



Inverclyde council

2011 Air Quality Progress Report for Inverclyde Council

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

June 2011



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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 and 2010 data has reported that one site, namely East Hamilton Street, Greenock has exceeded the annual mean Objective for NO₂. Another monitoring site in Greenock, Inverkip Street was also identified as exceeding the annual mean Objective for NO₂. Monitoring proposals for 2011 are contained in this report.

Inverclyde Council has also developed a Carbon Management Plan with reduction targets and initiatives in relation to climate change. The Local Transport Strategy 2011 has also been recently produced which contained a range of policies and actions to improve air quality in Inverclyde. The various targets, initiatives and policies are contained in this report.

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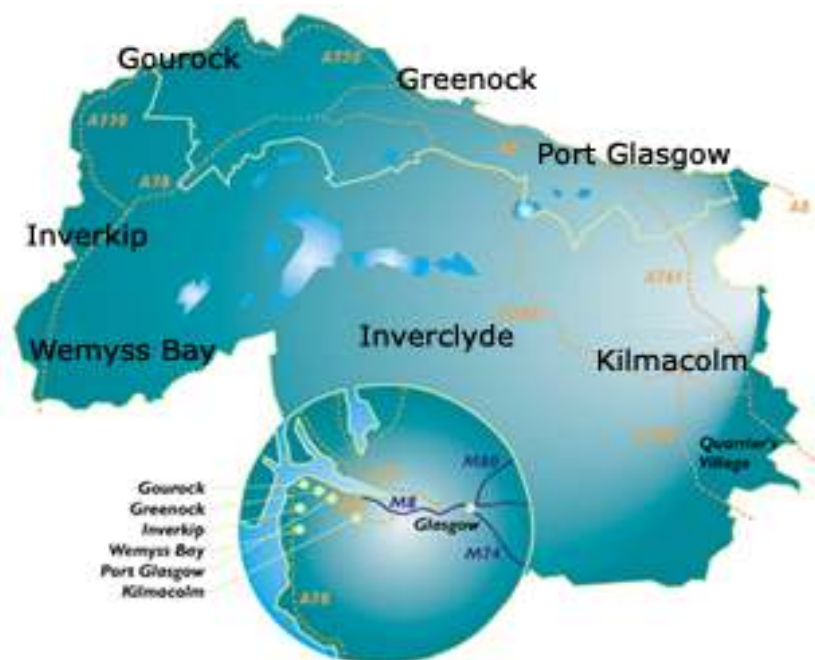
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1 Introduction

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 exceedences in each year that are permitted (where applicable).

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

Pollutant	Concentration	Measured as	Date to be achieved by
Benzene	16.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	3.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 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.

The 2010 Progress Report identified that the annual mean objective for NO₂ had been exceeded at one site along the A8, namely East Hamilton Street, Greenock. Additional monitoring was proposed for this site throughout 2010. All other monitoring sites were found to have met the National Objectives for all measured 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.
Progress Report: July 2010	Concluded that air quality objectives would be met with the exception of one site which required additional monitoring.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Until November 2009, Inverclyde Council shared a Mobile Air Quality Monitoring Station with North Ayrshire Council. This was positioned at Dellingburn Street, Greenock originally and then re-located to Kilblain Street, Greenock.

Monitoring data from these sites concluded that the National Objectives for NO₂, PM₁₀ and CO were being met and it was therefore decided that a new site would be chosen.

In April 2010 the monitoring station was placed at Dunlop Street, Greenock as shown in Figure 2.1 below. It is close to residential properties and positioned along one of the busiest roads in Greenock before it connects to the A78. Details are contained in Table 2.1 below.

Figure 2.1 Map of Automatic Air Quality Monitoring Site



- Air Quality Monitor/ NO₂ diffusion tube
- NO₂ diffusion tube

Table 2.1 Details of Automatic Monitoring Site

Site Name	Site Type	OS Grid Ref	Pollutants Monitored	Monitoring Technique	In AQMA ?	Relevant Exposure ? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Does this location represent worst-case exposure ?
Dunlop Street, Greenock	Roadside	226 163 675 537	NO ₂ , PM ₁₀	TEOM (PM ₁₀)	N	Y(20m)	4m	Y

The maintenance and calibration of the monitoring equipment is carried out by Air Monitors as part of the Service Level Agreement. Site Audits are also carried out by AEA.

The equipment can also be calibrated and data accessed remotely. At present NO₂ and PM₁₀ is measured and data is available from April 2010. This has been fully ratified by AEA and is contained in Section 2.2.

Details of the PM₁₀ TEOM data correction and QA/QC procedures are contained in Appendix A.

Inverclyde Council also own an Osiris Particulate Monitor which was positioned at Dellingburn Street, Greenock. The monitor is no longer operational and due to maintenance, calibration and data analysis issues the data provided is regarded as inaccurate and not included in the report.

2.1.2 Non-Automatic Monitoring Sites

Inverclyde Council currently monitors NO₂ and benzene throughout the area. There have been no changes to the 4 benzene monitoring sites in 2010. The following changes have however been made to the NO₂ monitoring network;

<u>Existing Site(if applicable)</u>	<u>Changes</u>	<u>New site (if applicable)</u>
East Hamilton Street	September 2010: One additional NO ₂ diffusion tube placed at existing site. Additional diffusion tube also placed at façade of nearest residential property.	In addition to existing: East Hamilton Street (2) and East Hamilton Street (property)
Scarlow Street, Port Glasgow	January 2010: NO ₂ diffusion tube relocated on same stretch of road to be closer to residential properties. Historical data showed Scarlow Street to have a maximum NO ₂ annual concentration of 20ug/m ³	Brown Street, Port Glasgow
Broomhill Street, Greenock	January 2010: NO ₂ diffusion tube relocated to Dunlop Street which is on a busier road, closer to residential properties and opposite a new build high school. The maximum annual NO ₂ concentration reported at the previous site was 19ug/ m ³ .	Dunlop Street, Greenock
N/A	September 2010: One NO ₂ diffusion tube has been positioned at the Automatic Air Quality Station in Dunlop Street, Greenock.	Dunlop Street (Air quality Station), Greenock
Mercury Lane, Greenock	January 2010: The NO ₂ diffusion tube has been relocated to Larkfield Road which is a busier road, closer to residential properties and opposite Inverclyde Royal Hospital. Mercury Lane previously had a maximum annual NO ₂ concentration of 26 ug/ m ³	Larkfield Road, Greenock
Greenock Road, Wemyss Bay	January 2010: The NO ₂ diffusion tube has been relocated to Main Street, Wemyss Bay where it is closer to the main road, closer to housing and opposite the ferry terminal. The maximum annual NO ₂ concentration reported for the previous site was 19ug/ m ³	Main Street, Wemyss Bay
N/A	Additional site introduced approx 80m from East Hamilton monitoring site due to exceedances at this site and to assist with co-location study for forthcoming year.	MacDougall Street, Greenock

A summary of the 2010 monitoring sites is shown in the Table 2.2 and a map showing the location of each site is contained in Appendix C.

Table 2.2 Details of Non- Automatic Monitoring Sites 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 ?
Carwood Court, Greenock	Urban Background	229503 675400	NO ₂	N	Y(13.5m)	5m	Y
Brown Street, Port Glasgow	Kerbside	231699 674620	NO ₂	N	Y (1m)	1m	Y
Bridge of Weir Rd, Kilmacolm	Kerbside	235824 669909	NO ₂	N	Y(1m)	1m	Y
East Hamilton St Greenock	Roadside	229365 675700	NO ₂ , Benzene	N	Y(12m)	2.25m	Y
East Hamilton St (2), Greenock	Roadside	229365 675700	NO ₂ , Benzene	N	Y(10m)	2.25m	Y
East Hamilton St (property), Greenock	Roadside	229301 675712	NO ₂	N	Y (at building façade)	14.25m	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
Dunlop St, Greenock	Roadside	226827 675622	NO ₂	N	Y (4m)	2m	Y
Dunlop St (air station)	Roadside	226163 675537	NO ₂		Y(20m)	4m	Y
Nelson St, Greenock	Roadside	227092 676134	NO ₂ , Benzene	N	Y(1m)	5m	Y
Inverkip Rd Greenock	Roadside	224441 675224	NO ₂ , Benzene	N	Y(15m)	4m	Y

Table 2.2 Cont'd

Larkfield Rd Greenock	Roadside	224869 675757	NO ₂	N	Y(3m)	2m	Y
Main St Wemyss Bay	Roadside	219407 668573	NO ₂	N	Y(1m)	2m	Y
Kempock St, Gourock	Kerbside	224097 677910	NO ₂	N	Y(1m)	1m	Y
Cardwell Rd Gourock	Roadside	224664 677168	NO ₂	N	Y(3m)	4m	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
MacDougall St, Greenock	Roadside	229605 675593	NO ₂	N	Y(13m)	3m	Y

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.

The 2009 data reported that the annual mean for NO₂ was exceeded at East Hamilton Street. This is a roadside site along the A8 with the nearest human receptor being approximately 14.25 m away from the kerb of the road.

For this reason we decided to place an NO₂ diffusion tube at the façade of the building and introduce another two diffusion tubes at and nearby the existing monitoring site in September 2010. These are shown again in figure 2.2 below and details contained in the table below. Data from all sites will be included in the next round of Review and Assessment.

Figure 2.2 Map of East Hamilton Street



- NO₂ diffusion tube at façade of nearest property (East Hamilton Street)
- 2 x NO₂ diffusion tubes, 1 x Benzene tube (East Hamilton Street)
- 1 x NO₂ diffusion tube (MacDougall Street)

Summary of East Hamilton Monitoring Sites

Site Name	Site Type	OS Grid Ref	Distance to relevant exposure(m)	Distance to kerb of nearest road (m)
East Hamilton Street 2 x NO ₂ tubes	Roadside	229365 675700	12m	2.25m
East Hamilton Street (property) 1 x NO ₂	Roadside	229301 675712	0m	14.25m
MacDougall Street 1 x NO ₂ tube	Roadside	229605 675593	13m	3m

In September 2010 an additional NO₂ diffusion tube was also placed at the automatic air quality monitor at Dunlop Street, Greenock. This was to allow for comparison with the automatic monitoring data. Along the same stretch of road, an existing NO₂ diffusion tube is located, please see figure 2.3 below. This data will be included in the next round of Review and Assessment

Figure 2.3 Map of Dunlop Street



- Air Quality Monitor and 1x NO₂ diffusion tube
- NO₂ diffusion tube

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

NO₂ is currently measured at our automatic air quality monitoring station at Dunlop Street, Greenock. Data is available since April 2010 when the station was moved to this site from Kilblain Street, Greenock

In order to allow for comparison with the annual mean the data below is from 01 May 2010 until 30 April 2011. The data was provided by AEA and is provisional from 01 January 2011 and may be subject to further quality control.

Table 2.3a Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with Annual Mean Objective and 1-hour Mean Objective

Location	Within AQMA?	Relevant public exposure? Y/N	Data Capture for year 2010/11 %	Annual mean concentration (µg/m ³)	Number of Exceedances of hourly mean (200 µg/m ³)
				May 2010-April 2011	May 2010-April 2011
Dunlop Street, Greenock	N	Y	91.6	21µg/m ³	0

The data shows that the National Objectives are likely to be met for both the annual mean and the hourly mean for NO₂.

Diffusion Tube Monitoring Data

The full monthly dataset for NO₂ monitoring is contained in Appendix C.

The 2010 data capture for each of the sites is provided in table 2.4 below along with the annual mean concentrations recorded at each site between 2008 and 2010.

Table 2.4 Results of Nitrogen Dioxide Diffusion Tubes

Location	Within AQMA?	Relevant public exposure ?	2010 Data Capture (%)	<u>Annual mean concentration (Adjusted for bias (ug/m3)</u>		
				2008	2009	2010
Car wood Court	N	Y	91.7 %	10.6	13.3	16.4
Brown Street, Port Glasgow	N	Y	91.7 %	N/A	N/A	23.5
Bridge of Weir Rd, Kilmacolm	N	Y	91.7 %	16.1	23.2	22
East Hamilton St, Greenock	N	Y	91.7 %	38.0	41.3	41
Dellingburn St, Greenock	N	Y	91.7 %	36.9	38	37.6
Dalrymple St, Greenock	N	Y	91.7 %	21.2	31.6	36.7
Inverkip St, Greenock	N	Y	91.7 %	33.4	37.3	44.4
Dunlop St, Greenock	N	Y	91.7 %	N/A	N/A	27.1
Nelson St, Greenock	N	Y	91.7 %	27.5	27.1	34.9
Inverkip Road, Greenock	N	Y	91.7 %	25.1	28.4	24.9
Larkfield Rd, Greenock	N	Y	91.7 %	N/A	N/A	22.8
Main St, Wemyss Bay	N	Y	91.7 %	N/A	N/A	17.8
Kempock St, Gourrock	N	Y	91.7 %	18.4	24.8	27.71
Cardwell Road, Gourrock	N	Y	91.7 %	24.0	37.2	33
Newark St, Greenock	N	Y	91.7 %	18.7	22.8	20.6
Brougham Street, Greenock	N	Y	75%	25.1	33.2	27.2

The 2010 data contained in the table above has been adjusted for bias using the factor of 1.1 as reported by the Review and Assessment website. Details are contained in Appendix A.

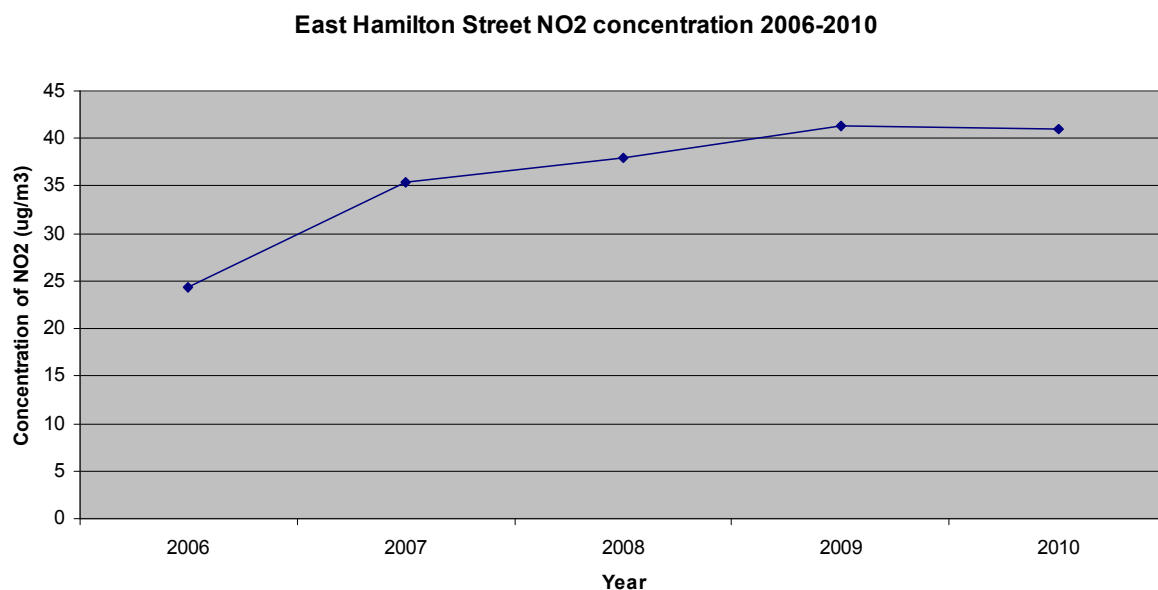
The data capture for 15 of the sites is 91.7% which is due to the dataset for January 2010 being reported by Glasgow Scientific Services as non-accredited due to an AQC failure associated with the samples. This data has therefore been excluded when calculating the annual mean.

The site at Brougham Street has a data capture of 75% as the diffusion tube was missing and damaged during the months of July and October. This combined with the non accredited report in January has lowered the data capture.

In summary the 2010 data has identified two sites which have exceeded the annual mean Objective of 40ug/m³. These are highlighted in the table in red.

The first site, East Hamilton Street, Greenock also exceeded the annual mean Objective in 2009, Figure 2.4 below shows that there has been a steady increase in the NO₂ concentration at this site in the period 2006-2009. This then remained at a similar level between 2009 and 2010.

Figure 2.4 Annual mean NO₂ East Hamilton Street



Additional NO₂ diffusion tubes have been placed at the site and at the façade of the nearest residential property. We are also proposing to move our automatic air quality monitor to this site to carry out more detailed monitoring and to assist with co-location studies to produce our local bias adjustment factor.

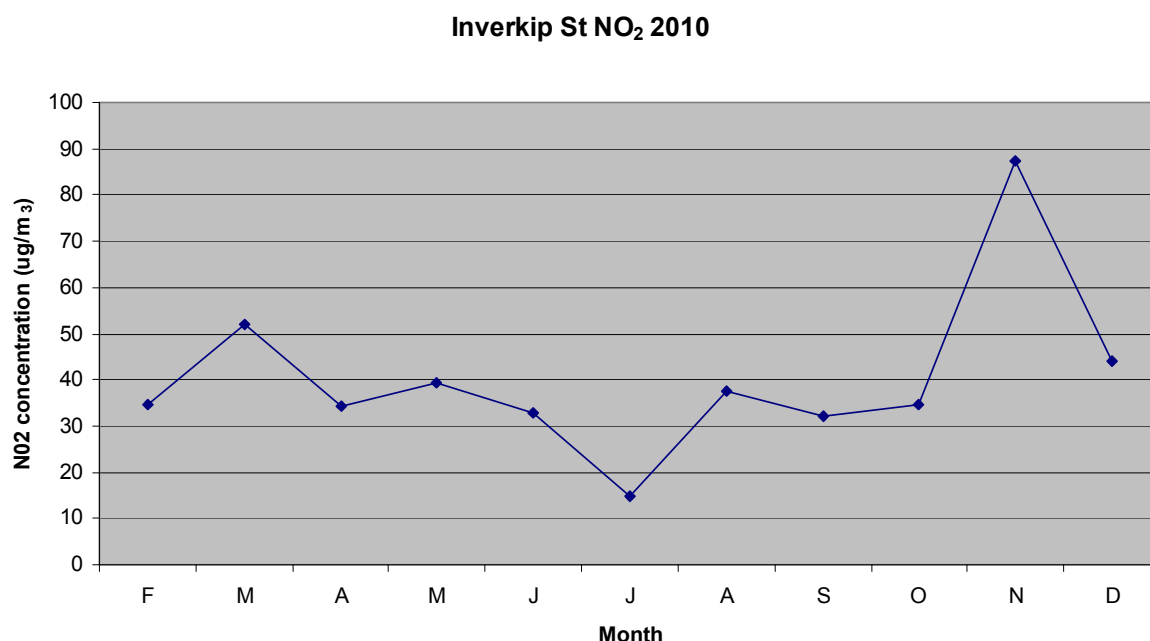
Inverkip Street, Greenock is the second site that exceeded the NO₂ annual mean Objective. The monthly NO₂ diffusion tube data is presented in Figure 2.5 below. The data contained in the chart is from February 2010 due to Glasgow Scientific Services reporting the January data as being non-accredited.

Throughout the year construction works were being carried out at the main bus station in Greenock which subsequently led to an increase in the number of buses using the bus stop beside where the diffusion tube is sited. This may be a contributing factor to the increase in NO₂ concentration at this site.

As shown in Figure 2.5 the monthly mean concentration for this site was reported as **87.5ug/m³** in November 2010. When calculating the annual mean NO₂ concentration at this site, the inclusion of this value which is inconsistent in relation to the majority of the other data reported, results in the exceedence of the annual mean Objective.

This site will be closely monitored throughout 2011 before considering whether a formal Detailed Assessment is necessary for this site.

Figure 2.5 Monthly NO₂ concentration at Inverkip Street, February- December 2010



All other sites were below the NO₂ annual mean Objective. There are two sites that were reported as being close to the National Objective. These are Dellingburn Street and Dalrymple Street, both in Greenock. These sites will be closely monitored and additional monitoring in these areas considered.

2.2.2 PM₁₀

PM₁₀ is currently measured at our automatic air quality monitoring station at Dunlop Street, Greenock. Data is available since April 2010 when the station was relocated to this site from Kilblain Street, Greenock

In order to allow for comparison with the annual mean the data below is from 01 May 2010 until 30 April 2011. The data was provided by AEA and is provisional from 01/01/2011 and may be subject to further quality control.

Table 2.5a Results of PM₁₀ Automatic Monitoring: Comparison with Annual Mean Objective and Daily Mean Objective

Location	Within AQMA?	Data Capture for year 2010/11 %	Annual mean concentrations (µg/m ³)	Number of Exceedances of daily mean objective (50 µg/m ³)
			May 2010-April 2011	May 2010-April 2011
Dunlop Street, Greenock	N	95%	17µg/m ³	2

The results show that the daily mean objective has not been exceeded more than 7 times and the annual mean Objective of 18ugm³ is likely to be achieved.

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;

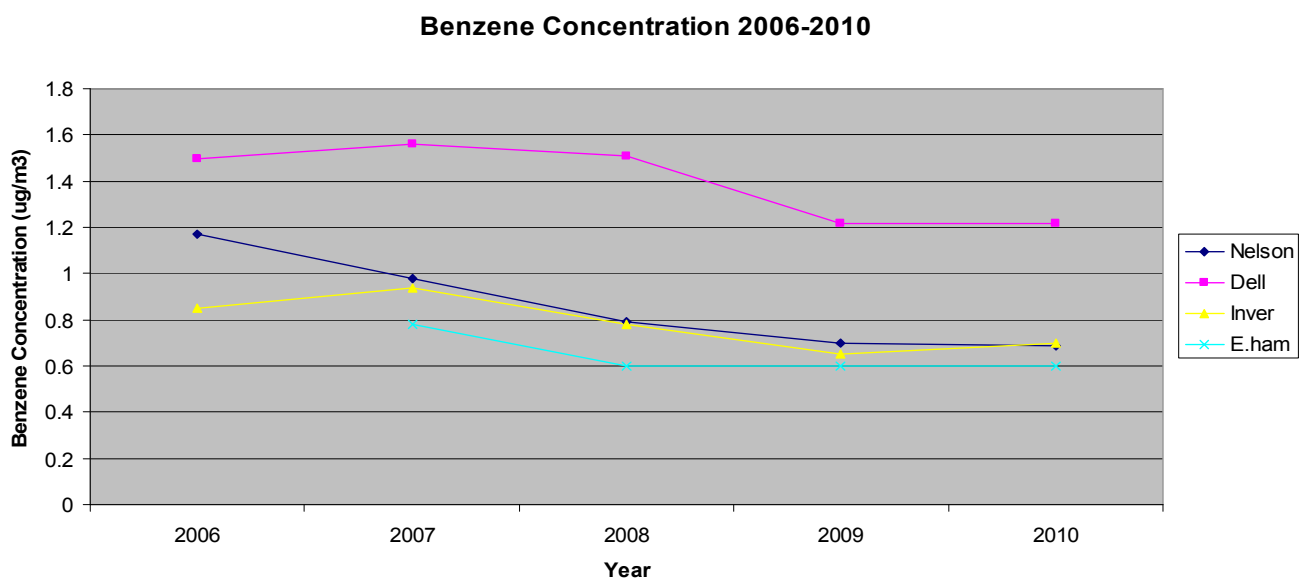
Table 2.6 Results of Benzene Diffusion Tube Monitoring

Benzene ($\mu\text{g}/\text{m}^3$): 2010 Data													
	J	F	M	A	M	J	J	A	S	O	N	D	Ann. mean
Nelson Street, Greenock	1.56	1.20	0.52	0.62	0.29	0.16	0.39	0.39	0.29	0.85	1.27	0.72	0.69
Dellingburn Street, Greenock	1.66	1.20	1.07	1.10	0.81	0.55	0.68	1.3	1.17	1.59	1.52	2.01	1.22
Inverkip Road, Greenock	1.43	1.20	0.55	0.42	0.36	0.16	0.19	0.46	0.39	0.75	0.91	1.53	0.7
East Hamilton Street, Greenock	0.94	0.88	0.55	0.42	0.42	0.16	0.55	0.16	0.36	0.65	0.88	1.20	0.6

The above table shows that the running annual mean Objective of $3.35\mu\text{g}/\text{m}^3$ has been achieved at all four monitoring sites.

Figure 2.6 displays the annual mean concentrations for the above sites from 2006/07 to 2010. This has shown an overall decline for all sites between 2007 and 2009. Between 2009 and 2010 this remained at a similar level. In conclusion the National Objective is likely to continue to be achieved at all 4 sites.

Figure 2.6



2.2.5 Other pollutants monitored

Carbon Monoxide was monitored in the previous continuous air monitor at Kilblain Street, Greenock. The measured concentrations were however consistently below the maximum daily running 8hour meaning Objective of 10mg/m^3 . During the monitoring period 2008/2009 this was reported as 0.13 mg/m^3 , we therefore decided to stop monitoring this pollutant when we purchased out new air monitoring equipment in 2010.

2.2.6 Summary of Compliance with AQS Objectives

Inverclyde Council has measured concentrations of NO₂ above the annual mean objective at two sites and will be carrying out additional, detailed monitoring at the identified locations.

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.

Inverclyde Council confirms that all the following have been considered –

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

4 Air Quality Planning Policies

In May 2011 Inverclyde Council published a Main Issues Report which is a consultative document intended to generate discussion on the areas where our new Local Development Plan is likely to differ from the previously adopted 2005 Local Plan.

The Local Development Plan- 'Proposed Plan' will be published in 2012 and will set out where and how future development in Inverclyde will take place for the next 10-20 years and will be the main policy document when determining planning applications.

The Main Issues Report 2011 contains a section on the Environment with the overall aim to protect and enhance the natural and built environment. Accompanying the report is a Strategic Environmental Assessment Interim Environmental Report. Both are open for consultation until 22 July 2011 with representations being made to ensure that the impact on Air Quality in Inverclyde is a key issue to be Included as part of the Local Development Plan.

5 Local Transport Plans and Strategies

Inverclyde Council Local Transport Strategy 2011-2016 was approved by Committee in May 2011 and sets out the Council's vision for improving the transport system within Inverclyde.

It has identified transportation as being a major source of air pollution and has listed particular areas within Inverclyde to be monitored as even minor accidents, breakdowns or roadwork's can cause major congestion in these areas thus creating local air quality problems at peak times.

The following has been taken from the Local Transport Strategy and sets the strategy for improving air quality through a range of policies and actions;

POLICIES	
Penviro1	The Council will support measures designed to encourage alternative transport solutions which reduce pollution (e.g. travel plans, public transport, walking and cycling).
Penviro2	The Council will encourage the use of lower emission vehicles, in compliance with national and regional objectives.
Penviro3	The Council will provide measures designed to improve traffic flow and to reduce congestion on the roads.
Penviro4	Monitor key pollutants, e.g. nitrogen dioxide, particulate matter & carbon monoxide, to ensure they remain below national standards.

ACTIONS	Action Plan Reference
Aenviro1	Support environmental choices when renewing the Council fleet
Aenviro2	Maintain good air quality in Inverclyde via monitoring and enforcement measures
Aenviro3	Produce an Action Plan to identify and monitor areas that have poor air quality to help improve air quality.
Aenviro4	Lead by example workstream based on Inverclyde's own operations: Greening vehicle fleet. Reduce carbon emissions through better transport management Carbon Management Plan.
Aenviro5	Carbon Footprinting : assessment of CO ₂ impact of transport schemes and of new development through the Development Control function.
Aenviro6	Preparation of Emission Control Plan.
Aenviro7	Smarter Choices Promotion: Hard copy, web-based and media promotion of Green Travel Modes.
Aenviro8	Prepare a Development Planning Guidance Toolkit on Smarter Choices and Green Travel Planning to accompany Development Plan.

DESIRABLE ACTIONS	
DAenviro1	Raise awareness of air pollution and initiatives like the annual "In Town without My Car" to favour 'Smarter Choices'.
DAenviro2	Encourage and develop work place travel plans and staff travel plans for all major employers in Inverclyde as well as for the councils' own staff, Inverclyde College, Royal Hospital, schools, etc.
DAenviro3	Initiate ongoing roadside testing of emissions to assess and monitor air pollution.
DAenviro4	Seek a bus quality partnership to introduce higher emission standards for buses to support SPT objectives.

Cont'd over

DAenviro5	Encourage bus operators to improve interchange and time table to speed up bus boarding times and therefore reduce congestion.
DAenviro6	Improve streetscape and urban design to encourage people to walk and cycle to work.
DAenviro7	Prioritise people over cars by redesigning main streets, reducing signage and railings as well as widening pavement and crossing areas.
DAenviro8	Establish a PM ₁₀ continuous monitoring station in Dellingburn Street, Greenock.
DAenviro9	Review the assessment of all the mobile phone masts located within Inverclyde.
DAenviro10	Continue the development of an effective Safer Communities Enforcement Policy.

6 Climate Change Strategies

In 2007 Inverclyde Council became a signatory of Scotland's Climate Change Declaration and established a Climate Change Strategy and Action Plan. It was also accepted onto the Carbon Trust's Local Authority Carbon Management Programme and drafted a Carbon Management Plan which set targets to reduce CO₂ emissions by 15% by 2012/13.

Since the original Plan in 2010, Inverclyde Council was selected to take part in the Carbon Trust's Revisited Carbon Management Programme, which covers the period 2011-16. This involves the establishment of a new Plan with a target to reduce the Council's CO₂ emissions by 16.5% by 2015/16 from a 2009/10 baseline.

The new Plan is due to be approved in autumn 2011 and will incorporate reducing emissions from buildings, street lighting, transport, waste and water.

Examples of some of the initiatives to help meet the targets of the Revisited Carbon Management Plan include rationalising the Council's building portfolio and improving the energy efficiency of buildings, introducing electric vehicles to the vehicle fleet and promoting efficient driving. The use of public transport for both business travel and staff commute will also be promoted.

7 Conclusions and Proposed Actions

7.1 Conclusions from New Monitoring Data

The 2010 monitoring data has shown that all four sites where benzene is monitored were below the annual mean objective. Within the NO₂ monitoring network, two out of sixteen monitoring sites exceeded the annual mean Objective.

For a second consecutive year one of the sites, East Hamilton Street, Greenock has been above the annual mean objective for NO₂ and has been subject to further monitoring since September 2010. As the data has been reported from a roadside site, further monitoring is being undertaken at the façade of the nearest residential property before considering whether a formal Detailed Assessment is necessary.

Inverkip Street was the second site that exceeded the annual mean Objective for NO₂. This may be due in part to the refurbishment of the nearby bus terminal which resulted in possible pollution sources from construction vehicles and also from the increased use of the bus stop near the monitoring site as the bus terminal was unable to be used during this refurbishment. In November 2010 there also appeared to be a possible rogue result of 87.3 ug/m³, which in turn resulted in an increase in the annual mean concentration at this site. We will however continue to closely monitor this site throughout the year.

From April 2010 onwards the automatic air quality station was positioned at Dunlop Street, Greenock. A summary report was provided by AEA which reported that PM₁₀ and NO₂ levels are likely to be met at this site. It is therefore proposed that the monitoring station be placed at East Hamilton Street where more detailed monitoring is required.

7.2 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 last round of Review and Assessment.

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

7.3 Proposed Actions

Inverclyde Council will continue to monitor NO₂ and benzene levels throughout the area using diffusion tubes. There are no plans at present to change the diffusion tube network however additional monitoring may require to be undertaken at one new site, Inverkip Street, depending on the data reported in 2011.

It is proposed that the automatic air quality monitor will be moved to East Hamilton Street where NO₂ and PM₁₀ will be monitored. The data from this combined with the additional NO₂ diffusion tubes in place will assist with developing our own local bias adjustment factor which we hope to use in the next round of Review and Assessment.

8 References

- 1 The Environment Act 1995
- 2 The Air Quality (Scotland) Regulations 2000
- 3 The Air Quality (Scotland) Amendment Regulations 2002
- 4 Part IV of the Environment Act 1995 Local Air Quality Management Technical Guidance LAQM.TG(09), DEFRA, February 2009
- 5 Inverclyde Council Update and Screening Assessment 2003
- 6 Inverclyde Council Update and Screening Assessment 2006
- 7 Inverclyde Council Progress Report 2007
- 8 Inverclyde Council Progress Report 2008
- 9 Inverclyde Council Update and Screening Assessment 2009
- 10 Inverclyde Council Progress Report 2010
- 11 Inverclyde Council Local Plan 2005
- 12 Inverclyde Council Local Plan: Monitoring and Update 2009
- 13 Inverclyde Council Local Development Plan: Main Issues Report May 2011
- 14 Inverclyde Council Main Issues Report: Strategic Environmental Assessment, Interim Environmental Report May 2011
- 15 Inverclyde Council Local Transport Strategy 2011-2016
- 16 DEFRA LAQM Support website <http://laqm.defra.gov.uk/>
- 17 Volatile Correction Web Portal <http://www.volatile-correction-model.info/>
- 18 WASP Annual Performance Criteria for NO₂ Diffusion Tubes used in Local Air Quality Management, 2008 onwards, AEA on behalf of DEFRA and the Devolved Administrations

Appendices

Appendix A: QA/QC Data

Appendix B: Maps of Diffusion Tube Monitoring Network in Inverclyde

Appendix C: Monthly NO₂ diffusion tube data 2010

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

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

The bias adjustment factor used for the NO₂ diffusion tube data was obtained from the Review and Assessment Helpdesk Database and is reported as 1.1

PM Monitoring Adjustment

The PM₁₀ data contained in this report has been provided by AEA. The data provided is the VCM corrected data from the TEOM contained in the air quality monitoring station at Dunlop Street, Greenock. Data from 01 January 2011 that is contained in this report was corrected using the VCM web portal.

QA/QC of automatic monitoring

The automatic monitoring station at Dunlop Street, Greenock contains one NO_x/NO₂ analyser and one TEOM Ambient Particulate Monitor.

Data from these analysers can be remotely accessed and uploaded. Air Monitors carry out regular monitoring of the operation of the analysers and the equipment is calibrated on a regular basis. Calibrations can also be carried out remotely.

Air Monitors carry out maintenance of the equipment including the regular replacement of the TEOM sample filters. Site audits are carried out by AEA on a regular basis as the data from this site is reported through the Scottish Air Quality website.

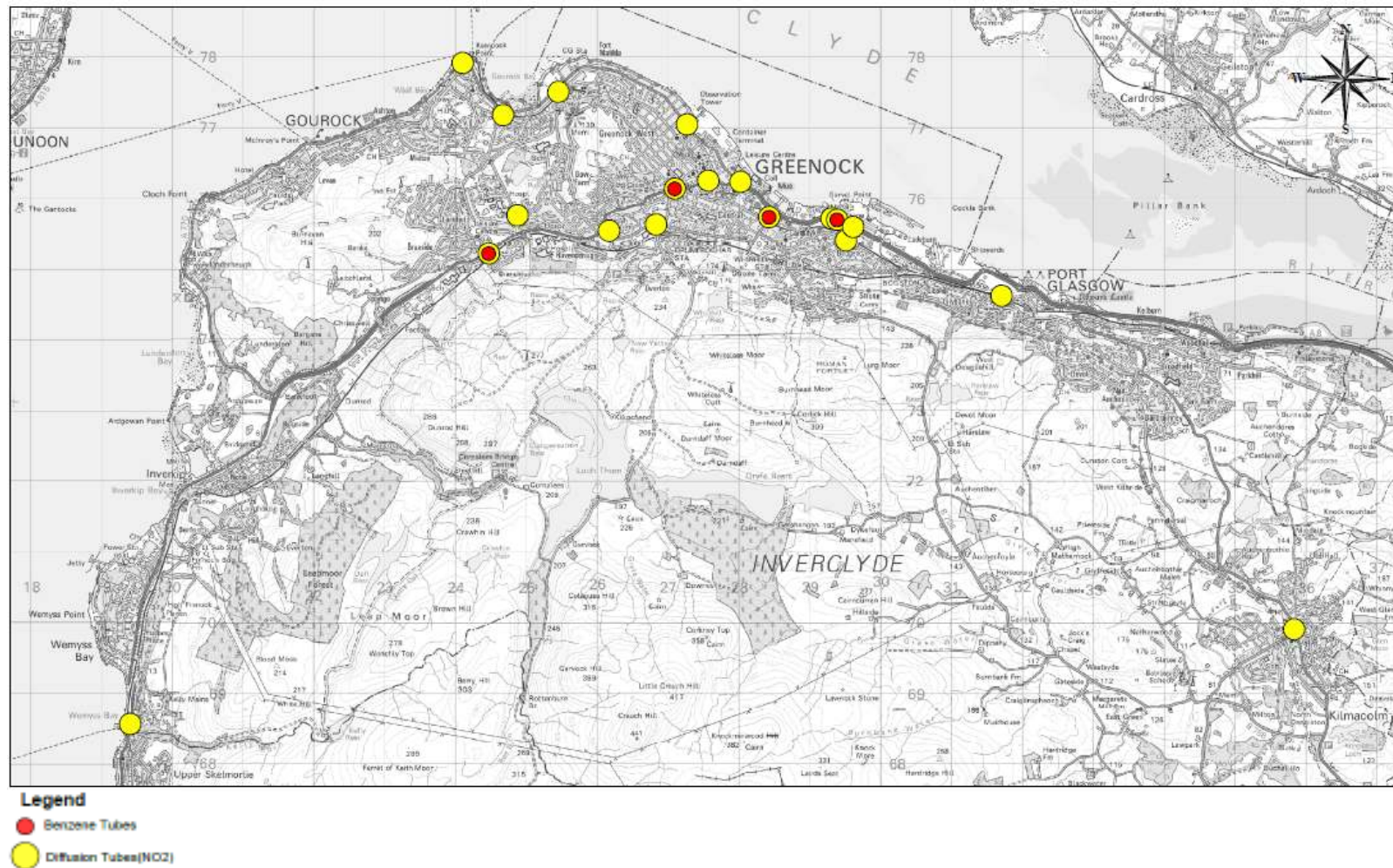
QA/QC of diffusion tube monitoring

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

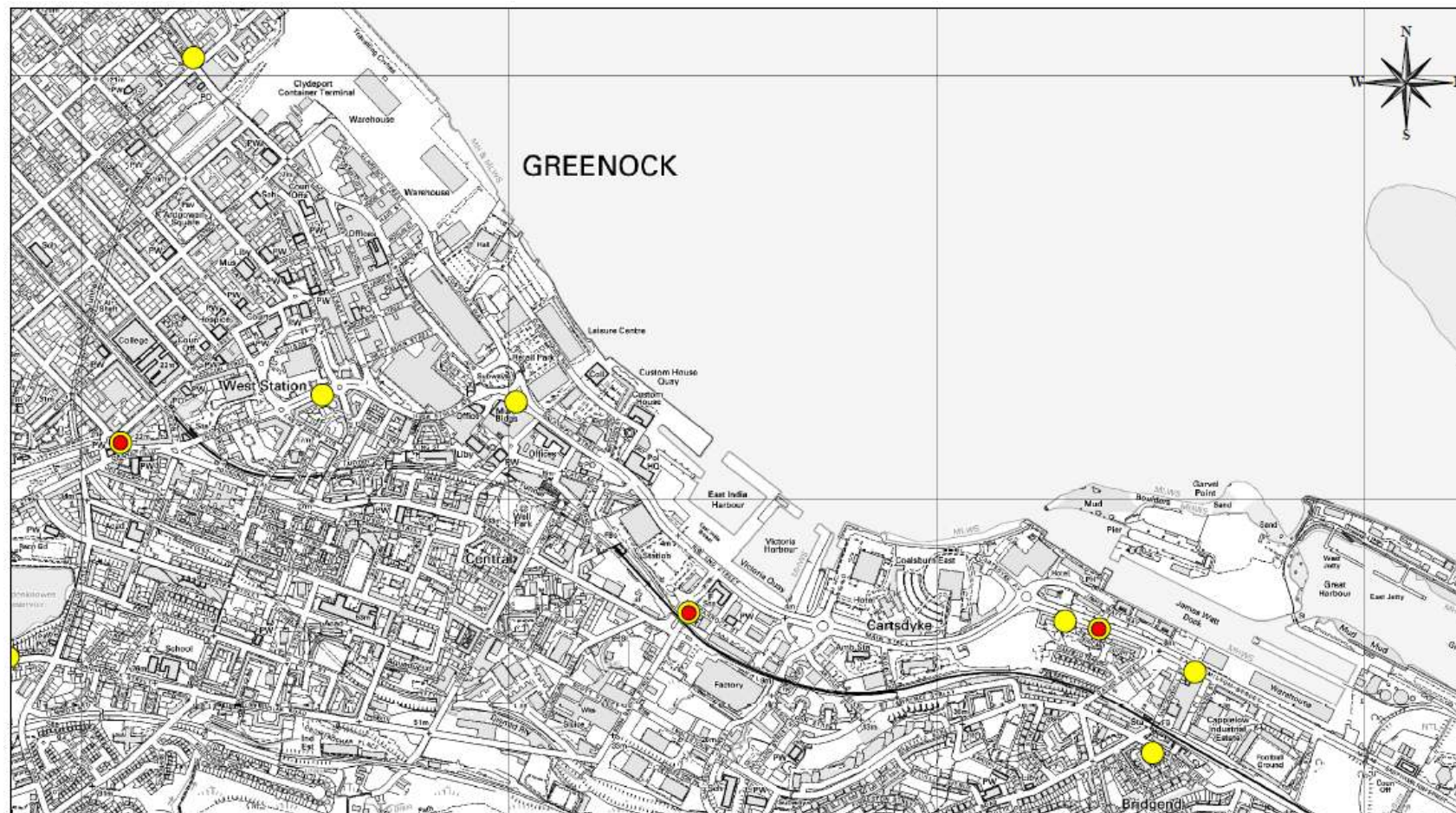
Glasgow Scientific Services also participate in the WASP scheme, managed by the Health and Safety Laboratory. The report WASP Annual Performance Criteria for NO₂ Diffusion Tubes used in Air Quality Management, 2008 onwards, prepared by AEA confirms Glasgow Scientific Services as having demonstrated satisfactory performance in the WASP Scheme of Analysis for NO₂ tubes April 2009-2010.

Appendix B: Maps of Diffusion Tube Monitoring Network in Inverclyde

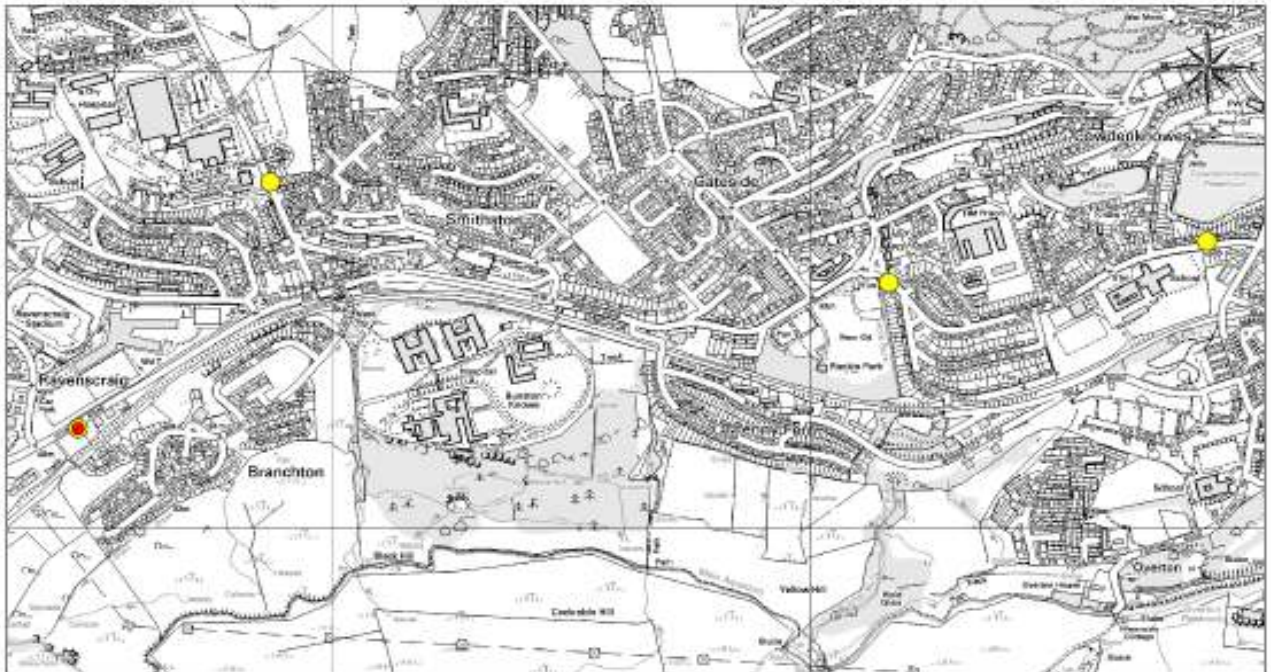
Map of Inverclyde Council Diffusion Tube Monitoring Network



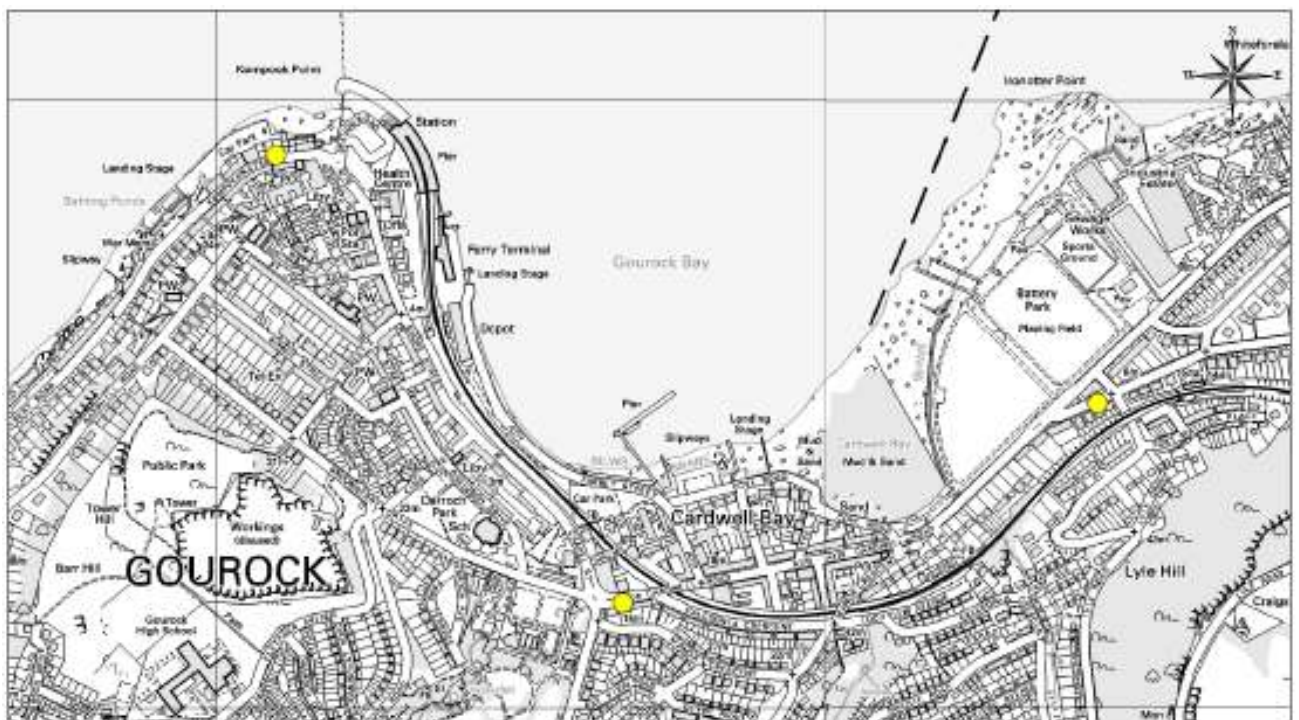
Map of Diffusion Tube Monitoring Network: Greenock Central



Map of Diffusion Tube Monitoring Network: Greenock South



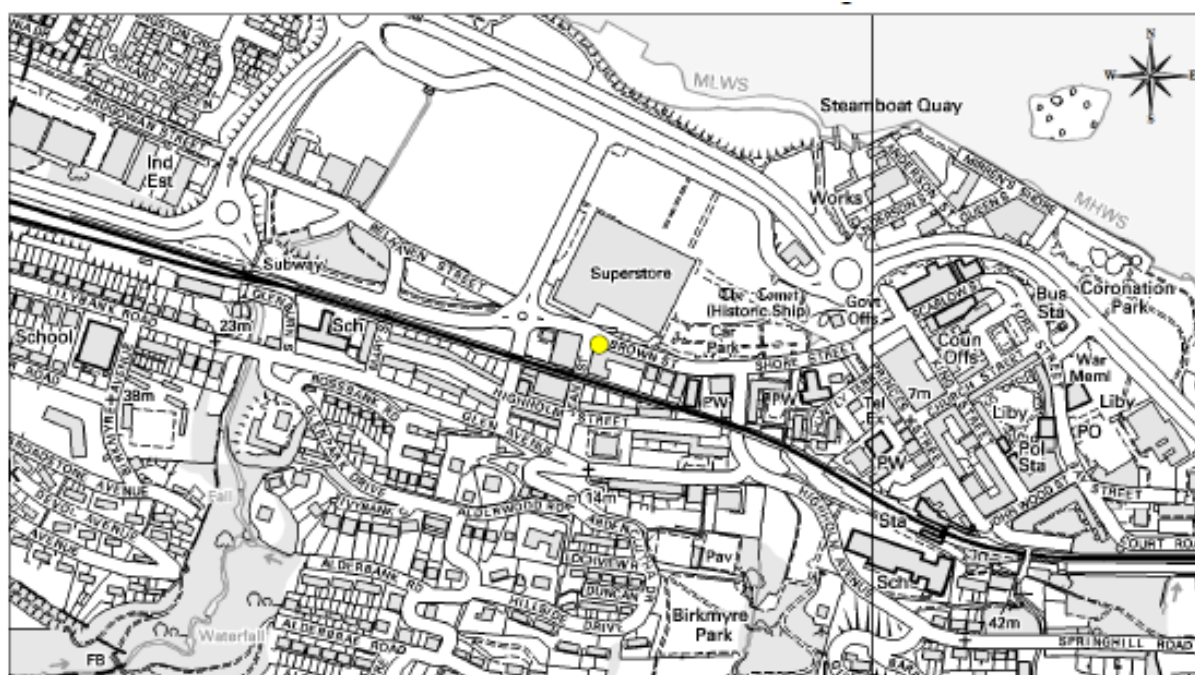
Map of Diffusion Tube Monitoring Network: Gourock/Greenock West



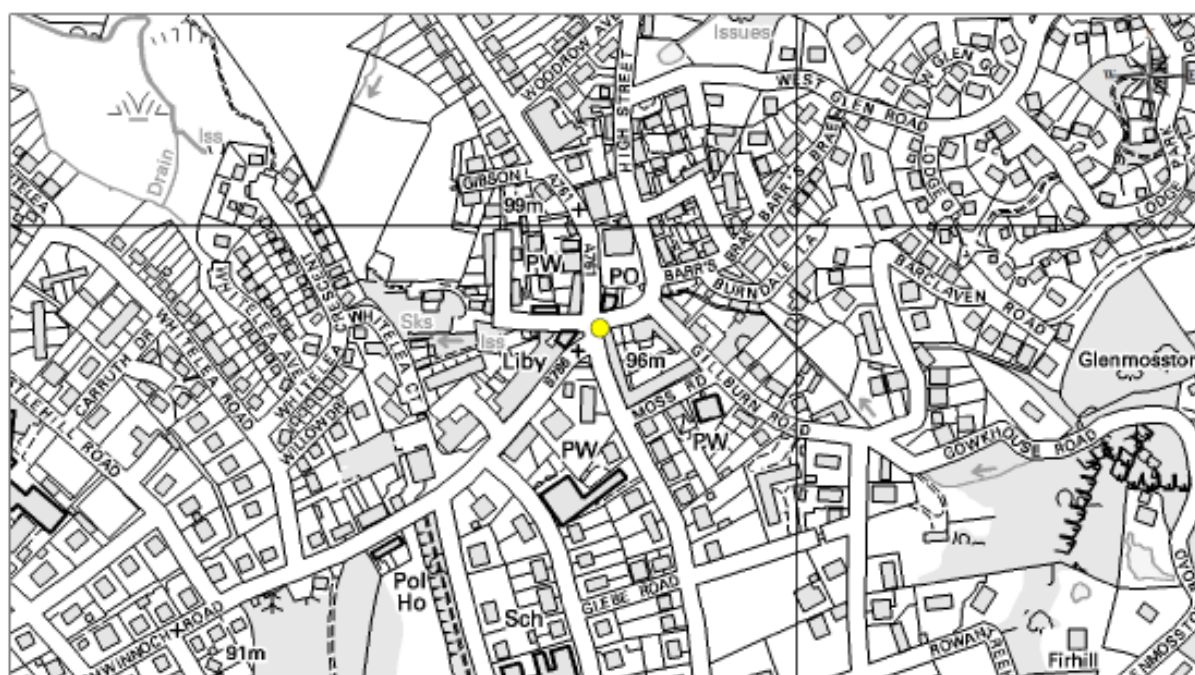
Legend

- Benzene Tubes
- Diffusion Tubes(NO2)

Map of Diffusion Tube Monitoring Network: Port Glasgow

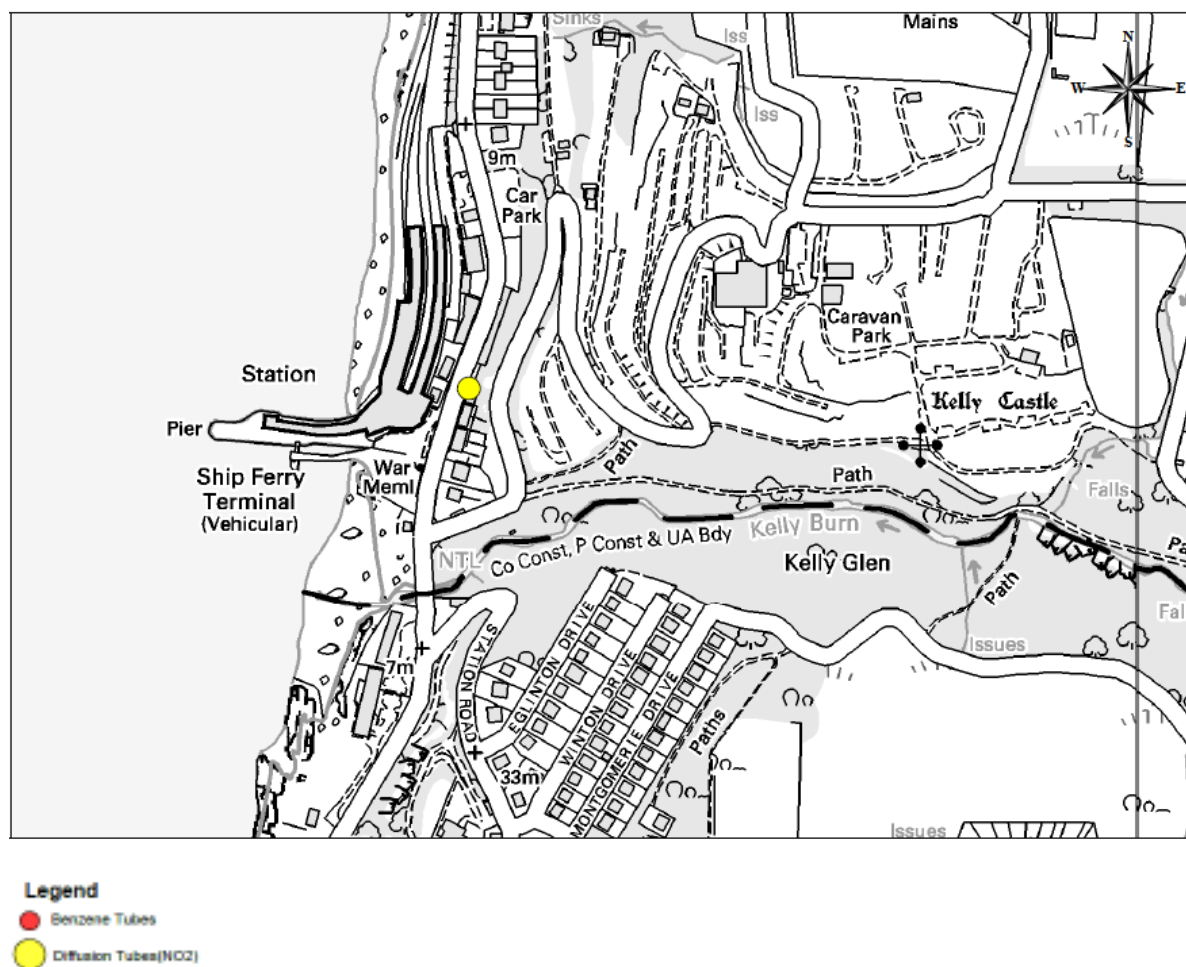


Map of Diffusion Tube Monitoring Network: Kilmacollm



Legend

- Benzene Tubes
- Diffusion Tubes(NO2)

Map of Diffusion Tube Monitoring Network: Wemyss Bay

Appendix C: Monthly NO₂ diffusion tube data 2010

	J***	F	M	A	M	J	J	A	S	O	N	D	average	bias adjusted
Carwood Court,														
Greenock	27.5*	23.5	12	10.2	7.8	10.4	22.4	8.1	9.4	15.6	23.5	21.1	14.9	16.4
Brown St,														
Port Glasgow	39.3*	26.8	25.7	17.5	19.9	17.8	18	18.3	16.7	18.4	33.7	22.5	21.4	23.5
Bridge of Weir Rd,														
Kilmacolm	30.8*	21.1	20.4	18.5	18.1	14.9	14.2	13.6	20.1	24.1	32.6	22	20	22
East Hamilton,														
Greenock	48.4*	36.9	35.5	36.5	35.2	35.3	29.3	34.5	31.5	40.1	52	43.2	37.3	41
Dellingburn St, Greenock	53.7*	32.8	34.2	30.3	32.5	34	36	30.4	27.7	45.7	49.4	23.8	34.3	37.7
Dalrymple St, Greenock	51.1*	97.6	28.1	22.3	20.5	19.7	22.7	20.9	27.1	32.6	37.3	37.7	33.3	36.7
Inverkip St, Greenock	74.4*	34.7	52	34.3	39.4	32.8	14.9	37.7	32	34.7	87.5	44.1	40.4	44.4
Dunlop St, Greenock	42.4*	37.6	29	23.5	18.9	11.4	17.2	17.3	16.8	25.9	36	37.8	24.7	27.1
Nelson St, Greenock	45.8*	33.3	27.8	25.2	31.5	23.6	50.2	26	23.7	26.7	39.4	41.6	31.7	34.9
Inverkip Rd, Greenock	35.5*	34.1	22.7	17.3	19.3	16.5	15.6	17.4	17.7	19.6	26.3	42.8	22.7	24.9
Larkfield Rd, Greenock	35.9*	27.7	19.5	16.5	13.2	16.4	13.3	17.3	20.7	23.6	31.5	28.1	20.7	22.8
Main St, Wemyss Bay	27.2*	16.5	20.5	21.9	17.7	14.4	7.4	15.9	17.3	15.8	20.5	10.1	16.2	17.8
Kempock St, Gourrock	44.8*	28.5	23.4	19.8	20.3	48.6	18.5	22.9	22.8	17.2	31.3	23.8	25.2	27.7
Cardwell Rd, Gourrock	45.8*	32.4	37.7	29.1	28.4	8	30.9	29.8	27.7	35	38.2	33.2	30	33
Newark St, Greenock	32.5*	22.4	19.4	17.3	15.1	11.2	18	15.2	13.9	22.2	26.9	24.3	18.7	20.6
Brougham St, Greenock	37.8*	38.5	22.1	18.9	20.1	9.7	X	18.5	19.6	X	51.7	23.5	24.7	27.2

*** Glasgow Scientific Services reported January results as non-accredited due to AQC failure associated with the samples
X Diffusion Tubes missing from site