Annual Progress Report (APR)

THE CITY OF EDINBURGH COUNCIL

2018 Air Quality Annual Progress Report (APR) for
City of Edinburgh Council

In fulfilment of Part IV of the
Environment Act 1995

Local Air Quality Management

October 2018

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Executive Summary: Air Quality in Our Area

Air Quality in Edinburgh

Air Quality in Edinburgh
Edinburgh has declared six Air Quality Management Areas (AQMAs), five for the pollutant nitrogen dioxide (NO_2) and one for fine particulates (PM_{10}). The maps of the AQMAs are available online at; http://www.edinburgh.gov.uk/airquality

An AQMA is required when a pollutant fails to meet air quality standards which are set by the Scottish Government. 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} is due to sources other than traffic. Emissions from dust generating activities associated with operations at Leith Docks are a contributory factor.

Monitoring Data

The Council monitored **nitrogen dioxide (NO2)** at seven automatic monitoring stations and 132 non-automatic monitoring locations across the City throughout 2017, as a part of the Local Air Quality Management statutory obligations. The results show that many of the locations are within the prescribed legal standards however, there are a number of locations within the Central, St John's Road and Glasgow Road Air Quality Management Areas (AQMAs) where breaches exist. Therefore, these AQMAs remain valid.

The results also show that for the first time since the declaration of the Great Junction Street AQMA there are no breaches of NO_2 objectives. There are also no breaches in the Inverleith Row AQMA, although levels are at the objective. Monitoring will continue in these areas, in order to consider whether revoking the AQMAs would be appropriate in the future.

Long-term trends of NO_2 and PM_{10} show concentrations are decreasing.

PM_{10} data from all monitoring locations in 2017 meets the UK National Objectives, however concentrations at Queensferry Road and Salamander Street station show breaches of the Scottish objectives.

Queensferry Road data is temporarily affected by demolition and construction work on adjacent land.

Salamander Street AQMA for PM_{10}, declared in January 2017, remains valid. Work ongoing to devise an Air Quality Action Plan will need to consider how the downward trend at this monitoring site is sustained, as there is residential development proposed for the area. The Action Plan, being developed in conjunction with SEPA, Forth Ports and relevant stakeholders will be published for consultation in 2019.

Progress on actions in Air Quality Action Plan

The main actions in the current NO_2 Air Quality Action Plan and Local Transport Strategy to improve air quality are based on;

- promoting cleaner transport, especially buses via a voluntary means,
- adoption of a fleet recognition efficiency scheme for reducing emissions from road freight vehicles,
- improving traffic flow and easing congestion by use of intelligent traffic signalling, and;
- promoting modal shift away from car use by means of an Active Travel Action Plan, provision of Park and Rides, controlled parking and priority parking zones.

Promoting Cleaner Transport

Generally, the bus companies operating in Edinburgh continue to improve their fleet, however it is recognised that substantial financial support is needed to deliver continued improvement.

Lothian Buses is the largest bus service provider in the city and is committed to reducing the emissions of its fleet and investing in low emission vehicles as a part of its fleet replacement strategy.

In August 2018, 78% of the fleet was Euro V (engine standard) or better. There has been significant investment in expanding the fleet and improving the Euro emission standard of vehicles overall. The number of Euro III buses has been reduced to 21% of the total fleet, from 31% in 2017. The bus company deploys its highest Euro Standard vehicles on high frequency services and those routes which transit AQMAs, e.g. Airlink 100 and Service 22 which both pass through the Central and St John's Road AQMAs and Great Junction Street AQMA respectively. The company also

continues to add to the electric vehicle charging infrastructure to support the operation of electric buses in the city.

All other major bus companies operating in Edinburgh have practically eradicated Euro III vehicles from their fleets.

Leading by example through the acquisition of lower emission vehicles for its own fleet, 75% of the Council's own operational fleet is Euro V or better.

Adoption of a Fleet Recognition Efficiency Scheme

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

The ECO Stars Edinburgh scheme was launched in January 2012 and recently confirmed the 200th member, totalling 8,001 vehicles, which makes it the largest ECO Stars scheme in the UK. Most members are goods vehicle operators (102), followed by passenger transport (27) and public-sector fleets (4). Sixty-seven members' fleets are ancillary to the main use of their business.

Intelligent Traffic Signalling

Improving traffic flow and reducing vehicle idling times are also measures which help to improve air quality. Two different types of traffic management systems are installed in the City;

- 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 get damaged and require repair. Maintenance work is ongoing. In 2018, new infrastructure was installed on the Bridges and the Ardmillan triangle including Gorgie/Dalry Road, Angle Park Terrace and Slateford Road, became fully operational.
- MOVA (Microprocessor Optimised Vehicle Actuation) was installed at the Newbridge Roundabout (Glasgow Road AQMA) in April 2016 and resulted in significant reductions in waiting time on the A8 westbound corridor. Subsequently, NO_2 concentrations measured at the junction showed some

improvement. Transport Scotland are currently re-designing lane integration from the M9 off-slip at this junction. Recommendations have been made to carry out an air quality impact assessment in relation to the proposals to ensure there is no adverse impact on air quality.

Progress with Other Actions

LEZ Development

The National Modelling Framework (NMF) introduced as a part of the Cleaner Air for Scotland Strategy 2015 will provide a significant proportion of the quantitative evidence for the development of a LEZ in Edinburgh. The Council continues to work with SEPA on Edinburgh specific inputs to the model development. Some initial findings, reported to the Council's Transport and Environment Committee in May 2018, showed predicted roadside concentrations across the city that will be in excess of an annual mean of 40µg/m^3 in 2019. Another scenario also showed exceedences when all vehicles were of the best available engine standard (Euro 6/VI), highlighting the need for other measures that will improve air quality. The modelling work to date also supports the findings of historic Local Air Quality Management work, which recognises the need to consider all vehicle classes, including cars, when exploring measures to improve air quality.

Revised vehicle emission factors have recently been incorporated into the model and the Council has committed to providing traffic model outputs, that will include the assessment of wider traffic management changes relating to other strategy development i.e. the City Centre Transformation and the City Mobility Plan. SEPA will provide an initial modelling summary and technical report before the end of 2018.

Following this, a detailed LEZ proposal will be developed in 2019 and a specific consultation process will be undertaken.

Funding to support the delivery of LEZs has been made available from the Scottish Government for a one-year period for 2018/19. An application for part of this funding has been successfully made by the Council.

To support the introduction of LEZ's across the different fleets there are other funding streams being developed. Transport Scotland's Bus Emissions Abatement Retrofit Programme, will provide a second phase of funding (2018/19) for buses, and for other vehicle owners there is to be a Low Emission Zone Support Fund that will

target specific cohorts of both commercial and private vehicle owners affected by the introduction of LEZs. The detail of this is to be developed by the Scottish Government in 2018/19.

Electric Vehicles

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 electric vehicle charging hubs. This is to encourage the uptake of EVs, while reducing carbon emissions, improving air quality and unlocking wider economic benefits.

In 2015 the Council updated the **Active Travel Action Plan** which aims to deliver significant increases in the number of pedestrian and cycling journeys travelled within Edinburgh. As well as bringing health benefits, the Active Travel Action Plan will assist in encouraging modal shift away from car use. The Plan has set targets of 35% for walking and 10% for cycling for all trips in the City by 2020.

The Council is planning to 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 permits 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.

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 emission (engine) standard policy. As of 1 October 2018, any new taxi licensed vehicle (or a replacement vehicle under an existing taxi licence) will require to be Euro 6 engine standard.

The Council has also agreed to develop a programme to hold **vehicle-free days** in the city centre on a regular basis. The overall aim is to ensure residents experience the city in a quieter, more people-focussed environment and will enable the Council to monitor congestion and travel behaviours to inform future plans for transforming the city centre.

Cleaner Air for Scotland (CAfS) Strategy

Following the air quality inquiry by the Environmental, Climate Change and land Reform committee of Scottish Parliament this year, the Scottish Government has reconfirmed the importance for CAfS to be kept under review and has committed to a full review of the strategy by 2020.

The initial version of the strategy focuses very much on transport, as this remains the most significant source of local air pollution. However, a key consideration of the review will be to give greater attention to other emissions sources such as domestic wood burning, and also to focus in more detail on effective co-ordination between air quality and climate change policies. Scottish Government recognise that the protection of both human and environmental health is central to the current strategy and this will continue to be the case.

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 has recently begun 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. The main consultation document will be presented to Planning Committee in January 2019. Early engagement on topics such as housing development, employment space, retail and leisure, 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.

Priorities for the Council in terms of air quality in 2018/19, will be:

- Commence revision of current (NO_2) Air Quality Action Plan in conjunction with the development of the new City Mobility Plan and the review of the national Cleaner Air for Scotland Strategy;
- Develop LEZ-specific proposals in early 2019 with partner organisations, SEPA, Transport Scotland and SEStran, as well as the Scottish Government;

- Produce an Air Quality Action Plan for the Salamander Street AQMA with relevant stakeholders; and
- Ensure the new City Plan 2030 takes cognisance of air quality policies and objectives for successful and 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.co.uk/what-can-i-do/

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1. Local Air Quality Management

This report provides an overview of air quality in Edinburgh during 2017. 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 the air quality objectives are likely to be achieved. Where an exceedance is considered likely the Council must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Progress Report (APR) summarises the work being undertaken by 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 or revoked AQMAs, including maps of AQMA boundaries are available online at http://www.edinburgh.gov.uk/airquality .

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 – Description of 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 **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 Progress and Impact of Measures to address Air Quality in Edinburgh

The City of Edinburgh Council has taken forward a number of measures during the current reporting year of 2017/2018 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.17.

More details on these measures can be found in the following Air Quality Action Plans (AQAPs):

Action Plan for Area Designated 31st December 2000 (July 2003)[1] and Air Quality Action Plan (Revised 2008)
http://www.edinburgh.gov.uk//download/downloads/id/321/air_quality_action_plan

The City of Edinburgh Council's, 'Transport 2030 Vision', provides an overarching 20-year strategy for the future development of transport in Edinburgh from 2010. Its ambition is 'to make Edinburgh's transport system one of the most environmentally friendly, healthiest and most accessible in northern Europe'. This document provides the framework which shapes the current Local Transport Strategy 2014-2019.

http://www.edinburgh.gov.uk//download/downloads/id/355/transport_2030_vision

There are several key policies identified in Edinburgh's Local Transport Strategy 2014 to 2019 (LTS) which contribute towards improving air quality.
http://www.edinburgh.gov.uk/download/downloads/id/3525/local_transport_strategy

The Council's existing 5-year local transport strategy is due to expire. This will 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. In September 2018 an eight-week period of public engagement began with a view to develop specific proposals in 2019. This engagement also took account of plans to deliver a Low Emission Zone in the city and considered a framework for the holistic, long-term development and management of the city centre. The latter, the 'Edinburgh City Centre Transformation' project will focus on providing a better experience for people on foot, bicycle, and public transport, therefore re-evaluating traffic management priorities in the centre.
http://www.edinburgh.gov.uk/download/meetings/id/58095/item_78_-_edinburgh_connecting_our_city_transforming_our_places_-_public_engagement_on_city_mobility_plan_low_emission_zones_and_city_centre_transformation

Other significant policy issues are contained in separate action plans and policies;

- Active Travel Plan (2016 Refresh). http://www.edinburgh.gov.uk/downloads/file/7316/active_travel_action_plan_2016_refresh
- Public and Accessible Transport Action Plan http://www.edinburgh.gov.uk//download/downloads/id/357/public_and_accessible_transport_action_plan
- The Council also has a framework for sustainable development of the city until 2020 and a Sustainable Energy Action Plan 2015 (see Section 2.3 below). http://www.edinburgh.gov.uk//download/downloads/id/1632/sustainable_edinburgh_2020_action_plan_2012-2014
- Scotland's low emission strategy, Cleaner Air for Scotland (CAfS) was launched in November 2015 by the Scottish Government. This strategy aims to deliver more effective and efficient policy direction and guidance combined with several 'actions' which local authorities, agencies and other partners will be expected to support to achieve the required reduction in emissions by 2020. In September 2018 the Scottish Government's Programme for Scotland 2018/19 announced a review of the air quality strategy, building on the progress made so far. http://www.scottishairquality.co.uk/assets/documents/news/Cleaner_Air_for_Scotland_Nov_2015.pdf
- The City of Edinburgh Council is working in close partnership with Scottish Environment Protection Agency (SEPA), Transport Scotland and the Scottish Government to assist in the development of the National Modelling Framework (NMF). The traffic data for Edinburgh has been collected and the local model is being developed. The NMF is a key element in CAfS and this will provide quantitative evidence for assessment of criteria which will be included in the National Low Emission Framework (NLEF), which is due for completion in 2018. This will include various vehicle restriction access schemes e.g. LEZs.
- The Council has also agreed to develop a programme to regularly hold vehicle-free days in the city centre and town centres on the first Sunday of every month (10am to 5pm). A current public consultation survey is the first

step to hearing views on the proposals. Based on the suggestions from the survey, the Council will engage with residents and businesses etc to investigate which streets can be closed to vehicles during an 'Open Streets' day. The Open Streets programme will help citizens experience the city in a quieter, more people-focussed environment and will enable the Council to monitor congestion, and travel behaviours, to inform future plans for transforming the city centre. http://www.edinburgh.gov.uk/connectingplaces/info/9/consultation/20/open_streets_consultation

- 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 October 2018, any new licensed taxi vehicle (or a replacement vehicle under an existing taxi licence) will require to be Euro 6 engine standard.

2.2.1 Completed measures

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. See Table 2.2.

Table 2.2 Annual Trams Passenger Numbers

Year relates to financial year	Passenger journeys
April 2014 to March 2015*	4.1 million
April 2015 to March 2016	5.3 million
April 2016 to March 2017	5.8 million
April 2017 to March 2018	6.8 million

* Incomplete year as Edinburgh Tram became operational at the end of May 2014.
Data obtained from Department of Transport light rail and tram statistics.

The final business case for the Trams extension to Newhaven/Leith will be considered by the Council in March 2019. If the project is approved, works will

commence soon after, with the current estimated time for completion is Spring 2022. The outline business case that was considered in September 2017 projected an increase of approximately 6.5million passenger journeys in year of opening.

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.

Airdrie- Bathgate- Edinburgh rail links

The above new rail line became operational in 2010.

Newcraighall - Portobello - Edinburgh- Fife rail links

Edinburgh to Newcraighall rail link became operational in 2002. In 2013, an additional platform at Brunstane (Portobello/Joppa) was constructed.

Borders rail link

The thirty-mile rail-link between Galashiels in the Scottish Borders to Edinburgh Waverley Station was reinstated and became operational in September 2015.

Edinburgh Glasgow Improvement Programme (EGIP)

EGIP is a comprehensive package of improvements to Scotland's railway infrastructure that includes modernisation and upgrades to key junctions and infrastructure, as well as widespread electrification of the Scottish rail network. So far, the project has resulted in a new railway station and interchange at Gogar, called the Edinburgh Gateway station, which opened on 1 December 2016. It is a rail interchange with Edinburgh Trams and therefore an important link to Edinburgh Airport. Platforms at Waverley Station in the city centre have also been extended to accommodate longer trains as a part of the EGIP, in preparation for future growth in capacity.

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 as shown in Table 2.3. 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. Usage at Ingliston and Hermiston continues to increase with Ingliston seeing an increase of 11% between 2016 and 2017. Details are shown in Table 2.4. Straiton is averaging 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. This would more than double the current capacity.

Table 2.3 – Park and Ride sites serving Edinburgh.

Park and Ride Site	Total Number of Parking Spaces
Wallyford, East Lothian*	321
Hermiston	450
Sheriffhall, Midlothian	561
Newcraighall*	565
Straiton	600
Ingliston**	1082
Ferrytoll, Fife	1040
Halbeath, Fife	1021
Total	**5640**

* Rail connections also accessible ** Trams accessible

Table 2.4 – Ingliston and Hermiston Park and Ride usage

	2012	2013	2014	2015	2016	2017
Ingliston	79,740	105,155	119,834	195,587	227,231	255,952
Hermiston	N/A	N/A	N/A	N/A	103,055	103,690

N/A - Not available

Traffic Management

Newbridge Roundabout (Glasgow Road AQMA)

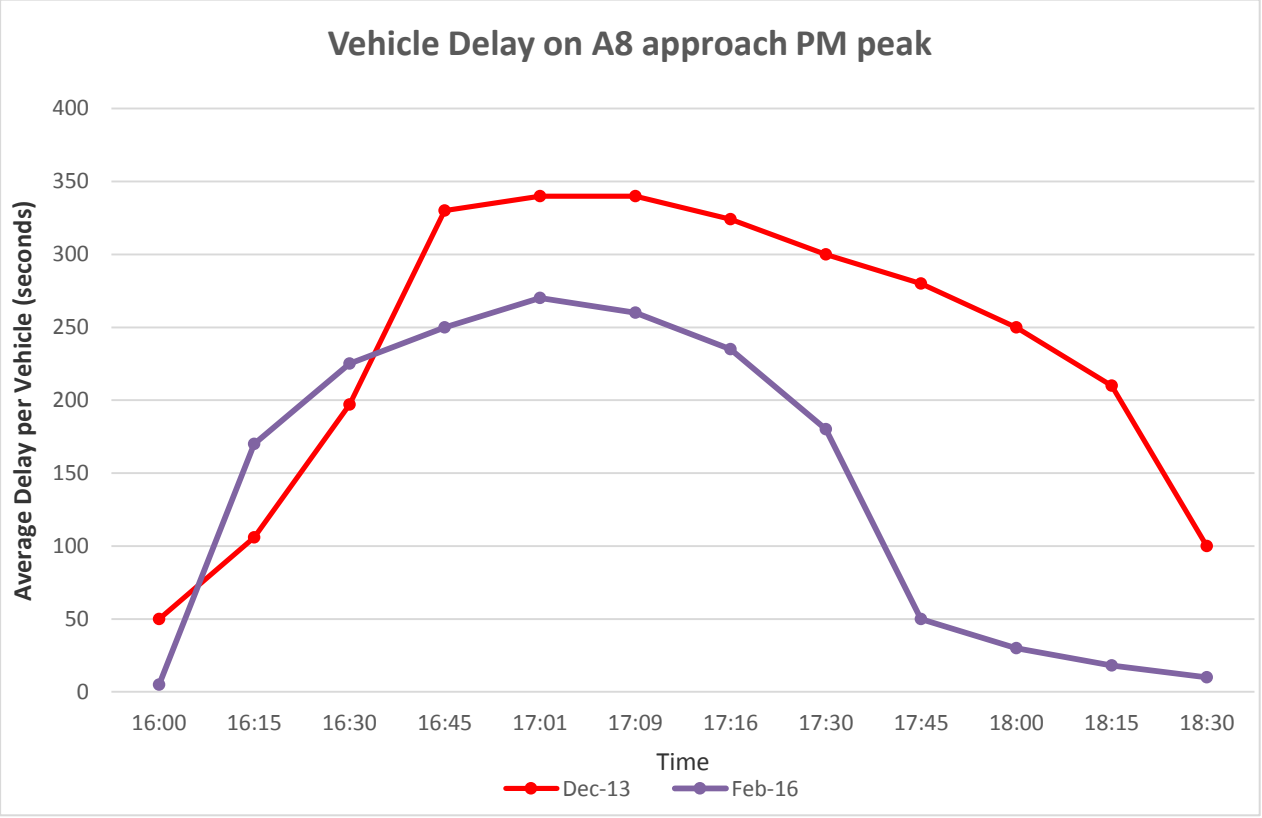
The ‘non-cable linked fixed- time’ traffic signalling which controlled Newbridge Roundabout was replaced in 2015 with a Microprocessor Optimised Vehicle Actuation (MOVA) system, following a feasibility study which looked at a few

options[2]. he modelled emission reductions for NOx, PM_{10} and CO_2 were as follows for the afternoon peak period, 47%, 29% and 43%. The vehicle queue length for the pm afternoon period on the A8 approach was estimated to reduce from 790m to 72m.

This system became fully operational in February 2016.

Vehicle time delays have been assessed pre-and post-installation of MOVA. Results show that there has been a significant reduction in waiting time on the A8 westbound corridor. For example, an average of 4 minutes and 10 seconds' delay per vehicle is saved between 17:45 to 18:00, thereby leading to reduced idling and less and stop/start events.[3] A graph illustrating the average delay per vehicle pre-and post MOVA is shown in Figure 2.1.

Figure 2.1 – Average delay per vehicle (westbound pm peak) on A8 Glasgow Road



Nitrogen dioxide concentrations have continued to decrease on the westbound carriageway in 2017. At Site ID16, where data showed concentrations at the annual mean objective (40µg/m^3) between 2013 and 2015, the concentration is now 35µg/m^3. In 2016 it was 37 µg/m^3. Concentrations have also reduced from 36 to 31µg/m^3 at ID16a.

On the eastbound carriageway there was a slight reduction in the measured concentration at the automatic monitoring station in 2017 (26µg/m^3) compared with 2016. However, nearer the roundabout there were slight increases in concentrations which show the statutory objective continues to be exceeded in the Glasgow Road AQMA.

Transport Scotland are currently considering alternations to the roundabout due to complaints about queuing on the M9 southbound slip road on approach to Newbridge. It is anticipated that the impact of any changes to the roundabout will take cognises of the air quality, 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 the city, covering the city centre, main shopping streets and residential areas while retaining a strategic network of roads at 30mph and 40mph. The fourth and final phase of the roll-out came into effect in South Edinburgh on 5th March 2018.

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 cognises of (LAQM) pollution concentration trends analysis.

Vehicle Fleet Efficiency

Driver training and ECO driving aids

The Council obtained Scottish Government air quality grant funding in 2010/2011 to trial a telematics system, and assess the delivery of fuel efficiencies through improved vehicle and driver management. The trial was carried out on a collaborative basis with the system provider Masternaut (Cybit) UK Ltd. Fifteen vehicles which operate within AQMAs were selected for the trial. The analysis report showed overall positive outcomes as summarised in Table 2.5.[4]

Table 2.5 – Changes observed following Eco- Driving instruction

Parameter measured between Benchmark and Go live	Percentage Change
Decrease in average miles	30.5%
Reduction in average idling time	26.5%
Reduction in harsh events	18.5%
Improvement in MPG	4.3%
Reduction in average weekly fuel litres	4.1%
Reduction in CO_2 output	4.2%

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. Privacy impact testing is currently being undertaken prior to the fitment of the system. 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.

2.2.2 Ongoing measures.

Vehicle Fleet Efficiency

Promoting low emission public transport

All bus companies operating in Edinburgh continue to improve their fleet, but it has not been possible to achieve the draft Voluntary Emissions Reduction Partnership (VERP) target of 100% Euro 5 by October 2015. It is recognised that substantial financial support is needed to deliver continuing improvement.

Scottish Government provide funding to support the roll out of low emission buses via the Scottish Green Bus Fund, whereby grants are given for up to 80% of the price differential between a low emission vehicle and its diesel equivalent. In May 2018 they announced £1.7m funding for the eighth round of the fund. The Bus Service Operators Grant also incentives use of Low Carbon Vehicles (LCV) by allowing an added payment (per kilometre), although this was slightly reduced in 2017.

In January 2017 Transport Scotland announced the first phase of the Bus Emissions Abatement Retrofit Programme (BEAR) (2017/18) to provide £1.6m to retrofit up to 55 buses across Scotland affected by plans to deliver Low Emission Zones into the

four Scottish main cities. The second phase of this funding (2018/19) is expected to total a further £10.8m, however criteria details have yet to be published.

Lothian Buses

Lothian buses are the main service provider in the urban areas of Edinburgh with a total of 817 vehicles in service. Significant improvements have been achieved since 2006 with the assistance of Scottish Government funding shown in Table 2.6. The yearly improvement is illustrated in Table 2.7.

In 2018, there was significant investment in expanding the fleet and improving the Euro emission standard of vehicles overall. The number of Euro III buses has been reduced to 21% of the total fleet, from 31% in 2017.

Table 2.6 – Number of older vehicles retrofitted and new buses purchased

Technology	2011	2012	2013	2014	2015	2016	2017	2018
Retro-fit SCRT (EMINOX) Euro III to Euro V/VI (EEV)	43 (A)							
Hybrid double deck vehicles. Euro V	15 (B)							
Hybrid single deck vehicles. Euro V		10 (C)						
Double deck EEV	60 (D)							
Single deck EEV		5 (D)						
Double deck vehicles. Euro V								54
Hybrid single deck vehicles. Euro VI			20 (E)	20 (F)				
Hybrid double deck vehicles. Euro VI					20 (G)	20(H)		
Single deck vehicles Euro VI							15(D)	
Double deck vehicles Euro VI				25 (D)		55 (D)	45(D)	
Electric							6	
Euro IV to V upgrades via engine management alter.				26 (D)	49 (D)			

KEY: A Lothian Buses contributed to total cost of £500,000 (Lothian Buses £243,000, CEC £50,000 and Scottish Government £207,000)

B Total cost £5M (Scottish Government £1M Green Bus Fund (1)

C Total cost £2.65M (Scottish Government £750,000 Green Bus Fund (2)

D Lothian Buses self-funding

E Scottish Government £1.5M Green Bus Fund (3)

F Scottish Government £1.05M Green Bus Fund (4)

G Scottish Government £1.5M Green Bus Fund (5)

H Scottish Government £1.5M Green Bus Fund (6)

I Scottish Government £1M Green Bus Fund (7)

Table 2.7– Euro Standard of service bus fleet (Lothian Buses 2006 to 2018)

Euro Stand.	Base 2006	Sept 2010	Oct 2011	Aug 2012	May 2013	May 2014	Mar. 2015	May 2016	Mar. 2017	Aug 2018
Pre-Euro	63 10%	0	0	0	0	0	0	0	0	0
Euro I	33 5%	0	0	0	0	0	0	0	0	0
Euro II	202 32%	64 10%	7 1%	12 2%	0	0	0	0	0	4 0.5%
Euro III	317 52%	307 52%	257 43%	254 42%	251 41%	273 43%	233 36%	222 33%	228 31%	170 21%
Euro IV	0	79 13%	79 13%	81 13%	81 13%	75 12%	55 9%	6 1%	6 1%	7 1%
Euro V	0	136 23%	141 23%	141 23%	141 23%	147 23%	186 29%	258 39%	258 36%	287 35%
EEV (V/VI)	0	1 0.1%	117 20%	117 19%	142 23%	146 23%	104 16%	85 13%	85 11%	94 12%
Euro VI						1 <1%	65 10%	97 14%	151 21%	249 30%
Electric										6 1%
Total	**615**	**587**	**601**	**605**	**615**	**642**	**643**	**668**	**728**	**817**

Data provided by Lothian Buses, August 2018

As part of a £6.5 million investment, all Euro II City Tour buses, which have a high, regular presence in the city centre area of the Central AQMA, were replaced with 30 Euro VI vehicles. The buses started operating in September 2016. See Table 2.8. NO_x and PM_{10} emission reductions have been calculated at between 95% and 99% and carbon emissions at 40%. The new buses are also quieter and therefore will be beneficial with respect to noise pollution.

In 2018 four Euro II buses were introduced to the fleet to provide service for private hire and bespoke, special events. It is not intended that they will operate on a regular service in the City.

Table 2.8 – Euro Standard of City Tour Bus fleet (Lothian Buses) 2010 to 2018

Euro Standard	Sept 2010	Oct 2011	Aug 2012	May 2013	May 2014	Mar 2015	Sept 2016	Mar 2017	Aug 2018
Pre-Euro	9	0	0	0	0	0	0	0	0
Euro I	0	0	0	0	0	0	0	0	0
Euro II	37	45	38	38	44	44	0	0	4
Euro III	0	0	1	1	1	1	0	0	0
Euro IV	0	0	0	0	0	0	0	0	0
Euro V	0	1	1	1	2	2	0	0	0
Euro VI	0	0	0	0	0	0	30	30	30
Total	**47**	**46**	**40**	**40**	**47**	**47**	**30**	**30**	**34**

Data provided by Lothian Buses, August 2018

Lothian Buses deploy their highest Euro standard vehicles on high-frequency services and those routes which transit AQMAs e.g. Airlink100 and service 22 which both pass through the Central AQMA and St John's Road or Great Junction Street AQMAs, respectively. The deployment of Euro V standard buses or better in AQMAs is shown in Table 2.9.

Table 2.9 – Deployment of Euro V standard or better Lothian Buses in AQMAs

Service Number	Euro Standard
Central AQMA	
30, 12, 24, 36	Euro VI hybrid single deck
34	Euro VI hybrid double deck
3, 8, 22, 26, Airlink100, Tour Buses	Euro VI double deck
10	Euro V double deck
1	Euro V hybrid single deck / Electric
St John's Road AQMA	
Airlink100	Euro VI double deck
12	Euro VI hybrid single deck
26	Euro VI
31	Euro V
Great Junction St AQMA	
22	Euro VI
10, 14	Euro V

Inverleith Row AQMA	
8	Euro VI double deck
21	Euro V double deck
23, 27	Euro V EEV

Data provided by Lothian Buses, August 2018

Lothian Buses continue to be committed to reducing the emissions from their fleet and to invest in low emission vehicles as part of their fleet replacement strategy. Currently 78% of the main bus fleet is Euro V or better.

In 2016 Lothian Buses formed East Coast Buses, a wholly owned subsidiary, following a rescue package of services previously operated by First in East Lothian. During 2017, 15 single deck Euro VI buses were deployed on East Coast bus routes, replacing all Euro III buses that had previously been used.

Lothian Motorcoaches was launched in June 2018, as an addition to the Edinburgh Bus Tour operation, offering bespoke day tours as well as private hire services. There is a fleet of 11 coaches, more than half of which are Euro V standard, or better. The company also continues to add to the electric vehicle charging infrastructure to support the operation of electric buses in the city.

First West Lothian (No update 2018)

In March 2017, First West Lothian operated 156 buses from Livingston and Falkirk using two routes which pass along the A8 through the Glasgow Road and St John's Road AQMAs. The fleet standard is shown in Table 2.10.

Table 2.10 – First West Lothian fleet in Edinburgh (2011-2017)

Euro Standard	2011	2013	2014	2015	2017
Euro I	23 (7%)	0	0	0	0
Euro II	149 (45%)	0	0	0	0
Euro III	116 (35%)	75 (69%)	53 (52%)	84 (54%)	0
Euro IV	33 (10%)	24 (22%)	31 (30%)	32 (21%)	43 (27%)
Euro V	9 (3%)	10 (9%)	18 (18%)	37 (24%)	65 (42%)
Euro VI					48 (31%)
Total vehicles	**330**	**109**	**102**	**153**	**156**

Data provided by First West Lothian buses, March 2017

Serving Edinburgh, First West Lothian had 48 Euro VI vehicles in the fleet in 2017. All Euro III vehicles have been eradicated and 73% are of a Euro V standard or better.

Stagecoach East Scotland

There are 71 buses in the Stagecoach East Scotland fleet operating on services into Edinburgh. The majority of these buses (65) pass through the Queensferry Road corridor into the city centre, while the JET Airport Service from Fife, goes through the Glasgow Road AQMA.

In November 2017, a fleet renewal of the JET service, brought all of the buses up to Euro VI standard. The delivery of 19 new coaches during May and June 2018 resulted in the city centre bound fleet being better than Euro V standard. The current Euro class status of the Stagecoach East Scotland fleet operating in Edinburgh is shown in Table 2.11.

Table 2.11. Stagecoach East Scotland fleet operating in Edinburgh

Euro	2012	2013	2014	2015	2016	2017	2018
Euro I	0	0	0	0	0	0	0
Euro II	2 (5%)	0	0	0	0	0	0
Euro III	4 (10%)	4 (10%)	8 (14%)	5 (9%)	0	0	0
Euro IV	27 (69%)	27 (64%)	33 (59%)	34 (59%)	10 (17%)	10 (17%)	0
Euro V	6 (15%)	11 (26%)	15 (27%)	19 (33%)	38 (63%)	34 (56%)	30 (42%)
Euro VI	-	-	-	-	12 (20%)	16 (27%)	41 (58%)
Total	**39**	**42**	**56**	**58**	**60**	**60**	**71**

Data provided by Stagecoach, July 2018

Citylink (No update in 2018)

Citylink operate several ‘inter-city’ type coach services between destinations across Scotland. The services are subcontracted to a range of different bus operators, consequently many of the vehicles are not directly owned by Citylink.

All services into Edinburgh pass through the Glasgow Road AQMA, St Johns Road AQMA and Central AQMA.

In 2016 there were 51 buses operating on services entering Edinburgh and the majority (86%) were Euro V standard or better. Five additional Euro VI buses were purchased to provide a service to Edinburgh Airport which was to commence in July 2016. The Citylink-managed fleet operating into the City in 2015 and 2016, is shown in Table 2.12.

Table 2.12 – Citylink fleet in Edinburgh, 2015 and 2016

Euro Standard	May 2015	July 2016
Euro I	0	0
Euro II	0	0
Euro III	2 (4%)	1 (2%)
Euro IV	0	6 (12%)
Euro V	43 (92%)	37 (72%)
Euro VI	2 (4%)	7 (14%)
Total	**47**	**51**

Data supplied by Citylink July 2016.

Fleet efficiency recognition schemes

The freight sector has been a more demanding group for local authorities to co-ordinate. A key action for the Scottish Government and Transport Scotland under CAfS is to encourage Freight Quality Partnerships to extend their activities to consider the environmental impact of freight transport; and encourage local authorities with AQMAs to create a Freight Quality Partnership.

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.

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.

The scheme was launched in January 2012 and to date 200 operators have joined with a total of 8,001 vehicles. Most members are goods vehicle operators (102), followed by passenger transport (27) and public-sector fleets (4). Sixty-seven members fleets are ancillary to the main use of their business.

Progress made with ECO Stars Edinburgh is detailed in Table 2.13.

Table 2.13 - ECO Stars Edinburgh Scheme – Progress from 2012 to 2018

Year	Number of vehicles	Number of operators
2012 (May)	1,684	14
2013 (May)	2,900	35
2014 (May)	3,525	51
2015 (June)	5,048	84
2016 (August)	6,089	129
2017 (May)	7,061	154
2018 (August)	8,001	200

Additional funding has been secured to continue the scheme during 2018/19 from the Scottish Government Air Quality Action Plan grant.

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.

Table 2.14 - Improvement in City of Edinburgh Council fleet 2003 to 2018

Euro Standard	2003	2011	2012	2013	2014	2015	2016	2017	2018
Pre-Euro	12 1%	0	0	0	0	0	0	0	0
Euro 1/I	96 12%	0	0	0	0	0	0	0	0
Euro 2/II	374 45%	0	0	0	0	0	0	0	0
Euro 3/III	338 41%	78 8.3%	45 4.6%	38 4%	44 5%	44 5%	21 2%	15 2%	14 2%
Euro 4/IV	12 1%	627 67.1%	561 58.2%	476 50%	476 49%	183 19%	238 26%	217 25%	221 24%
Euro 5/V	0	227 24.2%	348 36.1%	430 45%	440 45%	708 73%	532 58%	497 56%	376 42%
Euro 6/VI	0	0	0	0	0	10 1%	104 11%	128 15%	267 30%
Electric	0	3 0.3%	10 1%	10 1%	11 1%	27 3%	27 3%	25 3%	25 3%
Total	**832**	**935**	**964**	**954**	**971**	**971**	**921**	**882**	**903**

In 2014, the Council purchased 16 new electric-powered vehicles, with the assistance from the Scottish Government's Low Carbon Vehicle Procurement Support Scheme. The total number of electric vehicles is currently 25. Seventy five

percent of the Council's operational fleet is at Euro 5/V standard or better, while 3% is full electric. The proportion of Euro 6/VI vehicles doubled between 2017 and 2018 due to increase of new vehicles.

Promoting Low Emission Transport

Managing traffic emissions via mandatory Low Emission Zone

The Transport (Scotland) Bill was introduced to the Scottish Parliament in June 2018 and is currently progressing through the parliamentary process. This will provide legislation that enables the creation and civil enforcement of low emission zones in Scotland. The Bill will allow the government to set consistent national standards for a number of key aspects of low emission zones (LEZs) including emissions, penalties, certain exemptions and parameters for grace periods. Local authorities will then have the powers to create, enforce, operate or revoke a LEZ in their areas. The Bill is progressing through Parliament and is expected to be enacted by Summer 2019.

The Scottish Government has committed to work with Scotland's four biggest cities Glasgow, Edinburgh, Aberdeen and Dundee, to introduce LEZs in those cities between 2018 and 2020. The City of Edinburgh Council has confirmed its intention to support this commitment to a LEZ in a report to the Transport and Environment Committee in May 2018. LEZ design and development is currently being considered alongside two other major transport related strategies; the City Mobility Plan (a revised Local Transport Strategy), and the City Centre Transformation Project, which aims to re-imagine how people move around and use the city centre. In respect to these three projects, a substantial public consultation process was undertaken in Autumn 2018, which will help inform plans for each project as they are developed during 2019.

The National Modelling Framework (NMF) introduced with the Cleaner Air for Scotland Strategy 2015 will provide a significant proportion of the quantitative evidence for the development of a LEZ in Edinburgh. The Council continues to work with SEPA on Edinburgh specific inputs to the model development. Some initial findings, reported to the Transport and Environment in May, showed predicted roadside concentrations across the city that will be in excess of an annual mean of 40µg/m^3 in 2019. Another scenario also showed exceedances when all vehicles were of the best available engine standard (Euro 6/VI), highlighting the need for other

measures that will improve air quality. The modelling work to date supports finding of historic LAQM work, which recognises the need to consider all vehicle classes, including cars, when exploring measures to improve air quality.

Revised vehicle emission factors have recently been incorporated into the model and the Council has committed to providing traffic model outputs, that will include the assessment of wider traffic management changes relating to other strategy development i.e. the City Centre Transformation and the City Mobility Plan. SEPA will provide an initial modelling summary and technical report before the end of 2018 to inform LEZ scheme development.

Funding to support the delivery of LEZs has been made available from the Scottish Government for a year period 2017/18. An application for part of this funding has been made by the Council and a response to this is due in autumn 2018.

To support the introduction of LEZ's across the different fleets there are other funding streams being developed. As mentioned previously the BEAR, Transport Scotland's Bus Emissions Abatement Retrofit Programme is to announce a second phase of funding (2018/19) for buses, and for other vehicle owners there is to be a Low Emission Zone Support Fund that will target specific cohorts of both commercial and private vehicle owners affected by the introduction of LEZs in Scotland.

Promotion of electric vehicle recharging infrastructure

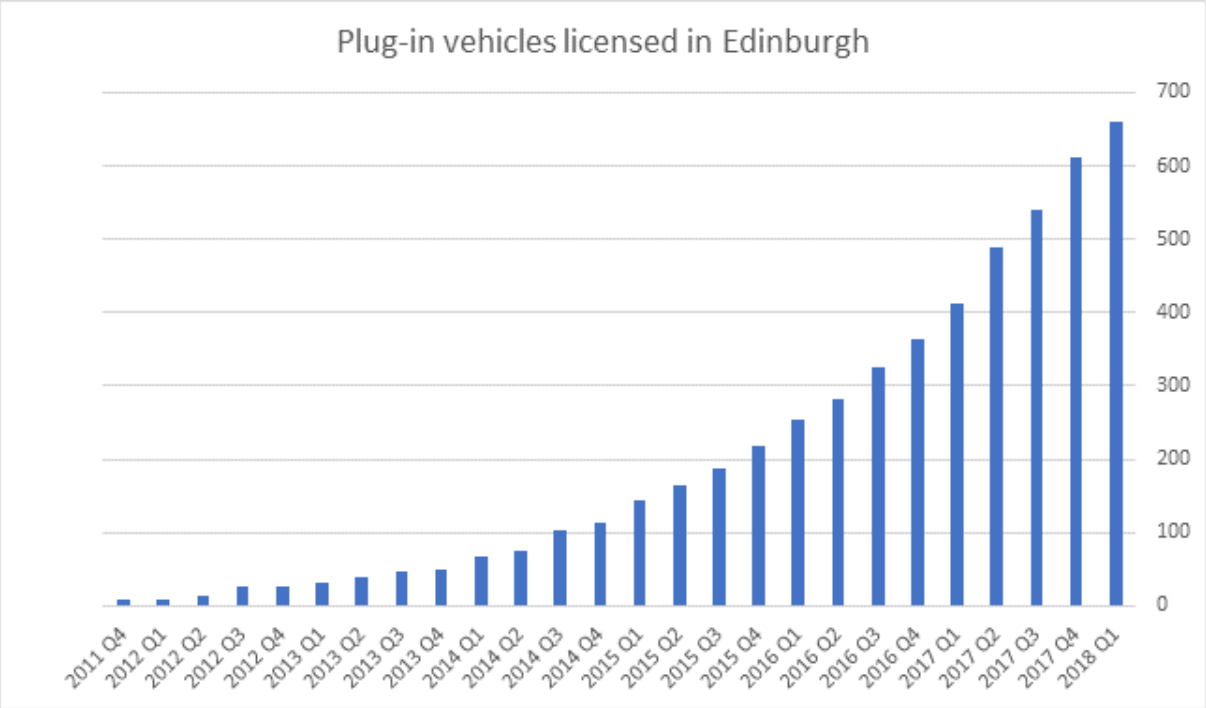
In December 2017, the Council approved Edinburgh's first Electric Vehicle (EV) Action Plan, with the key purpose of developing a strategic and co-ordinated approach to charging hubs. This is to encourage the uptake of EVs, while reducing carbon emissions, improving air quality and unlocking wider economic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

The development of the strategic charging hubs is dependent on understanding not just the demand and future growth of EVs, but also the best locations, how to phase any work and the cost. Issues such as grid constraints could also impact on future installations and be very costly. A key action outlined in the Plan is to firstly develop a business case that will assess the above issues and provide a route map to delivering solutions across three zones.

The Council is working with Transport Scotland and has appointed consultants to develop this business case.

The Department of Transport's vehicle licensing statistics show that plug-in (electric) vehicles are steadily increasing in Edinburgh (see Figure 2.2). At the end of 2011 there were just 9 plug-in vehicles registered in Edinburgh as of the end of March 2018 there were 659 plug-in vehicles registered in the city.

Figure 2.2 - Cumulative number of electric and plug in hybrids vehicles licensed each quarter in Edinburgh from 2011 to 2018



The Council continues to administer 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 during this current financial year 2018-19 a total of 23 plug-in vehicles are earmarked for five organisations.

Additionally, Transport Scotland's 'Charge Place Scotland' grant which provides grant funding for EV charging infrastructure is 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.

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 what is 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.

Figure 2.3 Power (kWh) used per month 2014-2018

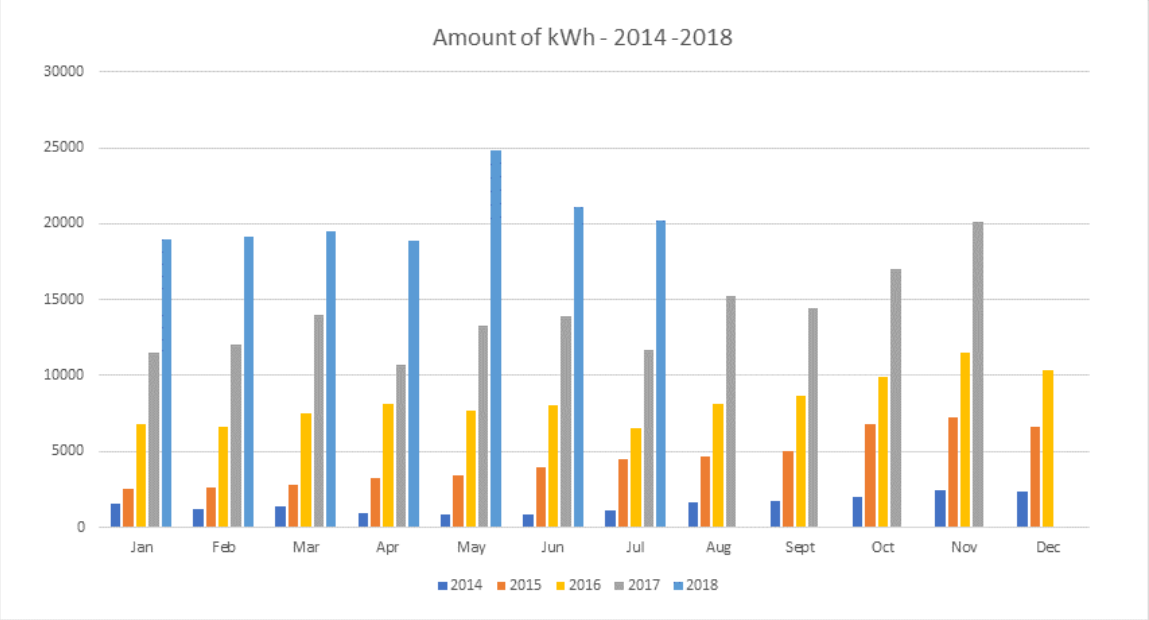
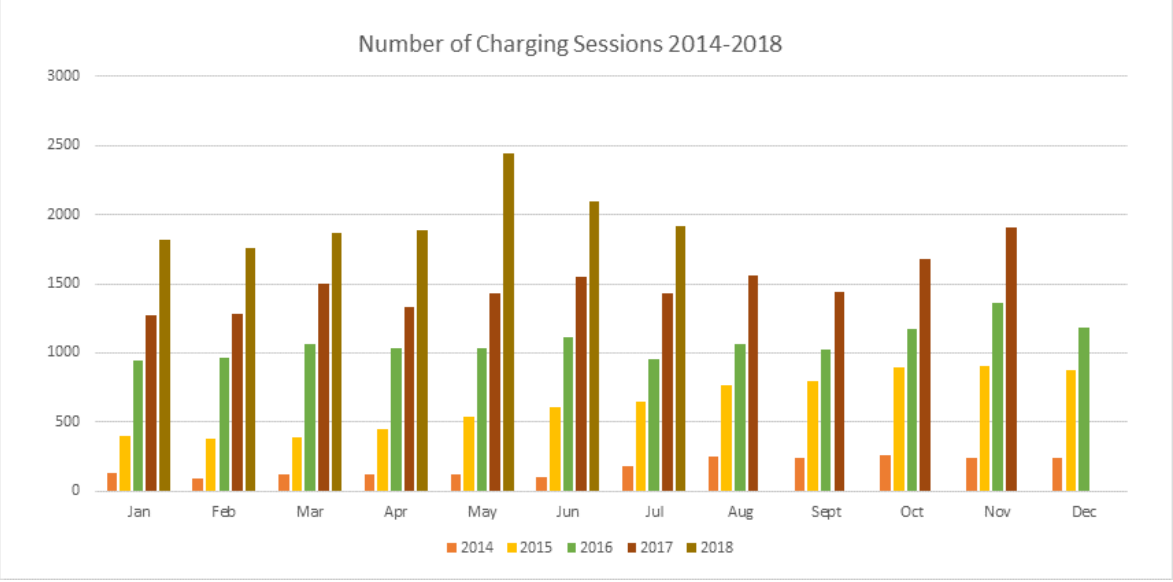


Figure 2.4 Number of charging sessions per month 2014-2018



The Council has been successful in receiving funding via Scottish Enterprise and Innovate UK's, Can Do Challenge Innovation Fund. Phase 1 of the programme is currently underway and will see four companies undertake feasibility work to develop smart charging infrastructure that enables vehicle to grid, integrates renewable generational and battery storage and reduces the reliance on the grid.

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 has been installed at the following junctions Lothian Road/ Fountainbridge and West Port/Lady Lawson Street. This however, will initially be run on fixed time until timing options have been explored further.

In 2018, new infrastructure was installed on the Bridges and the Ardmillan triangle, including Gorgie Road/Dalry, Angle Park Terrace and Slateford Road, became fully operational.

SCOOT has been operational at Portobello High Street junction from Fishwives' Causeway to Bellfield Street since November 2016, where NO_2 concentrations have been borderline.

Current SCOOT status for the AQMAs is detailed in Table 2.15.

SCOOT systems outwith AQMAs have been installed in the following areas:

- Morningside Road (Holy Corner to Comiston Road and Greenbank Crescent)
- Ferry Road/Pilton Drive
- Pilton Drive/Morrisons
- Ferry Road/East Fettes Avenue

- Dalkeith Road/ East Preston Street to Prestonfield
- Portobello High Street junctions from Fishwives' Causeway to Bellfield Street
- A90 Craigleith to Barnton – Part installed. Full scheme to be funded as part of the A90 Bus Priority Improvement works.
- Chesser Avenue (New Mart Road) to Inglis Green Road (Sainsbury's)
- Causewayside, Hope Park Terrace to Ratcliffe Terrace

Table 2.15 SCOOT status in AQMAs 2018

SCOOT Status	Locations
Central AQMA	
Operational - Some loop damage noted which is programmed for repair 2018/19	Gorgie Road, Chesser Avenue, Balgreen Road
Operational - Some loop damage noted which is programmed for repair 2018/19	Gorgie Road, Westfield Avenue, Robertson Avenue
Operational – September 2018	Ardmillan Triangle (Gorgie / Dalry, Angle Park, Slateford)
Infrastructure installed, but loop repairs and re-validation required. Bridges – majority of loops repaired during recent resurfacing. Remaining ones to be re-cut over coming months and region revalidated. Pedestrian crossings will also be linked during daytime hours. Target 2019 Q1	The Bridges, Nicholson Street, Clerk Street/ South Clerk Street
Temporary traffic management arrangements used during the closure of Leith Street are being removed. Following on from this, loops will be repaired and revalidated. Target 2019 Q1	London Road - Easter Road to Marionville Road plus Abbeymount
Provisional approval given for grant funding, to be tendered and installed – Target 2019 Q2	London Road – Meadowbank to Jock's Lodge
Scheme is on hold due to East West Cycle project. New options will be devised during design phase.	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

SCOOT Status	Locations
New area. Provisional approval given for grant funding, to be tendered and installed. Target 2019 Q2	Cowgate, St Mary's Street, High Street
St John's Road AQMA	
Infrastructure installed. Cabling work, configuration and revalidation required. Expected completion date March 2019	St Johns Road, Corstorphine Manse Road / St Johns Road
Great Junction Street AQMA	
Operational	Bernard Street, Salamander Street, Seafield Road
Inverleith Row/ Ferry Road junction	
Infrastructure installed. Loop repairs and validation required. Extended to include neighbouring junction. Target 2019 Q2	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 CPZ, a Priority Parking Zone (PPZ) was trialled in the south-central area of the city during 2010. The operational times of the PPZ were aligned with peak travel periods and, as with the standard CPZs aims to deter commuter travel. The trial delivered positive outcomes and has been made permanent. Thus, several new areas in the city have been designated PPZs. The areas are shown in Table 2.16.

Table 2.16- Priority Parking Zones within City of Edinburgh Council

Code	Area	Implementation Date
B1	South Grange /Newington	September 2011
B2	South Morningside	March 2013
B3	Arboretum/Kinnear/Inverleith	March 2013
B4	Craigleith	November 2013
B5	Blinkbonny	March 2014
B6	Netherliberton/Blackford	March 2014
B7	Priestfield	November 2014
B8	Craiglockhart	November 2014
B9	Murrayfield	May 2015
B10	Telford	April 2017

Introduction of new and extensions to existing CPZs or PPZs are kept under regular review by the Council. Locations of residential CPZs and PPZs can be downloaded from the following website;
http://www.edinburgh.gov.uk/info/20083/parking_permits/577/parking_permit_map

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.[5] 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 permits 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 due to;

- Development of the Salamander Street Air Quality Action Plan due to staff resourcing issues,
- 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 to work with Lothian Bus to improve fleet standard and support installation of electric charging infra-structure to enable operation of electric buses in the city,
- Continue ECOSTARS scheme,
- Commence the roll out of telematics across the Council Fleet, following the privacy impact assessment work
- Develop new areas of SCOOT implementation and complete outstanding SCOOT repair work,
- Develop a Business Case to ensure successful implementation of the Electric Vehicle Action Plan
- Continue support for Active Travel Action Plan,
- Develop new Corporate Travel Plan,
- SEPA to complete first report on Edinburgh Local Air Quality Model under the National Modelling Framework (CAfS), in conjunction with the Council,
- Develop Air Quality Action Plan for Salamander Street with relevant Stakeholders,
- Publish proposed LEZ scheme for consultation, and;

- Commence a review of the existing NO_2 Air Quality Action Plan, in conjunction with the developing City Mobility Plan (new Local Transport Strategy) and the review of the Cleaner Air for Scotland Strategy.

Table 2.17 – 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 Citywide Planning and Transport	2009 - 2011	Euro 4 by 2012 Euro 5 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 **Lothian Bus** Main Service E2 = 0.5% E3 = 21% E4 = 1% E5 = 35% E5/6 =12%% E6 = 30% Electric = 1% **817 vehicles** Tour E2 = 12% E6 = 88% **34 vehicles** **Stagecoach** E5 = 42% E6 = 58% **71 vehicles**	On going	LB bus aim to be E5 or better by 2020 LB Tour fleet 4 Euro2 bespoke service buses not operating regularly in the City. In 2018, no update from some bus companies. Engagement reconsidered in light of LEZ design and development.
1a	Implementation of an 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		CAfS LEZ to be in place by 2020		Will be determined by outcomes of NMF and NLEF under CAfS	New legislation (Transport Bill) being progressed by Scottish Government	Council LEZ scheme to be drafted 2019 with implementation 2020	Transport Bill to be enacted late Summer 2019 and relevant regulations available thereafter

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 ECOSTARS	Vehicle Fleet Efficiency	Manage road freight emissions	CEC in conjunction with TRL	2010-2011	2011	Recruitment figures		August 2018 200 operators and 8,001 vehicles registered	Ongoing	Additional funding secured for 2018/19
3	Cleaner council vehicles	Vehicle Fleet Efficiency	Improve emissions by ensuring highest standard for vehicle replacement	CEC, Fleet		2003		Not quantified	August 2018 E3 = 2% E4 = 24% E5 = 42% E6 = 30% EV = 3% Total 903	Ongoing	
3a	ECO driver training and ECO driving aids	Vehicle Fleet Efficiency	Council vehicle trial telematics system	CEC, Fleet	2018		Reduction in fuel consumption and idling	Not quantified	Council approved installation of a Telematics system for all council vehicles	Trial completed Timing for roll out of telematics to be agreed	Privacy impact assessment on-going to enable telematics roll-out
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	
7	Tramline 1	Transport Planning and Infrastructure	Zero emissions at source. Encourage modal shift from car use	CEC/ TFE		Line 1 May 2014	Passenger growth	Not quantified	6.8 m Passengers 2017/18	Completed	Extension of line to Newhaven, Leith proposed to be considered by Committee in March 2019
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

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
9	New cycle networks	Transport Planning and Infrastructure	Part of CECs Active Travel Plan	CEC/ Sustrans/ NHS Lothian	2010			Not quantified		On going	
9a	Promoting travel alternatives	Promotion of cycling and walking	CECs Active Travel Plan Encourage modal shift away from car	CEC/ Sustrans/ NHS Lothian				Not quantified		On going	
10a	Urban traffic control systems - SCOOT	Traffic Management	Reduce waiting times and stop/starts	CEC Transport				Not quantified	No. of schemes across City. New area; Cowgate, St Mary's St. Fully operational; Ardmillan Triangle	On going	Many existing schemes need repairing and re-validating
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 2016. Slight increase 2017.
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		31/01/2018	2018 Fully implemented

2.3 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 http://www.gov.scot/Publications/2015/11/5671/17. Progress by the City of Edinburgh Council against relevant actions within this strategy is demonstrated below.

2.3.1 Transport – Avoiding travel (T1)

All local authorities should ensure that they have a corporate travel plan which is consistent with any Air Quality Action Plan. The City of Edinburgh Council is in the process of developing a new travel plan. Smarter Choices, Smarter Places funding is being used to progress the recruitment of a travel planning officer who will be responsible for implementing the new travel plan.

Smarter Choices, Smarter Places funding has also enabled the Council to co-ordinate workplace travel planning activity in large work place sites in the city since August 2015. Transport planning consultants at SWECO have been delivering this on the Council's behalf and will continue throughout 2017/18 and 2018/19. This has involved: arranging travel advice road-show events at each site offering travel planning for individuals, arranging challenge-style initiatives to offer incentives to individuals to travel actively and sustainably, and supporting businesses with advice for organising travel planning initiatives for their workplace site. Through this project, the Council has collected mode share survey data for each employer. Cumulatively, 59 different organisations have participated in the programme in the last three years. This does not include any independent organisations who may have signed up solely to participate in the challenges.

The Council will continue to offer this support to large workplaces, as well as offering travel planning to individuals working for the Council. Complementary to this, the Travel Plan officer will review the practices to transport goods, and implement policies to mitigate the impact this has on the transport network.

2.3.2 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.

2.3.3 Transport – Active Travel (T3)

The Council produced an Active Travel Action Plan (ATAP) in 2010, which was updated in 2015. This 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 for 2018-19, showing routes which are being designed and improved during this financial year, can be downloaded;

http://www.edinburgh.gov.uk/info/20087/cycling_and_walking/1791/cycling_and_walking_projects/5

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 every day 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 are being 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 2.18).

Table 2.18 – 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 2018/19 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. There is over a million pounds of investment secured for various projects that are at design, feasibility and construction stages for 2017/18, with match funding through Sustrans Community Links grant programme.

3. Air Quality Monitoring Data and Comparison with Air Quality Objectives

3.1 Summary of Monitoring Undertaken

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

3.1.1 Automatic Monitoring Sites

The City of Edinburgh Council undertook automatic (continuous) monitoring at seven sites during 2017. Table A.1 and A.2 in Appendix A shows the details of the sites (including historic) and what each of them measure. Further details can be found on the Scottish Air Quality website, here; www.scottishairqaulity.co.uk.

Maps showing the location of the monitoring sites are provided in Appendix A - Figure A.1. Further details on how the monitors are calibrated and how the data has been adjusted and distance corrected, where necessary, are included in Appendix C.

In conjunction with DEFRA, the local authority set-up a new site on Nicolson Street in December 2017, which currently measures Nitrogen Dioxide (NO_2). This will form part of the UK Automatic Urban and Rural Network and the first full year of data will be published in the Annual Progress Report 2019. Grant funding has been obtained to install a FIDAS to monitor particulates at this new station in 2019. A FIDAS particulate monitor is also being established for Salamander Street AQMA. Both these units will monitor PM_{10} and $PM_{2.5}$. Currently the unit is in place, however delivery of the analyser and electricity supply are planned for Autumn 2018.

3.1.2 Non-Automatic Monitoring Sites

The City of Edinburgh Council undertook non-automatic, Passive Diffusion Tube (PDT) monitoring of NO_2 at 132 sites across the City during 2017. Table A.3 in Appendix A shows the details of the sites including grid reference co-ordinates. A map showing the city-wide spatial coverage of the monitoring sites is provided in Appendix A - Figure A.2. Detailed maps are provided at the following link (Note - use 'site code' data);
https://edinburghcouncil.maps.arcgis.com/apps/webappviewer/index.html?id=dc93485b492947d0b2182c75aca4c554

Further details on Quality Assurance and Quality Control (QA/QC), bias adjustment and distance corrections for the diffusion tubes are included in Appendices C and D.

New monitoring was established at the following six sites at the beginning of 2017, following a review of the network;

ID22a	Roseburn Terrace	ID33a	Queen Street
ID151	Comiston Road	ID152	Mayfield Road
ID153	Viewcraig Gardens	ID154	St John's Hill

Monitoring ceased at one site - Glasgow Road, Ratho Station (ID16b), where access had been an issue.

3.2 Individual pollutants

The air quality monitoring results presented in this section are bias adjusted and annualised where relevant. Results also indicate exposure at relevant receptors, so in some cases the data is distance corrected. Further details on these adjustments and calculations are provided in Appendix C and D.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.4a and A.4b in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations with the air quality objective of 40µg/m^3.

For diffusion tubes, the full 2017 dataset of monthly mean values is provided in Appendix B.

Table A.5 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

St John's Road (ID5) remains the only **automatic monitoring** data to show breaches of the objectives for NO_2, with an annual mean concentration of 53µg/m^3. However, there was only one hour in the year period when the average concentration was greater than 200µg/m^3, which means the hourly-mean objective was met.

There was poor data capture at Queensferry Road due to a number of issues with the analyser throughout the year. The analyser was replaced towards the end of 2017. Data capture was sporadic, so an annualisation calculation could not be undertaken.

All other automatic monitoring stations meet the Scottish and UK Air Quality Objectives. There was good data capture from the Roadside locations – Gorgie Road, Salamander Street and Glasgow Road - where concentrations are well below the objective – 30µg/m^3, 25µg/m^3 and 26µg/m^3 respectively. All sites saw a reduction in concentrations from the previous year except St John's Road, which was static.

Analysis of the **non-automatic monitoring** (PDT) results shows the annual mean objective continues to be exceeded at locations within the Central, St John's Road and Glasgow Road AQMAs, therefore they remain valid.

The data does not suggest any breaches of the hourly mean objective for NO_2.

Potential exceedance of the annual mean objective are noted at a number of locations within each AQMA, namely; Angle Park Terrace (ID76b), Bernard Street (ID29c), Clerk Street (ID138), Cowgate/Blackfriars (ID48c), Dundee Street (ID79d), Haymarket Terrace (ID HT1), Inverleith Row (ID55), London Road/Easter Road (ID46), London Road/East Norton Place (ID81), London Road/Wolseley Terrace (ID70), Queen's Street (ID33), South Clerk Street (ID141), Torphichen Place (ID3b) and West Maitland Street (ID2). Monitoring will continue at all these locations.

In the Inverleith Row AQMA (ID55), the result (40µg/m^3) is at the annual mean objective, therefore for the first time the objective is met in this AQMA. Monitoring data at locations in the Great Junction Street AQMA also show that the annual mean objective is met.

There was one location where the annual mean objective was breached outwith the AQMAs, at Queensferry Road (ID64). Monitoring is undertaken at a lamp-post in this location and the NO_2 Fall off with Distance Calculator is used to estimate concentrations at the residential property. However, alternative monitoring is undertaken at the façades of the residential properties – ID63, ID64a and ID64b. At these relevant receptors the concentrations are as follows; 27µg/m^3, 30µg/m^3 and 32µg/m^3 respectively – all well within the annual mean objective. There are ongoing investigations with SEPA's modelling capabilities to try to understand why the higher concentrations from the lamp-post location. However, data capture from the automatic monitoring station was poor in 2017, and this has hamper progress. The Council has decided that it would not be appropriate to declare an AQMA in this location at this time considering these circumstances, however the investigations will continue.

Overall, the PDT data in 2017 shows reductions in concentrations at most of the monitoring locations across the network, when compared with 2016 data. There was an increase in the bias adjustment factor used in the analysis (from 0.77 in 2016 to 0.82 in 2017, See Appendix C for details), however in some cases, the reduction in concentrations over this period is significant, for example Great Junction Street (ID30) 32µg/m^3 (42µg/m^3 in 2016) and Angle Park Terrace (ID76) 35µg/m^3 (43µg/m^3 in 2016).

Monitoring will continue in all the AQMAs to continue to assess compliance with the objectives. A review of monitoring locations will be considered for the 2019 period, so that any future AQMA revocations can be progressed with certainty.

There were a few sites where concentrations increased slightly from the previous year, most significantly at Newbridge roundabout in the Glasgow Road AQMA, where the concentration remains above the annual mean objective (ID58, 44µg/m^3). As mentioned previously, Transport Scotland are currently re-designing lane integration from the M9 off-slip at this junction. Recommendations have been made to carry out an air quality impact assessment in relation to the proposals to ensure there is no adverse impact on air quality.

New monitoring established near the Pleasance CHP plant showed concentrations in keeping with general background levels - 17µg/m^3 and 19µg/m^3 at sites ID153 and ID154, respectively. Other new monitoring on Comiston Road (ID151), outside South Morningside Primary School and Mayfield Road (ID152) show results well below the objective (25µg/m^3 and 26µg/m^3 respectively). Data from the McDonald Road site (ID20) was not utilised as it was moved to a new site in October (2017) and prior to that, affected by temporary signage from construction work. At Calder Road (ID4a) the NO_2 fall-off with distance calculation could not be undertaken as the measured concentration was lower than the background maps concentrations. This site was relocated in 2017 to 12m from the road edge of Calder Road.

Trends

Trend analysis has been undertaken at all the automatic monitoring locations, which all have five or more years of valid data except for Queensferry Road, which did not have sufficient data in 2017 to make an assessment. Annual mean concentrations have therefore been plotted for successive years at St Leonard's, Gorgie Road,

Salamander Street, Currie, St John's Road and Glasgow Road. This includes the annualised data from St Leonard's and Queen Street in 2016. Trend lines were drawn using an Excel simple regression statistical program.

Analysis has also been carried out with the hourly mean data from St John's Road.

Graphs are shown in Appendix A – Figures A.3a to A.3g. Table 3.1 summarises the trend analysis.

Table 3.1 Summary of Annual Mean NO_2 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 2018) ↘	Slightly decreasing
Gorgie Road	Roadside	(1999 to 2018) ↘	Slightly decreasing
Salamander St.	Roadside	(2009 to 2018) ↘	Slightly decreasing
Currie	Suburban	(2010 to 2018) ↘	Slightly decreasing
Glasgow Road	Roadside	(2012 to2018) ↘	Slightly decreasing
St John's Road	Kerbside	(2007 to 2018) ↓	Decreasing

The annual mean nitrogen dioxide concentrations at all sites except St John's Road, shows they are slightly decreasing, hence a downward trend. At St John's Road the matter is more defined for both annual mean and hourly concentrations showing a more significant downward trend.

This picture is in keeping with national findings but it is difficult to draw city-specific conclusions. There have been temporary and permanent changes to the road network in Edinburgh in recent years, stemming from major transport infrastructure projects such as the construction and operation of Edinburgh Trams and the redevelopment of St James, but also major utilities projects e.g. replacement of the Victorian sewer in Haymarket Terrace 2017/18.

There have also been changes to traffic data collection processes in recent years too. Separately, Transport Scotland and SEPA undertook an extensive traffic monitoring survey in November 2016, as a part of the CAfS National Modelling Framework, which involved data collection at 144 sites across the city. It is the Council's intention to repeat this work again in 2019, which should give some recent insight into any changes in traffic volumes and composition and therefore the impact this may have on concentrations.

3.2.2 Particulate Matter (PM_{10})

Table A.11 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations with the Scottish air quality objective of 18µg/m^3. Table A.12 in Appendix A compares the PM_{10} daily mean concentrations with the air quality objective of 50µg/m^3, not to be exceeded more than 7 times per year (in Scotland).

PM_{10} data from all monitoring locations in 2017 meets the UK National Objectives.

Data from Queensferry Road (22µg/m^3) show a breach of the annual mean Scottish objective and the daily mean objective, where the 50µg/m^3 24-hour concentration was exceeded 8 times throughout the year.

Data capture at the monitoring site was not sufficient (85%) to make a strict comparison against the objectives. That said, there is a significant increase in concentrations from the previous year. This is due to the fact that in October 2017, the land adjacent to the station became a demolition and construction site. These, temporary, works are due to come to an end early in 2019, with development of a 60-bed care home. For these reasons declaration of an AQMA will not be required at this location.

Data from Salamander Street shows a breach of the annual mean Scottish Objective. TEOM data was corrected to provide a gravimetric equivalent using Edinburgh's local gravimetric factor. Results show an annual mean concentration of 19µg/m^3. VCM (Volatile Correct Methodology) corrected TEOM data from the station shows an annual mean concentration of 17µg/m^3. Concrete crushing activity at Albert Docks from the recycling of material from the Edinburgh St James project, may have resulted in a slight increase in concentration in 2017. During some months there was 350 tonnes of material crushed, recycled and returned to the city centre construction site. With the annual mean objective continuing to be breached at this site, the Salamander Street AQMA, declared in January 2017, remains valid.

The Council is currently in the process of developing an Action Plan in conjunction with SEPA, Forth Ports and relevant stakeholders. Due to resourcing issues this work has progressed slower than anticipated, however a draft Plan is expected early 2019.

In the meantime, a new FIDAS particulate monitor has been installed within the AQMA at the opposing (western) boundary to Salamander Street monitoring station. This will monitor PM_{10} and $PM_{2.5}$. In addition, SEPA have confirmed that the Pollution

Prevention and Control (PPC) permit for the concrete batching plant on Bath Road has now been surrendered in full, so this activity is no longer permitted there.

All other sites are also below or at the objective.

Data capture at Currie was poor (82%), where the annual mean concentration was the lowest recorded (8µg/m^3). Data from St Leonards' also failed to meet good data capture standards (85%).

For the first time PM_{10} data was collected at St John's Road. This was with the FIDAS instrument and resulted in an annual mean concentration of 12µg/m^3. It was noted that this was well below the objective. Monitoring will continue.

Trends

In 2017 there were five monitoring sites with five or more full year's data which is required in order to undertake trend analysis. For the first time a trend analysis was undertaken at Glasgow Road.

The non-volatile fraction of the FDMS data for years 2004 to 2017 at St Leonard's is used to ensure a consistent approach as the TEOM instrument was replaced with a FDMS unit in 2008. It should be noted that data capture has been poor for several year periods (2009, 2012, 2014 to 2017). At Currie volatile corrected (VCM) TEOM data was used for the analysis. At Salamander Street and Glasgow Road un-corrected TEOM data was used.

Trend lines have been drawn using an Excel simple regression statistical program and graphs are shown in Appendix A - Figures A.5a to A.5e. Below is a summary.

Table 3.2 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 2017) ↘	Slightly decreasing
Currie (Suburban)	(2010 to 2017) ↘	Slightly decreasing
Queensferry Road (Roadside)	(2011 to 2017) ↔	Flat
Salamander St (Roadside/Fugitive)	(2010 to 2017) ↓	Decreasing
Glasgow Road (Roadside)	(2013 to 2017) ↔	Flat/Stable

PM_{10} trends from measured data at the urban background and suburban sites in Edinburgh shows a slight downward trend (slight decrease in concentrations with time). There is more of a defined downward trend at Salamander Street in the PM10

AQMA, which is generally affected by industrial, fugitive and road sources. As previously discussed there are changes to potential sources in the vicinity of this site, not least the relocation of a cement batching plant, which are likely to have resulted in this trend. Further work with the Salamander Street Air Quality Action Plan will consider the analysis and take steps to ensure that the downward trend is continued, particularly as there is new residential development proposed for the area.

Queensferry Road and Glasgow Road, both Roadside monitoring sites, are showing a flattening trend. Previously, the trend at Queensferry Road has been downward, however considering the step-increase in the 2017 concentrations (due to the demolition/construction works on the adjacent land), this may cause some temporary changes to the trend.

The annual mean concentrations at Glasgow Road have not changed significantly since monitoring began in 2013, therefore the trend is flat.

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.13a in Appendix A compares the ratified and adjusted measured $PM_{2.5}$ annual mean concentrations for the past eight years at the urban background site, St Leonards, with the Scottish air quality annual mean objective of 10µg/m^3. In 2017 there was a slight increase in the annual mean concentration from both years previous when it was 6µg/m^3, in so far that it was 7 µg/m^3.

The table also highlights the first full year of $PM_{2.5}$ monitoring at a roadside location within in Council's administrative area (St John's Road). The annual mean concentration was 6µg/m^3, which is very comparable with the background site and well within the legal objective.

Estimations of $PM_{2.5}$ from PM_{10} data at all other relevant monitoring stations was undertaken using the nationally derived factor correction ratio of 0.7 and the Scottish factor[7] of 0.63. Details are described in Table A.13b. It shows there are potential exceedances at all roadside monitoring locations in Edinburgh. However, 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.

Trend analysis has been carried out for $PM_{2.5}$ monitoring at St Leonard's using an Excel simple regression statistical program and a graph is shown in Appendix A –

Figure A.6. It shows that there is a general downward (decreasing concentrations) trend at this site.

3.2.4 Sulphur Dioxide (SO_2)

Table A.14 in Appendix A compares the ratified continuous monitored SO_2 concentrations since 2009 with the air quality objectives for SO_2. As in previous years, 2017 data show that there are no exceedances of any of the objectives.

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 2017. 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

Table A.15 in Appendix A presents the ratified continuous monitored Ozone concentrations since 2009 with the air quality objective. The Air Quality Strategy Objective for 2005 for Ozone Daily maximum 8-hour running mean > 100 μg/m^3) on more than ten days has been met in 2017. There were 4 exceedances of the 8hr running mean >100μgm^{-3}.

3.2.5.2 Polycyclic Aromatic Hydrocarbons (PAHs)

There are many different PAHs; however, a component, used as a marker, is benzo (a) pyrene (B(a)P). The concentration monitored at St Leonard's complies with the UK objective in 2017. Monitoring is undertaken using a Digitel sampler. Concentrations since 2009 are shown in Table A.16 in Appendix A.

4. New Local Developments

4.1 Road Traffic Sources

Planning applications can be found on the Council's website here; http://www.edinburgh.gov.uk/info/20067/planning_applications; using reference numbers detailed below with each case.

The air quality impact of cumulative development, especially large proposals on the green belt, is a concern for the Council. One development near Riccarton Mains (16/05217/PPP) was refused, partly because it was unacceptable in principle in terms of being suitably located. The Air Quality Impact Assessment (AQIA) submitted in support of the application indicated that the predicted air quality impacts from the proposed development were of negligible significance. However, it wasn't clear from the submission whether the AQIA took account of committed development in the area. Environmental Health raised concerns with the cumulative impacts of development and how local roads in the area are already congested during peak hours, with the development of the site only likely to exacerbate this.

In accordance with local and national policy, a transport assessment for a development proposal for 435 residential units and associated retail/community uses (Baileyfield, 16/05898/FUL), considered all sustainable modes of travel. The report indicated that the current walking and cycling provision in the area is plentiful and will accommodate the expected future demand from the site. However, as a part of the development, measures to enhance access to existing public transport services were to be provided and additional pedestrian / cyclist facilities were to be introduced on site, to further promote connectivity with the surrounding area. The Transport Assessment promoted a Residential Travel Plan to be issued to residents upon occupation, to provide upfront information on the sustainable travel opportunities in the area. In addition, the Council also required the provision of an electric vehicle (EV) charging infrastructure to be installed.

A proposal on Ocean Drive (16/03684/FUL) for 388 residential units and 29 commercial units was given planning permission by way of a Committee Hearing, in August 2018. An AQIA, submitted in support of the application, included an assessment relating to traffic generation and also any impact from nearby fugitive

and industrial activities, in particular Leith Docks. The site is close to the NO_2 Great Junction Street AQMA and the PM_{10} Salamander Street AQMA. In relation to traffic impacts, the AQIA concluded that based on worst case scenario there will be some moderate adverse impacts on Baltic Street from the traffic generated from the proposal. The site is in an accessible location that benefits from good access to public transport (including proposed tram) and is in walking distance to a range of amenities. Hence, the level of car parking (308 spaces) associated with the development was a concern, but it was noted that this had been reduced from previous application submissions and it was at the lower end of the range allowed for developments of this size/type, according to the Councils Parking Standards. In conclusion, the AQIA indicated that mitigation in the form of electric vehicle charging points and travel incentives for new occupiers should be included with the development. Informatives were included on the Planning permission to ensure the developer considered these mitigation measures. The assessment of particle pollution in relation to this development is discussed below (Section 4.5).

The new road crossing over the Forth estuary - Queensferry Crossing – opened at the end of August 2017. Transport Scotland has a plan for evaluating progress towards achieving the project's objectives, and is due to carry out a full post–project evaluation in late 2018. The plan details how performance relating to journey times and traffic flow will be measured, but more detail is required on other outcome measures, for example, how it will assess the impact of improved network connections and junctions, and the project's contribution to economic growth. The Forth Road Bridge is now a dedicated for public transport use, cycling and walking.

Transport Scotland approached the City of Edinburgh Council with respect to re-designing lane integration from the M9 off-slip onto the A8 at Newbridge roundabout. The Council upgraded the traffic signalling to a MOVA system early 2016 as a measure to reduce idling time and congestion on the West bound carriageway and hence improve air quality. 2017 data shows continued improvement at westbound locations but there continues to be exceedance of the objectives at the roundabout. Recommendations have been made to Transport Scotland to carry out an air quality impact assessment in relation to the proposals to ensure there is no adverse impact on air quality.

4.2 Other Transport Sources

Airport

Edinburgh Airport recorded the busiest ever year in 2017 with more than 13.4 million passengers. In January 2018, 837,542 passengers passed through Edinburgh Airport which was a 7.1% increase on the same month, the previous year.

The airport has been subject to a screening assessment in previous rounds of Review and Assessment. In conjunction with consultants, Ricardo Energy & Environment, Edinburgh Airport LTD commission regular studies to investigate whether the objectives for NO_2 concentrations are met. A repeat, six-month air quality monitoring survey was undertaken between December 2017 and June 2018 and the findings shared with the Council.

It was estimated annual mean NO_2 concentrations above 40µg/m^3 were measured at two sites – the multi-storey car-park taxi rank and drop off area - with annual NO_2 concentrations of 48.5µg/m^3 and 44.2µg/m^3, respectively. These sites are not considered relevant exposure when comparing to the statutory annual mean objective and therefore, this objective is not likely to have been breached at any location during 2017/2018.

Additionally, it was considered that the hourly NO_2 objective of no more than 18 exceedances of 200µg/m^3 in a year, is not likely to have been exceeded at any location.

Rail

The east coast mainline rail services at the Craigentinny and Portobello maintenance and servicing depots have recently revised their monitoring regime. Reports are being progressed and will be shared with the Council thereafter. A further update will be provided in the 2019 Annual Progress Report.

4.3 Industrial Sources

The Aggregate Industries cement batching plant (and associated stockpiling) on Bath Road, was relocated to Ocean Drive at the end of 2015. There were reductions in the PM_{10} concentrations in the area in 2016, likely to be attributable to this action. SEPA have now confirmed that the permit for this process has been surrendered, as of 12th December 2017. The Council has requested that should there be any applications for similar processes in the area, that it is consulted.

North British Distillery in Gorgie, which is permitted under the Pollution Prevention and Control (PPC) regime, enforced by SEPA, is currently upgrading its burner

systems on boilers. This will result in lower NO_x generation and hence may contribute to reduced background levels in the area.

PM_{10} monitoring which was undertaken at Gogarburn Poultry Farm by SEPA on behalf of the Council and Scottish Government, concluded that the air quality objectives would not be breached at the worst-case location previously identified by the screening tool.[8] These findings were reported in the Council's Detailed Assessment of Particles 2016.

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.

There was one planning application (No. 18/00619/FUL) to erect a building to house two 35kW biomass boilers and a wood pellet storage area at a care home in the Gilmerton area of the City in 2018. The application was refused.

The Royal Highland Centre, Ingliston has recently received planning permission to develop a multi-use event building. The proposal was made on the basis that gas power would be provided from the existing site infrastructure network. Discussions are ongoing with the agent as to the status of the 350kW biomass boiler, that had previously received planning permission in 2016.

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 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 NO_x abatement technology, having been approved, installed and part-operational in 2013. Initial screening[9] of the plant indicates a contribution from the CHP at the nearest receptor in excess of 70μgm^{-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 at St John's Hill and Viewcraig Gardens. Results show that concentration are in keeping with general background levels in the area - 17µg/m^3 and 18µg/m^3 at sites ID154 and ID153, respectively. Further sites will be considered in 2019.

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

Fugitive or uncontrolled sources relate to dust emissions, which can lead to elevated PM_{10} concentrations include major construction projects.

The Edinburgh St James project construction phase began in October 2016, with the closure of the St James Shopping Centre and demolition. The retail and leisure development is to complete in 2020/21. The developer installed two Turnkey airborne particulate monitors at fixed locations on the boundary of the site to monitor PM_{10} concentrations from these activities. The main dust generating activities are now complete on-site. Throughout 2017, there were some months when 350-tonne loads of material were crushed at Albert Docks, Leith and returned to the site for re-use. This is likely to have contributed to a slight increase in concentrations of PM_{10} at the Salamander Street monitoring station. The Council is currently in the process of developing an Action Plan for the Salamander Street PM_{10} AQMA, in conjunction with SEPA, Forth Ports and relevant stakeholders. It will aim to ensure that the long-term trend of PM10 at this location is maintained.

A planning application for a residential proposal adjacent to Leith Docks (14/05172/FUL) was refused by the Council because the proposal was contrary to Local Development Plan Policy (Env22) in terms of air quality. The site lies within the

Salamander Street AQMA, declared because concentrations of PM_{10} exceed the Scottish objective. Concerns were raised that the development would increase the number of people exposed to unacceptable levels of the pollutant and potentially be detrimental to the health of future residents. The applicant appealed the decision and the reporter, appointment by Scottish Ministers, allowed the appeal and granted permission (PPA-230-2201). The Reporter was of the view that on balance the adverse effects for health should not be regarded as significant and that the issue can be acceptably mitigated via two conditions. These are reproduced below;

- No construction works shall take place until full technical details of the proposed mechanical ventilation system (including HEPA filters), and full details of a scheme for the management and maintenance of the system (including HEPA filters), have been submitted to and approved in writing by the planning authority. No residential unit shall be occupied until the ventilation system serving it has been provided in accordance with the approved details. Management and maintenance of the system (including HEPA filters) shall thereafter be in accordance with the approved details. [Reason: in order to protect the amenity of the occupiers of the development.]

- No residential unit shall be occupied before 1 January 2020. [Reason: to protect the amenity of the occupiers of the development in the light of air quality considerations.]

Monitoring of particles will commence in the area with the development of the new monitoring station at Tower Street.

As mentioned in section 4.1 above, proposals on Ocean Drive (16/03684/FUL) for 388 residential units and 29 commercial units were given planning permission. An Air Quality Impact Assessment in support of the application included an assessment relating to traffic generation (discussed above) and also any impact from nearby fugitive and industrial activities, particularly stemming from Leith Docks. The site is close to two AQMAs, the Great Junction Street AQMA (NO_2) and the PM_{10} Salamander Street AQMA. In terms of particle pollution, the applicant undertook monitoring over a period of around four months. Environmental Health had some concerns with the monitoring (such as a lack of information on wind direction and an assessment of operations in the dock that coincide with the monitoring period). Note,

the scope of the City-Wide Detailed Assessment for Particles[6] that led to the declaration of the AQMA did not consider the application site, as there were no relevant receptors. The assessment concluded that the particulate matter levels are below those recorded at Salamander Street and also within the Scottish Government's thresholds. The Council will have to consider long term monitoring of particles in the area where new residential exposure will be introduced.

There is a newly licenced Waste Transfer station at 36-40 Newhaven Road operated by Changeworks Recycling Limited. Site previously operated under waste management exemption. Most operation carried out within a building but might be low risk of dust generation.

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. This will set out policies and proposals for development in Edinburgh between 2020 and 2030. The main consultation document will be presented to Planning Committee in January 2019. Early engagement on topics such as housing development, employment space, retail and leisure, 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 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 ensures 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 Central Edinburgh, St John's Road and Glasgow Road (Newbridge). These AQMAs therefore remain valid. See summary Table 6.1 below.

Table 6.1Summary of the locations where 2017 monitoring results are at or exceed the annual mean Nitrogen Dioxide Objective

Site ID	Site address	In AQMA (NO_2)?	Data Capture	Annual mean concentration µg/m³ (Bias adjusted 0.82)
138	Clerk Street 15	**Y Central**	100	**41**
48c	Cowgate Blackfriars	**Y Central**	100	**41**
48e	Cowgatehead 2	**Y Central**	67	**48**
37a*	Grassmarket 41	**Y Central**	83	**50**
HT1	Haymarket Terrace	**Y Central**	92	**41**
81	London Rd/E. Norton Pl	**Y Central**	75	**41**
46	London Road/Easter Rd	**Y Central**	83	**40**
135	Nicolson Street 69	**Y Central**	100	**44**
27	North Bridge – South	**Y Central**	67	**43**
47	Princes Street Eastbound	**Y Central**	75	**43**
24	Princes Street/Mound	**Y Central**	67	**44**
33	Queen Street	**Y Central**	67	**40**
144	South Bridge 59	**Y Central**	100	**43**
3b	Torphichen Place 1	**Y Central**	92	**41**
3	Torphichen Place CH	**Y Central**	92	**42**
28d	West Port 42	**Y Central**	83	**47**
15	Glasgow Rd Newbridge	**Y Glasgow Rd**	100	**41**
58*	Glasgow Rd Newbridge	**Y Glasgow Rd**	100	**44**
1d	St John's Road 131	**Y St John's Rd**	83	**42**
ID5	St John's Road (Auto)	**Y St John's Rd**	97	**53**
55	Inverleith Row	**Y Inverleith Row**	83	**40**
64	Queensferry Road 550	**No**	100	**41**

* Duplicate passive diffusion tube result

Automatic monitoring data from St John's Road Monitoring Station

There was one breach of the objective outwith the AQMAs at Queensferry Road (ID64), where the concentration was just above the objective. There are ongoing investigations with SEPA's modelling capabilities to try to understand why higher concentrations are recorded with this distance corrected data, compared with that

monitored exactly at the facades. However, data capture from the automatic monitoring station was poor in 2017, and this has hamper progress. The Council has decided that it would not be appropriate to declare an AQMA in this location at this time considering the circumstances, however the investigations will continue.

There are no locations where the hourly objective is potentially exceeded.

The results also show that for the first time since the declaration of the Great Junction Street and Inverleith Row AQMAs there are no breaches of NO_2 objectives, although levels in the Inverleith AQMA are at the annual mean objective. Monitoring will continue in these areas, nevertheless, in order to consider whether revoking the AQMAs would be appropriate in the future.
2017 data showed much lower concentrations in comparison to the previous year at most locations across the city. In general, there is a downward trend in annual mean concentrations at all the automatic monitoring sites.

PM_{10} data from all monitoring locations in 2017 meets the UK National Objectives, however concentrations at Queensferry Road and Salamander Street station show breaches of the Scottish objectives.

At Queensferry Road data is temporarily being affected by the demolition and construction work on adjacent land, associated with the development of a 60-bed care-home.

At Salamander Street, which is within the PM10 AQMA the levels are just above the objective. They have reduced in recent years and are showing a downward trend, likely due to changes in industrial and fugitive sources in the vicinity of this site.

Concrete crushing activity at Albert Docks from the recycling of material from the Edinburgh St James project, may have resulted in a slight increase in concentration in 2017. The Salamander Street AQMA, declared in January 2017, remains valid. Work ongoing to devise an Air Quality Action Plan will need to consider how the downward trend is sustained, as there is residential development proposed for the area. The Action Plan, being developed in conjunction with SEPA, Forth Ports and relevant stakeholders will be published for consultation in early 2019.

PM10 and PM2.5 long term trends from measured data across all sites generally show a decrease in concentrations with time, as shown in Appendix 4, although at Glasgow Road concentrations are more stable.

6.2 Conclusions relating to New Local Developments

The air quality impact of cumulative development, especially large proposals on the green belt, is a concern for the Council, in terms of air quality impact. The cumulative impact on air quality in the operational phases of large residential developments with excessive car-parking anywhere is the City is also of concern, particularly in terms of increasing roadside NO_2 concentrations.

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 Council will have to consider long term monitoring of particles 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 it is consulted.

Transport Scotland is re-designing lane integration from the M9 off-slip onto the A8 at Newbridge roundabout. Recommendations have been made to Transport Scotland to carry out an air quality impact assessment in relation to the proposals to ensure there is no adverse impact on air quality.

The east coast mainline rail services at the Craigentinny and Portobello maintenance and servicing depots have recently revised their monitoring regime. Reports are being progressed and will be shared with the Council thereafter. A further update will be provided in the 2019 Annual Progress Report.

The Council has recently begun 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. The main consultation document will be presented to Planning Committee in January 2019. Early engagement on topics such as housing development, employment space, retail and leisure, 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.

6.3 Proposed Actions

The Air Quality Action Plan for the recently declared Salamander Street AQMA will be produced with relevant stakeholders.

The revision to the existing NO_2 Air Quality Action Plan (2008) will commence, in conjunction with the developing City Mobility Plan (new Local Transport Strategy) and the review of the Cleaner Air for Scotland Strategy.

The Council will work with SEPA, Transport Scotland and Scottish Government to develop a LEZ proposed scheme, which would be implemented in the City by 2020.

Monitoring of particles will commence at the newly established Nicolson Street monitoring station in 2019, with the help of Scottish Government grant funding.

Progress with existing and new actions is on-going and covered in detailed in Table 2.17 within this report. The following summary details several key action plan measures which will continue to be taken forward during 2018/ 2019;

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

- Continue to work with Lothian Bus to improve fleet standard and support installation of electric charging infra-structure to enable operation of electric buses in the city,
- Continue ECOSTARS scheme,
- Commence the roll out of telematics across the Council's Fleet, following the privacy impact assessment work,
- Develop new areas of SCOOT implementation and complete outstanding SCOOT repair work,
- Develop a Business Case to ensure successful implementation of the Electric Vehicle Action Plan,
- Continue support for Active Travel Action Plan, and;
- Develop new Corporate Travel Plan.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In AQMA?	Pollutants Monitored	Monitoring Technique	Distance to Relevant Exposure(1) (m)	Distance to kerb of nearest road (m)	Inlet Height (m)
ID1	**Queen Street**	Roadside	324826	674078	Yes (NO_2)	NO_2 PM_{10}	Chemiluminescent TEOM	0	5.2	2.87
ID2	**Haymarket***	Roadside	323896	673197	Yes (NO_2)	NO_2 PM_{10}	Chemiluminescent TEOM	7	9.2	N/A
ID3	**Roseburn***	Roadside	322939	673233	Yes (NO_2)	NO_2 PM_{10}	Chemiluminescent TEOM	4.9	7.6	n/a
ID4	**Gorgie Road**	Roadside	323121	672314	Yes (NO_2)	NO_2	Chemiluminescent	0	2.5	2.63
ID5	**St. John's Road**	Kerbside	320101	672907	Yes (NO_2)	NO_2 PM_{10} $PM_{2.5}$	Chemiluminescent FIDAS 200 FIDAS 200	0	0.5	1.98
ID6	**Currie High School**	Suburban	317595	667909	No	NO_2 PM_{10}	Chemilum TEOM	N/A	N/A	3.59 3.24

Continued overleaf/…

Site ID	Site Name	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In AQMA?	Pollutants Monitored	Monitoring Technique	Distance to Relevant Exposure(1) (m)	Distance to kerb of nearest road (m)	Inlet Height (m)
ID7	**St. Leonard's**	Urban Back-ground (AURN)	326265	673129	No	NO_2 PM_{10} $PM_{2.5}$ O_3 CO SO_2 PAH	Chemiluminescent FDMS FDMS UV absorp IR absorp UV absorp Digitalsamp	N/A	35m	3.4m 3.2m 3.1m 3.4m 3.4m 3.4m 3.4m
ID8	**Salamander Street**	Roadside	327615	676333	Yes (PM_{10})	NO_2 PM_{10}	Chemiluminescent TEOM	0	2.13m	2.86
ID9	**Queensferry Road**	Roadside	318736	674930	No	NO_2 PM_{10}	Chemiluminescent TEOM/FDMS	6.5	1.7m	2.96
ID10	**Glasgow Road**	Roadside	313103	672663	Yes (NO_2)	NO_2 PM_{10}	Chemiluminescent TEOM	0	6m	2.84

Notes for Table;

(1) 0 meters if the monitoring site is at a location of exposure (e.g. representative of the façade of a residential property).

(2) * Historic sites

Table A.2 – Description of Automatic Monitoring Locations

Site ID	Site Name	Description of automatic monitoring location
ID1	**Queen Street**	Pavement in line with residential property located 5.2m from road edge. No buildings at rear of monitoring unit. Relevant exposure.
ID2	**Haymarket**	Now decommissioned, this monitoring site was located in a car parking bay at Haymarket Station 9.2m from the main road, set back from the façade of residential property. Not in street canyon.
ID3	**Roseburn**	Now decommissioned, it was located on footbridge over the water of Leith 7.6m from kerb edge. Set back from line of residential property. Does not take account of canyon at Roseburn Terrace.
ID4	**Gorgie Road**	Located in line with façade of adjacent residential flats on edge of children's play park. Within 2.5m of kerb edge. Not located in canyon area of street. Relevant exposure.
ID5	**St John's Road**	Pavement (kerbside) of busy shopping street. Residential properties within 2.1m of kerb edge. Takes account of junction and street canyon. Relevant exposure and worst-case location.
ID6	**Currie High School**	Located adjacent to school building at rear of school. Representative of suburban / semi-rural exposure.
ID7	**St. Leonard's**	Located in small park area adjacent to Medical centre 35m from nearest main road. Representative of urban exposure.
ID8	**Salamander Street**	Located on pavement 2.13m from road edge, in line with adjacent residential property.
ID9	**Queensferry Road**	Located on pavement 1.7m from busy road edge and adjacent bus stop. 6.5m in front of residential property.
ID10	**Glasgow Road**	Located on recreational land 6m from A8 northbound carriageway, in line with nearby residential properties.

Figure A.1 Map of the Air Quality Monitoring Stations, Edinburgh

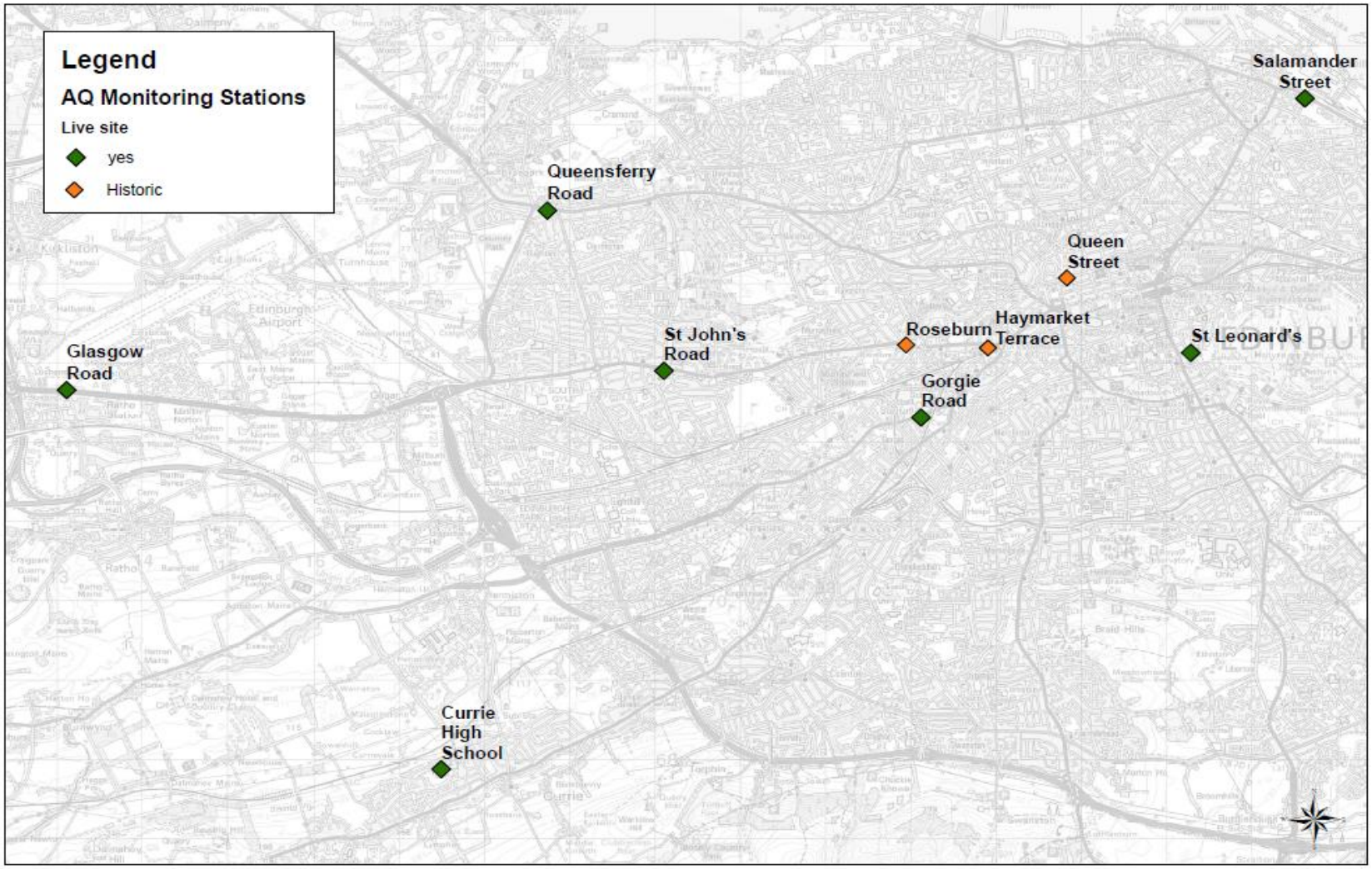


Table A.3 - Details of Non-Automatic Monitoring Sites (NO_2 Passive Diffusion Tubes)

Site ID	Site Name / Address	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In NO_2 AQMA?	Distance to Relevant Exposure (m)	Distance to kerb of nearest road (m)
	NORTH WEST						
13a	**Deanhaugh/Raeburn Place**	Kerbside	324533	674655	No	0	2
57	**Glasgow Road 158**	Roadside	318185	672756	No	8.5	3.6
16a	**Glasgow Road 68 facade**	Roadside	313028	672629	Yes	0	6.2
16	**Glasgow Road 68**	Roadside	313028	672633	Yes	4.4	1.8
15a	**Glasgow Road 9**	Roadside	312702	672675	Yes	0	7.5
58	**Glasgow Road Newbridge**	Roadside	312693	672670	Yes	5.2	2.8
15	**Glasgow Road Newbridge**	Roadside	312664	672672	Yes	3.8	1.6 + 2.4 [ii]
56	**Glasgow Road /Drumbrae**	Roadside	319212	672921	No	4.6	0.57 + 2 [ii]
16b	**Glasgow Road/Ratho Station 94**	Roadside	313211	672612	Yes	0	2.9
143a	**Hamilton Place Library**	Roadside	324699	674651	No	0 play area	2.1m
41	**Hillview Terrace**	Background	320081	673232	No	N/A	1.0
55c	**Inverleith Row/Montague**	Roadside	324686	675941	Yes	1.06	2.28 + 2.0[ii]
55	**Inverleith Row/Ferry Road**	Roadside	324638	675993	Yes	0	4.65
63	**Queensferry Road 544**	Roadside	318723	674963	No	0	13.6
64	**Queensferry Road 550**	Roadside	318698	674955	No	9.2	1.49
64b	**Queensferry Road 550 Facade**	Roadside	318701	674964	No	0	11
64a	**Queensferry Road 552**	Roadside	318698	674964	No	0	10.5
62	**Queensferry Road 561**	Roadside	318810	674903	No	0	16.9
40	**Queensferry Rd/Hillhouse Rd**	Roadside	322144	674497	No	0	2.0 + 2 [ii]
22a	**Roseburn Terrace** [i]	Kerbside	322984	673189	Yes	2.2	0.5
23	**Roseburn Terrace**	Kerbside	323007	673198	Yes	2.3	0.23
1d	**St John's Road 131**	Roadside	320096	672907	Yes	0	2.1
SJ2	**St John's Road 63**	Kerbside	320436	672830	Yes	9.15	0.37

Site ID	Site Name / Address	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In NO_2 AQMA?	Distance to Relevant Exposure (m)	Distance to kerb of nearest road (m)
SJ3	**St John's Road 81**	Roadside	320316	672857	Yes	14.48	1.15
1b	**St John's Road IR**	Roadside	320154	672911	Yes	0	2.0
1	**St John's Road SB**	Kerbside	320122	672917	Yes	1.8	0.54
SJ1	**St John's Road/Kaimes Rd**	Kerbside	320571	672809	Yes	2.26	0.28
39	**St John's Road/Victor Park**	Roadside	319677	672991	Yes	4.15	1.6
14	**Trinity Crescent**	Roadside	324896	676991	No	4.0	2.0
	SOUTH WEST						
76c	**Angle Park Terrace 25**	Roadside	323587	672360	Yes	0	4.75
76b	**Angle Park Terrace 74**	Roadside	323527	672285	Yes	0	2.1
76	**Angle Park/Harrison Road**	Roadside	323498	672263	Yes	0	2.20
76a	**Ardmillan Terrace 22**	Roadside	323487	672287	Yes	0	2.2
80e	**Balgreen Road / Library**	Roadside	322110	672268	No	0 [Play area]	2
4a	**Calder Road** [i]	Roadside	318894	670493	No	5	12.0
79d	**Dundee Street/Yeaman Place**	Roadside	323926	672550	Yes	0	2.3
79a	**Fountainbridge 103**	Roadside	324731	672984	No	0	2.2
79	**Fountainbridge/Tollcross**	Roadside	324682	672939	No	0	3.3
80	**Gorgie Road / Delhaig**	Roadside	321967	671666	Yes	0	2.6
80b	**Gorgie Road 549**	Roadside	321724	671557	Yes	0	2.5
18	**Gorgie Road 8**	Roadside	323477	672476	Yes	0	2.4
80c	**Gorgie Road 87**	Roadside	323265	672394	Yes	0	2.5
80a	**Gorgie Road Glen Lea**	Roadside	322381	671950	Yes	0	2.6
5	**Gorgie Road/Murieston Road**	Kerbside	323484	672478	Yes	4.9	0.3
76d	**Henderson Terrace**	Roadside	323632	672449	Yes	0	1.8
11	**Lanark Road 610**	Roadside	319527	668420	No	3.7	1.5
77a	**Slateford Road 51**	Roadside	323167	672009	Yes	0	2.3

Site ID	Site Name / Address	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In NO_2 AQMA?	Distance to Relevant Exposure (m)	Distance to kerb of nearest road (m)
77b	**Slateford Road 93/95**	Roadside	322999	671876	Yes	0	2.6
77	**Slateford Road 97**	Roadside	322960	671846	Yes	0	2.67
	NORTH EAST						
29a	**Bernard Street/Kings Chambers**	Roadside	327137	676529	Yes	0	2.1
29c	**Bernard Street/PS**	Roadside	327135	676515	Yes	0	2.1
29	**Bernard Street/CA**	Roadside	327148	676507	Yes	0	2.2
43	**Broughton Road**	Roadside	325513	675134	No	0	2.0
9d	**Commercial Street**	Roadside	326477	676759	Yes	0	2.6
9	**Commercial Street 88**	Roadside	326879	676626	Yes	0	2.6
9a	**Commercial St/Portland Place**	Roadside	326430	676754	Yes	3.90	1.47
30f	**Duke Street**	Roadside	327106	675816	No	0	2.2
25c	**Easter Road 105/109**	Roadside	326958	674770	Yes	0	3.25
25e	**Easter Road 198**	Roadside	326999	674940	Yes	0	3.95
25d	**Easter Road/Bothwick**	Roadside	326974	674780	Yes	0	2.8
25	**Easter Road/CH Shop**	Roadside	326934	674503	Yes	0	2.3
25b	**Easter Road/Rossie Place**	Roadside	326950	674624	Yes	0	3.3
53	**Ferry Road/Bowhill Terrace 6**	Roadside	324726	676004	Yes	1.57	1.75 +2.85 [ii]
45d	**Ferry Road/North Junction Street**	Roadside	326503	674436	Yes	0	3.1
30b	**Great Junction Street 137**	Roadside	326740	676138	Yes	0	2.9
30c	**Great Junction Street 14**	Roadside	326925	675949	Yes	0	2.8
30e	**Great Junction Street/CG**	Roadside	326845	676015	Yes	0	2.7
30	**Great Junction Street/FV**	Roadside	326884	675997	Yes	0	2.8
30d	**Great Junction Street/WC**	Roadside	326757	676144	Yes	0	2.8
21	**Leith Walk/Brunswick Road**	Roadside	326413	674899	Yes	0	4.5
20	**Leith Walk/McDonald Road**	Kerbside	326361	674882	Yes	0	5.6

Site ID	Site Name / Address	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In NO_2 AQMA?	Distance to Relevant Exposure (m)	Distance to kerb of nearest road (m)
66	**London Road/Cadzow Place**	Roadside	327468	674362	Yes	0	2.04 + 2.0[ii]
67	**London Road/Earlston Place**	Roadside	327190	674433	Yes	0	2.7
81	**London Rd/East Norton Place**	Roadside	326980	674446	Yes	0	2.5
46	**London Road/Easter Road**	Roadside	326944	674472	Yes	0	5.6
68	**Parsons Green Terrace**	Roadside	328042	674179	Yes	0	2.7
69	**London Road/Wolseley Place**	Roadside	328272	674143	Yes	0	2.62
70	**London Road/Wolseley Terrace**	Roadside	328337	674129	Yes	0	4.6
32	**Niddrie Mains Road 28**	Kerbside	328889	671649	No	4.7	0.2 + 2.4[ii]
9c	**North Junction Street**	Roadside	326448	676710	Yes	2.05	2.65
71	**Portobello High Street 185**	Roadside	330533	673850	No	0	3.0
73d	**Portobello Road/Ramsay F**	Roadside	329917	674388	No	0	3.7
51c	**Salamander Street/Baltic Street**	Roadside	327476	676418	No	0	2.25
72	**Seafield Road East 10**	Roadside	329993	674457	No	0	4.5
	SOUTH EAST						
44	**Broughton Street**	Roadside	325918	674430	No	0	3.4
6a	**Bruntsfield Place 210**	Roadside	324495	672035	No	0	2.8
138	**Clerk Street 15**	Roadside	326229	672287	Yes	0	2.35 +2 [ii]
151	**Comiston Road** [i]	Roadside	324367	670473	No	0	2.7
48f	**Cowgate/50 St Mary's Street**	Roadside	326198	673587	No	0	2.6
48c	**Cowgate Blackfriars**	Roadside	326047	673519	Yes	0	2.4
48a	**Cowgate/Blair Street**	Roadside	325929	673490	Yes	0	3.2
48	**Cowgate/Guthrie Street**	Roadside	325881	673471	Yes	0	4.5
48e	**Cowgatehead 2**	Roadside	325537	673405	Yes	0	1.9
150	**Drum Street**	Roadside	329281	668615	No	0	1.5
74f	**George Street 112**	Roadside	324880	673891	Yes	0	6.8

Site ID	Site Name / Address	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In NO_2 AQMA?	Distance to Relevant Exposure (m)	Distance to kerb of nearest road (m)
37a	**Grassmarket 41**	Roadside	325401	673340	Yes	0	3.4
37b	**Grassmarket 75**	Roadside	325471	673369	Yes	0	5.0
37c	**Grassmarket/Thompsons Court**	Background	325397	673377	Yes	0	21 + 2.1 [ii]
75e	**Great Stuart Street 9**	Roadside	324476	673967	No	0	7.25 +2.1[ii]
HT1	**Haymarket Terrace (North)**	Roadside	323985	673219	Yes	0	3.7
HT2	**Haymarket Terrace (South)**	Kerbside	323787	673212	Yes	1.75	0.5
10	**Home Street**	Roadside	324904	672906	No	0	2
140	**Hope Park Terrace/Clerk Street**	Roadside	326323	672596	Yes	3.5	1.3
17a	**Hope Park Terrace/VS**	Roadside	326312	672614	Yes	0	5
149a	**Howden Hall Road 79**	Roadside	327383	668079	No	0	4.5
34	**India Street**	Background	324790	674341	No	N/A	0.4 + 2.1[ii]
74g	**Leith Street 35**	Roadside	325897	674051	Yes	0	3.65
152	**Mayfield Road** [i]	Roadside	326640	671384	No	0	3.7
38	**Melville Drive**	Roadside	325141	672733	No	10.0	2.8
42	**Midmar Drive**	Background	325105	670511	No	N/A	1.4
8	**Morningside Road**	Roadside	324542	671167	No	0	3.7
49	**Morrison Street**	Roadside	324167	673249	Yes	2.4	2.2
135	**Nicolson Street 69**	Roadside	326112	673115	Yes	0	3 + 2
136	**Nicolson Street 92**	Roadside	326164	673054	Yes	0	3.74 + 2 [ii]
27	**North Bridge – South**	Roadside	325944	673670	Yes	0	3.5
47	**Princes Street (Eastbound)**	Roadside	325049	673791	Yes	6.5	9.0
24	**Princes Street/Mound**	Kerbside	325397	673869	Yes	10.2	1.0
33	**Queen Street/Hanover Street**	Roadside	325467	674229	Yes	0	6.5
33a	**Queen Street/Weymss Place** [i]	Roadside	324817	674077	Yes	0	6.0
SH1	**Shandwick Place**	Roadside	324513	673556	Yes	0	2.5

Site ID	Site Name / Address	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In NO_2 AQMA?	Distance to Relevant Exposure (m)	Distance to kerb of nearest road (m)
144	**South Bridge 59**	Roadside	326020	673370	Yes	0	2.3
142	**South Clerk Street 41a**	Roadside	326367	672554	Yes	0	1.96 + 2 [ii]
141	**South Clerk Street 84**	Roadside	326383	672472	Yes	0	2.57 + 2 [ii]
75d	**St Colme Street 4**	Roadside	324646	674025	No	0	6.2
153	**St John's Hill** [i]	Roadside	326374	673474	No	0	1.7
3b	**Torphichen Place 1**	Roadside	324277	673309	Yes	0	4.8
3	**Torphichen Place CH**	Roadside	324258	673295	Yes	0	2.25
154	**Viewcraig Gardens No.7** [i]	Roadside	326418	673511	No	0	10
2	**West Maitland Street**	Kerbside	324193	673346	Yes	5.2	0.5
28d	**West Port 42**	Roadside	325203	673250	Yes	0	2.7
28b	**West Port 62**	Roadside	325166	673242	Yes	0	1.4
28c	**West Port Opposite 50**	Roadside	325184	673261	Yes	0	3.0
36	**York Place**	Roadside	325828	674362	Yes	2.7	5.5

Notes to Table A.3;

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

i. New sites in 2017

ii. Distance to nominal kerb, due to parking bay in front of monitoring location.

Figure A.2 Maps of PDTs City-Wide 2017

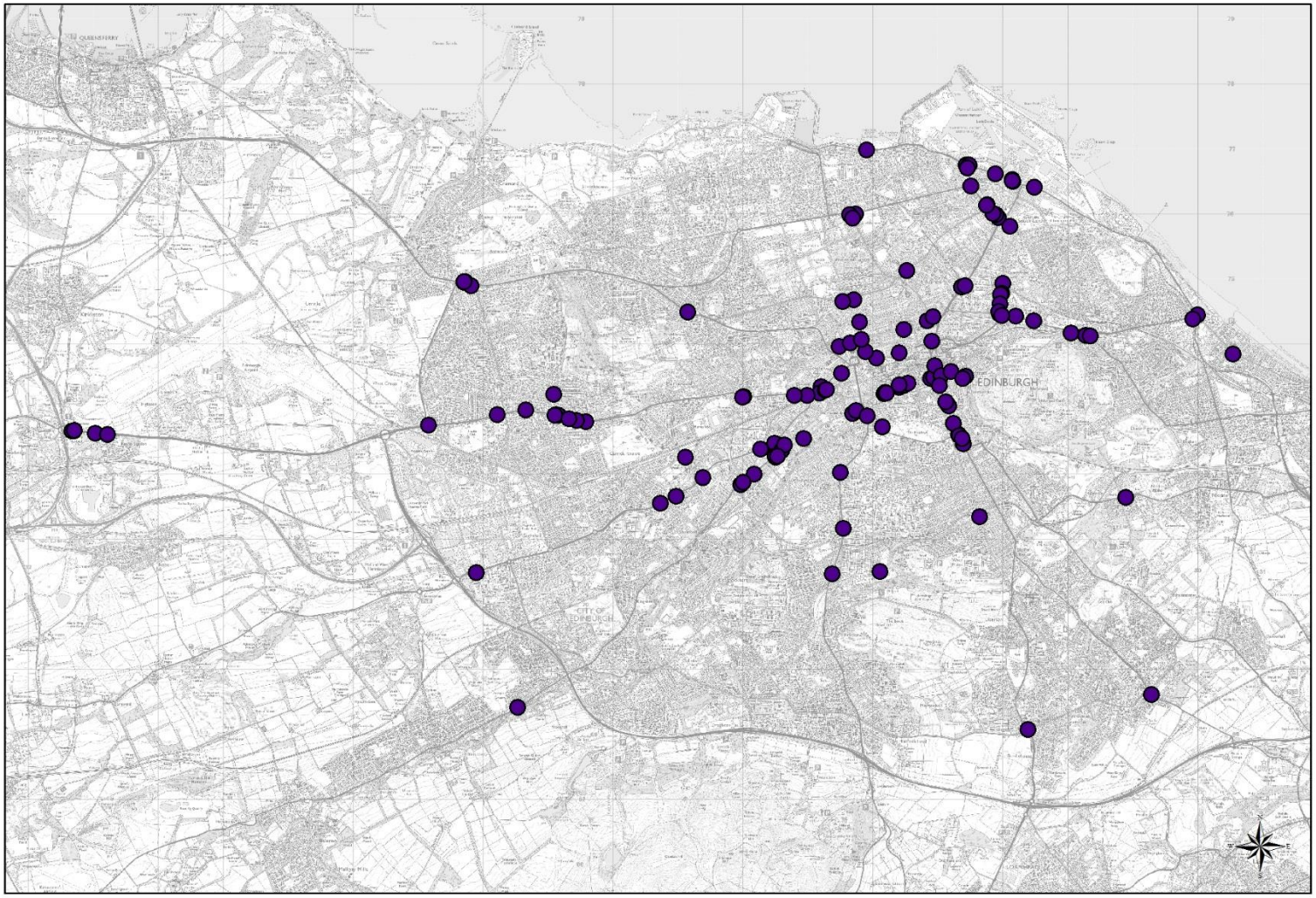


Table A.4a – Annual Mean NO_2 Monitoring Results – Automatic Data

Site ID	Site Name / Type	Within AQMA?	Data Capture 2017 % [a]	Annual Mean Concentration (µg/m³)							
				2010	2011	2012	2013	2014	2015	2016	2017
ID1	**Queen Street** Roadside	Y (NO_2)	N/A	37	29	28	28	26	27	24[b]	N/A
ID3	**Roseburn** Roadside	Y (NO_2)	N/A	30 (33)	24 [b]	N/A	N/A	N/A	N/A	N/A	N/A
ID4	**Gorgie Road** Roadside	Y (NO_2)	97	**41**	37	39	38	34	32	33	30
ID5	**St John's Road** Kerbside	Y (NO_2)	97	**71**	**65**	**58**	**57**	**59**	**65**	**53**	**53**
ID6	**Currie** Suburban	N	97	10	6	8	8	7	7	7	6
ID7	**St Leonard's** Urban Background	N	97	31	25	24	22	22 [b]	N/A	23 [b]	20
ID8	**Salamander St** Roadside	Y (PM_{10})	97	30	29	30	28	27	28	27	25
ID9	**Queensferry Rd** Roadside	N	70	N/A	41 (29)	52 **(40)**	43(34)[b]	46 (36)	41 (33)	42 (32)	N/A
ID10	**Glasgow Road** Roadside	Y (NO_2)	94	N/A	N/A	29 [b]	27	27	26	28	26

Notes for Table;

In bold and red, exceedance of the NO_2 annual mean objective of 40µg/m³and in bold black, result of 40µg/m³shown

a Data capture for the full calendar year N/A Data not available

b annualised mean per TG16 (valid data capture < 75%)

Data in brackets represents the estimated annual concentration at relevant receptors using the NO2 Fall Off with Distance calculator (DEFRA website, LAQM, Tools, 2013). Details are shown in Appendix D.

Table A.4b – Annual Mean NO_2 Monitoring Results – Non-Automatic (Passive Diffusion Tube Data)

Site ID	Site address	Valid Data Capture (%) 2017 (1)	Annual mean concentration (adjusted for bias) µg/m³ (2)						
			2011 Bias Adjustment Factor = 0.81	2012 Bias Adjustment Factor = 0.76	2013 Bias Adjustment Factor = 0.75	2014 Bias Adjustment Factor = 0.74	2015 Bias Adjustment Factor = 0.76	2016 Bias Adjustment Factor = 0.77	2017 Bias Adjustment Factor = 0.82
NORTH WEST									
13a	Deanhaugh/Raeburn Place	58	-	-	-	-	-	26	27
53	Ferry Rd/Bowhill Terr	92	32.5	35	34	33	35	33	33
57	Glasgow Road 158	83	36.5	36	33	33	33	32	32
16a	Glasgow Road 68 facade	58	-	-	38	36	34	36	31
16	Glasgow Road 68	100	**43.8**	**47**	**40**	**40**	**40**	37	35
15a	Glasgow Road 9	100	-	-	-	34	39	33	35
58*	Glasgow Rd Newbridge	100	**51.5**	**48**	**46**	**45**	**45**	**41**	**44**
15	Glasgow Rd Newbridge	100	**40.9**	**40**	39	37	**40**	**40**	**41**
56	Glasgow Rd /Drumbrae	83	29.5	31	30	29	26	28	27
143a	Hamilton Place Library	92	-	-	34	35	29	33	28
41	Hillview Terrace	83	18.4	21	18	18	19	20	17
55c	Inverleith Row/Montague	92	28.2	32	31	29	25	28	23
55*	Inverleith Row/Ferry Rd	83	**43.8**	**46**	**43**	**40**	**41**	**41**	**40**
63	Queensferry Road 544	92	25.2	26	26	23	27	24	27
64	Queensferry Road 550	100	**43.9**	**50**	**47**	**47**	**48**	**44**	**41**
64b	Queensferry Road 550 F	100	-	-	-	-	36	31	32
64a	Queensferry Road 552	100	-	30	28	30	30	29	30
62	Queensferry Road 561	100	19.2	25	21	19	19	20	18
40	Queensf'y Rd/Hillhouse	92	34.2	**40**	37	32	32	32	28
22a	Roseburn Terrace	83	-	-	-	-	-	-	35
23	Roseburn Terrace	67	34.5	38	35	37	32	32	27

Site ID	Site address	Valid Data Capture (%) 2017 (1)	Annual mean concentration (adjusted for bias) µg/m³ (2)						
			2011 Bias Adjustment Factor = 0.81	2012 Bias Adjustment Factor = 0.76	2013 Bias Adjustment Factor = 0.75	2014 Bias Adjustment Factor = 0.74	2015 Bias Adjustment Factor = 0.76	2016 Bias Adjustment Factor = 0.77	2017 Bias Adjustment Factor = 0.82
1d	St John's Road 131	83	**56.3**	**52**	**52**	**48**	**46**	**45**	**42**
SJ3	St John's Road 81	83	-	-	-	27	27	25	25
SJ2	St John's Road 63	75	-	-	-	25	23	22	21
1b	St John's Road IR	92	38.4	**44**	**41**	37	33	36	29
1	St John's Road SB	75	35.1	38	36	34	31	32	28
SJ1	St John's Rd/Kaimes Rd	83	-	-	-	31	28	27	28
39	St John's Road/Victor Pk	92	30.0	32	35	32	30	30	30
14	Trinity Crescent	92	28.9	28	27	25	22	21	21
SOUTH WEST									
76c	Angle Park Terrace 25	100	-	36	32	30	30	30	30
76b	Angle Park Terrace 74	100	-	**51**	**46**	**41**	**46**	**44**	39
76	Angle Pk/Harrison Rd	100	**44.4**	**48**	**41**	**41**	38	**43**	35
76a	Ardmillan Terrace 22	83	-	32	30	27	27	31	29
80e	Balgreen Road / Library	83	-	-	37	32	34	33	32
4a	Calder Road	83	31.7	32	30	26	25	28	N/A
79d	Dundee St/Yeaman Pl	92	-	-	**46**	**41**	**42**	39	38
79a	Fountainbridge 103	100	-	39	37	34	31	36	31
79	Fountainbridge/Tollcross	58	36.3	37	36	34	30	36	27
80	Gorgie Road Delhaig	83	**42.2**	**42**	**44**	37	33	38	34
80b	Gorgie Road 549	83	-	33	34	31	28	32	28
18	Gorgie Road 8	92	**48.2**	**49**	**45**	**42**	37	38	35
80c	Gorgie Road 87	50	-	39	**40**	N/A	34	34	26
80a	Gorgie Road / Glen Lea	92	-	-	33	31	27	31	29
5	Gorgie Rd/Murieston Rd	92	**44.4**	**43**	**41**	35	34	33	33

Site ID	Site address	Valid Data Capture (%) 2017 (1)	Annual mean concentration (adjusted for bias) µg/m³ (2)						
			2011 Bias Adjustment Factor = 0.81	2012 Bias Adjustment Factor = 0.76	2013 Bias Adjustment Factor = 0.75	2014 Bias Adjustment Factor = 0.74	2015 Bias Adjustment Factor = 0.76	2016 Bias Adjustment Factor = 0.77	2017 Bias Adjustment Factor = 0.82
76d	Henderson Terrace	100	-	38	35	32	32	33	28
11	Lanark Road 610	92	**22.5**	24	22	19	20	20	18
77a	Slateford Road 51	100	-	**41**	37	35	35	36	31
77b	Slateford Road 93/95	92	-	**46**	**42**	38	38	36	33
77	Slateford Road 97	75	**38.1**	**43**	**40**	37	38	34	29
NORTH EAST									
29a	Bernard Street	83	**41.9**	**40**	38	34	34	37	27
29c*	Bernard Street/PS	88	**44.6**	**44**	**42**	39	**40**	39	36
29	Bernard Street/CA	92	38.9	37	36	31	32	33	32
43	Broughton Road	92	34.6	37	37	35	32	34	32
9d	Commercial Street	92	-	-	-	**42**	36	**42**	36
9	Commercial Street 88	92	31.2	35	32	30	29	32	26
9a	Commercial St/Portland Pl	75	**41.0**	39	36	35	36	33	30
30f	Duke Street	75	-	-	-	-	**40**	38	35
25c	Easter Road 105/109	92	**41.0**	**41**	37	29	31	33	31
25e	Easter Road 198	75	32.0	33	27	31	24	27	24
25d	Easter Road/Bothwick	75	32.7	34	30	30	30	32	29
25	Easter Road/CH Shop	58	**43.6**	**45**	**41**	39	**40**	**46**	36
25b	Easter Rd/Rossie Place	67	35.8	35	34	31	31	35	31
45d	Ferry Rd/North J St	92	39.6	37	34	34	37	33	33
30b	Gt Junction Street 137	92	**40.0**	38	36	33	38	33	33
30c	Gt Junction Street 14	83	38.4	38	39	37	34	**40**	34
30e	Gt Junction Street/CG	50	**41.2**	37	36	33	32	34	N/A
30	Great Junction St/FV	92	39.1	38	**41**	N/A	33	**42**	32

Site ID	Site address	Valid Data Capture (%) 2017 (1)	Annual mean concentration (adjusted for bias) µg/m³ (2)						
			2011 Bias Adjustment Factor = 0.81	2012 Bias Adjustment Factor = 0.76	2013 Bias Adjustment Factor = 0.75	2014 Bias Adjustment Factor = 0.74	2015 Bias Adjustment Factor = 0.76	2016 Bias Adjustment Factor = 0.77	2017 Bias Adjustment Factor = 0.82
30d	Gt Junction Street/WC	67	33.8	38	34	34	30	33	35
21	Leith Walk/Brunswick Rd	50	34.2	36	34	33	33	**40**	32
20	Leith Walk/McDonald Rd	67	-	35	34	32	33	**40**	N/A
66	London Rd/Cadzow Pl	75	-	36	34	31	32	32	31
67	London Rd/Earlston Pl	67	**45.5**	**46**	**46**	39	**42**	**41**	33
81	London Rd/E. Norton Pl	75	**51.2**	**46**	**44**	**43**	**50**	**57**	**41**
46	London Rd/Easter Rd	83	**40.4**	**46**	38	38	37	39	**40**
68	Parsons Green Terrace	83	31.5	33	29	28	31	31	30
69	London Rd/Wolseley Pl	100	**50.4**	**42**	**40**	**42**	**43**	38	37
70	London Rd/Wolseley Terr	92	**42.4**	**41**	**44**	38	**44**	**40**	38
32	Niddrie Mains Road 28	83	30.9	33	31	28	28	25	25
9c	North Junction Street	67	-	-	-	30	29	31	34
71	Portobello High St 185	100	36.0	32	33	32	31	31	29
73d	Portobello Rd/Ramsay F	92	-	-	38	35	38	36	31
51c	Salamander St/Baltic St	75	38.5	35	33	30	32	31	32
72	Seafield Road East 10	100	33.1	37	36	33	30	33	28
SOUTH EAST									
44	Broughton Street	75	32.8	34	31	31	30	33	36
6a	Bruntsfield Place 210	83	-	-	-	32	30	32	31
138	Clerk Street 15	100	-	**40**	38	38	37	39	**41**
151	Comiston Road	92	-	**-**	-	-	-	-	25
48f	Cowgate/50 St Mary's St	92	-	-	-	37	37	38	34
48c	Cowgate Blackfriars	100	-	**43**	**42**	34	**41**	**40**	**41**
48a	Cowgate/Blair Street	58	31.4	**40**	35	36	34	37	34

Site ID	Site address	Valid Data Capture (%) 2017 (1)	Annual mean concentration (adjusted for bias) µg/m³ (2)						
			2011 Bias Adjustment Factor = 0.81	2012 Bias Adjustment Factor = 0.76	2013 Bias Adjustment Factor = 0.75	2014 Bias Adjustment Factor = 0.74	2015 Bias Adjustment Factor = 0.76	2016 Bias Adjustment Factor = 0.77	2017 Bias Adjustment Factor = 0.82
48	Cowgate/Guthrie Street	92	**40.2**	**40**	38	33	33	38	33
48e	Cowgatehead 2	67	-	-	39	35	**44**	**41**	**48**
150	Drum Street	92	-	-	-	-	27	29	25
74f	George Street 112	92	**44.7**	**47**	34	30	26	31	30
37a*	Grassmarket 41	83	**42.0**	**43**	**44**	**40**	**43**	**53**	**50**
37b	Grassmarket 75	100	37.1	39	37	35	36	37	34
37c	Grassmarket/Thompsons	100	-	-	27	25	27	28	26
75e	Great Stuart Street 9	92	-	-	24	23	24	24	22
HT1	Haymarket Terrace (North)	92	-	-	-	-	37	**42**	**41**
HT2	Haymarket Terrace (South)	58	-	-	-	-	39	39	33
10	Home Street	100	25.7	33	31	27	30	37	38
140	Hope Pk Terrace/Clerk St	83	-	35	35	32	32	31	30
17a	Hope Park Terrace	100	37.4	39	36	35	36	34	32
149a	Howden Hall Road 79	100	-	-	-	-	30	33	29
34	India Street	92	23.6	23	21	20	20	21	20
74g	Leith Street 35	42	-	-	-	-	**49**	**59**	N/A
152	Mayfield Road	100	-	-	-	-	-	-	26
38	Melville Drive	83	27.3	29	26	23	24	23	23
42	Midmar Drive	92	16.1	18	15	13	15	17	15
8	Morningside Road	100	28.6	26	25	23	24	26	23
49	Morrison Street	92	**48.5**	**46**	**42**	36	35	39	36
135	Nicolson Street 69	100	-	**50**	**45**	**43**	**46**	**46**	**44**
136	Nicolson Street 92	100	-	**42**	39	39	35	38	32
27	North Bridge – South	67	**48.7**	**52**	**47**	**48**	N/A	**53**	**43**

Site ID	Site address	Valid Data Capture (%) 2017 (1)	Annual mean concentration (adjusted for bias) µg/m³ (2)						
			2011 Bias Adjustment Factor = 0.81	2012 Bias Adjustment Factor = 0.76	2013 Bias Adjustment Factor = 0.75	2014 Bias Adjustment Factor = 0.74	2015 Bias Adjustment Factor = 0.76	2016 Bias Adjustment Factor = 0.77	2017 Bias Adjustment Factor = 0.82
47	Princes Street Eastbound	75	**45.3**	**45**	**50**	**50**	**42**	**48**	**43**
24	Princes Street/Mound	67	N/A	34	**41**	N/A	**42**	**41**	**44**
33	Queen St/North David St	92	**50.0**	**49**	33	N/A	N/A	39	**40**
33a	Queen Street/Weymss Pl	75	-	-	-	-	-	-	29
SH1	Shandwick Place	58	-	-	-	-	39	36	N/A
144	South Bridge 59	100	-	-	**46**	**47**	**44**	**50**	**43**
142	South Clerk Street 41a	83	-	**42**	**40**	36	34	37	33
141	South Clerk Street 84	100	-	**44**	**41**	38	**40**	36	38
75d	St Colme Street 4	92	-	-	31	27	26	29	25
153	St John's Hill	100	-	-	-	-	-	-	17
3b	Torphichen Place 1	92	-	-	-	**45**	**42**	**44**	**41**
3	Torphichen Place CH	92	**55.1**	**48**	**43**	**43**	**45**	**50**	**42**
154	Viewcraig Gardens	92	-	-	-	-	-	-	19
2	West Maitland Street	92	**55.3**	**40**	-	**43**	**42**	**42**	39
28d	West Port 42	83	**55.2**	**60**	**58**	**51**	**52**	**51**	**47**
28b	West Port 62	58	**57.0**	**61**	**52**	**56**	**58**	**59**	N/A
28c	West Port Opposite 50	67	39.0	-	39	N/A	**46**	**44**	36
36	York Place	83	35.4	**41**	28	33	35	32	35

Notes for Table A.4b (and overleaf):

Exceedances of the NO_2 annual mean objective of 40µg/m³ are shown in bold and red.

Concentrations at the objective (40µg/m³) are shown in bold black.

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

(1) 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%).

(2) 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%, except where data capture was very poor and sporadic. See Appendix C for details.

Yellow coloured cells indicate data that is distance corrected. See Appendix D for detail of calculations.

* Site ID - concentration is the result of duplicate tubes (2017)

Table A.5 – 1-Hour Mean NO_2 Monitoring Results

Site ID	Site Name / Type	Within AQMA ?	Data Capture 2017 % [a]	Number of Hourly Means > 200µg/m^3							
				2010	2011	2012	2013	2014	2015	2016	2017
ID1	**Queen St** Roadside	Y (NO_2)	N/A	0	0	0	0	0	0	N/A	N/A
ID3	**Roseburn** Roadside	Y (NO_2)	N/A	1	0 (101) [b]	N/A	N/A	N/A	N/A	N/A	N/A
ID4	**Gorgie Road** Roadside	Y (NO_2)	97	0 (122) [b]	0	0	0 (115)	0	0	0	0
ID5	**St John's Road** Roadside	Y (NO_2)	97	**60**	**52**	**62**	8	1	**42** (224)	5	1
ID6	**Currie** Suburban	N	97	0	0	0	0	0	0	0	0
ID7	**St Leonard's** Urban Background	N	97	0	0	0	0	0 (69)	0	0 (73)	0
ID8	**Salamander St** Roadside	Y (PM_{10})	97	0	0	0	0	0	0	0	0
ID9	**Queensferry Rd** Roadside	N	70	N/A	0	3	0 (145)	0	0	0 (142)	3 (159)
ID10	**Glasgow Road** Roadside	Y (NO_2)	94	N/A	N/A	0	0	0	0	0	0

Notes for table; a data capture for the full calendar year.

b if data capture for full calendar year is < 90%, the 99.8th percentile of hourly means is shown in brackets.

In bold and red, exceedance of the NO_2 hourly mean objective (200µg/m^3 – not to be exceeded more than 18 times per year).

Figure A.3a Trend in Automatically Measured Annual Mean Nitrogen Dioxide Concentrations (µg/m³) at St Leonard's

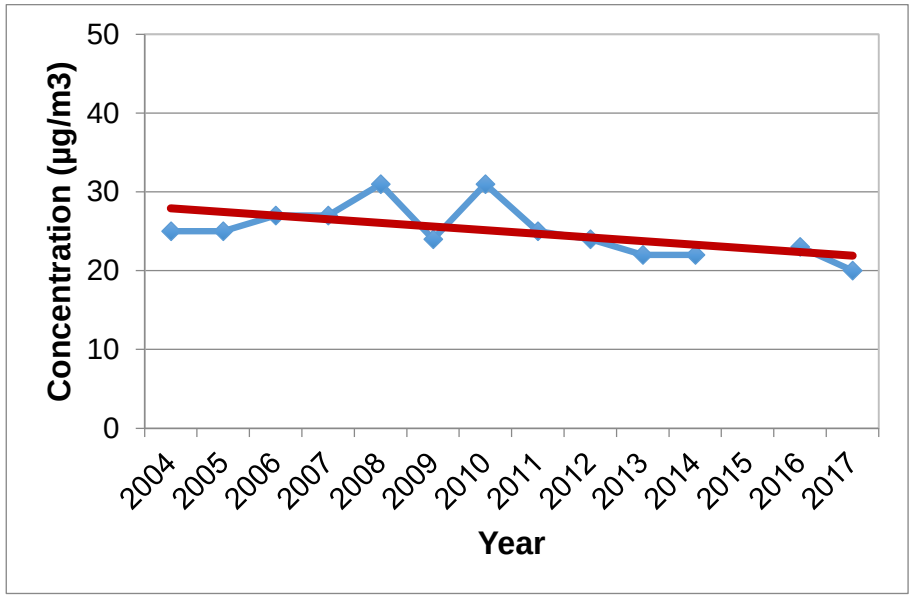


Figure A.3b Trend in Automatically Measured Annual Mean Nitrogen Dioxide Concentrations (µg/m³) at Gorgie Road

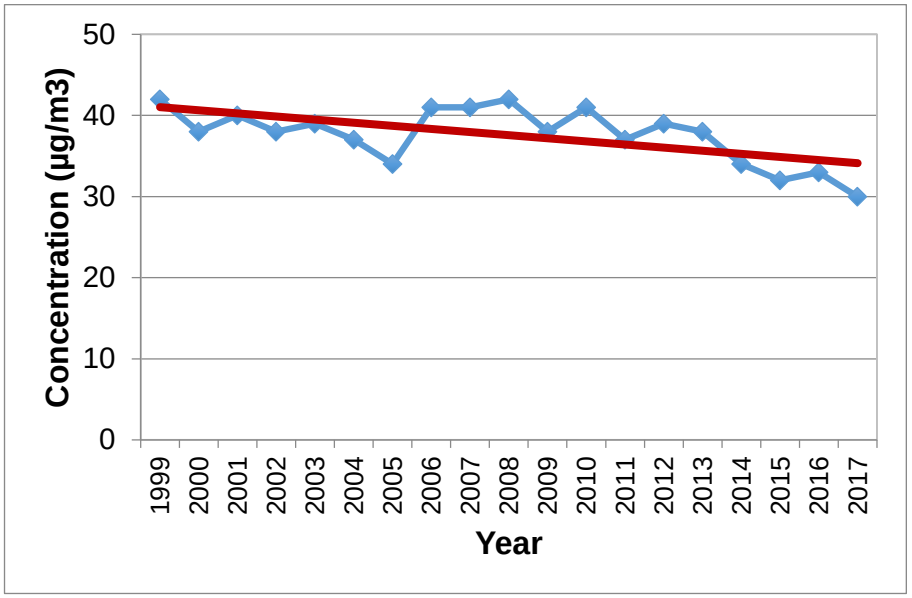


Figure A.3c Trend in Automatically Measured Annual Mean Nitrogen Dioxide Concentrations (µg/m³) at Salamander Street

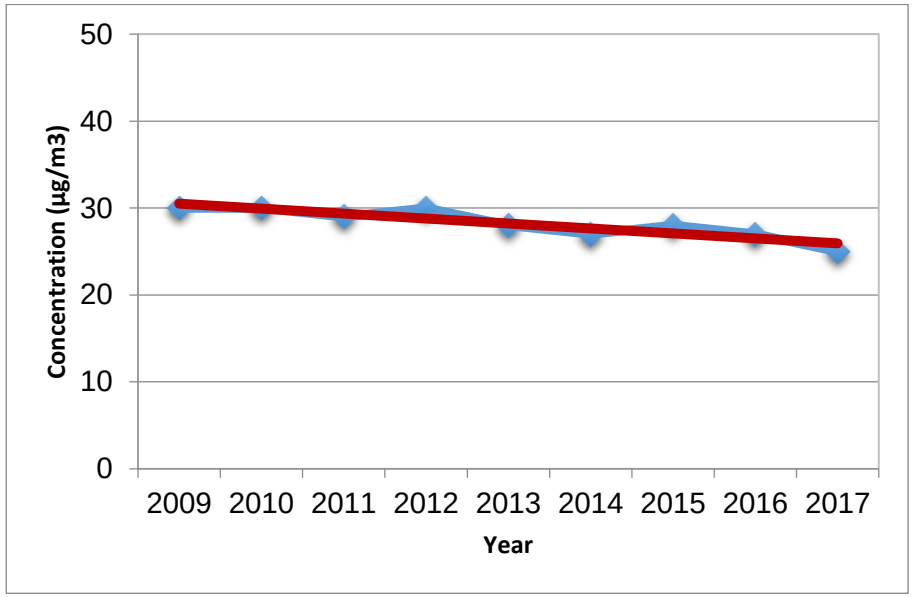


Figure A.3d Trend in Automatically Measured Annual Mean Nitrogen Dioxide Concentrations (µg/m³) at Currie

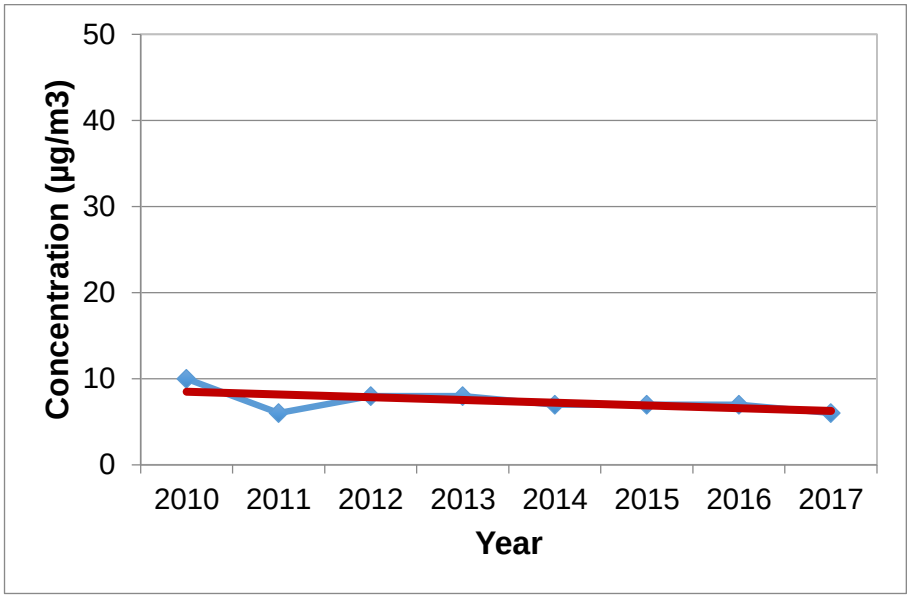


Figure A.3e Trend in Automatically Measured Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) at St John's Road

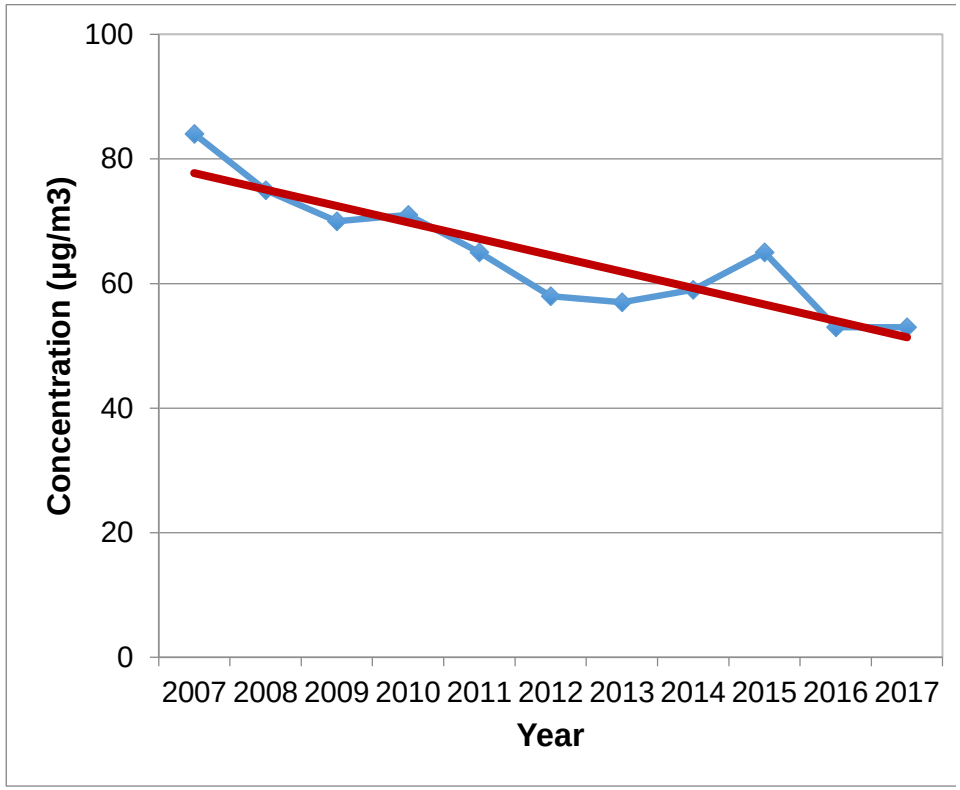


Figure A.3f Trend in the Number of Exceedances of the Hourly Mean Objective for Nitrogen Dioxide at St John's Road

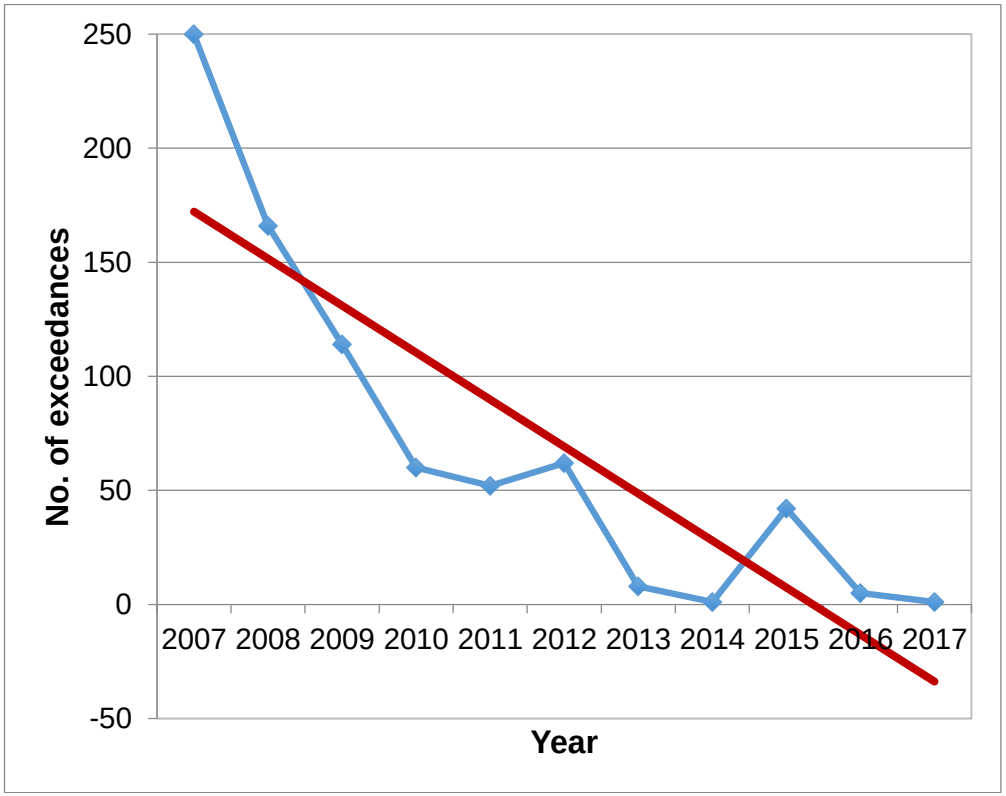


Figure A.3g Trend in Automatically Measured Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) at Glasgow Road

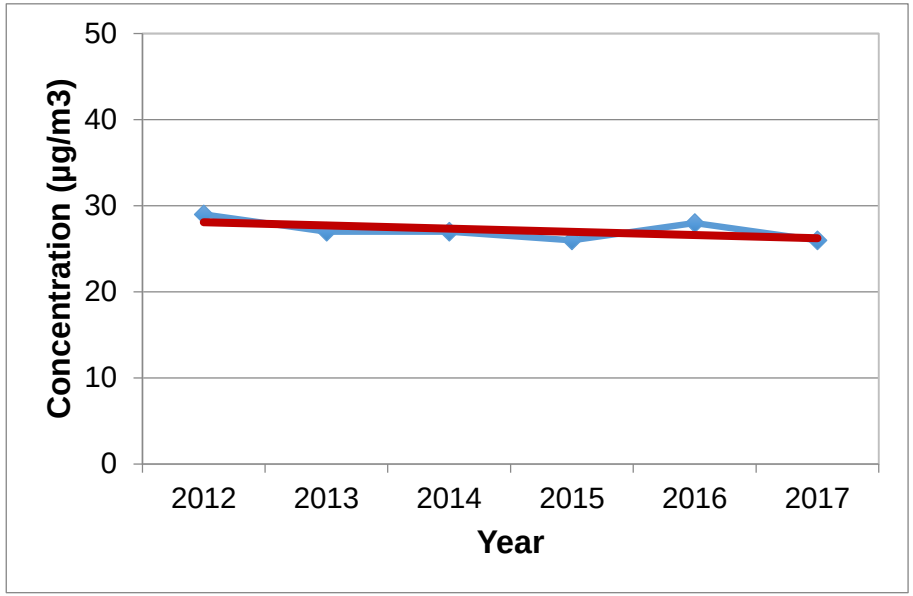


Table A.11 – Annual Mean PM_{10} Monitoring Results

Site ID	Site Name (Instrument) Site Type	Within AQMA ?	Annual Mean Concentration (µg/m^3)							
			2010	2011	2012	2013	2014	2015	2016	2017
ID1	**Queen Street** (TEOM) Roadside **Data capture (%)**	Y (NO2)	**18** (VCM) **19** (1.14) **96%**	16 (VCM) 16 (1.14) **94%**	16 (VCM) 16 (1.14) **96%**	17 (VCM) 17 (1.14) **96%**	17 (VCM) 16 (1.14) **97%**	15 (VCM) 16 (1.14) **98%**	N/A **49%**	N/A
ID5	**St John's Road** (FIDAS) Kerbside **Data capture (%)**	Y (NO_2)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	12 **100%**
ID6	**Currie** (TEOM) Suburban **Data capture (%)**	N	11 (VCM) 11 (1.14) **98%**	13 (VCM) 11 (1.14) **99%**	11 (VCM) 11 (1.14) **98%**	12 (VCM) 11 (1.14) **64%**	11 (VCM) 10 (1.14) **98%**	9 (VCM) 10 (1.14) **77%**	9 (VCM) 10 (1.14) **98%**	8 (VCM) 8 (1.14) **82%**
ID7	**St Leonard's** (FDMS) Urban BG **Data capture (%)**	N	14 **95%**	15 **98%**	16 **68%**	14 **94%**	13 **71%**	10 **93%**	11 **79%**	10 **85%**
ID8	**Salamander St** (TEOM) Roadside **Data capture (%)**	Y (PM_{10})	**26** (VCM) **27** (1.14) **97%**	**26** (VCM) **27** (1.14) **97%**	**23** (VCM) **24** (1.14) **96%**	**22** (VCM) **22** (1.14) **94%**	**21** (VCM) **21** (1.14) **98%**	**20** (VCM) **22** (1.14) **90%**	17 (VCM) **18** (1.14) **98%**	17(VCM) **19** (1.14) **96%**
ID9	**Queensferry Road** (FDMS) Roadside **Data capture (%)**	N	N/A	**21** **63%**	**18** **86%**	**19** **77%**	**19** **68%**	16 **87%**	**19** **78%**	**22** **85%**
ID10	**Glasgow Road** (TEOM) Roadside **Data capture (%)**	Y (NO_2)	N/A	N/A	15 (VCM) 15 (1.14) **32%**	16 (VCM) 16 (1.14) **97%**	16 (VCM) 16 (1.14) **98%**	15 (VCM) 16 (1.14) **97%**	15 (VCM) 17 (1.14) **85%**	15(VCM) 16 (1.14) **94%**

Notes for Table A.11 (continued overleaf)

Exceedances of the PM_{10} annual mean objective of 18µg/m^3 are shown in bold red. Results of 18µg/m^3 are shown in bold black.

Notes (continued) for Table A.11

Data from St Leonard's had a new correction method applied in 2015.

Data not annualised due to sporadic nature. N/A – No or insufficient data for assessment.

Table A.12 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Name (Equipment Type) Site Type	Within AQMA?	Data Capture 2017 %	Number of Daily Means > 50µg/m^3 [a]							
				2010	2011	2012	2013	2014	2015	2016	2017
ID1	**Queen Street** (TEOM) **Roadside**	Y (NO_2)	N/A	1	0	2	2	1	2	N/A	N/A
ID5	**St John's Road** (FIDAS) **Kerbside**	Y (NO_2)	100	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1
ID6	**Currie** (TEOM) **Suburban**	N	82	0	0	0	0(29) [a]	0	0(23) [a]	0	0
ID7	**St Leonard's** (FDMS) **Urban Background**	N	85	1	0	2(40) [a]	3	0(32) [a]	0(31) [a]	0 (29)	0
ID8	**Salamander St** (TEOM) **Roadside**	Y (PM_{10})	96	**19**	**22**	**13**	5	5	**8**	0	0
ID9	**Queensferry Road** (FDMS) **Roadside**	N	85	N/A	2	3	2(41) [a]	1(38) [a]	1(39) [a]	0(40)	**8**
ID10	**Glasgow Road** (TEOM) **Roadside**	Y (NO_2)	94	N/A	N/A	0(35) [a]	1	0	1	0	0

Notes for table;

Exceedance of the PM_{10} daily mean objective 50µg/m^3 – not to be exceeded more than 7 times per year – are shown in bold red.

[a] if data capture for full calendar year is less than 90%, the 98.08th percentile of 24-hour means is in brackets (expressed in µg/m^3).

Figure A.5a Trend in Automatically Measured Annual Mean PM_{10} Concentrations (Non-Volatile Fraction) ($\mu g/m^3$) at St Leonard's

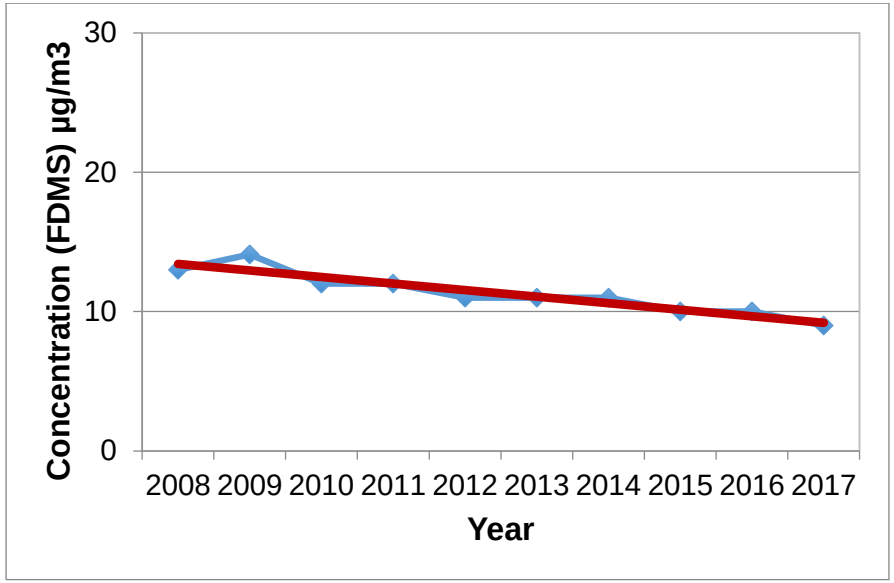


Figure A.5b Trend in Automatically Measured Annual Mean PM_{10} Concentrations ($\mu g/m^3$) at Currie

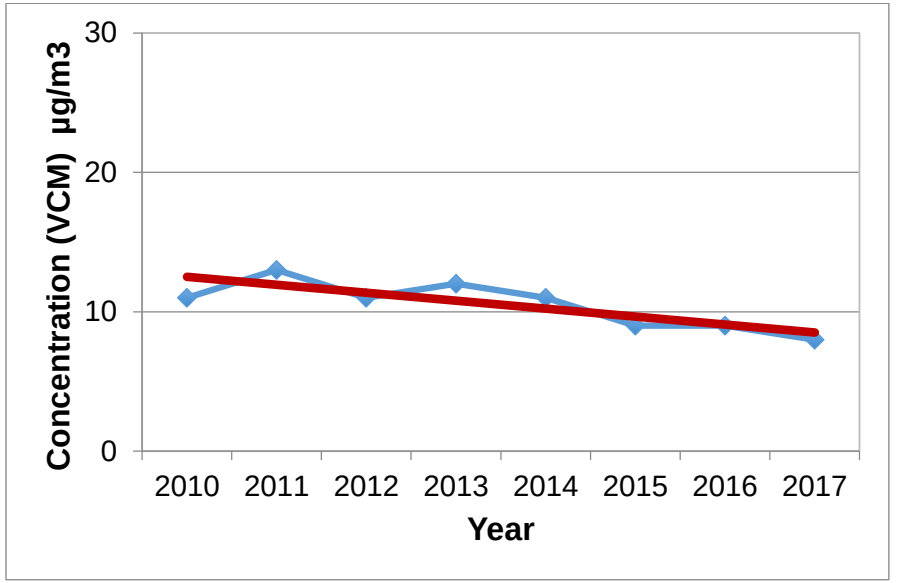


Figure A.5c Trend in Automatically Measured Annual Mean PM_{10} Concentrations ($\mu g/m^3$) at Salamander Street

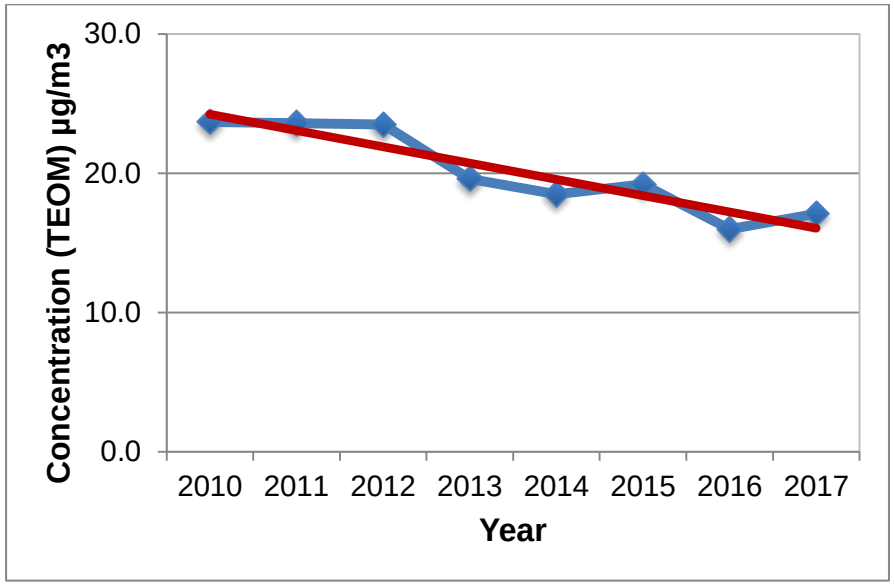


Figure A.5d Trend in Automatically Measured Annual Mean PM_{10} Concentrations ($\mu g/m^3$) at Queensferry Road

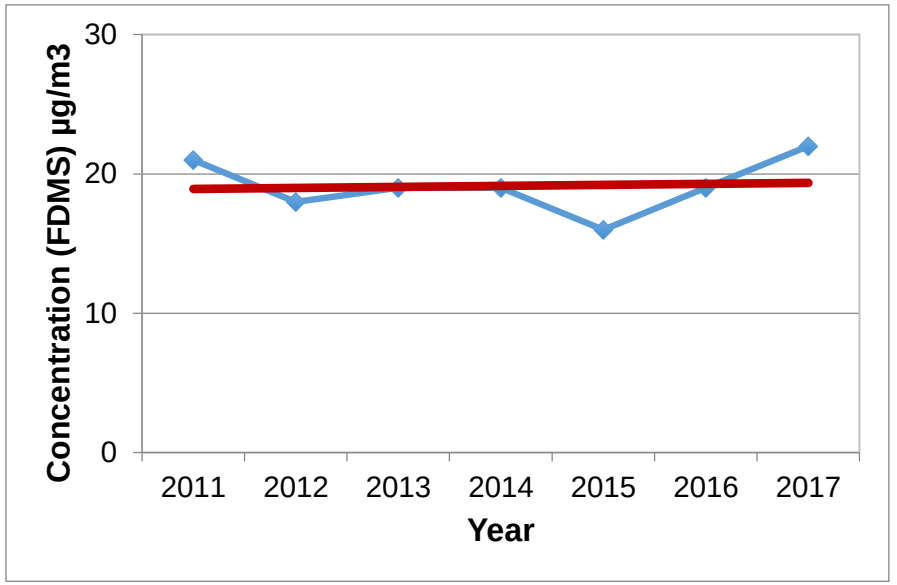


Figure A.5e Trend in Automatically Measured Annual Mean PM_{10} Concentrations ($\mu g/m^3$) at Glasgow Road

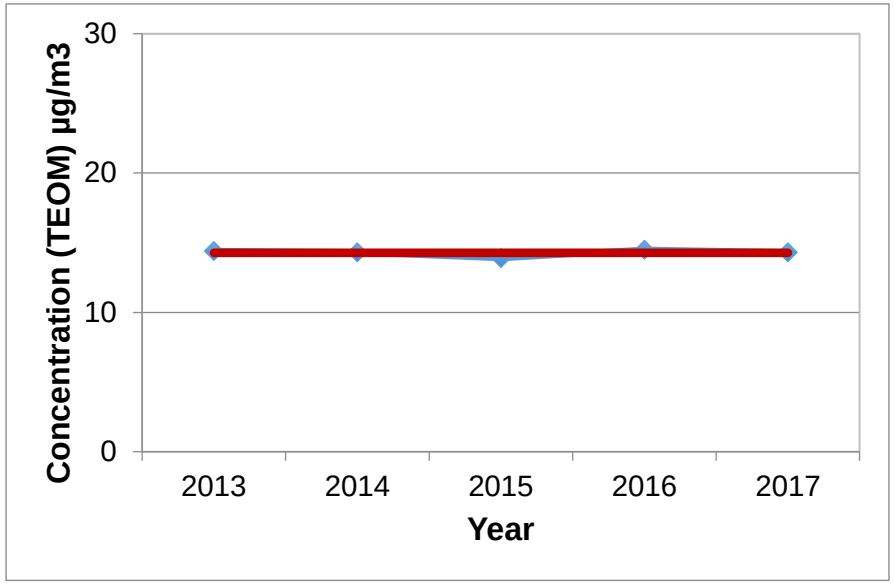


Table A.13a – Annual Mean $PM_{2.5}$ - Measured Concentrations

Site ID	Site Name (Instrument) Site Type	Annual Mean Concentration (µg/m³) (Data Capture %)							
		2010	2011	2012	2013	2014	2015	2016	2017
ID5	**St John's Road** (FIDAS) **Kerbside**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6 (100%)
ID7	**St Leonard's** (TEOM FDMS) **Urban BG**	9 (94%)	**12** (98%)	***11*** *(72%)*	8 (98%)	*9* *(65%)*	6 (86%)	6 (92%)	7 (95%)

Notes for Table Exceedances of the $PM_{2.5}$ annual mean objective of 10µg/m³ are shown in **bold red.**

Data capture in brackets (%) for measured data. Italic text indicates poor PM_{10} data capture.

Figure A.6 - Trend in Automatically Measured Annual Mean $PM_{2.5}$ Concentrations (µg/m³) at St Leonard's

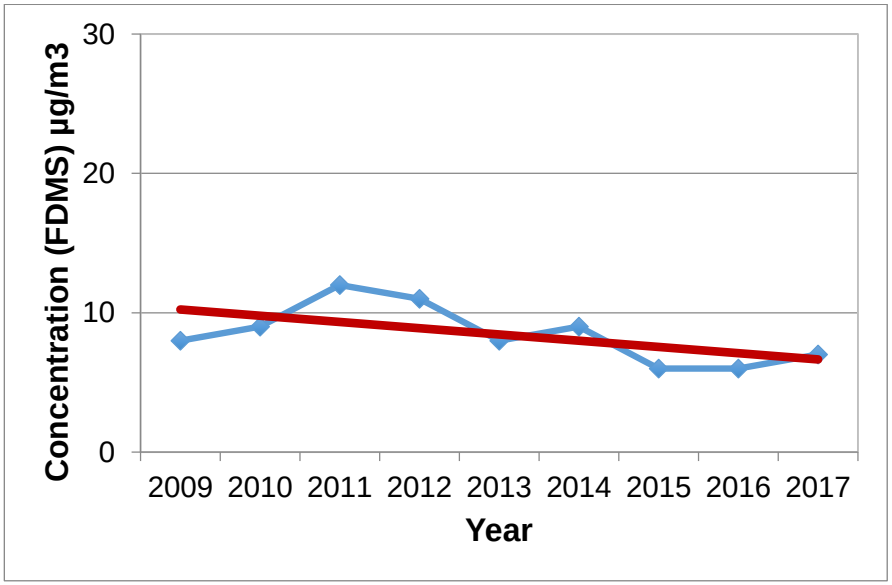


Table A.13b Estimation of $PM_{2.5}$ concentrations from PM_{10} Measured data using the UK National & Scottish Factors

Site ID & Name (Instrument) Site Type		Annual Mean Concentration (µg/m^3)					
		2012	2013	2014	2015	2016	2017
ID6 - Currie (TEOM) Suburban	National factor 0.7	8 (VCM) 8 (1.14)	*8 (VCM)* *8 (1.14)*	8 (VCM) 7 (1.14)	*6 (VCM)* *7 (1.14)*	*6 (VCM)* *7 (1.14)*	6 (VCM) 6 (1.14)
	Scottish factor 0.63	7 (VCM) 7 (1.14)	*8* (VCM) 7 (1.14)	7 (VCM) 6 (1.14)	*6* (VCM) 6 (1.14)	*6* (VCM) 6 (1.14)	5 (VCM) 5 (1.14)
ID8 - Salamander St (TEOM) Roadside	National factor 0.7	**16** (VCM) **17** (1.14)	**15** (VCM) **15** (1.14)	**15** (VCM) **15** (1.14)	**14** (VCM) **15** (1.14)	**12** (VCM) **13** (1.14)	**12** (VCM) **13** (1.14)
	Scottish factor 0.63	**14** (VCM) **15** (1.14)	**14** (VCM) **14** (1.14)	**13** (VCM) **13** (1.14)	**13** (VCM) **14** (1.14)	**11** (VCM) **11** (1.14)	**11** (VCM) **12** (1.14)
ID9 - Queensferry Rd (TEOM FDMS) Roadside	National factor 0.7	**13**	***13***	***13***	**11**	**13**	**15**
	Scottish factor 0.63	**11**	***12***	***12***	**10**	**12**	**14**
ID10 - Glasgow Road (TEOM) Roadside	National factor 0.7	***11 (VCM)*** ***11 (1.14)***	**11** (VCM) **11** (1.14)	**11** (VCM) **11** (1.14)	**11** (VCM) **11** (1.14)	**11** (VCM) **12** (1.14)	**11** (VCM) **11** (1.14)
	Scottish factor 0.63	*9* (VCM) 9 (1.14)	**10** (VCM) **10** (1.14)	**10** (VCM) **10** (1.14)	9 (VCM) **10** (1.14)	9 (VCM) **11** (1.14)	9 (VCM) **10** (1.14)

Notes for Table: Estimation of $PM_{2.5}$ concentrations from PM_{10} Measurements using national factor (0.7) – Yellow

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

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

Table A.14 – SO_2 Monitoring Results

Site ID	Site Type	Year	Valid Data Capture [a] (%)	Number of Exceedances (percentile in bracket) [3]		
				15-minute Objective	1-hour Objective	24-hour Objective
ID7	**St Leonard's** Urban Background	2010	92	0	0	0
		2011	98	0	0	0
		2012	98	0	0	0
		2013	97	0	0	0
		2014	73	0	0	0
		2015	97	0	0	0
		2016	95	0	0	0
		2017	96	0	0	0

Notes for Table: (a) Data capture for the full calendar years.

Table A.15 – Number of Ozone exceedances at St Leonard's

St Leonard's (Urban Background)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Data Capture[a] %	98	96	95	96	99	92	98	*72*	98	97	98
No. of exceedances	**44**	**109**	**12**	0	0	**43**	9	***42***	**14**	**43**	4

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

Table A.16 – PAH (B(a)P) Monitoring at St Leonard's

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

Notes for Table: Concentrations shown are not time-weighted
Italic; poor data capture

Appendix B: Full Monthly Diffusion Tube Results for 2017

Table B.1 – NO_2 Monthly Diffusion Tube Results for 2017

	Site code	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Raw Data[1]	Bias Adjust-ed[2]
NORTH WEST LOCALITY															
Deanhaugh St/Raeburn Pl	**13a**	36.4	E	30.0	M	27	21	M	22.4	M	27.7	37.0	34.0	33.0 [a]	27.1
Glasgow Road 158	**57**	M	E	51.2	55.1	40	44.9	40.1	46	52.8	47.9	50.7	49.9	47.9	39.2
Glasgow Road 68/ Facade	**16a**	35.9	44.7	M	28.7	45.9	29.1	M	32.4	M	M	42.7	M	37.8 [a]	31.0
Glasgow Road 68/adj	**16**	64.4	57.5	44.0	38.1	45.5	43.6	47.1	44.7	50.2	36.2	55.4	52.4	48.3	39.6
Glasgow Road Facade/9	**15a**	56.7	38.2	44.5	35.2	34.7	38	32.3	44.3	47.4	50.6	52.8	43.3	43.2	35.4
Glasgow Road Newbridge	**58**	60.4	52.3	38.3	52.6	62.2	50.8	52	63.2	70.2	73.1	74.1	63.3	59.4	48.7
Glasgow Road Newbridge	**58**	67.8	59.7	56.6	58.6	51.3	63.1	56.3	67.7	82.2	70.8	67.5	73.8	64.6	53.0
Glasgow Road Newbridge	**15**	55.6	44.9	61.1	39.5	51.6	43.7	38.4	55.3	57.2	69.8	75.3	56.9	54.1	44.4
Glasgow Road/Drumbrae	**56**	48.9	E	43.8	32.3	38.2	26.6	25.8	33.9	32.8	M	46.8	42.6	37.2	30.5
Hamilton Place/Stockbridge	**143a**	49.2	E	42.1	24.6	30.1	26.3	23.8	28.2	32.3	34.3	46.1	41.2	34.4	28.2
Hillview Terrace	**41**	32.4	E	15.0	14.0	15.3	10.6	14.1	15.6	19.1	M	30.5	40.4	20.7	17.0
Inverleith Row/Montague	**55c**	34.4	E	34.4	23.8	39.1	19.4	28.6	20.4	31.0	27.5	29.3	25.7	28.5	23.4
Inverleith Row/Ferry Road	**55**	53.1	E	M	51.4	46.9	42.8	42.7	49.1	45.3	42.2	61.6	52.0	48.7	39.9
Inverleith Row/Ferry Road	**55**	59.5	E	M	48.2	37.1	39.8	44.6	49	52.3	47.9	49.4	48.3	47.6	39.0
Queensferry Road 544	**63**	M	30.6	31.3	29.0	25.6	26.3	21.8	28.4	33.7	35.0	49.5	44.9	32.4	26.5
Queensferry Road 550	**64**	96.8	85.4	81.4	73.9	36.1	62.8	53.9	71.1	77.6	83.0	82.4	90.8	74.6	61.2
Queensferry Road 550F	**64b**	51.2	37.1	39.4	36.2	29.9	28.9	24.3	35	42	44.4	53.8	52.4	39.6	32.4
Queensferry Road 552	**64a**	48.5	33.3	43.3	36.5	32.6	25.6	23.8	31.1	35.9	35.7	46.0	48.5	36.7	30.1
Queensferry Road 561	**62**	20.9	21.5	29.6	19.2	23.3	15.9	19.8	16.6	20	21.5	25.7	31.3	22.1	18.1
Queensferry Road/Hillhouse	**40**	41.2	M	42.5	29.2	40.7	26.8	29.2	25.7	34.4	29.5	44.7	30.8	34.1	27.9
Roseburn Terrace	**23**	41.4	E	40.3	36.8	69.3	37.0	M	34.7	50.9	38.0	52.8	30.2	39.0 [a]	32.0

	Site code	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Raw Data[1]	Bias Adjust -ed[2]
Roseburn Terrace Wbound	**22a**	60.5	E	58.3	47.0	48.3	49.8	44.7	47	54.2	49.5	64.7	52.2	51.8	42.5
St John's Road 131	**1d**	57.0	E	M	45.9	49	40.6	39.3	45.9	53.9	52.3	75.4	52.6	51.2	42.0
St John's Road 81	**SJ3**	M	E	M	43.8	48.2	27.6	32.4	35.7	41.3	42.2	56.5	43.9	41.3	33.9
St John's Road 63	**SJ2**	38.3	E	7.6	M	32.9	21.2	26.1	23.7	33.9	32.0	45.7	37.1	32.3	26.5
St John's Road IR	**1b**	34.6	E	37.6	30.9	46	29.3	32.3	32.3	38.8	36.7	42.1	21.9	34.8	28.5
St John's Road SB	**1**	36.2	E	37.9	25.4	51.3	52.4	35.2	M	32.2	7.8	45.7	36.8	39.2	32.2
St John's Road/Kaimes Road	**SJ1**	55.3	E	45.6	38.0	38.9	30.8	31.2	28.4	M	39.3	52.9	41.7	40.2	33.0
St John's Road/Victor Park	**39**	61.9	E	51.7	38.7	34.2	37.6	31.6	41.4	44.7	30.1	68.3	28.6	42.6	34.9
Trinity Crescent	**14**	41.5	E	31.8	21.6	23.5	17.3	21.0	21.1	28.4	16.9	35.3	42.1	27.3	22.4
SOUTH WEST LOCALITY															
Angle Park Terrace 25	**76c**	56.9	37.1	47.0	37.1	30.8	23.9	25.7	33.2	31.6	31.0	47.5	41.5	36.9	30.3
Angle Park Terrace 74	**76b**	52.5	46.0	61.0	40.0	48.8	35.8	40.7	42.1	37.6	47.5	63.3	49.7	47.1	38.6
Angle Park Ter/Harrison Rd	**76**	44.6	44.5	48.8	30.8	50.5	32.9	36.7	37.9	47.4	34.5	44.6	53.8	42.3	34.6
Ardmillan Terrace 22	**76a**	47.2	1.7	66.2	25.7	34.4	22.3	M	25.5	29.5	26.4	34.9	37.6	35.0	28.7
Balgreen Rd/Library	**80e**	41.6	E	M	47.3	30.8	32.3	26.4	36	40.4	32.8	49.0	48.3	38.5	31.6
Calder Road	**4a**	30.8	24.8	21.0	26.3	30.6	24.6	M	21.4	M	27.5	31.4	27.5	26.6	21.8
Dundee Street/Yeaman Pl	**79d**	56.8	50.3	52.1	36.8	51.6	34	38.7	49.2	50.8	39.2	55.5	M	46.8	38.4
Fountainbridge 103	**79a**	48.8	44.1	36.2	29.8	46.7	27.7	35	32.4	36.7	29.0	40.7	47.3	37.9	31.1
Fountainbridge/Tollcross	**79**	19.8	37.1	40.1	26.3	M	28.9	M	M	38.6	29.8	M	M	32.4 [a]	26.6
Gorgie Road - Delhaigh	**80**	43.7	E	M	35.2	41.3	32.3	36	39	42.9	44.0	53.1	49.6	41.7	34.2
Gorgie Road 549	**80b**	45.0	E	37.1	34.9	34.4	22.3	M	28.4	38.5	28.5	44.8	31.5	34.5	28.3
Gorgie Road 8	**18**	57.0	E	55.6	31.8	48.2	30.4	34.8	35.7	46.4	31.3	58.9	43.0	43.0	35.3
Gorgie Road 87	**80c**	M	E	M	34.8	31.2	27.5	31.1	M	39.2	M	55.2	M	31.4 [a]	25.7
Gorgie Road/Glen Lea	**80a**	34.7	E	33.4	62.1	31.1	24.6	25.3	23.6	34.6	31.7	44.4	39.9	35.0	28.7
Gorgie Road/Murieston Road	**5**	61.1	E	65.8	54.3	49.3	35.3	38.9	48.9	48.1	43.3	69.7	58.1	52.1	42.7

	Site code	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Raw Data[1]	Bias Adjust -ed[2]
Henderson Terrace	**76d**	43.5	33.6	25.5	25.6	36.3	25.8	29.2	33.6	40.8	31.4	45.1	42.2	34.4	28.2
Lanark Road 610	**11**	30.5	21.6	27.0	24.2	21.3	M	17.8	17.8	23.1	23.4	28.9	33.7	24.5	20.1
Slateford Road 51	**77a**	55.5	38.7	40.9	25.9	41.7	27.8	31.8	34	38.5	35.0	41.7	46.9	38.2	31.3
Slateford Road 93/95	**77b**	45.3	49.4	53.0	31.1	41.9	30.5	34.4	33.3	38.9	M	42.4	44.9	40.5	33.2
Slateford Road 97	**77**	52.1	37.5	45.5	23.5	M	27.8	33.3	26.6	34.5	37.6	M	M	35.4	29.0
NORTH EAST LOCALITY															
Bernard Street/ K.Chambers	**29a**	46.2	E	34.5	31.3	37.7	26.5	26.8	28	34.7	30.7	M	37.3	33.4	27.4
Bernard Street/PS	**29c**	44.9	E	43.6	46.7	40.5	34.7	33	42.9	42.4	M	51.4	48.4	42.9	35.1
Bernard Street/PS	**29c**	56.0	E	51.4	39.1	37.3	29.8	34.4	41.9	51.8	50.4	54.0	45.3	44.7	36.6
Bernard Street/Sainsburys	**29**	42.0	E	39.5	37.9	37.3	32.6	27	33.9	41	40.1	55.0	44.7	39.2	32.1
Broughton Road	**43**	52.6	E	42.5	32.1	36.6	28.5	28	33.4	44.5	34.8	45.2	46.0	38.6	31.6
Commercial Street	**9d**	51.7	E	47.1	38.0	57.4	37	43.7	33.4	46.8	39.3	52.5	37.6	44.0	36.1
Commercial Street 88	**9**	31.4	E	40.5	26.6	41.3	23.1	31.3	27.0	32.4	27.4	37.3	34.6	32.1	26.3
Commercial St/Portland Pl	**9a**	50.5	E	55.6	50.1	42.2	40.6	38.7	44.8	M	30.5	M	32.7	42.9	35.1
Duke Street	**30f**	55.0	E	55.0	44.2	M	36.1	32	41.8	3.1	43.9	57.6	51.5	42.0	34.5
Easter Road 105/109	**25c**	46.5	E	37.7	30.5	33.3	28	27.2	36.8	43.3	35.7	48.2	42.3	37.2	30.5
Easter Road 198	**25e**	33.7	E	38.1	22.5	36	21.7	26.7	24.6	30.2	28.4	M	34.6	29.2	23.9
Easter Road/Bothwick	**25d**	43.9	E	41.2	25.9	41.2	24.7	M	30.6	36.7	M	39.2	34.7	35.3	29.0
Easter Road/CH shop	**25**	<1.0	E	49.3	36.9	59.7	17.6	40.9	M	M	36.1	48.5	45.9	44.4 [a]	36.4
Easter Road/Rossie Place	**25b**	44.6	E	50.1	25.1	M	25.5	33.4	M	M	31.3	42.1	37.6	37.3 [a]	30.6
Ferry Road/ 6 Bowhill Terr	**53**	51.1	E	40.8	40.2	29.7	34.3	30.3	41.9	41.6	44.3	58.3	49.5	42.0	34.4
Ferry Road/Nt Junction St	**45d**	42.4	E	46.8	35.8	40.2	29.1	31.2	41.2	38.2	41.4	55.1	44.0	40.5	33.2
Great Junction Street 137	**30b**	58.3	E	47.5	42.9	41.9	33.7	30.6	38.4	34.4	29.7	41.4	41.2	40.0	32.8
Great Junction Street 14	**30c**	43.1	E	50.9	16.0	56.8	30.5	41.3	37.7	38.3	31.2	44.0	42.9	41.7	34.2
Great Junction Street/Pirrie	**30e**	37.3	E	12.3	M	48	32.2	M	36.2	M	M	41.5	37.4	N/A	

	Site code	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Raw Data[1]	Bias Adjust -ed[2]
Great Junction Street/FV	**30**	48.5	E	46.4	28.8	52.9	29.4	39.7	32.3	38.1	36.3	36.9	35.4	38.6	31.7
Great Junction Street No.137	**30d**	47.7	E	46.9	27.0	34.9	27.4	53	28.6	44.1	M	54.1	45.1	42.2 [a]	34.6
Leith Walk/Brunswick Road	**21**	M	E	M	M	M	M	35	43.5	50.7	40.2	52.7	54.2	39.4 [a]	32.3
Leith Walk/McDonald Road	**20**	55.2	E	58.7	42.1	M	M	M	46.5	42.2	38.2	56.1	57.2	N/A	
London Road/Cadzow Place	**66**	47.0	E	M	M	46.7	29	32.8	31.7	M	31.9	41.9	42.7	38.0	31.1
London Road/Earlston Place	**67**	M	E	M	M	61	45.1	41.7	50.1	44.1	46.1	50.2	56.1	39.7 [a]	32.6
London Road/East Norton Pl	**81**	M	E	M	42.2	48.1	59.2	38.8	53.6	51.5	42.3	60.6	53.0	49.9	40.9
London Road/junct Easter Rd	**46**	59.8	E	53.4	44.4	42	34.9	M	46.4	47.1	47.0	52.8	56.3	48.4	39.7
London Rd/Parson's Green	**68**	42.3	M	45.8	M	37.4	28.6	30.8	28.5	33.8	36.1	44.8	39.8	36.8	30.2
London Road/Wolseley Place	**69**	51.6	56.3	55.5	45.5	41.2	39.8	31.4	37.1	38.3	36.7	50.3	50.3	44.5	36.5
London Road/Wolseley Terr	**70**	53.1	M	41.9	54.3	37	38.1	36.6	50.1	44.4	45.9	58.6	52.4	46.6	38.2
Niddrie Mains Road 28	**32**	50.7	34.7	32.8	M	29.7	M	24.5	33.3	34.2	33.2	38.8	43.4	35.5	29.1
North Junction St No.4	**9c**	43.1	E	31.0	37.6	32.8	M	M	M	34.6	41.5	57.0	59.1	44.4 [a]	36.4
Portobello High Street W 185	**71**	52.9	31.6	40.6	41.5	28	29.7	25	30.3	20.1	35.7	43.3	48.3	35.6	29.2
Portobello Rd/Ramsay Inst	**73d**	53.1	39.9	26.6	M	38.6	31.7	31.4	32.6	43.1	37.6	43.3	39.6	38.0	31.1
Salamander Street/Baltic St	**51c**	53.7	E	42.3	16.8	26.3	25.8	25.1	33.3	41.0	40.4	55.8	47.4	39.1	32.1
Seafield Road East 10	**72**	36.3	30.9	42.6	29.4	47.1	23.4	34.3	23.7	32.1	30.6	34.4	37.3	33.5	27.5
SOUTH EAST LOCALITY															
Broughton Street	**44**	58.8	E	47.3	28.7	46.9	34	33.6	36.1	40.9	M	62.4	36.9	43.5	35.7
Bruntsfield Place 210	**6a**	46.4	33.8	36.5	33.4	40.9	M	M	30.8	40.9	26.7	42.6	41.2	37.3	30.6
Clerk Street 15	**138**	57.7	47.6	54.7	51.2	43.8	38.7	37.8	49.1	53.3	43.4	71.6	53.5	50.2	41.2
Comiston Road No.116	**151**	39.8	31.0	36.4	M	26.7	25.7	22.2	28.4	35.6	21.7	37.7	34.9	30.9	25.4
Cowgate/ 50 St Mary's St	**48f**	54.2	51.3	48.5	31.9	M	27	34.4	36.8	42.9	35.6	45.3	41.8	40.9	33.5
Cowgate/Blackfriars	**48c**	66.9	46.2	66.7	49.6	36.5	27.2	39.6	45.9	53.4	46.4	64.6	56.5	50.0	41.0
Cowgate/Blair Street	**48a**	36.5	38.8	36.0	32.0	M	<0.1	35.3	M	39.4	M	43.2	M	41.8 [a]	34.3

	Site code	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Raw Data[1]	Bias Adjust -ed[2]
Cowgate/Guthrie Street	**48**	47.8	42.8	52.4	42.8	M	24	30.8	36.9	36.6	32.9	49.5	42.7	39.9	32.7
Cowgatehead 2	**48e**	80.9	43.6	63.9	43.3	35.5	36.6	M	58.7	M	M	M	75.6	58.1 [a]	47.6
Drum Street	**150**	29.9	38.6	41.0	28.8	28.1	24.9	22.3	23.2	38	M	32.5	30.6	30.7	25.2
George Street 112	**74f**	37.7	E	44.9	19.8	34.9	26.5	30.7	43	29.1	36.3	50.0	54.7	37.1	30.4
Grassmarket 41	**37a**	77.0	44.1	55.6	34.8	42.9	M	37.1	M	47.1	116.4	115	119.4	68.9	56.5
Grassmarket 41	**37a**	138.4	36.3	45.4	33.1	44.5	28.4	34.0	37.2	M	102.1	78.4	93.6	53.3	43.7
Grassmarket 75	**37b**	44.8	44.0	32.6	41.1	40.1	28.8	35.6	43.4	43.1	38.9	52.0	54.3	41.6	34.1
Grassmarket/Thomsons Ct	**37c**	28.5	31.0	42.5	30.8	33.9	21.2	26.8	27.0	32	26.9	42.9	38.4	31.8	26.1
Gt Stuart Street 9	**75e**	38.0	E	29.5	20.0	19.6	18.3	20.1	24.0	30.8	25.5	31.2	31.9	26.3	21.5
Haymarket Terrace North	**HT1**	50.1	E	59.1	46.5	58.5	43.4	40.6	44.9	52.4	46.0	60.1	44.9	49.7	40.7
Haymarket Terrace South	**HT2**	M	E	39.6	51.0	61	35	50.5	42.5	52.7	53.5	54.4	59.4	46.4 [a]	38.0
Home Street/Tollcross	**10**	45.4	42.5	54.0	49.2	43.4	40.1	34.2	46.3	55.1	41.7	57.4	45.4	46.2	37.9
Hope Park Terrace/Clerk St	**140**	56.3	39.0	38.1	79.9	46	31.8	M	39.7	40.2	37.7	42.4	40.9	41.2	33.8
Hope Park Terrace/VS	**17a**	39.1	35.7	47.9	36.6	39.8	32.6	32.6	35.2	44.4	33.2	46.8	43.3	38.9	31.9
Howden Hall Road 79	**149a**	42.3	42.0	35.5	33.2	46.4	26.2	28.3	31.3	32	30.8	41.1	33.3	35.2	28.9
India Street	**34**	37.7	E	33.4	15.2	19.9	12.4	17.6	18.1	22.9	25.5	35.2	29.4	24.3	19.9
Leith Street	**74g**	69.9	E	53.2	M	66	71.4	53.2	56	M	M	M	M	N/A	
Mayfield Road No.90	**152**	46.9	31.1	36.1	30.3	21.1	20.1	20.3	27.6	31	33.0	44.1	39.5	31.8	26.0
Melville Drive	**38**	1.6	27.9	40.1	35.5	20.4	23.4	21.4	33	35.3	30.5	M	41.2	30.9	25.3
Midmar Drive	**42**	27.7	18.2	20.1	15.6	2.9	11	12.2	13	15.6	14.6	22.8	24.9	17.8	14.6
Morningside Road	**8**	33.2	28.8	30.4	24.0	30.7	21.6	23.6	21.8	28	30.4	33.9	30.8	28.1	23.0
Morrison Street	**49**	61.1	E	52.2	44.4	47.6	37.5	39.4	41.5	45.2	41.6	53.9	46.3	46.4	38.1
Nicholson Street 69	**135**	53.2	62.4	66.7	55.2	60.5	53	39.7	53.5	47.3	45.8	48.6	53.8	53.3	43.7
Nicholson Street 92	**136**	38.7	38.2	52.7	37.7	48.7	30.2	31.7	35.1	36.3	30.5	48.2	43.6	39.3	32.2
North Bridge South	**27**	40.4	53.0	M	49.0	M	M	54.7	54	44.6	M	48.6	43.6	51.9 [a]	42.6
Princes Street (Eastbound)	**47**	47.0	E	57.0	40.6	56.5	34	M	37.4	M	43.5	53.1	49.6	46.5	38.1

	Site code	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Raw Data[1]	Bias Adjust -ed[2]
Princes Street/Mound	**24**	61.3	E	78.9	76.8	70	M	56.8	69.9	M	M	74.1	68.8	73.1 [a]	59.9
Queen Street/Albyn Pl	**33a**	49.1	E	37.3	30.5	38.5	28	2.6	M	41.3	M	41.3	49.3	35.3	29.0
Queen Street/North David St	**33**	60.0	E	37.7	42.0	50.5	35.7	42.2	48.7	44.6	47.4	59.7	63.0	48.3	39.6
Shandwick Place Hostel	**SH1**	58.4	E	40.8	29.5	M	30.4	M	39.7	38.3	M	48.7	52.7	N/A	
South Bridge 59	**144**	54.0	61.9	57.3	42.8	65	44.6	48.4	51	49.4	39.8	58.5	54.6	52.3	42.9
South Clerk Street 41a	**142**	M	34.1	53.1	29.3	49.2	M	39.4	38.3	35.3	36.5	47.5	39.8	40.3	33.0
South Clerk Street 84	**141**	62.0	52.8	53.1	53.5	41.6	32	33.1	42.8	50.6	38.7	53.7	47.5	46.8	38.4
St Colme Street/4	**75d**	28.8	E	41.3	23.3	37.2	22.2	27.2	24.3	33	28.7	34.9	34.8	30.5	25.0
St John's Hill No.16	**153**	34.5	20.2	11.6	20.1	15	12	11.7	16.1	21.2	19.7	34.4	33.2	20.8	17.1
Torphicen Place 1	**3b**	68.3	E	42.6	50.7	55.3	55.8	48.3	48.4	50	44.9	30.5	51.0	49.6	40.7
Torphichen Place	**3**	52.5	E	45.6	51.8	43.8	41	39.5	56.3	54.6	49.9	72.0	54.2	51.0	41.8
Viewcraig Gardens No.7	**154**	34.0	25.8	24.9	25.6	14	14.6	14.1	20.5	22.1	21.0	M	32.1	22.6	18.5
West Maitland Street	**2**	80.0	E	61.8	60.8	66	41.5	52.4	55.5	61.6	52.2	63.9	57.7	59.4	48.7
West Port 42	**28d**	71.2	55.5	57.8	M	52.2	M	49.7	62.5	52.6	55.1	61.2	54.7	57.3	46.9
West Port 62	**28b**	63.1	65.1	M	63.0	63.3	M	53.4	68.5	M	M	M	74.9	N/A	
West Port Opp 50	**28c**	45.4	M	M	50.6	M	27.4	2.8	48.8	45	39.1	49.9	34.0	43.8	35.9
York Place	**36**	56.5	E	50.6	32.3	47.9	30.4	33.5	36.6	M	36.6	47.7	50.0	42.2	34.6

Notes for Table; **M** – Tube missing on collection. **E** – Laboratory Error N/A – Not Applicable: data not used

Data in **red** – problematic data removed from the data set e.g. tube upside down or squint on collection.
[1] Raw data, annualised ([a]) where data capture below 75%. See details in Appendix C.
[2] See Appendix C for details on bias adjustment factor.

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

C1 Nitrogen Dioxide (NO_2) Diffusion Tube Bias Adjustment Factors

Edinburgh Scientific Services 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 annual mean data from the historical local co-location studies always show that passive diffusion samplers over read the real-time analysers by average factors from 0.74 to 0.91. See Tables C1a and C1b.

Between 2011 and 2015 the bias was calculated using a combination of local factors and the factors contained in the National Bias Database, with sites which are also analysed by Edinburgh Scientific Services. This followed a step change in the bias factor in 2011. A manual approximate orthogonal regression calculation was undertaken to combine the bias factors. The procedure for this calculation was updated with the revised technical guidance in 2016.

Table C1a Historical bias data used in previous reports 2001 - 2007

Site	Type	2001	2002	2003	2004	2005	2006	2007	2008
Currie	Suburban	N/A	N/A	N/A	0.91	N/A	N/A	N/A	N/A
Gorgie	Roadside	N/A	N/A	N/A	N/A	0.86	N/A	0.91	0.94
Haymarket	Roadside	0.93	N/A	N/A	0.88	0.93	0.91	0.92	0.87
Leith Walk	Roadside	0.89	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Queen St	Roadside	0.91	0.91	0.91	0.90	0.84	0.83	0.85	0.81
Roseburn	Roadside	N/A	N/A	N/A	N/A	0.92	N/A	N/A	0.91
St John's Rd.	Kerbside	N/A	N/A	N/A	N/A	N/A	N/A	0.93	0.86
Mean		**0.91**	**0.91**	**0.91**	**0.89**	**0.89**	**0.87**	**0.90**	**0.88**

(Table continued overleaf)

Table C1b Historical bias data used in previous reports 2007 - 2016

Site	Type	2009	2010	2011	2012	2013	2014	2015	2016
Glasgow Rd	Roadside	N/A	N/A	N/A	N/A	0.64	0.67	0.6	0.69
Gorgie	Roadside	N/A	N/A	0.87	0.86	0.87	0.85	0.86	0.83
Qns'ferry Rd	Roadside	N/A	N/A	0.66	0.71	0.71	0.69	0.66	0.67
Queen St	Roadside	0.83	0.84	0.69	0.65	0.7	0.64	0.7	N/A
Salamander	Roadside	N/A	0.79	0.77	0.80	0.78	0.77	0.8	0.76
Roseburn	Roadside	0.82	0.85	N/A	N/A	N/A	N/A	N/A	N/A
St.John's Rd	Kerbside	0.92	0.92	0.79	0.74	0.77	0.82	0.94	0.83
Mean		**0.86**	**0.85**	0.76	0.75	0.75	0.73	0.74	0.75
Combined Mean[1]				**0.81**	**0.76**	**0.75**	**0.74**	**0.76**	**0.77**

Edinburgh co-locates triplicate tubes on the sampler head cages of each roadside and kerbside monitoring station. Data from four sites were considered for the co-location study 2017. Queensferry Road site was not used due to low data capture. The details and factors are shown in Table C2. Generally, the passive diffusion tubes give higher concentrations than the real-time analysers over an annual period.

Table C2 Bias Factors 2017 Data

Site	Type	Analyser Mean [2]	DC [3] (%) Analyser	PDT [4] Mean	PDT* Precision	Periods	Bias Factor A	Bias B (%)
Glasgow Road	Roadside	26	97	41	7	11	0.63	58
Gorgie Road	Roadside	29	100	33	7	11	0.89	13
Salamander St	Roadside	26	99	32	8	10	0.81	23
St John's Road	Kerbside	54	99	61	6	10	0.88	14

In 2017 the overall precision of triplicate tubes was good. So too was the overall data capture. Usual checks were carried out with respect to the automated and passive diffusion tube data to assess the reliability of the bias factor. Edinburgh Scientific Services laboratory scored satisfactory in the AIR/WASP NO_2 proficiency testing scheme throughout the year.

[1] An approximate orthogonal regression calculation was undertaken with the National Bias database data.
[2] Concentrations match sampling period not calendar year.
[3] DC - Data Capture (for periods used).
[4] PDT – Passive Diffusion Tube.

An annual mean bias factor of 0.79 from the local co-location studies was calculated as per Table C3, below – **Mean Local Bias**.

Table C3 Calculation of Local and Combined Bias Factors

	Bias A	Bias B	Calculation	Bias
Local Bias				
Glasgow Road	0.63	58%		
Gorgie Road	0.89	13%		
Salamander Street	0.81	23%		
St John's Road	0.88	14%		
Mean Local Bias		**27**	0.27+1 = 1.27	
			1/1.27 =	**0.79**
National Bias				
Marylebone Road	0.87	15.4%		
Stirling	0.91	10%		
Mean Combined Bias		**22.2**	0.222+1 = 1.222	
			1/1.222 =	**0.82**

At the time of assessment there was two other studies available on the National Diffusion Tube Bias Adjustment Factor Spreadsheet, for Edinburgh Scientific Services (Marylebone Inter-comparison and Stirling). These studies were similar in nature to those in Edinburgh in so far that there were kerbside and roadside locations (respectively) and they used the same tube preparation method. The overall precision was good in both studies.

In keeping with the methodology of combining the local studies with those available on the national database since 2011, a manual approximate orthogonal regression calculation was undertaken which resulted in a bias adjustment factor of 0.82. Details of the calculation are also shown in Table C3 - **Mean Combined Bias**. This combined factor was chosen as the most appropriate factor to use with 2017 data as it represents the worse-case scenario. The national bias factor as of September 2018 was 0.81, so in good agreement with the Council's chosen factor.

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). Nevertheless, all data, including calibration data, is scrutinised daily by the Council (Monday to

Friday) by visual examination, to see if they contained unusual measurements. Any data which was suspicious (e.g. large spikes) is 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 during 6-monthly audits.

Calibration procedures

The two ML 9841 B NO_x analysers (located at Glasgow Road and Salamander Street) perform an auto-calibration each day with zero air and NO gas. Warning limits are set at +/- 5 % on the software program.

All other sites including those listed above are visited fortnightly, apart from the National Network sites (St Leonards and Nicolson Street) which are visited monthly, and manual calibration checks are carried out using certified NO gas at approximately 500ppb plus a zero check. All cylinders are replaced at 12 to 18month intervals. Nitric Oxide cylinders were supplied by Air Liquide UK prior to September 2012 and thereafter, 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 the 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 regularly - approximately every 2 weeks.

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

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. It is UKAS accredited for this task and participates in the independent AIR-PT scheme, operated by LGC Standards and supported by the Health and Safety Laboratory, with yearly assessment against agreed performance criteria. AIR-PT combines two long running PT schemes: LGC Standards STACKS PT scheme and HSL Workplace Analysis Scheme for Proficiency (WASP). The lab's performance was rated as being satisfactory over the rolling five rounds prior to the end of 2017.

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.

All passive diffusion tube monitoring data shown in this report has been corrected for diffusion tube bias in accordance with LAQM TG (16). The monthly exposed passive diffusion tubes in Edinburgh generally over-read real-time analysers. Pre-2011 this was by a factor range of 0.85 to 0.91, which were derived from local co-location studies. There was then a step change in the studies and results have since ranged from 0.74 to 0.81, using a combined calculation with national bias factors. In 2017 the bias adjustment factor is 0.80.

C4 Short-term to Long-term Data adjustment for NO_2

Data from St Leonards, Currie and Bush Estate (Midlothian) monitoring sites was used to estimate annual nitrogen dioxide concentrations from short term measurements. The data capture for all these sites was within acceptable limits for the purpose. The Bush Estate is part of national Automatic Urban and Rural Network (AURN) and located within the required distance to Edinburgh.

Non-Automatic Monitoring (Passive Diffusion Tubes)

Where passive diffusion tubes have less than 75% data capture for the annual period, the same annualisation calculation is undertaken. See tables below for details. Note; annual mean concentrations from the automatic sites varies as timings/dates are coordinated to the relevant passive diffusion tube exposure dates.

Site ID No. 9c				
Measured Mean Value (M) = 41.5				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	4.69	4.92	1.05
St Leonards	Urban Background	19.71	22.42	1.14
Currie	Suburban	6.33	6.52	1.03
			Average Ratio (R)	1.07
Adjusted Mean (M x R) = 44.4				

Site ID No. 13a				
Measured Mean Value (M) = 30.6				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	4.69	5.01	1.07
St Leonards	Urban Background	19.71	22.21	1.13
Currie	Suburban	6.33	6.68	1.06
			Average Ratio (R)	1.08
Adjusted Mean (M x R) = 33.0				

Site ID No. 16a				
Measured Mean Value (M) = 37.1				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	4.69	4.84	1.03
St Leonards	Urban Background	19.64	19.57	1.00
Currie	Suburban	6.31	6.49	1.03
			Average Ratio (R)	1.02
Adjusted Mean (M x R) = 37.8				

Site ID No. 20c				
Measured Mean Value (M) = 42.5				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	4.69	4.42	1.06

St Leonards	Urban Background	19.64	21.20	0.93
Currie	Suburban	6.31	5.73	1.10
			Average Ratio (R)	1.03
Adjusted Mean (M x R) = 43.8				

Site ID No. 21				
Measured Mean Value (M) = 42.4				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	4.69	4.24	0.90
St Leonards	Urban Background	19.71	20.03	1.02
Currie	Suburban	6.33	5.43	0.86
			Average Ratio (R)	0.93
Adjusted Mean (M x R) = 39.4				

Site ID No. 23				
Measured Mean Value (M) = 40.2				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	4.69	4.36	0.93
St Leonards	Urban Background	19.71	21.25	1.08
Currie	Suburban	6.33	5.73	0.91
			Average Ratio (R)	0.97
Adjusted Mean (M x R) = 39.0				

Site ID No. 24				
Measured Mean Value (M) = 69.6				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	4.69	4.89	1.04
St Leonards	Urban Background	19.64	21.27	1.08
Currie	Suburban	6.31	6.43	1.02
			Average Ratio (R)	1.05
Adjusted Mean (M x R) = 73.1				

Site ID No. 25				
Measured Mean Value (M) = 45.3				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	4.69	4.49	0.96
St Leonards	Urban Background	19.71	20.34	1.03
Currie	Suburban	6.33	6.00	0.95

Average Ratio (R)	0.98
Adjusted Mean (M x R) = 44.4	

Site ID No. 25b				
Measured Mean Value (M) = 36.9				
Site	**Site Type**	**Annual Mean (AM) µg/m³**	**Period Mean (PM) µg/m³**	**Ratio AM/PM**
Bush	Rural background	4.69	4.65	0.99
St Leonards	Urban Background	19.71	21.15	1.07
Currie	Suburban	6.33	6.13	0.97
			Average Ratio (R)	1.01
Adjusted Mean (M x R) = 37.3				

Site ID No. 27				
Measured Mean Value (M) = 48.5				
Site	**Site Type**	**Annual Mean (AM) µg/m³**	**Period Mean (PM) µg/m³**	**Ratio AM/PM**
Bush	Rural background	4.69	5.04	1.07
St Leonards	Urban Background	19.64	21.61	1.10
Currie	Suburban	6.31	6.46	1.02
			Average Ratio (R)	1.07
Adjusted Mean (M x R) = 51.9				

Site ID No. 30d				
Measured Mean Value (M) = 41.1				
Site	**Site Type**	**Annual Mean (AM) µg/m³**	**Period Mean (PM) µg/m³**	**Ratio AM/PM**
Bush	Rural background	4.69	4.75	1.01
St Leonards	Urban Background	19.71	21.00	1.07
Currie	Suburban	6.33	6.22	0.98
			Average Ratio (R)	1.02
Adjusted Mean (M x R) = 42.2				

Site ID No. 48e				
Measured Mean Value (M) = 54.8				
Site	**Site Type**	**Annual Mean (AM) µg/m³**	**Period Mean (PM) µg/m³**	**Ratio AM/PM**
Bush	Rural background	4.69	4.94	1.05
St Leonards	Urban Background	19.64	20.17	1.03
Currie	Suburban	6.31	6.88	1.09

Average Ratio (R)	1.06
Adjusted Mean (M x R) = 58.1	

Site ID No. 48a				
Measured Mean Value (M) = 37.3				
Site	**Site Type**	**Annual Mean (AM) µg/m³**	**Period Mean (PM) µg/m³**	**Ratio AM/PM**
Bush	Rural background	4.69	5.37	1.14
St Leonards	Urban Background	19.64	21.40	1.09
Currie	Suburban	6.31	7.07	1.12
			Average Ratio (R)	1.12
Adjusted Mean (M x R) = 41.8				

Site ID No. 67				
Measured Mean Value (M) = 45.1				
Site	**Site Type**	**Annual Mean (AM) µg/m³**	**Period Mean (PM) µg/m³**	**Ratio AM/PM**
Bush	Rural background	4.69	4.07	0.87
St Leonards	Urban Background	19.71	18.31	0.93
Currie	Suburban	6.33	5.38	0.85
			Average Ratio (R)	0.88
Adjusted Mean (M x R) = 39.7				

Site ID No. 79				
Measured Mean Value (M) = 31.5				
Site	**Site Type**	**Annual Mean (AM) µg/m³**	**Period Mean (PM) µg/m³**	**Ratio AM/PM**
Bush	Rural background	4.69	4.82	1.03
St Leonards	Urban Background	19.64	19.36	0.99
Currie	Suburban	6.31	6.70	1.06
			Average Ratio (R)	1.03
Adjusted Mean (M x R) = 32.4				

Site ID No. 80c				
Measured Mean Value (M) = 36.5				
Site	**Site Type**	**Annual Mean (AM) µg/m³**	**Period Mean (PM) µg/m³**	**Ratio AM/PM**
Bush	Rural background	4.69	3.99	0.85
St Leonards	Urban Background	19.71	17.52	0.89
Currie	Suburban	6.33	5.25	0.83

Average Ratio (R)	0.86
Adjusted Mean (M x R) = 31.4	

Site ID No. HT2				
Measured Mean Value (M) = 51.0				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	4.69	4.16	0.89
St Leonards	Urban Background	19.64	18.60	0.94
Currie	Suburban	6.31	5.67	0.90
			Average Ratio (R)	0.91
Adjusted Mean (M x R) = 46.4				

C5 PM Monitoring Adjustment

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 newly established 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

NO_2 Fall-Off with Distance Calculator (V4.2, released March 2018) was used to undertake the following calculations

Non-automatic (Passive Diffusion Tube) Data

SITE NO.	1	2	4a	5	9a	9c	11	14	15	16	22a
How far from kerb was measurement made (m)	0.5	0.5	12.0	0.3	1.5	2.7	1.5	2.0	4.0	1.8	0.5
How far from kerb is receptor in metres (m)	2.3	5.7	17.0	5.2	5.4	4.7	5.2	6.0	7.8	6.2	2.7
Local background concentration of NO_2	17.0	26.5	23.9	21.9	18.3	18.3	13.3	16.0	24.9	22.3	17.3
Annual mean bias corrected value	32.2	48.7	21.8	42.7	35.1	36.4	20.1	22.4	44.4	39.6	42.5
Result; Predicted annual mean at receptor	**28.1**	**39.1**	**N/A***	**33.1**	**30.4**	**33.9**	**18.2**	**20.8**	**40.8**	**34.7**	**35.0**

SITE NO.	23	24	32	36	38	39	47	49	53	55c	56
How far from kerb was measurement made (m)	0.2	1.0	2.6	5.5	2.8	1.6	9.0	2.2	4.6	4.3	2.6
How far from kerb is receptor in metres (m)	2.5	11.2	7.3	8.2	12.8	5.8	2.5	4.6	6.2	5.3	7.2
Local background concentration of NO_2	19.8	26.6	14.4	23.0	19.4	17.6	26.6	26.5	16.0	17.1	17.6
Annual mean bias corrected value	32.0	59.9	29.1	34.6	25.3	34.9	38.1	38.1	34.4	23.4	30.5
Result; Predicted annual mean at receptor	**27.3**	**43.7**	**25.3**	**33.2**	**23.0**	**29.9**	**43.4**	**36.0**	**32.8**	**23.0**	**27.2**

* Distance corrected value could not be calculated as the measured concentration was lower than the modelled background maps concentration [http://www.scottishairquality.co.uk/data/mapping?view=data].

SITE NO.	57	58	58	64	140	SJ1	SJ2	SJ3	HT2
How far from kerb was measurement made (m)	3.6	2.8	2.8	1.5	1.3	0.3	0.4	1.2	0.5
How far from kerb is receptor in metres (m)	12.1	8.0	8.0	10.7	4.8	2.5	9.5	15.6	2.3
Local Background concentration of NO_2	16.7	24.9	24.9	14.5	20.5	17.1	17.1	17.1	19.8
Annual mean bias corrected value	39.2	48.7	53.0	61.2	33.8	33.0	26.5	33.9	38.0
Result; Predicted annual mean at receptor	**31.8**	**42.3**	**45.5**	**41.0**	**30.1**	**27.5**	**21.4**	**24.9**	**33.1**

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the LA intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
APR	Air quality Annual Progress Report
AURN	Automatic Urban and Rural Network (UK air quality monitoring network)
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

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