

North Ayrshire Council

Local Air Quality Management

Progress Report: 2004

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Chapter 1: Introduction

1.1: Summary of National Air Quality Strategy and Local Air Quality Management (LAQM)

In order to tackle the problem of poor air quality the Environment Act 1995 put in place measures at both national and local level. However, there is a significant local dimension to air quality, with emissions varying dramatically in different areas, depending on geography, industry and traffic. Local Air Quality Management aims to ensure that solutions are tailored to local needs. The National Air Quality Strategy requires all local authorities to develop an integrated approach to local air quality management, ensuring that all air quality is considered alongside issues such as transport and land use planning. Local authorities must provide the public with information and forecasts on local air quality, consulting on any action that may be required as a result of poor air quality within their area.

Air quality assessments carried out by Local Authorities should act as benchmarks against which future progress in making improvements to air quality in their areas can be measured.

It should be stressed that, to fully appreciate the standard of local air quality, this progress report should be read in conjunction with the Stage 1 and Stage 2 Reviews and Assessments and the updating and screening report already completed by North Ayrshire Council.

The current phased approach towards air quality is summarised in Table 1.1.

Table1. 1.1 – Summary of Phased Approach Towards Air Quality

Level of Assessment	Objective	Approach
Updating and Screening Assessment	To identify those matters that have changed since the last review and assessment, which might lead to a risk of an air quality objective being exceeded.	Use a checklist to identify significant changes that require further consideration. Where such changes are identified, then apply simple screening tools to decide whether there is sufficient risk of an exceedance of an objective to justify a Detailed Assessment.
Detailed Assessment	To provide an accurate assessment of the likelihood of an air quality objective being exceeded at locations with relevant exposure. This should be sufficiently detailed to allow the designation or amendment of any necessary AQMAs.	Use quality-assured monitoring and validated modelling methods to determine current and future pollutant concentrations in areas where there is a significant risk of exceeding an air quality objective.

The recommended timescale for submission of reviews and assessments and Progress Reports are detailed in Table 1.1.2.

Table 1.1.2 - Recommended Timescale

LAQM ACTIVITY	COMPLETION DATE	WHICH AUTHORITIES
Updating and Screening Assessment	End of May 2003	All authorities ^a
Detailed Assessment	End of April 2004	Those authorities ^a which have identified the need for a Detailed Assessment in their May 2003 Updating and Screening Assessment
Progress Report	End of April 2004	Those authorities ^a which have identified no need for a Detailed Assessment in their May 2003 Updating and Screening Assessment
Progress Report	End of April 2005	All authorities
Updating and Screening Assessment	End of April 2006	Those authorities which have identified the need for a Detailed Assessment in their April 2006 Updating and Screening Assessment
Detailed Assessment	End of April 2007	Those authorities which have identified the need for a Detailed Assessment in their April 2006 Updating and Screening Assessment
Progress Report	End of April 2007	Those authorities which have identified no need for a Detailed Assessment in their April 2006 Updating and Screening Assessment
Progress Report	End of April 2008	All authorities
Updating and Screening Assessment	End of April 2009	All authorities
Detailed Assessment	End of April 2010	Those authorities which have identified the need for a Detailed Assessment in their April 2009 Updating and Screening Assessment
Progress Report	End of April 2010	Those authorities which have identified no need for a Detailed Assessment in their April 2009 Updating and Screening Assessment

a. All local authorities except those in Northern Ireland and London local authorities that have designated AQMAs. London local authorities that have designated AQMAs will be expected to submit an Updating and Screening Assessment by the end of 2003 or earlier if possible, and to complete Detailed Assessments (where required) by the end of 2004.

1.2: Air Quality Objectives

Table 1.2.1, below shows the Air Quality Objectives required under the Air Quality Regulations 2000 and the Air Quality (Scotland) Amendment Regulations 2002.

Table 1.2.1: UK Air Quality Objectives

POLLUTANT	AIR QUALITY OBJECTIVE CONCENTRATION	MEASURED AS	DATE TO BE ACHIEVED BY
*BENZENE All authorities	16.25 µg/m³	Running annual mean	31.12.2003
English and Welsh Authorities only	5.00 µg/m ³	Annual mean	31.12.2010
Scottish and N Ireland Authorities only	3.25 µg/m³	Running Annual Mean	31.12.2010
*1,3 BUTADIENE	2.25 µg/m³	Running Annual mean	31.12.2003
CARBON MONOXIDE	10.0 mg/m³	Maximum Daily Running 8-hour Mean	31.12.2003
*LEAD	0.5 µg/m³ 0.25 µg/m³	Annual Mean Annual Mean	31.12.2004 31.12.2008
*NITROGEN DIOXIDE	200 µg/m³ not to be exceeded more than 18 times per year	1 Hour Mean	31.12.2005
	40 µg/m³	Annual Mean	31.12.2005
*PARTICLES (PM10) All authorities	50 µg/m³ not to be exceeded more than 35 times a year	24 Hour Mean	31.12.2004
	40 µg/m ³	Annual Mean	31.12.2004
Scottish Authorities only	50 µg/m³ not to be exceeded more than 7 times a year	24 Hour Mean	31.12.2010
	18 µg/m³	Annual Mean	31.12.2010
SULPHUR DIOXIDE	350 µg/m³ not to be exceeded more than 24 times a year	1 Hour Mean	31.12.2004
	125 µg/m³ not to be exceeded more than 3 times a year	24 Hour Mean	31.12.2004
	266 µg/m³ not to be exceeded more than 35 times a year	15 Minute Mean	31.12.2005

* Since the previous round of reviews and assessments these air quality objectives have been tightened either in terms of concentrations or compliance date.

The Environment Act 1995 makes a requirement for Local Authorities to review and assess air quality in their areas. The Air Quality Regulations 1997 provided National Air Quality objectives for 7 key

pollutants, local authorities must assess whether these objectives are liable to be met. Any Local Authority, which identifies any areas where objectives are not likely to be met, must declare an Air Quality Management Area.

1.3 Findings of Previous Reviews and Assessments

The **first stage** of review and assessment was carried out in **1998** and conclusions for North Ayrshire were as follows: -

1. The air quality objectives for 6 of the 7 specified parameters namely benzene, 1,3-butadiene, carbon monoxide, lead, PM₁₀ and sulphur dioxide are all likely to be achieved by 2005.
2. There is insufficient information at this stage to conclude that the nitrogen dioxide standard will be achieved in the vicinity of several local industrial sources and therefore North Ayrshire will be progressing to a second stage review and assessment for nitrogen dioxide.

The **second stage** review and assessment carried out in **2000** concluded as follows:-

1. The air quality objective for nitrogen dioxide are likely to be met by the end of 2005, it will, therefore not be necessary to proceed to a stage three review and assessment.
2. It would be prudent to undertake a limited programme of diffusion tube monitoring adjacent to the A78 at Auchengate sawmill to confirm the level of nitrogen dioxide at that location.

The enactment of the Air Quality (Scotland) Amendment Regulations 2002 reduced the Objective Levels for many of the pollutants. As part of the phased approach for review and assessment introduced by the regulations North Ayrshire Council carried out an **Updating and Screening Assessment** in 2003 to identify whether there were areas at risk of exceedences of the new objectives.

No areas in North Ayrshire were identified by this assessment as being at risk of exceeding the objectives for any of the 7 pollutants. There was, therefore, no reason to proceed with a detailed assessment for any pollutant.

The monitoring programme has continued and this is a progress report on local air quality in North Ayrshire to date. The locations of monitoring points are indicated in Table 1.3.1 and Figs. 1.3.1-1.3.2.

North Ayrshire : Local Air Quality Monitoring Locations

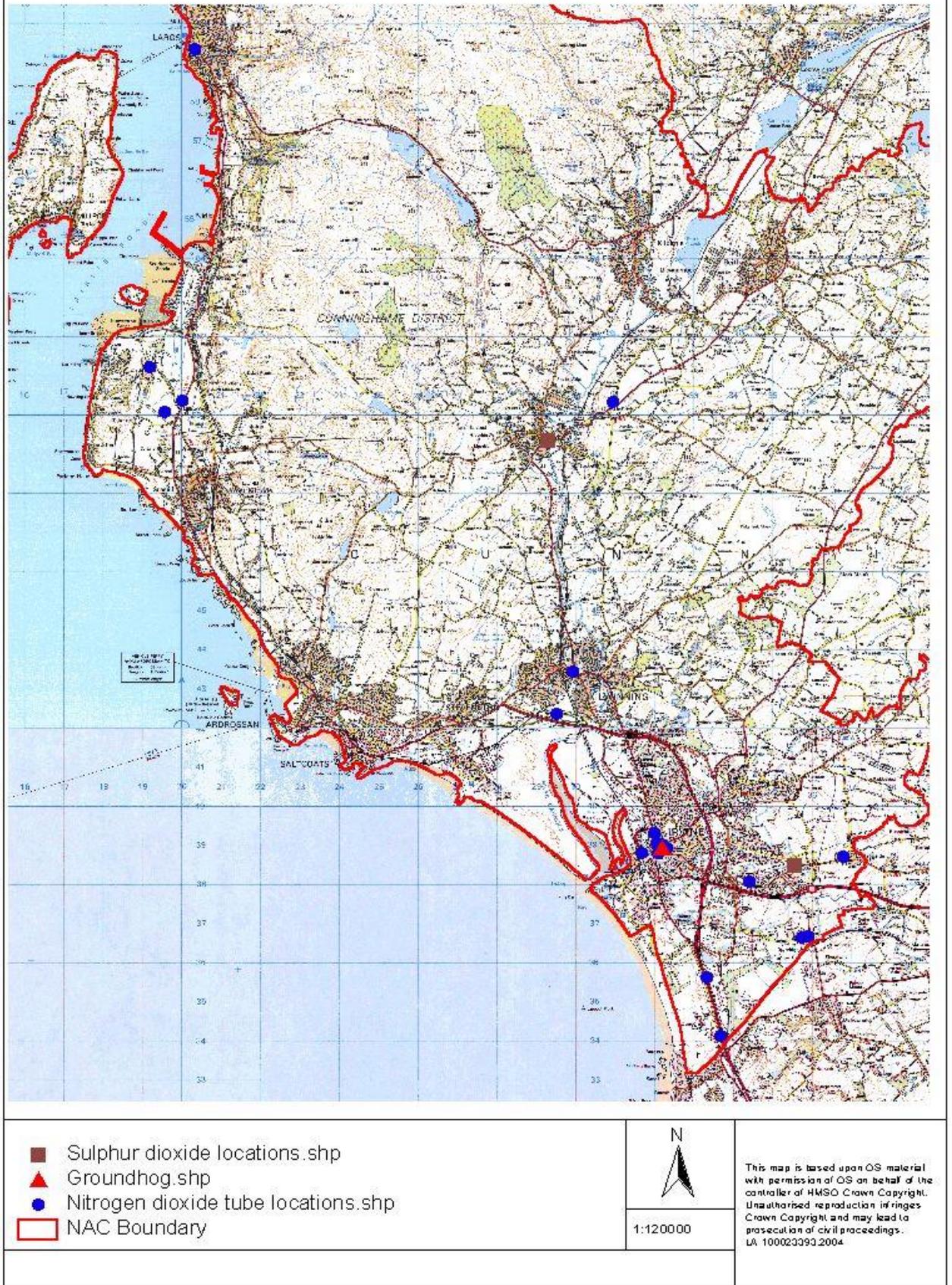


Figure 1.3.1.

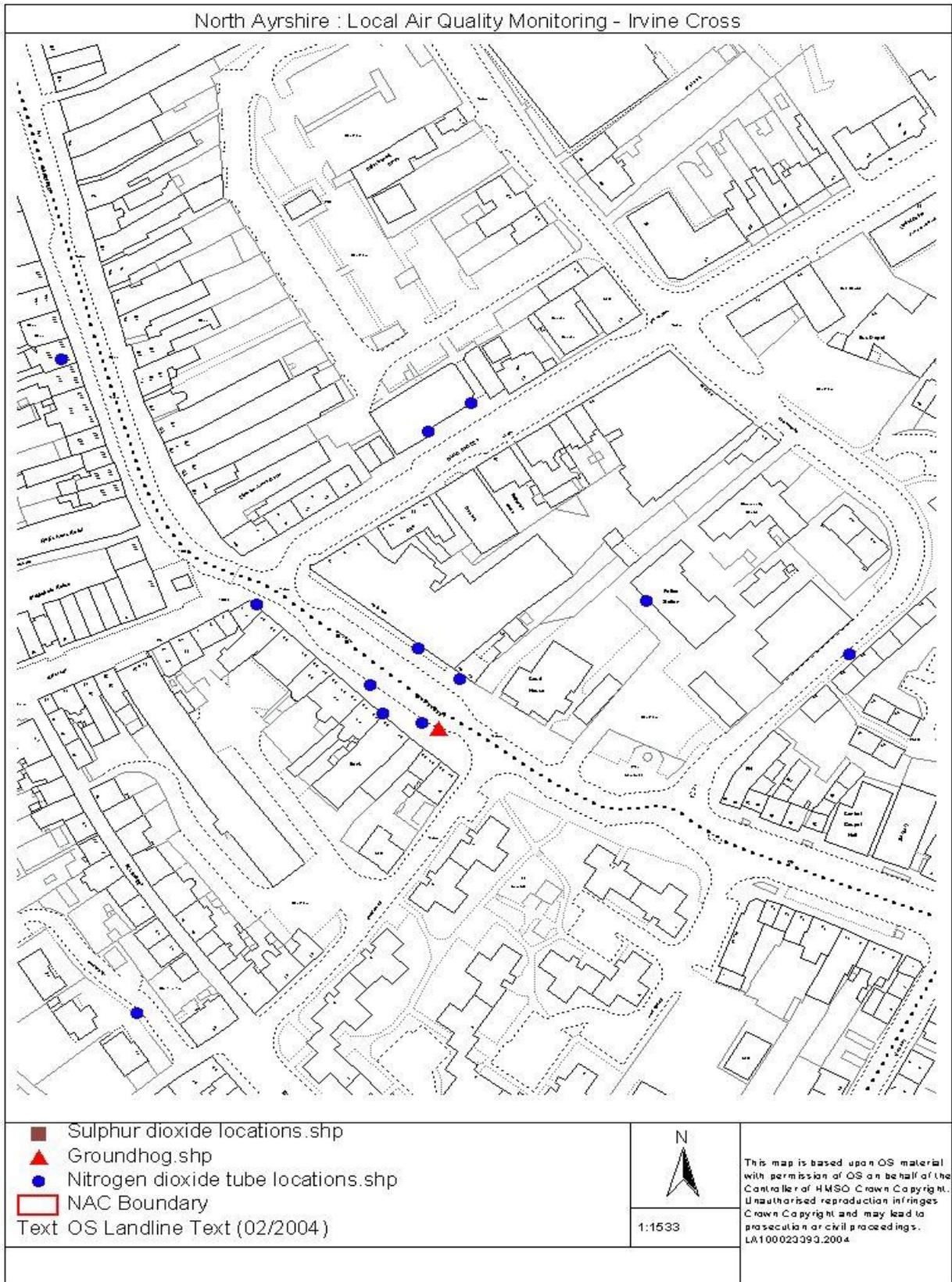


Figure 1.3.2.

TABLE 1.3.1 LOCAL AIR QUALITY MONITORING SITES 2003-2004

NITROGEN DIOXIDE TUBE SITES		NORTH AYRSHIRE
SITE NAME		
(1) CUNNINGHAME HOUSE, IRVINE		1 ST FLOOR EAST WING
(2) GREENWOOD ACADEMY, DREGHORN		LAMP POLE MAIN GATE
(3) DRYBRIDGE MAIN STREET		LAMPPOST OPPOSITE OLD SCHOOL SITE
(4) SHEWALTON MOSS ESTATE, DRYBRIDGE		LAMPPOST ENTRANCE TO ESTATE
(5) DREGHORN PRIMARY SCHOOL		LAMPPOST OPPOSITE PRIMARY SCHOOL
(6) SPRINGSIDE MAIN STREET		LAMPPOST CNR STATION RD/SPRINGHILL TERR
(7) EAST ROAD, IRVINE		LAMPPOST OPP. POLICE STN GARAGE
(8) IRVINE POLICE STATION		DRAIN PIPE POLICE STN. OPP. TOWNHOUSE
(9) SHORTS THE BAKERS, HIGH STREET, IRVINE		ON DRAINPIPE LEFT HAND SIDE OF SHOP
(10) IRVINE CROSS (MAMA'S CAFÉ (VICTORIA CAFE))		LAMPPOST OUTSIDE MAMA'S CAFÉ
(11) IRVINE CROSS (KWIKSAVE)		LAMPPOST OUTSIDE KWIKSAVE
(12) IRVINE CROSS (RS.McCOLLS)		LAMPPOST OUTSIDE RS.McCOLLS
(13) IRVINE CROSS (LOBSTER POT)		LAMPPOST OUTSIDE LOBSTER POT
(14) IRVINE CROSS (OK JOES)		DRAINPIPE OK JOE'S RESTAURANT
(15) KIRKGATE IRVINE		LAMPPOST HALF WAY UP HILL KIRKGATE
(16) EGLINTON STREET IRVINE		DRAINPIPE CNR EGLINTON ST /CASTLE RD
(17) DALRY ROAD KILWINNING		LAMPPOST DOWN FROM TRAFFIC LIGHTS
(18) HIGHFIELD HAMLET DALRY		LAMPPOST AT CNR CYCLE TRACK TO GLENGARNOCK
(19) LARGS MAIN STREET		LAMPPOST AT PEDESTRIAN CROSSING
(20) BYREHILL KILWINNING		MAP REF.NS 296 423
(21) GROUND HOG		LAMPPOST/ TRAILER, 65 HIGH ST IRVINE
(22) AUCHENGATE (BRIDGE)		PEDESTRIAN BRIDGE NORTH OF PAPER MILL
(23) AUCHENGATE (HOUSE)		HOUSE BEHIND AUCHENGATE SAWMILL
(24) AUCHENGATE (ROAD)		ROAD IN AUCHENGATE SAWMILL
(25) GOLDENBERRY FARM ROAD		SOUTH OF HUNTERSTON POWER STATION
(26) SEAMILL/HUNTERSTON ROAD(LAYBY)		LAYBY A78 SEAMILL TO HUNTERSTON
(27) HUNTERSTON ROAD/CYCLE TRACT		JUNCT. CYCLE TRACK / HUNTERSTON PWR STN ROAD
(28) INDIGO SUN, BANK ST, IRVINE		DRAINPIPE RIGHT HAND CORNER OF SHOP
(29) KING WORLD TRAVEL, 19 BANK ST, IRVINE		DRAINPIPE LEFT HAND CORNER OF SHOP
SULPHUR DIOXIDE 8-PORT SAMPLERS		
SITE NAME		
(1) PUBLIC HALL, AITKEN STREET, DALRY		GROUND FLOOR STOREROOM
(2) PRIMARY SCHOOL, DREGHORN		1 ST FLOOR RESOURCE ROOM
MOBILE AIR QUALITY MONITORING UNIT (GROUNDHOG) CO, NO₂ AND PM₁₀.		
SITE NAME		
GROUNDHOG, 65 HIGH STREET, IRVINE.		KERBSIDE

2.0 Pollutant Specific Assessments

2.1 Benzene

No recent monitoring of benzene has been undertaken. However, previous reviews have concluded that:

1. There was no significant industrial source of benzene located either within North Ayrshire or neighbouring areas which is likely to adversely affect air quality within North Ayrshire.
2. There was no need to proceed to a detailed assessment for benzene.

Since the updating and screening assessment carried out in 2003 there has been no evidence of any change to benzene production or release in North Ayrshire, consequently a detailed assessment for benzene remains unnecessary.

2.2 1,3-Butadiene

No monitoring of 1,3-Butadiene has been undertaken. However, previous reviews concluded that:

1. There was no significant industrial sources of 1,3-Butadiene located either within North Ayrshire or neighbouring areas which is likely to adversely affect air quality in North Ayrshire.
2. There was no need to proceed to a detailed assessment for 1,3-Butadiene.

Since the updating and screening assessment carried out in 2003 there has been no evidence of any change to 1,3-Butadiene production or release in North Ayrshire, consequently a detailed assessment for 1,3-Butadiene remains unnecessary.

2.3 Carbon Monoxide

During 2003 carbon monoxide monitoring was carried out in a road canyon located in High Street, Irvine by North Ayrshire Council using an automatic analyser. This equipment is operated in partnership with Inverclyde Council, each authority now siting it in their area for twelve-month periods. Previously, the equipment was shared, based on a four-month turn around. The change was undertaken as it was agreed that more meaningful data would be obtained over the longer period.

Unfortunately, due to technical difficulties the analyser was off-line from mid-April until the start of October, going back off-line from mid-October until mid-November. The monitoring data, therefore, is not complete but is shown as a guide and for completeness (see Table 2.3.1). Also shown is the percentage capture rates for each month

Table 2.3.1 Results of Automatic Monitoring of Carbon Monoxide at High Street, Irvine 2003

Month	CO Max. (mg/m ³)	CO Min. (mg/m ³)	CO Ave. (mg/m ³)	Exceedences of 8-hr Mean (10 mg/m ³)	Data Capture %
January	2.9	0.04	0.45	0	98
February	1.4	0.02	0.41	0	98
March	1	0.03	0.31	0	98
April	1.5	0.04	0.4	0	56
May	No Data	No Data	No Data	No Data	0
June	No Data	No Data	No Data	No Data	0
July	No Data	No Data	No Data	No Data	0
August	No Data	No Data	No Data	No Data	0
September	No Data	No Data	No Data	No Data	0
October	0.47	0	0.07	0	90.3
November	1.47	0	0.14	0	91.1
December	1.25	0.05	0.31	0	96.8

*Raw data validated and analysed by Casella ETI Data Services.

Previous reviews concluded that:

1. There is no significant carbon monoxide source, industrial or road transport, located either within North Ayrshire or neighbouring areas which are likely to adversely affect air quality in North Ayrshire.
2. There is no need to proceed to a detailed assessment for carbon monoxide.

Since the updating and screening assessment carried out in 2003 there has been no evidence of any change to carbon monoxide production or release in North Ayrshire. Additionally, though not complete, monitoring indicates that carbon monoxide does not pose a significant threat to local air quality and consequently a detailed assessment for carbon monoxide remains unnecessary.

2.4 Lead

No monitoring of lead has been undertaken. However, previous reviews concluded that:

1. There was no significant industrial sources of lead located either within North Ayrshire or neighbouring areas which is likely to adversely affect air quality in North Ayrshire.
2. There was no need to proceed to a detailed assessment for lead.

Since the updating and screening assessment carried out in 2003 there has been no evidence of any change to lead production or release in North Ayrshire, consequently a detailed assessment for lead remains unnecessary.

2.5 Nitrogen Dioxide

In North Ayrshire monitoring of nitrogen dioxide by passive diffusion tubes has been undertaken regularly since 1993, after earlier involvement in the two short national surveys.

The aim of the nitrogen dioxide monitoring undertaken so far in North Ayrshire has been to measure pollutant concentrations at busy roads and junctions especially near residential areas. Monitoring has

also been undertaken at sites where the continuous frontage of buildings provides a canyon effect and allows pollutant levels to accumulate.

Four of the monitoring sites in the Irvine Cross area became part of the National Nitrogen Dioxide Diffusion Tube Survey in 1998.

The results of monitoring are summarised graphically in Figure 2.5.1 and also in tabular form (see Table 2.5.1). They show that for the existing sites nitrogen dioxide levels remain low at all sites except in the High Street, Irvine area, where levels have risen significantly over the past year. This is considered to be due to the number of public service vehicles waiting in this area.

Fig.2.5.1: Local Bias Corrected Nitrogen Dioxide Levels 1998-2003 and projected levels for 2005 & 2010

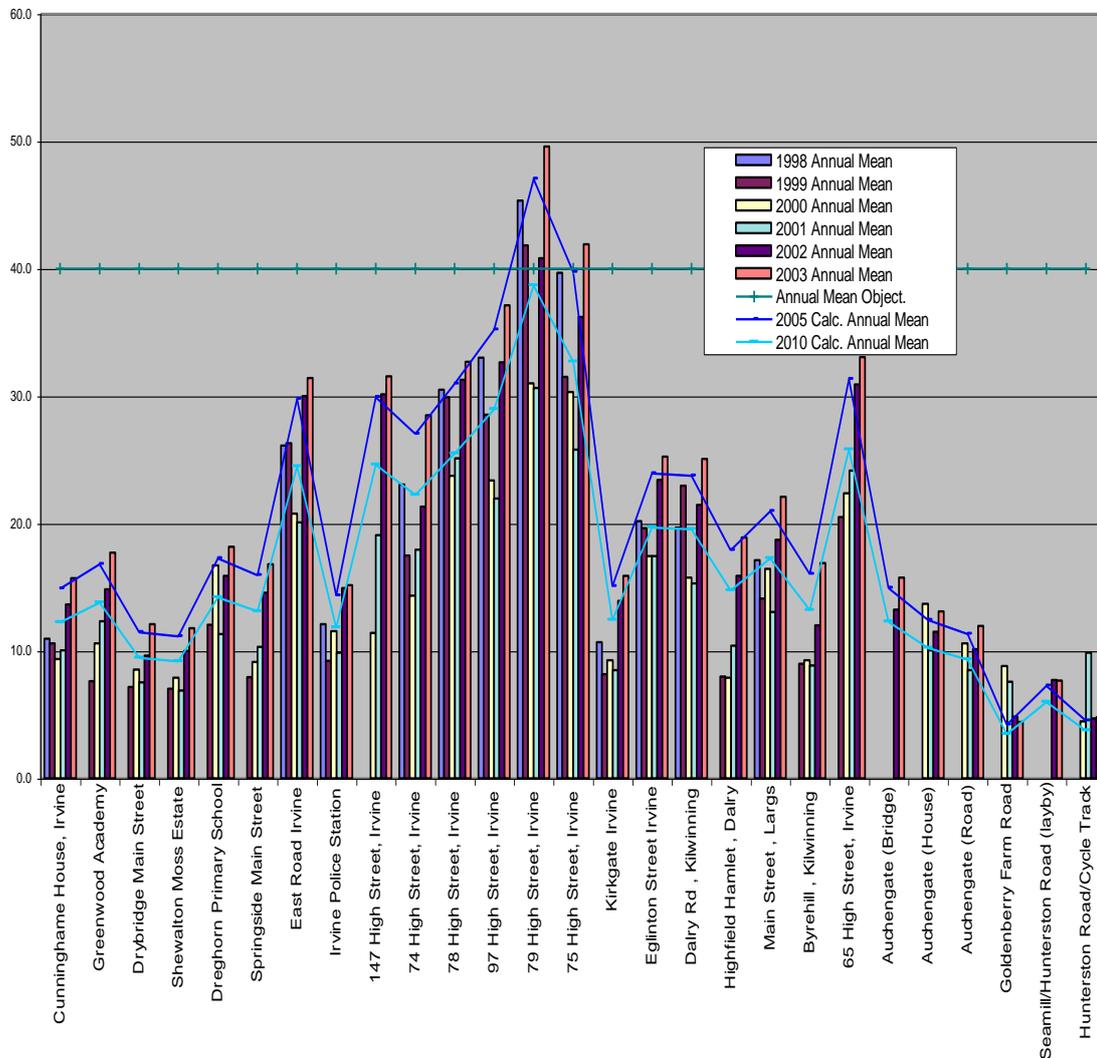


Table 2.5.1: Local Bias Corrected NO₂ Results 1998–2003 and Predicted Levels 2005 and 2010

Local Annual Bias *+10.3 *+4.0 *+2.3 *+24.3 *+20.0 *+20.0

RESULTS IN UG/M3	1998 Annual Mean	1999 Annual Mean	2000 Annual Mean	2001 Annual Mean	2002 Annual Mean	2003 Annual Mean	Annual Mean Object.	2005 Calc. Annual Mean	2010 Calc. Annual Mean
Cunninghame House, Irvine	11.0	10.6	9.4	10.1	13.7	15.70	40	14.9	12.2
Greenwood Academy		7.6	10.6	12.3	14.8	17.71	40	16.8	13.8
Drybridge Main Street		7.2	8.6	7.5	9.6	12.10	40	11.5	9.4
Shewalton Moss Estate		7.1	7.9	6.9	10.0	11.76	40	11.1	9.2
Dreghorn Primary School		12.1	16.7	11.3	15.9	18.19	40	17.2	14.2
Springside Main Street		7.9	9.1	10.3	14.5	16.83	40	16.0	13.1
East Road Irvine	26.1	26.3	20.8	20.1	30.0	31.40	40	29.8	24.5
Irvine Police Station	12.1	9.2	11.6	9.9	14.9	15.15	40	14.4	11.8
147 High Street, Irvine			11.4	19.1	30.2	31.54	40	29.9	24.6
74 High Street, Irvine	23.1	17.5	14.3	18.0	21.3	28.50	40	27.0	22.2
78 High Street, Irvine	30.5	29.9	23.8	25.1	31.3	32.67	40	31.0	25.5
97 High Street, Irvine	33.0	28.5	23.4	21.9	32.7	37.12	40	35.2	29.0
79 High Street, Irvine	45.3	41.8	31.0	30.7	40.8	49.59	40	47.0	38.7
75 High Street, Irvine	39.7	31.5	30.3	25.8	36.2	41.92	40	39.7	32.7
Kirkgate Irvine	10.7	8.2	9.3	8.5	13.9	15.91	40	15.1	12.4
Eglinton Street Irvine	20.2	19.6	17.4	17.4	23.4	25.25	40	23.9	19.7
Dalry Rd , Kilwinning	19.7	23.0	15.7	15.3	21.4	25.05	40	23.7	19.5
Highfield Hamlet , Dalry		8.0	7.9	10.4	15.9	18.88	40	17.9	14.7
Main Street , Largs	17.1	14.1	16.4	13.1	18.7	22.11	40	21.0	17.2
Byrehill , Kilwinning		9.0	9.3	8.8	12.0	16.90	40	16.0	13.2
65 High Street, Irvine		20.5	22.4	24.1	30.9	33.06	40	31.3	25.8
Auchengate (Bridge)				0.0	13.3	15.77	40	14.9	12.3
Auchengate (House)			13.7	10.1	11.5	13.11	40	12.4	10.2
Auchengate (Road)			10.6	8.5	10.2	11.97	40	11.3	9.3
Goldenberry Farm Road			8.8	7.6	4.8	4.43	40	4.2	3.5
Seamill/Hunterston Road (layby)				0.0	7.7	7.68	40	7.3	6.0
Hunterston Road/ Cycle Track			4.5	9.9	4.7	4.77	40	4.5	3.7

*The annual mean levels in Fig 2.5.1 and Table 2.5.1 have been corrected for “local bias” as allowed in the guidance. The “local bias” figures relevant to North Ayrshire Council have been provided by Glasgow Scientific Services. It is accepted that whilst the “Local Bias” of 20% is applicable only for Kerbside sites, it will be greater for background and rural sites. As such, the results shown for these sites will be more conservative.

The Predicted Level for 2005 was calculated, using the formula:

$$2005 \text{ Predicted Level} = \frac{2003 \text{ Annual Mean} * 0.892}{0.941}$$

The Predicted Level for 2010 was calculated, using the formula:

$$2010 \text{ Predicted Level} = \frac{2003 \text{ Annual Mean} * 0.734}{0.941}$$

All the corrected Annual Mean results for 2003 meet the air quality objective with the exception of the kerbside monitoring sites at 75 and 79 High Street, Irvine. These are located adjacent to two busy bus stops. Here the bias corrected Annual Mean Concentrations are 41.92µg/m³ and 49.59µg/m³ respectively. This indicates that for 2005, when the “year correction factors” are applied, the kerbside nitrogen dioxide level predicted at 79 High Street, Irvine is 47µg/m³ thus exceeding the 2005 Air Quality Objective. However, the “corrected” 2005 nitrogen dioxide Annual Mean Concentration at the

façade of the building, where there is a “relevant exposure to the public”, is predicted to meet the Air Quality Objective for 2005. As shown in Fig 2.5.1 and Table 2.5.1 above, when the “year correction factors” are applied, all predicted Annual Mean levels for 2010 shall meet the Air Quality Objective.

Additionally, during 2003 nitrogen dioxide monitoring was carried out in a road canyon located in High Street, Irvine by North Ayrshire Council using an automatic analyser. This equipment is operated in partnership with Inverclyde Council, each authority now siting it in their area for twelve-month periods. Previously, the equipment was shared, based on a four-month turn around. The change was undertaken as it was agreed that more meaningful data would be obtained over the longer period. The monitoring data, therefore, is shown (see Table 2.5.2). Also shown is the percentage capture rates for each month.

Table 2.5.2 Results of Automatic Monitoring of Nitrogen Dioxide at High Street, Irvine 2003

Month	NO ₂ Max. (µg/m ³)	NO ₂ Min. (µg/m ³)	NO ₂ Ave. (µg/m ³)	Exceedences of 1-hr Mean (200 µg /m ³)	Data Capture %
January	112	0	30	0	100
February	100	0	36	0	92
March	128	1	41	0	93
April	153	2	39	0	99
May	128	2	32	0	96
June	111	4	36	0	100
July	144	1	31	0	99
August	154	3	38	0	100
September	142	4	39	0	100
October	140.3	6.6	44.9	0	91.4
November	143.8	1	30.8	0	68.1
December	155.6	2	43.6	0	89
Annual	155.6	0	36.8	0	94

*Raw data validated and analysed by Casella ETI Data Services.

There were no exceedences of the NAQS for the 1-hour Mean Value (200 µg /m³).

The average against NAQS Annual Mean Guideline Value (40 µg/m³) is **36.8µg/m³**. The kerbside location of this automatic monitoring site is within 30 metres of the diffusion tubes showing the highest readings. This suggests a very localised area of concern.

As discussed in the 2003 USA report, the proposals for a traffic management scheme in the Irvine Cross area are now underway. One of the anticipated effects of this scheme around 79 High Street, Irvine is a reduction in exhaust emissions, particularly from public service vehicles and Heavy Goods Vehicles. Additional nitrogen dioxide diffusion tubes have been deployed to assess the effect of this scheme in adjacent streets. Unfortunately, as the scheme is still developing it will be some months before any improvement can be assessed objectively.

Previous reviews concluded:

1. DMRB screening shows that there are no areas within North Ayrshire, which are likely to fail the objective due to Road Traffic. The annual mean nitrogen dioxide levels over a short length of High Street, Irvine, however, are marginally in excess of the annual mean objective in 2002. When the “year correction factors” are applied, as allowed in the guidance, all Annual Mean levels for 2005 should meet the Air Quality Objective. It is believed also that the traffic management scheme, already proposed by North Ayrshire Council will minimise the risk of any further increase.
2. Passive monitoring for nitrogen dioxide should continue in High Street, Irvine to assess the effect of the proposed traffic management scheme.

3. There are no significant industrial sources of nitrogen dioxide within North Ayrshire.
4. There is no requirement to proceed to a detailed assessment for nitrogen dioxide.

Since then, passive and automatic monitoring of nitrogen dioxide has indicated that there is a localised kerbside area of High Street, Irvine. Currently and for the end of 2005 this area is predicted to be subject to an annual mean concentration of nitrogen dioxide level in excess of 40 µg/m³. However, this is not an area of relevant public exposure, consequently a detailed assessment for nitrogen dioxide remains unnecessary.

2.6 Particulate Matter PM₁₀

PM₁₀ Monitoring within North Ayrshire

Throughout 2003 continuous PM₁₀ monitoring was carried out by North Ayrshire Council at High Street, Irvine, using an automatic analyser. This equipment is operated in partnership with Inverclyde Council, each authority now siting it in their area for twelve-month periods. This site was chosen as it is on a heavily used bus route within Irvine town centre. The most recent results indicate the PM₁₀ levels to be well below the 2004 objective as can be seen in Table.2.6.1. Also shown is the percentage capture rates for each month.

Table.2.6.1. Results of Automatic Monitoring of PM₁₀ at High Street, Irvine 2003

Month	PM ₁₀ Max. (µg/m ³)	PM ₁₀ Max. (µg/m ³) Grav.	PM ₁₀ Min. (µg/m ³)	PM ₁₀ Min. (µg/m ³) Grav.	PM ₁₀ Ave. (µg/m ³)	PM ₁₀ Ave. (µg/m ³) Grav.	Exceedences of 24-hr Mean (50µg /m ³)	Data Capture %
January	32	41.6	11	14.3	16	20.8	0	48
February	36	46.8	8	10.4	22	28.6	0	89
March	48	62.4	11	14.3	24	31.2	0	90
April	45	58.5	7	9.1	23	29.9	0	10
May	28	36.4	8	10.4	14	18.2	0	68
June	28	36.4	10	13	17	22.1	0	100
July	31	40.3	9	11.7	15	19.5	0	10
August	34	44.2	5	6.5	15	19.5	0	77
September	21	27.3	5	6.5	14	18.2	0	93
October	21	27.3	6.9	8.97	13.6	17.6	0	83.9
November	23.3	30.3	6.3	8.2	13.4	17.4	0	86.7
December	23.9	31.1	4.1	5.3	14.1	18.3	0	83.9
Annual	48	62.4	4.1	5.3	16.7	21.7	0	70

*Raw data validated and analysed by Casella ETI Data Services.

There were no exceedences of the NAQS for the 24-hour Mean Value (50 µg /m³).

The average against NAQS Annual Mean Guideline Value (40 µg/m³) is:

16.7µg/m³ (21.7µg/m³ Gravimetric).

As can be seen from Table.2.6.1. the annual data capture rate was approximately 70%, which is less than the 90% minimum capture rate specified in the guidance. However, the data are shown for completeness. Additionally, the following predicted PM₁₀ concentrations for 2004 and 2010 may only be taken as indicative.

This measured 2003 Annual Mean concentration of 21.7µg/m³ was used to predict estimated annual mean concentrations for 2004 and 2010. See Box 2.6.1 for calculation method.

BOX 2.6.1: PM10 Predictions 2004 & 2010

Based on method described in Technical Guidance LAQM: TG(03) Box 8.6.		
Monitoring data for 2003 are available for a calendar year. Measured using a TEOM analyser the annual mean concentration [CT2003] is:		16.70 Ug/m3
Step 1: Adjust TEOM data to estimate Gravimetric values by multiplying by 1.3 .		
[CG2003]=	$[CT2003] \times 1.3 =$	21.71 Ug/m3
Step 2 Derive the local secondary PM10 concentration from the internet maps for 2001:		
	[Csec2001]	
	GRID REF= X: 232500; Y: 639500	3.76 Ug/m3
Step 3 Estimate the local secondary PM10 concentration in 2003 [Csec2003] using correction factors (Box 8.7).		
[Csec2003]=	$[Csec2001] \times 0.955$ =	3.59 Ug/m3
Step 4 Estimate the local primary PM10 concentration in 2003 [Cprim2003] by subtracting secondary & *coarse concentrations from the measured PM10 concentration.		
	*coarse concentration taken to be R&A Helpdesk advised lower figure is accepted as being more appropriate.	8.8 Ug/m3
[Cprim2003]=	$[CG2003] - [Csec2003] - 8.8 =$	9.32 Ug/m3
Step 5 Adjust local primary PM10 concentration in 2003 to the future years of interest eg 2004 & 2010 using the correction factors in Box 8.7		
[Cprim2004]=	$[Cprim2003] \times (0.930 / 0.954) =$	9.08 Ug/m3
[Cprim2010]=	$[Cprim2003] \times (0.815 / 0.954) =$	7.96 Ug/m3
Step 6 Calculate the secondary PM10 concentration in the same future years, 2004 & 2010 using the correction factors in Box 8.7.		
[Csec2004]=	$[Csec2001] \times 0.932$ =	3.50 Ug/m3
[Csec2010]=	$[Csec2001] \times 0.795$ =	2.99 Ug/m3
Step 7 Calculate the total estimated PM10 concentration in 2004 & 2010 by adding the components together.		
[CG2004]=	$[Cprim2004] + [Csec2004] + 8.8 \text{ Ug/m3 Gravimetric} =$	21.39 Ug/m3
[CG2010]=	$[Cprim2010] + [Csec2010] + 8.8 \text{ Ug/m3 Gravimetric} =$	19.75 Ug/m3

Previous reviews concluded that:

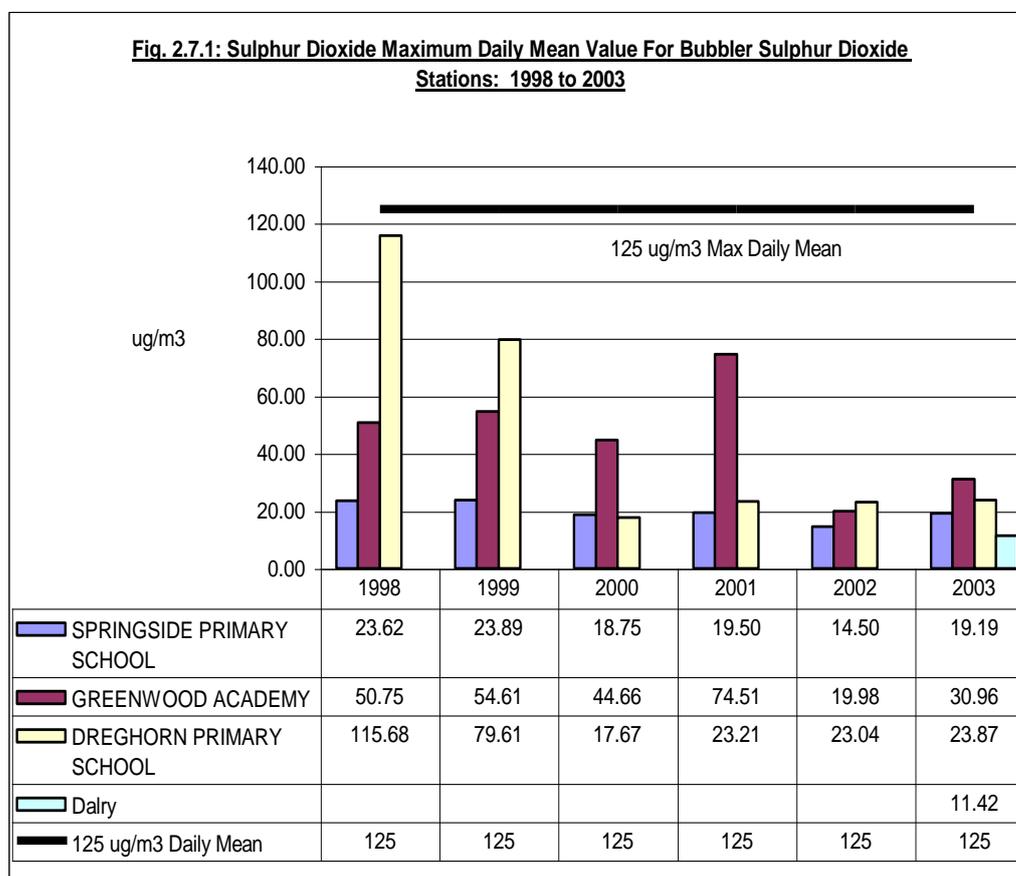
1. There are no industrial sources within North Ayrshire, which are liable to cause any exceedance in either the 2004 or 2010 objectives for PM₁₀.
2. Screening using the DMRB model indicates that road traffic will not cause any exceedences of the objectives for PM₁₀.
3. There is no requirement to proceed to a detailed assessment for PM₁₀.

Since the updating and screening assessment carried out in 2003 there has been no evidence of any increase in PM₁₀ production or release in North Ayrshire, as the result of either fixed sources or road traffic. Measurement of PM₁₀ undertaken in High Street, Irvine during 2003 suggests that, whilst the predicted estimated annual mean concentration for 2004 (21.39µg/m³) shall be well below the Air Quality Objective, for 2010 it is predicted to be 19.75µg/m³, marginally exceeding the much reduced Air Quality Objective 18µg/m³. However, as with nitrogen dioxide, these results were obtained when there was heavy public transport traffic in the area. Since then a traffic-management scheme has been put in place to disperse this traffic. It is anticipated, therefore, that the annual mean concentration of PM₁₀ shall reduce significantly in future years and consequently a detailed assessment for PM₁₀ remains unnecessary.

2.7 Sulphur Dioxide

Since 2001 monitoring of sulphur dioxide has continued using 8-Port sampling technology in three schools in the Dreghorn / Springside area. However, due to lack of space the unit in Greenwood Academy was removed mid-2003. Similarly, the unit in Springside Primary was removed in June 2004.

Monitoring results obtained since 1998 for the various sites are represented graphically in Figure 2.7.1.



Previous reviews concluded that:

1. The extensive smoke control programme undertaken by Cunninghame District Council has improved sulphur dioxide levels in the area due to the shift to natural gas and electricity.
2. The extensive historical and current monitoring programmes for sulphur dioxide in North Ayrshire has covered every urban area and results indicate the air quality standard continues to be met.
3. There is no need to progress to a detailed assessment for sulphur dioxide.

Since the updating and screening assessment carried out in 2003 there has been no evidence of any change to sulphur dioxide production or release in North Ayrshire, consequently a detailed assessment for sulphur dioxide remains unnecessary.

3.0 Conclusions

- 3.1 With the exception of nitrogen dioxide all guideline limits for the National Air Quality Standards shall be met for 2004.
- 3.2 With regard to nitrogen dioxide, it is predicted that a highly localised area of High Street, Irvine shall continue to be subject to concentration levels in excess of the guideline limit for the annual mean ($40\mu\text{g}/\text{m}^3$) national air quality standard at the end of 2005. However, this is not an “area of relevant public exposure”, consequently a detailed assessment for nitrogen dioxide remains unnecessary. It also is predicted that by the end of 2010 all areas will meet the guideline limit for the annual mean national air quality standard for nitrogen dioxide.
- 3.3 With regard to PM_{10} , whilst the predicted estimated annual mean concentration for 2004 ($21.39\mu\text{g}/\text{m}^3$) shall be well below the U.K. Air Quality Objective, for 2010 it is predicted to be $19.75\mu\text{g}/\text{m}^3$, marginally exceeding the much reduced Scottish Air Quality Objective of $18\mu\text{g}/\text{m}^3$.
- 3.4 However, a traffic management plan has being implemented for High Street, Irvine. This should secure reductions in nitrogen dioxide and PM_{10} levels in the area.
- 3.5 Passive sampling shall continue in the area to monitor ambient levels of nitrogen dioxide. Additionally, the TEOM particulate monitor is due to be re-sited in the area from May 2005 for twelve months. At the end of that period the effects of the traffic management scheme can be further assessed.
- 3.6 There is no need to proceed to a detailed assessment for any of the seven air pollutants.

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