

Annual Progress Report (APR)



North Ayrshire Council
Comhairle Siorrachd Àir a Tuath

2022 Air Quality Annual Progress Report (APR) for
North Ayrshire Council

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

June 2022

North Ayrshire Council

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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 2016 (TG16) and sets out the air quality monitoring carried out in North Ayrshire, with results and conclusions of data collected for 2021. Monitoring is carried out in North Ayrshire for Nitrogen Dioxide (NO₂) and Particulate Matter (PM), particles of soot (carbon), metals or inorganic salts of sizes less than or equal to 10micrometers, PM₁₀; 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 NO₂ and related to a) traffic congestion in High Street, Irvine and b) queuing traffic in New Street, Dalry. Mitigation projects have now been completed successfully 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.

As expected, following the easing of COVID-19 travel restrictions and a return to business as usual, NO₂ at the three diffusion tube monitors of previous years' concern in High Street, Irvine, increased slightly from 10,12,12ug/m³ in 2020 to 11,13,14 ug/m³ in 2021 respectively. The nearby automatic monitor station has also shown a slight increase in NO₂ from 10ug/m³ in 2020 to 13ug/m³ for 2021.

In New Street, Dalry, NO₂ has shown a further reduction from 16ug/m³ in 2020 to 14ug/m³ in 2021 for the same corresponding diffusion tube of concern.

PM₁₀ remained constant at 11ug/m³ from 2020 to 2021 in High Street, Irvine. The Scottish annual mean air quality objective for PM₁₀ is 18ug/m³. PM_{2.5} also remained constant at 6ug/m³ from 2020 to 6ug/m³ in 2021 for the same location. The Scottish annual mean air quality objective for PM_{2.5} is 10ug/m³.

Overall, monitoring results for 2021 have shown that all levels of NO₂ have increased in High Street whilst PMs have remained constant. NO₂ levels in New Street, Dalry have also shown a slight decrease. NO₂ levels have shown a downward trend across the whole of

North Ayrshire since 2017 with a slight increase in 2021 following the easing of COVID-19 restrictions. PMs have remained constant throughout 2020-2021.

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

2021 data shows that there is 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 implemented a Sustainable Business Travel Plan Car Pool Scheme alongside Enterprise CarClub. Across January – December 2021, this car-share scheme had initially 28 vehicles (a split of 20 petrol-hybrids and 8 EVs) however in March 2021 this was reduced to a total of 22 vehicles (a split of 14 petrol-hybrids and 8 EVs). Vehicle numbers and locations were revised as a response to Covid-19, ensuring vehicles were available for key-workers, and at suitable locations where demand was highest – all whilst reducing costs to NAC. Across the January – December 2021, some 230,556 miles were travelled by the CarClub scheme. Of this, a total of 47,702 miles were travelled on 100% Electric Vehicles – approximately 20% of the total CarClub miles. At the time of writing there are now over 1400 members who have access to 18 vehicles (14 petrol- hybrid vehicles and 4 EVs) across 10 council office locations. The number of EVs have reduced owing to some vehicles being put off-lease in May 2022, and not yet replaced, however during the remainder of the year the number of vehicles may increase again as meetings/site visits begin to resume, pushing demand for staff transport. 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 has been programmed across the two years 2021-23 and remains on target for completion as anticipated, significantly reducing our energy use and carbon emissions from lighting.

During 2021 our Workplace Engagement Officer organised 61 events within 4 workplaces, engaging with 257 staff to help facilitate and encourage alternative active travel in the workplace. COVID restrictions continued to impact the number of events that would normally have taken place throughout the year, resulting in fewer events and participants.

North Ayrshire Council participated in National Clean Air Day on Thursday 17th June 2021 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 2021-23](#).

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 \(north-ayrshire.gov.uk\)](http://north-ayrshire.gov.uk).

North Ayrshire Council participated in Clean Air Day (CAD) 2021 on 17th 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 \(scottishairquality.scot\)](https://www.scottishairquality.scot/know-respond).

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 \(scottishairquality.scot\)](https://www.scottishairquality.scot/apps).

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1 Local Air Quality Management

This report provides an overview of air quality in North Ayrshire Council during 2021. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Progress Report (APR) summarises the work being undertaken by 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	31.12.2021
Sulphur dioxide (SO ₂)	350 µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
Sulphur dioxide (SO ₂)	125 µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
Sulphur dioxide (SO ₂)	266 µg/m ³ , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005
Benzene	3.25 µg/m ³	Running annual mean	31.12.2010
1,3 Butadiene	2.25 µg/m ³	Running annual mean	31.12.2003
Carbon Monoxide	10.0 mg/m ³	Running 8-Hour mean	31.12.2003

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12 months, setting out measures it intends to put in place in pursuit of the objectives. 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 NO₂ 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 2021 – 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 \(north-ayrshire.gov.uk\)](https://www.north-ayrshire.gov.uk/development-plan) (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 \(north-ayrshire.gov.uk\)](https://www.north-ayrshire.gov.uk/development-plan-scheme) (DPS) was published in September 2021 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 \(north-ayrshire.gov.uk\)](https://www.north-ayrshire.gov.uk/transport-strategy)

The 2015-20 Local Transport Strategy (LTS) is still current and was scheduled to be updated in 2021 but this was delayed due to the COVID-19 pandemic and the impact it had on travel behaviour. However, we are now in the process of creating a new combined Local Transport and Active Travel Strategy. It is likely that this will be published towards the end of 2022 or possibly early 2023.

North Ayrshire Council's Cabinet also approved the first Electric Vehicle (EV) Strategy (2021-2025) [Electric Vehicle Strategy \(north-ayrshire.gov.uk\)](https://www.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 has developed their Environmental Sustainability & Climate Change Strategy for 2021 – 2023 (ESCCS 3). 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 CO₂ across North Ayrshire in total since 2005, and 27,088 tonnes within the Council estate.

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

[Environmental Sustainability & Climate Change Strategy \(north-ayrshire.gov.uk\)](https://www.north-ayrshire.gov.uk)

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. It has been recognised locally and nationally as good practice. This is funded by the Smarter Choices Smarter Places programme and delivered 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.

This project worked with a number of local employers including NHS Ayrshire and Arran, KA Leisure, GSK, and Booth Welsh, participating in a number of challenges including: The Active January Alphabet Challenge, The Scottish Workplace Journey Challenge, National Walking Month Cycle to Workday, Paths For All Step Count Challenge and Clean Air Day. Partner workplaces benefited from long term loans of an ebikes for over 1 month, allowing employees to trail an ebike at any time, and 65 employees across various workplaces have borrowed e-bikes for a 2 week period.

In 2021 sixty-two North Ayrshire Council Staff purchased new bikes through the Cycle To Work Scheme. Since their purchase in 2018, three ebikes have been used by a number of

staff within various services for work related duties in replacement of a motor vehicle and have clocked up approx. 1200 miles to date.

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives

3.1 Summary of Monitoring Undertaken

A fixed automatic monitoring station is located in 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 PM₁, PM_{2.5} as per EN 14907 and PM₁₀ as per EN12341 since 14th April 2015. This monitoring station is also the site being used for the triplicate co-location of NO₂ diffusion tubes.

Calibration checks are conducted every 2 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 6 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 NO₂ at various locations in towns throughout North Ayrshire and the data capture rate was 95.5%.

As expected, due to the travel restrictions easing following the pandemic, 2021 results show that all pollutants were still significantly reduced, compared to pre pandemic levels, throughout North Ayrshire and have not yet returned their business as usual levels. This trend is in accordance with the rest of the UK. No monitoring results for 2021 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 2021. [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 11: Automatic Monitoring Site Location, High Street, Irvine 2021](#) 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 NO₂ at twenty-two sites during 2021. [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 12: Non-Automatic Monitoring Site Locations 202](#) and further details on the data and bias adjustment for the diffusion tubes are included in Appendix C: [QA/QC of Diffusion Tube Monitoring](#).

Other Monitoring Activities

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

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](#)

Nitrogen Dioxide (NO₂)

[Table A.3](#) in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past five years with the air quality objective of 40 µg/m³.

For diffusion tubes, the full 2021 dataset of monthly mean values is provided in [Appendix B](#).

Annual Mean NO₂ 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 2017. There has been a particularly noticeable decline in the NO₂ concentrations since 2017 in and around Irvine and Dalry following mitigation measures to ease traffic congestion. There has been a slight increase during 2021 due the easing of COVID-19 pandemic restrictions and return to normality. A graph of these trends is included in Appendix C: [Figure 7: Trends in Annual Mean NO₂ Concentrations measured at Diffusion Tube Monitoring Sites in Irvine 2017 - 202](#) & [Figure 8: Trends in Annual Mean NO₂ Concentrations measured at Diffusion Tube Monitoring Sites in Dalry 2017 - 202](#)

[Table A.4](#) in Appendix A compares the ratified continuous monitored NO₂ hourly mean concentrations for the past five years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year. There has been no exceedance of over 18 times per year for the 2017 to 2021 reporting period with North Ayrshire Council.

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

3.2.1 Particulate Matter (PM₁₀)

[Table A.5](#) in Appendix A compares the ratified and adjusted monitored PM₁₀ annual mean concentrations for the past five years with the air quality objective of 18µg/m³.

[Table A.6](#) in Appendix A compares the ratified continuous monitored PM₁₀ daily mean concentrations for the past five years with the air quality objective of 50µg/m³, not to be exceeded more than seven times per year.

PM₁₀ levels remained steady during 2018 – 2019 at 14µg/m³ but decreased to 11µg/m³ during 2020 and continued to remain at this level for 2021 at High Street, Irvine. A graph showing this trend is included in Appendix C: [Figure 9: Trends in Annual Mean PM₁₀ Concentrations measured at Automatic Station \(ROMON\) in High Street, Irvine 2017 – 2021](#)

There have been no exceedances of over 7 times per year for the 2017 to 2021 reporting period.

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

3.2.2 Particulate Matter (PM_{2.5})

[Table A.7](#) in Appendix A compares the ratified and adjusted monitored PM_{2.5} annual mean concentrations for the past five years with the air quality objective of 10µg/m³.

PM_{2.5} levels remained steady during 2018 – 2019 at 8µg/m³ but decreased to 6µg/m³ during 2020 and continued to remain at this level for 2021 at High Street, Irvine. A graph showing this trend is included in Appendix C: [Figure 10: Trends in Annual Mean PM2.5 Concentrations measured at Automatic Station \(ROMON\) in High Street, Irvine 2017 - 202](#)

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

3.2.3 Sulphur Dioxide (SO₂)

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.

3.2.4 Carbon Monoxide, Lead and 1,3-Butadiene

No recent monitoring of Carbon 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 five significant housing developments proposed in 2021 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:

[21/00074/PP | Erection of residential development comprising of 41 dwelling houses and associated infrastructure | Phase 2C Site To North Of Arran View Nursing Home And Site To West Of Dalry Road Saltcoats Ayrshire \(north-ayrshire.gov.uk\)](#) Assessment awaited.

[21/00961/PPP | Planning permission in principle for residential development \(to include details of site access arrangements\) | Bridgend Mill Site No 3 Bridgend Dalry Ayrshire \(north-ayrshire.gov.uk\)](#) Assessment awaited.

[21/01042/PP | Demolition of all existing buildings and structures on site and the development of a single retail unit \(for convenience retailing purposes\), associated car parking, revised vehicular access, servicing and ancillary development plus hard and soft landscaping | 123-125 Main Street Largs Ayrshire KA30 8JJ \(north-ayrshire.gov.uk\)](#)

Screening Report submitted and accepted.

[21/01174/PPM | Erection of 220 dwelling houses and associated infrastructure and landscaping | Site To North Of Summerlea Road And West Of Snowdon Terrace Seamill West Kilbride Ayrshire \(north-ayrshire.gov.uk\)](#) Screening Report submitted and accepted.

[21/01234/PP | Erection of residential development comprising 28 no. units within 5 blocks including the formation of road access from Gottries Road, parking, landscaping and associated servicing infrastructure | Jewson Timber And Building Supplies Ltd Gottries Road Irvine Ayrshire KA12 8QE \(north-ayrshire.gov.uk\)](#) Assessment awaited.

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 kerb; 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 2021.

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 large 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 2021.

4.3 Industrial Sources

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 2021.

4.4 Commercial and Domestic Sources

There was one biomass boiler installation proposed in 2021 that had the potential to have a detrimental effect on the local air quality. This is listed below with the reporting status.

[21/00925/LUE | Certificate of lawfulness for the existing development of 2 biomass boilers | 53 Marine Parade Millport Ayrshire KA28 0EF \(north-ayrshire.gov.uk\)](#) Screening Report submitted and accepted.

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 2021 at this time.

5 Planning Applications

Relevant new local developments are detailed above in Section 4 of this report.

6 Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

All NO₂, PM₁₀ and PM_{2.5} monitoring data within North Ayrshire Council for 2021 complied with the 40µg/m³, 18µg/m³ and 10µg/m³ respective Air Quality Objectives as set out in the Directive. Monitoring will continue at all the existing sites for 2022.

6.2 Conclusions relating to New Local Developments

Planning applications for five significant housing developments were received in 2021. 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. Due to development timescales, one screening report has been submitted to date which was satisfactory and detailed modelling was not required.

6.3 Proposed Actions

2021 monitoring data has not identified any new exceedances of the objectives for any pollutant or any need for additional monitoring or changes to the existing monitoring programme within North Ayrshire.

Irvine

Following the introduction of mitigation measures to reduce congestion, a significant reduction in NO₂ has been recorded in High Street since their implementation in 2018. Monitoring showed that levels reduced further during 2020, due to COVID-19 pandemic travel restrictions, but have now shown a slight increase during 2021 as normal travel routines have resumed. It is proposed that NO₂ 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 2020 eased traffic congestion significantly through the town and NO₂ concentrations were seen to reduce accordingly. NO₂ have increased slightly during 2021 and 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	18 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 NO₂ Monitoring Results (µg/m³)

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
ROMON	Roadside	Automatic	-	98	21	18	16	10	13
DT1	Roadside	Diffusion Tube	-	100	22	21	20	13	15
DT2	Roadside	Diffusion Tube	-	100	22	25	19	11	11
DT3	Roadside	Diffusion Tube	-	92	21	23	16	11	16
DT4	Roadside	Diffusion Tube	-	100	27	18	17	10	11
DT5	Kerbside	Diffusion Tube	-	100	41	23	20	12	13
DT6	Roadside	Diffusion Tube	-	100	32	22	20	12	14
DT7	Roadside	Diffusion Tube	-	100	25	20	20	10	13
DT8	Roadside	Diffusion Tube	-	92	24	21	19	12	12
DT9	Roadside	Diffusion Tube	-	75	23	19	19	12	11
DT10	Urban Background	Diffusion Tube	-	92	8	11	9	7	8
DT11	Kerbside	Diffusion Tube	-	100	14	13	13	10	8
DT12	Urban Background	Diffusion Tube	-	100	12	12	11	10	8
DT13	Kerbside	Diffusion Tube	-	100	19	21	17	13	15
DT14	Kerbside	Diffusion Tube	-	100	9	10	9	6	6
DT15	Urban Background	Diffusion Tube	-	92	29	25	21	12	14
DT16	Kerbside	Diffusion Tube	-	100	38	34	26	16	14
DT17	Kerbside	Diffusion Tube	-	67	27	26	21	11	11
DT18	Roadside	Diffusion Tube	-	100	19	17	14	8	6
DT19	Urban Background	Diffusion Tube	-	100	17	18	16	12	13
DT20	Kerbside	Diffusion Tube	-	100	5	5	5	3	3
DT21	Rural	Diffusion Tube	-	92	15	16	15	12	11
DT22	Kerbside	Diffusion Tube	-	100	19	17	14	11	13

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in bold.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

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

- (1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
- (2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Table A.4 – 1-Hour Mean NO₂ Monitoring Results, Number of 1-Hour Means > 200µg/m³

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
ROMON	Roadside	Automatic	-	98	0	0	0	0	0

Notes:

Exceedances of the NO₂ 1-hour mean objective (200 µg/m³ 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 PM₁₀ Monitoring Results (µg/m³)

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
ROMON	Roadside	-	97	13	14	14	11	11

Notes:

Exceedances of the PM₁₀ annual mean objective of 18 µg/m³ are shown in bold.

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

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

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

Table A.6 – 24-Hour Mean PM₁₀ Monitoring Results, Number of PM₁₀ 24-Hour Means > 50µg/m³

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
ROMON	Roadside	-	97	0	0	0	0	0

Notes:

Exceedances of the PM₁₀ 24-hour mean objective (50 µg/m³ 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/m³)

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
ROMON	Roadside	-	97	7	8	8	6	6

Notes:

Exceedances of the PM_{2.5} annual mean objective of 10 µg/m³ are shown in bold.

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

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

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

Table A.8 – SO₂ 2021 Monitoring Results, Number of Relevant Instances

Site ID	Site Type	Valid Data Capture for monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽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 SO₂ 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 SO₂ monitoring is undertaken within North Ayrshire Council since 2004.

Appendix B: Full Monthly Diffusion Tube Results for 2021

Table B.1 – NO₂ 2021 Monthly Diffusion Tube Results (µg/m³)

Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted ⁽¹⁾
DT1	18.6	5.3	16.8	15.3	13.8	9.4	9.4	8.6	18.0	14.8	23.4	21.1	14.5	15.0
DT2	21.1	6.9	11.4	11.4	9.1	5.1	5.5	7.0	10.7	9.0	13.9	16.4	10.6	10.9
DT3	34.2	20.0	9.8	12.0	9.2	4.0	6.5		13.5	12.3	30.3	27.5	16.3	15.6
DT4	16.2	5.7	8.9	12.9	9.6	3.0	7.1	7.8	9.9	11.2	15.8	14.9	10.3	10.6
DT5	19.1	7.1	13.0	7.9	14.1	6.2	8.3	9.8	16.5	12.8	22.3	16.9	12.8	13.2
DT6	19.3	9.8	13.6	13.1	11.9	9.2	4.3	10.0	17.0	15.5	20.9	14.2	13.2	13.6
DT7	20.8	6.8	10.8	12.3	12.1	10.4	8.7	8.5	15.1	12.4	16.5	14.4	12.4	12.8
DT8		6.5	9.7	10.5	10.6	7.9	9.7	5.8	14.7	11.6	18.1	15.1	10.9	11.5
DT9	19.9	5.1	10.0			11.7		8.0	15.4	12.7	19.6	13.2	12.8	11.1
DT10	16.7	6.0	4.5	9.1	5.6	2.2	5.9	3.6	7.5		9.0	10.0	7.3	7.5
DT11	6.1	2.3	9.4	9.6	9.0	4.3	4.2	7.3	11.3	6.9	13.8	12.3	8.0	8.3
DT12	13.7	4.0	9.8	6.7	6.7	2.2	9.0	3.6	7.8	6.2	11.8	10.4	7.7	7.9
DT13	20.5	13.0	15.1	13.3	13.6	11.1	11.1	8.5	16.5	11.9	18.8	19.1	14.4	14.8
DT14	16.7	6.4	4.2	7.8	6.3	3.1	4.0	3.0	4.9	4.2	5.7	8.7	6.3	6.4
DT15	26.1	13.8	19.4	17.1	10.8	9.2	-	9.1	11.1	8.9	17.4	13.8	14.2	13.6
DT16	24.0	6.8	13.9	13.0	11.2	9.7	9.3	8.9	17.7	19.7	18.9	13.1	13.9	14.3
DT17			12.2	13.5	11.8	8.5	7.1	7.3		14.9		15.8	11.4	10.7
DT18	12.8	6.3	5.1	6.7	6.1	2.2	-	4.2	2.6	6.9	6.3	8.9	5.8	6.0
DT19	19.0	4.4	10.3	15.8	12.8	5.1	21.0	9.2	10.1	14.5	15.8	18.2	13.0	13.4
DT20	4.4	1.9	3.1	4.4	2.6	2.2	2.7	4.2	4.4	4.2	2.5	3.5	3.3	3.4
DT21		7.3	10.5	15.1	14.5	12.4	12.6	11.0	11.2	12.6	12.1	14.0	11.1	11.4
DT22	18.6	7.2	11.6	13.2	12.4	13.3	9.3	11.5	9.8	16.6	14.2	13.4	12.6	13.0

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 2021

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

Additional Air Quality Works Undertaken by North Ayrshire Council During 2021

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

QA/QC of Diffusion Tube Monitoring

Glasgow Scientific Services (GSS) was the supplier used for diffusion tubes within 2021 and the method of preparation was 20% TEA in water and has been supplying North Ayrshire Council's diffusion 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 below.

Monitoring was completed in adherence with the 2021 Diffusion Tube Monitoring Calendar.

Diffusion Tube Annualisation

Annualisation was required at one diffusion tube location in Dalry due to a data capture of 66%. The calculations are provided in Table C.2 below.

Diffusion Tube Bias Adjustment Factors

North Ayrshire Council have applied a local bias adjustment factor of **1.03** to the 2021 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 (2017-2021)

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2021	Local	-	1.03
2020	Local	-	0.92
2019	National	03/20	0.86
2018	National	03/18	0.91
2017	National	03/18	0.91

National Adjustment Factors

Diffusion tubes (20% TEA/Water) used in the sampling period for 2021 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 below. The Tube Precision and AIR results for the laboratory are shown in Figure 3 below. The resultant bias for GSS is 1.12 based on six studies with five of poor precision.

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 below). The resulting Bias Factor for 2021 data is **1.03** 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 and it is felt that the local derived bias factor range of 0.92 – 1.17 is within the corresponding parameters of other years. Records show from Table C.1 that previous derived bias factors over the last four years ranged from 0.91 – 1 between 2017 and 2019. The National Bias Adjustment Factor from GSS is based on 6 studies, only one of which had “Good” precision. Therefore, it is considered that the Local National Bias Adjustment Factor when applied to the data reflects more accurately on the true values of air quality when over the entire district. Using the local bias factor of **1.03** reflects a more realistic trend for NO₂ pollution levels within North Ayrshire Council.

NO₂ Fall-off with Distance from the Road

No diffusion tube NO₂ monitoring locations within North Ayrshire Council required distance correction during 2021.

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 2 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 6 months to carry out calibration audit tests and the Annual Report and Certificates from these visits are included in Figure 4 & 5 below. The instrument units are also serviced twice yearly by a specialist company and reports from these visits are included in Figure 6 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 \(scottishairquality.scot\)](https://scottishairquality.scot)

PM₁₀ and PM_{2.5} Monitoring Adjustment

The Fidas 200 type of PM₁₀/PM_{2.5} monitor(s) utilised within North Ayrshire Council do not require the application of a correction factor.

Automatic Monitoring Annualisation

All automatic monitoring locations within North Ayrshire Council recorded data capture 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.

NO₂ Fall-off with Distance from the Road

No automatic NO₂ monitoring locations within North Ayrshire Council required distance correction during 2021.

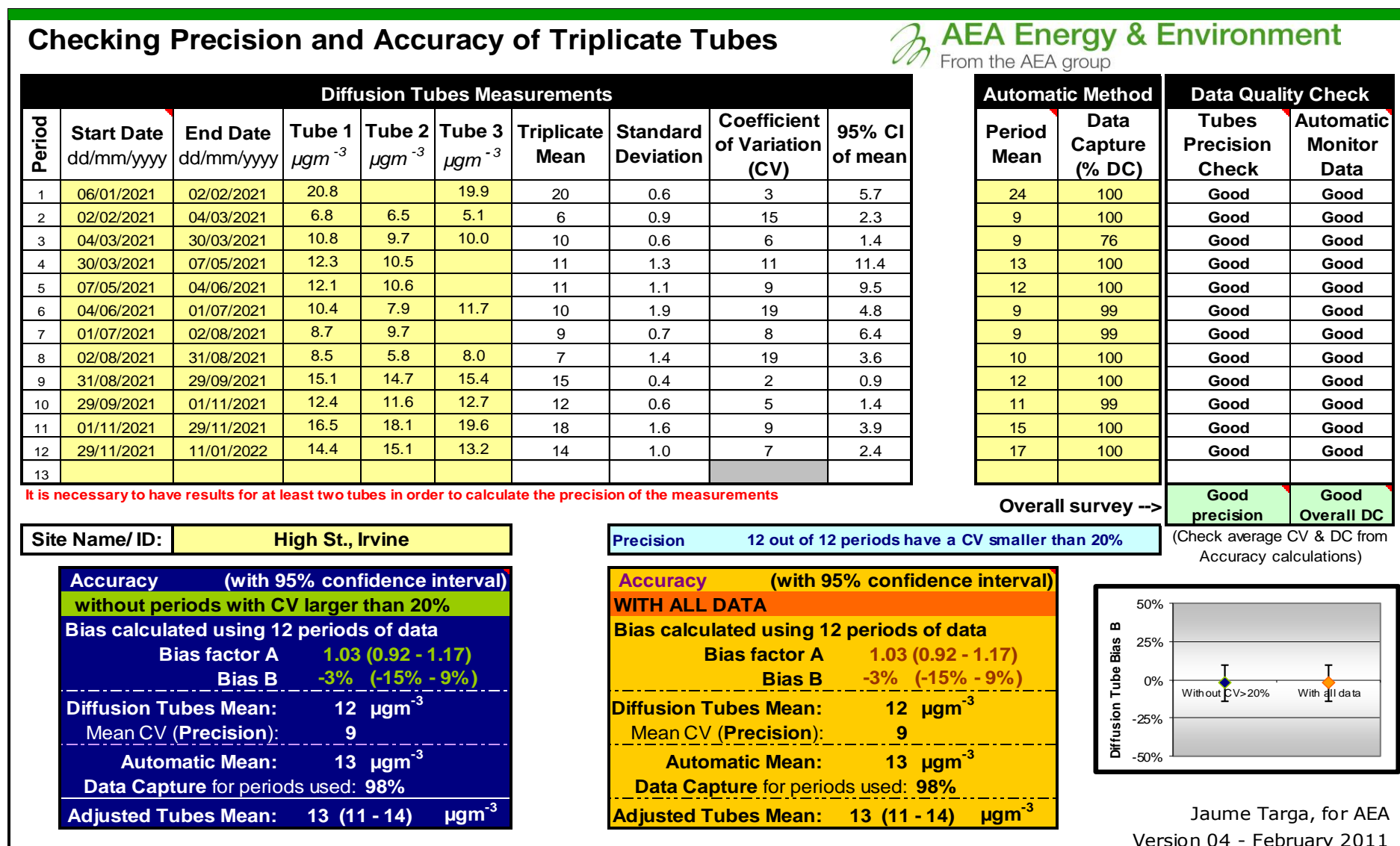
Table C.2 – Annualisation Summary (concentrations presented in $\mu\text{g}/\text{m}^3$)**Non-Automatic Annualisation For NO_2**

Site ID	Annualisation Factor Site 1 Glasgow, Whaulkmillglen	Annualisation Factor Site 2 Glasgow, Townhead	Annualisation Factor Site 3 North Lanarkshire, Whifflet	Annualisation Factor Site 4 N/A	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT17	1.0603	1.0871	1.0289	-	1.0588	10.1	10.7	Based on data missing data for the months Jan, Feb, Sep, Nov

Notes:

The Average Annualisation Factor of 1.0588 is in close agreement with the North Ayrshire Council Local Bias Adjustment Factor of 1.03 that has been used for the Diffusion Tube data set.

Figure 1: Diffusion Tube Accuracy



If you have any enquiries about this spreadsheet please contact the LAQM Helpdesk at:

LAQMHelpdesk@uk.bureauveritas.com

Adjustment of SINGLE Tubes

Diffusion Tube Measurements															
Site Name/ID	Periods													Raw Mean	Valid periods
	1	2	3	4	5	6	7	8	9	10	11	12	13		
35 East Road Irvine	18.6	5.3	16.8	15.3	13.8	9.4	9.4	8.6	18.0	14.8	23.4	21.1		14.5	12
22 Bank St, Irvine (Murray Gillies & Wilson Solicitors)	21.1	6.9	11.4	11.4	9.1	5.1	5.5	7.0	10.7	9.0	13.9	16.4		10.6	12
147 High Street, Irvine (Browings)	34.2	20.0	9.8	12.0	9.2	4.0	6.5		13.5	12.3	30.3	27.5		16.3	11
85 High St, Irvine (Shoe Repair/Indian Palace)	16.2	5.7	8.9	12.9	9.6	3.0	7.1	7.8	9.9	11.2	15.8	14.9		10.3	12
79 High St, Irvine (Fishmongers)	19.1	7.1	13.0	7.9	14.1	6.2	8.3	9.8	16.5	12.8	22.3	16.9		12.8	12
75 High St, Irvine (Yoohoo/The Meridian Room)	19.3	9.8	13.6	13.1	11.9	9.2	4.3	10.0	17.0	15.5	20.9	14.2		13.2	12
65a High Street, Irvine, (AUTO MONITOR STATION)	20.8	6.8	10.8	12.3	12.1	10.4	8.7	8.5	15.1	12.4	16.5	14.4		12.4	12
65 High Street, Irvine, (AUTO MONITOR STATION)		6.5	9.7	10.5	10.6	7.9	9.7	5.8	14.7	11.6	18.1	15.1		10.9	11
65 High Street, Irvine, (AUTO MONITOR STATION)	19.9	5.1	10.0			11.7		8.0	15.4	12.7	19.6	13.2		12.8	9
34 Kirkgate Irvine	16.7	6.0	4.5	9.1	5.6	2.2	5.9	3.6	7.5		9.0	10.0		7.3	11
25 Main Rd, Springside	6.1	2.3	9.4	9.6	9.0	4.3	4.2	7.3	11.3	6.9	13.8	12.3		8.0	12
Auchengate (Bridge)	13.7	4.0	9.8	6.7	6.7	2.2	9.0	3.6	7.8	6.2	11.8	10.4		7.7	12
Dalry Rd , Kilwinning	20.5	13.0	15.1	13.3	13.6	11.1	11.1	8.5	16.5	11.9	18.8	19.1		14.4	12
12 Garnock St, Dalry	16.7	6.4	4.2	7.8	6.3	3.1	4.0	3.0	4.9	4.2	5.7	8.7		6.3	12
67 New St, Dalry (Royal Hotel)	26.1	13.8	19.4	17.1	10.8	9.2		9.1	11.1	8.9	17.4	13.8		14.2	11
45 New St Dalry (Zain's Curry House)	24.0	6.8	13.9	13.0	11.2	9.7	9.3	8.9	17.7	19.7	18.9	13.1		13.9	12
2 Townhead, St, Dalry (Housing Office)			12.2	13.5	11.8	8.5	7.1	7.3		14.9		15.8		11.4	8
Highfield Hamlet , Dalry	12.8	6.3	5.1	6.7	6.1	2.2	1.8	4.2	2.6	6.9	6.3	8.9		5.8	12
85 Main Street , Largs (Key Centre)	19.0	4.4	10.3	15.8	12.8	5.1	21.0	9.2	10.1	14.5	15.8	18.2		13.0	12
Hunterston Road/Cycle Track	4.4	1.9	3.1	4.4	2.6	2.2	2.7	4.2	4.4	4.2	2.5	3.5		3.3	12
41-43 Princes St, Ardrossan		7.3	10.5	15.1	14.5	12.4	12.6	11.0	11.2	12.6	12.1	14.0		12.1	11
21 Vernon St, Saltcoats	18.6	7.2	11.6	13.2	12.4	13.3	9.3	11.5	9.8	16.6	14.2	13.4		12.6	12

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

Adjusted measurement (95% confidence interval) with all the data 12 periods used in this calculations	
Bias Factor A 1.03 (0.92 - 1.17) Bias B -3% (-15% - 9%)	
Tube Precision: 9	Automatic DC: 98%
Adjusted with 95% CI	15 (13 - 17)
Adjusted with 95% CI	11 (10 - 12)
Adjusted with 95% CI	17 (15 - 19)
Adjusted with 95% CI	11 (9 - 12)
Adjusted with 95% CI	13 (12 - 15)
Adjusted with 95% CI	14 (12 - 15)
Adjusted with 95% CI	13 (11 - 15)
Adjusted with 95% CI	11 (10 - 13)
Adjusted with 95% CI	13 (12 - 15)
Adjusted with 95% CI	8 (7 - 9)
Adjusted with 95% CI	8 (7 - 9)
Adjusted with 95% CI	8 (7 - 9)
Adjusted with 95% CI	15 (13 - 17)
Adjusted with 95% CI	6 (6 - 7)
Adjusted with 95% CI	15 (13 - 17)
Adjusted with 95% CI	14 (13 - 16)
Adjusted with 95% CI	12 (10 - 13)
Adjusted with 95% CI	6 (5 - 7)
Adjusted with 95% CI	13 (12 - 15)
Adjusted with 95% CI	3 (3 - 4)
Adjusted with 95% CI	12 (11 - 14)
Adjusted with 95% CI	13 (12 - 15)

Adjustment of DUPLICATE or TRIPLICATE Tubes



Diffusion Tubes Measurements									
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
1	06/01/2021	02/02/2021	20.8		19.9	20.4	0.64	3.13	5.72
2	02/02/2021	04/03/2021	6.8	6.5	5.1	6.1	0.91	14.79	2.25
3	04/03/2021	30/03/2021	10.8	9.7	10.0	10.2	0.57	5.59	1.41
4	30/03/2021	07/05/2021	12.3	10.5		11.4	1.27	11.16	11.44
5	07/05/2021	04/06/2021	12.1	10.6		11.4	1.06	9.35	9.53
6	04/06/2021	01/07/2021	10.4	7.9	11.7	10.0	1.93	19.31	4.80
7	01/07/2021	02/08/2021	8.7	9.7		9.2	0.71	7.69	6.35
8	02/08/2021	31/08/2021	8.5	5.8	8.0	7.4	1.44	19.32	3.57
9	31/08/2021	29/09/2021	15.1	14.7	15.4	15.1	0.35	2.33	0.87
10	29/09/2021	01/11/2021	12.4	11.6	12.7	12.2	0.57	4.65	1.41
11	01/11/2021	29/11/2021	16.5	18.1	19.6	18.1	1.55	8.58	3.85
12	29/11/2021	11/01/2022	14.4	15.1	13.2	14.2	0.96	6.75	2.39
13									

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

Data Quality Check
Diffusion Tubes Precision Check
Good
Good
Good
Good
Good
Good
Good
Good
Good
Good
Good
Good

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: 9 Automatic DC: 98% Bias factor A: 1.03 (0.92 - 1.17) Bias B: -3% (-15% - 9%)
Information about tubes to be adjusted Diffusion Tube average: 12 μgm^{-3} Average Precision (CV): 9 Adjusted Tube average: 13 +/- 2 μgm^{-3}

Adjusted measurement (95% confidence level) with all data
Bias calculated using 12 periods of data Tube Precision: 9 Automatic DC: 98% Bias factor A: 1.03 (0.92 - 1.17) Bias B: -3% (-15% - 9%)
Information about tubes to be adjusted Diffusion Tube average: 12 μgm^{-3} Average Precision (CV): 9 Adjusted Tube average: 13 +/- 2 μgm^{-3}

Figure 2: Bias Factor Spreadsheet (Glasgow Scientific)

National Diffusion Tube Bias Adjustment Factor Spreadsheet							Spreadsheet Version Number: 03/22				
<p>Follow the steps below in the correct order to show the results of relevant co-location studies</p> <p>Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods</p> <p>Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet</p> <p>This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.</p>										<p>This spreadsheet will be updated at the end of June 2022</p> <p>LAQM Helpdesk Website</p>	
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	Year ⁵	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) ($\mu\text{g}/\text{m}^3$)	Automatic Monitor Mean Conc. (Cm) ($\mu\text{g}/\text{m}^3$)	Bias (B)	Tube Precision ⁶	Bias Adjustment Factor (A) (Cm/Dm)	
Glasgow Scientific Services	20% TEA in water	2021	R	Glasgow City Council	12	26	25	4.1%	P	0.96	
Glasgow Scientific Services	20% TEA in water	2021	R	Glasgow City Council	11	16	21	-22.1%	P	1.28	
Glasgow Scientific Services	20% TEA in water	2021	R	Glasgow City Council	12	18	22	-19.8%	P	1.25	
Glasgow Scientific Services	20% TEA in water	2021	KS	Glasgow City Council	12	37	44	-15.3%	P	1.18	
Glasgow Scientific Services	20% TEA in water	2021	UB	Glasgow City Council	12	14	17	-19.3%	P	1.24	
Glasgow Scientific Services	20% TEA in water	2021	KS	Marylebone Road Intercomparison	10	46	41	11.9%	G	0.89	
Glasgow Scientific Services	20% TEA in water	2021		Overall Factor ³ (6 studies)					Use	1.12	

Figure 3: Tube Precision & AIR-PT Results.

Table 1: Laboratory summary performance for AIR NO₂ PT rounds AR0030, 31, 33, 34, 36, 37, 39, 40 and 42

The following table lists those UK laboratories undertaking LAQM activities that have participated in recent AIR NO₂ PT rounds and the percentage (%) of results submitted which were subsequently determined to be **satisfactory** based upon a z-score of $\leq \pm 2$ as defined above.

AIR PT Round	AIR PT AR030	AIR PT AR031	AIR PT AR033	AIR PT AR034	AIR PT AR036	AIR PT AR037	AIR PT AR039	AIR PT AR040	AIR PT AR042
Round conducted in the period	January – February 2019	April – May 2019	July – August 2019	September – November 2019	January – February 2020	May – June 2020	July – August 2020	September – October 2020	January – March 2021
Aberdeen Scientific Services	75 %	100 %	100 %	100 %	100 %	NR [3]	NR [3]	100 %	100 %
Edinburgh Scientific Services	100 %	NR [2]	100 %	25 %	50 %	NR [3]	NR [3]	100 %	25 %
SOCOTEC	87.5 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	NR [3]	NR [3]	100 % [1]	100 % [1]
Glasgow Scientific Services	100 %	100 %	100 %	50 %	100 %	NR [3]	NR [3]	100 %	50 %
Gradko International	75 %	100 %	100 %	100 %	75 %	NR [3]	NR [3]	75 %	25 %
Lambeth Scientific Services	50 %	100 %	50 %	100 %	100 %	NR [3]	NR [3]	100 %	100 %
Milton Keynes Council	100 %	100 %	50 %	100 %	100 %	NR [3]	NR [3]	25 %	0 %
Somerset Scientific Services	100 %	100 %	100 %	100 %	100 %	NR [3]	NR [3]	100 %	100 %
South Yorkshire Air Quality Samplers	100 %	100 %	100 %	75 %	100 %	NR [3]	NR [3]	100 %	100 %
Staffordshire County Council	100 %	75 %	75 %	75 %	100 %	NR [3]	NR [3]	50 %	100 %
Tayside Scientific Services (formerly Dundee CC)	100 %	NR [2]	100 %	NR [2]	100 %	NR [3]	NR [3]	100 %	NR [2]
West Yorkshire Analytical Services	100 %	100 %	100 %	50 %	100 %	NR [3]	NR [3]	NR [2]	NR [2]

[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] Round was cancelled due to pandemic.

Cardiff Scientific Services, Exova (formerly Clyde Analytical), Kent Scientific Services, Kirklees MBC and Northampton Borough Council; these labs are not detailed as they no longer carry out NO₂ diffusion tube monitoring and therefore did not submit results for any of the AIR NO₂ PT rounds listed.

Figure 4: RICARDO - AEA Air Pollution Report

North Ayrshire Irvine High St

01/01/2021 to 31/12/2021

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 ($\mu\text{g}/\text{m}^3$)	0	0	0	0	171	39	79	41	6	97.6
NO₂ ($\mu\text{g}/\text{m}^3$)	0	0	0	358	85	45	69	49	13	97.6
NO_x ($\mu\text{g}/\text{m}^3$)	0	0	0	0	332	99	173	102	22	97.6
PM₁₀ ($\mu\text{g}/\text{m}^3$)	0	0	0	357	135	29	43	30	11	97.4
PM_{2.5} ($\mu\text{g}/\text{m}^3$)	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
NO₂	Hourly mean > 200 $\mu\text{g}/\text{m}^3$	None	0
NO₂	Period mean > annual mean obj 40 $\mu\text{g}/\text{m}^3$	No	
PM₁₀	Daily mean > 50 $\mu\text{g}/\text{m}^3$	None	0
PM₁₀	Period mean > annual mean obj 18 $\mu\text{g}/\text{m}^3$ (Scotland)	No	
PM_{2.5}	Period mean > annual mean obj 10 $\mu\text{g}/\text{m}^3$ (Scotland)	No	
PM_{2.5}	Period mean > annual mean obj 20 $\mu\text{g}/\text{m}^3$ (EU)	No	
Note: When comparing site measurements against the air quality objectives data capture should meet or exceed 90% across a calendar year.			

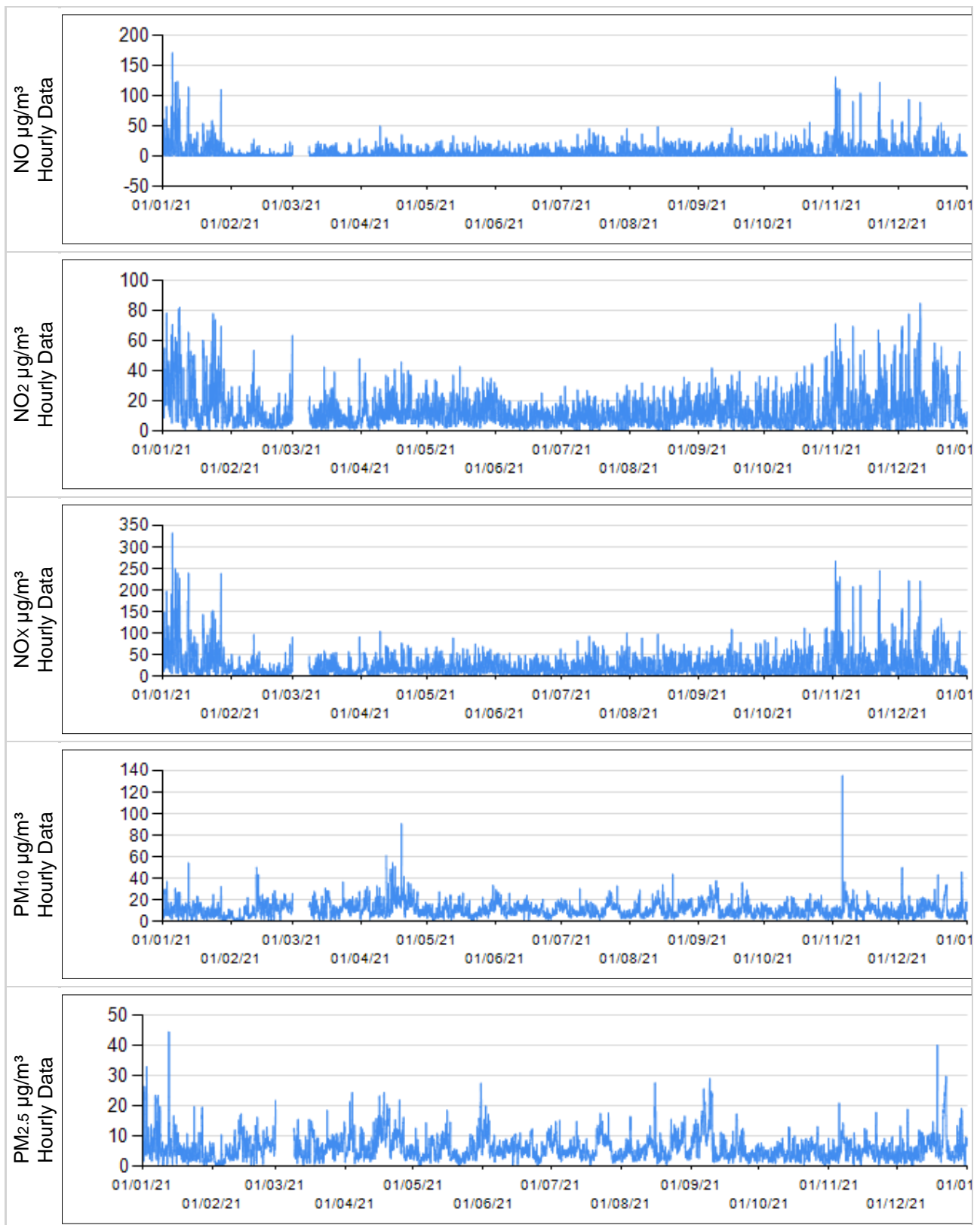


Figure 5: Ricardo - AEA Certificates of Calibration




CERTIFICATE OF CALIBRATION

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

Telephone 01235 753434



Page 1 of 3

Approved Signatories:

<input type="checkbox"/> S. Eaton	<input type="checkbox"/> B Stacey
<input type="checkbox"/> D Hector	<input type="checkbox"/> S Stratton
<input type="checkbox"/> N Rand	<input checked="" type="checkbox"/> S Telfer
<input type="checkbox"/> B Davies	<input type="checkbox"/> S Gray

Signed: 

Date of issue: 29 July 2021

Certificate Number: 5502

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: ED11194/5502

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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West Sussex
BN43 6FG

Registered in England No.
08229264

VAT Registration No.
GB 212 8365 24

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CERTIFICATE OF CALIBRATION



Page 2 of 3

Date of issue: 29 July 2021

Certificate Number: 5502

Ricardo Energy & Environment ID: ED11194/5502

North Ayrshire Council
NOx analysers

Station	Date of Audit	Species	Analyser Serial no	Zero Response ¹	Zero uncertainty oob	Calibration Factor ²	Factor uncertainty %	Converter eff. (%) ³
North Ayrshire Irvine High Street	24 June 2021	NOx	19-2513	1.0	2.7	1.0481	3.50	100.9
		NO		0.0	2.5	1.0433	3.50	

Fidas analysers

Station	Date of audit	Analyser Serial no	Calculated ko ²	Uncertainty %	Total flow ⁴	Uncertainty %	Main flow	Uncertainty %
North Ayrshire Irvine High Street	24 June 2021	6251			4.69	2.2		2.2



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CERTIFICATE OF CALIBRATION



Page 3 of 3

Date of issue: 29 July 2021

Certificate Number: 5502

Ricardo Energy & Environment ID: ED11194/5502

The gaseous ambient analysers listed above have been tested for zero response, calibration factor, linearity and converter efficiency (NO_x 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 given in ppb (parts per billion) mole fractions or ppm (parts per million) mole fractions.

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 (ppb for NO, NO_x, SO₂, O₃ and ppm for CO. Where 1ppm = 1000ppb). 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 NO₂ 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.

⁶ The calculated *k₀* value (specifically for TEOM analysers) is the calculated *k₀* 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 *k₀*.

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.


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CERTIFICATE OF CALIBRATION

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

Telephone 01235 753434



Page 1 of 3

Approved Signatories:

☐
☐
☐
☐

S. Eaton
D Hector
N Rand
B Davies

☐ B Stacey
☐ S Stratton
☒ S Telfer
☐ S Gray

Signed:

S Telfer

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

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CERTIFICATE OF CALIBRATION



Page 2 of 3

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*	Uncertainty %	Total flow*	Uncertainty %	Main flow	Uncertainty %
North Ayrshire Irvine High Street	24 December 2021	6251			4.65	2.2		2.2



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CERTIFICATE OF CALIBRATION



Page 3 of 3

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 (NO_x 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_o* (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, NO_x, 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 NO₂ 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_o* value (specifically for TEOM analysers) is the calculated *k_o* 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_o*.

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.

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Figure 6: NOx & PM Fidas Install/Service Reports

EnviroTechnology Services <i>Air Pollution Solutions</i>		
Kingfisher Business Park, London Road, Stroud, Glos, GL5 2BY, UK Tel: + 44 (0)1453 733200 Fax: +44 (0)1453 733201 Email: info@et.co.uk www.et.co.uk		
ENGINEER'S REPORT		
🌱 Please consider the environment before printing this report		
ET Ref No:	CS8789 & 8790	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:	21/07/2021	Time:
	10:20	GMT <small>(Data Elimination)</small>
Site Visit End Date:	21/07/2021	Time:
	13:00	GMT
Reported Fault / Task:	Issues Found at Audit:	
Routine service of Fidas & Nox. Air con service & PAT test to be carried out.	Yes <input type="radio"/> OptNo <input checked="" type="radio"/> OptNA <input checked="" type="radio"/> Opti	
Engineer's Comments:	Audit Issues Resolved:	
Routine service carried out on both instruments. Changed / cleaned all filters. Nox sample line had a lot of water inside so cleared that. Greased cage hinges. Air con serviced, drain plug was in place so removed that & drained condensate. All OK on site.	Yes <input type="radio"/> OptNo <input checked="" type="radio"/> OptNA <input checked="" type="radio"/> Opti	
Parts Used:	Communications Tested:	
	Yes <input checked="" type="radio"/> OptNo <input type="radio"/> OptNA <input type="radio"/> Opti	
Part Number	Description	Quantity
FILT-004	Filter, 47mm 5um P.T.F.E., 25pk (unlaminated)	2
Total Time:		2hrs 40

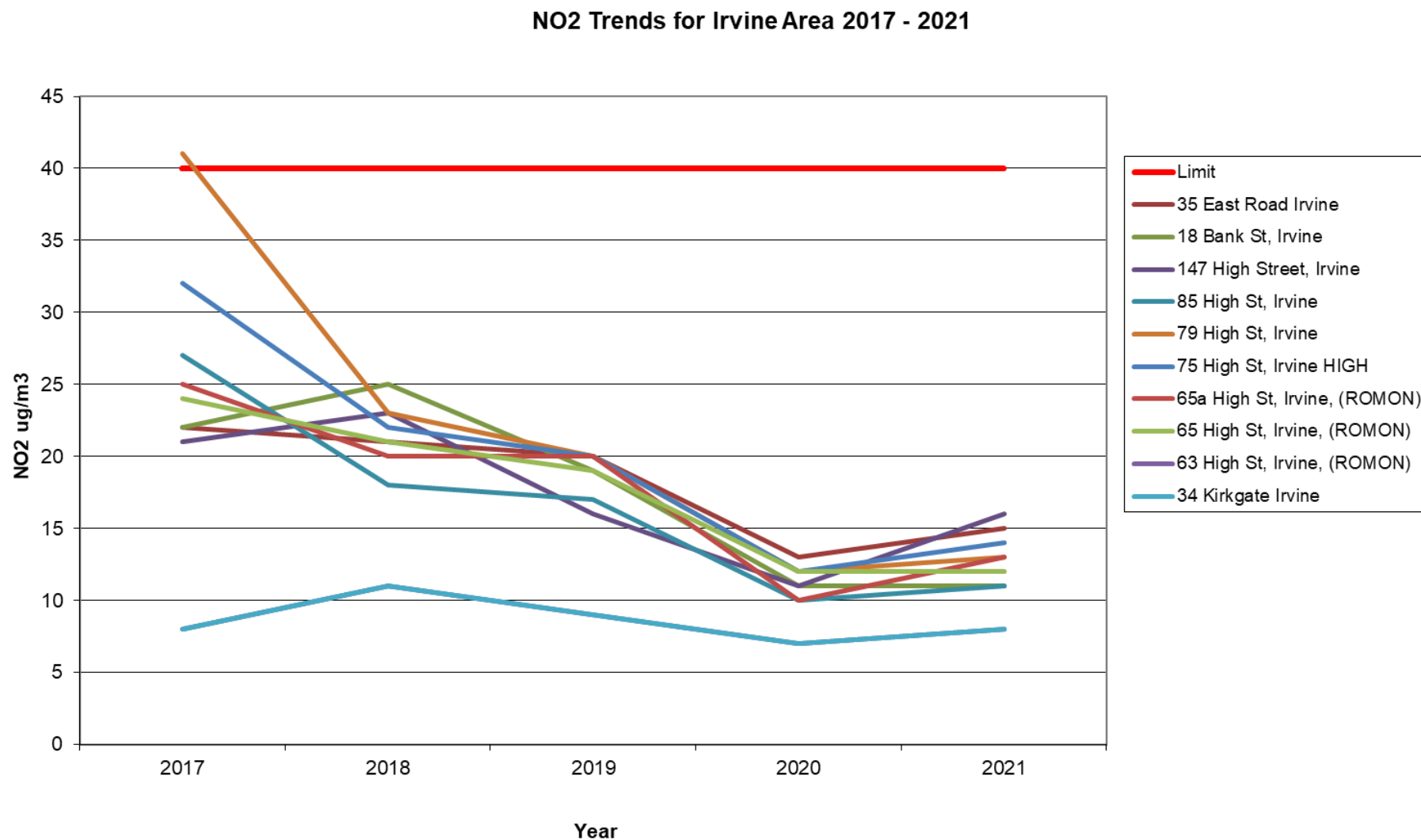
Figure 7: Trends in Annual Mean NO₂ Concentrations measured at Diffusion Tube Monitoring Sites in Irvine 2017 - 2021

Figure 8: Trends in Annual Mean NO₂ Concentrations measured at Diffusion Tube Monitoring Sites in Dalry 2017 - 2021

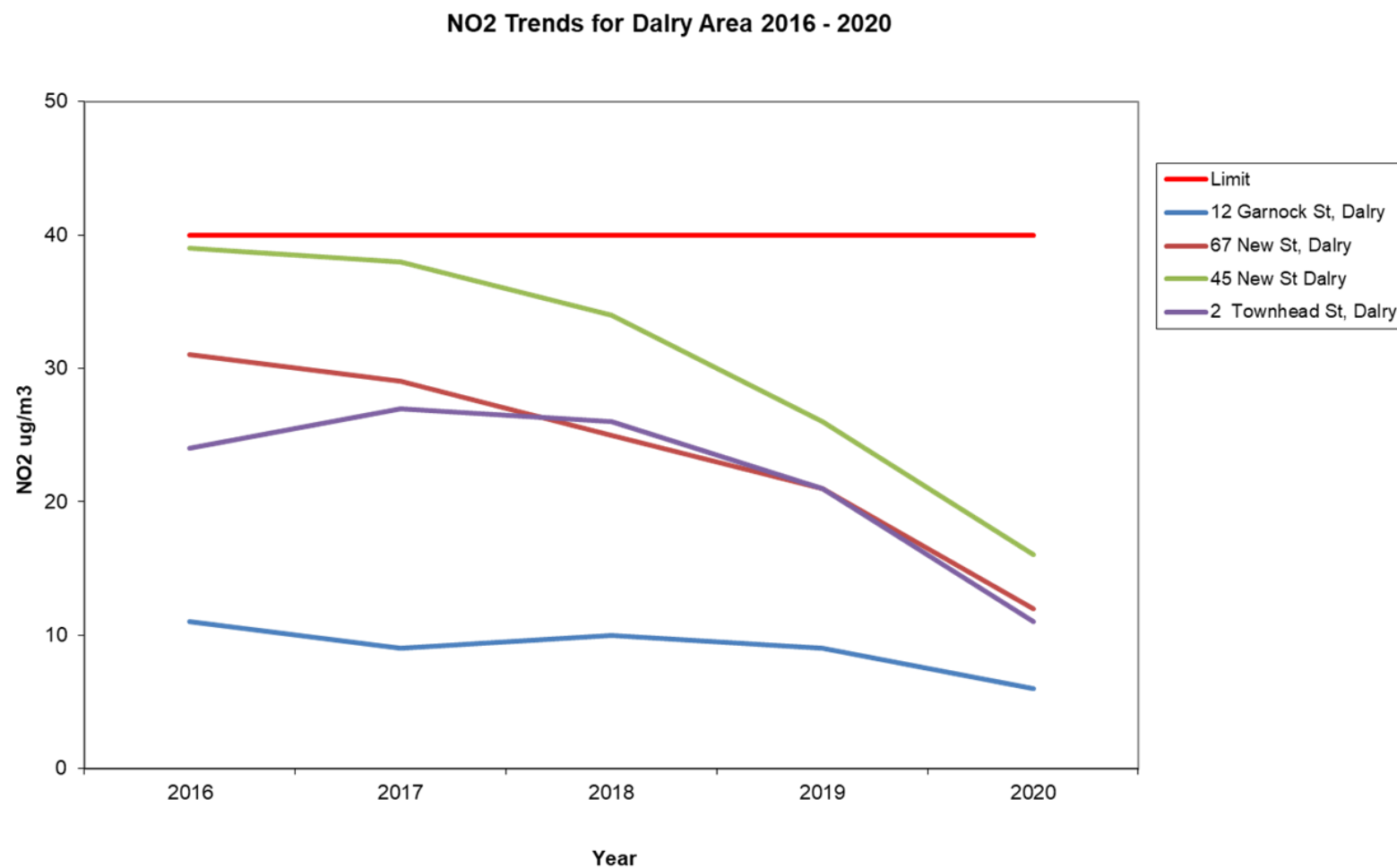


Figure 9: Trends in Annual Mean PM10 Concentrations measured at Automatic Station (ROMON) in High Street, Irvine 2017 – 2021

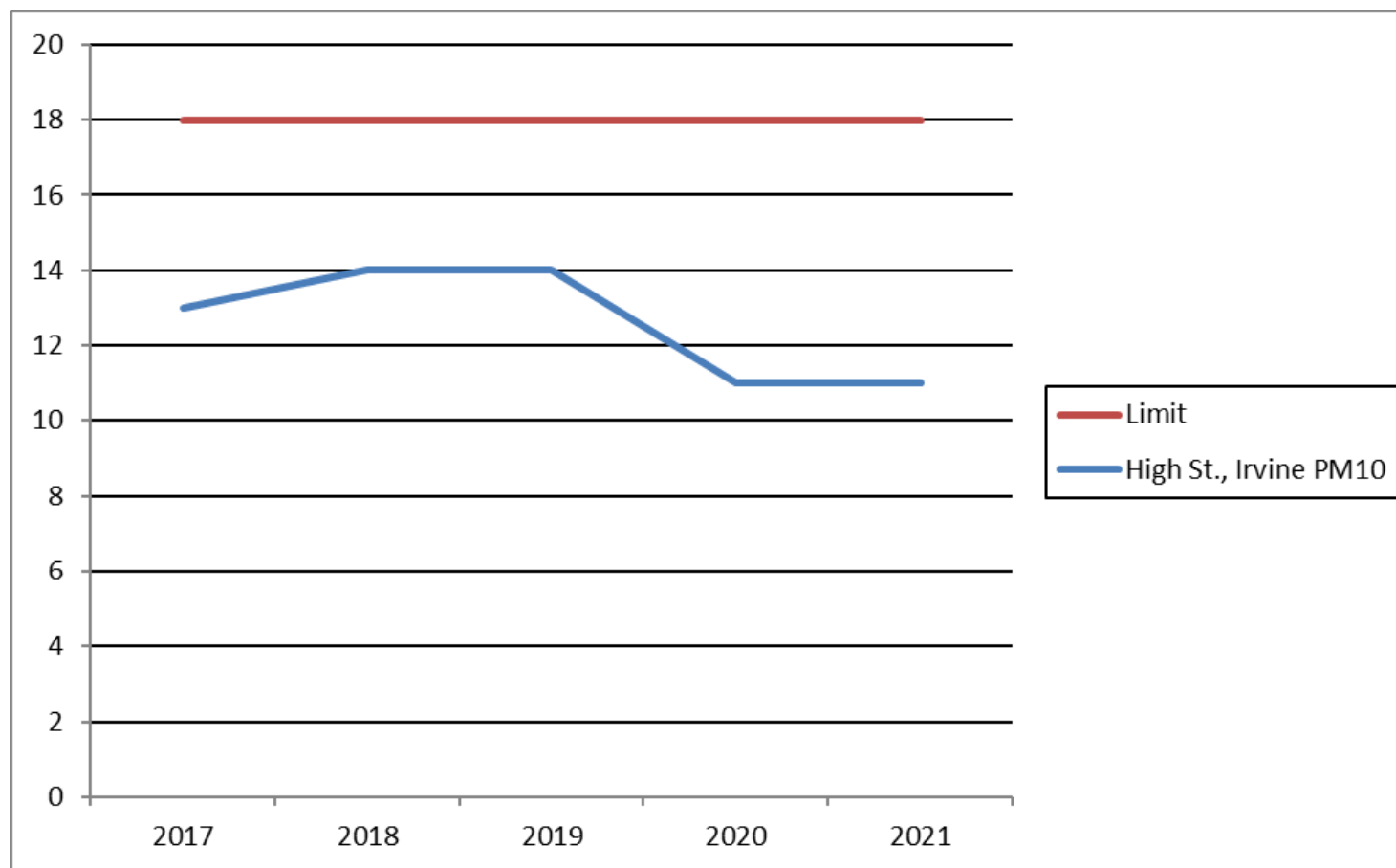


Figure 10: Trends in Annual Mean PM2.5 Concentrations measured at Automatic Station (ROMON) in High Street, Irvine 2017 - 2021

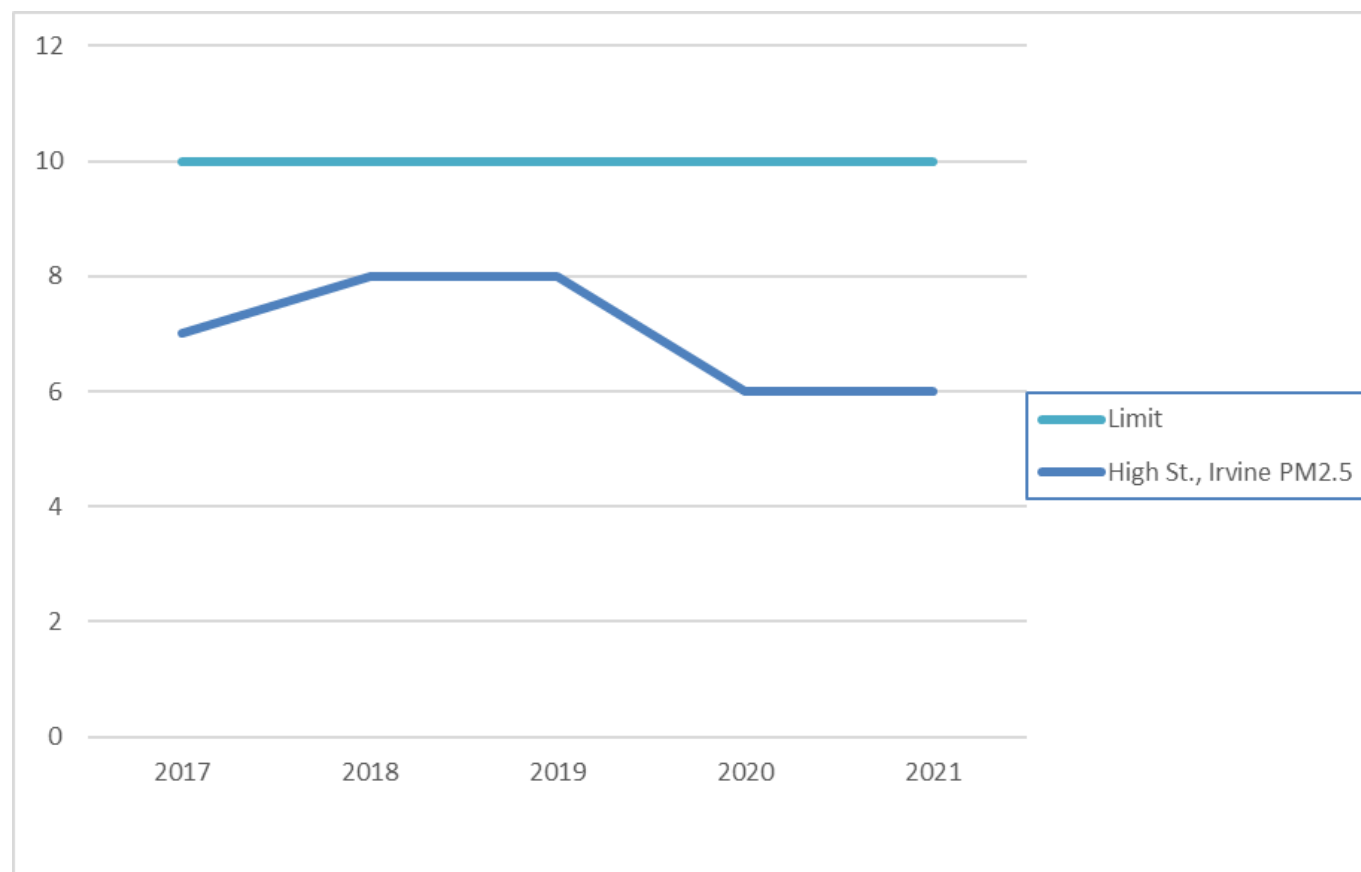


Figure 11: Automatic Monitoring Site Location, High Street, Irvine 2021

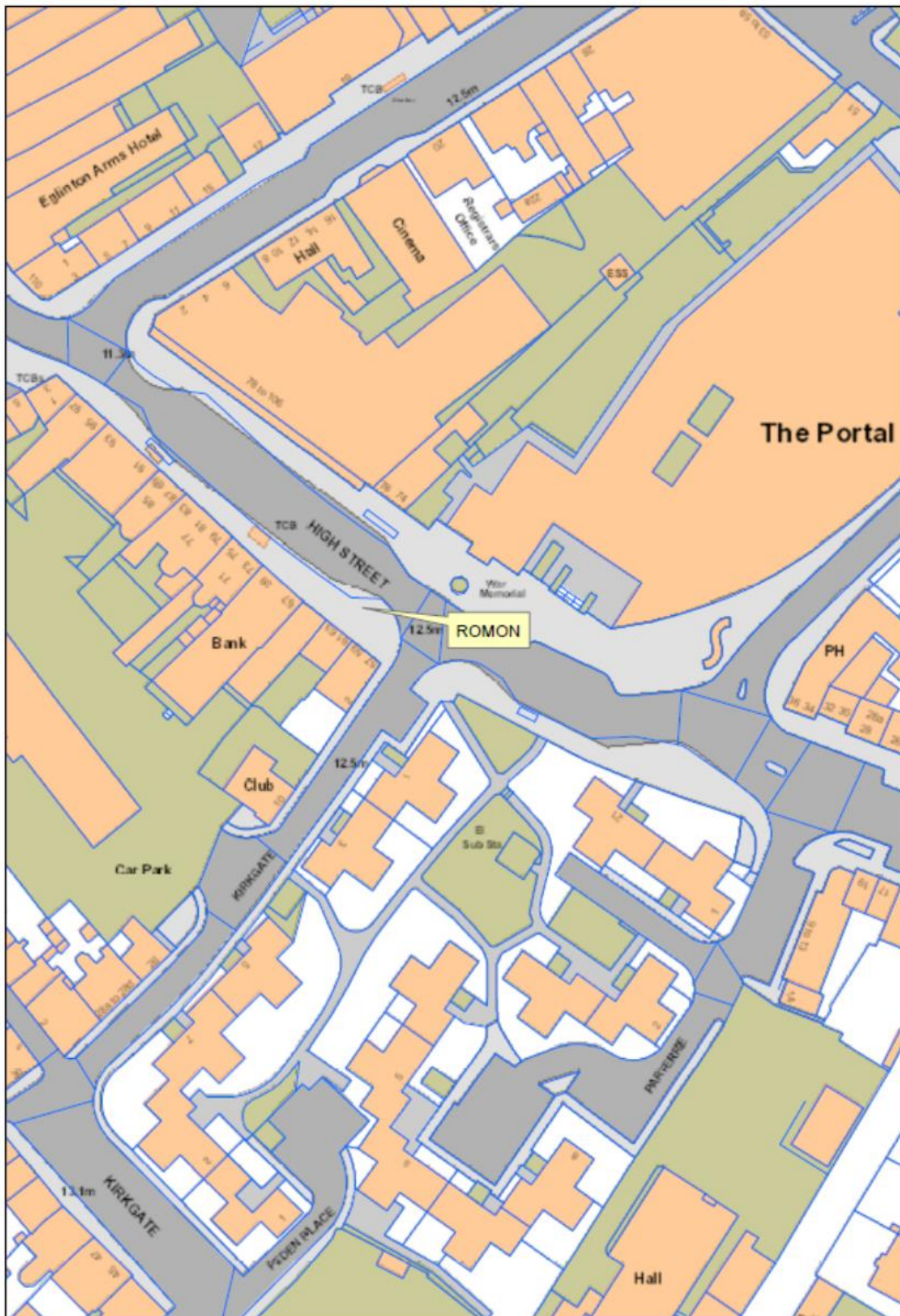


Figure 12: Non-Automatic Monitoring Site Locations 2021

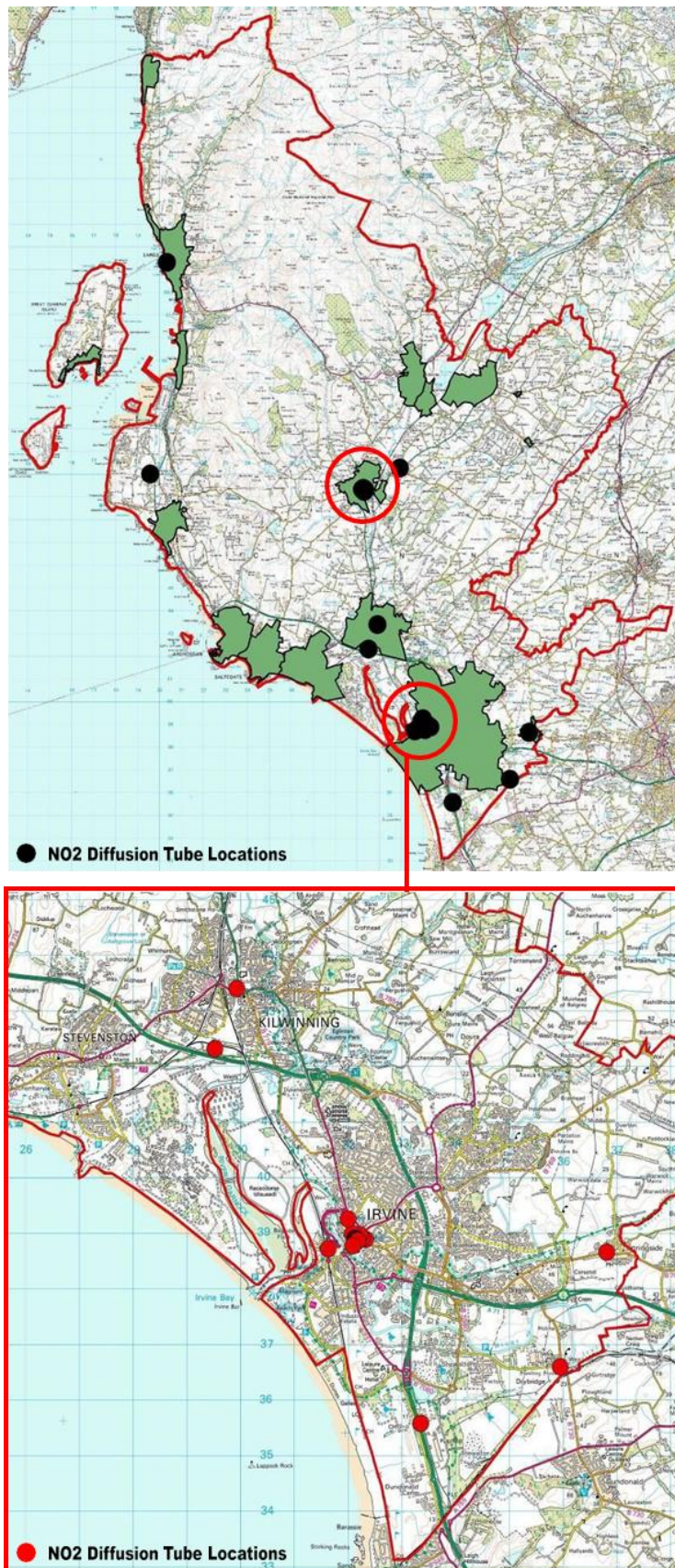


Figure 13: High Street, Irvine Diffusion Tube Site Locations & Concentrations 2021

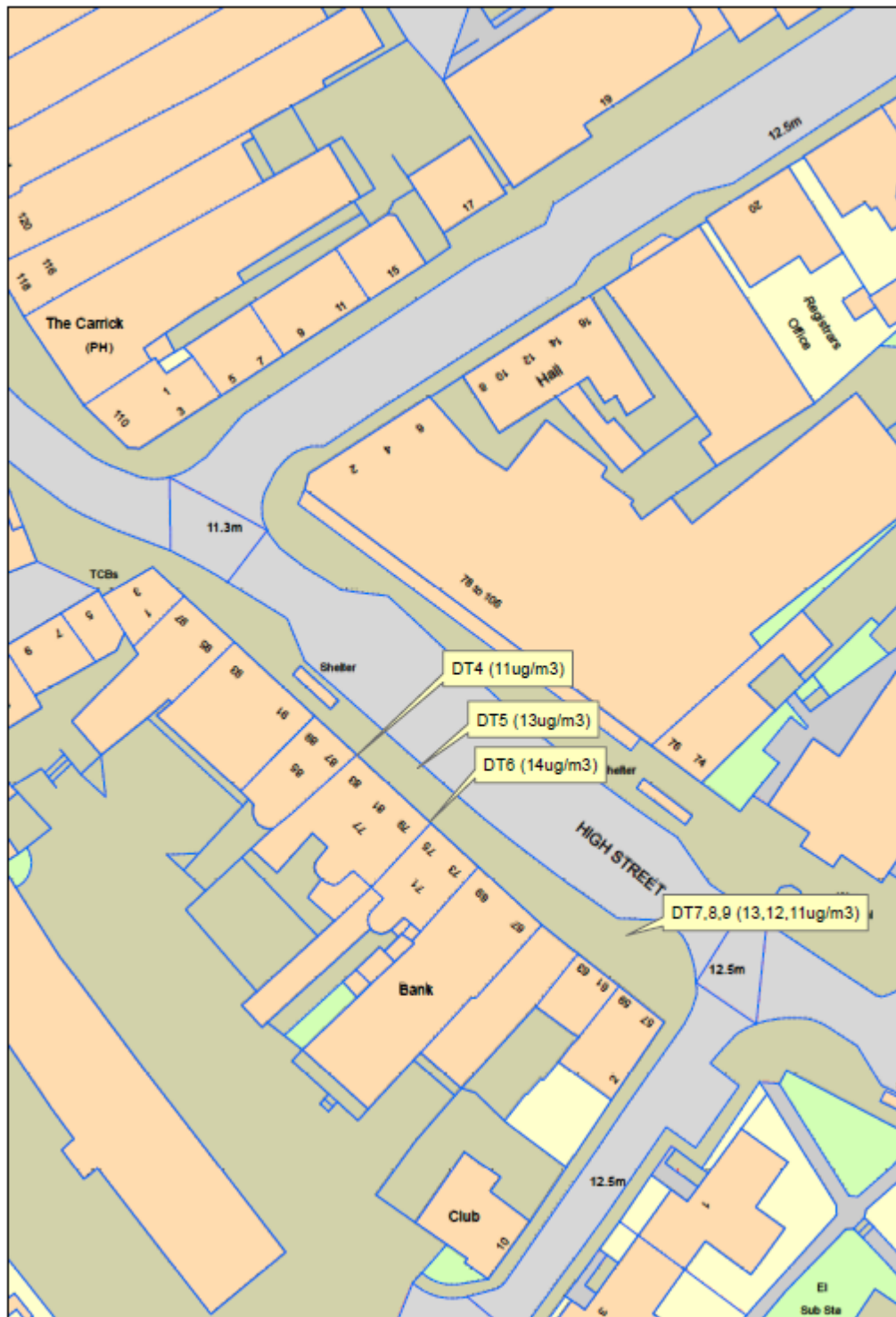
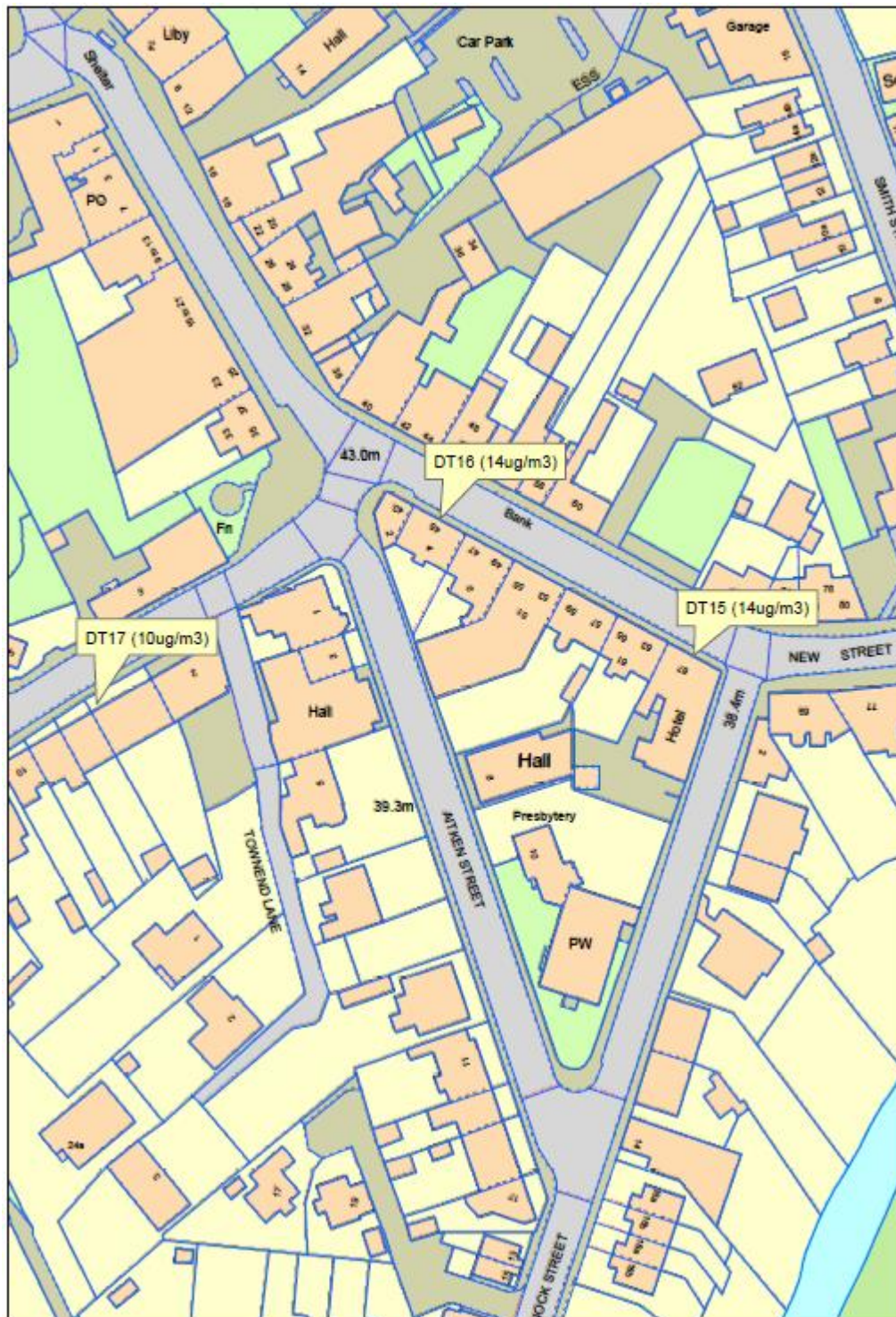


Figure 14: Dalry Diffusion Tube Site Locations & Concentrations 2021



Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the LA intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
APR	Air quality Annual Progress Report
AURN	Automatic Urban and Rural Network (UK air quality monitoring network)
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO ₂	Sulphur Dioxide

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