



Inverclyde council

2010 Air Quality Progress Report for Inverclyde Council

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

July 2010



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Executive Summary

In order to fulfil its statutory obligation under Part IV of the Environment Act 1995, Inverclyde Council has undertaken a Review and Assessment of air quality throughout Inverclyde. The findings are detailed in this report.

Previous rounds of Review and Assessment concluded that there was no requirement to proceed to a Detailed Assessment for any pollutants contained in the Air Quality Scotland Regulations 2000 and there has never been an Air Quality Management Area declared within Inverclyde.

There have been no significant changes to the existing road network or the introduction of new domestic or industrial sources since the previous round of Review and Assessment.

At present monitoring of NO₂ and benzene is undertaken throughout the area and Inverclyde Council also has an Automatic Air Quality Monitoring Station which records the levels of NO₂ and PM₁₀.

Historically, data from these monitoring sites have consistently shown that Air Quality Objectives were being met for all measured pollutants however the 2009 data has now reported that one site, namely East Hamilton Street, Greenock has exceeded the annual mean Objective for NO₂ and requires further monitoring.

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Appendix A: QA/QC Data

Appendix B: Map of Air Quality Monitoring Sites in Inverclyde

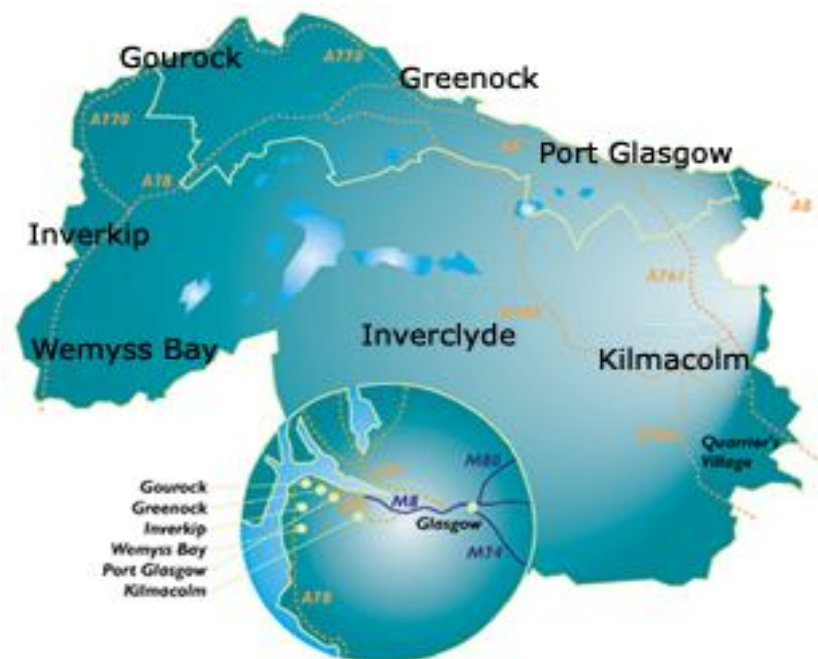
Appendix C: Monthly NO₂ Diffusion Tube Monitoring Data for 2009

1 Introduction

1.1 Description of Local Authority Area

Inverclyde is situated on the south bank of the Clyde Estuary at the mouth of the River Clyde where it opens into the Firth of Clyde. It is bounded by North Ayrshire to the south, Renfrewshire to the east and Argyll and Bute to the west and north. It is one of the smallest local authorities in Scotland extending 61 square miles and has a mixture of both urban and rural areas.

Map of Inverclyde



The 2008 population was estimated to be approximately 80,500 and is projected to fall to 77,500 by 2015 and 69,500 by 2030.

To stabilise one of the fastest declining populations in Scotland, a local regeneration company Riverside Inverclyde has been established. They will lead a £400 million initiative with the mission to revive Inverclyde into an attractive area for housing, businesses and leisure.

One of the targeted areas, shown below is the coastal strip between Greenock and Port Glasgow. Historically Inverclyde had significant associations with maritime trade and the associated industries of shipbuilding, rope making and sugar refining, the majority being confined to this area. Seven developments will now transform redundant dockland into residential and commercial areas, marina, leisure and public spaces.



Currently the majority of the population in Inverclyde is concentrated in Port Glasgow, Greenock and Gourock. Typical industries throughout the area consist of high technology firms and service sector industries.

Gourock contains little manufacturing industry and is recognised as a residential town and popular destination with ferry terminals connecting Inverclyde with Argyll and Bute.

The smaller settlements consisting of the rural villages Kilmacolm and Quarriers Village and the coastal villages of Inverkip and Wemyss Bay are also growing residential areas.

Road Network

Inverclyde is served by three main roads, the A8 (M8) from Glasgow and the Central Belt, the A78 which leads to Ayrshire and the West Coast and A761 from the rural areas of Kilmacolm and Bridge of Weir.

The busiest areas of road are along the A8 corridor which runs through Port Glasgow and Greenock. These stretches of road can become fairly congested during rush hour.

1.2 Purpose of Progress Report

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

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

1.3 Air Quality Objectives

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

Table 1.1 Air Quality Objectives included in Regulations for the purpose of Local Air Quality Management in Scotland.

Pollutant	Concentration	Measured as	Date to be achieved by
Benzene	16.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	3.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	0.25 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2005
Particles (PM₁₀) (gravimetric)	50 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	50 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	18 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2010
Sulphur dioxide	350 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

The first round of Review and Assessment began in 1998 with a first stage review. This was a screening process to eliminate any pollutants which would not be of concern. The outcome of this stage was that a second stage review was required for PM₁₀ and Nitrogen Dioxide, the two principal pollutants related to road traffic.

The second stage review was conducted in March 2000 and used extended monitoring and some simple modelling to predict current and future pollutant levels.

The results of these assessments concluded that the National Objectives would be met in Inverclyde.

Since then the Air Quality (Scotland) Amendment Regulations 2002 have tightened the Air Quality Objectives, and a new phased approach to Review and Assessment has been introduced.

An Updating and Screening Assessment was produced in April 2003. This concluded that the National Air Quality Objective would be met for Carbon Monoxide, 1,3-Butadiene, Lead, Sulphur Dioxide, Nitrogen Dioxide and PM₁₀. It also concluded that the National Air Quality Objective for Benzene should be met.

As a result of these conclusions, Inverclyde was not required to carry out a detailed assessment for any pollutant and therefore produced a Progress Report in April 2004.

The 2004 Progress Report concluded that the Objectives would be met for 5 of the 7 pollutants. After identifying high levels of Benzene in 2002, the 2003 results were reduced to a level more realistic for an authority of this size, and we were confident that the Objective would be met.

We also concluded that the Nitrogen Dioxide levels were marginally above the Objective level and therefore decided to monitor the sites closely over 2004.

The 2005 Progress Report and the 2006 Updating and Screening Assessment both showed that the Objectives would be met for all 7 pollutants, and that no detailed assessment would be required.

The subsequent 2007 and 2008 Progress Reports and 2009 Update and Screening Assessment again concluded that the National Objectives would be met for all 7 pollutants.

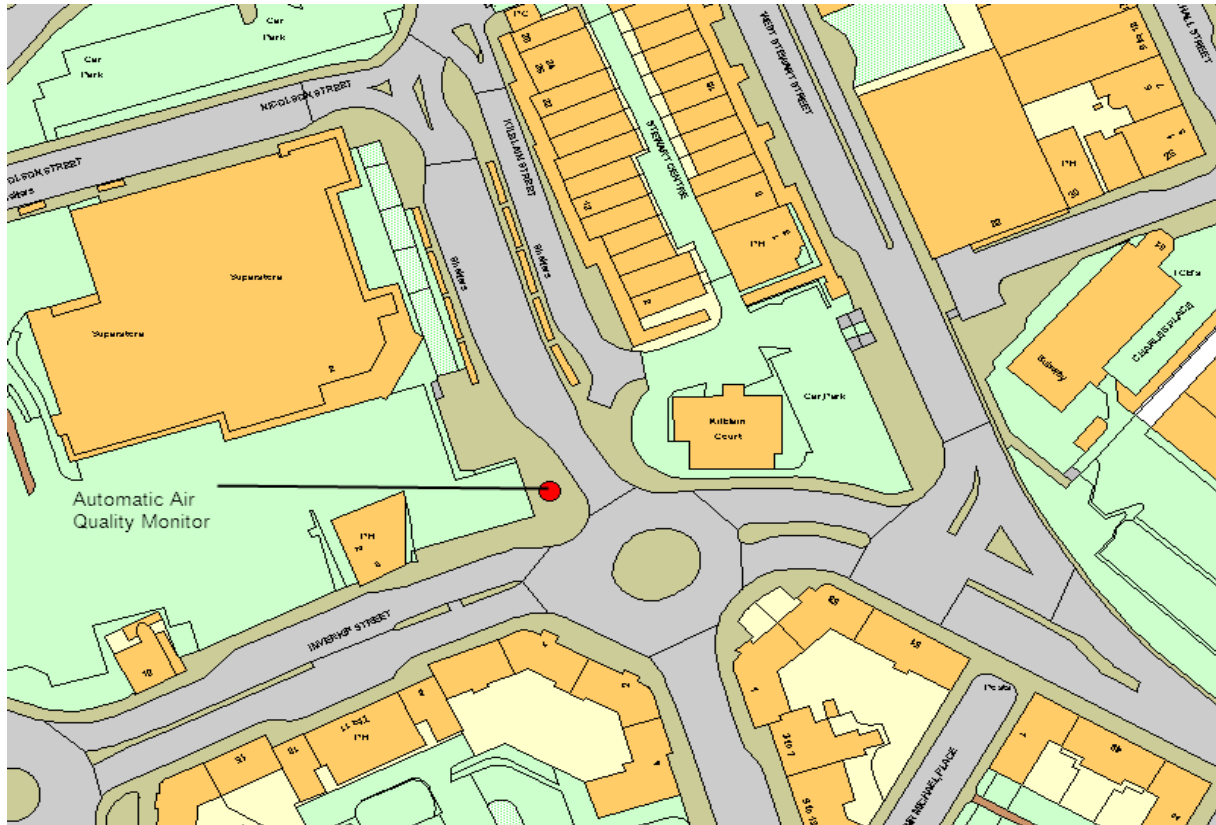
Summary of Reports

Report Date	Outcome
Update and Screening Assessment: May 2003	Concluded that all air quality objectives would be met. No Detailed Assessment required.
Progress Report: April 2004	Concluded that all air quality objectives would be met.
Progress Report: June 2005	Concluded that all air quality objectives would be met.
Update and Screening Assessment: July 2006	Concluded that all air quality objectives would be met. No Detailed Assessment required.
Progress Report: July 2007	Concluded that all air quality objectives would be met.
Progress Report: July 2008	Concluded that all air quality objectives would be met.
Update and Screening Assessment: August 2009	Concluded that all air quality objectives would be met. No Detailed Assessment required.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites



Between August 2008 and November 2009 our Mobile Automatic Air Quality Monitoring Station was located at Kilblain Street, Greenock as shown in the figure above.

Due to construction work taking place at the above site, the monitoring station had to be removed. As new monitoring equipment was due to be purchased in February 2010 this was not reinstated elsewhere.

In April 2010 Dunlop Street, Greenock was chosen as the new location for our new automatic air quality monitoring station. The site was chosen as it is close to residential properties and along one of the busiest roads in Greenock which connects to the A78.

Additionally an Osiris Particulate Monitor has been positioned at Dellingburn Street which measures PM₁₀, PM_{2.5} and PM₁.

Table 2.1 Automatic Air Quality Monitor Details.

Site Name	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA?	Relevant Exposure ? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location ?
Kilblain Street, Greenock **Site no longer in use from Nov 2009**	Urban Centre	227581 676282	NO ₂ , PM10, CO	N	25m	1.5m	Y

Throughout the 2008/ 2009 monitoring period Casella Monitor collated and analysed the data from the monitoring station at Kilblain Street, Greenock.

The maintenance and calibration of the analysers was undertaken by Casella Monitor as part of the Service Level Agreement with Inverclyde Council. Details of the QA/QC procedures are contained in Appendix A.

2.1.2 Non-Automatic Monitoring

Inverclyde Council currently monitors NO₂ and benzene throughout the area using diffusion tubes.

NO₂ diffusion tubes have been placed at 16 sites (11 in Greenock, 2 in Gourock and one each of the towns of Port Glasgow, Kilmacolm and Wemyss Bay). Benzene diffusion tubes have also been placed at 4 of these sites, all located within Greenock.

A summary of the 2009 monitoring sites is shown in the Table 2.2 and a map showing the location of each site is contained in Appendix C.

In January 2010 the following NO₂ diffusion tubes were moved to new locations;

- Scarlow Street, Port Glasgow has now been moved to Brown Street, Port Glasgow.
- Broomhill Street, Greenock has been moved to Dunlop Street. The diffusion tube is also on the same stretch of road as the new automatic air quality monitoring station.
- Mercury Lane, Greenock has now been moved to Larkfield Road, Greenock
- Greenock Road, Wemyss Bay has been relocated to Shore Road, Wemyss Bay

Details can also be found in Table 2.3 below.

The monitoring data for each of diffusion tubes from 2006 to 2009 is contained in table 2.4b in this report to justify relocating these sites. The data shows that the measured NO₂ levels at each of the above sites had been consistently below the annual mean Objective of 40 µg/m³. The new sites that have been selected are on busier stretches of road and have been positioned closer to receptors than the previous sites.

The NO₂ diffusion tube data for 2009 contained in these reports is based on the data obtained from the original sites as detailed in table 2.2 below

Glasgow Scientific Services analyse the diffusion tubes on a monthly basis. Details of the preparation method used and the bias adjustment factor applied are contained in Appendix A. Details of the QA/QC procedures are also contained here.

Table 2.2 Details of Non- Automatic Monitoring Sites 2009

Site Name	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location?
Carwood Court, Greenock	Urban Background	229503 675400	NO ₂	N	Y(13.5m)	5m	Y
East Hamilton St, Greenock	Roadside	229365 675700	NO ₂ , Benzene	N	Y(10m)	2.25m	Y
Dellingburn St, Greenock	Roadside	228422 675735	NO ₂ , Benzene	N	Y(3.5m)	5m	Y
Dalrymple St, Greenock	Roadside	228311 675993	NO ₂	N	Y(15m)	3m	Y
Inverkip St, Greenock	Roadside	227563 676246	NO ₂	N	Y(1m)	2.5m	Y
Nelson St, Greenock	Roadside	227092 676134	NO ₂ , Benzene	N	Y(1m)	5m	Y
Broomhill St	Roadside	227263 675558	NO ₂	N	Y(48m)	1.5m	Y
Inverkip Rd, Greenock	Roadside	224441 675224	NO ₂ , Benzene	N	Y(15m)	4m	Y
Mercury Lane, Greenock	Roadside	223940 675018	NO ₂	N	Y(31m)	2.5m	Y
Newark St, Greenock	Urban Background	225460 677501	NO ₂	N	Y(1m)	5m	Y
Brougham St, Greenock	Roadside	227242 677032	NO ₂	N	Y(7m)	5.5m	Y
Scarlow St, Port Glasgow	Roadside	231992 674633	NO ₂	N	Y (28m)	2m	Y
Bridge of Weir Rd, Kilmacolm	Kerbside	235824 669909	NO ₂	N	Y(1m)	1m	Y
Kempock St, Gourrock	Kerbside	224097 677910	NO ₂	N	Y(1m)	1m	Y
Cardwell Road, Gourrock	Roadside	224664 677168	NO ₂	N	Y(3m)	4m	Y
Greenock Road, Wemyss Bay	Kerbside	219407 669162	NO ₂	N	Y(18m)	1m	Y

Table 2.3 New Monitoring Sites Introduced in January 2010

Site Name	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA ?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location ?
Brown Street, Port Glasgow (replaces Scarlow Street)	Kerbside	231699 674620	NO ₂	N	Y (1m)	1m	Y
Dunlop Street, Greenock (replaces Broomhill Street)	Roadside	226827 675622	NO ₂	N	Y (4m)	2m	Y
Larkfield Road, Greenock (replaces Mercury Lane)	Roadside	224869 675757	NO ₂	N	Y(3m)	2m	Y
Shore Road, Wemyss Bay (replaces Greenock Road)	Roadside	219407 668573	NO ₂	N	Y(1m)	2m	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

From August 2008 until October 2009 Nitrogen Dioxide was monitored using the Automatic Air Quality Monitor located in Kilblain Street, Greenock.

The monthly monitoring data from November 2008 until October 2009 has been included in tables 2.4a and 2.4b below

Table 2.4a

2008/2009	<u>NO₂ monthly mean (µg/m³)</u>	<u>No. of accidents of hourly mean (200 µg/m³)</u>
November	26.5	0
December	35	0
January	27.3	0
February	22.6	0
March	16.9	0
April	19.4	0
May	12.5	0
June	13.5	0
July	15.7	0
August	14.6	0
September	15.7	0
October	23.9	0
Annual Mean Concentration: 20.3 µg/m³		

Table 2.4b Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with Annual Mean Objective and Comparison with 1 hourly mean (200 µg/m³)

Location	Within AQMA?	Data Capture for full calendar year %	Annual mean concentrations (µg/m ³)	Number of Exceedances of hourly mean (200 µg/m ³)	
			2008/2009	2008	2009
Kilblain Street, Greenock	N	100%	20.3	0	0

The above results show that the NO₂ annual mean concentration from November 2008 to October 2009 is below the Air Quality Objective of 40 µg/m³.

There have been no exceedances of the hourly mean of 200 µg/m³ reported throughout the monitoring period of August 2008 to October 2009.

Diffusion Tube Monitoring Data

The 2009 monthly passive diffusion tube results for NO₂ are contained in Appendix C

The annual mean concentrations at each of the 16 monitoring sites are detailed in table 2.4a below. The data contained in this table has been adjusted for bias using the National Bias Adjustment factor of 1.23 obtained from the Review and Assessment website and also using the factor of 1.015 obtained from local co-location studies within Renfrewshire Council. Details of the adjustment factors can be found in Appendix A.

For purposes of comparison with each of the sites, Table 2.4b contains the annual mean concentration for each site for 2006, 2007 and 2008.

Table 2.5a Results of Nitrogen Dioxide Diffusion Tubes

<u>Location</u>	<u>Within AQMA?</u>	<u>Data Capture 2009 (%)</u>	Annual mean concentrations 2009 (µg/m³) Adjusted for bias 1.23	Annual mean concentrations 2009 (µg/m³) Adjusted for bias 1.015
Car wood Court, Greenock	N	100%	13.3	10.8
Scar low St, Port Glasgow	N	100%	21.4	17.7
100%, Kilmacolm	N	100%	23.2	19.1
East Hamilton St, Greenock	N	100%	41.3	34.1
Dellingburn St, Greenock	N	100%	38	31.4
Dalrymple St, Greenock	N	100%	31.6	26.1
Inverkip St, Greenock	N	91.7%	37.3	30.8
Broomhill St, Greenock	N	100%	19.2	15.8
Nelson St, Greenock	N	100%	27.1	22.4
Inverkip Road, Greenock	N	100%	28.4	23.4
Mercury Lane, Greenock	N	100%	26.1	21.5
Greenock Rd, Wemyss Bay	N	100%	18.7	15.4
Kempock St, Gourrock	N	100%	24.8	20.5
Cardwell Road, Gourrock	N	100%	37.2	30.7
Newark St, Greenock	N	91.7%	22.8	18.8
Brougham Street, Greenock	N	91.7%	33.2	27.4

Table 2.5b Results of Nitrogen Dioxide Diffusion Tubes for 2006-2009

Location	Within AQMA?	Annual mean concentrations (µg/m3) Adjusted for bias			<u>2009 (national factor applied)</u>	<u>2009 (local factor applied)</u>
		<u>2006</u>	<u>2007</u>	<u>2008</u>		
Car wood Court	N	13.58	9.74	10.6	13.3	10.8
Scar low St, Port Glasgow	N	20.3	15.5	13.1	21.4	17.4
Bridge of Weir Rd, Kilmacolm	N	19.7	16.9	16.1	23.2	18.9
East Hamilton St, Greenock	N	24.4	35.4	38.0	41.3	33.6
Dellingburn St, Greenock	N	41.4	35.4	36.9	38	31
Dalrymple St, Greenock	N	28.4	22.3	21.2	31.6	25.7
Inverkip St, Greenock	N	32.7	31.5	33.4	37.3	30.3
Broomhill St, Greenock	N	17.5	11.2	11.0	19.2	15.6
Nelson St, Greenock	N	26.3	25.2	27.5	27.1	22.1
Inverkip Road, Greenock	N	21	31.5	25.1	28.4	23.1
Mercury Lane, Greenock	N	21.8	17.9	18.2	26.1	21.3
Greenock Rd, Wemyss Bay	N	16.3	14.4	12.9	18.7	15.2
Kempock St, Gourock	N	25.3	21.4	18.4	24.8	20.2
Cardwell Road, Gourock	N	32.3	27.4	24.0	37.2	30.2
Newark St, Greenock	N	19.9	17.7	18.7	22.8	18.5
Brougham Street, Greenock	N	27.4	27.4	25.1	33.2	27.4

When applying the National Bias Adjustment Factor of 1.23 to the diffusion tube data, all of the 16 sites remain below the annual mean Objective of $40 \mu\text{g}/\text{m}^3$ with the exception of the site at East Hamilton Street which is reported as $41.3 \mu\text{g}/\text{m}^3$.

Over the following year further monitoring will be carried out at this site for NO_2 by introducing more diffusion tubes along this stretch of the A78, close to where the current NO_2 tube is positioned.

Depending on the results obtained at the new site in Dunlop Street, we will consider moving our Automatic Air Quality Monitoring Station to East Hamilton Street to carry out more detailed monitoring.

Other sites which are shown to be close to the annual mean Objective were identified as Cardwell Road, (Gourock), Inverkip Street (Greenock) and Dellingburn Street (Greenock). These will continue to be closely monitored and we will consider introducing new diffusion tube monitoring sites around these areas.

2.2.2 PM₁₀

PM₁₀ was monitored from August 2008 to October 2009 using the TEOM analyser within the Mobile Automatic Air Quality Station at Kilblain Street, Greenock

The data recorded between November 2008 and October 2009 is shown in table 2.6a and 2.6b below

Table 2.6a

2008/2009	PM ₁₀ monthly mean (µg/m ³)	No. of exceedances of 24 hour mean (50 µg/m ³)
November	18.2	0
December	20.5	0
January	12.5	0
February	10.3	0
March	13.5	0
April	16.4	0
May	10.2	0
June	12	0
July	10.9	0
August	8.9	0
September	10.9	0
October	11.4	0
Annual Mean Concentration: 13.0 µg/m ³		

Table 2.6b Results of PM₁₀ Automatic Monitoring: Comparison with Annual Mean Objective

Location	Within AQMA?	Data Capture 2008 %	Annual mean concentrations (µg/m ³)	Number of exceedances of 24 hour mean objective (50 µg/m ³)	
			2008/2009	2008	2009
Kilblain Street, Greenock	N	100	13.0	0	0

The results show that the annual mean Objective of $40 \mu\text{g}/\text{m}^3$ was not been exceeded and there were also no exceedances of the daily mean objective of $50 \mu\text{g}/\text{m}^3$ recorded during the monitoring period between August 2008 and October 2009. .

The existing PM_{10} analyser has now been moved to the new monitoring site at Dunlop Street, Greenock.

The Osiris Particulates Monitor has also been introduced into the monitoring regime to measure PM_{10} and $\text{PM}_{2.5}$, and PM_1 and is currently positioned at Dellingburn Street, Greenock.

All data from 2010 on will be assessed against the new PM_{10} annual mean objectives of $18 \mu\text{g}/\text{m}^3$.

2.2.3 Sulphur Dioxide

No monitoring for Sulphur Dioxide is undertaken in Inverclyde.

2.2.4 Benzene

The following benzene diffusion tube data has been provided by Glasgow Scientific Services.

Table 2.7a Results of Benzene Diffusion Tube Monitoring

Benzene ($\mu\text{g}/\text{m}^3$)													
	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual mean
Nelson Street	1.00	0.29	0.23	0.55	1.45	0.62	0.71	0.71	1.17	0.71	0.65	0.26	0.7
Dellingburn Street	1.46	1.12	1.10	xxx	2.4	1.49	0.87	0.81	xxx	0.9	0.62	1.13	1.22
Inverkip Road	0.97	0.62	0.55	1.02	1.33	0.45	0.42	0.26	0.98	0.23	0.23	0.78	0.65
East Hamilton Street	xxx	0.26	xxx	xxx	0.76	1.14	0.52	0.68	0.49	0.65	0.36	xxx	0.6

Table 2.7b Results of Benzene Diffusion Tube Monitoring 2006-2009

Location	Within AQMA?	Annual mean concentrations ($\mu\text{g}/\text{m}^3$)			
		<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>
Nelson Street, Greenock	N	1.17	0.98	0.79	0.70
Dellingburn Street, Greenock	N	1.50	1.56	1.51	1.22
Inverkip Road, Greenock	N	0.85	0.94	0.78	0.65
East Hamilton Street, Greenock	N	xxx	0.78	0.60	0.60

Based on the above data, the annual mean concentration for all sites is likely to continue to be below the annual mean Objective of $3.35 \mu\text{g}/\text{m}^3$.

2.2.5 Other pollutants monitored

Carbon monoxide was monitored from August 2008 to October 2009 at the Mobile Automatic Air Quality Station at Kilblain Street, Greenock.

The data from November 2008 to October 2009 is contained in table 2.8a and shows that the maximum daily running 8 hour mean concentration of 10mg/m^3 was not exceeded throughout the monitoring period.

Table 2.8a Results of Automatic Monitoring for Carbon Monoxide: Comparison with 8 hourly mean 10mg/m^3)

Location	Within AQMA?	Data Capture 2009 %	mean concentrations (mg/m^3)	Number of Exceedances of Max Daily Running 8 Hour Mean mean (10 mg/m^3)	
			2008/2009	2008	2009
Kilblain Street, Greenock	N	100	0.15	0	0

As the measured concentrations of carbon monoxide recorded have been very low we will not be monitoring carbon monoxide at our new monitoring station.

Summary of Compliance with AQS Objectives

Inverclyde Council has measured concentrations of NO₂ above the annual mean Objective at relevant locations and will carry out a Detailed Assessment for the site at East Hamilton Street, Greenock.

3 New Local Developments

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

4 Conclusions and Proposed Actions

4.1 Conclusions from New Monitoring Data

In summary the 2009 monitoring data from our Automatic Air Quality Monitor at Kilblain Street, Greenock recorded no exceedances of the National Objectives for NO₂, CO or PM₁₀.

Additionally the data obtained from the benzene diffusion tube monitoring sites recorded no exceedances of the annual mean Objective.

The NO₂ diffusion tube monitoring has identified one site along the A78 at East Hamilton Street to have exceeded the annual mean Objective for NO₂. Although historically this site has recorded concentrations below the annual mean Objective further monitoring requires to be undertaken in this area.

4.2 Conclusions relating to New Local Developments

Inverclyde Council has not identified any changes to the existing road infrastructure or changes to existing sources of transport in the area since the Update and Screening Assessment.

There have also been no new industrial installations or biomass combustion plants introduced or fugitive sources identified.

4.3 Conclusions relating to New Local Developments

The outcome of this round of Review and Assessment has identified the need for further monitoring to be undertaken at the East Hamilton Street monitoring site in Greenock. Our proposal is to introduce additional diffusion tubes around this area and consider relocating our new Automatic Air Quality Monitoring Station to this site.

In April 2010 the new monitoring station was positioned at Dunlop Street, Greenock to monitor NO₂ and PM₁₀. The Osiris PM₁₀ monitor is also located at Dellingburn Street and real time data from both these sites can now be readily accessed from our offices and is continuously monitored.

Changes were also made in January 2010 to our NO₂ diffusion tube monitoring network with four of our NO₂ diffusion tube monitor sites being relocated. The data from all of the above monitoring sites will be included as part of the next Report.

5 References

1. The Air Quality (Scotland) Regulations 2000
2. The Air Quality (Scotland) Amendment Regulations 2002
3. Part IV of the Environment Act 1995 Local Air Quality Management Technical Guidance LAQM.TG(09), DEFRA, February 2009
4. Inverclyde Council Update and Screening Assessment 2003
5. Inverclyde Council Update and Screening Assessment 2006
6. Inverclyde Council Progress Report 2007
7. Inverclyde Council Progress Report 2008
8. Inverclyde Council Update and Screening Assessment 2009
9. UK Air Quality Archive website www.airquality.co.uk/archive/laqm/tools.php
10. Air Quality Review and Assessment Helpdesk ww.uwe.ac.uk/aqm/review/

Appendices

Appendix A: QA/QC Data

Appendix B: Map of Air Quality Monitoring Sites in Inverclyde

Appendix C: Monthly NO₂ Diffusion Tube Monitoring Data for 2009

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

Glasgow Scientific Services supply and analyse both NO₂ and benzene diffusion tubes on a monthly basis. The preparation method used for NO₂ diffusion tubes is 20% TEA in Water.

The National Bias Adjustment factor for the NO₂ diffusion tube data was obtained from the Review and Assessment Helpdesk Database and reported as 1.23.

Inverclyde Council has not undertaken any co-location studies to produce a local bias adjustment factor however as the National Bias Adjustment factor appeared to be fairly high in comparison to other laboratories using the same method of analysis we have considered using the factor obtained from one of our neighbouring authorities, Renfrewshire Council.

Renfrewshire Council have undertaken two local co-location studies which has produced a bias adjustment factor of 1.015. The details of both Bias Adjustment Factors are contained in the tables below;

National Bias Adjustment Factor for NO₂ diffusion tubes 2009 (Laboratory Co-location)

Site Name	Study duration	Tube precision	Bias correction factor
East Dunbartonshire Council	12	P	1.21
East Dunbartonshire Council	12	G	1.14
East Dunbartonshire Council	11	P	1.41
AEA Technology	11	G	1.17
Overall factor from Glasgow Scientific Services co-location studies			1.23

Factor from Renfrewshire Local Co-location Studies

Site Name	Study duration	Tube precision	Bias correction factor
Glasgow Airport	12	G	1.12
Gordon Street	12	G	0.91
Overall factor from Renfrewshire Council			1.015

This report contains data where both of these Factors have been applied for comparison purposes and to assist with our decision making as to whether a Detailed Assessment was necessary for one of our monitoring sites.

PM Monitoring Adjustment

As per TG09 the Tapered Element Oscillating Microbalance (TEOM) fails the equivalence criteria for PM₁₀ monitoring and the data collected should be adjusted using the Volatile Correction Model (VCM).

The data provided in all reports prepared by Casella Monitor for the TEOM contained in the Mobile Air Quality Monitor Station have been adjusted using the VCM Portal and can therefore be compared to the Air Quality Objectives.

QA/QC of automatic monitoring

The Mobile Air Quality Monitor that was located in Kilblain Street, Greenock during 2009 was fitted with the following 3 analysers:-

Monitor labs – Nitrogen Oxides as Analyser (ML 984 1B)
Monitor labs – Carbon Monoxide Gas Analyser (ML 9830B)
Rupprecht and Patashnick Co. – TEOM – Series 14004A Ambient Particulate Monitor.

Readings from these analysers were collected on site by an Odessa Data Logger. The information held by the Odessa was then accessed by a modem link to a Personal Computer (PC) situated in our offices in Greenock. The data was collected and processed on the PC by “Envview Software”.

Both gas analysers were calibrated shortly after midnight each day. This was achieved by the use of calibration gases for both the measurement gas and the zero gas (i.e. air with no NO_x or CO present). All of the calibration gases used are to a certified content.

The Council did have a service level agreement with the Casella Monitor, the station's supplier and all the analysers including the TEOM were serviced on a 6 monthly basis.

Programmed routine maintenance was carried out for filter replacement on the gas analysers on a 4 weekly cycle.

The Station's output information e.g. monitor readings, calibrations etc were checked daily (working days only).

Sample filters for the TEOM were also replaced before it reached 90% completion. This information was collected by the analyser and displayed by the Envview Software. Any readings from the TEOM when the sample filter was over 90% complete was automatically recorded as invalid.

Any bogus readings which resulted from the servicing of the analysers were also marked invalid.

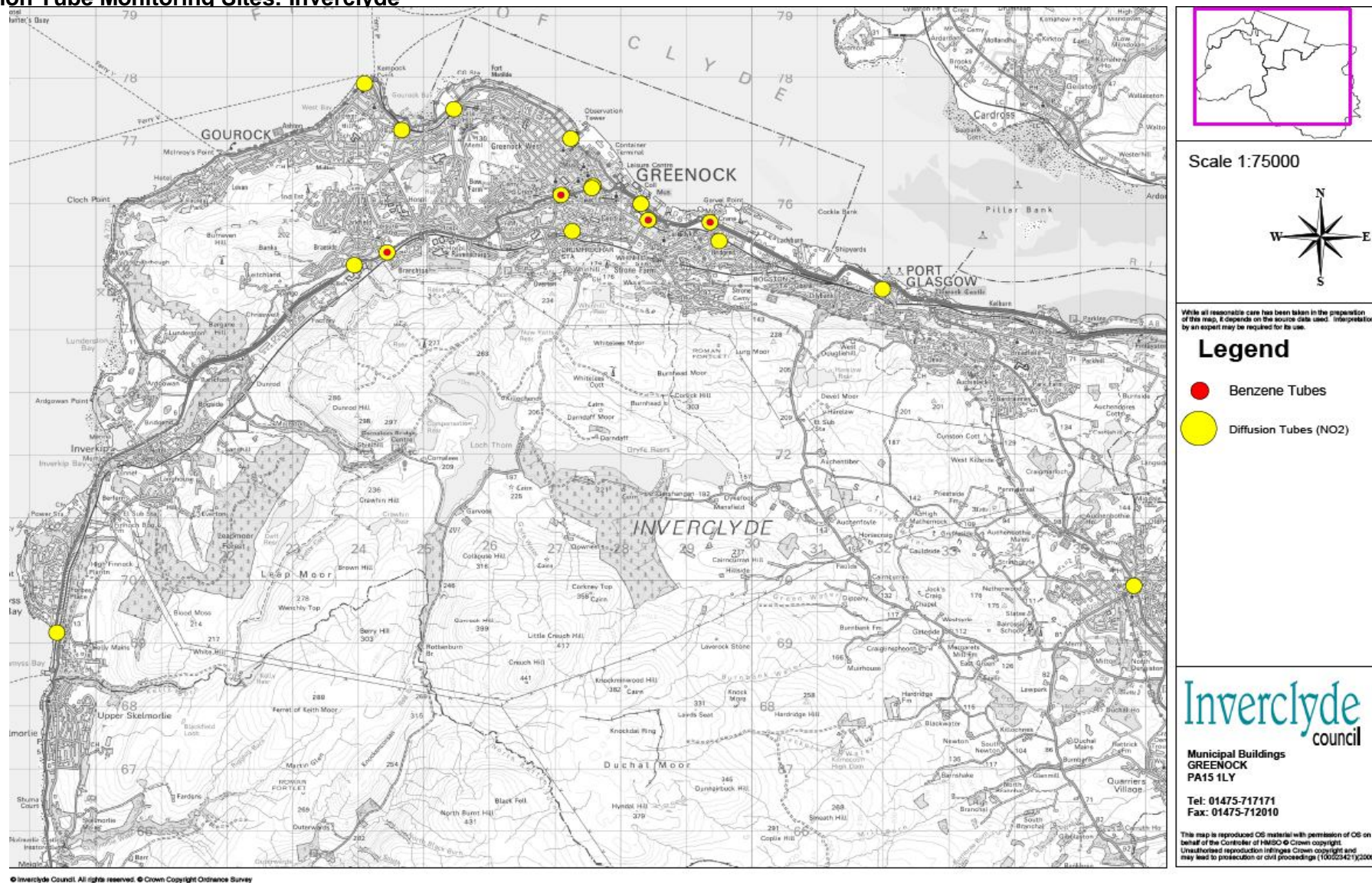
QA/QC of diffusion tube monitoring

Inverclyde Council's NO₂ diffusion tubes are supplied and analysed by Glasgow Scientific Services. This is a UKAS Accredited Laboratory and has adopted the procedures for preparation and analysis of the diffusion tubes contained in the document 'Diffusion Tubes for Ambient NO₂ Monitoring: Practical Guidance'

Glasgow Scientific Services also participate in the WASP scheme, managed by the Health and Safety Laboratory

Appendix B: Map of Air Quality Monitoring Sites, Inverclyde 2009

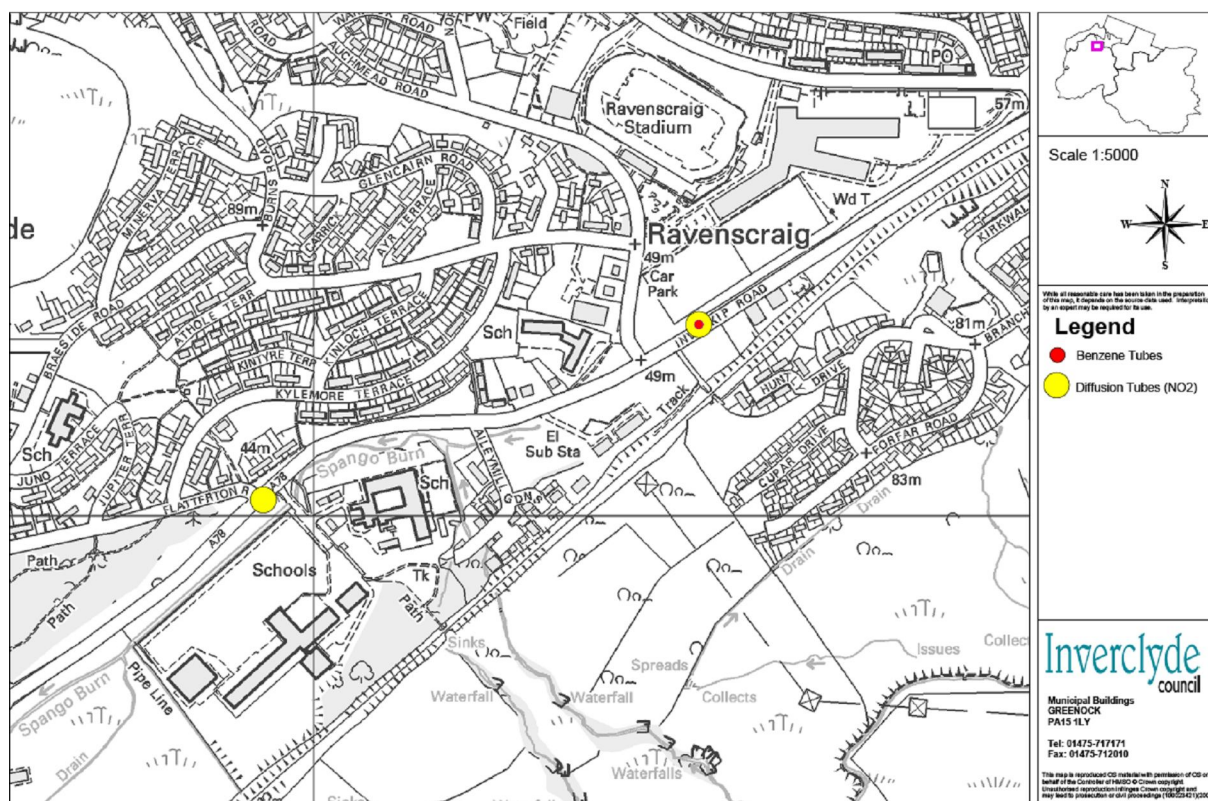
Diffusion Tube Monitoring Sites: Inverclyde



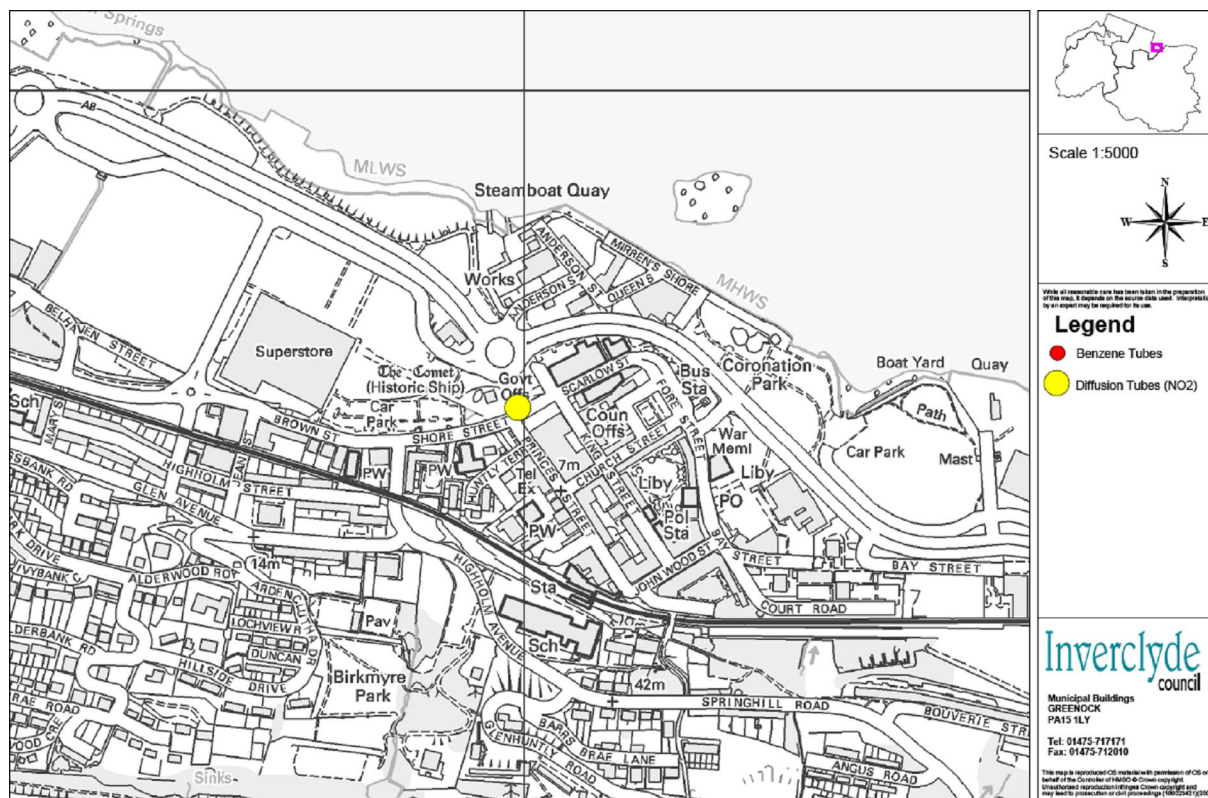
NO₂ and Benzene Diffusion Tubes: Greenock Central



NO₂ and Benzene Diffusion Tubes: Greenock South West Area



NO₂ and Benzene Diffusion Tubes: Port Glasgow



NO₂ and Benzene Diffusion Tubes: Kilmacolm



Kempock Point

Station

Health Centre

Ferry Terminal

Landing Stage

Depot

Cardwell Bay

Lyle Hill

Legend

- Benzene Tubes
- Diffusion Tubes (NO₂)

Scale 1:7000

Inverclyde council

Municipal Buildings
GREENOCK
 PA15 1LY
 Tel: 01475-747474
 Fax: 01475-712010

Wemyss Bay

Wemyss Bay Road

Wallace Road

Hotel

Kelly Mains

Car Park

Path

Sinks

Fingelt Burn

Issues

Scale 1:5000

Legend

- Benzene Tubes
- Diffusion Tubes (NO₂)

Inverclyde council

Municipal Buildings
GREENOCK
PA15 1LY

Tel: 01475-747474
Fax: 01475-712010

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Appendix C: 2009 Monthly NO₂ diffusion tube monitoring data (Using National Bias Adjustment Factor of 1.23)

	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Mean((µg/m ³))
Carwood Court	24.1	13.8	7.1	17.7	9.8	9.6	9.5	7.0	10.2	23.6	9.8	17.2	13.3
Scarlow Street	35.7	22.0	20.9	28.2	15.6	21.3	14.3	11.8	14.3	32.0	18.1	22.1	21.4
Kilmacolm	34.9	23.1	24.2	25.6	23.9	19.7	22.1	15.3	16.1	24.7	18.0	30.8	23.2
East Hamilton St	48.2	42.6	61.4	42.2	41.1	28.8	37.3	23.4	38.7	52.2	33.2	46.7	41.3
Dellingburn St	47.4	35.5	33.7	42.6	44.3	28.8	36.8	28.5	37.5	37.6	24.8	59.0	38.0
Dalrymple St	46.5	51.4	25.3	30.4	21.8	20.9	19.6	25.5	26.6	42.1	26.4	43.1	31.6
Inverkip St	xxxx	37.8	31.1	34.6	44.0	23.0	33.2	28.3	19.2	52.9	44.8	61.5	37.3
Broomhill St	30.5	17.8	16.0	21.4	17.0	13.5	11.6	11.9	15.1	26.9	24.0	24.6	19.2
Nelson St	39.0	25.2	26.1	24.6	28.0	20.7	20.4	15.1	23.4	33.3	27.8	41.8	27.1
A78	28.5	27.6	26.4	23.7	25.1	19.3	18.9	21.4	25.1	35.3	33.1	56.6	28.4
Mercury Lane	34.9	35.3	22.3	18.8	23.9	16.1	15.7	15.1	23.7	35.8	30.0	41.8	26.1
Wemyss Bay	27.2	18.1	15.4	21.0	18.6	16.7	16.9	12.5	14.4	24.1	19.7	19.7	18.7
Kempock St	36.2	27.1	23.2	25.3	26.2	14.1	18.0	10.0	17.6	36.2	31.9	32.0	24.8
Cardwell Rd	47.2	41.3	31.0	43.3	38.9	24.2	31.2	33.1	29.6	45.0	42.2	39.4	37.2
Newark St	xxxx	25.8	19.1	23.9	22.5	14.1	13.9	14.5	16.9	33.8	29.4	36.9	22.8

