

The first step in the assessment is to determine whether there is relevant public exposure near the sources of dust emission. The distances to the actual sources of emission are considered (e.g. the haul roads, crushers, stockpiles etc) and not the distances to the site boundary. Concentrations of PM₁₀ fall-off rapidly on moving away from the source.

The Technical Guidance advises:

"In the absence of any local monitoring data, the following approach is recommended:

- If there are no relevant locations for public exposure within 1000 metres of the dust emissions source then there should be no need to proceed further.

- If there are relevant locations for public exposure within 400 to 1000 metres of the dust emissions source, then there should be no need to proceed further if the 2004 PM₁₀ background is less than 27 µg/m³, or the 2010 background is less than 17 µg/m³
- If there are relevant locations for public exposure within 200 to 400 metres of the dust emissions source, then there should be no need to proceed further if the 2004 PM₁₀ background is less than 26 µg/m³, or the 2010 background is less than 16 µg/m³.”

L.2 Screening by evidence of complaints

The Technical Guidance also states:

- Where properties lie closer than 200 metres to the source, authorities are advised to investigate whether any dust nuisance complaints have been reported, as this may give a guide to potential problems. The absence of complaints is not alone a basis for saying that the objectives will not be exceeded, and authorities are advised to take account of local background levels and their own professional judgement based on visual inspection of the operations.

The Scottish Environment Protection Agency regulates quarries and landfill sites. They have advised that they have not received any significant complaints regarding dust emissions and that visual inspection of the sites have not suggested that dust emissions present a problem.

M AIRCRAFT

M.1 Technical Guidance LAQM.TG(03)

The Technical Guidance advises that in screening airports, the predicted total passenger equivalents in 2040 and 2010 should be considered. The tonnes of freight handled is converted to passenger equivalents using 100,000 tonnes = 1 mppa (million passengers per annum) The screening threshold for PM₁₀ is that the air quality objectives are unlikely to be exceeded where

- the predicted total equivalent passenger throughput in 2004 does not exceed 10 mppa; and
- the predicted total equivalent passenger throughput in 2010 does not exceed 5 mppa

M.2 Stornoway Airport

The airport manager has provided estimates of the expected future movements at the airport.

Figure 11.16 Stornoway Airport – Throughput of passengers and freight

Year	Tonnes of Freight transported by non-passenger aircraft	Passenger equivalents (mppa)	Number of Passengers	Total passenger equivalents (mppa)
2001	1,554 tonnes	0.01554	371,000	0.38654
2004	2,000 tonnes	0.02	500,000	0.52
2010	3,000 tonnes	0.03	700,000	0.73

As can be seen from Figure 11.16 above, the number of “passenger equivalents” per annum is expected to rise to 0.02 mppa in 2004 and 0.03 mppa in 2010. **There is no need to proceed to a Detailed Assessment for aircraft.**

11.7 Conclusions for the screening of PM₁₀

From the screening assessment it can be concluded that there is little likelihood that the air quality objectives for PM₁₀ will be exceeded in 2004 or 2010.

A Detailed Assessment is not required for PM₁₀.

Annex 1

Gradko International Quality Assurance and Quality Control

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‘STATEMENT OF QUALITY ASSURANCE AND QUALITY CONTROL IN RELATION TO THE SUPPLY AND ANALYSIS OF NITROGEN DIOXIDE PASSIVE DIFFUSION TUBES’

ACCREDITATION

Gradko International Ltd Analytical Laboratory has UKAS accreditation to the requirements of ISO/IEC 17025.. Our accreditation number is 2187.

QUALITY ASSURANCE

The Laboratory analysis method for the of NO₂ diffusion tubes uses a variation of the Saltzman reaction where nitrogen dioxide absorbed by Triethanolamine is determined by ultraviolet /visible spectrophotometry. The analysis protocol forms part of the Gradko International Ltd documented Laboratory Quality Management System assessed by UKAS.

The accuracy of analysis is monitored on a monthly basis by an external laboratory proficiency scheme administered by the Health and Safety Laboratories. This system is called W.A.S.P. (Workplace Analysis Scheme for Efficiency).

The Laboratory is also supplied on a quarterly basis, with a standard solution of Nitrite from AEA Technology Environment Laboratories at Culham (NETCEN) in order to monitor the instrument calibration curve.

In addition to participation in the W.A.S.P. scheme, once per month, NO₂ tubes prepared at Gradko International Ltd are sent to HSL Sheffield to be co- located alongside an automatic analyser. This project is the NETCEN NO₂ Network Field Intercomparison. The tubes are returned to Gradko for analysis and the results used to publish % bias data for each month.

QUALITY CONTROL

The Laboratory Analyst in accordance with documented protocols follows strict quality control procedures. The u.v./visible spectrophotometer is calibrated every quarter by the use of traceable Holmium and Didymium filters to check the wavelength accuracy.

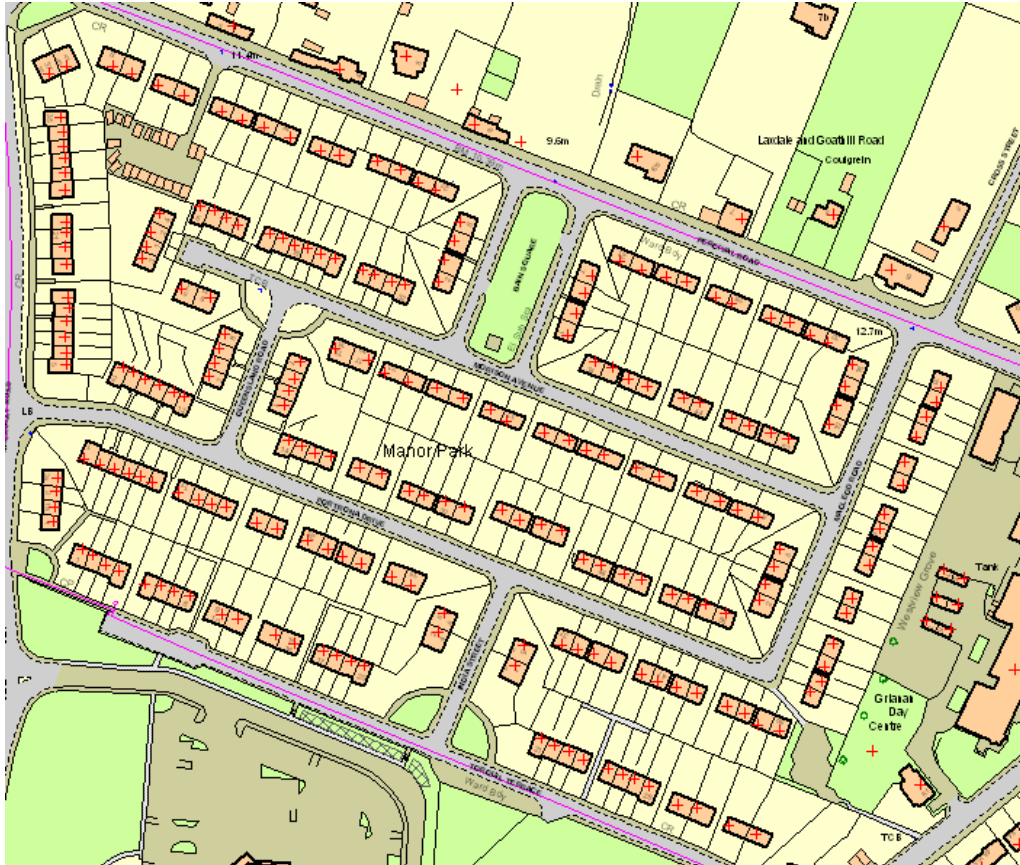
Nitrite Standards ranging 0.5 – 4ppm are used to check the method and accuracy of readings. The full range of these standards is run once per month and a calibration graph generated. The acceptance criteria for a linear graph is $R^2 = >0.995$.

A blank, prepared NO₂ tube is doped with the 2ppm nitrite standard and run at the start of every days analysis as a quality control check. New absorbent and analytical solutions are checked after makeup by the use of blank tubes and nitrite standards.

Periodically a number of blank prepared tubes are doped with the standard nitrite solutions and analysed. This serves as a quality control check on the tube preparation procedures. All of the Gradko International Ltd Laboratory Quality Management Procedures are open to audit.

Annex 2

Annex 2 Map from MapInfo GIS showing the 500 x 500m square used for calculating the number of dwellings in the manor park area



Annex 3

Domestic Fuel Survey Form

DOMESTIC FUEL SURVEY **MANOR**

Please take a few moments to complete this form and return it in the FREEPOST envelope. If you have enquiries regarding this survey, please telephone 01851 709492.

Q1. What is the MAIN FUEL you use for heating your home?

- Gas (Mains, bottle or tank)
Electricity
Oil
Solid fuel:
Coal
Anthracite
Smokeless
Wood
Other

Q1, Please tick ONE box only

Q2. Do you use any OTHER FUELS for heating your home? YES NO

Q3 If YES to question 2, which of these OTHER FUELS do you use?

- Gas (Mains, bottle or tank)
Electricity
Oil
Solid fuel:
Coal
Anthracite
Smokeless
Wood
Other

Q3 Example:

If you heat your home mainly with an Oil-Fired Central Heating System but you also have a fireplace and burn solid fuel, you should tick the appropriate box or boxes under solid fuel

Q4 If YES to Q2, on average, how often do you use OTHER FUELS for heating your home?

- Less than 10 days a year
11 to 50 days a year
51 to 100 days a year
More than 100 days a year

This will obviously vary from year to year but your best guess will help us.

Q5 What fuels do you use for heating water?

- Gas (inc. Bottled gas)
Electricity
Oil
Solid fuel:
Coal
Anthracite
Smokeless
Wood
Other

**You can tick more than one box if necessary.
Example: You may heat your home with a coal fire, which has a back boiler for hot water, but you may also use an electric immersion heater from time to time. In this example you would tick Coal and Electricity**

Thank you for helping us with this survey.