Inverclyde council

2012 Air Quality Updating and Screening Assessment for Inverclyde Council

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

August 2012

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Report Reference number	Inverclyde USA 2012
Date	28 August 2012

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 NO_2 is undertaken throughout the area with a diffusion tube network of 20 sites. Inverclyde Council also has an Automatic Air Quality Monitoring Station which records the levels of NO_2 and PM_{10}.

Historically, data from these monitoring sites have consistently shown that Air Quality Objectives were being met for all measured pollutants however recent data has shown that one site, namely East Hamilton Street, Greenock has exceeded the annual mean Objective for NO_2. Additional monitoring was introduced at this site and proposals are in place for further detailed monitoring to be carried out at this location.

All other pollutants continue to be below the Air Quality Objectives contained in this report.

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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.

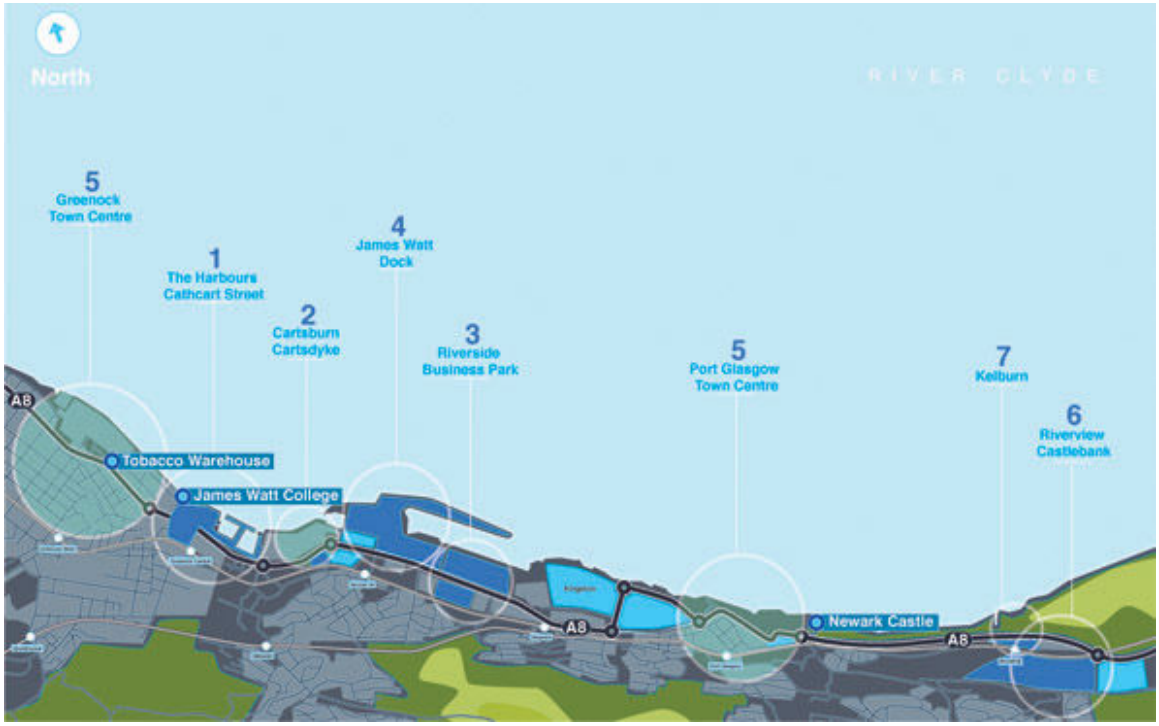
Map of Inverclyde

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 Report

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedences are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

The objective of this Updating and Screening Assessment is to identify any matters that have changed which may lead to risk of an air quality objective being exceeded. A checklist approach and screening tools are used to identify significant new sources or changes and whether there is a need for a Detailed Assessment. The USA report should provide an update of any outstanding information requested previously in Review and Assessment reports.

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 $\mu g/m^3$ (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 LAQM in Scotland

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 $\mu g/m^3$	Running annual mean	31.12.2003
	3.25 $\mu g/m^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu g/m^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu g/m^3$	Annual mean	31.12.2004
	0.25 $\mu g/m^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu g/m^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu g/m^3$	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 $\mu g/m^3$, not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	18 $\mu g/m^3$	Annual mean	31.12.2010
Sulphur dioxide	350 $\mu g/m^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu g/m^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu g/m^3$, 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 PM_{10} 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 PM_{10}. 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 and 2011 Progress Reports have since identified that the annual mean objective for NO_2 has been exceeded at one site along the A8, namely East Hamilton Street, Greenock. Additional monitoring was therefore introduced at this site in 2010.

The 2011 Progress Report also identified that the annual mean objective for NO_2 was exceeded at Inverkip Street, Greenock for the first time. All other sites were found to have met the National Objectives for all measured pollutants throughout the 2009-10 monitoring period.

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.
Progress Report: June 2011	Concluded that air quality objectives were likely to be met with the exception of one site which continued to require additional monitoring using the automatic NO_2 analyser.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Inverclyde Council has one automatic monitoring station located at Dunlop Street, Greenock as shown in Figure 2.1 below. This has been operational since April 2010 and currently measures NO_2 and PM_{10}.

It is close to residential properties and positioned along one of the busiest roads in Greenock before the road connects to the A78. Site details are contained in Table 2.1 below.

Figure 2.1 Map of Automatic Air Quality Monitoring Site

- **Air Quality Monitor/ NO_2 diffusion tube**
- **NO_2 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 analysers can be calibrated and the data accessed remotely however the ongoing maintenance and calibration is carried out by Air Monitors as part of the Service Level Agreement.

Site Audits are also carried out by AEA. The monitoring data for 2011 has been fully ratified by AEA and is contained in Section 2.2.

Details of the PM_{10} TEOM data correction and QA/QC procedures are also contained in Appendix A.

It was our intention to relocate the monitoring station to East Hamilton Street, Greenock in January 2012 as diffusion tube monitoring data has shown exceedances of the NO_2 annual mean Objective since 2010.

Due to ongoing difficulties with Amey, who have failed to provide a power supply at the site, we have been unable to do so. We are continuing to request that Amey assist us to allow us to progress with the required monitoring at this site as soon as possible.

2.1.2 Non-Automatic Monitoring Sites

Inverclyde Council is no longer including Benzene in the diffusion tube monitoring network as the data has shown the measured concentrations of this pollutant to be consistently below the annual mean Objective.

There have been no changes to the NO_2 monitoring network since the previous round of Review and Assessment. Maps showing the locations of these 20 diffusion tubes are contained in Appendix B.

Details of the locations and positioning of the diffusion tubes can be found in Table 2.2.

We continue to carry out detailed monitoring at East Hamilton Street, Greenock as previous rounds of Review and Assessment showed exceedances of the NO_2 annual mean. Details of this site can be found below.

We are in the process of re-locating the automatic air quality station to this site however are experiencing ongoing difficulties with matters out with our control.

Figure 2.2 Map of East Hamilton Street

- **NO_2 diffusion tube at façade of nearest property (East Hamilton Street)**
- **2 x NO_2 diffusion tubes, 1 x Benzene tube (East Hamilton Street)**
- **1 x NO_2 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

Alongside our Air Quality Station in Dunlop Street there is one NO_2 diffusion tube and an additional diffusion tube further along Dunlop Street. This is shown in figure 2.3 below.

Figure 2.3 Map of Dunlop Street

- **Air Quality Monitor and 1x NO_2 diffusion tube**
- **NO_2 diffusion tube**

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

Site Name	Site Type	Grid Ref (X,Y)	Pollutants Monitored	In AQMA	Is monitoring collocated with a Continuous Analyser	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(m)*	Does this location represent worst-case exposure?
Carwood Court, Greenock	Urban Background	229503 675400	NO_2	N	N	Y(13.5m)	5m	Y
Brown Street, Port Glasgow	Kerbside	231699 674620	NO_2	N	N	Y (1m)	1m	Y
Bridge of Weir Rd, Kilmacolm	Kerbside	235824 669909	NO_2	N	N	Y(1m)	1m	Y
East Hamilton St Greenock	Roadside	229365 675700	NO_2,	N	N	Y(12m)	2.25m	Y
East Hamilton St (b), Greenock	Roadside	229365 675700	NO_2,	N	N	Y(12m)	2.25m	Y
East Hamilton St (property), Greenock	Roadside	229301 675712	NO_2	N	N	Y (at building façade)	14.25m	Y
Dellingburn St, Greenock	Roadside	228422 675735	NO_2,	N	N	Y(3.5m)	5m	Y
Dalrymple St, Greenock	Roadside	228311 675993	NO_2	N	N	Y(15m)	3m	Y
Inverkip St, Greenock	Roadside	227563 676246	NO_2	N	N	Y(1m)	2.5m	Y
Dunlop St, Greenock	Roadside	226827 675622	NO_2	N	N	Y (4m)	2m	Y
Dunlop St (air station)	Roadside	226163 675537	NO_2	N	Y	Y(20m)	4m	Y

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Table 2.2 Cont'd Details of Non-Automatic Monitoring Sites

Site Name	Site Type	Grid Ref (X,Y)	Pollutants Monitored	In AQMA	Is monitoring collocated with a Continuous Analyser	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(m)*	Does this location represent worst-case exposure?
Nelson St, Greenock	Roadside	227092 676134	$NO_{2,}$	N	N	Y(1m)	5m	Y
Inverkip Rd Greenock	Roadside	224441 675224	$NO_{2,}$	N	N	Y(15m)	4m	Y
Larkfield Rd Greenock	Roadside	224869 675757	NO_2	N	N	Y(3m)	2m	Y
Main St Wemyss Bay	Roadside	219407 668573	NO_2	N	N	Y(1m)	2m	Y
Kempock St, Gourock	Kerbside	224097 677910	NO_2	N	N	Y(1m)	1m	Y
Cardwell Rd Gourock	Roadside	224664 677168	NO_2	N	N	Y(3m)	4m	Y
Newark St, Greenock	Urban Background	225460 677501	NO_2	N	N	Y(1m)	5m	Y
Brougham St, Greenock	Roadside	227242 677032	NO_2	N	N	Y(7m)	5.5m	Y
MacDougall St, Greenock	Roadside	229605 675593	NO_2	N	N	Y(13m)	3m	Y

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2.2 Comparison of Monitoring Results with AQ Objectives

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

NO_2 has been measured at the automatic air quality monitoring station at Dunlop Street, Greenock since April 2010. Table 2.3 contains the data for the 2011 monitoring period. This data has been fully ratified by AEA and shows that the annual mean Objective of 40 $\mu g/m^3$ and hourly mean Objective of 200$\mu g/m^3$ for NO_2 have not been exceeded.

Details of QA/QC procedures are contained in Appendix A.

Table 2.3 Results of Automatic Monitoring of Nitrogen Dioxide: Comparison with Annual Mean and Hourly Mean Objective

Location	Site Type	Within AQMA ?	Valid Data Capture for period of monitoring %	Valid Data Capture 2011 (%)	Annual Mean Concentration $\mu g/m^3$ 2011	Number of Exceedances hourly mean (200$\mu g/m^{3)}$ 2011
Dunlop Street, Greenock	Roadside	N	100%	99.4%	19$\mu g/m^3$	0

Diffusion Tube Monitoring Data

NO_2 is measured at 18 separate locations throughout Inverclyde. There are 20 diffusion tubes in total as some sites have more than one diffusion tube.

Table 2.4 contains the annual mean concentrations of NO_2 that was measured at each of the diffusion tube locations throughout 2011. The raw data has been adjusted by a factor of 0.94 as reported by the LAQM website as the National Bias Adjustment Factor. Details of this can be found in Appendix A along with details of the analysts QA/QC procedures.

This table shows that no sites exceeded the annual mean Objective of 40$\mu g/m^3$ throughout the 2011 monitoring period.

An additional table has also been included in the report, Table 2.5 which contains the data from 2008-2011. This allows enables comparisons to be made to highlight any trends in the monitoring data. The bias adjustment factors for these years are also contained in this table.

Within both tables, the sites that are closest to reaching the annual mean objective concentration of 40 $\mu g/m^3$ have been highlighted in red.

Table 2.4 Results of Nitrogen Dioxide Diffusion Tubes in 2011

Site ID	Location	Site Type	Within AQMA?	Data Capture 2011 (Number of Months	Annual mean concentration (Bias Adjustment factor = 0.94) 2011 (µg/m^3)
1	Car wood Court	Urban Background	N	12	11.3
2	Brown Street, Port Glasgow	Kerbside	N	10	19.3
3	Bridge of Weir Rd, Kilmacolm	Kerbside	N	11	17.3
4	**East Hamilton St, Greenock**	**Roadside**	**N**	**10**	**33.4**
5	**Dellingburn St, Greenock**	**Roadside**	**N**	**12**	**34.2**
6	Dalrymple St, Greenock	Roadside	N	12	25.1
7	**Inverkip St, Greenock**	**Roadside**	**N**	**12**	**32.8**
8	Dunlop St, Greenock	Roadside	N	12	22.3
9	Nelson St, Greenock	Roadside	N	12	27
10	Inverkip Road, Greenock	Roadside	N	12	17.7
11	Larkfield Rd, Greenock	Roadside	N	12	21
12	Main St, Wemyss Bay	Roadside	N	12	17.3
13	Kempock St, Gourock	Kerbside	N	11	18.3
14	**Cardwell Road, Gourock**	**Roadside**	**N**	**10**	**32.8**

Site ID	Location	Site Type	Within AQMA?	Data Capture 2011 (Number of Months	Annual mean concentration (Bias Adjustment factor = 0.94) 2011 (μg/m^3)
15	Newark St, Greenock	Urban Background	N	11	18.6
16	Brougham Street, Greenock	Roadside	N	11	17.6
17	**East Hamilton Street (b)**	**Roadside**	**N**	**12**	**34.9**
18	East Hamilton Street (property)	Roadside	N	11	24.7
19	MacDougall Street	Roadside	N	11	28.3
20	Dunlop Street (Air Quality Station)	Roadside	N	12	14.2

Table 2.5 Results of Nitrogen Dioxide Diffusion Tubes (2008 to 2011)

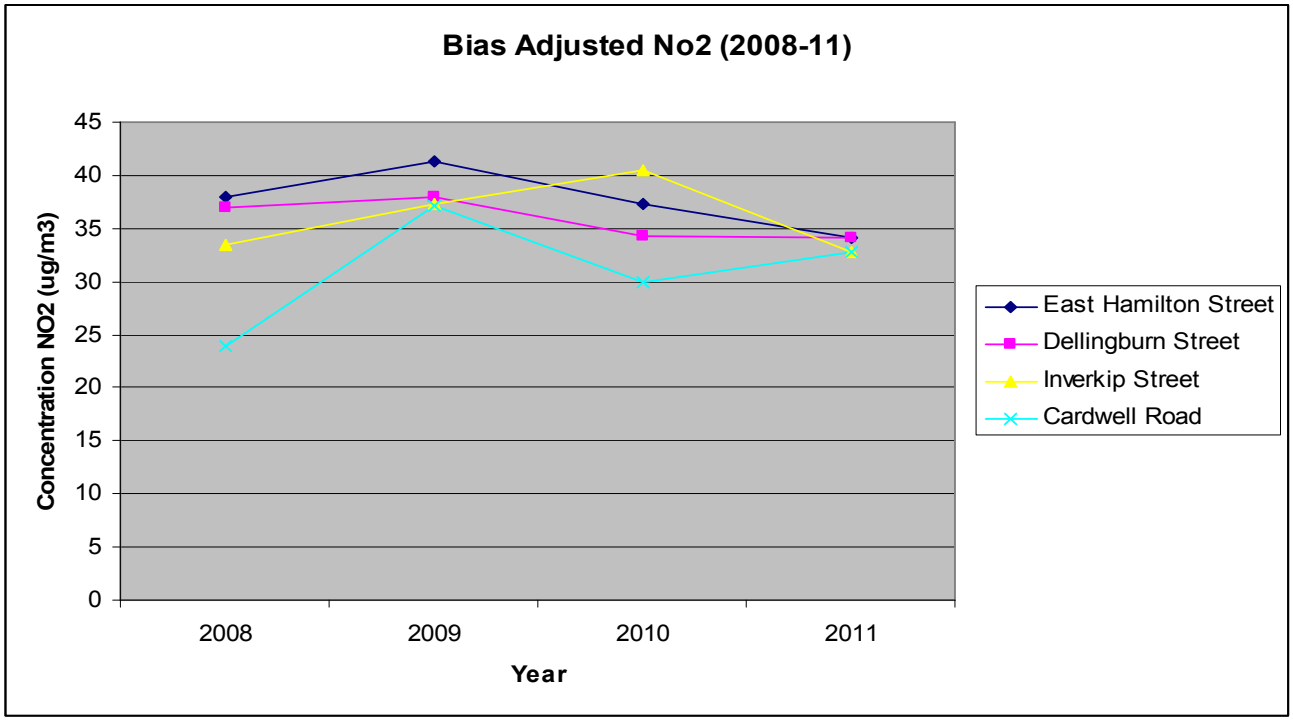
Site ID	Site Type	Within AQMA ?	Annual mean concentration (adjusted for bias) µg/m^3			
			2008* (Bias Adjustment Factor = 1.05)	2009* (Bias Adjustment Factor = 1.23)	2010* (Bias Adjustment Factor = 1.1)	2011 (Bias Adjustment Factor = 0.94)
1	Urban Background	N	10.6	13.3	16.4	11.3
2	Kerbside	N	N/A	N/A	23.5	19.3
3	Kerbside	N	16.1	23.2	22	17.3
4	**Roadside**	**N**	**38.0**	**41.3**	**41**	**33.4**
5	**Roadside**	**N**	**36.9**	**38**	**37.6**	**34.2**
6	Roadside	N	21.2	31.6	36.7	25.1
7	**Roadside**	**N**	**33.4**	**37.3**	**44.4**	**32.8**
8	Roadside	N	New site	New site	27.1	22.3
9	Roadside	N	27.5	27.1	34.9	27
10	Roadside	N	25.1	28.4	24.9	17.7
11	Roadside	N	N/A	N/A	22.8	21
12	Roadside	N	N/A	N/A	17.8	17.3
13	Kerbside	N	18.4	24.8	27.71	18.3
14	**Roadside**	**N**	**24.0**	**37.2**	**33**	**32.8**
15	Urban Background	N	18.7	22.8	20.6	18.6
16	Roadside	N	25.1	33.2	27.2	17.6
17	**Roadside**	**N**	**New site**	**New site**	**New site**	**34.9**
18	Roadside	N	New site	New site	New site	24.7
19	Roadside	N	New site	New site	New site	28.3
20	Roadside	N	New site	New site	New site	14.2

There are four sites that in the last four years have shown a trend towards nearing or exceeding the National Objective NO_2 concentration of 40μg/m^3. This is summarised in Table 2.6 and Figure 2.4. All other sites have consistently remained below 30μg/m^3.

Table 2.6 Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Diffusion Tube Sites: East Hamilton St, Dellingburn St, Inverkip St, Cardwell Rd

	2008 (Bias Adjustment factor = 1.05)	2009 (Bias Adjustment factor = 1.23)	2010 (Bias Adjustment factor = 1.1)	2011 (Bias Adjustment factor = 0.94)
	2011 (μg/m^3)	2011 (μg/m^3)	2011 (μg/m^3)	2011 (μg/m^3)
East Hamilton Street	38	41.3	37.3	34.2
Dellingburn Street	36.9	38	34.3	34.2
Inverkip Street	33.4	37.3	40.4	32.8
Cardwell Road	24	37.2	30	32.8

Figure 2.4 Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Diffusion Tube Sites: East Hamilton St, Dellingburn St, Inverkip St, Cardwell Rd



Of the four sites, two of these have been monitored previously using the automatic NO_2 and PM_{10} analysers.

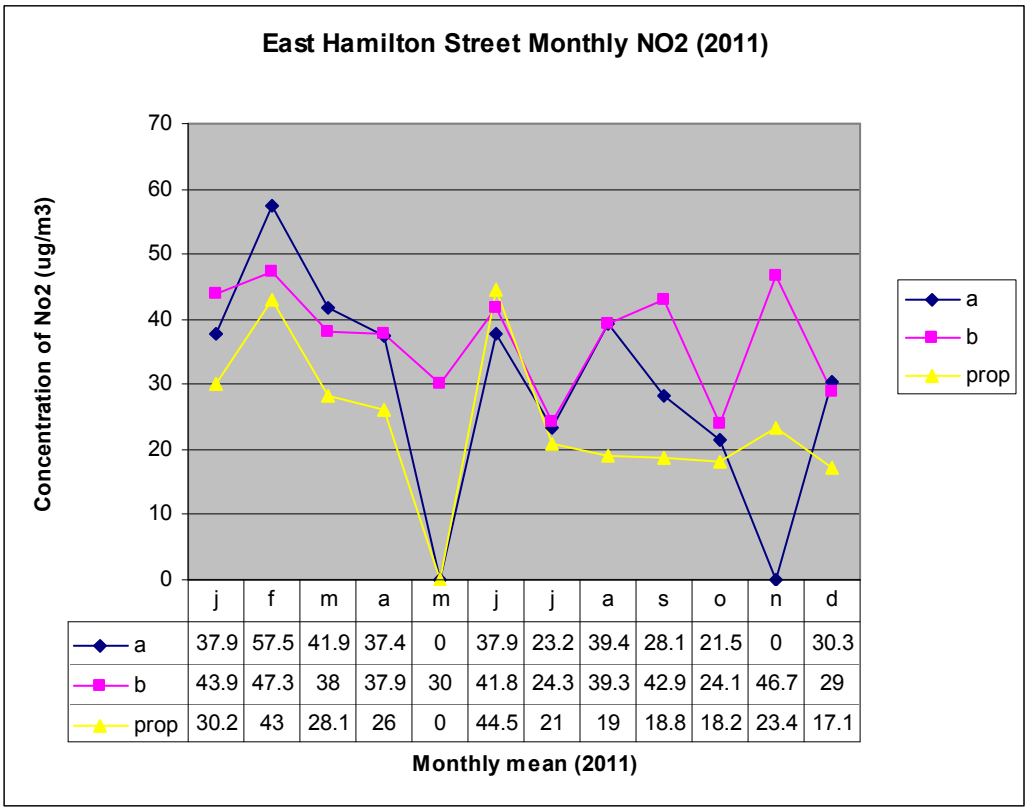
Between 2006 and 2007 the automatic air quality monitoring station was located at Dellingburn Street, Greenock before being relocated to Inverkip Street, Greenock between 2008 and 2009. Monitoring data from these periods showed there to be no exceedances of the annual mean or hourly mean NO_2 Objective therefore it was decided to re-locate this to another site in 2010.

Cardwell Road has recently shown an increase in NO_2 and this will be closely monitored and consideration given to placing additional diffusion tubes at or within close proximity to the existing sites at Cardwell Road, Dellingburn Street and Inverkip Street.

East Hamilton Street has remained close to the annual mean NO_2 Objective. This is a roadside site along a stretch of the A8. Residential properties are approximately 12m away. We have positioned two diffusion tubes at the roadside and one diffusion tube at the façade of the property. The 2011 monitoring results are contained in Figure 2.5 below.

We are in the process of relocating our automatic monitoring station to this roadside location to allow us to get more detailed results and to assist us to produce a reliable local bias adjustment factor.

Figure 2.5 East Hamilton Street Monthly NO_2 Diffusion Tube monitoring results 2011



	j	f	m	a	m	j	j	a	s	o	n	d
a	37.9	57.5	41.9	37.4	0	37.9	23.2	39.4	28.1	21.5	0	30.3
b	43.9	47.3	38	37.9	30	41.8	24.3	39.3	42.9	24.1	46.7	29
prop	30.2	43	28.1	26	0	44.5	21	19	18.8	18.2	23.4	17.1

2.2.2 PM_{10}

PM_{10} is currently measured at the automatic air quality monitoring station in Dunlop Street, Greenock. Data is available since April 2010 and is contained in Tables 2.7 and 2.8 below

Table 2.7 Results of Automatic Monitoring of PM_{10}: Comparison with Annual Mean Objective

Site Name	Site Type	Within AQMA ?	Valid Data Capture for monitoring Period (%)	Valid Data Capture 2011 (%)	Confirm Gravimetric Equivalent (Y or NA)	Annual Mean Concentration μg/m³	
						2010	2011
Dunlop Street, Greenock	Roadside	N	99.2%	100%	Y	17	14

Table 2.8 Results of Automatic Monitoring for PM_{10}: Comparison with 24-hour mean Objective

Site Name	Site Type	Within AQMA ?	Valid Data Capture for monitoring Period %	Valid Data Capture 2011 (%)	Confirm Gravimetric Equivalent (Y or NA)	Number of Exceedances of 24-Hour Mean (50 μg/m³)	
						2010	2011
Dunlop Street, Greenock	Roadside	N	99.2%	100%	Y	2	0

This data is fully ratified by AEA. Details can be found in Appendix A: QA/QC Data

The results show that the annual mean Objective of 18 μg/m³ and 24-hour mean Objective of 50 μg/m³ for PM_{10} were not exceeded in 2011.

2.2.3 Summary of Compliance with AQS Objectives

Inverclyde Council has examined the results from monitoring in Inverclyde. Concentrations are all below the objectives, therefore there is no need to proceed to a Detailed Assessment.

Additional monitoring is being considered at three sites and detailed monitoring will be carried out at East Hamilton Street by relocating the automatic analysers to this site.

3 Road Traffic Sources

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Inverclyde Council confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

3.2 Busy Streets Where People May Spend 1-hour or More Close to Traffic

Inverclyde Council confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

3.3 Roads with a High Flow of Buses and/or HGVs.

Inverclyde Council confirms that there are no new/newly identified roads with high flows of buses/HDVs.

3.4 Junctions

Inverclyde Council confirms that there are no new/newly identified busy junctions/busy roads.

3.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment

Inverclyde Council confirms that there are no new/proposed roads.

3.6 Roads with Significantly Changed Traffic Flows

Inverclyde Council confirms that there are no new/newly identified roads with significantly changed traffic flows.

3.7 Bus and Coach Stations

Inverclyde Council confirms that there are no new/newly identified bus stations in the Local Authority area.

4 Other Transport Sources

4.1 Airports

Inverclyde Council confirms that there are no airports in the Local Authority area.

4.2 Railways (Diesel and Steam Trains)

4.2.1 Stationary Trains

Inverclyde Council confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

4.2.2 Moving Trains

Inverclyde Council confirms that there are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

4.3 Ports (Shipping)

Inverclyde Council confirms that there are no newly identified ports or shipping operations that meet the specified criteria within the Local Authority area.

5 Industrial Sources

5.1 Industrial Installations

5.1.1 New or Proposed Installations for which an Air Quality Assessment has been Carried Out

Inverclyde Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.1.2 Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been Introduced

Inverclyde Council confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

5.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment

Inverclyde Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.2 Major Fuel (Petrol) Storage Depots

There are no major fuel (petrol) storage depots within the Local Authority area.

5.3 Petrol Stations

Inverclyde Council confirms that there are no petrol stations meeting the specified criteria.

5.4 Poultry Farms

Inverclyde Council confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

Inverclyde Council confirms that there are no biomass combustion plant in the Local Authority area.

6.2 Biomass Combustion – Combined Impacts

Inverclyde Council confirms that there are no biomass combustion plant in the Local Authority area.

6.3 Domestic Solid-Fuel Burning

Inverclyde Council confirms that there are no areas of significant domestic fuel use in the Local Authority area.

7 Fugitive or Uncontrolled Sources

Inverclyde Council confirms that there are no potential sources of fugitive particulate matter emissions in the Local Authority area.

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

The 2011 monitoring data has shown that all sites within the NO_2 diffusion tube monitoring network have been below the annual mean objective of 40 $\mu g/m^3$.

We have however identified four sites which have previously exceeded or are close to the annual mean Objective and are considering carrying out additional monitoring at these sites.

The automatic air quality monitoring station at Dunlop Street, Greenock, recorded no exceedances of the hourly and annual mean Objectives for NO_2. There were also no exceedances of the 24-hourly mean and annual mean Objectives for PM_{10} throughout 2011. It is therefore proposed that the monitoring station be relocated.

8.2 Conclusions from Assessment of Sources

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.

8.3 Proposed Actions

Inverclyde Council will continue to monitor $N0_2$ levels throughout the area using diffusion tubes. We are considering introducing additional diffusion tubes at three of the Greenock sites highlighted in the report as requiring attention, namely East Hamilton Street, Dellingburn Street, Inverkip Street and Cardwell Road in Gourock.

We expected to have the automatic air quality monitor located in East Hamilton Street in January 2011 to provide us with more detailed monitoring results. Due to circumstances out with our control we have been unable to do so. We will continue to request that this issue is resolved to allow us to gather data that we require in order to progress. The data from this combined with the additional $N0_2$ diffusion tubes in place will assist with developing our own local bias adjustment factor to use in the next round of Review and Assessment.

The next report to be submitted will be the 2013 Progress Report.

9 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 Progress Report 2011

12 DEFRA LAQM Support website http://laqm.defra.gov.uk/

17 Volatile Correction Web Portal http://www.volatile-correction-model.info/

18 Bias Adjustment Spreadsheet: http://laqm.defra.gov.uk/documents/Diffusion_Tube_Bias_Factors-v07_12.xls

19 WASP Summary of Laboratory Performance in WASP NO2 Proficiency Testing Scheme for Rounds 108-115

Appendices

Appendix A: QA/QC Data

Appendix B: Maps of Diffusion Tube Monitoring Network in Inverclyde

Appendix C: Monthly NO_2 diffusion tube data 2011

Appendix D: DMRB Calculations

Appendix E: Maps of DMRB Model Locations

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

Glasgow Scientific Services supply and analyse the NO_2 diffusion tubes on a monthly basis. The preparation method used for NO_2 diffusion tubes is 20% TEA in Water.

The bias adjustment factor used for the NO_2 diffusion tube data was obtained from the LAQM Review and Assessment Database and is reported as 0.94

PM Monitoring Adjustment

The PM_{10} 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.

QA/QC of automatic monitoring

The automatic monitoring station at Dunlop Street, Greenock contains one NOx/NO_2 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

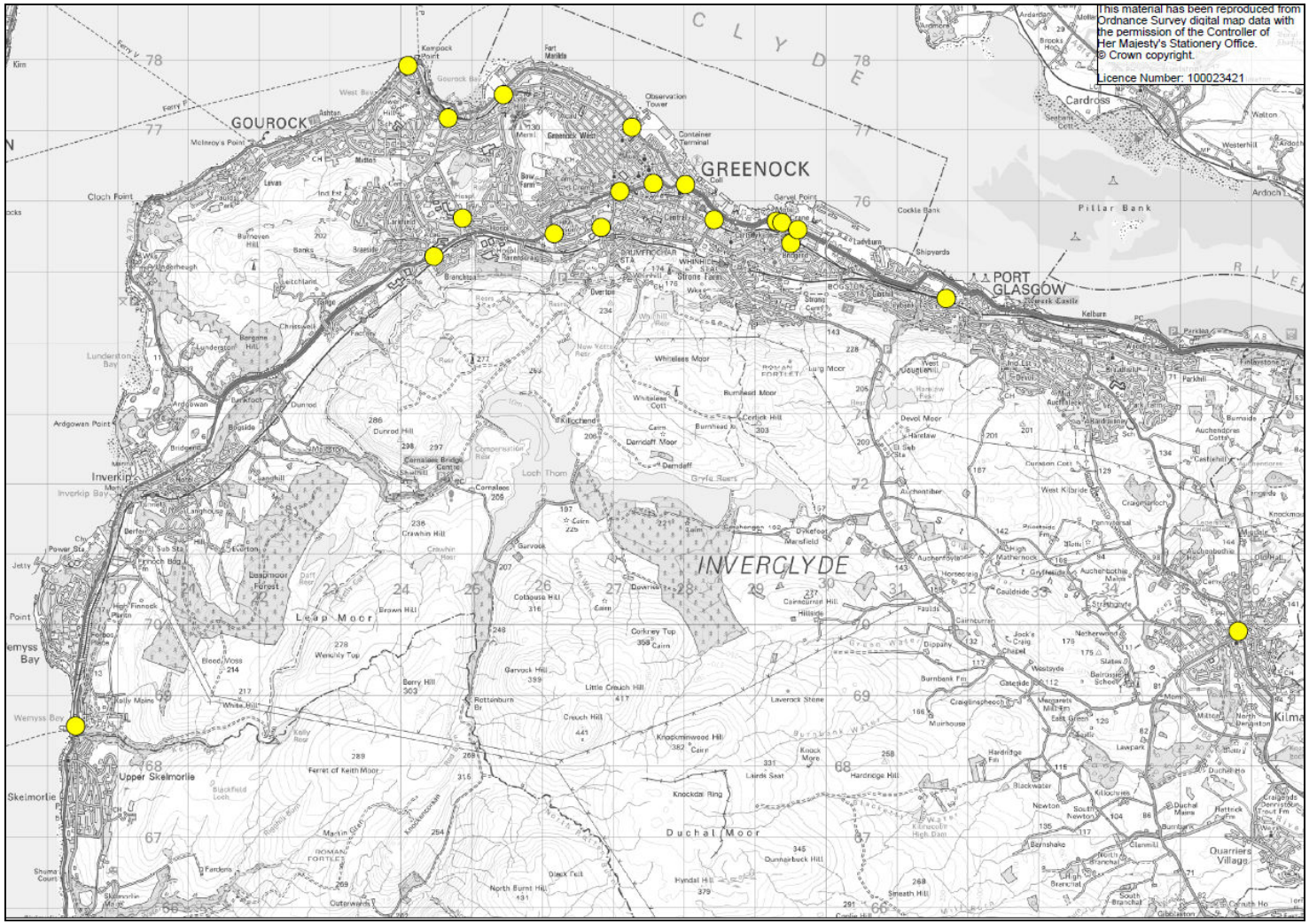
Inverclyde Council's NO_2 diffusion tubes are supplied and analysed by Glasgow Scientific Services. The Laboratory has adopted the procedures for preparation and analysis of the diffusion tubes contained in the document 'Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance'

Glasgow Scientific Services also participate in the WASP scheme, managed by the Health and Safety Laboratory. The Summary of Laboratory Performance in WASP NO_2 Proficiency Testing Scheme for Rounds 108-115 Report confirmed Glasgow Scientific Services as

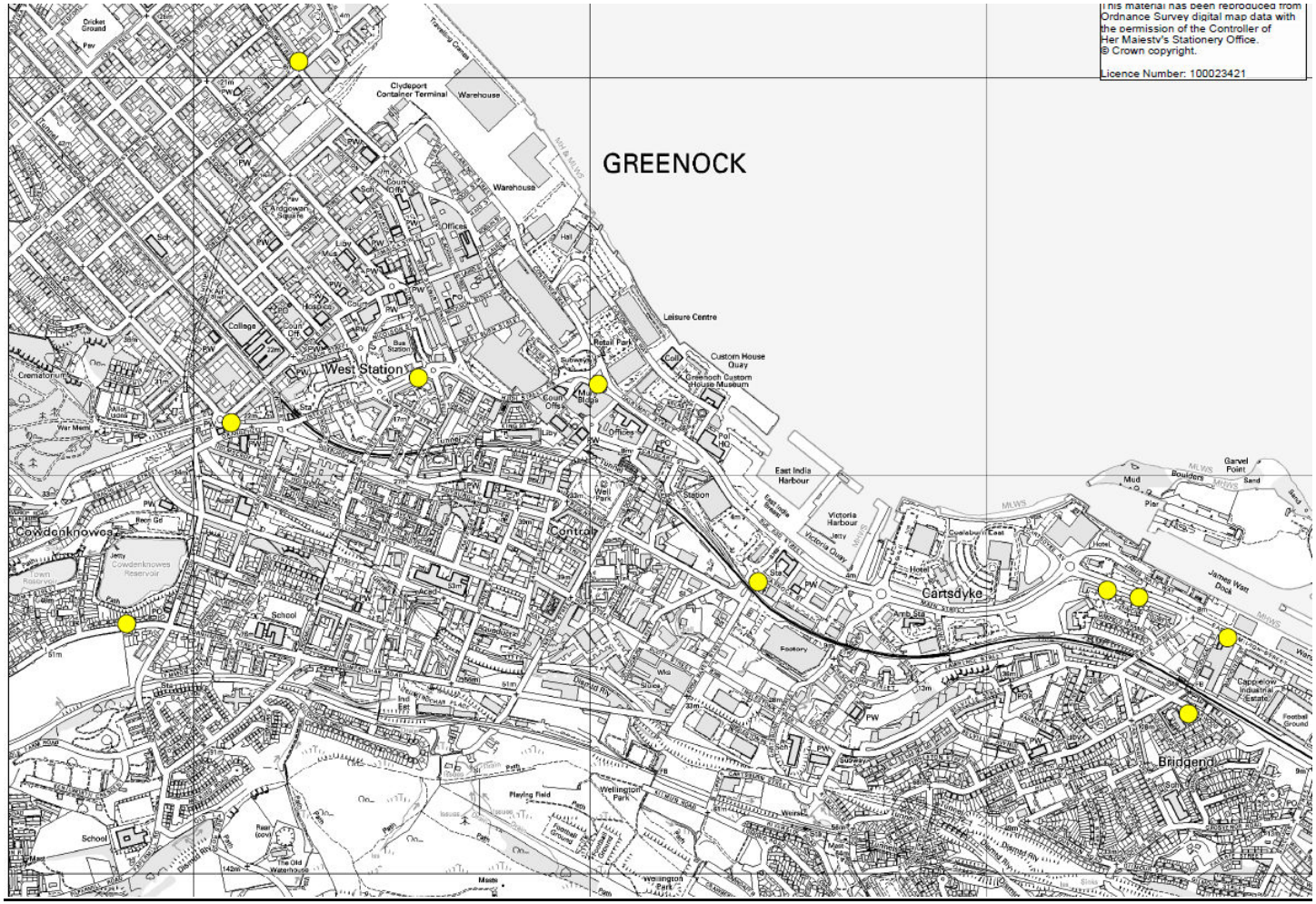
having demonstrated satisfactory performance in the WASP Scheme of Analysis for NO_2 diffusion tubes in 2011.

Appendix B: Maps of Diffusion Tube Monitoring Network in Inverclyde

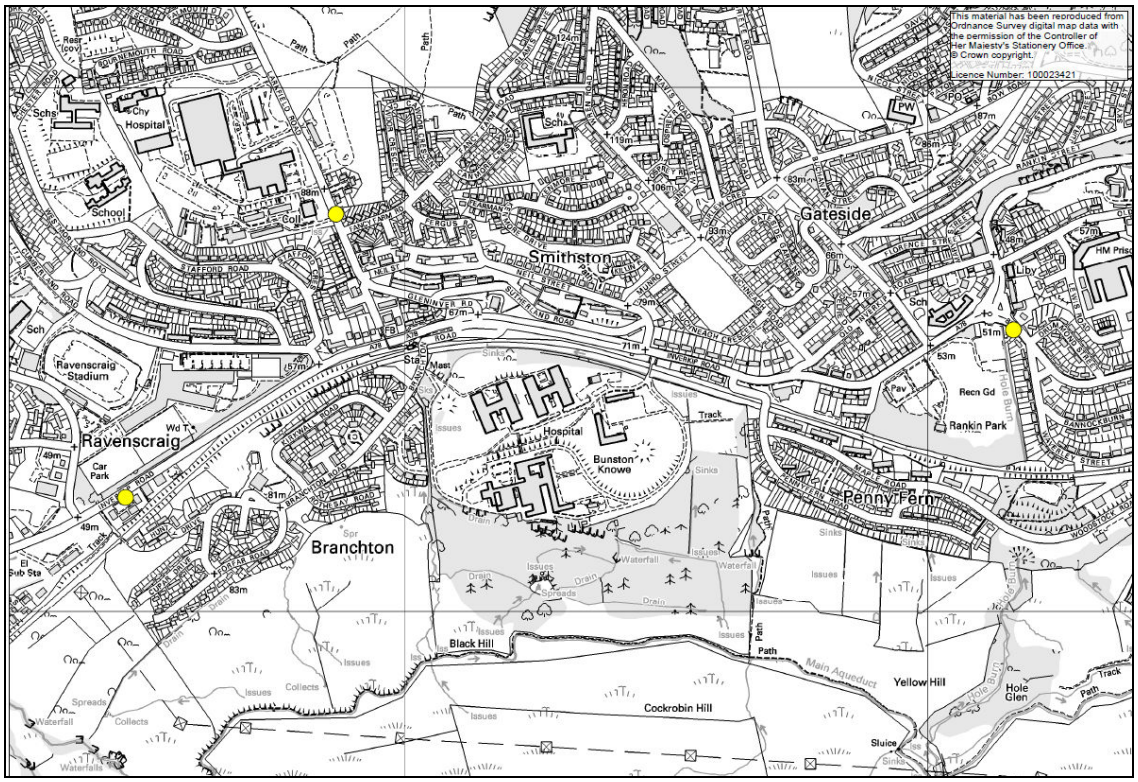
Map of NO_2 Inverclyde Council Diffusion Tube Monitoring Network



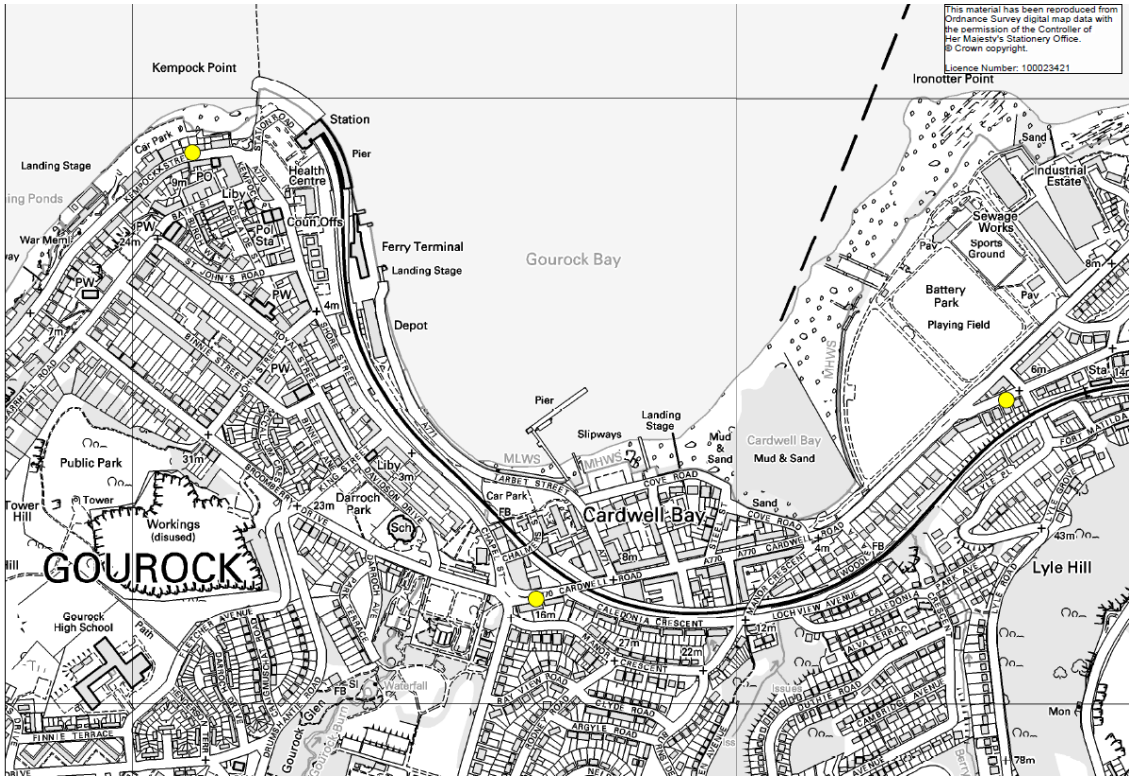
Map of NO_2 Diffusion Tube Monitoring Network: Greenock Central



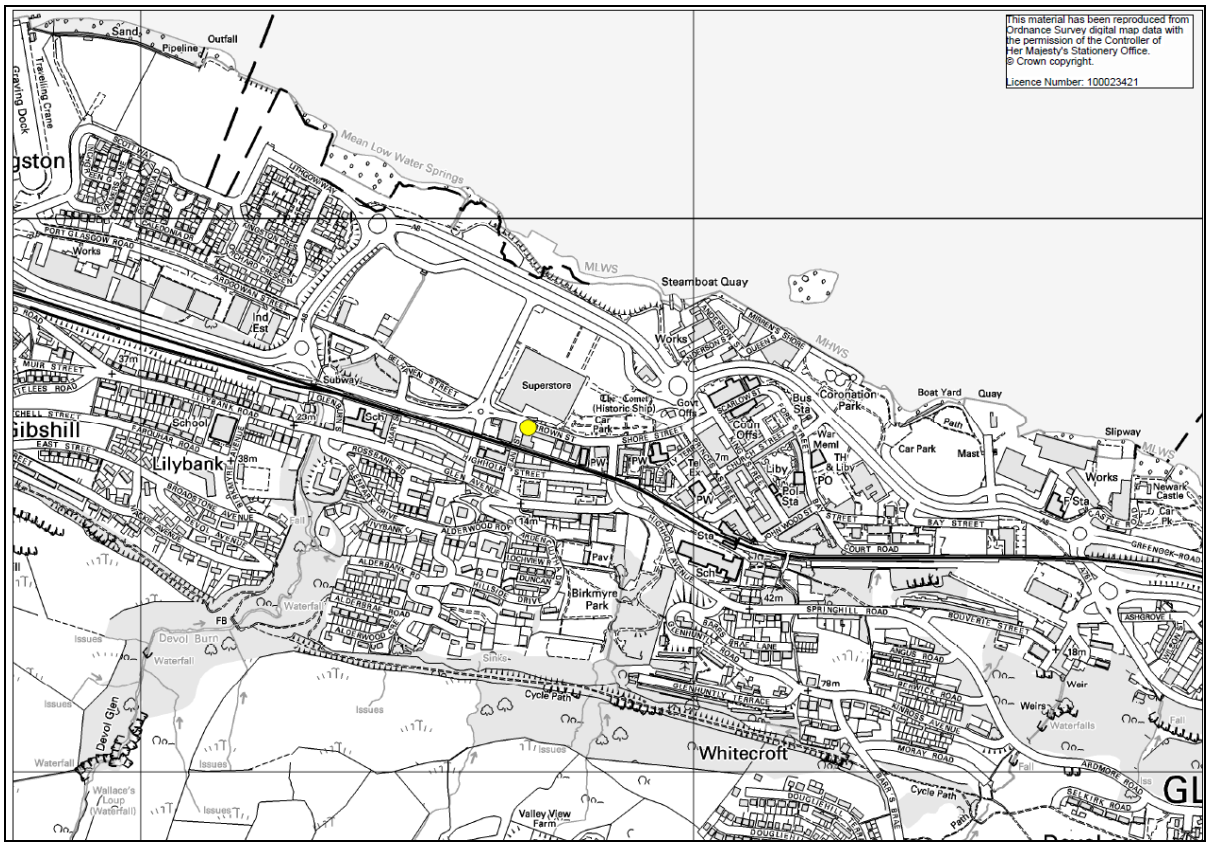
Map of NO_2 Diffusion Tube Monitoring Network: Greenock South



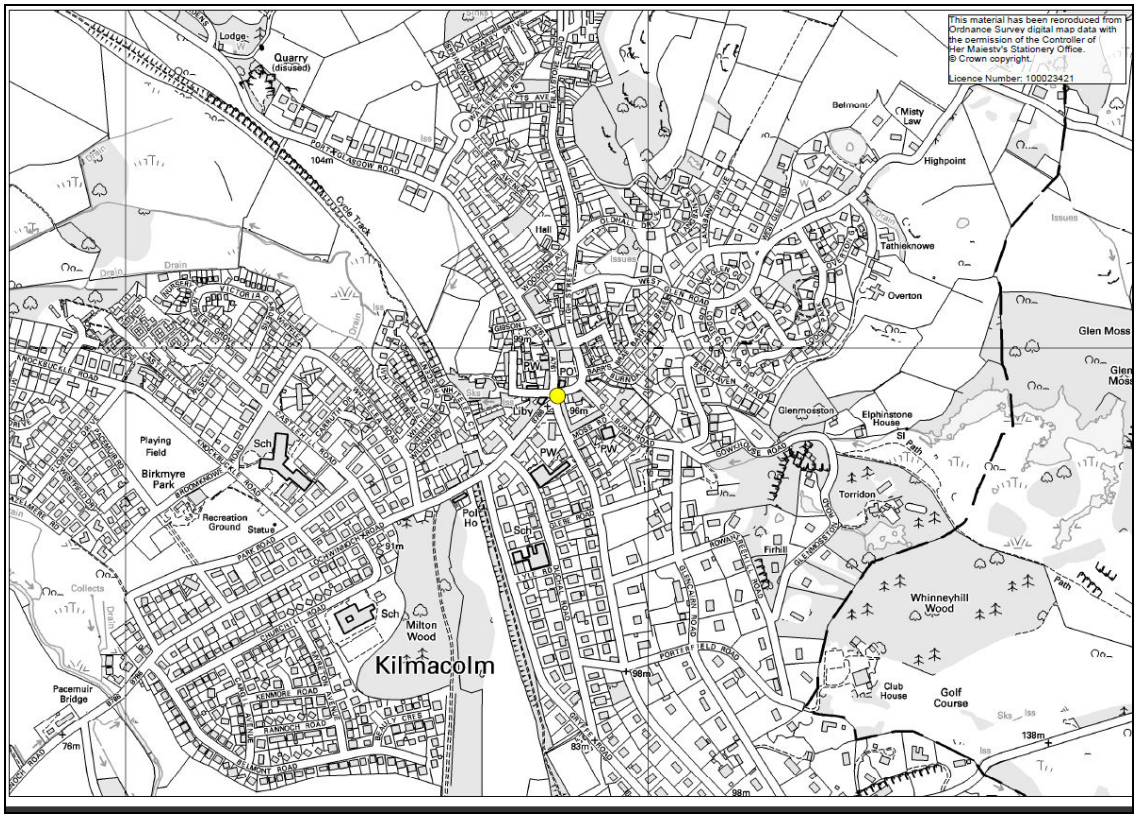
Map of NO_2 Diffusion Tube Monitoring Network: Gourock/Greenock West



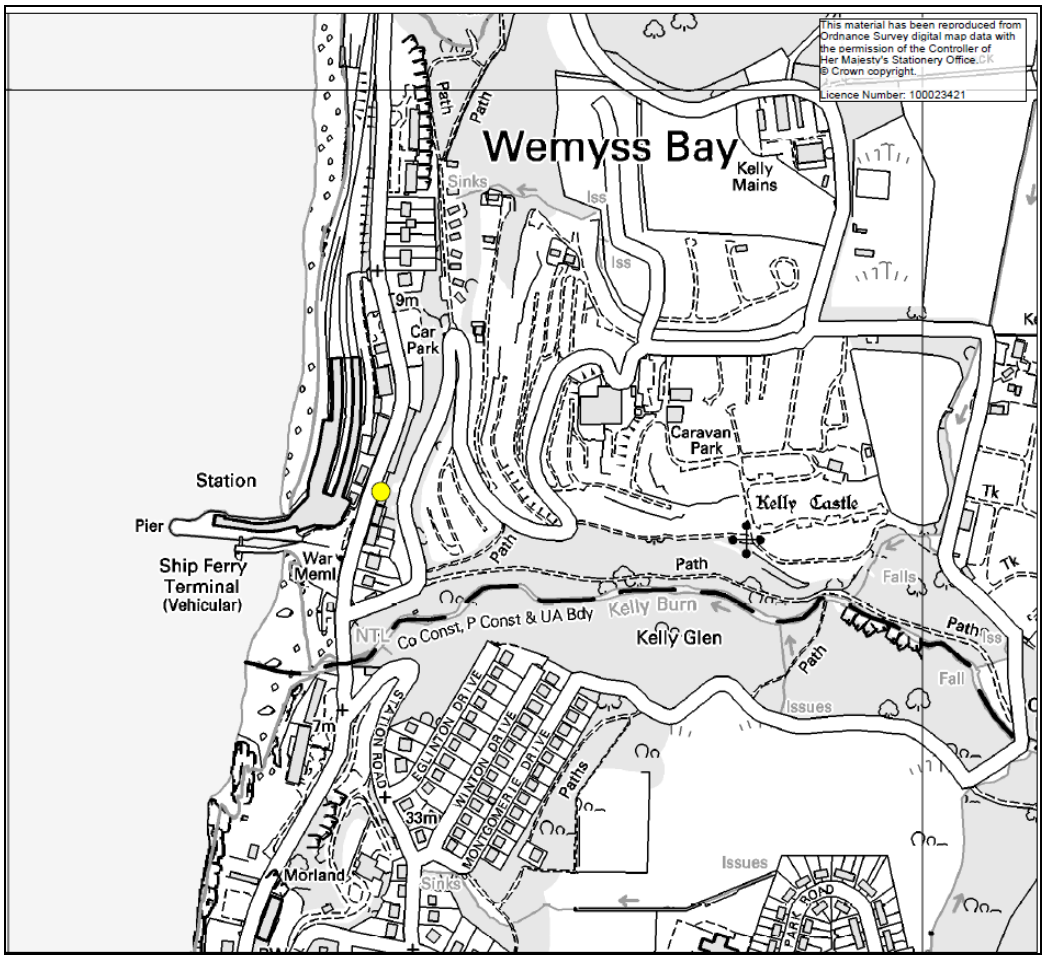
Map of NO_2 Diffusion Tube Monitoring Network: Port Glasgow



Map of NO_2 Diffusion Tube Monitoring Network: Kilmacolm



Map of NO_2 Diffusion Tube Monitoring Network: Wemyss Bay



Appendix C: Monthly NO_2 diffusion tube data 2011 (Raw) ($\mu g/m^3$)

	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	Annual Mean
Carwood Court, Greenock	16	23	14.6	10.6	9.4	13.1	3.4	13	7.9	6.6	18	9	12
Brown St, Port Glasgow	22	38	22.7	xxx	xxx	20.1	16	19	18.2	19	22	9.7	20.6
Bridge of Weir Rd, Kilmacolm	22	35	22.1	15.1	xxx	32.1	10	16	14.7	17.4	2.7	16	18.4
East Hamilton St, Greenock	38	58	41.9	37.4	xxx	37.9	23.2	39	28.1	21.5	xxx	30.3	35.5
East Hamilton St (b), Greenock	44	47	38	37.9	30	41.8	24.3	39	42.9	24.1	47	29	37.1
East Hamilton St (Property), Greenock	30	43	28.1	26	xxx	44.5	21	19	18.8	18.2	23	17.1	26.3
Dellingburn St, Greenock	36	58	42.1	31.2	33	31.3	28.7	26	36.3	39.1	49	25.7	36.3
Dalrymple St, Greenock	26	51	31.9	27.4	18	34.5	19.5	18	22.6	21.8	41	10.4	26.7
Inverkip St, Greenock	36	39	46.8	32.7	26	26.3	24.5	27	33.2	36.4	58	31	34.9
Dunlop St, Greenock	24	71	37.2	18.6	13	18.7	12.9	17	15.2	15.6	20	20.1	23.7
Dunlop St (AQ Station), Greenock	20	32	19.8	11.5	8.7	16.3	13.4	12	9.1	8.8	19	10.1	15.1
Nelson St, Greenock	38	47	33.6	25.4	20	28.3	24.8	25	19.3	29.4	35	18.5	28.7
Inverkip Rd, Greenock	24	31	25.9	21.9	15	20	14.3	17	13.8	12.8	16	14.2	18.8
Larkfield Rd, Greenock	32	42	24.9	16.7	16	20.2	13.1	20	18.7	19	27	18.6	22.3
Main St, Wemyss Bay	15	26	21.2	19.9	16	20	17.2	15	15	14.4	26	15.5	18.4
Kempock St, Gourock	18	28	25.8	19.6	15	22.1	10.4	xxx	16.1	11.6	29	19	19.4
Cardwell Rd, Gourock	32	61	37.8	31.5	27	31.2	21.8	xxx	55.5	24.9	xxx	26.9	34.9
Newark St, Greenock	29	41	22.4	17.5	xxx	15.9	11.6	12	16.8	13.3	22	16.8	19.8
Brougham St, Greenock	27	32	25.5	xxx	13	16.7	9.5	13	12.8	12.9	29	15	18.7
MacDougall St, Greenock	31	45	30.1	22.7	15	25.5	22.9	24	12.2	11.7	xxx	22.1	23.7

Appendix D: DMRB Calculations

Road traffic data was available from Transport Scotland for five sites that had relevant receptors within 200m of the monitoring location. Maps showing the location of these sites are contained in Appendix E.

The data for the background concentrations of NO_x, NO_2 and PM_{10} were provided from the 2011 Background Maps from the LAQM helpdesk.

The data entered for the distance from the link centre to receptor has been reduced from the actual distances to provide results based on a worst case scenario.

Input Data

A Background Concentrations

Location/ Receptor	Grid Ref	Background Concentrations 2011 (μg/m^3)		
		NOx	NO_2	PM_{10}
A761 Kilmacolm Road, Port Glasgow	234043 673286	**10.76**	**10.43**	**11.12**
A8 Greenock	230406 675160	**21.03**	**15.62**	**11.45**
A78 Inverkip Road, Greenock	224023 675076	**9.21**	**9.2**	**10.68**
A78 Bridgend, Greenock	220830 672250	**5.05**	**5.13**	**9.76**
A78 Greenock	226770 676030	**16**	**10.12**	**10.67**

B Road Traffic Data

Location/ Receptor	Link number	Distance from link centre to receptor (m)	Traffic flow & speed		Traffic composition		
			AADT (combined, veh/day)	Annual average speed (km/h)	Road type (A,B,C,D)	Total % LDV (<3.5t GVW)	Total % HDV (>3.5t GVW)
A761 Kilmacolm Road, Port Glasgow	1	5	23,643	50	A	98	2
A8 Greenock	1	5	31,821	56	A	97	3
A78 Inverkip Road, Greenock	1	5	16,537	43	A	98	2
A78 Bridgend, Greenock	1	5	13,017	73	A	98	2
A78 Greenock	1	5	14,104	51	A	98	2

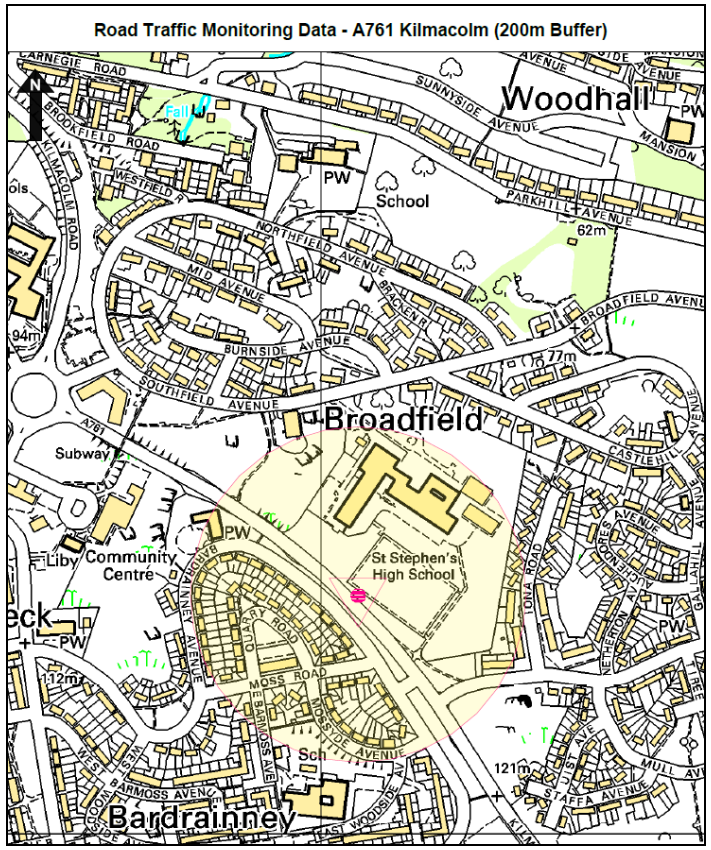
Verification

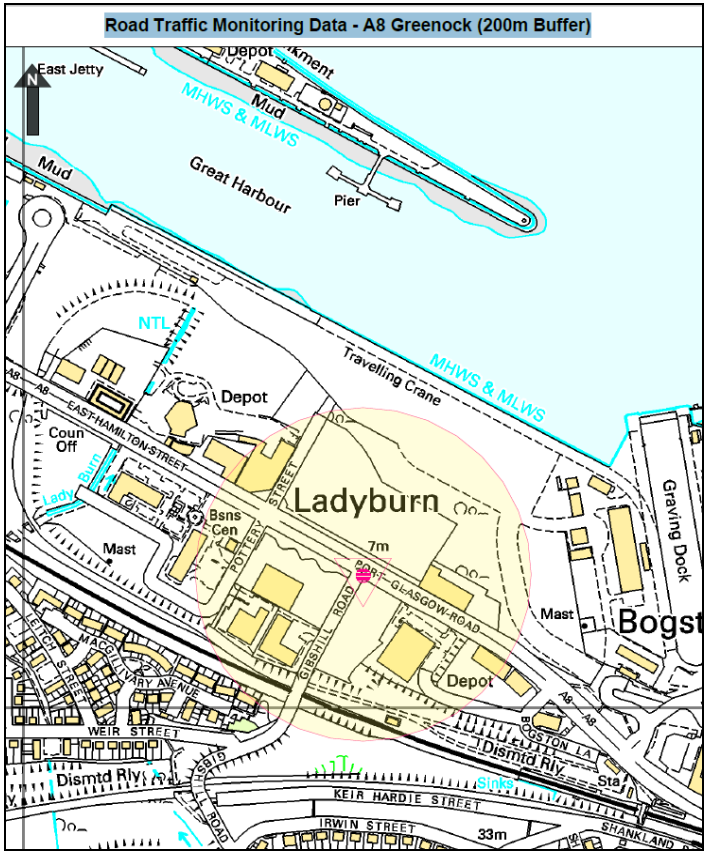
There has been no verification of the DMRB results with monitoring data.

Results

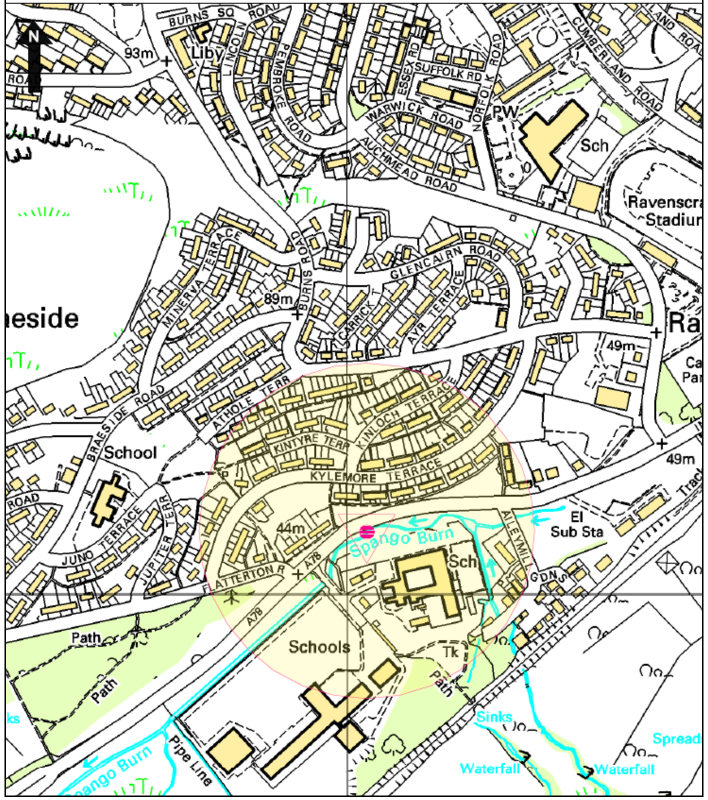
All receptors			Pollutant concentrations at receptor						
Receptor number	Name	Year	CO *	Benzene	1,3-butadiene	NO_x	NO_2 *	PM_{10}	
			Annual mean mg/m^3	Annual mean µg/m^3	Annual mean µg/m^3	Annual mean µg/m^3	Annual mean µg/m^3	Annual mean µg/m^3	Days >50µg/m^3
1	A761 Kilmacolm Road	2011	0.08	0.13	0.08	24.54	14.71	12.72	0.00
2	A8 Greenock	2011	0.09	0.15	0.11	38.55	20.53	13.29	0.00
3	A78 Greenock	2011	0.08	0.10	0.06	21.41	13.11	12.19	0.00
4	A78 Inverkip Rd, Greenock	2011	0.05	0.05	0.03	15.34	8.66	10.86	0.00
5	A78 Inverkip Rd, Greenock	2011	0.06	0.07	0.05	26.78	13.41	11.91	0.00

Appendix E: Maps of DMRB Model Locations

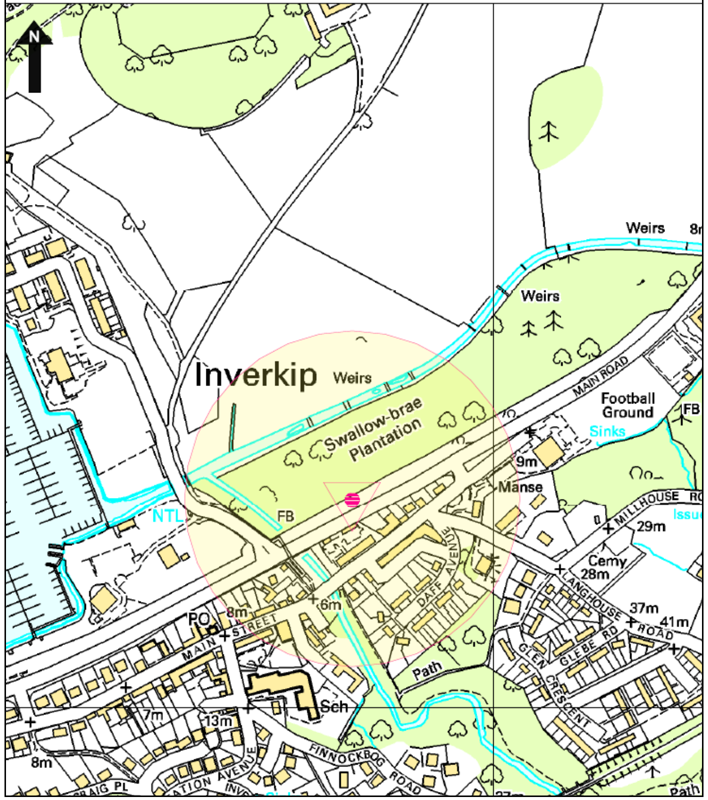




Road Traffic Monitoring Data - A78 Inverkip Road (200m Buffer)



Road Traffic Monitoring Data - A78 Bridgend (200m Buffer)



Road Traffic Monitoring Data - A78 Greenock (200m Buffer)