Annual Progress Report (APR)

2023 Air Quality Annual Progress Report (APR) for Aberdeen City Council

In fulfilment of Part IV of the Environment Act 1995, as amended by the Environment Act 2021

Local Air Quality Management

June 2023

Information	**Aberdeen City Council**
Local Authority Officer	Ann Marie Rankin
Department	Protective Services
Address	Aberdeen City Council, Marischal College, Business Hub 15, Broad Street, Aberdeen AB10 1AB
Telephone	03000 200 292
E-mail	poll@aberdeencity.gov.uk
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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 (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$), related to road traffic emissions.

In 2022, all temporary traffic restrictions that had been implemented as part of the Spaces for People initiative across 2020 and 2021 had been removed, except for certain restrictions along Union Street that have now become permanent alternations as part of the City Centre Master Plan (CCMP). The annual mean NO_2 levels monitored across the city, both within and outside of AQMAs, did not differ significantly to 2021, but have increased slightly in some areas as expected given the removal of restrictions and a return to a new normal in post-pandemic life. All monitoring locations apart from two diffusion tubes on Bridge Street in the city centre suggest NO_2 levels were below the annual mean objective in 2022.

There were no exceedances of the NO_2 one hour objective at any of the monitoring locations, nor were there any exceedances of the annual or 24-hour mean PM_{10} objectives. There were also no exceedances of the $PM_{2.5}$ annual mean objective.

The Low Emission Zone (LEZ) for the city 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 is currently in the process of being updated now the LEZ has been formally introduced, with a proposed publication date of March 2024.

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:

- LEZ declared in May 2022, triggering commencement of 2-year grace period.

Active Travel:

- Launch of the Big Issue eBike bicycle rental scheme;
- Launch of the Walking and Cycling Index (WACI), an assessment of cycling in Aberdeen to support future planning, investment and delivery;
- Continued delivery of cycle parking facilities throughout the city;
- Continued progression of a programme of multimodal corridor studies, considering opportunities for improved active travel infrastructure on key corridors to and from the city centre;
- Continued delivery of the I Bike schools programme, which works with school clusters in the city to encourage active travel amongst school children;
- Launch of the I Bike communities programme which works with adults in the same school clusters as above to encourage active travel.

Public Transport:

- Permanent removal of general traffic from Union Street Central from summer 2022, making this a bus, taxi and cycle priority space;
- Committee approval given for bus priority measures on Market Street / Bridge Street / Guild Street to be delivered in 2023;
- Continued progression of Aberdeen Rapid Transit (ART) feasibility study to assess options for a high-capacity rapid public transport system in Aberdeen;
- Continued progression of a programme of multimodal corridor studies considering opportunities for improved bus infrastructure on key corridors to and from the city centre.

Clean Vehicles:

- Appointment of a new contracted operator for the Aberdeen Car Club;
- Continued expansion of the Car Club, with more electric and hydrogen vehicles added to the fleet for the public to use;
- Installation of more electric vehicle (EV) charge points in the city

Road Improvements:

- Completion of A92/A96 Haudagain improvements.

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:

- Development of and engagement on a revised Aberdeen Air Quality Action Plan;
- Development of and engagement on a revised Local Transport Strategy for Aberdeen;
- Adoption of a revised Aberdeen Local Development Plan, and publication of supporting Planning Guidance on Transport and Air Quality;
- Establishment of the LEZ via implementation of signage and enforcement camera system;
- Commencement of an Active Travel Network Review to determine future walking, wheeling and cycling priorities for the city and develop a programme for delivery;
- Launch of first phase of a residential cycle parking project to deliver safe and secure cycle storage for residents of Council-owned high rises;
- Further expansion of the city's pedestrian and cycle count monitoring capabilities;
- Completion of South College Street Phase 1 improvements;
- Implementation of Market Street / Guild Street / Bridge Street bus priority loop and associated traffic management measures;
- Identification of a preferred option for cycling facilities on Union Street;
- Commencement of ART Outline Business Case (OBC);
- Completion of a number of transport corridor improvement studies, with recommendations proceeding to OBC;
- Completion of A956/Beach Boulevard junction improvement OBC;
- Development of a revised Council Travel Plan;
- Increasing access to car club vehicles, all of which are petrol, hybrid, EV or hydrogen powered, in the city for members of the public and Aberdeen City Council staff;
- Growing and maintaining the network of publicly-available EV charge points across the city;

- Rolling out a behaviour change programme through the Smarter Choices Smarter Places programme, centred around promoting and enabling active and sustainable travel;
- Continuing to have I Bike Communities and I Bike Schools officers working within school clusters in the city, this year focused on the St Machar Academy and Harlaw School clusters.

Challenges

The main challenge is likely to be political and public support for the outcomes of the ART development work and the programme of multimodal corridor studies which are likely to recommend significant reallocation of road space from the private car to walking, cycling and public transport, including removal of kerbside parking spaces.

How to Get Involved

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

Local Transport Strategy

City Centre Masterplan

Low Emission Zone

Car Club

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1 Local Air Quality Management

This report provides an overview of air quality in Aberdeen City Council during 2022. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Progress Report (APR) summarises the work being undertaken by Aberdeen City Council to improve air quality and any progress that has been made.

Table 1.1 – Summary of Air Quality Objectives in Scotland

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

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare publish and implement an Air Quality Action Plan (AQAP) within the shortest possible time and no later than 12 months of the date of AQMA Designation Order. The AQAP must set out measures the local authority intends to put in place in pursuit of the objectives within the shortest possible time. Measures should be provided with milestones and a final date for completion. The action plan itself should have a timescale for completion and for revocation of the AQMA. Where measures to reduce air pollution may require a longer timescale an action plan shall be reviewed and republished within five years of initial publication and then five-yearly thereafter.

A summary of AQMAs declared by Aberdeen City Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at DEFRA AQMA list and DEFRA AQMA maps websites.

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	Aberdeen	Declared in 2008, amended 2011 and	Air Quality Action Plan 2011

AQMA Name	Pollutants and Air Quality Objectives	City / Town	Description	Action Plan
	PM_{10} annual mean		2018. Pockets of exceedances at residential properties along Anderson Drive and Auchmill Road.	
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 adopted during 2023. The Council undertakes a biennial staff travel survey to identify how staff usually travel to work. The most recent survey was undertaken in 2022 and the outcomes will help inform the revised 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 is expected to be subject to public and stakeholder engagement in 2023.

A City Centre and Beach Masterplan (CCBMP) was approved in 2022, sitting above a revised City Centre Masterplan (CCMP) and emerging Beach Development Framework (BDF), with a renewed emphasis on developing places for people, reducing the impacts of vehicular traffic in the city centre and the beach area, and improving active travel and bus connectivity between the city centre and beach. Various projects emerging from the CCBMP are now in progress including city centre traffic restriction measures and work to improve the A956/Beach Boulevard junction for people walking, wheeling and cycling.

A revised Aberdeen Local Development Plan was approved by ACC in 2022 and submitted to Scottish Ministers for approval. This contains 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 the LEZ. 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 the Scottish Environment Protection Agency (SEPA) will look at opportunities to promote zero-carbon city centres within the existing LEZs structure.

Following the final objection period in November 2021, Aberdeen's LEZ plans were submitted to and approved by Scottish Ministers in 2022. The LEZ was formally declared on 30 May 2022, triggering the two-year grace period, meaning enforcement will commence from 1 June 2024. The LEZ has been developed in accordance with the National Low Emission Framework (NLEF) and National Modelling Framework (NMF).

2.2.3 Further Actions

Aberdeen City Council has taken forward a number of measures during the current reporting year of 2022 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. Key completed measures are:

- Formal declaration of the LEZ in May 2022;
- Launch of the Big Issue eBike bicycle rental scheme;
- Launch of the Walking and Cycling Index (WACI), an assessment of cycling in Aberdeen to support future planning, investment and delivery;
- Continued delivery of cycle parking facilities throughout the City;
- Continued delivery of the I Bike schools programme, which works with school clusters in the city to encourage active travel amongst school children. In recent years, the programme has worked with the Harlaw Academy and Aberdeen Grammar School clusters which are city centre based so very much within or close to the LEZ area;
- Launch of the I Bike communities programme which works with adults in the same school clusters as above to encourage active travel. This allows the parents and guardians of the children to also benefit so that momentum is kept in the community;
- Rolling out a behaviour change programme through the Smarter Choices Smarter Places programme, centred around promoting and enabling active and sustainable travel;

- Permanent removal of general traffic from Union Street Central from summer 2022, making this a bus, taxi and cycle priority space;
- Appointment of a new contracted operator for the Aberdeen Car Club;
- Continued expansion of the Car Club, with more electric and hydrogen vehicles added to the fleet for the public to use;
- Installation of more EV charge points in the city for members of the public to use; and
- Completion of A92/A96 Haudagain improvements.

2.3 Implementation of Air Quality Action Plan(s) and/or measures to address air quality

In order to ensure that local authorities implement the measures within an action plan by the timescales stated within that plan, the Scottish Government expects authorities to submit updates on progress through the APR process. Aberdeen City Council has taken forward a number of measures within the action plan during the current reporting year of 2022 in pursuit of improving local air quality and meeting the air quality objectives within the shortest possible time. 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, Local Transport Strategy for Aberdeen, and revised Aberdeen Local Development Plan.

Key completed measures for this reporting year are:

- Formal declaration of the LEZ;
- Launch of the Big Issue ShareBike bicycle rental scheme;
- Launch of the Walking and Cycling Index (WACI);
- Continued delivery of cycle parking facilities throughout the City;
- Continued delivery of the I Bike schools programme;
- Launch of the I Bike communities programme;
- Various behaviour change initiatives;
- Permanent removal of general traffic from Union Street Central making this a bus, taxi and cycle priority space;
- Appointment of a new contracted operator for the Aberdeen Car Club;

- Continued expansion of the Car Club, with more electric and hydrogen vehicles added to the fleet for the public to use;
- Expansion of the EV charging network;
- Completion of A92/A96 Haudagain improvements.

Progress on the following measures has been slower than expected:

- Council Travel Plan – staff travel survey paused until 2022 to allow for stabilisation of working patterns following the removal of the majority of COVID-19 restrictions;
- Car Parking Framework – paused as a result of COVID-19 impacts on the city centre, and will now follow the adoption of a revised LTS

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

- Development of and engagement on a revised Aberdeen Air Quality Action Plan;
- Public and stakeholder engagement on a revised Local Transport Strategy for Aberdeen;
- Adoption of a revised Aberdeen Local Development Plan, and publication of supporting Planning Guidance on Transport and Air Quality;
- Development of a revised Council Travel Plan;
- Establishment of the LEZ via implementation of signage and enforcement camera system;
- Further expansion of the city's pedestrian and cycle count monitoring capabilities;
- Completion of South College Street Phase 1 improvements;
- Implementation of Market Street / Guild Street / Bridge Street bus priority loop and associated traffic management measures;
- Identification of a preferred option for cycling facilities on Union Street;
- Completion of a number of transport corridor improvement studies, with recommendations proceeding to OBC.

Aberdeen City Council has identified the following new measures since the last reporting year:

- An Active Travel Network Review to determine future walking, wheeling and cycling priorities for the city and develop a programme for delivery;

- Phase 1 of a residential cycle parking project to deliver safe and secure cycle storage for residents of Council-owned high rises;
- Launch of the I Bike communities programme;
- Completion of A956/Beach Boulevard junction improvement OBC to identify preferred option for enhanced active travel and public transport connectivity between the city centre and beachfront.

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											
1.1 a	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	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, and a representative of Bus Users Scotland. 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	Ongoing	Further city centre bus priority measures to be introduced in 2023.

									experience delays and inconsistent journey times because of congestion or other traffic management issues. Options for addressing the priorities of the Bus Alliance are now being looked at in detail via several transport corridor studies which have public transport efficiency as a key outcome. As part of CCMP delivery, Union Street Central was made a bus/cycle/taxi only space in 2022.		
1.1 b	Increase bus use	Alternatives to private vehicle use	Increase corridors covered by BPIP (currently voluntary)	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	Several transport corridors are being reviewed to identify and appraise options for improving conditions for active and sustainable transport. The Wellington Road corridor study was completed in 2021 with elements now moving towards delivery.	Ongoing	These corridors have been prioritised with agreement from the Bus Alliance. 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

									Appraisal and Business Case work is underway on the following corridors: Ellon to Garthdee; A947 Dyce to Bucksburn; A96 Inverurie to Aberdeen; A944/A9119 Westhill to Aberdeen; A93 Banchory to Aberdeen; A92 Bridge of Don to Bridge of Dee; A92/A90 Laurencekirk to Aberdeen. In parallel, options for a more formal Bus Services Improvement Partnership (BSIP) are being developed.		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	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.

									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.		
1.2 a	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. A complete survey of the Aberdeen Core Path Network was undertaken in 2021/22. The survey recorded path condition, surface type, signage, accessibility and issues.	Ongoing	This survey will help prioritise future path improvements on the core path network
1.2 b	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,	Not quantifiable	A revised Active Travel Action Plan was adopted by the Council in 2021. The Council took part in the	Ongoing	A more detailed Active Travel Network review is due to commence in 2023, working in partnership

							Aberdeen City Voice)		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. The findings of the WACI are now informing future walking and cycling priorities.		with Aberdeenshire Council and Nestrans.

1.3 a	Travel Plans	Promoting travel alternatives	Existing Organisations	ACC & Nestrans	2015-16	2016 onwards	No. organisation adopting TPs; No. employees covered by TPs, progress of travel plans in study area (North Dee, South Dee and Dyce)	Not quantifiable	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. 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.	Ongoing	

1.3 b	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 Supplementary Guidance to the 2017 Aberdeen Local Development Plan.	Ongoing	Planning Guidance being updated to support the revised 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	Biennial staff survey undertaken in 2022. 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. Council Climate Change Plan Mobility Sub-group formed, looking at options to improve active travel uptake	Ongoing	Travel Plan being revised in 2023. Budget allocated in the Council's 2023/24 Non-Housing Capital plan to support car club redesign for staff use. Resource now in place to look at active travel provision in council estate

									amongst staff, to encourage more staff use of car club and to overhaul staff travel policy and plans.		
1.4 a	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	
1.4 b	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			
1.4 d	Improve public awareness of air quality issues	Public information	Undertake air quality and sustainable travel events with Getabout Partnership	Get About	Ongoing	Ongoing	Events taking place	Not quantifiable	The Getabout Aberdeen Cycling Festival (GACF) event took place on Saturday the 3rd of September 2022. This involved a series of cycling races for children and	Ongoing	Programme of events for 2023 being developed.

									adults as well as a number of family friendly additional activities. Over 32,000 people attended the GACF event and it recently won the E-Awards Best Sporting Event award.		
1.4 e	Improve public awareness of air quality issues	Public information	Information and Marketing Initiatives	ACC/ Getabout	Ongoing	Ongoing	N/A	Not quantifiable	There are currently 2 I-Bike officers employed by ACC and Sustrans to promote the uptake of active travel in schools and communities respectively. A marketing campaign to promote the Aberdeen City and Aberdeenshire sustainable transport brand, Getabout, has continued. Love to Ride, a project designed to encourage people to cycle more often took place in Aberdeen City and Aberdeenshire, involving a	Ongoing	Initiatives will continue during 2023. I Bike Schools officer will work with St Machar Academy Cluster in 2023 and will continue supporting the Harlaw Academy cluster. I Bike communities will work in same area with adults to build on schools programme Comms on air quality will continue during 2023 and 2024 prior to full operation of the LEZ.

									number of campaigns and competitions throughout the year aimed at individuals, workplaces and community groups. Two additional walking trails have been developed and added to the 'Discover' function in the GoABZ app. A Cycling Training project for P4 to 7 pupils allows children who cannot currently cycle to learn to ride a bike and potentially go on to take part in Bikeability. In order to ensure that children are safe while they are travelling actively to school, road safety magic shows were run in Autumn and Winter in Aberdeen City primary schools. Increasing the availability of digital real time		

									information for bus users. LEZ comms and engagement is raising awareness of air quality concerns in Aberdeen.		
1.5 a	Car Clubs / Carpool Schemes	Promoting low emission transport	General Public	ACC	2011	Ongoing	Car Club membership figures. Number of Car Club vehicles available.	Estimate 0 – 1 µg/m^3	The Aberdeen Car Club contract was retendered in late 2021/ early 2022 with Enterprise replacing Co-wheels as the Council's contracted supplier. There are now 21 alternatively (electric or hydrogen) fuelled vehicles and 5 petrol hybrid vehicles in the fleet of 44 vehicles, 34 of which are available for public use. Co-wheels are still operating in the city with 16 cars across Aberdeen, giving members of the public a choice of 2 volume car club suppliers in Aberdeen.	Ongoing	Car club is a vital way of giving people access to an LEZ-compliant, low or zero emission vehicle for those times when they need a car, without them needing to own one. Recent additions include Hollybank Place.

									Marketing of Enterprise Car Club cars in regeneration areas in Middlefield, Northfield, Mastrick, Tillydrone & Torry was undertaken using SCSP 2022/23 funding. Funded memberships were also offered to Aberdeen City residents to encourage the uptake of the car club using SCSP 2022/23 funding.		
1.5 b	Car Clubs / Carpool Schemes	Promoting low emission transport	Corporate	ACC	2011	Ongoing	Number of Car Club vehicles available.	Estimate 0 – 1 µg/m^3	10 vehicles (6 x Hydrogen FCEV and 4 x BEV) available for the exclusive use by the Council, with further vehicles being investigated. These are all zero emission at tailpipe. Council staff membership continues to grow. Action for staff car club redesign stemming from	Ongoing	Budget allocated in the Council's 2023/24 Non-Housing Capital plan to support car club redesign.

									Council Climate Change Plan Mobility Group which will see smarter use of car club by staff to reduce grey fleet use.		
1.6 a	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/m^3	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 options appraisal work due to commence in 2023, following Transport Scotland's approval of the Case for Change Report.
1.6 b	Rail Improvements	Alternatives to private vehicle use	Infrastructure improvements	Transport Scotland/ Nestrans	Ongoing	Ongoing	Studies and infrastructure delivered	Not quantifiable	Wider Aberdeen to Inverness rail improvement project ongoing. Kintore Station re-opened to passenger services in late 2020.	Ongoing	Laurencekirk to Aberdeen options appraisal work due to commence in 2023, following Transport Scotland's approval of the

									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.		Case for Change Report.
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. A study into demand and capacity for more rail freight locally has commenced.	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	The electric vehicle charging network has continued to expand, with more charging points located at various locations throughout the City. ACC is working with Scottish Futures Trust,	Ongoing	Recent installations at Virginia Street, Summer Street and Craibstone Park and Ride should be powered up soon. ACC has just awarded works to install additional

									Transport Scotland, Highland and Aberdeenshire Councils and consultants as part of a pathfinder to build a business case that looks at future models for delivery including the Council working with private sector - to be completed in 2023 Tariff now being charged for use of EV charge points - £1 minimum charge and 47p per kWh. Two-hour maximum stay time applies at rapid chargers along with an overstay fee of £1 per minute up to a maximum of £60 to encourage efficient use		charge points which will see a further 2 rapid chargers and 8 fast chargers installed across the city, all capable of recharging 2 vehicles at once. Future ratios and requirements for electrical vehicle charging are due to be updated in light of new standards coming through as part of building standards changes, to be introduced Scotland-wide in June 2023. As part of the pathfinder project, ACC, Highland and Aberdeenshire Councils have been engaging with suppliers to inform what model to go to market with. Procurement is likely to take place in 2023 with a view to contracting a

											deliver partner in 2024.
2.2 a	Emissions Testing & Idling Enforcement	Public information	Roadside Emission Testing	ACC	Ongoing	Ongoing	No. of tests / fails	Not quantifiable			
2.2 b	Emissions Testing & Idling Enforcement	Public information	Idling Vehicles	ACC			No. cautions	Not quantifiable			
2.3 a	Taxis	Vehicle fleet efficiency	Non-idling signs	ACC	Ongoing	On hold	Spatial coverage of signs	Not quantifiable		Ongoing	
2.3 b	Taxis	Vehicle fleet efficiency	Licensing vehicle inspections, emissions restrictions	ACC			Fleet emissions profile improvement	Not quantifiable			
2.4	Low Emission Zone	Environ-mental Permits	Low Emission Zone	ACC	2011	Ongoing	Air quality improvement within LEZ area	Various depending on location – full details in NLEF and NMF reports.	LEZ declared in May 2022.	Ongoing	Enforcement to commence from June 2024.
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. General traffic removed from Union Street Central from summer 2022.	Ongoing	Schoolhill/ Upperkirkgate pedestrianisation to be completed in 2023. Union Street design work ongoing.
3.2 a	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/m^3 for PM_{10} and NO_2 (Market St and Anderson Dr)	Final section opened in Feb 2019		Complete.
3.2 b	Road Building / Junction Alterations	Transport planning and infrastructure	Haudagain Improvements	Transport Scotland	2012-2019	2019-2021	Delivery of scheme	TBC	Completed in 2022.		Complete.

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	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. 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. 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	The SCOOT revalidation is complete the CCTV system expansion is ongoing and the new control room is complete	

4.2	High Occupancy Vehicle (HOV) Lane	Traffic management	Stone-haven Road	ACC	2011	Ongoing	N/A	Not quantifiable	Feasibility study complete. Option will be revisited as part of A92 Aberdeen to Laurencekirk study.	Subject to impleme ntation of A90 south P and R	Laurencekirk to Aberdeen Case for Change approved by Transport Scotland in 2022 with option development and appraisal to commence in 2023.
4.3 a	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	
4.3 b	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.	Ongoing	

5.1 a	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/ public transport movements first.	Ongoing	Revised Aberdeen Planning Guidance to be prepared upon adoption of the revised Local Development Plan.
5.1 b	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 developments signing CCoP	Not quantifiable			New National Building Standards legislation for Scotland with standards for EV charging in new developments

											due to launch in June 2023.
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	Transport and Public Health Objective 2 is: *Reduce air pollution, especially within Air Quality Management Areas*	Ongoing	HTAP currently subject to review.
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, with formal programme of road reclassifications approved in 2020.	Complete	Complete.

5.5 a	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.
5.5 b	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.

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.
5.6 a	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 vehicle or mode to become LEZ compliant. Grants for home and workplace	Ongoing	

									charging facilities are available through Home Energy Scotland.		
5.6 b	National Lobbying	Transport planning and infrastructure	Shipping Emissions Reductions	ACC	2011	Ongoing	N/A	Not quantifiable	No work being undertaken currently	Ongoing	
5.6c	National Lobbying	Transport planning and infrastructure	HGV/Bus Scrappage schemes	ACC	2011	Ongoing	N/A	Not quantifiable	Several bus and HGV 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 six sites during 2022. 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 NO_2, PM_{10} 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. A bus gate was also installed in June 2022 between the Bridge Street and Market Street junctions of Union Street – which had been closed to all vehicles since 2020 as part of the Spaces for People measures during the COVID-19 pandemic – allowing local buses, cycles and emergency vehicles along what was once a busy throughfare of the city centre.

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 Park 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 NO_2 at 67 sites during 2022. 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 and at www.scottishairquality.scot/latest. 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, Bridge 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.

3.1.3 Other Monitoring Activities

There were no other monitoring activities undertaken during 2022.

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 (NO_2)

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

For diffusion tubes, the full 2022 dataset of monthly mean values is provided in Appendix B.

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

Monitored NO_2 levels at all automatic monitoring sites continue to be below the annual mean air quality objective of 40 µg/m^3. The trend in NO_2 levels over the last 5 years is shown in Appendix D. Figure 1. NO_2 levels have been decreasing since 2015, and 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 2018.

In relation to diffusion tubes, duplicate and triplicate tube monitoring locations were assessed for precision using the precision accuracy bias spreadsheet available on the SAQD website.

Access to DT15 was not possible from April 2022 due to construction works for the refurbishment of the Northfield Swimming Pool building, therefore it was removed from the city survey and later replaced with location DT103 once the building was reopened.

Twelve new diffusion tube locations were added to the city survey in 2022. DT92, DT93, DT94, DT95, DT96, DT97, DT98, DT99 in locations throughout the city centre were added to assess the impact of the LEZ on junctions outside of the LEZ area, identified as locations where increases in traffic are likely by modelling carried out by SEPA. DT100 and DT101 were added to the city survey to replace locations removed during construction works for the improvements to the Hauagain roundabout in 2021 when access was no longer available. DT102 was added as another location on Bridge Street in response to elevated levels being returned from monitoring at DT93.

Most diffusion tube monitoring locations within Aberdeen City recorded data capture of 75% or more, however 5 locations did record less than this and of those, 2 recorded less

than 33% (DT102 and DT103). Three locations requiring annualisation (DT15, DT100 and DT101) are included in Table C.2.

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 36µg/m^3 and therefore do not require distance correction during 2022.

All tubes suggest NO_2 levels were below the objective level except for DT93 and DT102 located at 6 and 19 Bridge Street respectively, both with an annual average of 48 µg/m^3. These locations were added in 2022. Bridge Street has an incline for northbound traffic, and is a busy city centre street with cars and buses. With the closure of the central section of Union Street to vehicles other than buses, service vehicles and taxis, it is now one of the main thoroughfares onto the west section Union Street from the east part of the city centre. Union Terrace – directly opposite Bridge Street – provides another connection to this section of Aberdeen's main street, however it was closed to southbound traffic from January 2022 due to construction works at the Union Terrace Gardens, and a full closure was in place between June and August. This likely displaced more traffic in the area, with more vehicles redirected to Bridge Street to access the west of the city centre. This section of Bridge Street is also flanked by tall buildings on either side, creating a street canyon effect and potentially affecting atmospheric dispersal.

In 2021, diffusion tube DT9 at 39 Market Street was the only location to exceed the objective level, recording 42 µg/m^3. This reduced to 38 µg/m^3 in 2022 and was the first year not to exceed the objective level at this location. Demolition works of the large Aberdeen Market building on the west side of Market Street, which commenced in March, were completed in early June. During this time, Market Street operated a one-way system for buses only. The removal of the building has opened up this section of the street, reducing the potential street canyon effect. It also reopened to all traffic in both directions, following the removal of the bus gate between the Broad Street and Market Street section of Union Street, in June.

Diffusion tubes (DT5, DT20 and DT34) along King Street, a busy link through the north of the city for the third year in a row saw no change to their annual means of 20µg/m^3, 21µg/m^3 and 18µg/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 are both situated around the Haudagain Roundabout, an area where the annual mean was exceeded at both locations in 2018 but are now comfortably below this level, each recording 24µg/m^3 in 2022. The roundabout is within the Anderson Drive AQMA. This site is now benefitting from the improvement works completed in this area in May 2022, together with the Aberdeen Western Peripheral Route (AWPR) city bypass redirecting large amounts of traffic from this bottleneck. Further south along the AQMA, another location to benefit from the AWPR is Anderson Drive. DT8 at 107 South Anderson Drive also continues to decrease since its last exceedence in 2018, recording 29µg/m^3 in 2022.

The western section of Union Street in the city centre is another area where DT29 and DT30 last exceeded in 2018, but continue to see improvements in levels of NO_2 recorded, returning with an annual mean of 31µg/m^3 and 29µg/m^3 respectively. However, in the busier eastern section of Aberdeen's main street – closer to the retail hubs of the city centre – DT12 located at 40 Union Street, with a previous exceedence in 2019 has seen steady increases from 26µg/m^3 in 2020, 32µg/m^3 in 2021, to 36µg/m^3 in 2022.

The same trend is seen at DT82 located at 7 Virginia Street, where the annual mean was last exceeded in 2019 but has returned 32µg/m^3 in 2020, 34µg/m^3 in 2021 and 36µg/m^3 in 2022. This street is a busy dual carriageway in both directions and forms an important link between the north and south of the city for all vehicle types, particularly LGVs and HGVs. However, this street forms part of the LEZ which becomes enforceable in 2024.

The NO_2 automatic monitoring data collected at all sites in 2022 bar Union Street decreased slightly on 2021 levels, and the increase at Union Street was marginal and remained well within the objective level. The graphs in Appendix D: Figure 3 plot the time series of the concentration of NO_2 measured at each automatic site from January 2022.

Monitoring locations are shown in Appendix E: Figure 1, and the overall de-seasonalised trend at all sites from 2018 is shown in Appendix D: Figure 4.

Considering both automatic and passive monitoring sites, no location's annual mean was greater than 60µg/m^3, indicating that an exceedence of the 1-hour mean objective is unlikely across the city's monitoring locations. The hourly mean has not been exceeded at any automatic site in the last 8 years.

3.2.2 Particulate Matter (PM_{10})

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of 18µg/m^3. For completeness, as per the recommendations from the report compiled by Ricardo Energy & Environment for by the Scottish Government, both the corrected – by applying the correction factor of 0.909 – and uncorrected results, as reported on the SAQD website, are reported in the table.

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

Equipment failure of the Fidas monitor at Wellington Road, leading to it being sent back to the manufacturer for repair, meant there was no data capture between 1 January and 7 June 2022. The data for this site was therefore annualised.

There are 6 continuous monitoring sites measuring PM_{10} levels in Aberdeen City. Monitoring locations are shown in Appendix E: Figure 1. No exceedances of the annual mean or 24-hour mean objective were recorded at any of the continuous monitoring sites. No exceedances of the objective have been recorded at any site since 2016.

Since 2016 the general trend is a reduction in PM_{10} levels, however all sites apart from Wellington Road – which was annualised due to poor data capture – saw an increase in PM_{10} levels in 2022. Roadside measurements are similar to urban background levels measured at Erroll Park.

The trend over the last 5 years is shown in Appendix D. Figure 5. The graph in Appendix D. Figure 6 shows the annual average PM_{10} annual levels measured at each automatic site since 2018.

The graphs in Appendix D: Figure 7 plot the time series of the concentration of PM_{10} measured at each automatic site from January 2022, and the overall de-seasonalised trend at all sites from 2018 is shown in Appendix D: Figure 8.

3.2.3 Particulate Matter ($PM_{2.5}$)

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

completeness, as per the recommendations from the report compiled by Ricardo Energy & Environment for by the Scottish Government, both the corrected – by applying the correction factor of 1.06 – and uncorrected results, as reported on the SAQD website, are reported in the table.

Equipment failure of the Fidas monitor at Wellington Road, leading to it being sent back to the manufacturer for repair, meant there was no data capture between 1 January and 7 June 2022. The data for this site was therefore annualised.

There are 6 continuous monitoring sites measuring $PM_{2.5}$ levels in Aberdeen City. 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 (SO_2)

No monitoring of sulphur dioxide was carried out in 2022 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 2022 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 commenced in June 2022 and is due to be operational July 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 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 NO_2 or PM_{10} 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 Bridge Street and the provision of bus gates on Union Street east of Market Street. A proposal to reopen Union Steet to buses, taxis and service vehicles was approved in March 2022 following the easing of Covid-19 restrictions. City Centre access restrictions on the Market Street/Guild Street/Bridge Street corridor limiting access to buses, taxis and service vehicles are due to be implemented in summer 2023.

4.2 Other Transport Sources

The South Harbour – as part of the Port of Aberdeen expansion project – welcomed the first commercial vessel on 2 July 2022. The new deep water berthing facility, located south of the main city harbour, at Nigg Bay, can accommodate much larger, multi-purpose vessels from the oil and gas sector, and other new business streams including berthage

for large cruise ships, and the decommissioning of oil and gas industry infrastructure. Construction of the South Harbour is scheduled to be fully complete in 2023, which will make Aberdeen the largest berthage port in Scotland.

Air quality in the vicinity is good and there have been no exceedances of the air quality objectives during the construction phase, nor are there expectations of exceedances once the new harbour is fully operational.

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 (SEPA) are the licensing and enforcement authority for different types of industrial installation and have identified the following new sources:

Authorisation No	Authorisation Level	Site Address	Authorisation Holder	Authorisation Activity
PPC/A/1186430	PPC Part A	NESS EfW Facility, Greenbank Crescent, East Tullos Industrial Estate, Aberdeen, AB12 3BG	EFW NESS Limited	PPC(A) - Incinerators (Chapter V IED)
PPC/B/5002854	PPC Part B	Torry Heat Network Heat Distribution Facility (HDF), Greenbank Crescent, East Tullos Industrial Estate, East Tullos, Aberdeen, AB12 3BG	Aberdeen City Council	PPC(B) - Combustion of Fuels

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.

There were no new commercial and domestic sources in Aberdeen City in 2022.

4.5 New Developments with Fugitive or Uncontrolled Sources

New Source in 2022	Detail
Landfill sites	No new sources in 2022
Quarries	No new sources in 2022

Waste transfer stations etc.	No new sources in 2022
Unmade haulage roads on industrial sites	No new sources in 2022
Other potential sources of fugitive particulate matter emissions.	No new sources in 2022

5 Planning Applications

This section identifies any major planning applications under consideration in 2022 that might affect air quality with a summary detailed in Table 5.1. Details of planning application can be viewed on the Aberdeen City Council website.

Table 5.1: Planning Applications in 2022 that may affect Air Quality

Planning Application	Application No.	Air Quality Impacts
Erection of energy centre and chimney including associated external works and vehicle access bridge, Stoneywood Mill, Stoneywood Terrace, Aberdeen, AB21 9AB	210674	Application approved 21 April 2023 The approved Development is a natural gas fired Energy Centre, along with 2 x 35m stack to house and related facilities consisting of: • 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. Environmental Health requested the submission of an Air Quality Impact Assessment including a detailed dispersion modelling assessment to assess the operational phase of the proposal and its findings accepted, namely, road vehicle trips during the construction and operational phase with the impacts considered to have insignificant effects on air quality. A detailed dispersion modelling assessment was undertaken to assess the operational phase of the energy centre emissions with impacts at human sensitive receptors are predicted to be negligible at all locations within the assessment extents, and therefore effects are not significant.
Installation of electric substations, transformers, feeder pillars, chargers, acoustic fences and associated works | First Aberdeen Ltd 395 King Street Aberdeen AB24 5RP	221328	Application approved 12 January 2023 The approved development includes electrical infrastructure works to provide the power required to charge the Low Emission Electric Buses to replace the current diesel bus fleet. This is considered to potentially decrease emissions from the diesel fleet. The works consist of the following: • 1No. GRP Housing for a Ring Main Unit (RMU) • 4No. GRP Housings for Transformer substations • Feeder pillars (electrical switch panels / distribution boards) • Meter housings

		• 69 dual headered chargers • 69 power units located within timber acoustic fence enclosure / housings. These buses will replace existing diesel buses so there will not be an increase of bus parking on site. The site has planning permission for up to 200 buses.

6 Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

Data from all continuous automatic monitoring sites was below the NO_2 annual mean objective of 40mg/m^3. NO_2 levels at all automatic monitoring sites have been below the objective level since 2018. Trends in NO_2 levels suggest that air quality continues to improve across the City.

The NO_2 automatic monitoring data collected at sites apart from Union Street saw a decrease on 2021 values, and the increase seen on Aberdeen's main city centre street was marginal. The vast majority of diffusion tube locations also showed lower NO_2 concentrations compared to previous years.

All diffusion tubes located in and outside of AQMAs suggest NO_2 levels are below the objective level, except for DT93 and DT102 located at 6 and 19 Bridge Street respectively (City Centre AQMA), both with an annual average of 48 µg/m^3. 2023 will provide the first full year of data for these diffusion tubes, however there are also traffic restrictions being imposed on this street in summer 2023 which should assist in reducing the levels and potentially bring these sites under the exceedance limit.

There were no exceedances of the NO_2 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 PM_{10} 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 NO_2 and PM_{10} annual means and further monitoring is required for a full year now some traffic restrictions in the city centre are established, and further restrictions including the pending enforcement of the LEZ in 2024 are being implemented.

New monitoring data has not identified a need for any other changes to the existing AQMAs, however this will continue to be monitored in 2023 with a future plan of revoking Wellington Road and Anderson Drive 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. Initial monitoring results suggest there are some improvements in this area, as the alterations to Manor Avenue – linking Anderson Drive with Auchmill Road – divert a proportion of traffic away from the roundabout bottleneck, significantly improving traffic flow, and potentially enable the revocation of the AQMA.

Construction on the new Energy from Waste facility in the south of Aberdeen is also nearing completion. Air quality in the vicinity of the site is good and dispersion modelling predicted there would be no significant impact on air quality due to plant emissions

6.3 Proposed Actions

1. Enforcement of the LEZ to commence in June 2024 following a two-year grace period.
2. Progress the equipment procurement process and other associated legal and infrastructure actions to support the implementation of a City Centre LEZ.
3. Monitor exceedances of NO_2 on Bridge Street given the introduction of traffic restrictions in 2023 and LEZ in 2024.
4. Continued implementation of the Actions within the Air Quality Action Plan 2011.
5. Review of the Air Quality Action Plan 2011 – the draft of which is progressing at the time of publication – with target of March 2024 for publication.
6. Continue to review monitoring within AQMAs with a view to potentially revoke or partially revoke Anderson Drive and Wellington Road areas.
7. Submit the next air quality Annual 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	Union Street	Roadside	X393656	Y805967	PM_{10}, $PM_{2.5}$ NO_2 (NO, NO_x)	YES City Centre	Fidas 200 Chemiluminescence	2	2	2.5
CM2	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
CM3	Anderson Drive	Roadside	X392506	Y804186	PM_{10}, NO_2 (NO, NO_x)	YES Anderson Drive	Fidas 200 Chemiluminescence	10	6	1.5
CM4	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
CM5	King Street	Roadside	X394333	Y808770	PM_{10}, $PM_{2.5}$ NO_2 (NO, NO_x)	NO	Fidas 200 Chemiluminescence	10	3	1.5
CM6	Erroll Park	Urban Background	X394365	Y807396	PM_{10}, $PM_{2.5}$, O_3, NO_2 (NO, NO_x)	NO	Fidas 200 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 City Centre	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)
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 City Centre	0	4	N	2.3
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

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)
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	NO2	NO	0	9	N	2.6
DT36	115 Menzies Rd/Wellington Rd	Roadside	394403	804799	NO2	YES Wellington Rd	14	4	N	2.4
DT37	137 Wellington Road	Roadside	394697	803735	NO2	NO	17	14	N	1.6
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

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)
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	102 Picktillum Place	Urban Background	393025	807828	NO_2	NO	N/A	N/A	N	2.5
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	395431	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		Roadside	393350	806922	NO_2	NO	5	3	N	2.6

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)
	5 Caroline Place									
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
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)
DT92	52 Guild Street	Facade	394184	806001	NO_2	YES City Centre	N/A	3	N	2.5
DT93	6 Bridge Street	Facade	393945	806009	NO_2	YES City Centre	N/A	3	N	2.5
DT94	8 Midstocket Road	Facade	392607	806502	NO_2	NO	N/A	2	N	2.4
DT95	283 Rosemount Place	Facade	392680	806500	NO_2	NO	N/A	3	N	2.5
DT96	64 Skene Street	Facade	393543	806315	NO_2	NO	N/A	3	N	2.4
DT97	73 Skene Street	Facade	393557	806309	NO_2	NO	N/A	3	N	2.4
DT98	5 Anderson Drive	Roadside	391973	804775	NO_2	YES Anderson Drive	3	2	N	2.4
DT99	36 Spring Gardens	Facade	394047	806909	NO_2	NO	N/A	3	N	2.5
DT100	537 North Anderson Drive	Roadside	391441	808897	NO_2	YES Anderson Drive	2	4	N	2.4
DT101	13 Manor Avenue	Roadside	391361	808923	NO_2	NO	10	5	N	2.7
DT102		Facade	393971	805996	NO_2	YES	N/A	2	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)
	19 Bridge Street					City Centre				
DT103	Northfield Swimming Pool	Urban Background	390796	808123	NO_2	NO	N/A	N/A	N	2.3
CL1	Union Street	Roadside	393656	805967	NO_2	YES City Centre	2	2	Y	2.5
CL2	Market Street	Roadside	394560	805677	NO_2	YES City Centre	0	2	Y	1.5
CL3	Anderson Drive	Roadside	392506	804186	NO_2	YES Anderson Dr	10	6	Y	1.5
CL4	Wellington Road	Roadside	394395	804779	NO_2	YES Wellington Rd	5	4	Y	1.5
CL5	King Street	Roadside	394333	808770	NO_2	NO	10	3	Y	1.5
CL6	Erroll Park	Urban Background	394365	807396	NO_2	NO	N/A	N/A	Y	3

Notes:

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

(2) N/A if not applicable.

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

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2022 (%) [2]	2018	2019	2020	2021	2022
CM1	Roadside	Automatic		99.4	**40**	38	24	25	26.6
CM2	Roadside	Automatic		99.7	31	33	22	27	23.4
CM3	Roadside	Automatic		95.5	19	17	12	13	11.6
CM4	Roadside	Automatic		99.7	39	39	25	28	24.5
CM5	Roadside	Automatic		95.9	23	22	16	17	15.5
CM6	Background	Automatic		99.5	N/A	N/A	N/A	21	16.5
DT4	Roadside	Diffusion Tube		100	29	27	19	20	19
DT5	Roadside	Diffusion Tube		100	47	27	20	20	20
DT6	Roadside	Diffusion Tube		100	28	30	21	21	20
DT7	Roadside	Diffusion Tube		100	32	31	22	23	21
DT8	Roadside	Diffusion Tube		100	**48**	39	31	32	29

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
DT9	Roadside	Diffusion Tube		100	**46**	**44**	**42**	**42**	38
DT10	Roadside	Diffusion Tube		100	**47**	**47**	33	37	35
DT11	Roadside	Diffusion Tube		100	**48**	**45**	34	32	37
DT12	Roadside	Diffusion Tube		92	**44**	**43**	26	32	36
DT13	Roadside	Diffusion Tube		100	N/A	35	22	25	27
DT14	Urban background	Diffusion Tube		83	10	8	6	7	6
DT15	Urban background	Diffusion Tube		25	11	9	7	8	9
DT16	Roadside	Diffusion Tube		100	37	39	27	34	31
DT17	Roadside	Diffusion Tube		100	**44**	**43**	28	30	34
DT18	Roadside	Diffusion Tube		83	39	39	25	26	26
DT19	Roadside	Diffusion Tube		92	**40**	**43**	27	26	28
DT20	Roadside	Diffusion Tube		92	30	27	21	21	21
DT21	Roadside	Diffusion Tube		100	34	33	23	24	26

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2022 (%) [2]	2018	2019	2020	2021	2022
DT22	Roadside	Diffusion Tube		100	36	34	24	25	26
DT24	Roadside	Diffusion Tube		100	24	21	14	15	15
DT25	Roadside	Diffusion Tube		100	37	35	26	22	25
DT26	Roadside	Diffusion Tube		100	24	23	15	17	16
DT29	Roadside	Diffusion Tube		92	**45**	**42**	28	29	31
DT30	Roadside	Diffusion Tube		100	**41**	39	24	24	29
DT33	Roadside	Diffusion Tube		92	**40**	35	29	28	30
DT34	Roadside	Diffusion Tube		100	26	24	18	18	18
DT36	Roadside	Diffusion Tube		100	**43**	39	29	30	29
DT37	Roadside	Diffusion Tube		100	23	22	17	17	15
DT39	Roadside	Diffusion Tube		100	**43**	37	27	25	24
DT40	Facade	Diffusion Tube		100	30	26	19	19	18

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
DT41	Roadside	Diffusion Tube		100	**40**	36	27	24	24
DT45	Facade	Diffusion Tube		100	24	21	16	17	15
DT46	Roadside	Diffusion Tube		92	26	24	17	18	17
DT47	Roadside	Diffusion Tube		92	**41**	**40**	30	29	32
DT48	Roadside	Diffusion Tube		75	28	26	19	19	18
DT49	Roadside	Diffusion Tube		100	31	30	22	22	20
DT63	Roadside	Diffusion Tube		100	23	23	16	17	17
DT64	Urban Background	Diffusion Tube		100	17	14	11	12	11
DT67	Roadside	Diffusion Tube		100	38	32	21	21	21
DT70	Urban Background	Diffusion Tube		100	14	13	10	12	11
DT71	Urban Background	Diffusion Tube		92	10	9	7	8	7
DT72	Urban Background	Diffusion Tube		100	8	7	5	6	5
DT73	Facade			100	**40**	38	29	30	29

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
		Diffusion Tube							
DT74	Roadside	Diffusion Tube		100	34	34	23	27	26
DT75	Urban Background	Diffusion Tube		100	16	15	12	15	13
DT77	Roadside	Diffusion Tube		100	37	38	27	23	27
DT80	Roadside	Diffusion Tube		100	24	23	14	19	15
DT81	Roadside	Diffusion Tube		100	30	27	16	15	20
DT82	Roadside	Diffusion Tube		100	**44**	**42**	32	34	36
DT85	Urban Background	Diffusion Tube		100	13	13	11	13	10
DT88	Roadside	Diffusion Tube		100	n/a	35	29	26	29
DT90	Facade	Diffusion Tube		100	n/a	n/a	20	19	17
DT91	Facade	Diffusion Tube		100	n/a	n/a	36	30	31
DT92	Facade	Diffusion Tube		83	n/a	n/a	n/a	n/a	38
DT93	Facade	Diffusion Tube		83	n/a	n/a	n/a	n/a	**48**

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
DT94	Facade	Diffusion Tube		83	n/a	n/a	n/a	n/a	19
DT95	Facade	Diffusion Tube		83	n/a	n/a	n/a	n/a	18
DT96	Facade	Diffusion Tube		83	n/a	n/a	n/a	n/a	17
DT97	Facade	Diffusion Tube		83	n/a	n/a	n/a	n/a	20
DT98	Roadside	Diffusion Tube		83	n/a	n/a	n/a	n/a	34
DT99	Facade	Diffusion Tube		83	n/a	n/a	n/a	n/a	17
DT100	Roadside	Diffusion Tube		58	n/a	n/a	n/a	n/a	17
DT101	Roadside	Diffusion Tube		42	n/a	n/a	n/a	n/a	18
DT102	Facade	Diffusion Tube		25	n/a	n/a	n/a	n/a	**48**
DT103	Urban Background	Diffusion Tube		25	n/a	n/a	n/a	n/a	10

Notes:

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

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

Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.TG(22) if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

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

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
CM1	Roadside	Automatic		99.4	0	0	0	0	0
CM2	Roadside	Automatic		99.7	0	0	0	0	0
CM3	Roadside	Automatic		95.5	0	0 (93)	0 (78)	0	0
CM4	Roadside	Automatic		99.7	0	0	0	0	0
CM5	Roadside	Automatic		95.9	0	0	0	0	0
CM6	Background	Automatic		99.5	-	-	-	0 (82)	0

Notes:

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

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

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

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

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

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022 (3)
CM1	Roadside		100	15	12	10	11	13 (14.3)
CM2	Roadside		99	17	13	10	11	12.7 (14)
CM3	Roadside		93	14	13	9	9	10.1 (11.1)
CM4	Roadside		57	17	14	14	12	10.6 (11.6)
CM5	Roadside		97	14	14	11	12	13 (14.3)
CM6	Background		100	-	-	-	9.5	11.3 (12.4)

Notes:

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

All means have been "annualised" as per LAQM.TG(22), 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) Corrected results as recommended by Ricardo for the Scottish Government report in brackets.

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

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
CM1	Roadside		100	0	0 (32)	0 (21)	0 (23)	2
CM2	Roadside		99	5	4	0	0	4
CM3	Roadside		93	0	3	0	0	1
CM4	Roadside		57	3	4	0	0	0 (27)
CM5	Roadside		97	5 (48)	3 (45)	0	0 (31)	3
CM6	Background		100	-	-	-	1 (21)	2

Notes:

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

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

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

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

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

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022 (3)
CM1	Roadside		100	8	8	5	6	7.1 (7.5)
CM2	Roadside		99	8	7	5	5	6.4 (6.8)
CM3	Roadside		93	-	-	-	5	5.6 (6)
CM4	Roadside		57	8	7	6	6	5.2 (5.5)
CM5	Roadside		97	7	7	6	6	6.5 (6.9)
CM6	Background		100	-	-	-	5	6 (6.3)

Notes:

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

All means have been “annualised” as per LAQM.TG(22), 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) Corrected results as recommended by Ricardo for the Scottish Government report in brackets.

Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1 – NO_2 2022 Monthly Diffusion Tube Results (µg/m^3)

Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted (1)
DT04	31	40	21	35	24	19	21	19	20	21	27	30	26	19
DT05	32	37	23	29.5	44.5	18	18	18.5	19.5	20	25.5	32.5	27	20
DT06	30	30	23.5	26.5	32.5	22.5	20	23.5	25.5	30	28	28	27	20
DT07	31	30	22	34	32	24	21	26	25	28	27	28	27	21
DT08	43	54	36	45	46	29	27	31	34	39	34	43	38	29
DT09	65	49.5	46	59.5	65	53.5	39	40.5	45.5	57	44.5	46	51	38
DT10	52.5	55.5	44	47.5	48.5	41.5	36.5	39	44.5	58	46	42	46	35
DT11	54	51	44	57	47	39.5	43	41.5	44	49	54	66	49	37
DT12	48	46	44	61	-	48	46	42	43	50	48	50	48	36
DT13	40	40	33	36	37	31	27	27	30	40	38	46	35	27
DT14	13	14	6	12	6	5	-	-	5	5	8	13	9	6
DT15	-	14	6	16	-	-	-	-	-	-	-	-	12	9
DT16	41	46.5	35	42	49.5	41	33	36.5	41	49.5	41	46.5	42	31
DT17	39.5	39.5	35.5	61.5	51	41	40	41.5	44	45.5	42.5	56	45	34
DT18	-	39.5	37.5	34.5	35	32	25.5	26.5	34.5	37.5	-	37.5	34	26
DT19	46.5	43	39.5	37.5	37	32	28.5	31	34.5	40	-	36.5	37	28
DT20	33	-	25	39	25	21	23.5	24.5	21.5	24.5	29.5	37.5	28	21
DT21	39.5	36.5	29	44.5	37	28.5	29	30.5	31	31	35.5	44.5	35	26
DT22	35.5	36	28.5	43.5	37	28.5	30	30	31.5	35.5	35.5	45.5	35	26
DT24	27	26	25	21	20	16	15	16	19	21	20	19	20	15
DT25	38	5	26	42	41	31	31	30	30	39	42	39	33	25
DT26	27	26	16	26	24	17	17	17	20	20	18	24	21	16
DT29	46	45	39	50	39	41	37	28	-	41	45	48	42	31
DT30	44	42	34	45	38	36	34	29	38	41	42	45	39	29
DT33	45	44.5	38.5	46	37	33	34.5	35	-	31	41	48	39	30
DT34	32	29	23.5	34	22.5	18	20	17.5	19	19	25.5	33.5	24	18
DT36	38.5	35	30.5	43	49.5	36	29.5	36.5	41.5	45	37	37	38	29
DT37	23	27	18	23	21	17	15	17	18	18	20	21	20	15

Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted (1)
DT39	38	39	34	39	33	30	24	24	29	30	34	37	33	24
DT40	30	34	21	40	20	18	16	16	17	19	26	28	24	18
DT41	42	44	33	29	30	28	24	25	26	29	37	38	32	24
DT45	24	28	20	24	26	15	12	15	18	21	18	22	20	15
DT46	-	27	17	36	21	17	20	19	18	21	23	34	23	17
DT47	-	46	41	56	45	34	33	35	36	42	49	51	43	32
DT48	30	-	24	32	-	20	17	20	20	24	25	-	24	18
DT49	33	35	24	37	26	19	18	20	23	26	27	36	27	20
DT63	28	30	16	30	22	17	16	18	19	23	21	30	23	17
DT64	20	22.5	15	21	13.5	9.5	8.5	9	10	13	13.5	22	15	11
DT67	36	32	21	34	25	23	23	23	29	31	29	31	28	21
DT70	19	21.3	11.6	20.7	18	10.3	8	12	14.3	13.3	14.5	15.7	15	11
DT71	13.3	-	7.6	13.7	12.3	7	6	8	9.7	8	10	10.3	10	7
DT72	9	9.3	6.3	9.3	7.3	5	5	5	5.3	5	6	9	7	5
DT73	37	42	37	48	45	36	31	33	35	41	38	44	39	29
DT74	38	36	24	40	40	30	25	31	29	54	31	36	35	26
DT75	32.7	29	16	16.7	18.3	11.7	8.7	12.3	12	22.7	13.7	16.3	18	13
DT77	40	46	33	42	36	29	29	30	30	38	36	37	36	27
DT80	24	24	14	34	18	12	12	13	18	22	19	27	20	15
DT81	30	32	21	37	19	20	21	19	24	30	28	35	26	20
DT82	49	49.5	45.5	53	48.5	43.5	42.5	43.5	42	49	50	60	48	36
DT85	18	16.3	11.6	20.3	19.7	10.7	7.7	11	12.7	11.3	14.3	12.3	14	10
DT88	45	51	42	44	29	33	33	29	32	35	43	49	39	29
DT90	25	26	17	27	30	19	15	20	20	30	21	28	23	17
DT91	47	47	33	47	38	38	38	37	38	41	43	53	42	31
DT92	45	-	-	59	65	49	44	43	47	55	48	47	50	38
DT93	46	-	-	84	59	81	83	46	53	69	68	52	64	48
DT94	32	-	-	29	28	23	16	20	20	31	27	25	25	19
DT95	31	-	-	33	19	19	20	17	19	22	27	30	24	18
DT96	31	-	-	25	27	23	16	18	16	30	24	23	23	17
DT97	30	-	-	33	30	19	22	21	20	33	29	31	27	20
DT98	47	-	-	48	49	42	41	39	47	48	44	43	45	34
DT99	26	-	-	31	32	17	16	17	17	23	22	28	23	17
DT100	26	-	-	-	-	-	15	17	17	23	40	24	23	17
DT101	29	-	-	-	-	-	-	-	17	24	20	28	24	18

Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted (1)
DT102	64	-	-	-	-	-	-	-	-	-	46	83	64	48
DT103	14	-	-	-	-	-	-	-	-	-	11	18	14	10

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 2022

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

Additional Air Quality Works Undertaken by Aberdeen City Council During 2022

Aberdeen City Council has not completed any additional works within the reporting year of 2022.

QA/QC of Diffusion Tube Monitoring

UKAS plans to carry out an annual assessment of the laboratory in July 2023 to ensure laboratory guidance is being implemented. Following the relocation in May 2022 the laboratories nitrogen dioxide testing has been successfully reaccredited.

The laboratory participates in the Laboratory of the Government Chemist (LGC) AIR PT scheme. During 2022 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 2022, the Laboratory participated in all available rounds. The annual summary (produced by AEA Energy & Environment) indicated that all results were classified as "Good" throughout 2022 with a "Bias Correction Factor A" of 0.76.

Diffusion Tube Annualisation

Annualisation of data was carried out in accordance with LAQM (TG22), where data capture was less than 75% but greater than 33% for the following diffusion tube locations in 2022:

- Diffusion Tube DT15
- Diffusion Tube DT100
- Diffusion Tube DT101

Diffusion tubes DT102 and DT103 were not annualised due to data capture for the year being less than 33%.

Two urban background continuous monitoring sites that form part of the national monitoring network have been used to carry out annualisation of the diffusion Tube sites in 2022:

- Aberdeen Erroll Park
- Dundee Mains Loan

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 Erroll Park and Mains Loan is above 85% in 2022.

The DEFRA Diffusion Tube Data Processing Tool v3.0 was used to calculate the annualisation factor. Results are summarised in Table C.2.

Diffusion Tube Bias Adjustment Factors

Aberdeen City Council have applied a local bias adjustment factor of 0.75 to the 2022 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 03/23 advises to use 0.76 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.

In accordance with LAQM (TG22) the local bias factor adjustment tool, downloaded from the DEFRA Local Air Quality Management website (Diffusion Tube Data Processing Tool v3.0), 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. Only data with good precision has been used (coefficient of variation smaller than 20%).

Erroll Park is an urban background site while the other sites are roadside.

LAQM (TG22) 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 (TG22), 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 **0.75**. 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 Erroll Park, of **0.73**.

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor Roadside	Adjustment Factor Background
2022	Local	-	0.75	0.73
2021	Local	-	0.76	0.80
2020	Local	-	0.79	0.71
2019	Local	-	0.80	0.79
2018	Local	-	0.78	0.78

NO_2 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/m^3 and the monitoring site is not located at a point of relevant exposure (taking the limitations of the calculator into account).

No diffusion tube NO_2 monitoring locations within Aberdeen City Council required distance correction during 2022.

QA/QC of Automatic Monitoring

All equipment is subject to the QA/QC procedures recommended in LAQM (TG22). 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 Park, 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 NO_2.

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

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

FIDAS PM_{10} is corrected by dividing by 0.909.

FIDAS $PM_{2.5}$ is corrected by multiplying by 1.06.

For completeness, as recommended from the report compiled by Ricardo Energy & Environment for by the Scottish Government, both the corrected and uncorrected results, as reported on the SAQD website, are reported.

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 TG22 where there was insufficient data capture for Wellington Road $PM_{2.5}$ and PM_{10}.

Erroll Park and Dundee Mains Loan were the urban background continuous monitoring sites – that also form part of the national monitoring network – 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 2022.

The annualisation factor derived from Erroll Park and Mains Loan for $PM_{2.5}$ and PM_{10} data in 2022 were used to annualise the Aberdeen automatic sites data capture less than 75% but greater than 25%.

An annualisation summary is provided in Table C.2.

NO_2 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/m^3 and the monitoring site is not located at a point of relevant exposure.

No automatic NO_2 monitoring locations within Aberdeen City required distance correction during 2022. All roadside automatic monitoring sites not at point of exposure identified in Table A.3 recorded annual mean concentrations below 36µg/m^3 and therefore do require distance correction.

Erroll Park is an urban background site.

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

Site ID	Annualisation Factor Erroll Park	Annualisation Factor Dundee Mains Loan	Annualisation Factor Site 3	Annualisation Factor Site 4	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
CM4	1.085	1.169	-	-	1.127	10.373	11.92	Factors for PM10 annual mean
CM4	1.168	1.240	-	-	1.204	5.179	6.236	Factors for PM2.5 annual mean
DT15	0.859	-	-	-	0.859	12.0	10.3	Mains Loan not available due to low data capture
DT100	1.071	-	-	-	1.071	22.7	24.3	Mains Loan not available due to low data capture
DT101	0.933	-	-	-	0.933	22.3	20.8	Mains Loan not available due to low data capture

Table C.3 – Local Bias Adjustment Calculations

	Local Bias Adjustment Union St (CM1) Roadside	Local Bias Adjustment Market St (CM2) Roadside	Local Bias Adjustment Anderson Dr (CM3) Roadside	Local Bias Adjustment Wellington Rd (CM4) Roadside	Local Bias Adjustment King St (CM5) Roadside	Local Bias Adjustment Erroll Park (CM6) Urban Background
Periods used to calculate bias	12	11	12	12	11	12
Bias Factor A	0.75 (0.71 – 0.8)	0.68 (0.6 – 0.78)	0.91 (0.79 – 1.07)	0.68 (0.59 – 0.8)	0.75 (0.7 – 0.82)	0.73 (0.67 – 0.8)
Bias Factor B	33% (25% - 41%)	47% (28% - 66%)	10% (-6% - 27%)	47% (25% - 70%)	33% (22% - 43%)	38% (25% – 50%)
Diffusion Tube Mean (µg/m^3)	35	33	15	34	19	21
Mean CV (Precision)	3%	3%	4%	5%	4%	5
Automatic Mean (µg/m^3)	26.0	22	14	23	14	15
Data Capture	99%	100	98%	100%	99%	100%
Adjusted Tube Mean (µg/m^3)	26 (25 – 28)	22 (20 – 25)	14 (12 – 16)	23 (20 – 27)	14 (13 – 15)	15 (14 – 17)

Notes:

A combined local bias adjustment factor of 0.75 has been used to bias adjust the 2022 roadside diffusion tube results. Calculation in Table C.3a.

A single local bias adjustment factor of 0.73 has been used to bias adjust the 2022 urban background diffusion tube results.

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

Automatic roadside monitoring site	Bias B (%)
Anderson Drive	10
King Street	33
Market Street	47
Union Street	33
Wellington Road	47
Mean Bias B	34
Factor + 1	1.34
Inverse	**0.75**

Appendix D: Supporting Information Charts

Figure 1: Trend in NO_2 Annual Mean Concentration (µg/m^3) Continuous Monitoring Sites 2018-2022

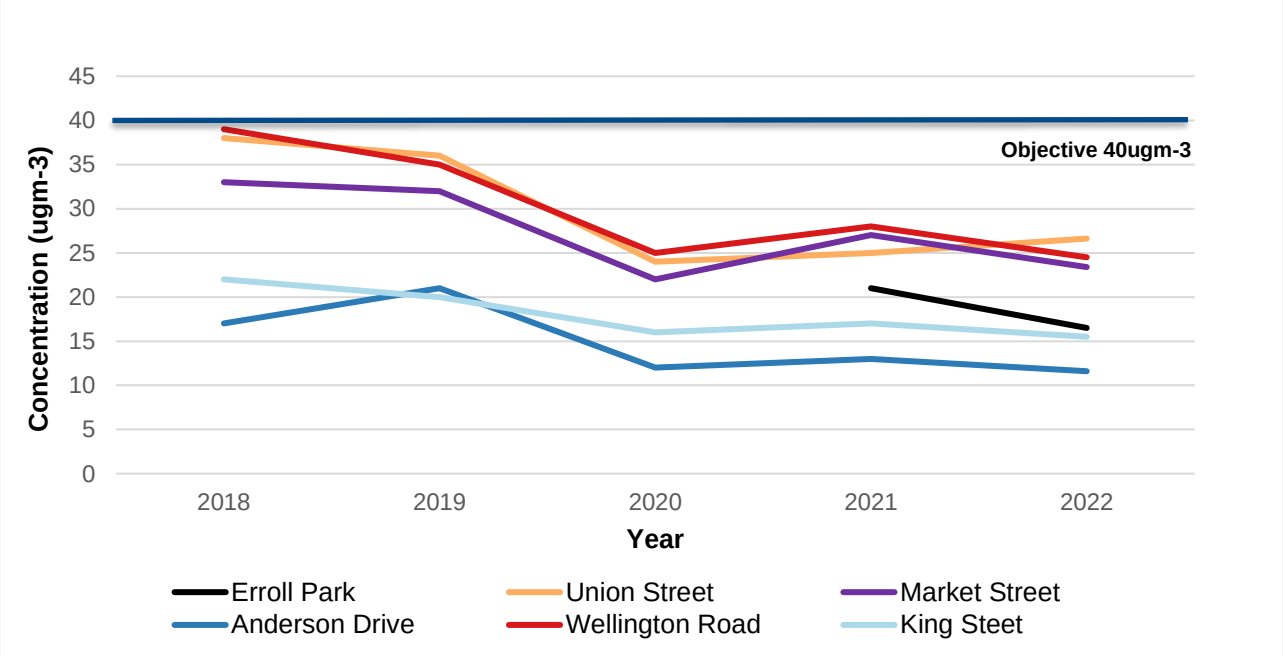


Figure 2: Trend in NO_2 Annual Mean Concentration (µg/m^3) Continuous Monitoring Sites 2018-2022

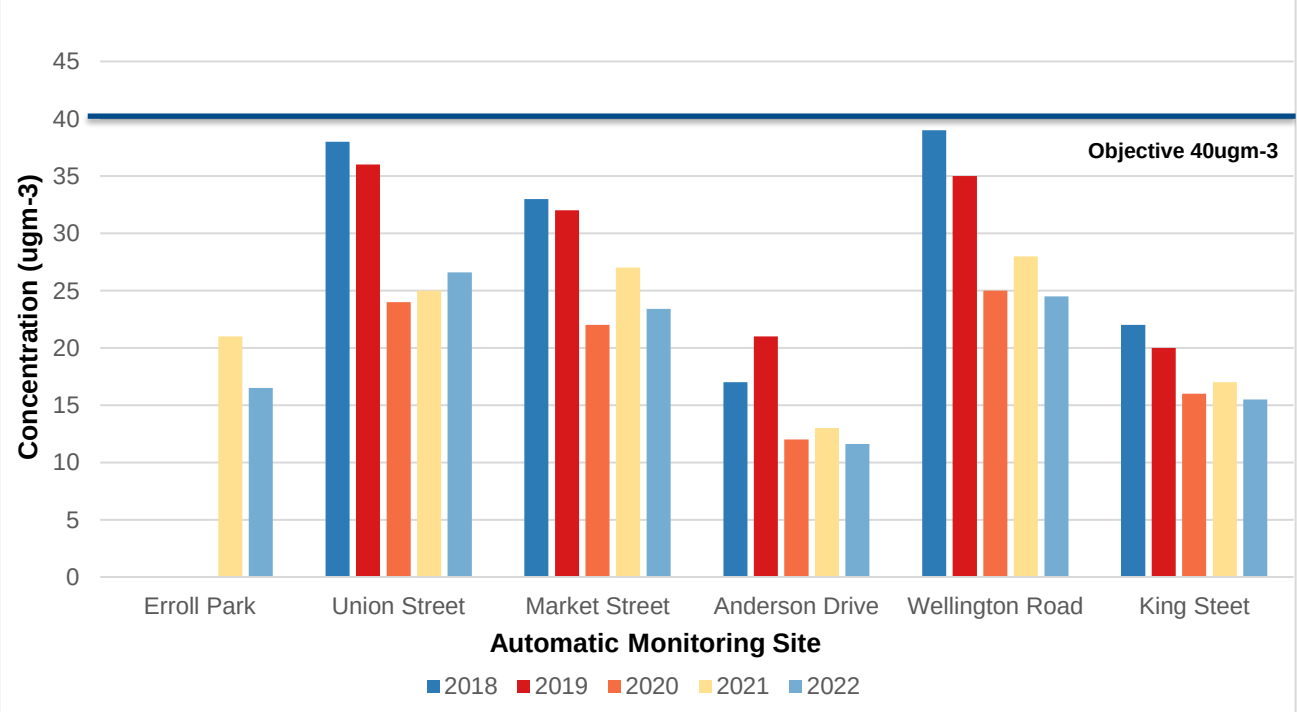
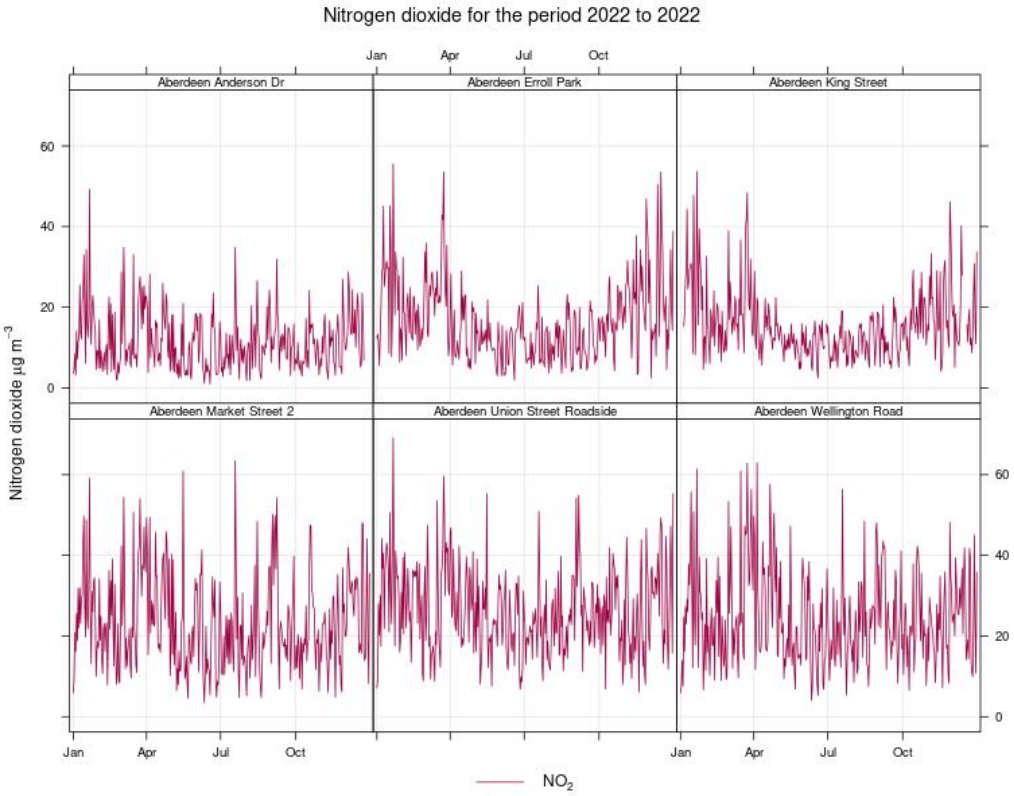
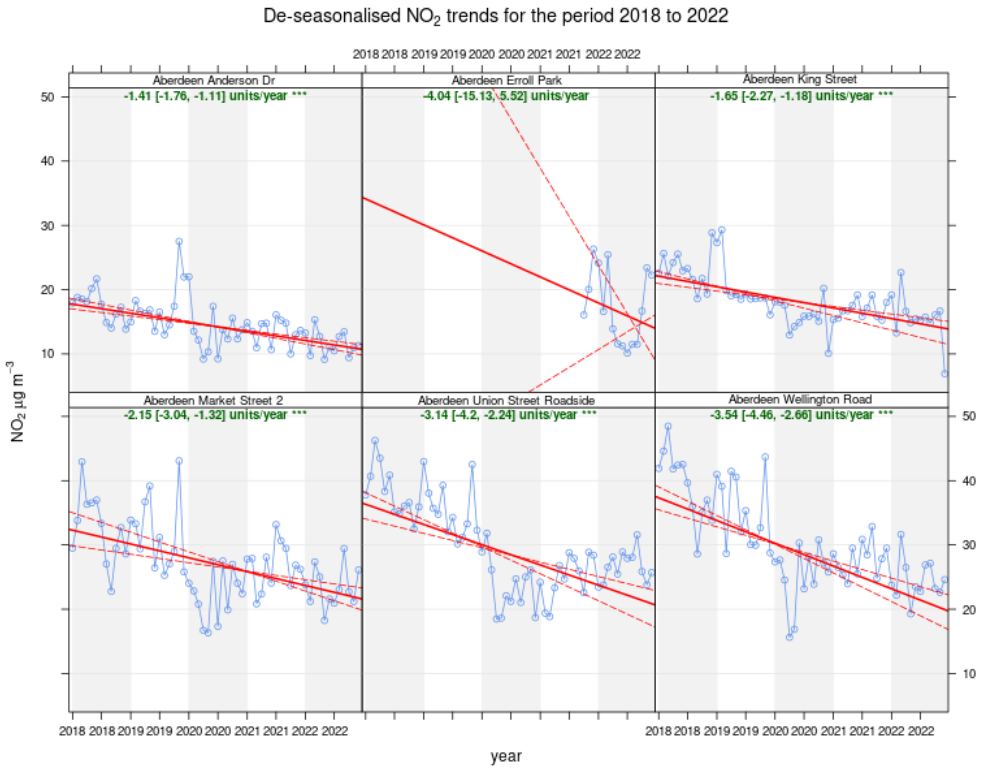


Figure 3: Time Series for NO_2 Daily concentrations at each Continuous Monitoring Site 2022



Source: (Ricardo Energy & Environment)

Figure 4: De-seasonalised NO_2 trends at each Continuous Monitoring Site 2018-2022



Source: (Ricardo Energy & Environment)

Figure 5: Trend in PM_{10} Annual Mean Concentration (µg/m^3) at each Continuous Monitoring Sites 2018-2022

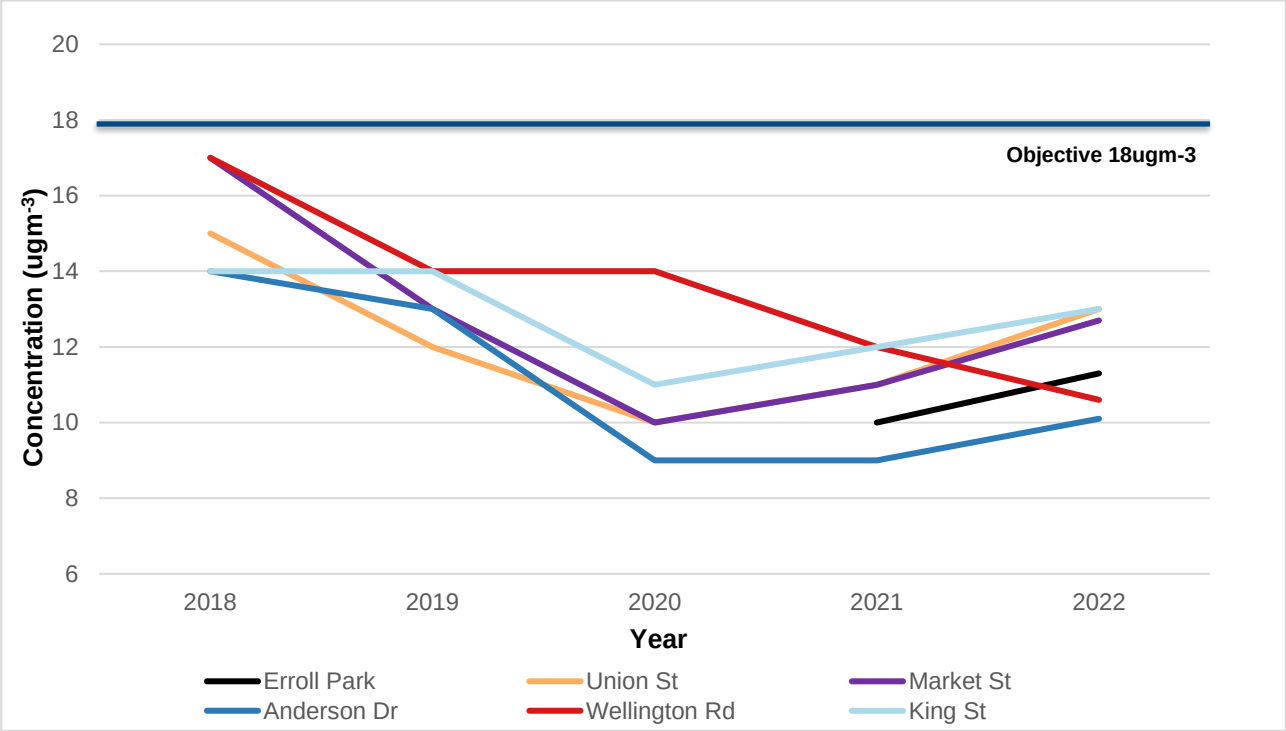


Figure 6: Trend in PM_{10} Annual Mean Concentration (µg/m^3) at each Continuous Monitoring Site 2018-2022

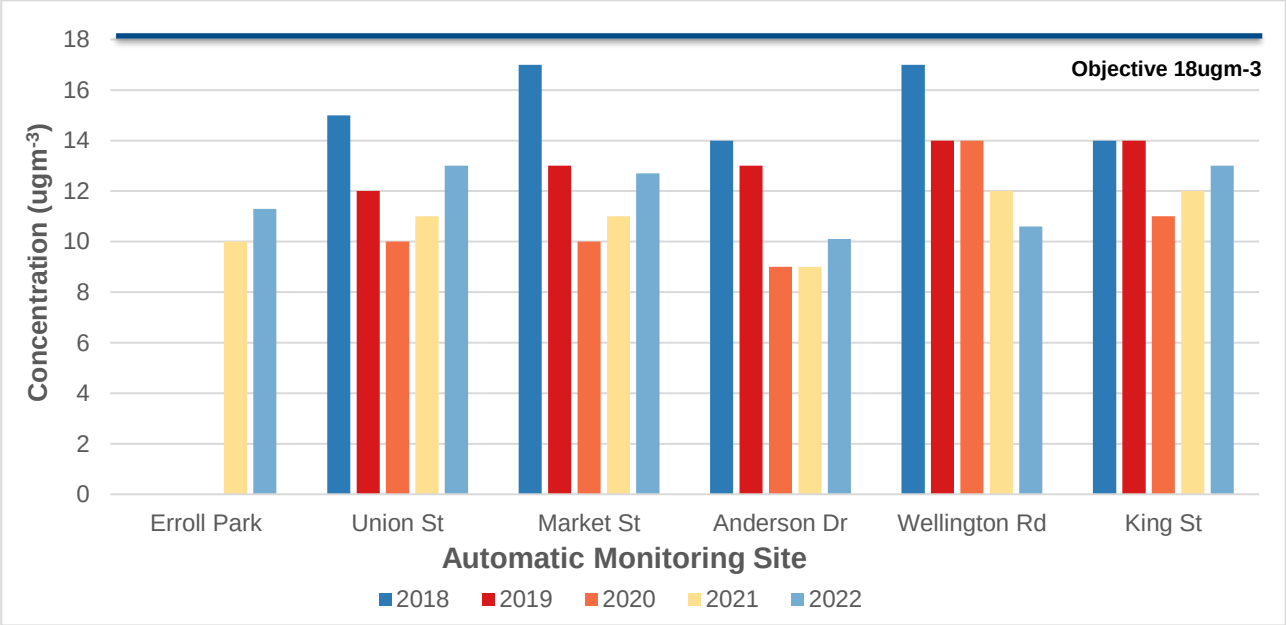
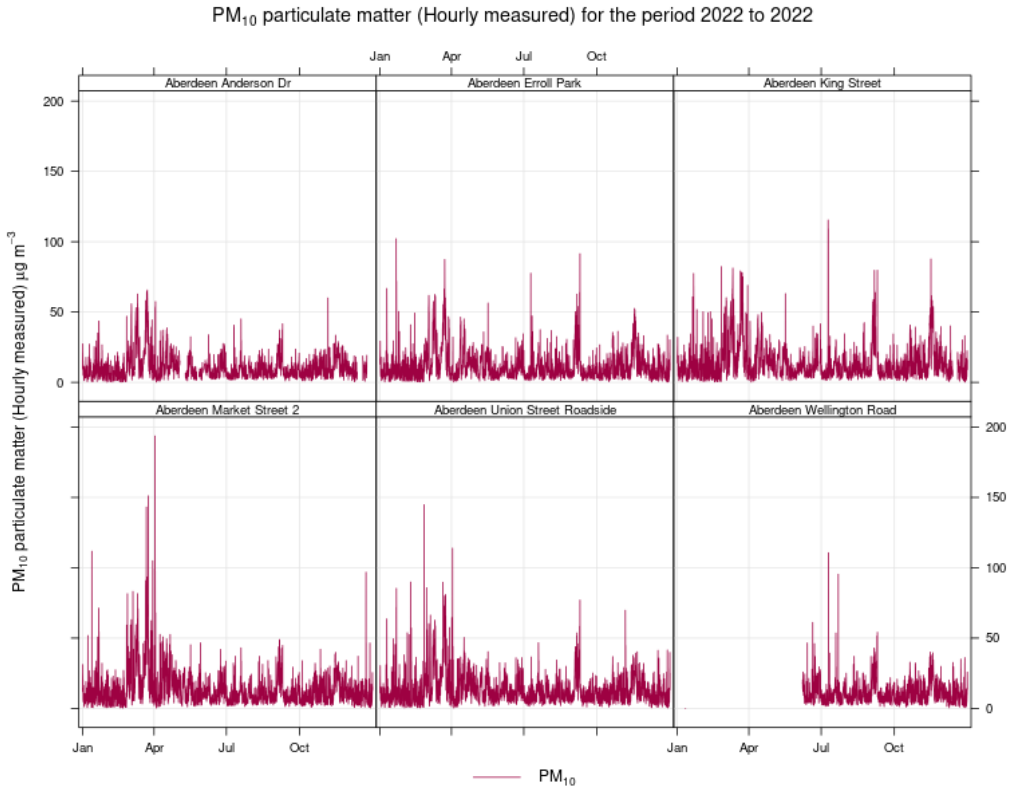
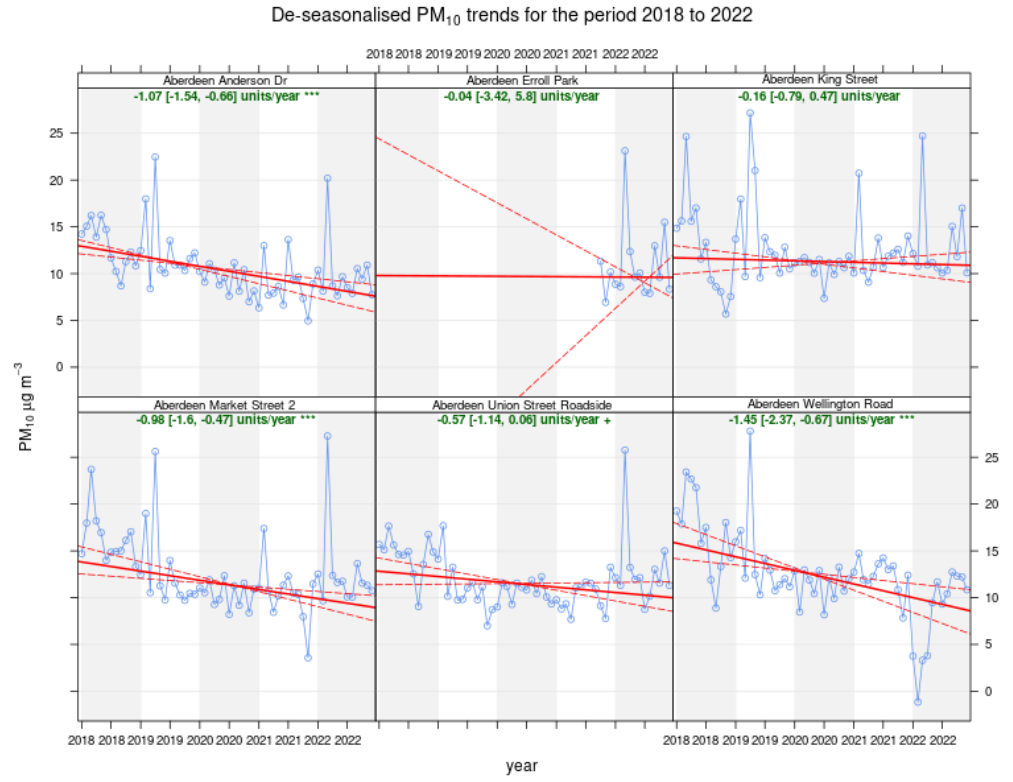


Figure 7: Time Series for PM_{10} Daily concentrations at each Continuous Monitoring Site 2022



Source: (Ricardo Energy & Environment)

Figure 8: De-seasonalised PM_{10} trends at each Continuous Monitoring Site 2018-2022



Source: (Ricardo Energy & Environment)

Appendix E: Monitoring Locations

Figure 1: Aberdeen City AQMAs and Automatic Monitoring Locations

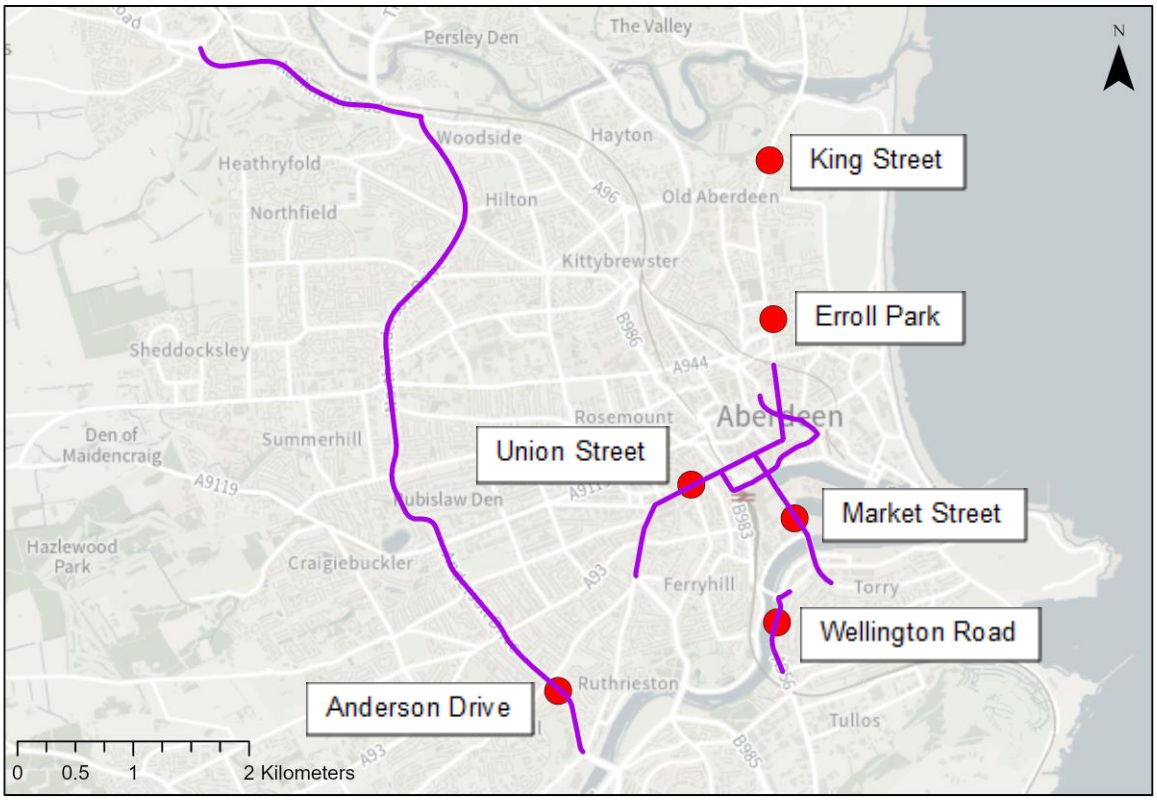


Figure 2: Aberdeen City-wide diffusion tube locations, separated into Plates 1-7

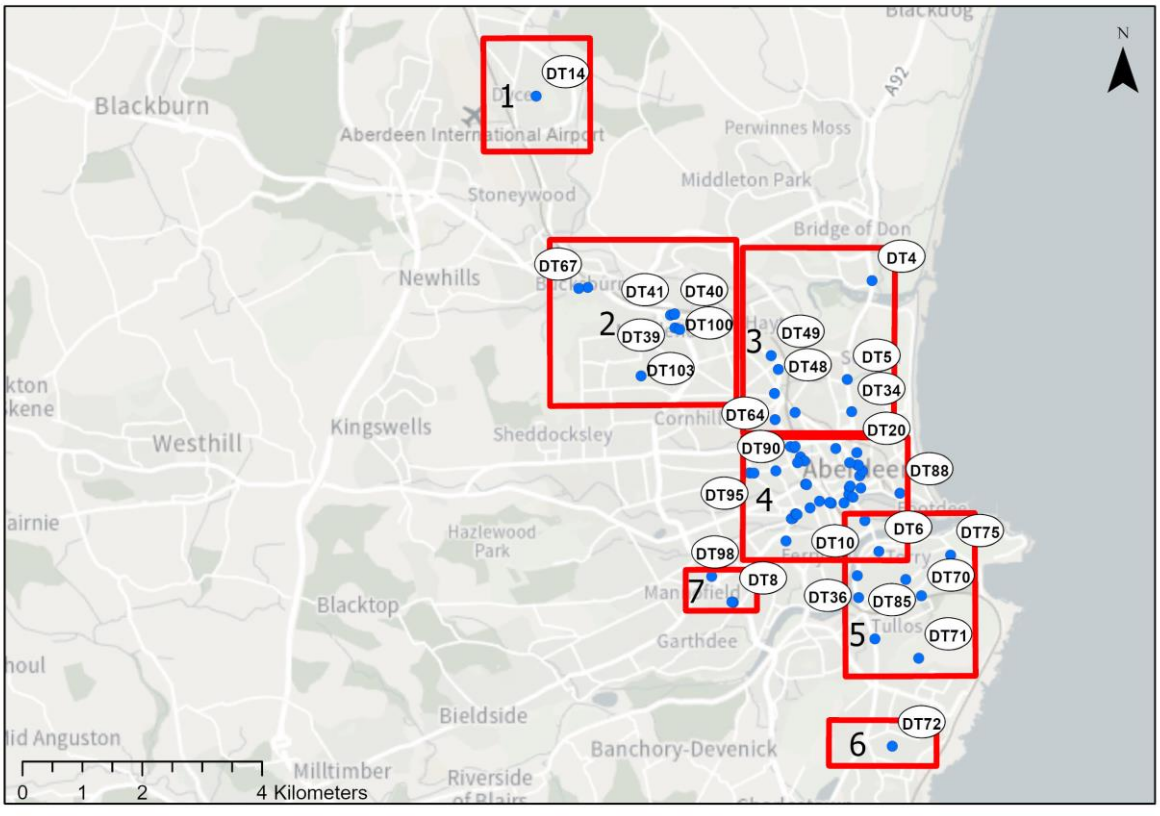


Figure 3: Plate 1 – Diffusion tube locations, Dyce

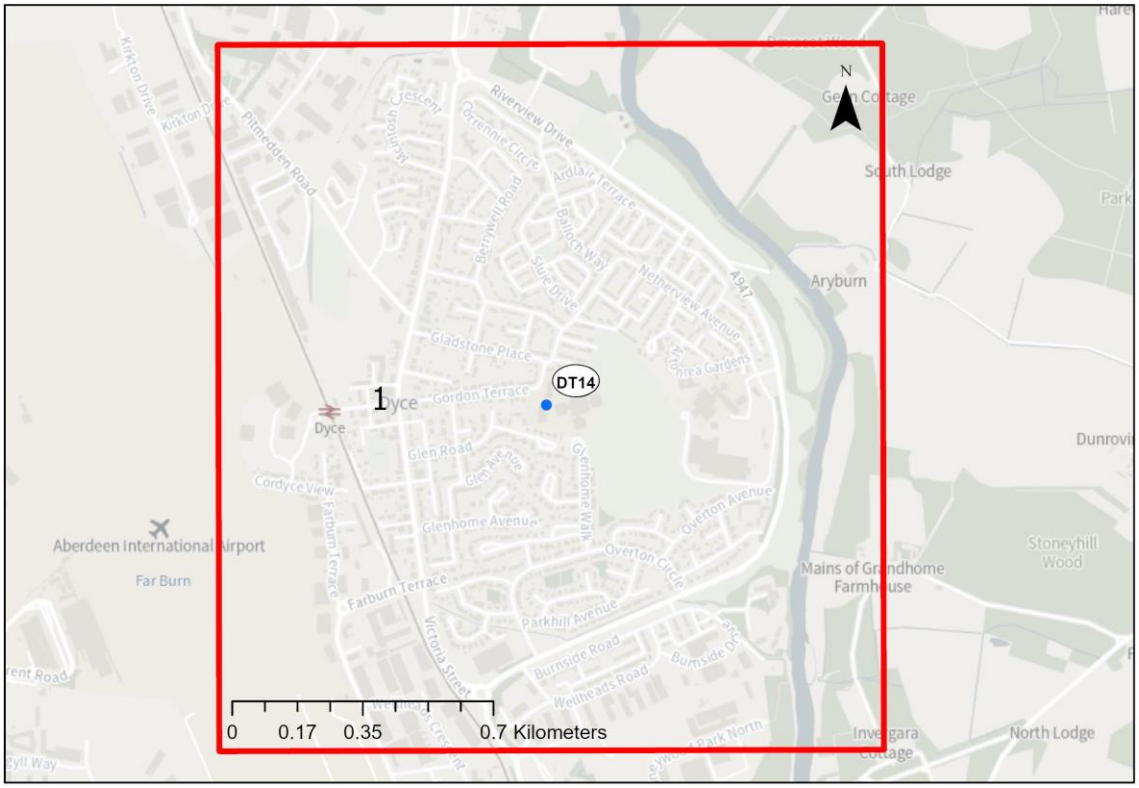


Figure 4: Plate 2 – Diffusion tube locations, Bucksburn

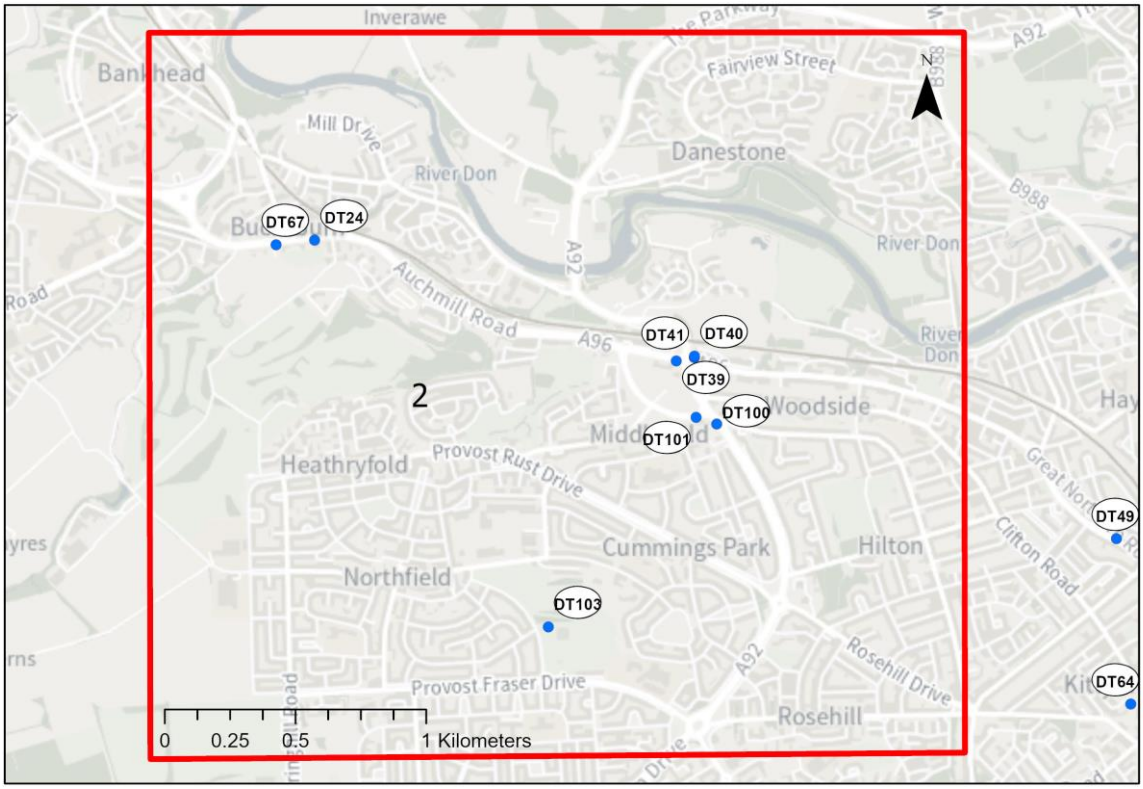


Figure 5: Plate 3 – Diffusion tube locations, Seaton/Kittybrewster

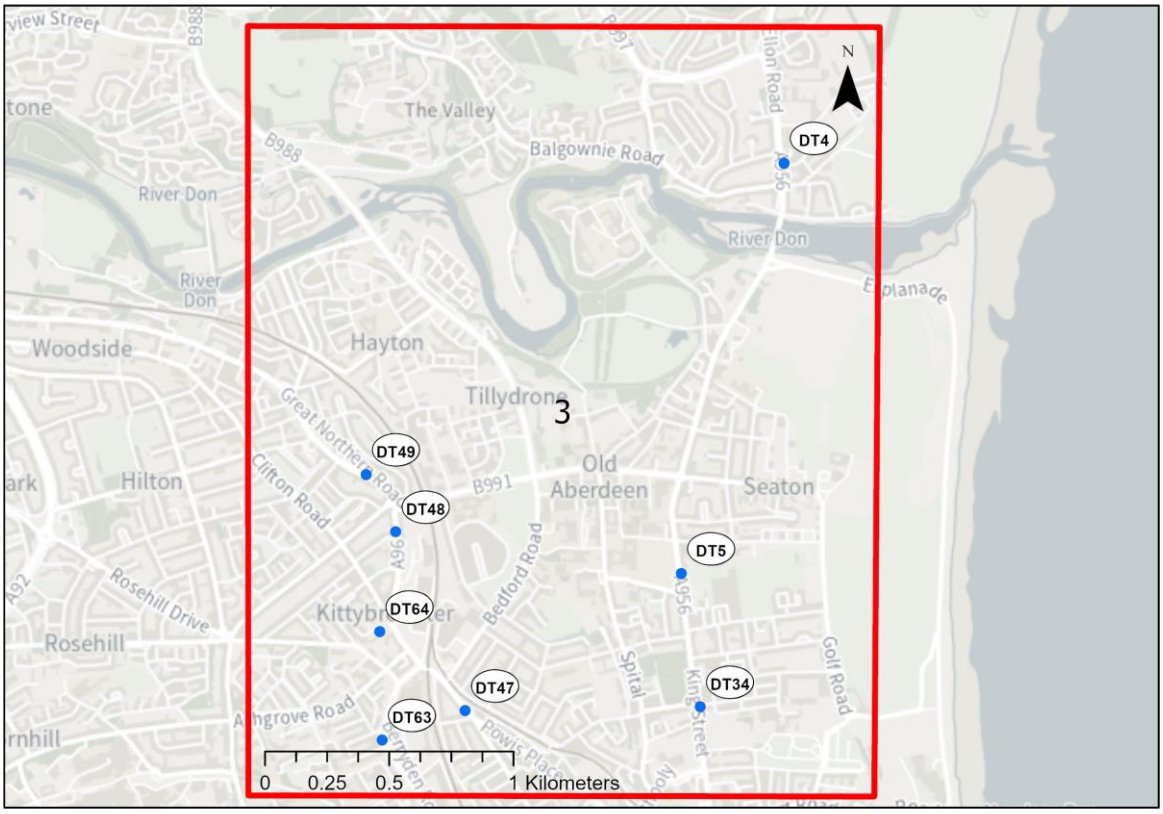


Figure 6: Plate 4 – Diffusion tube locations, City Centre

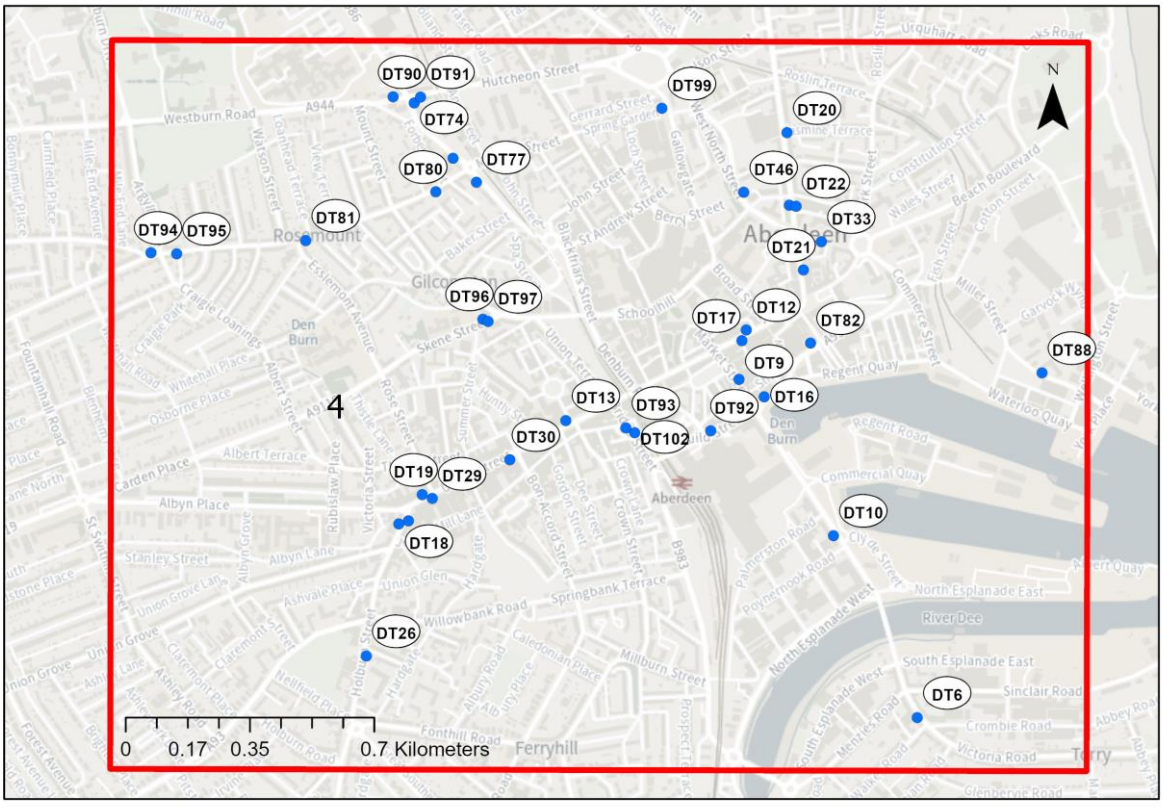


Figure 7: Plate 5 – Diffusion tube locations, Torry

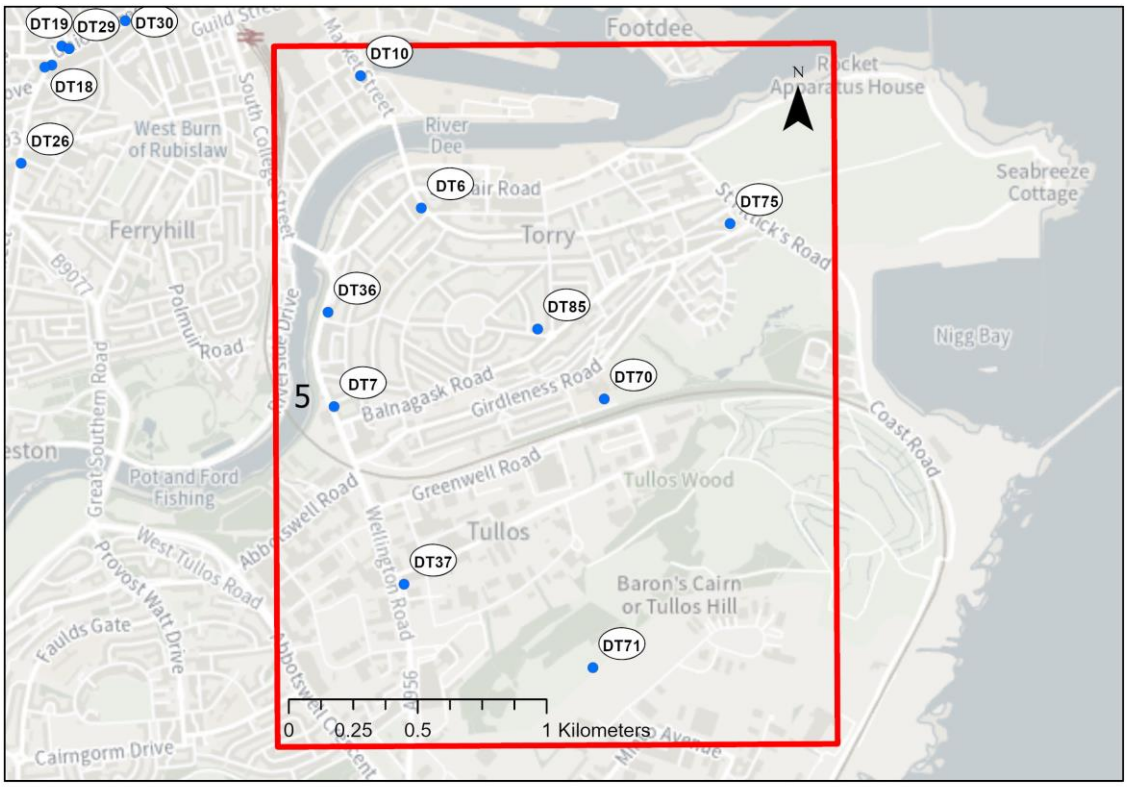


Figure 8: Plate 6 – Diffusion tube locations, Cove

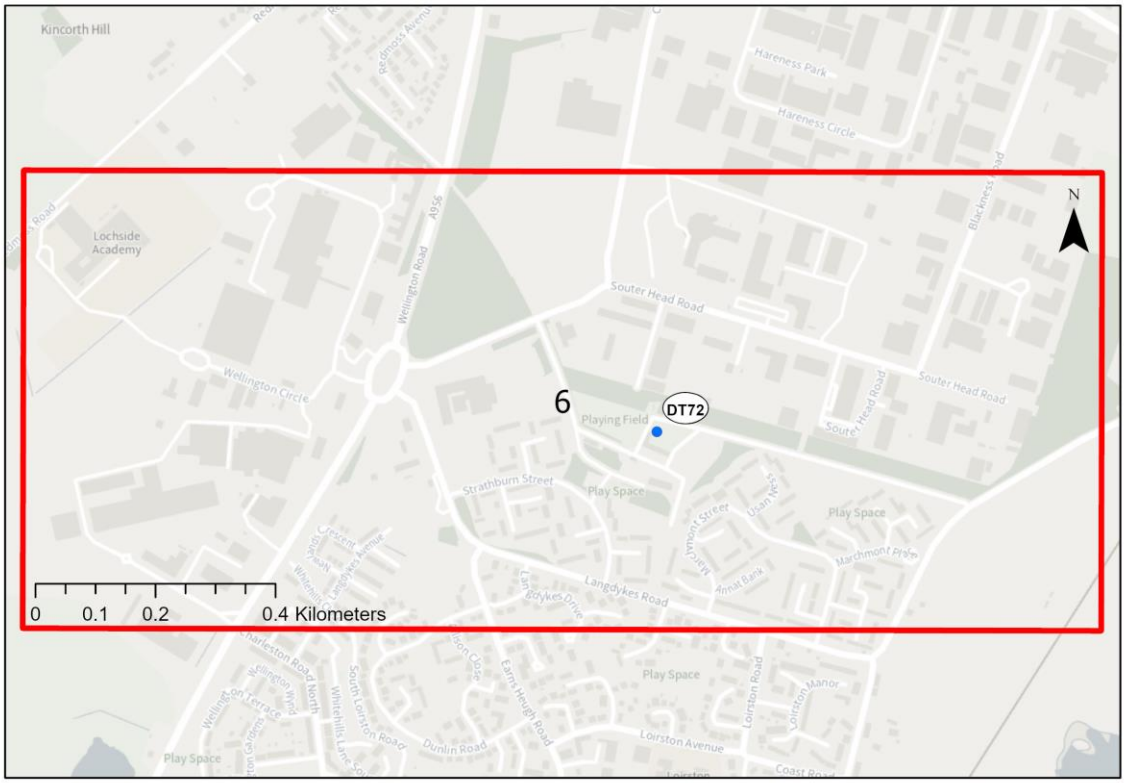
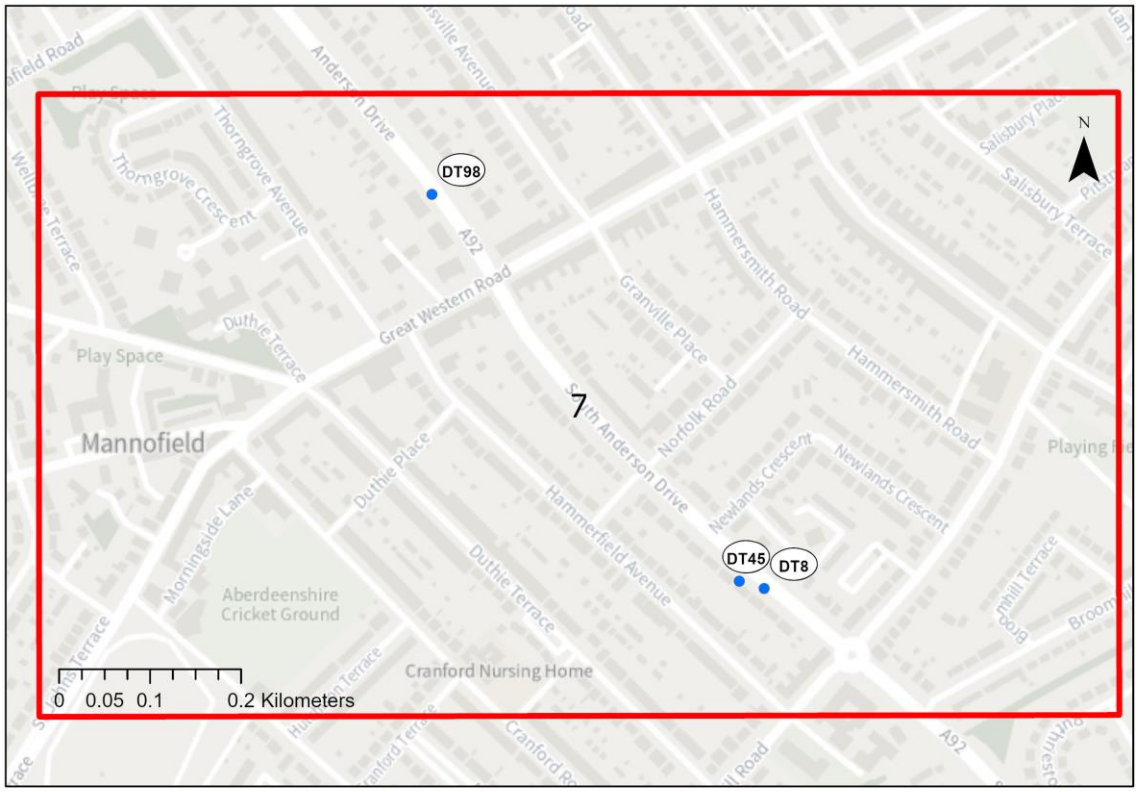


Figure 9: Plate 7 – Diffusion tube locations, Anderson Drive



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
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
LEZ	Low Emission Zone
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

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2. The Air Quality (Scotland) Regulations 2000
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5. Local Air Quality Management Policy Guidance, (PG) (S) (23), The Scottish Government, March 2023
6. Aberdeen City Council Action Plan, March 2011
7. 2022 Air Quality Annual Progress Report (APR) for Aberdeen City Council, June 2022
8. Equivalence study to investigate Particulate Matter monitoring in Scotland using the Fidas 200 report for Scottish Government, Ricardo, May 2023