Annual Progress Report (APR)

North Ayrshire Council
Comhairle Siorrachd Àir a Tuath

2023 Air Quality Annual Progress Report (APR) for
North Ayrshire Council

In fulfilment of Part IV of the Environment Act 1995, as amended by the Environment Act 2022

Local Air Quality Management

June 2023

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Executive Summary: Air Quality in Our Area

Air Quality in North Ayrshire Council

This report was prepared in accordance with the Local Air Quality Management (LAQM) Technical Guidance 2022 (TG22) and sets out the air quality monitoring carried out in North Ayrshire, with results and conclusions of data collected for 2022. Monitoring is carried out in North Ayrshire for Nitrogen Dioxide (NO_2) and Particulate Matter (PM), particles of soot (carbon), metals or inorganic salts of sizes less than or equal to 10micrometers, PM_{10}; and less than or equal to 2.5micrometers, $PM_{2.5}$.

Monitoring in previous years identified that the main air quality issue in North Ayrshire was associated with NO_2 and related to a) traffic congestion in High Street, Irvine and b) queuing traffic in New Street, Dalry. Mitigation projects were completed successfully in 2019 for the two areas and monitoring results reflect the changes in ambient air quality, showing a downward trend accordingly. Monitoring continues to ensure that this these mitigation measures have been successful.

Following the easing of COVID-19 travel restrictions and a return to business as usual, it was expected that NO_2 would continue to increase as seen during 2021 however, NO_2 at the three diffusion tube monitors of previous years' concern in High Street, Irvine, remained the same or showed a decreased from **11,13,14**µg/m^3 in 2021 to **11,11,11**µg/m^3 in 2022 respectively. A corresponding decrease was also observed at the nearby automatic monitor station where NO_2 decreased from **13**µg/m^3 in 2021 to **11**µg/m^3 for 2022.

In New Street, Dalry, NO_2 also deceased or remained the same at **14,14**µg/m^3 in 2021 and **10,14**µg/m^3 for 2022 respectively for the same corresponding diffusion tubes of concern.

Whilst relatively new PM monitoring instruments have generally brought improvements in measurement capability, achieving accurate and reproducible measurements of low concentrations remains a significant challenge and it was recognised that ambient concentrations of PM_{10} and $PM_{2.5}$ reported by different instruments in the same environments can vary by several micrograms (as an annual mean). This prompted investigation into the relevant instruments and the completed report can be found here:

Equivalence Study to Investigate Particulate Matter Monitoring in Scotland Using the Fidas 200 | Scottish Air Quality with the corresponding guidance here Local Authority Guidance Note for LAQM Reporting of Scottish PM Data | Scottish Air Quality.

PM statistics will now be displayed as corrected and uncorrected values. PM_{10} increased from an annual mean of 10.8µg/m^3 (**11.9**µg/m^3 corrected) in 2021 to 12.5µg/m^3 (**13.8**µg/m^3 corrected) in 2022 in High Street, Irvine. The Scottish annual mean air quality objective for PM_{10} is 18µg/m^3. $PM_{2.5}$ also increased slightly from 6µg/m^3 (**6.3**µg/m^3 corrected) in 2021 to 6.7µg/m^3 (**7.1**µg/m^3 corrected) in 2022 for the same location. The Scottish annual mean air quality objective for $PM_{2.5}$ is 10µg/m^3.

Overall, monitoring results for 2022 have shown that NO_2 decreased, and PM levels have increased in High Street, Irvine. NO_2 levels in New Street, Dalry have also shown a decrease or remained the same. NO_2 levels have shown a downward trend across the whole of North Ayrshire since 2018 and showed a slight increase in 2021 following the easing of COVID-19 restrictions but this has not continued in 2022. PMs have shown an increase from 2021 to 2022. This may be due to prevailing weather conditions during 2022.

North Ayrshire Council has one officer located within Environmental Health who implements the LAQM requirements: ensuring monitoring equipment is maintained correctly; dealing with enquiries, planning permissions and complaints; report writing, liaising with relevant colleagues in other departments and partners as required e.g. SEPA and Transport Scotland.

2022 data shows that there are no ambient air quality issues within North Ayrshire Council.

Actions to Improve Air Quality

North Ayrshire Council has Energy and Sustainability Officers, an Access Officer, a School Travel Plan Co-ordinator, Traffic and Transportation Managers, a Business Change Project Manager, Workplace Engagement Officers and supporting teams who collectively promote modal shift and actions to improve air quality and wellbeing.

North Ayrshire Council operates a Sustainable Business Travel Plan Carpool Scheme alongside Enterprise Car Club. Across January – December 2022, the car-share scheme had 15 vehicles (a split of 11 petrol-hybrids and 4 EVs). Between January – December 2022, some 182,514 miles were travelled by the Car Club scheme. Of this, a total of

40,094 miles were travelled on 100% Electric Vehicles – approximately 21% of the total Car Club miles. The next stage is to continue implementing further charging infrastructure, and providing electric vehicle driver training, so that we may further increase our use of electric vehicles across all of the NAC fleet as this is in line with our sustainability aims.

The £695k programme of additional energy efficient lighting improvements to introduce LED white lighting for around 5,000 other existing white light sources with higher energy consumption is programmed across the two years 2022-23. It remains on target for completion as anticipated and will significantly reduce our energy use and carbon emissions from lighting.

During 2022 the Council's Travel Smart behaviour change project continued to promote modal shift to active and sustainable travel, but also focused on Mental and Physical Wellbeing whilst employees were working at home. One Workplace Engagement Officer is appointed within North Ayrshire Council to promote active and sustainable travel to/from work, and a Schools and Workplaces Active Travel Programme.

Working with several local employers including NHS Ayrshire and Arran, KA Leisure, GSK, and Booth Welsh, the project has organised:

Step Count Challenge: NAC employees took part in a bespoke Step Count Challenge achieving over 71.9 million steps by walking, cycling, running, yoga, and swimming in June 2022.

National Bike Week: In June 2022 employees within workplaces achieved as many points as possible based on a point scoring challenge. Achieving points by using multi modes of active travel to places of work secured small incentive rewards.

E-Bike Taster Sessions: To engage with employees and to make it more accessible to all, staff events were held on a Saturday. Over two Saturday mornings in February 2023 a total of seven employees trialled an e-bike.

Travel Smart Reward Card: This rewarded staff in February 2023 who travel to work by walking/cycling/public transport or multi-mode travel after six active travel journeys to work by providing a Travel Smart Goody bag as an incentive and prize.

E-Bike Loans: Throughout the 2022-year forty e-bikes were loaned to employees across three workplaces. These e-bike loans were for a period of two weeks and allowed

employees to experience an e-bike for the first time, but also allowed them to trial one prior to purchasing their own one through the Cycle To Work Scheme.

North Ayrshire Council participated in National Clean Air Day on Thursday 16th June 2022 and encouraged staff to actively travel to work. Staff Pledged to do various activities throughout Clean Air Day, these ranged from Cycling To Work, participating in our Daily Step Count Challenge and Leaving The Car At Home. The pledges are shown below.

(North Ayrshire Council)

Local Priorities and Challenges

The priorities for North Ayrshire Council in addressing air quality for the coming year are a) to continue with monitoring air quality within its area, particularly in High Street, Irvine and New Street, Dalry, to ensure concentrations remain below the relevant objective levels following the improvement works and to observe if post COVID-19 pandemic pollutant concentrations return to business as usual levels b) to continue improving on charge-infrastructure so that we may further increase our use of electric vehicles across NAC, c) continue to promote, support and help facilitate Active Travel and d) to implement the Actions in the Council's Environmental Sustainability & Climate Change Strategy 2022-23.

The challenges will be to ensure that a) any LAQM monitoring equipment malfunction is rectified timeously and the data capture rate is maintained at a high level and b) any targets with regard to improving air quality, directly or indirectly within North Ayrshire are achieved.

How to Get Involved

If you would like to become involved and participate in helping improving air quality in the area, details of alternative modes of travel, route options and projects can be found at Leisure, parks and events (north-ayrshire.gov.uk).

North Ayrshire Council participated in Clean Air Day (CAD) 2022 on 16th June and encouraged staff to actively travel to work. The event was promoted to staff and schools via internal Newsletters, Facebook and Twitter. North Ayrshire Council will continue to support and promote this event. For information on how to become involved in air quality events around the UK and free promotional material please visit Clean Air Day - the UK's largest clean air campaign.

Further information on our local air quality can also be found here Home page | Scottish Air Quality on the Air Quality in Scotland website where information is updated every hour. A free service to subscribers in Scotland (that may be of benefit to people whose breathing gets worse when air pollution increases) is Know & Respond – Scotland. The service sends an alert message to registered members if air pollution in their area is forecast to be moderate, high or very high and this may be of benefit to pollution sensitive individuals who want to take steps to minimise the effects of any pollution incidents. To register for Know & Respond – Scotland please visit: Know & Respond - Scotland, the free air pollution alert messaging system - Air Quality in Scotland (scottishairquality.scot).

Know and Respond can also be accessed via an iPhone and Android app which is free to download at: Apps for iPhone and Android - Air Quality in Scotland (scottishairquality.scot).

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1 Local Air Quality Management

This report provides an overview of air quality in North Ayrshire Council during 2022. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), 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 North Ayrshire 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	31.12.2022
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 publish and implement an Air Quality Action Plan (AQAP) within the shortest possible time and no later than 12 months of the date of AQMA Designation Order. The AQAP must set out measures the local authority intends to put in place in pursuit of the objectives within the shortest possible time Measures should be provided with milestones and a final date for completion. The action plan itself should have a timescale for completion and for revocation of the AQMA. Where measures to reduce air pollution may require a longer timescale an action plan shall be reviewed and republished within five years of initial publication and then five-yearly thereafter.

North Ayrshire Council currently does not have any AQMAs.

Monitoring in previous years identified that the main air quality issue in North Ayrshire was associated with NO_2 and related to a) traffic congestion caused by a small section of High Street, Irvine being used as a bus terminus and b) queuing traffic in New Street, Dalry as a result of traffic lights on the main A737 passing through the town. The history of these two areas and mitigation measures have been discussed in previous reports which can be found here LAQM Reports | Scottish Air Quality. Mitigation projects have now been completed successfully for both areas and monitoring results reflect the changes in ambient air quality, showing a downward trend accordingly.

2.2 Cleaner Air for Scotland 2

Cleaner Air for Scotland 2 – Towards a Better Place for Everyone (CAFS2) 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 2022 – 2026. CAFS2 was published in July 2021 and replaces Cleaner Air for Scotland – The Road to a Healthier Future (CAFS), 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 North Ayrshire 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.

North Ayrshire Council has a Adopted Local Development Plan (north-ayrshire.gov.uk) (LDP) that was published in November 2019.

The LDP sets out how we aim to guide development and investment in our area over the next 20 years and includes:

- Our **spatial development strategy:** the principles we will use to direct the right development to the right place.
- Our **placemaking policy:** the key criteria that will allow us to deliver the six qualities of successful places.
- Our **strategic development areas** and the key factors we will consider in developing these major areas of change.

To support this our Development Plan Scheme (north-ayrshire.gov.uk) (DPS) was published in September 2022 and sets out a planning authority's programme for preparing and reviewing their development plan. As the local planning authority, we are required to prepare a DPS every year. The DPS must also include a Participation Statement stating when, how and with whom consultation on the plan will take place.

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.

North Ayrshire Council does not meet the criterion to have a LEZ but has Travel Plan which can be accessed here:

Transport strategy (north-ayrshire.gov.uk)

The 2015-20 Local Transport Strategy (LTS) is still current however, a draft combined Local Transport and Active Travel Strategy is now available, and this is scheduled to be published in August 2023.

North Ayrshire Council also has an Electric Vehicle (EV) Strategy (2022-2025) Electric Vehicle Strategy (north-ayrshire.gov.uk). It includes an action to work in partnership with government agencies to explore potential for further EV charging infrastructure. Encouraging the uptake of EVs will help reduce greenhouse gas emissions and help improve local air quality.

2.2.3 Further Actions

North Ayrshire Council's Environmental Sustainability & Climate Change Strategy 2022 – 2023 (ESCCS 3) is currently being updated and is due to be presented to Cabinet in December 2023. It contains an ambition to achieve a 40% reduction in carbon emissions North Ayrshire wide by 2030, based on a 2005 baseline year. This would equate to a reduction of 581,000 tonnes of CO_2 across North Ayrshire in total since 2005, and 27,088 tonnes within the Council estate.

The key actions completed, in progress or planned and outcomes in terms of benefits for air quality can be found in Appendix 1 of the current Strategy's Action Plan here:

Environmental Sustainability & Climate Change Strategy (north-ayrshire.gov.uk)

The Council's Travel Smart behaviour change project will also continue to promote modal shift to active and sustainable travel, and focus on Mental and Physical Wellbeing whilst employees are working at home by delivering a wide range of activities including: E-Bike Loans to workplace staff members; promotion of active and sustainable travel to/from work; implementation of a Schools and Workplaces Active Travel Programme, and the support and promotion of a number of infrastructure projects between Sustrans and North Ayrshire Council.

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives

3.1 Summary of Monitoring Undertaken

A fixed automatic monitoring station is located on High Street, Irvine. It has contained a chemiluminescent NO_x analyser monitor since its installation in 2009 and a Fidas 200 fine dust and monitoring emission measurement system for the continuous and simultaneous measurement of PM_1, $PM_{2.5}$ as per EN 14907 and PM_{10} as per EN12341 since 14th April 2015. This monitoring station is also the site being used for the triplicate co-location of NO_2 diffusion tubes.

Calibration checks are conducted every two weeks on site by Local Authority Officers and collected data is forwarded to Ricardo - AEA who validate and ratify the data. The unit is calibrated by Ricardo - AEA every six months. Ricardo - AEA reports are included in Appendix C, Figure 4: RICARDO - AEA Air Pollution Report & Figure 5: Ricardo - AEA Certificates of Calibration. Twenty-two diffusion tubes also monitor NO_2 at various locations in towns throughout North Ayrshire and the data capture rate was 95.5%.

It was expected that pollutant levels would increase as in 2021 due to the travel restrictions easing following the pandemic, but 2022 results show that all pollutants have either remained the same or decreased throughout North Ayrshire and have not yet returned their business-as-usual levels. This may have been due to weather conditions and more monitoring will be required to establish any long-term trend.

No monitoring results for 2022 within North Ayrshire has exceeded any relevant UK or EU Limit Value. None of these changes have led to the declaration of an AQMA, decision to amend or revoke an AQMA, or appropriate local strategy.

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.

North Ayrshire Council undertook automatic (continuous) monitoring at one site during 2022. Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at Home page | Scottish Air Quality.

A map showing the location of the automatic monitoring site is provided in Appendix C: Figure 12: Automatic Monitoring Site Location, High Street, Irvine 2022. Further details on how the monitors are calibrated and how the data has been adjusted are included in QA/QC of Automatic Monitoring.

3.1.2 Non-Automatic Monitoring Sites

North Ayrshire Council undertook non- automatic (passive) monitoring of NO_2 at twenty-two sites during 2022. Table A.2 in Appendix A shows the details of the sites. National non-automatic monitoring sites and results are available at:

Latest pollution map (scottishairquality.scot)

Maps showing the location of the monitoring sites is provided in Appendix C: Figure 13: Non-Automatic Monitoring Site Locations 2022 and further details on the data and bias adjustment for the diffusion tubes are included in Appendix C: QA/QC of Diffusion Tube Monitoring.

3.1.3 Other Monitoring Activities

North Ayrshire Council has two Zephyr low-cost air monitors produced by Earth Sense Zephyr Air Quality Monitor | EarthSense. These monitors are solar-powered and measure NO, NO_2, O_3, PM_1, $PM_{2.5}$, PM_{10}, temperature, humidity, and pressure continuously. The monitors are not certified to Equivalence standards but are co-located with such instruments and their differences certificated (Figure 6: Earth Sense/Zephyr Certificates of Calibration). Low-cost sensors are only indicative of the ambient air quality but nonetheless useful tools to install in areas where there are no previous recordings. The monitors are currently located near the former bitumen terminal to the west of Montgomerie Street, Ardrossan (Figure 16: Zephyr Monitoring Locations, Ardrossan) and were deployed here to record the relevant background measurements, to aid in future air quality assessments, prior to a major redevelopment of the site by North Ayrshire Council. Details of which can be found here:

23/00319/PPM | Erection of community campus comprising early years, primary & secondary school with additional support needs, shared community facilities including; library, learning hub and integrated services, indoor sports facilities including swimming pool, sports hall, gymnasium, dance studio & fitness studio, outdoor sports facilities including 2 sports pitches and Multi-Use Games Area (MUGA); Outdoor learning

landscape, recreational spaces and growing spaces, associated parking and infrastructure | Site At North Shore Adjacent To North Crescent Road Ardrossan Ayrshire (north-ayrshire.gov.uk).

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias and annualised. Further details on adjustments are provided in Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

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 2022 dataset of monthly mean values is provided in Appendix B.

Annual Mean NO_2 concentrations measured at the automatic monitoring site in High Street, Irvine and diffusion tube monitoring sites located throughout North Ayrshire have shown a downward trend since 2018. There has been a particularly noticeable decline in the NO_2 concentrations since 2018 in and around Irvine and Dalry following mitigation measures to ease traffic congestion. There was a slight increase during 2021 due the easing of COVID-19 pandemic restrictions and return to normality but this has not been seen in 2022 where concentrations remained the same or decreased. A graph of these trends is included in Appendix C: Figure 8: Trends in Annual Mean NO2 Concentrations measured at Diffusion Tube Monitoring Sites in Irvine 2018 - 2022 & Figure 9: Trends in Annual Mean NO2 Concentrations measured at Diffusion Tube Monitoring Sites in Dalry 2018 - 2022.

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. There has been no exceedance of over 18 times per year for the 2018 to 2022 reporting period with North Ayrshire Council.

None of these changes have led to the declaration of an AQMA.

3.2.2 Particulate Matter (PM_{10})

At High Street, Irvine, PM_{10} levels remained steady during 2018 – 2019 at around **16**µg/m^3 (mean corrected) but decreased to around **12**µg/m^3 (mean corrected) during 2020 – 2021. PM_{10} levels have now increased to around **14**µg/m^3 (mean corrected) for 2022. A graph showing this trend is included in Appendix C: Figure 10: Trends in Annual Mean PM10 Concentrations measured at Automatic Station (ROMON) in High Street, Irvine 2018 – 2022.

Table A.5 in Appendix A compares the ratified and corrected 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 and corrected continuous monitored PM_{10} 24-Hour 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.

There have been no exceedances of over 7 times per year for the 2018 to 2022 reporting period.

None of these changes have led to the declaration of an AQMA.

3.2.3 Particulate Matter ($PM_{2.5}$)

$PM_{2.5}$ levels remained steady during 2018 – 2019 at **8.5**µg/m^3 (corrected) but decreased to around **6.5**µg/m^3 (corrected) during 2021 but increased to **7.1**µg/m^3 (corrected) in 2022 at High Street, Irvine. A graph showing this trend is included in Appendix C: Figure 11: Trends in Annual Mean PM2.5 Concentrations measured at Automatic Station (ROMON) in High Street, Irvine 2018 - 2022.

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

None of these changes have led to the declaration of an AQMA.

3.2.4 Sulphur Dioxide (SO_2)

Monitoring for sulphur dioxide and smoke has been discontinued in North Ayrshire since 2004. Historical monitoring data is available for nearly every town in the area and there is

no indication from these results that the air quality standard is likely to be breached even around local industrial sources.

Further details of historic SO2 monitoring can be found in North Ayrshire Council's previous Air Quality Reports which are available online at:

LAQM Reports | Scottish Air Quality

There has been no evidence of any change to sulphur dioxide production or release in North Ayrshire. Similarly, there has been no development likely to result in any increase in sulphur dioxide levels at locations where there could be relevant public exposure.

3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene

No monitoring of Carbon recent Monoxide, Lead and 1,3-Butadiene has been undertaken.

Further details of historic Carbon Monoxide, Lead and 1,3-Butadiene monitoring can be found in North Ayrshire Council's previous Air Quality Reports which are available online at:

LAQM Reports | Scottish Air Quality

There has been no evidence of any change to Carbon Monoxide, Lead and 1,3- Butadiene production or release in North Ayrshire. Similarly, there has been no development likely to result in any increase in Carbon Monoxide, Lead and 1,3- Butadiene levels at locations where there could be relevant public exposure.

4 New Local Developments

There were two significant housing developments proposed in 2022 that was considered to have the potential to increase traffic numbers and flows in and around the relevant area. These are listed below together with their reporting status:

22/00094/PPM | Erection of 60 dwellinghouses including the formation of access roads, open space, landscaping and ancillary works | 1 - 5 Crompton Way North Newmoor Irvine Ayrshire KA11 4HU (north-ayrshire.gov.uk) AQ Assessment awaited.

22/00420/PPM | Erection of 99 dwelling houses | Site To North Of St Andrews Court Saltcoats Ayrshire (north-ayrshire.gov.uk) AQ Assessment approved.

4.1 Road Traffic Sources

North Ayrshire Council confirms that there are no new/newly: narrow congested streets with a flow above 5,000 vehicles per day and residential properties close to the pavement; busy streets where people may spend 1 hour or more close to traffic; roads with high flows of buses/heavy delivery vehicles; busy junctions/busy roads; roads with significantly changed traffic flows and no relevant bus stations in the Local Authority area identified during 2022.

4.2 Other Transport Sources

North Ayrshire Council confirms that there are no: airports in the Local Authority area; locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m; locations with a significant number of movements of diesel locomotives, and potential long-term relevant exposure within 30m; or ports or shipping that meet the specified criteria within the Local Authority area identified during 2022.

4.3 Industrial Sources

There was one significant industrial development proposed in 2022 with the potential to contribute to air pollution. This facility is controlled by SEPA and required dispersion modelling. The application is listed below together with the reporting status:

22/00595/PPM | Erection of chemical production and distribution facility for the manufacture of an animal feed additive | DSM Nutritional Products UK Ltd Drakemyre Dalry Ayrshire KA24 5JJ (north-ayrshire.gov.uk). AQ Assessment accepted.

North Ayrshire Council confirms that there are no other new or proposed industrial installations: for which an air quality assessment has been carried out; existing installations where emissions have increased substantially, or new relevant exposure has been introduced; significantly changed installations with no previous air quality assessment; major fuel storage depots storing petrol; petrol stations or poultry farms that we are aware of during 2022.

4.4 Commercial and Domestic Sources

North Ayrshire Council has Smoke Control Areas covering the main towns of Dalry, Kilbirnie, Glengarnock, Ardrossan, Saltcoats, Stevenston and Kilwinning. Ten enquiries were received from householders during 2022 regarding the installation of wood burning stoves in these areas. The householders were interested in installing them due to the increase in domestic fuel prices. The installation of these is unregulated due to Permitted Planning Rights or they do not meet the relevant Building Standards criteria. It is anticipated that there is a significant unknown number of them installed throughout the area.

4.5 New Developments with Fugitive or Uncontrolled Sources

North Ayrshire Council is not aware of any new developments with fugitive or uncontrolled sources within the Local Authority area in 2022 at this time.

5 Planning Applications

Several planning applications were received during 2022 for future developments to support the transition to Net Zero. These are listed and detailed below:

22/00025/EIA | EIA request for Installation of a photovoltaic solar farm with an output of up to 5MW and associated infrastructure | Site To The North East Of Wee Minnemoer Millport Isle Of Cumbrae Ayrshire (north-ayrshire.gov.uk)

22/00050/EIA | Request for EIA Screening Opinion for proposed solar farm and energy storage system | Benthead Farm Kilwinning Ayrshire KA13 7RU (north-ayrshire.gov.uk)

22/00133/PPPM | Planning permission in principle for the erection of a high voltage cable manufacturing facility, including detailed planning permission for the construction of a 185m high extrusion tower with associated factories, research and testing laboratories, offices with associated stores, transport, access, parking and landscaping with on-site generation and electrical infrastructure and cable delivery system | Former Coal Terminal Hunterston West Kilbride Ayrshire (north-ayrshire.gov.uk)

22/00209/EIA | EIA request for 49.9MW Solar Farm Development | Site To North Of Lawhill Farmhouse West Kilbride North Ayrshire (north-ayrshire.gov.uk)

22/00754/EIA | EIA screening opinion for construction of 200 Mega volt amps (MVar), 400 kilovolt (kV) shunt reactor | Site To West Of Campbelton Farm Hunterston Estate West Kilbride North Ayrshire (north-ayrshire.gov.uk)

22/00979/PP | Planning Application seeking temporary consent for the establishment of a Fastrig Wing Sail Test Facility Yard to include all temporary buildings (including workshop, storage, office, canteen and WC), access, parking and other required infrastructure | Hunterston Construction Yard Fairlie Largs Ayrshire (north-ayrshire.gov.uk)

22/00985/EIA | Request for screening opinion for a 7.5MW solar farm | Nethermains Landfill Irvine Ayrshire (north-ayrshire.gov.uk)

Two applications were received for major development projects and are detailed below:

22/00092/EIA | EIA screening request for the development of 520 dwellinghouses and neighbourhood centre to potentially incorporate Class 1 retail, Class 2 office/professional

services, Class 3 café and sui generis hot food takeaway uses | Tournament Park Redburn Industrial Estate Irvine Ayrshire (north-ayrshire.gov.uk). Advised AQ Assessment will be required.

23/00319/PPM | Erection of community campus comprising early years, primary & secondary school with additional support needs, shared community facilities including; library, learning hub and integrated services, indoor sports facilities including swimming pool, sports hall, gymnasium, dance studio & fitness studio, outdoor sports facilities including 2 sports pitches and Multi-Use Games Area (MUGA); Outdoor learning landscape, recreational spaces and growing spaces, associated parking and infrastructure | Site At North Shore Adjacent To North Crescent Road Ardrossan Ayrshire (north-ayrshire.gov.uk). AQ Assessment will be required.

6 Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

All NO_2, PM_{10} and $PM_{2.5}$ monitoring data within North Ayrshire Council for 2022 complied with the 40μg/m^3, 18μg/m^3 and 10μg/m^3 respective Air Quality Objectives as set out in the Directive. Monitoring will continue at all the existing sites for 2023.

6.2 Conclusions relating to New Local Developments

Planning applications for two significant housing developments were received in 2022. Consideration was given to the applications as they met the criterion of the relevant guidance for local air quality to be assessed. The applicants were requested, via Planning Conditions, to undertake Air Quality Screening Assessments and submit a report to demonstrate whether their proposed development would have any detrimental effect on local air quality. One screening report has been submitted to date which was satisfactory and detailed modelling was not required.

6.3 Proposed Actions

2022 monitoring data has not identified any new exceedances of the objectives for any pollutant or any need for additional monitoring. It is anticipated that a review of the existing monitoring programme within North Ayrshire will be undertaken to ensure all monitoring points are relevant.

Irvine

Following the introduction of mitigation measures to reduce congestion, a significant reduction in NO_2 has been recorded in High Street since their implementation in 2019. Monitoring showed that levels reduced further during 2020, due to COVID-19 pandemic travel restrictions, but showed an increase during 2021, as expected, as normal travel routines resumed. However, this trend was not continued with levels shown to decrease again in 2022. This may have been a result of prevailing weather conditions. It is proposed that NO_2 sampling continues in this area to monitor the effects of post COVID-19 easing to observe the return to business as normal. This will establish the effects mitigation measures have had without abnormal effects. Close supervision of any future developments in the area shall also be observed if required.

Dalry

Monitoring has shown that the opening of the Dalry Bypass in May 2019 eased traffic congestion significantly through the town and NO_2 concentrations were seen to reduce accordingly. NO_2 increased during 2021 again at the locations of concern, as expected, following the easing of travel lockdown restrictions but has shown a decrease in 2022. It is proposed that monitoring is continued in this area to establish normal levels following post COVID-19 lockdown easing.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	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)
ROM	ROMON	Roadside	232189	638857	NO_2; PM_{10}; $PM_{2.5}$	No	Chemiluminescent; Optical Light Scatter	20	4.88	2.15

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 ID	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?	Tube Height (m)
DT1	**35 East Road, Irvine**	Roadside	**232323**	**638892**	**NO2**	**N**	1	2.5	N	2.5
DT2	**22 Bank Street, Irvine**	Roadside	**232202**	**638952**	**NO2**	**N**	2.5	1.6	N	2.5
DT3	**147 High Street, Irvine**	Roadside	**232077**	**638990**	**NO2**	**N**	0	4	N	2.5
DT4	**85 High Street, Irvine**	Roadside	**232158**	**638882**	**NO2**	**N**	0	3.7	N	3.0
DT5	**79 High St, Irvine**	Roadside	**232169**	**638878**	**NO2**	**N**	3.5	1.5	N	2.5
DT6	**75 High St, Irvine HIGH**	Roadside	**232170**	**638871**	**NO2**	**N**	0	5	N	3.0
DT7	**65a High Street, Irvine, (ROMON)**	Roadside	**232192**	**638827**	**NO2**	**N**	4.7	1.7	Y	2.15
DT8	**65 High Street, Irvine, (ROMON)**	Roadside	**232192**	**638827**	**NO2**	**N**	4.7	1.7	Y	2.15
DT9	**63 High Street, Irvine, (ROMON)**	Roadside	**232192**	**638827**	**NO2**	**N**	4.7	1.7	Y	2.15
DT10	**34 Kirkgate Irvine**	Urban Background	**232085**	**638774**	**NO2**	**N**	10	0.5	N	2.5
DT11	**25 Main Rd, Springside**	Kerbside	**236813**	**638659**	**NO2**	**N**	5	1	N	2.5
DT12	**Auchengate (Bridge)**	Urban Background	**233332**	**635558**	**NO2**	**N**	N/A	32	N	2.5
DT13	**Dalry Rd, Kilwinning**	Kerbside	**229928**	**643400**	**NO2**	**N**	2	1	N	2.5
DT14	**Vernon St, Saltcoats**	Kerbside	**224697**	**641366**	**NO2**	**N**	0	1	N	2.5
DT15	**12 Garnock St, Dalry**	Urban Background	**229326**	**649250**	**NO2**	**N**	10	0.5	N	2.5
DT16	**67 New St, Dalry**	Kerbside	**229338**	**649337**	**NO2**	**N**	0	0.5	N	2.5
DT17	**45 New St, Dalry**	Kerbside	**229286**	**649365**	**NO2**	**N**	0	0.5	N	2.5

Site ID	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?	Tube Height (m)
DT18	**2 Townhead St, Dalry**	Roadside	**229230**	**649338**	**NO2**	**N**	0	3	N	2.0
DT19	**Highfield Hamlet, Dalry**	Urban Background	**230943**	**650280**	**NO2**	**N**	10	1	N	2.0
DT20	**85 Main Street, Largs**	Kerbside	**220333**	**659322**	**NO2**	**N**	1.5	0	N	2.0
DT21	**Hunterston Road**	Rural	**219582**	**650020**	**NO2**	**N**	N/A	N/A	N	2.0
DT22	**Princess St/Glasgow St, Ardrossan**	Kerbside	**219582**	**650020**	**NO2**	**N**	0	0.5	N	2.5

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 (µg/m^3)

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
ROMON	Roadside	Automatic	-	96	18	16	10	13	11
DT1	Roadside	Diffusion Tube	-	100	21	20	13	15	13
DT2	Roadside	Diffusion Tube	-	92	25	19	11	11	9
DT3	Roadside	Diffusion Tube	-	100	23	16	11	16	11
DT4	Roadside	Diffusion Tube	-	92	18	17	10	11	12
DT5	Kerbside	Diffusion Tube	-	100	23	20	12	13	11
DT6	Roadside	Diffusion Tube	-	100	22	20	12	14	11
DT7	Roadside	Diffusion Tube	-	100	20	20	10	13	10
DT8	Roadside	Diffusion Tube	-	100	21	19	12	12	11
DT9	Roadside	Diffusion Tube	-	100	19	19	12	11	11
DT10	Urban Background	Diffusion Tube	-	100	11	9	7	8	6
DT11	Kerbside	Diffusion Tube	-	100	13	13	10	8	8
DT12	Urban Background	Diffusion Tube	-	100	12	11	10	8	7
DT13	Kerbside	Diffusion Tube	-	92	21	17	13	15	12
DT14	Kerbside	Diffusion Tube	-	92	10	9	6	6	5
DT15	Urban Background	Diffusion Tube	-	100	25	21	12	14	11
DT16	Kerbside	Diffusion Tube	-	100	34	26	16	14	14
DT17	Kerbside	Diffusion Tube	-	75	26	21	11	11	9
DT18	Roadside	Diffusion Tube	-	92	17	14	8	6	6
DT19	Urban Background	Diffusion Tube	-	92	18	16	12	13	11
DT20	Kerbside	Diffusion Tube	-	83	5	5	3	3	3
DT21	Rural	Diffusion Tube	-	92	16	15	12	11	11
DT22	Kerbside	Diffusion Tube	-	100	17	14	11	13	12

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(22) 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 2022 (%) (2)	2018	2019	2020	2021	2022
ROMON	Roadside	Automatic	-	96	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 99.8th 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 (µg/m^3)

Site	Year	Mean	Mean_Corrected	Hourly max	Hourly max Corrected	Max 24-hour	Max 24-hour Corrected
North Ayrshire Irvine High St	**2018**	14.4	15.9	105	115.6	38.6	42.5
North Ayrshire Irvine High St	**2019**	14.5	16	918.3	1,010.2	69.7	76.7
North Ayrshire Irvine High St	**2020**	11.3	12.5	238.3	262.2	35.8	39.4
North Ayrshire Irvine High St	**2021**	10.8	11.9	135.4	148.9	28.9	31.8
North Ayrshire Irvine High St	**2022**	12.5	13.8	85.4	93.9	55.7	61.3

Notes:

There were no exceedances of the PM_{10} annual mean objective of 18 µg/m^3.

The total data captured throughout the whole year was 98%.

No annualization was required as per LAQM.TG(22) as data capture was greater than 75%.

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 2022 (%) (2)	2018	2019	2020	2021	2022
ROMON	Roadside	-	98	0	0	0	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	Year	Mean	Mean Corrected	Max 24-hour mean	Max 24-hour Corrected
North Ayrshire Irvine High St	**2018**	8.1	8.5	30.9	32.7
North Ayrshire Irvine High St	**2019**	8	8.5	40	42.4
North Ayrshire Irvine High St	**2020**	6.1	6.5	19.9	21.1
North Ayrshire Irvine High St	**2021**	6	6.3	22.7	24
North Ayrshire Irvine High St	**2022**	6.7	7.1	40.3	42.7

Notes:

There were no exceedances of the $PM_{2.5}$ annual mean objective of 10 µg/m^3.

The total data was captured throughout the whole year was 98%.

No annualization was required as per LAQM.TG(22) as data capture was greater than 75%.

Table A.8 – SO_2 2022 Monitoring Results, Number of Relevant Instances

Site ID	Site Type	Valid Data Capture for monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	Number of 15-minute Means > 266 µg/m	Number of 1-hour Means > 350 µg/m	Number of 24-hour Means > 125 µg/m
N/A*	N/A	N/A	N/A	N/A	N/A	N/A

Notes:

Exceedances of the SO_2 objectives are shown in bold (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed a year)

If the period of valid data is less than 85%, the relevant percentiles are provided in brackets (15-Minute means: 99.9th percentile, 1-hour means: 99.7th percentile, 24-hour means: 99.2nd percentile).

(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%).

* No SO_2 monitoring is undertaken within North Ayrshire Council since 2004.

Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1 – NO_2 2022 Monthly Diffusion Tube Results (µg/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)
DT1	24.0	18.7	21.0	17.5	12.5	11.1	6.8	11.2	14.2	11.6	15.7	26.8	15.9	13.1
DT2	10.1	8.7	16.8	12.8	7.9	8.0	7.1	7.8	10.4	9.5		24.5	11.2	9.2
DT3	12.4	14.3	16.7	13.3	9.1	7.8	10.9	9.1	12.4	14.8	11.2	28.3	13.4	11.0
DT4	14.3	13.6	21.1	14.7	11.8	11.4	14.3		11.7	11.0	8.7	22.2	14.1	11.5
DT5	15.1	11.5	11.8	16.0	13.6	12.4	15.1	11.9	11.8	8.7	9.5	25.9	13.6	11.2
DT6	17.7	14.4	18.8	14.3	13.9	11.2	11.9	10.1	8.7	13.5	8.3	22.7	13.8	11.3
DT7	12.0	11.5	15.3	10.9	10.4	8.5	10.9	9.3	12.5	10.3	12.9	24.2	12.4	10.2
DT8	12.8	11.9	15.5	14.5	11.2	9.3	9.4	9.5	12.7	11.3	13.9	22.9	12.9	10.6
DT9	11.7	13.1	18.0	13.3	10.3	8.4	13.5	11.7	12.3	11.7	12.5	26.9	13.6	11.2
DT10	4.4	5.7	9.7	7.2	3.6	1.9	4.8	5.8	5.6	6.4	8.7	20.1	7.0	5.7
DT11	10.0	8.4	11.7	8.8	8.2	6.9	8.0	9.1	8.0	7.5	10.0	18.1	9.6	7.8
DT12	12.6	9.7	11.9	10.2	6.8	4.5	7.1	7.6	6.0	7.2	9.1	14.3	8.9	7.3
DT13	15.1	15.1	20.9		11.9	9.8	10.6	11.7	12.1	16.4	15.6	20.3	14.5	11.9
DT14	4.9	4.4	9.3	5.6	2.9	2.7	3.0	4.1	5.9	5.9		19.7	6.2	5.1
DT15	12.8	13.5	14.2	19.3	11.1	10.8	6.5	12.1	11.6	11.7	12.0	20.4	13.0	10.7
DT16	18.8	16.1	15.2	15.7	15.9	15.8	12.2	15.7	12.6	17.0	20.0	26.9	16.8	13.8
DT17	8.8	7.8			8.2	5.9		9.4	11.3	7.6	13.7	26.8	11.1	9.1
DT18	4.5	5.9	9.1	7.5		4.2	3.1	6.2	5.6	7.6	9.0	16.5	7.2	5.9
DT19	10.5	11.3	14.6	16.5		10.5	11.4	14.9	19.4	8.6	9.5	17.1	13.1	10.8
DT20	2.7	2.1		5.0	2.5	4.6	2.3	5.4	3.9	1.9		4.9	3.5	2.9
DT21	8.0	10.3	17.6	15.5	12.0	10.6	8.5		13.0	12.1	12.9	21.2	12.9	10.6
DT22	13.5	11.1	16.8	17.7	14.4	12.3	13.5	15.5	12.0	11.0	12.3	18.7	14.1	11.5

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 North Ayrshire Council During 2022

North Ayrshire Council has not identified any new sources relating to air quality within the reporting year of 2022.

Additional Air Quality Works Undertaken by North Ayrshire Council During 2022

North Ayrshire Council has not competed any additional works within the reporting year of 2022.

QA/QC of Diffusion Tube Monitoring

Glasgow Scientific Services (GSS) was the supplier used for diffusion tubes within 2022 and the method of preparation was 20% TEA in water. GSS has been supplying North Ayrshire Council's diffusion tubes since December 2013.

GSS are UKAS accredited, and their process is based on the AEA and DEFRA procedure. They participate in the AIR-PT analysis scheme and in the annual field inter-comparison exercise. The results of which are presented below in Figure 3: Tube Precision & AIR-PT Results. below.

Monitoring was completed in adherence with the 2022 Diffusion Tube Monitoring Calendar.

Diffusion Tube Annualisation

Annualisation was not required for any data locations as all data capture was 75% or greater.

Diffusion Tube Bias Adjustment Factors

North Ayrshire Council have applied a local bias adjustment factor of 0.82 to the 2022 monitoring data. A summary of bias adjustment factors used by North Ayrshire Council over the past five years is presented in

Table C.1.

Table C.1 – Bias Adjustment Factor (2018-2022)

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	Local	-	0.82
2021	Local	-	1.03
2020	National	03/20	0.92
2019	National	03/18	0.86
2018	National	03/18	0.91

National Adjustment Factors

Diffusion tubes (20% TEA/Water) used in the sampling period for 2022 were supplied and analysed by Glasgow Scientific Services (GSS). Diffusion Tube Bias Adjustment Factors for tubes provided by GSS are listed in the National Diffusion Tube Bias Adjustment Factor Spreadsheet Version 03/22 in Figure 2: Bias Factor Spreadsheet (Glasgow Scientific) below. The resultant bias for GSS is **1.05** based on six studies with three of poor precision. The range was 0.78 – 1.33 with three poor results being greater than 1.00. The Tube Precision and AIR results for the laboratory are shown in Figure 3: Tube Precision & AIR-PT Results. below.

Factor from Local Co-location Studies

The automatic monitoring station (ROMON) on High Street, Irvine has been operational since early 2009 and is the site being used for three co-location tubes. The unit is permanently located here and allows for full “calendar year” data to be collected.

The ROMON has fortnightly checks carried out in accordance with the prescribed methodology as issued by Ricardo - AEA. The unit is audited every 6 months by Ricardo - AEA and is serviced every 6 months under contract to a specialist company. Corresponding data was entered in the “Checking Precision and Accuracy of Triplicate Tubes” spreadsheet (

Figure 1: Diffusion Tube Accuracy below). The resulting Bias Factor for 2022 data is **0.82** using 12 periods.

Discussion of Choice of Factor to Use

The diffusion tube co-location study for North Ayrshire Council shows this has "Good" precision and corresponding "Good" overall Data Capture from the ROMON for all twelve periods. Records show from Table C.1 that previous derived bias factors over the last four years ranged from 0.86 – 1.03 between 2018 and 2021. The National Bias Adjustment Factor from GSS of **1.05** is based on 6 studies, three of which had "Poor" precision. Therefore, it is considered that the Local Bias Adjustment Factor of **0.82** is based on more reliable data and when applied reflects a more realistic trend for NO_2 pollution levels within North Ayrshire Council. In addition to this, when the range (0.74 – 1.05) of the National Bias results from the nine participating laboratories are considered, **0.82** is the average (Figure 2: Bias Factor Spreadsheet (Glasgow Scientific) below).

NO_2 Fall-off with Distance from the Road

No diffusion tube NO_2 monitoring locations within North Ayrshire Council required distance correction during 2022.

QA/QC of Automatic Monitoring

The automatic monitoring instruments housed within the roadside cabinet has Local Site Operator (LSO) onsite calibration and data management checks conducted every two weeks by a Local Authority Officer. All checks are carried out in accordance with procedures laid out by Ricardo - AEA and calibration check sheets are forwarded to them after each visit. The site is visited by Ricardo - AEA engineers every six months to carry out calibration audit tests and the Annual Report and Certificates from these visits are included in Figure 4: RICARDO - AEA Air Pollution Report & Figure 5: Ricardo - AEA Certificates of Calibration below. The instrument units are also serviced twice yearly by a specialist company and reports from these visits are included in Figure 7: NOx & PM Service Reports below. Data derived from the automatic monitors and presented within this report has all been ratified by Ricardo AEA. All live and historic data pertaining to North Ayrshire Council is available through the Air Quality in Scotland website Latest pollution map - Air Quality in Scotland (scottishairquality.scot)

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

North Ayrshire Council operate a Fidas 200 type of PM_{10}/$PM_{2.5}$ monitor(s) and following research Equivalence Study to Investigate Particulate Matter Monitoring in Scotland Using

the Fidas 200 | Scottish Air Quality the application of a correction factor is required. In accordance with Scottish Government guidance Local Authority Guidance Note for LAQM Reporting of Scottish PM Data | Scottish Air Quality

Collected PM_{10} data has been corrected by **dividing the** ratified data by **0.909**.

Collected $PM_{2.5}$ data has been corrected by **multiplying** ratified data **by 1.06**.

Both the corrected and uncorrected ratified data statistics has been presented as recommended.

Automatic Monitoring Annualisation

All automatic monitoring locations within North Ayrshire Council recorded data capture rate of greater than 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.

NO_2 Fall-off with Distance from the Road

No automatic NO_2 monitoring locations within North Ayrshire Council required distance correction during 2022.

Figure 1: Diffusion Tube Accuracy

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm $^{-3}$	Tube 2 µgm $^{-3}$	Tube 3 µgm $^{-3}$	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	11/01/2022	01/02/2022	12.0	12.8	11.7	12	0.6	5	1.4	12	100	Good	Good
2	01/02/2022	01/03/2022	11.5	11.9	13.1	12	0.8	7	2.1	8	99	Good	Good
3	01/03/2022	01/04/2022	15.3	15.5	18.0	16	1.5	9	3.7	15	79	Good	Good
4	01/04/2022	04/05/2022	10.9	14.5	13.3	13	1.8	14	4.6	9	75	Good	Good
5	04/05/2022	06/06/2022	10.4	11.2	10.3	11	0.5	5	1.2	8	99	Good	Good
6	06/06/2022	07/07/2022	8.5	9.3	8.4	9	0.5	6	1.2	7	100	Good	Good
7	07/07/2022	01/08/2022	10.9	9.4	13.5	11	2.1	18	5.2	8	100	Good	Good
8	01/08/2022	29/08/2022	9.3	9.5	11.7	10	1.3	13	3.3	9	99	Good	Good
9	29/08/2022	29/09/2022	12.5	12.7	12.3	13	0.2	2	0.5	9	100	Good	Good
10	29/09/2022	01/11/2022	10.3	11.3	11.7	11	0.7	6	1.8	8	100	Good	Good
11	01/11/2022	28/11/2022	12.9	13.9	12.5	13	0.7	6	1.8	12	100	Good	Good
12	28/11/2022	05/01/2023	24.2	22.9	26.9	25	2.0	8	5.1	22	100	Good	Good
13													
												Good precision	Good Overall DC

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Overall survey -->

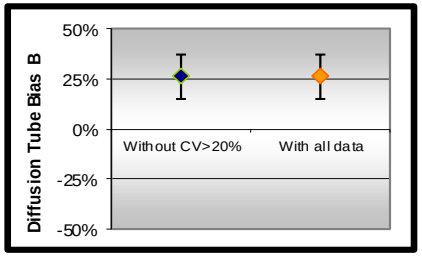
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	High St., Irvine

Precision: 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 12 periods of data	
Bias factor A	0.82 (0.75 - 0.9)
Bias B	23% (12% - 34%)
Diffusion Tubes Mean:	13 µgm^{-3}
Mean CV (Precision):	8
Automatic Mean:	11 µgm^{-3}
Data Capture for periods used:	96%
Adjusted Tubes Mean:	11 (10 - 12) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 12 periods of data	
Bias factor A	0.82 (0.75 - 0.9)
Bias B	23% (12% - 34%)
Diffusion Tubes Mean:	13 µgm^{-3}
Mean CV (Precision):	8
Automatic Mean:	11 µgm^{-3}
Data Capture for periods used:	96%
Adjusted Tubes Mean:	11 (10 - 12) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

If you have any enquiries about this spreadsheet please contact the LAQM Helpdesk at: LAQMHelpdesk@uk.bureauveritas.com

Adjustment of SINGLE Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tube Measurements

Site Name/ID	Periods													Raw Mean	Valid periods	Adjusted measurement (95% confidence interval) with all the data 12 periods used in this calcuations
	1	2	3	4	5	6	7	8	9	10	11	12	13			Bias Factor A 0.82 (0.75 - 0.9) Bias B 23% (12% - 34%) Tube Precision: 8 Automatic DC: 96%
DT1 35 East Road Irvine	24.0	18.7	21.0	17.5	12.5	11.1	6.8	11.2	14.2	11.6	15.7	26.8		15.9	12	Adjusted with 95% CI 13 (12 - 14)
DT2 22 Bank St, Irvine (Murray Gillies & Wilson Solicitors)	10.1	8.7	16.8	12.8	7.9	8.0	7.1	7.8	10.4	9.5		24.5		11.2	11	Adjusted with 95% CI 9 (8 - 10)
DT3 147 High Street, Irvine (Browings)	12.4	14.3	16.7	13.3	9.1	7.8	10.9	9.1	12.4	14.8	11.2	28.3		13.4	12	Adjusted with 95% CI 11 (10 - 12)
DT4 85 High St, Irvine (Shoe Repair/Indian Palace)	14.3	13.6	21.1	14.7	11.8	11.4	14.3		11.7	11.0	8.7	22.2		14.1	11	Adjusted with 95% CI 12 (11 - 13)
DT5 79 High St, Irvine (Fishmongers)	15.1	11.5	11.8	16.0	13.6	12.4	15.1	11.9	11.8	8.7	9.5	25.9		13.6	12	Adjusted with 95% CI 11 (10 - 12)
DT6 75 High St, Irvine (Yoohoo/The Meridian Room)	17.7	14.4	18.8	14.3	13.9	11.2	11.9	10.1	8.7	13.5	8.3	22.7		13.8	12	Adjusted with 95% CI 11 (10 - 12)
DT7 65a High Street, Irvine, (AUTO MONITOR STATION)	12.0	11.5	15.3	10.9	10.4	8.5	10.9	9.3	12.5	10.3	12.9	24.2		12.4	12	Adjusted with 95% CI 10 (9 - 11)
DT8 65 High Street, Irvine, (AUTO MONITOR STATION)	12.8	11.9	15.5	14.5	11.2	9.3	9.4	9.5	12.7	11.3	13.9	22.9		12.9	12	Adjusted with 95% CI 11 (10 - 12)
DT9 65 High Street, Irvine, (AUTO MONITOR STATION)	11.7	13.1	18.0	13.3	10.3	8.4	13.5	11.7	12.3	11.7	12.5	26.9		13.6	12	Adjusted with 95% CI 11 (10 - 12)
DT10 34 Kirkgate Irvine	4.4	5.7	9.7	7.2	3.6	1.9	4.8	5.8	5.6	6.4	8.7	20.1		7.0	12	Adjusted with 95% CI 6 (5 - 6)
DT11 25 Main Rd, Springside	10.0	8.4	11.7	8.8	8.2	6.9	8.0	9.1	8.0	7.5	10.0	18.1		9.6	12	Adjusted with 95% CI 8 (7 - 9)
DT12 Auchengate (Bridge)	12.6	9.7	11.9	10.2	6.8	4.5	7.1	7.6	6.0	7.2	9.1	14.3		8.9	12	Adjusted with 95% CI 7 (7 - 8)
DT13 Dalry Rd , Kilwinning	15.1	15.1	20.9		11.9	9.8	10.6	11.7	12.1	16.4	15.6	20.3		14.5	11	Adjusted with 95% CI 12 (11 - 13)
DT14 12 Garnock St, Dalry	4.9	4.4	9.3	5.6	2.9	2.7	3.0	4.1	5.9	5.9		19.7		6.2	11	Adjusted with 95% CI 5 (5 - 6)
DT15 67 New St, Dalry (Royal Hotel)	12.8	13.5	14.2	19.3	11.1	10.8	6.5	12.1	11.6	11.7	12.0	20.4		13.0	12	Adjusted with 95% CI 11 (10 - 12)
DT16 45 New St Dalry (Zain's Curry House)	18.8	16.1	15.2	15.7	15.9	15.8	12.2	15.7	12.6	17.0	20.0	26.9		16.8	12	Adjusted with 95% CI 14 (13 - 15)
DT17 2 Townhead, St, Dalry (Housing Office)	8.8	7.8			8.2	5.9		9.4	11.3	7.6	13.7	26.8		11.1	9	Adjusted with 95% CI 9 (8 - 10)
DT18 Highfield Hamlet , Dalry	4.5	5.9	9.1	7.5		4.2	3.1	6.2	5.6	7.6	9.0	16.5		7.2	11	Adjusted with 95% CI 6 (5 - 6)
DT19 85 Main Street , Largs (Key Centre)	10.5	11.3	14.6	16.5		10.5	11.4	14.9	19.4	8.6	9.5	17.1		13.1	11	Adjusted with 95% CI 11 (10 - 12)
DT20 Hunterston Road/Cycle Track	2.7	2.1		5.0	2.5	4.6	2.3	5.4	3.9	1.9		4.9		3.5	10	Adjusted with 95% CI 3 (3 - 3)
DT21 41-43 Princes St, Ardrossan	8.0	10.3	17.6	15.5	12.0	10.6	8.5		13.0	12.1	12.9	21.2		12.9	11	Adjusted with 95% CI 11 (10 - 12)
DT22 21 Vernon St, Saltcoats	13.5	11.1	16.8	17.7	14.4	12.3	13.5	15.5	12.0	11.0	12.3	18.7		14.1	12	Adjusted with 95% CI 12 (11 - 13)

The bias adjustment factor used in these calculations include all the data and no screening of data due to poor precision has been applied.

Adjustment of DUPLICATE or TRIPLICATE Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Data Quality Check
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Average	Standard Deviation	CV	95% CI mean	Diffusion Tubes Precision Check
1	11/01/2022	01/02/2022	12.0	12.8	11.7	12.2	0.57	4.67	1.41	Good
2	01/02/2022	01/03/2022	11.5	11.9	13.1	12.2	0.83	6.84	2.07	Good
3	01/03/2022	01/04/2022	15.3	15.5	18.0	16.3	1.50	9.25	3.74	Good
4	01/04/2022	04/05/2022	10.9	14.5	13.3	12.9	1.83	14.21	4.55	Good
5	04/05/2022	06/06/2022	10.4	11.2	10.3	10.6	0.49	4.64	1.23	Good
6	06/06/2022	07/07/2022	8.5	9.3	8.4	8.7	0.49	5.65	1.23	Good
7	07/07/2022	01/08/2022	10.9	9.4	13.5	11.3	2.07	18.41	5.15	Good
8	01/08/2022	29/08/2022	9.3	9.5	11.7	10.2	1.33	13.10	3.31	Good
9	29/08/2022	29/09/2022	12.5	12.7	12.3	12.5	0.20	1.60	0.50	Good
10	29/09/2022	01/11/2022	10.3	11.3	11.7	11.1	0.72	6.50	1.79	Good
11	01/11/2022	28/11/2022	12.9	13.9	12.5	13.1	0.72	5.50	1.79	Good
12	28/11/2022	05/01/2023	24.2	22.9	26.9	24.7	2.04	8.27	5.07	Good
13										

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Jaume Targa, for AEA

Version 04 - February 2011

Site Name/ ID: High St., Irvine

Adjusted measurement (95% confidence level)
Without periods with CV larger than 20%

Bias calculated using 12 periods of data
Tube Precision: 8 Automatic DC: 96%
Bias factor A: 0.82 (0.75 - 0.9)
Bias B: 23% (12% - 34%)

Information about tubes to be adjusted
Diffusion Tube average: 13 μgm^{-3}
Average Precision (CV): 8
Adjusted Tube average: 11 +/- 1 μgm^{-3}

Adjusted measurement (95% confidence level)
with all data

Bias calculated using 12 periods of data
Tube Precision: 8 Automatic DC: 96%
Bias factor A: 0.82 (0.75 - 0.9)
Bias B: 23% (12% - 34%)

Information about tubes to be adjusted
Diffusion Tube average: 13 μgm^{-3}
Average Precision (CV): 8
Adjusted Tube average: 11 +/- 1 μgm^{-3}

Figure 2: Bias Factor Spreadsheet (Glasgow Scientific)

National Diffusion Tube Bias Adjustment Factor Spreadsheet

Spreadsheet Version Number: 03/23

Follow the steps below **in the correct order** to show the results of **relevant** co-location studies

Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods

Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet

This spreadhseet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of June 2023

LAQM Helpdesk Website

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1:	Step 2:	Step 3:	Step 4:
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	**Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.**
If a laboratory is not shown, we have no data for this laboratory.	If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data[2]	If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953

Analysed By[1]	Method (To undo your selection, choose (All) from the pop-up list)	Year[5] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m^3)	Automatic Monitor Mean Conc. (Cm) (µg/m^3)	Bias (B)	Tube Precision[6]	Bias Adjustment Factor (A) (Cm/Dm)
Glasgow Scientific Services	20% TEA in Water	2022	R	Glasgow City Council	12	30	27	11.9%	G	**0.89**
Glasgow Scientific Services	20% TEA in Water	2022	R	Glasgow City Council	11	14	19	-24.3%	P	**1.32**
Glasgow Scientific Services	20% TEA in Water	2022	KS	Glasgow City Council	12	41	39	6.6%	G	**0.94**
Glasgow Scientific Services	20% TEA in Water	2022	R	Glasgow City Council	12	16	21	-25.1%	P	**1.33**
Glasgow Scientific Services	20% TEA in Water	2022	UB	Glasgow City Council	12	14	17	-15.8%	P	**1.19**
Glasgow Scientific Services	20% TEA in water	2022	KS	Marylebone Road Intercomparison	12	55	42	28.6%	G	**0.78**
Glasgow Scientific Services	20% TEA in water	2022		**Overall Factor[3] (6 studies)**				**Use**		**1.05**

National Diffusion Tube Bias Adjustment Factor Spreadsheet

Spreadsheet Version Number: 03/23

Follow the steps below **in the correct order** to show the results of **relevant** co-location studies
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet
This spreadhseet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of June 2023

LAQM Helpdesk Website

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List

If a laboratory is not shown, we have no data for this laboratory.

Step 2: Select a Preparation Method from the Drop-Down List

If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down List

If a year is not shown, we have no data[2]

Step 4:

Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.

If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953

Analysed By[1]	Method (To undo your selection, choose (All))	Year[5] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision[6]	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in water	2022	R	Blackburn With Darwen Bc	12	26	19	35.0%	G	0.74
Gradko	20% TEA in water	2022	R	Gedling Borough Council	12	31	26	19.9%	G	0.83
Aberdeen Scientific Services	20% TEA in water	2022	R	Aberdeen City Council	12	15	15	4.3%	G	0.96
Aberdeen Scientific Services	20% TEA in water	2022	UB	Aberdeen City Council	12	21	16	34.4%	G	0.74
Aberdeen Scientific Services	20% TEA in water	2022	R	Aberdeen City Council	11	19	14	30.9%	G	0.76
Aberdeen Scientific Services	20% TEA in water	2022	R	Aberdeen City Council	11	33	22	46.0%	G	0.68
Aberdeen Scientific Services	20% TEA in water	2022	R	Aberdeen City Council	12	35	26	32.8%	G	0.75
Aberdeen Scientific Services	20% TEA in water	2022	R	Aberdeen City Council	12	34	24	40.8%	G	0.71
Gradko	20% TEA in water	2022	R	Ards And North Down Borough Council	12	33	22	49.4%	G	0.67
Gradko	20% TEA in water	2022	R	Bath & North East Somerset	12	30	25	19.0%	G	0.84
Gradko	20% TEA in water	2022	R	Birmingham City Council	11	32	24	36.8%	G	0.73
Gradko	20% TEA in water	2022	UB	East Devon District Council	12	8	7	23.6%	G	0.81
Gradko	20% TEA in water	2022	R	Gateshead Council	11	23	20	14.2%	G	0.88
Gradko	20% TEA in water	2022	R	Gateshead Council	12	23	21	12.7%	G	0.89
Gradko	20% TEA in water	2022	R	Gateshead Council	12	25	23	10.1%	G	0.91
Gradko	20% TEA in water	2022	R	Gateshead Council	11	30	23	29.0%	G	0.77
Gradko	20% TEA in water	2022	R	Gateshead Council	9	31	36	-14.0%	G	1.16
Glasgow Scientific Services	20% TEA in Water	2022	R	Glasgow City Council	12	30	27	11.9%	G	0.89
Glasgow Scientific Services	20% TEA in Water	2022	R	Glasgow City Council	11	14	19	-24.3%	P	1.32
Glasgow Scientific Services	20% TEA in Water	2022	KS	Glasgow City Council	12	41	39	6.6%	G	0.94
Glasgow Scientific Services	20% TEA in Water	2022	R	Glasgow City Council	12	16	21	-25.1%	P	1.33
Glasgow Scientific Services	20% TEA in Water	2022	UB	Glasgow City Council	12	14	17	-15.8%	P	1.19
Gradko	20% TEA in Water	2022	R	Lisburn & Castlereagh City Council	12	24	19	23.7%	G	0.81
Staffordshire Scientific Services	20% TEA in water	2022	KS	Manchester City Council	12	49	43	13.8%	G	0.88
Staffordshire Scientific Services	20% TEA in water	2022	UC	Manchester City Council	12	29	29	0.4%	G	1.00
Staffordshire Scientific Services	20% TEA in water	2022	SI	Manchester City Council	12	17	16	12.1%	G	0.89
Gradko	20% TEA in Water	2022	R	Monmouthshire County Council	12	35	28	23.8%	G	0.81
Aberdeen Scientific Services	20% TEA in water	2022	KS	Marylebone Road Intercomparison	11	56	43	31.9%	G	0.76
Glasgow Scientific Services	20% TEA in water	2022	KS	Marylebone Road Intercomparison	12	55	42	28.6%	G	0.78
Gradko	20% TEA in water	2022	KS	Marylebone Road Intercomparison	12	52	42	22.8%	G	0.81
Milton Keynes Council	20% TEA in water	2022	KS	Marylebone Road Intercomparison	11	55	43	28.4%	G	0.78
SOCOTEC Didcot	20% TEA in water	2022	KS	Marylebone Road Intercomparison	12	59	42	38.9%	G	0.72
SOCOTEC Glasgow	20% TEA in water	2022	KS	Marylebone Road Intercomparison	12	58	42	35.8%	G	0.74
Somerset County Council	20% TEA in water	2022	KS	Marylebone Road Intercomparison	12	55	42	29.0%	G	0.78
Staffordshire Scientific Services	20% TEA in water	2022	KS	Marylebone Road Intercomparison	12	51	42	20.5%	G	0.83
Tayside Scientific Services	20% TEA in water	2022	KS	Marylebone Road Intercomparison	12	56	42	33.0%	G	0.75
SOCOTEC Didcot	20% TEA in water	2022	R	New Forest District Council	9	27	20	33.9%	G	0.75
SOCOTEC Didcot	20% TEA in water	2022	KS	Nfdc	12	37	25	46.5%	G	0.68
Gradko	20% TEA in Water	2022	UB	Plymouth City Council	12	18	18	3.2%	G	0.97
Staffordshire Scientific Services	20% TEA in water	2022	UB	Salford City Council	12	23	22	6.9%	G	0.94
Staffordshire Scientific Services	20% TEA in water	2022	B	Salford City Council	10	13	11	16.3%	G	0.86
Staffordshire Scientific Services	20% TEA in water	2022	R	Salford City Council	12	40	34	17.6%	G	0.85
Gradko	20% TEA in water	2022	UC	Belfast City Council	12	26	20	30.7%	G	0.76
Gradko	20% TEA in water	2022	R	Belfast City Council	12	47	36	28.1%	G	0.78
Gradko	20% TEA in water	2022	R	Belfast City Council	12	25	22	14.0%	G	0.88
Gradko	20% TEA in water	2022	R	Belfast City Council	12	36	28	29.0%	G	0.78
Gradko	20% TEA in water	2022	R	Brighton & Hove City Council	10	37	23	62.8%	G	0.61
Staffordshire Scientific Services	20% TEA in water	2022	R	Bury Council	11	24	21	16.0%	G	0.86
Staffordshire Scientific Services	20% TEA in water	2022	R	East Staffordshire Borough Council	10	39	31	23.9%	G	0.81
Gradko	20% TEA in water	2022	UB	Hertsmere Borough Council	12	16	15	7.1%	G	0.93
Somerset County Council	20% TEA in water	2022	R	South Gloucestershire Council	9	32	26	21.5%	G	0.82
Somerset County Council	20% TEA in water	2022	R	South Gloucestershire Council	12	25	22	14.9%	G	0.87
Somerset County Council	20% TEA in water	2022	R	South Gloucestershire Council	12	20	13	58.3%	G	0.63
SOCOTEC Didcot	20% TEA in water	2022	R	South Oxfordshire Distric Council	12	25	18	33.8%	G	0.75
SOCOTEC Didcot	20% TEA in water	2022	R	South Oxfordshire District Council	12	36	32	10.0%	G	0.91
Gradko	20% TEA in water	2022	R	Southampton City Council	12	36	28	30.6%	G	0.77
Gradko	20% TEA in water	2022	UC	Southampton City Council	12	28	24	15.4%	G	0.87
Gradko	20% TEA in water	2022	R	Southampton City Council	12	34	31	8.4%	G	0.92
Staffordshire Scientific Services	20% TEA in water	2022	UB	Stoke-On-Trent City Council	11	23	20	17.1%	G	0.85
Staffordshire Scientific Services	20% TEA in water	2022	UB	Wigan Council	12	21	17	21.6%	G	0.82
Staffordshire Scientific Services	20% TEA in water	2022	R	Wigan Council	12	27	22	22.6%	G	0.82
Somerset County Council	20% TEA in water	2022	R	Wiltshire Council	10	28	28	0.3%	G	1.00
Somerset County Council	20% TEA in Water	2022	R	Wiltshire Council	10	30	26	14.4%	G	0.87
Gradko	20% TEA in water	2022	R	Worcestershire	11	13	12	4.2%	G	0.96
Gradko	20% TEA in water	2022	R	Lancaster City Council	13	34	27	25.8%	G	0.79
Gradko	20% TEA in water	2022	R	Lancaster City Council	12	28	24	15.2%	G	0.87
Aberdeen Scientific Services	20% TEA in water	2022		**Overall Factor[3] (7 studies)**				Use		0.76
Glasgow Scientific Services	20% TEA in water	2022		**Overall Factor[3] (6 studies)**				Use		1.05
Gradko	20% TEA in water	2022		**Overall Factor[3] (27 studies)**				Use		0.83
Milton Keynes Council	20% TEA in water	2022		**Overall Factor[3] (1 study)**				Use		0.78
SOCOTEC Didcot	20% TEA in water	2022		**Overall Factor[3] (5 studies)**				Use		0.76
SOCOTEC Glasgow	20% TEA in water	2022		**Overall Factor[3] (1 study)**				Use		0.74
Somerset County Council	20% TEA in water	2022		**Overall Factor[3] (6 studies)**				Use		0.82
Staffordshire Scientific Services	20% TEA in water	2022		**Overall Factor[3] (12 studies)**				Use		0.87
Tayside Scientific Services	20% TEA in water	2022		**Overall Factor[3] (1 study)**				Use		0.75

Figure 3: Tube Precision & AIR-PT Results.

Table 1: Laboratory summary performance for AIR NO_2 PT rounds AR037, 39, 40, 42, 43, 45, 46, 49 and 50

The following table lists those UK laboratories undertaking LAQM activities that have participated in recent AIR NO_2 PT rounds and the percentage (%) of results submitted which were subsequently determined to be **satisfactory** based upon a z-score of ≤ ± 2 as defined above.

AIR PT Round	AIR PT AR037	AIR PT AR039	AIR PT AR040	AIR PT AR042	AIR PT AR043	AIR PT AR045	AIR PT AR046	AIR PT AR049	AIR PT AR050
Round conducted in the period	May – June 2020	July – August 2020	September – October 2020	January – February 2021	May – June 2021	July – August 2021	September – October 2021	January – February 2022	May – June 2022
Aberdeen Scientific Services	NR [4]	NR [4]	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Cardiff Scientific Services	NR [4]	NR [4]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Edinburgh Scientific Services	NR [4]	NR [4]	100 %	25 %	100 %	100 %	75 %	NR [2]	50 %
SOCOTEC	NR [4]	NR [4]	100 % [1]	100 % [1]	100 % [1]	87.5 % [1]	100 % [1]	100 % [1]	100 % [1]
Exova (formerly Clyde Analytical)	NR [4]	NR [4]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Glasgow Scientific Services	NR [4]	NR [4]	100 %	50 %	100 %	100 %	NR [2]	100 %	100 %
Gradko International	NR [4]	NR [4]	75 %	25 %	100 %	100 %	100 %	100 %	100 % [1]
Kent Scientific Services	NR [4]	NR [4]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Kirklees MBC	NR [4]	NR [4]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Lambeth Scientific Services	NR [4]	NR [4]	100 %	100 %	100 %	75 %	75 %	50 %	75 %
Milton Keynes Council	NR [4]	NR [4]	25 %	0 %	50 %	100 %	100 %	75 %	100 %
Northampton Borough Council	NR [4]	NR [4]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Somerset Scientific Services	NR [4]	NR [4]	100 %	100 %	100 %	100 %	100 %	75 %	100 %
South Yorkshire Air Quality Samplers	NR [4]	NR [4]	100 %	100 %	75 %	100 %	100 %	NR [2]	NR [2]
Staffordshire County Council	NR [4]	NR [4]	50 %	100 %	100 %	100 %	100 %	100 %	100 %
Tayside Scientific Services (formerly Dundee CC)	NR [4]	NR [4]	100 %	NR [2]	100 %	NR [2]	100 %	NR [2]	NR [2]
West Yorkshire Analytical Services	NR [4]	NR [4]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]

[1] Participant subscribed to two sets of test results (2 x 4 test samples) in each AIR PT round.
[2] NR, No results reported.
[3] Cardiff Scientific Services, Exova (formerly Clyde Analytical), Kent Scientific Services, Kirklees MBC, Northampton Borough Council and West Yorkshire Analytical Services; no longer carry out NO2 diffusion tube monitoring and therefore did not submit results.
[4] Round was cancelled due to pandemic.

NO2 PT Summary – AIR PT Rounds AR037, 39, 40, 42, 43, 45, 46, 49 and 50 Page 5 of 5

Figure 4: RICARDO - AEA Air Pollution Report

North Ayrshire Irvine High St

01/01/2022 to 31/12/2022

These data have been fully ratified

Correction Factor for Gravimetric Equivalence applied

	V High (No. of Days)	High (No. of Days)	Mod (No. of Days)	Low (No. of Days)	Max. Hourly Conc.	Max. Daily Conc.	Max. Running 8 Hour Mean	Max. Running 24 Hour Mean	Period Mean Conc.	Period Data Capture (%)
NO (µg/m³)	0	0	0	0	171	39	79	41	6	97.6
NO_2 (µg/m³)	0	0	0	358	85	45	69	49	13	97.6
NO_X (µg/m³)	0	0	0	0	332	99	173	102	22	97.6
PM_{10} (µg/m³)	0	0	0	357	135	29	43	30	11	97.4
$PM_{2.5}$ (µg/m³)	0	0	0	357	44	23	27	24	6	97.3

Particulate matter concentrations are reported at ambient temperature and pressure.
All mass units are at 20°C and 1013mb.

	Air Quality Objective	Exceedances	Days
NO_2	Hourly mean > 200 µg/m³	None	0
NO_2	Period mean > annual mean obj 40 µg/m³	No	
PM_{10}	Daily mean > 50 µg/m³	None	0
PM_{10}	Period mean > annual mean obj 18 µg/m³ (Scotland)	No	
$PM_{2.5}$	Period mean > annual mean obj 10 µg/m³ (Scotland)	No	
$PM_{2.5}$	Period mean > annual mean obj 20 µg/m³ (EU)	No	
Note: When comparing site measurements against the air quality objectives data capture should meet or exceed 90% across a calendar year.			

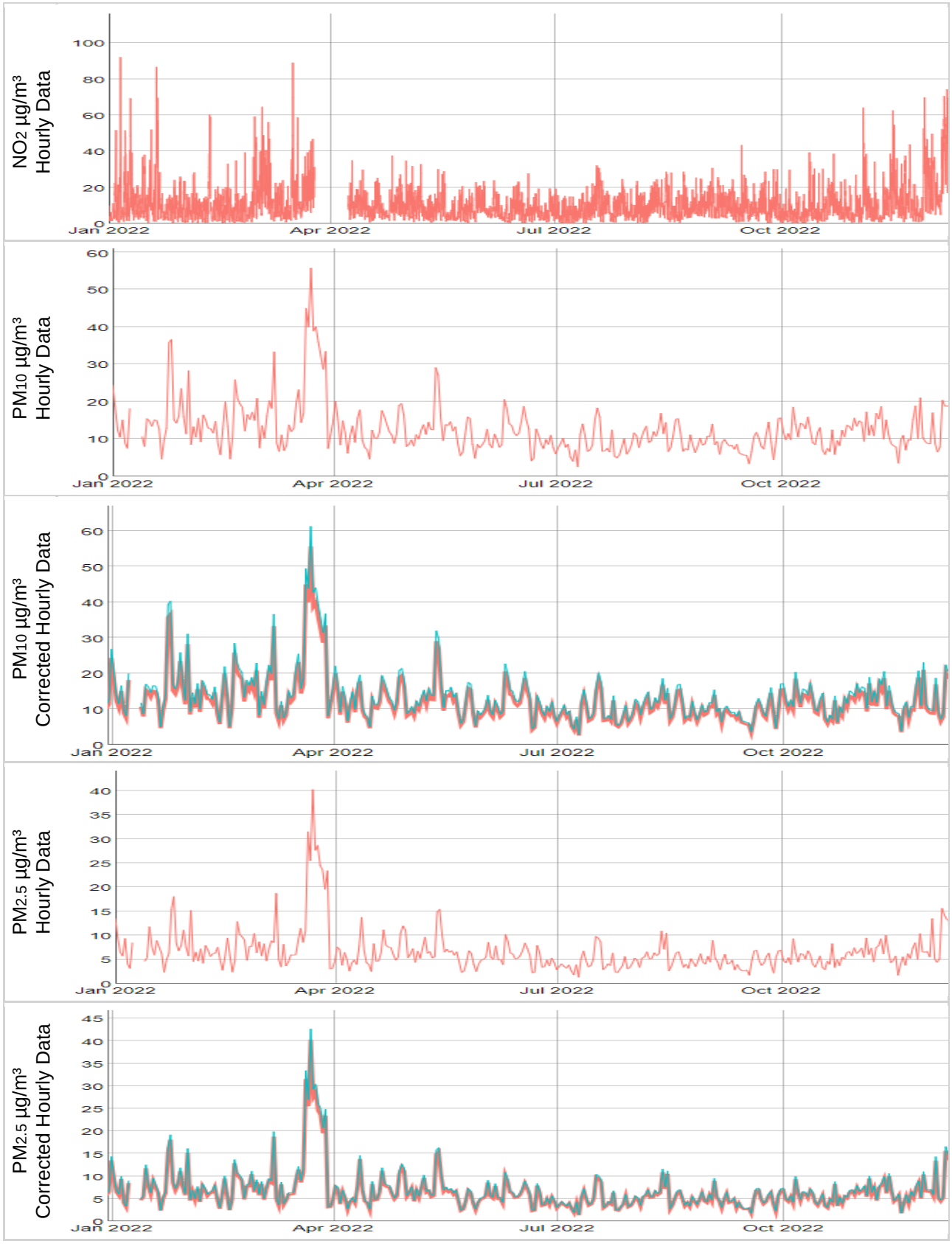

NO2 µg/m³ Hourly Data
PM10 µg/m³ Hourly Data
PM10 µg/m³ Corrected Hourly Data
PM2.5 µg/m³ Hourly Data
PM2.5 µg/m³ Corrected Hourly Data
Jan 2022
Apr 2022
Jul 2022
Oct 2022

Figure 5: Ricardo - AEA Certificates of Calibration

CERTIFICATE OF CALIBRATION

Ricardo Energy & Environment 18 Blythswood Square, Glasgow, G2 4BG

Telephone 01235 753434

0401

Page 1 of 3

Approved Signatories:

☐	S. Eaton	☐	B Stacey
☐	D Hector	☐	S Stratton
☐	N Rand	☑	S Telfer
☐	B Davies	☐	S Gray

Signed: STelfer

Date of issue: 25 February 2022

Certificate Number: 5745

Customer Name and Address:

Scottish Government
Water, Air, Soils and Flooding Division
Environmental Quality Directorate
Scottish Government
Victoria Quay
Edinburgh
EH6 6QQ

Description: Calibration factors for the air monitoring station(s) at North Ayrshire Council

Ricardo Energy & Environment ID: ED11194 / 5745

The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor k=2 providing a level of confidence of approximately 95% The uncertainty evaluation has been carried out in accordance with UKAS requirements.

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory

Ricardo Energy & Environment

18 Blythswood Square (2nd Floor),
Glasgow,
G2 4BG

Tel: 01235 753205

Registered office
Shoreham Technical Centre
Shoreham-by-Sea
West Sussex
BN43 5FG

Registered in England No.
08229264

VAT Registration No.
GB 212 8365 24

ee.ricardo.com

CERTIFICATE OF CALIBRATION

Date of issue: 25 February 2022

Certificate Number: 5745

Ricardo Energy & Environment ID: ED11194 / 5745

North Ayrshire Council
NOx analysers

Station	Date of Audit	Species	Analyser Serial no	Zero Response[1]	Zero uncertainty nmol/mol	Calibration Factor[2]	Factor uncertainty %	Converter eff. (%)[3]
North Ayrshire Irvine High Street	24 December 2021	NOx	19-2513	1.0	2.5	1.0088	3.50	99.5
		NO		0.0	2.7	1.0000	3.50	

FIDAS analyser

Station	Date of audit	Analyser Serial no	Calculated ko[4]	Uncertainty %	Total flow[4]	Uncertainty %	Main flow	Uncertainty %
North Ayrshire Irvine High Street	24 December 2021	6251			4.65	2.2		2.2

CERTIFICATE OF CALIBRATION

Date of issue:	25 February 2022
Certificate Number:	5745
Ricardo Energy & Environment ID:	ED11194 / 5745

The gaseous ambient analysers listed above have been tested for zero response, calibration factor, linearity and converter efficiency (NOx analysers) by documented methods. The factors have been calculated using certified gas standards. The particulate analysers listed above have been tested for sample flow rates and k_0(where appropriate) by documented methods. Note that the test results are valid on the day of test only, as analyser drift over time cannot be quantified. All results for gaseous species are reported in concentration units of nmol/mol or µmol/mol.

[1] The zero response is the zero reading on the data logging system of the analyser when audit zero gas was introduced to the analysers under test.

[2] The calibration factor is the multiplying factor required to scale the reading on the data logging system of the analyser into reported concentration units (nmol/mol for NO, NOx, SO_2, O_3 and µmol/mol for CO). It should be used in conjunction with the zero response. A corrected concentration is calculated using the following equation:

Concentration = F(Output - Zero Response)
Where F = Calibration Factor provided on this certificate
Output = Reading on the data logging system of the analyser
Zero Response = Zero Response provided on this certificate

[3] Converter eff. is the measured efficiency of the NO_2 to NO converter within the oxides of nitrogen analyser under test.

[4] The measured main flow rate (where this is applicable) is the flow rate through the sensor unit of the TEOM particulate analyser under test. The measured total flow rate is the total flow rate through the particulate analyser under test. Units of flow are $l.min^{-1}$, reported at prevailing ambient conditions unless otherwise specified. Where flow rates are highlighted in bold, it indicates that measurements were not made at the analyser sample inlet. These measurements therefore may not accurately reflect analyser performance in normal operation.

[5] The calculated k_0 value (specifically for TEOM analysers) is the calculated k_0 spring constant based on tests undertaken with filters of known weight. The % deviation indicates the closeness of the calculated result to the manufacturer's specified value of k_0.

The calibration results shaded are those that fall within our scope of accreditation, all other results on this certificate are not UKAS accredited, but have been included for completeness.

CERTIFICATE OF CALIBRATION

Ricardo Energy & Environment 18 Blythswood Square, Glasgow, G2 4BG

Telephone 01235 753434

0401

Approved Signatories:

☐	S. Eaton	☐	B Stacey
☐	D Hector	☐	S Stratton
☐	N Rand	☑	S Telfer
☐	B Davies	☐	S Gray

Signed: STelfer

Date of issue: 04 August 2022

Certificate Number: 5940

Customer Name and Address:

Scottish Government
Water, Air, Soils and Flooding Division
Environmental Quality Directorate
Scottish Government
Victoria Quay
Edinburgh
EH6 6QQ

Description: Calibration factors for the air monitoring station(s) at North Ayrshire Council

Ricardo Energy & Environment ID: ED11194/5940

The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor k=2 providing a level of confidence of approximately 95% The uncertainty evaluation has been carried out in accordance with UKAS requirements.

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory

Ricardo Energy & Environment

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VAT Registration No.
GB 212 8365 24

CERTIFICATE OF CALIBRATION

Date of issue: 04 August 2022

Certificate Number: 5940

Ricardo Energy & Environment ID: ED11194/5940

North Ayrshire Council
NOx analysers

Station	Date of Audit	Species	Analyser Serial no	Zero Response[1]	Zero uncertainty nmol/mol	Calibration Factor[2]	Factor uncertainty %	Converter eff. (%)[3]
North Ayrshire Irvine High St	08 July 2022	NOx	19-2513	0.0	2.5	1.0271	3.50	100.9
		NO		0.0	2.5	1.0202	3.50	

Fidas analysers

Station	Date of audit	Analyser Serial no	Calculated ko[5]	Uncertainty %	Total flow[4]	Uncertainty %	Main flow	Uncertainty %
North Ayrshire Irvine High St	08 July 2022	6251			4.90	2.2		2.2

CERTIFICATE OF CALIBRATION

Date of issue:	04 August 2022
Certificate Number:	5940
Ricardo Energy & Environment ID:	ED11194/5940

The gaseous ambient analysers listed above have been tested for zero response, calibration factor, linearity and converter efficiency (NOx analysers) by documented methods. The factors have been calculated using certified gas standards. The particulate analysers listed above have been tested for sample flow rates and k0(where appropriate) by documented methods. Note that the test results are valid on the day of test only, as analyser drift over time cannot be quantified. All results for gaseous species are reported in concentration units of nmol/mol or µmol/mol.

[1] The zero response is the zero reading on the data logging system of the analyser when audit zero gas was introduced to the analysers under test.

[2] The calibration factor is the multiplying factor required to scale the reading on the data logging system of the analyser into reported concentration units (nmol/mol for NO, NOx, SO2, O3 and µmol/mol for CO). It should be used in conjunction with the zero response. A corrected concentration is calculated using the following equation:

Concentration = F(Output - Zero Response)
Where F = Calibration Factor provided on this certificate
Output = Reading on the data logging system of the analyser
Zero Response = Zero Response provided on this certificate

[3] Converter eff. is the measured efficiency of the NO_2 to NO converter within the oxides of nitrogen analyser under test.

[4] The measured main flow rate (where this is applicable) is the flow rate through the sensor unit of the TEOM particulate analyser under test. The measured aux flow rate (where this is applicable) is the flow rate through the bypass tubing of the TEOM particulate analyser under test. The measured total flow rate is the total flow rate through the particulate analyser under test. Units of flow are l.min-1, reported at prevailing ambient conditions unless otherwise specified. Where flow rates are highlighted in bold, it indicates that measurements were not made at the analyser sample inlet. These measurements therefore may not accurately reflect analyser performance in normal operation.

[5] The calculated k_0 value (specifically for TEOM analysers) is the calculated k_0 spring constant based on tests undertaken with filters of known weight. The % deviation indicates the closeness of the calculated result to the manufacturer's specified value of k_0.

The calibration results shaded are those that fall within our scope of accreditation, all other results on this certificate are not UKAS accredited, but have been included for completeness.

Figure 6: Earth Sense/Zephyr Certificates of Calibration

EARTH SENSE

EarthSense Sensing Cartridge Calibration Certificate

Sensing Cartridge 1286

Calibration summary

Start Date of calibration: 2020-03-19 11:00:00

End Date of calibration: 2020-03-25 09:00:00

Location of calibration: Leicester University 0 (km) Background Urban

Pollutant	RMSE $\mu g\ m^{-3}$	R^2
NO_2	7.810	0.648
O_3	9.157	0.814
NO	6.819	0.376
$PM_{2.5}$	2.687	0.896

Approved for customer shipment: Jordan White

Quality standards approval: Prof. Roland Leigh

EARTHSENSE

TRUSTED AIR QUALITY INSIGHT

EarthSense Systems Ltd.

Zephyr Sensor Cartridge Calibration Certificate

Sensor Cartridge BIC2083

Calibration Summary

Location: *EarthSense manufacturing facility*
Start Date: *2022-02-21 00:00:01*
End Date: *2022-02-28 00:00:01*

Pollutant	RMSE	RMSE Pass Criteria	R^2	R^2 Pass Criteria	Status
NO2	3.17 ug/m^3	7 ug/m^3	0.944	0.75	Pass
NO	3.6 ug/m^3	8 ug/m^3	0.967	0.75	Pass
O3	3.89 ug/m^3	12 ug/m^3	0.874	0.75	Pass
PM2.5	2.84 ug/m^3	7 ug/m^3	0.931	0.75	Pass

Approved for customer shipment: *Isaac Mitchell*

Quality standards approval: *Dr. Roland Leigh*

Figure 7: NOx & PM Service Reports

ENGINEER'S REPORT

Please consider the environment before printing this report

ET Ref No:	CS 22858	Customer Order No:	
Engineer Name:	Colin Rennie	Visit Type:	Routine Service
Enviro Client / Database Name:	North Ayrshire		
Official Defra Site Name (if applicable):	Irvine		
Site Visit Start Date:	03/02/2022	Time:	11:20 GMT (Data Elimination)
Site Visit End Date:	03/02/2022	Time:	14:00 GMT

Reported Fault / Task: Issues Found at Audit: Yes ○ Opti No ○ Opti NA ◉ Opti

Routine service of Fidas & Nox.

Engineer's Comments: Audit Issues Resolved: Yes ○ Opti No ○ Opti NA ◉ Opti

Routine service carried out on both instruments. Changed / cleaned all filters. All OK on site.

Communications Tested: Yes ◉ Opti No ○ Opti NA ○ Opti

Parts Used:

Part Number	Description	Quantity
FILT-004	Filter, 47mm 5um P.T.F.E., 25pk (unlaminated)	2

Total Time: 2hrs40

ENGINEER'S REPORT

Please consider the environment before printing this report

ET Ref No:	CS 24304	**Customer Order No:**	
Engineer Name:	Colin Rennie	**Visit Type:**	Routine Service
Enviro Client / Database Name:	North Ayrshire		
Official Defra Site Name (if applicable):	Irvine		
Site Visit Start Date:	01/08/2022	**Time:**	11:00 GMT (Data Elimination)
Site Visit End Date:	01/08/2022	**Time:**	14:00 GMT

Reported Fault / Task: **Issues Found at Audit:** Yes ○ Opti No ○ Opti NA ◉ Opti

Routine service of Fidas & Nox.

Engineer's Comments: **Audit Issues Resolved:** Yes ○ Opti No ○ Opti NA ◉ Opti

Routine service carried out on both instruments. Changed / cleaned all filters. Nox flow OK, pump vac is good. All OK. Nox cal cylinder getting low after audit, (40Bar). Customer is aware of this. Annual PAT test and 6 monthly air con service carried out. All OK. Cooling 8'C from 20'C.

Communications Tested: Yes ◉ Opti No ○ Opti NA ○ Opti

Parts Used:

Part Number	Description	Quantity
FILT-004	Filter, 47mm 5um P.T.F.E., 25pk (unlaminated)	2

Total Time: 3hrs

Figure 8: Trends in Annual Mean NO_2 Concentrations measured at Diffusion Tube Monitoring Sites in Irvine 2018 - 2022

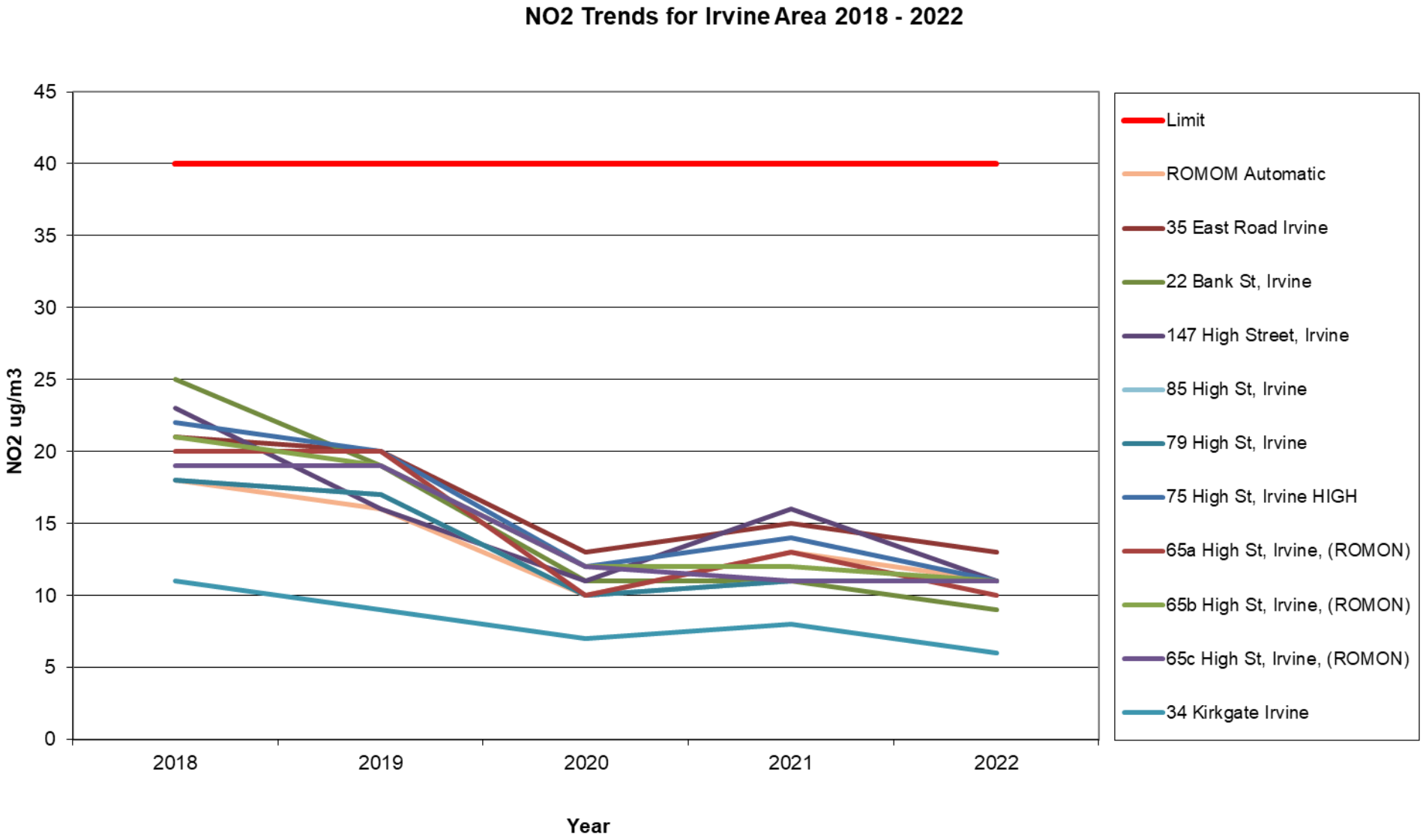


Figure 9: Trends in Annual Mean NO_2 Concentrations measured at Diffusion Tube Monitoring Sites in Dalry 2018 - 2022

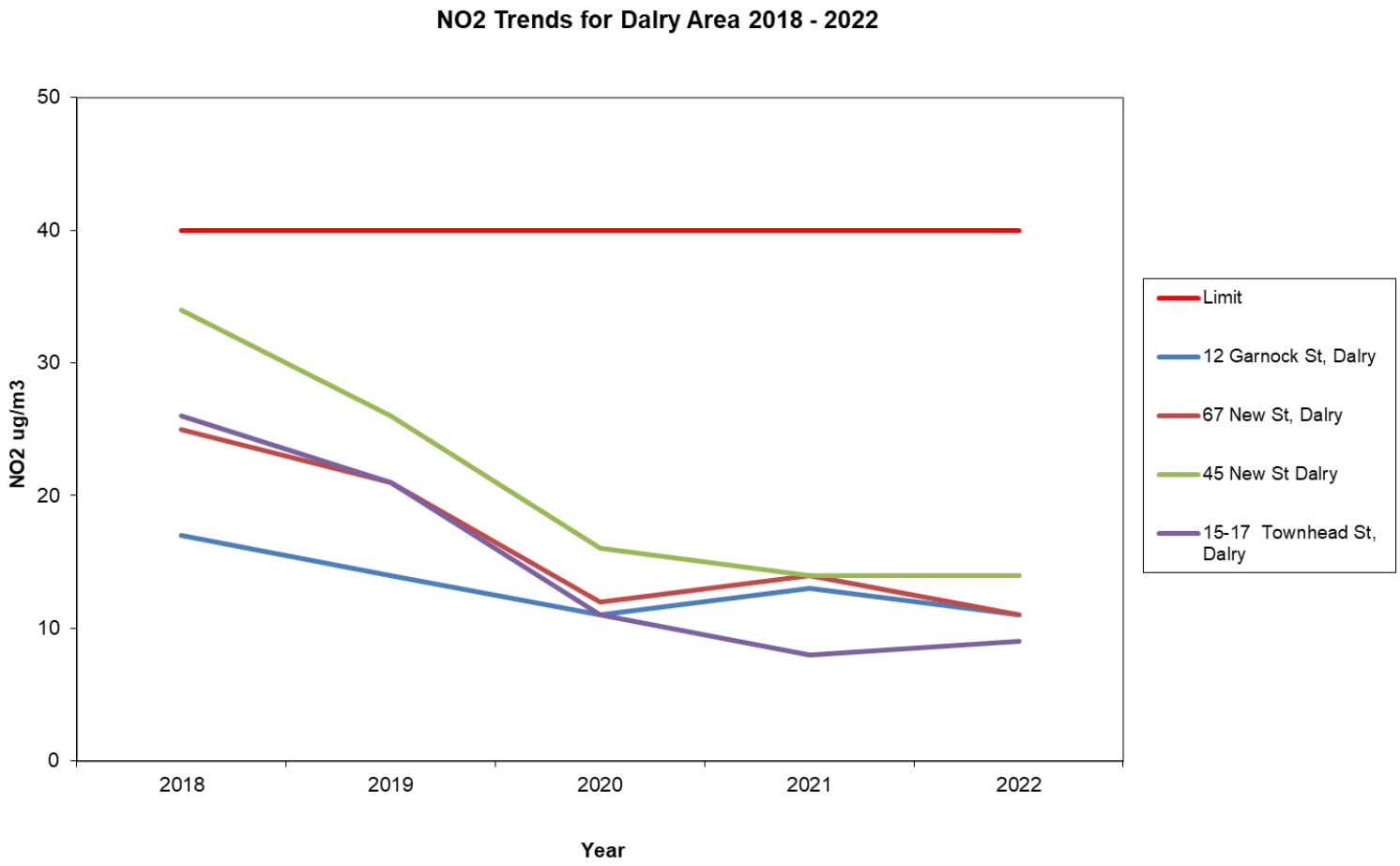


Figure 10: Trends in Annual Mean PM_{10} Concentrations measured at Automatic Station (ROMON) in High Street, Irvine 2018 – 2022

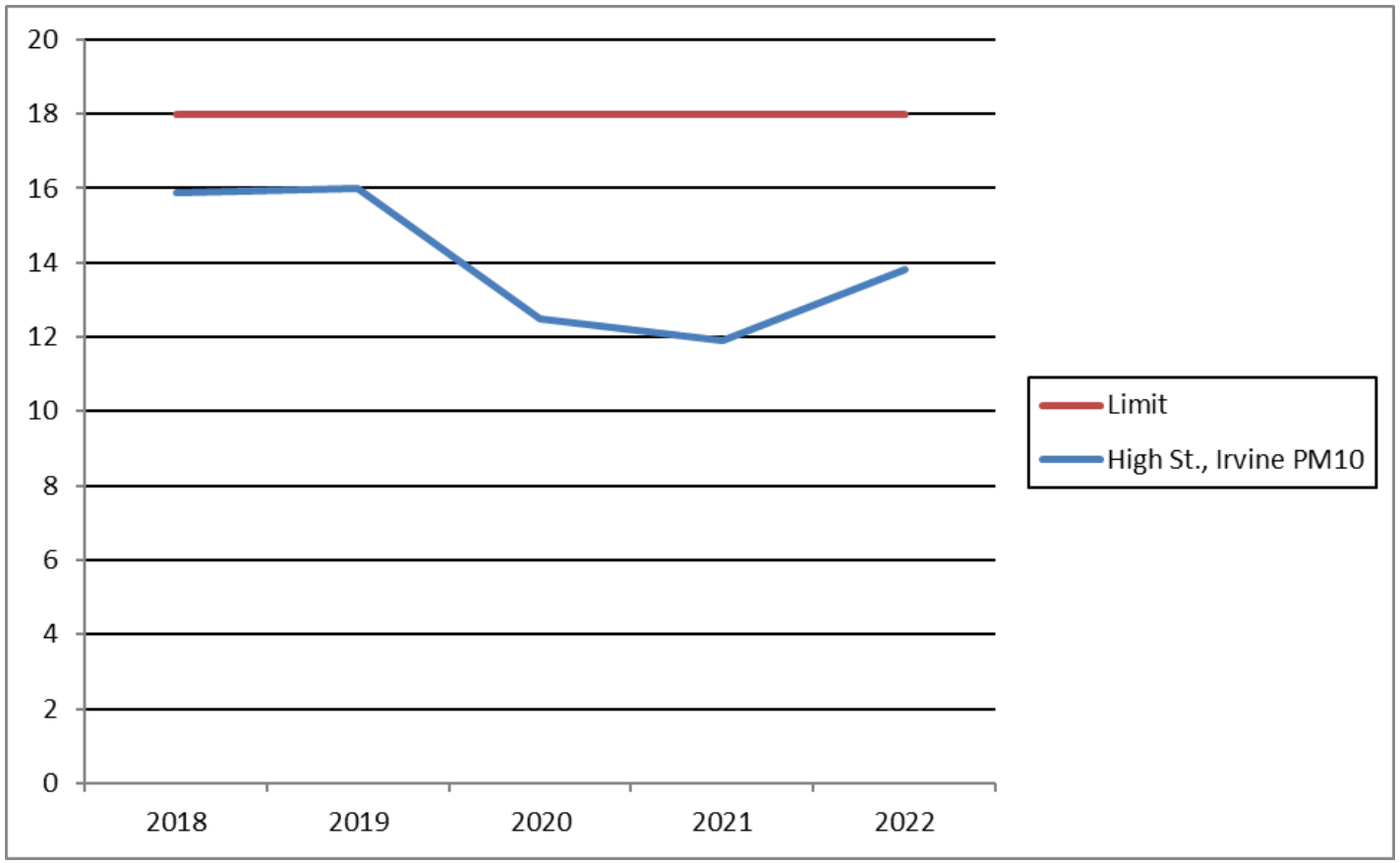


Figure 11: Trends in Annual Mean $PM_{2.5}$ Concentrations measured at Automatic Station (ROMON) in High Street, Irvine 2018 - 2022

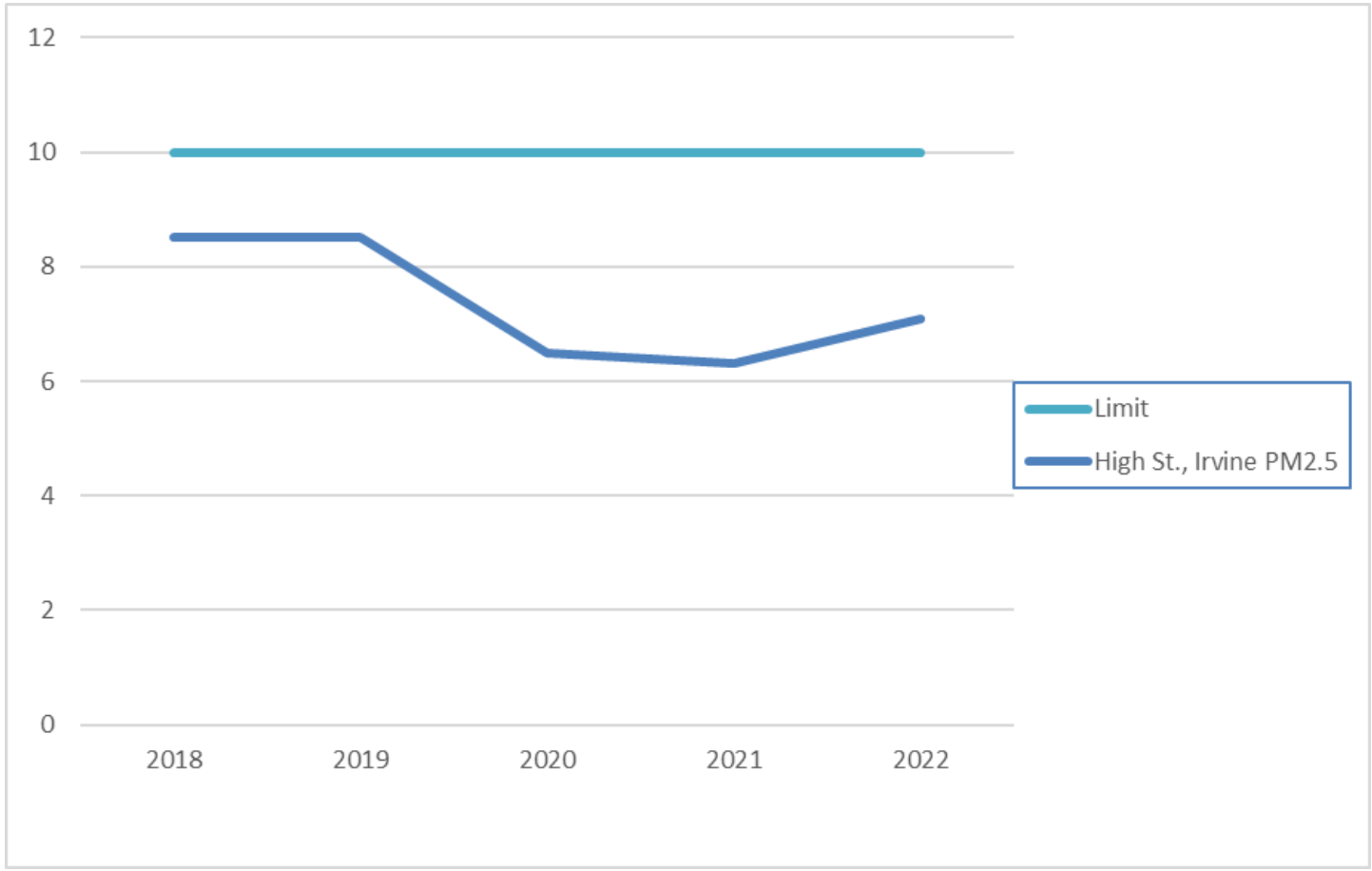


Figure 12: Automatic Monitoring Site Location, High Street, Irvine 2022

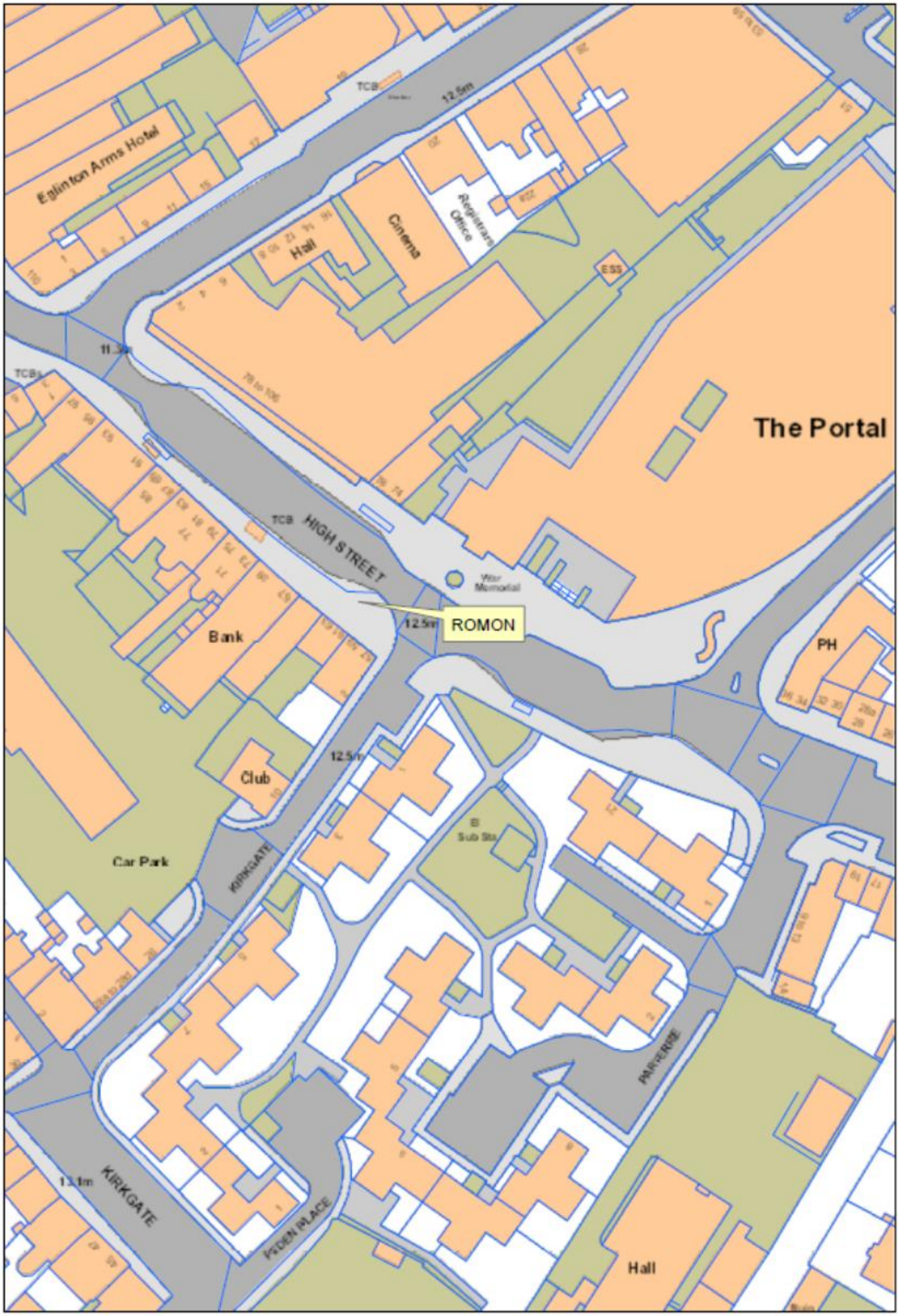


Figure 13: Non-Automatic Monitoring Site Locations 2022

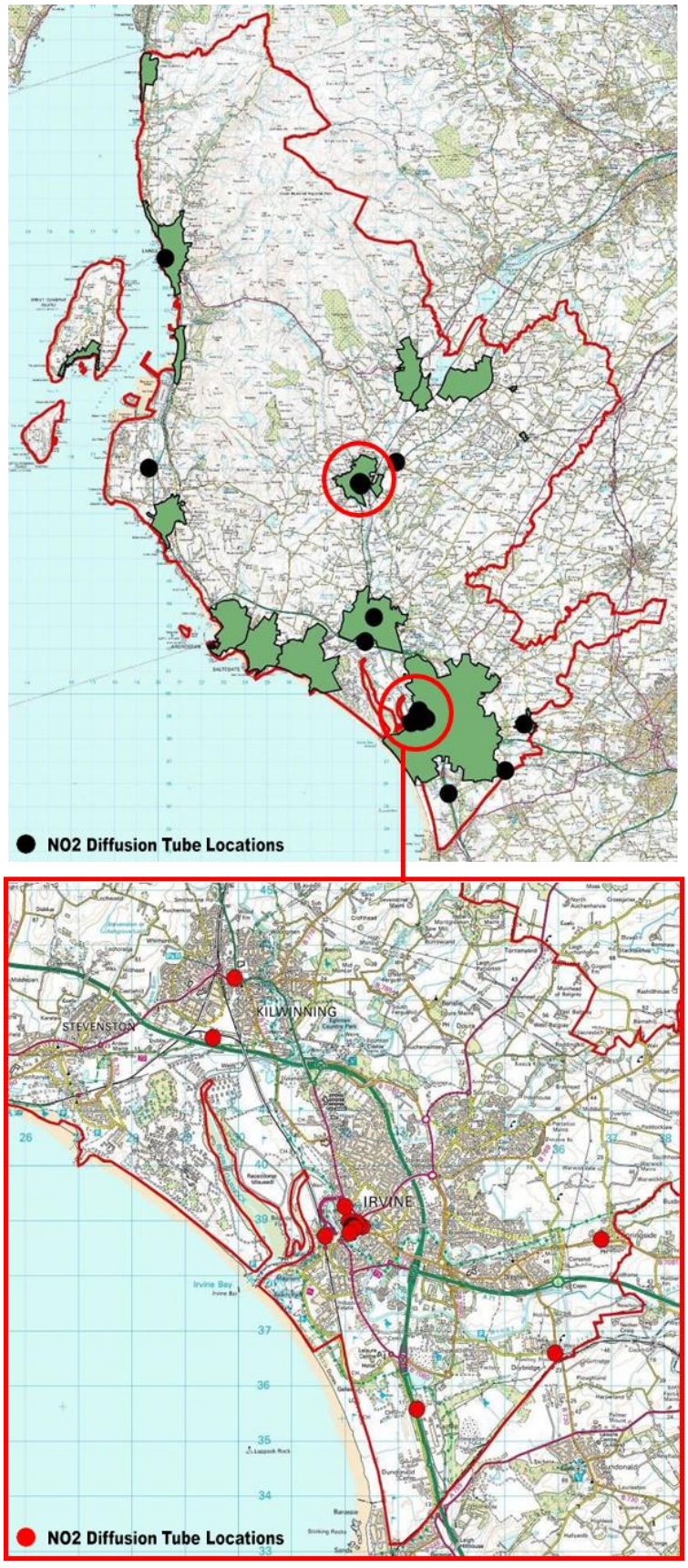


Figure 14: High Street, Irvine Diffusion Tube Site Locations & Concentrations 2022

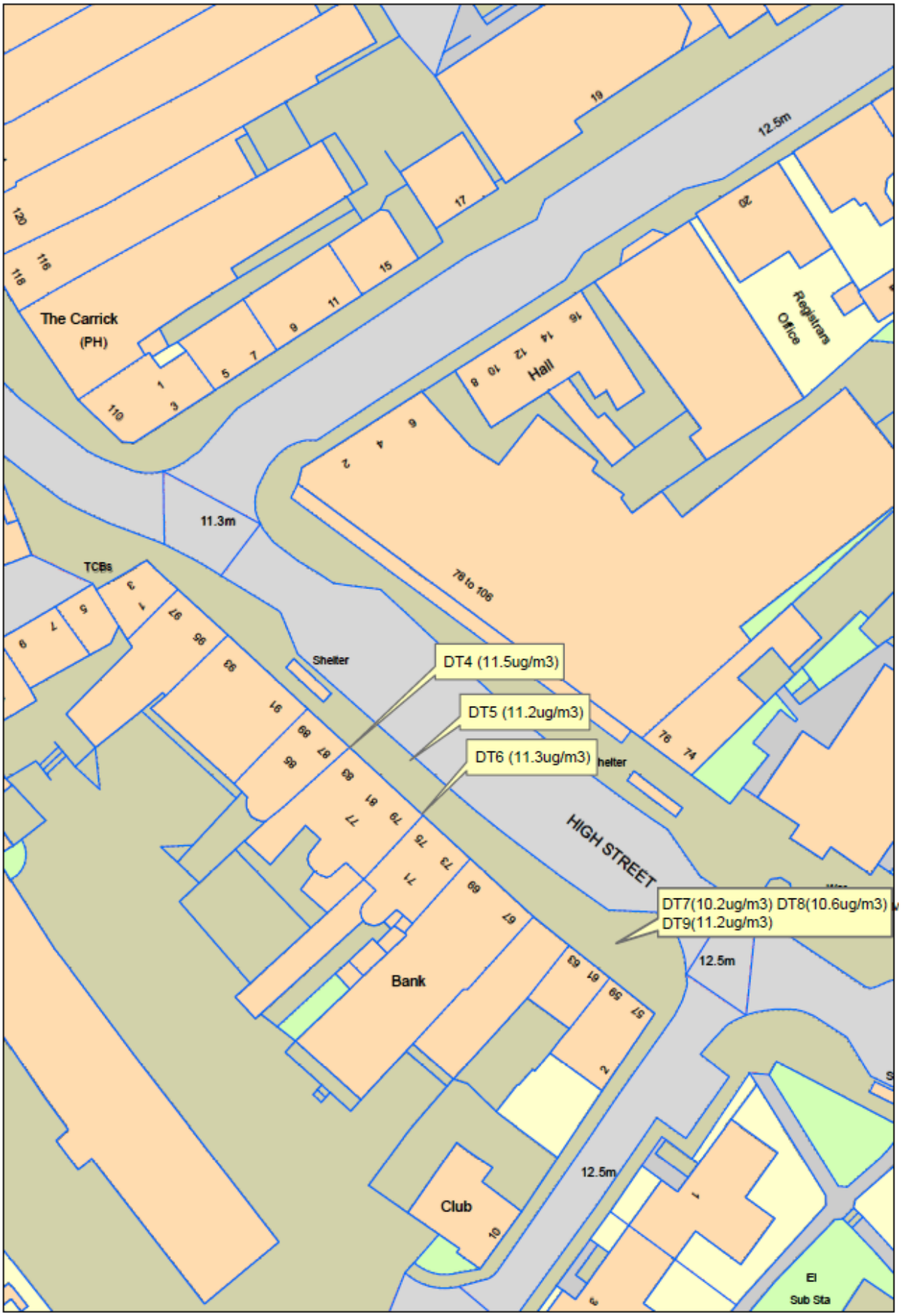


Figure 15: Dalry Diffusion Tube Site Locations & Concentrations 2022

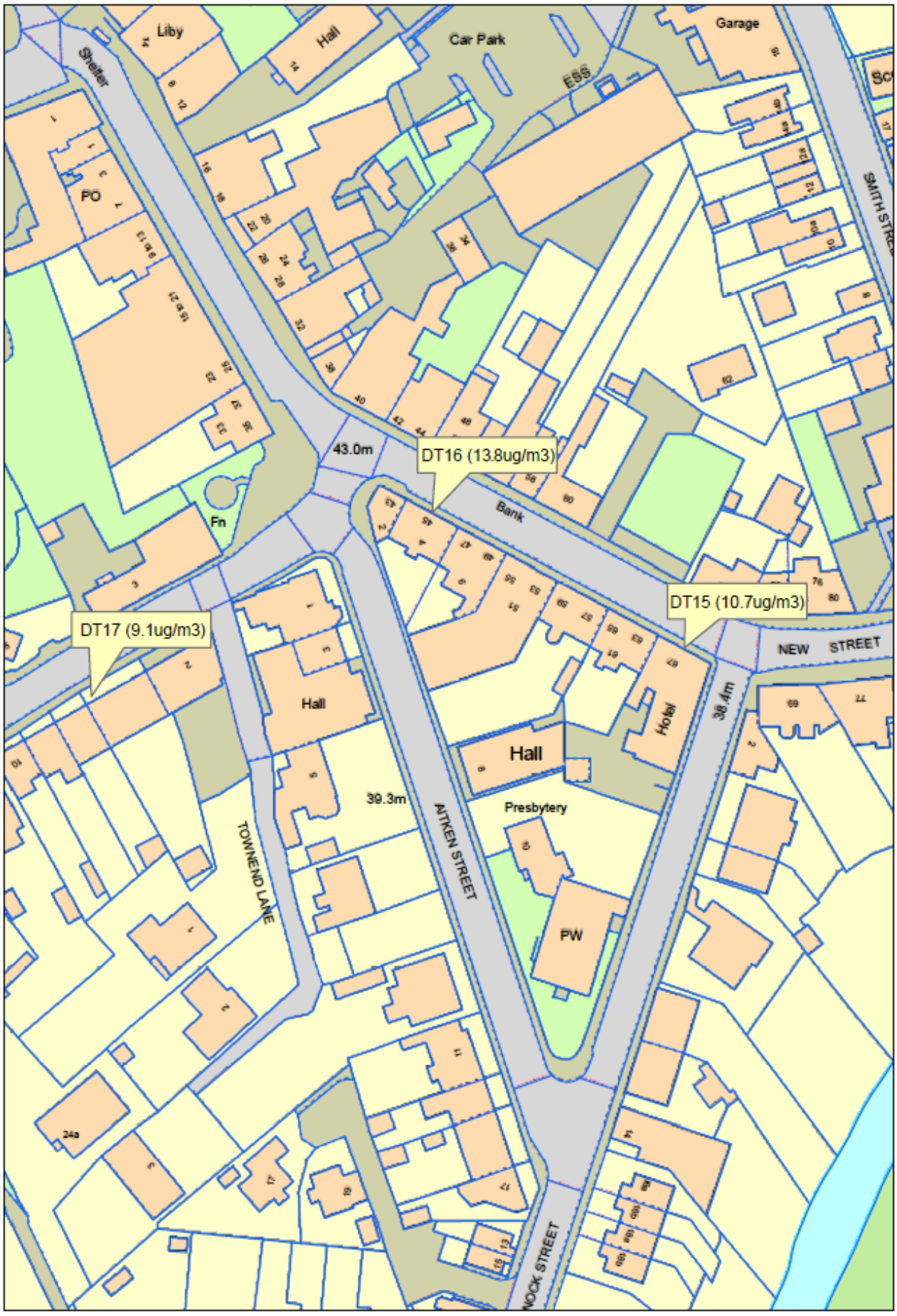
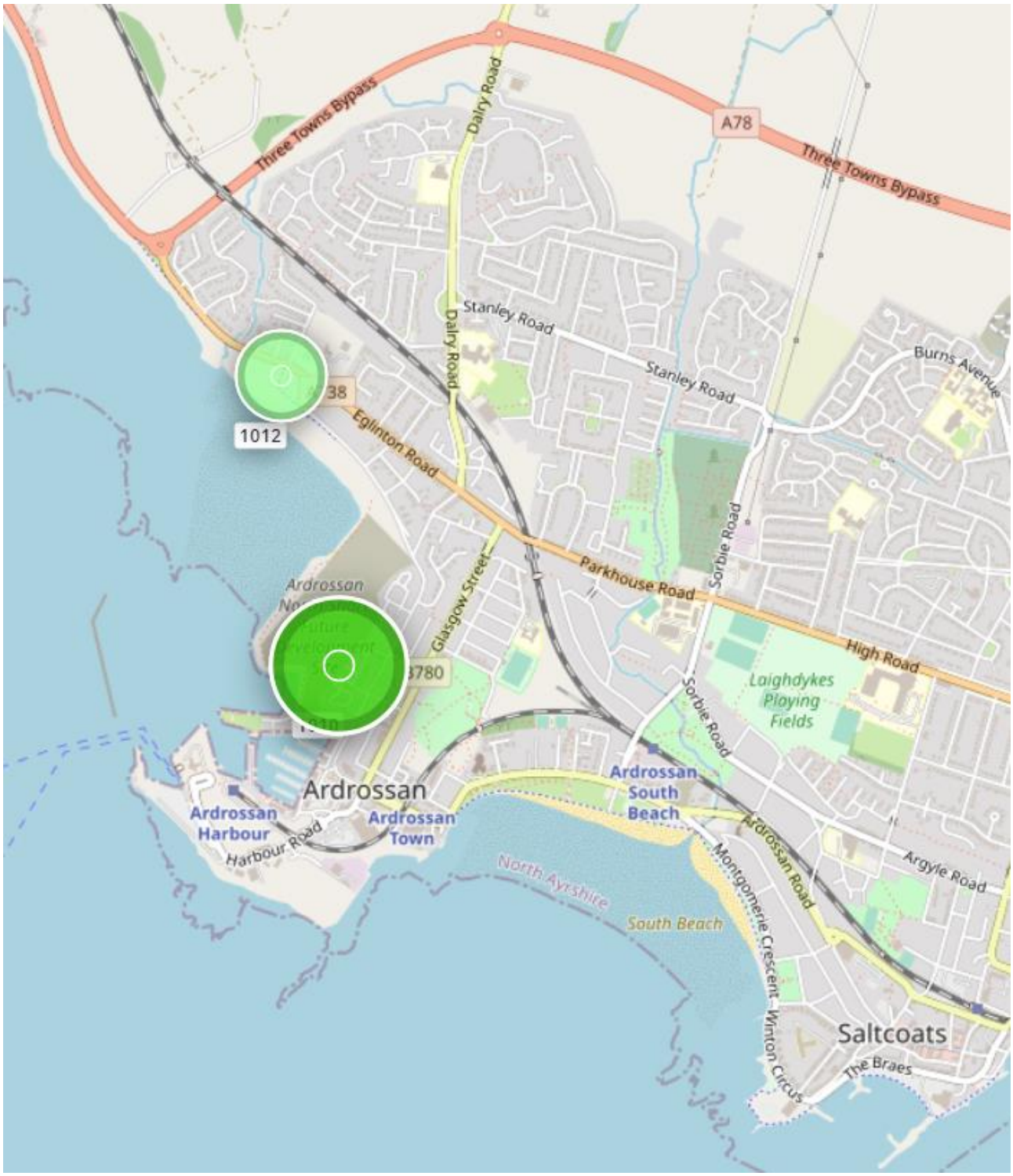


Figure 16: Zephyr Monitoring Locations, Ardrossan



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

References

1. Checking Precision and Accuracy of Triplicate Tubes (Version 04 - Feb 2011).
2. Cleaner Air for Scotland Strategy – The Road to a Healthier Future (CAFS), November 2015.
3. Cleaner Air for Scotland 2 – Towards a Better Place for Everyone (CAFS2) July 2022.
4. Environment Act 1995 Part IV.
5. Local Air Quality Management, Technical Guidance LAQM.TG (22), August 2022.
6. National Diffusion Tube Bias Adjustment Factor Spreadsheet Version Number 03/22.
7. North Ayrshire Council Environmental Sustainability & Climate Change Strategy 2022-2023.
8. North Ayrshire Council Transport Strategy 2015-2021.
9. North Ayrshire Council Electric Vehicle (EV) Strategy 2022-2025.
10. North Ayrshire Council Adopted Local Development Plan November 2019.
11. North Ayrshire Council Development Plan Scheme September 2022.