THE CITY OF EDINBURGH COUNCIL

2020 Air Quality Annual Progress Report (APR) for The City of Edinburgh Council

In fulfilment of Part IV of the
Environment Act 1995

Local Air Quality Management

December 2020

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Executive Summary: Air Quality in Our Area

The report provides an annual update on the most recently available annual air quality monitoring data (2019), local pollutant trends and emerging issues, fulfilling the requirements of the statutory Local Air Quality Management Framework.

Air Quality in Edinburgh

The City of Edinburgh Council has declared six Air Quality Management Areas (AQMAs), five for the pollutant nitrogen dioxide (NO_2) and one for fine particulates (PM_{10}). A map of the AQMAs are available online at https://edinburghcouncil.maps.arcgis.com/apps/webappviewer/index.html?id=dc93485b492947d0b2182c75aca4c554 or https://www.edinburgh.gov.uk/pollution/local-air-quality-management/1

Maps are also found in Appendix E.

An AQMA is required when a pollutant fails to meet air quality standards which are set by the Scottish and UK Governments. Road traffic is by far the greatest contributor to the high concentrations of NO_2 in the city. However, the AQMA at Salamander Street declared for PM_{10} exceedances is due to other sources as well as traffic. Emissions from industrial and fugitive sources from operations in and around Leith Docks are a contributory factor.

Monitoring Data

During the monitoring period of 2019, City of Edinburgh Council monitored nitrogen dioxide (NO_2) at nine automatic monitoring locations and 158 non-automatic monitoring locations, four of which are duplicate sites and another five which are triplicate co-location sites. Exceedances of the NO_2 annual objective have continued to be monitored within St John's and the City Centre AQMAs, therefore these remain valid. Exceedances of the NO_2 annual objective were also reported within the Glasgow Road AQMA, however once distance correction calculations were carried out, the estimated concentrations were below 40µg/m^3 (Site 16 – 34.7µg/m^3, Site 58 – 39.7µg/m^3). Twenty-two diffusion tube monitoring locations reported annual exceedances in 2019, the majority of which are located within an AQMA, however five of these are located outside any designated AQMA boundary. Once distance correction calculations had been carried out where relevant, only two remaining locations continued to exceed the annual mean NO_2 objective – sites 48G

(Canongate) and 62B (Lothian Road). These are both newly deployed sites in 2019, and future year concentrations will be closely monitored. No monitoring locations reported annual concentrations in excess of 60µg/m^3.

For the third consecutive year, Great Junction Street AQMA has reported no breaches of the NO_2 annual objectives. A review will be undertaken to consider the potential revocation of the AQMA, particularly in relation to changing traffic management priorities in the area. With the Inverleith Row AQMA, there was no breach of the said objective for the second year in a row. Monitoring will continue to assess whether this AQMA can be revoked in the future.

St John's Road AQMA is also declared for exceedances of the NO_2 1-hour objective. 2019 is the fourth consecutive year in which less than 18 hourly concentrations greater than 200µg/m^3 were reported. Therefore, the Council will amend the AQMA to remove this designation.

PM_{10} and $PM_{2.5}$ monitoring data shows that for all locations, except Salamander Street, there are no breaches of the Scottish objectives. Salamander Street has reported a breach of the annual mean PM_{10} objective when using the local factor to adjust the TEOM data.

Trend analysis has shown that for NO_2, PM_{10}, and $PM_{2.5}$, concentrations are largely decreasing across Edinburgh. In some locations (Currie, NO_2, and Glasgow Road, PM_{10}) the concentrations are remaining stable, however no exceedances are located in these areas.

Actions to Improve Air Quality

Concentrations of the main pollutants of concern are decreasing at most locations across the city, although there remain areas where statutory legal objectives are being breached, especially traffic related nitrogen dioxide in the city centre. The development of a low emission zone is expected to reduce concentrations of nitrogen dioxide (NO_2). The objective for fine particulate matter (PM_{10}) continues to be exceeded in the Salamander Street Air Quality Management Area (AQMA), albeit marginally.

The Council has continued to make progress with a range of actions that will improve air quality. These include engaging with bus and freight sector to encourage

reduction in emissions from vehicles, implementing measures to deal with congestion and promoting modal shift away from car use.

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

- Continue ECO Stars scheme,
- Continue the roll out of telematics across the Council Fleet,
- Complete outstanding SCOOT development and repair work,
- Install on-street electric vehicle charging infrastructure to strengthen the existing network,
- Continue support for Active Travel Action Plan,
- Reconvene the Steering Group considering the PM_{10} Salamander Street Air Quality Action Plan to further develop the Draft Plan,
- Revise the existing NO_2 Air Quality Action Plan, in conjunction with the developing LEZ scheme, City Mobility Plan and the Cleaner Air for Scotland 2 Strategy,
- Continue on-going development work with SEPA, Transport Scotland and partners to develop the Low Emission Zone (LEZ) scheme under the National Low Emission Framework and the National Modelling Framework, and;
- Finalise a preferred LEZ scheme for Edinburgh, for public consultation and statutory processing, as per the developing regulations under the Transport (Scotland) Act 2019.

The Council will also need to undertake initial investigations for a new monitoring location representative of new or proposed residential properties near Leith Docks (west).

Local Priorities and Challenges

Continuing economic growth in the city and wider region presents a challenge for air quality. Population growth has inevitable demand for all modes of transport and supported infrastructure.

The Council is preparing a new Local Development Plan for Edinburgh called the City Plan 2030, which will set out policies and proposals for development in Edinburgh between 2020 and 2030. Alignment with local air quality management and

developing local and national air quality strategies will be crucial to ensuring sustainable economic growth.

How to Get Involved

Individual decisions can make a big difference to improving air quality for example, rethinking your journey to lower your pollution footprint.

Further information on how you can help improve air quality can be found by clicking on the link below:

http://www.scottishairquality.scot/what-can-i-do/

QuietRoutes are Edinburgh's walking and cycling routes, which avoid the busy main roads. The link below directs you to the route maps:

http://www.edinburgh.gov.uk/info/20087/cycling_and_walking/1475/explore_quietroutes

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1. Local Air Quality Management

This report provides an overview of air quality in Edinburgh during 2019. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Progress Report (APR) is summarises the work being undertaken by the City of Edinburgh 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		Date to be achieved by
	Concentration	Measured as	
Nitrogen dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	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
	18 µg/m^3	Annual mean	31.12.2010
Particulate Matter ($PM_{2.5}$)	10 µg/m^3	Annual mean	31.12.2020
Sulphur dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	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
Lead	0.25 µg/m^3	Annual Mean	31.12.2008

2. Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12 months, setting out measures it intends to put in place in pursuit of the objectives. A summary of AQMAs declared by the City of Edinburgh Council can be found in Table 2.1.

Further information related to declared AQMAs, including maps of AQMA boundaries are available online at http://www.edinburgh.gov.uk/airquality. The AQMAs can also be viewed on the Council's air quality monitoring network map at the following link: https://edinburghcouncil.maps.arcgis.com/apps/webappviewer/index.html?id=dc93485b492947d0b2182c75aca4c554

Edinburgh has declared six AQMAs in total, five are due to road traffic sources of nitrogen dioxide and one is related to different sources of particles (PM_{10}) including industrial and fugitive emissions, road traffic and re-suspended road dust.

Table 2.1 – Declared Air Quality Management Areas

Central AQMA	**Declared 31/12/2000**
Includes area of city centre and main arterial routes leading into the centre. Exceedances mostly in locations where there are street canyons, high percentage of bus movements and congested traffic. Residential properties at basement, ground, first, second, third, and fourth level, 2 – 4 metres from road edge. Busy shopping areas include Princes Street, George Street, Dalry/Gorgie Rd, Leith Walk, North Bridge, West Port, Grassmarket, London Road and Easter Road. Upwards road gradient Leith Walk, North Bridge (south bound) and West Port. **Source of pollutant** – traffic.	
Pollutant	**Amendments**
NO_2	**09/03/2009** Extended to include West Port – Amended to cover hourly breach as well as annual breach of NO_2 air quality objective. **26/04/2013** Extended to include Gorgie Road / Chesser, Grassmarket/Cowgate and London Road/Easter Road **07/09/2015** Extended to include Angle Park Terrace and Clerk Street/Nicolson Street areas
	Continued overleaf/…

St John's Road AQMA	Declared 31/12/2006
Part of the A8 route at Corstorphine area. Residential properties at ground, first, second, third and fourth floor level within 2m of kerb edge. Street canyon effect in part. Busy shopping area. Congested flat road with high percentage of bus movements. **Source of pollutant** – traffic.	
Pollutant	**Amendments**
NO_2	**09/03/2009** Amended to cover hourly breach as well as annual breach of NO_2.

Great Junction Street AQMA	Declared 09/03/2009
The full length of road to the depth of the building facades, including the Ferry Road Junction area. Residential properties at first, second, third and fourth floor level. Street canyon, congested traffic and busy shopping area. Receptors close to road edge. High percentage of bus movements. **Source of pollutant** - traffic	
Pollutant	**Amendments**
NO_2	**26/04/2013** Extended to include Bernard Street, Commercial Street and North Junction Street.

Glasgow Road AQMA	Declared 26/04/2013
Part length of A8, between Newbridge Roundabout and Ratho Station, to the depth of the building facades. **Source of pollutant** – traffic.	
Pollutant	
NO_2	

Inverleith Row AQMA	Declared 26/04/2013
The road comprising the junction of Inverleith Row and Ferry Road, to the depth of building facades. **Source of pollutant** – traffic.	
Pollutant	
NO_2	

Salamander Street AQMA	Declared 20/01/2017
A section of the A199 including Salamander Street, Baltic Street, Bernard Street, and part of Seafield Road; an area to the north east as far as the East Sands of Leith and south of Baltic Street, extending to Queen Charlotte Street and Links Place **Source of pollutant** industrial, fugitive emissions, traffic, re-suspended road dust	
Pollutant	
PM_{10}	

2.2 Cleaner Air for Scotland

Cleaner Air for Scotland – The Road to a Healthier Future (CAFS) is a national cross-government strategy that sets out how the Scottish Government and its partner organisations propose to reduce air pollution further to protect human health and fulfil Scotland's legal responsibilities as soon as possible. A series of actions across a range of policy areas are outlined, a summary of which is available at https://www.gov.scot/Publications/2015/11/5671/17. Progress by the City of Edinburgh Council against relevant actions within this strategy is demonstrated below. A draft new Air Quality Strategy, CAFS2, was released for consultation in October 2020.

2.2.1 Transport – Avoiding travel – T1

The City of Edinburgh Council is in the process of developing a new travel plan. Smarter Choices, Smarter Places funding has been utilised to recruit a travel planning officer who will be responsible for implementing the new Plan.

Smarter Choices, Smarter Places funding has also enabled the Council to co-ordinate workplace travel planning activity in large workplace sites in the city since August 2015. Transport planning consultants at SWECO and Stantec/Steer have been delivering this on the Council's behalf, and this has evolved from providing workplaces with free travel advice roadshow events and other promotional measures in the early years of the programme, to producing a toolkit to help employers to determine the specific transport issues their workplace faces, whether this be low awareness of how employees are travelling to work, low awareness of funding available to make facilities based improvements or advice on supporting employees with home-working. The Council will continue to develop this toolkit and develop the sustainable travel measures available to individuals working for the Council, as one of the city's major employers.

Complementary to this, the Council has also received funding to continue work with schools and offer community-based travel planning, which can include public events, road safety education, travel packs for social housing and major events travel planning.

2.2.2 Climate Change – Effective co-ordination of climate change and air quality policies to deliver co-benefits – CC2

Scottish Government expects any Scottish local authority which has or is currently developing a Sustainable Energy Action Plan to ensure that air quality considerations are covered.

The City of Edinburgh Council has a Sustainable Energy Action Plan (SEAP). This was launched in 2015 with the aim of reducing carbon emissions across the city by 42% by 2020. The vision is that Edinburgh will transform its energy use by reducing demand and encouraging local generation. These benefits will also help to improve air quality, alleviate fuel poverty, and create local jobs and more sustainable communities.

The SEAP is currently being delivered through five programme areas. These are energy efficiency, district heating, renewables, resource efficiency and sustainable transport. One of the SEAPs key outcomes will be to reduce levels of air pollution, aligning with the City's Air Quality Action Plan. Many of the key carbon reduction actions currently underway in the SEAP will have a positive impact on air quality. These include increasing the amount of electric vehicle charging infrastructure in Edinburgh; the energy retrofit of many non-domestic and domestic properties across the city; and the installation of renewable heat technologies such as air source and ground source heat pump systems.

2.2.3 Transport – Active Travel (T3)

The Council produced an Active Travel Action Plan (ATAP) in 2010, which was updated in 2016 and is due a further review in 2020. The Plan aims to deliver significant increases in the number of pedestrian and cycling journeys travelled within Edinburgh. The ATAP as well as bringing health benefits will assist in encouraging modal shift away from car use. The plan has set targets of 35% of all Edinburgh adult residents' trips being made by walking and 10% by bicycle by 2020.

A core element of the plan is the development of the 'QuietRoutes' cycle network which will enable people to travel around the city on safe routes away from the busier roads. Several major and smaller cycling and pedestrian schemes have been delivered and additional schemes are in progress. The active travel improvements programme, showing routes which are being designed and improved can be downloaded; https://www.edinburgh.gov.uk/cycling-walking/cycling-walking-projects

Cycling has become a more attractive travel option due to bold measures such as the new segregated path on Buccleuch Street. This is a key link in Edinburgh's walking and cycling network and the National Cycle Network, forming a single route from the Meadows to the Innocent Railway Tunnel in Holyrood Park. This then follows an old railway route to Duddingston, Brunstane and Musselburgh, creating a major cycling corridor in the south east of the city providing the opportunity to travel this route by bike, without having to dismount or negotiate busy junctions. New crossings have been created to permit cycling, and an alleyway at Gifford park was opened up, flanked by two community murals, to provide a safe and attractive route for people to make everyday journeys on foot and by bike.

Segregated cycle lanes offer real protection from traffic. Being serious about road safety and encouraging more people to travel by bike makes this kind of facility crucial. As a result, further roadside segregated cycle paths have been constructed on large sections of Leith Walk. The success of these routes will hopefully continue this momentum of rolling out safer, more accessible schemes further and faster across the city.

To monitor levels of walking and cycling over time, there are cycle and pedestrian counters across the city. Progress of ATAP actions have been reviewed in 2013 and 2015. Increases in active travel for cycling and walking are shown below in an extract from the Plan (Table 2.2).

Table 2.2 – ATAP progress for cycling and walking

Activity	2011 Data	2014/15 Data	2020 Target
Cycling			
% of all Edinburgh residents' trips	-	3%b	10%
% of trips to work by Edinburgh residents	4.9%a	7.3%b	15%
Walking			
% of all Edinburgh residents' trips	-	32%b	35%
% of trips to work by Edinburgh residents	18.2%a	20%b	21%
School cycling training			
% of P6/P7 children provided with on-road cycle training	-	63%	72%

a 2011 Census
b Scottish Household Survey 2015 and Edinburgh Bike Life report

Analysis of travel to work data indicates that in most parts of Edinburgh walking mode share could be increased by 10% to 20%. The City of Edinburgh Council is currently working towards improvements to bike life in the City in the following ways:

- Connecting missing links between key trip generators and sections of the QuietRoutes Network to create a safe, convenient, and seamless network;
- Planned upgrades to the city's existing QuietRoutes Network will continue to make cycling without mixing with busy traffic a realistic travel choice,
- Committed 10% of the Roads and Transportation budget in to cycling and walking,
- Increase modal shift towards walking and cycling - developing a city that is attractive and safe for people on bikes, whatever their age or ability,
- Complete the City Centre West to East Link (CCWEL) - the extensive network of routes is missing a vital link along its west-east axis across the city centre, and;
- Collaborating with Sustrans in developing projects for cycle network infrastructure which aims to rebalance streets for people, especially in West Edinburgh and the City Centre, with plans to transform some of the most car dominated parts of the city into safe and attractive places for pedestrians and cyclists.

2.3 National Low Emission Framework (NLEF) Stage 1 Screening Appraisal

A key element of the current CAFS strategy is the National Low Emissions Framework NLEF[1], which was published in January 2019. The NLEF provides a methodology for local authorities to undertake air quality assessment to inform decisions on transport related actions to improve air quality, where transport is identified as the key contributor to local air quality problems. It is designed to support and build on the work already being done through Air Quality Action Planning, incorporating elements of the CAFS strategy into the Local Air Quality Management (LAQM) regime.

Completion of NLEF screening assessments is a component of the 2017/18 Programme for Government (PfG) commitment that Scottish Government will 'with local authorities, introduce Low Emission Zones (LEZs) into Scotland's four biggest

[1] https://www.gov.scot/publications/national-low-emission-framework/pages/2/

cities between 2018 and 2020, and into all other Air Quality Management Areas (AQMAs) by 2023 where the NLEF appraisals advocate such mitigation'.

Given that there is a commitment is to ensure a LEZ in Edinburgh, as one of the four biggest Scottish Cities, the screening process is not necessary.

Further details on LEZ development is detailed below.

2.4 Progress and Impact of Measures to address Air Quality in the City of Edinburgh

The City of Edinburgh Council has taken forward a number of measures during the current reporting year 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 and the following plans and strategies.

The Council's existing 5-year local transport strategy is due to be replaced by a 'City Mobility Plan' (CMP), that will cover a 10-year period to 2030 and determine the strategic direction for mobility, set objectives, and inform related priorities, resources, and investment. The Council consulted on a draft City Mobility Plan in 2020 and is intending to finalise the Plan early 2021;
http://www.edinburgh.gov.uk/download/downloads/id/3525/local_transport_strategy

The Council's current Active Travel Action Plan (ATAP) covers the period 2010-2020. Initial funding of £65,000 was secured from Sustrans Scotland's 2019/20 'Places for Everyone' programme to take forward the development of a new 10-year plan for 2020-2030;
http://www.edinburgh.gov.uk/downloads/file/7316/active_travel_action_plan_2016_refresh

The Public and Accessible Transport Action Plan was updated in 2020;
http://www.edinburgh.gov.uk//download/downloads/id/357/public_and_accessible_transport_action_plan

A road map for moving forward the ambitious target to deliver a carbon neutral Capital by 2030 has been set out by the City of Edinburgh Council. The 'short window improvement plan' outlines 37 immediate and short-term actions across all areas of Council business such as planning, transport, housing, energy, education,

tourism, culture, festivals, economic development, waste/recycling, parks, biodiversity/green infrastructure, our communities and partners. https://democracy.edinburgh.gov.uk/documents/s9896/Item%204.1%20-%20Achieving%20Net%20Zero%20in%20the%20City%20of%20Edinburgh.pdf

The Council approved a City Centre Transformation plan to ensure a people-focused Capital City Centre. It outlines a programme to enhance public spaces to better support life in the city, by prioritising movement on foot, by bike and by public transport. The Council will therefore need to undergo a re-evaluation of traffic management priorities in the City Centre, while also taking cognisance of the development of the Low Emission Zone and the emerging City Mobility Plan. https://www.connectingedinburgh.com/citycentre

'Open Streets' is the name given to the Council's programme of monthly street closures, that aim to help people experience the city in a quieter, more people-focussed environment, while helping the Council to monitor congestion, and travel behaviours, to inform future plans. The programme launched in May 2019, however due to the pandemic events were cancelled in 2020.

https://www.connectingedinburgh.com/open-streets/open-streets-1?documentId=9&categoryId=6

The conditions for taxis and private hire cars licences have been altered to help improve air quality. Emissions reduction is expected through the introduction of an age limitation and vehicle engine (emission) policy. As of 1 April 2020, any new licensed taxi or PHC vehicle (or a replacement vehicle under an existing taxi/PHC licence) was to be Euro 6 engine standard. However, in response to the COVID-19 pandemic the policy timescales were extended to alleviate pressure on the sector. The extension of these dates allows licence holders to retain existing vehicles for a longer period (18 months) than would previously have been allowed. Although there are no changes to the policy in respect of Euro 0-4 vehicles and they must be replaced upon the expiry of their current licence. (Unless an exemption has already been granted).

2.4.1 Completed measure

Key completed measures from the AQAP and LTS are set out below including outcomes if known:

Transport Planning and Infrastructure Projects

Tramline 1

The Trams operate from Edinburgh Airport to a temporary stop at York Place in the city centre, becoming operational on 30th May 2014. Passenger journeys have increased each financial year since 2014/15. Construction on the agreed extension from York Place to Newhaven/Leith started in Autumn 2019, with passenger services anticipated in 2023. The annual forecast demand, with the extension, is 15.7 million journeys in 2023.

Rail Improvements

In recent years, new rail lines have been constructed which serve the Edinburgh area. It is anticipated that air quality benefits to the city are being delivered due to commuter model shift from road to rail.

Alternatives to private vehicle use

Park and Ride (P&R)

The City of Edinburgh Council has several Park and Ride locations around the periphery of the city boundary and is also served by Park and Rides in East Lothian, Midlothian and Fife. The current number of spaces available has the potential to reduce the two-way daily work commuter traffic by 11,280 vehicles if operated at maximum capacity.

Newcraighall and Wallyford also have rail accessibility and Ingliston is connected to Edinburgh Trams service. There was a slight decrease in usage at Ingliston between 2018 and 2019, while at Hermiston usage increased slightly over the same period. Details are shown in Table 2.3. Straiton continues to average around 30,000 cars per year. Usage for the other park and ride sites was not known at time of reporting.

Land has been acquired at Hermiston for development of the P&R extension, however funding has yet to be allocated. This would more than double the capacity.

Table 2.3 Ingliston and Hermiston Park and Ride usage

	2012	2015	2016	2017	2018	2019
Ingliston	79,740	195,587	227,231	255,952	284,640	281,921
Hermiston	N/A	N/A	103,055	103,690	101,856	104,919

N/A - Not available

Traffic Management

Newbridge Roundabout (Glasgow Road AQMA)

The 'non-cable linked fixed- time' traffic signalling which controlled Newbridge Roundabout was replaced in 2015 with a Microprocessor Optimised Vehicle Actuation (MOVA) system. This system became fully operational in February 2016 and vehicle time delays were assessed showing that there has been a significant reduction in waiting time on the A8 westbound corridor, as previously reported.

In terms of non-automatic air quality monitoring carried out using passive diffusion tubes in 2019, sites within the area continue to report annual mean concentrations in exceedance of the annual mean objective (40µg/m^3) at the point of measurement. However, these two sites (58 and 16) are not at a location of relevant exposure. Following distance correction calculations both report a concentration below 40µg/m^3, with site 58 being within 10% of the objective (39.7µg/m^3). This is the first year where concentrations at relevant receptors in the Glasgow Road AQMA met the objective. However, exceedances of the NO_2 annual objective have continued to be monitored at the point of measurement.

Historically, Transport Scotland have received complaints about queuing on the M9 slip, leading to the Newbridge roundabout and consideration has been given to alternations to the roundabout. Air quality would have to be a major factor in any changes, as concentrations remain above the legal objective.

Reduction of speed limits, 20mph zones

The City of Edinburgh Council has introduced a 20mph speed limit across parts of the city, covering the city centre, main shopping streets and residential areas while retaining a strategic network of roads at 30mph and 40mph. The scheme has been introduced primarily for road safety purposes; however, it is also anticipated to

improve travelling conditions across the city for walking and cycling, which will encourage modal shift. There is uncertainty with respect to any direct improvements it will have on air quality. The project monitoring framework will take cognisance of (LAQM) pollution concentration trends analysis.

Vehicle Fleet Efficiency

Driver training and ECO driving aids

The Council plans to install a telematics system in all Council vehicles with a view to providing data which would enable effective management of the fleet and contribute to the Council's wider aims of air quality improvement and carbon reduction targets. Installation on the HGV fleet is currently underway. Some delays have occurred with the pandemic response; however, the Waste fleet is nearing completion. This was targeted first as it is the heaviest fleet in terms of fuel usage and emissions. The Council proposes to address engine idling, reduce size of the fleet, and determine the potential for alternative fuel vehicles, such as electric or dual hybrid systems, with the information gained from the telematics data.

2.4.2 Ongoing measures

Vehicle Fleet Efficiency

Promoting low emission public vehicles

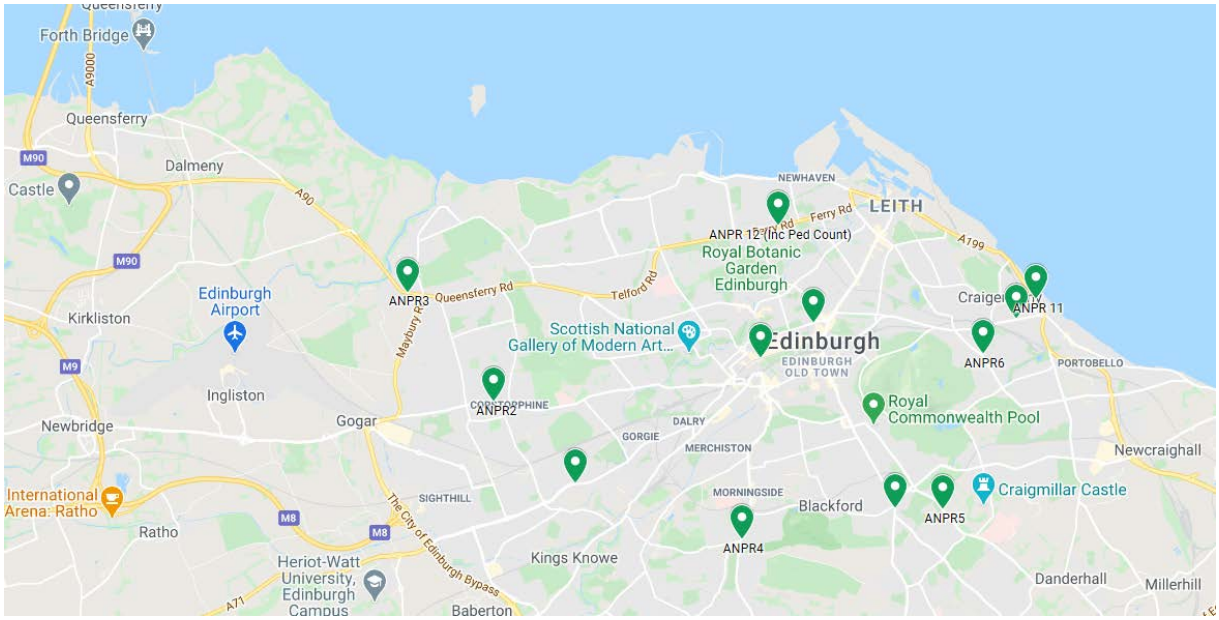
Bus companies operating in Edinburgh are engaged with the Council, in respect to promoting low emission vehicles, especially in relation to the Low Emission Zone work.

In 2020, the COVID-19 pandemic has had a serious impact on society which has resulted in a significant downturn in public transport patronage. Bus and tram demand reduced considerably since March and there are likely longer-term consequences that will impact the financial viability of the sector.

Given the circumstances, an update on the main operator's bus fleet was not obtained in 2020. Alternatively, an analysis of the buses operating on main arterial routes in Edinburgh was undertaken. As a part of the Council's on-going work under the National Low Emission Framework, traffic data has been gathered at a number of select locations across the city in 2016, 2019 and 2020. The 2016 Automatic Number Plate Recognition (ANPR) data was analysed with the Euro class standard for each

bus advised by the operator. The DVLA assumed Euro standard was used for the analysis in 2019, 2020, which is likely to give less accurate representation, albeit sufficient for these purposes.

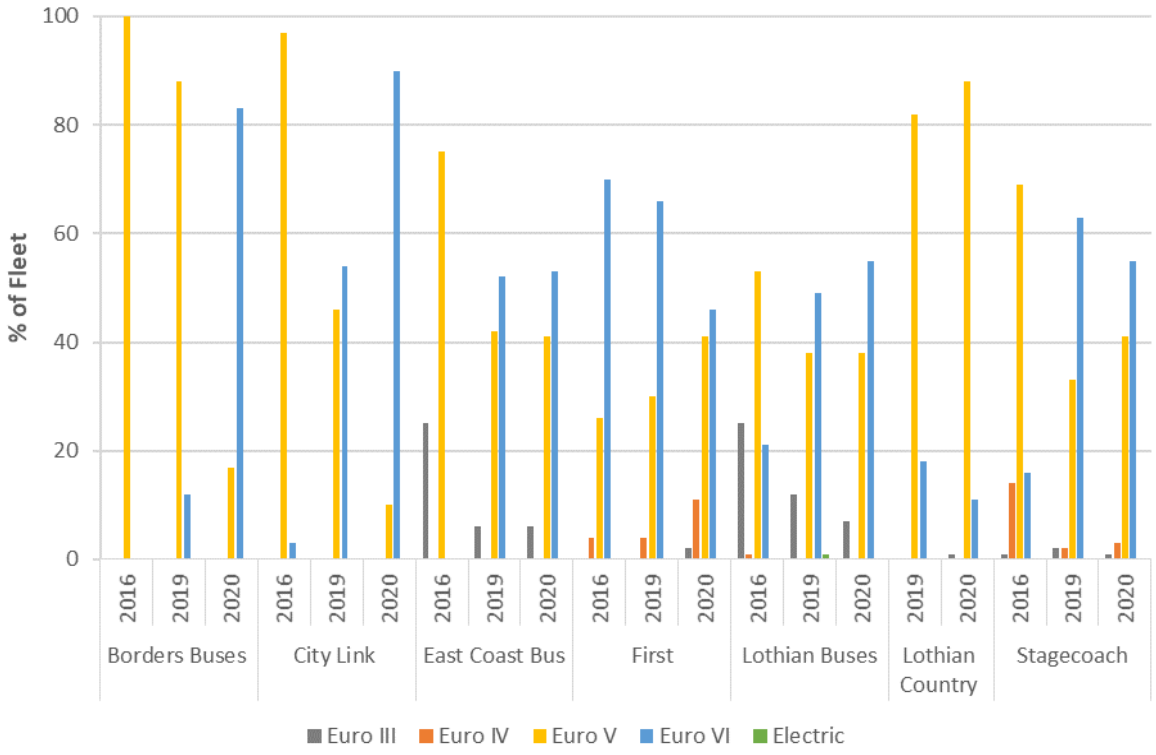
Figure 2.1 showing location of Traffic Data ANPR camera survey (2019)



Analysis of the traffic data shows a general pattern to eradicate the older buses from the main operator's fleet (Euro III) however the percentage composition of Euro classes in the fleet does tend to change on a year to year basis.

A Low Emission Zone will be an important tool in setting consistent standards on the environmental performance of the bus fleet.

Figure 2.2 % Euro Standard Fleet Composition by Bus Operator from ANPR data 2016, 2019 and 2020



Scottish Government have previously provided funding to support the roll out of low emission buses via the Scottish Green Bus Fund, where grants were given for up to 80% of the price differential between a low emission vehicle and its diesel equivalent. In August 2020 the scheme evolved to a new Ultra-Low Emission Bus Scheme which will cover 50 to 75% of the cost difference between an ultra-low emission bus and a conventional diesel equivalent (higher contribution for zero emission running capability) and up to 75% costs for infrastructure for the technology.

The Bus Service Operators Grant also incentivises use of Low Carbon Vehicles (LCV) by allowing an added payment per kilometre of distance travelled for use of such vehicles. This was revised in 2019 with more of an incentive for buses with greater emission savings and zero emission capability.

To support the delivery of Scotland's Low Emission Zones (LEZs), Transport Scotland devised the Bus Emissions Abatement Retrofit (BEAR) programme which allows for buses/coaches to be fitted with CVRAS (Clean Vehicle Retrofit Accreditation Scheme) retrofit technology to improve vehicle emissions to an equivalent Euro VI standard or better. BEAR Phases 1 and 2 awarded funds to allow

130 vehicles to be retrofitted across Scotland. BEAR Phase 3 funding (£9.75 million) was fully subscribed in the 2020/21 financial year to licensed bus and coach operators, local authorities and community transport operators. Lothian Buses obtained enough funding to retrofit 188 Euro V buses. Other buses and coaches that are likely to operate in Edinburgh will also be retrofitted.

Fleet efficiency recognition schemes

The freight sector has been a more challenging group for local authorities to co-ordinate. To persuade road freight operators to voluntarily reduce their emissions, the Council became a partner in an EU-funded project, ECO Stars Europe, through which the ECO Stars Edinburgh scheme was established. The latter is now funded through the Air Quality Action Plan grant award.

This is a voluntary, free to join fleet recognition scheme that provides bespoke guidance on environmental best practice to operators of goods vehicles, buses and coaches, whose fleets regularly serve Edinburgh area.

Progress made with ECO Stars Edinburgh is detailed in Table 2.4.

Table 2.4 - ECO Stars Edinburgh Scheme – Progress from 2012 to 2020

Year	Number of vehicles	Number of operators
2012	1,684	14
2013	2,900	35
2014	3,525	51
2015	5,048	84
2016	6,089	129
2017	7,061	154
2018	8,001	200
2019	9,254	241
2020	9,997	287

Council Fleet

The Council is committed to leading by example through the acquisition of lower emission vehicles for its own fleet, as set out in Policy ENV2 of the Local Transport Strategy 2014 to 2019. The degree of ongoing fleet improvement is set out below/overleaf.

Table 2.5 - Improvement in City of Edinburgh Council fleet 2003 to 2020

Euro Standard	2003	2016	2017	2018	2019	2020
Pre-Euro	12 1%	0	0	0	0	0
Euro 1/I	96 12%	0	0	0	0	0
Euro 2/II	374 45%	0	0	0	0	0
Euro 3/III	338 41%	21 2%	15 2%	14 2%	12 1%	8 1%
Euro 4/IV	12 1%	238 26%	217 25%	221 24%	188 19%	150 15%
Euro 5/V	0	532 58%	497 56%	376 42%	337 34%	322 33%
Euro 6/VI	0	104 11%	128 15%	267 30%	433 43%	448 45%
Electric	0	27 3%	25 3%	25 3%	33 3%	57 6%
Total	**832**	**921**	**882**	**903**	**1003**	**985**

The proportion of the Council's fleet Euro 6/VI and above, continues to increase from 33% in 2018 to 51% in 2020. The number of electric vehicles in the fleet is now 57.

A Fleet replacement programme is in place to replace the oldest vehicles in the Council fleet. The Euro 3 vehicles left within the fleet are predominantly truck based vehicles and these will be replaced within the next 18 months.

The above snapshot of the Fleet was made in April 2020 (in line with the previous years) and the number of electric vehicles within the fleet will rise as more of these replace the Euro 5 Diesel cars in the fleet. The plan was for there to be no fleet owned diesel cars by 2021 (for clarification Spot Hire cars, that are not Council owned, can still be diesel or petrol variants), but there is now a level of uncertainty as to whether this can be done as there may be a demand for extra cars in the short term to respond to the COVID-19 pandemic. The most cost-effective way to meet this extra demand is to retain some of the Euro 5 vehicles, in the interim.

An electric 15-tonne mechanical Street Sweeper entered operation in October 2020, which is the first of its type in Scotland.

Fleet Management have been examining the impact of the Low Emission Zone and the restrictions that this will place on some fleet units, going forward. Careful planning of key replacement vehicles will mitigate the effect on operations. Passenger operations is an area that will need urgent planning, as this fleet was not included in the fleet review, due to being under its own separate review, now complete. However, three electric low-level, passenger buses have recently been adopted into the fleet.

Promoting Low Emission Transport

Managing traffic emissions via mandatory Low Emission Zone

The Council is committed to implementing a Low Emission Zone in terms of the Programme for Government commitment 2017/18, where Scottish Government agreed to work with the four major Scottish Cities to have LEZs in place by 2020.

In February 2020, the Council's Transport and Environment Committee agreed that a proposal be developed for the Traffic Commissioner to consider a Low Emission Zone (LEZ) scheme for buses, that would be enforced through Traffic Regulation Conditions. This would maintain progress to fulfil the Programme for Government Commitment. However, work was paused during the COVID-19 pandemic response and a new implementation timeline was set by Scottish Government. LEZs are now to be introduced across Edinburgh, Aberdeen, Dundee and Glasgow between February and May 2022.

The regulations and guidance that are necessary for local authorities to be able to introduce and enforce LEZs are being developed and expected in Spring 2021. In accordance with this, the Council will develop and consult on a final Proposed Scheme in preparation for implementation in 2022.

The LEZ scheme will be devised in conjunction with the development of the local transport strategy (City Mobility Plan (CMP)) and Edinburgh City Centre Transformation (CCT) programme. The Council continues to work in close partnership with Scottish Environment Protection Agency (SEPA), Transport Scotland and the Scottish Government to assist in the work of the National Modelling Framework (NMF) which is also a key element in CAFS. The NMF aims to provide the quantitative evidence for assessment of criteria for the NLEF and LEZs in particular. An initial Interim Report was published by SEPA in November 2018. A

further report is due to analyse 2019 traffic data, as well as the potential impact in the region of proposed boundaries. The results of the 2019 public consultation on two proposed boundaries (City centre and City wide) will be considered alongside traffic modelling, an analysis of wider impacts (Integrated Impact Assessment), study of enforcement options for the Council and financial modelling in order to finalise the Proposed Scheme going forward.

In addition, the impact of the COVID-19 pandemic and potential future traffic and travel demand will constitute a major consideration of the LEZ development work.

The Council has commissioned a Real-World Driving Emission study to support elements of the National Modelling Framework and provide local insight to help inform Action Planning, in general. Results of the study will be reported in 2021.

Funding to support the implementation of LEZs is being made from the Scottish Government on a year to year basis.

To support the introduction of LEZ's across the different fleets there are other funding streams being developed. As mentioned previously BEAR, Transport Scotland's Bus Emissions Abatement Retrofit Programme, is ongoing. An additional £1m is available in 2020/21 to support the retrofitting of light goods vehicles, heavy goods vehicles and taxis through the LEZ Retrofitting Fund for micro-businesses. In October 2020, the Low Emission Zone Support Fund for low-income households and micro-businesses was announced to incentivise the scrapping of older petrol and diesel vehicles and encourage a change to sustainable transport.

Promotion of electric vehicle charging infrastructure

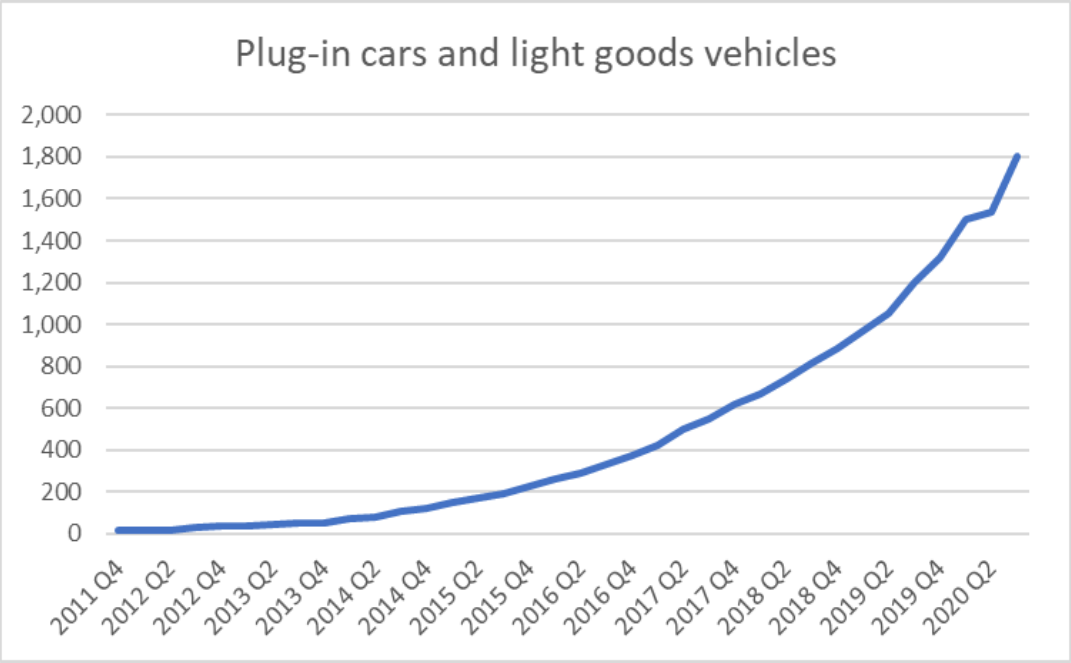
In December 2017, the Council approved Edinburgh's first Electric Vehicle (EV) Action Plan, with the key purpose of developing a strategic and co-ordinated approach to charging hubs. This was to encourage the uptake of EVs, while reducing carbon emissions, improving air quality and unlocking wider economic benefits.

More recently, the Council approved a Business Case for the installation of on-street EV charging infrastructure and developed a detailed project plan, which identified specific locations for the installation of 66 on-street charging points (including 32 fast chargers, nine rapid chargers and 24 slow chargers) across the City, to strengthen the existing network. Installation of the chargers is delayed with the pandemic response; however, work is underway. Funding for the first phase of work has been

secured from Transport Scotland via a £2.2m grant. A number of issues such as the specific type of infrastructure, tariff, charging and enforcement regimes require further development.

The Department of Transport's vehicle licensing statistics show that Plug-in cars and light goods vehicles are steadily increasing in Edinburgh (see Figure 2.3). At the end of 2011 there were just 18 Plug-in vehicles registered in Edinburgh as of the end of September 2020 there were almost 1,800 vehicles registered in the city.

Figure 2.3 - Cumulative number of Plug-in cars and light goods vehicles licensed per year quarter in Edinburgh from 2011 to 2020 (Q3)



The Council previously administered Transport Scotland's Switched on Fleets grant on behalf of the Edinburgh Community Planning Partners. Over the financial year 2016-17 there were a total of eight plug-in vehicles procured by four organisations. In 2017-18 another eight vehicles were procured by three organisations and in 2018-19 a total of 23 plug-in vehicles are earmarked for five organisations. In 2019/20 the Council has received funding to assist improvement in the electric car fleet, as well as to trial an electric Street Sweeper.

Additionally, Transport Scotland's 'Charge Place Scotland' grant which provides grant funding for EV charging infrastructure has been also administered by the Council. Over the financial year 2017-18, the Council installed two additional 50kW Rapid charging units and one 22kW Fast charging unit. A further six charging units

(12 charging points) were upgraded with new more innovative charging units across six sites which included the University of Edinburgh and Queen Margaret University sites.

Funding has been obtained from the Air Quality Action Plan Grant to assist in the development of EV charging infrastructure on the Council's own estate in 2019-2021.

Along with the steady increase in plug-in vehicles in Edinburgh, the number of charging sessions and kWh used continues to increase year on year. The following graphs reveal the continued year on year growth of charging infrastructure usage since 2014. The data is drawn from the Charge Place Scotland back office and covers most of the charging infrastructure within the Council's estate. The actual statistics will be higher than that represented here, as many sites in the city with charging infrastructure will be operated independently by the host site. The Council also has no data on the number of charging units installed by residents or businesses who have private access to their own off-street parking. Some of the effects of the pandemic can been seen in the April and May with less usage as expected with the trends.

Figure 2.4 Power (kWh) used per month 2014-2020

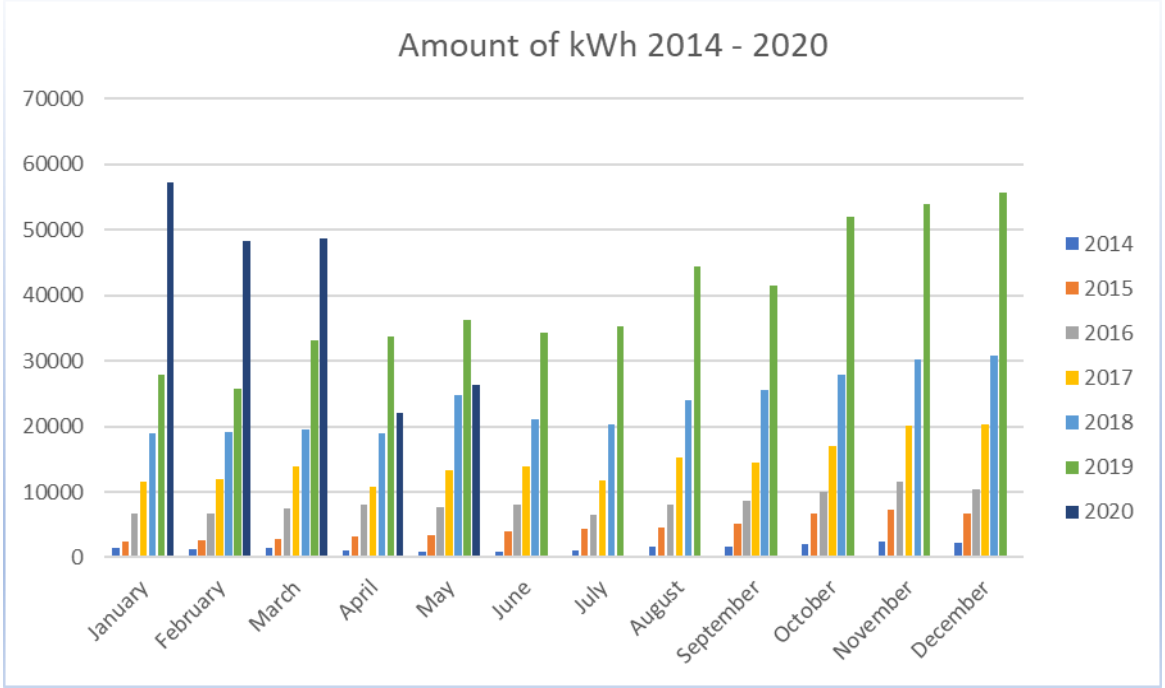
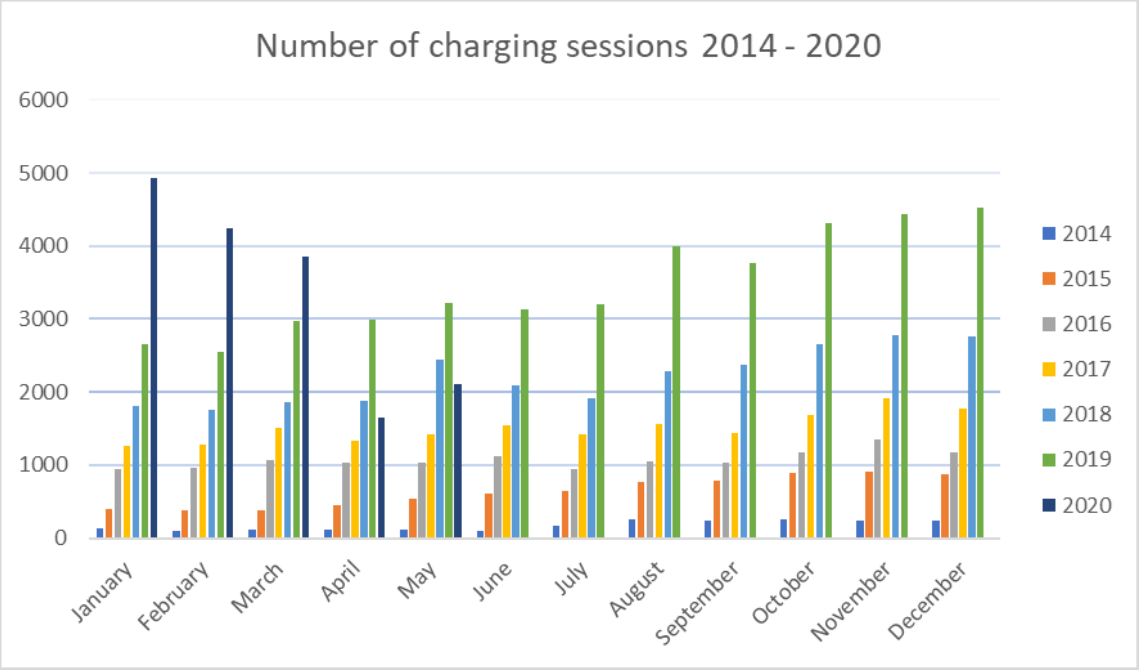


Figure 2.5 Number of charging sessions per month 2014-2020



In association with Innovate UK, the Council is participating in a project considering the benefits and costs of wireless electric vehicle charging. The project overall will bring together logistics modelling expertise from Heriot-Watt University (HWU) and low carbon and vehicle technology, energy infrastructure and commercial knowledge from Flexible Power Systems (FPS), while the Council will function as the vehicle user, with two dedicated vehicles.

Traffic Management

Urban Traffic Control Systems (SCOOT)

Improving traffic flow and reducing idling time are measures which help to improve air quality. Split Cycle Offset Optimisation Technique (SCOOT) systems are automatically responsive to traffic flows and demand and therefore help ease congestion by providing more effective control of traffic signals.

SCOOT infrastructure is in place on many road networks in the city. However, due to ongoing utility works and road improvements, many of the inductive loops have been damaged and require repair and in several locations the system requires validation. This work is ongoing.

Equipment at Lothian Road/ Fountainbridge and West Port/Lady Lawson Street is running on fixed time until suitable timing options have been explored.

Air Quality Action Plan grant funding will assist with SCOOT development in Cowgate, The Bridges, London Road and Inverleith Row.

Current SCOOT status in the AQMAs is detailed in Table 2.6.

Table 2.6 – SCOOT status in AQMAs 2020

SCOOT Status	Locations
Central AQMA	
Fully operational	Gorgie Road, Chesser Avenue, Balgreen Road
Operational - Loop damage which is programmed for repair	Gorgie Road, Westfield Avenue, Robertson Avenue
Operational – Loop damage at Ardmillan is programmed for repair in 2020	Ardmillan Triangle (Gorgie / Dalry, Angle Park, Slateford)
Infrastructure installed, but loop repairs and re-validation required. Intermittent communications issues hampering operational capability.	Bridges, Nicholson Street, Clerk Street/ South Clerk Street
Operational except communications at Hillside pedestrian crossing.	London Road - Easter Road to Marionville Road plus Abbeymount
Loop installations to be managed resurfacing programme – validation will follow	London Road – Meadowbank to Jock's Lodge
Scheme is on hold due to East West Cycle project.	Roseburn
Unlikely to be re-installed due to Tram priority.	Haymarket, Princes Street, Queen Street and Leith Walk
Equipment installed and timings are being refined.	West Port
Partially operational on Cowgate - one loop repair needed. High Street loops to be installed (once setts replaced) but partial validation is possible.	Cowgate, St Mary's Street, High Street
St John's Road AQMA	
Infrastructure installed. Cabling work, configuration and revalidation required. Mesh unit to be installed at Featherhall,	St Johns Road, Corstorphine Manse Road / St Johns Road

SCOOT Status	Locations
maintenance repairs to be carried out at Clermiston Road.	
Great Junction Street AQMA	
Fully operational	Bernard Street, Salamander Street, Seafield Road
Inverleith Row/ Ferry Road junction	
Infrastructure installed and loops repaired. validation required. Extended to include neighbouring junction. Target – End of 2019 Communication units to be installed, and validation to follow. Target – end of 2020	Inverleith Row (Goldenacre) / Ferry Road and Ferry Road / Granton Road

Other Action Plan Initiatives

Controlled Parking Zones

Controlled Parking Zones (CPZs) enable on-road parking spaces to be used by residents and therefore reduce opportunity for car commuting into the city centre. The boundary of the Council's CPZ was substantially extended in 2006-2007 and covers the central core of the city.

An alternative form of parking control, a Priority Parking Area (PPA) was trialled in the south-central area of the city during 2010. The operational times of the PPA were aligned with peak travel periods and, as with the CPZs, aims to make it easier for residents to park near to their homes. The trial delivered positive outcomes and has been made permanent. Thus, several new areas in the city have been designated PPAs.

Introduction of new and extensions to existing CPZs or PPAs are kept under regular review by the Council and a strategic review of parking is currently underway. This aims to determine parking pressures across the city and inform a citywide strategy for addressing parking pressures in areas where they have become a problem. The locations of residential CPZs and PPAs can be downloaded from the following link: http://www.edinburgh.gov.uk/info/20083/parking_permits/577/parking_permit_map

Residential Parking Permits

The Council also operates a tiered pricing scheme for residential parking permits based on CO_2 emissions and engine size. Work undertaken for 2015 Air Quality

Action Plan Progress Report showed that there had been an element of behaviour change with residents moving towards the purchase of smaller engine vehicles producing less CO_2. A recent review of the parking pricing strategy has proposed a change to the pricing structure (from a five-tiered system, to seven) on the basis that this would protect and reward the owners of the smaller, low CO_2 emission-engine vehicles.

Also, as a part of the pricing review, the Council ran a consultation between October 2017 and January 2018 on the possible introduction of a surcharge on parking permits issued to diesel vehicles. The Council received a huge response to the consultation with 5,412 responses to the online questionnaire, with over 98% living within the city. Overall the majority (88%) of respondents recognise the impact air quality has on their health and agree (82%) that it is important to tackle air pollution. Nearly half (47%) agreed that the Council should charge more for permits issued to the most polluting vehicles. The Council will now introduce a surcharge on residents' permits for diesel-fuelled vehicles, with a view to encouraging owners to consider the impact of their vehicle choice, on both the wider-environment and local air quality. The new surcharge will come into force with new permit holders or existing permit holders changing to diesel vehicles, but omit those who currently own a diesel car, to compensate for purchases that were made in good faith at a time when diesel vehicles were incentivised.

Progress on the following measures has been slower than expected, predominately due to staff resourcing issues and prioritisation of the LEZ work:

- Completion of the Draft PM_{10} Salamander Street Air Quality Action Plan,
- Revision of the Air Quality Action Plan for NO_2. There is a need for co-development with the LEZ, developing City Mobility Plan and the review of the national air quality strategy - Cleaner Air for Scotland 2 Strategy, and;
- No current commitment for financial support for the expansion of Hermiston Park and Ride.

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

- Continue ECO Stars scheme,
- Continue the roll out of telematics across the Council Fleet,
- Complete outstanding SCOOT development and repair work,
- Install on-street electric vehicle charging infrastructure to strengthen the existing network,
- Continue support for Active Travel Action Plan,
- Reconvene the Steering Group considering the PM_{10} Salamander Street Air Quality Action Plan to further develop the Draft Plan,
- Revise the existing NO_2 Air Quality Action Plan, in conjunction with the developing LEZ scheme, City Mobility Plan and the Cleaner Air for Scotland 2 Strategy,
- Continue on-going development work with SEPA, Transport Scotland and partners to develop the Low Emission Zone (LEZ) scheme under the National Low Emission Framework and the National Modelling Framework, and;
- Finalise a preferred LEZ scheme for Edinburgh, for public consultation and statutory processing, as per the developing regulations under the Transport (Scotland) Act 2019.

Table 2.7 – Progress on Measures to Improve Air Quality

Measure 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	Promoting low emission public transport	Vehicle fleet efficiency	Reduce bus emissions via voluntary agreements with bus companies	CEC	2009 - 2011	Euro IV by 2012 Euro V by 2015 Formal agreement not reached due to being onerous in absence of financial support		NOx Central 59% St John's 48% Gt Junction St 61%	TTR study Completed.	On going	Details update from bus operators was not obtained 2020. However, analysis of the ANPR traffic studies 2016-19 show fluctuations of bus standards being used in the Edinburgh fleet.
1a	Implementation of a LEZ	Promoting Low emission transport	Manage bus emissions and potentially emissions from other vehicle classes	CEC in conjunction with Scottish Government, Transport Scotland and SEPA		Programme for Government commitment for LEZ to be in place by 2020		Will be determined by outcomes of NMF and NLEF under CAFS Interim SEPA Report, based on 2016 modelled data indicates 50-75% NO2 reduction required in Central AQMA.	New legislation in force to allow development of LEZs - Transport (Scotland) Bill 2019.	Preferred LEZ scheme to undergo statutory and public consultation in 2021. Scheme to be in place Feb-May 2022/23.	Regulations associated with the Act continue to be developed.

Measure 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
2	Fleet efficiency and recognition Scheme ECO Stars	Vehicle Fleet Efficiency	Manage road freight emissions	CEC in conjunction with TRL	2010-2011	2011 to date	Recruitment figures		2020 - 287 operators and 9,997 vehicles registered	Ongoing	Additional funding secured for 2020/21
3	Cleaner council vehicles	Vehicle Fleet Efficiency	Improve emissions by ensuring highest standard for vehicle replacement	CEC, Fleet		2003		Not quantified	2020 - E3/III = 1% E4/IV = 15% E5/V = 33% E6/VI = 45% Electric = 6% Total 985	Ongoing	
3a	ECO driver training and ECO driving aids	Vehicle Fleet Efficiency	Council vehicle trial telematics system	CEC, Fleet	2018		Reduction in idling and fuel consumption	Not quantified	Council approved installation of a Telematics system for all council vehicles	Trial completed Roll out of telematics underway	
4	Bus based Park and Rides Rail based Park and Rides * Tram based Park and Rides**	Alternative to private vehicle use Modal shift	Reduce emissions by easing congestion at peak travel times	CEC			Usage	Not quantified	Ferrytoll (1040) Ingliston** (1082) Straiton (600) N'craighall* (565) Sheriffhall (561) Hermiston (450) Wallyford* (321) Halbeath (1021	Land secured at Hermiston Lasswade Hermiston Gait for future expansion	Require funding to enable expansion

Measure 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
5	Differential parking	Promoting low emission vehicles	Aimed at smaller engines and low CO_2 emission vehicles Diesel-surcharge on resident's car parking permits	CEC				Not quantified			Requires adoption of low emission vehicles NOx and PM_{10}
6	Controlled Parking Zones Priority Parking Zones PPZ	Traffic Management	Discourage car commuting into city centre	CEC				Not quantified	Several CPZ in city centre One new PPZ introduced Total 10 PPZs surrounding city centre	0ngoing	Strategic Parking Review underway
7	Tramline 1	Transport Planning and Infrastructure	Zero emissions at source. Encourage modal shift from car use	CEC/ TFE		Line 1 May 2014 Line 1a from Autumn 2019	Passenger growth	Not quantified	7.5 m Passengers 2018/19	Completed	Construction of Line 1a (extension to Newhaven/ Leith) underway. Due for completion 2023.
8	New rail line stations; 1 Aidrie - Bathgate 2 New Craighall 3 Borders 4 Gogar	Transport Planning and Infrastructure	Modal shift to reduce road traffic entering Edinburgh	Transport for Scotland			Passenger numbers	Not quantified	Completed 1 2010 2 2002 3 Sept 2015 4 2016	All Completed	Passenger growth recorded
9	New cycle networks	Transport Planning and Infrastructure	Part of CECs Active Travel Action Plan	CEC/ Sustrans/ NHS Lothian	2010	2016 (updated)		Not quantified		On going	

Measure 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
9a	Promoting travel alternatives	Promotion of cycling and walking	CECs Active Travel Action Plan Encourage modal shift away from car	CEC/ Sustrans/ NHS Lothian	Ongoing			Not quantified		On going	
10a	Urban traffic control systems - SCOOT	Traffic Management	Reduce waiting times and stop/starts	CEC Transport	Ongoing			Not quantified	No. of schemes across City. New area; Cowgate/St Mary's St, London Rd/M'Bank Fully operational 2019; Gorgie /Chesser /Balgreen	On going	New schemes to be finalised. Many existing schemes need repairing and re-validating Funding secured to assist.
10b	Urban traffic Control systems – MOVA at Newbridge	Traffic Management	Reduce idling time	CEC transport	2014	Mar 2016	Reduced NO_2 concentrations and idling times	44% NOx 26% PM_{10} 40% CO_2	Completed April 2016	Completed	Delay time reduced on Westbound A8 pm. Measured NO_2 at junction reduced.
11	20mph speed limits across the City	Traffic Management	To assist improving cycle and walking uptake by making roads safer	CEC	2015	31/07/2016 commenced		Not quantified		2018	2018 Fully implemented

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.

The City of Edinburgh undertook automatic (continuous) monitoring at 9 sites during 2019. Table A.1 in Appendix A shows the details of the sites (including historic). National monitoring results are available at http://www.scottishairquality.scot/.

Maps showing the location of the monitoring sites (including historic sites) are available at https://edinburghcouncil.maps.arcgis.com/apps/webappviewer/index.html?id=dc93485b492947d0b2182c75aca4c554. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

In response to the designation of the Salamander Street AQMA, a FIDAS particulate monitor was installed at the new Tower Street site in 2018. The first full year of data from this monitor is presented within this report. In July 2019, Defra installed a new FIDAS 200 monitor at the St Leonards site, part of the UK Automatic Urban and Rural Network. This was in order to replace the aging FDMS TEOM particulate monitor which was previously located there. Additionally, installation of the FIDAS monitor at Nicolson Street was completed in 2019, and the first full years' worth of monitoring data from this location will be published in next year's APR.

As part of a programme to replace NO_x and TEOM analysers with support from the Scottish Government Local Air Quality Management Funding Support, a new FIDAS monitor was installed at the Queensferry Road site in October 2019 to measure PM_{10} and $PM_{2.5}$, in order to replace the failing TEOM FDMS analyser which was removed in 2018. As a result, no data has been presented for this site due to less than 3 months' worth of data being collected. Additionally, a new T200 NO_x analyser was installed at St John's Road in June 2019 to replace the aging analyser. Further NO_x analyser replacements were made at Currie, Glasgow Road and Salamander Street sites.

3.1.2 Non-Automatic Monitoring Sites

The City of Edinburgh Council undertook non- automatic (passive) monitoring of NO_2 at 158 sites during 2019, 4 of which are duplicate sites, and 5 of which are triplicate co-location sites. Table A.2 in Appendix A shows the details of the sites. 20 new monitoring locations were deployed in 2019, 4 of which were relocations of old sites (to similar sites of exposure). Details of this listed in Table 3.1. This was part of the continual review and analysis of the network, and in addition to help with development of a local air quality model by SEPA as part of the National Modelling Framework (NMF).

Table 3.1 – Newly Deployed Diffusion Tube Sites

Tube ID	Site ID	New / Relocated / Removed (during 2019)
69i	Queensferry Rd/Lyle Court	New
129	Queensferry Rd/Hillpark Wood	New
18a	Ferry Rd no. 203	New
8a	Brougham St no.9	New
48g	Canongate	New
8b	Lauriston Place opp. 119	New
62a	Lothian Rd no. 45	New
62b	Lothian Rd no. 139	New
62c	Morrison St no. 91	New
62x	Lothian Rd/Rutland Place	New
30a	Rodney St no. 10	New
30b	Rodney St no. 31	New
10a	George IV Bridge	New
10b	Bank St	New
10c	Teviot Place	New
6b	Bruntsfield Place no. 147	New
153	New Arthur Place no. 4	New (Relocated from 16 St Johns Hill)
154	Viewcraig St no.9	New (Relocated from 7 Viewcraig Gardens)
135a	69 Nicolson St	Removed during August 2019
135b	59-61 Nicolson St in August	New (Relocated, replacing 135a)
63	Queensferry Rd 544	Removed during October 2019
63a	Queensferry Rd 540	New (Relocated, replacing 63)

Maps showing the location of the monitoring sites are provided in Appendix E as well as at the following link (Note – look at 'Site Code' rather than 'Tube Number').
https://edinburghcouncil.maps.arcgis.com/apps/webappviewer/index.html?id=dc93485b492947d0b2182c75aca4c554

Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

3.2 Individual pollutants

The air quality monitoring results presented in this section 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 5 years with the air quality objective of 40µg/m^3.

For diffusion tubes, the full 2019 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 5 years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

All automatic monitors reported a data capture greater than 95% with the exception of Gorgie Road and Currie, which reported an annual data capture of 76.8% and 30.7% respectively. At Gorgie Road, this was largely due to an issue with the air con unit, and at Currie this was largely due to issues with the analyser following the transfer of instrumentation to a new enclosure.

Similar to 2018, St John's Road and Nicolson Street both breached the annual objective for NO_2, with annual mean concentrations of 41.9µg/m^3 and 50.4µg/m^3 respectively. In terms of hourly mean objective, all sites reported 0 hourly average concentrations in exceedance of 200µg/m^3 with the exception of Nicolson Street, which reported 4. This is an increase on last year, however it still remains below the allowance of 18 exceedances. No other continuous monitoring location reported an exceedance of the annual mean NO_2 objective, nor any hourly concentrations in excess of 200µg/m^3. Additionally, all roadside locations remained static or showed a slight reduction in the annual average compared to the 2018 concentrations. This is the fourth consecutive year in which the hourly NO_2 objective has not been breached at St John's Road. This AQMA will therefore be amended to remove the designation for the hourly objective.

In terms of **non-automatic monitoring** carried out using passive diffusion tubes, 22 sites reported annual mean concentrations in exceedance of the annual mean objective 40µg/m^3. 14 of these were reported within the Edinburgh City Centre AQMA, sites HT2, 2, 3, 62A, 62C, 62X, 28B, 28D, 37A, 24, 27, 74G, 135a, 81, Queensferry Road co-location site, and St John's Road co-location site. The maximum of these was at site 62A, on Lothian Road, where an annual mean concentration of 56.6µg/m^3 was observed. All sites within the Edinburgh City Centre AQMA, with the exception of HT2, 2, and 24, were reported at a site of relevant exposure. For the three sites which were not sited at relevant exposure, once distance correction calculations were completed all three sites reported a concentration below the AQS annual mean NO_2 objective, with site 2 and 24 remaining within 10% of the objective with concentration of 36.2µg/m^3 and 39.1µg/m^3 respectively. An additional 2 of the 22 exceeding sites were located within the Glasgow Road AQMA, sites 58 and 16. Neither of these sites are at a location of relevant exposure. Following distance correction calculations both report a concentration below 40µg/m^3, with site 58 being within 10% of the objective (39.7µg/m^3). Monitoring will continue at all of these sites.

The 5 remaining sites reporting a concentration in exceedance of 40µg/m^3 are all located outside any declared AQMA. These sites are 64, 69I, Queesnferry Road co-location site, which are all located along Queensferry Road junction to Maybury Road/Whitehouse Road, site 62B located on Lothian Road along the A700 near to the junction to the B700, just outside the City Centre AQMA, and site 48G located along Canongate near to the junction to St Mary's Street. Only site 48G is located at relevant exposure. Following distance correction at the other four sites, 64, 69I, and the Queensferry co-location site all report concentrations below 40µg/m^3 (with site 64 remaining within 10% of the objective). Site 62B continued to report a concentration in exceedance of 40µg/m^3 (40.4µg/m^3) following distance correction. Sites 62B and 48G were newly deployed in 2019, and if exceedances continue to be reported in future years then extension of the City Centre AQMA may be required. Continual expansion of new monitoring sites near to these 5 sites is recommended, ideally at a site of relevant exposure, to capture the extent of exceedance areas.

Twelve additional sites reported concentrations within 10% of the AQS objective prior to distance correction, including Site 15 which is located within the Glasgow Road AQMA. Site 15 reported a concentration of 39.2µg/m3 in 2019 prior to distance

correction, and for the past 4 years had reported concentrations exceeding the annual mean AQS objective for NO_2. All other newly deployed monitoring sites in 2019, which have not been mentioned above, have reported concentrations below 40µg/m^3, with 10B and 8A (both located outside any AQMAs) reporting concentrations within 10% of the AQS objective.

No sites reported a concentration greater than 60µg/m^3, which would suggest an exceedance of the hourly average AQS objective for NO_2.

The annual mean objective has been met for the third consecutive year at all monitoring points at the Great Junction Street AQMAs, and for the second year in the Inverleith Row AQMA.

The first full years' worth of monitoring data was obtained for the new 2019 sites. Out of these, 6 reported concentrations greater than 40µg/m^3,

TRENDS

Trend analysis has been undertaken at all automatic monitoring locations which have 5 or more years worth of valid data. Trend analysis has been completed using Excel, such as that in previous reports, however this report also includes trend analysis utilising the Openair package in R Studio. The Scottish Air Quality website allows users to use this without the requirement of downloading and using R Studio[2].

All continuous monitoring locations have sufficient data available to assess the trends in NO_2 concentrations, with the exception of ID11 Nicolson Street, which began monitoring in 2018.

Graphs are shown in Appendix A – Figure A.1 to Figure A.3. Table 3.2 summarises the trend analysis.

Table 3.2 – Summary of Annual Mean Nitrogen Dioxide trends measured at Automatic (Continuous) Monitoring Sites

Monitoring Location	Site Type	Trend in Annual Mean NO_2 (Years)	Concentrations of NO_2
St Leonard's	Urban background	(2004 to 2019) ↘	Slightly decreasing
Currie	Suburban	(2010 to 2019) →	Stable
Gorgie Road	Roadside	(1999 to 2019) ↓	Decreasing
Salamander St.	Roadside	(2009 to 2019) ↘	Slightly decreasing
Queensferry Rd	Roadside	(2011 to 2019) ↘	Slightly decreasing
St John's Road	Kerbside	(2007 to 2019) ↓	Decreasing

[2] Openair data analysis tools – Scottish Air. Available at http://www.scottishairquality.scot/data/openair.

Monitoring Location	Site Type	Trend in Annual Mean NO_2 (Years)	Concentrations of NO_2
Glasgow Road	Roadside	(2012 to 2019) ↘	Slightly decreasing

Trend analysis of the annual mean NO_2 concentrations shows that at all sites, with the exception of Currie, report a decrease. St John's Road is showing the greatest average decrease of 2.9µg/m^3 each year. The NO_2 concentrations at the Suburban site of Currie has remained relatively consistent since 2010.

It is important to note that when carrying out trend analysis within Excel, this has utilised the annual averages, including any annualised values, such as that of Currie in 2019. Comparitively, the trend analysis tools as part of the Openair package, more specifically the TheilSen tool, have utilised the monthly averages and do not include any annualised values. This means that any significant gaps in the data could cause the trend to be skewed. There are slight differences in the value of regression provided by both methodologies, however these remain relatively consistent with one-another.

Using the Trend Level tool, monthly averaged hourly concentrations are displayed for each year where monitoring data is available and highlights during which hours of the day, and which months, that the measured NO_2 concentrations are greatest. This also shows that in general there has a been an overall improvement across all continuous monitoring locations. This also highlights that the winter months generally experience higher concentrations of NO_2 than the summer months, due to the natural relationship and reactions between Sunlight/ozone and NO_x, whilst also around the hours of 09:00 and 18:00 there are elevated concentrations which are likely resulting from increased traffic and congestion due to being peak hours.

Trend analysis with passive diffusion tubes located within the AQMAs was also undertaken - a summary is shown in Table 3.3. This has only been carried out using the previously employed method in Excel, as there is no option to input diffusion tube data into the Scottish Air trend tools webpage. Data used in the analysis as well as graphs for each AQMA is shown in Appendix A – Figure A.4 and Table A.5 to Table A.9. Data was corrected using the relevant bias adjustment factor for each year and taken from the point of measurement (not distance corrected).

Table 3.3 – Summary of Annual Mean Nitrogen Dioxide Passive Diffusion Tube Trends within the AQMAs

AQMA	Trend in Annual Mean NO_2 (Years Included)	Concentrations of NO_2
Central AQMA	(2008 to 2019) ↓	Decreasing
Great Junction Street AQMA	(2008 to 2019) ↓	Decreasing
St John's Road AQMA	(2008 to 2019) ↓	Decreasing
Glasgow Road AQMA	(2009 to 2019) ↓	Decreasing
Inverleith Row AQMA	(2011 to 2019) ↓	Decreasing

Across all AQMAs, there is a trend of decreasing NO_2 concentrations observed since the deployment of the tubes. The maximum decrease of 2.2µg/m^3 per year is reported at St John's Road AQMA, and the minimum decrease of 1.1µg/m^3 is reported at Inverleith Row. The general downward trend is in keeping with the national trend of NO_2 pollution showing long-term improvement at urban background and roadside locations. It is thought that significant improvement in the St John's AQMA is due to the deployment of predominantly Euro VI buses along that corridor. It is important to note that these trends are calculated from an average of relevant monitoring locations within each AQMA.

3.2.2 Particulate Matter (PM_{10})

Table A.11 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the air quality objective of 50µg/m^3, not to be exceeded more than 7 times per year.

The majority of sites reported good annual data capture in 2019, ranging from 80.1% to 99.9%, however Nicolson Street and Queensferry Road had data captures of 5.6% and 22.3% respectively. The FIDAS monitor at Nicolson Street was only installed in the latter part of December 2019, and has a 100% data capture for the period in which it was active. Similarly, a new FIDAS monitor was installed at Queensferry Road in October 2019 to replace the failing TEOM, and has a 99.6% data capture for the period in which it was active. Annaulisation has not been carried out for either of these sites as they have less than 3 months worth of data.

All montiroing locations reported concentrations below the annual mean objective for PM_{10} in 2019, with Salamander Street reporting the maximum of 17.3µg/m^3. Additionally, there were no breaches of the daily mean objective, with Salamander Street reporitng a maximum of 5 daily averages greater than 50µg/m^3 (when using the Volatile Correct Methodology (VCM)). When correcting the TEOM data collected

at Salamander Street with Edinburgh's local gravimetric factor, the annual mean is 18.1µg/m^3, therefore in exceedance of the annual mean objective.

A new FIDAS particulate monitor was installed within the AQMA at the opposing (western) boundary to the Salamander Street monitoring station on Tower Street. This unit commenced monitoring PM_{10} and $PM_{2.5}$ in October 2018, with 2019 reporting the first full year's monitoring data. An annual average concentration of 10.7µg/m^3 was reported here, with 1 daily average reporting a concentration greater than 50µg/m^3.

All other sites reported concentrations well below the annual mean objective, and with less than 7 daily concentrations exceeding 50µg/m^3.

TRENDS

Trend analysis has been undertaken at all automatic monitoring locations which have 5 or more years worth of valid data. Trend analysis has been completed using an Excel simple regression statistical program, such as that in previous reports, however this report also includes trend analysis utilising the Openair package in R Studio. The Scottish Air website allows users to use this without the requirement of downloading and using R Studio[3].

All continuous monitoring locations have sufficient data available to assess the trends in PM_{10} concentrations, with the exception of ID5 St John's Road, which began monitoring in 2017, and EDNS and ED012 (Nicholson Street and Tower Street), both of which have the first complete year of data in 2019.

In 2019 there were four monitoring sites with five or more full years of data which is required in order to undertake trend analysis. Analysis of Queensferry Road has not been carried out due to reporting a data capture of 22.2% in 2019. Volatile corrected (VCM) TEOM data has been used for analysis where required.

Trend graphs are shown in Appendix A - Figure A.5 to Figure A.7. A summary is presented in Table 3.4 (overleaf).

[3] Openair data analysis tools – Scottish Air. Available at http://www.scottishairquality.scot/data/openair.

Table 3.4 – Summary of PM_{10} Annual Mean Trend Data

Monitoring Location (Type)	Trend in annual mean PM_{10} (years)	Concentrations of PM_{10}
St Leonard's (Urban background)	(2004 to 2019) ↘	Slightly decreasing
Currie (Suburban)	(2010 to 2019) ↘	Slightly decreasing
Salamander St (Roadside/Fugitive)	(2010 to 2019) ↘	Slightly decreasing
Glasgow Road (Roadside)	(2013 to 2019) →	Stable / slightly decreasing

Trend analysis of the annual mean PM_{10} concentrations shows that at all sites with the exception of Glasgow Road, there is a decrease. Salamander Street is showing the greatest average decrease of 0.9µg/m^3 per year. The PM_{10} concentrations at the Roadside site of Glasgow Road has remained relatively consistent since 2013. When using the trend tools available on Scottish Air Quality website, more specifically TheilSen tool, Glasgow Road is shown to have a slightly steeper negative trend, suggesting that concentrations are decreasing. This however looks at monthly averages as opposed to the annual averages, so monthly variation is taken into consideration.

Using the Trend Level tool, it is possible to visualise how hourly PM_{10} concentrations vary by month across multiple years. This shows that in general there has been little improvement in the reduction of PM_{10} concentrations in recent years at monitoring locations Currie and Glasgow Road, whilst a more noticable decrease can be observed at Salamander Street and St Leonards.

PM_{10} concentrations are generally higher between the hours of 08:00 and 20:00, when there is expected to be higher volumes of traffic and industrial and fugitive source activity is also greater. This pattern is not as noticable at St Leonards and Currie, due to being Urban Background and Suburban sites and situated further from busy roads – particulate matter is less likely to be dispersed over significant distances unless favourable meteorological conditions allow.

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.12 in Appendix A compares the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years with the air quality objective of 10µg/m^3.

New monitors were installed in in the final quarter of 2019 at both Nicolson Street and Queensferry Road, therefore 2020 will be the first year in which a full set of $PM_{2.5}$ data is available at these sites. At the three remaining sites, St John's Road, St

Leonards, and Tower Street, annual mean concentrations of $PM_{2.5}$ were well below the objective of 10µg/m^3, with a maximum annual mean concentration of 7.0µg/m^3 being reported at St John's Road.

Trend analysis has been carried out for monitoring at St Leonards over the past 12 years using both the Excel simple regression statistical program and the Basic Trend Tools available on Scottish Air. Graphs are shown in Appendix A, Figure A.8 and Figure A.9. Both methods of trend analysis show that there is a general downward trend (decreasing concentrations) at this site.

Estimations of $PM_{2.5}$ from PM_{10} data at all other relevant monitoring stations where $PM_{2.5}$ monitoring isn't carried out was undertaken using the nationally derived factor correction ratio of 0.7 and the Scottish factor of 0.63. Results are presented in Table A.13. It shows there are potential exceedances at Glasgow Road and Salamander Street. Despite this, Scottish Local Authorities are not required to declare Air Quality Management Areas (AQMAs) until robust measured data becomes available from future $PM_{2.5}$ monitoring networks.

3.2.4 Sulphur Dioxide (SO_2)

Table A.14 in Appendix A compares the ratified continuous monitored SO_2 concentrations for year 2019 with the air quality objectives for SO_2. There were no exceedances in any of the objectives, which is consistent with previous years.

3.2.5 Other Pollutants Monitored

The following pollutants were also monitored in the City at the urban background (AURN) site at St Leonard's in 2019. The data is presented in Appendix A. The UK Government and Devolved Administrations are responsible for the review and assessment of these pollutants.

3.2.5.1 Ozone (O_3)

Table A.15 in Appendix A presents the ratified continuous monitored Ozone Concentrations from 2015 to 2019 with the air quality objectives. There were seven 8-hour periods in which the average concentrations exceeded 100µg/m^3. This is below the AQS objective of no more than 10.

3.2.5.2 Polycyclic Aromatic Hydrocarbons (PAHs)

There are many different PAHs; however, a component used as a marker, is benzo (a) pyrene (BaP). The concentration monitored at St Leonard's complies with the UK Objective in 2019. Monitoring is undertaken using a Digitel sampler. Concentrations since 2009 are shown Table A.16.

4. New Local Developments

4.1 Road Traffic Sources

Planning applications can be found on the Council's website here: https://www.edinburgh.gov.uk/planningcomments

using reference numbers detailed below with each case.

Environmental Health has previously commented on similar proposals for a site in semi-industrial area of Bonnington. It was for the removal of the existing office building and associated storage yard and the erection of 40 flats (14/05208/FUL) and was consented subject to conditions. A new application (19/05092/FUL) was granted permission in April 2020 for increased residential use with reduced number of parking spaces. Electric vehicle charging points were also proposed and advice given for the applicant to consider not using gas boilers but more sustainable power/energy production. The surrounding area has seen the development of further residential properties since the last application was consented. There are still some commercial uses neighbouring the site with heavier vehicles however there is a net reduction in trip movement from the development overall.

An applicant was granted to allow a mixed-use development including the provision of student accommodation, affordable housing, café, workspace and retail (20/00465/FUL) on a site which interacts with both the Great Junction Street NO2 AQMA and Salamander Street PM10 AQMA. A similar development adjacent to this site has been previously consented (18/08206/FUL), with similar concerns due to the poor level of amenity in regard to air quality and noise. The applicant was advised to undertake monitoring of PM10 on the site, in preparation for the planning application submission, however, modelling of the potential future impacts was undertaken instead, utilising data from the air quality monitoring station on Salamander Street, which has registered breaches of the annual mean objective of PM10 since monitoring began in 2009. The application was granted against the recommendation of the Environmental Health service. The results from the applicant's own air quality impact assessment indicate that levels of NO2 are at risk of exceeding the EC annual mean Limit Value at elevations within the proposed development that face directly onto Baltic Street at ground and first floor levels. It then goes on to state that air pollution from local road traffic is predicted to decrease significantly with increased

height above ground level and that the effect of local air pollution on residential units could be significantly reduced by installing Mechanical Ventilation Heat Recovery (MVHR) systems within affected dwellings. It was also suggested that air intakes be provided at roof level and residential units are held under positive pressure, however the air quality impact assessment did not consider the impact of such a system in any detail. It is also noted that the proposed development will introduce a street canyon along Constitution Street which is an import factor with regards local air quality. Monitoring is currently undertaken in the vicinity and will continue post canyon (development) construction.

A proposal for 54 residential dwellings was granted in January 2020, on a site that is currently vacant ground, Corbishot (19/02600/FUL). The application site is located west of the supermarket car park (car wash, recycling and petrol station), east of private housing on Corbieshot, south of The Jewel and north of the railway line. With regards local air quality impacts the applicant has highlighted in the Design and Access Statement that sustainability has been an inherit part of the design process. Furthermore, the site is well-situated in relation to the existing transport network. A series of footpaths, footways and usable cycle links exist in the surrounding area offering connections with the wider network. The site is well-located for access to public transport services with local bus routes. The applicant was advised during the pre-planning stage to keep the car parking numbers down to a minimum to try and encourage sustainable travel. However, conventional front driveway parking is proposed and meets the Council's parking standards. Environmental Health recommended that electric vehicle charging points be installed and low NOX boilers be fitted to the properties, to mitigate against private car use.

4.2 Other Transport Sources

None of the following transport sources have been identified as new since the Annual Progress Report 2019:

• Airports;

• Locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m;

• Locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m; or

• Ports for shipping.

During 2020, there was an increase in the number of complaints in respect to emissions from ships idling in Port of Leith (Leith Docks) due to either engines or auxiliary generators running continually. Although, the increase in this issue, is likely to be temporary in nature (due to the pandemic), the former port land continues to be re-developed bringing residential properties closer to shipping transport, industrial and fugitive sources of PM and other pollutants. Hence, it will be necessary to consider the feasibility of monitoring air quality in the area.

4.3 Industrial Sources

SEPA have provided an update to industrial sources at Leith Docks. This is detailed below;

- **Surrendered Permits;**

PPC/B/1010520 (Aggregate Industries) – Permit surrendered in 2018
PPC/B/1000127 (Bredero Shaw) – Permit surrendered in 2018
PPC/B/1010445 (Bredero Shaw) – Permit surrendered in 2018

- **Dormant Operations;**

PPC/B/1000161 (Lafarge) – Cement batching plant
PPC/B/1009122 (Forth Ports) – Coal unloading
PPC/B/1009123 (Bredero Shaw) – Concrete coating plant and associated cement batching

- **Sites Operating;**

PPC/B/1004246 (Forth Ports) – Cement unloading operations
PPC/B/1000073 (Cemex) – Tar coating plant.
PPC/B/1004358 (Cemex) – Cement batching plant
PPC/B/1000124 (Cemex) – Cement storage unit and cement batching plant.

- **Waste Management Licences sites;**

WML/E/0220205 (TKC) – Waste transfer station.
WML/E/0000112 (Dalton's) – Metal recycling.
WML/E/0220164 (Dalton's) – Metal recycling.
WML/E/1118800 (NWH) – Waste transfer station.

- **Other Operations (not regulated by SEPA)**

Unloading of materials not regulated by SEPA (grain, salt, non-permitted aggregates). Dust emissions would be subject to provisions under EPA 1990, Part III.

Note. Council recorded complaints in September 2020 due to an incident occurring during the unloading of a shipment of grain.

In respect to wider industrial installations for which an air quality assessment might have been carried out, SEPA advise that there were no new, proposed or significantly changed installations. Nor have any of the existing industrial installations increased emissions substantially or new relevant exposure have been introduced nearby.

SEPA have also advised that there have been no new or major changes to fuel storage depots storing petrol, petrol stations or poultry farms.

4.4 Commercial and Domestic Sources

The City of Edinburgh Council issued Interim Planning Policy (2010) that discourages the installation of commercial biomass combustion installations in the city.

Combined Heat and Power (gas) units are now commonly installed in new developments. Planning applicants are advised to submit a chimney height application if they are installing any CHP or heating that is bigger than 366Kw output. This will ensure they comply with the Clean Air Act and provide the Council with upfront details on the height of the proposed flue/chimney. It should be noted that the applicants don't always take this advice on board. However, an informative is normally attached to any planning permission given to ensure this is carried out.

If a new or proposed CHP/energy plant is bigger than 1MW (accumulative) the Council will request that the plant be fitted with secondary abatement technology.

The primary CHP plant at the University of Edinburgh's Pleasance site comprises a single, internal combustion, spark ignition engine with an electrical power output of 1.5MWe and two 9MWth boilers supplying district heating and electric networks serving nearly 20 academic and student accommodation buildings. The installation does not include any NOx abatement technology, having been approved, installed and part-operational in 2013. Initial screening of the plant indicates a contribution from the CHP at the nearest receptor in excess of 70 µg/m^3. Although it is recognised the screening tool errs on the side of caution by considering the impact based on ground level release. Edinburgh University are continuing to consider options for the engine operation, particularly whether it can operate to a low NOx specification. The

Council commenced monitoring of NO_2, in January 2017 by installing a number of passive diffusion sites in the Pleasance area during 2017, 2018 and 2019. Results show that concentration are in keeping with general background levels in the area.

The Pollution Prevention and Control (Scotland) Regulations 2012 were amended in December 2017 to transpose the requirements of the Medium Combustion Plant Directive (MCPD –Directive (EU) 2015/2193 of 25 November 2015 on the limitation of emissions of certain pollutants into the air from medium combustion plants). The purpose of the MCPD is to improve air quality. All combustion plant between 1 and 50 MW (net rated thermal input) will have to register or have a permit from SEPA. The Council's informal policy is to ensure require secondary abatement technology is incorporated into any plant above 1MW (accumulate assessment).

SEPA have reported no new or significantly changes CHP or Biomass plants with the Council's administrative area over the past year.

Smoke Control Orders cover the entire City of Edinburgh Council area. There are currently no areas where significant coal burning takes place.

4.5 New Developments with Fugitive or Uncontrolled Sources

SEPA have reported that there are no new or significantly changed landfill sites, quarries, unmade haulage roads on industrial sites or waste transfer stations within the local authority's boundary over the past year.

As mentioned above, a further residential development has been introduced in the Salamander Street AQMA declared for exceedances of PM_{10} originating from a range of source including fugitive emissions, industrial, and traffic. Monitoring will continue in this area.

Additional monitoring will be considered to the west of Leith Docks. It remains that the scope of the City-Wide Detailed Assessment for Particles 2016 that led to the declaration of the AQMA, did not consider residential premises in this area, as there were no relevant receptors. With properties now under construction, work will commence to consider the feasibility of such monitoring.

5. Planning Applications

Continuing economic growth in the city and wider region presents a challenge for air quality. Population growth has inevitable demand for all modes of transport and supported infrastructure.

The Council is preparing a new Local Development Plan for Edinburgh called the City Plan 2030, which will set out policies and proposals for development in Edinburgh between 2020 and 2030. The first stage of preparing the Plan consulted on changes through a main issues report, called 'Choices for City Plan 2030'. This document set out the changes the Council wishes to make in the next plan and how views will be gathered on these. Responses to the Choices to help preparation of the new Plan were published in Summer 2020. The proposed Plan will be reported to Committee in February/March 2021 and will be followed by a period of representations during which comments to the plan can be submitted.

Engagement on topics such as housing development, local and regional transport, employment space etc, with relevant industry/development sectors and community representatives has begun.

Alignment with local air quality management and developing local and national air quality strategies will be crucial to ensuring a sustainable economic growth.

In terms of the existing Local Development Plan, Supplementary Planning Guidance published in August 2018 sets out the Council's approach to the assessment of infrastructure requirements associated with new development and a framework for the collection of developer contributions. The transport improvements identified by the studies and set out in the current LDP Action Programme include;

- the delivery of Edinburgh tram;
- access to bus services and park and ride facilities;
- improvements to the public realm and other pedestrian and cycle actions; and,
- traffic management, including junction improvements.

The guidance aimed to ensure developers make a fair and realistic contribution to the delivery of necessary infrastructure provision and improvement associated with development.

6. Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

Analysis of the monitoring results for **Nitrogen Dioxide (NO_2)** shows the annual mean objective continues to be exceeded in locations within the current AQMAs covering Edinburgh City Centre, St John's Road and Glasgow Road. These AQMAs therefore remain valid. See the summary presented in Table 6.1 below.

Table 6.1 – Summary of 2019 NO_2 Exceedances (Annual Mean Objective)

Site ID	Site address	In AQMA (NO_2)?	Data Capture	Annual mean concentration µg/m³ (Bias adjusted 0.84)
ID5	St John's Road (Auto)	**Yes (St John's)**	99.2	**42**
EDNS	Nicolson Street (Auto)	**Yes (Edinburgh City Centre)**	99.4	**50**
16	Glasgow Road 68	**Yes (Glasgow Road)**	100.0	**41**
58 (Duplicate)	Glasgow Road Newbridge	**Yes (Glasgow Road)**	100.0	**46**
64	Queensferry Road 550	**No**	100.0	**57**
69I	Queensferry Rd/Lyle Court	**No**	58.3	**40**
81	London Rd/East Norton Place	**Yes (Edinburgh City Centre)**	100.0	**50**
48G	Canongate	**No**	75.0	**43**
37a (Duplicate)	Grassmarket 41	**Yes (Edinburgh City Centre)**	58.3	**52**
HT2	Haymarket Terrace (South)	**Yes (Edinburgh City Centre)**	83.3	**41**
74g	Leith Street 35	**Yes (Edinburgh City Centre)**	83.3	**44**
62A	Lothian Road 45	**Yes (Edinburgh City Centre)**	58.3	**57**
62B	Lothian Road 139	**No**	58.3	**44**
62X	Lothian Road/Rutland St	**Yes (Edinburgh City Centre)**	75.0	**46**
62C	Morrison Street 91	**Yes (Edinburgh City Centre)**	75.0	**42**
135a	Nicolson Street 69	**Yes (Edinburgh City Centre)**	58.3	**41**
27	North Bridge – South	**Yes (Edinburgh City Centre)**	100.0	**41**
24	Princes Street/Mound	**Yes (Edinburgh City Centre)**	75.0	**53**
3	Torphichen Place CH	**Yes (Edinburgh City Centre)**	83.3	**41**
2	West Maitland Street	**Yes (Edinburgh City Centre)**	100.0	**46**
28d	West Port 42	**Yes (Edinburgh City Centre)**	66.7	**44**
28b	West Port 62	**Yes (Edinburgh City Centre)**	75.0	**54**
CL123*	Queensferry Road	**No**	100.0	**45**

Site ID	Site address	In AQMA (NO_2)?	Data Capture	Annual mean concentration µg/m^3 (Bias adjusted 0.84)
CL131415*	St Johns Road	**Yes (St John's Road)**	100.0	**47**

Distance correction has not been applied.
* Triplicate co-location site

Where monitoring sites were not located at relevant exposure, distance correction calculations have been completed. One site where distance correction was applied (62B) continued to report an exceedance. For the sites located outside any AQMA (following distance correction where relevant) two sites (62B and 48G) reported an annual mean concentration exceeding the AQS objective. These are located near to the City Centre AQMA, and additional monitoring will be deployed in these areas to identify whether a further extension of the AQMA boundary is required.

No diffusion tube monitoring locations reported an annual mean concentration in 2019 in excess of 60µg/m^3, suggesting that there has not been an exceedance of the hourly mean objective. The maximum number of hourly concentrations in excess of 200µg/m^3 was 4, reported at Nicolson Street. St John's Road AQMA is also declared for exceedances of the NO_2 1-hour objective. 2019 is the fourth consecutive year in which less than 18 hourly concentrations greater than 200µg/m^3 were reported. Therefore, the Council will amend the AQMA to remove this designation.

For the third consecutive year, Great Junction Street AQMA has reported no breaches of NO_2 objectives, with the Inverleith Row AQMA reporting no breaches for the second year in a row. Monitoring shall continue in these areas in order to aid the decision of whether the revocation of these AQMAs would be appropriate in the future.

Overall, there is a general decreasing trend of NO_2 concentrations observed across Edinburgh, from both the Automatic and Non-automatic (Passive diffusion tube) data.

PM_{10} and $PM_{2.5}$ monitoring data shows that for all locations in 2019, with the exception of Salamander Street, there are no breaches of the Scottish objectives. Salamander Street has reported a breach of the annual mean PM_{10} objective when using the local factor to adjust the TEOM data. This site is within an AQMA declared

for exceedances of the annual mean PM_{10} objective, therefore no additional action is required.

Overall, there is a general decreasing trend in both PM_{10} and $PM_{2.5}$ concentrations reported across Edinburgh.

6.2 Conclusions relating to New Local Developments

The air quality impact of cumulative development, especially large proposals with associated car-parking, is a concern for the Council, in terms of air quality impact and the risk of increasing roadside NO_2 concentrations. The assessment of New Local Developments highlights a number of traffic-generating developments in densely populated areas in Edinburgh North. Additionally, new sensitive receptors (especially residential) may also be subject to levels of pollution from existing and proposed neighbouring uses, especially in the vicinity of industrial and fugitive sources of PM_{10}.

The introduction of new sensitive receptors with new local development is also proposed adjacent to sources of NO_2.

The Council will need to consider long term monitoring of NO_2 and particles in areas where new residential exposure will be introduced.

In terms of SEPA regulated processes, the Council has requested that should there be any applications for permitted processes within the Salamander Street AQMA, that consultation with the Council is undertaken.

The Council is preparing a new Local Development Plan for Edinburgh called the City Plan 2030. This will set out policies and proposals for development in Edinburgh between 2020 and 2030. Engagement on topics such as housing development and local and regional transport, employment space, retail and leisure, with relevant industry/development sectors and community representatives has been undertaken. Alignment with local air quality management and developing local and national air quality strategies will be crucial to ensuring a sustainable economic growth. The City Plan 2030 will be published in Summer 2020.

6.3 Proposed Actions

The report provides an annual update on the most recently available annual air quality monitoring data (2019), local pollutant trends and emerging issues, fulfilling the requirements of the statutory Local Air Quality Management Framework.

Concentrations of the main pollutants of concern are decreasing at most locations across the city, although there remain areas where statutory legal objectives are being breached, especially traffic related nitrogen dioxide in the city centre. The development of a low emission zone is expected to reduce concentrations of nitrogen dioxide (NO_2). The objective for fine particulate matter (PM_{10}) continues to be exceeded in the Salamander Street Air Quality Management Area (AQMA), albeit marginally.

For the third consecutive year, Great Junction Street AQMA has reported no breaches of the NO_2 annual objectives. A review will be undertaken to consider the potential revocation of the AQMA, particularly in relation to changing traffic management priorities in the area. With the Inverleith Row AQMA, there was no breach of the said objective for the second year in a row. Monitoring will continue to assess whether this AQMA can be revoked in the future.

St John's Road AQMA is also declared for exceedances of the NO_2 1-hour objective. 2019 is the fourth consecutive year in which less than 18 hourly concentrations greater than 200µg/m^3 were reported. Therefore, the Council will amend the AQMA to remove this designation.

The Council will undertake initial investigations for a new monitoring location representative of new or proposed residential properties near Leith Docks (west).

The Council has continued to make progress with a range of actions that will improve air quality. These include engaging with bus and freight sector to encourage reduction in emissions from vehicles, implementing measures to deal with congestion and promoting modal shift away from car use.

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

- Continue ECO Stars scheme,
- Continue the roll out of telematics across the Council Fleet,
- Complete outstanding SCOOT development and repair work,
- Install on-street electric vehicle charging infrastructure to strengthen the existing network,
- Continue support for Active Travel Action Plan,

- Reconvene the Steering Group considering the PM_{10} Salamander Street Air Quality Action Plan to further develop the Draft Plan,
- Revise the existing NO_2 Air Quality Action Plan, in conjunction with the developing LEZ scheme, City Mobility Plan and the Cleaner Air for Scotland 2 Strategy,
- Continue on-going development work with SEPA, Transport Scotland and partners to develop the Low Emission Zone (LEZ) scheme under the National Low Emission Framework and the National Modelling Framework, and;
- Finalise a preferred LEZ scheme for Edinburgh, for public consultation and statutory processing, as per the developing regulations under the Transport (Scotland) Act 2019.

Appendix A: Monitoring Results

Table A.4 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
ID4	**Gorgie Road**	Roadside	323121	672314	NO_2	Y(NO_2)	Chemiluminescent	0	2.5	2.63
ID5	**St. John's Road**	Kerbside	320101	672907	NO_2 PM_{10} $PM_{2.5}$	Y(NO_2)	Chemiluminescent FIDAS 200 FIDAS 200	0	0.5	1.98
ID6	**Currie High School**	Suburban	317595	667909	NO_2 PM_{10}	N	Chemiluminescent TEOM	N/A	N/A	3.59 3.24
ID7	**St. Leonard's**	Urban Background (AURN)	326265	673129	NO_2 PM_{10} $PM_{2.5}$ PM_{10} $PM_{2.5}$ O_3 CO	N	Chemiluminescent FDMS (until 25/07/2019) FIDAS (from 26/07/2019) UV absorp IR absorp	N/A	35	3.4m 3.2m 3.1m 3.2 3.1 3.4 3.4

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
					SO_2 PAH		UV absorp Digitalsamp			3.4 3.4
ID8	**Salamander Street**	Roadside	327615	676333	NO_2 PM_{10}	Y(PM_{10})	Chemiluminescent TEOM	0	2.13	2.86
ID9	**Queensferry Road**	Roadside	318736	674930	NO_2 PM_{10}	N	Chemiluminescent FIDAS 200 (from 11/10/2019)	6.5	1.7	2.96
ID10	**Glasgow Road**	Roadside	313103	672663	NO_2 PM_{10}	Y(NO_2)	Chemiluminescent TEOM	0	6	2.84
EDNS	**Nicolson Street**	Roadside	326151	673041	NO_2 PM_{10} $PM_{2.5}$	Y(NO_2)	Chemiluminescent FIDAS 200 (from 04/12/2019)	2.2	2.9[i]	2
ED012	**Tower Street**	Urban Industrial	327467	676537	PM_{10} $PM_{2.5}$	Y (PM_{10})	FIDAS 200	0	N/A	2

(1) 0 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.

i. Distance to nominal kerb, due to parking bay/parking restrictions/cycle lane in front of monitoring location.

Table A.13 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?
13a	**Deanhaugh/Raeburn Place**	Roadside	324533	674655	NO_2	No	0	2	No
57	**Glasgow Road 158**	Roadside	318185	672756	NO_2	No	8.5	3.6	No
16a	**Glasgow Road 68 facade**	Roadside	313028	672629	NO_2	Yes	0	6.2	No
16	**Glasgow Road 68**	Roadside	313028	672633	NO_2	Yes	4.4	1.8	No
15a	**Glasgow Road 9**	Roadside	312702	672675	NO_2	Yes	0	7.5	No
58 (Duplicate)	**Glasgow Road Newbridge**	Roadside	312693	672670	NO_2	Yes	5.2	2.8	No
15	**Glasgow Road Newbridge**	Roadside	312664	672672	NO_2	Yes	3.8	4	No
56	**Glasgow Road /Drumbrae**	Roadside	319212	672921	NO_2	No	4.6	2.6	No
143a	**Hamilton Place Library**	Roadside	324699	674651	NO_2	No	0 play area	2.1m	No
41	**Hillview Terrace**	Background	320081	673232	NO_2	No	N/A	1	No
55c	**Inverleith Row/Montague**	Roadside	324686	675941	NO_2	Yes	1.1	4.3[ii]	No

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?
55 (Duplicate)	**Inverleith Row/Ferry Road**	Roadside	324638	675993	NO_2	Yes	0	4.7	No
63	**Queensferry Road 544**	Roadside	318723	674963	NO_2	No	0	13.6	No
63A	**Queensferry Road 540**	Roadside	318794	674959	NO_2	No	0	13.5	No
64	**Queensferry Road 550**	Roadside	318698	674955	NO_2	No	9.2	1.5	No
64b	**Queensferry Road 550 Facade**	Roadside	318701	674964	NO_2	No	0	11	No
64a	**Queensferry Road 552**	Roadside	318698	674964	NO_2	No	0	10.5	No
62	**Queensferry Road 561**	Roadside	318810	674903	NO_2	No	0	16.9	No
69l [i]	**Queensferry Rd/Lyle Court**	Roadside	318616	674968	NO_2	No	7.5	2	No
40	**Queensferry Rd/Hillhouse Rd**	Roadside	322144	674497	NO_2	No	0	2	No
129 [i]	**Queensferry Rd/Hillpark Wood**	Roadside	321343	674956	NO_2	No	0	14.2	No
22a	**Roseburn Terrace**	Kerbside	322984	673189	NO_2	Yes	1.7	2.5[ii]	No
23	**Roseburn Terrace**	Kerbside	323007	673198	NO_2	Yes	2.3	0.2	No
1d	**St John's Road 131**	Roadside	320096	672907	NO_2	Yes	0	2.1	No
1b	**St John's Road IR**	Roadside	320154	672911	NO_2	Yes	0	2	No
1	**St John's Road SB**	Kerbside	320122	672917	NO_2	Yes	1.8	0.5	No
SJ1	**St John's Road/Kaimes Rd**	Kerbside	320571	672809	NO_2	Yes	2.3	0.3	No

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?
39	**St John's Road/Victor Park**	Roadside	319677	672991	NO_2	Yes	4.2	1.6	No
14	**Trinity Crescent**	Roadside	324896	676991	NO_2	No	4	2	No
	SOUTH WEST								
76c	**Angle Park Terrace 25**	Roadside	323587	672360	NO_2	Yes	0	4.8	No
76b	**Angle Park Terrace 74**	Roadside	323527	672285	NO_2	Yes	0	2.1	No
76	**Angle Park/Harrison Road**	Roadside	323498	672263	NO_2	Yes	0	2.2	No
76a	**Ardmillan Terrace 22**	Roadside	323487	672287	NO_2	Yes	0	2.2	No
80e	**Balgreen Road / Library**	Roadside	322110	672268	NO_2	No	0 [Play area]	2	No
4a	**Calder Road**	Roadside	318894	670493	NO_2	No	5	12	No
79d	**Dundee Street/Yeaman Place**	Roadside	323926	672550	NO_2	Yes	0	2.3	No
79a	**Fountainbridge 103**	Roadside	324731	672984	NO_2	No	0	2.2	No
79	**Fountainbridge/Tollcross**	Roadside	324682	672939	NO_2	No	0	3.3	No
80	**Gorgie Road / Delhaig**	Roadside	321967	671666	NO_2	Yes	0	2.6	No
18	**Gorgie Road 8**	Roadside	323477	672476	NO_2	Yes	0	2.4	No
80c	**Gorgie Road 87**	Roadside	323265	672394	NO_2	Yes	0	2.5	No
80f	**Gorgie Road 160**	Roadside	323141	672345	NO_2	Yes	0	3.2	No
80g	**Gorgie Road 173**	Kerbside	323083	672311	NO_2	Yes	2.9	1.8[ii]	No
80b	**Gorgie Road 549**	Roadside	321724	671557	NO_2	Yes	0	2.5	No

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?
80a	**Gorgie Road Glen Lea**	Roadside	322381	671950	NO_2	Yes	0	2.6	No
5	**Gorgie Road/Murieston Road**	Kerbside	323484	672478	NO_2	Yes	4.9	0.3	No
76d	**Henderson Terrace**	Roadside	323632	672449	NO_2	Yes	0	1.8	No
11a	**Lanark Road 425**	Roadside	320625	669070	NO_2	No	0	2.6	No
11	**Lanark Road 610**	Roadside	319527	668420	NO_2	No	3.7	1.5	No
77a	**Slateford Road 51**	Roadside	323167	672009	NO_2	Yes	0	2.3	No
77b	**Slateford Road 93/95**	Roadside	322999	671876	NO_2	Yes	0	2.6	No
77	**Slateford Road 97**	Roadside	322960	671846	NO_2	Yes	0	2.7	No
80h	**Wardlaw Street 2**	Roadside	323065	672295	NO_2	Yes	0	5	No
	NORTH EAST								
29a	**Bernard Street/Kings Chambers**	Roadside	327137	676529	NO_2	Yes	0	2.1	No
29c (Duplicate)	**Bernard Street/PS**	Roadside	327135	676515	NO_2	Yes	0	2.1	No
29	**Bernard Street/CA**	Roadside	327148	676507	NO_2	Yes	0	2.2	No
43	**Broughton Road**	Roadside	325513	675134	NO_2	No	0	2	No
9d	**Commercial Street**	Roadside	326477	676759	NO_2	Yes	0	2.6	No
9	**Commercial Street 88**	Roadside	326879	676626	NO_2	Yes	0	2.6	No
9a	**Commercial St/Portland Place**	Roadside	326430	676754	NO_2	Yes	3.9	1.5	No
30f	**Duke Street**	Roadside	327106	675816	NO_2	No	0	2.2	No

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?
25c	**Easter Road 105/109**	Roadside	326958	674770	NO_2	Yes	0	3.3	No
25e	**Easter Road 198**	Roadside	326999	674940	NO_2	Yes	0	4	No
25d	**Easter Road/Bothwick**	Roadside	326974	674780	NO_2	Yes	0	2.8	No
25	**Easter Road/CH Shop**	Roadside	326934	674503	NO_2	Yes	0	2.3	No
25b	**Easter Road/Rossie Place**	Roadside	326950	674624	NO_2	Yes	0	3.3	No
18A [i]	**Ferry Road 203**	Roadside	325873	674956	NO_2	No	2.4	1.6	No
53	**Ferry Road/Bowhill Terrace 6**	Roadside	324726	676004	NO_2	Yes	1.6	4.6[ii]	No
45d	**Ferry Road/North Junction Street**	Roadside	326503	674436	NO_2	Yes	0	3.1	No
30b	**Great Junction Street 137**	Roadside	326740	676138	NO_2	Yes	0	2.9	No
30c	**Great Junction Street 14**	Roadside	326925	675949	NO_2	Yes	0	2.8	No
30e	**Great Junction Street/CG**	Roadside	326845	676015	NO_2	Yes	0	2.7	No
30	**Great Junction Street/FV**	Roadside	326884	675997	NO_2	Yes	0	2.8	No
30d	**Great Junction Street/WC**	Roadside	326757	676144	NO_2	Yes	0	2.8	No
21	**Leith Walk/Brunswick Road**	Roadside	326413	674899	NO_2	Yes	0	4.5	No

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?
20	**Leith Walk/McDonald Road**	Roadside	326361	674882	NO_2	Yes	3.1	1.2	No
66	**London Road/Cadzow Place**	Roadside	327468	674362	NO_2	Yes	0	5.7[ii]	No
67	**London Road/Earlston Place**	Roadside	327190	674433	NO_2	Yes	0	2.7	No
81	**London Rd/East Norton Place**	Roadside	326980	674446	NO_2	Yes	0	2.5	No
46	**London Road/Easter Road**	Roadside	326944	674472	NO_2	Yes	0	5.6	No
68	**Parsons Green Terrace**	Roadside	328042	674179	NO_2	Yes	0	2.7	No
69	**London Road/Wolseley Place**	Roadside	328272	674143	NO_2	Yes	0	2.62	No
70	**London Road/Wolseley Terrace**	Roadside	328337	674129	NO_2	Yes	0	4.6	No
32	**Niddrie Mains Road 28**	Kerbside	328889	671649	NO_2	No	4.7	2.6[ii]	No
9c	**North Junction Street**	Roadside	326448	676710	NO_2	Yes	2.1	2.7	No
71	**Portobello High Street 185**	Roadside	330533	673850	NO_2	No	0	3	No
73d	**Portobello Road/Ramsay F**	Roadside	329917	674388	NO_2	No	0	3.7	No
30X [i]	**Rodney Street 31**	Roadside	325443	674969	NO_2	No	0	2.4	No
30A [i]	**Rodney Street 10**	Roadside	325409	675013	NO_2	No	0	3	No

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?
51c	Salamander Street/Baltic Street	Roadside	327476	676418	NO_2	No	0	2.3	No
72	Seafield Road East 10	Roadside	329993	674457	NO_2	No	0	4.5	No
	SOUTH EAST								
10B [i]	Bank Street	Roadside	325598	673616	NO_2	No	0	2.7	No
44	Broughton Street	Roadside	325918	674430	NO_2	No	0	3.4	No
8A [i]	Brougham Street 9	Roadside	324967	672931	NO_2	No	0	3.7	No
6B [i]	Bruntsfield Place 147	Roadside	324619	672131	NO_2	No	0	5.5	No
6a	Bruntsfield Place 210	Roadside	324495	672035	NO_2	No	0	2.8	No
48G [i]	Canongate	Roadside	326173	673700	NO_2	No	0	2.6	No
138	Clerk Street 15	Roadside	326229	672789	NO_2	Yes	0	4.4 [ii]	No
151	Comiston Road	Roadside	324367	670473	NO_2	No	0	2.7	No
48f	Cowgate/50 St Mary's Street	Roadside	326198	673587	NO_2	No	0	2.6	No
48c	Cowgate Blackfriars	Roadside	326047	673519	NO_2	Yes	0	2.4	No
48a	Cowgate/Blair Street	Roadside	325929	673490	NO_2	Yes	0	3.2	No
48	Cowgate / Guthrie Street	Roadside	325881	673471	NO_2	Yes	0	4.5	No
48e	Cowgatehead 2	Roadside	325537	673405	NO_2	Yes	0	1.9	No
150	Drum Street	Roadside	329281	668615	NO_2	No	0	1.5	No
10A [i]	George IV Bridge	Roadside	325675	673358	NO_2	No	0	2.7	No
74f	George Street 112	Roadside	324880	673891	NO_2	Yes	0	6.8	No

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?
37a (Duplicate)	**Grassmarket 41**	Roadside	325401	673340	NO_2	Yes	0	3.4	No
37b	**Grassmarket 75**	Roadside	325471	673369	NO_2	Yes	0	5	No
37c	**Grassmarket/Thompsons Court**	Background	325397	673377	NO_2	Yes	0	22.8[ii]	No
75e	**Great Stuart Street 9**	Roadside	324476	673967	NO_2	No	0	9.4[ii]	No
HT1	**Haymarket Terrace (North)**	Roadside	323985	673219	NO_2	Yes	0	3.7	No
HT2	**Haymarket Terrace (South)**	Kerbside	323787	673212	NO_2	Yes	1.75	0.5	No
10	**Home Street**	Roadside	324904	672906	NO_2	No	0	2	No
140	**Hope Park Terrace/Clerk Street**	Roadside	326323	672596	NO_2	Yes	3.5	1.3	No
17a	**Hope Park Terrace/VS**	Roadside	326312	672614	NO_2	Yes	0	5	No
149a	**Howden Hall Road 79**	Roadside	327383	668079	NO_2	No	0	4.5	No
34	**India Street**	Background	324790	674341	NO_2	No	N/A	2.5[ii]	No
8B [i]	**Lauriston Place Opp 119**	Roadside	324989	673016	NO_2	No	0	4.9 (parking bay)	No
74g	**Leith Street 35**	Roadside	325897	674051	NO_2	Yes	0	3.65	No
62A [i]	**Lothian Road 45**	Roadside	324777	673425	NO_2	Yes	0	4.1	No

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?
62B [i]	**Lothian Road 139**	Roadside	324827	673138	NO_2	No	3.2	3.5 (loading bay)	No
62X [i]	**Lothian Road/Rutland St**	Roadside	324711	673635	NO_2	Yes	0	4.8	No
152	**Mayfield Road**	Roadside	326640	671384	NO_2	No	0	3.7	No
38	**Melville Drive**	Roadside	325141	672733	NO_2	No	10	2.8	No
42	**Midmar Drive**	Background	325105	670511	NO_2	No	N/A	1.4	No
8	**Morningside Road**	Roadside	324542	671167	NO_2	No	0	3.7	No
62C [i]	**Morrison Street 91**	Roadside	324541	673183	NO_2	Yes	0	2.36	No
49	**Morrison Street**	Roadside	324167	673249	NO_2	Yes	2.4	2.2	No
135a	**Nicolson Street 69**	Roadside	326112	673115	NO_2	Yes	0	2.8	No
135b	**59-61 Nicolson Street**	Roadside	326099	673140	NO_2	Yes	0	2.8	No
136	**Nicolson Street 92**	Roadside	326164	673054	NO_2	Yes	0	5.7 [ii]	No
27	**North Bridge – South**	Roadside	325944	673670	NO_2	Yes	0	3.5	No
47	**Princes Street (Eastbound)**	Roadside	325049	673791	NO_2	Yes	6.5	9	No
24	**Princes Street/Mound**	Kerbside	325397	673869	NO_2	Yes	10.2	1	No
33b	**Queen Street 66**	Roadside	324837	674053	NO_2	Yes	0	7	No
33a	**Queen Street/Weymss Place**	Roadside	324817	674077	NO_2	Yes	0	6	No
33	**Queen Street/Hanover Street**	Roadside	325467	674229	NO_2	Yes	0	6.5	No

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?
SH1	**Shandwick Place**	Roadside	324513	673556	NO_2	Yes	0	2.5	No
144	**South Bridge 59**	Roadside	326020	673370	NO_2	Yes	0	2.3	No
142	**South Clerk Street 41a**	Roadside	326367	672554	NO_2	Yes	0	2	No
141	**South Clerk Street 84**	Roadside	326383	672472	NO_2	Yes	0	2.6	No
75d	**St Colme Street 4**	Roadside	324646	674025	NO_2	No	0	6.2	No
153	**New Arthur Place 4 ** tube moved**	Background	326365	673310	NO_2	No	0	N/A	No
10C [i]	**Teviot Place**	Roadside	325754	673144	NO_2	No	0	2.5	No
3b	**Torphichen Place 1**	Roadside	324277	673309	NO_2	Yes	0	4.8	No
3	**Torphichen Place CH**	Roadside	324258	673295	NO_2	Yes	0	2.3	No
154	**Viewcraig Street No.9 ** tube moved**	Roadside	326487	673541	NO_2	No	0	N/A	No
2	**West Maitland Street**	Kerbside	324193	673346	NO_2	Yes	5.2	0.5	No
28d	**West Port 42**	Roadside	325203	673250	NO_2	Yes	0	2.7	No
28b	**West Port 62**	Roadside	325166	673242	NO_2	Yes	0	1.4	No
28c	**West Port Opposite 50**	Roadside	325184	673261	NO_2	Yes	0	3	No
36	**York Place**	Roadside	325828	674362	NO_2	Yes	2.7	5.5	No
	Co-located Sites								
CL123	**Queensferry Road**	Roadside	318736	674930	NO2	No	6.5	1.7	Yes
CL456	**Gorgie Road**	Roadside	323121	672314	NO2	Yes	0	6	Yes
CL789	**Salamander Street**	Roadside	327615	676333	NO2	Yes (PM10	0	2.13	Yes

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?
						)			
CL101112	**Glasgow Road**	Roadside	313103	672663	NO2	Yes	0	6	Yes
CL131415	**St Johns Road**	Kerbside	320101	672907	NO2	Yes	0	0.5	Yes

(1) 0 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.

Distance to relevant exposure not applicable (N/A) where passive diffusion tube represents background concentrations.

i. New sites in 2019
ii. Distance to nominal kerb, due to parking bay/parking restrictions/cycle lane in front of monitoring location

Table A.5 – Annual Mean NO_2 Monitoring Results

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
						2015 Bias Adjustment Factor=0.76	2016 Bias Adjustment Factor = 0.77	2017 Bias Adjustment Factor = 0.82	2018 Bias Adjustment Factor = 0.9	2019 Bias Adjustment Factor = 0.84
ID4	Gorgie Road	Roadside	Automatic	76.8	76.8	32	33	30	28	27.0
ID5	St John's Road	Kerbside	Automatic	99.2	99.2	**65**	**53**	**53**	**43**	**41.9**
ID6	Currie	Suburban	Automatic	30.7	30.7	7	7	6	8	9.9
ID7	St Leonard's	Urban Background	Automatic	95.1	95.1	N/A	23	20	18	20.8
ID8	Salamander St	Roadside	Automatic	95.6	95.6	28	27	25	25	24.3
ID9	Queensferry Rd	Roadside	Automatic	99.2	99.2	**41**	**42**	N/A	**52**	36.9
ID10	Glasgow Road	Roadside	Automatic	98.6	98.6	26	28	26	26	25.2
ID11	Nicolson Street	Kerbside	Automatic	99.4	99.4	N/A	N/A	N/A	**51**	**50.4**
	NORTH WEST									

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
						2015 Bias Adjustment Factor=0.76	2016 Bias Adjustment Factor = 0.77	2017 Bias Adjustment Factor = 0.82	2018 Bias Adjustment Factor = 0.9	2019 Bias Adjustment Factor = 0.84
13a	Deanhaugh/ Raeburn Pl	Roadside	Diffusion Tube	100.0	100.0	N/A	26	23	26	22.1
57	Glasgow Road 158	Roadside	Diffusion Tube	91.7	91.7	**40**	**41**	33	38	31.9
16a	Glasgow Rd 68 Facade	Roadside	Diffusion Tube	41.7	41.7	34	36	30	N/A	29.1
16	Glasgow Rd 68	Roadside	Diffusion Tube	100.0	100.0	**46**	**45**	40	**46**	**40.9**
15a	Glasgow Rd 9	Roadside	Diffusion Tube	100.0	100.0	39	33	35	38	32.0
58 (Duplicate)	Glasgow Rd Newbridge	Roadside	Diffusion Tube	100.0	100.0	**51**	**49**	**51**	**52**	**46.0**
15	Glasgow Rd Newbridge	Roadside	Diffusion Tube	100.0	100.0	**43**	**44**	**44**	**44**	39.2
56	GlasgowRd Drumbrae	Roadside	Diffusion Tube	91.7	91.7	28	32	31	32	25.3
143a	Hamilton Pl Library	Roadside	Diffusion Tube	100.0	100.0	29	33	28	27	25.0
41	Hillview Terrace	Background	Diffusion Tube	100.0	100.0	19	20	17	18	16.7
55c	Inverleith Row/Montague	Roadside	Diffusion Tube	100.0	100.0	25	29	23	24	23.9
55	Inverleith	Roadside	Diffusion	100.0	100.0	**41**	**41**	**40**	34	33.4

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
						2015 Bias Adjustment Factor=0.76	2016 Bias Adjustment Factor = 0.77	2017 Bias Adjustment Factor = 0.82	2018 Bias Adjustment Factor = 0.9	2019 Bias Adjustment Factor = 0.84
(Duplicate)	Row/Ferry Road		Tube							
63	Queensferry Road 544	Roadside	Diffusion Tube	66.7	66.7	27	24	27	25	23.4
63A	Queensferry Road 540	Roadside	Diffusion Tube	100.0	25.0	N/A	N/A	N/A	N/A	18.0
64	Queensferry Road 544	Roadside	Diffusion Tube	100.0	100.0	**71**	**68**	**61**	**62**	**56.9**
64b	Queensferry Road 550 façade	Roadside	Diffusion Tube	100.0	100.0	36	31	32	32	27.2
64a	Queensferry Road 552	Roadside	Diffusion Tube	91.7	91.7	30	29	30	30	26.4
62	Queensferry Road 561	Roadside	Diffusion Tube	100.0	100.0	19	20	18	21	17.8
69l	Queensferry Road/Lyle Court	Roadside	Diffusion Tube	58.3	58.3	N/A	N/A	N/A	N/A	**40.3**
40	Queensferry Rd/HIllhouse Rd	Roadside	Diffusion Tube	83.3	83.3	32	32	28	30	24.7
129	QnsfrryRd Hillpark Wd	Roadside	Diffusion Tube	91.7	91.7	N/A	N/A	N/A	N/A	15.2
23	Roseburn	Kerbside	Diffusion	91.7	91.7	38	40	32	37	35.3

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
						2015 Bias Adjustment Factor=0.76	2016 Bias Adjustment Factor = 0.77	2017 Bias Adjustment Factor = 0.82	2018 Bias Adjustment Factor = 0.9	2019 Bias Adjustment Factor = 0.84
	Terrace		Tube							
22a	Roseburn Terrace	Kerbside	Diffusion Tube	100.0	100.0	N/A	N/A	**43**	**42**	36.5
1d	St John's Road 131	Roadside	Diffusion Tube	100.0	100.0	**46**	**45**	**42**	**40**	37.7
1b	St John's Road IR	Roadside	Diffusion Tube	100.0	100.0	33	36	29	28	27.3
1	St John's Road SB	Kerbside	Diffusion Tube	91.7	91.7	35	37	32	29	31.8
SJ1	St John's Road/Kaimes Road	Kerbside	Diffusion Tube	75.0	75.0	33	34	33	31	27.7
39	St John's Raod/Victor Park	Roadside	Diffusion Tube	100.0	100.0	34	36	35	32	30.4
14	Trinity Crescent	Roadside	Diffusion Tube	91.7	91.7	23	24	22	24	20.4
	SOUTH WEST									
76c	Angle Park Terrace 25	Roadside	Diffusion Tube	100.0	100.0	30	30	30	30	26.8
76b	Angle Park Terrace 74	Roadside	Diffusion Tube	91.7	91.7	**46**	**44**	39	**40**	33.8
76	Angle	Roadside	Diffusion	100.0	100.0	38	**43**	35	37	33.2

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
						2015 Bias Adjustment Factor=0.76	2016 Bias Adjustment Factor = 0.77	2017 Bias Adjustment Factor = 0.82	2018 Bias Adjustment Factor = 0.9	2019 Bias Adjustment Factor = 0.84
	Pk/Harrison Rd		Tube							
76a	Ardmillan Terrace 22	Roadside	Diffusion Tube	91.7	91.7	27	31	29	28	27.1
80e	Balgreen Rd/Library	Roadside	Diffusion Tube	91.7	91.7	34	33	32	31	28.0
4a	Calder Road	Roadside	Diffusion Tube	91.7	91.7	N/A	30	22	24	22.7
79d	Dundee St/Yeaman Pl	Roadside	Diffusion Tube	91.7	91.7	**42**	39	38	**40**	34.5
79a	Fountainbridge 103	Roadside	Diffusion Tube	91.7	91.7	31	36	31	29	27.0
79	Fountainbridge/Tollcross	Roadside	Diffusion Tube	83.3	83.3	30	36	25	28	29.4
80	Gorgie Rd/Delhaig	Roadside	Diffusion Tube	91.7	91.7	33	38	34	37	33.3
18	Gorgie Road 8	Roadside	Diffusion Tube	100.0	100.0	37	38	35	35	33.2
80c	Gorgie Road 87	Roadside	Diffusion Tube	58.3	58.3	34	34	35	34	27.4
80f	Gorgie	Roadside	Diffusion	91.7	91.7	N/A	N/A	N/A	35	32.5

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
						2015 Bias Adjustment Factor=0.76	2016 Bias Adjustment Factor = 0.77	2017 Bias Adjustment Factor = 0.82	2018 Bias Adjustment Factor = 0.9	2019 Bias Adjustment Factor = 0.84
	Road 160		Tube							
80g	Gorgie Road 173	Kerbside	Diffusion Tube	58.3	58.3	N/A	N/A	N/A	39	31.1
80b	Gorgie Road 549	Roadside	Diffusion Tube	100.0	100.0	28	32	28	N/A	28.1
80a	Gorgie Rd Glen Lea	Roadside	Diffusion Tube	100.0	100.0	27	31	29	27	25.8
5	Gorgie Rd/Muriesto n Rd	Kerbside	Diffusion Tube	100.0	100.0	**42**	**44**	**43**	**42**	33.3
76d	Henderson Terrace	Roadside	Diffusion Tube	91.7	91.7	32	33	28	33	28.6
11a	Lanark Road 425	Roadside	Diffusion Tube	100.0	100.0	N/A	N/A	N/A	33	27.5
11	Lanark Road 610	Roadside	Diffusion Tube	91.7	91.7	22	23	20	20	20.5
77a	Slateford Road 51	Roadside	Diffusion Tube	100.0	100.0	35	36	31	32	28.2
77b	Slateford Road 93/95	Roadside	Diffusion Tube	91.7	91.7	38	36	33	36	34.2
77	Slateford Road 97	Roadside	Diffusion Tube	83.3	83.3	38	34	29	35	31.9
80h	Wardlaw	Roadside	Diffusion	91.7	91.7	N/A	N/A	N/A	28	27.2

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
						2015 Bias Adjustment Factor=0.76	2016 Bias Adjustment Factor = 0.77	2017 Bias Adjustment Factor = 0.82	2018 Bias Adjustment Factor = 0.9	2019 Bias Adjustment Factor = 0.84
	Street 2		Tube							
NORTH EAST										
29a	Bernard St/Kings Chambers	Roadside	Diffusion Tube	91.7	91.7	34	37	27	31	27.1
29c (Duplicate)	Bernard St/PS	Roadside	Diffusion Tube	100.0	100.0	**40**	39	36	37	35.4
29	Bernard St/CA	Roadside	Diffusion Tube	100.0	100.0	32	33	32	30	25.9
43	Broughton Road	Roadside	Diffusion Tube	100.0	100.0	32	34	32	34	29.4
9d	Commercial Street	Roadside	Diffusion Tube	100.0	100.0	36	**42**	36	35	33.6
9	Commercial Street 88	Roadside	Diffusion Tube	100.0	100.0	29	32	26	29	26.3
9a	Commercial St/Portland Pl	Roadside	Diffusion Tube	100.0	100.0	**42**	40	35	37	32.8
30f	Duke Street	Roadside	Diffusion Tube	91.7	91.7	**40**	38	35	35	32.3
25c	Easter Rd 105/109	Roadside	Diffusion Tube	100.0	100.0	31	33	31	33	33.2

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
						2015 Bias Adjustment Factor=0.76	2016 Bias Adjustment Factor = 0.77	2017 Bias Adjustment Factor = 0.82	2018 Bias Adjustment Factor = 0.9	2019 Bias Adjustment Factor = 0.84
25e	Easter Road 198	Roadside	Diffusion Tube	100.0	100.0	24	27	24	28	25.5
25d	Easter Road/Bothwick	Roadside	Diffusion Tube	83.3	83.3	30	32	29	38	25.6
25	Easter Rd/CH Shop	Roadside	Diffusion Tube	91.7	91.7	**40**	**46**	38	37	33.2
25b	Easter Rd/Rossie Pl	Roadside	Diffusion Tube	83.3	83.3	31	35	30	32	30.1
18A	Ferry Road 203	Roadside	Diffusion Tube	91.7	91.7	N/A	N/A	N/A	N/A	31.8
53	Ferry Rd/Bowhill Terrace 6	Roadside	Diffusion Tube	100.0	100.0	36	34	34	31	28.8
45d	Ferry Rd/North Junction St	Roadside	Diffusion Tube	100.0	100.0	37	33	33	32	31.2
30b	Great Junction St 137	Roadside	Diffusion Tube	91.7	91.7	38	33	33	32	30.8
30c	Great Junction Street 14	Roadside	Diffusion Tube	100.0	100.0	34	**40**	34	37	33.1

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
						2015 Bias Adjustment Factor=0.76	2016 Bias Adjustment Factor = 0.77	2017 Bias Adjustment Factor = 0.82	2018 Bias Adjustment Factor = 0.9	2019 Bias Adjustment Factor = 0.84
30e	Great Junction Street/CG	Roadside	Diffusion Tube	83.3	83.3	32	34	N/A	34	33.3
30	Great Junction Street/FV	Roadside	Diffusion Tube	100.0	100.0	33	**42**	32	37	32.8
30d	Great Junction St/WC	Roadside	Diffusion Tube	100.0	100.0	30	33	33	32	28.7
21	Leith Walk/Brunswick Rd	Roadside	Diffusion Tube	66.7	66.7	35	**40**	38	N/A	30.6
20	Leith Walk/McDonald Rd	Roadside	Diffusion Tube	91.7	91.7	33	**40**	N/A	39	37.9
66	London Rd/Cadzow Place	Roadside	Diffusion Tube	100.0	100.0	32	32	31	28	29.8
67	London Rd/Earlston Place	Roadside	Diffusion Tube	100.0	100.0	**42**	**41**	**42**	**42**	36.9
81	London Rd/East Norton Place	Roadside	Diffusion Tube	100.0	100.0	**50**	**57**	**41**	**43**	**50.0**

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
						2015 Bias Adjustment Factor=0.76	2016 Bias Adjustment Factor = 0.77	2017 Bias Adjustment Factor = 0.82	2018 Bias Adjustment Factor = 0.9	2019 Bias Adjustment Factor = 0.84
46	London Rd/Easter Rd	Roadside	Diffusion Tube	100.0	100.0	37	39	**40**	37	34.9
68	Parsons Green Ter	Roadside	Diffusion Tube	91.7	91.7	31	31	30	33	28.0
69	London Rd/Wolseley Place	Roadside	Diffusion Tube	100.0	100.0	**43**	38	37	38	35.4
70	London Rd/Wolseley Terrace	Roadside	Diffusion Tube	83.3	83.3	**44**	**40**	38	**40**	37.6
32	Niddrie Mains Rd 28	Kerbside	Diffusion Tube	100.0	100.0	32	29	29	28	26.4
9c	North Junction St	Roadside	Diffusion Tube	100.0	100.0	30	34	36	28	26.0
71	Portobello High St	Roadside	Diffusion Tube	91.7	91.7	31	31	29	29	25.1
73d	Portobello Rd/Ramsay F	Roadside	Diffusion Tube	91.7	91.7	38	36	31	34	31.4
30X	Rodney Street 31	Roadside	Diffusion Tube	91.7	91.7	N/A	N/A	N/A	N/A	25.2

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
						2015 Bias Adjustment Factor=0.76	2016 Bias Adjustment Factor = 0.77	2017 Bias Adjustment Factor = 0.82	2018 Bias Adjustment Factor = 0.9	2019 Bias Adjustment Factor = 0.84
30A	Rodney Street 10	Roadside	Diffusion Tube	91.7	91.7	N/A	N/A	N/A	N/A	32.4
51c	Salamander St/Baltic St	Roadside	Diffusion Tube	91.7	91.7	32	31	32	31	26.5
72	Seafield Rd East 10	Roadside	Diffusion Tube	100.0	100.0	30	33	28	31	27.5
	SOUTH EAST									
10B	Bank Street	Roadside	Diffusion Tube	100.0	100.0	N/A	N/A	N/A	N/A	36.5
44	Broughton Street	Roadside	Diffusion Tube	83.3	83.3	30	33	36	30	27.4
8A	Brougham St 9	Roadside	Diffusion Tube	91.7	91.7	N/A	N/A	N/A	N/A	37.7
6B	Bruntsfield Place 147	Roadside	Diffusion Tube	100.0	100.0	N/A	N/A	N/A	N/A	17.8
6a	Bruntsfield Place 210	Roadside	Diffusion Tube	83.3	83.3	30	32	31	31	25.4
48G	Canongate	Roadside	Diffusion Tube	75.0	75.0	N/A	N/A	N/A	N/A	**42.7**
138	Clerk Street 15	Roadside	Diffusion Tube	83.3	83.3	37	39	**41**	37	33.4
151	Comiston Road	Roadside	Diffusion Tube	100.0	100.0	N/A	N/A	25	25	21.2

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
						2015 Bias Adjustment Factor=0.76	2016 Bias Adjustment Factor = 0.77	2017 Bias Adjustment Factor = 0.82	2018 Bias Adjustment Factor = 0.9	2019 Bias Adjustment Factor = 0.84
48f	Cowgate/50 St Mary's St	Roadside	Diffusion Tube	91.7	91.7	37	38	34	39	34.6
48c	Cowgate Blackfriars	Roadside	Diffusion Tube	83.3	83.3	**41**	**40**	**41**	34	36.0
48a	Cowgate/Blair St	Roadside	Diffusion Tube	33.3	33.3	34	37	27	36	38.2
48	Cowgate/Guthrie St	Roadside	Diffusion Tube	100.0	100.0	33	38	33	33	31.7
48e	Cowgatehead 2	Roadside	Diffusion Tube	58.3	58.3	**44**	**41**	**43**	37	29.6
150	Drum Street	Roadside	Diffusion Tube	83.3	83.3	27	29	25	25	23.0
10A	George IV Bridge	Roadside	Diffusion Tube	91.7	91.7	N/A	N/A	N/A	N/A	27.7
74f	George Street 112	Roadside	Diffusion Tube	100.0	100.0	26	31	30	30	25.7
37a (Duplicate)	Grassmarket 41	Roadside	Diffusion Tube	58.3	58.3	**43**	**53**	**50**	**56**	**52.5**
37b	Grassmarket 75	Roadside	Diffusion Tube	91.7	91.7	36	37	34	37	38.8
37c	Grassmarket/THomspons Court	Background	Diffusion Tube	91.7	91.7	27	28	26	26	25.1

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
						2015 Bias Adjustment Factor=0.76	2016 Bias Adjustment Factor = 0.77	2017 Bias Adjustment Factor = 0.82	2018 Bias Adjustment Factor = 0.9	2019 Bias Adjustment Factor = 0.84
75e	Great Stuart Street 9	Roadside	Diffusion Tube	91.7	91.7	24	24	22	24	19.7
HT1	Haymarket Terrace (North)	Roadside	Diffusion Tube	91.7	91.7	37	**42**	**41**	31	36.5
HT2	Haymarket Terrace (South)	Kerbside	Diffusion Tube	83.3	83.3	**45**	**46**	38	**41**	**40.8**
10	Home Street	Roadside	Diffusion Tube	83.3	83.3	30	37	38	38	30.7
140	Hope Park Ter/Clerk St	Roadside	Diffusion Tube	91.7	91.7	36	37	34	32	26.5
17a	Hope Park Ter/VS	Roadside	Diffusion Tube	100.0	100.0	36	34	32	31	28.7
149a	Howden Hall Rd 79	Roadside	Diffusion Tube	75.0	75.0	30	33	29	33	26.5
34	India Street	Background	Diffusion Tube	100.0	100.0	20	21	20	19	17.7
8B	Lauriston Place Opp 119	Roadside	Diffusion Tube	83.3	83.3	N/A	N/A	N/A	N/A	31.2
74g	Leith Street 35	Roadside	Diffusion Tube	83.3	83.3	**49**	**59**	N/A	N/A	**44.4**

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
						2015 Bias Adjustment Factor=0.76	2016 Bias Adjustment Factor = 0.77	2017 Bias Adjustment Factor = 0.82	2018 Bias Adjustment Factor = 0.9	2019 Bias Adjustment Factor = 0.84
62A	Lothian Road 45	Roadside	Diffusion Tube	58.3	58.3	N/A	N/A	N/A	N/A	**56.6**
62B	Lothian Road 139	Roadside	Diffusion Tube	58.3	58.3	N/A	N/A	N/A	N/A	**43.9**
62X	Lothian Road/Rutland Street	Roadside	Diffusion Tube	75.0	75.0	N/A	N/A	N/A	N/A	**46.1**
152	Mayfield Road	Roadside	Diffusion Tube	83.3	83.3	N/A	N/A	26	28	24.8
38	Melville Drive	Roadside	Diffusion Tube	83.3	83.3	26	27	25	26	22.8
42	Midmar Drive	Background	Diffusion Tube	91.7	91.7	15	17	15	15	12.6
8	Morningside Road	Roadside	Diffusion Tube	100.0	100.0	26	26	23	25	21.9
62C	Morrison Street 91	Roadside	Diffusion Tube	75.0	75.0	N/A	N/A	N/A	N/A	**42.2**
49	Morrison Street	Roadside	Diffusion Tube	91.7	91.7	36	**42**	38	37	37.2
135a	Nicolson Street 69	Roadside	Diffusion Tube	58.3	58.3	**46**	**46**	**44**	**43**	**40.6**
135b	59-61 Nicolson St	Roadside	Diffusion Tube	41.7	41.7	N/A	N/A	N/A	N/A	37.8

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
						2015 Bias Adjustment Factor=0.76	2016 Bias Adjustment Factor = 0.77	2017 Bias Adjustment Factor = 0.82	2018 Bias Adjustment Factor = 0.9	2019 Bias Adjustment Factor = 0.84
136	Nicolson Street 92	Roadside	Diffusion Tube	91.7	91.7	35	38	32	37	32.2
27	North Bridge – South	Roadside	Diffusion Tube	100.0	100.0	N/A	**53**	37	**40**	**40.6**
47	Princes St (Eastbound)	Roadside	Diffusion Tube	83.3	83.3	38	**41**	38	36	36.2
24	Princes St/Mound	Kerbside	Diffusion Tube	75.0	75.0	**54**	**57**	**60**	**53**	**53.2**
33b	Queen St 66	Roadside	Diffusion Tube	100.0	100.0	N/A	N/A	N/A	35	29.2
33a	Queen St/Wemyss Place	Roadside	Diffusion Tube	100.0	100.0	N/A	N/A	29	33	28.7
33	Queen St/Hanover St	Roadside	Diffusion Tube	100.0	100.0	N/A	39	**40**	**42**	36.0
SH1	Shandwick Place	Roadside	Diffusion Tube	83.3	83.3	39	36	N/A	**40**	37.0
144	South Bridge 59	Roadside	Diffusion Tube	83.3	83.3	**44**	**50**	**43**	**41**	38.1
142	South Clerk St 41a	Roadside	Diffusion Tube	91.7	91.7	34	37	33	35	29.8

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
						2015 Bias Adjustment Factor=0.76	2016 Bias Adjustment Factor = 0.77	2017 Bias Adjustment Factor = 0.82	2018 Bias Adjustment Factor = 0.9	2019 Bias Adjustment Factor = 0.84
141	South Clerk St 84	Roadside	Diffusion Tube	100.0	100.0	**40**	36	38	37	32.9
75d	St Colme Street 4	Roadside	Diffusion Tube	100.0	100.0	26	29	25	27	22.9
153 **	New Arthur Place	Background	Diffusion Tube	83.3	83.3	N/A	N/A	17	17	16.9
10C	Teviot Place	Roadside	Diffusion Tube	91.7	91.7	N/A	N/A	N/A	N/A	28.2
3b	Torphichen Place1	Roadside	Diffusion Tube	100.0	100.0	**42**	**44**	**41**	**43**	40.0
3	Torphichen Place CH	Roadside	Diffusion Tube	83.3	83.3	**45**	**50**	**42**	**43**	**40.5**
154 **	Viewcraig Street No. 9	Roadside	Diffusion Tube	25.0	25.0	N/A	N/A	19	20	19.9
2	West Maitland St	Kerbside	Diffusion Tube	100.0	100.0	**51**	**54**	**49**	**50**	**45.8**
28d	West Port 42	Roadside	Diffusion Tube	66.7	66.7	**52**	**51**	**47**	**51**	**44.0**
28b	West Port 62	Roadside	Diffusion Tube	75.0	75.0	**58**	**59**	N/A	**65**	**54.2**
28c	West Port Opposite 50	Roadside	Diffusion Tube	91.7	91.7	**46**	**44**	36	38	35.0
36	York Place	Roadside	Diffusion Tube	100.0	100.0	36	34	35	32	29.5

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
						2015 Bias Adjustment Factor=0.76	2016 Bias Adjustment Factor = 0.77	2017 Bias Adjustment Factor = 0.82	2018 Bias Adjustment Factor = 0.9	2019 Bias Adjustment Factor = 0.84
Co-located Sites										
CL123	Queensferry Road	Roadside	Diffusion Tube	100.0	100.0	**62**	**65**	N/A	**55**	**44.8**
CL456	Gorgie Road	Roadside	Diffusion Tube	100.0	100.0	37	**40**	33	32	30.4
CL789	Salamander Street	Roadside	Diffusion Tube	100.0	100.0	36	35	32	27	27.8
CL101112	Glasgow Road	Roadside	Diffusion Tube	100.0	100.0	**43**	**41**	**41**	35	32.3
CL131415	St John's Road	Kerbside	Diffusion Tube	100.0	100.0	**66**	**64**	**61**	**47**	**46.6**

Notes: Exceedances of the NO_2 annual mean objective of $40\mu g/m^3$ are shown in **bold**.

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

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

** New tube placed during monitoring period in an area of similar exposure to the previously named location

Table A.6 – 1-Hour Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2015	2016	2017	2018	2019
ID4	**Gorgie Road** Roadside	Automatic	76.8	76.8	0	0	0	0	0
ID5	**St John's Road** Roadside	Automatic	99.2	99.2	**42** (224)	5	1	2	0
ID6	**Currie** Suburban	Automatic	30.7	30.7	0	0	0	0	0 (79)
ID7	**St Leonard's** Urban Background	Automatic	95.1	95.1	0	0 (73)	0	0	0
ID8	**Salamander St** Roadside	Automatic	95.6	95.6	0	0	0	0	0
ID9	**Queensferry Rd** Roadside	Automatic	99.2	99.2	0	0 (142)	3 (159)	3	0
ID10	**Glasgow Road** Roadside	Automatic	98.6	98.6	0	0	0	0	0
EDNS	**Nicolson Street Kerbside**	Automatic	99.4	99.4	-	-	**-**	0	4

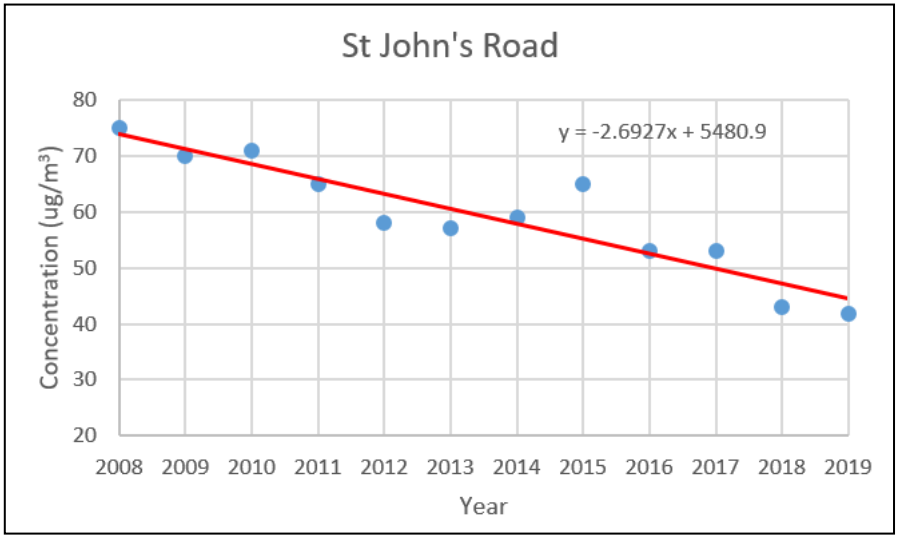
Notes: Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold.**

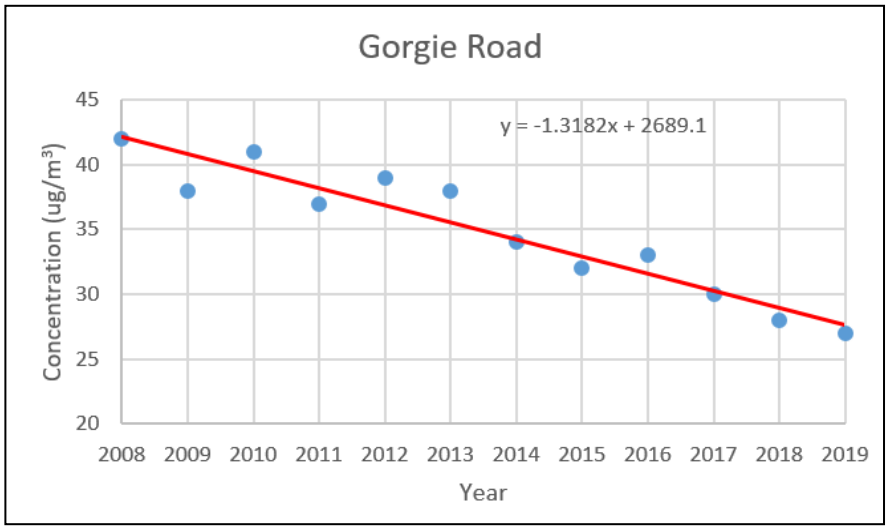
(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

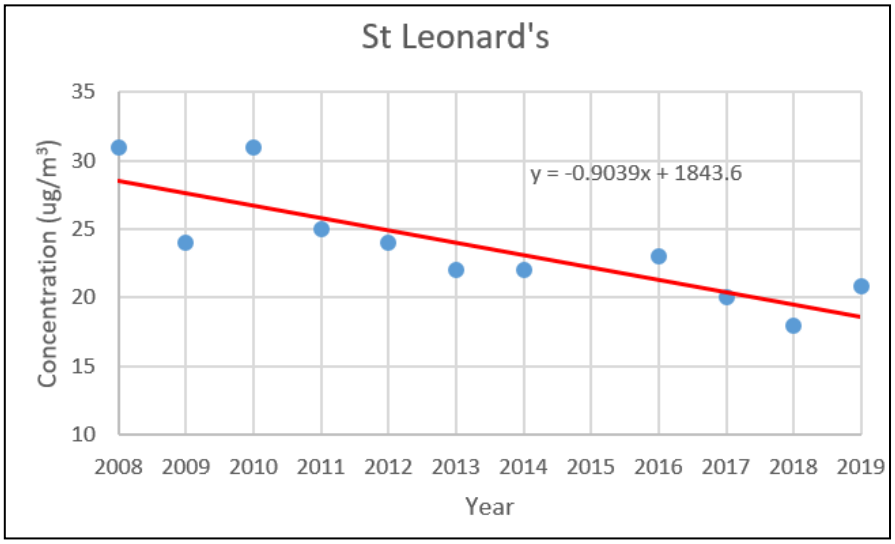
(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

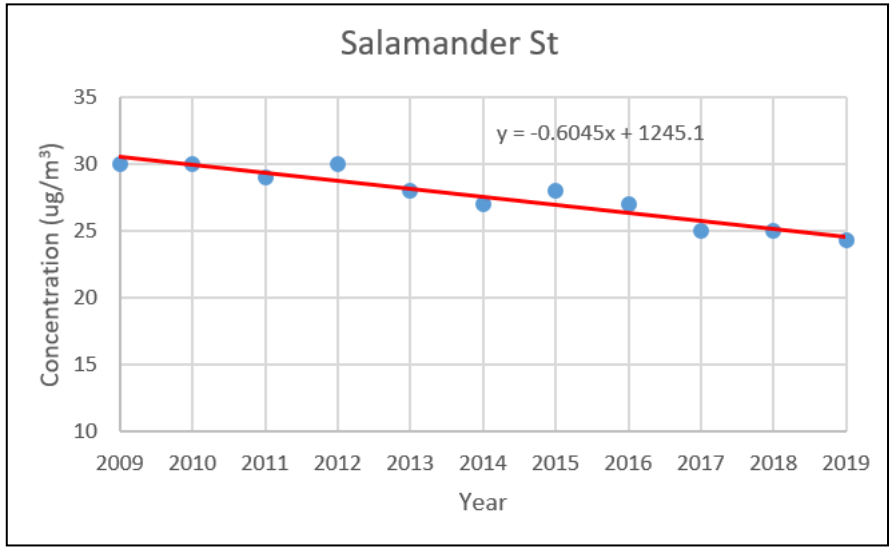
(3) If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

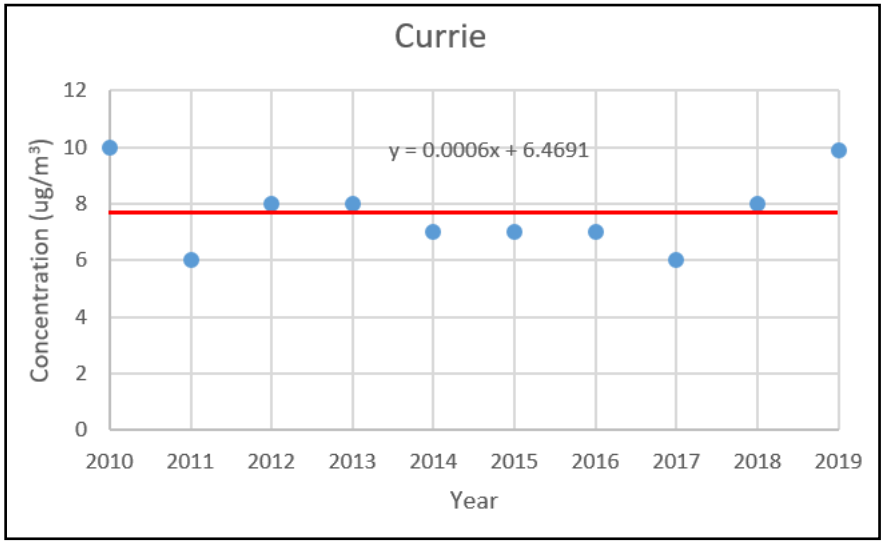
Figure A.11 – NO_2 Concentration Trends at Continuous Monitoring Locations (Excel Method)

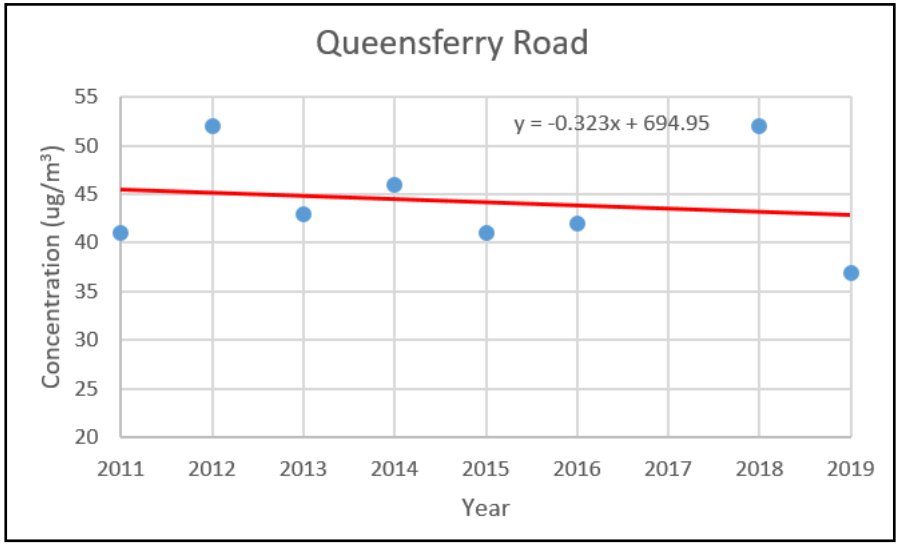









Currie
y = 0.0006x + 6.4691
Concentration (ug/m³)
Year
0
2
4
6
8
10
12
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019


Queensferry Road
y = -0.323x + 694.95
Concentration (ug/m³)
Year
20
25
30
35
40
45
50
55
2011
2012
2013
2014
2015
2016
2017
2018
2019

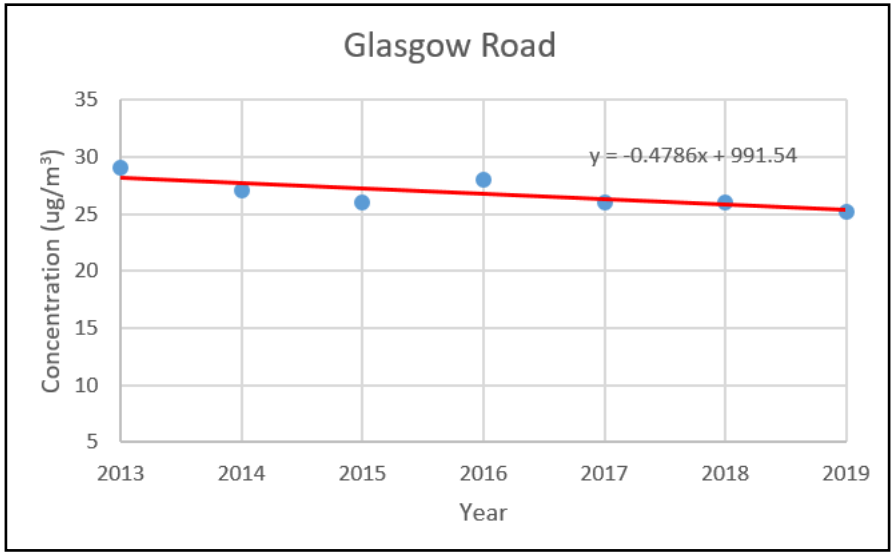
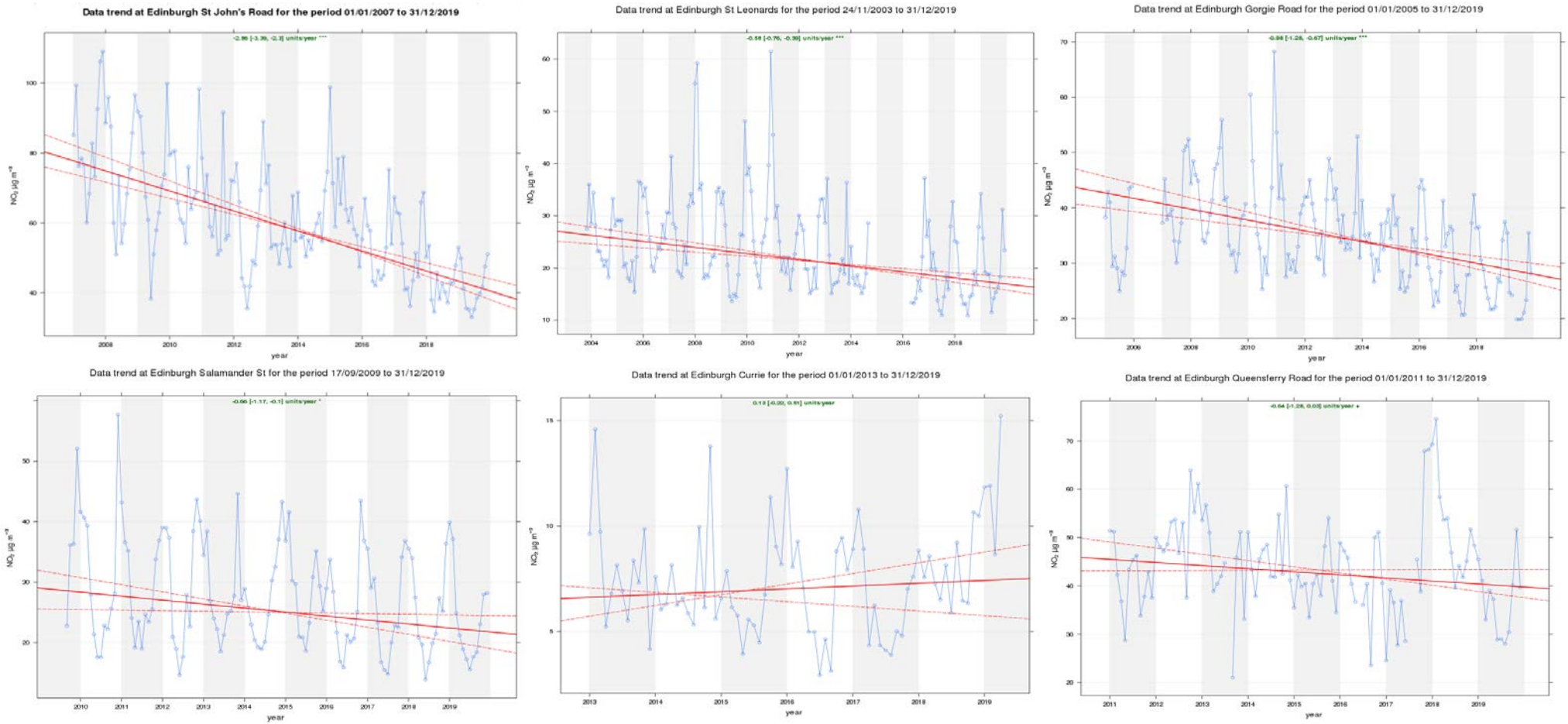

Glasgow Road
y = -0.4786x + 991.54
Concentration (ug/m³)
Year
5
10
15
20
25
30
35
2013
2014
2015
2016
2017
2018
2019

Figure A.12 – NO_2 Concentration Trends at Continuous Monitoring Locations (Openair Method)



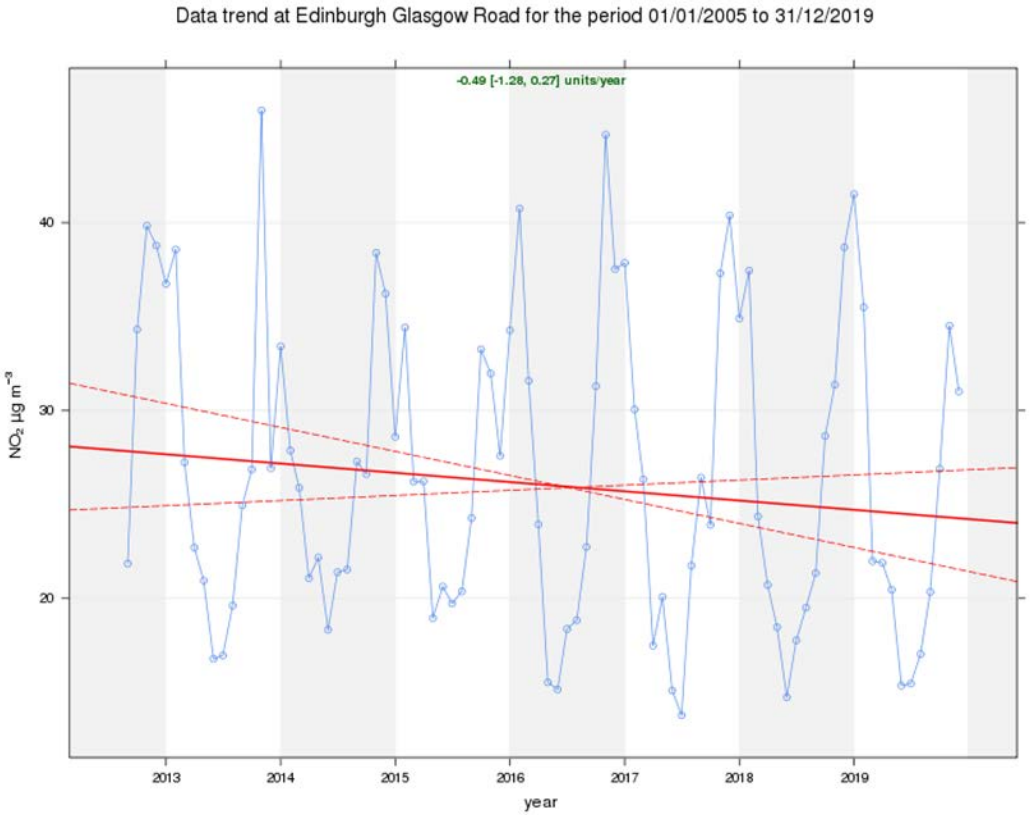
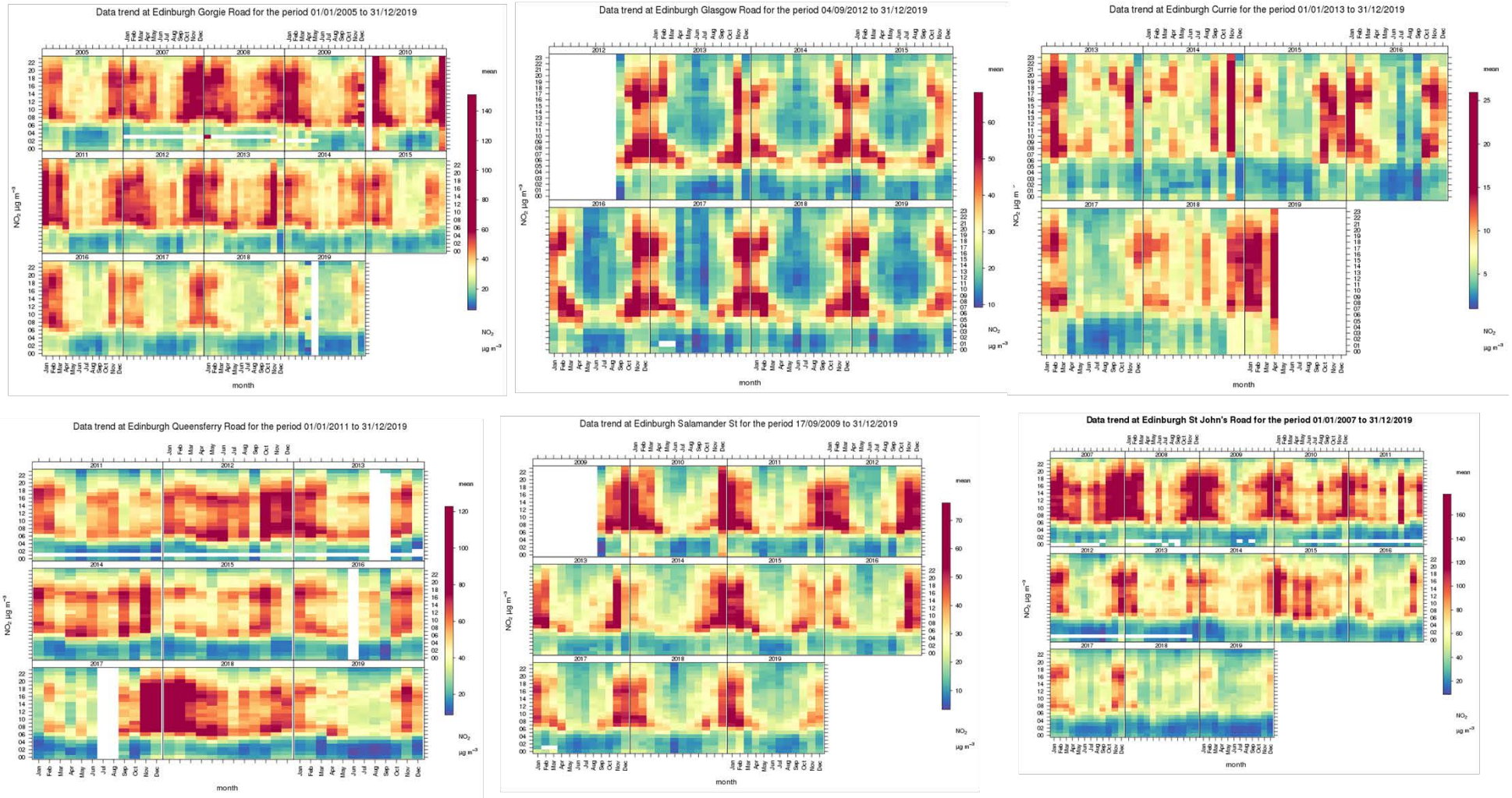

Data trend at Edinburgh Glasgow Road for the period 01/01/2005 to 31/12/2019
-0.49 [-1.28, 0.27] units/year
40
30
20
NO_2 µg m^{-3}
2013
2014
2015
2016
2017
2018
2019
year

Figure A.13 – Hourly Average NO_2 Data Trends Each Month at Continuous Monitoring Locations



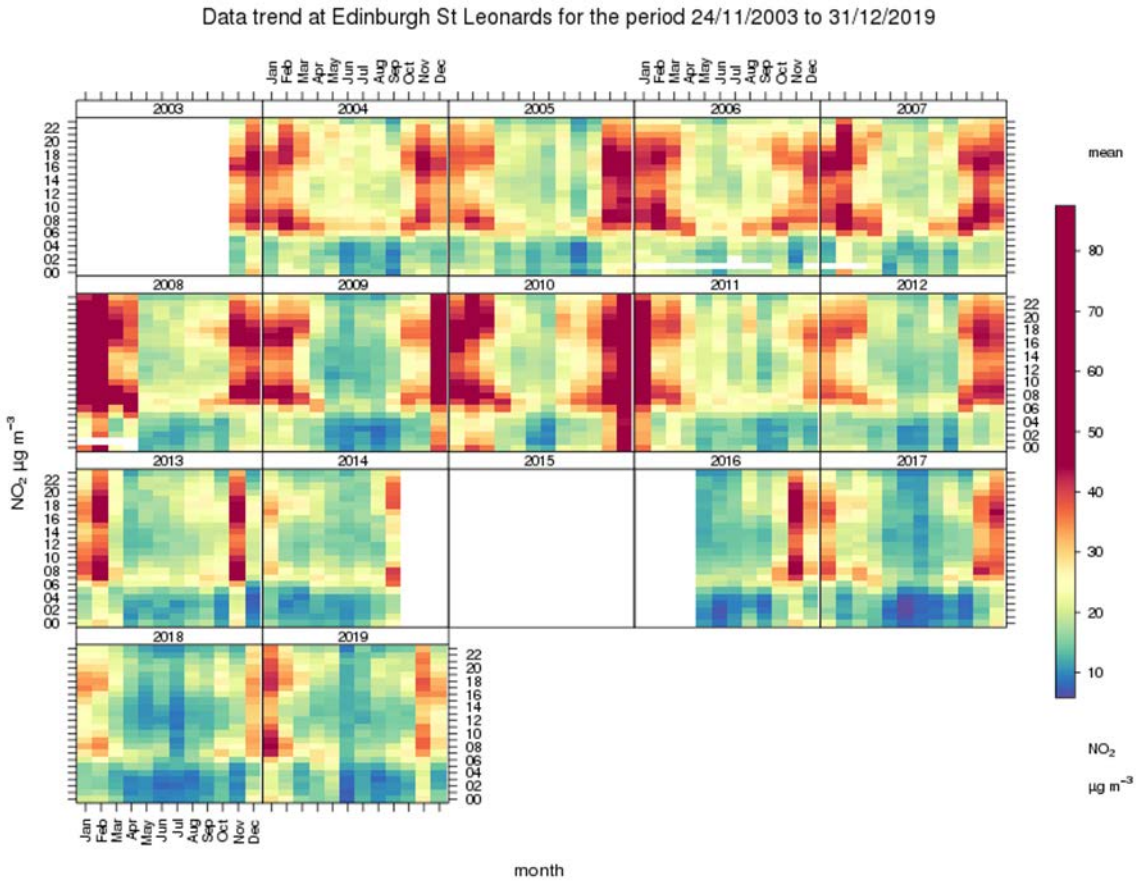
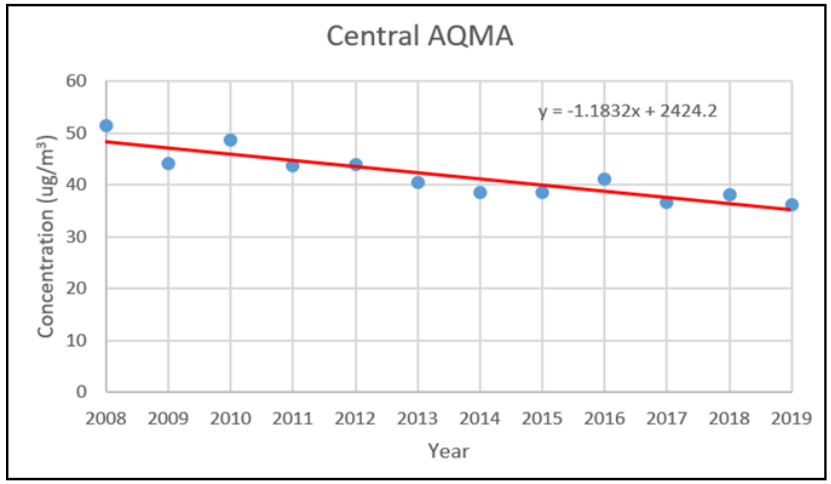
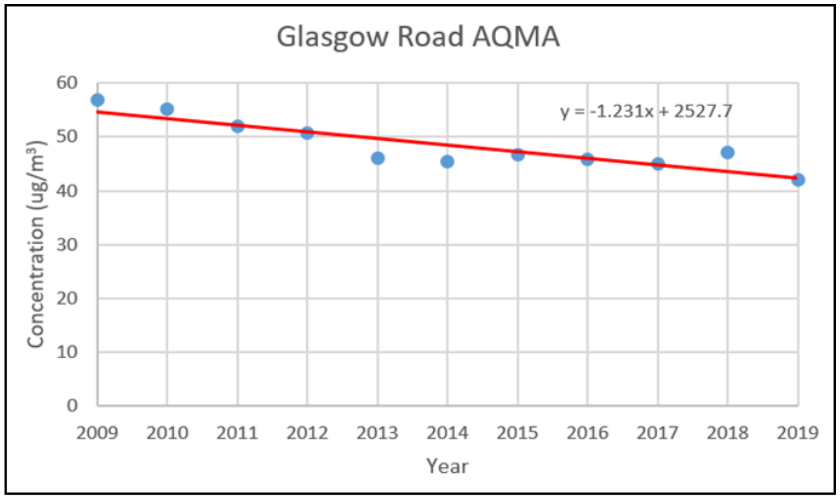
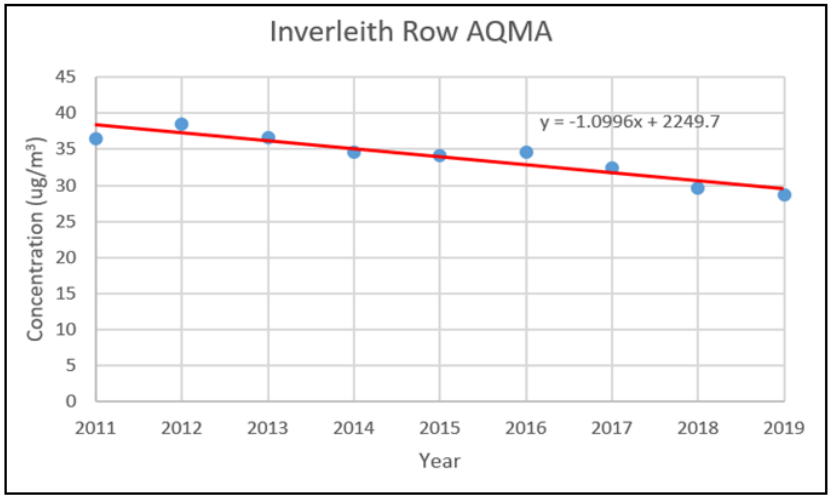
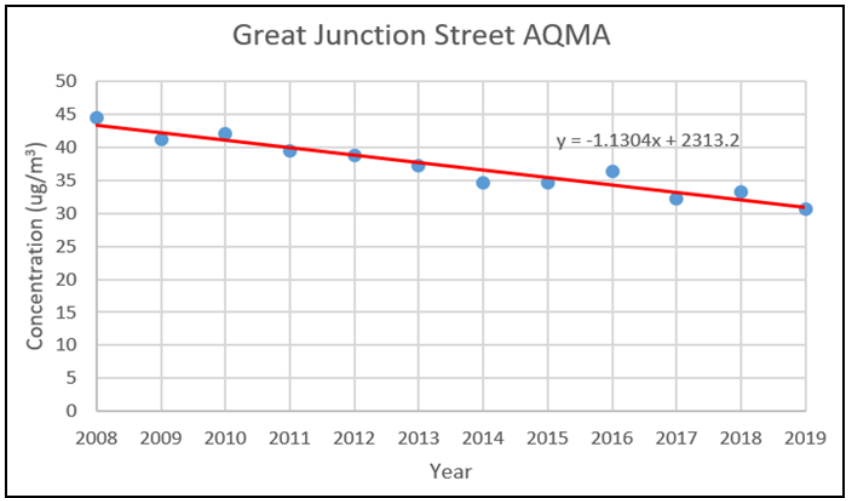

Data trend at Edinburgh St Leonards for the period 24/11/2003 to 31/12/2019
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
00 02 04 06 08 10 12 14 16 18 20 22
NO2 µg m−3
month
mean
80
70
60
50
40
30
20
10
NO2
µg m−3

Figure A.14 – Average Passive Diffusion Tube NO_2 Concentration Trends within Each AQMA









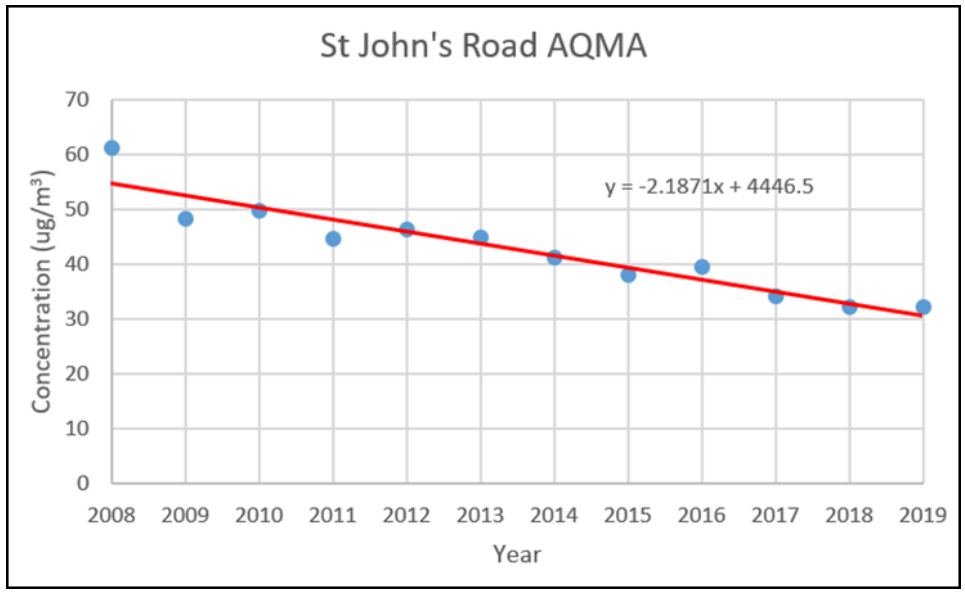

St John's Road AQMA
y = -2.1871x + 4446.5
Concentration (ug/m³)
70
60
50
40
30
20
10
0
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Year

Table A.14 – Data used to establish the trend of annual mean concentrations of nitrogen dioxide at passive diffusion tube sites within the City Centre AQMA

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
2	N/A	56.8	73.4	73.2	50.5	N/A	58.8	51	54.3	48.7	49.5	45.8
3	58.2	26.3	55.6	55.1	48	43	43	45	49.6	41.8	43.2	40.5
5	N/A	58.2	60.1	54.3	51.9	48.5	43.3	42	44	42.7	42	33.3
18	51.5	45	54.5	48.2	49	45	42	37	38.3	35.3	34.8	33.2
20	53.1	36.8	38.1	N/A	35	34	32	33	39.7	N/A	45.3	37.9
21	N/A	40	40.7	35.8	38.8	36.2	35.1	35	40.3	37.9	N/A	30.6
23	N/A	47.5	58.2	41.4	45.1	41.2	45.7	37	39.7	34.3	37.1	35.3
24	N/A	46.2	73	N/A	49.7	59.9	N/A	54	56.7	54.2	52.7	53.2
25	58.2	50.8	49.7	43.6	45	41	39	40	45.7	37.9	37.1	33.2
27	52.3	48.4	49.4	48.7	52	47	48	N/A	53	37.4	40.4	40.6
36	N/A	39.2	41.1	36.9	43.1	29.1	34.1	36	33.6	34.6	31.9	29.5
46	52.3	43.4	46.2	40.4	46	38	38	37	39.3	39.7	37.4	34.9
47	N/A	31.6	47.5	39	N/A	41	41.1	38	40.8	38.1	35.5	36.2
48	46.6	39.8	46.2	40.2	40	38	33	33	37.7	32.7	32.9	31.7
49	N/A	48.2	54.5	53.5	50.8	46.8	39.3	36	41.7	38.1	37	37.2
66	N/A	43	40.5	N/A	36	34	31	33	31.5	31.1	28.1	29.8
67	N/A	47.9	51.3	45.5	46	46	39	42	40.5	42.1	41.7	36.9
68	N/A	30.4	36.6	31.5	33	29	28	31	30.9	30.2	32.7	28.0
69	N/A	56.2	50.6	50.4	42	40	42	43	39.3	36.5	37.8	35.4
70	N/A	47.3	46.1	42.4	41	44	38	44	40	38.2	40.1	37.6
76	N/A	N/A	52.9	44.4	48	41	41	38	43.4	34.6	37.1	33.2
77	N/A	N/A	47.6	38.1	43	40	37	38	33.9	29	34.5	31.9
80	N/A	N/A	47.4	42.2	42	44	37	33	38	34.2	36.5	33.3
81	N/A	N/A	N/A	51.2	46	44	43	50	56.7	40.9	42.6	50.0
17a	N/A	38.8	43.4	37.4	39	36	35	36	34.4	31.9	31.2	28.7

25b	44.9	38.8	39.1	35.8	35	34	31	31	34.7	29.9	31.8	30.1
25c	43.8	38	37.7	41	41	37	29	31	33.1	30.5	32.6	33.2
25d	40.8	37.3	37.1	32.7	34	30	30	30	32.3	29	28.1	25.6
25e	37.3	34.1	34.2	32	33	27	31	25	27.4	23.9	28.4	25.5
28b	72.5	66.7	62.4	57	61	52	56	58	58.9	N/A	64.9	54.2
28c	51.5	43.5	41.5	39	N/A	39	N/A	46	43.5	35.9	38.3	35.0
28d	66.6	60.2	54.9	55.2	60	58	51	52	50.8	46.9	51.4	44.0
37a	42.3	40.5	60	42	43	44	40	42	54.1	56.5	56.3	52.5
37b	N/A	N/A	N/A	37.1	39	37	35	36	36.7	34.1	37.1	38.8
48a	N/A	N/A	37.7	31.4	40	35	36	34	37.4	27.6	35.6	38.2
74f	N/A	N/A	43.4	44.7	47	34	30	26	30.8	30.4	30.3	25.7
Mean	**51.5**	**44.2**	**48.6**	**43.7**	**43.9**	**40.4**	**38.6**	**38.6**	**41.2**	**36.7**	**38**	**36.1**

Table A.15 – Data used to establish the trend of annual mean concentrations of NO_2 at passive diffusion tube sites within the Glasgow Road AQMA

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
16	57.3	54.7	50.9	54.8	44.9	45.6	46	44.8	39.6	46	40.9
58	61.8	65	59.3	54.8	52	51.9	51.3	49	50.9	52	46.0
15	51.4	45.7	45.9	42.5	41.4	38.6	42.8	44	44.4	43.7	39.2
Mean	**56.8**	**55.1**	**52**	**50.7**	**46.1**	**45.4**	**46.7**	**45.9**	**45**	**47.2**	**42.0**

Table A.16 – Data used to establish the trend of annual mean concentrations of NO_2 at passive diffusion tube sites within the Inverleith Row AQMA.

	2011	2012	2013	2014	2015	2016	2017	2018	2019
55	43.8	46	43	40	41	40.5	39.5	34.3	33.4
55c	28.6	32.7	31.3	29.3	24.9	29.2	23.4	23.6	23.9
53	36.9	36.8	35.5	34.5	36.4	34.2	34.4	30.8	28.8
Mean	**36.4**	**38.5**	**36.6**	**34.6**	**34.1**	**34.6**	**32.4**	**29.6**	**28.7**

Table A.17 – Data used to establish the trend of annual mean concentrations of NO_2 at passive diffusion tube sites within the Great Junction Street AQMA.

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
29	45.3	45.1	43.7	38.9	37	36	31	32	33.2	32.1	29.8	25.9
29a	48	42	44.6	41.9	40	38	34	34	37.2	27.4	31.1	27.1
29c	53.4	48.2	49.4	44.6	44	42	39	40	41.6	35.9	36.5	35.4
9	40.4	31.6	36.7	31.2	35	32	30	29	32	26.3	29.1	26.3
9a	N/A	N/A	45.5	46.2	44	41	41	42	39.8	35.1	36.5	32.8
45d	42.4	40.9	38.3	39.6	37	34	34	37	33.2	33.2	32	31.2
30b	38.4	38.5	39.9	40	38	36	33	38	32.8	32.8	31.7	30.8
30c	50.2	42.6	44.1	38.4	38	39	37	34	40.3	34.2	37.1	33.1
30d	39	37.1	39.9	33.8	38	34	34	30	33	33	31.2	28.7
30e	43.1	41.9	38.7	41.2	37	36	33	32	34	N/A	33.9	33.3
30	44.6	44.1	41.8	39.1	38	41	N/A	33	42.1	31.7	36.9	32.8
Mean	**44.5**	**41.2**	**42.1**	**39.5**	**38.7**	**37.2**	**34.6**	**34.6**	**36.3**	**32.2**	**33.3**	**30.7**

Table A.18 – Data used to establish the trend of annual mean concentrations of NO_2 at passive diffusion tube sites within the St John's Road AQMA.

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
1	50	43	47	39	43	42	39	35	37.3	32.2	29.2	31.8
1b	48.8	44.2	43.5	38.4	44	41	37	33	36.1	28.5	27.7	27.3
1d	84.9	57.8	58.8	56.3	52	52	48	46	45.1	42	40.1	37.7
Mean	**61.2**	**48.3**	**49.8**	**44.6**	**46.3**	**45**	**41.3**	**38**	**39.5**	**34.2**	**32.3**	**32.3**

Table A.19 – Annual Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2019 (%) [2]	PM_{10} Annual Mean Concentration ($\mu g/m^3$) [3]				
				2015	2016	2017	2018	2019
ID5	**St John's Road** (FIDAS) Kerbside	80.1	80.1	N/A	N/A	12 **100%**	13 **99%**	13.6
ID6	**Currie** (TEOM) Suburban	90.8	90.8	9 (VCM) 10 (1.14) **77%**	9 (VCM) 10 (1.14) **98%**	8 (VCM) 8 (1.14) **82%**	9 (VCM) 9 (1.14) **97%**	9.8 (VCM) 9.5 (1.14)
ID7	**St Leonard's** (FDMS untill 25/07/2019, FIDAS from 26/07/2019) Urban BG	90.6	90.6	10 **93%**	11 **79%**	10 **85%**	11 **93%**	11
ID8	**Salamander St** (TEOM) Roadside	95.4	95.4	**20** (VCM) **22** (1.14) **90%**	17 (VCM) **18** (1.14) **98%**	17(VCM) **19** (1.14) **96%**	**19**(VCM) **20**(1.14) **93%**	17.3 (VCM) **18.1** (1.14)
ID9	**Queensferry Road** (FDMS until Dec 2018, FIDAS from 11/10/2019) Roadside	99.6	22.2	16 **87%**	**19** **78%**	**22** **85%**	**25** **91%**	N/A
ID10	**Glasgow Road** (TEOM) Roadside	96.8	96.8	15 (VCM) 16 (1.14) **97%**	15 (VCM) 17 (1.14) **85%**	15(VCM) 16 (1.14) **94%**	15(VCM) 16(1.14) **98%**	15.4 (VCM) 15.9 (1.14)
EDNS	**Nicolson Street** (FIDAS from 04/12/2019) Roadside	100	5.6	N/A	N/A	N/A	N/A	N/A

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	PM_{10} Annual Mean Concentration ($\mu g/m^3$) (3)				
				2015	2016	2017	2018	2019
ED012	**Tower Street** (FIDAS) Urban Industrial	99.9	99.9	N/A	N/A	N/A	N/A	10.7

Notes: Exceedances of the PM_{10} annual mean objective of 18µg/m^3 are shown in **bold.**

Percentage data capture for previous years shown below the concentration.

Concentration values from TEOM analysers presented using both the VCM and Edinburgh's Gravimetric Factor (1.14)

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

Table A.20 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
				2015	2016	2017	2018	2019
ID5	**St John's Road** (FIDAS) **Kerbside**	80.1	80.1	N/A	N/A	1	1	3
ID6	**Currie** (TEOM) **Suburban**	90.8	90.8	0(23) [a]	0	0	0	1
ID7	**St Leonard's** (FDMS untill 25/07/2019, FIDAS from 26/07/2019) Urban BG **Urban Background**	90.6	90.6	0(31) [a]	0 (29)	0	0	1
ID8	**Salamander St** (TEOM) **Roadside**	95.4	95.4	**8**	0	0	3	5
ID9	**Queensferry Road** (FDMS until Dec 2018, FIDAS from 11/10/2019) **Roadside**	99.6	22.2	1(39) [a]	0(40)	**8**	4	0 (56.1)
ID10	**Glasgow Road** (TEOM) **Roadside**	96.8	96.8	1	0	0	0	3
EDNS	**Nicholson Street**	100	5.6	N/A	N/A	N/A	N/A	0 (43.3)

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
				2015	2016	2017	2018	2019
	(FIDAS from 04/12/2019) **Roadside**							
ED012	**Tower Street** (FIDAS) **Urban Industrial**	99.9	99.9	N/A	N/A	N/A	N/A	1

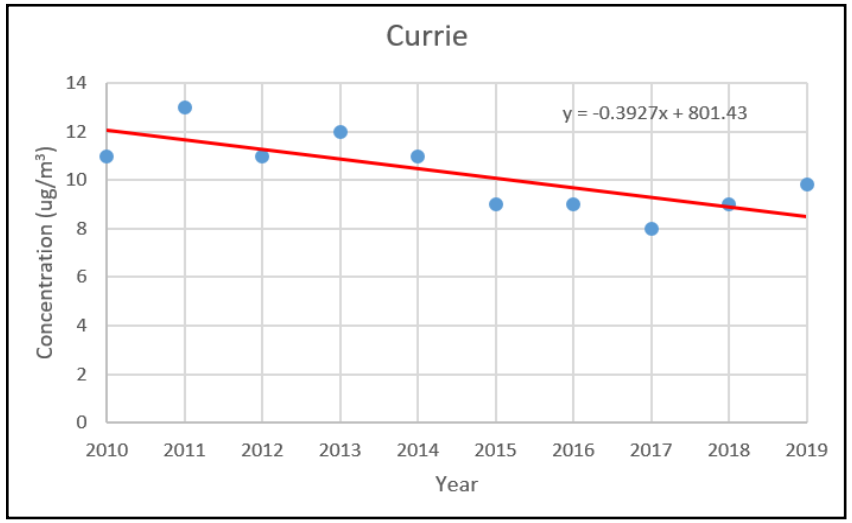
Notes: Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 7 times/year) are shown in **bold.**

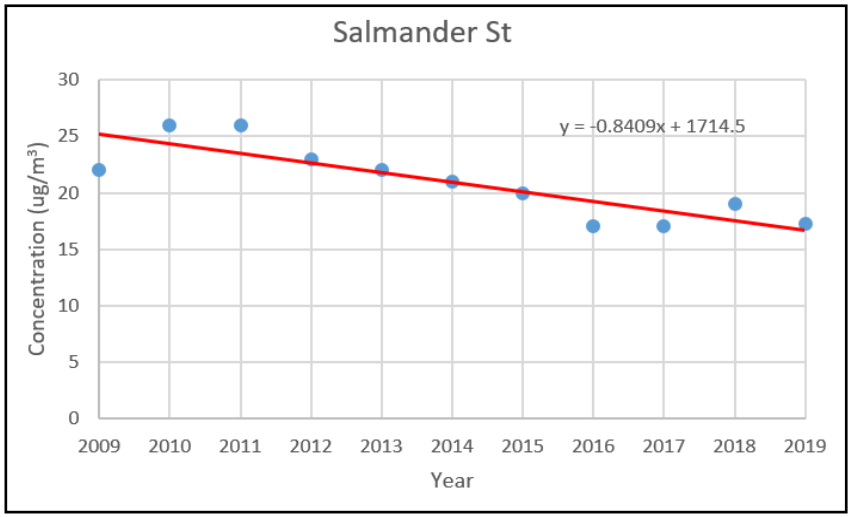
(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

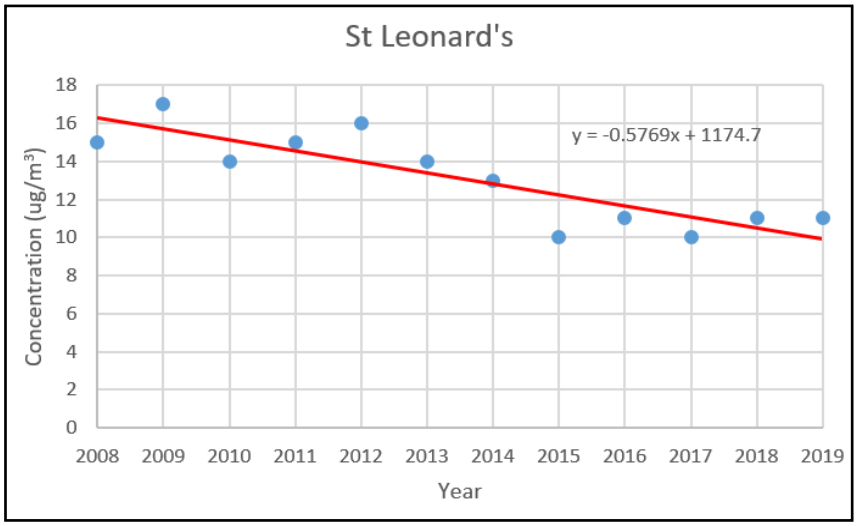
(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

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

Figure A.15 – PM_{10} Concentration Trends at Continuous Monitoring Locations (Excel Method)







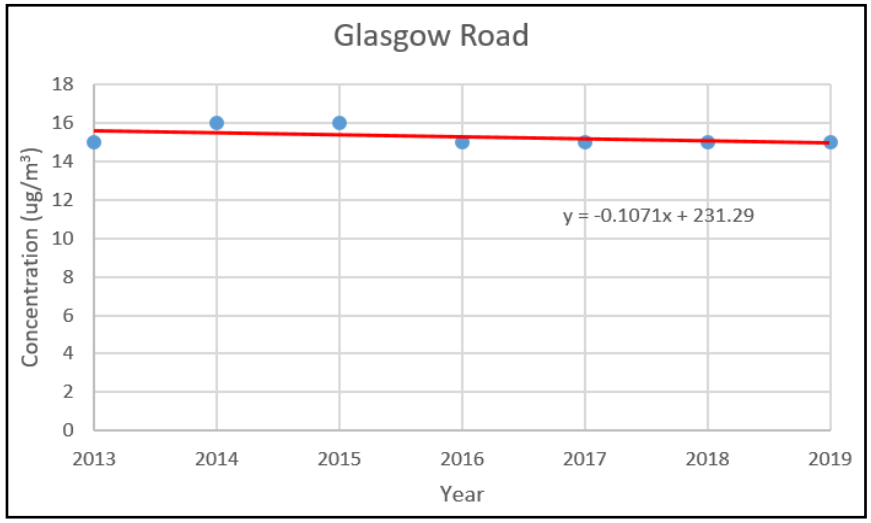
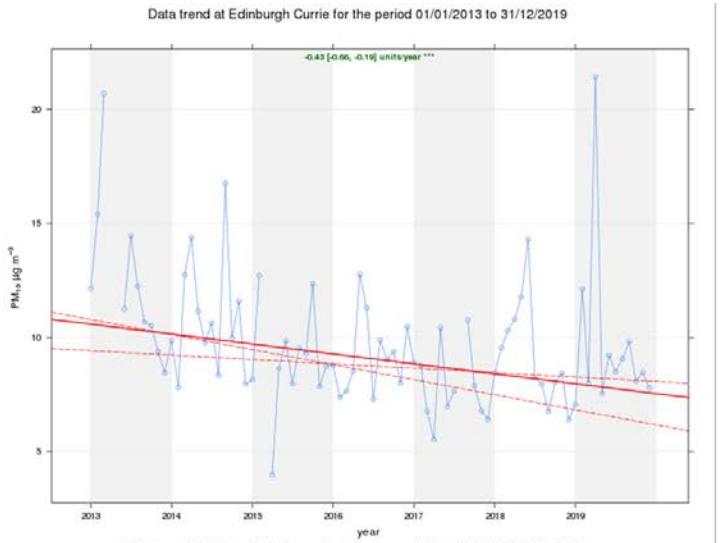
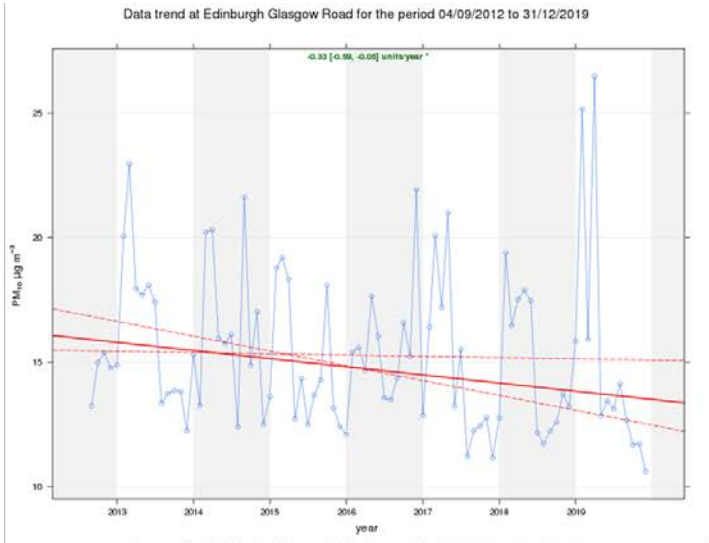
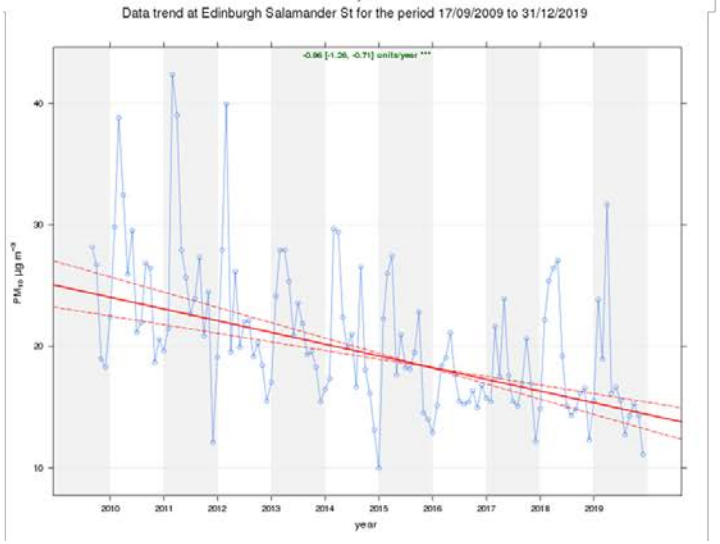


Figure A.16 – PM_{10} Concentration Trends at Continuous Monitoring Locations (Openair Method)







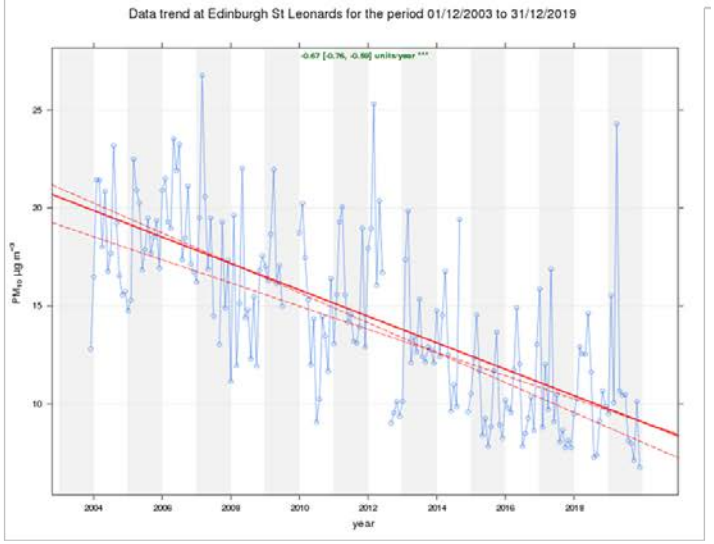
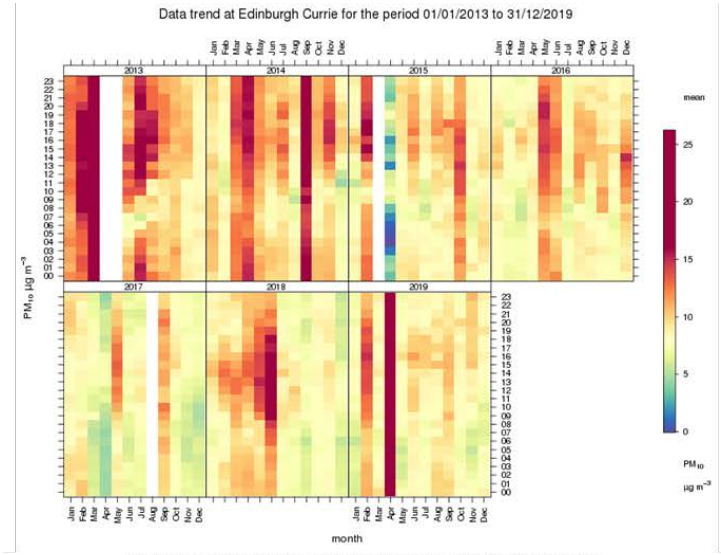
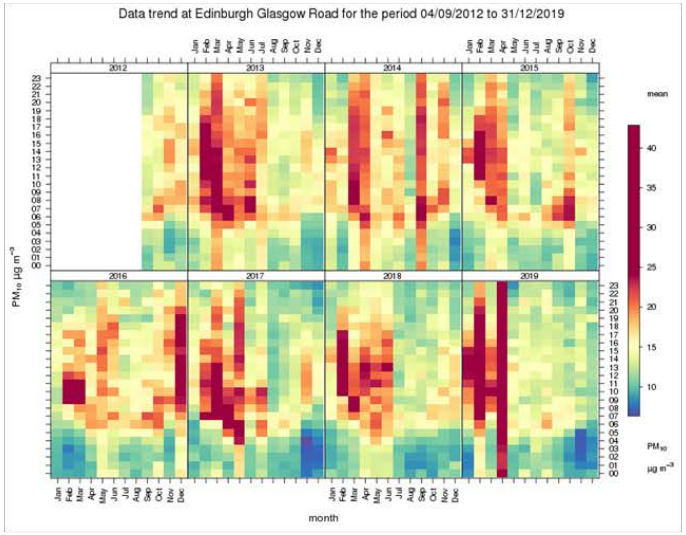
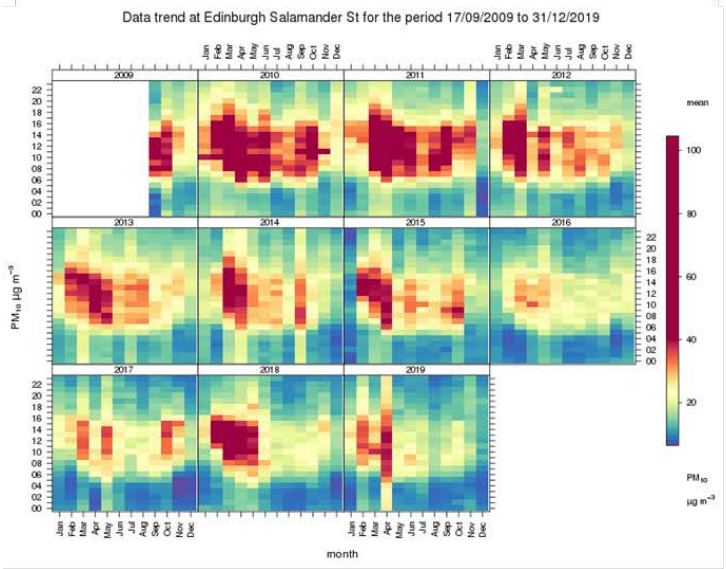


Figure A.17 – Hourly Average PM_{10} Data Trends Each Month at Continuous Monitoring Locations







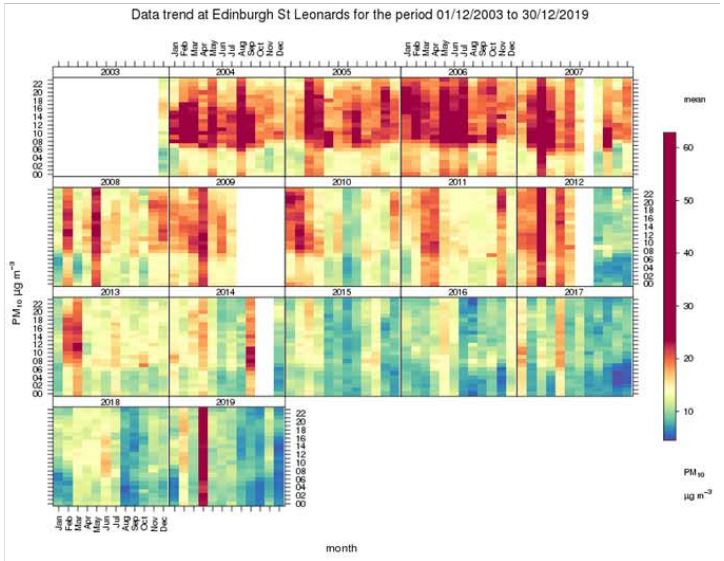


Table A.21 – Annual Mean $PM_{2.5}$ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	$PM_{2.5}$ Annual Mean Concentration (µg/m^3) (3)				
				2015	2016	2017	2018	2019
ID5- St John's Road	(FIDAS) **Kerbside**	80.1	80.1	N/A	N/A	6 100%	6 99%	7
ID7- St Leonard's	(TEOM FDMS) **Urban Background**	92.9	92.9	6 86%	6 92%	7 95%	6 93%	6.4
ID9 - Queensferry Road	(FIDAS from 11/10/2019) **Roadside**	99.6	22.3	N/A	N/A	N/A	N/A	6.1
EDNS - Nicholson Street	(FIDAS from 04/12/2019) **Roadside**	100	5.6	N/A	N/A	N/A	N/A	5.2
ED012 - Tower Street	(FIDAS) **Urban Industrial**	99.9	99.9	N/A	N/A	N/A	N/A	5.7

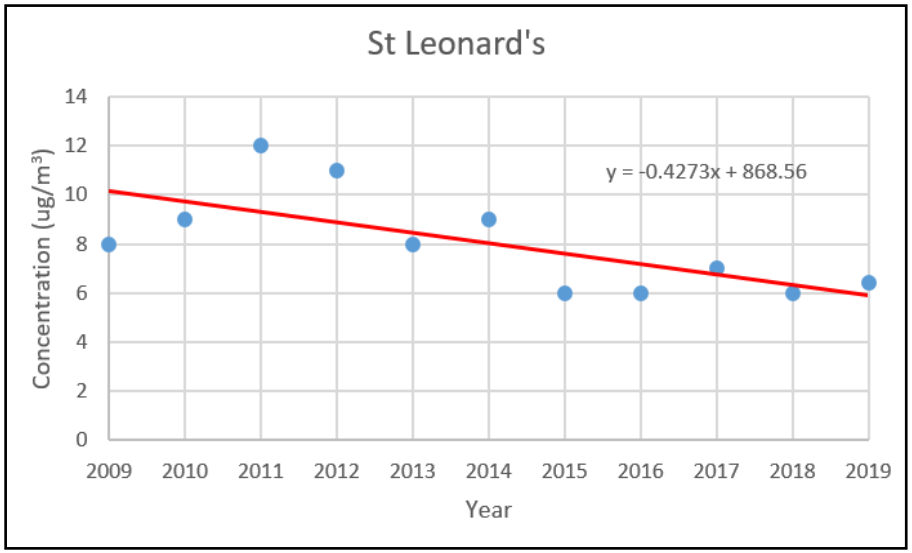
Notes: Exceedances of the PM_{10} annual mean objective of 10µg/m^3 are shown in **bold.**

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

Figure A.18 – $PM_{2.5}$ Concentration Trends at St Leonard's (Excel and Openair Method)



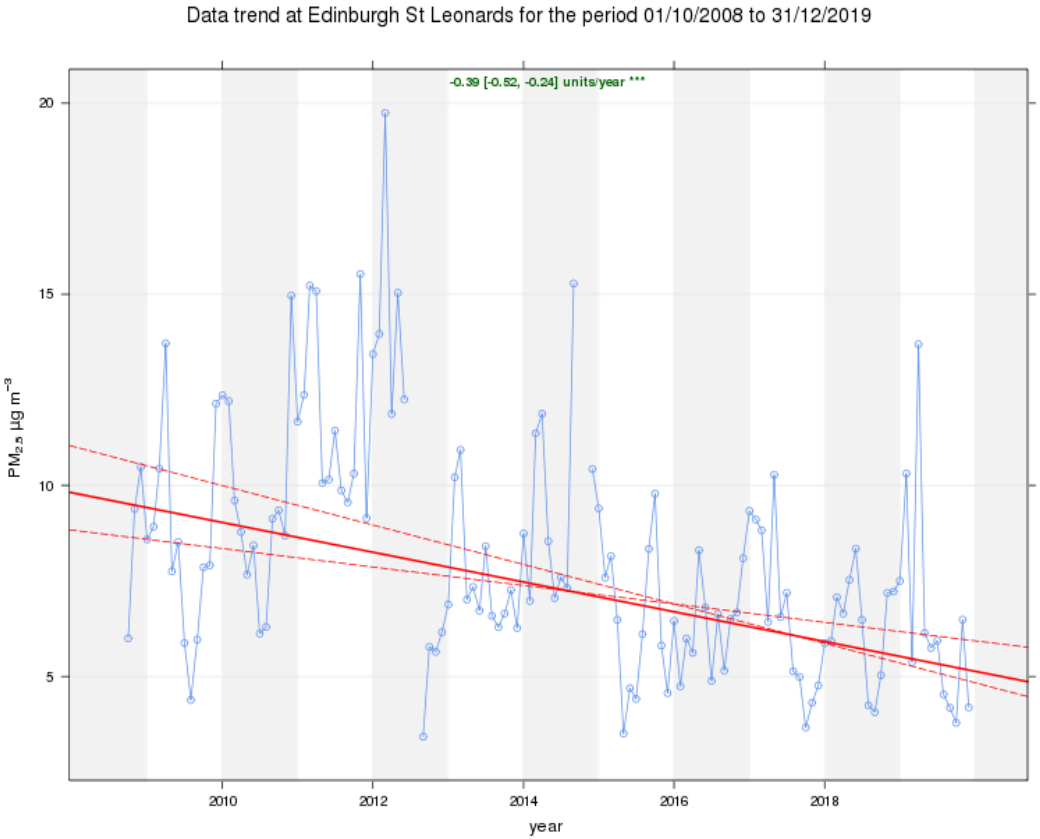


Figure A.19 – Hourly Average $PM_{2.5}$ Data Trends Each Month at St Leonard's

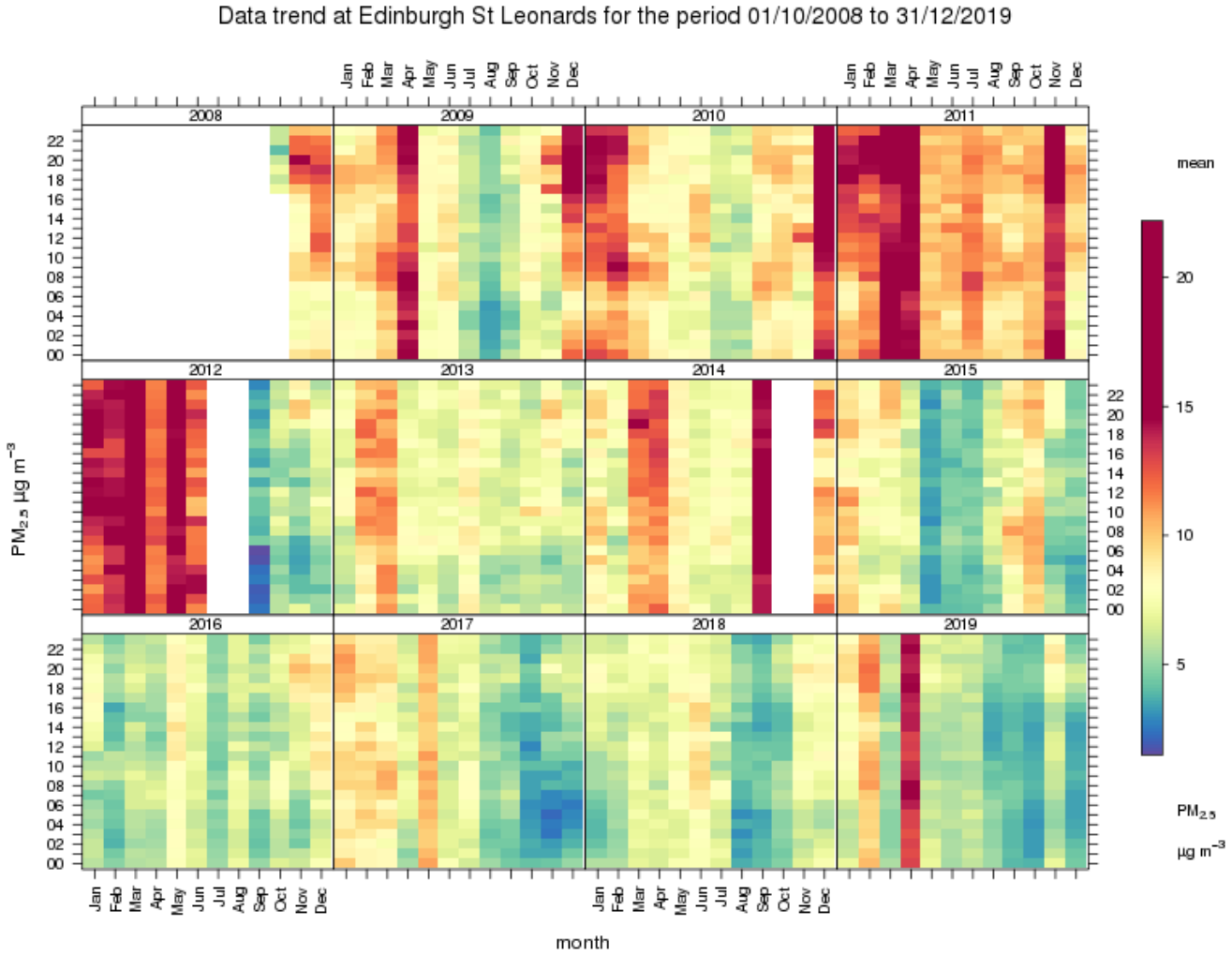


Table A.22 – Annual Mean $PM_{2.5}$ Monitoring Results – Estimations from PM_{10} Measured Data using the UK & Scottish Factors

Site ID	Site Type		$PM_{2.5}$ Annual Mean Concentration (µg/m³) (3)				
			2015	2016	2017	2018	2019
ID6 - Currie	Suburban (TEOM)	National factor 0.7	*6 (VCM)* *7 (1.14)*	*6 (VCM)* *7 (1.14)*	6 (VCM) 6 (1.14)	6 (VCM) 6 (1.14)	*6.1 (VCM)* *6.7 (1.14)*
		Scottish factor 0.63	*6* (VCM) 6 (1.14)	*6* (VCM) 6 (1.14)	5 (VCM) 5 (1.14)	6 (VCM) 6 (1.14)	*6.8 (VCM)* 6.0 (1.14)
ID8 - Salamander St	Roadside (TEOM)	National factor 0.7	**14** (VCM) **15** (1.14)	**12** (VCM) **13** (1.14)	**12** (VCM) **13** (1.14)	**13** (VCM) **14** (1.14)	**12.1** (VCM) **12.6** (1.14)
		Scottish factor 0.63	**13** (VCM) **14** (1.14)	**11** (VCM) **11** (1.14)	**11** (VCM) **12** (1.14)	**12** (VCM) **13** (1.14)	**10.9** (VCM) **11.4** (1.14)
ID10 - Glasgow Road	Roadside (TEOM)	National factor 0.7	**11** (VCM) **11** (1.14)	**11** (VCM) **12** (1.14)	**11** (VCM) **11** (1.14)	**11** (VCM) **11** (1.14)	**10.8** (VCM) **11.1** (1.14)
		Scottish factor 0.63	9 (VCM) **10** (1.14)	9 (VCM) **11** (1.14)	9 (VCM) **10** (1.14)	9 (VCM) **10** (1.14)	9.7 (VCM) **10.0** (1.14)

(1) Estimation of $PM_{2.5}$ concentrations from PM_{10} Measurements using national factor (0.7) – Yellow

(2) Estimation of $PM_{2.5}$ concentrations from PM_{10} Measurements using Scottish Factor 0.63 – Blue

(3) Potential exceedances of the $PM_{2.5}$ annual mean objective of 10µg/m³ are shown in **bold red**, annual mean of 10µg/m³ are shown in bold

Table A.23 – SO_2 Monitoring Results

Site ID	Site Type	Valid Data Capture for monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	Number of Exceedances (percentile in bracket) (3)		
				15-minute Objective (266 µg/m^3)	1-hour Objective (350 µg/m^3)	24-hour Objective (125 µg/m^3)
ID7	**St Leonard's** Urban Background	80.4	80.4	0	0	0

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

(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) If the period of valid data is less than 85%, the relevant percentiles are provided in brackets.

Table A.24 – Number of Ozone exceedances at St Leonard's

St Leonard's (Urban Background)	2014	2015	2016	2017	2018	2019
Data Capture[a] %	*72*	98	97	98	98	97.9
No of exceedances in 8 hourly running mean> 100 µg/m^3 (air quality standard)	*42*	14	43	4	88	55
Air quality strategy objective for 2005 daily maximum 8-hour running mean > 100 µg/m^3 on more than 10 days	*N/A[b]*	Not Exceeded	Not Exceeded	Not Exceeded	**Exceeded**	Not Exceeded

Notes: Exceedances of the O_3 objective are shown in red and bold

(a) data capture for the full calendar year
Italic; poor data capture

(b) data capture below 85%; for a strict comparison against the objectives there must be a data capture of 85% or greater throughout the calendar year.

Table A.25 – PAH (B(a)P) Monitoring at St Leonard's

St Leonard's Urban Background	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Annual Concentration (ngm^{-3})	0.131	0.129	0.099	0.109	0.084	*0.058*	0.073	0.077	0.047	0.078	0.071

Appendix B: Full Monthly Diffusion Tube Results for 2019

Table B.2 – NO_2 Monthly Diffusion Tube Results for 2019

Site address	Site ID	NO_2 Mean Concentrations (µg/m^3)													
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
														Raw Data	Bias Adjusted (1)
Deanhaugh Street/Raeburn Pl	**13a**	38.6	28.0	27.0	26.1	26.9	21.4	25.1	19.0	29.1	27.5	20.1	26.6	26.3	22.1
Glasgow Road 158	**57**	54.3	49.3	45.7	37.1	39.2	19.1	24.2	34.2	41.6	37.2		35.9	38.0	31.9
Glasgow Road 68/ Facade	**16a**	49.1	41.7	30.6	41.6	28.0								38.2	29.1
Glasgow Road 68/adj	**16**	62.0	52.2	29.6	62.9	53.1	40.8	53.0	42.3	43.5	48.8	61.6	34.1	48.7	40.9
Glasgow Road Facade/9	**15a**	52.7	52.7	37.2	32.9	21.8	33.0	37.8	35.6	43.0	39.2	38.8	31.7	38.0	32.0
Glasgow Road Newbridge R'about	**58***	65.0	63.8	48.3	52.4	63.5	47.8	49.7	55.6	52.7	50.7	54.4	45.3	54.8	46.0
Glasgow Road Newbridge R'about	**58***	80.8	73.0	62.5	46.8	46.2	48.2	53.5	64.5	63.2	50.9	30.2	45.3		
Glasgow Road Newbridge R'about/3	**15**	61.6	60.9	54.6	46.5	49.2	19.9	37.3	47.4	46.5	40.8	52.5	42.4	46.6	39.2
Glasgow Road/Drumbrae R'about	**56**	44.2	29.6	25.5	32.8	33.8		27.3	24.5	25.1	29.5	30.0	28.6	30.1	25.3
Hamilton Place/Stockbridge Library	**143a**	39.0	33.6	26.6	28.7	27.1	24.8	24.7	25.8	27.2	32.7	38.2	28.8	29.8	25.0
Hillview Terrace	**41**	30.7	18.9	18.7	19.8	17.0	16.1	16.5	14.6	18.4	22.4	28.9	16.2	19.9	16.7
Inverleith Row/Café Montague	**55c**	35.2	24.4	17.9	35.5	29.9	28.3	28.9	23.2	26.0	28.7	41.7	21.2	28.4	23.9
Inverleith Row/Ferry Road	**55***	46.9	43.1	43.6	33.5	41.8	37.3	35.6	41.1		38.3	51.5	37.8	39.7	33.4
Inverleith Row/Ferry Road	**55***	45.4	37.6	45.3	29.7	42.8	31.2	43.2	40.3	32.4	39.7	42.3	39.8		
Queensferry Road 540	**63a**										22.7	29.8	24.8	25.8	18.0
Queensferry Road 544	**63**		36.0	31.6	20.0	11.7	20.4	21.1	21.9	24.0				23.3	23.4
Queensferry Road 550	**64**	89.6	70.7	72.7	48.4	68.9	64.9	68.4	60.5	67.6	56.8	76.0	67.7	67.7	56.9
Queensferry Road 550F	**64b**	46.9	41.6	30.8	21.6	25.9	23.2	26.3	31.0	34.0	30.1	39.1	37.9	32.4	27.2
Queensferry Road 552	**64a**	40.3	37.4	33.2	22.6	27.9	26.6	26.1	29.8	28.9	34.4	37.8		31.4	26.4

Site address	Site ID	NO_2 Mean Concentrations (µg/m^3)													
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
														Raw Data	Bias Adjusted (1)
Queensferry Road 561	**62**	28.6	19.2	19.1	25.4	19.3	17.8	20.3	16.8	19.4	24.5	28.1	15.5	21.2	17.8
Queensferry Road/Lyle Court	**69i**			41.7	42.0			50.4	47.6	50.0		59.1	40.9	47.4	40.3
Queensferry Road/Hillhouse Road	**40**	17.4	32.6	21.9	42.8	34.6	30.8	30.2	27.6	29.2	26.4			29.4	24.7
Queensferry Road/Hillpark Wood	**129**	19.3	17.1	12.7	23.8	18.8	15.9		11.8	17.6	20.1	29.4	11.8	18.0	15.2
Roseburn Terrace	**23**	37.8	34.0	34.7	66.5	46.7	38.5	39.2	35.2		40.9	56.1	32.3	42.0	35.3
Roseburn Terrace Wbound	**22a**	53.5	44.4	47.1	42.1	45.4	31.6	41.8	40.5	44.3	41.7	48.1	40.1	43.4	36.5
St John's Road 131	**1d**	57.3	53.8	52.0	37.2	37.2	33.3	41.5	54.2	43.6	44.2	46.5	38.1	44.9	37.7
St John's Road IR	**1b**	39.1	36.0	28.2	34.4	35.3	28.5	31.5	23.1	32.9	31.5	41.5	27.8	32.5	27.3
St John's Road SB	**1**	46.7	39.2	32.2	40.8	42.9		34.5	25.3	35.1	33.0	55.9	30.2	37.8	31.8
St John's Road/Kaimes Road	**SJ1**		41.5	33.3		37.2	30.6	30.3	26.7	28.8	34.6		33.5	32.9	27.7
St John's Road/Victor Park Terr	**39**	50.7	37.2	39.3	30.8	33.8	27.3	30.9	31.3	35.1	39.2	39.8	38.0	36.1	30.4
Trinity Crescent	**14**	40.0	34.0	23.4	20.8	20.4	17.7	14.6	17.9	19.0		32.6	27.0	24.3	20.4
Angle Park Terrace 25	**76c**	37.4	39.0	37.2	28.2	29.8	22.7	24.1	27.6	27.6	32.1	42.7	34.0	31.9	26.8
Angle Park Terrace 74 2M East	**76b**	45.3		43.8	40.6	44.7	30.9	35.3	38.5	36.4	35.6	53.4	37.5	40.2	33.8
Angle Park Terrace/Harrison Road	**76**	51.3	49.5	38.1	42.6	40.9	34.3	35.7	33.7	34.1	34.7	47.2	32.1	39.5	33.2
Ardmillan Terrace 22	**76a**	40.7	39.1	26.1	36.6	32.2	27.2	30.0	24.1	23.4	32.5	43.0		32.3	27.1
Balgreen Rd/Library	**80e**	51.8	40.7	32.7	23.6	30.8	24.8	26.4		27.0	34.1	42.4	32.0	33.3	28.0
Calder Road	**4a**	37.7	28.9	24.1	26.8	24.8	25.5	26.5	18.0		30.3	35.3	19.3	27.0	22.7
Dundee Street/Yeaman Place	**79d**	57.8	49.2	44.0		39.6	37.4	33.2	39.2	30.8	37.3	47.0	36.5	41.1	34.5
Fountainbridge 103	**79a**	30.2	36.4	27.6	38.9		30.7	35.0	28.5	26.5	28.3	43.5	28.3	32.2	27.0
Fountainbridge/Tollcross	**79**	35.6	39.7		34.8	35.6	29.9	31.1	31.5		44.8	37.6	29.6	35.0	29.4
Gorgie Road - Delhaigh	**80**	44.3	44.1	38.9	51.7	40.6		32.7	32.9	36.9	46.2	48.4	19.3	39.6	33.3

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Gorgie Road 8	**18**	51.3	32.2	33.2	48.0	41.6	32.7	33.2	34.4	36.5	43.6	55.2	31.5	39.5	33.2
Gorgie Road 87	**80c**			35.6	34.9		33.3			11.7	50.4	44.5	30.0	34.3	27.4
Gorgie Road No160	**80f**	47.4	35.2	38.9	38.4	38.3	34.3		30.3	34.6	41.7	53.9	32.1	38.6	32.5
Gorgie Road No173	**80g**	57.8				29.5	31.6			36.2	42.9	45.4	31.6	39.3	31.1
Gorgie Road 549	**80b**	32.5	34.3	26.5	33.8	35.1	34.1	31.8	28.5	33.3	40.0	45.4	25.2	33.4	28.1
Gorgie Road/Glen Lea	**80a**	36.3	34.0	23.3	32.8	32.0	28.1	25.0	25.2	25.9	35.1	44.6	25.4	30.6	25.8
Gorgie Road/Murieston Road	**5**	43.0	44.6	42.7	38.7	41.9	36.7	35.8	32.3	40.5	34.9	48.0	36.6	39.6	33.3
Henderson Terrace	**76d**		44.6	33.1	37.9	33.2	26.2	29.0	31.8	31.9	31.1	44.2	30.9	34.0	28.6
Lanark Road 425	**11a**	38.7	38.7	34.8	30.3	39.3	31.1	29.0	29.1	30.6	32.6	30.1	28.6	32.7	27.5
Lanark Road 610	**11**	32.6	24.1	20.6	25.6	25.8	18.9	18.6	17.3	22.3	27.2	35.8		24.4	20.5
Slateford Road 51	**77a**	47.7	44.4	32.1	33.3	32.7	26.6	11.9	34.0	28.9	41.3	41.0	28.2	33.5	28.2
Slateford Road 93/95	**77b**	51.4	47.1	39.1	40.6	39.8	34.1		32.9	31.7	56.2	43.8	31.3	40.7	34.2
Slateford Road 97	**77**	48.1	45.0	22.7	50.1			36.8	**26.3**	35.5	35.5	50.9	28.5	37.9	31.9
Wardlaw Street No2	**80h**	46.7	35.1		32.7	29.8	27.7	27.0	22.9	28.9	36.2	37.3	31.7	32.4	27.2
Bernard Street/opp King Chambers	**29a**	27.9	39.3	27.2	35.8		31.7	27.8	26.7	28.3	33.7	42.3	34.2	32.3	27.1
Bernard Street/PS	**29c***	61.4	55.7	47.6	35.7	37.9	37.6	35.2	49.5	32.1	44.5	52.4	37.1	42.2	35.4
Bernard Street/PS	**29c***	43.5	54.3	46.0	34.8	40.0	33.9	34.0	43.8	11.6	57.8	42.1	43.1		
Bernard Street/Sainsburys	**29**	42.0	42.9	21.5	26.8	28.9	24.5	26.4	28.6	28.2	31.7	36.4	32.6	30.9	25.9
Broughton Road	**43**	42.6	42.0	34.8	32.3	32.3	23.0	29.7	31.3	31.5	35.8	43.8	40.5	35.0	29.4
Commercial Street 0pp Job centre plus	**9d**	40.8	43.8	34.2	49.4	45.6	38.1	39.7	29.0	34.4	40.4	48.6	35.1	39.9	33.6
Commercial Street 88	**9**	33.1	37.5	21.2	37.0	36.3	25.5	29.8	25.7	28.6	34.0	38.5	27.7	31.2	26.3
Commercial Street/Portland Place	**9a**	59.1	44.6	41.6	34.2	41.0	35.2	39.2	35.7	19.6	36.2	43.6	38.5	39.0	32.8

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Duke Street	**30f**	54.6	47.4	47.6	29.2	35.3	28.1	34.6	35.7		34.0	39.4	36.5	38.4	32.3
Easter Road 105/109	**25c**	40.9	44.8	46.2	21.2	35.1	22.5	42.4	48.4	32.0	52.7	52.8	35.1	39.5	33.2
Easter Road 198	**25e**	39.2	34.3	30.1	33.3	32.7	26.0	30.7	18.8	21.3	33.9	33.6	30.5	30.4	25.5
Easter Road/Bothwick	**25d**	35.2	30.8	27.7	30.8	35.3	25.5	26.8	24.4			38.8	29.8	30.5	25.6
Easter Road/CH shop	**25**	52.8	47.3	20.7	48.2	37.1	35.7		32.0	35.5	34.7	52.0	38.4	39.5	33.2
Easter Road/Rossie Place	**25b**	41.0	40.5	26.5	46.1	32.9			26.5	30.3	36.6	42.5	35.0	35.8	30.1
Ferry Road 203	**18a**	41.0	43.6	35.6	33.1	36.9		32.0	38.1	35.7	37.9	42.7	39.7	37.8	31.8
Ferry Road/ 6 Bowhill Terrace	**53**	47.7	39.9	38.9	24.9	28.5	27.7	31.8	35.0	33.1	31.8	34.5	37.5	34.3	28.8
Ferry Road/North Junction Street	**45d**	45.7	50.0	42.4	32.5	33.4	26.2	34.0	38.9	30.7	39.2	31.7	40.5	37.1	31.2
Great Junction Street 137	**30b**	46.0	44.5	44.0	26.0	35.6		26.8	35.7	37.3	32.8	35.9	39.0	36.7	30.8
Great Junction Street 14	**30c**	40.7	44.2	30.6	48.4	42.5	39.0	38.2	29.8	35.1	36.6	53.3	34.1	39.4	33.1
Great Junction Street/CG junct Pirrie St	**30e**	50.8	49.4	39.9	45.1		33.8	34.7		30.4	41.3	38.6	32.5	39.7	33.3
Great Junction Street/FV	**30**	41.7	40.6	36.1	50.9	37.8	20.3	38.2	27.8	39.4	53.2	51.4	31.6	39.1	32.8
Great Junction Street/WC opp 137	**30d**	42.2	34.9	28.1	45.7	39.9	28.9	35.1	23.8	27.2	35.3	43.4	24.7	34.1	28.7
Leith Walk/Brunswick Road	**21**	39.4		40.8	39.6	39.8	37.7			38.3		38.6	36.2	38.8	30.6
Leith Walk/McDonald Road	**20**	63.0	49.7	50.7	37.0	43.2		39.0	43.4	44.4	43.1	43.9	38.7	45.1	37.9
London Road/Cadzow Place	**66**	39.5	36.3	30.9	35.1	40.0	29.2	33.9	28.8	34.5	37.5	53.4	26.7	35.5	29.8
London Road/Earlston Place	**67**	50.0	51.5	34.3	40.9	49.8	40.7	44.0	43.0	45.9	38.7	48.9	39.8	44.0	36.9
London Road/East Norton Place	**81**	59.9	59.4	49.5	32.1	39.7	43.9	57.1	63.5	74.0	73.5	101.8	59.0	59.5	50.0
London Road/junct Easter Road	**46**	58.2	48.3	42.8	38.4	36.1	33.6	39.4	31.3	43.9	35.8	46.4	43.7	41.5	34.9
London Road/Parson's Green Ter	**68**	42.9	30.5	32.0	32.7	34.6	25.9	31.4		32.2	31.0	39.8	33.3	33.3	28.0
London Road/Wolseley Place	**69**	46.9	46.4	43.4	37.6	40.9	31.0	37.4	38.3	40.1	60.4	43.5	39.3	42.1	35.4

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London Road/Wolseley Terrace	**70**	52.7	48.8	48.6		41.1	32.9	38.8	48.8	51.1		46.4	38.6	44.8	37.6
Niddrie Mains Road 28	**32**	46.2	36.2	31.8	29.9	32.6	23.9	28.0	33.2	12.2	32.9	40.0	30.7	31.5	26.4
North Junction St nr 4	**9c**	46.3	33.3	28.5	30.3	32.1	26.2	28.9	26.5	25.6	30.7	34.8	28.2	31.0	26.0
Portobello High Street W 185	**71**	38.8	40.7		23.7	27.6	23.2	26.5	27.1	25.7	28.3	37.3	30.0	29.9	25.1
Portobello Rd facade Ramsay Inst	**73d**	48.7	42.4	28.8	33.0	36.9		36.5	37.3	36.5	46.1	28.8	35.9	37.4	31.4
Rodney Street 31	**30x**	42.5	36.2	27.3	28.4	27.4	24.8		21.6	25.1	28.0	36.3	32.2	30.0	25.2
Rodney Street 10	**30a**	54.1	45.8	38.2	43.8	37.3	36.0	37.9		29.0	19.9	44.0	38.2	38.6	32.4
Salamander Street/Baltic Street	**51c**	27.7	44.6	40.4	23.6	27.0	21.0	26.1	35.0	29.3		33.0	39.0	31.5	26.5
Seafield Road East 10	**72**	39.1	38.4	16.0	47.7	42.1	28.6	36.8	25.1	26.5	22.7	43.4	26.8	32.8	27.5
Bank Street	**10B**	45.7	46.6	51.6	34.1	38.8	36.5	39.6	54.5	40.0	42.9	45.6	45.0	43.4	36.5
Broughton Street	**44**	34.1	38.0	31.0	40.0	29.3		28.3	34.0	28.6		26.7	35.7	32.6	27.4
Brougham Street 9	**8A**	43.6	50.1	41.5		36.2	30.5	37.2	39.6	30.5	64.1	88.6	31.1	44.8	37.7
Bruntsfield Place 147	**6B**	30.2	27.3	19.1	29.0	8.6	18.9	21.6	18.8	22.5	20.0	17.0	21.6	21.2	17.8
Bruntsfield Place 210	**6a**	40.2	40.0	30.0	34.6	21.1	26.3	24.6	26.2	21.6		37.3		30.2	25.4
Cannongate	**48G**	51.1	49.5	54.6	53.4			50.9	49.6	52.2	51.6		44.4	50.8	42.7
Clerk Street 15	**138**	53.9	50.8	37.3	27.1			37.3	38.7	40.6	43.4	36.4	31.4	39.7	33.4
Comiston Road No.116	**151**	35.9	36.0	26.2	23.5	24.4	18.3	20.3	20.1	20.3	21.6	29.9	25.5	25.2	21.2
Cowgate/ 50 St Mary's Street	**48f**	48.4	44.4	27.0	45.7	40.1	34.5		34.8	36.8	45.7	66.7	29.2	41.2	34.6
Cowgate/Blackfriars	**48c**	47.0	53.0		33.4		35.1	40.8	52.5	41.1	36.0	52.0	37.1	42.8	36.0
Cowgate/Blair Street	**48a**					39.1	31.0	48.4					30.0	37.1	38.2
Cowgate/Guthrie Street	**48**	46.6	43.7	36.4	34.7	38.6	28.5	36.6	33.6	31.9	36.2	46.9	38.5	37.7	31.7
Cowgatehead 2	**48e**		41.0		41.6	39.0	36.3				30.9	45.1	32.6	38.1	29.6

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Drum Street	**150**	31.4	28.0		31.3		21.1	28.5	23.2	12.1	25.9	49.0	23.5	27.4	23.0
George IV Bridge	**10A**	36.0	37.6	32.3	19.8	35.6		34.4	38.3	33.1	37.2	29.0	29.3	33.0	27.7
George Street 112	**74f**	41.3	33.7	30.8	31.0	27.4	24.9	29.0	23.0	24.6	30.0	41.1	29.5	30.5	25.7
Grassmarket 41	**37a***	48.1		91.3	53.5		41.6				76.3	108.6	92.3	70.7	52.5
Grassmarket 41	**37a***	60.1		63.8	50.4		48.1				88.5	108.7	57.8		
Grassmarket 75	**37b**	48.1	45.5	91.3	45.8	33.0	36.3	40.6		34.0	43.2	50.4	39.3	46.1	38.8
Grassmarket/nrThomsons Court	**37c**	35.0	31.1	28.2	27.2	25.2	28.0	29.2		29.9	31.5	37.0	25.8	29.8	25.1
Gt Stuart Street 9	**75e**	30.6	29.7	19.8	17.9		18.5	19.0	18.9	20.9	29.1	30.3	23.0	23.4	19.7
Haymarket Terrace North side	**HT1**	55.2	39.5	37.9	44.9	45.4	40.6		38.3	41.4	46.9	52.7	35.2	43.5	36.5
Haymarket Terrace South side	**HT2**	50.7	46.3	50.7	52.2	44.8			40.7	41.5	57.1	52.8	48.2	48.5	40.8
Home Street/Tollcross	**10**	39.7		33.6	33.5	34.8	30.4	35.2	37.4	43.6		38.9	38.5	36.6	30.7
Hope Park Terrace/Clerk Street	**140**	19.2	38.1	37.5	37.4	13.9	29.7		31.1	30.9	40.5	40.1	28.0	31.5	26.5
Hope Park Terrace/VS	**17a**	43.7	32.8	37.7	33.4	34.1	30.0	26.0	30.1	32.6	31.7	45.2	32.4	34.1	28.7
Howden Hall Road 79	**149a**		17.5		41.1	37.8	29.0	31.5	30.5	28.9	32.1	35.8		31.6	26.5
India Street	**34**	33.7	26.5	19.0	17.4	17.9	12.3	18.1	16.5	19.0	26.0	22.3	24.4	21.1	17.7
Lauriston Place Opp119	**8B**	40.2	39.6	39.1	34.8	45.0	31.5		37.8	33.1	42.7		27.9	37.2	31.2
Leith Street News Room Pub	**74g**	50.0	54.4	45.0	59.1	43.5		63.8	67.3	49.4		50.3	45.5	52.8	44.4
Lothian Road 45	**62A**		65.4	45.1		62.5	53.6	51.7	58.3		53.8			55.8	56.6
Lothian Road 139	**62B**				53.5	55.0	48.5		48.8	48.9	34.5		38.1	46.8	43.9
Lothian Road/Rutland St	**62X**	66.3	76.0	61.0	42.3	42.3	44.5	45.5			50.2	65.5		54.8	46.1
Mayfield Road No.90	**152**	41.1	33.3	30.0	22.4	23.8			26.3	26.0	27.2	35.0	29.4	29.5	24.8
Melville Drive	**38**	41.3		35.2	16.1	23.8	19.4	21.3	25.7	24.0		35.4	28.6	27.1	22.8

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Midmar Drive	**42**	23.3	20.7	15.6	15.2	9.7	11.1		12.9	12.1	7.0	23.9	13.7	15.0	12.6
Morningside Road	**8**	32.0	32.0	18.3	25.4	26.8	21.3	20.6	20.9	31.8	24.8	35.0	24.5	26.1	21.9
Morrison Street 91	**62C**	75.5	38.7	47.2	48.9	42.5				56.0	49.5	53.0	40.2	50.2	42.2
Morrison Street	**49**	54.8	36.8	38.1	48.0	40.2		39.6	41.2	56.5	41.3	51.1	39.2	44.3	37.2
Nicholson Street 69	**135a**	57.7	50.1	53.5	34.3	49.2	41.2	44.4						47.2	40.6
Nicholson Street 59-61	**135b**								47.9	52.3	49.3	45.2	37.7	46.5	37.8
Nicholson Street 92	**136**	38.0	33.6	28.6	47.3	45.3	32.3		32.0	32.8	48.5	42.5	40.5	38.3	32.2
North Bridge South	**27**	47.9	42.0	42.3	73.7	49.1	49.9	49.8	42.4	42.4	44.5	58.8	36.5	48.3	40.6
Princes Street (Eastbound)	**47**		46.9	48.7	39.1	49.1	41.8		44.1	37.8	37.1	44.8	41.2	43.1	36.2
Princes Street/Mound	**24**	62.1	69.5	74.5	57.3	59.7		60.8			62.1	64.1	59.4	63.3	53.2
Queen Street No66	**33b**	38.4	45.2	26.9	37.3	33.2	33.4	32.9	36.7	31.2	32.5	30.4	38.7	34.7	29.2
Queen Street/Albyn Pl	**33a**	51.0	42.5	37.8	31.9	29.1	29.1	27.9	33.2	33.9	31.9	31.8	29.4	34.1	28.7
Queen Street/North David Street	**33**	50.8	49.6	37.8	35.4	39.9	38.4	38.5	45.2	37.1	52.7	39.8	48.2	42.8	36.0
Shandwick Place Hostel	**SH1**	39.9	40.2	44.3	51.0	46.8	43.0	45.6	39.6		45.7		44.1	44.0	37.0
South Bridge 59	**144**	54.5	47.3		53.2	49.3		44.6	50.1	41.9	22.6	49.0	40.8	45.3	38.1
South Clerk Street 41a	**142**	41.2	38.5	38.2	38.9	38.4	32.1	33.1		27.7	33.1	40.5	28.3	35.5	29.8
South Clerk Street 84	**141**	44.7	45.7	46.9	36.2	40.2	31.8	37.2	35.1	34.7	45.2	44.7	26.9	39.1	32.9
St Colme Street/4	**75d**	34.8	27.5	27.5	29.3	29.9	24.9	26.6	10.9	25.3	30.6	37.0	22.3	27.2	22.9
New Arthur Place	**153**	26.3	20.0	22.5	10.3	17.0	12.8			17.7	19.0	35.7	19.7	20.1	16.9
Teviot Place 14	**10c**	36.9	37.6	30.8	28.0	25.0		33.2	37.6	33.0	35.5	42.8	28.6	33.5	28.2
Torphicen Place 1	**3b**	56.0	50.4	46.3	51.1	50.6	47.1	46.4	37.4	44.7	49.7	50.9	40.4	47.6	40.0
Torphichen Place/Chiropractice	**3**	54.9	45.0	55.2	44.9	53.7	44.5	43.4		42.3		53.1	45.2	48.2	40.5

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Viewcraig Street 9	**154**	35.8								22.2		38.1		32.0	19.9
West Maitland St/Palmerston Pl	**2**	66.1	58.4	68.2	58.0	58.7	52.9	50.0	32.8	43.8	58.0	61.7	45.1	54.5	45.8
West Port 42	**28d**	63.6	63.3	70.9		52.9				49.6	56.0	48.4	53.2	57.2	44.0
West Port 62	**28b**	85.2	66.4	70.8			51.7		62.0	59.4	55.3	73.4	55.9	64.5	54.2
West Port Opp 50	**28c**	53.5	41.0	45.3	37.3	48.4	39.3		40.7	39.2	37.8	43.7	31.4	41.6	35.0
York Place	**36**	46.1	47.5	36.7	30.9	31.9	27.8	30.0	33.0	33.1	27.4	40.9	36.1	35.1	29.5
Queensferry Road Co-location	**CL1***	51.8	43.9	48.3	49.2	49.4	46.2	46.6	43.6	48.1	44.1	51.7	43.3	44.8	37.6
Queensferry Road Co-location	**CL2***	54.0	31.7	46.6	50.7	43.9	44.5	45.5	39.1	44.0	35.3	33.5			
Queensferry Road Co-location	**CL3***	50.2	43.3	42.7	52.9	55.0	45.4	47.7	42.6	35.3	48.2		34.0		
Gorgie Road Co-location	**CL4***	34.9	39.1	33.1	31.0	27.7	25.4	26.8	24.9	28.2	30.5	36.0	29.4	30.4	25.5
Gorgie Road Co-location	**CL5***	31.7	39.2	36.1	27.1	28.8	25.3	26.0	23.4	24.1	30.8	39.0	31.0		
Gorgie Road Co-location	**CL6***	37.8	41.8	33.6	30.2	27.0	28.6	24.1	22.0	26.8	28.0	39.2	26.1		
Salamander Street Co-Location	**CL7***	42.7	35.3	27.8	20.9	23.7	18.0	23.5	24.6	22.8		31.4	33.9	27.8	23.4
Salamander Street Co-Location	**CL8***	38.8	41.7	25.1	19.7	24.6	22.5	22.7	24.3	23.3	19.1	31.0			
Salamander Street Co-Location	**CL9***	39.6	39.4	31.6	21.6	24.8	22.4	23.0	24.5	27.2	28.2	31.5	33.3		
Glasgow Road Co-location	**CL10***		38.3	30.4	26.4	27.8	24.1		31.2	32.6	31.7	42.3	29.6	32.3	27.1
Glasgow Road Co-location	**CL11***	35.4	42.9	41.3	25.5	20.6	23.9	26.6	35.5	35.5	35.1	37.8	31.8		
Glasgow Road Co-location	**CL12***	37.8	45.9	30.4	22.5	25.1	21.7	29.3	31.7	33.2	35.2	46.4	32.7		
St John's Road Co-location	**CL13***	58.0	51.8	59.3	33.9	50.8	37.4	39.6	51.4	48.3	41.2	51.1	49.6	46.6	39.2
St John's Road Co-location	**CL14***	57.9	56.1	52.1	32.1	37.5	35.9	40.7	44.3	47.8	41.5	44.7	53.1		
St John's Road Co-location	**CL15***	59.7	53.3	58.2	33.4	38.5	39.0	37.3	48.3	46.3	47.7	50.3	50.7		

(1) See Appendix C for details on bias adjustment

* Duplicate/Triplicate sites

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

C1 Nitrogen Dioxide (NO_2) Diffusion Tube Bias Adjustment Factors

Edinburgh Scientific Services (ESS) supply and analyse the passive diffusion tubes. The tubes are made of acrylic and the laboratory uses 50% v/v Triethanolamine (TEA) in acetone for the adsorbent; the grids are dipped into this solution and allowed to dry before insertion into the tube. The tubes are exposed for 4 or 5-week periods, in accordance with the recommended calendar supplied by DEFRA. The method has remained unchanged during the monitoring periods.

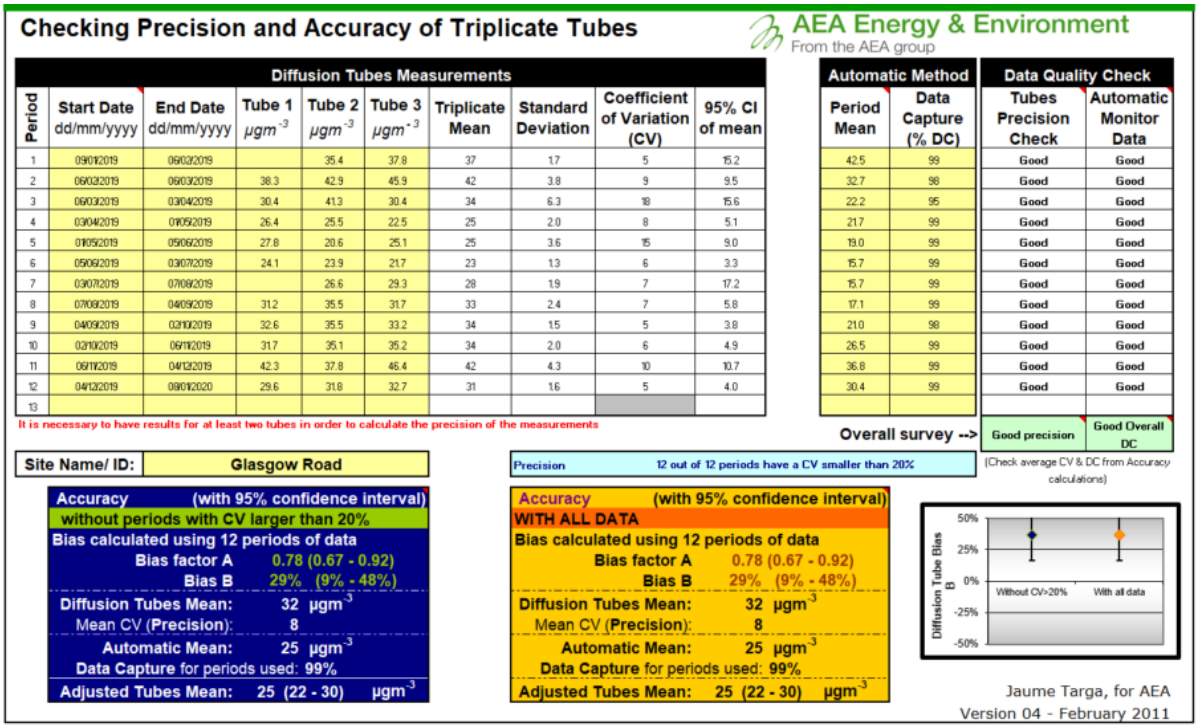
The diffusion tube data has been corrected using a bias adjustment factor, which is an estimate of the difference between diffusion tube concentration and continuous monitoring, the latter assumed to be a more accurate method of monitoring. Defra LAQM.TG(16) provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

With regard to the application of a bias adjustment factor for diffusion tubes, Defra LAQM.TG(16) and the LAQM Helpdesk recommend the use of a local bias adjustment factor where available and relevant to diffusion tube sites.

Edinburgh co-locates triplicate tubes on the sampler head cages at roadside and kerbside monitoring stations – Glasgow Road, Gorgie Road, Queensferry Road, Salamander Street, and St John's Road. Data from five sites were considered for the co-location study 2019. The details of calculation and factors are shown in Figure C.1 to Figure C.5. Generally, the passive diffusion tubes give higher concentrations than the real-time analysers over an annual period.

The national bias adjustment factor for ESS in 2019, obtained from the national bias adjustment spreadsheet (v09/20) is 0.93 (based on 6 studies), as presented in Figure C.6

Figure C.8 – Glasgow Road Local Bias Adjustment



Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	09/01/2019	09/02/2019		35.4	37.8	37	1.7	5	15.2
2	09/02/2019	09/03/2019	38.3	42.9	45.9	42	3.8	9	9.5
3	09/03/2019	03/04/2019	30.4	41.3	30.4	34	6.3	18	15.6
4	03/04/2019	07/05/2019	26.4	25.5	22.5	25	2.0	8	5.1
5	07/05/2019	05/06/2019	27.8	20.6	25.1	25	3.6	15	9.0
6	05/06/2019	03/07/2019	24.1	23.9	21.7	23	1.3	6	3.3
7	03/07/2019	07/08/2019		26.6	29.3	28	1.9	7	17.2
8	07/08/2019	04/09/2019	31.2	35.5	31.7	33	2.4	7	5.8
9	04/09/2019	02/10/2019	32.6	35.5	33.2	34	1.5	5	3.8
10	02/10/2019	06/11/2019	31.7	35.1	35.2	34	2.0	6	4.9
11	06/11/2019	04/12/2019	42.3	37.8	46.4	42	4.3	10	10.7
12	04/12/2019	09/01/2020	29.6	31.8	32.7	31	1.6	5	4.0
13									

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

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
42.5	99	Good	Good
32.7	98	Good	Good
22.2	95	Good	Good
21.7	99	Good	Good
19.0	99	Good	Good
15.7	99	Good	Good
15.7	99	Good	Good
17.1	99	Good	Good
21.0	98	Good	Good
26.5	99	Good	Good
36.8	99	Good	Good
30.4	99	Good	Good
Overall survey -->		Good precision	Good Overall DC

(Check average CV & DC from Accuracy calculations)

Site Name/ ID: Glasgow Road

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

Accuracy (with 95% confidence interval) without periods with CV larger than 20%
Bias calculated using 12 periods of data
Bias factor A 0.78 (0.67 - 0.92)
Bias B 29% (9% - 48%)
Diffusion Tubes Mean: 32 µgm^{-3}
Mean CV (Precision): 8
Automatic Mean: 25 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 25 (22 - 30) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA
Bias calculated using 12 periods of data
Bias factor A 0.78 (0.67 - 0.92)
Bias B 29% (9% - 48%)
Diffusion Tubes Mean: 32 µgm^{-3}
Mean CV (Precision): 8
Automatic Mean: 25 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 25 (22 - 30) µgm^{-3}

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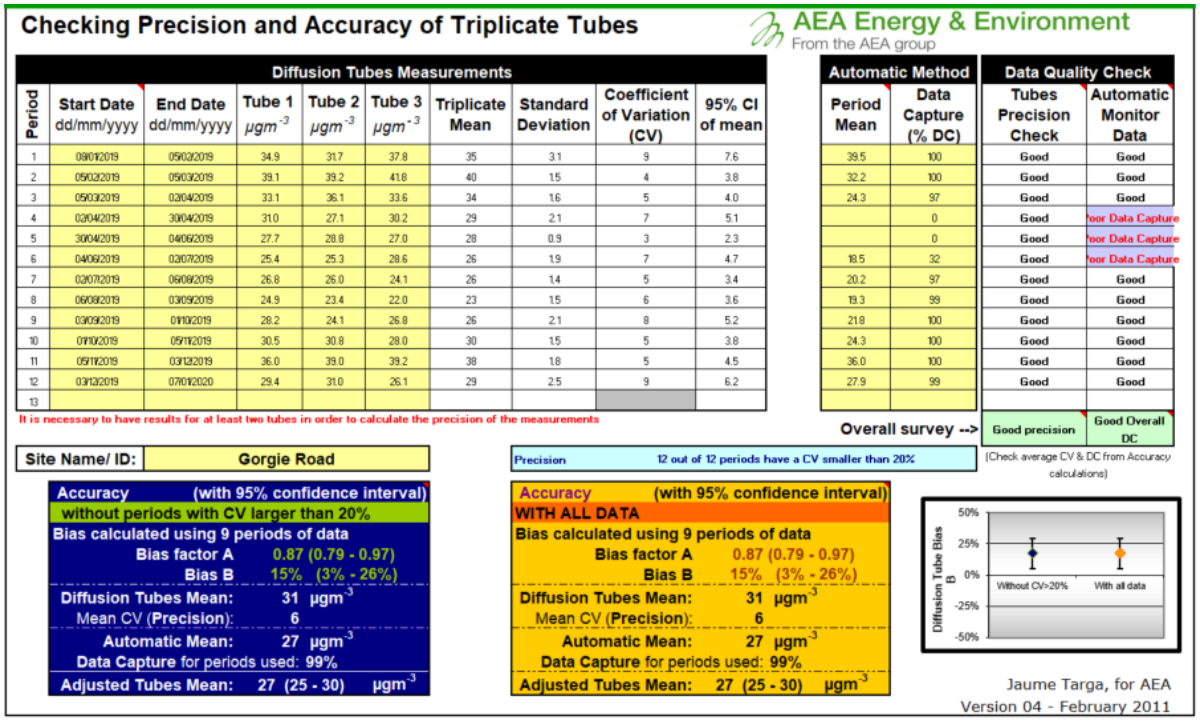
Figure C.9 – Gorgie Road Local Bias Adjustment



Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	09/01/2019	05/02/2019	34.9	31.7	37.8	35	3.1	9	7.6
2	05/02/2019	05/03/2019	39.1	39.2	41.8	40	1.5	4	3.8
3	05/03/2019	02/04/2019	33.1	36.1	33.6	34	1.6	5	4.0
4	02/04/2019	30/04/2019	31.0	27.1	30.2	29	2.1	7	5.1
5	30/04/2019	04/06/2019	27.7	28.8	27.0	28	0.9	3	2.3
6	04/06/2019	02/07/2019	25.4	25.3	28.6	26	1.9	7	4.7
7	02/07/2019	06/08/2019	26.8	26.0	24.1	26	1.4	5	3.4
8	06/08/2019	03/09/2019	24.9	23.4	22.0	23	1.5	6	3.6
9	03/09/2019	01/10/2019	28.2	24.1	26.8	26	2.1	8	5.2
10	01/10/2019	05/11/2019	30.5	30.8	28.0	30	1.5	5	3.8
11	05/11/2019	03/12/2019	36.0	39.0	39.2	38	1.8	5	4.5
12	03/12/2019	07/01/2020	29.4	31.0	26.1	29	2.5	9	6.2
13									

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

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
39.5	100	Good	Good
32.2	100	Good	Good
24.3	97	Good	Good
	0	Good	Poor Data Capture
	0	Good	Poor Data Capture
18.5	32	Good	Poor Data Capture
20.2	97	Good	Good
19.3	99	Good	Good
21.8	100	Good	Good
24.3	100	Good	Good
36.0	100	Good	Good
27.9	99	Good	Good
Overall survey -->		Good precision	Good Overall DC

(Check average CV & DC from Accuracy calculations)

Site Name/ ID: Gorgie Road

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

Accuracy (with 95% confidence interval) without periods with CV larger than 20%
Bias calculated using 9 periods of data
Bias factor A 0.87 (0.79 - 0.97)
Bias B 15% (3% - 26%)
Diffusion Tubes Mean: 31 µgm^{-3}
Mean CV (Precision): 6
Automatic Mean: 27 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 27 (25 - 30) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA
Bias calculated using 9 periods of data
Bias factor A 0.87 (0.79 - 0.97)
Bias B 15% (3% - 26%)
Diffusion Tubes Mean: 31 µgm^{-3}
Mean CV (Precision): 6
Automatic Mean: 27 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 27 (25 - 30) µgm^{-3}

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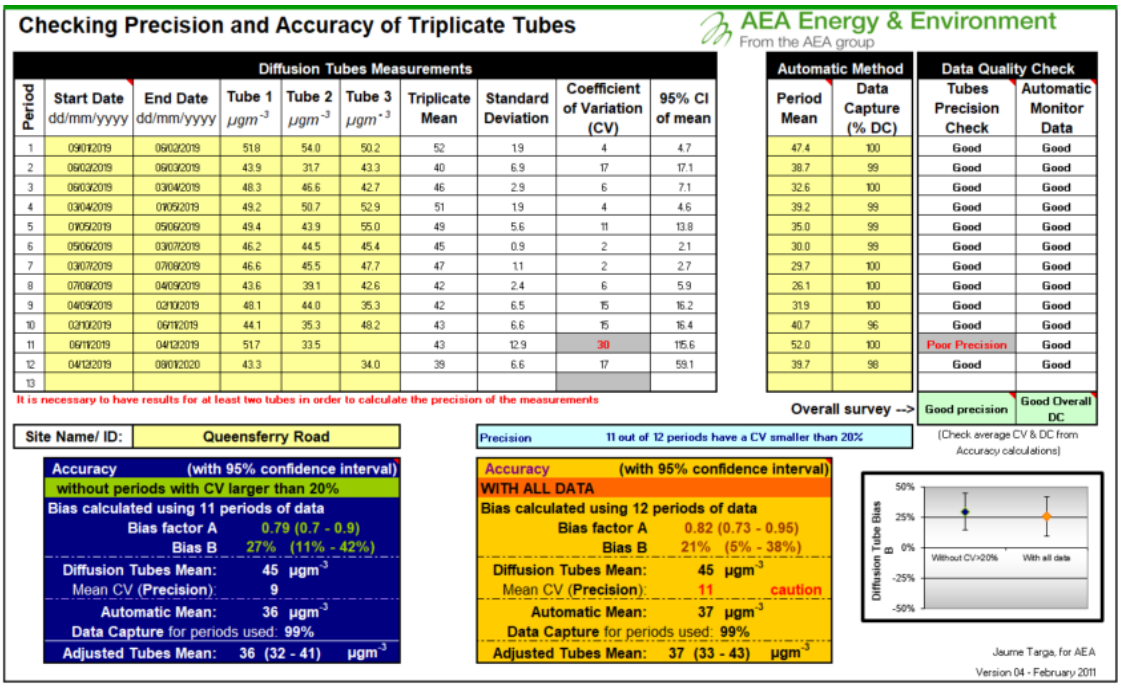
Version 04 - February 2011

Figure C.10 – Queensferry Road Local Bias Adjustment



Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Automatic Method: Period Mean	Automatic Method: Data Capture (% DC)	Data Quality Check: Tubes Precision Check	Data Quality Check: Automatic Monitor Data
1	09/01/2019	06/02/2019	51.8	54.0	50.2	52	1.9	4	4.7	47.4	100	Good	Good
2	06/02/2019	06/03/2019	43.9	31.7	43.3	40	6.9	17	17.1	38.7	99	Good	Good
3	06/03/2019	03/04/2019	48.3	46.6	42.7	46	2.9	6	7.1	32.6	100	Good	Good
4	03/04/2019	01/05/2019	49.2	50.7	52.9	51	1.9	4	4.6	39.2	99	Good	Good
5	01/05/2019	05/06/2019	49.4	43.9	55.0	49	5.6	11	13.8	35.0	99	Good	Good
6	05/06/2019	03/07/2019	46.2	44.5	45.4	45	0.9	2	2.1	30.0	99	Good	Good
7	03/07/2019	07/08/2019	46.6	45.5	47.7	47	1.1	2	2.7	29.7	100	Good	Good
8	07/08/2019	04/09/2019	43.6	39.1	42.6	42	2.4	6	5.9	26.1	100	Good	Good
9	04/09/2019	02/10/2019	48.1	44.0	35.3	42	6.5	15	16.2	31.9	100	Good	Good
10	02/10/2019	06/11/2019	44.1	35.3	48.2	43	6.6	15	16.4	40.7	96	Good	Good
11	06/11/2019	04/12/2019	51.7	33.5		43	12.9	30	115.6	52.0	100	Poor Precision	Good
12	04/12/2019	09/01/2020	43.3		34.0	39	6.6	17	59.1	39.7	98	Good	Good
13													

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

Overall survey --> Good precision | Good Overall DC

(Check average CV & DC from Accuracy calculations)

Site Name/ ID: Queensferry Road

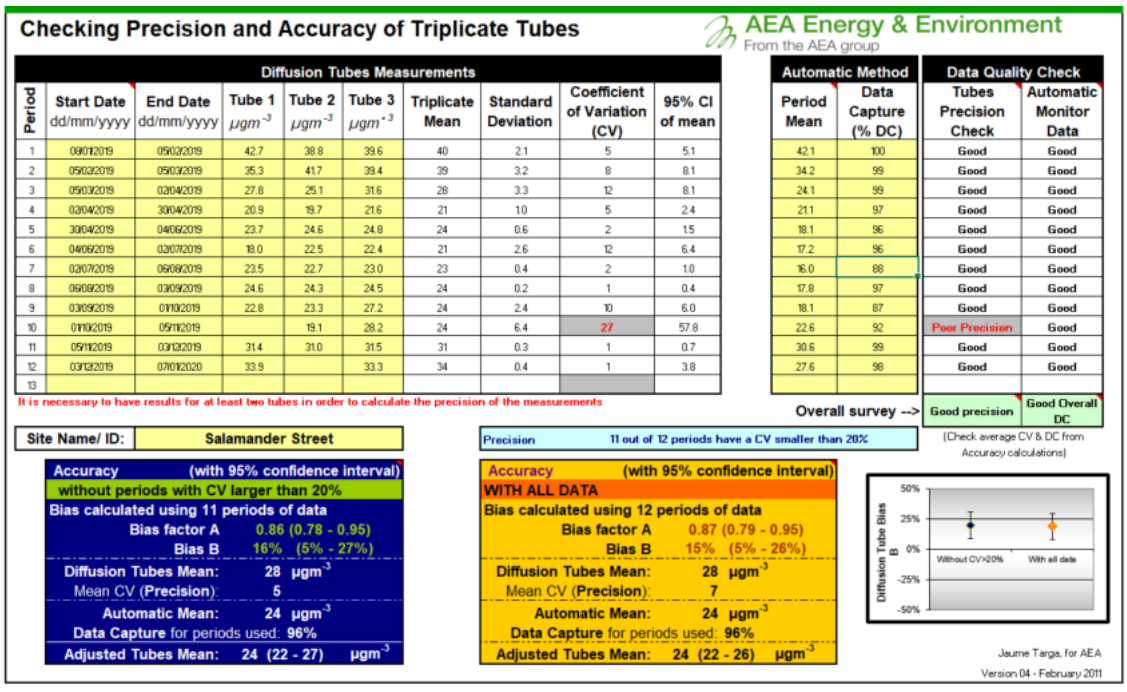
Precision: 11 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%
Bias calculated using 11 periods of data
Bias factor A 0.79 (0.7 - 0.9)
Bias B 27% (11% - 42%)
Diffusion Tubes Mean: 45 µgm^{-3}
Mean CV (Precision): 9
Automatic Mean: 36 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 36 (32 - 41) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA
Bias calculated using 12 periods of data
Bias factor A 0.82 (0.73 - 0.95)
Bias B 21% (5% - 38%)
Diffusion Tubes Mean: 45 µgm^{-3}
Mean CV (Precision): 11 caution
Automatic Mean: 37 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 37 (33 - 43) µgm^{-3}

Jaume Targa, for AEA
Version 04 - February 2011

Figure C.11 – Salamander Street Local Bias Adjustment



Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Automatic Method: Period Mean	Automatic Method: Data Capture (% DC)	Data Quality Check: Tubes Precision Check	Data Quality Check: Automatic Monitor Data
1	09/01/2019	05/02/2019	42.7	38.8	39.6	40	2.1	5	5.1	42.1	100	Good	Good
2	05/02/2019	05/03/2019	35.3	41.7	39.4	39	3.2	8	8.1	34.2	99	Good	Good
3	05/03/2019	02/04/2019	27.8	25.1	31.6	28	3.3	12	8.1	24.1	99	Good	Good
4	02/04/2019	30/04/2019	20.9	19.7	21.6	21	1.0	5	2.4	21.1	97	Good	Good
5	30/04/2019	04/06/2019	23.7	24.6	24.8	24	0.6	2	1.5	18.1	96	Good	Good
6	04/06/2019	02/07/2019	18.0	22.5	22.4	21	2.6	12	6.4	17.2	96	Good	Good
7	02/07/2019	06/08/2019	23.5	22.7	23.0	23	0.4	2	1.0	16.0	88	Good	Good
8	06/08/2019	03/09/2019	24.6	24.3	24.5	24	0.2	1	0.4	17.8	97	Good	Good
9	03/09/2019	01/10/2019	22.8	23.3	27.2	24	2.4	10	6.0	18.1	87	Good	Good
10	01/10/2019	05/11/2019		19.1	28.2	24	6.4	27	57.8	22.6	92	Poor Precision	Good
11	05/11/2019	03/12/2019	31.4	31.0	31.5	31	0.3	1	0.7	30.6	99	Good	Good
12	03/12/2019	07/01/2020	33.9		33.3	34	0.4	1	3.8	27.6	98	Good	Good
13													

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

Overall survey --> Good precision | Good Overall DC

(Check average CV & DC from Accuracy calculations)

Site Name/ ID: Salamander Street

Precision: 11 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%
Bias calculated using 11 periods of data
Bias factor A 0.86 (0.78 - 0.95)
Bias B 16% (5% - 27%)
Diffusion Tubes Mean: 28 µgm^{-3}
Mean CV (Precision): 5
Automatic Mean: 24 µgm^{-3}
Data Capture for periods used: 96%
Adjusted Tubes Mean: 24 (22 - 27) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA
Bias calculated using 12 periods of data
Bias factor A 0.87 (0.79 - 0.95)
Bias B 15% (5% - 26%)
Diffusion Tubes Mean: 28 µgm^{-3}
Mean CV (Precision): 7
Automatic Mean: 24 µgm^{-3}
Data Capture for periods used: 96%
Adjusted Tubes Mean: 24 (22 - 26) µgm^{-3}

Jaume Targa, for AEA
Version 04 - February 2011

Figure C.12 – St John's Road Local Bias Adjustment

Checking Precision and Accuracy of Triplicate Tubes — AEA Energy & Environment, From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	08/01/2019	05/02/2019	58.0	57.9	59.7	59	1.0	2	2.5
2	05/02/2019	05/03/2019	51.8	56.1	53.3	54	2.2	4	5.4
3	05/03/2019	02/04/2019	59.3	52.1	58.2	57	3.9	7	9.6
4	02/04/2019	30/04/2019	33.9	32.1	33.4	33	0.9	3	2.3
5	30/04/2019	04/06/2019	50.8	37.5	38.5	42	7.4	18	18.4
6	04/06/2019	02/07/2019	37.4	35.9	39.0	37	1.6	4	3.9
7	02/07/2019	06/08/2019	39.6	40.7	37.3	39	1.7	4	4.3
8	06/08/2019	03/09/2019	51.4	44.3	48.3	48	3.6	7	8.8
9	03/09/2019	01/10/2019	48.3	47.8	46.3	47	1.0	2	2.6
10	01/10/2019	05/11/2019	41.2	41.5	47.7	43	3.7	8	9.1
11	05/11/2019	03/12/2019	51.1	44.7	50.3	49	3.5	7	8.7
12	03/12/2019	07/01/2020	49.6	53.1	50.7	51	1.8	4	4.4
13									

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

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
55.2	99	Good	Good
47.9	98	Good	Good
41.0	100	Good	Good
34.8	100	Good	Good
33.5	99	Good	Good
34.8	95	Good	Good
34.7	100	Good	Good
39.2	99	Good	Good
40.3	100	Good	Good
40.7	100	Good	Good
51.3	100	Good	Good
50.9	100	Good	Good
Overall survey -->		Good precision	Good Overall DC

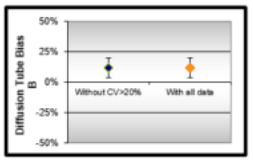
(Check average CV & DC from Accuracy calculations)

Site Name/ ID: St John's Road

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

Accuracy (with 95% confidence interval) without periods with CV larger than 20%
Bias calculated using 12 periods of data
Bias factor A 0.9 (0.84 - 0.97)
Bias B 11% (3% - 19%)
Diffusion Tubes Mean: 47 µgm^{-3}
Mean CV (Precision): 6
Automatic Mean: 42 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 42 (39 - 45) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA
Bias calculated using 12 periods of data
Bias factor A 0.9 (0.84 - 0.97)
Bias B 11% (3% - 19%)
Diffusion Tubes Mean: 47 µgm^{-3}
Mean CV (Precision): 6
Automatic Mean: 42 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 42 (39 - 45) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Figure C.13 – ESS 50% TEA in Acetone 2019 National Bias Adjustment Factor

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 09/20

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

This spreadsheet will be updated at the end of March 2021
LAQM Helpdesk Website

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

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

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List. If a laboratory is not shown, we have no data for this laboratory.

Step 2: Select a Preparation Method from the Drop-Down List. If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down List. If a year is not shown, we have no data.

Step 4: Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor shown in blue at the foot of the final column. If you have your own co-location study then see footnote. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953

Analysed By	Method (To undo your selection, choose (All) from the pop-up list)	Year (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m^3)	Automatic Monitor Mean Conc. (Cm) (µg/m^3)	Bias (B)	Tube Precision	Bias Adjustment Factor (A) (Cm/Dm)
Edinburgh Scientific Services	50% TEA in acetone	2019	KS	Marylebone Road Intercomparison	12	75	65	15.4%	P	0.87
Edinburgh Scientific Services	50% TEA in acetone	2019	R	City of Edinburgh Council	12	32	25	28.4%	G	0.78
Edinburgh Scientific Services	50% TEA in acetone	2019	R	City of Edinburgh Council	9	31	27	14.6%	G	0.87
Edinburgh Scientific Services	50% TEA in acetone	2019	R	City of Edinburgh Council	12	45	37	21.2%	P	0.82
Edinburgh Scientific Services	50% TEA in acetone	2019	R	City of Edinburgh Council	12	28	24	15.1%	G	0.87
Edinburgh Scientific Services	50% TEA in acetone	2019	KS	City of Edinburgh Council	12	47	42	11.4%	G	0.90
Edinburgh Scientific Services	50% TEA in acetone	2019		Overall Factor (6 studies)				Use		0.85

Choice of Bias Adjustment Factor

It is recommended by Defra LAQM.TG(16) and the LAQM Helpdesk that the local bias adjustment factor should be used where available and relevant. Historically, City of Edinburgh Council has used a combined factor of the local co-location sites, and any additional co-location sites used within the national study. All local co-location sites report good data quality and data capture, therefore are able to be used in combination to calculate a local bias adjustment factor, however the additional national study site, Marylebone Road, reported poor tube precision. The combined

factors were calculated using the methodology stated within LAQM.TG(16) for areas where there are more than one local co-location study. A factor was calculated utilising only City of Edinburgh Council's co-location sites, and an additional factor was calculated that included the Marylebone Road site.

City of Edinburgh Council Only

$$\frac{(0.29 + 0.16 + 0.15 + 0.11 + 0.27)}{5} + 1 = 1.20$$

$$\frac{1}{1.20} = 0.835$$

City of Edinburgh Council and Marylebone Road

$$\frac{(0.29 + 0.16 + 0.15 + 0.11 + 0.27 + 0.15)}{6} + 1 = 1.19$$

$$\frac{1}{1.19} = 0.840$$

By including the Marylebone Road site into the combined factor, there is little difference in the final bias adjustment factor calculated. Additionally, it is a slightly higher factor, therefore considered to be more conservative. A bias adjustment factor of 0.840 was therefore used to adjust all NO_2 diffusion tube measurements in 2019. This factor also remains in-line with historical factors used in recent-past by City of Edinburgh Council.

Table C.3 – Previously Used Bias Adjustment Factors

Year	Factor Used
2011	0.81
2012	0.76
2013	0.75
2014	0.74
2015	0.76
2016	0.77
2017	0.82
2018	0.90

C2 QA/QC of Automatic Monitoring

All monitoring stations are subject to an independent audit and stringent QA/QC procedures which are undertaken by Ricardo on behalf of DEFRA and the Scottish Government. This agreement commenced in 2007 (2013 for Currie). In addition, all data, including calibration data, are scrutinised on a daily basis by the Council (Monday to Friday) by visual examination, to check for any unusual measurements. Any suspicious data (e.g. large spikes) are flagged to undergo further checks.

Staff competence

Officers are trained as local site operators in relation to the management of the stations and undertake the necessary calibrations and basic maintenance. Shadow training is carried out where appropriate during 6-monthly audits (performed by Ricardo).

Calibration procedures

The two ML 9841 B NO_x analysers (located at Glasgow Road and Salamander Street) perform a daily auto-calibration. Warning limits are set at +/- 5 % on the software program.

All sites including those listed above are visited fortnightly, apart from the National Network site of St Leonards which is managed by DEFRA/AECOM and visited monthly.

Manual calibration checks are preformed using zero air/scrubber and certified NO gas at approximately 500ppb. All cylinders are replaced at 12 to 18-month intervals. Nitric Oxide cylinders are supplied by BOC.

Details of manual calibration checks and precision and accuracy of instruments can be made available on request.

Servicing

All instruments are serviced and recalibrated every six months by an appropriate supplier. The service contracts include a support package for software and replacement parts, plus any necessary call outs to the sites.

The TEOM heads on the automatic PM_{10} units are cleaned monthly and filters are changed when necessary in accordance with the instrument.

Filters are changed on the FIDAS instruments every 6 months. Servicing follows 6monthly audits by Ricardo.

During all visits to the monitoring stations, actions taken and activities noted adjacent to the site are recorded in the site log book.

Short-term to Long-term Data Adjustment

Data capture for the majority of continuous monitoring locations during 2019 was greater than 75%. This is however with exception of Edinburgh Currie for NO_2, Edinburgh Nicolson Street for PM_{10} and $PM_{2.5}$, and Edinburgh Queensferry Road for PM_{10} and $PM_{2.5}$. Annualisation was completed for continuous NO_2 monitoring at Currie, however for PM_{10} and $PM_{2.5}$ at Nicolson Street and Queensferry Road, the data was unable to be annualised due to both monitoring locations having less than 25% data capture in 2019. Details of the annualisation completed at Currie are presented within Table C.2. The sites used to annualise the data are the nearest continuous monitoring locations with data capture for 2019 greater than 85%.

Table C.4 – Edinburgh Currie NO_2 Annualisation

	Bush Estate	Edinburgh St Leonards	Glasgow Anderston	Grangemouth Moray	Raw Data Annual Mean (µg/m^3)	Annualised Annual Mean (µg/m^3) – Raw x Ratio
Annual Mean (A_m)	5.3	20.8	25.5	14.7	11.7	9.9
Period Mean (P_m)	5.8	24.7	29.0	19.6		
A_m/P_m	0.914	0.842	0.879	0.750		
Ratio (Annualisatio	0.846					

n Factor)			

C3 QA/QC of NO_2 Diffusion Tube Monitoring

Sampling staff at Scientific Services Laboratory, City of Edinburgh Council are trained to fulfil the requirements associated with passive diffusion tube samplers. The tubes are also supplied and analysed by the laboratory. ESS participates in the AIR-PT scheme which is an independent analytical proficiency-testing (PT) scheme, operated by LGC Standards and supported by the Health and Safety Laboratory (HSL). AIR-PT started in April 2014 and combines two long running PT schemes: LGC Standards STACKS PT scheme and HSL WASP PT scheme.

Defra and the Devolved Administrations advise that diffusion tubes used for Local Air Quality Management should be obtained from laboratories that have demonstrated satisfactory performance in the AIR-PT scheme. Laboratory performance in AIR-PT is also assessed, by the National Physical Laboratory (NPL), alongside laboratory data from the monthly NPL Field Intercomparison Exercise carried out at Marylebone Road, central London. A laboratory is assessed and given a 'z' score. A score of 2 or less indicates satisfactory laboratory performance.

In the 2019 AIR-PT results, AIR-PT AR030 (January to February 2019) and AR033 (July to August 2019), ESS scored 100%. AIR-PT AR031 (April to May 2019) no results were reported, and AIR-PT AR34 (September to November 2019) ESS scored 25%. The percentage score reflects the results deemed to be satisfactory based upon the z-score of $< \pm 2$.

Additionally, the precision of the NO_2 diffusion tubes supplied by ESS has been classified as 'good' for four observations during 2019, and poor for two observations. This precision reflects the laboratory's performance and consistency in preparing and analysing the tubes, as well as the subsequent handling of the tubes in the field. Precision summary results are available from the LAQM website, at: https://laqm.defra.gov.uk/diffusion-tubes/precision.html.

NO_2 diffusion tube monitoring is conducted in accordance with the quality requirements contained in the UK NO_2 Survey Instruction Manual for local/unitary authorities and Technical Guidance LAQM.TG (16). The kerbside diffusion tubes are

located within 1 metre of the kerb edge, roadside locations are greater than 1 metre from the road edge or at the façade of residential property. The tubes are attached to sign posts / lampposts using plastic spacer holders at a height of approximately 2m above ground level.

Three diffusion tubes from each monthly batch are used as blanks. These tubes are not exposed and are stored in a refrigerator during the exposure period. They are analysed along with the appropriate batch of exposed tubes. The purpose of blanks is to determine whether NO_2 contamination occurred during tube preparation.

C4 Short-term to Long-term Data Adjustment for NO_2 Diffusion Tubes

Annualisation was completed using version 1 of the Annualisation Tool[4] developed by Bureau Veritas on behalf of Defra. This was required for 17 diffusion tube locations where the annual data capture was less than 75%. Continuous monitoring background locations used were Bush Estate, Edinburgh St Leonards, Glasgow Anderston, and Grangemouth Moray, which were the nearest monitoring locations with an annual data capture greater than 85% in 2019. The annualisation summary is presented in Figure C.7.

Figure C.14 – 2019 Annualisation Tool Summary

Diffusion Tube ID	Annualisation Factor Bush Estate	Annualisation Factor Edinburgh St Leonards	Annualisation Factor Glasgow Anderston	Annualisation Factor Grangemouth Moray	Average Annualisation Factor	Raw Data Simple Annual Mean (µg/m3)	Annualised Data Simple Annual Mean (µg/m3)	Comments
16a	0.9311	0.9184	0.9177	0.8634	0.9076	38.2	34.7	
63a	1.1730	1.1771	1.1163	1.2998	1.1916	23.3	27.8	
63b	0.7818	0.8653	0.8448		0.8307	25.8	21.4	
69i	1.0157	1.0233	0.9976		1.0122	47.4	48.0	
80c	0.9006	1.0150	0.9280		0.9479	34.3	32.6	
80g	0.9207	0.9388	0.9677		0.9424	39.3	37.0	
21	0.9304	0.9513	0.9392	0.9345	0.9388	38.8	36.4	
48a	1.2669	1.2419	1.1667		1.2252	37.1	45.5	
48e	0.8773	0.9918	0.8976	0.9322	0.9247	38.1	35.2	
37a	0.8600	0.9168	0.8754		0.8841	-	-	Duplicate/Triplicate site - Annual data provided for other tube
37b	0.8600	0.9168	0.8754		0.8841	70.7	62.5	
62A	1.1986	1.1757	1.1718	1.2806	1.2067	55.8	67.3	
62B	1.0697	1.1598	1.0269	1.2144	1.1177	46.8	52.3	
135a	1.0467	1.0265	1.0118	1.0089	1.0235	47.2	48.3	
135b	0.9470	0.9684	0.9844		0.9666	46.5	44.9	
154	0.7452	0.7223	0.8625	0.6281	0.7395	32.0	23.7	
28d	0.9245	0.9028	0.9675	0.8650	0.9149	57.2	52.4	

C5 Short-term to Long-term Data Adjustment for NO_2 Diffusion Tubes

[4] https://laqm.defra.gov.uk/tools-monitoring-data/annualisation.html

Ricardo-AEA Ltd provided Volatile Correction Model (VCM) corrected Tapered Element Oscillating Microbalance (TEOM) data to the Council under the Scottish Air Quality Database project for the Salamander Street and Glasgow Road automatic monitoring stations. In 2013 this included the Currie station for the first time. PM FIDAS data from the St Leonards, Queensferry Road, Nicholson Street, Tower Street, and St John's Road automatic particle monitoring is also provided by Ricardo and corrected in accordance with the relevant technical guidance.

TEOM data was also corrected to provide a gravimetric equivalent using Edinburgh's local gravimetric factor, 1.14. This factor was derived from undertaking a co-location study with a Partisol unit and TEOM instrument in Detailed Assessment Report 2004.

Appendix D: Nitrogen Dioxide Fall-Off with Distance Calculations

In line with LAQM.TG(16) distance correction has been applied to NO_2 monitoring sites that have recorded an annual mean concentration above the annual mean objective, or within 10% of the annual mean objective. Only 1 site that met this criteria in 2019 was not located at a site of relevant exposure.

In accordance with LAQM.TG(16) guidance the NO_2 Fall-Off with Distance Calculator (v4.2) has been used to derive the NO_2 concentration at a location of relevant exposure; the results of the calculations are presented in Figure D.1 and Figure D.2. The background concentrations used within the calculations have been taken from the SEPA 2019 (2018 base year) background maps that are available on the Scottish Air Quality website.

Figure D.3 – NO_2 Fall-Off with Distance Summary

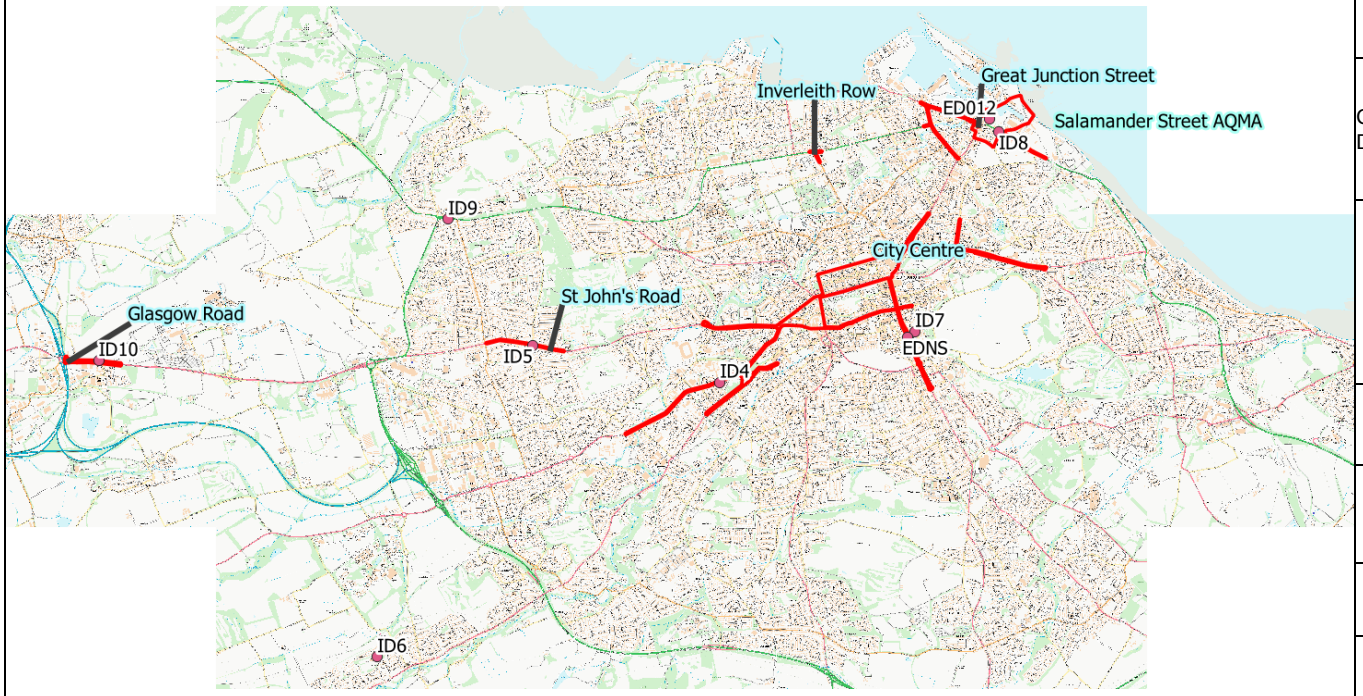
Site Name/ID	Distance (m)		NO_2 Annual Mean Concentration ($\mu g/m^3$)			Comment
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor	
16.0	1.8	6.2	19.0	40.9	34.7	
58 Duplicate	2.8	8.0	22.2	46.0	39.7	Predicted concentration at Receptor within 10% the AQS objective.
15.0	4.0	7.8	22.2	39.2	36.0	Predicted concentration at Receptor within 10% the AQS objective.
64.0	1.5	10.7	13.4	56.9	38.2	Predicted concentration at Receptor within 10% the AQS objective.
69i	2.0	9.5	13.4	40.3	30.5	
22a	2.5	4.2	14.2	36.5	33.6	
20.0	1.2	4.3	18.8	37.9	32.8	

Figure D.4 – NO_2 Fall-Off with Distance Summary (Continued)

Site Name/ID	Distance (m)		NO_2 Annual Mean Concentration ($\mu g/m^3$)			Comment
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor	
HT2	0.5	2.3	17.0	40.8	34.5	
62B	3.5	6.7	23.6	43.9	**40.4**	Predicted concentration at Receptor above AQS objective.
49.0	2.2	4.6	23.6	37.2	34.8	
47.0	9.0	2.5	24.3	36.2	**41.7**	Predicted concentration at Receptor above AQS objective.
24.0	1.0	11.2	24.3	53.2	*39.1*	Predicted concentration at Receptor within 10% the AQS objective.
2.0	0.5	5.7	23.6	45.8	*36.2*	Predicted concentration at Receptor within 10% the AQS objective.
Queensferry Road Co-loca	1.7	8.2	13.4	37.6	29.0	

Appendix E: Maps of Monitoring Locations and AQMAs

Figure E.8 – Continuous Air Quality Monitoring Locations: Edinburgh



Legend:

Automatic Monitoring

AQMA

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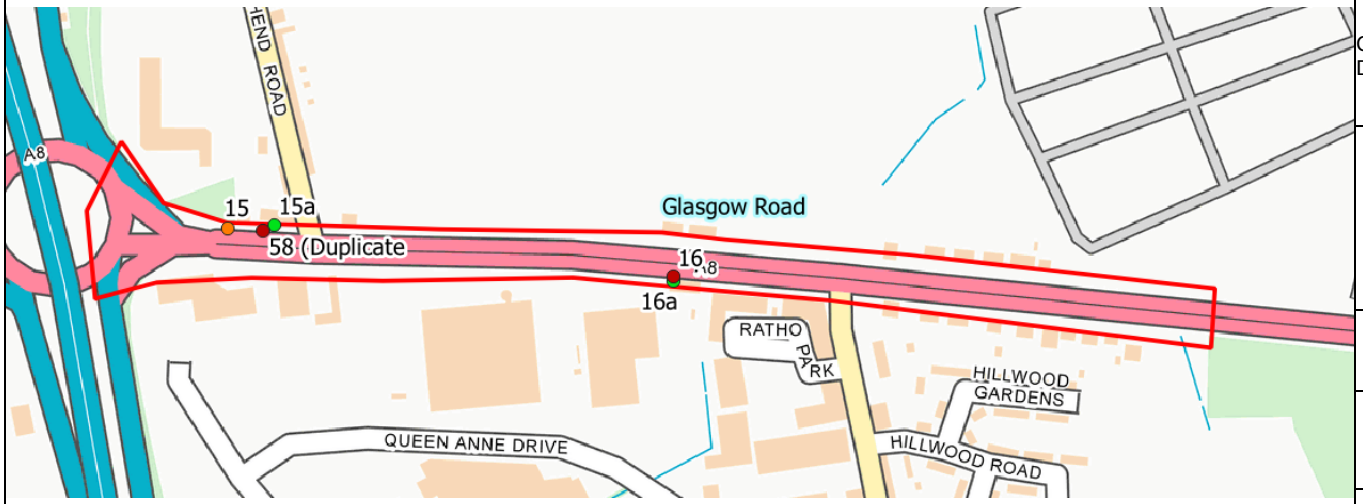
Air Quality
Bureau Veritas
5th Floor
66 Prescot Street
London, E1 8HG

Location **Edinburgh**	
Title **Continuous Air Quality Monitoring Locations: Edinburgh**	
By AS	**Approved** HS
Scale NTS	**Job Ref** 9659516
Date November 2020	**Figure No.** E.1

Figure E.9 – Passive Air Quality Monitoring Locations: Glasgow Road AQMA



Legend:

Passive Monitoring Locations (2019 Non-distance corrected concentration ug/m3)

- <36
- >=36
- >=40
- >=60
- AQMA

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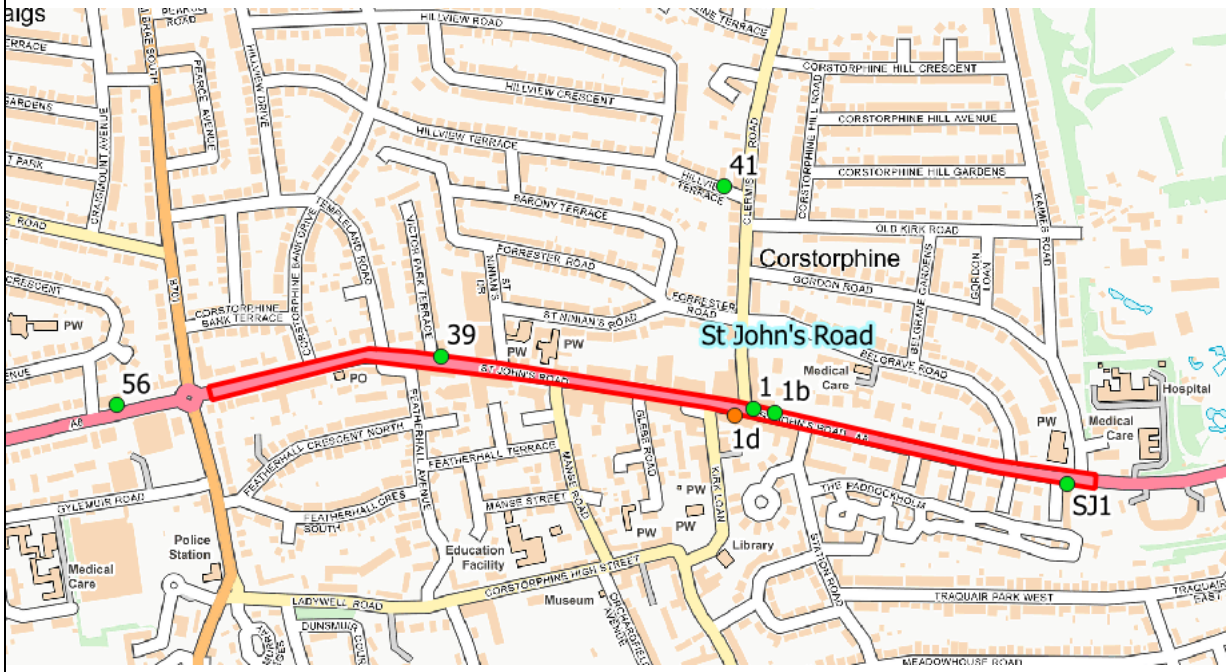
Location **Edinburgh**	
Title **Passive Air Quality Monitoring Locations: Glasgow Road AQMA**	
By AS	**Approved** HS
Scale NTS	**Job Ref** 9659516
Date November 2020	**Figure No.** E.2

Figure E.10 – Passive Air Quality Monitoring Locations: St John's Road AQMA



Legend:

Passive Monitoring Locations (2019 Non-distance corrected concentration ug/m3)

- <36
- >=36
- >=40
- >=60
- AQMA

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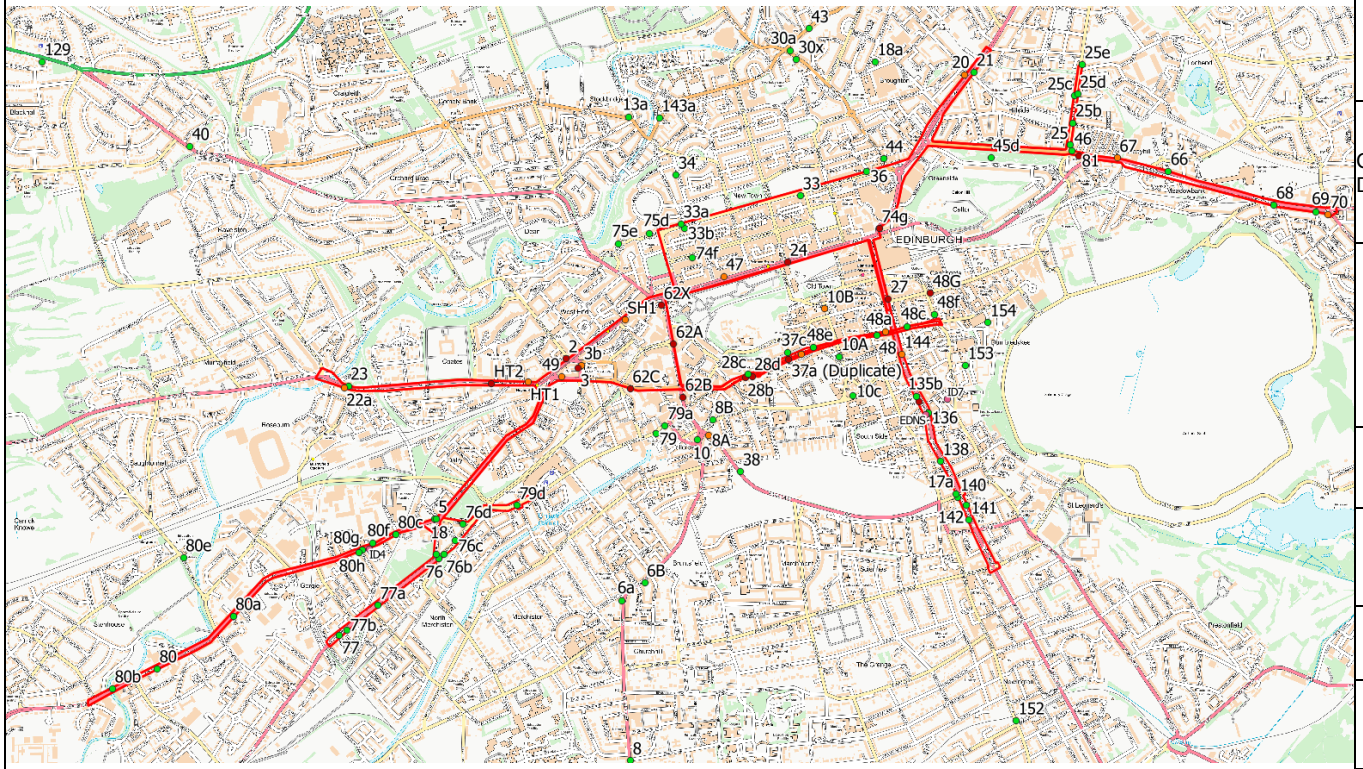
Location **Edinburgh**	
Title **Passive Air Quality Monitoring Locations: St John's Road AQMA**	
By AS	**Approved** HS
Scale NTS	**Job Ref** 9659516
Date November 2020	**Figure No.** E.3

Figure E.11 – Passive Air Quality Monitoring Locations: Edinburgh City Centre AQMA



Legend:

Passive Monitoring Locations (2019 Non-distance corrected concentration ug/m3)

- <36
- >=36
- >=40
- >=60

AQMA

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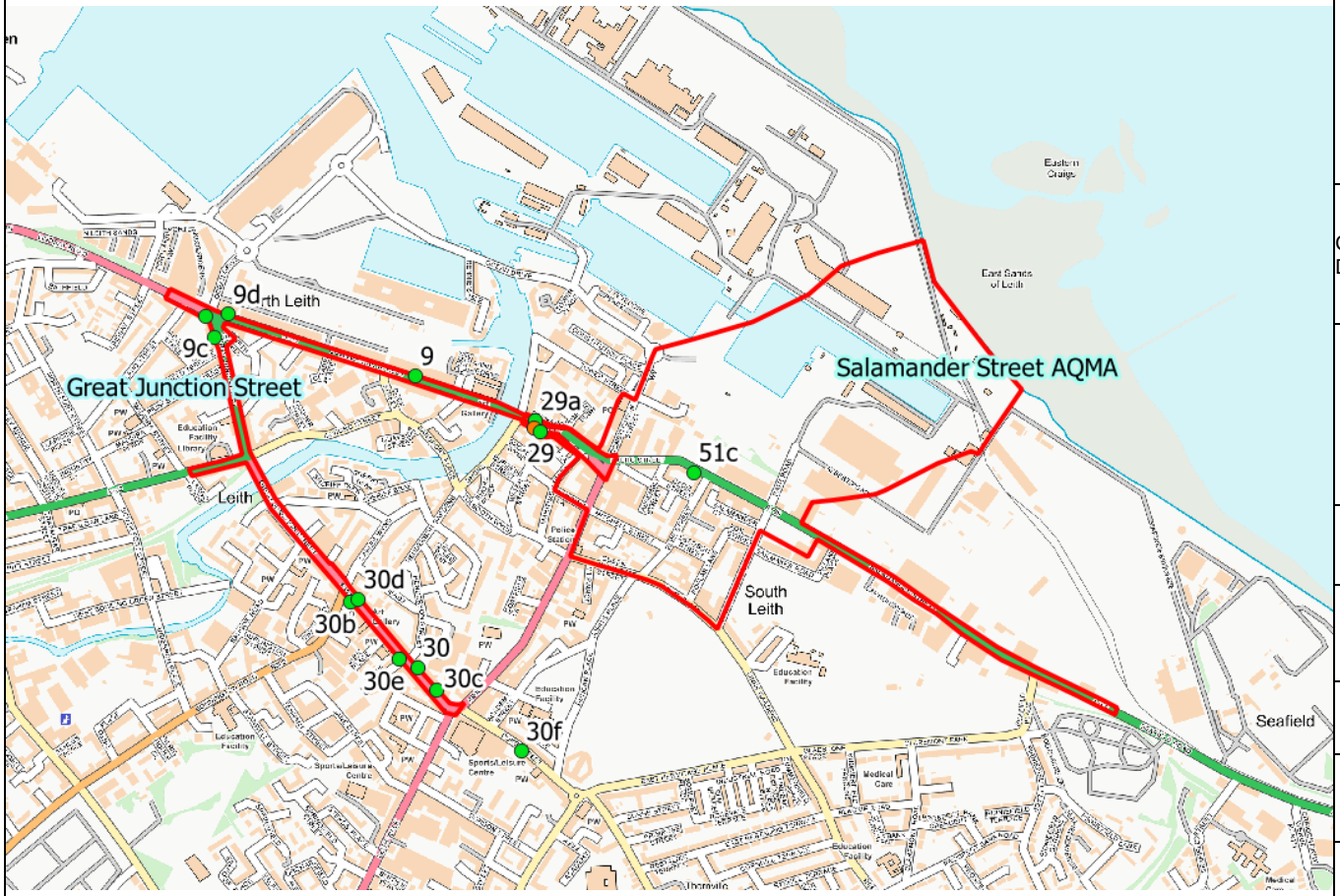
Location **Edinburgh**	
Title **Passive Air Quality Monitoring Locations: Edinburgh City Centre AQMA**	
By AS	**Approved** HS
Scale NTS	**Job Ref** 9659516
Date November 2020	**Figure No.** E.4

Figure E.12 – Passive Air Quality Monitoring Locations: Great Junction Street and Salamander Street AQMAs



Legend:

Passive Monitoring Locations (2019 Non-distance corrected concentration ug/m3)

- <36
- >=36
- >=40
- >=60
- AQMA

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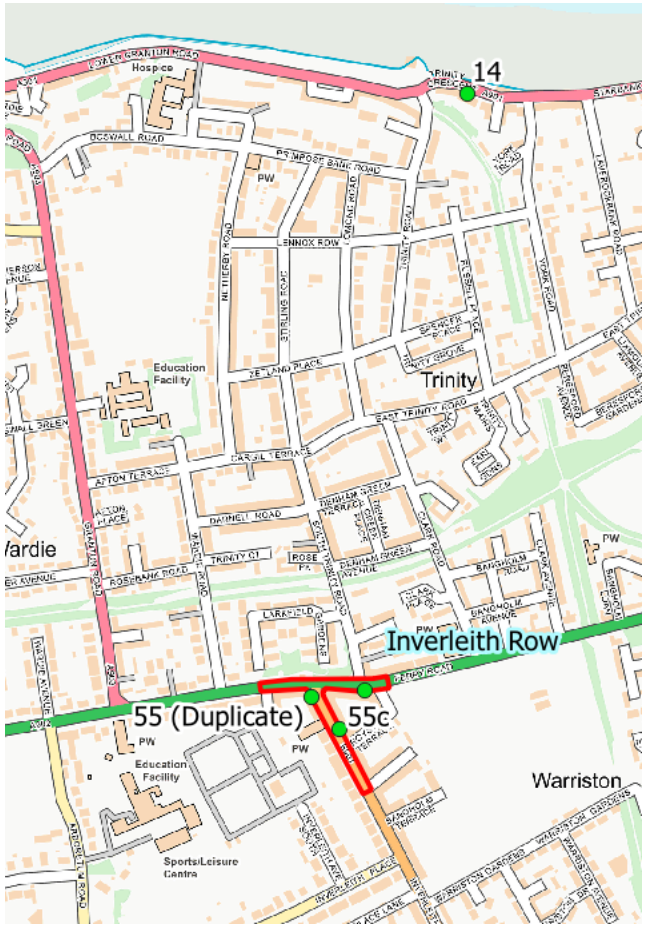
Location **Edinburgh**	
Title **Passive Air Quality Monitoring Locations: Great Junction Street and Salamander Street AQMAs**	
By AS	**Approved** HS
Scale NTS	**Job Ref** 9659516
Date November 2020	**Figure No.** E.5

Figure E.13 – Passive Air Quality Monitoring Locations: Inverleith Row AQMA



Legend:

Passive Monitoring Locations (2019 Non-distance corrected concentration ug/m3)

- <36
- >=36
- >=40
- >=60
- AQMA

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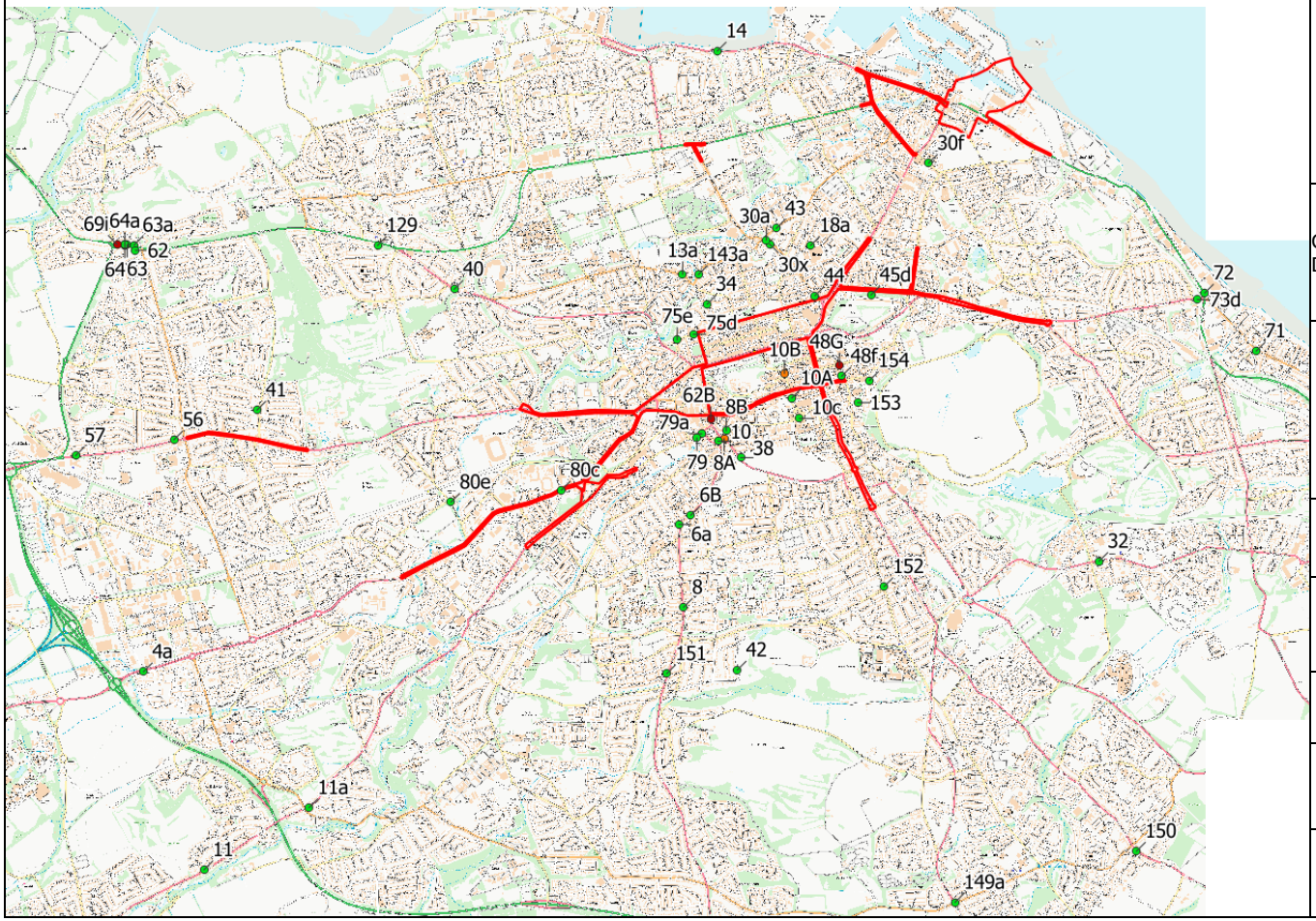
Location **Edinburgh**	
Title **Passive Air Quality Monitoring Locations: Inverleith Row AQMA**	
By AS	**Approved** HS
Scale NTS	**Job Ref** 9659516
Date November 2020	**Figure No.** E.6

Figure E.14 – Passive Air Quality Monitoring Locations: Outside Any AQMA



Legend:

Passive Monitoring Locations (2019 Non-distance corrected concentration ug/m3)

- <36
- >=36
- >=40
- >=60
- AQMA

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Location **Edinburgh**	
Title **Passive Air Quality Monitoring Locations: Outside Any AQMA**	
By AS	**Approved** HS
Scale NTS	**Job Ref** 9659516
Date November 2020	**Figure No.** E.7

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)
ATAP	Edinburgh Council's Active Travel Action Plan
BaP	Benzo(a)pyrene
BEAR	Transport Scotland's funded Bus Abatement Retrofit Programme
CAFS	Cleaner Air For Scotland – The Road to a Healthier Future; Scottish Government's national low emission strategy
CCT	Edinburgh's City Centre Transformation strategy
CCWEL	Edinburgh's City Centre West to East Link –a new cycle route linking the Roseburn path to Leith Walk via the City Centre
CMP	City Mobility Plan – Edinburgh's new local transport strategy
CPZ	Controlled Parking Zone
CVRAS	Clean Vehicle Retrofit Accreditation Scheme
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EV	Electric Vehicle
ESS	Edinburgh Scientific Services

FDMS	**Filter Dynamics Measurement System**
LAQM	**Local Air Quality Management**
LEZ	**Low Emission Zone**
MOVA	**Microprocessor Optimised Vehicle Activation – traffic flow management system**
NMF	**National Modelling Framework**
NO2	**Nitrogen Dioxide**
NOx	**Nitrogen Oxides**
PAHs	**Polycyclic Aromatic Hydrocarbons**
PDT	**Passive Diffusion Tube**
PHC	**Private Hire Car**
PM10	**Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less**
PM2.5	**Airborne particulate matter with an aerodynamic diameter of 2.5µm or less**
PPZ	**Priority Parking Zone**
P&R	**Park and Ride**
QA/QC	**Quality Assurance and Quality Control**
SO2	**Sulphur Dioxide**
SCOOT	**Split Cycle Offset Optimisation Technique- traffic flow management system**
SEPA	**The Scottish Environment Protection Agency**