

Annual Progress Report (APR)



2022 Air Quality Annual Progress Report (APR) for Aberdeen City Council

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

June 2022

Aberdeen City Council

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Executive Summary: Air Quality in Our Area

Air Quality in Aberdeen City

The Annual Progress Report has been undertaken to fulfil Aberdeen City Council's duty to annually review and assess air quality. The report provides the latest monitoring results and discusses the implications for air quality management in Aberdeen.

The main pollutants of concern in Aberdeen City are nitrogen dioxide (NO₂) and particulate matter (PM₁₀), related to road traffic emissions.

Another national lockdown was brought in for mainland Scotland on 5 January 2021, with a new legal requirement forbidding anyone from leaving their home other than for essential purposes. This remained in place until April, when the 'stay at home' message was replaced with a 'stay local' message, before finally all of Scotland moved to living with much less restrictions in July (source: Scottish Government).

In 2021, annual mean NO₂ levels monitored across the city, both within and outside of AQMAs, did not differ significantly to 2020, given the restrictions of "lockdown" that were experienced for a large period of 2020 which had a large impact on traffic levels throughout the city. The temporary traffic restrictions that were implemented as part of the Spaces for People initiative in 2020 were still in place along stretches of Union Street, which will have altered traffic patterns across the city. All monitoring locations suggest NO₂ levels were below the annual mean objective in 2021.

There were no exceedances of the NO₂ one hour objective at any of the monitoring locations, nor were there any exceedances of the annual or 24-hour mean PM₁₀ objectives. There were also no exceedances of the PM_{2.5} annual mean objective.

Following identification of a preferred option for the Low Emission Zone (LEZ) in summer 2021, this was subject to a second round of public and stakeholder engagement, resulting in a finalised scheme proposal being taken forward to the formal objection period in November 2021.

Following some minor tweaks in response to the feedback received, a final proposed scheme was identified and submitted to Scottish Ministers for approval. This was formally approved and introduced on 30 May 2022, with a two-year grace period before enforcement commences on 1 June 2024.

The Air Quality Action Plan 2011 will be updated now the LEZ has been formally introduced.

Actions to Improve Air Quality

This section provides a brief summary of core actions to target sources of pollution in Aberdeen City over the past year.

Low Emission Zone:

- Final option appraisal, modelling and consultation completed.

Active Travel:

- Adoption of a revised Active Travel Action Plan;
- Continued delivery of cycle parking and bicycle maintenance facilities throughout the City;
- Appointment of a supplier for the Aberdeen bicycle rental scheme;
- Completion of a cycle signage audit and action plan;
- Progression of a programme of multimodal corridor studies considering opportunities for improved active travel infrastructure on key corridors to and from the city centre;
- Design work is underway for the transformation of Union Street and other city centre streets from vehicle-dominated spaces to pedestrian priority spaces;
- Commencement of Core Paths Plan Review.

Public Transport:

- Commencement of Aberdeen Rapid Transit (ART) feasibility study to assess options for a high-capacity rapid public transport system in Aberdeen;
- Completion of the Wellington Road Multimodal Corridor Study, which recommends various options for supporting additional active travel and public transport journeys on this route, part of which forms a AQMA;
- Progression of a programme of multimodal corridor studies considering opportunities for improved bus infrastructure;
- Completion of Phase 1 of the City Centre Masterplan Traffic Management Plan, which identifies a series of traffic restrictions on streets in the city centre to prioritise people walking, wheeling, cycling and using public transport.

Clean Vehicles:

- Adoption of Electric Vehicle Framework to guide future infrastructure planning and prioritisation;
- Launch of a city centre charging hub, featuring 3 rapid triple chargers and 5 double fast chargers;
- Launch of 15 fuel cell electric double decker buses, the first in the world, in partnership with First Bus Aberdeen;
- Continued expansion of the Aberdeen Car Club, with more electric and hydrogen vehicles added to the fleet for the public to use;
- The incorporation of the Aberdeen Car Club into the Development Management process for new land use developments in Aberdeen continues to provide additional memberships and vehicles for the benefit of residents and the community

Local Priorities and Challenges

This section provides a brief summary of the priorities and challenges for Aberdeen City Council in addressing air quality for the coming year.

Priorities:

- Formal declaration of the Aberdeen LEZ (introduced on 31 May 2022);
- Implementation of city centre traffic restriction and active travel and bus priority measures identified during LEZ appraisal and CCMP review;
- Launch of Big Issue / Share Bike bicycle rental scheme;
- Launch of the Walking and Cycling Index (WACI), an assessment of cycling in Aberdeen to support future planning, investment and delivery;
- Completion of a number of transport corridor improvement studies, with recommendations proceeding to Business Case development;
- Appointment of a new contracted operator for the Car Club;
- Development of a revised Council Travel Plan;
- Completion of the Haudagain Roundabout improvement scheme (completed and reopened 16 May 2022);
- Commencement of construction of Phase 1 of the South College Street junction improvement scheme.

Challenges:

The main challenge is likely to be political and public support for implementing the recommendations of the City Centre Masterplan review and the programme of multimodal corridor studies which are likely to recommend significant reallocation of roadspace from the private car to walking, cycling and public transport, including reallocation and/or removal of kerbside parking spaces.

How to Get Involved

Further information on the Local Transport Strategy, Action Plan and Active Travel Action Plan, and Low Emission Zone is available at the following websites:

[Local transport strategy](#)

[City Centre Masterplan](#)

[Low Emission Zone](#)

Further information on the schemes Aberdeen City Council has been delivering on Air Quality Action Plan and Local Transport Strategy actions over previous years can be found on best practice pages on the Energy Saving Trust website:

Car Club

www.energysavingtrust.org.uk/sites/default/files/Aberdeen%20City%20Council.pdf

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1 Local Air Quality Management

This report provides an overview of air quality in Aberdeen City 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 Aberdeen City 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 (AQMA) 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.

A summary of AQMA declared by Aberdeen City Council can be found in Table 2.1. Further information related to declared or revoked AQMA, including maps of AQMA boundaries are available online at uk-air.defra.gov.uk/aqma/list and uk-air.defra.gov.uk/aqma/maps

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City / Town	Description	Action Plan
City Centre	NO ₂ annual mean PM ₁₀ annual mean & 24 hour mean	Aberdeen	Declared 2001, extended in 2003. PM ₁₀ included in 2005 & 2011. Amended 2018. An area encompassing several properties Union St, King St, Market St, Holburn St and Victoria Road.	Air Quality Action Plan 2011
Anderson Drive	NO ₂ annual mean PM ₁₀ annual mean	Aberdeen	Declared in 2008, amended 2011 and 2018. Pockets of exceedances at residential properties along Anderson Drive and Auchmill Road.	Air Quality Action Plan 2011
Wellington Road	NO ₂ annual mean PM ₁₀ annual mean & 24 hour mean	Aberdeen	Declared 2008. Residential properties along Wellington Road (Queen Elizabeth II Bridge to Balnagask Rd)	Air Quality Action Plan 2011

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 Aberdeen City 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.

Aberdeen City Council has had a Council Travel Plan since 2001 which encourages and enables staff and visitors to make healthy and clean travel choices. The Plan is currently under review, with an updated Plan expected to be developed during 2022. The Council undertakes a biannual staff travel survey to identify how staff usually travel to work. The 2021 survey was not undertaken as a result of travel habits being disrupted during the COVID-19 pandemic, although the next survey will take place in 2022 and the outcomes will help inform the revised Travel Plan.

The Council's Local Transport Strategy (LTS) 2016-2021 identifies "*Improved air quality and the environment*" as a key outcome, with an objective "*to improve air quality across the City, so that the existing Air Quality Management Areas are revoked and no further Air Quality Management Areas are declared.*" In line with the adoption of the new Regional Transport Strategy, NESTRANS 2040, in November 2021 and the Council Delivery Plan commitment to "*refresh the local transport strategy*", a review of the LTS commenced in 2021 and will continue throughout 2022 with a final document expected in 2023.

A revised Active Travel Action Plan for Aberdeen was adopted in February 2021, setting out the Council's priorities for walking, wheeling and cycling in the city, to encourage and empower more people to travel via clean modes of transport.

The Council's Electric Vehicle (EV) Framework was also adopted in February 2021, which sets out the predicted growth of EVs by 2025 and 2030 and identifies numbers and types of EV infrastructure needed to support this, along with suggested locations and supporting measures.

A review of the Aberdeen City Centre Masterplan (CCMP) took place during 2021, with a renewed emphasis on developing places for people and reducing the impacts of vehicular traffic in the city centre. *Improve air quality* was identified as a key objective to inform the public realm visioning and design proposals triggered by the review.

In 2020, the Council adopted a Net Zero Vision and supporting Strategic Infrastructure Plan which identifies a range of infrastructure projects which will contribute to the city's energy transition from fossil-based to net carbon zero. *Sustainable Mobility* is identified as a Strategic Infrastructure Goal, while *City Centre Regeneration* is noted as a priority project, to encompass traffic management measures and network improvements to support pedestrianisation and cycling opportunities accompanied by a 20% reduction in traffic demand. The contribution of the Low Emission Zone (LEZ) to achieving this priority project is noted in the Plan.

The Council Climate Change Plan was approved in 2021 setting a net zero target of carbon dioxide equivalent emissions by 2045 from Council assets and operations. Mobility is a theme in the plan, which includes actions for staff travel and to transition the council fleet from fossil fuels. Through collaborative work a Net Zero Aberdeen Routemap is also being prepared, setting net zero targets for the city, Mobility is one of the 6 enabling strategies that will accompany the Routemap.

Aberdeen City Council is also preparing its next Local Development Plan for 2022, with the Proposed Plan containing a specific policy on Air Quality (WB2) – *Development proposals which may have a detrimental impact on air quality will not be permitted unless measures to mitigate the impact of air pollutants are proposed and agreed with the Planning Authority. Planning applications for such proposals should be accompanied by an assessment of the likely impact of development on air quality and any mitigation measures proposed.*

Aberdeen Planning Guidance on Air Quality will set out the likely circumstances in which applicants must submit an assessment of the potential impact of particular types of development on existing and future air quality, particularly in and around AQMAs and LEZs. It will also provide guidance on the process of air quality assessment and how mitigation measures will be assessed and implemented.

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.

Throughout 2021, ACC has continued to develop its LEZ proposal in accordance with the National Low Emission Framework (NLEF) and National Modelling Framework (NMF). Following identification of a preferred option in summer 2021, this was subject to a second round of public and stakeholder engagement, resulting in a finalised scheme proposal being taken forward to the formal objection period in November 2021.

Following some minor tweaks in response to the feedback received, a final proposed scheme was identified and submitted to Scottish Ministers for approval. This was formally approved and introduced on 30 May 2022, with a two-year grace period before enforcement commences on 1 June 2024. The map below illustrates the area of Aberdeen City's LEZ.



Source: Aberdeen City Council

2.3 Progress and Impacts of Measures to address Air Quality in Aberdeen City Council

Aberdeen City Council has taken forward a number of measures during the current reporting year of 2021 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. More detail on these measures can be found in the air quality Action Plan relating to each AQMA. Key completed measures are:

Action 1: Modal Shift and Influencing Travel Choice

1.1 Increase bus use:

- Commencement of Aberdeen Rapid Transit (ART) feasibility study to assess options for a high-capacity rapid public transport system in Aberdeen;
- Completion of the Wellington Road Multimodal Corridor Study, which recommends various options for supporting additional active travel and public transport journeys on this route, part of which forms an AQMA;
- Work has continued and/or commenced on a number of other multimodal corridor studies under the Scottish Government's Bus Partnership Fund (BPF) to look at opportunities for enhanced bus priority on a series of radial corridors to and from the city centre – A944/A9119 Westhill to Aberdeen, A96 Inverurie to Aberdeen, Ellon to Garthdee, and A90/A92 Laurencekirk to Aberdeen;
- Completion of Phase 1 of the City Centre Masterplan (CCMP) Traffic Management Plan, which identifies a series of traffic restrictions on streets in the city centre to prioritise people walking, wheeling, cycling and using public transport. The Council has agreed that sections of Market Street, Guild Street and Bridge Street within the City Centre AQMA should become bus/cycle/taxi/local access only, and this should be delivered during 2022.

1.2 Improve cycling and walking provision:

- Adoption of a revised Active Travel Action Plan;
- Completion of a cycle signage audit and action plan;
- In addition to the multimodal corridor studies described above (which also consider opportunities for walking and cycling improvements), further studies have commenced on the A93 Banchory to Aberdeen and A947 Dyce to Aberdeen corridors to look at options for improving active travel infrastructure;

- Continued delivery of cycle parking and bicycle maintenance facilities throughout the City;
- Appointment of a supplier for the Aberdeen bicycle rental scheme;
- Commencement of Core Paths Plan Review.

1.3 Travel Plans

- Allocation of an annual budget to support the Council Travel Plan to encourage staff to travel to, from and around work more sustainably. The majority of this budget is used to fund the exclusive use booking of ten car club vehicles (six hydrogen fuel cell vehicles and four battery electric vehicles) with the remainder being used to support the Council's pool bike fleet, maintaining the Council's membership of Liftshare and Acttravelwise.

1.4 Improve public awareness of air quality issues:

- Consultation on options for an Aberdeen LEZ, including regular communications about why a LEZ is required in Aberdeen;
- Delivery of a series of awareness raising campaigns, events and projects to encourage sustainable transport using Smarter Choices, Smarter Places funding.
- An I Bike officer continues to work to deliver targeted and intensive cycling training and promotion to schools in several Associated Schools group (ASG) clusters.

1.5 Car Clubs / Car Pool Schemes:

- Continued expansion of the Aberdeen Car Club, with more electric and hydrogen vehicles added to the fleet for the public to use.
- The incorporation of the Aberdeen Car Club into the Development Management process for new land use developments in Aberdeen continues to provide additional memberships and vehicles for the benefit of residents and the community

Action 2: Lower Emissions and Cleaner Vehicles

2.1 Green Vehicle Procurement & Fuel/Charging Infrastructure

- The Council, along with Aberdeenshire and Highland Councils, has received funding from the Scottish Futures Trust as part of a Pathfinder project to investigate different

delivery models for future provision of EV charging points. This will include ways in which the Council can work with private companies to grow the number of chargers. The funding has allowed a consultant to be procured who will produce a business case to investigate these different models. The business case is set to be completed by the end of summer 2022.

- A city centre charging hub, featuring 3 rapid triple chargers and 5 double fast chargers opened in Frederick Street car park in 2021. This also plays host to an EV car club car.
- A tariff is now being charged for use of the City Council charge points. 38p connection fee and 19p per kWh for energy. This is to cover the Council's costs associated with running the service but should also encourage more private operators into the market as they no longer have to compete with a free model. This is due to increase in the 2022/23 financial year.
- Adoption of Electric Vehicle Framework to guide future infrastructure planning and prioritisation, with delivery now underway.
- 15 fuel cell electric double decker buses, the first in the world, were launched in January 2021 in partnership with First Bus Aberdeen. An additional 10 FCEV buses were ordered and will enter the fleet in 2022. These buses have zero well to wheel emissions (hydrogen generated by green tariff electricity) and are estimated to save 1 kg of CO₂ per km driven and are therefore a significant improvement on the Euro 4 and 5 buses they replaced.

2.5 Low Emission Zone

- Final option appraisal, modelling and consultation completed in 2021. Final approval by Scottish Ministers made May 2022, with LEZ in place from 31 May 2022.

Action 3: Road Infrastructure

3.1 Pedestrianisation

- Design work is underway for the transformation of Union Street and other city centre streets from vehicle-dominated spaces to pedestrian priority spaces, following the Council agreeing the outcomes of the 2021 City Centre Masterplan review.

3.2 Road Building / Junction Alterations

- Confirmation of the Compulsory Purchase Order (CPO) for the Berryden corridor improvement by Scottish Ministers.
- Conclusion of the CPO process for Phase 1 of the South College Street junction improvement project, with construction due to commence in 2022.
- Ongoing delivery of the Haudagain Roundabout improvement scheme.

Action 4: Traffic Management

4.1 Intelligent Transport Systems (ITS)

- Revalidation of the SCOOT (Split Cycle Offset Optimisation Technique) system on King Street and Market Street to address congestion concerns and improve bus journey times.
- Expansion of the network of traffic monitoring CCTV cameras to include the Queens Road/Skene Road corridor to permit incidents or congestion on the network to be dealt with timeously.
- Opening of a new joint operations control room housing ITS Unit staff and Police Scotland to facilitate closer cooperation and the more efficient management of incidents on the road network.

Action 5: Planning and Policies

5.1 Produce Supplementary Planning Guidance

- ACC is preparing its next Local Development Plan for 2022, which contains policies on sustainable transport, and which is accompanied by Planning Guidance on Air Quality which sets out the circumstances in which an air quality assessment would be required and how this should be undertaken.

5.2 Integration of AQAP with Local Transport Strategy (LTS) and Regional Transport Strategy (RTS)

- The revised Regional Transport Strategy, Nestrans 2040, was adopted in 2021. One of its key priorities is “*Air quality that is cleaner than World Health Organisation standards for emissions from transport*”, under the *Wellbeing* ‘pillar’.
- ACC is currently developing a revised Local Transport Strategy – in the context of revised national and regional strategies this is likely to have an enhanced focus on health and wellbeing. The main issues stage has been completed and 2022 will see the development of a draft plan.

Progress on the following measures has been slower than expected due to further restrictions imposed in 2021 due to the COVID-19 pandemic and the resulting impacts on the city centre:

- Sustainable Urban Mobility Plan – implementation paused during 2020 and 2021 as a result of the necessity to deliver Spaces for People temporary measures in response to physical distancing guidelines; now further paused until the outcomes of the City Centre Masterplan review are known, including a final decision on the future of Central Union Street (expected summer 2022).
- Car Parking Framework – paused as a result of COVID-19 impacts on the city centre. Will now follow the adoption of a revised LTS.
- As part of travel planning work undertaken between 2016 and 2020 under the CIVITAS PORTIS project, businesses in the North Dee and South Dee areas of the city were engaged with, culminating in a list of short- and long-term actions to aid uptake of sustainable transport. This led to the creation of umbrella “Liftshare” schemes for both areas and, in North Dee, identification of pedestrian access improvements. The delivery of these has been delayed by COVID-19 and subsequent discouragement of people returning to offices.
- Haudagain Roundabout improvement completion – delays as a result of adverse weather, COVID-19 absences and supply chain issues.

Aberdeen City Council expects the following measures to be completed over the course of the next reporting year:

- Formal declaration of the Aberdeen LEZ (announced May 2022)
- Implementation of city centre traffic restriction measures identified during LEZ appraisal and CCMP review.
- Launch of a series of neighbourhood sustainable travel guides.
- Completion of a number of transport corridor improvement studies, with recommendations proceeding to Business Case development.
- Walking and cycling infrastructure – further measures to improve walking and cycling networks.
- Appointment of a new contracted operator for the Car Club as the current contract is due to expire in May 2022.
- Launch of a new Aberdeen Local Development Plan for Aberdeen, with Planning Guidance covering air quality, transport and accessibility.

- Completion of a Cycle Network Data review, an assessment of current cycling data availability, with recommendations for additional data requirements, to support future Active Travel Action Plan development.
- Launch of the Walking and Cycling Index (WACI), an assessment of cycling in Aberdeen to support future planning, investment and delivery.
- Launch of Big Issue / Share Bike bicycle rental scheme.
- Development of a revised Council Travel Plan to support employees to travel to and from work as sustainably as possible.
- Completion of the Haudagain Roundabout improvement scheme (completed and road opened 16 May 2022).
- Construction underway on Phase 1 of the South College Street junction improvement scheme.

Table 2.2 – Progress on Measures to Improve Air Quality

No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
1 Alternatives to private vehicle use											
1.1a	Increase bus use	Alternatives to private vehicle use	Delivery of standards and targets agreed by Bus Quality Partnership	North East of Scotland Bus Alliance	2010	Ongoing	Proportion of people not working from home travelling to work by bus (Scottish Household Survey, Aberdeen City Voice)	Not quantifiable	<p>In 2018, the North East Bus Alliance (replacing the former Local Authority Bus Operator Forum) was established with a revised Terms of Reference and Quality Partnership Agreement. The Alliance comprises Nestrans, Aberdeen City Council, Aberdeenshire Council, First Aberdeen, Stagecoach Bluebird, Bains Coaches and a representative of Bus Users Scotland.</p> <p>A State of the Network review has been undertaken and a subsequent Bus Action Plan developed, with a key focus on identifying areas where buses experience delays and inconsistent journey times because of congestion or other traffic management issues.</p> <p>Options for addressing these are now being looked at in detail via several transport corridor studies which have public transport efficiency as a key outcome.</p>	Ongoing	The Wellington Road corridor study was completed in 2021. Further studies are due for completion during 2021 and 2022.

1.1b	Increase bus use	Alternatives to private vehicle use	Increase corridors covered by BPIP (currently voluntary)	North East of Scotland Bus Alliance	2010	On-going	Proportion of people not working from home travelling to work by bus (Scottish Household Survey, Aberdeen City Voice)	Not quantifiable	Several transport corridors are being reviewed to identify and appraise options for improving conditions for active and sustainable transport. These corridors have been prioritised with agreement from the Bus Alliance	Ongoing	The Wellington Road corridor study was completed in 2021. Further studies are due for completion in 2021 and 2022. The outcomes of these studies will inform Business Cases and future funding applications to enable the delivery of the improvements identified, including to the Scottish Government's Bus Partnership Fund.
1.1c	Increase bus use	Alternatives to private vehicle use	Integrated Ticketing	North East of Scotland Bus Alliance / Transport Scotland	No defined start date	Ongoing		Not quantifiable	Both First and Stagecoach offer contactless payment on buses. First Aberdeen has introduced 'tap and cap', with fares capped at the most favourable daily rate to offer better value to the customer. The multi-operator Grasshopper ticket for North East Scotland continues to be promoted, and there is ambition to improve the Grasshopper offering by exploring opportunities for smart and mobile ticketing as well as contactless ticket options and new ticket types. Work is currently ongoing to develop an online retail solution for purchasing Grasshopper tickets.	Ongoing	User engagement / co-design work has highlighted that it may be useful / attractive to deploy Rail & Bus ticket fulfilment features and a secure payment gateway / e-wallet on the GoABZ app, so these features are being investigated.
1.2a	Improve Cycling & Walking Provision	Alternatives to private vehicle use	Core Paths Plan	ACC	Ongoing	Ongoing	Proportion of individuals walking and cycling (Scottish Household Survey, Aberdeen City Voice)	Not quantifiable	Various routes continue to be upgraded and installed. Full Core Paths Plan review has commenced.	Ongoing	Review due for completion in 2022.

1.2b	Improve Cycling & Walking Provision	Alternatives to private vehicle use	Cycling Strategy/ Active Travel Action Plan	ACC	2014-2016	Ongoing	Proportion of individuals walking and cycling (Scottish Household Survey, Aberdeen City Voice)	Not quantifiable	<p>A revised Active Travel Action Plan was adopted by the Council in 2021.</p> <p>The Council is taking part in the Walking and Cycling Index (WACI) a project whereby via data gathering and public and stakeholder input, a robust assessment is made of the local public's propensity for cycling and what more the local authority can do to enable this.</p> <p>9 additional cycle counters were installed in the city in 2021.</p>	Ongoing.	Future iterations of the Plan will be informed by the findings of WACI.
1.3a	Travel Plans	Promoting travel alternatives	Existing Organisations	ACC & Nestrans	2015-16	2016 onwards	<p>No. organisation adopting TPs; No. employees covered by TPs,</p> <p>progress of travel plans in study area (North Dee, South Dee and Dyce)</p>	Not quantifiable	<p>Travel planning work undertaken in the North Dee, South Dee and Dyce areas of Aberdeen as part of Civitas Portis EU funded project. Engagement activities, travel surveys and site audits undertaken, resulting in the development of action plans for each area.</p> <p>Additional car club car implemented in North Dee, Travel guides developed for North and South Dee, dropped kerb sites identified for North Dee (and awaiting delivery this year) and Umbrella Liftshare schemes developed for both North and South Dee.</p>	2020	Will have launch events in 2022 as more people start to come back to office and with lifting of National discouragement of car/ ride sharing during COVID-19.
1.3b	Travel Plans	Promoting travel alternatives	New Developments	ACC	2014-16	2016 onwards	N/A	Not quantifiable	Guidance for new developments contained in the Transport and Accessibility	Ongoing	Planning Guidance being updated to support the Aberdeen local Development Plan 2022.

									Supplementary Guidance to the 2017 Aberdeen Local Development Plan.		
1.3c	Travel Plans	Promoting travel alternatives	Council	ACC	Ongoing	2003 onwards	% of Council staff using sustainable modes to travel to work (CTP Surveys)	Not quantifiable	<p>Biannual staff surveys undertaken. A refresh of the Plan will take place in 2022.</p> <p>Budget continues to be allocated annually to support measures to encourage staff to travel to, from and during work more sustainably – provision of exclusive use zero emission pool cars, provision of pool bikes, membership of Liftshare and Act Travelwise.</p>	Ongoing	Next survey to be undertaken in 2022
1.4a	Improve public awareness of air quality issues	Public information	Use of Variable Messaging System (VMS)	ACC & Transport Scotland	Ongoing	Ongoing	N/A	Not quantifiable	There have been 9 new Variable Messaging Signs (VMS) installed on routes on approach to the AWPR which are under Council control.	Ongoing	
1.4b	Improve public awareness of air quality issues	Public information	ACC Website Improvements	ACC	2011	Ongoing	N/A	Not quantifiable	A new LEZ page was created in 2020 to provide information on air quality issues in Aberdeen and why a LEZ is being considered in response to this.	Ongoing	This page is being kept up to date as LEZ planning and delivery continues.
1.4c	Improve public awareness of air quality issues	Public information	'Airtext' Alert Service	ACC			No. of service users	Not quantifiable			

1.4d	Improve public awareness of air quality issues	Public information	Undertake air quality and sustainable travel events with Getabout Partner-ship	Get About	Ongoing	Ongoing	Events taking place	Not quantifiable	<p>As a result of the pandemic, most events could not take place in 2020 or 2021.</p> <p>A family friendly Getabout Activity Village (GAV) was held at the finish line of the Tour of Britain in September 2021. The GAV included, Dr Bikes, Bicycle stunt show, assault course, Car Club, Getabout Bicycle Roadshow, Electric Go Karts, Transition Extreme high rope course and many more.</p>	Ongoing	Programme of events for 2022 being developed.
1.4e	Improve public awareness of air quality issues	Public information	Information and Marketing Initiatives	ACC/ Getabout	Ongoing	Ongoing	N/A	Not quantifiable	<p>An I Bike officer currently promotes the uptake of active travel in schools.</p> <p>A marketing campaign to promote the Aberdeen City and Aberdeenshire sustainable transport brand, Getabout, has continued.</p> <p>The Living Streets Travel Tracker project is currently running in several Aberdeen City schools. The project allows children to record their journey to school and to collect points depending on how sustainably they travelled. Anti-Idling campaigns were also run as part of this project.</p> <p>Walking trail maps have been integrated in to the GoABZ app. There are over 700 points of interest and 22 walking trails in the</p>	Ongoing	<p>Initiatives will continue during 2022.</p> <p>Comms on air quality will continue during 2022 and 2023 prior to full operation of the LEZ.</p>

									<p>'Discover' function of the GoABZ app.</p> <p>A Cycling Training project for P6 & 7 pupils allows children who cannot currently cycle to learn to ride and bike and potentially go on to do Bikeability.</p> <p>To support the Cycle Training project, Dr Bikes and Getabout Bicycle Roadshows have also been undertaken in Aberdeen City Schools.</p> <p>Travel Planning projects, for students and staff, were carried out at both Robert Gordon's University and the University of Aberdeen.</p> <p>Increasing the availability of digital real time information for bus users.</p> <p>LEZ comms and engagement is raising awareness of air quality concerns in Aberdeen.</p>		
1.5a	Car Clubs / Carpool Schemes	Promoting low emission transport	General Public	ACC	2011	Ongoing	<p>Car Club member-ship figures.</p> <p>Number of Car Club vehicles available.</p>	Estimate 0 – 1 µg/m3	<p>The Aberdeen Car Club has continued to expand, with more electric and hydrogen vehicles added to the fleet. It now has 25 alternatively (electric or hydrogen) fuelled vehicles and 17 petrol hybrid vehicles as part of its fleet of 52 vehicles, 41 of which are available for public use.</p> <p>Marketing of Car Club cars in Middlefield, Northfield,</p>	Ongoing	<p>Recent additions include Osprey Housing Association at Bucksburn through "Switched on Communities" and May Baird Avenue through Developer Contributions.</p>

									Bridge of Don, Tillydrone & Seaton was undertaken using SCSP 2021/22 funding.		
1.5b	Car Clubs / Carpool Schemes	Promoting low emission transport	Corporate	ACC	2011	Ongoing	Number of Car Club vehicles available.	Estimate 0 – 1 µg/m3	10 vehicles available for the exclusive use by the Council. Council staff membership continues to grow.	Ongoing	
1.6a	Rail Improvements	Alternatives to private vehicle use	Local rail improvements	Transport Scotland/ Nestrans	Ongoing	Ongoing	Number of stations in the North East. Travel to work by rail mode share (Census).	Estimate 0 – 1 µg/m3	Aberdeen to Inverurie track dualling was completed in 2019, allowing a higher frequency and higher capacity local rail service to be delivered between Inverurie and Montrose via Aberdeen. Kintore Station re-opened to passenger services in late 2020. A study is underway looking at the feasibility of further rail stations in the region.	Ongoing	Laurencekirk to Aberdeen Case for Change report to be submitted to Transport Scotland in spring 2022.
1.6b	Rail Improvements		Infra-structure improvements	Transport Scotland/ Nestrans	Ongoing	Ongoing	Studies and infra-structure delivered	Not quantifiable	Wider Aberdeen to Inverness rail improvement project ongoing. Kintore Station re-opened to passenger services in late 2020. A study is underway looking at the feasibility of further rail stations in the region. As part of the Aberdeen City Region Deal, options for reducing rail journey times between Aberdeen and the Central Belt are being investigated.	Ongoing	Laurencekirk to Aberdeen Case for Change report to be submitted to Transport Scotland in spring 2022.

1.7	Rail Freight	Freight and delivery management	Modal Shift from road to rail	Nestrans	Ongoing	Ongoing	N/A	Not quantifiable	New rail freight strategy for Scotland launched in 2016	Ongoing	
2 Lower Emissions and Cleaner Vehicles											
2.1	Green Vehicle procurement & Fuel/Charging Infrastructure	Promote low emission transport	Increase electric vehicle charging points	ACC	Ongoing	Ongoing	Number of charge points available.	Not quantifiable	<p>The electric vehicle charging network has continued to expand, with more charging points located at various locations throughout the City.</p> <p>An Electric Vehicle Framework for Aberdeen was adopted in 2021.</p> <p>EV charging hub installed at Frederick Street car park in 2021 with 3 x rapid triple chargers and 5 x double fast chargers</p> <p>Exploring on-street pilot as part of framework</p> <p>Tariff now being charged for use of ev charge points - 38p connection fee and 19p per kWh.</p>	Ongoing	<p>Future ratios and requirements for electrical vehicle charging will be set out in Aberdeen Planning Guidance: Transport and Accessibility. The Aberdeen Planning Guidance takes account of the finding of the Electric Vehicle Framework. The Planning Guidance will be subject to a separate consultation process and will be adopted under the Aberdeen Local Development Plan 2022.</p> <p>ACC is working with Scottish Futures Trust, Transport Scotland, Highland and Aberdeenshire Councils and consultants to build a business case that looks at future models for delivery including the Council working with private sector. To be completed by August 2022.</p>
2.2a	Emissions Testing & Idling Enforcement	Public information	Roadside Emission Testing	ACC	Ongoing	Ongoing	No. of tests / fails	Not quantifiable			
2.2b	Emissions Testing & Idling	Public information	Idling Vehicles	ACC			No. cautions	Not quantifiable			

	Enforcement										
2.3a	Taxis	Vehicle fleet efficiency	Non-idling signs	ACC	Ongoing	On hold	Spatial coverage of signs	Not quantifiable		Ongoing	
2.3b	Taxis	Vehicle fleet efficiency	Licensing vehicle inspections, emissions restrictions	ACC			Fleet emissions profile improvement	Not quantifiable			
2.4	Low Emission Zone	Environmental Permits	Low Emission Zone	ACC	2011	Ongoing	Air quality improvement within LEZ area	Various depending on location – full details in NLEF and NMF reports/	Preferred option identified in 2021, with final objection period concluded in November.	Ongoing	Assuming Ministerial approval, LEZ will be declared in Spring 2022.
3 Transport planning and infrastructure											
3.1	Pedestrianisation	Transport planning and infrastructure	Union Street and Broad Street	ACC	2008-2015	From 2016	N/A	TBC	City Centre Masterplan and Sustainable Urban Mobility Plan approved. Part pedestrianisation of Broad Street complete. Schoolhill Public Realm Enhancement Stage 1 complete.	Ongoing	Schoolhill/Upperkirkgate pedestrianisation agreed by the Council in 2021, for implementation in 2022. Central Union Street option appraisal due to be reported to the Council in 2022.
3.2a	Road Building / Junction Alterations	Transport planning and infrastructure	Aberdeen Western Peripheral Route	AWPR Managing Agent	2008	2015-2019	Monitoring data from permanent traffic counters on Anderson Drive, Market Street and Wellington Road	0 – 1 µg/m3 for PM10 and NO2 (Market St and Anderson Dr)	Final section opened in Feb 2019		

3.2b	Road Building / Junction Alterations	Transport planning and infrastructure	Haudagain Improvements	Transport Scotland	2012-2019	2019-2021	Delivery of scheme	TBC	Construction underway		Due for completion 2022.
4 Traffic Management											
4.1	Intelligent Transport System (ITS)	Traffic management	To reduce city centre congestion	ACC	Ongoing	Ongoing	Predicted traffic flow impacts; air quality modelling; Monitoring data when operational; LTS monitoring data	Not quantifiable	<p>Revalidation of the SCOOT/UTC system covering the King Street and Market Street corridors has been carried out to address congestion concerns and reduce bus journey times.</p> <p>The traffic monitoring CCTV system is being expanded to include the Queens Road/Skene Road corridor to allow incidents or congestion issues to be dealt with timeously to reduce delays to public transport.</p> <p>A new joint operations control room accommodating ACC ITS staff and Police Scotland has been created to permit closer co-operation and a more joined up approach to managing incidents on the road network</p>	The SCOOT revalidation is complete, the CCTV system expansion is ongoing and the new control room is complete	
4.2	High Occupancy Vehicle	Traffic management	Stone-haven Road	ACC	2011	Ongoing	N/A	Not quantifiable	Feasibility study complete.	Subject to implementation of A90	Laurencekirk to Aberdeen Case for Change to be

	(HOV) Lane								Option will be revisited as part of future south of the city corridor study, due to be complete in 2022.	south P and R	submitted to Transport Scotland in Spring 2022.
4.3a	Freight and Commercial Vehicle Access	Freight and delivery management	HGV Priority Measures	ACC	Ongoing	Ongoing	N/A	Not quantifiable	The need for HGV priority measures will be considered within multimodal corridor studies.	Ongoing	
4.3b	Freight and Commercial Vehicle Access	Freight and delivery management	Commercial Delivery Strategy (routing, timing, idling control)	Netstrans	2015	Ongoing	N/A	Not quantifiable	Regional Freight Distribution Strategy adopted. Revised freight route maps and app-based solution in development for communicating to operators and drivers	Ongoing	
4.3c	Freight and Commercial Vehicle Access	Freight and delivery management	Freight Consolidation Centre	Nestrans	Ongoing	Ongoing	Delivery of study	Not quantifiable	Research to date has suggested such a venture would have to be private sector led but has garnered little interest so far.	TBC	
5.1a	Produce Supplementary Planning Guidance	Policy guidance and development control	Improve Development Control	ACC	Ongoing	Ongoing	Database of permitted development	Not quantifiable	SGs for Transport and Accessibility, Air Quality and Noise. adopted as part of Aberdeen Local Development Plan (2017). New developments now 'master-planned' and consider layout of the development for ped/ cycle/	Ongoing	Work now taking place on Aberdeen Local Development Plan 2022,

									public transport movements first.		
5.1b	Produce Supplementary Planning Guidance	Policy guidance and development control	Section 75 monetary contributions	ACC	Ongoing	Ongoing	Database of contributions and what they have funded	Not quantifiable	Contributions sought for sustainable transport improvements: core paths, car club, public transport infrastructure and pedestrian safety improvements such as pedestrian crossings, etc.	Ongoing	
5.1c	Produce Supplementary Planning Guidance	Policy guidance and development control	Construction Code of Practice	ACC			Database of development s signing CCoP	Not quantifiable			
5.2	Integration of AQAP with LTS and RTS	Policy guidance and development control		ACC and Nestrans	2013-15	2016-21	N/A	Not quantifiable	LTS adopted in January 2016. Air quality and noise embedded within the LTS with specific objectives and actions to improve. Revised RTS adopted in 2021 with specific air quality objective.	2021	LTS due to be revised in 2023.
5.3	Integration of AQAP with Health and Transport Action Plan (HTAP)	Policy guidance and development control	Highlight Health Impacts	ACC / NHS	Ongoing	Ongoing	N/A	Not quantifiable	HTAP agreed and Steering Group/Board established.	Ongoing	
5.4	Road Hierarchy	Transport planning and infrastructure	Reclassify Union St / Denburn (requires TRO)	ACC	2015-19	2019-2021	N/A	Not quantifiable	A revised Roads Hierarchy was approved by Elected Members in June 2019,	Complete	Complete.

									with formal programme of road reclassifications approved in 2020.		
5.5a	Car Parking Policies	Policy guidance and development control	Low Emission Vehicle Parking Incentives	ACC	Ongoing	Ongoing	No. of low emissions permits as proportion of total	Not quantifiable	Being considered as one of the measures within a revised Car Parking Framework.	Ongoing	Several city centre car parks will be within the LEZ boundary, meaning they can only be used by compliant vehicles.
5.5b	Car Parking Policies	Policy guidance and development control	Limit car parking for new developments	ACC	2013	Ongoing	N/A	Not quantifiable	Revised parking standards included in Local Development Plan 2017 and associated Transport and Accessibility Supplementary Guidance. City Centre Masterplan proposes zero parking for new office developments.	Ongoing	Will be reviewed as part of the developing Car Parking Framework and Local Development Plan 2022.
5.5c	Car Parking Policies	Policy guidance and development control	Development of Local and Regional Car Parking Policies	ACC & Nestrans	Ongoing	Ongoing	N/A	Not quantifiable	Regional Car parking Strategy adopted 2012. Revised parking standards included in Aberdeen Local Development Plan 2017 and Transport and Accessibility Supplementary Guidance. Strategic car Parking Review is complete with the outcomes being developed into a revised Car Parking Framework.	Ongoing	Will be reviewed as part of the developing Car Parking Framework and Local Development Plan 2022.
5.6a	National Lobbying	Transport planning and infrastructure	Incentives/ funding/ tax breaks for Low Emission Initiatives	ACC	2011	Ongoing	N/A	Not quantifiable	In the lead-in to LEZ implementation, the Scottish Government has several grant schemes available to help residents and businesses change	Ongoing	

									vehicle or mode to become LEZ compliant. Grants for home and workplace charging facilities are available through Home Energy Scotland.		
5.6b	National Lobbying	Transport planning and infrastructure	Shipping Emissions Reductions	ACC	2011	Ongoing	N/A	Not quantifiable	No work being undertaken currently	Ongoing	
5.6c			HGV/Bus Scrappage schemes	ACC	2011	Ongoing	N/A	Not quantifiable	Several bus replacement and/or retrofit schemes are being funded by Transport Scotland to support carbon reduction and LEZ development.	Ongoing	

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

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

Aberdeen City Council undertook automatic (continuous) monitoring at 6 sites during 2021. Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at www.scottishairquality.scot.

Maps showing the location of the monitoring sites are provided in Appendix E. Figure 1, and also available at www.scottishairquality.scot. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

The Union Street and Market Street continuous monitoring sites are on busy city centre roads and are representative of population exposure for NO₂, PM₁₀ and PM_{2.5}. Union Street is the city's main shopping street with shops on the ground level and commercial premises and flats on the 1st, 2nd and 3rd floors. Almost all the city's bus routes pass along at least part of Union Street and the inside lane of both sides of the road are designated bus lanes.

Market Street is adjacent to Aberdeen Harbour and has a high proportion of HGVs travelling between the north-east of Scotland, the Harbour and locations to the south of Aberdeen. The street is used by pedestrians travelling to the city centre from residential properties to the south of the River Dee, visiting the Union Square retail park and people working around the Harbour area. There are a small number of 1st, 2nd and 3rd floor flats. Emissions from Aberdeen Harbour also contribute to the pollution on Market Street.

The Anderson Drive site is 4m from the kerb and is not representative of population exposure as residential properties are set back 10-20m from the kerb. Similarly, the site at Wellington Road is around 3-4m closer to the kerb than residential properties in the area. The nearest properties are 10m from the King Street site, however the location is typical of

flatted properties close to the kerb at other locations on King Street. Errol Place was moved 30m west to a new location on Errol Park in September 2021, due to demolition and construction works removing access to the original site. It is representative of typical residential properties close to the city centre but not adjacent to a major road and provides urban background data.

The automatic monitoring sites at Union Street, Market Street, Wellington Road and Anderson Drive are located within AQMAs.

The King Street site is not located within an AQMA but is relatively close to the City Centre in an area of high traffic flow.

3.1.2 Non-Automatic Monitoring Sites

Aberdeen City Council undertook non-automatic (passive) monitoring of NO₂ at 53 sites during 2021. Table A.2 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix E. Figure 2 to Figure. 9, and [Air Quality - Diffusion Tubes - Datasets - Open Data Aberdeen \(aberdeencity.gov.uk\)](https://airquality.aberdeencity.gov.uk/diffusion-tubes/datasets) and [Latest pollution map \(scottishairquality.scot\)](https://scottishairquality.scot/). Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

Diffusion tubes on Market Street, Union Street and the majority of those on Holburn Street and King Street within the city centre are at building façade and are representative of population exposure. Some of the tubes out with the city centre are at roadside locations with the façade of the nearest relevant property 5-20m back from the roadside.

3.2 Individual Pollutants

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

3.2.1 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.

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.

The automatic monitoring site at Erroll Place was removed due to the demolition of a housing development on the street, and has been relocated at Erroll Park. Due to this move in September 2021, the data for Erroll Place has been annualised, and Erroll Park has been included in this year's report for information only since data collection only commenced in October 2021.

Monitored NO₂ levels at all automatic monitoring sites continue to be below the annual mean air quality objective of 40 µg/m³. The trend in NO₂ levels over the last 5 years is shown in Appendix D.Figure 1. NO₂ levels have been decreasing since 2015. NO₂ levels at all automatic monitoring sites have been below the objective level since 2018. The graph in Appendix D.Figure 2, shows the annual average at each automatic monitoring location since 2017.

In relation to diffusion tubes, duplicate and triplicate tube monitoring locations were assessed for precision using the precision accuracy bias spread sheet available on the SAQD website. Adjustments made, due to poor precision, are detailed in Table C.4, Appendix C.

Diffusion tubes at 16 locations (DT50, DT54, DT55, DT56, DT57, DT58, DT59, DT60, DT62, DT65, DT66, DT78, DT79, DT83, DT84 and DT89) were removed in August 2021 as concentrations of NO₂ were consistently low across these sites. 8 of these locations were installed as part of the project following the opening of the Diamond Bridge – the third crossing stretching the River Don in the north of the city – in 2016. Access to DT02 was not possible from September 2020 due to construction works for the improvements to the Haudagain Roundabout, therefore it was also removed from the city survey.

Meanwhile, two diffusion tubes (DT90 and DT91) installed at a busy junction of Westburn Road and Hutcheon Street in September 2020 provided a first full year of data for this year's report. No new diffusion tube locations were added in 2021.

All diffusion tube monitoring locations within Aberdeen City recorded data capture of 75% or more, therefore it was not required to annualise any monitoring data.

Diffusion tube monitoring locations are at areas of relevant exposure except where indicated in Table A.2. Diffusion tube monitoring sites, not at point of exposure, recorded annual mean concentrations below $36\mu\text{g}/\text{m}^3$ and therefore do not require distance correction during 2021.

The NO_2 automatic monitoring data collected at all sites in 2021 increased slightly on 2020 levels. This was to be expected following a relaxation of Covid-19 restrictions in relation to the twelve months previous. The graphs in Appendix D: Figure 3 plot the time series of the concentration of NO_2 measured at each automatic site from January 2021. The national lockdown stretching from January to April will have had some impact on road traffic levels for the first quarter of the year; however overall since restrictions on travel were removed there was not a return to pre-pandemic levels of NO_2 .

All tubes suggest NO_2 levels were below the objective level except for DT9 located at 39 Market Street, with an annual average of $42\mu\text{g}/\text{m}^3$ – the same objective exceedance as 2020. This part of Market Street has served as the re-routed path for buses since the central stretch of Union Street between the Market Street junction and Bridge Street was closed to all traffic as part of the Spaces for People initiative in September 2020. A bus gate also introduced for this initiative permitted only buses, taxis and authorised vehicles between the Broad Street and Market Street section of Union Street.

Diffusion tubes (DT5, DT20 and DT34) along King Street, a busy link through the north of the city saw no change to the 2020 annual mean of $20\mu\text{g}/\text{m}^3$, $21\mu\text{g}/\text{m}^3$ and $18\mu\text{g}/\text{m}^3$ respectively, together with another busy route through the north, Great Northern Road. Data here also saw levels remain static (DT48 and DT49), or marginal increases.

DT39 and DT41, situated on the Haudagain Roundabout, both saw a decrease on 2020 levels. Both roadside diffusion tubes previously saw levels exceeding the objective – last in 2018 – but have continued to decrease since the opening of the Aberdeen Western Peripheral Route (the city's bypass), and this will hopefully continue to fall with more traffic movement improvements completed in May 2022.

Busy routes in the south of the city, along Victoria Street (DT06) and Wellington Road (DT37) also saw no increase. Two of the diffusion tubes removed this year were also along Wellington Road. DT30 (335 Union Street) remained at $24\mu\text{g}/\text{m}^3$, whilst others on

Union Street saw minimal increases of $1\mu\text{g}/\text{m}^3$. One of the largest decreases was at DT77 (27 Skene Square), which has dropped $15\mu\text{g}/\text{m}^3$ on 2019 levels. Removal of physical distancing measures installed in response to the COVID-19 pandemic along Rosemount Place – which saw the road reduce to a one-way system until September 2021 – may account for sustained reduced levels at DT80 and DT81, particularly at DT81 where levels are half the 2018 annual mean.

DT10 (184-192 Market Street), which up until 2019 was exceeding the annual objective mean, increased to $37\mu\text{g}/\text{m}^3$ in 2021. DT12 (40 Union Street) was another that until 2020 exceeded the objective and has increased to $32\mu\text{g}/\text{m}^3$ in 2021. Appendix D: Figure 4 plots the diffusion tubes that previously exceeded the objective and shows overall trends for these tubes. DT16 at the junction of Market Street and Guild Street was another to increase, and builds on the developing picture that the rerouting of buses and other permitted vehicles down this street as opposed to along central Union Street has likely contributed to an increase to NO_2 levels in this area.

NO_2 levels across all continuous monitoring stations have increased slightly on 2020 levels, however again are not showing a return to pre-pandemic levels of 2019. The continuous monitoring site at Market Street saw the largest increase on 2020 levels, as people returned to travelling through this area of the city centre and visiting the nearby Union Square shopping centre. Wellington Road saw the second largest increase, while the other 4 sites included in the city survey – Erroll Park has been included in this report for reference only – saw marginal increases. A combination of reduced road traffic and temporary traffic restrictions on Union Street may have had the greatest impact for these locations. Automatic traffic counters in Aberdeen City recorded reduced daily traffic flows in 2021 compared to 2020. A comparison of traffic flow trends is illustrated in Appendix D: Figure 6.

Monitoring locations are shown in Appendix E: Figure 1, and the overall de-seasonalised trend at all sites from 2017 is shown in Appendix D: Figure 5.

There were no exceedances of the hourly mean objective at any automatic or diffusion tube sites in 2021. The hourly mean has not been exceeded at any automatic site in the last 7 years.

3.2.2 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.

There are 6 continuous monitoring sites measuring PM₁₀ levels in Aberdeen City, as the Anderson Drive TEOM monitor has been replaced by a Fidas device, which has been monitoring PM₁₀ levels since 20 July 2021. Due to this installation date and subsequent data capture, the data for PM₁₀ at this site has been annualised. The FDMS instrument at Union Street was also replaced by a Fidas device in July 2021, therefore PM₁₀ data for this site was also annualised.

Equipment failure of the Fidas monitor at King Street leading to it being sent back to the manufacturer for repair meant there was no data capture between 27 July 2021 and 20 December 2021. The data for this site was therefore annualised.

The PM₁₀ annual mean measured at each automatic site in 2021 were below the objective level and marginally lower than levels measured in 2020, other than Union Street and King Street which saw marginal increases. The graphs in Appendix D: Figure 9 plot the time series of the concentration of PM₁₀ measured at each automatic site from January 2021. A reduction in traffic during the COVID-19 lockdown period, and alterations in traffic routes due to physical distancing measures may have had some impact on PM₁₀ levels but the impact appears less significant compared to changes in NO₂ levels. This may be due to transboundary pollutant sources. Roadside measurements are similar to urban background levels measured at Erroll Place.

Since 2016 the general trend is a reduction in PM₁₀ levels, and the trend over the last 5 years is shown in Appendix D: Figure 7. The graph in Appendix D: Figure 8 shows the annual average PM₁₀ annual levels measured at each automatic site since 2017.

The 24-Hour Mean PM₁₀ monitoring results are detailed in Table A.6. There have been no exceedances of the objective at any monitoring site since 2016. The de-seasonalised trend at all sites from 2017 is shown in Appendix D: Figure 10.

3.2.3 Particulate Matter (PM_{2.5})

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

There are now 6 continuous monitoring sites measuring PM_{2.5} levels in Aberdeen City, as the Anderson Drive TEOM monitor has been replaced by a Fidas device, which has been monitoring PM_{2.5} levels since 20 July 2021. Due to this installation date and subsequent data capture, the data for PM_{2.5} at this site has been annualised. The FDMS instrument at Union Street was also replaced by a Fidas device in July 2021, therefore PM_{2.5} data for this site was also annualised.

No exceedances of the annual mean were recorded at any of the continuous monitoring sites. No exceedances of the objective have been recorded at any site since 2016.

3.2.4 Sulphur Dioxide (SO₂)

No monitoring of sulphur dioxide was carried out in 2021 as previous assessments did not predict a likelihood of exceedance of the objectives and there has been no significant change in local emissions.

3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene

No monitoring of Carbon Monoxide, Lead and 1,3-Butadiene was carried out in 2021 as previous assessments did not predict a likelihood of exceedances of the objectives and there has been no significant change in local emissions.

4 New Local Developments

4.1 Road Traffic Sources

Berryden Corridor Improvements

The improvements include the widening of existing roads and creation of a new road, providing a more direct link between the City Centre and the north of the city. Necessary planning consents were obtained in 2020. The scheme is subject to a Compulsory Purchase Order (CPO) to acquire the land necessary to deliver the project.

In March 2020 Transport Scotland were requested to pass the CPO to the Planning and Environmental Appeals Division (DPEA) of the Scottish Government, to examine the CPO and consider the outstanding objections. The DPEA's inquiry process concluded in April 2021 with the passing of their report to the Scottish Ministers. Following consideration of this report the CPO was confirmed by the Scottish Ministers in June 2021. The Council made a General Vesting Declaration on the 12 January 2022 and ownership of the land and rights in land required for the project vest in the Council as of 12 March 2022. It is anticipated that the project will commence in the next 2 years and take 2-3 years to complete.

The improvements include the duelling of Berryden Road and provide a more direct link between the City Centre and the Diamond Bridge, known locally as the Third Don Crossing.

It is anticipated that the proposed junction improvements will reduce congestion in this area and improve air quality, however these benefits may be offset by an increase in traffic flow. Air quality assessments predicted that the scheme would not lead to exceedances of the air quality objectives outside the existing AQMAs.

South College Street Junction Improvements (Phase 1) Project

Phase 1 of the South College Street project is due to commence in June 2022 and be operational summer 2023. The development will provide additional road capacity to accommodate the rerouting of vehicular traffic arising from the implementation of the public realm and bus priority enhancements along Guild Street and Union Street. The

corridor's improved capacity and operation will also complement its position in the new roads hierarchy and enhance infrastructure for walking and cycling.

A90/A96 Haudagain Improvements

Construction works commenced on the site in 2019 and are now substantially complete with project roads opened in May 2022. The improvements have created a new dual carriageway link road to the southwest of the Haudagain roundabout and improve traffic flow and air quality. The DMRB Environmental Statement details that there are no predicted exceedances of the annual mean NO₂ or PM₁₀ levels with the scheme in place and concludes that there will be no significant impact on local air quality as a result of the proposed scheme. It is hoped that the improvements will enable compliance with the air quality objectives along the entire Anderson Drive AQMA and the future revocation of the AQMA.

City Centre Vehicle Access Restrictions

A number of vehicle access restrictions were implemented in 2020 as part of the Spaces for People measures implemented during the Covid-19 pandemic. These included the pedestrianisation of part of Schoolhill and Union Street between Market Street and Union Terrace and the provision of bus gates on Union Street east of Market Street. A proposal to reopen Union Street to buses, taxis and service vehicles was approved in March 2022 following the easing of covid restrictions. A report is being submitted to the June 2022 Committee with options for permanent City Centre access restrictions on Market St/Guild Street/Bridge St corridor and the permanent pedestrianisation of Schoolhill. It is anticipated Union St will reopen in late June 2022 with any approved access restrictions implemented in late summer/early autumn 2022.

4.2 Other Transport Sources

Other transport sources include:

- Airports.
- 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.

- Ports for shipping.

There were no new other transport sources in Aberdeen City in 2021.

4.3 Industrial Sources

Industrial Sources include:

- **Industrial installations:** new or proposed installations for which an air quality assessment has been carried out.
- **Industrial installations:** existing installations where emissions have increased substantially or new relevant exposure has been introduced.
- **Industrial installations:** new or significantly changed installations with no previous air quality assessment.
- Major fuel storage depots storing petrol.
- Petrol stations.
- Poultry farms.

The Scottish Environmental Protection Agency are the licensing and enforcement authority for different types of industrial installation. At the time of publication there were no updates. Further updates are anticipated to be provided in subsequent annual reports.

4.4 Commercial and Domestic Sources

Commercial and domestic sources include:

- Biomass combustion plant – individual installations.
- Areas where the combined impact of several biomass combustion sources may be relevant.
- Areas where domestic solid fuel burning may be relevant.
- Combined Heat and Power (CHP) plant.

New sources of this type in 2021 were:

New source in 2021	Air Quality Impacts
<p>Installation of CHP station/boiler house</p> <p>B & W Depot Sillerton Lane Aberdeen AB12 5DF</p>	<p>Planning application approved December 2021.</p> <p>The development is to install a CHP station at Sillerton Lane Depot to supply heat from the depot to Kincorth Academy and Craighill site.</p> <p>Comprising of:</p> <ul style="list-style-type: none"> • 1x 140kWe CHP fired on natural gas with a single flue • 6x 150kWe boilers fired on natural gas each with a single flue <p>Environmental Health requested the submission of an Air Quality Impact Assessment including a detailed assessment of the impact of emissions on air quality at sensitive receptors.</p> <p>The assessment submitted, which concluded that the overall effect on air quality was considered 'not significant', was assessed, considered reasonable, and the findings for flue emission levels at sensitive receptors were accepted. This included the conclusion that no significant impact is predicted on existing residents as a result of the development.</p>

4.5 New Developments with Fugitive or Uncontrolled Sources

This section relates potential fugitive or uncontrolled particulate matter from the following new sources:

New Source in 2020	Detail
Landfill sites	No new sources in 2021
Quarries	No new sources in 2021
Unmade haulage roads on industrial sites	No new sources in 2021
Other potential sources of fugitive particulate matter emissions.	No new sources in 2021

5 Planning Applications

This section identifies any major planning applications under consideration in 2021 that might affect air quality. A summary of applications in 2021 that may impact air quality are detailed in Table 5.1. Details of planning application can be viewed on the [Aberdeen City Council website](#)

Table 5.1: Planning Applications in 2021 that may affect Air Quality

Planning Application	Application No.	Air Quality Impacts
<p>Erection of energy centre and chimney including associated external works and vehicle access bridge</p> <p>Stoneywood Mill, Stoneywood Terrace, Aberdeen, AB21 9AB</p>	210674/DPP	<p>Application currently pending</p> <p>The Proposed Development is a natural gas fired Energy Centre, along with 2 x 35m stack to house and related facilities consisting of:</p> <ul style="list-style-type: none"> • 1 No. 7,900 kilowatt electrical (kWe) Centrax Gas Turbine, with a 18,500 kilograms per hour (kg/hr) Heat Recovery Steam Boiler (from waste heat from the Gas Turbine exhaust gas) • 3 No. 18,500kg/hr Gas fired steam boilers. <p>In addition, the Proposed Development, will be classified as 'new' Medium Combustion Plant and therefore requires a Part B PPC permit from the Scottish Environmental Protection Agency (SEPA).</p> <p>Environmental Health requested the submission of an Air Quality Impact Assessment including a detailed dispersion modelling assessment to assess the operational phase of the energy centre emissions.</p>

Planning Application	Application No.	Air Quality Impacts
<p>Proposed development of Aberdeen Beachfront</p> <p>Beach Esplanade, Aberdeen, AB24 5NR</p>	211367/PREAPP	<p>Proposal still under consideration.</p> <p>Proposals include the development of the Aberdeen Beachfront. The options include the redevelopment of the existing Beach Ballroom, a new beachfront Stadium, together with options for sports/leisure facilities, and the introduction of ancillary leisure uses, greenspace, with hard and soft landscaping. There would also be associated works and access connections including alterations to road layout and traffic routes.</p> <p>Environmental Health have advised that should the project be progressed, the Service would require an Air Quality Impact Assessment for operational aspects. In relation to the construction phase, an Air Quality (Dust) Risk Assessment and Dust Management Plan would also be required.</p>

6 Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

Data from all continuous automatic monitoring sites was below the NO₂ annual mean objective of 40mg/m³. NO₂ levels at all automatic monitoring sites have been below the objective level since 2018. Trends in NO₂ levels suggest that air quality continues to improve across the City.

The NO₂ automatic monitoring data collected at all sites in 2021 showed slight increases on 2020 levels, but did not show a return to pre-pandemic levels of 2019. The vast majority of diffusion tube locations also showed lower NO₂ concentrations compared to previous years. The national lockdown imposed at the beginning of the year lasting until April will have had some impact on travel patterns and therefore pollutant source during this period.

All diffusion tubes located in and outside of AQMAs suggest NO₂ levels below the objective level, except for DT9 located at 39 Market Street (City Centre AQMA), with a annual average of 42 µg/m³.

There were no exceedances of the NO₂ one hour mean objective at any of the automatic sites. Diffusion tube data also recorded no sites with an annual mean >60ugm⁻³ suggesting exceedances of the 1-hour objective were unlikely across the city.

The annual mean and 24-hour PM₁₀ objectives were met at all monitoring locations and the concentrations at measurement locations across the city are comparable to annual monitoring data since 2016.

No exceedances of the PM_{2.5} annual mean were recorded at the 6 continuous monitoring sites.

The 3 AQMAs in the City remain valid for NO₂ and PM₁₀ annual means and further monitoring is required for a full year with no travel restrictions.

New monitoring data has not identified a need for any other changes to the existing AQMAs.

6.2 Conclusions relating to New Local Developments

Infrastructure measures around the Haudagain roundabout within the Anderson Drive AQMA were completed and the road opened on 16 May 2022, following delays due to logistical challenges following the COVID-19 pandemic. It is anticipated these improvement works will significantly improve traffic flow and local air quality, and potentially enable the revocation of the AQMA.

6.3 Proposed Actions

1. Take forward an air quality education initiative in local primary schools using a mobile monitor to allow children to collect data and analyse the results. This project has been delayed due to the COVID-19 pandemic.
2. Following formal approval by Scottish Ministers, introduce the LEZ and develop plans for enforcement to commence in June 2024 following a two-year grace period.
3. Progress the equipment procurement process and other associated legal and infrastructure actions to support the implementation of a City Centre LEZ.
4. Continued implementation of the Actions within the Air Quality Action Plan 2011.
5. Review of the Air Quality Action Plan 2011, plans for which are progressing at the time of publication.
6. Submit the next air quality progress report.

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)
CM1	Errol Place	Urban Background	X394397	Y807392	PM ₁₀ , PM _{2.5} , O ₃ , NO ₂ (NO, NO _x)	NO	FIDAS Chemiluminescence	N/A	N/A	3
CM2	Union Street	Roadside	X393656	Y805967	PM ₁₀ , PM _{2.5} , NO ₂ (NO, NO _x)	YES City Centre	Dichotomous Monitor FDMS Chemiluminescence	2	2	2.5
CM3	Market Street	Roadside	X394560	Y805677	PM ₁₀ , PM _{2.5} , NO ₂ (NO, NO _x)	YES City Centre	Fidas 200 Chemiluminescence	0	2	1.5
CM4	Anderson Drive	Roadside	X392506	Y804186	PM ₁₀ , NO ₂ (NO, NO _x)	YES Anderson Drive	TEOM Chemiluminescence	10	6	1.5
CM5	Wellington Road	Roadside	X394395	Y804779	PM ₁₀ , PM _{2.5} , NO ₂ (NO, NO _x)	YES Wellington Road	Fidas 200 Chemiluminescence	5	4	1.5
CM6	King Street	Roadside	X394333	Y808770	PM ₁₀ , PM _{2.5} , NO ₂ (NO, NO _x)	NO	Fidas 200 Chemiluminescence	10	3	1.5
CM7	Erroll Park	Urban Background	X394365	Y807396	PM ₁₀ , PM _{2.5} , O ₃ , NO ₂ (NO, NO _x)	NO	FIDAS Chemiluminescence	N/A	N/A	1.5

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)
DT2	885 Gt Northern Rd	Roadside	391149	809164	NO ₂	YES Anderson Dr	11	3	N	2.5
DT4	38 Ellon Rd	Roadside	394652	809714	NO ₂	NO	7	3	N	2.3
DT5	520 King St	Roadside	394236	808066	NO ₂	NO	9	0.1	N	2.6
DT6	86 Victoria Rd Torry	Roadside	394764	805197	NO ₂	NO	0	3	N	2.3
DT7	Wellington Rd/Kerloch Pl	Roadside	394411	804407	NO ₂	YES Wellington Rd	0	3	N	2.4
DT8	107 Anderson Dr	Roadside	392337	804340	NO ₂	YES Anderson Dr	14	3	N	2.3
DT9	39 Market St	Roadside	394264	806146	NO ₂	YES City Centre	0	3	N	2.1
DT10	184 Market St	Roadside	394530	805708	NO ₂	YES City Centre	0	3	N	2.6
DT11	105 King St	Roadside	394406	806637	NO ₂	YES	0	3	N	2.2

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)
						City Centre				
DT12	40 Union St	Roadside	394285	806285	NO ₂	YES City Centre	0	3	N	2.4
DT13	Music Hall, Union St	Roadside	393777	806030	NO ₂	YES City Centre	0	6	N	2.6
DT14	Dyce Primary Gordon Ter	Urban background	389046	812794	NO ₂	NO	N/A	N/A	N	2
DT15	Northfield swimming pool	Urban background	390801	808132	NO ₂	NO	N/A	N/A	N	2.4
DT16	1 Trinity Quay	Roadside	394336	806097	NO ₂	YES City Centre	0	5	N	2.5
DT17	43/45 Union St	Roadside	394273	806255	NO ₂	YES City Centre	0	3	N	2.1
DT18	14 Holburn St	Roadside	393305	805734	NO ₂	YES City Centre	0	3	N	2.6
DT19	468 Union St	Roadside	393386	805826	NO ₂	YES City Centre	0	3	N	2.4
DT20	212 King St	Roadside	394400	806842	NO ₂	NO	0	4	N	2.3
DT21	26 King St	Roadside	394449	806453	NO ₂	YES City Centre	0	4	N	2.4
DT22	104 King St	Roadside	394425	806634	NO ₂	YES	0	4	N	2.3

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)
						City Centre				
DT24	40 Auchmill Rd	Roadside	389930	809603	NO ₂	NO	0	3	N	2.2
DT25	21 Holburn St	Roadside	393332	805748	NO ₂	YES City Centre	0	3	N	2.4
DT26	147 Holburn St	Roadside	393214	805367	NO ₂	NO	0	3	N	2.3
DT29	469 Union St	Roadside	393400	805811	NO ₂	YES City Centre	0	3	N	2.4
DT30	335 Union St	Roadside	393619	805919	NO ₂	YES City Centre	0	5	N	2.5
DT33	16 East North St	Roadside	394505	806531	NO ₂	YES City Centre	0	4	N	2.3
DT34	404 King Street	Roadside	394317	807527	NO ₂	NO	0	9	N	2.6
DT36	115 Menzies Rd/Wellington Rd	Roadside	394403	804799	NO ₂	YES Wellington Rd	14	4	N	2.4
DT37	137 Wellington Road	Roadside	394697	803735	NO ₂	NO	17	14	N	1.6

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)
DT39	819 Gt Northern Rd	Roadside	391293	809136	NO2	YES Anderson Dr	0	3	N	2.4
DT40	852 Fullerton Ct (facade)	Facade	391353	809158	NO2	YES Anderson Dr	0	7	N	2.5
DT41	852 Fullerton Ct (roadside)	Roadside	391352	809151	NO2	YES Anderson Dr	7	0.1	N	2.3
DT45	111 S Anderson Dr	Facade	392311	804349	NO2	YES Anderson Dr	0	13	N	1.9
DT46	West North Street	Roadside	394277	806671	NO2	YES City Centre	0	4	N	2.4
DT47	Powis Terrace	Roadside	393368	807511	NO2	NO	5	0.1	N	2.5
DT48	139 Gt. Northern Road	Roadside	393088	808232	NO2	NO	10	0.1	N	2.4
DT49	142 Gt. Northern Road	Roadside	392969	808460	NO ₂	NO	11	3	N	2.4
DT63	93 Berryden Road	Roadside	393034	807392	NO ₂	NO	11	2	N	2.4
DT64		Urban Background	393025	807828	NO ₂	NO	N/A	N/A	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)
	102 Picktillum Place									
DT67	37 Inverurie Rd	Roadside	389756	809583	NO ₂	NO	6	3	N	2.5
DT70	Kirkhill Place Tullos Primary	Urban Background	395476	804452	NO ₂	NO	N/A	N/A	N	2.4
DT71	Tullos Hill	Urban Background	39543	803410	NO ₂	NO	N/A	N/A	N	2.6
DT72	North Loirston Souter Head Road Cove Allotments	Urban Background	394988	801940	NO ₂	NO	N/A	N/A	N	2.5
DT73	61 Skene Square	Facade	393458	806768	NO ₂	NO	0	6	N	2.4
DT74	5 Caroline Place	Roadside	393350	806922	NO ₂	NO	5	3	N	2.6
DT75	Pentland Close	Urban Background	395964	805132	NO ₂	NO	N/A	N/A	N	2.6
DT77	27 Skene Square	Roadside	393524	806701	NO ₂	NO	0	5	N	2.4

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)
DT80	27 Rosemount Place	Roadside	393410	806674	NO ₂	NO	0	4	N	2.6
DT81	131 Rosemount Place	Roadside	393044	806537	NO ₂	NO	0	2	N	2.5
DT82	7 Virginia Street	Roadside	394466	806248	NO ₂	YES City Centre	0	8	N	2.5
DT85	Tullos Place	Urban Background	395216	804724	NO ₂	NO	N/A	N/A	N	2.4
DT86	21 Manor Av	Roadside	391330	808904	NO ₂	NO	10	0.1	N	2.4
DT88	31 St Clement St	Roadside	395118	806164	NO ₂	NO	0	1	N	2.4
DT90	4 Westburn Road	Facade	393290	806942	NO ₂	NO	N/A	3	N	2.5
DT91	155 Hutcheon Street	Facade	393367	806941	NO ₂	NO	N/A	2	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)
CL1	Errol Place	Urban Background	394397	807392	NO ₂	NO	N/A	N/A	Y	3
CL2	Union Street	Roadside	393656	805967	NO ₂	YES City Centre	2	2	Y	2.5
CL3	Market Street	Roadside	394560	805677	NO ₂	YES City Centre	0	2	Y	1.5
CL4	Anderson Drive	Roadside	392506	804186	NO ₂	YES Anderson Dr	10	6	Y	1.5
CL5	Wellington Road	Roadside	394395	804779	NO ₂	YES Wellington Rd	5	4	Y	1.5
CL6	King Street	Roadside	394333	808770	NO ₂	NO	10	3	Y	1.5

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
CM1	Background	Automatic		68.9 ⁽³⁾	21	22	20	14	15
CM2	Roadside	Automatic		98	43	40	38	24	25
CM3	Roadside	Automatic		99.7	35	31	33	22	27
CM4	Roadside	Automatic		91.9	21	19	17	12	13
CM5	Roadside	Automatic		99.6	46	39	39	25	28
CM6	Roadside	Automatic		84.1	28	23	22	16	17
CM7	Background	Automatic		25.1 ⁽⁴⁾	N/A	N/A	N/A	N/A	21
DT4	Roadside	Diffusion Tube		100	33	29	27	19	20
DT5	Roadside	Diffusion Tube		100	31	47	27	20	20
DT6	Roadside	Diffusion Tube		100	27.8	28	30	21	21
DT7	Roadside	Diffusion Tube		100	33.2	32	31	22	23

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
DT8	Roadside	Diffusion Tube		100	48	48	39	31	32
DT9	Roadside	Diffusion Tube		83	47.9	46	44	42	42
DT10	Roadside	Diffusion Tube		92	47.6	47	47	33	37
DT11	Roadside	Diffusion Tube		83	48.1	48	45	34	32
DT12	Roadside	Diffusion Tube		100	45.9	44	43	26	32
DT13	Roadside	Diffusion Tube		100	N/A	N/A	35	22	25
DT14	Urban background	Diffusion Tube		100	10.1	10	8	6	7
DT15	Urban background	Diffusion Tube		100	13.0	11	9	7	8
DT16	Roadside	Diffusion Tube		83	37.4	37	39	27	34
DT17	Roadside	Diffusion Tube		100	42.8	44	43	28	30
DT18	Roadside	Diffusion Tube		100	41.6	39	39	25	26
DT19	Roadside			100	40.9	40	43	27	26

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
		Diffusion Tube							
DT20	Roadside	Diffusion Tube		92	30.8	30	27	21	21
DT21	Roadside	Diffusion Tube		100	41.6	34	33	23	24
DT22	Roadside	Diffusion Tube		100	36.2	36	34	24	25
DT24	Roadside	Diffusion Tube		100	28.0	24	21	14	15
DT25	Roadside	Diffusion Tube		83	37.1	37	35	26	22
DT26	Roadside	Diffusion Tube		100	23.8	24	23	15	17
DT29	Roadside	Diffusion Tube		100	42.7	45	42	28	29
DT30	Roadside	Diffusion Tube		92	41.9	41	39	24	24
DT33	Roadside	Diffusion Tube		100	40.4	40	35	29	28
DT34	Roadside	Diffusion Tube		100	27.6	26	24	18	18
DT36	Roadside	Diffusion Tube		100	41	43	39	29	30
DT37	Roadside	Diffusion Tube		100	24	23	22	17	17

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
DT39	Roadside	Diffusion Tube		100	45.4	43	37	27	25
DT40	Facade	Diffusion Tube		100	31.0	30	26	19	19
DT41	Roadside	Diffusion Tube		100	44	40	36	27	24
DT45	Facade	Diffusion Tube		100	25.2	24	21	16	17
DT46	Roadside	Diffusion Tube		100	25.5	26	24	17	18
DT47	Roadside	Diffusion Tube		100	43	41	40	30	29
DT48	Roadside	Diffusion Tube		75	29	28	26	19	19
DT49	Roadside	Diffusion Tube		100	32	31	30	22	22
DT63	Roadside	Diffusion Tube		100	23	23	23	16	17
DT64	Urban Background	Diffusion Tube		92	17.2	17	14	11	12
DT67	Roadside	Diffusion Tube		100	25	38	32	21	21
DT70	Urban Background	Diffusion Tube		92	14.7	14	13	10	12

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
DT71	Urban Background	Diffusion Tube		83	10.6	10	9	7	8
DT72	Urban Background	Diffusion Tube		100	7.8	8	7	5	6
DT73	Facade	Diffusion Tube		100	39.7	40	38	29	30
DT74	Roadside	Diffusion Tube		100	39	34	34	23	27
DT75	Urban Background	Diffusion Tube		100	19.1	16	15	12	15
DT77	Roadside	Diffusion Tube		83	n/a	37	38	27	23
DT80	Roadside	Diffusion Tube		100	n/a	24	23	14	19
DT81	Roadside	Diffusion Tube		100	n/a	30	27	16	15
DT82	Roadside	Diffusion Tube		100	n/a	44	42	32	34
DT85	Urban Background	Diffusion Tube		92	n/a	13	13	11	13
DT88	Roadside	Diffusion Tube		100	n/a	n/a	35	29	26
DT90	Facade	Diffusion Tube		92	n/a	n/a	n/a	20	19

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
DT91	Facade	Diffusion Tube		100	n/a	n/a	n/a	36	30

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%).

(3) Automatic monitoring at Erroll Place between 1/1/21 until 20/9/21. Site now closed.

(4) Automatic monitoring commenced at Erroll Park on 1/10/2021. Data not annualised, for information only.

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
CM1	Background	Automatic		68.9 ⁽³⁾	4	1	0	0	0 (76)
CM2	Roadside	Automatic		98	0	0	0	0	0
CM3	Roadside	Automatic		99.7	0	0	0	0	0
CM4	Roadside	Automatic		91.9	0	0	0(93)	0(78)	0
CM5	Roadside	Automatic		99.6	0	0	0	0	0
CM6	Roadside	Automatic		84.1	0	0	0	0	0
CM7	Background	Automatic		25.1 ⁽⁴⁾	-	-	-	-	0 (82)

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%).

(3) Automatic monitoring at Erroll Place between 1/1/21 until 20/9/21. Site now closed.

(4) Automatic monitoring commenced at Erroll Park on 1/10/2021. Data not annualised, for information only.

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
CM1	Background		69 ⁽³⁾	11	14	14	11	10
CM2	Roadside		52 ⁽⁴⁾	13	15	12	10	11
CM3	Roadside		98	11	17	13	10	11
CM4	Roadside		94 ⁽⁵⁾	12	14	13	9	9
CM5	Roadside		99	13	17	14	14	12
CM6	Roadside		50	12	14	14	11	12
CM7	Background		25 ⁽⁶⁾	-	-	-	-	9.5

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%).

- (3) Automatic monitoring at Erroll Place between 1/1/21 until 20/9/21. Site now closed.
- (4) FDMS between 1/1/21 and 20/7/21. FIDAS from 20/7/21.
- (5) TEOM between 1/1/21 and 20/7/21. FIDAS from 20/7/21.
- (6) Automatic monitoring commenced at Erroll Park on 1/10/2021. Data not annualised, for information only.

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
CM1	Background		69 ⁽³⁾	0	1	1	0	0(30)
CM2	Roadside		52 ⁽⁴⁾	0	0	0(32)	0(21)	0(23)
CM3	Roadside		98	0	5	4	0	0
CM4	Roadside		94 ⁽⁵⁾	0	0	3	0	0
CM5	Roadside		99	0	3	4	0	0
CM6	Roadside		50	0	5 (48)	3(45)	0	0(31)
CM7	Background		25 ⁽⁶⁾	-	-	-	-	1(21)

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%).

(3) Automatic monitoring at Erroll Place between 1/1/21 until 20/9/21. Site now closed.

- (4) FDMS between 1/1/21 and 20/7/21. FIDAS from 20/7/21.
- (5) TEOM between 1/1/21 and 20/7/21. FIDAS from 20/7/21.
- (6) Automatic monitoring commenced at Erroll Park on 1/10/2021. Data not annualised, for information only.

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
CM1	Background		69 ⁽³⁾	6	7	7	5	6
CM2	Roadside		52 ⁽⁴⁾	7	8	8	5	6
CM3	Roadside		98	6	8	7	5	5
CM4	Roadside		44 ⁽⁵⁾	-	-	-	-	5
CM5	Roadside		99	6	8	7	6	6
CM6	Roadside		50	6	7	7	6	6
CM7	Background		25 ⁽⁶⁾	-	-	-	-	5

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%).

- (3) Automatic monitoring at Erroll Place between 1/1/21 until 20/9/21. Site now closed.
- (4) FDMS between 1/1/21 and 20/7/21. FIDAS from 20/7/21.
- (5) TEOM between 1/1/21 and 20/7/21. FIDAS from 20/7/21.
- (6) Automatic monitoring commenced at Erroll Park on 1/10/2021. Data not annualised, for information only.

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⁾
DT04	42	24	23	21	22	19	17	21	29	32	33	37	27	20
DT05	38	23	24.5	22.5	21.5	19	19	23	27.5	27.5	29.5	33.5	26	20
DT06	30.5	23.5	24.5	26	29.5	21	30	28.5	30	26.5	30	31	28	21
DT07	36	26	28	29	33	26	30	32	35	28	32	29	30	23
DT08	49	40	41	41	46	30	43	43	43	35	46	45	42	32
DT09	-	61.5	44.5	58	67.5	50.5	60.5	59.5	60	47	-	48	56	42
DT10	65.5	46.5	45	46	47.5	39	46.5	48	49.5	-	53	47.5	49	37
DT11	48	41	37	37	40	39	34	39.5	-	-	46.5	52.5	41	32
DT12	47	37	39	37	43	39	39	44	47	39	43	48	42	32
DT13	40	33	27	30	35	24	32	34	33	31	34	34	32	25
DT14	15	12	7	7	5	5	5	6	8	9	10	14	9	7
DT15	16	15	8	9	12	6	7	9	9	10	10	14	10	8
DT16	54	44.5	37.5	45	48.5	37.5	46.5	-	40	-	40.5	49	44	34
DT17	43.5	40	32.5	37	44.5	39.5	39	39	45	36	32.5	38.5	39	30
DT18	44.5	34.5	31	33	30.5	24.5	29	33.5	36.5	38.5	40	40	35	26
DT19	48	31.5	27	29.5	32	25.5	30.5	32	33.5	37	40	41.5	34	26
DT20	40	-	27	24	25.5	24.5	22.5	25.5	30.5	28.5	29	34	28	21
DT21	36.5	29.5	27.5	28.5	30.5	27	28	28.5	36.5	32.5	31.5	37.5	31	24
DT22	36.5	32.5	29	30.5	35	31.5	33.5	33.5	37	30.5	29.5	39.5	33	25
DT24	33	20	20	20	17	14	16	16	18	19	25	24	20	15
DT25	38	34	23	-	-	24	31	32	35	6	30	38	29	22
DT26	30	20	17	20	25	16	22	22	22	20	21	27	22	17
DT29	42	40	30	31	43	34	37	35	42	40	37	42	38	29
DT30	37	37	25	28	35	27	31	29	31	29	35	-	31	24
DT33	45	36	35.5	31.5	37.5	25	29	33.5	41	39.5	39.5	44	36	28

Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted ⁽¹⁾
DT34	36.5	26.5	22.5	19	22	18	18	19.5	25.5	25	25.5	30	24	18
DT36	44.5	34.5	34	40.5	47	33	44	42.5	44	36.5	37.5	38	40	30
DT37	26	21	22	21	18	17	18	20	24	24	25	25	22	17
DT39	38	33	32	28	34	30	28	29	30	39	38	38	33	25
DT40	39	26	23	19	18	18	15	17	34	29	31	28	25	19
DT41	52	35	32	25	24	23	25	25	23	37	41	42	32	24
DT45	29	24	21	24	26	15	23	21	21	18	22	25	22	17
DT46	29	27	15	20	19	21	20	22	25	24	24	32	23	18
DT47	44	39	34	39	42	32	35	35	35	39	40	46	38	29
DT48	36	26	24	24	24	19	-	21	-	25	30	-	25	19
DT49	41	28	24	28	28	20	24	26	26	29	31	36	28	22
DT63	34	23	17	21	22	18	19	21	22	22	25	30	23	17
DT64	24.5	17.5	13	13.5	14	10	10.5	12.5	13	-	18	23	15	12
DT67	31	30	14	30	34	23	28	26	25	29	31	32	28	21
DT70	-	12	15.3	14	12	12	15	17	13.7	15.3	20.3	20.3	15	12
DT71	-	10	9.3	10.3	8.7	8	9.7	12	10	11.3	14.3	-	10	8
DT72	13	7.7	6	7.3	6	5	5.3	6.3	6	7	9	10.7	7	6
DT73	48	36	37	35	40	34	36	38	41	38	42	45	39	30
DT74	44	34	28	35	38	31	39	37	36	31	33	42	36	27
DT75	31.7	10	18.7	20.3	15	12	17.3	16.7	14	19.3	28.7	26.3	19	15
DT77	42	34	11	13	34	-	-	33	15	39	41	42	30	23
DT80	43	18	31	30	15	12	15	15	36	16	17	46	25	19
DT81	27	20	12	13	15	13	13	15	22	25	25	32	19	15
DT82	49.5	44.5	44.5	43	46	39	39	40.5	49.5	48.5	46.5	50.5	45	34
DT85	22.3	14.3	16.7	18.3	14.7	11	15	17.7	12.3	-	19	18	16	13
DT88	42	39	35	28	29	30	22	26	36	43	37	46	34	26
DT90	50	22	19	-	27	20	23	25	24	21	21	29	26	19
DT91	31	42	40	35	43	38	37	33	42	45	43	49	40	30

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 Aberdeen City Council During 2021

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

Additional Air Quality Works Undertaken by Aberdeen City Council During 2021

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

QA/QC of Diffusion Tube Monitoring

UKAS carried out an annual assessment of the laboratory in March 2022 to ensure laboratory guidance is being implemented. No problems were identified. In May 2022, the service was re-located from Old Aberdeen House to the James Hutton Institute and, as a consequence, Aberdeen Scientific Services will be required to voluntarily suspend its UKAS accreditation until formal re-accreditation is achieved in August/September 2022.

The laboratory participates in the Laboratory of the Government Chemist (LGC) AIR PT scheme. During 2021 the Laboratory participated in all available rounds and all results submitted were satisfactory (z-score < ± 2).

The laboratory also participates in the nitrogen dioxide "inter comparison" exercise, managed by the National Physical Laboratory. During 2021, the Laboratory participated in all available rounds. The annual summary (produced by AEA Energy

& Environment) indicated that all results were classified as "Good" throughout 2021 with a "Bias Correction Factor A" of 0.92.

Diffusion Tube Annualisation

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

Diffusion Tube Bias Adjustment Factors

Aberdeen City Council have applied a local bias adjustment factor of 0.76 Roadside and 0.8 Urban Background to the 2021 monitoring data. A summary of bias adjustment factors used by Aberdeen City Council over the past five years is presented in Table C.1.

Aberdeen City Council operates a co-location study at all automatic monitoring sites across the city. All results are submitted to the national bias adjustment factors (NBAFS). The national diffusion tube bias adjustment factor spreadsheet version 3/22 advises to use 0.75 for Aberdeen City. Although the Aberdeen Scientific Services Laboratory undertakes the analysis of diffusion tubes from neighbouring authorities, Aberdeen City Council is the only authority with continuous monitoring stations that can be used to calculate bias adjustment factors.

Accordingly, a locally derived bias factor based on the co-located tubes at all the Aberdeen continuous monitoring stations was used to adjust diffusion tube measurements at the other locations across the city. This process was considered appropriate due to the lack of other co-located studies using the laboratory for tube analysis, the remote location of Aberdeen from other conurbations and the good QA/QC performance of the laboratory.

Triplicate diffusion tubes are located adjacent to continuous monitor air analyser inlets. Tubes are exposed in 4-week periods throughout the year. Diffusion tubes are provided by Gradko International and analysed by Aberdeen City Council's Public

Analyst. The preparation technique is 20% tri-ethanolamine in water. All automatic monitoring sites have been used in the study except for Erroll Park, that commenced monitoring in September. Erroll Park will be included in the 2022 study.

In accordance with LAQM TG 16 the Local bias factor adjustment tool, downloaded from the DEFRA Local Air Quality Management website ([AEA DifTPAN c04.xls](#)), is used to calculate bias adjustment factors and the precision and accuracy of the triplicate co-located tubes. Table C.3 summarises the bias adjustment factors and the AEA_DifTPAN_c04.xls records for each site. Only data with good precision has been used (coefficient of variation smaller than 20%).

Errol Place is an urban background site while the other sites are roadside.

LAQM TG 16 advises the value of a local co-location study (and the subsequent bias adjustment) will be improved if the concentrations being measured are similar to those in the wider survey. Therefore, separate bias adjustment has been derived for roadside and background.

In accordance with LAQM TG 16, Bias B values of all roadside continuous monitoring locations were averaged for the roadside locations and the inverse derived to obtain a bias adjustment factor of **0.76**. This provides a slightly greater conservative adjustment than the factor published by NBAFS. Table C.3a summarises the calculation.

A separate adjustment factor is derived for background sites using the Bias A, from Errol Place, of **0.8**.

Table C.1 – Bias Adjustment Factor

Report Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor Roadside	Adjustment Factor Background
2021	Local	-	0.76	0.80
2020	Local	-	0.79	0.71
2019	Local	-	0.80	0.79
2018	Local	-	0.78	0.78
2017	Local	-	0.86	0.79

NO₂ Fall-off with Distance from the Road

Distance correction should be considered at any monitoring site where the annual mean concentration is greater than 36µg/m³ and the monitoring site is not located at a point of relevant exposure.

Diffusion tube monitoring sites not at point of exposure identified in Table A.2 recorded annual mean concentrations below 36µg/m³ and therefore do require distance correction during 2021.

QA/QC of Automatic Monitoring

All equipment is subject to the QA/QC procedures recommended in LAQM.TG 16. Equipment is serviced at 6 monthly intervals. The contract includes call outs to site for repairs and the routine replacement of consumables. Local Site Operator duties are carried out by Aberdeen City Council Protective Services Officers.

The Errol Place, Union Street and Wellington Road sites are part of the UK's Automatic Urban Network. All sites are part of the Scottish Government data reporting process and subject to independent audit by Ricardo AEA (RAEA) at 6 monthly intervals. Data validation and ratification is also performed by RAEA.

The analysers perform daily automatic calibrations which are used to assess the routine performance of the analysers and any long-term response drift. Manual calibrations are performed by trained Council officers every two weeks using a calibration mixture traceable to national standards. These calibrations act as a check on the operation of the analysers and enable determination of the instrument response factors used to calculate the concentration of NO₂.

Data is checked daily (Monday-Friday). Should a problem be identified either by Council officers or by RAEA the site is visited immediately and, if necessary, a further manual calibration is performed. Data considered suspect is deleted. Records are kept of instrument breakdowns, services and audits and any local activities or meteorological conditions that may influence readings.

Live and historical data is available at scottishairquality.scot

Historical data is also available at aberdeencity.gov.uk

PM₁₀ and PM_{2.5} Monitoring Adjustment

PM₁₀ TEOM data at Anderson Drive is corrected to gravitational equivalent by RAEA using the Volatile Correction Model (VCM).

PM₁₀ and PM_{2.5} FDMS TEOM data at Union Street do not require correction.

FIDAS PM₁₀ does not require correction.

FIDAS PM_{2.5} is corrected using a factor of 0.943.

Automatic Monitoring Annualisation

Annualisation is required for any automatic monitoring site with data capture less than 75% but greater than 25%.

Annualisation of data was carried out in accordance with LAQM TG 16 where there was insufficient data capture for the following locations:

- Erroll Place NO₂, PM_{2.5} and PM₁₀
- Union Street PM_{2.5} and PM₁₀
- Anderson Drive PM_{2.5}
- King Street PM_{2.5} and PM₁₀

Dundee Mains Loan is the only urban background continuous monitoring site, that also forms part of the national monitoring network, that has been used to carry out annualisation.

Mains Loan is within a 55-mile radius of the monitoring locations in Aberdeen. There are no other background monitoring sites available. Valid data capture for and Mains Loan is above 85% in 2021.

The annualisation factor derived from Mains Loan for NO₂, PM_{2.5} and PM₁₀ data in 2021 was used to annualise the Aberdeen automatic sites data capture less than 75% but greater than 25%.

Erroll Park has not been annualised as data capture is not greater than 25%.

An annualisation summary is provided in Table C.2.

NO₂ Fall-off with Distance from the Road

Distance correction should be considered at any automatic monitoring site where the annual mean concentration is greater than 36µg/m³ and the monitoring site is not located at a point of relevant exposure.

No automatic NO₂ monitoring locations within Aberdeen City required distance correction during 2021. All roadside automatic monitoring sites not at point of exposure identified in

Table A.2, recorded annual mean concentrations below $36\mu\text{g}/\text{m}^3$ and therefore do require distance correction.

Erroll Place and Erroll Park are urban background sites.

Table C.2 – Annualisation Summary (concentrations presented in $\mu\text{g}/\text{m}^3$)

Site ID	Annualisation Factor Dundee Mains Loan	Annualisation Factor Site 2	Annualisation Factor Site 3	Annualisation Factor Site 4	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
CM1	1.086	-	-	-	1.086	13.9	15.1	Factors for NO ₂ annual mean
CM1	0.939	-	-	-	0.939	10.9	10.2	Factors for PM ₁₀ annual mean
CM2	1.050	-	-	-	1.050	10	10.5	Factors for PM ₁₀ annual mean
CM6	1	-	-	-	1	12.4	12.4	Factors for PM ₁₀ annual mean
CM1	0.961	-	-	-	0.961	5.7	5.5	Factors for PM _{2.5} annual mean
CM2	1.065	-	-	-	1.065	5.8	6.2	Factors for PM _{2.5} annual mean
CM4	1.015	-	-	-	1.015	4.7	4.8	Factors for PM _{2.5} annual mean
CM6	0.951	-	-	-	0.951	6.3	6.0	Factors for PM _{2.5} annual mean

Table C.3 – Local Bias Adjustment Calculations

	Local Bias Adjustment Union St (CM2) Roadside	Local Bias Adjustment Market St (CM3) Roadside	Local Bias Adjustment Anderson Dr (CM4) Roadside	Local Bias Adjustment Wellington Rd (CM5) Roadside	Local Bias Adjustment King St (CM6) Roadside	Local Bias Adjustment Erroll PI (CM1) Urban background
Periods used to calculate bias	13	13	12	13	11	10
Bias Factor A	0.78 (0.72 – 0.84)	0.76 (0.73 – 0.79)	0.72 (0.65 – 0.81)	0.74 (0.69 – 0.80)	0.79 (0.74 – 0.85)	0.8 (0.76 – 0.86)
Bias Factor B	29% (19% - 39%)	31% (26% - 37%)	40% (24% - 55%)	35% (25% - 45%)	27% (18% - 35%)	24% (16% - 32%)
Diffusion Tube Mean ($\mu\text{g}/\text{m}^3$)	31	35	18	36	21	18
Mean CV (Precision)	5%	6%	5%	9%	4%	4%
Automatic Mean ($\mu\text{g}/\text{m}^3$)	24.0	26.0	13.0	26	17	14
Data Capture	98%	100%	95%	100%	96%	96%
Adjusted Tube Mean ($\mu\text{g}/\text{m}^3$)	24 (22 – 26)	26 (25 – 27)	13 (12 – 14)	26 (25 – 28)	17 (16 – 18)	14 (13 – 15)

Notes:

A single local bias adjustment factor of 0.76 has been used to bias adjust the 2021 urban background diffusion tube results.

A combined local bias adjustment factor of 0.80 has been used to bias adjust the 2021 roadside diffusion tube results. Calculation in Table C.3a

Local Bias Adjustment Union Street precision and accuracy record

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	15/12/2020	14/01/2021	33.0	31.0	34.0	33	1.5	5	3.8	26.3	99.72	Good	Good
2	14/01/2021	10/02/2021	39.0	43.0	43.0	42	2.3	6	5.7	34	99.54	Good	Good
3	10/02/2021	09/03/2021	29.0	28.0	27.0	28	1.0	4	2.5	22.2	99.85	Good	Good
4	09/03/2021	08/04/2021	24.0	24.0	28.0	25	2.3	9	5.7	19.6	100.00	Good	Good
5	08/04/2021	07/05/2021	28.0	30.0	29.0	29	1.0	3	2.5	25.1	99.86	Good	Good
6	07/05/2021	04/06/2021	30.0	27.0	31.0	29	2.1	7	5.2	24.6	100.00	Good	Good
7	04/06/2021	30/06/2021	22.0	23.0	22.0	22	0.6	3	1.4	17.5	100.00	Good	Good
8	30/06/2021	27/07/2021	28.0	28.0	29.0	28	0.6	2	1.4	19.9	75.12	Good	Good
9	27/07/2021	25/08/2021	32.0	30.0	32.0	31	1.2	4	2.9	24.3	99.14	Good	Good
10	25/08/2021	21/09/2021	32.0	31.0	30.0	31	1.0	3	2.5	24.6	99.85	Good	Good
11	21/09/2021	19/10/2021	31.0	32.0	32.0	32	0.6	2	1.4	17.6	100.00	Good	Good
12	19/10/2021	17/11/2021	29.0	31.0	34.0	31	2.5	8	6.3	24.1	100.00	Good	Good
13	17/11/2021	14/12/2021	40.0	37.0	41.0	39	2.1	5	5.2	32.2	100.00	Good	Good

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

Site Name/ ID:	Union St
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Accuracy (with 95% confidence interval)
without periods with CV larger than 20%

Bias calculated using 13 periods of data

Bias factor A 0.78 (0.72 - 0.84)

Bias B 29% (19% - 39%)

Diffusion Tubes Mean: 31 µgm⁻³

Mean CV (Precision): 5

Automatic Mean: 24 µgm⁻³

Data Capture for periods used: 98%

Adjusted Tubes Mean: 24 (22 - 26) µgm⁻³

Precision	13 out of 13 periods have a CV smaller than 20%
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Accuracy (with 95% confidence interval)
WITH ALL DATA

Bias calculated using 13 periods of data

Bias factor A 0.78 (0.72 - 0.84)

Bias B 29% (19% - 39%)

Diffusion Tubes Mean: 31 µgm⁻³

Mean CV (Precision): 5

Automatic Mean: 24 µgm⁻³

Data Capture for periods used: 98%

Adjusted Tubes Mean: 24 (22 - 26) µgm⁻³

Overall survey --> Good precision Good Overall DC

(Check average CV & DC from Accuracy calculations)

Diffusion Tube Bias

50%

25%

0%

-25%

-50%

Without CV>20%

With all data

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Local Bias Adjustment Market Street precision and accuracy record

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	15/12/2020	14/01/2021	36.0	35.0	35.0	35	0.6	2	1.4	26.3	99.72	Good	Good
2	14/01/2021	11/02/2021	38.0	45.0	43.0	42	3.6	9	9.0	35.2	100.00	Good	Good
3	11/02/2021	11/03/2021	27.0	27.0	29.0	28	1.2	4	2.9	21.9	99.70	Good	Good
4	11/03/2021	08/04/2021	28.0	28.0	27.0	28	0.6	2	1.4	21.1	99.55	Good	Good
5	08/04/2021	05/05/2021	38.0	37.0	48.0	41	6.1	15	15.1	27.5	99.23	Good	Good
6	05/05/2021	01/06/2021	39.0	32.0	41.0	37	4.7	13	11.7	29.7	99.85	Good	Good
7	01/06/2021	29/06/2021	30.0	30.0	31.0	30	0.6	2	1.4	21.7	100.00	Good	Good
8	29/06/2021	27/07/2021	38.0	37.0	40.0	38	1.5	4	3.8	29.4	99.55	Good	Good
9	27/07/2021	24/08/2021	41.0	41.0	38.0	40	1.7	4	4.3	30.3	99.70	Good	Good
10	24/08/2021	23/09/2021	38.0	39.0	33.0	37	3.2	9	8.0	30	100.00	Good	Good
11	23/09/2021	19/10/2021	30.0	29.0	29.0	29	0.6	2	1.4	21.1	99.68	Good	Good
12	19/10/2021	17/11/2021	31.0	29.0	28.0	29	1.5	5	3.8	23	99.57	Good	Good
13	17/11/2021	15/12/2021	38.0	36.0	37.0	37	1.0	3	2.5	26.9	99.70	Good	Good

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

Site Name/ ID:	Market Street
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Precision13 out of 13 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	Accuracy (with 95% confidence interval) WITH ALL DATA
Bias calculated using 13 periods of data	Bias calculated using 13 periods of data
Bias factor A0.76 (0.73 - 0.79)	Bias factor A0.76 (0.73 - 0.79)
Bias B31% (26% - 37%)	Bias B31% (26% - 37%)
Diffusion Tubes Mean:35 μgm^{-3}	Diffusion Tubes Mean:35 μgm^{-3}
Mean CV (Precision):6	Mean CV (Precision):6
Automatic Mean:26 μgm^{-3}	Automatic Mean:26 μgm^{-3}
Data Capture for periods used:100%	Data Capture for periods used:100%
Adjusted Tubes Mean:26 (25 - 27) μgm^{-3}	Adjusted Tubes Mean:26 (25 - 27) μgm^{-3}

Overall survey -->

Good precision	Good Overall DC
----------------	-----------------

(Check average CV & DC from Accuracy calculations)

Diffusion Tube Bias

50%

25%

0%

-25%

-50%

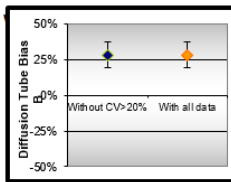
With out CV> 20%

With all data

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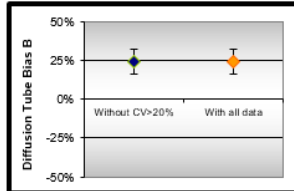
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Local Bias Adjustment King Street precision and accuracy record

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	15/12/2020	14/01/2021	24.0	23.0	22.0	23	1.0	4	2.5	18	78	Good	Good
2	14/01/2021	11/02/2021	24.0	23.0	21.0	23	1.5	7	3.8	20	82	Good	Good
3	11/02/2021	11/03/2021	26.0	26.0	25.0	26	0.6	2	1.4	20	100	Good	Good
4	11/03/2021	08/04/2021	17.0	17.0	16.0	17	0.6	3	1.4	14	100	Good	Good
5	08/04/2021	07/05/2021	19.0	18.0	18.0	18	0.6	3	1.4	15	100	Good	Good
6	07/05/2021	03/06/2021	18.0	19.0	19.0	19	0.6	3	1.4	14	100	Good	Good
7	03/06/2021	01/07/2021	16.0	14.0	15.0	15	1.0	7	2.5	13	19	Good	or Data Capture
8	01/07/2021	27/07/2021	17.0	15.0	15.0	16	1.2	7	2.9	11	58	Good	or Data Capture
9	27/07/2021	23/08/2021	17.0	17.0	18.0	17	0.6	3	1.4	13	100	Good	Good
10	23/08/2021	23/09/2021	22.0	21.0	21.0	21	0.6	3	1.4	16	100	Good	Good
11	23/09/2021	20/10/2021	22.0	21.0	20.0	21	1.0	5	2.5	13	100	Good	Good
12	20/10/2021	17/11/2021	19.0	23.0	23.0	22	2.3	11	5.7	18	99	Good	Good
13	17/11/2021	15/12/2020	25.0	26.0	25.0	25	0.6	2	1.4	23	95	Good	Good
It is necessary to have results for at least two tubes in order to calculate the precision of the measurements										Overall survey -->		Good precision	Poor Overall DC
Site Name/ ID: King Street										Precision 13 out of 13 periods have a CV smaller than 20%		(Check average CV & DC from Accuracy calculations)	
Accuracy (with 95% confidence interval) without periods with CV larger than 20% Bias calculated using 11 periods of data Bias factor A 0.79 (0.74 - 0.85) Bias B 27% (18% - 35%) Diffusion Tubes Mean: 21 μgm^{-3} Mean CV (Precision): 4 Automatic Mean: 17 μgm^{-3} Data Capture for periods used: 96% Adjusted Tubes Mean: 17 (16 - 18) μgm^{-3}										Accuracy (with 95% confidence interval) WITH ALL DATA Bias calculated using 11 periods of data Bias factor A 0.79 (0.74 - 0.85) Bias B 27% (18% - 35%) Diffusion Tubes Mean: 21 μgm^{-3} Mean CV (Precision): 4 Automatic Mean: 17 μgm^{-3} Data Capture for periods used: 96% Adjusted Tubes Mean: 17 (16 - 18) μgm^{-3}			

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Local Bias Adjustment Erroll Place precision and accuracy record

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	15/12/2020	13/01/2021	23.0	23.0	23.0	23	0.0	0	0.0	16.7	99.14	Good	Good
2	13/01/2021	09/02/2021	25.0	25.0	22.0	24	1.7	7	4.3	19.2	91.33	Good	Good
3	09/02/2021	08/03/2021	27.0	25.0	26.0	26	1.0	4	2.5	19.8	100.00	Good	Good
4	08/03/2021	05/04/2021	16.0	15.0	15.0	15	0.6	4	1.4	12.2	99.85	Good	Good
5	05/04/2021	05/05/2021	15.0	14.0	14.0	14	0.6	4	1.4	12.7	99.58	Good	Good
6	05/05/2021	31/05/2021	13.0	14.0	13.0	13	0.6	4	1.4	11.3	99.84	Good	Good
7	31/05/2021	30/06/2021	15.0	15.0	15.0	15	0.0	0	0.0	11.6	99.86	Good	Good
8	30/06/2021	26/07/2021	15.0	16.0	16.0	16	0.6	4	1.4	11.2	99.52	Good	Good
9	26/07/2021	24/08/2021	12.0	15.0	13.0	13	1.5	11	3.8	12	78.06	Good	Good
10	24/08/2021	20/09/2021	15.0	16.0	16.0	16	0.6	4	1.4	14.5	93.49	Good	Good
11										0	0.00		or Data Capture
12										0	0.00		or Data Capture
13										0	0.00		or Data Capture
It is necessary to have results for at least two tubes in order to calculate the precision of the measurements										Overall survey -->		Good precision	Poor Overall DC
Site Name/ ID: Erroll PI										Precision 10 out of 10 periods have a CV smaller than 20%		(Check average CV & DC from Accuracy calculations)	
Accuracy (with 95% confidence interval) without periods with CV larger than 20% Bias calculated using 10 periods of data Bias factor A 0.8 (0.76 - 0.86) Bias B 24% (16% - 32%) Diffusion Tubes Mean: 18 μgm^{-3} Mean CV (Precision): 4 Automatic Mean: 14 μgm^{-3} Data Capture for periods used: 96% Adjusted Tubes Mean: 14 (13 - 15) μgm^{-3}										Accuracy (with 95% confidence interval) WITH ALL DATA Bias calculated using 10 periods of data Bias factor A 0.8 (0.76 - 0.86) Bias B 24% (16% - 32%) Diffusion Tubes Mean: 18 μgm^{-3} Mean CV (Precision): 4 Automatic Mean: 14 μgm^{-3} Data Capture for periods used: 96% Adjusted Tubes Mean: 14 (13 - 15) μgm^{-3}			

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Table C.3a – Combined Local Bias Adjustment Factor Calculation (Roadside)

Automatic roadside monitoring site	Bias B (%)
Anderson Drive	40
King Street	27
Market Street	31
Union Street	29
Wellington Road	35
Mean Bias B	32.4
Factor + 1	1.324
Inverse	0.76

Table C.4 – Adjustment of Duplicate/Triplicate Tubes

Diffusion Tube Measurements									Data Quality Check	Action
Tube ID	Monitoring Period 2020	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Average	Standard Deviation	CV	95% CI mean	Diffusion Tubes Precision Check	Tube Adjustment
DT9	December	34.0	49.0		41.5	10.61	25.56	95.30	Poor Precision	Excluded from study
DT20	January	36.0	25.0		30.5	7.78	25.50	69.88	Poor Precision	Excluded from study
DT16	July	46.0	32.0		39.0	9.90	25.38	88.94	Poor Precision	Excluded from study
DT10	December	50.0	67.0		58.5	12.02	20.55	108.00	Poor Precision	Excluded from study
DT16	September	8.0	38.0		23.0	21.21	92.23	190.59	Poor Precision	Excluded from study
DT64	September	7.0	14.0		10.5	4.95	47.14	44.47	Poor Precision	Excluded from study
DT85	September	12.0	18.0	12.0	14.0	3.46	24.74	8.61	Poor Precision	Excluded from study
DT9	November	60.0	45.0		52.5	10.61	20.20	95.30	Poor Precision	Excluded from Study

Appendix D: Supporting Information Charts

Figure 1: Trend in NO₂ Annual Mean Concentration (µg/m³) Continuous Monitoring Sites 2017-2021

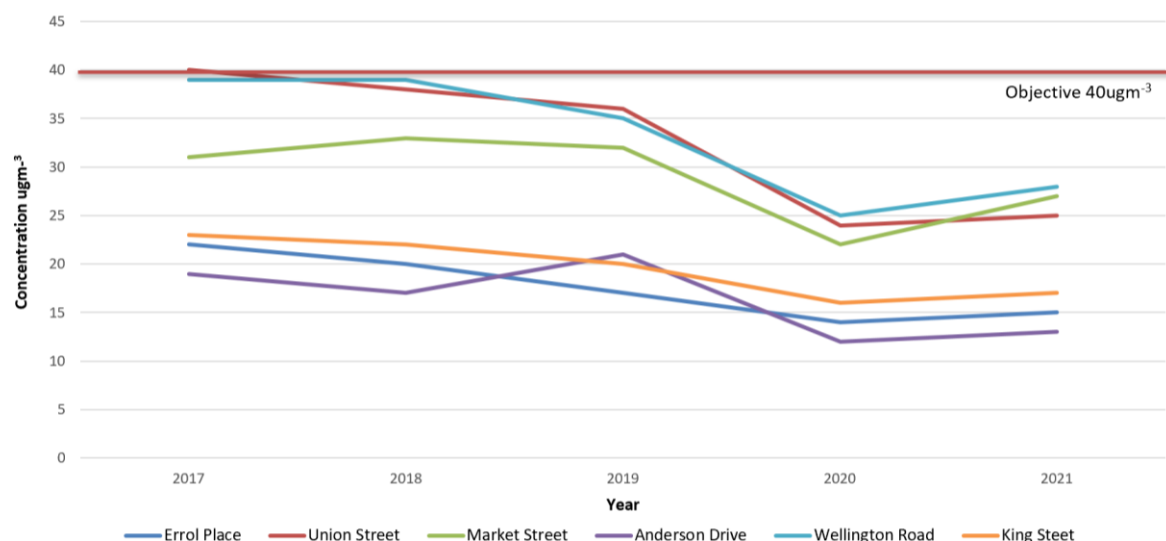


Figure 2: Trend in NO₂ Annual Mean Concentration (µg/m³) at each Continuous Monitoring Sites 2017-2021

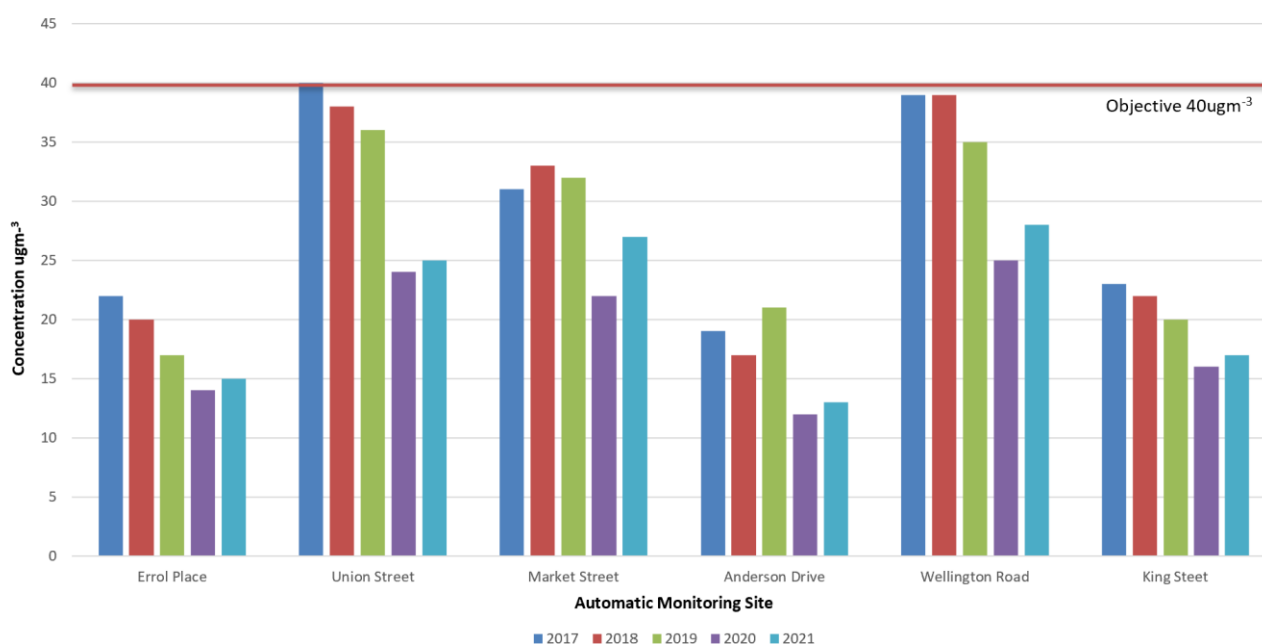
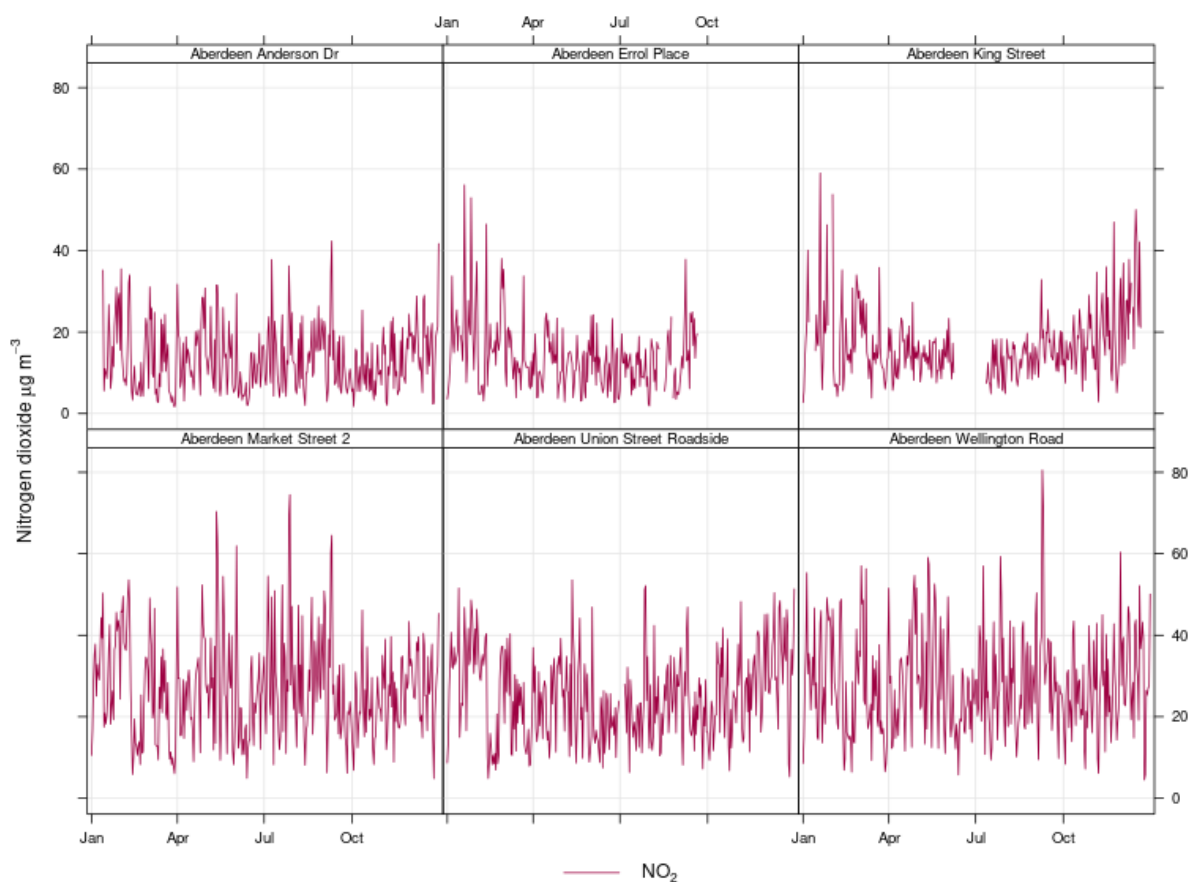


Figure 3: Time Series for NO₂ Daily concentrations at each Continuous Monitoring Site 2021



Source: (Ricardo Energy & Environment)

Figure 4: Trend in NO₂ Annual Mean Concentration (µg/m³) of Diffusion Tubes exceeding/previously exceeding objective for the period 2017-2021

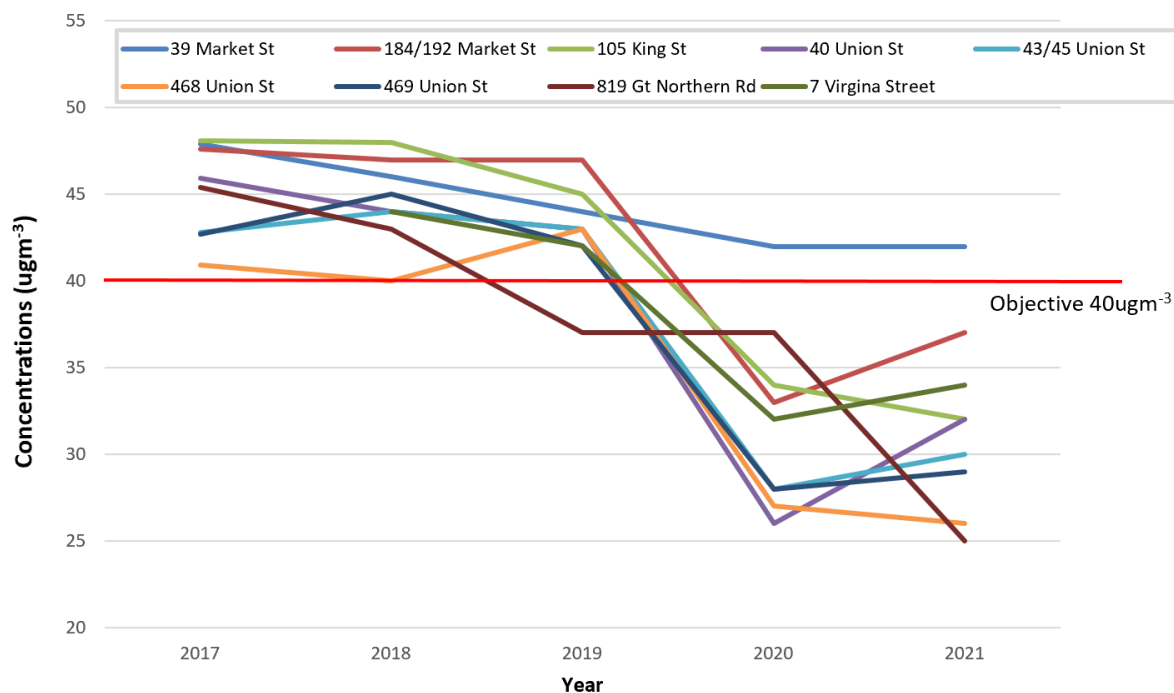
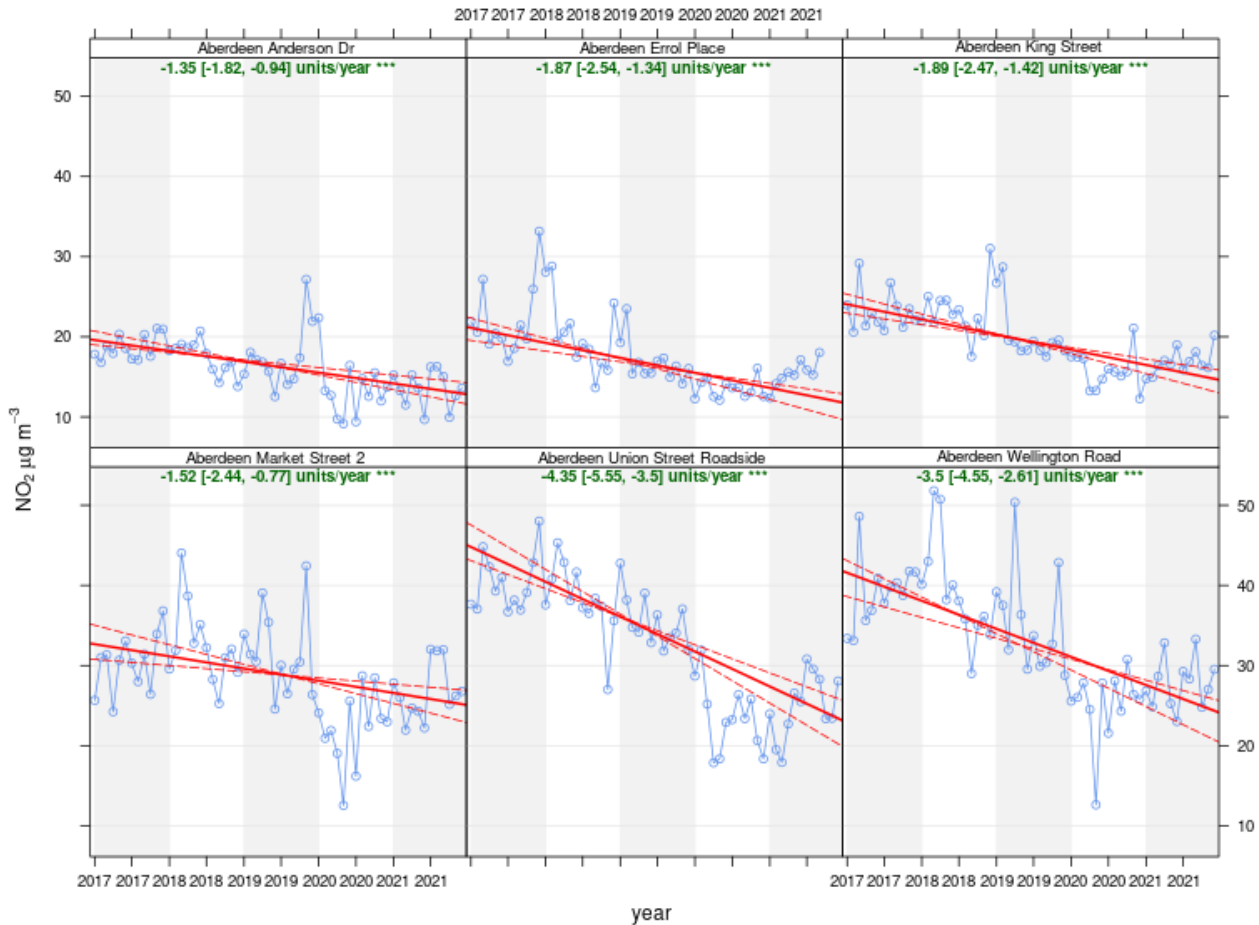


Figure 5: De-seasonalised NO₂ trends at each Continuous Monitoring Site 2017-2021



Source: (Ricardo Energy & Environment)

Figure 6: Average daily traffic flows from January 2019 to February 2022

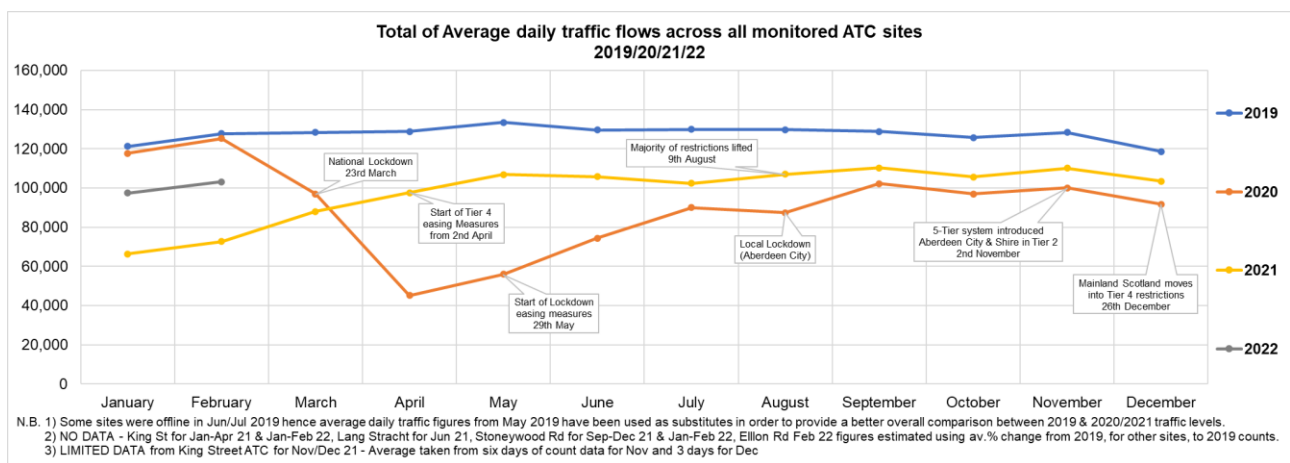


Figure 7: Trend in PM₁₀ Annual Mean Concentration (µg/m³) at each Continuous Monitoring Sites 2017-2021

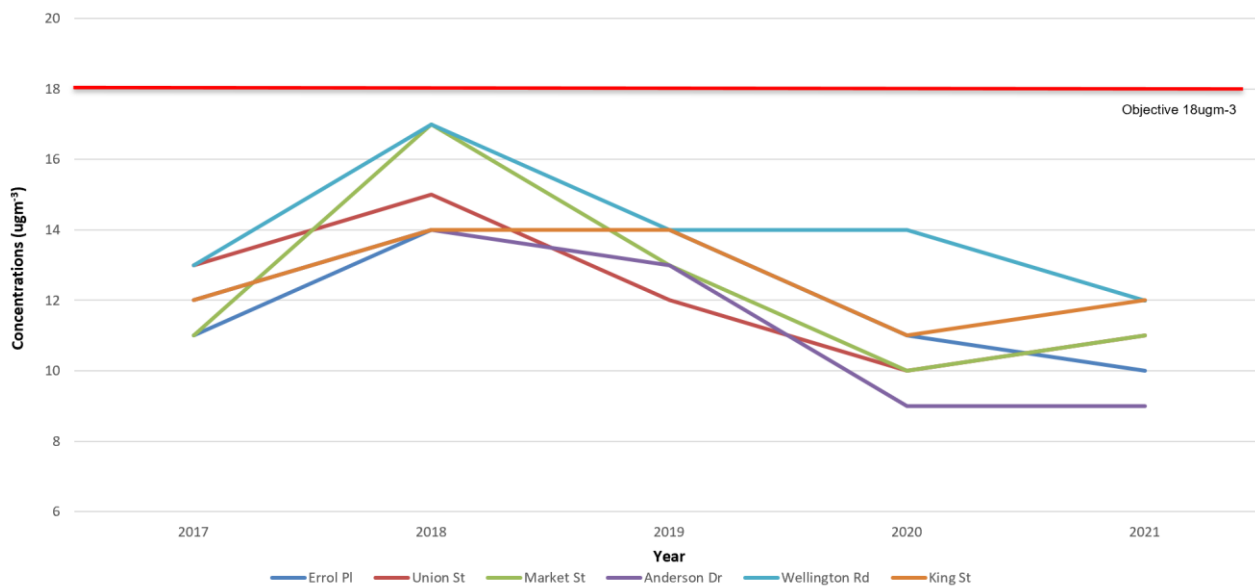


Figure 8: Trend in PM₁₀ Annual Mean Concentration (µg/m³) at each Continuous Monitoring Site 2017-2021

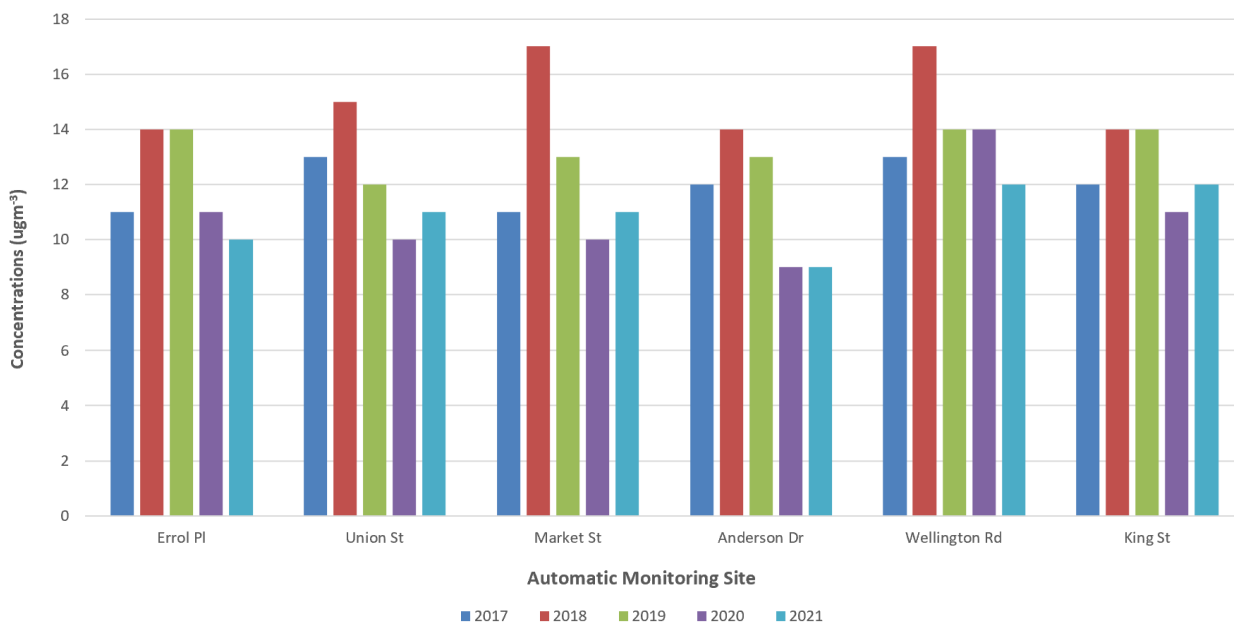
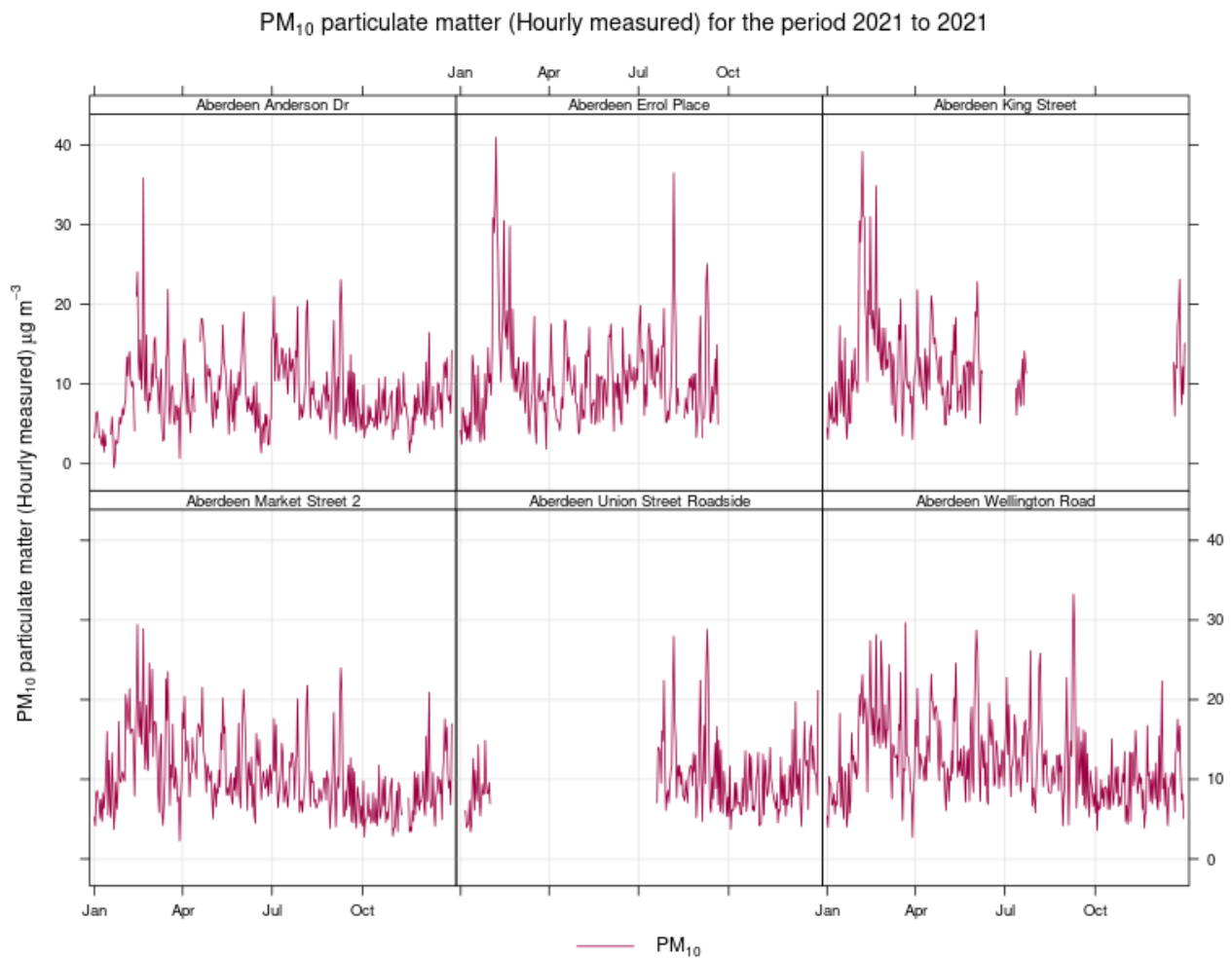
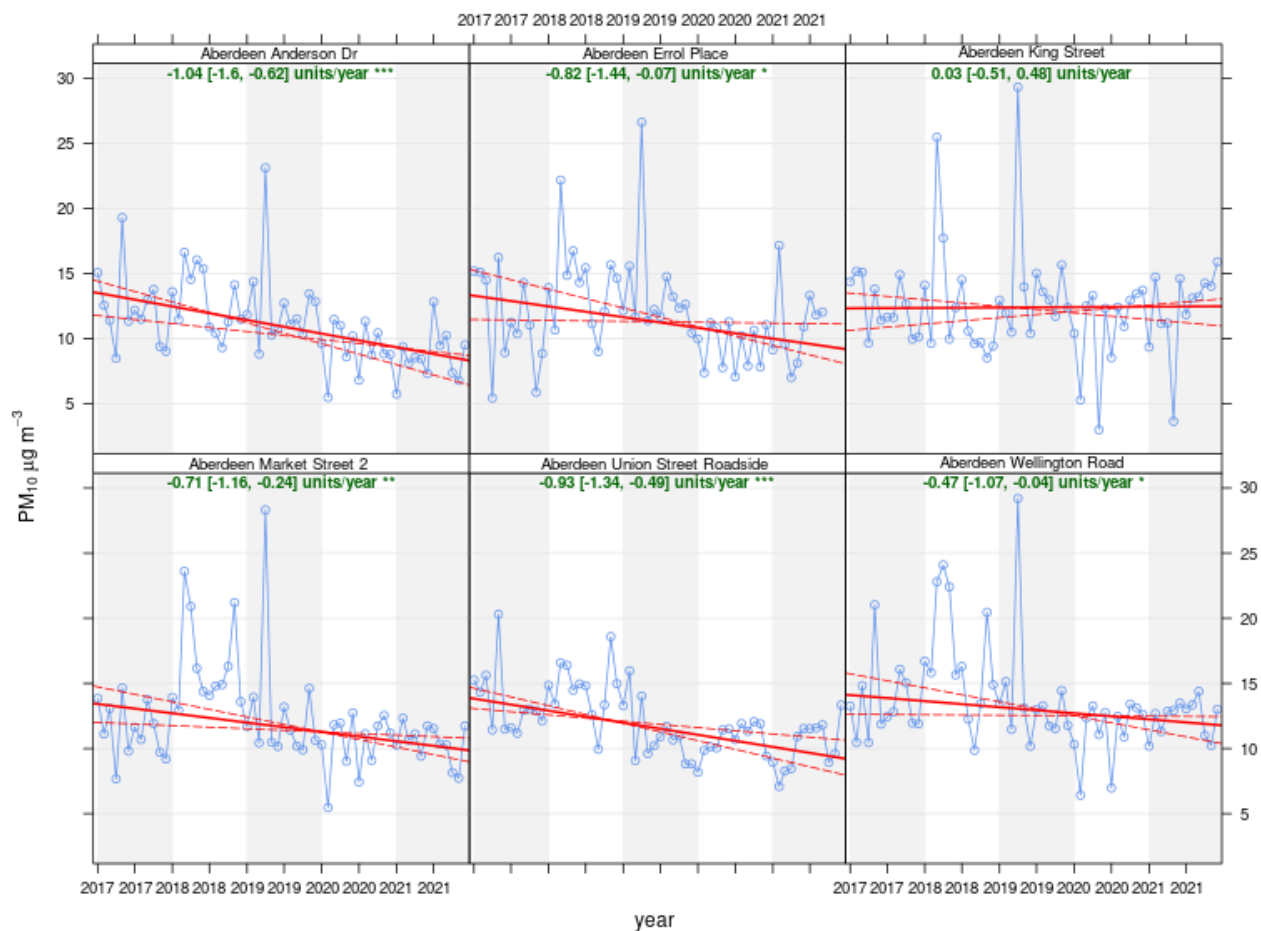


Figure 9: Time Series for PM₁₀ Daily concentrations at each Continuous Monitoring Site 2021



Source: (Ricardo Energy & Environment)

Figure 10: De-seasonalised PM₁₀ trends at each Continuous Monitoring Site 2017-2021



Source: (Ricardo Energy & Environment)

Appendix E: Monitoring Locations

Figure 1: Aberdeen City AQMAs and Automatic Monitoring Locations

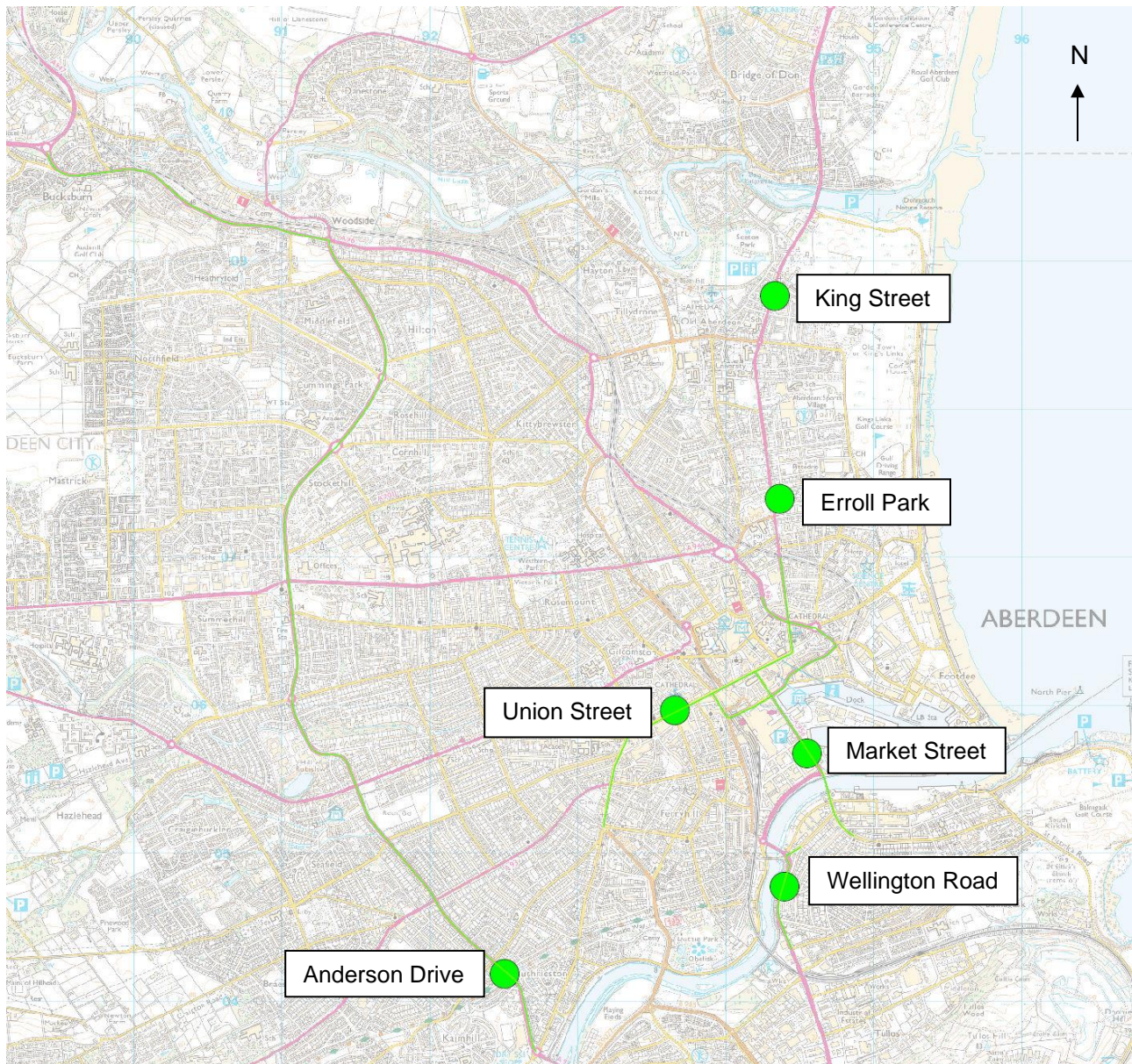


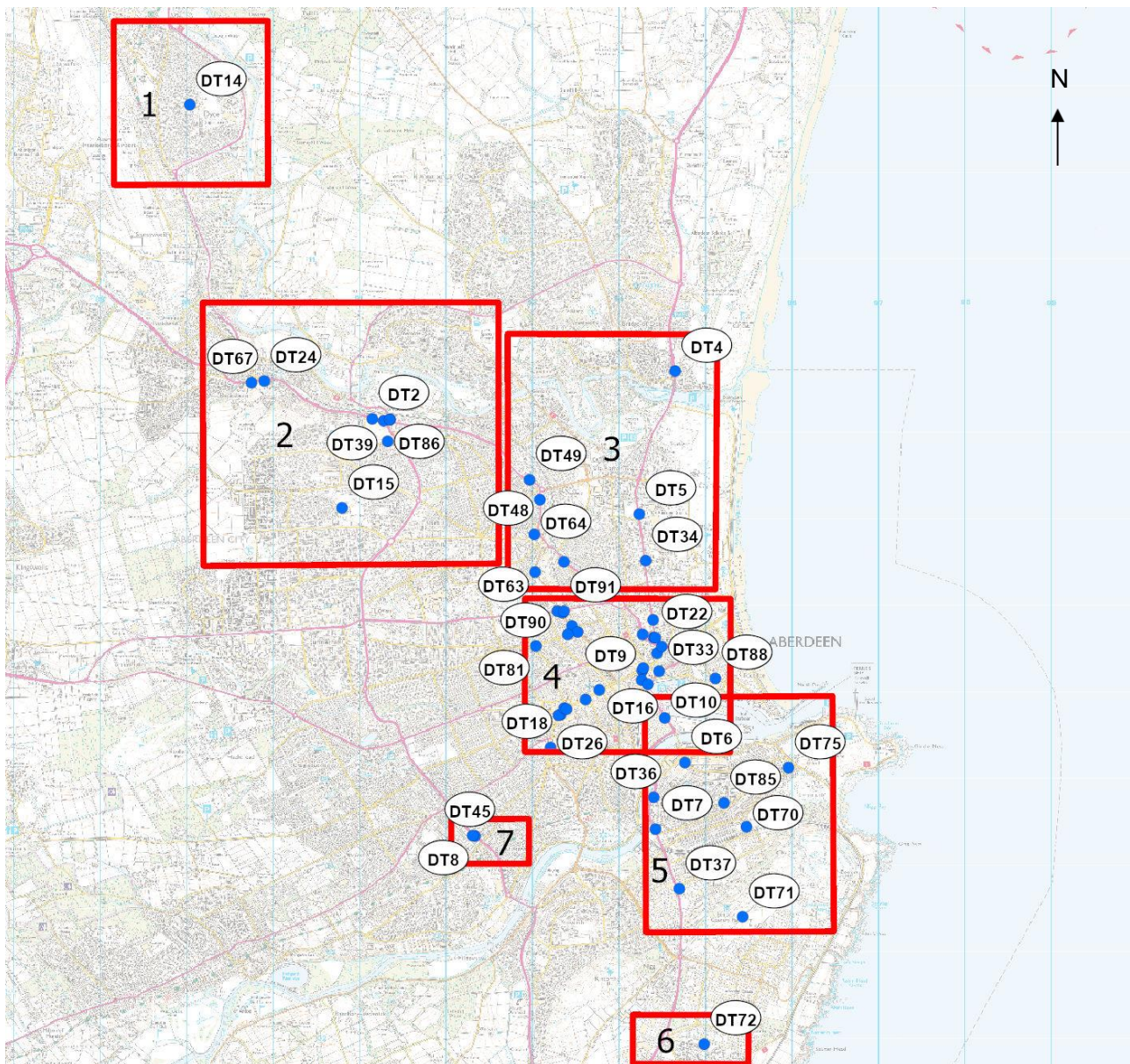
Figure 2: Aberdeen City-wide diffusion tube locations, separated into Plates 1-7

Figure 3: Plate 1 – Diffusion tub locations, Dyce

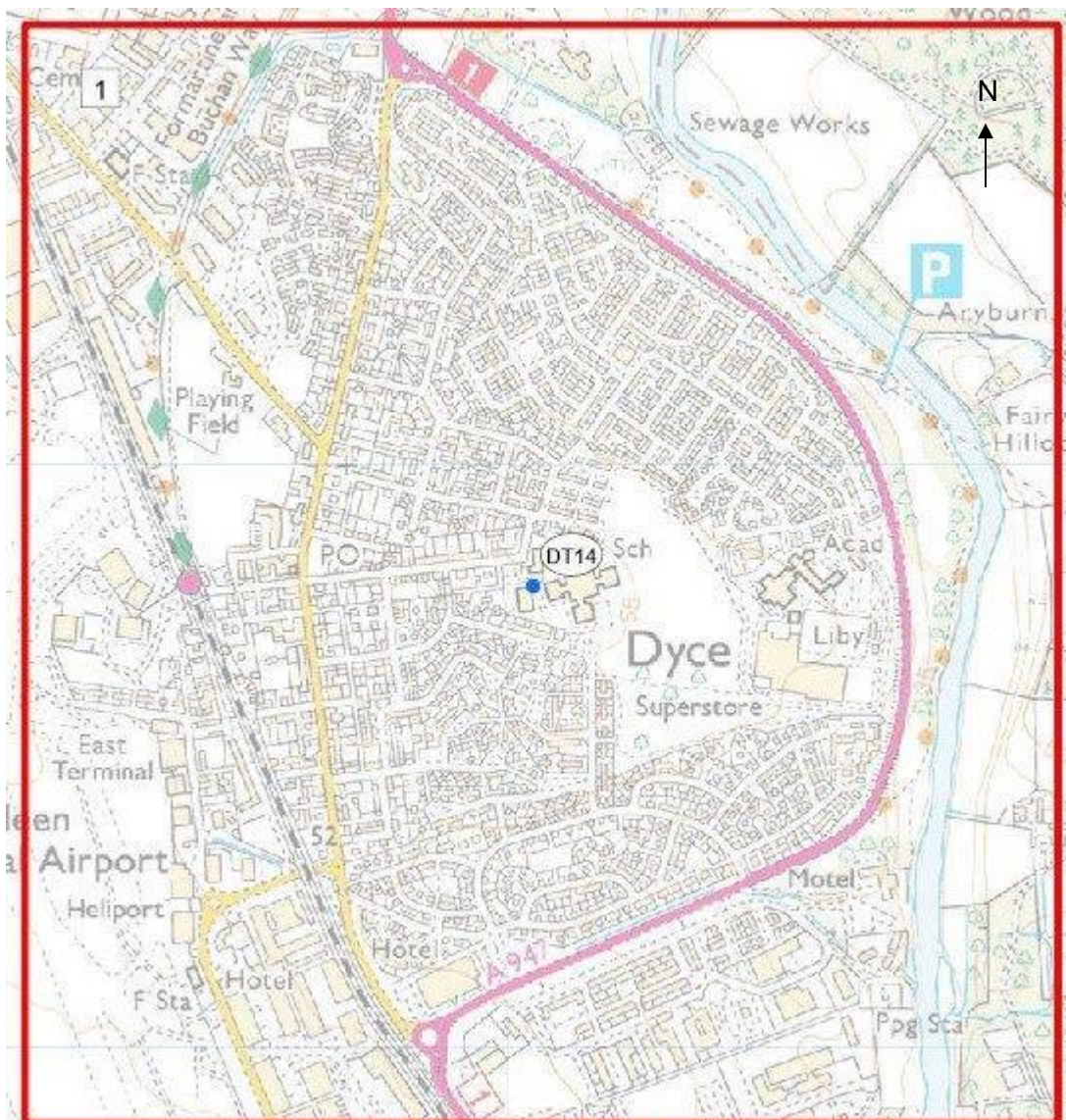


Figure 4: Plate 2 – Diffusion tube locations, Bucksburn

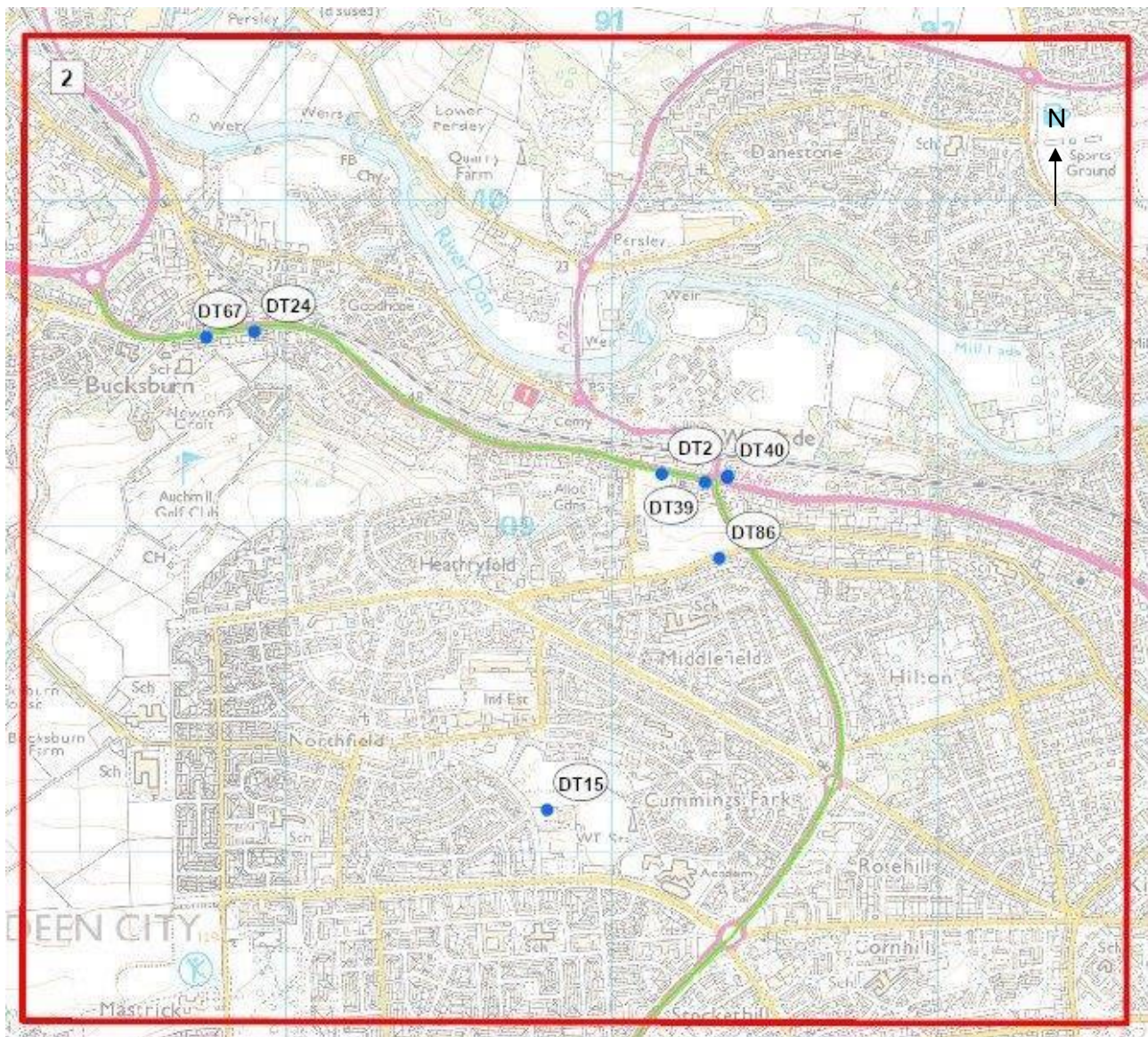


Figure 5: Plate 3 – Diffusion tube locations, Seaton/Kittybrewster

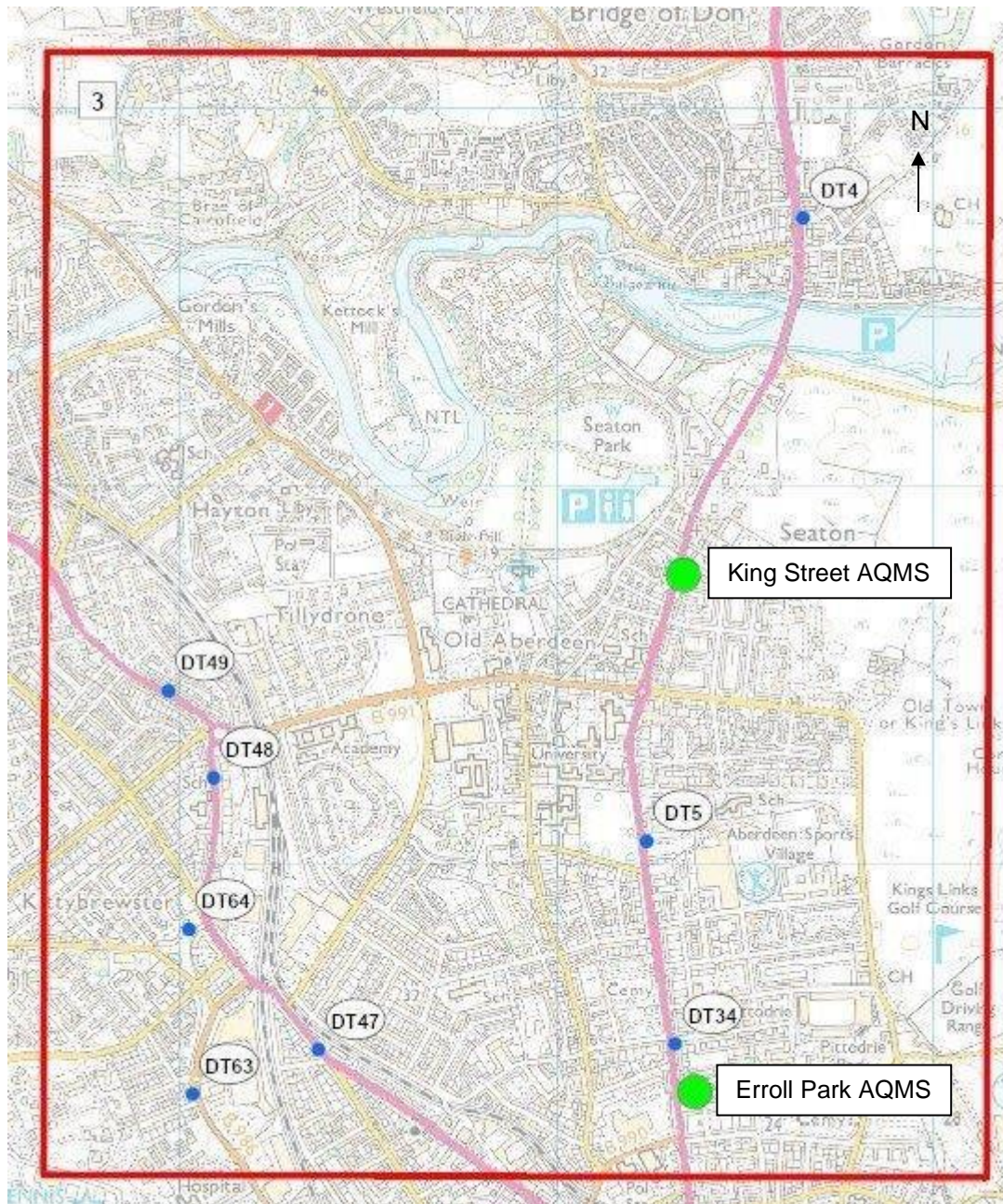


Figure 6: Plate 4 – Diffusion tube locations, City Centre

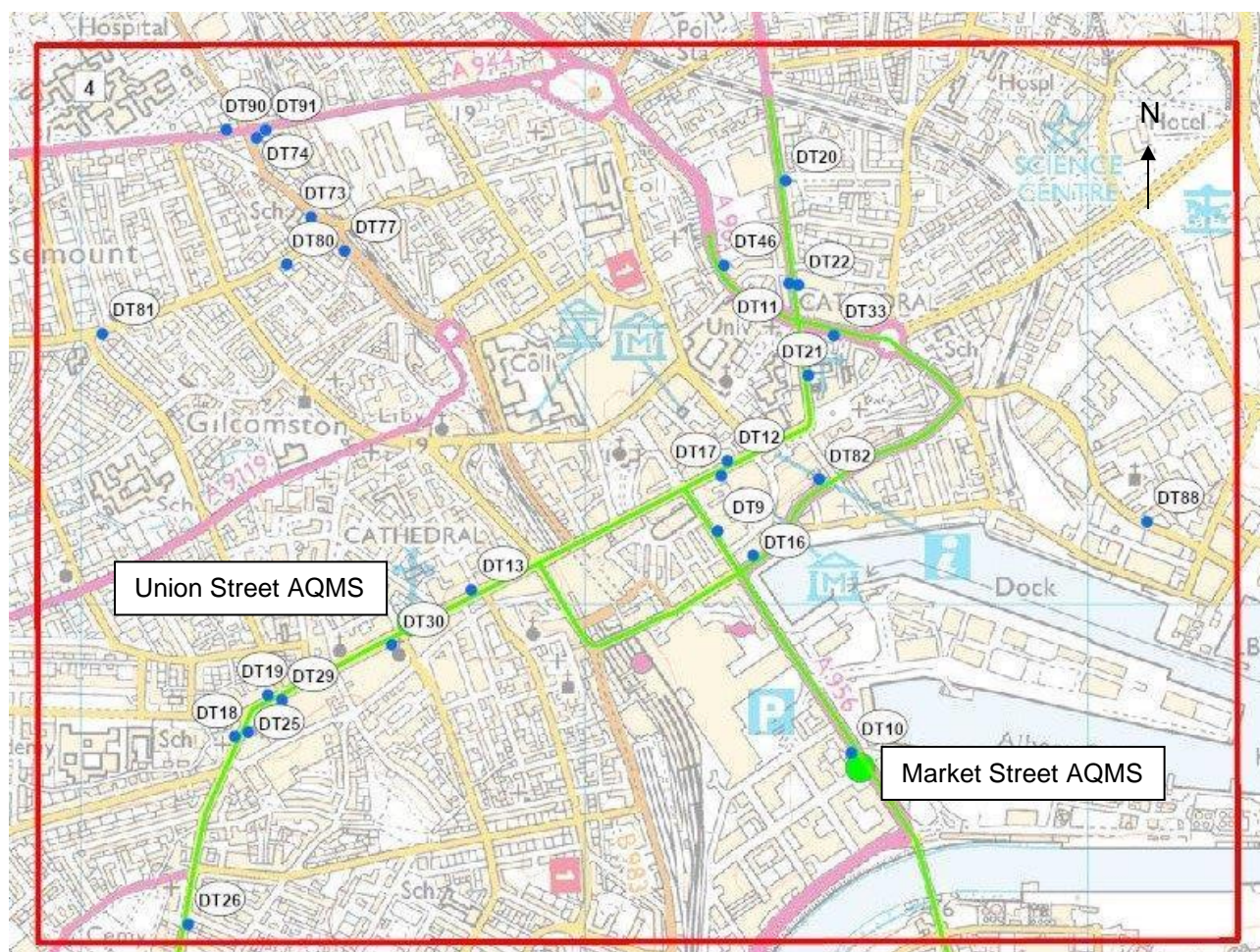


Figure 7: Plate 5 – Diffusion tube locations, Torry

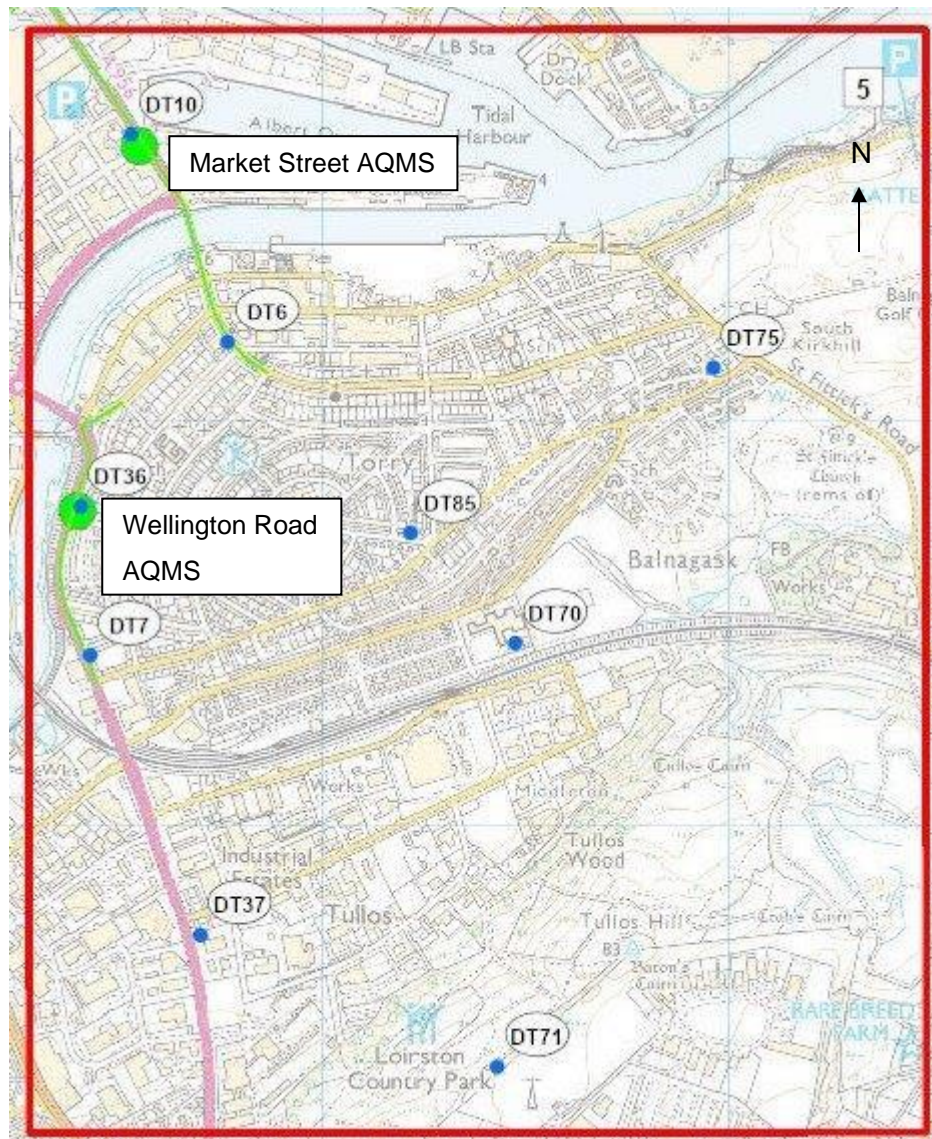


Figure 8: Plate 6 – Diffusion tube locations, Cove

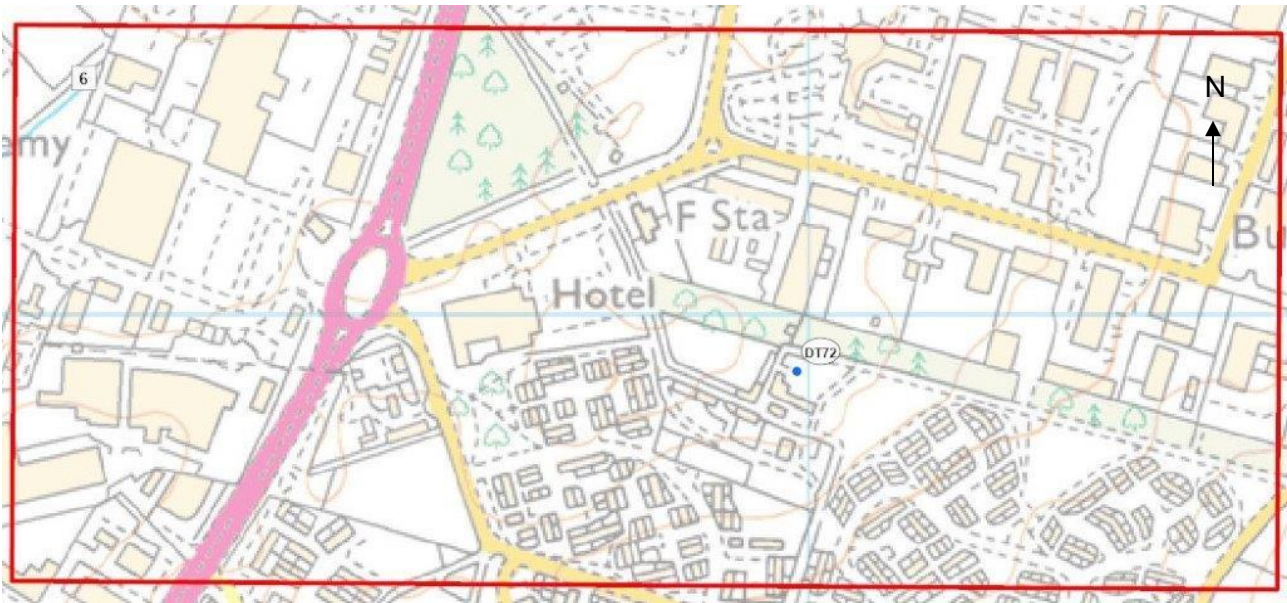
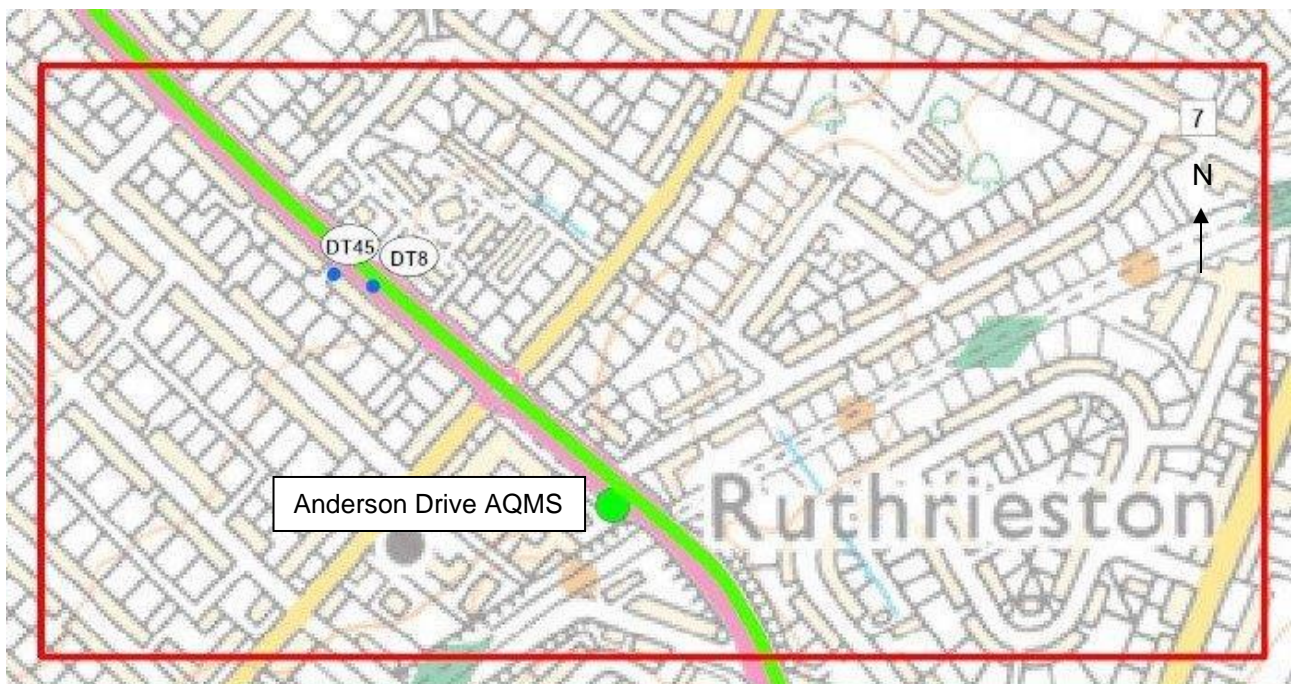


Figure 9: Plate 7 – Diffusion tube locations, Anderson Drive



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
FCEV	Full Cell Electric Vehicle
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. Environment Act 1995.
2. The Air Quality (Scotland) Regulations 2000.
3. The Air Quality (Scotland) (Amendment) Regulations 2001.
4. Local Air Quality Management Technical Guidance LAQM, TG(16), DEFRA, April 2021
5. Local Air Quality Management Policy Guidance, (PG)(S)(16), DEFRA, March 2016
6. Aberdeen City Council Action Plan, March 2011
7. 2021 Air Quality Annual Progress Report (APR) for Aberdeen City Council, June 2021