# Annual Progress Report (APR)

2022 Air Quality Annual Progress Report (APR) for Inverclyde Council

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

30th June 2022

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# Executive Summary: Air Quality in Our Area

## Air Quality in Inverclyde Council

Under the requirement of the Environment Act 1995, Inverclyde council regularly monitors air quality within the local area. There is a diffusion tube network in place which monitors $NO_2$ within 17 different sites. There is also an Automatic Air Quality Monitoring Station in place to measure the levels of $NO_2$, $PM_{10}$, $PM_{2.5}$ and $PM_1$ at East Hamilton Street, Greenock.

The results have consistently shown $NO_2$, $PM_{10}$ and $PM_{2.5}$ levels to be below the National Air Quality Objectives, therefore there has been no requirement to proceed to a Detailed Assessment for any of the pollutants. To date there has been no declaration of an Air Quality Management Area within Inverclyde.

There has been no significant changes that have taken place within the local area which could have a negative impact on air quality since the previous report in 2021.

## Actions to Improve Air Quality

In 2020, local air pollution in Inverclyde was significantly reduced as a consequence of the Covid-19 pandemic. The lockdown measures and numerous restrictions that were put in place by the Scottish Government reduced the movement of people and the level of traffic on roads. In 2021, the state of the pandemic was variable with local restrictions in place at the beginning of the year, restrictions started to lessen months later and by the end of the year the public was then advised to ‘stay at home’. In comparison to the previous year there has been a lot more movement of people with an increase in road traffic. The concentrations of air pollutants has increased slightly as a result. Efforts have been taken to encourage active travel within the community to minimise local air pollution.

Inverclyde Council aims to increase active travel within the community through effective planning and development. The objective of the Inverclyde Green Connection Programme is to construct better network links and develop the ground area of Greenock and Port Glasgow. Implementing elements of the active travel strategy and the green network strategy will help to improve the health and wellbeing of citizens and to improve local air quality. To encourage active travel a dedicated cycle lane from Gourock, Battery Park to Greenock, Container Way was constructed and completed in 2021. This route links

Gourock to Greenock town centre. The proposed plans for extending the dedicated cycle lane to Port Glasgow have been approved and should be beneficial in getting the community to travel actively.

To improve air quality, Inverclyde Council continues to promote active travel and encourage more sustainable methods of transport. To promote active travel Inverclyde Council, with the support of other organisations, participated in Clean Air Day 2021. Teaching material was provided to the most affected primary schools within the local area and delivered to primary 6 children. The material produced was to aid understanding on the topic of air pollution and promote sustainable travel. Inverclyde Council Cooperate Communications participated in the event by raising awareness about Clean Air Day on all social media platforms allowing the information to be communicated widely to people in the local area.


**Image 1:** P6 pupils from St Mary's Primary School participating in Clean Air Day

Inverclyde Council continues to strive to reduce carbon emissions. By 2021/2022 a target of 16% reduction on the 2007/2008 baseline has been set. The greenhouse gas emissions recorded for the whole of Inverclyde have also been steadily declining.

## Local Priorities and Challenges

Inverclyde Council does not have any specific priorities or challenges for the coming year. Statutory monitoring will continue and the next report to be submitted will be the 2022 Air Quality Annual Progress Report.

## How to Get Involved

Air Quality information and Inverclyde Council's Air Quality Annual Progress Reports can be found at the following link on the Inverclyde Council website, Air quality - Inverclyde Council (1).

Up to date monitoring results from the automatic monitoring station can be found on the Scottish Air Quality website, Site Data | Scottish Air Quality (2).

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# 1 Local Air Quality Management

This report provides an overview of air quality in Inverclyde Council during 2021. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) 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 an exceedance is considered likely the local authority must 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. This Annual Progress Report (APR) summarises the work being undertaken by Inverclyde Council to improve air quality and any progress that has been made.

**Table 1.1 – Summary of Air Quality Objectives in Scotland**

| Pollutant | Air Quality Objective Concentration | Air Quality Objective Measured as | Date to be Achieved by |
|---|---|---|---|
| Nitrogen dioxide ($NO_2$) | 200 µg/m$^3$ not to be exceeded more than 18 times a year | 1-hour mean | 31.12.2005 |
| Nitrogen dioxide ($NO_2$) | 40 µg/m$^3$ | Annual mean | 31.12.2005 |
| Particulate Matter ($PM_{10}$) | 50 µg/m$^3$, not to be exceeded more than 7 times a year | 24-hour mean | 31.12.2010 |
| Particulate Matter ($PM_{10}$) | 18 µg/m$^3$ | Annual mean | 31.12.2010 |
| Particulate Matter ($PM_{2.5}$) | 10 µg/m$^3$ | Annual mean | 31.12.2021 |
| Sulphur dioxide ($SO_2$) | 350 µg/m$^3$, not to be exceeded more than 24 times a year | 1-hour mean | 31.12.2004 |
| Sulphur dioxide ($SO_2$) | 125 µg/m$^3$, not to be exceeded more than 3 times a year | 24-hour mean | 31.12.2004 |
| Sulphur dioxide ($SO_2$) | 266 µg/m$^3$, not to be exceeded more than 35 times a year | 15-minute mean | 31.12.2005 |
| Benzene | 3.25 µg/m$^3$ | Running annual mean | 31.12.2010 |
| 1,3 Butadiene | 2.25 µg/m$^3$ | Running annual mean | 31.12.2003 |
| Carbon Monoxide | 10.0 mg/m$^3$ | Running 8-Hour mean | 31.12.2003 |

# 2 Actions to Improve Air Quality

## 2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12 months, setting out measures it intends to put in place in pursuit of the objectives.

There has been no exceedance or likely exceedance of an air quality objective in Inverclyde, therefore, no AQMA has been declared.

## 2.2 Cleaner Air for Scotland 2

Cleaner Air for Scotland 2 – Towards a Better Place for Everyone (CAFS2) [3] is Scotland's second air quality strategy. CAFS2 sets out how the Scottish Government and its partner organisations propose to further reduce air pollution to protect human health and fulfil Scotland's legal responsibilities over the period 2021 – 2026. CAFS2 was published in July 2021 and replaces Cleaner Air for Scotland – The Road to a Healthier Future (CAFS) [4], which was published in 2015. CAFS2 aims to achieve the ambitious vision for Scotland "to have the best air quality in Europe". A series of actions across a range of policy areas are outlined, a summary of which is available on the Scottish Government's website.

Progress by Inverclyde Council against relevant actions for which local authorities are the lead delivery bodies within this strategy is demonstrated below.

### 2.2.1 Placemaking – Plans and Policies

Local authorities with support from the Scottish Government will assess how effectively air quality is embedded in plans, policies, City Deals and other initiatives, and more generally in cross departmental working, identifying and addressing evidence, skills, awareness and operational gaps.

Inverclyde Council has successfully incorporated air quality into a variety of plans, polices, City Deals and other initiatives. Further information to evidence this will be provided in the sections below.

### 2.2.2 Transport – Low Emission Zones

Local authorities working with Transport Scotland and SEPA will look at opportunities to promote zero-carbon city centres within the existing LEZs structure. To date Inverclyde Council does not possess a LEZ.

### 2.2.3 Integrated Policy – Climate Change Plan

Inverclyde Council produced the Carbon Management Plan in 2007, with the objective of minimising the generation of carbon emissions from the Councils operation. Since the initial publication the Council has revised the plan to introducing additional targets to achieve further reduction in carbon emissions. The Carbon Management Plan was reinvented into the Climate Change Plan [(5)], this plan focused not only on decreasing carbon emissions but on measures that are required to mitigate climate change at present and in the future. Upon implementation of the Carbon Management Plan the carbon emissions emitted from the Councils operations have been reducing each year, with an estimated 39% reduction. Introducing a range of measures that enable minimisation of energy and water use, changing the Council's vehicles, placing LED lamps in street lights, promoting waste reduction, improving the recycling infrastructure and other initiatives has collectively led to a significant reduction in the Councils total carbon emissions. By 2021/2022 a target of 16% reduction on the 2007/2008 baseline has been set. The total carbon emission data for 2021/2022 has not yet been made available, therefore the attainment of this target will be revealed in the next annual progress report.

Each year Inverclyde Council reports the total amount of greenhouse gas emissions, in tonnes, created by the Councils operations over the year (April to March). Table 2.1 details the amount of greenhouse gas emissions generated by Inverclyde Council over the last five years.

**Table 2.1 Inverclyde Council's Greenhouse Gas Emission.**

| **Total Greenhouse Gas Emissions Generated by Inverclyde Council** | | | | | |
|---|---|---|---|---|---|
| **Year** | 2015/2016 | 2016/2017 | 2017/2018 | 2018/2019 | 2019/2020 |
| **Tonnes $CO_2$** | 14,808 | 14,457 | 12,777 | 10,928 | 10,212 |

The Climate Change Plan also documents the total greenhouse gas emissions generated by the whole of Inverclyde. Past and present data on greenhouse gas emissions generated by Inverclyde as a whole, highlights levels of greenhouse gas emissions have been declining over the years[(6)]. Table 2.2 shows the levels of greenhouse gas emissions recorded for all of Inverclyde over a five year period.

**Table 2.2 Inverclyde's greenhouse gas emissions**

| **Total Greenhouse Gas Emissions Generated by Inverclyde** | | | | | |
|---|---|---|---|---|---|
| **Year** | 2015 | 2016 | 2017 | 2018 | 2019 |
| **Tonnes $CO_2$** | 363.7 | 335.0 | 321.8 | 309.6 | 297.0 |

### 2.2.4 Integrated Policy – Net Zero Strategy 2021-2045

The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019, set the target of reducing Scotland's carbon emissions to net zero by 2045. Local Governments have a major role, legally and morally in the reduction of carbon emissions to achieve the net zero target. In 2021, Inverclyde Council published the Net Zero Strategy 2021-2045[(7)]. This strategy aims to implement a series of actions to secure a 73% reduction in carbon emissions by the period 2030/2031 based on the 2012/2013 baseline. From 2030/2031 Inverclyde Council will look to reduce carbon emissions even more by undertaking an improvement process (Plan-Do-Check-Act), working collaboratively with organisations and where needed using certified carbon sinks to offset remainder emissions in order to attain the net zero target.

Inverclyde Council will continue to implement measures detailed in the Climate Change Plan and introduce additional measures that will become viable to secure further reduction

in carbon emissions. Possible solutions detailed in the Net Zero Strategy 2021-2045 include switching to hydrogen as a fuel source for vehicles, alternative heating appliances such as water-based heat pumps to decarbonise heating systems or introducing advanced thermal insulation products to buildings to increase the retention of heat and making them more energy efficient.

### 2.2.5 Integrated Policy - Local Heat and Energy Efficiency Strategy

The Scottish Government has placed a statutory duty upon local authorities to produce Local Heat and Energy Efficiency Strategies. This will require local authorities to create and implement projects to improve the energy efficiency of buildings and decarbonise heating systems in the local area. Actions to reduce reliance on heat and the use of low carbon technology will help tackle climate change and improve air quality. Heating domestic properties within Inverclyde is estimated to generate 41% of Inverclyde's $CO_2$ emissions.

Although the Local Heat and Energy Efficiency Strategy will not be produced till the near future, for several years Inverclyde Council has been working to improve the energy efficiency of properties. In partnership with Home Energy Scotland and local housing associations, financial assistance has been provided to enable external wall insulation to be placed on properties that fall within the area based scheme programme. The development and introduction of future projects to decarbonise heating systems within the local area will help reduce emissions and improve air quality over time.

### 2.2.7 Place Making and Connectivity

#### 2.2.7.1 Developmental Planning in Inverclyde

Encouraging active travel and the use of public transport as opposed to the use of household vehicles requires effective developmental planning. Place making is an important factor that helps to improve air quality by reducing the number of vehicles on the road through the use of land allocation and spatial development strategy. Making urban areas in our jurisdiction well-connected is one of the objectives set out in Inverclyde Council's Local Development Plan [(8)]. The Council strives to ensure new housing, business and industry, retail and other commercial and community developments are easily accessible. This objective coincides with the CAFS2 place making action on the

creation of 20 minute neighbourhoods, as well as the proposals set out in the National Planning Framework 4.

#### 2.2.7.2 Inverclyde's Transport Routes

Inverclyde has a great transport network in place to keep people well connected. The A8 and A78 are two trunk roads that run through the area. There are a number of bus companies that operate. The rail network is comprised of two train lines and fourteen stations. Situated on the coastal route, Inverclyde has ferry services that operate providing travel links to several locations in Argyll and Bute.

Inverclyde is also connected by a comprehensive core path network and National Cycle Network routes, NCN75 and NCN753 provide active travel to Renfrewshire, Glasgow and Ayrshire.

### 2.2.8 Reducing Road Traffic Emissions

#### 2.2.8.1 Electric Vehicles

Inverclyde Council has a vehicle replacement strategy in place to phase out petrol and diesel fuelled vehicles within their fleet. Since 2011, Inverclyde Council has purchased new electric vehicles each year and continues to improve the charging point infrastructure within the local area with the help of Transport Scotland funding.

By the end of 2021, the Council had a total of 36 electric vehicles within its fleet. Only one additional electric charging point was installed within Inverclyde as four of the installations planned for 2021 have been delayed to the following year. A total of 23 council owned, publically accessible charging stations have been fitted within the local area. There are also privately owned charging stations that are available for use throughout the local area these can be found using Live Map - Charge Place Scotland [(9)]. These charging points are usually found in car parks of supermarkets, train stations and business establishments. Inverclyde Council seeks to further develop the electric charging point infrastructure within the local area to support and encourage the use of electric vehicles.

### 2.2.8.2 Active Travel

Encouraging active travel is crucial to improving air quality and public health. To increase active travel within the community, it is important to have routes that are accessible and safe. Inverclyde Council's Local Development plan (8) recognises the importance of keeping people connected and the significance of a green infrastructure. Similarly, the Clydeplan(10) sets out strategies to promote sustainable transport, promote active travel and increase connectivity within the region. Involvement in the Glasgow City –Region City Deal Project provides funding opportunities for major infrastructure projects.

Funding was received by the Spaces for People and the Safer Walking, Safer Roads groups to make improvements to cycling, walking and wheeling infrastructure. These two funding schemes can allow permeant and temporary measures to be installed in the local area to improve active travel routes. A project to develop a dedicated cycle route from Gourock to Greenock, with an option for a second phase from Greenock to Port Glasgow, was approved by the Council in 2020. Phase 1 of the new cycle lane started in February 2021, with the cycle lane starting at Battery Park, Gourock to Container Way, Greenock. Phase 1 of the development is now complete and the second phase will commence in September 2022.

The Active Travel Strategy (11) sets out several actions that the Council has taken to promote and encourage active travel within the community by enhancing opportunities. The public can access numerous active travel related links through Inverclyde Council website (12).

Local community groups further promote active travel within Inverclyde. There are two local travel active hubs which have been established to provide advice and support on active travel. The Inverclyde Bothy (13) is a walk-in hub situated at Gourock railway station and can also be accessed online. This hub can help people plan walking and cycling routes, allow people to access history walks, health walks or led bike rides. Community Tracks is an online hub that similarly offers a wide range of advice and support for locals. The hub can provide people with access to cycle maintenance classes, bike fixing workshops, cycling for confidence sessions and led bike rides. In addition, Community Tracks has had a project titled' flattening hills' which allows people to hire e-bikes. The topography in Inverclyde contains a vast amount of hills and this can often be a barrier to encouraging active travel. The Community tracks 'flattening hills' project was an initiative that would attract more people within the community to uptake cycling.

### 2.2.9 Public Engagement - Clean Air Day 2021

Clean Air Day was held on the 17th June 2021, Inverclyde Council participated in this event to raise awareness on the subject of air pollution, the associated health effects and sustainable travel. The theme for Clean Air Day 2021 was 'protect our children's health from air pollution'. A teaching package was created for teachers to deliver on Clean Air Day. Due to the Covid-19 restrictions in schools, we were unable to deliver the Clean Air Day event in person.

The Clean Air Day teaching package contained slide show presentations from the Environmental Health Department, the Bikeability Officers and McGills Bus Company. The presentations and resources provided aimed to teach children about sustainable travel and the advantages to their health and the health of the environment. Individual activities, group activities and a prize poster presentation were incorporated to encourage the children to learn in a fun manner. Following the event the Environmental Health Department received positive feedback from the schools that participated.

To raise awareness further, Inverclyde Council's Cooperate Communication Department posted on social media platforms about Clean Air Day using resources provided from Environmental Protection Scotland. This enabled Inverclyde Council to promote Clean Air Day further to a much wider audience.

# 3. Air Quality Monitoring Data and Comparison with Air Quality Objectives

## 3.1 Summary of Monitoring Undertaken

### 3.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how local concentrations of the main air pollutants compare with the objectives.

Inverclyde Council undertook automatic (continuous) monitoring at East Hamilton Street, Greenock site during 2021. Appendix A shows the details of the sites. National monitoring results are available at Site Data | Scottish Air Quality [(2).]

Ricardo Energy & Environment have published an air pollution report for Inverclyde which provides an analytical overview of the air quality measured throughout the year [(14)].

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

### 3.1.2 Non-Automatic Monitoring Sites

Inverclyde Council undertook non- automatic (passive) monitoring of $NO_2$ at 17 sites during 2021. Table A.2 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

## 3.2 Individual Pollutants

The air quality monitoring results presented in this section where relevant, adjusted for annualisation and bias. Further details on adjustments are provided in Appendix C.

### 3.2.1 Nitrogen Dioxide ($NO_2$)

Table A.3 in Appendix A compares the ratified and adjusted monitored $NO_2$ annual mean concentrations for the past five years with the air quality objective of 40 µg/$m^3$.

For diffusion tubes, the full 2021 dataset of monthly mean values is provided in Appendix B.

Table A.4 in Appendix A compares the ratified continuous monitored $NO_2$ hourly mean concentrations for the past five years with the air quality objective of 200µg/$m^3$, not to be exceeded more than 18 times per year.

In 2021, the automatic monitoring machine recorded no exceedences of the hourly mean objective or the annual mean objective for $NO_2$. The annual mean $NO_2$ concentration measured by the automatic monitor was 24 µg/$m^3$, below the National Air Quality Objective Limit.

Analysing the $NO_2$ data from the automatic monitoring machine shows concentrations were heightened at the beginning of the year. The monthly average $NO_2$ concentration recorded for January was 32 µg/$m^3$. High $NO_2$ hourly concentrations were recorded on the 8$^{th}$ January (97.49 µg/$m^3$) and the 19$^{th}$ January (111.52 µg/$m^3$). The month of April showed an increase in $NO_2$ concentrations with this month recording the second highest monthly average $NO_2$ concentration (29 µg/$m^3$) with the highest hourly concentration reaching 100.94 µg/$m^3$. There were sporadic days in the months of February, March and May where concentrations of $NO_2$ were elevated but for the most part $NO_2$ concentrations were high in the month of January and April. Concentrations were the lowest in the months of June and July, unfortunately no data was obtained for the remaining months to determine whether the decreasing trend would continue. The calendar plots in the annual statistics report produced by Ricardo Energy & Environment allows for effective visualisation of the data, depicting the trends identified in the time series information[(14)].

The results obtained from the $NO_2$ diffusion tubes also show no exceedances of the annual mean objective at the 17 non-automatic monitoring sites. In contrast to the $NO_2$ data obtained from the automatic monitoring machine, the $NO_2$ diffusion tube data revealed that the average $NO_2$ monthly concentrations was highest in October. However, a true comparison cannot be made as no data was obtained from the automatic monitoring machine for this month.

Both the automatic and non-automatic monitoring sites consistently measure $NO_2$ concentrations below the annual mean objective with the exception of one diffusion tube situated at East Hamilton Street, this was before the installation of the automatic monitor machine. The data from the diffusion tube located at the nearest residential property on East Hamilton Street has consistently shown lower concentrations of $NO_2$ in comparison to the diffusion tubes situated at the roadside.

### 3.2.2 Particulate Matter ($PM_{10}$)

Table A.5 in Appendix A compares the ratified and adjusted monitored $PM_{10}$ annual mean concentrations for the past five years with the air quality objective of 18µg/$m^3$.

Table A.6 in Appendix A compares the ratified continuous monitored $PM_{10}$ daily mean concentrations for the past five years with the air quality objective of 50µg/$m^3$, not to be exceeded more than seven times per year.

In 2021, the automatic monitoring machine recorded no exceedences for both the 24 hourly mean objective and the annual mean objective. The annual mean concentration measured for $PM_{10}$ was 10 µg/$m^3$, this was below the National Air Quality Objective Limit.

Examining the $PM_{10}$ concentrations for the year 2021 reveals that concentrations were the highest during the month of April. The monthly average $PM_{10}$ concentration recorded for April was 19 µg/$m^3$. There was sporadic occurrences were the daily $PM_{10}$ concentrations were extremely high, particularly on the 2nd March (35 µg/$m^3$), 9th September (32.04 µg/$m^3$) and 22nd December (27.61 µg/$m^3$). The lowest $PM_{10}$ concentrations were recorded during the months of October and November.

Since the automatic air quality machine was installed at East Hamilton Street in 2014 there has been no exceedances of the annual mean and only in 2019 has there been daily exceedances recorded.

### 3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.7 in Appendix A compares the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past five years with the air quality objective of 10µg/$m^3$.

In 2021, the automatic monitoring machine recorded no exceedences of the annual mean objective set for $PM_{2.5}$ .The annual mean concentration measured was 6 µg/$m^3$, this was below the National Air Quality Objective Limit.

The $PM_{2.5}$ concentrations for 2021 were relatively stable, however, there were days of heightened PM2.5 concentrations. Similarly to $PM_{10}$, the concentrations were the greatest on the 2nd March (21.73 µg/$m^3$), 9th September (23.37 µg/$m^3$) and 22nd December (20.80 µg/$m^3$). Likewise, the lowest $PM_{2.5}$ concentrations were recorded during the months of October and November.

### 3.2.4 Sulphur Dioxide ($SO_2$)

Inverclyde Council does not monitor for $SO_2$.

### 3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene

Inverclyde Council does not monitor for Carbon Monoxide, Lead and 1,3-Butadiene.

# 4 New Local Developments

### Road Traffic Sources

There has been no road traffic sources that have not been considered in previous review and assessment exercises.

### Other Transport Sources

There is no airport situated within Inverclyde Council and no significant changes have occurred in the Shipping Port operations.

### Industrial Sources

There are no new or proposed industrial installations for which an air quality assessment has been carried out in 2021. Inverclyde Council is not aware of any significant changes to existing installations of the introduction of a new receptor that is exposed.

### Commercial and Domestic Sources

There has been no new planning applications approved for the installation of biomass combustion plants.

### New Developments with Fugitive or Uncontrolled Sources

Inverclyde Council has not identified any new potential sources of fugitive or uncontrolled particulate matter.

# 5 Conclusion and Proposed Actions

### Conclusions from New Monitoring Data

In conclusion all measured air pollutants did not have concentrations which exceeded the National Air Quality Objective. Therefore no air quality management area needs to be declared.

An accurate conclusion for $NO_2$ concentrations cannot be drawn as the data capture for the automatic monitoring machine was 58%. However, taking into consideration past air quality in Inverclyde and the data obtained from the $NO_2$ diffusion tubes, it is more than likely that the $NO_2$ concentrations will be below the National Air Quality Objective.

The Covid-19 pandemic has had a notable effect on the air quality within Inverclyde in the year 2020. No national restrictions were in place for 2021, however local restrictions were introduced and only essential shops were allowed to operate at the start of the year. In April 2021, non-essential shops and leisure facilities were allowed to re-open. Universities, college and schools returned to in-person learning. This could be a possible reason as to why $NO_2$ and $PM_{10}$ concentrations were greater for the month of April.

### Proposed Actions

Inverclyde Council will continue to regularly monitor and review air quality within the local area. The $NO_2$ diffusion tubes have been located at the same sites for a long period of time. It was stated in the 2021 Annual Progress Report that discussions were taking place to change the locations of the diffusion tubes. Instead of removing diffusion tubes and replacing them in a different area, additional $NO_2$ diffusion tubes were added. This was to allow continued monitoring of busy areas in Inverclyde and identify potential air pollution hot spots. Three additional diffusion tubes were added to the network in January 2022. The annual data obtained for these sites will be detailed in the June 2023 Annual Progress Report. At present, there does not look to be potential or actual exceedances at the new locations. This will be monitored closely over the course of the year, however to date it does not highlight the need for further monitoring.

The automatic monitoring machine will remain situated at East Hamilton Street. The colocation study will continue at East Hamilton Street, obtaining data from the air monitor and three $NO_2$ diffusion tubes to develop a local bias adjustment factor.

The relationship between road traffic and air pollution is well documented and it reinforces that proposed actions need to be targeted at reducing road traffic. Inverclyde Council will continue its efforts to promote and encourage sustainable travel within the local area to reduce road traffic emissions. Actions will be taken over the course of the following year to ensure carbon emissions are reducing locally to help Scotland achieve the net zero target.

The next Air Quality Annual Progress Report will be submitted June 2023.

# Appendix A: Monitoring Results

**Table A.1 – Details of Automatic Monitoring Sites**

| Site ID<br>Site Name | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA? Which AQMA? | Monitoring Technique | Distance to Relevant Exposure (m) (1) | Distance to kerb of nearest road (m) (2) | Inlet Height (m) |
|---|---|---|---|---|---|---|---|---|---|
| Inverclyde Greenock A8 | Roadside | 229365 | 675700 | $NO_2$, $PM_{10}$, $PM_{2.5}$, $PM_1$ | N | TEOM | 12 | 2.5 | 1.8 |

**Notes:**

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable.

**Table A.2 – Details of Non-Automatic Monitoring Sites**

| Site Name | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA? Which AQMA? | Distance to Relevant Exposure (m) (1) | Distance to kerb of nearest road (m) (2) | Tube co-located with a Continuous Analyser? |
|---|---|---|---|---|---|---|---|---|
| Carwood Court | Roadside | 229503 | 675400 | $NO_2$ | N | 13.5m | 5m | N |
| Brown Street, PG | Roadside | 231699 | 674620 | $NO_2$ | N | 1m | 1m | N |
| Bridge of Weir Rd | Roadside | 235824 | 669909 | $NO_2$ | N | 1m | 1m | N |
| East Hamilton Street (1) | Roadside | 229365 | 675700 | $NO_2$ | N | 12m | 2.5m | Y |
| East Hamilton Street (2) | Roadside | 229365 | 675700 | $NO_2$ | N | 12m | 2.5m | Y |
| East Hamilton Street (3) | Roadside | 229365 | 675700 | $NO_2$ | N | 12m | 2.5m | Y |
| East Hamilton Street (property) | Roadside | 229301 | 675712 | $NO_2$ | N | 0m | 14.25m | N |
| Dellingburn St | Roadside | 228422 | 675735 | $NO_2$ | N | 3.5m | 5m | N |
| Dalrymple St | Roadside | 228311 | 675993 | $NO_2$ | N | 15m | 3m | N |

| Site Name | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA? Which AQMA? | Distance to Relevant Exposure (m) (1) | Distance to kerb of nearest road (m) (2) | Tube co-located with a Continuous Analyser? |
|---|---|---|---|---|---|---|---|---|
| Inverkip St | Roadside | 227563 | 676246 | $NO_2$ | N | 1m | 2.5m | N |
| Dunlop St | Roadside | 226827 | 675622 | $NO_2$ | N | 4m | 2m | N |
| Nelson St | Roadside | 227092 | 676134 | $NO_2$ | N | 1m | 5m | N |
| Inverkip Rd | Roadside | 224441 | 675224 | $NO_2$ | N | 15m | 4m | N |
| Larkfield Rd | Roadside | 224869 | 675757 | $NO_2$ | N | 3m | 2m | N |
| Main St, WB | Roadside | 219407 | 668573 | $NO_2$ | N | 1m | 2m | N |
| Kempock St, | Roadside | 224097 | 677910 | $NO_2$ | N | 1m | 1m | N |
| Cardwell Rd | Roadside | 224664 | 677168 | $NO_2$ | N | 3m | 4m | N |
| Newark St | Roadside | 225460 | 677501 | $NO_2$ | N | 1m | 5m | N |
| Brougham St | Roadside | 227242 | 677032 | $NO_2$ | N | 7m | 5.5m | N |

| Site Name | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA? Which AQMA? | Distance to Relevant Exposure (m) (1) | Distance to kerb of nearest road (m) (2) | Tube co-located with a Continuous Analyser? |
|---|---|---|---|---|---|---|---|---|
| MacDougall St | Roadside | 229605 | 675593 | $NO_2$ | N | 13m | 3m | N |

**Notes:**

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property).

(2) N/A if not applicable.

**Table A.3 – Annual Mean $NO_2$ Monitoring Results ($\mu g/m^3$)**

| Site ID | Site Type | Monitoring Type | Valid Data Capture 2021 (%) [2] | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|
| Inverclyde Greenock A8 | Roadside | Automatic | 56 | 28.0 | 32.0 | 28.0 | 21 | 24 |
| Carwood Court | Roadside | Diffusion Tube | 100 | 9.8 | 10.5 | 7.8 | 8.0 | 7.0 |
| Brown Street, PG | Roadside | Diffusion Tube | 100 | 18.1 | 17.7 | 14.4 | 13.4 | 12.1 |
| Bridge of Weir Rd | Roadside | Diffusion Tube | 91.7 | 15.1 | 14.0 | 12.3 | 9.0 | 11.7 |
| East Hamilton Street (1) | Roadside | Diffusion Tube | 100 | 34.7 | 31.6 | 27.6 | 22.9 | 23.9 |
| East Hamilton St (2) | Roadside | Diffusion Tube | 100 | 36.0 | 35.1 | 28.5 | 24.2 | 25.5 |
| East Hamilton St (3) | Roadside | Diffusion Tube | 100 | 35.0 | 33.9 | 27.0 | 23.4 | 25.6 |
| East Hamilton St (property) | Roadside | Diffusion Tube | 83.3 | 22.0 | 20.4 | 17.6 | 11.9 | 15.8 |
| Dellingburn St | Roadside | Diffusion Tube | 100 | 33.5 | 29.3 | 24.8 | 20.5 | 22.1 |
| Dalrymple St | Roadside | Diffusion Tube | 100 | 22.5 | 23.8 | 18.5 | 15.3 | 14.5 |
| Inverkip St | Roadside | Diffusion Tube | 100 | 27.4 | 27.6 | 24.1 | 23.5 | 20.8 |
| Dunlop St | Roadside | Diffusion Tube | 100 | 19.2 | 16.1 | 14.8 | 13.1 | 14.4 |
| Nelson St | Roadside | Diffusion Tube | 100 | 26.4 | 24.9 | 22.9 | 18.0 | 19.8 |

| Site ID | Site Type | Monitoring Type | Valid Data Capture 2021 (%) (2) | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|
| Inverkip Rd | Roadside | Diffusion Tube | 100 | 19.7 | 18.9 | 16.5 | 13.0 | 16.1 |
| Larkfield Rd | Roadside | Diffusion Tube | 100 | 20.5 | 17.0 | 15.8 | 11.8 | 14.0 |
| Main St WB | Roadside | Diffusion Tube | 100 | 14.1 | 12.7 | 11.2 | 8.2 | 9.8 |
| Kempock St | Roadside | Diffusion Tube | 91.7 | 14.7 | 14.6 | 11.6 | 9.2 | 10.3 |
| Cardwell Rd | Roadside | Diffusion Tube | 100 | 24.7 | 25.3 | 20.1 | 16.4 | 18.1 |
| Newark St | Roadside | Diffusion Tube | 100 | 19.9 | 15.2 | 11.8 | 9.7 | 9.7 |
| Brougham St | Roadside | Diffusion Tube | 100 | 24.9 | 24.7 | 20.3 | 14.8 | 16.7 |
| MacDougall St | Roadside | Diffusion Tube | 100 | 21.2 | 21.5 | 16.7 | 12.8 | 17.7 |

**Notes:**

Exceedances of the $NO_2$ annual mean objective of 40µg/$m^3$ are shown in bold.

$NO_2$ annual means exceeding 60µg/$m^3$, indicating a potential exceedance of the $NO_2$ 1-hour mean objective are shown in **bold and underlined**.

Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG(16) if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

**Table A.4 – 1-Hour Mean $NO_2$ Monitoring Results, Number of 1-Hour Means > 200µg/m$^3$**

| Site ID | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2021 (%) (2) | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|
| Inverclyde Greenock A8 | Roadside | Automatic | 100 | 56 | 0 | 0 | 0 | 0 | 0 |

**Notes:**

Exceedances of the $NO_2$ 1-hour mean objective (200 µg/m$^3$ not to be exceeded more than 18 times/year) are shown in bold.

If the period of valid data is less than 85%, the 99.8$^{th}$ percentile of 1-hour means is provided in brackets.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

**Table A.5 – Annual Mean $PM_{10}$ Monitoring Results ($\mu g/m^3$)**

| Site ID | Site Type | Monitoring Type | Valid Data Capture 2021 (%) (2) | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|
| Inverclyde Greenock A8 | Roadside | Automatic | 100 | 10 | 12 | 12 | 10 | 11 |

**Notes:**

Exceedances of the $PM_{10}$ annual mean objective of 18 $\mu g/m^3$ are shown in bold.

All means have been "annualised" as per LAQM.TG(16), valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

**Table A.6 – 24-Hour Mean $PM_{10}$ Monitoring Results, Number of $PM_{10}$ 24-Hour Means > 50µg/m$^3$**

| Site ID | Site Type | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2021 (%) (2) | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|
| Inverclyde Greenock A8 | Roadside | Automatic | 100 | 0 | 0 | **5** | 0 | 0 |

**Notes:**

Exceedances of the $PM_{10}$ 24-hour mean objective (50 µg/m$^3$ not to be exceeded more than seven times/year) are shown in bold.

If the period of valid data is less than 85%, the 98.1st percentile of 24-hour means is provided in brackets.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

**Table A.7 – Annual Mean $PM_{2.5}$ Monitoring Results (µg/m$^3$)**

| Site ID | Site Type | Monitoring Type | Valid Data Capture 2021 (%) (2) | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|
| Inverclyde Greenock A8 | Roadside | Automatic | 100 | 5 | 6 | 7 | 5 | 6 |

**Notes:**

Exceedances of the $PM_{2.5}$ annual mean objective of 10 µg/m$^3$ are shown in bold.

All means have been "annualised" as per LAQM.TG(16), valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

# Appendix B: Full Monthly Diffusion Tube Results for 2021

**Table B.1 – $NO_2$ 2021 Monthly Diffusion Tube Results ($\mu g/m^3$)**

| Site ID | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual Mean: Raw Data | Annual Mean: Bias Adjusted (1) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Carwood Court | 14.2 | 4.9 | 4.1 | 4.5 | 6.8 | 2.2 | 2.9 | 4.9 | 4.1 | 9.5 | 5.8 | 11.5 | 6.3 | 7.0 |
| Brown Street | 17.3 | 8.6 | 7.4 | 7.2 | 12.0 | 5.4 | 8.1 | 12.3 | 9.8 | 14.5 | 10.3 | 16.3 | 10.8 | 12.1 |
| Bridge of Weir Road | 12.1 | 8.6 | 7.1 | 5.0 | 7.8 | **X** | 24.5 | 6.8 | 6.6 | 12.3 | 9.8 | 14.6 | 10.5 | 11.7 |
| East Hamilton Street (1) | 32.4 | 12.0 | 21.6 | 14.6 | 26.7 | 13.2 | 8.5 | 17.9 | 19.6 | 32.3 | 27.3 | 30.3 | 21.4 | 23.9 |
| East Hamilton Street (2) | 25.0 | 14.0 | 18.2 | 22.5 | 23.1 | 16.0 | 24.1 | 21.1 | 21.4 | 34.1 | 23.4 | 30.5 | 22.8 | 25.5 |
| East Hamilton Street (3) | 25.5 | 13.4 | 13.4 | 12.9 | 30.6 | 13.7 | 19.2 | 33.9 | 24.6 | 32.6 | 24.8 | 29.5 | 22.8 | 25.6 |
| East Hamilton Street Property | **X** | **X** | 12.1 | 13.5 | 12.6 | 9.9 | 16.4 | 2.0 | 14.4 | 22.5 | 16.8 | 21.0 | 14.1 | 15.8 |
| Dellingburn Street | 23.4 | 14.5 | 14.6 | 11.1 | 14.5 | 13.3 | 23.6 | 14.7 | 19.9 | 32.9 | 23.7 | 30.9 | 19.8 | 22.1 |
| Dalrymple Street | 16.1 | 8.8 | 6.4 | 10.0 | 16.6 | 3.8 | 12.7 | 12.8 | 14.4 | 18.7 | 13.2 | 21.9 | 13.0 | 14.5 |
| Inverkip Street | 25.3 | 11.5 | 12.5 | 17.9 | 20.3 | 11.2 | 8.2 | 19.4 | 21.4 | 27.8 | 17.7 | 29.4 | 18.6 | 20.8 |
| Dunlop Street | 17.7 | 9.7 | 7.7 | 10.1 | 15.4 | 4.7 | 9.5 | 13.6 | 13.3 | 19.7 | 15.1 | 17.6 | 12.8 | 14.4 |
| Nelson Street | 17.7 | 8.3 | 7.5 | 18.3 | 23.9 | 8.4 | 16.7 | 25.2 | 19.8 | 22.3 | 19.4 | 24.6 | 17.7 | 19.8 |
| Inverkip Road | 17.2 | 9.2 | 6.9 | 14.0 | 17.8 | 6.2 | 15.9 | 16.0 | 14.8 | 18.8 | 17.2 | 18.0 | 14.3 | 16.1 |
| Larkfield Road | 18.7 | 4.3 | 5.7 | 18.6 | 16.3 | 5.1 | 10.7 | 14.1 | 11.8 | 16.5 | 12.3 | 15.9 | 12.5 | 14.0 |
| Main Street Wemyss Bay | 9.5 | 10.3 | 5.5 | 7.6 | 8.9 | 2.2 | 8.4 | 11.7 | 11.0 | 11.5 | 6.4 | 11.9 | 8.7 | 9.8 |
| Kempock Street | 10.4 | 6.1 | 3.3 | 9.4 | 12.4 | 5.0 | 11.8 | 14.2 | 8.0 | 11.2 | 9.6 | **X** | 9.2 | 10.3 |
| Cardwell Road | 19.8 | 14.1 | 10.8 | 11.4 | 13.3 | 10.1 | 15.0 | 13.1 | 15.6 | 25.7 | 20.3 | 24.9 | 16.2 | 18.5 |
| Newark Street | 14.0 | 10.4 | 5.4 | 12.0 | 11.5 | 3.1 | 7.4 | 7.7 | 8.6 | 12.3 | 10.6 | 1.4 | 8.7 | 9.6 |
| Brougham Street | 23.7 | 12.3 | 11.1 | 18.3 | 19.6 | 7.7 | 16.2 | 18.4 | 12.4 | 21.9 | 16.3 | 1.4 | 14.9 | 16.7 |
| MaDougall Street | 16.4 | 12.0 | 7.6 | 22.3 | 19.1 | 7.2 | 17.7 | 20.6 | 12.4 | 17.4 | 17.2 | 20.2 | 15.8 | 17.7 |

**Notes:**

(1) See Appendix C for details on bias adjustment

# Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

### New or Changed Sources Identified Within Inverclyde Council During 2021

Inverclyde Council has not identified any new sources relating to air quality within the reporting year of 2021.

### Additional Air Quality Works Undertaken by Inverclyde Council During 2021

Inverclyde Council has not completed any additional works within the reporting year of 2021.

### QA/QC of Diffusion Tube Monitoring

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 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' [(15)].

There are 3 diffusion tubes currently located at the automatic monitoring site at East Hamilton Street.

The National Bias adjustment factor of 1.12 for 2021 was retrieved from Glasgow Scientific Services data provided in the DEFRA National Diffusion Tube Bias Adjustment Factor Spreadsheet (03/22) [(16)].

The Local Bias adjustment factor of 1.17 was obtained using the AEA Energy & Environment Group Spreadsheet. The spreadsheet allowed for the precision and accuracy of our co-location study to be determined. The results revealed the 1.17 Local Bias adjustment factor and the overall quality of the data was found to have poor precision. In accordance with the LAQM TG16, the decision was taking to apply the National Bias adjustment factor, 1.12 to the data obtained.

### Diffusion Tube Annualisation

All diffusion tube monitoring locations within Inverclyde Council recorded data capture of 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

### Diffusion Tube Bias Adjustment Factors

Inverclyde Council have applied a national bias adjustment factor of 1.12 to the 2021 monitoring data. A summary of bias adjustment factors used by Inverclyde Council over the past five years is presented in Table C.1.

A national bias adjustment factor was chosen as the quality of diffusion tube data obtained for 2021 showed poor precision.

**Table C.1 – Bias Adjustment Factor**

| Year | Local or National | If National, Version of National Spreadsheet | Adjustment Factor |
|---|---|---|---|
| 2021 | National | 03/22 | 1.12 |
| 2020 | Local | - | 0.81 |
| 2019 | Local | - | 0.73 |
| 2018 | Local | - | 0.79 |
| 2017 | National | 09/18 | 0.91 |

### $NO_2$ Fall-off with Distance from the Road

No diffusion tube $NO_2$ monitoring locations within Inverclyde Council required distance correction during 2021.

### QA/QC of Automatic Monitoring

The automatic monitoring site at East Hamilton Street contains one $NO_x/NO_2$ analyser and one TEOM Ambient Particulate Monitor. Throughout 2021 site audits and calibrations were undertaken by Ricardo Energy & Environment and services carried out every 6 months by Air Monitors. Fortnightly manual calibrations were carried out by Inverclyde Council. The monitoring data obtained from the Inverclyde Greenock A8 automatic air quality monitor is uploaded onto the Scottish Air Quality website (2). This data provided within the report has underwent ratification by Ricardo Energy & Environment.

### $PM_{10}$ and $PM_{2.5}$ Monitoring Adjustment

The $PM_{10}$ data contained in this report has been obtained from the Scottish Air Quality website (2). The data provided is the VCM corrected data from the TEOM within at the automatic monitoring site at East Hamilton Street, Greenock.

### Automatic Monitoring Annualisation

The data capture obtained for $PM_{10}$ and $PM_{2.5}$ was above 75%, therefore no annualisation was carried out. However, the data capture for $NO_2$ was poor (56%), thus the data was annualised and this information is presented in Table C.2.

$NO_2$ data was captured for the whole of 2021, however, having undergone ratification the data for August to December was deemed unreliable and therefore deleted from the website. On 27th July 2021 a new $NO_2$ analyser was introduced and calibrations were carried out using the analyser's permeation tube as opposed to the cylinder. This lead to unreliable calibrations and loss of data, although this went undetected for several months the issue has now been resolved.

### $NO_2$ Fall-off with Distance from the Road

No automatic $NO_2$ monitoring locations within Inverclyde Council required distance correction during 2021.

**Table C.2 – Annualisation Summary (concentrations presented in µg/m$^3$)**

| Site ID | Annualisation Factor Site 1 – Glasgow Waulkmillglen Reservoir | Annualisation Factor Site 2 – Glasgow Townhead | Annualisation Factor Site 3- Falkirk Grangemouth MC | Annualisation Factor Site 4 – Grangemouth Moray | Average Annualisation Factor | Raw Data Annual Mean | Annualised Annual Mean | Comments |
|---|---|---|---|---|---|---|---|---|
| Inverclyde Greenock A8-$NO_2$ | 0.875 | 1.059 | 1.077 | 0.929 | 0.985 | 24 | 23.6 | Urban Background, Suburban and Rural sites within a 50 mile radius to Inverclyde's Automatic Monitoring Machine was chosen to calculate annualised annual $NO_2$/NO mean. |
| Inverclyde Greenock A8-NO | 1.000 | 1.000 | 0.800 | 1.000 | 0.950 | 18 | 17.1 | |

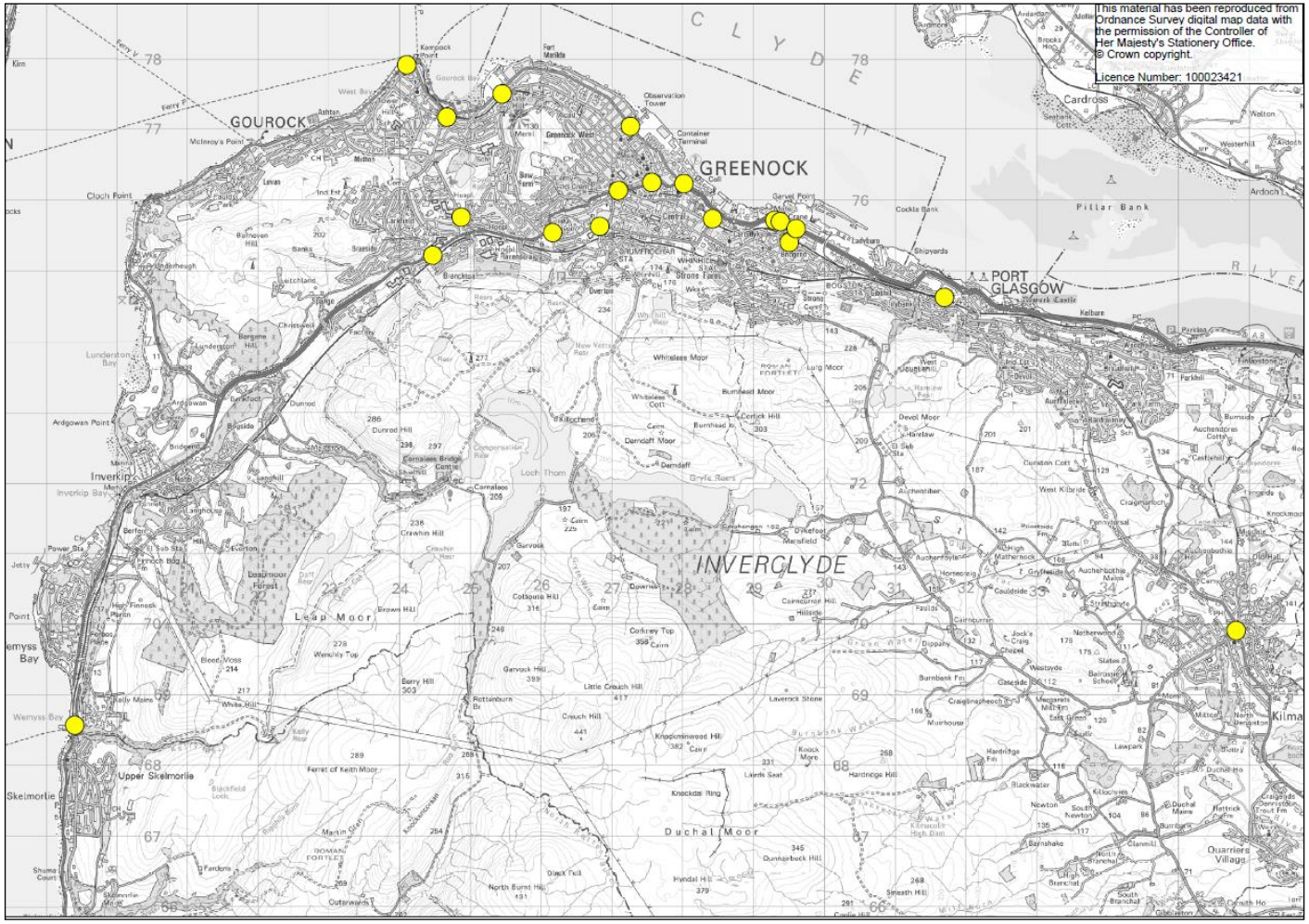
**Table C.3 – Local Bias Adjustment Calculations**

| | Local Bias Adjustment |
|---|---|
| **Periods used to calculate bias** | 12 |
| **Bias Factor A** | 1.17 (0.88 – 1.75) |
| **Bias Factor B** | -15% (-43% - 13%) |
| **Diffusion Tube Mean (µg/m$^3$)** | 20 |
| **Mean CV (Precision)** | 12% |
| **Automatic Mean (µg/m$^3$)** | 24 |
| **Data Capture** | 99% |
| **Adjusted Tube Mean (µg/m$^3$)** | 24 (18 – 36) |

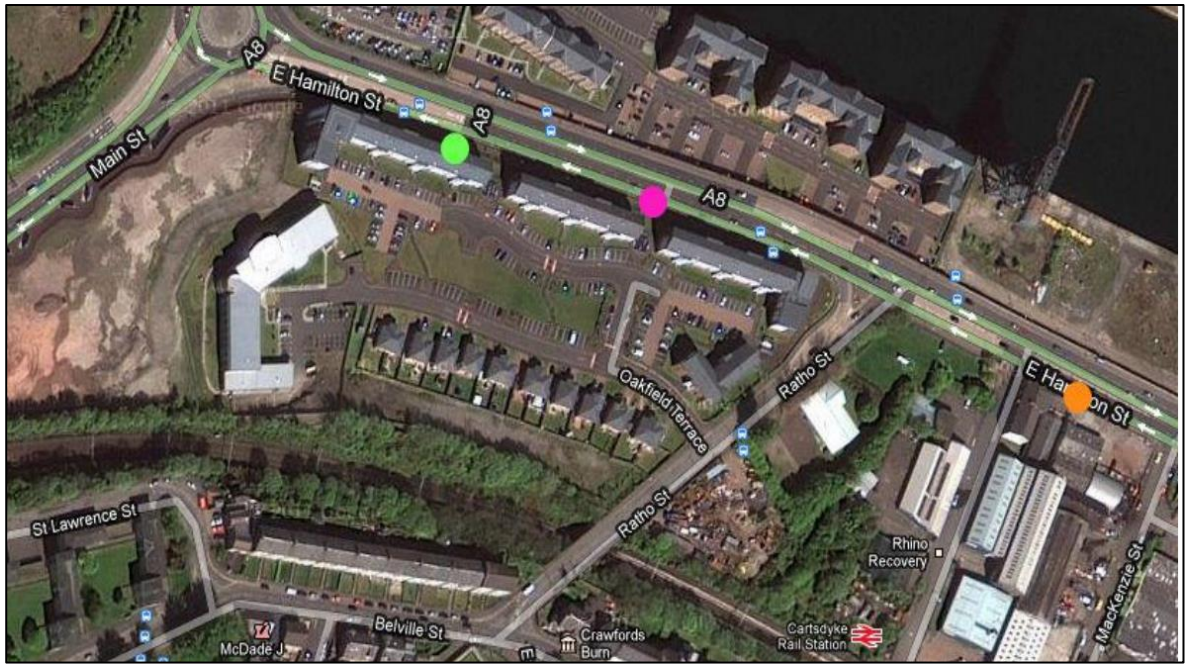
Notes:

A single local bias adjustment factor has been used to bias adjust the 2021 diffusion tube results.

## Appendix D: Maps of Monitoring Locations in Inverclyde

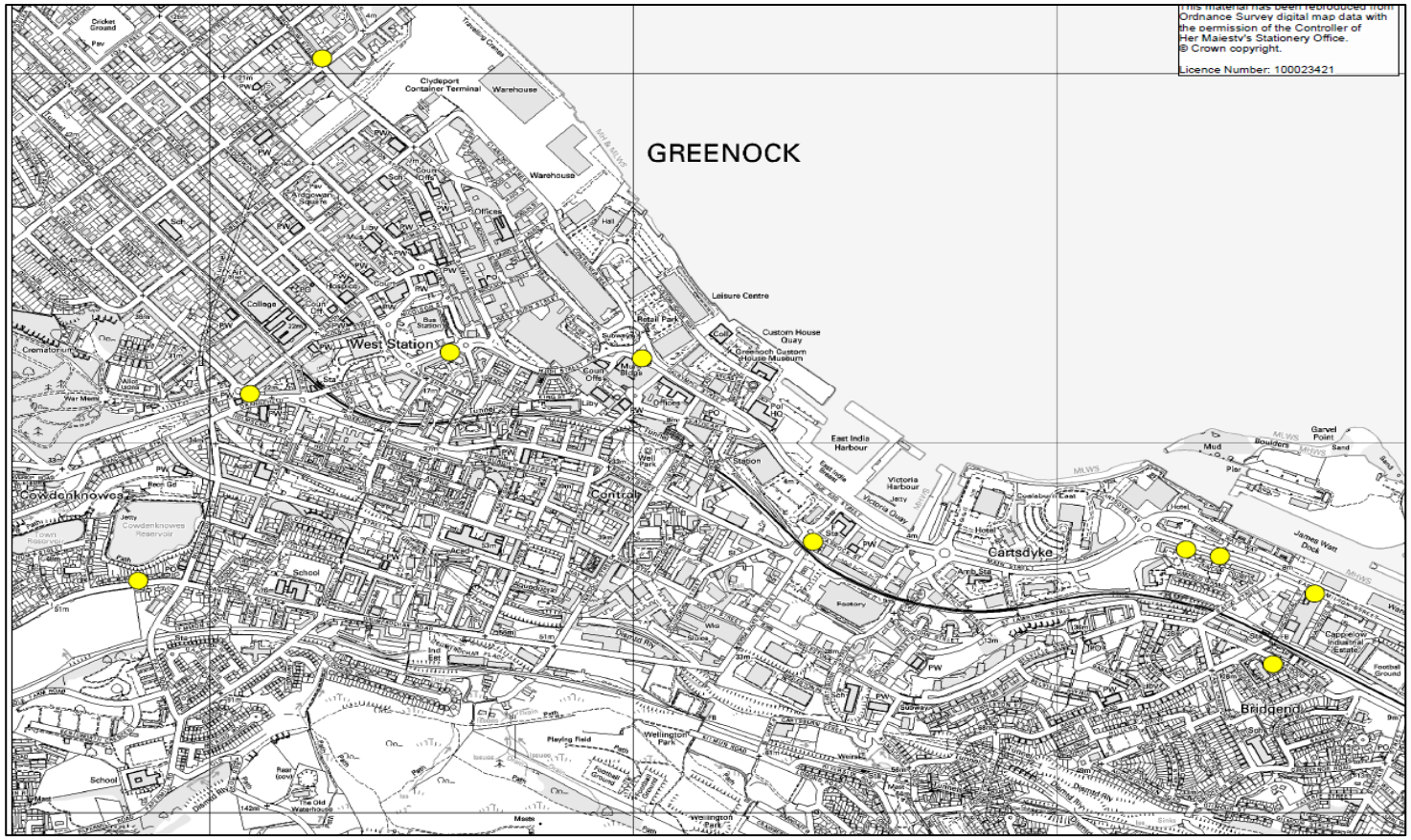


## Map of Automatic Air Monitoring Site and Collocation study at East Hamilton Street

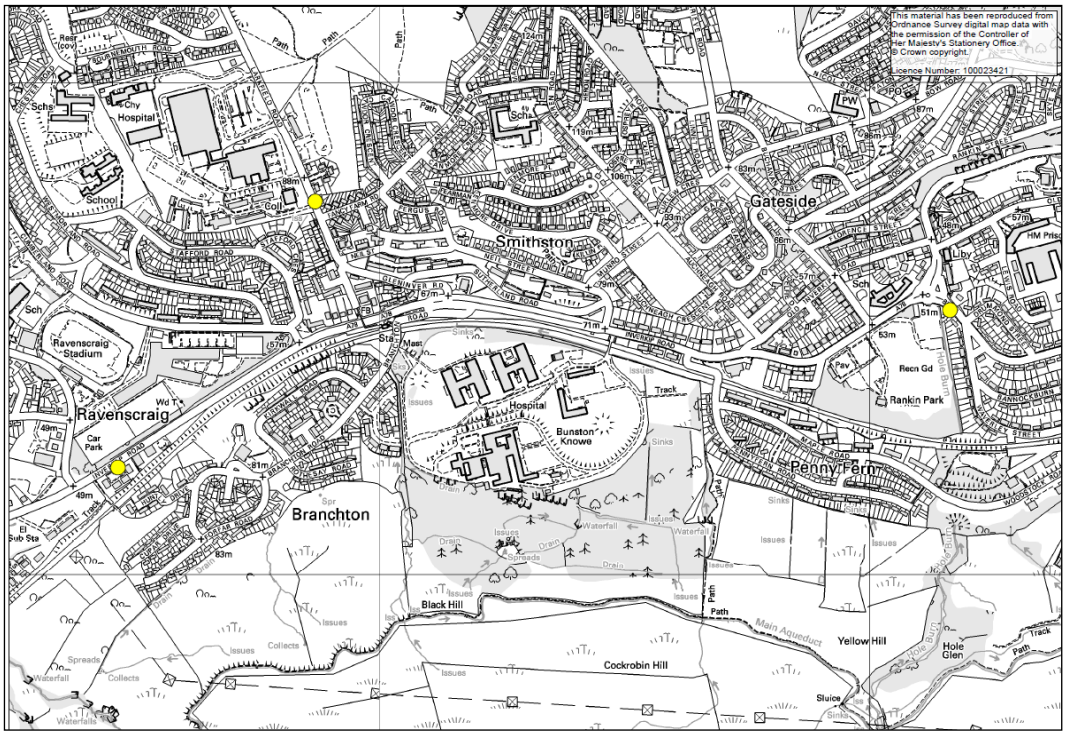



- $NO_2$ diffusion tube at façade of nearest property (East Hamilton Street)
- Automatic Air Quality Monitor with 3 x $NO_2$ diffusion tubes (East Hamilton Street)
- 1 x $NO_2$ diffusion tube (MacDougall Street)

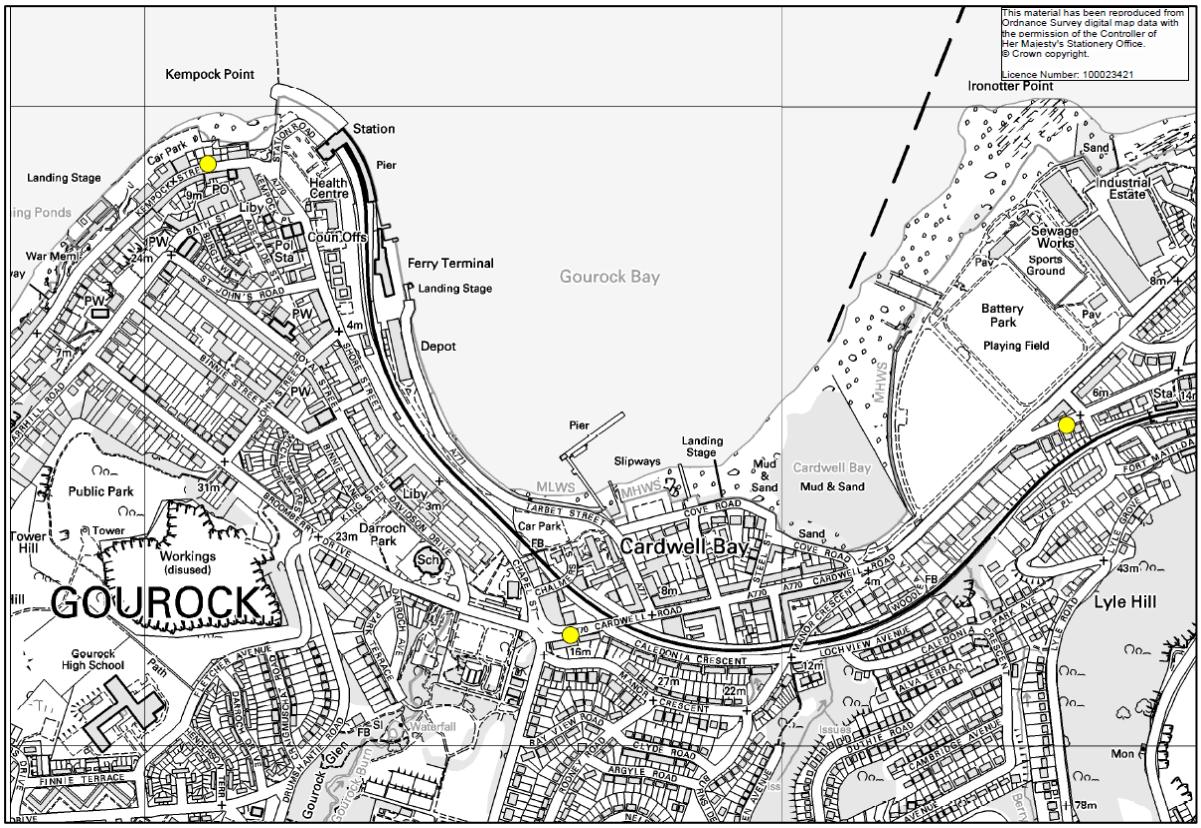
## Map of $NO_2$ Diffusion Tube Monitoring Network: Greenock Central



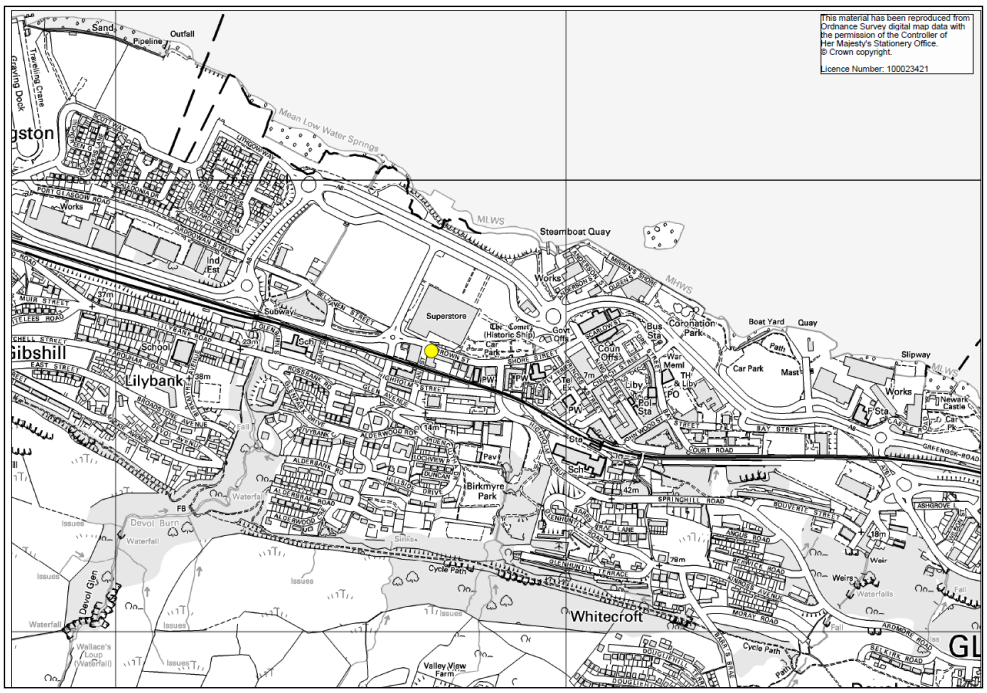
**Map of $NO_2$ Diffusion Tube Monitoring Network: Greenock South**



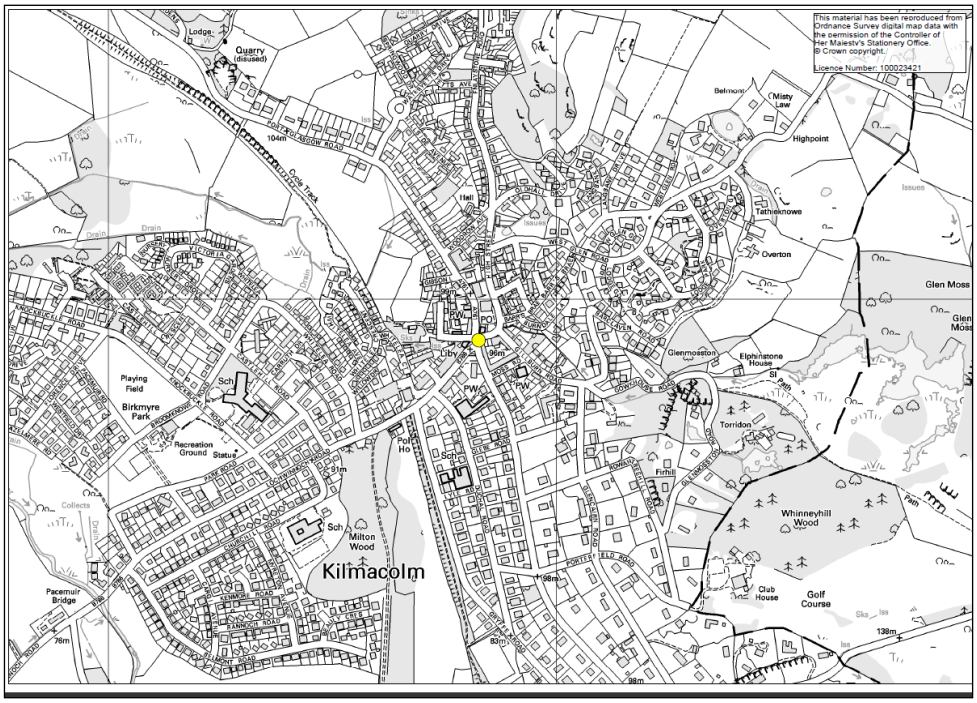

**Map of $NO_2$ Diffusion Tube Monitoring Network: Gourock/Greenock West**



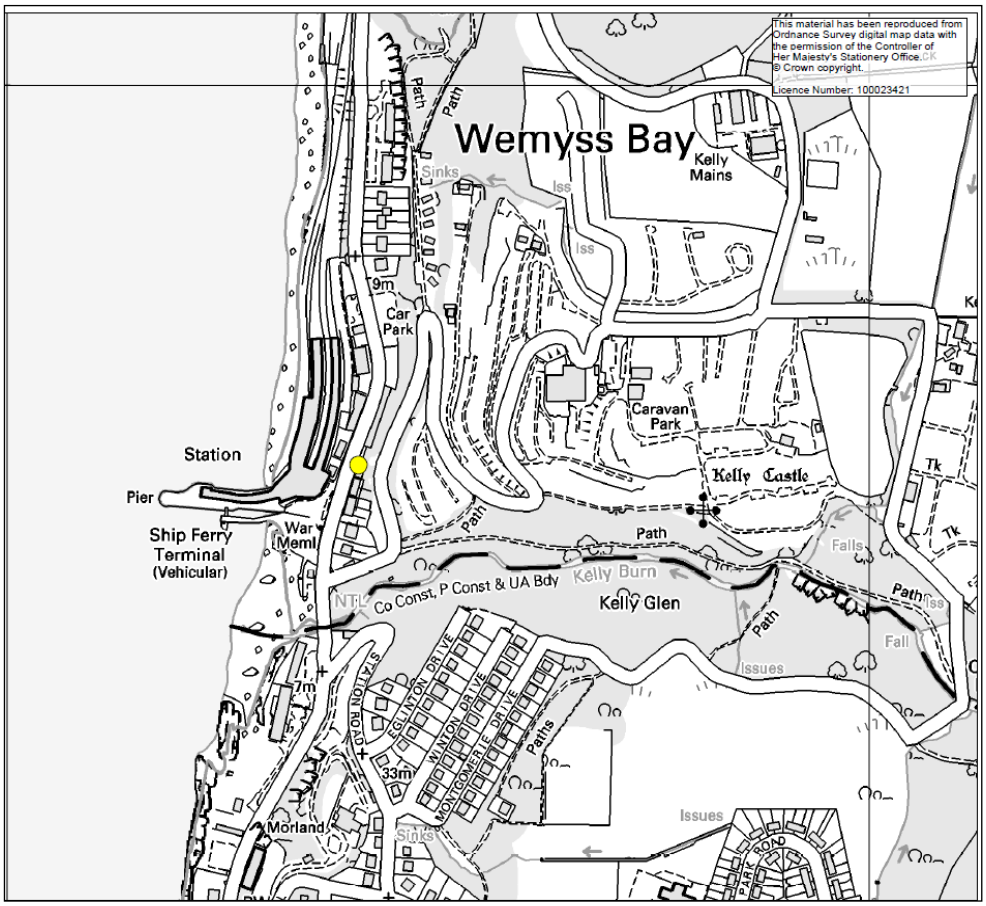
## Map of $NO_2$ Diffusion Tube Monitoring Network: Port Glasgow




## Map of $NO_2$ Diffusion Tube Monitoring Network: Kilmacolm



## Map of $NO_2$ Diffusion Tube Monitoring Network: Wemyss Bay



# Glossary of Terms

| Abbreviation | Description |
|---|---|
| AQAP | Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the LA intends to achieve air quality limit values' |
| AQMA | Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives |
| APR | Air quality Annual Progress Report |
| AURN | Automatic Urban and Rural Network (UK air quality monitoring network) |
| Defra | Department for Environment, Food and Rural Affairs |
| DMRB | Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England |
| FDMS | Filter Dynamics Measurement System |
| LAQM | Local Air Quality Management |
| $NO_2$ | Nitrogen Dioxide |
| $NO_x$ | Nitrogen Oxides |
| $PM_{10}$ | Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less |
| $PM_{2.5}$ | Airborne particulate matter with an aerodynamic diameter of 2.5µm or less |
| QA/QC | Quality Assurance and Quality Control |
| $SO_2$ | Sulphur Dioxide |

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