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THE CITY OF EDINBURGH COUNCIL

2016 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

August 2016

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Executive Summary: Air Quality in Our Area

Air Quality in City of Edinburgh

Edinburgh has declared five Air Quality Management Areas (AQMAs) for the pollutant nitrogen dioxide (NO_2). 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.

Earlier assessment work has shown that the NO_2 contribution from each vehicle class is different within the AQMAs. For example, cars were shown to contribute the most at Glasgow Road AQMA, with buses having the largest impact along some routes in the Central AQMA (London Road, Gorgie Road/Chesser, Princes Street) and HGVs having a significant impact at Bernard Street. Therefore, in order to improve air quality, it will be necessary to keep all motor vehicle classes under review.

Although the monitoring data for 2015 shows that the AQMAs are still required, the good news is that concentrations of NO_2 in these areas of concern are going down.

No new AQMAs or extensions of existing AQMAs are required for the pollutant NO_2, but an AQMA will be required for particles (PM_{10}) at Salamander Street. There is evidence to suggest that activities regarding handling and storage of open fine materials within and adjacent to Leith Docks are a contributory factor.

The report identified that there is a new point emission source from a gas fired Combined Heat and Power Plant (CHP), which may lead to the air quality standards being breached. This will be subject to further investigation by the Council.

In November 2015, the Scottish Government published a document called Cleaner Air for Scotland – The road to a healthier future. This is a national strategy to improve local air quality and Councils are expected to work in partnership with Transport Scotland, Scottish Environment Protection Agency and Health Boards to help deliver a number of key actions. Two of the main actions are the development of a National Modelling Framework and a National Low Emission Framework. This work will set

the scene for local authorities to adopt Low Emission Zones and Clean Air Zones and will ensure that there is a consistent approach across the country.

Actions to Improve Air Quality

The main actions in the Council's Air Quality Action Plan and Local Transport Strategy to improve air quality are;

- promoting cleaner transport, in particular buses via a voluntary means
- adoption of a fleet recognition efficiency scheme for reducing emissions from heavy goods vehicles
- improving traffic flow and easing congestion by use of intelligent traffic signalling
- promoting model shift away from car use by means of an Active Travel Action Plan.

Steady progress has been achieved over the year with respect to improvements in the bus fleets which operate in the city. Lothian buses (Transport for Edinburgh) are the principle provider of bus services in the city; currently 66% of the main fleet are Euro 5 or better. The company continues to use the cleanest buses on the high frequency services which pass through the AQMAs. Lothian buses will also replace their Euro 2 standard City Tour buses with Euro 6 standard vehicles by September 2016. The City Tour Fleet has a high presence in the Central AQMA.

There will be significant reductions in emissions of NO_x and particulates from the Euro 6 vehicles compared with the present Euro 2 vehicles. The reductions have been calculated to be in the range of 95% to 99%. Carbon emissions will be reduced by 40% and the new vehicles are quieter, thereby providing additional benefits with respect to climate change and noise pollution.

During 2015, 49 double- deck Euro 4 Volvo buses were converted to a cleaner Euro 5 standard engine system to reduce NOx emissions. The estimated reductions under normal route operating conditions have been calculated at 13% per vehicle.

The new Euro 6 standard Tour Fleet of buses

Other bus operators in the city have also improved their fleets, all Euro 3 standard vehicles have now been removed from the Stagecoach fleet and 83% of the fleet are Euro 5 or better. Citylink have one Euro 3 vehicle operating in Edinburgh and 86% of the fleet are Euro 5 or better.

First Scotland East Fleet services into Edinburgh are under review. 34% of the overall fleet is Euro 5 or better and a further 19 Euro 6 hybrid vehicles will be joining the fleet in September 2016.

A new traffic signalling system was installed (Microprocessor Optimised Vehicle Actuation (MOVA)), at Newbridge Roundabout which became fully operational in April 2016. This was designed to improve traffic flow and vehicle delay times in the Glasgow Road AQMA and thus reduce exhaust emissions.

Results show that there has been a significant reduction in waiting time on the A8 westbound corridor. An assessment of ambient concentrations of NO_2 will be undertaken for the annual Air Quality Progress Report 2017.

ECOSTARS Edinburgh a fleet efficiency and recognition scheme has been successful in assisting the Council encourage emission improvement from the goods and passenger transport sector operating in the city. We have observed yearly increases in membership and to date the scheme has attracted 129 operators and a total of 6,089 vehicles are registered.

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. As well as bringing health benefits the ATAP 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. A core element of the plan is the development of the 'QuietRoutes' cycle network which enables people to travel around the city on safer routes away from the busier roads. A number of major and smaller cycling and pedestrian schemes have been delivered and other schemes are in progress. Scottish Household Survey 2015 and Edinburgh Bike Life report indicate that cycling to work by Edinburgh residents increased from 4.9% in 2011 to 7.3% during 2014/15.

Additional cycle and pedestrian counters have been installed across the city to monitor progress which is being made towards achieving the set targets.

To encourage residents to purchase electric vehicles a number of public accessible charging points have been installed across the city and the Council has seen an increase in the number of charging sessions and amount of power used.

Transport Scotland has become a partner with the Council to assist the funding of an on-street pilot electric charging scheme to provide fourteen units at seven locations in the Marchmont area of the city. The units should be available for use by the end of 2017, subject to Traffic Regulation Order consultations.

In September 2015, the new Borders Railway became operational, linking Edinburgh to Midlothian and Tweedbank. It is anticipated that there will be air quality benefits as a result of commuter model shift from road to rail. Passenger numbers exceeded original estimates and from September 2015 to March 2016 there were almost 700,000 using the service.

In December 2015, the Council took a decision to proceed with Stage 1 of a tram extension to Newhaven (Leith). A further report is required to be produced by summer 2017 on a way forward for delivery.

Local Priorities and Challenges

Continuing economic growth in the city and wider region presents a challenge for air quality. It has been estimated from the recent Census figures that if the recent trend continues Edinburgh's population would grow by 28.2% to reach 619,000 at 2037. Consequently, there will be an inevitable demand for all modes of transport and supported infrastructure.

Edinburgh is a major centre of employment and attracts a substantial amount of commuter traffic as well as local traffic.

According to the 2011 Census, car journeys are still the most popular mode of transport to work accounting for 46% of all journeys into or within the city.

Edinburgh will need to manage economic growth with its neighbouring Councils in a more sustainable manner to ensure that air quality is safe for its residents and visitors and does not breach the standards set by the Scottish Government.

A priority for the Council in 2017 will be to revise the current Air Quality Action Plan and investigate 'new' measures and incentivise existing ones.

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/

Table of Contents

List of Tables

List of Figures

1. Local Air Quality Management

This report provides an overview of air quality in the City of Edinburgh during 2015. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

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

Table1.1 – Summary of Air Quality Objectives in Scotland

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Nitrogen dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m^3	Annual mean	31.12.2005
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	18 µg/m^3	Annual mean	31.12.2010
Particulate Matter ($PM_{2.5}$)	10 µg/m^3	Annual mean	31.12.2020
Sulphur dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005
Benzene	3.25 µg/m^3	Running annual mean	31.12.2010
1,3 Butadiene	2.25 µg/m^3	Running annual mean	31.12.2003
Carbon Monoxide	10.0 mg/m^3	Running 8-Hour mean	31.12.2003
Lead	0.25 µg/m^3	Annual Mean	31.12.2008

2. Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

A summary of AQMAs declared by the City of Edinburgh Council can be found in Table 2.1. Further information related to declared AQMAs, including maps of the boundaries are available online at http://www.edinburgh.gov.uk/airquality . All AQMAs have been declared for the pollutant Nitrogen Dioxide. However following the recommendations from a Detailed Assessment of Particles (2016) a new Area will be declared to cover exceedances of PM_{10} at Salamander Street.

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 city 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
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	

2.2 Progress and Impact of Measures to address Air Quality in City of Edinburgh Council

City of Edinburgh Council has taken forward a number of measures during the current reporting year of 2015/16 in pursuit of improving local air quality. Details of measures completed, in progress, or planned are set out in Table 2.21 and supplementary information is detailed below.

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]

Air Quality Action Plan (Revised 2008)

http://www.edinburgh.gov.uk//download/downloads/id/321/air_quality_action_plan

City of Edinburgh Council's, 'Transport 2030 Vision', provides an overarching strategy for the future development of transport in Edinburgh over a 20 year period 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 Local Transport Strategy (LTS).

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

There are a number of 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

Several other significant policy issues are contained in separate local action plans:

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.

http://www.edinburgh.gov.uk//download/downloads/id/1632/sustainable_edinburgh_2020_action_plan_2012-2014

http://www.edinburgh.gov.uk//download/downloads/id/6756/sustainable_energy_action_plan_easy_read.pdf

Scotland's low emission strategy, Cleaner Air for Scotland -The road to a healthier future (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 a number of 'actions' which local authorities, agencies and other partners will be expected to support in order to achieve the required reduction in emissions by 2020.
http://www.scottishairquality.co.uk/assets/documents/news/Cleaner_Air_for_Scotland_Nov_2015.pdf

City of Edinburgh Council is working in partnership with SEPA, Transport Scotland and the Scottish Government to assist in the development of the National Modelling Framework (NMF) for Edinburgh. This is a key element of the delivery of CAFs and will provide quantitative evidence for the National Low Emission Framework (NLEF).

Key completed measures from AQAP and LTS are set out below including known outcomes.

2.2.1 Completed measures

Transport Planning and Infra Structure projects

Tramline 1

The Tram operates from Edinburgh Airport to a temporary stop at York Place in the city centre. Trams became operational on 30th May 2014.

Passenger numbers from 28 December 2014 to 2 January 2016 were 5.3 million.

In December 2015 the Council took a decision to proceed with Stage 1 of a tram extension to Newhaven (Leith). A governance structure was also approved. Officers are required to report back to Council in 2017 (Summer) with recommendations for delivery.

Rail improvements

A number of new rail lines have been constructed which serve the Edinburgh area. It is anticipated that air quality benefits to the city will be delivered as a result of commuter model shift from road to rail.

Borders rail link

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

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.

Alternatives to private vehicle use

Park and Rides

Edinburgh is served by a number of Park and Ride locations around the periphery of the city boundary, East and Mid Lothian and Fife as shown in Table 2.2. The current number of spaces available has the potential to reduce the two way daily work

commuter traffic by 11,280 if operated at maximum capacity. Newcraighall and Wallyford also have rail accessibility and Ingliston is connected to Edinburgh Tram service. Ingliston Park and Ride has seen an increase (16%) in usage from 2015 to 2016 for months January to June as detailed in Table 2.3.

Table 2.2 – Park and Ride sites serving Edinburgh.

Park and Ride Site	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 ** Tram accessible

Table 2.3 – Usage at Ingliston Park and Ride site for 2015 and 2016

Time period	January to June 2015	January to June 2016
Number of vehicles Parking	85,000	101,000

The usage for the other park and ride sites was not known at time of reporting.

Land has now been acquired at Hermiston for development of the Park and Ride extension. This would more than double the current capacity to provide 1000 spaces.

Traffic Management

Newbridge Roundabout (Glasgow Road AQMA)

The 'non cable linked fixed- time' traffic signalling which controlled Newbridge Roundabout has been replaced with a Microprocessor Optimised Vehicle Actuation (MOVA) system, following a feasibility study which looked at a number of options.[2]

The 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.

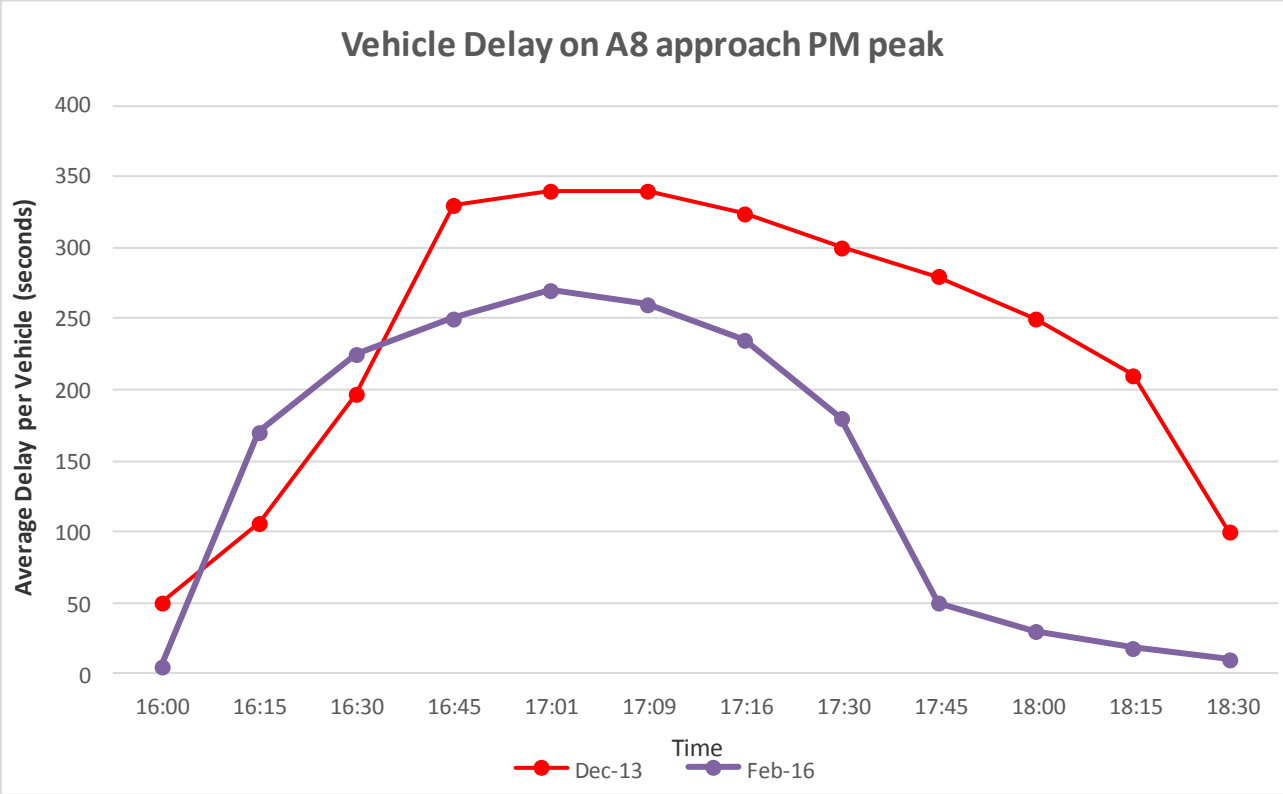
This system became fully operational on April 2016 following validation and minor adjustments to improve journey times on the A89. The adjustments did not compromise the calculated February 2016 afternoon vehicle delay times on the A8 approach.

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 4minutes and 10 seconds delay per vehicle is saved between 17:45 to 18:00. Therefore, this would lead 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.

It is too early to establish if there have been any overall air quality improvements within the AQMA Glasgow Road. An assessment of ambient concentrations of NO_2 will be undertaken for the Annual Air Quality Progress Report 2017.

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



Reduction of speed limits

Edinburgh City Council has introduced a 20mph speed limit across the city which will be phased in over a period of eighteen months. The first phase which covers the city centre and rural west (South Queensferry, Kirkliston, Ratho, Currie and Balerno) became operational on 31st July 2016.

The project extends the 20mph to the city centre, main shopping streets and residential areas while retaining a strategic network of roads at 30mph and 40mph.

This has been introduced primarily for road safety reasons and will improve travelling conditions across the city for both walking and cycling. Air quality has not been assessed and there is uncertainty with respect to direct improvements that might be delivered.

Promoting Travel Alternatives

Active Travel Action Plan

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% for walking and 10% for cycling for all trips in the city 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.

To monitor outcomes there are over 20 cycle counters across the city and a network of automated pedestrian counters are now being installed in a mix of on street and off-street locations.

Progress of ATAP actions have been reviewed in 2013 and 2015. A further review is expected in late 2017. In 2018 the ATAP will be updated and extended to 2025. Increases in active travel for cycling and walking are shown in Table 2.4.

Table 2.4 – 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%.

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%

Telematics is currently being considered in greater detail by the Council.

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.

The Scottish Government Green Bus and the Bus Operators Grant are currently being reviewed. Therefore, until funding information becomes available it has not been possible for bus companies to submit bids for the purchase of greener vehicles.

Lothian Buses Transport for Edinburgh (TfE)

Lothian buses are the main service provider in the urban areas of Edinburgh with a total of 668 vehicles in service. Significant improvements have been achieved since 2006 with the assistance of Scottish Government funding shown in Table 2.6. The degree of year on improvement is illustrated in Table 2.7.

During 2015, 49 double- deck Volvo vehicles of Euro 4 standard were converted to Euro 5 by a process of engine management system re-mapping. The re-mapped engines have been certified to operate as a Euro 5 standard vehicle by the Vehicle and Operators Services Agency (VOSA). The NOx emission reduction estimates have been calculated at 13% per vehicle under normal route operating conditions.

Transport for Edinburgh (TfE) has recently approved a project involving an enhanced deployment of specially adapted Lothian diesel-electric hybrid buses. These buses will deliver substantial emission savings and will operate in full-electric mode through the City of Edinburgh's Council's Central AQMA and East Lothian Council's AQMA in Musselburgh.

A fleet of new diesel-electric hybrid vehicles will be purchased to facilitate this technology. The buses will be engineered to receive an electric charge via an adapted pantograph system on the roof of the vehicles. The service route selected for this project will require specifically designed, rapid electric charging infrastructure to be installed at each terminus, where the vehicles' large capacity batteries will be fast-charged. It is envisaged that with the enhanced electric storage capacity, the buses will switch automatically to electric-only mode when operating in AQMAs (and other areas where air quality is a consideration) utilising GIS 'Geo Fencing' SMART technology.

Work is being progressed to secure funding for the electric charging infra structure which is required.

As part of a £6.5 million investment, all Euro 2 standard City Tour buses, which have a high presence in the City Centre area of the Central AQMA, will be replaced with 30 Euro 6 Standard vehicles. It is anticipated that the buses will start arriving in July 2016 and will be integrated into the fleet by 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%. This will result in a significant improvement in terms of

air quality and climate change. The new buses are also quieter and therefore will be beneficial with respect to noise pollution.

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

Technology	2011 (Funding)	2012 (Funding)	2013 (Funding)	2014 (Funding)	2015 (Funding)
Retro fit using SCRT (EMINOX) Euro 3 to Euro 5/6 (EEV standard)	43 (A) In service				
Hybrid Double Deck vehicles Euro 5 standard	15 (B) In service				
Hybrid Single Deck vehicles Euro 5 standard		10 (C) In service			
Double Deck EEV standard	60 (D) In service				
Single Deck EEV standard		5 (D) In service			
Hybrid Single Deck vehicles Euro 6 standard			20 (E) In service	20 (F) In service	
Hybrid Double Deck vehicles Euro 6 standard					20 (G) In service
Double Deck vehicles Euro 6				25 (D) In service	
Euro 4 to 5 upgrades via engine management alteration				26 (D) In service	49 (D) In service

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 round 1)

C Total cost £2.65M (Scottish Government £750,000 Green bus fund round 2)

D Lothian Buses self-funding

E Scottish Government £1.5M Green bus fund round 3

F Scottish Government £1.05M Green bus fund round 4

G Scottish Government £1.5M Green bus fund round 5

Table 2.7 – Euro Standard of service bus fleet (Lothian Buses 2006 to 2016)

Euro Standard	Base 2006	Sept 2010	Oct 2011	Aug 2012	May 2013	May 2014	March 2015	May 2016
Pre Euro	63 10%	0	0	0	0	0	0	0
Euro 1	33 5%	0	0	0	0	0	0	0
Euro 2	202 32%	64 10%	7 1%	12 2%	0	0	0	0
Euro 3	317 52%	307 52%	257 43%	254 42%	251 41%	273 43%	233 36%	222 33%
Euro 4	0	79 13%	79 13%	81 13%	81 13%	75 12%	55 9%	6 1%
Euro 5	0	136 23%	141 23%	141 23%	141 23%	147 23%	186 29%	258 39%
EEV (5/6)	0	1 0.1%	117 20%	117 19%	142 23%	146 23%	104 16%	85 13%
Euro 6						1 <1%	65 10%	97 14%
Total	**615**	**587**	**601**	**605**	**615**	**642**	**643**	**668**

Data provided by Lothian Buses (TfE) June 2016

Table 2.8 – Euro Standard of City Tour Bus fleet (Lothian Buses) 2010 to 2016

Euro Standard	Sept 2010	Oct 2011	Aug 2012	May 2013	May 2014	March 2015	Sept 2016
Pre Euro	9	0	0	0	0	0	0
Euro 1	0	0	0	0	0	0	0
Euro 2	37	45	38	38	44	44	0
Euro 3	0	0	1	1	1	1	0
Euro 4	0	0	0	0	0	0	0
Euro 5	0	1	1	1	2	2	0
Euro 6							30
Total	**47**	**46**	**40**	**40**	**47**	**47**	**30**

Data provided by Lothian Buses (TfE), June 2016

Lothian Buses deploy their highest Euro standard vehicles on high-frequency services and those routes which transit AQMAs e.g. Airlink100 and service 26. Both these service routes pass through the Central and St Johns Road AQMAs.

Euro 5 standard buses are also used on the high- frequency service 22 route which passes through both the Central and Great Junction Street AQMAs.

The number 36 bus service consists of Euro 6 hybrid standard vehicles which operate in the central AQMA.

The deployment of Euro 5 standard buses or better in AQMAs is shown in Table 2.9.

The City Tour Fleet which will be Euro 6 by the end of September 2016 also has a high presence in the central AQMA.

Lothian Buses continue to be committed to reducing the emissions from their fleet and to deploy new, cleaner vehicle technologies wherever possible. Currently 66% of the main service bus fleet are Euro 5 or better and from September 2016 the City Tour Fleet will also be of a Euro 6 standard.

Table 2.9 – Deployment of Euro 5 standard or better Lothian Buses (TfE) in AQMAs.

Service Number	Euro bus standard June 2016
Central AQMA	
30, 12, 24,36	Euro 6 hybrid single deck
34	Euro 6 hybrid double deck
3, Airlink100	Euro 6 double deck
10	Euro 5 hybrid double deck
1	Euro 5 hybrid single deck
22	Euro 5
26	Euro 5
Tour bus fleet	Euro 6 (from September 2016)
St John's Road AQMA	
Airlink100	Euro 6 double deck
26	Euro 5
Great Junction St AQMA	
22	Euro 5
10	Euro 5 hybrid
Inverleith Row AQMA	
21	E3 SCRT and Euro 5
23	Euro 5 and EEV
27	Euro 5 and EEV

Data provided by Lothian Buses (TfE) June 2016

First Scotland (East)

First Scotland East services into Edinburgh are currently under review. The fleet operating in Edinburgh as of June 2015 is shown in Table 2.10

Table 2.10 – First Scotland (East) fleet operating in Edinburgh 2011 to 2015

Euro Standard	2011	2013	2014	2015
Euro 1	23 (7%)	0	0	0
Euro 2	149 (45%)	0	0	0
Euro 3	116 (35%)	75 (69%)	53 (52%)	84 (54%)
Euro 4	33 (10%)	24 (22%)	31 (30%)	32 (21%)
Euro 5	9 (3%)	10 (9%)	18 (18%)	37 (24%)
Total vehicles	**330**	**109**	**102**	**153**

Data provided by First Bus (East) February 2015

Currently 34% of the First Scotland East Fleet is of Euro 5 standard or better as shown in Table 2.11

Table 2.11– Current First Scotland East Fleet

Euro Standard	2016
Euro 1	0
Euro 2	49 (17%)
Euro 3	89 (31%)
Euro 4	51 (18%)
Euro 5	65 (23%)
Euro 6	31 (11%)
Total vehicles	**285**

Data provided by First Scotland East June 2016

Firstbus East now has 31 Euro 6 vehicles in the fleet and a further 19 Euro 6 hybrid vehicles are being introduced to the fleet in August and September 2016.

Stage Coach Ltd

There are 60 buses in the Stagecoach fleet operating on services into the centre of Edinburgh. These services pass through the Queensferry Road corridor and St Johns Road AQMA and the 747 Airport Service from Fife goes along the Glasgow Road AQMA. The majority (83%) of the Stagecoach fleet into Edinburgh are now Euro 5 or better. All Euro 3 vehicles have being eliminated from the fleet and Euro 4

vehicles have been significantly reduced. The current Euro class status of the Stagecoach fleet operating in Edinburgh is shown in Table 2.12.

Table 2.12– Stagecoach Fleet operating in Edinburgh 2012 to 2016

Euro Standard	2012 (%)	2013 (%)	2014 (%)	2015 (%)	2016 (%)
Euro 1	0	0	0	0	0
Euro 2	2 (5%)	0	0	0	0
Euro 3	4 (10%)	4 (10%)	8 (14%)	5 (9%)	0
Euro 4	27 (69%)	27 (64%)	33 (59%)	34 (59%)	10 (17%)
Euro 5	6 (15%)	11 (26%)	15 (27%)	19 (33%)	38 (63%)
Euro 6	-	-	-	-	12 (20%)
Total vehicles	**39**	**42**	**56**	**58**	**60**

Data provided by Stagecoach June 2016

Citylink

Citylink operate a number of '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. There are 51 buses operating on services entering Edinburgh, the vast majority (86%) are Euro 5 standard or better.

The current Citylink-managed fleet operating into Edinburgh is shown in Table 2.13.

Table 2.13 – Citylink fleet operating in Edinburgh 2015 to 2016

Euro Standard	May 2015	July 2016
Euro 1	0	0
Euro 2	0	0
Euro 3	2 (4%)	1 (2%)
Euro 4	0	6 (12%)
Euro 5	43 (92%)	37 (72%)
Euro 6	2 (4%)	7 (14%)
Total	**47**	**51**

Data supplied by Citylink July 2016.

Five additional Euro 6 buses have been purchased which will provide a service to Edinburgh Airport commencing July 2016. All services into Edinburgh pass through the Glasgow Road AQMA, St Johns Road AQMA and Central AQMA.

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.

In an attempt to persuade road freight operators to voluntarily reduce their emissions, the Council became a partner in an EU-funded project, ECOSTARS Europe through which the ECOSTARS 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 129 operators have joined with a total of 6,089 vehicles. The majority of members are goods vehicle operators (104), followed by passenger transport (19) and public sector fleets (6). Progress made with ECOSTARS Edinburgh is detailed in Table 2.14.

Table 2.14 ECOSTARS Edinburgh – progress from 2012 to 2016

Year	Number of vehicles in the scheme	Number of operators in the scheme
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

Additional funding has been secured to continue the scheme during 2016/17 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.

In 2014, the Council purchased 16 new electric-powered vehicles, with the assistance of the Scottish Government's Low Carbon Vehicle Procurement Support Scheme. This brings the total number of electric vehicles operated by CEC to 27. Presently, 72% of the Council's operational fleet is at Euro 5 standard or better, while 3% is full electric. The degree of ongoing Council fleet improvement is set out in Table 2.15.

Table 2.15 Improvement in City of Edinburgh Council fleet 2003 to 2016

Euro Standard	2003	2011	2012	2013	2014	2015	2016
Pre Euro	12 1%	0	0	0	0	0	0
Euro 1	96 12%	0	0	0	0	0	0
Euro 2	374 45%	0	0	0	0	0	0
Euro 3	338 41%	78 8.3%	45 4.6%	38 4%	44 5%	44 5%	21 2%
Euro 4	12 1%	627 67.1%	561 58.2%	476 50%	476 49%	183 19%	238 26%
Euro 5	0	227 24.2%	348 36.1%	430 45%	440 45%	708 73%	532 58%
Euro 6	0	0	0	0	0	10 1%	104 11%
Electric	0	3 0.3%	10 1%	10 1%	11 1%	27 3%	26 3%
Total	**832**	**935**	**964**	**954**	**971**	**971**	**921**

Data provided by CEC Fleet July 2016. Includes hired vehicles.

Promoting low emission transport

Managing traffic emissions via Mandatory Low Emission Zone

In November 2015, the Scottish Government released their national strategy to improve air quality in Scotland, Cleaner Air for Scotland (The road to a healthier future). Embodied in the document are two key actions; development of a National Modelling Framework (NEF) and a National Low Emission Framework (NLEF). Both actions are currently working progress. The latter action aims to encourage the adoption of LEZs by local authorities. Devising a national LEZ Framework is a highly complex process and will require a large degree of development and testing in order

to be fit-for-purpose. Local authorities will require to work within the established 'frameworks'. Therefore, it is City of Edinburgh Council's intention to wait for Scottish Government's NLEF and associated guidance prior to undertaking further work regarding potential implementation of a LEZ in Edinburgh.

Promotion of electric vehicle recharging infrastructure

A number of electric charging points have been installed in Edinburgh since 2012. All public accessible charging sites are listed in Table 2.16 and can be found on the following website:

http://chargeyourcar.org.uk

Table 2.16 Locations and number of charging units installed in Edinburgh

Location	Number of Charging Units
Council Premises	
Bankhead Depot (West)	2
Blackhall Library	2
Bonnington Road Social Work	1
Central Library (Cowgate)	1
City Chambers Quadrangle (City Centre)(A)	2
Cottins Road Sighthill	2*
Cowan's Close (South)	1
Drumbrae Hub Garage (West)	1
East Neighbourhood Office Niddrie (East)	3
Inch Park (South)	1
Kirk Loan (St Johns Road)	1
Kirkliston Local Library (North West)	1
Morton Hall	2
Murrayburn Depot (South West)	5
North Edinburgh Office (North)	2
Peffer Place (East)	2
Portobello Town Hall	1
Powderhall Broughton Road (North)	2
Restalrig House Craigentinny (East)	1
Russell Road Depot (West)	5
Scientific Services Seafield Laboratory (East)	6
South Neighbourhood Office (South)	2
Waverley Court (City Centre)(A)	5
West Neighbourhood Office Drumbrae (West)	2
Westerhailes Healthy Living Centre	2
Westerhailes Wood Gate	1

Table 2.16 Locations and number of charging units installed in Edinburgh

Location	Number of Charging Units
Universities/Colleges	
Appleton Tower Edinburgh University	2
Edinburgh College Granton	4
Edinburgh College Sighthill	2
Edinburgh University Roberson Close	2
Edinburgh University David Hume Tower	2
Edinburgh Napier Merchiston Campus (South)	2
Edinburgh College Milton Road Campus	5
Kings Buildings West Mains Road (South)	2
Queen Margaret University (East Lothian)	2
Other	
Airport Edinburgh	2
Change works	2
Corstophine (Edinburgh Zoo)	2
Feta (Transport Scotland) Queensferry	5*
Fettes Lothian and Borders Police HQ (North)	4
Fountainbridge X Leisure	3
High School Yards Infirmary Street	2
Hermiston Park and Ride	3
Holyrode Road (Dynamic Earth)	2
Longstone Road (Sainsburys)	2
Marchmont (Pilot on street parking)	14*
Niddrie Castlerock Housing	2*
Royal Bank of Scotland HQ Glasgow Road	2
Scotmid	2
Science and Advice for Scottish Agriculture	2
Straiton Park and Ride	3
Ingliston Park and Ride (West)	7
Marriot Hotel (Glasgow Road West)	1
National Galleries Scotland Dean Village	2

(A) Funding obtained from Scottish Government Air Quality Action Plan Grant

* Under construction

Progress regarding installation of electric charging infrastructure is shown in Table 2.17.

Table 2.17 Electric charging infrastructure progress from 2012 to 2016

EV Infrastructure (units & sites)	2012	2013	2014	2015	2016
Number of charging heads	8	14	58	89	141
Number of site locations	5	9	26	38	60

Note: Table includes sites which are under construction during 2016.

Since 2014, data has been complied for the number of charging sessions and amount of electricity used at locations across the city. As expected, with additional infra structure provision and more electric vehicles in the fleet there has been an increase in usage. The amount of power in kWh and number of charging sessions per month and yearly comparisons of power used are shown in Figures 2.2 and 2.3.

Data is not accessible from all the charging locations in the city and therefore usage is likely to be greater than what is represented in the following graphs.

City of Edinburgh Council's Parking Standards policy expects developers to consider provision for encouraging electric vehicle charging infrastructure throughout all types of development. This is currently being progressed through the inclusion of an informative on planning consents, rather than Section 75 Legal Agreements or use of planning conditions. It is recognised that the Council will need to provide stronger encouragement if increased electric charging provision is to be realised through new development.

Transport Scotland has recently become a partner with City of Edinburgh Council to assist with funding of an agreed on-street pilot electric charging scheme to provide fourteen units at seven locations in the Marchmont area of the city. It is anticipated that this will be operational by the end of 2017 subject to Traffic Regulation Order consultations.

Figure 2.2 Power (kWh) used and number of charging sessions per month.

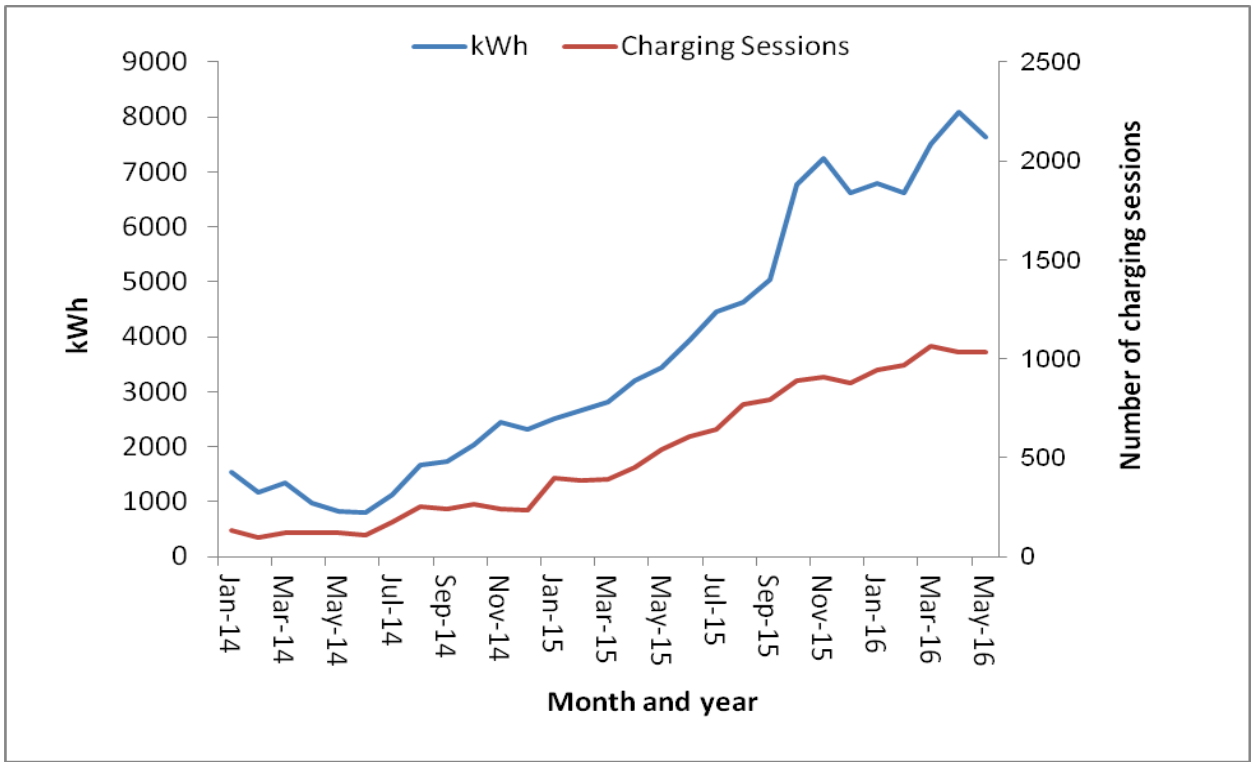
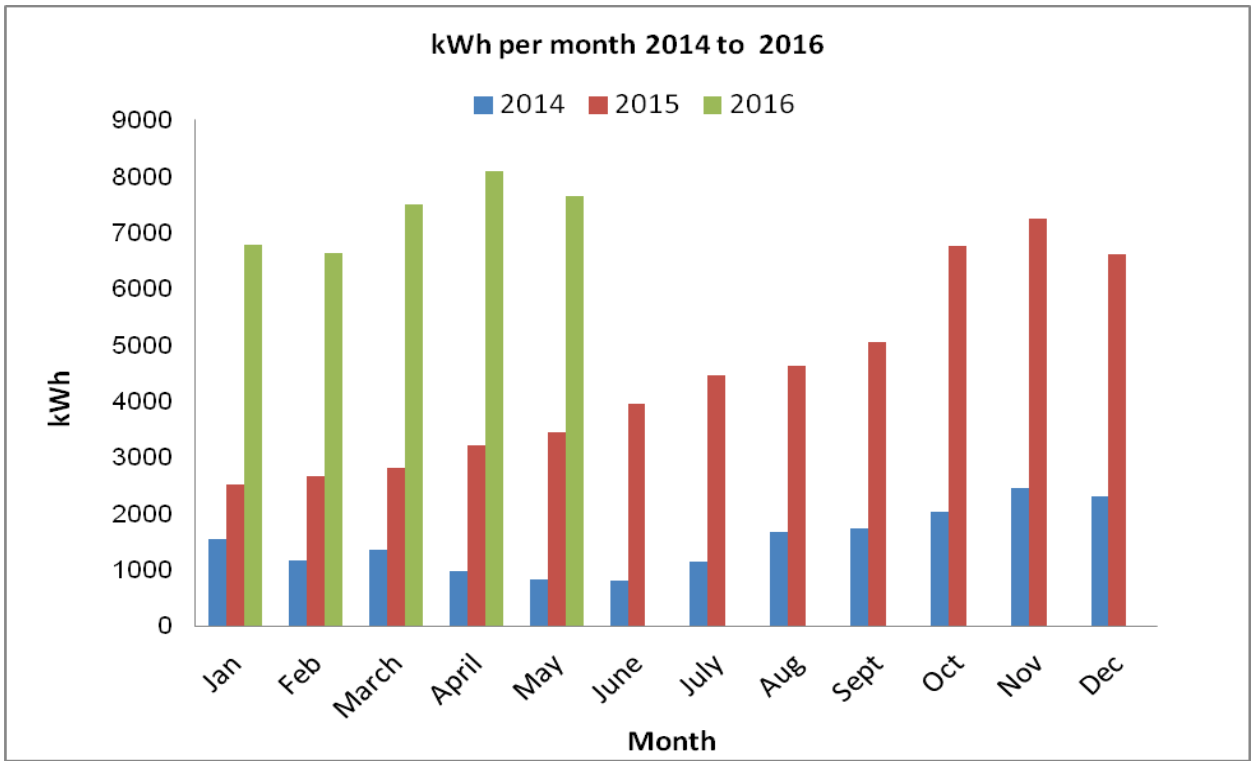


Figure 2.3 Power (kWh) used each month from 2014 to 2016.



Feasibility Study Report for trialling Ultra Low Emission Vehicle Taxis

The City of Edinburgh Council has recently submitted a bid to the Office for Low Emission Vehicles (OLEV) Government in order to fund a trial of ultra Low Emission Vehicles (ULEV) Taxis. The bid was based on a feasibility study undertaken by various stakeholders in the City of Edinburgh Council in conjunction with University of Edinburgh via the Living Lab partnership. If successful, this would reduce the upfront cost of purpose-built ULEV taxis and provide funding towards electric charging infrastructure for taxi use. Currently the bid is being assessed by OLEV.

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 a number of 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 a number of locations the system requires validation.

Within the Central AQMA, SCOOT is fully operational at three major links on the network;

- Gorgie Road, Chesser Avenue and Balgreen Road
- Gorgie Road, Westfield Avenue and Robertson Avenue
- Ardmillan ‘Triangle’ (Gorgie Road, Dalry Road, Angle Park Terrace) and Slateford Road and Shandon. Completed end of 2014

Current SCOOT status for the city is detailed in Table 2.18.

Table 2.18 Status of SCOOT in AQMAs 2016

SCOOT Status	Locations
Central AQMA	
Fully operational	Gorgie Road, Chesser Avenue, Balgreen Road
Fully operational	Gorgie Road, Westfield Avenue and Robertson Avenue
Fully operational	Ardmillan Triangle including Gorgie Road/ Dalry Angle Park Terrace, Slateford
Infrastructure installed, but loop repairs and re-validation required	The Bridges, London Road, Easter Road Nicholson Street, Clerk Street/ South Clerk Street
Loops and validation required	Roseburn
Unlikely to be re-installed due to Tram priority	Queen Street, Princes Street, Haymarket, Leith Walk, St Andrews Square
Not installed	Grassmarket, Cowgate and West Port
St John's Road AQMA	
Infrastructure installed Cabling work, configuration and revalidation required	St Johns Road, Corstorphine Manse Road / St Johns Road [(A)]
Great Junction Street AQMA	
Infrastructure not installed	Bernard Street / Shore/Salamander Street Ocean Terminal / Commercial Street
Inverleith Row/ Ferry Road junction	
Infrastructure installed Loop repairs and validation required	Inverleith Row (Goldenacre) Ferry Road

[A] Clermiston Road /St Johns Road (potential loop repair and revalidation following recent footway improvements)

Programme of ongoing SCOOT work

SCOOT repair and installation work is being progressed at number of junction locations within AQMAs which are detailed in Table 2.19.

Table 2.19 Ongoing SCOOT work

Location of proposed work	Status	Estimated date of completion
Central AQMA		
London Road /Easter Road	Loop repair work is being progressed and the following junctions will be incorporated into the SCOOT network (Montrose Terrace, Abbey Lane and Marionville)	December 2016
Lothian Road/Fountainbridge West Port/Lady Lawson Street	Outside contractors Siemens have been appointed to deliver SCOOT including validation of the system	July 2016
Great Junction Street AQMA		
Bernard Street/Salamander Street	Outside contractors Siemens have been appointed to deliver SCOOT including validation of the system	November 2016
St Johns Road AQMA		
Including Manse Road	Loops re-cut following resurfacing programme. Revalidation is required.	November 2016
Non AQMA locations		
Portobello High Street junctions from Fishwives' Causeway to Bellfield Street	Currently being installed	November 2016

SCOOT locations outwith AQMAs.

SCOOT systems have now 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

Other Action Plan Initiatives

Controlled Parking Zones

Controlled Parking Zones (CPZs) provide a number of on-road parking spaces for residents and therefore assist in discouraging car commuting into city centres. The boundary of Edinburgh's Controlled Parking Zone (CPZ) was substantially extended in 2006-2007.

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 aim to deter commuter travel. The trial delivered positive outcomes and has been made permanent. As a result several new areas in the city have been designated PPZs. The areas are shown in Table 2.20.

Table 2.20 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

One new PPZ in the Murrayfield area of the city became operational in May 2015. A potential new zone, Bangholm /Wardie/Telford is under consideration.

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 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]

However, to obtain improvements in NO_x and particle emissions it would require the Council to adopt a system which encouraged the purchase of low emission vehicles with respect to these pollutants.

Progress on the following measures during 2015/16 has been slower than expected:

- Expansion of Hermiston Park and Ride: due to lack of funding
- SCOOT improvements have been delayed: due to reduced staff resources
- Purchase of low emission buses has been put on hold: due to national review of the Scottish Green Bus Fund (round 6) and the Bus Operators Grant.
- Electric charging infra structure to support Lothian bus operating key services which will be electric powered through AMQAs and areas of concern has been delayed: due to the requirement to seek additional funding.
- Emotes trial at St Johns Road has now being abandoned due to issues with electrochemical sensor monitoring technology for NO_2.
- Purchase of low emission vehicles for the Council fleet: the Council's Structural Review (Transformation) has prompted a wide ranging fleet view which is looking at fitness for purpose, utilisation and whether tasks can be delivered differently. There is an over aching aim to reduce the number of vehicles in the fleet
- Implementation of a Telematics system for the Council Fleet: this has been delayed due to the Council's Structural Review.

City of Edinburgh Council has a number of ongoing measures which will be progressed and measures which will be completed over the course of the next reporting year:

Traffic Management

Further SCOOT improvements are expected to be completed at the end of 2016. These are detailed in Table 2.19.

Vehicle fleet efficiency

It is the Council's intention to continue to promote cleaner buses in the city, which is subject to funding availability, for both vehicles and infrastructure to support low emission vehicles.

The Council also supports the acquisition of lower emission vehicles for its own fleet and is investigating the installation of eco driving aids (Telematics) to reduce fuel wastage and idling times.

The fleet efficiency and recognition scheme ECOSTARS Edinburgh will continue during 2016/17 with funding secured from the Scottish Government.

Promoting Low Emission Transport

The Council has formed a partnership with Transport Scotland, Scottish Government and Scottish Environment Protection Agency to assist with producing an air quality model for the city. This will provide quantitative evidence for the National Low Emission Framework appraisal, which may lead to the declaration of Low Emission Zones or Clean Air Zones. It is anticipated that the model will be finalised during 2017.

Promoting electric charging infra-structure

Transport and Planning Infra-structure

A further report regarding the way forward for the TRAM extension to Newhaven Leith (North of the city) is expected to be presented to Council in 2017.

Promotion of Cycling and Walking

The Council's Active Action Travel Plan is expected to achieve the following measures during the next year. A number of new cycle ways will be constructed and enhancements made to existing ones as listed below:

- Meadows to Union Canal 2017
- Meadows to city centre via George IV Bridge 2016- 17
- A8 Gyle to Newbridge 2016- 17

- Ongoing programme of installing lighting (LED and conventional) on off –road paths

Provision and improvement of city centre bike parking

Table 2.21 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
1	Promoting low emission public transport	Vehicle fleet efficiency	Reduce bus emissions via voluntary agreements with bus companies	CEC	2009-2011	Euro 4 by 2012 Euro 5 by 2015 Formal agreement not reached considered too onerous in absence of financial suppo	.	NOx Central 59% St John's 48% Gt Junct 61%	TTR study Completed **Lothian Bus** Main Service E3= 33% E4= 1% E5=39% E5/6=13% E6=14% **668 vehicles** Tour E6 = 100% **30 vehicles** 49 DD Engine upgrades **First Scotland East** Overall fleet E2= 17% E3= 31% E4=18% E5 = 23% E6 = 11% **285 vehicles**	On going Sept 2016 Autumn 2015	LB bus aim to be E5 Or better by 2020 Other bus companies unable to predict improvements Reductions NOx and PM_{10} 95% - 99% NO_x 13% per vehicle Fleet service provider under review

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
1a	Implementation of a LEZ/CAZ	Promoting Low emission transport	Manage bus emissions and potentially emissions from other vehicle classes	CEC in conjunction with Scottish Government , Transport Scotland	In progress	2020	To be determined	Will be determined by outcomes of NMF and NLEF Under CAFs	Frameworks being progressed	2019 SG expect LEZ /CAZs in place by 2020	Will need to review evidence following modelling work
2	Fleet efficiency and recognition Scheme ECOSTARS	Vehicle Fleet Efficiency	Manage road freight emissions	CEC	2010-2011	2011	Recruitment figures	Not quantified check with Ann	June 2016 129 operators 6,089 vehicles registered	On going	Further funding has been secured to continue scheme 2016/17
3	Cleaner council vehicles	Vehicle Fleet Efficiency	Improve emissions by ensuring highest std for vehicle replacement	CEC		2003		Not quantified	July 2016 E3 2% E4 26% E5 58% E6 11% Electric 3% No vehicles 921	On going	Fleet subject to review with an aim to reduce current vehicles in fleet
3a	Eco driver training and ECO	Vehicle Fleet Efficiency	Council vehicle trial telematics system	CEC			Reduction in fuel consumption and idling	Not quantified	Completed Trial	2013	Still to be implemented , but tendering process now completed

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
4	Bus based Park and Rides Rail based Park and Rides * Tram based Park and Rides**	Alternative to private vehicle use	Reduce emissions by easing congestion at peak travel times				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	Requires funding to commence
5	Differential parking	Promoting low emission vehicles	Aimed at smaller engines and low CO_2 emission vehicles								Requires adoption of low emission vehicles NOx and PM_{10}
5	Controlled Parking Zones CPZ Priority Parking Zones PPZ	Traffic Management	Discourage car commuting into city centre	CEC				Not quantified	9 PPZs	On going	
6	Tramline 1	Transport Planning and Infrastructure	Zero emissions at source. Encourage modal shift from car use	CEC/ TFE	2008-11 Revised to 2014		Passenger numbers	Not quantified	Report to CEC regarding proposals for extension	Completed 2014	Extension To Newhaven /Leith approved by Council

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
7	New rail line /stations Aidrie Bathgate New Craighall Borders	Transport Planning and Infra-structure	Modal shift to reduce road traffic entering Edinburgh	Transport for Scotland			Passenger numbers	Not quantified	Completed 2010 2002 Sept 2015	Lines and new stations completed	Passenger Growth recorded
8	Transport Planning and infrastructure	New cycle networks	Part of CECs Active Travel Plan	CEC/ Sustrans/ NHS Lothian	2010			Not quantified		On going	
8a	Promoting travel alternatives	Promotion of cycling and walking	CECs Active Travel Plan Encourage modal shift away from car	CEC/Sustrans/ NHS Lothians	2010	2011	All trips in the city: Cycling (10%) Walking (35%) By 2020	Not quantified	3% cycling 32% walking	On going	% increase in walking and cycling
9a	Urban traffic control systems SCOOT	Traffic Management	Reduce waiting times and stop /starts	CEC		In progress		Not quantified		On going	
9b	Urban traffic Control systems MOVA Newbridge	Traffic Management	Reduce waiting times and stop /starts	CEC	2013/15	Mar 2016		44% NOx 26% PM_{10} 40% CO_2	Completed	2015	Delay time reduced on Westbound A8 pm
10	20mph speed limits across the City NEW	Traffic Management	To assist improving cycle and walking uptake by making roads safer	CEC	2015	Starts 31/07/2016		Not assessed			

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

City of Edinburgh Council undertook automatic (continuous) monitoring at eight sites during 2015. Table A.1 and A.2 in Appendix A shows the details of the sites and what each of them measure. National monitoring results are available at; 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.

3.1.2 Non-Automatic Monitoring Sites

City of Edinburgh Council undertook non-automatic (Passive Diffusion Tube PDT) monitoring of NO_2 at 156 sites during 2015. Table A.3 in Appendix A shows the details of the sites including grid reference co-ordinates. A general map showing the locations of the monitoring sites city-wide is provided in Appendix A - Figure A.2. Detailed maps are provided separately. Further details on Quality Assurance/Quality Control (QA/QC), bias adjustment and distance correction for the diffusion tubes are included in Appendix C and D.

New monitoring commenced at a number of locations on main arterial routes south of the City where traffic congestion and major development proposals are of concern; Captains Road (PDT149), Howden Hall Road (PDT149a, PDT149b & PDT 149c) and Drum Street (PDT150). In the city centre monitoring was increased within the AQMA on Princes Street, Shandwick Place and Haymarket Terrace. In addition an alternative site was established on Leith Street (PDT 74g) in the AQMA due to poor data collection from the original location in 2014. In Leith, additional monitoring commenced on Duke Street (PDT30f) due to evidence of traffic congestion. In order to further investigate the exceedance anomaly at Queensferry Road, a further site was established on the facade of a residential building (PDT 64b).

Following a review at the end of 2014 monitoring ceased at a number of sites where data collection had been poor, there is alternative monitoring in the vicinity or concentrations were low. The sites include; Bernard Street (PDT29b), Ferry Road/Maderia Street (PDT45b), Inverleith Row (PDT IR1 & PDT IR2), Hamilton Place (PDT143), Corstorphine High Street (PDT145), Easter Road (PDT25f & PDT25g), Portobello Road (PDT73e, PDT73f & PDT73g), Hope Park Terrace (PDT139), Grassmarket (PDT37), Station Road, Kirkliston (PDT146 & PDT146a), Craigcrook Terrace (PDT40b) and Craigcrook/Queensferry Road (PDT40c).

3.2 Individual pollutants

The air quality monitoring results presented in this section are all bias adjusted and where relevant, adjusted for annualisation and distance corrected to relevant exposure. Further details on adjustments 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 2015 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.

The only **automatic monitoring** data to show breaches of the objectives for NO_2 is that from St John's Road (ID5), with an annual mean concentration of 65µg/m^3 and 42 hourly-means greater than 200µg/m^3, which breaches the hourly mean objective.

All other stations meet the Scottish and UK Air Quality objevtives.

Data from Queensferry Road (41µg/m^3) is distance corrected to the facade of the residential property (relevant exposure) set back from the monitoring station, where the objective is met (33µg/m^3).

Data capture at Gorgie Road and St John's Road automatic stations was just below the 90% threshold which is required for a strict comparison of the objectives (89% respectively). Nevertheless the data shows that Gorgie Road is well below the objectives and St John's Road, well in exceedance.

Due to an leak in the sampling manifold it was determined that there was no reliable data from the urban background site at St Leonard's.

Analysis of the **PDT monitoring** results shows the annual mean objective continues to be exceeded in locations within all of the current AQMAs except the Great Junction Street AQMA which just meets the objective (40µg/m^3 at PDT29c). The AQMAs therefore remain valid.

None of the passive diffusion tube data collected during 2015 suggests breaches of the hourly mean objective for NO_2, although data from Westport (ID28b) shows that there is potential (58µg/m^3).

There was one breach of the annual mean objective outwith the AQMAs at Queensferry Road (PDT64). Monitoring at this roadside location has consistently resulted in breaches of the annual mean objective, however adjacent monitoring, including that from the automatic analyser has always been compliant. At the start of 2015 further monitoring commenced on the facade of a residential property concurrent with PDT64. The NO_2 concentration at the new site (facade) is 36µg/m^3 (PDT64b), compared with a distance corrected value of 48µg/m^3 for PDT64. Further detailed analysis of the localised conditions at the site will be undertaken as part of air pollution dispersion modelling programmed under the Cleaner Air for Scotland Strategy in 2017.

Potential exceedance of the annual mean objective is noted at the following locations; Duke Street (PDT30f), Bernard Street (PDT29c), Ferry Road (PDT45d), Great Junction Street (PDT30b), Easter Road (PDT25), Portobello Road (PDT73a PDT73d), Haymarket Terrace (PDT HT1&2), Shandwick Place (PDT SP1), London Road (PDT46), Clerk Street (PDT138), St Mary's Street (PDT48f), South Clerk Street (PDT141), West Maitland Street (PDT 2), Glasgow Road (Newbridge) (PDT 15, PDT15a & PDT 16), Angle Park Terrace (PDT 76) and Slateford (PDT77 & PDT77b). A number of these sites are located outwith AQMAs, including Duke Street (PDT30f), which is close to the boundary of the Great Junction Street AQMA. Monitoring began at this site in 2015. The annual mean concentration is 40µg/m^3 just below the objective. Monitoring will continue at this location. Monitoring will also continue at Portobello Road (37µg/m^3) and St Mary's Street (37µg/m^3), which are also located

outwith the AQMAs, as well as these other sites where there is potential for exceedance.

In general across the monitoring network many sites show a decrease in concentrations. However sites on London Road show a marked increase, in particular PDT81 which had an annual mean of 43µg/m^3 in 2014 and 50µg/m^3 in 2015. Roadwork's to the London Road/Easter Road junction and then in the vicinity of Regent Road and Abbey Mount commenced on 14 September 2015 and finished mid December. It is likely that traffic congestion at this time caused this increase in concentration.

Results of new monitoring at Captain's Road (PDT149), Howden Hall Road (PDTs149a, 149b & 149c) and Drum Street (PDT150), on main arterial routes south of the City, all showed low annual mean concentrations (ranging between 25µg/m^3 and 30µg/m^3).

In 2015 data capture from the new monitoring location on Leith Street (PDT 74g) was 75%; the annual mean concentration is 49µg/m^3. Preparatory work for redevelopment of the St James Centre led to traffic changes and congestion in the general area, which may account for the high concentration. The site is located within the Central AQMA.

A gradual fall in concentrations is noted on George Street (PDT74f), likely stemming from a temporary pedestrian scheme implemented during summer and winter festival periods. Currently the Council is considering design principles for the future use of the street.

Data capture at three new monitoring locations on Princes Street was very poor so the data was not annualised. Data capture was also low and sporadic at Queen Street (PDT33) and North Bridge (PDT27), so it too was not annualised.

New monitoring on Haymarket Terrace (HT1&2) showed borderline concentrations of the annual mean objective (37µg/m^3 and 39µg/m^3 respectively). Both sites are within the existing AQMA.

Trends

Trend analysis has been undertaken at all automatic monitoring locations that have five or more years of valid data. For the first time this included Queensferry Road data. Annual mean nitrogen dioxide concentrations have therefore been plotted for successive years at St Leonard's, Queen Street, Gorgie Road, St John's Road, Salamander Street, Currie and Queensferry Road. As mentioned above, there was no data collected at St Leonards in 2015. 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.3h. Table 3.1 below summarises the trend analysis.

Table 3.1 Summary of Annual Mean Nitrogen Dioxide trends measured at Automatic (Continuous) Monitoring Sites

Monitoring Location	Site Type	Trend in Annual Mean NO_2 (Years)	Concentrations of NO_2
St Leonard's	Urban background	(2004 to 2014) ↘	Slightly decreasing
Currie	Suburban	(2010 to 2015) ↘	Slightly decreasing
Gorgie Road	Roadside	(1999 to 2015) ↘	Slightly decreasing
Salamander St.	Roadside	(2009 to 2015) ↘	Slightly decreasing
Queensferry Rd	Roadside	(2011 to 2015) ↘	Slightly decreasing
Queen Street	Roadside	(2006 to 2015) ↓	Decreasing
St John's Road	Kerbside	(2007 to 2015) ↓	Decreasing

Trend analysis of the annual mean nitrogen-dioxide concentrations at a number of sites shows there is a slight decrease, namely; St Leonard's, Gorgie Road, Salamander Street, Currie and Queensferry Road. These sites are a combination of background and roadside types.

The downward trend is more defined at Queen Street and St John's Road in respect to annual mean concentrations, albeit there is a slight increase in the annual mean at St John's Road over the past two years. The number of hourly exceedances at St John's Road has comparably remained the same since 2014 with the overall trend of a reduction in concentrations.

This year for the first time, trend analysis was undertaken with passive duiffusion tubes located in each of the AQMAs. A summary is shown in Table 3.2 below. Data used in the analysis as well as specific graphs is shown in Appendix A – Tables A.6 to A.10 and Figures A.4a to A.4e.

Data was corrected using the relevant bias adjustment factor for each year and taken from the point of measurement (not distance corrected).

Table 3.2 Summary of Annual Mean Nitrogen Dioxide Passive Diffusion Tube Trends within the AQMAs

AQMA	Trend in Annual Mean NO_2 (Years Included)	Concentrations of NO_2
Central AQMA	(2008 to 2015) ↓	Decreasing
Great Junction Street AQMA	(2008 to 2015) ↓	Decreasing
St John's Road AQMA	(2008 to 2015) ↓	Decreasing
Glasgow Road AQMA	(2009 to 2015) ↓	Decreasing
Inverleith Row AQMA	(2011 to 2015) ↘	Slightly decreasing

In all AQMAs there is a general trend of decreasing NO_2 concentrations observed from data from the passive diffusion tube monitoring network since 2008/9. In Inverleith Row AQMA there is a slight downward trend with analysis data from 2011.

There have been many changes to the central Edinburgh road network with the development of the Trams services, during construction and since the start of operations in May 2014. It is therefore difficult to have confidence in trend. Under the recommendations of the Cleaner Air for Scotland Strategy the City will undergo a period of intense traffic monitoring, which will assist in interpreting data in the future.

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 air quality objective of 18µg/m^3. Table A.12 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations with the air quality objective of 50µg/m^3, not to be exceeded more than 7 times per year. The World Health Organisation (WHO) guidelines for vaules of PM_{10} (annual mean 20µg/m^3) will be included in future legislaiton as Scottish Objectives. However the assessment herein is concerning the existing objectives.

PM_{10} data from all monitoring locations in 2015 meets the UK National Objectives.

The data also meets the tighter Scottish objectives except at Salamander Street where the annual and daily mean objectives were breached with an annual mean concentration of 20µg/m^3 and the daily mean of 50µg/m^3 exceeded eight times throughout the year.

The Local Authority has recently reported results of a detailed assessment for PM_{10} in Edinburgh which included emissions from all sources including road traffic, fugitive

and poultry farms. The report concluded that an AQMA will need to be declared for both PM_{10} objectives at Salamander Street and surrounding area.[6]

Evidence from the assessment of polar plots and visual observations within and adjacent to Leith Docks suggest that activities regarding handling and storage of open material are a contributory factor to the higher concentrations observed at Salamander Street. Re-suspended road dust also plays a role with respect to the exceedances however, this is difficult to quantify. The process of AQMA declaration will commence in autumn 2016 and dialogue with SEPA and Forth Ports will be necessary with respect to site management of the docks.

At St Leonard's initial QAQC concluded poor data capture (45%) likely due to a faulty dryer however further checks and analysis of the 6 monthly audits found the problem to be a baseline shift with the TEOM FDMS instrument. A new baseline correction procedure was therefore applied to ensure the majority of the data was retained (93%). Details of the correction methodology are not yet published. Data capture at Currie was also low overall (77%). Both sites show similar results;

- 10µg/m^3 at St Leonard's, and,
- 9µg/m^3 [VCM] / 10µg/m^3 [local gravimetric equivalent] at Currie.

This is unprecedented considering the different site environments – the former an urban background site and Currie a surburban background site. Data from both these sites should be considered with caution.

In 2015 data capture at Queensferry Road was also slightly below the 90% required to make a strict comparison against the air quality objectives with 87% capture. The annual mean concentration was 16µg/m^3, meaning the site is below the Scottish annual mean objective, for the first time since 2012. However as with previous years' data from this site, it should all be considered with caution because of the data capture problems. The data is not annualised due to the sporadic nature of missing data and the lack of suitable background data.

Data from the other roadside locations - Queen Street and Glasgow Road - was well below the objectives, with both sites showing an annual mean of 15µg/m^3. The local authority's recently approved detailed assessment for PM_{10} referred to the concentrations from the UK Pollution and Climate Mapping (PCM) model which suggests that concentrations along the A8 could be potentially exceeding the

annual mean PM_{10} objective. Although measured concentrations on the A8 at Glasgow Road, show that this is not the case. Monitoring of PM_{10} (as well as a range of particle sizes) will commence at St John's Road to establish concentrations in a more built-up area of the A8. This monitoring will commence in 2017.

Ongoing monitoring that is being undertaken at Gogarburn Poultry Farm on the outskirts of the city will cease in the autumn - the date has been extended due to loss of some data. Interim results shows that PM_{10} daily concentrations measured using the Partisol instrument are likely to meet the Scottish Air Quality Objectives. A full report will be made available to the Scottish Government on completion of the study.

Generally PM_{10} data has not been annualised at those sites where data capture was poor, due to lack of suitable background data and sporadic nature of data collection.

Trends

In 2015 there were five monitoring sites with five or more year's data which is required in order to undertake trend analysis.

Uncorrected TEOM data (non-volatile fraction) has been used to assess PM_{10} trends at Queen Street, due to changes in gravimetric correction methodology. The non-volatile fraction of the FDMS data for years 2008 to 2015 at St Leonard's has also been used to ensure a consistent approach. Nevertheless this should be viewed with caution as the TEOM instrument was replaced with a FDMS unit in 2008. Also data capture has been poor on a number of years (2009, 2012, 2014 and 2015). At Salamander Street and Currie volatile corrected (VCM) TEOM data was used for the analysis.

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 3.3 Summary of PM_{10} Annual Mean Trend Data

Monitoring Location (Type)	Trend in annual mean PM_{10} (years)	Concentrations of PM_{10}
Currie (Suburban)	(2010 to 2015) ↓	Decreasing
St Leonard's (Urban background)	(2004 to 2015) ↓	Decreasing
Queen Street (Roadside)	(1999 to 2015) ↓	Decreasing
Salamander Street (Roadside/Fugitive)	(2010 to 2015) ↓	Decreasing
Queensferry Road (Roadside)	(2011 to 2015) ↓	Decreasing

PM_{10} trends from measured data in Edinburgh shows a downward trend (decrease in concentrations with time) at all monitoring locations. In general all PM_{10} data in 2015 shows a slight decrease likely to be the result of meteorological effects of a cool and wet summer and an exceptionally wet early winter. Further details of PM_{10} concentrations are provided in the recently compiled Detailed Assessment of Particles 2016.

3.2.3 Particulate Matter ($PM_{2.5}$)

Table 13 in Appendix A compares the ratified and adjusted measured $PM_{2.5}$ annual mean concentrations for the past seven years with the air quality objective of 10µg/m^3. The range of concentrations has been between 6 µg/m^3 and 12µg/m^3 since 2009. In 2015 the data at the background location at St Leonard's meets the new standard (6µg/m^3), but failed to comply in 2011 and 2012. However, data capture for 2012, 2014 and 2015 was less than 90%, which is required for comparison against the objective.

In addition to monitoring and in conjunction with the updated technical guidance (2016) an estimation 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. Details are also described in Table A.13. It shows there are potential exceedances at all roadside monitoring locations in Edinburgh.

Detailed Assessment of Particulates for City of Edinburgh Council 2016 also included results obtained from the PCM model, used for government reporting to European Commission. Many of the road sections considered within the model also showed an exceedance. Note, not all roads are assessed under EU requirements, for example B roads and roads which are less than 100m in length.

Although there are concerns that the $PM_{2.5}$ concentrations may breach the new objective at a number of roadside locations, the local authority will gather further evidence on this before determining whether to proceed with declaration. The Scottish Government does not expect local authorities in Scotland to declare AQMAs until robust data has been gathered from monitoring stations and findings from the PM_{10} and $PM_{2.5}$ ratio evaluation study for Scotland are available.

Monitoring of $PM_{2.5}$ will commence at the existing St John's Road monitoring site in early 2017. This will provide invaluable data regarding levels at a kerbside location in Edinburgh.

Trend analysis has been carried out for $PM_{2.5}$ monitoring at St Leonards 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, 2015 data show that there are no exceedances of any of the objectives.

3.2.5 Other pollutants monitored

The following pollutants were also monitored within the City of Edinburgh at the urban background (AURN) site at St Leonards in 2015. 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. In 2015 there were 14 exceedances of the 8hr running mean >100μgm^{-3}.

3.2.5.2 Polycyclic Aromatic Hydrocarbons (PAHs)

There are many different PAHs; however, the 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 2015. 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

A number of Air Quality Impact Assessments were included with planning applications for major development sites or sites located within or near an AQMA in 2015. Generally the assessments found that the developments would have a negligible or insignificant impact on local air quality.

Proposals for a large mixed used development comprising a 235-bed hotel, bar, restaurant, cafe, retail and commercial uses and extending from Victoria Street to Cowgate, obtained planning permission in May 2016. The development includes the creation of a new street canyon near Cowgatehead with the potential to worsen air quality within the Central Air Quality Management Area. An air quality impact assessment submitted in support of the application (planning application reference no. 15/04445/FUL) concluded that the additional section of canyon created by the proposal will have a localised effect on NO_2. Outside the section of the newly created canyon no change is predicated in the annual NO_2 concentrations. Within the section of the newly created canyon a small increase in annual mean concentrations is predicated, less than 0.5µg/m^3. However as the modelling work undertaken for the assessment was verified by unusually low passive diffusion tube data from Cowgatehead (2013), there is little confidence in the assessment.

A further planning application to the previously approved development at Shrubhill (15/00643/FUL) included another air quality impact assessment which concluded that the development would cause a negligible impact on local air quality once fully occupied. Air quality for future residents was also predicted to be acceptable. Although some aspects of the assessment were questioned, the decision was balanced with what had been previously consented. Concerns about the potential impacts on local air quality were due to the numbers of car parking spaces in close proximity to an existing AQMA and the possible introduction of combined heat and power (CHP) units with chimneys. It was recommended that electric vehicle charging was incorporated into the development and advice given that all CHP units must comply with the Clean Air Act 1993.

A number of planning application in respect to original outline permission have been submitted for the Granton Harbour Masterplan area in the Waterfront/north part of the

City. There has been an overall reduction in residential density however car parking capacity increased with recent detailed proposals (14/05305/AMC) which was Minded-to-Grant by the local authority. Increases in car parking provision have the potential to have an adverse impact on local air quality and therefore recommendations have been made to ensure the likely impact is fully assessed with any further/detailed applications.

Planning permission was refused for a development site west of Portobello High Street in April 2009 for a high density scheme which included 710 residential units and c3400m^2 of commercial space with 562 car parking spaces. A further development proposal (14/03706/PPP) which included a 1,675m^2 food store, with up to 219 houses and 160 associated car parking facilities was approved in June 2015. Ninety-eight of the parking spaces are to be provided for the food store with the remaining for the residential aspect. The applicant carried out an air quality impact assessment in support of this application which concluded that the impact of the development would be negligible for PM_{10} and negligible or slightly adverse for NO_2. The local authority concurred with these conclusions however also recommended a number of measures of air quality mitigation be considered.

There were a number of planning applications in 2015 which did not include an air quality impact assessment but air quality related mitigation measures were proposed and recommended with the schemes. These mitigation measures typically included electric vehicle charging points and dust control during construction.

The issue of potential impacts from cumulative development remains a concern for the Local Authority, in particular where development is planned outwith those sites proposed in the Local Development Plan. This is particularly pertinent at Gogarburn, Station Road, where a mixed-use development with capacity for approximately 1,500 dwellings was approved on appeal against the local authority's decision of refusal. The application site extends to approximately 56 hectares. It is currently in agricultural use, and has an operational poultry farm located to the south. The site is located in west Edinburgh and bounded by Glasgow Road (A8) to the north, the City Bypass (A720) to the east and the main Edinburgh-Glasgow railway line to the south. Industrial premises (including scrap metal yard) are located to the south of the site, beyond the railway line. The Gogar roundabout has been identified through the PCM model as failing the EU pollutant limit values. As there are currently no residential

receptors in this area it does not require to be declared as an AQMA. It is also noted that there is already a significant amount of development planned for the west of Edinburgh. Therefore additional development sites such as this will only increase the pressures on the road network which includes the existing Glasgow Road AQMA. The application was accompanied by an Air Quality Assessment, set out in the Environmental Statement. Construction dust nuisance potential was identified as being of medium to high risk in the absence of mitigation measures. With the mitigation measures proposed the risk will be reduced to low or negligible. Operational phase emissions were assessed in relation to the additional traffic emissions generated by the development using dispersion modelling. Cumulative impacts with other development in the local area were also assessed. The assessment predicted that there would be areas on the boundary of the site and within the local vicinity over the Air Quality Objectives, with and without the proposed development and therefore mitigation would be necessary to make the site suitable for residential development. The assessment also said that with regard to increases in concentrations at the existing residential locations, it is unlikely to affect the implementation and effectiveness of the AQAP. Mitigation measures to further reduce the impact from the proposed development were recommended by way of minimising vehicle use during the operational phase and encouraging sustainable transport options.

4.2 Other Transport Sources

Edinburgh Airport published its Airport Surface Access Strategy (ASAS) in 2012 and covers the period until 2017. It sets out a new target of 35% of departing passengers using public transport to access the airport, by 2017. Vehicle access journeys can contribute to road congestion and impact on air quality around the airport; Edinburgh Airport therefore aims to encourage the use of public and sustainable forms of transport in order to minimise the number of vehicle access journeys undertaken. An update on modal share will be provided in 2017. In addition, Edinburgh Airport will also share bi-annual air quality monitoring data once 2016 project is complete.

Construction of the new domestic, Scottish Government-funded, Borders Railway has been completed and passenger services began on 6 September 2015, re-establishing links from Edinburgh through Midlothian to Tweedbank. The railway was rebuilt as a non-electrified, largely single-track line. Passenger services run half-

hourly on weekdays until 20:00, and hourly until 23:54 and on Sundays. The timetable also allows charter train promoters to run special excursion services. Passenger numbers exceeded original estimates by almost a quarter in the first six months - from September 2015 to March 2016 there were almost 700,000. The unexpected level of patronage resulted in the operator, Scotrail leasing additional car-parking space at Tweedbank station. The new railway will offer a fast and efficient alternative to the local road network. The new line is unlikely to be considered an issue with respect to the contribution of NO_2 levels from the number of diesel passenger trains operating on this service route.

A summary of the Detailed Assessment work carried out in respect of potential exceedances of nitrogen dioxide objectives associated with the movement of diesel trains at Haymarket Station can be found in the following report – 2010 Air Quality Progress Report for City of Edinburgh Council. The assessment was based on a greater number of train movements than the number which operate on the Borders Line and concluded that moving trains would not result in exceedances of nitrogen dioxide objectives.

4.3 Industrial Sources

A concrete batching plant was relocated from Bath Road to a site at the rear of Chancelot Mill, Western Harbour, Leith Docks in October 2015 without planning permission on the advice from the land owner, Forth Ports, that permitted development rights would apply. Consequently, SEPA provided a permit for Aggregate Industries to operate at this location. A recent Planning Authority enforcement investigation concluded that the plant does not benefit from permitted development under Class 35 of the Town and Country Planning (General Permitted Development) (Scotland) Order 1992 (as amended). The land owner and operator have been advised that a full application for planning permission is required. The Local Authority is however not proceeding with enforcement action at this time - further consideration is being given to the examination of the proposed Edinburgh Local Development Plan, which will help with the designation of the site for future use.

4.4 Commercial and Domestic Sources

The Local Authority issued Interim Planning Policy (2010) that discourages the installation of **commercial biomass combustion installations** in the city. There

were a number of enquiries in 2015. One proposal obtained planning permission. This was for a small (32kW) biomass (wood pellet) boiler heating system which was to replace an electrical heating system at Westfield House (16/01230/FUL). The property is not on the gas grid and is in a rural environment which has low background concentrations of nitrogen dioxide (NO_2) and particles (PM_{10}). Therefore, it met the geographical assessment criteria of Interim Planning Guidance on the Use of Biomass and the Scottish Government's preferred option location for the deployment of biomass.

A retrospective planning application is currently being considered for a 350kW biomass boiler at the Royal Highland Centre, Ingliston, near the Glasgow Road AQMA (15/04186/FUL). Part of the site is off-the gas grid which would meet some of the above mentioned criteria, however further work is to be considered in respect to appropriate abatement technology.

With Local Authorities obliged to work towards attainment of the new and tighter $PM_{2.5}$ objective, the interim policy will remain in place. The Scottish Government report on the Measurement and Modelling of Fine Particulate Emissions from Wood – Burning Boilers illustrated that a large percentage of particle emissions were composed of the $PM_{2.5}$ fraction when flue gases were measured.[7] Initial estimations of $PM_{2.5}$ in Edinburgh suggest urban areas will be borderline with respect to compliance with the new, tightened objective.

The primary Combined Heat and Power 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. The CHP plant commenced operation in June 2014 and the district heating element of the plans commenced in September 2013. Initial screening of the plant indicates a contribution from the CHP at the nearest receptor in excess of $70 \mu g m^{-3}$. The effective stack height (1.66m), based upon a release at 18m and a building of 17m height - means that the impact is being determined based upon a ground level release. The Tool errs on the side of caution in this respect. Nevertheless, further consideration of the emissions and associated impact will be discussed with Edinburgh University. The local authority will also consider indiciative monitoring in the surrounding area.

Modelling work submitted in support of the CHP central energy centre at the Edinburgh St James development specified the plant is to consist of the following:

- 1 No. 600kW thermal CHP as lead heat generator plant within a Tri-generation arrangement.
- 3 No. 3000MW Boilers with one in standby mode and 2 supplementing the CHP in satisfying demand
- 1 No. 300kW Absorption (ABO) chiller receiving heat from the CHP only
- 3 No. 2000MW Chillers with one in standby mode and 2 supplementing the ABO in satisfying demand.

The CHP unit will incorporate low NO_x burners with a NO_x emissions rate of 250 mg/m^3 maximum. The boilers are also low NOx and have an emission rate of 100mg/m^3 maximum. Secondary abatement is to be incorporated into the scheme with all elements having Selective Catalytic Reduction (SCR) NO_x Abatement Technology integrated. The developer has confirmed that this is a relatively straightforward process for the CHP unit, as the SCR system is constructed specifically for the installation. However, because the preferred boilers are 'plug and play' items, further work is necessary to understand successful integration, or whether alternative boilers are necessary. Monitoring of NO_2 in worse case location on Leith Street within the Central AQMA commenced at the beginning of 2015. The St James Development will be under construction for the next few years.

A number of smaller, medium sized CHP plants have been included in new developments across the city. These include;

- Fountainbridge Edinburgh (15/02892/PPP) where a total of 3 condensing gas fired boilers will be installed (each rated at approximately 450kW output) and two mini gas-fired CHP units (each rated at approximately 60kW gas input). The area is close to the recent extension of the Central AQMA where monitoring of NO_2 is established. This monitoring will continue.
- A residential development of 149 houses and flats at Greendykes Road proposed a centralised district heating system with a maximum rating gas boiler of 880kW. The Air Quality Impact assessment carried out for the development concluded the levels of NO_2 are likely to be acceptable in terms of the long term objective.

Chimney height calculations have been submitted to the Local Authority for the above mentioned developments (as well as any plant with an output capacity above 366kW) in conjunction with the requirements of the Clean Air Act.

Smoke Control Orders cover the entire local authority area. There are currently no areas where significant coal burning takes place.

4.5 New Developments with Fugitive or Uncontrolled Sources

Two main fugitive sources relating to quarrying activities and operations at Leith Docks were considered in detail in 2016. The latter was part of the investigations into exceedances of PM_{10} at Salamander Street. Further details are provided below.

Quarries

There are two quarries within Edinburgh's Administrative Area, Ravelrig and Hillwood, both are operated by Tarmac. The quarries have been reassessed with respect to the current Scottish modelled PM_{10} background maps and 'new' assessment criterion detailed in the revised Technical Guidance LAQM TG (16) (as shown in Appendix E).

Parameters used in the quarry assessment are detailed below in Table 4.1.

Table 4.1 Quarry Assessment

Quarry Name / Location	Closest Receptors (m)		Background concentrations PM_{10} (µg/m^3)		
			2013	2014	2015
Ravelrig Quarry					
N 314189 E 667093	Hannah Field (422 m)	N 313148 E 666668	11.9	11.7	11.6
	Haggs Cottage (595 m)	N 313700 E 667571	12.6	12.8	12.7
Hillwood Quarry					
N 312972 E 671936	Kerr Cottage (210 m)	N 312541 E 672005	18.9	18.6	18.4
	Hillwood Cottage (306 m)	N 313264 E 671963	19.8	19.4	19.0
	Claylands Farm (539 m)	N 312198 E 671449	22.8	22.2	21.7

Ravelrig Quarry

Ravelrig Quarry is situated between Long Dalmahoy Road and the A71 (Lanark Road West). A small suburban development Hannah Field (Balerno) lies to the South East. Geographically this is in a rural location with little impact from the road network.

Background concentrations obtained from the Scottish Background Maps at relevant receptors are between 11.6µg/m^3 and 12.7µg/m^3 for 2015 and the closest distance from the site boundary to relevant exposure is 422m. There is no relevant exposure within 50m of an off-site access road to the quarry.

In conclusion Ravelrig Quarry meets the assessment criteria and therefore further work is not required.

Hillwood Quarry

Hillwood Quarry is situated on the outskirts of Edinburgh's administrative boundary. The site is bounded by the M8 motorway to west and south and surrounded by foliage and trees. Approximately 500m north of the quarry is the A8 (Airport Road).

Although there are no relevant receptors within 200m of the quarry, the background PM_{10} concentrations from the Scottish Pollution maps are high. Therefore, the new screening assessment has identified a potential issue with both long and short term objectives for PM_{10} due to high background concentrations where there is relevant exposure.

However, Tarmac recently confirmed that blasting operations are only carried out at Ravelrig Quarry and material is transported to Hillwood Quarry in covered trucks where it is handled and stored. Given that blasting activities have ceased at Hillwood Quarry, the PM_{10} background levels may have been over estimated with respect to the industrial source component. Appendix E shows the breakdown of sources of PM_{10} in 2015.

On the National Atmospheric Inventory Emissions website (NAIE) PM_{10} emissions in tonnes are similar for both Hillwood and Ravelrig (5.588) yet activities are now different. This issue is been investigated by NAIE, who have provided the following response;

> *'The information used to distribute emissions from quarries in the NAEI originates from 2007 or earlier and is therefore unlikely to be representative of emissions where changes in working practices at a quarry have taken place. The information that you have provided has now been passed on to the appropriate team within the NAEI who will investigate incorporating this information into future versions of the NAEI.'*

The NAEI information is one of the parameters used to provide background mapping concentrations.

A cement batching plant is located at the Northern boundary of Hillwood Quarry which is operated by Aggregate Industries. There is also an asphalt coating plant on site.

Annual mass of PM_{10} emission data (2014) for Hillwood Quarry on the Scottish Pollutant Release Inventory (SPRI) website show that returns to SEPA were below the reporting threshold and for Ravelrig Quarry 17,402 kg of PM_{10} were reported.

PM_{10} annual mean roadside concentrations measured on Glasgow Road (A8), approximately 627m from the North East boundary of the quarry meet the Scottish Air Quality Objective. The annual mean measured concentration in 2015 was 15µg/m^3. However, the 2015 modelled background map concentration at this location was higher than the measured data, 16µg/m^3.

There is no relevant exposure within 50m of an off-site road used to access the quarry which has visible deposits.

Taking the above facts into consideration, City of Edinburgh Council will not progress to a Detailed Study for Hillwood Quarry.

Leith Docks operations

As mentioned in section 3.22, a Detailed Assessment of Particles was undertaken by the Council in June 2016 and submitted as a separate document to the Scottish Government.

The report concluded that fugitive emissions arising from handling and storage of open fine materials within and adjacent to Leith Docks were a contributory factor for exceedances of the PM_{10} Scottish Air Quality Objectives, at Salamander Street. It will be necessary to declare an AQMA and the designated area will be based on a modelling study undertaken by Ricardo on behalf of Edinburgh Council and will take account of existing and proposed relevant receptors.[8]

The Local Authority will commence declaration of the AQMA for PM_{10} in autumn 2016.

5. Planning Applications

The Second Local Development Plan (LDP), informed by responses received on the first Proposed LDP, was approved in June 2014 and submitted to Scottish Ministers at the end of May 2015 for examination. The examination report received by the Local Authority in July 2016 has made recommendations for modifications to the Plan. These recommendations are largely binding on the Council.

Some of the key recommendations which are notable in respect to air quality impacts are as follows;

- Housing Land and delivery
    - Additional housing allocations in the South East area, which have been previously allowed at planning application appeal stage;
        - Edmonstone (170-370 units)
        - The Wisp (71 units)
        - North of Lang Loan (220 units)
        - Gilmerton Station Road (160 units)
    - Additional development principles in West Edinburgh, South East Edinburgh and South West Edinburgh to set out anticipated infrastructure requirements, including transport infrastructure.
    - New transport policy to address cumulative and cross boundary transport matters.
- Prepare Supplementary Guidance for heat mapping and potential to establish district heating to reflect SPP.

The full examination report is currently being considered in detail by the Local Authority with a view to publishing the modified plan in September and adopting the LDP in November 2016.

A new school, community facilities, green spaces and around 770 residential dwellings is proposed at a site on Old Dalkeith Road - South East Wedge development site (15/05074/FUL). The site is not detailed in the Local Development Plan, nor has it been considered as additional housing allocation site through examination of the LDP. Air Quality will be assessed as a part of the application process.

Current housing Master Plans in neighbouring Local Authorities on the boundary of the City Council set the scene for major development outwith the control of Edinburgh Council. Such areas include Shawfair in the South East of the City and Redheugh to establish a new community at Gorebridge. Along with the neighbouring communities of Danderhall, Newton and Millerhill, it is anticipated that Shawfair rail station (Borders rail line) will serve over 4,000 new homes, three new schools and 24 hectares of employment land as part of a £200 million development plan.

6. Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

Analysis of the monitoring results for **Nitrogen Dioxide** shows the annual mean objective continues to be exceeded in locations within all of the current AQMAs except the Great Junction Street AQMA which just meets the objective (40µg/m^3 at PDT29c). The AQMAs therefore remain valid. See summary Table 6.1 below.

Table 6.1Summary of the locations where 2015 monitoring results are at or exceed the annual mean Nitrogen Dioxide Objective

Site ID	Site Address	In AQMA?	Data Capture (%)	Annual Mean Concentration (µg/m^3) Bias Adjustment Factor = 0.76
2	**West Maitland Street**	Yes Central	100	**42**
3	**Torphichen Place CH**	Yes Central	100	**45**
15	**Glasgow Rd Newbridge**	Yes Glasgow Rd	100	**40**
16	**Glasgow Road 68**	Yes Glasgow Rd	100	**40**
24	**Princes Street/Mound**	Yes Central	83	**42**
25	**Easter Road/CH Shop**	Yes Central	42	**40**
47	**Princes Street Eastbound**	Yes Central	100	**42**
55	**Inverleith Row/Ferry Rd**	Yes Inverleith Row	100	**41**
58	**Glasgow Rd Newbridge**	Yes Glasgow Rd	100	**45**
64	**Queensferry Road 550**	No	92	**48**
67	**London Rd/Earlston Pl**	Yes Central	58	**42**
69	**London Rd/Wolseley Pl**	Yes Central	92	**43**
70	**London Rd/Wolseley Terr**	Yes Central	100	**44**
81	**London Rd/E. Norton Pl**	Yes Central	100	**50**
135	**Nicolson Street 69**	Yes Central	100	**46**
141	**South Clerk Street 84**	Yes Central	83	**40**
144	**South Bridge 59**	Yes Central	83	**44**
1d	**St John's Road 131**	Yes St John's Rd	100	**46**
28b	**West Port 62**	Yes Central	83	**58**
28c	**West Port Opposite 50**	Yes Central	83	**46**
28d	**West Port 42**	Yes Central	83	**52**
29c	**Bernard Street/PS**	Yes Gt Junction St	100	**40**
30f	**Duke Street**	No	92	**40**
37a	**Grassmarket 41**	Yes Central	58	**43**
3b	**Torphichen Place 1**	Yes Central	83	**42**
48c	**Cowgate Blackfriars**	Yes Central	67	**41**
48e	**Cowgatehead 2**	Yes Central	50	**44**
74g	**Leith Street**	Yes Central	75	**49**
76b	**Angle Park Terrace 74**	Yes Central	100	**46**
79d	**Dundee Street/Yeaman Pl**	Yes Central	75	**42**
ID5	**St John's Rd (Automatic)**	Yes St John's Rd	89	**65**

There was one breach of the annual mean objective outwith the AQMAs at Queensferry Road (PDT64), although adjacent, non-automatic and automatic monitoring shows the objective is met. Further detailed analysis of the localised conditions at the site will be undertaken as part of the dispersion modelling programmed under the Cleaner Air for Scotland Strategy in 2017.

New monitoring at Duke Street, outwith any AQMAs, shows potential exceedance of the annual mean NO_2 objective in 2015. Monitoring will continue at this site and others where concentrations are near the objective.

In general there is a downward trend in annual mean concentrations at all the automatic monitoring sites. Non-automatic monitoring within each AQMAs shows there is also a trend for decreasing concentrations within the AQMAs.

PM_{10} data from all monitoring locations in 2015 meets the UK National Objectives. However the data from Salamander Street breaches the tighter Scottish objectives (annual and daily mean). The Local Authority has separately reported results of a Detailed Assessment for Particles 2016 which considered PM_{10} emissions from all sources including road traffic, fugitive and poultry farms. The report concluded that an AQMA will need to be declared for both objectives at Salamander Street and surrounding area.

The Detailed Assessment of Particles (2016) also considered concentrations of **$PM_{2.5}$** confirming background data at St Leonards currently meets the new standard. In conjunction with the new technical guidance (2016) an estimation of $PM_{2.5}$ from PM_{10} data at roadside monitoring stations was undertaken using a nationally derived correction factor. It shows there are potential exceedances at all roadside monitoring locations in Edinburgh.

Although it is mandatory for local authorities in Scotland to review and assess $PM_{2.5}$ against the new standard, they are not required to declare AQMAs until robust data has been gathered from monitoring stations and findings from the PM_{10} and $PM_{2.5}$ ratio evaluation study for Scotland are available. Monitoring of $PM_{2.5}$ will commence at the existing St John's Road monitoring site in early 2017. This will provide invaluable data regarding levels at a kerbside location in Edinburgh.

Particle (PM_{10} and $PM_{2.5}$) trends from measured data in Edinburgh show a downward trend (decrease in concentrations with time) at all monitoring stations.

6.2 Conclusions relating to New Local Developments

Monitoring will continue at Cowgatehead where a new multi-storey development will create a new street canyon environment within the Central AQMA.

The issue of potential impacts from cumulative development remains a concern for the Local Authority, in particular where development is planned outwith those sites proposed in the Local Development Plan.

Screening of the ~15MW CHP plant at the Pleasance (Edinburgh University) indicates the potential for excessive ground level NO_2 contribution. The screening tool generally errs on the side of caution however the local authority will consider indiciative monitoring in association with Edinburgh University.

6.3 Proposed Actions

This report has not identified any areas that require proceeding to Detailed Assessments.

In terms of the recent Detailed Assessment of Particles (2016) however, the local authority will declare the AQMA without delay and determine the numbers of locations of existing and relevant receptors affected.

$PM_{2.5}$ monitoring will be established at St John's Road monitoring site with the FIDAS instrumentation which is also capable of measuring a range of particles.

Following decommissioning of the Queen Street monitoring site, the local authority will work in partnership with DEFRA to set-up a new site, monitoring NO_2 and PM_{10} on the A7 at Nicolson Street.

The local authority will work in partnership with Scottish Government, Transport Scotland and SEPA to build on two key actions of the Cleaner Air for Scotland Strategy; development of a National Modelling Framework (NEF) and a National Low Emission Framework (NLEF). This work will also assist the local authority in assessing an exceedance of the NO_2 annual mean objective outwith the existing AQMAs.

In conjunction with SEPA the local authority will also ensure a report is submitted to the Scottish Government detailing the outcome of the assessment of poultry farms for potential PM_{10} exceedance.

The existing Air Quality Action Plan will be revised. The Council is considering the rationalisation of governance structures for local air quality management, local transport strategy development and local development plan delivery. Notwithstanding this, progress with existing and new actions is on-going and covered in detailed in Table 2.21 within the report. The following summary details a number of key action plan measures which will continue to be taken forward during 2016/ 2017;

- **Traffic Management**

Further SCOOT improvements will be delivered as detailed in Table 2.19

- **Vehicle fleet efficiency**

Continuation to promote low emission public transport

Promotion of cleaner buses subject to funding availability.

Driver Training and ECO driving aids

The Council will investigate the installation of eco driving aids (Telematics system) to its fleet which aims to reduce fuel wastage and idling times.

Fleet efficiency and recognition schemes

The scheme ECOSTARS Edinburgh will continue during 2016/17.

- **Trams**

A further report regarding the way forward for the delivery of the tram network extension to Newhaven Leith (north of the city) is expected to be presented to Council in 2017.

- **Promotion of Electric Vehicle Charging infrastructure**

Support for electric charging infrastructure will continue. An on street parking scheme will be piloted in the Sciennes area of the city and is expected to be operational at the end of 2017, subject to Traffic Regulation Order consultations.

- **Active Travel Action Plan**

New cycle ways are expected to be delivered and enhancements made to existing cycle ways as detailed in the Council's Active Travel Action Plan;

  - Meadows to Union Canal 2017
  - Meadows to city centre via George IV Bridge 2016- 17
  - Design and consultation
  - A8 Gyle to Newbridge 2016- 17

- Ongoing programme of installing lighting (LED and conventional) on off – road paths

There will be a greater provision and improvement of city centre bike parking.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref.	Y OS Grid Ref.	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure(1) (m)	Distance to kerb of nearest road (m)	Inlet Height (m)
ID1	**Queen Street**	Roadside	324826	674078	NO_2 PM_{10}	Yes	Chemiluminescent TEOM	0	5.2	2.87
ID2	**Haymarket**[1]	Roadside	323896	673197	NO_2 PM_{10}	Yes	Chemiluminescent TEOM	7	9.2	N/A
ID3	**Roseburn**[1]	Roadside	322939	673233	NO_2 PM_{10}	Yes	Chemiluminescent TEOM	4.9	7.6	n/a
ID4	**Gorgie Road**	Roadside	323121	672314	NO_2	Yes	Chemiluminescent	0	2.5	2.63
ID5	**St. John's Road**	Kerbside	320101	672907	NO_2	Yes	Chemiluminescent	1.35	0.5	1.98
ID6	**Currie High School**	Suburban	317595	667909	NO_2 PM_{10}	No	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.	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure(1) (m)	Distance to kerb of nearest road (m)	Inlet Height (m)
ID7	**St. Leonards**	Urban Back-ground (AURN)	326265	673129	NO_2 PM_{10} $PM_{2.5}$ O_3 CO SO_2 PAH	No	Chemiluminescent FDMS FDMS UV absorp IR absorp UV absorp Digitalsamp	29.0 (NB. background site)	35m	3.4m – 3.2m – 3.1m – 3.4m – 3.4m – 3.4m – 3.4m –
ID8	**Salamander Street**	Roadside	327615	676333	NO_2 PM_{10}	No	Chemiluminescent TEOM	0	2.13m	2.86
ID9	**Queensferry Road**	Roadside	318736	674930	NO_2 PM_{10}	No	Chemiluminescent TEOM/FDMS	6.5	1.7m	2.96
ID10	**Glasgow Road**	Roadside	313103	672663	NO_2 PM_{10}	Yes	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).

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

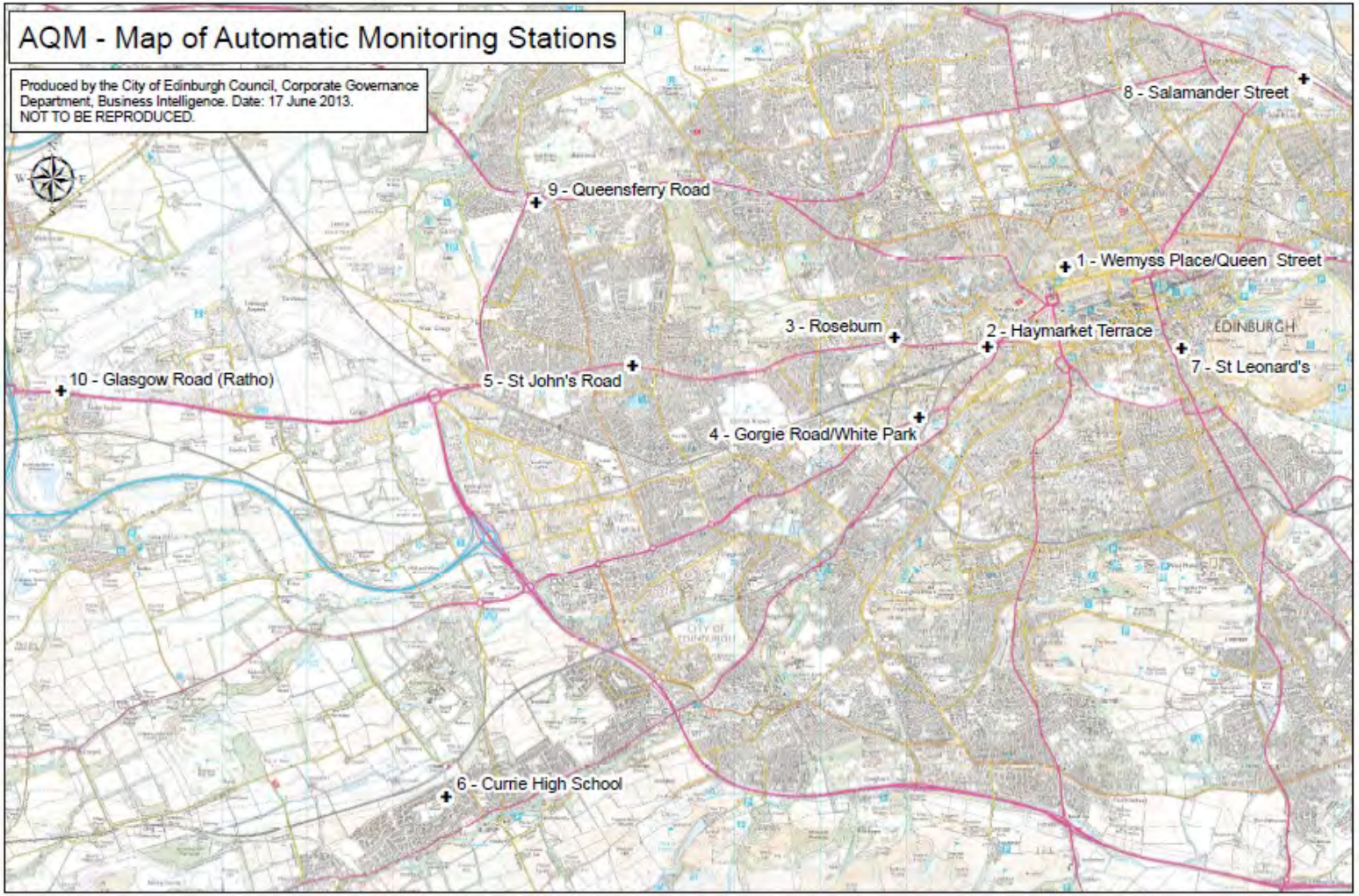


Table A.3 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name / Address	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In AQMA?	Distance to Relevant Exposure (m)(1)	Distance to kerb of nearest road (m)
	NORTH						
29	**Bernard Street/CA**	Roadside	327148	676507	Yes	0	2.2
29a	**Bernard Street/Kings Chambers**	Roadside	327137	676529	Yes	0	2.1
29c	**Bernard Street/PS**	Roadside	327135	676515	Yes	0	2.1
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** [i]	Roadside	327106	675816	No	0	2.2
52	**Ferry Road 268**	Roadside	324946	676070	No	4.6	1.65
53	**Ferry Road/Bowhill Terrace 6**	Roadside	324726	676004	Yes	1.57	1.75 +2.85 [ii]
45	**Ferry Road/North Fort Street**	Roadside	326136	676361	No	0	3.7
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
30d	**Great Junction Street/WC**	Roadside	326757	676144	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
55	**Inverleith Row/Ferry Road**	Roadside	324638	675993	Yes	0	4.65
55c	**Inverleith Row/Montague**	Roadside	324686	675941	Yes	1.06	2.28 + 2.0[ii]
9c	**North Junction Street**	Roadside	326448	676710	Yes	2.05	2.65
9b	**Ocean Drive/Leith**	Roadside	326455	676805	No	0	4.2
51c	**Salamander Street/Baltic Street**	Roadside	327476	676418	No	0	2.25
51b	**Salamander Street/Bath Road**	Roadside	327665	676331	No	0	1.8
14	**Trinity Crescent**	Roadside	324896	676991	No	4.0	2.0

Site ID	Site Name / Address	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In AQMA?	Distance to Relevant Exposure (m)[1]	Distance to kerb of nearest road (m)
	EAST						
19	**Baileyfield Road**	Background	329997	674274	No	N/A	18
31	**Dalkeith Road 187**	Roadside	327231	671782	No	4.9	1.8
25	**Easter Road/CH Shop**	Roadside	326934	674503	Yes	0	2.3
25b	**Easter Road/Rossie Place**	Roadside	326950	674624	Yes	0	3.3
25c	**Easter Road 105/109**	Roadside	326958	674770	Yes	0	3.25
25d	**Easter Road/Bothwick**	Roadside	326974	674780	Yes	0	2.8
25e	**Easter Road 198**	Roadside	326999	674940	Yes	0	3.95
46b	**London Road/Brunton Place**	Roadside	326779	674487	Yes	0	6.9 + 2[ii]
81	**London Rd/East Norton Place**	Roadside	326980	674446	Yes	0	2.5
67	**London Road/Earlston Place**	Roadside	327190	674433	Yes	0	2.7
68	**Parsons Green Terrace** [iii]	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
66	**London Road/Cadzow Place**	Roadside	327468	674362	Yes	0	2.04 + 2.0[ii]
46	**London Road/Easter Road**	Roadside	326944	674472	Yes	0	5.6
32	**Niddrie Mains Road 28**	Kerbside	328889	671649	No	4.7	0.2 + 2.4[ii]
71	**Portobello High Street 185**	Roadside	330533	673850	No	0	3.0
73a	**Portobello Road/Ramsay 1**	Roadside	329923	674389	No	1.98	2.8
73d	**Portobello Road/Ramsay F**	Roadside	329917	674388	No	0	3.7
72	**Seafield Road East 10**	Roadside	329993	674457	No	0	4.5
72a	**Seafield Road East 7**	Roadside	330001	674444	No	0	8.5
	CITY CENTRE NORTH						
43	**Broughton Road**	Roadside	325513	675134	No	0	2.0
44	**Broughton Street**	Roadside	325855	674527	No	0	4.5
13	**Deanhaugh Street**	Kerbside	324603	674555	No	5.1	0.6 + 2.1[ii]

Site ID	Site Name / Address	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In AQMA?	Distance to Relevant Exposure (m)[1]	Distance to kerb of nearest road (m)
35	**Dundas Street**	Kerbside	325243	674400	No	7.3	0.3 + 2.1[ii]
74f	**George Street 112**	Roadside	324880	673891	Yes	0	6.8
75b	**Great Stuart Street 7**	Roadside	324488	673978	No	6.1	2.5
75f	**Great Stuart Street 14**	Roadside	324487	673936	No	0	7.2 + 2.4[ii]
75e	**Great Stuart Street 9**	Roadside	324476	673967	No	0	7.25 +2.1[ii]
143a	**Hamilton Place Library**	Roadside	324699	674651	No	0 play area	2.1m
HT1	**Haymarket Terrace (North)** [i]	Roadside	323985	673219	Yes	0	3.7
HT2	**Haymarket Terrace (South)** [i]	Kerbside	323787	673212	Yes	1.75	0.5
34	**India Street**	Background	324790	674341	No	N/A	0.4 + 2.1[ii]
55b	**Inverleith Row/Summer Place**	Roadside	325052	675217	No	0	6.1
21	**Leith Walk/Brunswick Road**	Roadside	326386	674872	Yes	3.4	1.16
20	**Leith Walk/McDonald Road**	Kerbside	326361	674882	Yes	0	5.6
74g	**Leith Street 35**	Roadside	325897	674051	Yes	0	3.65
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	325362	674205	Yes	4.25	2.2 + 2.0 [ii]
SH1	**Shandwick Place** [i]	Roadside	324513	673556	Yes	0	2.5
75a	**St Colme Street**	Kerbside	324624	674012	No	5.1	0.6
75d	**St Colme Street 4**	Roadside	324646	674025	No	0	6.2
36	**York Place**	Roadside	325828	674362	Yes	2.7	5.5
	CITY CENTRE SOUTH						
6a	**Bruntsfield Place 210**	Roadside	324495	672035	No	0	2.8
149	**Captain's Road 150** [i]	Roadside	327392	668080	No	0	1.8
138	**Clerk Street 15**	Roadside	326229	672287	Yes	0	2.35 +2 [ii]
48	**Cowgate/Guthrie Street**	Roadside	325881	673471	Yes	0	4.5
48a	**Cowgate/Blair Street**	Roadside	325929	673490	Yes	0	3.2

Site ID	Site Name / Address	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In AQMA?	Distance to Relevant Exposure (m)[1]	Distance to kerb of nearest road (m)
48f	**Cowgate/50 St Mary's Street**	Roadside	326198	673587	No	0	2.6
48c	**Cowgate Blackfriars**	Roadside	326047	673519	Yes	0	2.4
48e	**Cowgatehead 2**	Roadside	325537	673405	Yes	0	1.9
79d	**Dundee Street/Yeaman Place**	Roadside	323926	672550	Yes	0	2.3
150	**Drum Street** [i]	Roadside	329281	668615	No	0	1.5
79a	**Fountainbridge 103**	Roadside	324731	672984	No	0	2.2
79b	**Fountainbridge/Grove Street**	Roadside	324438	672859	No	0	2.2
79	**Fountainbridge/Tollcross**	Roadside	324682	672939	No	0	3.3
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]
10	**Home Street**	Roadside	324905	672893	No	0	2.8
17a	**Hope Park Terrace/VS**	Roadside	326312	672614	Yes	0	5
140	**Hope Park Terrace/Clerk Street**	Roadside	326323	672596	Yes	3.5	1.3
149a	**Howden Hall Road 79** [i]	Roadside	327383	668079	No	0	4.5
149c	**Howden Hall Road 67** [i]	Roadside	327341	668148	No	0	2
149b	**Howden Hall Road 77** [i]	Roadside	327373	668096	No	0	4.5
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**	Kerbside	324538	671166	No	2.8	0.7
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
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]

Site ID	Site Name / Address	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In AQMA?	Distance to Relevant Exposure (m)[1]	Distance to kerb of nearest road (m)
141	**South Clerk Street 84**	Roadside	326383	672472	Yes	0	2.57 + 2 [ii]
28e	**St Leonards Street 145a**	Roadside	326559	672610	No	0	3.4
3	**Torphichen Place CH**	Roadside	324258	673295	Yes	0	2.25
3b	**Torphichen Place 1**	Roadside	324277	673309	Yes	0	4.8
3a	**Torphichen Street**	Roadside	326020	673370	Yes	0	5.8
2	**West Maitland Street**	Kerbside	324193	673346	Yes	5.2	0.5
28b	**West Port 62**	Roadside	325166	673242	Yes	0	1.4
28c	**West Port Opposite 50**	Roadside	325184	673261	Yes	0	3.0
28d	**West Port 42**	Roadside	325203	673250	Yes	0	2.7
	WEST						
56	**Glasgow Road /Drumbrae**	Roadside	319212	672921	No	4.6	0.57 + 2 [ii]
57	**Glasgow Road 158**	Roadside	318185	672756	No	8.5	3.6
16	**Glasgow Road 68**	Roadside	313028	672633	Yes	4.4	1.8
16a	**Glasgow Road 68 facade**	Roadside	313028	672629	Yes	0	6.2
16b	**Glasgow Road/Ratho Station 94**	Roadside	313211	672612	Yes	0	2.9
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]
15a	**Glasgow Road 9**	Roadside	312702	672675	Yes	0	7.5
40f	**Hillhouse Road 118**	Roadside	322478	674406	No	2.57	2.6
40d	**Hillhouse/Marischall Place No4**	Roadside	322123	674492	No	0	3.1
41	**Hillview Terrace**	Background	320081	673232	No	N/A	1.0
61	**Maybury Road/Barnton**	Roadside	318612	674924	No	12.5	2.8
40	**Queensferry Rd/Hillhouse Rd**	Roadside	322144	674497	No	0	2.0 + 2 [ii]
63	**Queensferry Road 544**	Roadside	318723	674963	No	0	13.6
64	**Queensferry Road 550**	Roadside	318698	674955	No	9.2	1.49
64a	**Queensferry Road 552**	Roadside	318698	674964	No	0	10.5

Site ID	Site Name / Address	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In AQMA?	Distance to Relevant Exposure (m)[1]	Distance to kerb of nearest road (m)
64b	**Queensferry Road 550 Facade** [i]	Roadside	318701	674964	No	0	11
62	**Queensferry Road 561**	Roadside	318810	674903	No	0	16.9
23	**Roseburn Terrace**	Kerbside	323007	673198	Yes	2.3	0.23
1	**St John's Road SB**	Kerbside	320122	672917	Yes	1.8	0.54
1b	**St John's Road IR**	Roadside	320154	672911	Yes	0	2.0
SJ1	**St John's Road/Kaimes Rd**	Kerbside	320571	672809	Yes	2.26	0.28
SJ2	**St John's Road 63**	Kerbside	320436	672830	Yes	9.15	0.37
SJ3	**St John's Road 81**	Roadside	320316	672857	Yes	14.48	1.15
1d	**St John's Road 131**	Roadside	320096	672907	Yes	0	2.1
39	**St John's Road/Victor Park**	Roadside	319677	672991	Yes	4.15	1.6
50a	**Whitehouse Rd/Barnton Grove**	Roadside	318571	675028	No	1.57	3.5
	SOUTH WEST						
76	**Angle Park/Harrison Road**	Roadside	323498	672263	Yes	0	2.20
76c	**Angle Park Terrace 25**	Roadside	323587	672360	Yes	0	4.75
76b	**Angle Park Terrace 74** [iii]	Roadside	323527	672285	Yes	0	2.1
76a	**Ardmillan Terrace 22**	Roadside	323487	672287	Yes	0	2.2
80d	**Balgreen Road / School**	Roadside	322069	672317	No	0 [Play area]	2.9
80e	**Balgreen Road / Library**	Roadside	322110	672268	No	0 [Play area]	2
4	**Calder Road**	Roadside	319062	670543	No	25	1.6
18	**Gorgie Road 8**	Roadside	323477	672476	Yes	0	2.4
80c	**Gorgie Road 87**	Roadside	323265	672394	Yes	0	2.5
80b	**Gorgie Road 549**	Roadside	321724	671557	Yes	0	2.5
80	**Gorgie Road / Delhaig**	Roadside	321967	671666	Yes	0	2.6
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

Site ID	Site Name / Address	Site Type	X OS Grid Ref.	Y OS Grid Ref.	In AQMA?	Distance to Relevant Exposure (m)(1)	Distance to kerb of nearest road (m)
11	**Lanark Road 610**	Roadside	319527	668420	No	3.7	1.5
77a	**Slateford Road 51**	Roadside	323167	672009	Yes	0	2.3
77b	**Slateford Road 93/95**	Roadside	322999	671876	Yes	0	2.6
77	**Slateford Road 97**	Roadside	322960	671846	Yes	0	2.67
78	**Slateford Road/The Maltings**	Roadside	322772	671606	No	0	2.2

Notes to Table A.3;

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

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

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

i. New monitoring location in 2015.

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

iii. Site relocated in 2015 in close proximity to previous site.

Figure A.2 Maps of PDTs City-Wide 2015

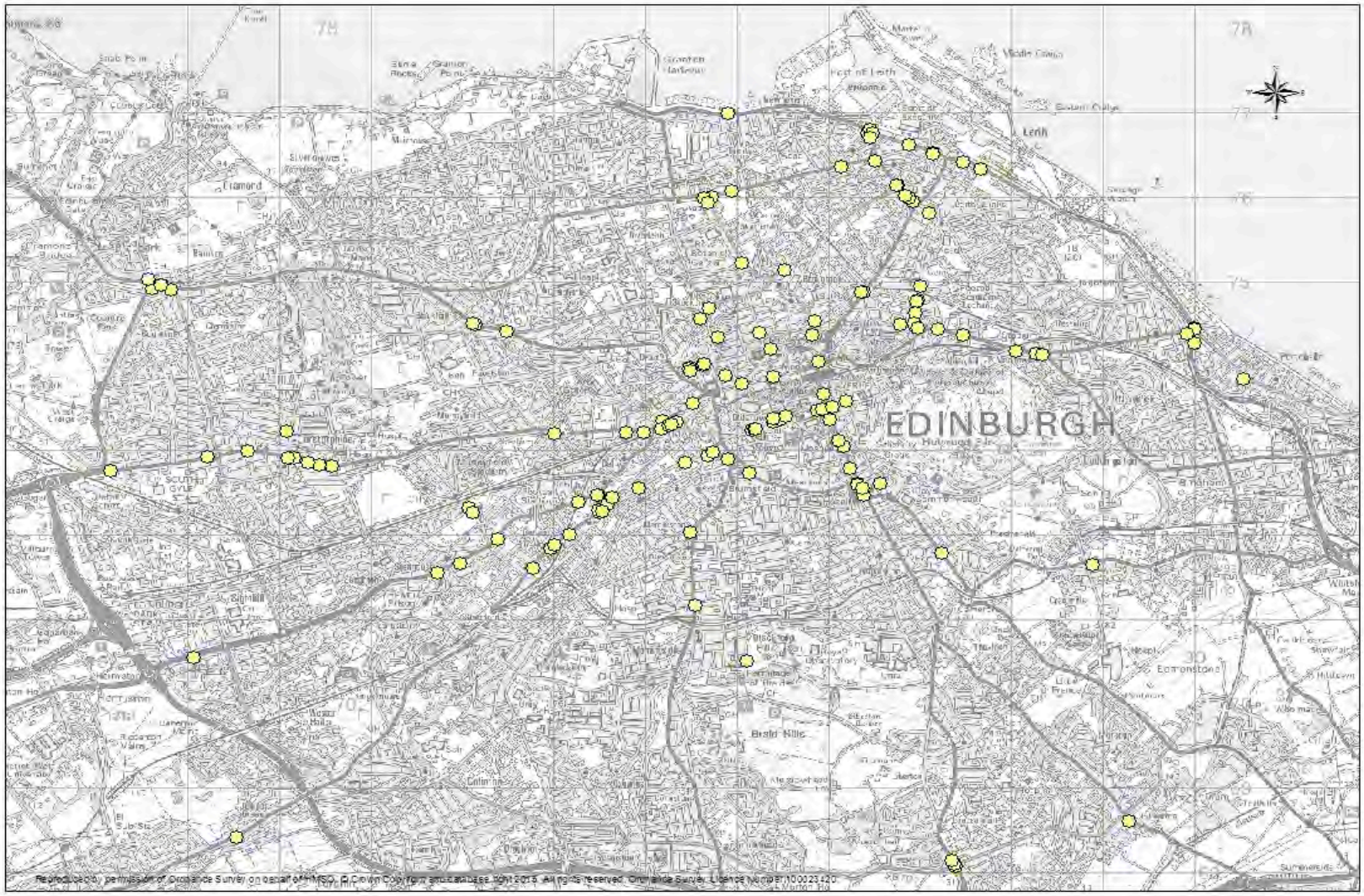


Table A.4a – Annual Mean NO_2 Monitoring Results – Automatic Data

Site ID	Site Name / Type	Within AQMA ?	Data Capture 2015 % [a]	Annual Mean Concentration (µg/m^3)							
				2008	2009	2010	2011	2012	2013	2014	2015
ID1	**Queen St** Roadside	Y	98	32	33	37	29	28	28	26	27
ID2	**Haymarket** Roadside	Y	N/A	**41 (49)**	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ID3	**Roseburn** Roadside	Y	N/A	28 (31)	26 (28)	30 (33)	24 [b]	N/A	N/A	N/A	N/A
D4	**Gorgie Road** Roadside	Y	89	**42**	38	**41**	37	39	38	34	32
ID5	**St John's Road** Kerbside	Y	89	**75**	**70**	**71**	**65**	**58**	**57**	**59**	**65**
ID6	**Currie** Suburban	N	95	N/A	N/A	10	6	8	8	7	7
ID7	**St Leonard's** Urban Background	N	0	31	24	31	25	24	22	22 [b]	N/A
ID8	**Salamander St** Roadside	N	99	N/A	30 [b]	30	29	30	28	27	28
ID9	**Queensferry Rd** Roadside	N	93	N/A	N/A	N/A	41 (29)	52 **(40)**	43 (34)[b]	46 (36)	41 (33)
ID10	**Glasgow Road** Roadside	Y	99	N/A	N/A	N/A	N/A	29 [b]	27	27	26

Notes for Table;

In bold and red, exceedance of the NO_2 annual mean objective of 40µg/m^{3}and in bold black, result of 40µg/m^{3}shown

a Data capture for the full calendar year

b annualised mean per TGO9 (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.

N/A Data not available

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

Site ID	Site address	Valid Data Capture (%) 2015 (1)	Annual mean concentration (adjusted for bias) µg/m³ (2)						
			2009 Bias Adjustment Factor = 0.86	2010 Bias Adjustment Factor = 0.85	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
North									
29	**Bernard Street/CA**	100	**45.1**	**43.7**	38.9	37	36	31	32
29a*	**Bernard St**	92	**42.0**	**44.6**	**41.9**	**40**	38	34	34
29c*	**Bernard Street/PS**	100	**48.2**	**49.4**	**44.6**	**44**	**42**	39	**40**
9d	**Commercial Street**	92	-	-	-	-	-	**42**	36
9	**Commercial Street 88**	92	31.6	36.7	31.2	35	32	30	29
9a	**Commercial St/Portland Pl**	75	-	38.1	**41.0**	39	36	35	36
30f	**Duke Street**	92	-	-	-	-	-	-	**40**
52	**Ferry Road 268**	92	32.1	32.4	32.5	34	28	29	27
53	**Ferry Rd/Bowhill Terr**	100	36.4	34.8	32.5	35	34	33	35
45	**Ferry Rd/North Fort St**	75	35.4	**41.5**	32.6	36	32	31	30
45d	**Ferry Rd/North J St**	83	**40.9**	38.3	39.6	37	34	34	37
30b	**Gt Junction Street 137**	75	38.5	39.9	**40.0**	38	36	33	38
30c	**Gt Junction Street 14**	100	**42.6**	**44.1**	38.4	38	39	37	34
30d	**Gt Junction Street/WC**	100	37.1	39.9	33.8	38	34	34	30
30e	**Gt Junction Street/CG**	92	**41.9**	38.7	**41.2**	37	36	33	32
30*	**Great Junction St/FV**	79	**44.1**	**41.8**	39.1	38	**41**	N/A	33
55*	**Inverleith Row/Ferry Rd**	100	**42.6**	**44.0**	**43.8**	**46**	**43**	**40**	**41**
55c	**Inverleith Row/Montague**	100	-	-	28.2	32	31	29	25
9c	**North Junction Street**	58	-	-	-	-	-	30	29
9b	**Ocean Drive/Leith**	100	-	33.0	26.2	31	29	28	25
51c	**Salamander St/Baltic St**	92	37.1	36.2	38.5	35	33	30	32

Site ID	Site address	Valid Data Capture (%) 2015 (1)	Annual mean concentration (adjusted for bias) µg/m^3 (2)						
			2009 Bias Adjustment Factor = 0.86	2010 Bias Adjustment Factor = 0.85	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
51b	Salamander St/Bath Rd	100	37.4	**40.3**	37.0	38	35	32	30
14	Trinity Crescent	92	28.6	27.5	28.9	28	27	25	22
East									
19	Baileyfield Road	58	22.5	27.5	24.3	22	20	19	21
31	Dalkeith Road 187	100	28.1	27.8	28.0	29	28	25	23
25	Easter Road/CH Shop	42	**50.8**	**49.7**	**43.6**	**45**	**41**	39	**40**
25b	Easter Rd/Rossie Place	100	38.8	39.1	35.8	35	34	31	31
25c	Easter Road 105/109	100	38.0	37.7	**41.0**	**41**	37	29	31
25d	Easter Road/Bothwick	83	37.3	37.1	32.7	34	30	30	30
25e	Easter Road 198	92	34.1	34.2	32.0	33	27	31	24
46b	London Rd/Brunton Pl	100	-	-	-	-	30	28	27
81	London Rd/E. Norton Pl	100	-	-	**51.2**	**46**	**44**	**43**	**50**
67	London Rd/Earlston Pl	58	**47.9**	**51.3**	**45.5**	**46**	**46**	39	**42**
68	Parsons Green Terrace	75	30.4	36.6	31.5	33	29	28	31
69	London Rd/Wolseley Pl	92	**56.2**	**50.6**	**50.4**	**42**	**40**	**42**	**43**
70	London Rd/Wolseley Terr	100	**47.3**	**46.1**	**42.4**	**41**	**44**	38	**44**
66	London Rd/Cadzow Pl	83	**43.0**	**40.5**	-	36	34	31	32
46	London Rd/Easter Rd	75	**43.4**	**46.2**	**40.4**	**46**	38	38	37
32	Niddrie Mains Road 28	75	30.7	32.5	30.9	33	31	28	28
71	Portobello High St 185	83	**43.0**	39.2	36.0	32	33	32	31
73a	Portobello Rd/Ramsay 1	92	-	-	**41.6**	37	37	36	37
73d	Portobello Rd/Ramsay F	92	-	-	-	-	38	35	38
72	Seafield Road East 10	100	35.0	38.4	33.1	37	36	33	30
72a	Seafield Road East 7	100	-	-	-	-	35	33	30

Site ID	Site address	Valid Data Capture (%) 2015 (1)	Annual mean concentration (adjusted for bias) µg/m^3 (2)						
			2009 Bias Adjustment Factor = 0.86	2010 Bias Adjustment Factor = 0.85	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
City Centre - North									
43	**Broughton Road**	92	38.1	39.8	34.6	37	37	35	32
44	**Broughton Street**	92	35.1	35.3	32.8	34	31	31	30
13	**Deanhaugh Street**	83	30.1	33.0	33.5	32	31	28	28
35	**Dundas Street**	100	27.2	31.6	30.6	31	30	27	28
74f	**George Street 112**	100	-	**43.4**	**44.7**	**47**	34	30	26
75b	**Great Stuart Street 7**	92	-	36.2	33.4	31	30	27	30
75f	**Great Stuart Street 14**	83	-	-	-	-	26	23	24
75e	**Great Stuart Street 9**	100	-	-	-	-	24	23	24
143a	**Hamilton Place Library**	100	-	-	-	-	34	35	29
HT1	**Haymarket Terrace (North)**	33	-	-	-	-	-	-	37
HT2	**Haymarket Terrace (South)**	42	-	-	-	-	-	-	39
34	**India Street**	92	22.6	22.7	23.6	23	21	20	20
55b	**Inverleith /Summer Pl**	100	-	-	33.7	32	30	27	30
21	**Leith Walk/Brunswick Rd**	100	35.3	35.4	34.2	36	34	33	33
20	**Leith Walk/McDonald Rd**	83	36.8	38.1	-	35	34	32	33
74g	**Leith Street 35**	75	-	-	-	-	-	-	**49**
47	**Princes Street Eastbound**	100	34	**58**	**45.3**	**45**	**50**	**50**	**42**
24	**Princes Street/Mound**	83	36.2	**49.3**	N/A	34	**41**	N/A	**42**
33	**Queen Street/Hanover St**	25	**50.8**	**56.3**	**50.0**	**49**	33	N/A	N/A
SH1	**Shandwick Place**	33	-	-	-	-	-	-	39
75a	**St Colme Street**	92	-	38.5	36.5	38	34	29	30
75d	**St Colme Street 4**	83	-	-	-	-	31	27	26
36	**York Place**	92	37.5	39.0	35.4	**41**	28	33	35

Site ID	Site address	Valid Data Capture (%) 2015 (1)	Annual mean concentration (adjusted for bias) µg/m^3 (2)						
			2009 Bias Adjustment Factor = 0.86	2010 Bias Adjustment Factor = 0.85	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
City Centre – South									
6a	**Bruntsfield Place 210**	75	-	-	-	-	-	32	30
149	**Captain's Road 150**	83	-	-	-	-	-	-	27
138	**Clerk Street 15**	83	-	-	-	**40**	38	38	37
48	**Cowgate/Guthrie Street**	75	39.8	**46.2**	**40.2**	**40**	38	33	33
48a	**Cowgate/Blair Street**	83	-	37.7	31.4	**40**	35	36	34
48f	**Cowgate/50 St Mary's St**	67	-	-	-	-	-	37	37
48c	**Cowgate Blackfriars**	67	-	-	-	**43**	**42**	34	**41**
48e	**Cowgatehead 2**	50	-	-	-	-	39	35	**44**
79d	**Dundee Street/Yeaman Pl**	75	-	-	-	-	**46**	**41**	**42**
150	**Drum Street**	92	-	-	-	-	-	-	27
79a	**Fountainbridge 103**	75	-	-	-	39	37	34	31
79b	**Fountainbridge/Grove St**	50	-	-	-	32	28	24	27
79	**Fountainbridge/Tollcross**	100	-	**42.0**	36.3	37	36	34	30
37a*	**Grassmarket 41**	58	**40.5**	**60.0**	**42.0**	**43**	**44**	**40**	**43**
37b	**Grassmarket 75**	75	-	-	37.1	39	37	35	36
37c	**Grassmarket/Thompsons**	92	-	-	-	-	27	25	27
10	**Home Street**	92	32.3	36.5	25.7	33	31	27	30
17a*	**Hope Park Terrace/VS**	100	38.8	**43.4**	37.4	39	36	35	36
140	**Hope Pk Terrace/Clerk St**	92	-	-	-	35	35	32	32
149a	**Howden Hall Road 79**	92	-	-	-	-	-	-	30
149c	**Howden Hall Road 67**	58	-	-	-	-	-	-	27
149b	**Howden Hall Road 77**	100	-	-	-	-	-	-	25
38	**Melville Drive**	75	25.3	27.6	27.3	29	26	23	24

Site ID	Site address	Valid Data Capture (%) 2015 (1)	Annual mean concentration (adjusted for bias) µg/m^3 (2)						
			2009 Bias Adjustment Factor = 0.86	2010 Bias Adjustment Factor = 0.85	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
42	**Midmar Drive**	100	15.2	18.4	16.1	18	15	13	15
8	**Morningside Road**	50	27.1	28.8	28.6	26	25	23	24
49	**Morrison Street**	92	**44.6**	**49.3**	**48.5**	**46**	**42**	36	35
135	**Nicolson Street 69**	100	-	-	-	**50**	**45**	**43**	**46**
136	**Nicolson Street 92**	58	-	-	-	**42**	39	39	35
27	**North Bridge – South**	42	**48.4**	**49.4**	**48.7**	**52**	**47**	**48**	N/A
144	**South Bridge 59**	83	-	-	-	-	**46**	**47**	**44**
142	**South Clerk Street 41a**	92	-	-	-	**42**	**40**	36	34
141	**South Clerk Street 84**	83	-	-	-	**44**	**41**	38	**40**
28e	**St Leonards Street 145a**	100	-	-	-	-	-	28	31
3	**Torphichen Place CH**	100	26.3	**55.6**	**55.1**	**48**	**43**	**43**	**45**
3b	**Torphichen Place 1**	83	-	-	-	-	-	**45**	**42**
3a	**Torphichen Street**	92	-	-	-	-	32	31	30
2	**West Maitland Street**	100	**45.6**	**52.4**	**55.3**	**40**	-	**43**	**42**
28b	**West Port 62**	83	**66.7**	**62.4**	**57.0**	**61**	**52**	**56**	**58**
28c	**West Port Opposite 50**	83	**43.5**	**41.5**	39.0	-	39	N/A	**46**
28d	**West Port 42**	83	**60.2**	**54.9**	**55.2**	**60**	**58**	**51**	**52**
West									
56	**Glasgow Rd /Drumbrae**	100	28.6	30.7	29.5	31	30	29	26
57	**Glasgow Road 158**	92	34.9	36.3	36.5	36	33	33	33
16	**Glasgow Road 68**	100	**46.8**	**44.5**	**43.8**	**47**	**40**	**40**	**40**
16a	**Glasgow Road 68 facade**	83	-	-	-	-	38	36	34
16b	**Glasgow Rd/Ratho Stat.**	92	-	-	-	-	-	32	32
58*	**Glasgow Rd Newbridge**	100	**51.1**	**51.3**	**51.5**	**48**	**46**	**45**	**45**

Site ID	Site address	Valid Data Capture (%) 2015 (1)	Annual mean concentration (adjusted for bias) µg/m^3 (2)						
			2009 Bias Adjustment Factor = 0.86	2010 Bias Adjustment Factor = 0.85	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
15	Glasgow Rd Newbridge	100	42.0	37.6	40.9	40	39	37	40
15a	Glasgow Road 9	83	-	-	-	-	-	34	39
40f	Hillhouse Road 118	100	-	-	-	35	31	30	29
40d	Hillhouse/Marischall Pl	92	-	-	-	32	33	30	30
41	Hillview Terrace	92	21.2	22.4	18.4	21	18	18	19
61	Maybury Road/Barnton	100	24.2	27.0	25.8	16	25	23	25
40	Queensf'y Rd/Hillhouse	100	37.4	42.4	34.2	40	37	32	32
63	Queensferry Road 544	100	27.6	29.4	25.2	26	26	23	27
64	Queensferry Road 550	92	46.8	47.5	43.9	50	47	47	48
64a	Queensferry Road 552	83	-	-	-	30	28	30	30
64b	Queensferry Road 550 F	92	-	-	-	-	-	-	36
62	Queensferry Road 561	100	22.0	25.6	19.2	25	21	19	19
23	Roseburn Terrace	75	37.2	43.2	34.5	38	35	37	32
1	St John's Road SB	83	36.7	38.6	35.1	38	36	34	31
1b	St John's Road IR	92	44.2	43.5	38.4	44	41	37	33
SJ1	St John's Rd/Kaimes Rd	83	-	-	-	-	-	31	28
SJ2	St John's Road 63	83	-	-	-	-	-	25	23
SJ3	St John's Road 81	58	-	-	-	-	-	27	27
1d	St John's Road 131	100	57.8	58.8	56.3	52	52	48	46
39	St John's Road/Victor Pk	92	28.2	31.1	30.0	32	35	32	30
50a	Whitehouse Rd/Barnton	75	29.8	32.1	27.8	32	28	28	32
South West									
76	Angle Pk/Harrison Rd	83	-	52.9	44.4	48	41	41	38
76c	Angle Park Terrace 25	100	-	-	-	36	32	30	30

Site ID	Site address	Valid Data Capture (%) 2015 (1)	Annual mean concentration (adjusted for bias) µg/m^3 (2)						
			2009 Bias Adjustment Factor = 0.86	2010 Bias Adjustment Factor = 0.85	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
76b	**Angle Park Terrace 74**	100	-	-	-	**51**	**46**	**41**	**46**
76a	**Ardmillan Terrace 22**	83	-	-	-	32	30	27	27
80d	**Balgreen Road / School**	100	-	-	-	-	36	31	33
80e	**Balgreen Road / Library**	75	-	-	-	-	37	32	34
4	**Calder Road**	83	26.3	25.9	31.7	32	30	26	25
80c	**Gorgie Road 8**	92	-	-	-	39	**40**	N/A	34
80b	**Gorgie Road 87**	83	-	-	-	33	34	31	28
80a	**Gorgie Road 549**	58	-	-	-	-	33	31	27
18*	**Gorgie Road / Delhaig**	96	**45.0**	**54.5**	**48.2**	**49**	**45**	**42**	37
80	**Gorgie Road Glen Lea**	100	-	**47.4**	**42.2**	**42**	**44**	37	33
5	**Gorgie Rd/Murieston Rd**	92	**42.6**	**42.9**	**44.4**	**43**	**41**	35	34
76d	**Henderson Terrace**	92	-	-	-	38	35	32	32
11	**Lanark Road 610**	100	**22.3**	**23.5**	**22.5**	24	22	19	20
77a	**Slateford Road 51**	100	-	-	-	**41**	37	35	35
77b	**Slateford Road 93/95**	75	-	-	-	**46**	**42**	38	38
77	**Slateford Road 97**	58	-	**47.6**	**38.1**	**43**	**40**	37	38
78	**Slateford Road/ Maltings**	67	-	**35.9**	**30.2**	31	30	25	24

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

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

Concentrations at the objective (40µg/m^3) 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%. See Appendix C for details.

Yellow coloured cells indicate data that is distance corrected.

* Concentration is the result of duplicate tubes (2015)

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

Site ID	Site Name / Type	Within AQMA ?	Valid Data Capture 2015 % [a]	Number of Hourly Means > 200µg/m^3							
				2008	2009	2010	2011	2012	2013	2014	2015
ID1	**Queen St** Roadside	Y	98	0	0	0	0	0	0	0	0
ID2	**Haymarket** Roadside	Y	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ID3	**Roseburn** Roadside	Y	N/A	0	0	1	0 (101) [b]	N/A	N/A	N/A	N/A
ID4	**Gorgie Road** Roadside	Y	89	0	0 (130) [b]	0 (122) [b]	0	0	0 (115)	0	0
ID5	**St John's Road** Roadside	Y	89	**166**	**114**	**60**	**52**	**62**	8	1	**42** (224)
ID6	**Currie** Suburban	N	95	N/A	N/A	0	0	0	0	0	0
ID7	**St Leonard's** Urban Background	N	98	0	0	0	0	0	0	0 (69)	0
ID8	**Salamander St** Roadside	N	99	0	0 (144) [b]	0	0	0	0	0	0
ID9	**Queensferry Rd** Roadside	N	93	N/A	N/A	N/A	0	3	0 (145)	0	0
ID10	**Glasgow Road** Roadside	Y	99	N/A	N/A	N/A	N/A	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/m^3) at St Leonards

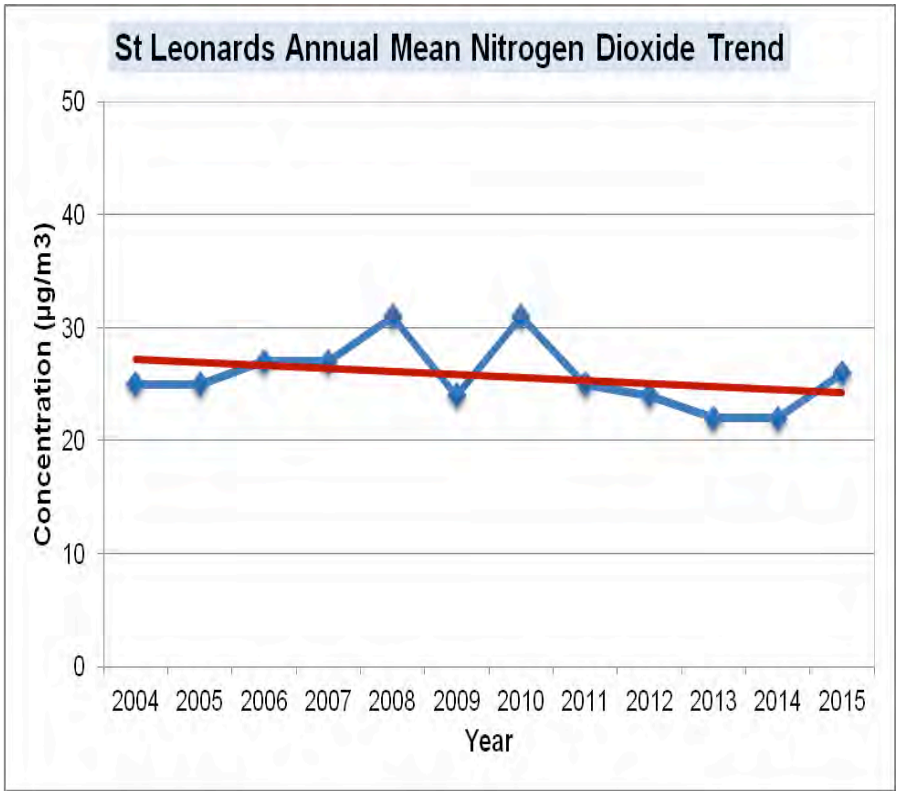


Figure A.3b Trend in Automatically Measured Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) at Gorgie Road

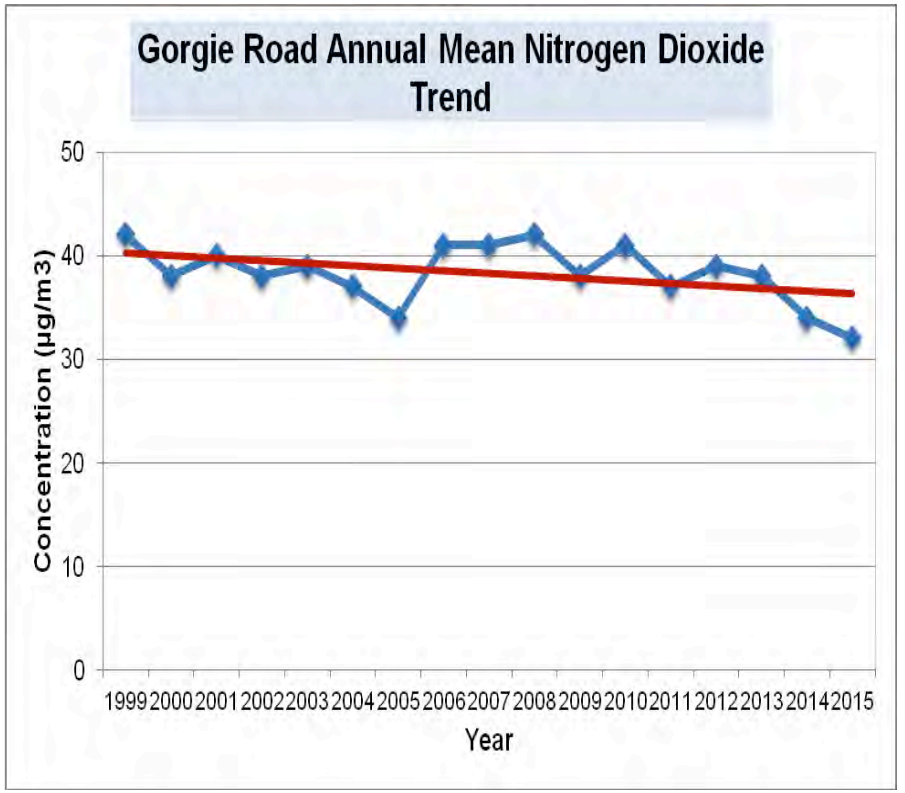


Figure A.3c Trend in Automatically Measured Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) at Queen Street

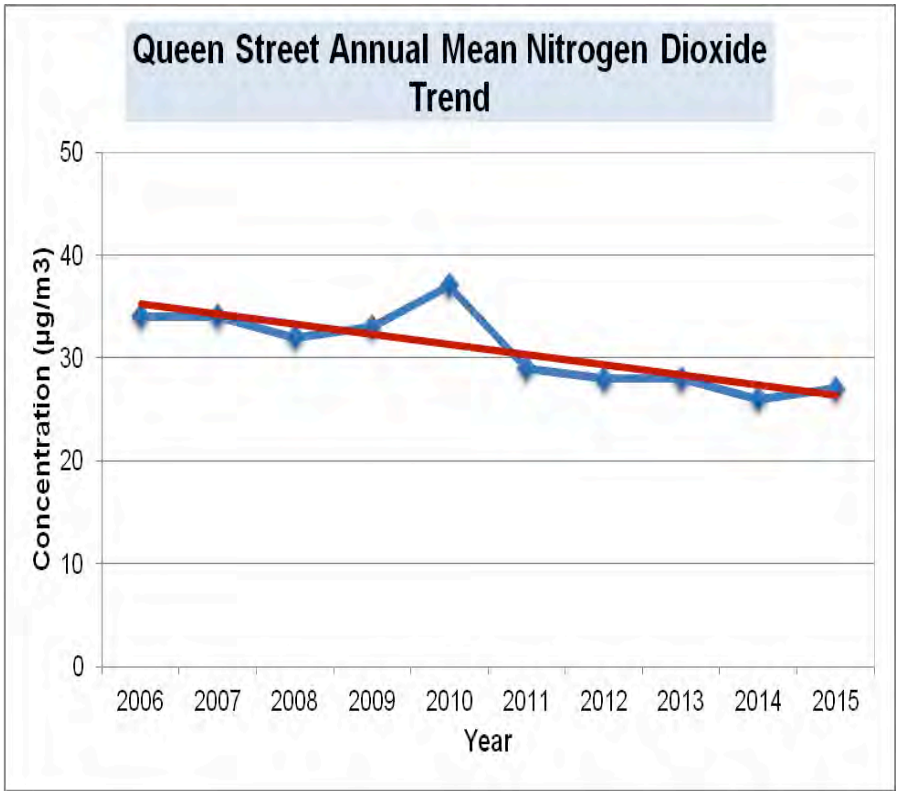


Figure A.3d Trend in Automatically Measured Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) at Salamander Street

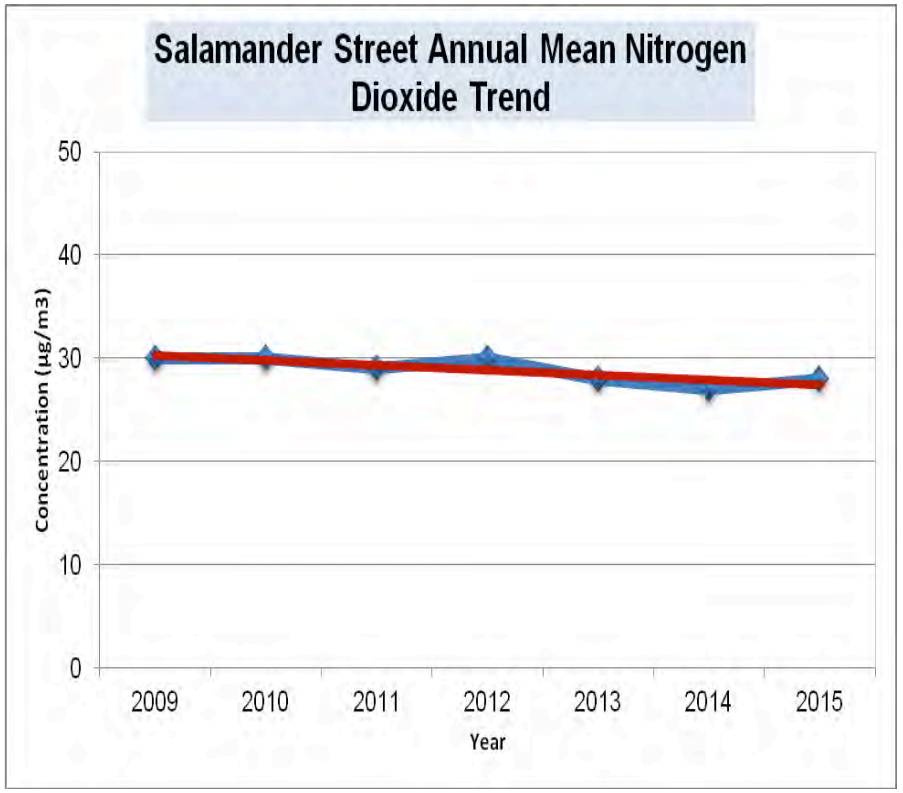


Figure A.3e Trend in Automatically Measured Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) at Currie

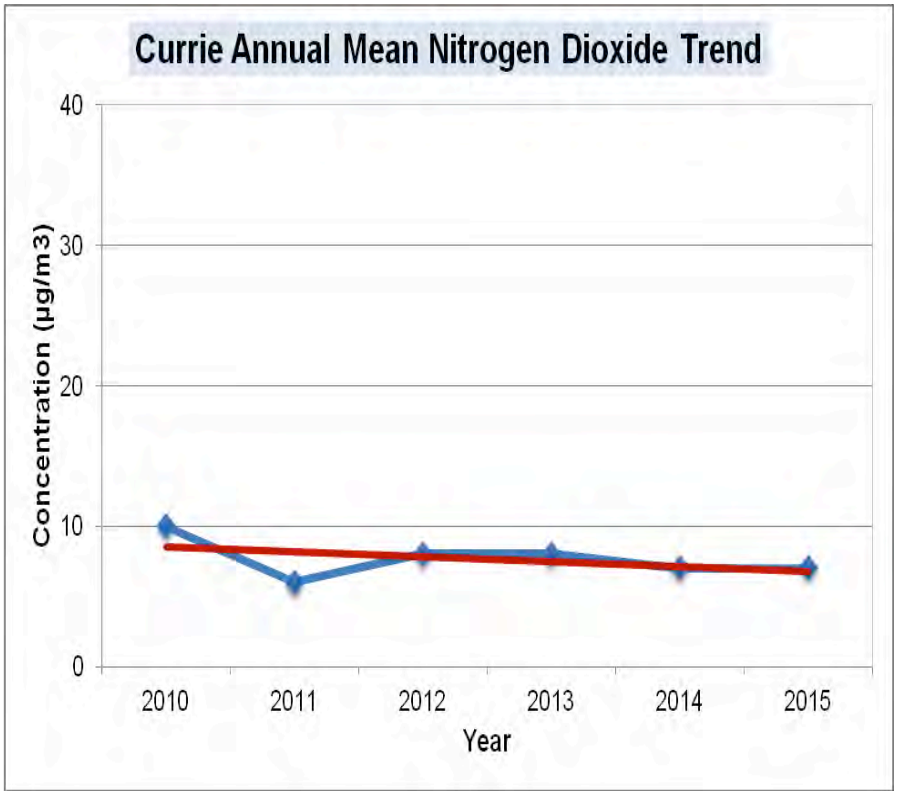


Figure A.3f Trend in Automatically Measured Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) at Queensferry Road

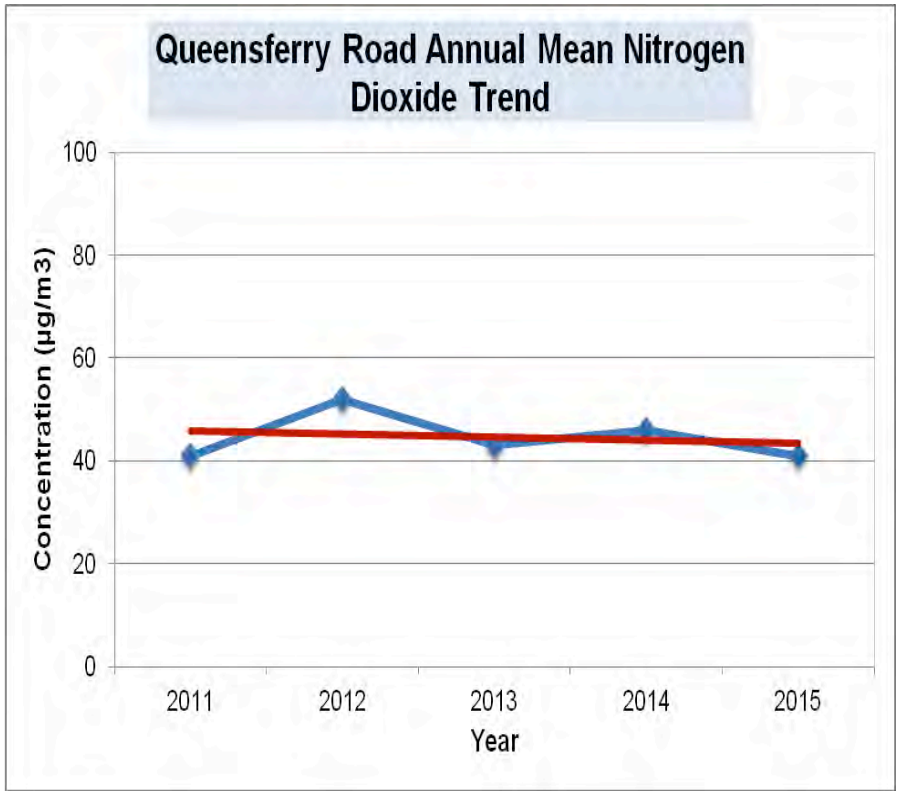


Figure A.3g Trend in Automatically Measured Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) at St John's Road

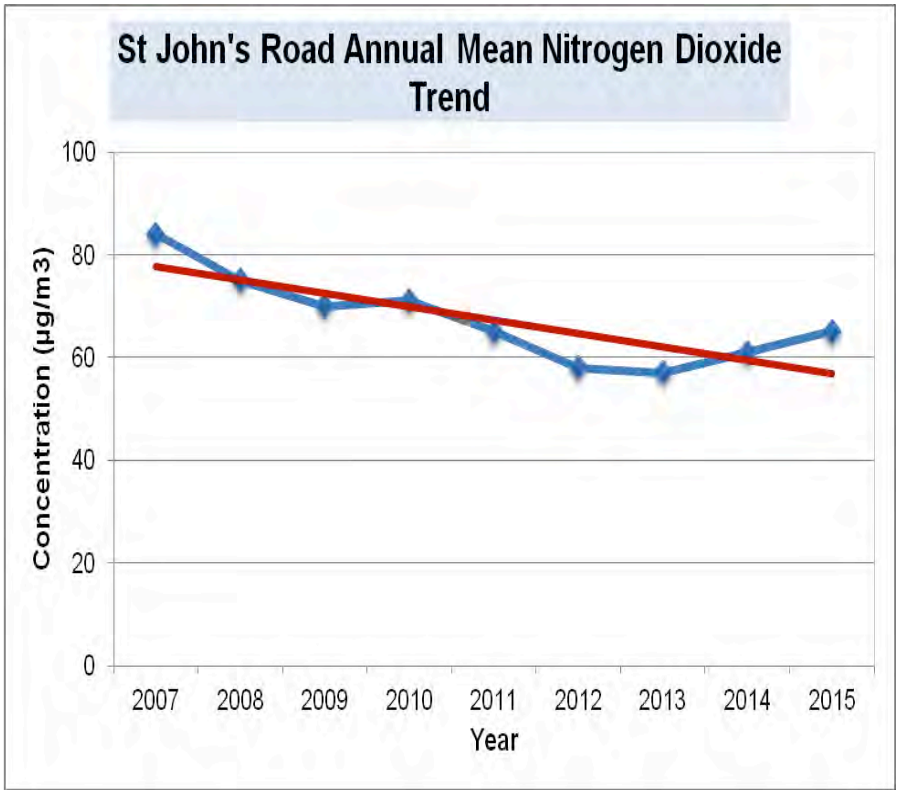


Figure A.3h Trend in the Number of Exceedances of the Hourly Mean Objective for Nitrogen Dioxide at St John's Road

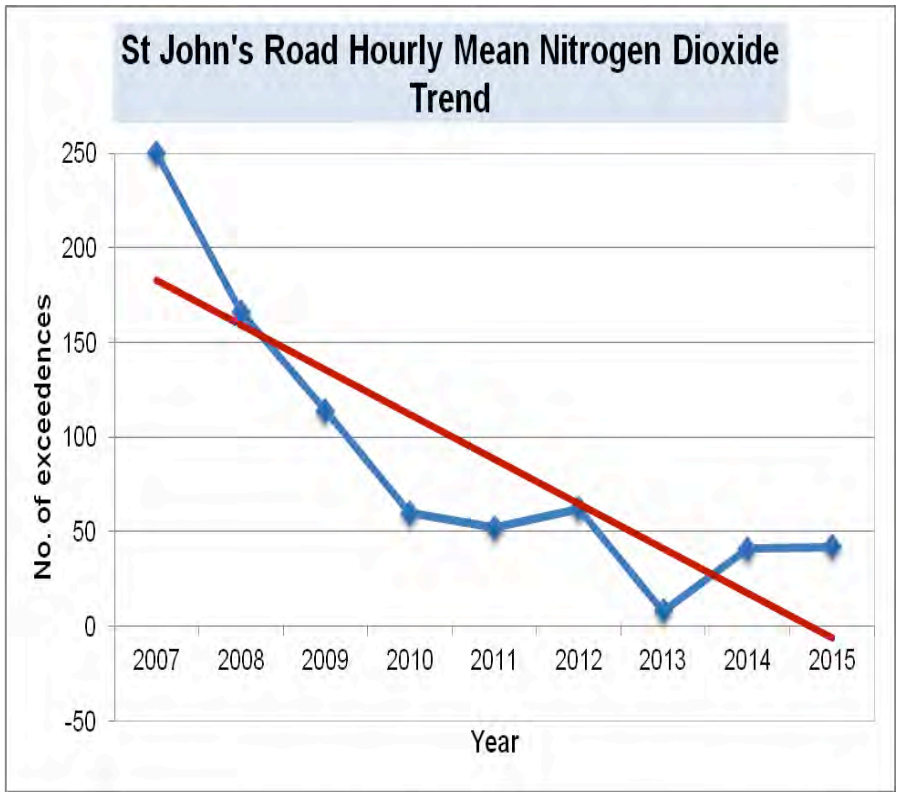


Table A.6 Data used to establish the trend of annual mean concentrations of nitrogen dioxide at passive diffusion tube sites within the Central AQMA.

	2008	2009	2010	2011	2012	2013	2014	2015
PDT 2	N/A	56.8	73.4	73.2	50.5	N/A	58.8	51
PDT 3	58.2	26.3	55.6	55.1	48	43	43	45
PDT 5	N/A	58.2	60.1	54.3	51.9	48.5	43.3	42
PDT 18	51.5	45	54.5	48.2	49	45	42	37
PDT 20	53.1	36.8	38.1	N/A	35	34	32	33
PDT 21	N/A	40	40.7	35.8	38.8	36.2	35.1	35
PDT 23	N/A	47.5	58.2	41.4	45.1	41.2	45.7	37
PDT 24	N/A	46.2	73	N/A	49.7	59.9	N/A	54
PDT 25	58.2	50.8	49.7	43.6	45	41	39	40
PDT 27	52.3	48.4	49.4	48.7	52	47	48	N/A
PDT 36	N/A	39.2	41.1	36.9	43.1	29.1	34.1	36
PDT 46	52.3	43.4	46.2	40.4	46	38	38	37
PDT 47	N/A	31.6	47.5	39	N/A	41	41.1	38
PDT 48	46.6	39.8	46.2	40.2	40	38	33	33
PDT 49	N/A	48.2	54.5	53.5	50.8	46.8	39.3	36
PDT 66	N/A	43	40.5	N/A	36	34	31	33
PDT 67	N/A	47.9	51.3	45.5	46	46	39	42
PDT 68	N/A	30.4	36.6	31.5	33	29	28	31
PDT 69	N/A	56.2	50.6	50.4	42	40	42	43
PDT 70	N/A	47.3	46.1	42.4	41	44	38	44
PDT 76	N/A	N/A	52.9	44.4	48	41	41	38
PDT 77	N/A	N/A	47.6	38.1	43	40	37	38
PDT 80	N/A	N/A	47.4	42.2	42	44	37	33
PDT 81	N/A	N/A	N/A	51.2	46	44	43	50
PDT 17a	N/A	38.8	43.4	37.4	39	36	35	36
PDT 25b	44.9	38.8	39.1	35.8	35	34	31	31
PDT 25c	43.8	38	37.7	41	41	37	29	31
PDT 25d	40.8	37.3	37.1	32.7	34	30	30	30
PDT 25e	37.3	34.1	34.2	32	33	27	31	25
PDT 28b	72.5	66.7	62.4	57	61	52	56	58
PDT 28c	51.5	43.5	41.5	39	N/A	39	N/A	46
PDT 28d	66.6	60.2	54.9	55.2	60	58	51	52
PDT 37a	42.3	40.5	60	42	43	44	40	42
PDT 37b	N/A	N/A	N/A	37.1	39	37	35	36
PDT 48a	N/A	N/A	37.7	31.4	40	35	36	34
PDT 74f	N/A	N/A	43.4	44.7	47	34	30	26
Mean	**51.5**	**44.2**	**48.6**	**43.7**	**43.9**	**40.4**	**38.6**	**38.6**

Table A.7 Data used to establish the trend of annual mean concentrations of NO_2 at passive diffusion tube sites within the Glasgow Road AQMA.

	2009	2010	2011	2012	2013	2014	2015
PDT 16	57.3	54.7	50.9	54.8	44.9	45.6	46
PDT 58	61.8	65	59.3	54.8	52	51.9	51.3
PDT 15	51.4	45.7	45.9	42.5	41.4	38.6	42.8
Mean	**56.8**	**55.1**	**52.0**	**50.7**	**46.1**	**45.4**	**46.7**

Table A.8 Data used to establish the trend of annual mean concentrations of NO_2 at passive diffusion tube sites within the Inverleith Row AQMA.

	2011	2012	2013	2014	2015
PDT 55	43.8	46	43	40	41
PDT 55c	28.6	32.7	31.3	29.3	24.9
PDT 53	36.9	36.8	35.5	34.5	36.4
Mean	**36.4**	**38.5**	**36.6**	**34.6**	**34.1**

Table A.9 Data used to establish the trend of annual mean concentrations of NO_2 at passive diffusion tube sites within the Great Junction Street AQMA.

	2008	2009	2010	2011	2012	2013	2014	2015
PDT 29	45.3	45.1	43.7	38.9	37	36	31	32
PDT 29a	48	42	44.6	41.9	40	38	34	34
PDT 29c	53.4	48.2	49.4	44.6	44	42	39	40
PDT 9	40.4	31.6	36.7	31.2	35	32	30	29
PDT 9a	N/A	N/A	45.5	46.2	44	41	41	42
PDT 45d	42.4	40.9	38.3	39.6	37	34	34	37
PDT 30b	38.4	38.5	39.9	40	38	36	33	38
PDT 30c	50.2	42.6	44.1	38.4	38	39	37	34
PDT 30d	39	37.1	39.9	33.8	38	34	34	30
PDT 30e	43.1	41.9	38.7	41.2	37	36	33	32
PDT 30	44.6	44.1	41.8	39.1	38	41	N/A	33
Mean	**44.5**	**41.2**	**42.1**	**39.5**	**38.8**	**37.1**	**34.6**	**34.7**

Table A.10 Data used to establish the trend of annual mean concentrations of NO_2 at passive diffusion tube sites within the St John's Road AQMA.

	2008	2009	2010	2011	2012	2013	2014	2015
PDT 1	50	43	47	39	43	42	39	35
PDT 1b	48.8	44.2	43.5	38.4	44	41	37	33
PDT 1d	84.9	57.8	58.8	56.3	52	52	48	46
Mean	**61.2**	**48.3**	**49.8**	**44.6**	**46.3**	**45.0**	**41.3**	**38.0**

Figure A.4a Trend in Average Passive Diffusion Tube Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) in the Central AQMA

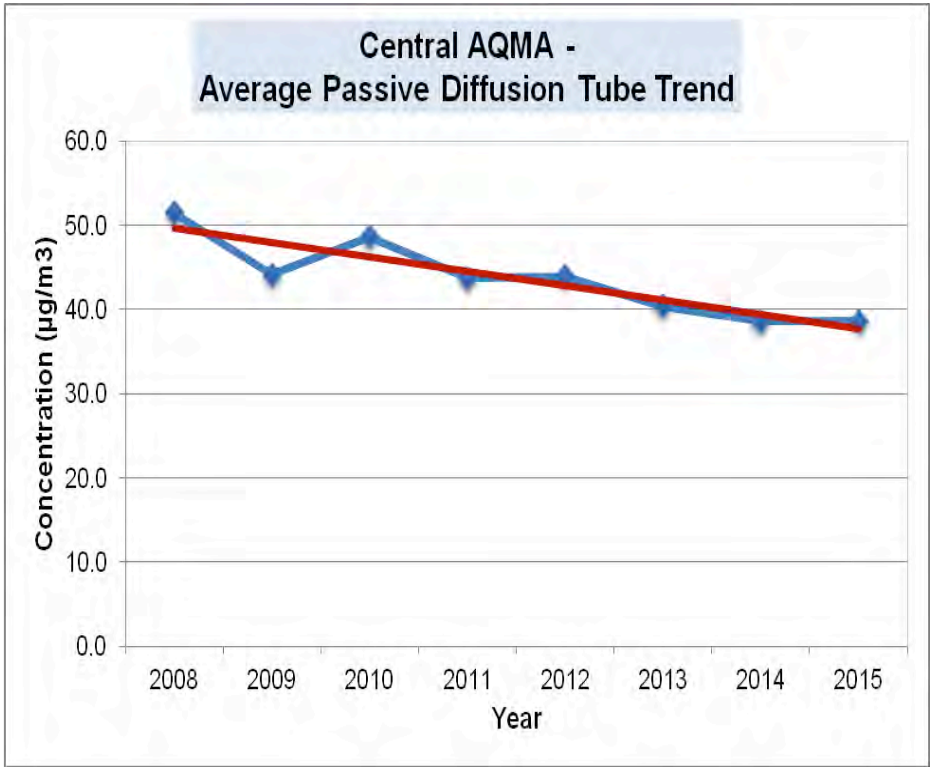


Figure A.4b Trend in Average Passive Diffusion Tube Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) in the Glasgow Road AQMA

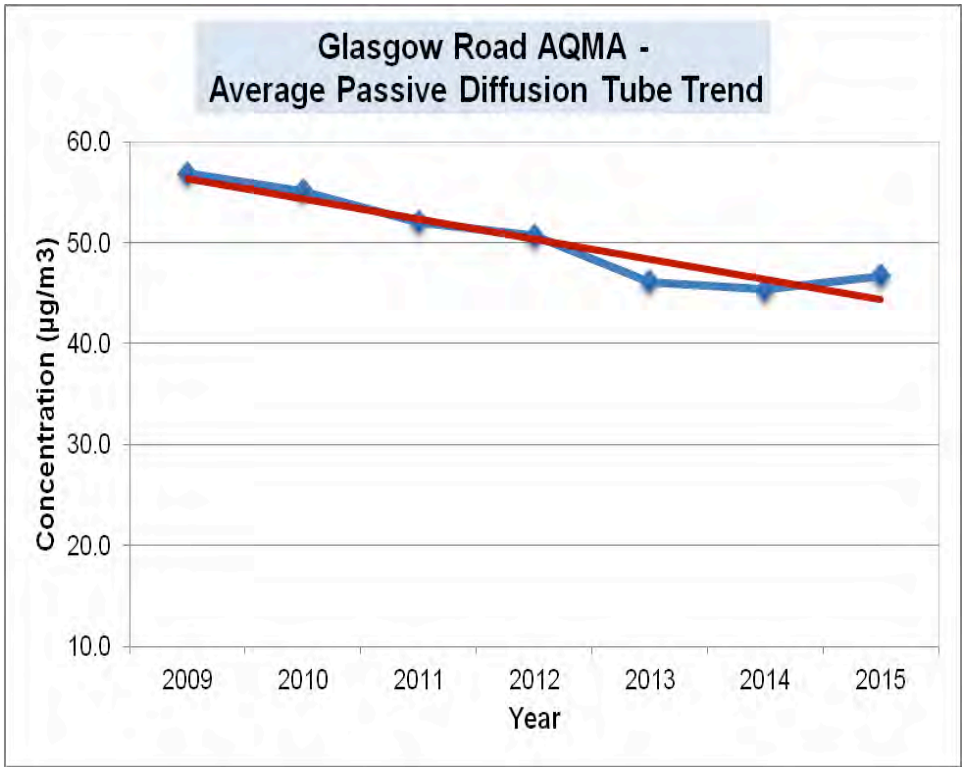


Figure A.4c Trend in Average Passive Diffusion Tube Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) in the Inverleith Row AQMA

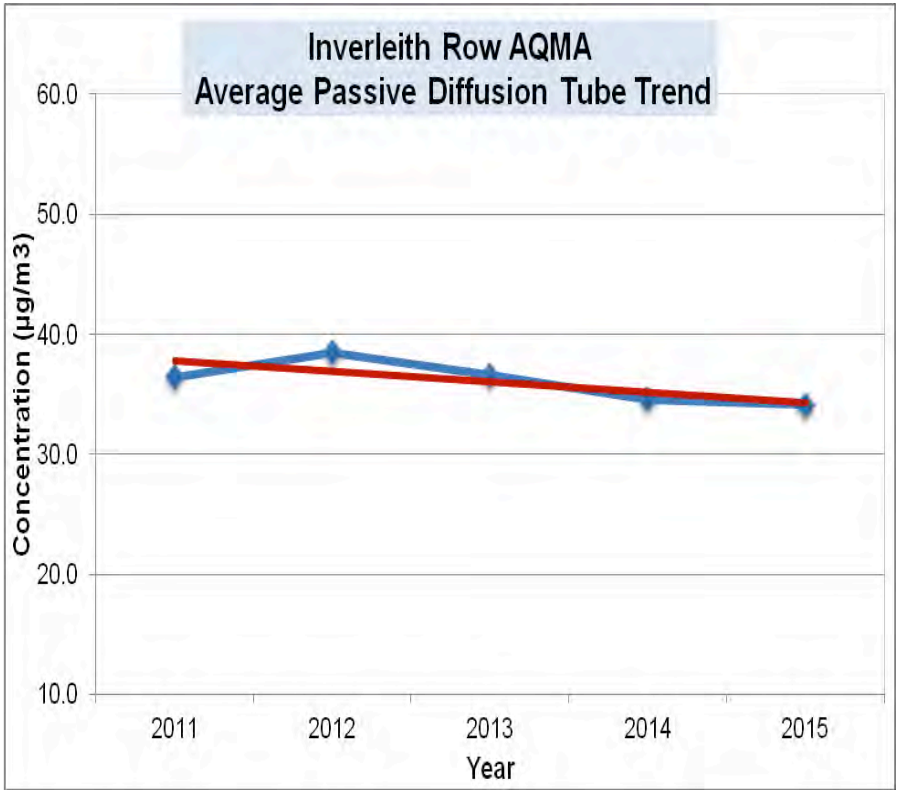


Figure A.4d Trend in Average Passive Diffusion Tube Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) in the Great Junction Street AQMA

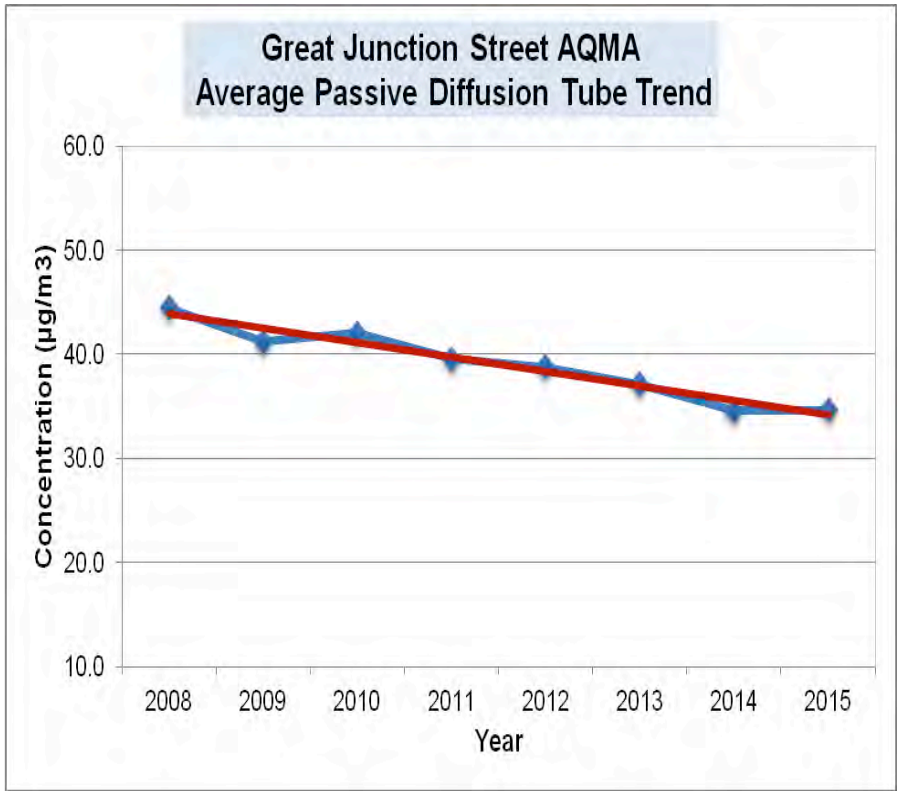


Figure A.4e Trend in Average Passive Diffusion Tube Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) in the St John's Road AQMA

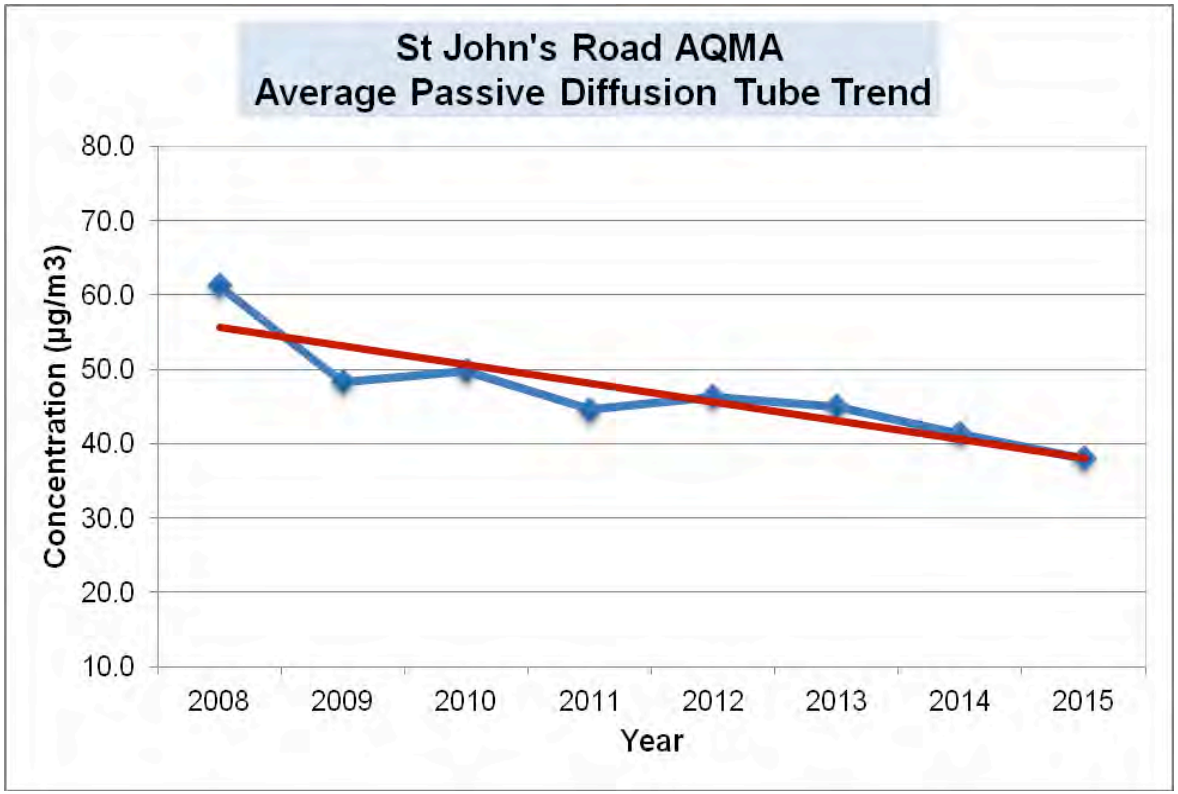


Table A.11 – Annual Mean PM_{10} Monitoring Results

Site ID	Site Name (Equipment Type) Site Type	Within AQMA ?	Annual Mean Concentration (µg/m^3)							
			2008	2009	2010	2011	2012	2013	2014	2015
ID1	**Queen Street** (TEOM) Roadside **Data capture (%)**	Y (NO_2)	**19** (VCM) **19** (1.14)	**18** (VCM) **18** (1.14) **96%**	**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%**
ID6	**Currie** (TEOM) Suburban **Data capture (%)**	N	N/A	N/A	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%**
ID7	**St Leonard's** (FDMS) Urban BG **Data capture (%)**	N	15	*17* **63%**	14 **95%**	15 **98%**	*16* **68%**	14 **94%**	*13* **71%**	*10* ***93%***
ID8	**Salamander St** (TEOM) Roadside **Data capture (%)**	N	N/A	***22*** *(VCM)* ***23*** *(1.14)* **97%**[1]	**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%**
ID9	**Queensferry Rd** (FDMS) Roadside **Data capture (%)**	N	N/A	N/A	N/A	***21*** **63%**	**18** **86%**	**19** **77%**	***19*** **68%**	16 **87%**
ID10	**Glasgow Road** (TEOM) Roadside **Data capture (%)**	Y (NO_2)	N/A	N/A	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%**

Notes for table A.11 Data capture generally represents full calendar year except [1] Data capture for period between September and December (when monitoring commenced at Salamander Street). Data is generally not annualised due to its sporadic nature.

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.

[#] Data from St Leonards had a new correction method applied in 2015 N/A Not applicable – Either no data or insufficient data.

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

Site ID	Site Name (Equipment Type) Site Type	Within AQMA?	Data Capture 2015 %	Number of Daily Means > 50µg/m^3 [a]							
				2008	2009	2010	2011	2012	2013	2014	2015
ID1	**Queen Street** (TEOM) **Roadside**	Y (NO_2)	98	0	1	1	0	2	2	1	2
ID6	**Currie** (TEOM) **Suburban**	N	77	N/A	N/A	0	0	0	0(29) [a]	0	0(23) [a]
ID7	**St Leonard's** (FDMS) **Urban Background**	N	45	0	2	1	0	2(40) [a]	3	0(32) [a]	0(31) [a]
ID8	**Salamander St** (TEOM) **Roadside**	N	90	N/A	2(44) [a]	**19**	**22**	**13**	5	5	**8**
ID9	**Queensferry Rd** (FDMS) **Roadside**	N	87	N/A	N/A	N/A	2	3	2(41) [a]	1(38) [a]	1(39) [a]
ID10	**Glasgow Road** (TEOM) **Roadside**	Y (NO_2)	97	N/A	N/A	N/A	N/A	0(35) [a]	1	0	1

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 µg/m^3) at St Leonard's

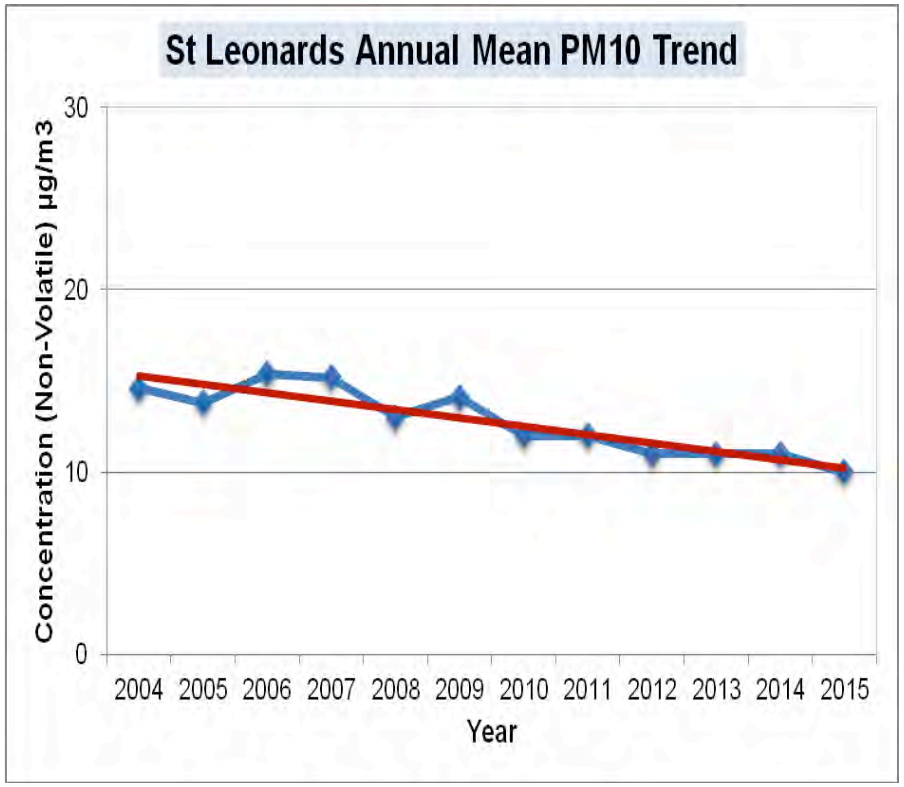


Figure A.5b Trend in Automatically Measured Annual Mean PM_{10} Concentrations (µg/m^3) at Queen Street

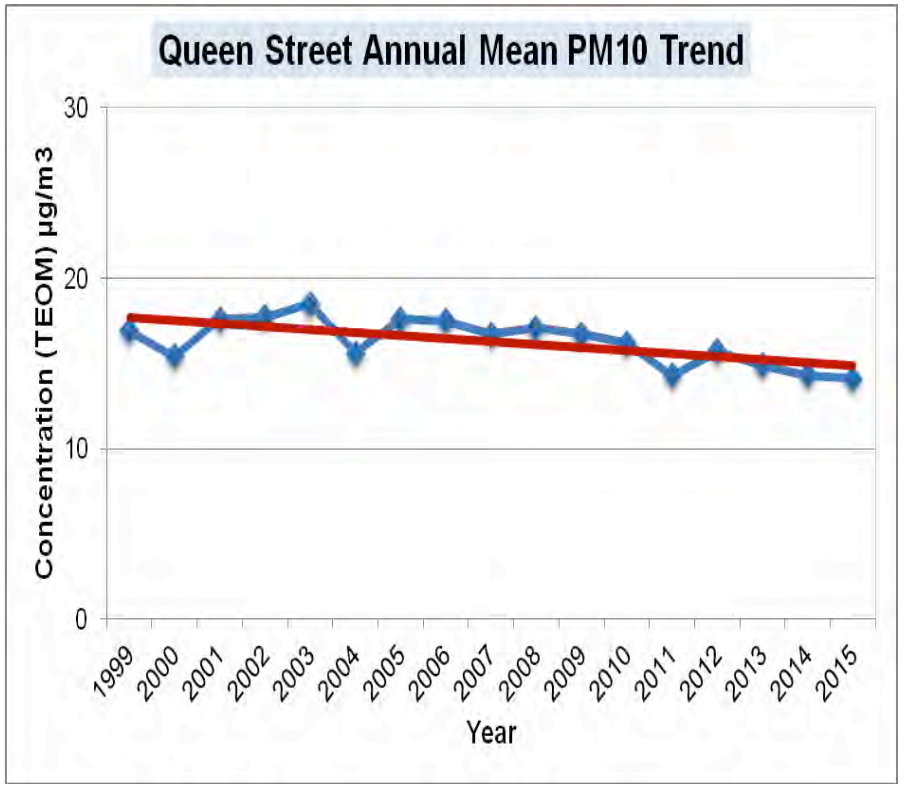


Figure A.5c Trend in Automatically Measured Annual Mean PM_{10} Concentrations ($\mu g/m^3$) at Currie

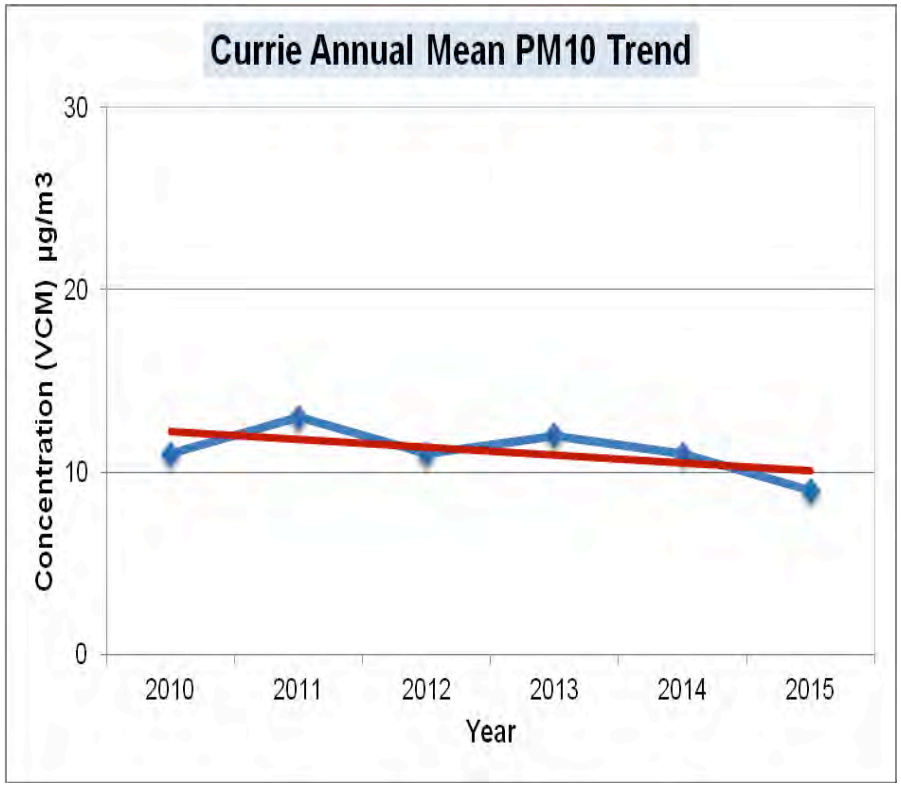


Figure A.5d Trend in Automatically Measured Annual Mean PM_{10} Concentrations ($\mu g/m^3$) at Salamander Street

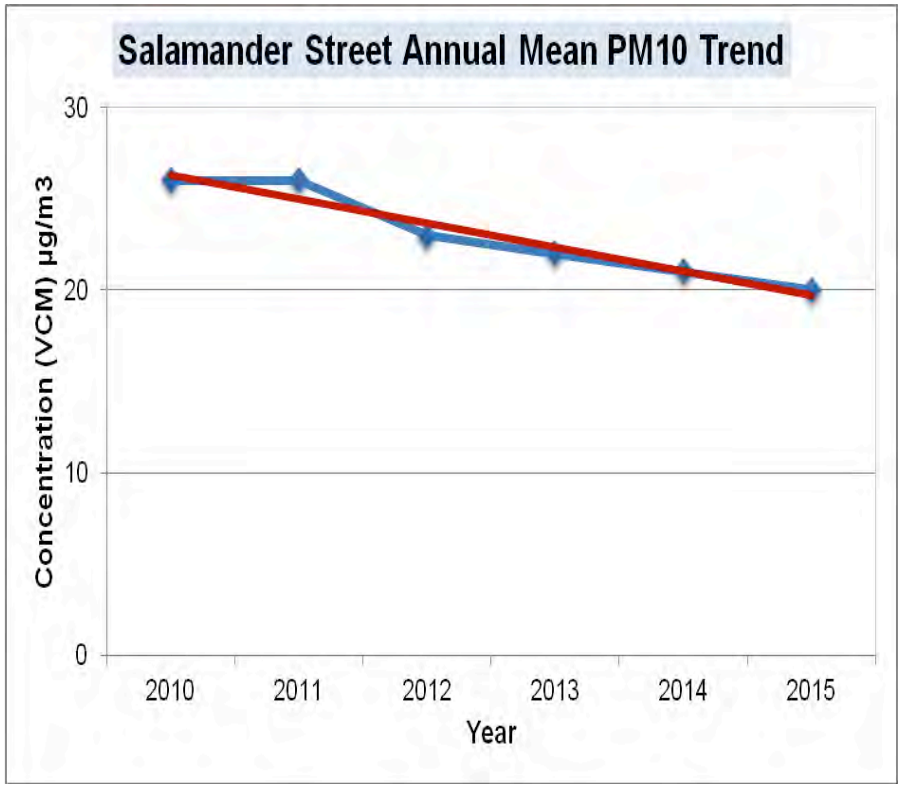


Figure A.5e Trend in Automatically Measured Annual Mean PM_{10} Concentrations ($\mu g/m^3$) at Queensferry Road

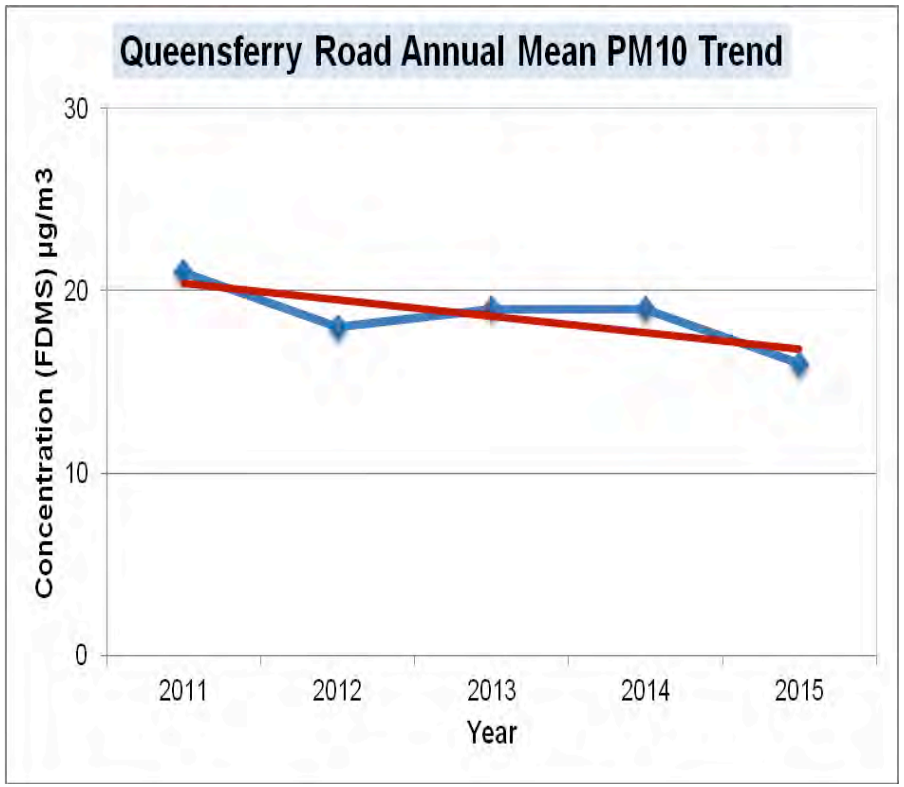


Table A.13 – Annual Mean $PM_{2.5}$ - Measured and Estimated Concentrations

Site ID	Site Name (Equipment Type) Site Type	Annual Mean Concentration (µg/m^3)						
		2009	2010	2011	2012	2013	2014	2015
Measured $PM_{2.5}$ data								
ID7	**St Leonards** (TEOM FDMS) Urban Background	8 (95%)	9 (94%)	**12** (98%)	***11*** *(72%)*	8 (98%)	*9 (65%)*	6 (86%)
Estimation of $PM_{2.5}$ concentrations from PM_{10} Measured data #								
ID1	**Queen Street** (TEOM) Roadside	**13** (VCM) **13** (1.14)	**13** (VCM) **13** (1.14)	**11** (VCM) **11** (1.14)	**11** (VCM) **11** (1.14)	**12** (VCM) **12** (1.14)	**12** (VCM) **11** (1.14)	**11** (VCM) **11** (1.14)
ID6	**Currie** (TEOM) Suburban	N/A	8 (VCM) 8 (1.14)	9 (VCM) 8 (1.14)	8 (VCM) 8 (1.14)	*8 (VCM)* *8 (1.14)*	8 (VCM) 7 (1.14)	*9 (VCM)* *7 (1.14)*
ID8	**Salamander St** (TEOM) Roadside	***15*** *(VCM)* ***16*** *(1.14)*	**18** (VCM) **19** (1.14)	**18** (VCM) **19** (1.14)	**16** (VCM) **17** (1.14)	**15** (VCM) **15** (1.14)	**15** (VCM) **15** (1.14)	**14** (VCM) **15** (1.14)
ID9	**Queensferry Rd** (TEOM FDMS) Roadside	N/A	N/A	***15***	**13**	***13***	***13***	**11**
ID 10	**Glasgow Road** (TEOM) Roadside	N/A	N/A	N/A	***11*** *(VCM)* ***11*** *(1.14)*	**11** (VCM) **11** (1.14)	**11** (VCM) **11** (1.14)	**11** (VCM) **11** (1.14

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

Exceedances and potential exceedances of the $PM_{2.5}$ annual mean objective of 10µg/m^3 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/m^3) at St Leonard's

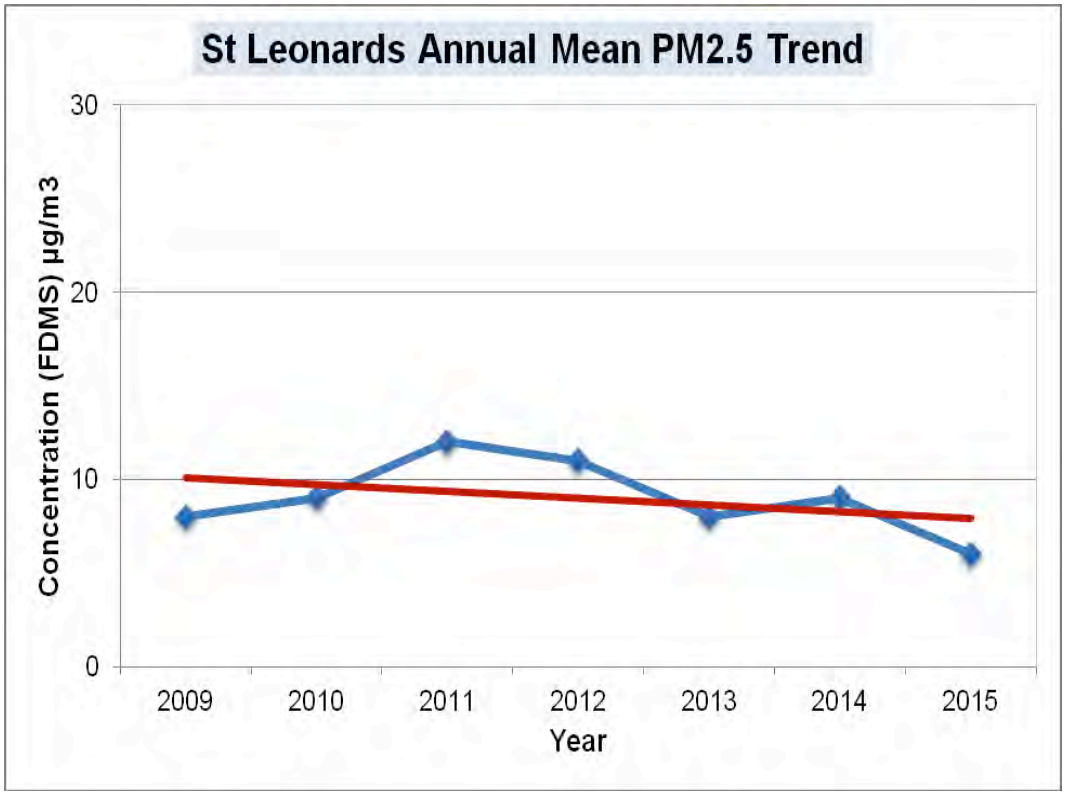


Table A.14 – SO_2 Monitoring Results

Site ID	Site Type	Year	Valid Data Capture [a] (%)	Number of Exceedances (percentile in bracket) [3]		
				15-minute Objive	1-hour Objective	24-hour Objective
ID7	**St Leonards** Urban Background	2009	95	0	0	0
		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

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

Table A.15 – Number of Ozone exceedances at St Leonards

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

Notes for Table: (a) data capture for the full calendar year
Italic; poor data capture
Updates have been provided to historic data (2007, 2008 and 2015) where the daily maximum 8hr running mean >100μgm^{-3} had been reported.

Table A.16 – PAH (B(a)P) Monitoring at St Leonards

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2015

Table B.1 – NO_2 Monthly Diffusion Tube Results for 2015

Site Code	Site address	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
														Raw data[1]	Bias Adjusted[2]
1	St John's Road SB	29.6	45.2	41.3	49.9	45.1	43.2	35.2	M	M	64.2	50.0	51.4	45.51	34.59
2	West Maitland St/Palmerston Pl	63.6	82.2	63.5	79.1	55.4	67.1	59.0	67.9	61.5	80.2	71.7	59.7	67.58	51.36
3	Torphichen Place/Chiropractice	60.5	69.3	52.9	61.2	54.9	56.2	50.4	54.5	51.9	77.1	71.3	52.2	59.37	45.12
4	Calder Road	31.9	M	M	52.5	39.1	36.4	45.0	40.8	47.7	56.2	49.7	31.3	43.06	32.73
5	Gorgie Road/Murieston Road	55.1	68.0	58.1	60.0	36.9	44.5	44.7	47.6	M	79.2	62.2	57.0	55.75	42.37
8	Morningside Road	32.0	27.0	33.3	M	M	26.5	M	31.6	39.9	M	M	M	33.5[a]	25.5
9	Commercial Street 88	M	33.5	36.2	42.7	33.1	33.4	39.1	35.4	31.5	55.7	39.3	35.4	37.75	28.69
10	Home Street/Tollcross	33.2	37.0	35.4	42.4	M	32.2	38.2	42.6	45.4	52.4	46.8	32.8	39.85	30.29
11	Lanark Road 610	29.8	29.8	30.8	31.3	21.7	28.4	28.7	23.4	32.7	38.7	33.9	22.0	29.27	22.24
13	Deanhaugh Street	43.4	50.1	35.7	47.8	28.2	33.1	26.7	35.2	M	M	42.0	41.4	38.36	29.15
14	Trinity Crescent	32.3	35.6	29.0	33.1	M	28.6	25.1	22.5	21.7	38.2	32.7	30.2	29.91	22.73
15	Glasgow Road Newbridge R'about/3	63.0	53.0	61.3	48.5	54.2	48.3	49.1	49.6	68.5	74.7	56.8	48.2	56.27	42.76
16	Glasgow Road 68/adj	51.8	49.8	57.5	52.9	44.4	58.2	68.3	64.5	77.0	90.9	64.0	46.3	60.47	45.95
18	Gorgie Road 8	50.5	39.8	39.1	60.5	34.3	45.8	36.7	40.0	53.7	78.8	49.6	47.3	48.01	36.49
18	Gorgie Road 8	42.9	53.4	43.4	61.1	M	49.1	38.7	42.1	53.3	52.5	58.5	42.6	48.87	37.14
19	Baileyfield Road	25.1	34.5	INV	M	15.1	M	26.8	M	M	38.4	33.7	26.5	27.0[a]	20.5
20	Leith Walk/McDonald Road	18.2	43.3	34.5	47.9	M	43.4	35.8	50.3	53.5	M	57.4	44.3	42.86	32.57
21	Leith Walk/Brunswick Road	26.6	43.4	39.6	54.4	30.0	43.2	37.5	52.1	54.4	63.8	50.7	57.2	46.08	35.02
23	Roseburn Terrace	INV	44.8	INV	46.5	41.2	42.4	40.7	50.9	47.3	79.5	**1.6**	50.3	49.29	37.46
24	Princes Street/Mound	66.6	78.1	65.3	74.1	76.7	62.3	55.3	85.3	59.9	M	M	82.1	70.57	53.63

[1] Raw data annualised where data capture below 75%. See details in Appendix C.
[2]See Appendix C for details on bias adjustment.

Site Code	Site address	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
														Raw data[1]	Bias Adjusted[2]
25	Easter Road/CH shop	64.1	52.9	45.7	60.9	30.2	M	M	M	M	M	M	M	52.0[a]	39.5
27	North Bridge South	41.2	M	M	51.6	M	46.8	M	M	M	120.2	M	73.6	N/A	N/A
29	Bernard Street/Sainsburys	45.2	54.5	26.7	49.5	41.0	34.7	32.3	36.4	37.3	56.1	54.0	40.1	42.32	32.16
30	Great Junction Street/FV	30.7	39.3	41.1	57.3	39.4	40.3	40.4	39.9	M	M	50.3	48.0	42.67	32.43
30	Great Junction Street/FV	M	44.4	42.7	46.9	47.3	40.1	41.8	48.7	M	M	39.4	43.3	43.84	33.32
31	Dalkeith Road 187	21.4	30.3	36.8	31.6	21.2	32.7	33.5	30.2	39.2	49.0	38.1	29.1	32.76	24.90
32	Niddrie Mains Road 28	**15.0**	54.9	44.6	39.0	**1.5**	32.7	36.3	45.8	45.9	M	43.7	35.2	42.01	31.93
33	Queen Street/Hanover Street	M	M	50.0	M	34.1	M	M	M	M	M	M	73.3	N/A	N/A
34	India Street	27.0	32.2	M	24.6	15.7	18.7	16.9	22.9	24.5	38.9	34.2	28.4	25.82	19.62
35	Dundas Street	32.1	40.0	36.8	39.5	28.8	32.6	27.7	40.1	38.8	50.6	46.9	37.8	37.64	28.61
36	York Place	M	57.7	47.9	55.7	37.4	39.0	35.3	41.0	55.1	57.7	55.5	44.8	47.92	36.42
38	Melville Drive	42.1	M	34.8	39.3	33.6	35.6	29.4	33.6	M	M	35.7	28.2	34.70	26.37
39	St John's Road/Victor Park Terr	35.7	58.6	M	48.9	31.4	46.7	30.9	38.0	56.0	52.6	44.0	44.3	44.28	33.65
40	Queensferry Road/Hillhouse Road	35.1	43.2	40.0	40.0	30.1	37.1	44.2	42.1	44.3	59.2	46.3	36.4	41.50	31.54
41	Hillview Terrace	25.5	27.4	23.3	21.3	M	15.5	17.4	21.2	20.8	35.5	32.9	26.9	24.34	18.50
42	Midmar Drive	23.3	20.8	20.2	19.3	11.9	17.2	17.9	17.6	24.0	24.8	24.7	15.7	19.78	15.04
43	Broughton Road	44.2	56.7	41.8	42.1	30.0	31.1	28.4	43.7	36.1	M	54.7	49.0	41.62	31.63
44	Broughton Street	INV	41.0	40.5	39.4	30.6	32.7	26.8	39.9	37.2	54.6	43.5	42.5	38.97	29.62
45	Ferry Road 128/North Fort Street	30.6	M	43.8	41.7	35.7	M	M	29.9	38.3	57.1	38.8	36.1	39.11	29.72
46	London Road/ Easter Road	41.0	42.2	52.9	M	40.2	46.5	38.2	M	59.0	70.3	49.9	M	48.91	37.17
47	Princes Street (Eastbound)	46.5	55.1	51.4	61.3	43.5	51.2	45.2	47.1	45.4	61.8	49.3	39.6	49.78	37.84
48	Cowgate/Guthrie Street	45.8	51.0	39.2	47.3	30.7	42.7	M	M	M	55.9	46.2	30.0	43.20	32.83
49	Morrison Street	55.2	60.9	43.6	57.9	39.0	43.4	41.6	48.4	35.4	M	58.4	43.1	47.90	36.40
52	Ferry Road 268	34.6	M	41.6	44.1	35.8	36.1	29.8	33.0	38.1	59.4	51.5	37.6	40.15	30.51
53	Ferry Road/ 6 Bowhill Terrace	49.0	57.5	41.7	51.6	34.6	42.4	33.8	45.8	53.4	56.3	60.5	48.0	47.88	36.39

Site Code	Site address	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
														Raw data[1]	Bias Adjusted[2]
55	Inverleith Row/Ferry Road	57.3	61.6	51.6	55.2	45.3	49.3	42.4	57.9	44.7	61.6	64.1	46.3	53.11	40.36
55	Inverleith Row/Ferry Road	51.1	58.0	54.9	56.8	54.6	48.0	44.9	50.0	45.6	65.9	60.6	52.8	53.60	40.74
56	Glasgow Road/Drumbrae R'about	31.7	45.6	32.1	38.7	23.9	33.6	29.7	33.2	35.7	53.3	44.6	38.6	36.73	27.91
57	Glasgow Road 158	44.3	58.3	49.0	61.2	50.3	55.8	M	52.1	45.0	61.0	53.8	47.6	52.58	39.96
58	Glasgow Road Newbridge R'about	72.9	71.4	62.9	71.1	48.9	63.1	61.5	71.3	73.1	83.5	70.9	58.6	67.43	51.25
58	Glasgow Road Newbridge R'about	80.1	61.1	60.4	62.0	54.5	60.4	72.4	80.1	76.5	77.7	80.7	45.7	67.63	51.40
61	Maybury Road/Barnton Junction	46.2	32.7	43.8	38.2	36.6	37.1	38.0	37.4	45.2	49.8	40.0	28.7	39.48	30.00
62	Queensferry Road 561	26.9	20.8	27.8	23.8	19.4	22.7	26.4	21.7	30.6	36.7	28.9	19.7	25.45	19.34
63	Queensferry Road 544	42.3	42.1	37.4	36.3	27.7	28.1	35.1	30.5	36.1	46.4	37.3	24.4	35.31	26.83
64	Queensferry Road 550	97.1	85.0	96.3	17.6	66.9	89.1	91.5	93.5	113.6	120.7	87.6	80.9	92.93	70.62
66	London Road/Cadzow Place	**91.5**	43.2	41.0	52.2	31.1	39.5	33.9	40.2	45.3	56.2	44.8	**34.7H**	42.74	32.48
67	London Road/Earlston Place	M	54.7	60.8	M	42.0	M	M	49.0	68.9	70.7	63.4	M	55.5[a]	42.2
68	London Road/Parson's Green Ter	40.8	47.6	48.2	47.5	30.2	M	M	31.5	44.6	M	42.9	33.9	40.80	31.01
69	London Road/Wolseley Place	41.2	60.1	58.9	43.2	M	45.1	41.5	55.4	56.1	70.3	72.1	73.4	56.12	42.65
70	London Road/Wolseley Terrace	45.5	65.0	63.5	52.2	51.6	52.0	39.0	49.3	60.6	81.5	86.1	41.8	57.34	43.58
71	Portobello High Street W 185	45.0	40.7	48.5	M	M	34.3	34.0	41.2	38.3	51.3	47.3	33.6	41.42	31.48
72	Seafield Road East 10	24.0	38.7	42.6	44.8	26.7	36.4	33.0	41.9	48.5	54.1	40.6	40.1	39.28	29.86
76	Angle Park Terrace/Harrison Road	53.0	51.2	56.3	48.9	36.1	43.8	47.0	55.7	M	**134.2**	55.7	52.3	50.00	38.00
77	Slateford Road 97	74.8	M	47.5	47.3	M	41.6	46.1	M	M	M	52.7	39.1	49.6[a]	37.7
78	Slateford Road/The Maltings	41.4	25.8	37.5	27.4	M	M	31.4	**14.0**	M	51.8	33.9	26.6	31.1[a]	23.6
79	Fountainbridge/Tollcross	35.0	45.9	42.1	40.1	23.8	39.1	39.7	37.2	42.9	55.2	44.2	34.3	39.96	30.37
80	Gorgie Road - Delhaigh	38.6	49.2	47.6	38.5	29.0	39.4	34.2	38.1	51.1	61.2	50.8	49.6	43.94	33.40
81	London Road/East Norton Place	54.1	73.2	48.7	57.0	50.1	44.1	47.1	73.4	45.9	123.7	91.8	80.1	65.77	49.98
135	Nicholson Street 69	45.9	60.5	55.3	64.9	43.3	63.2	59.0	69.1	73.0	75.3	66.3	52.7	60.71	46.14
136	Nicholson Street 92	46.8	M	M	40.3	36.3	M	48.4	41.7	**3.5**	M	48.7	42.7	45.9[a]	34.9

Site Code	Site address	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
														Raw data[1]	Bias Adjusted[2]
138	Clerk Street 15	45.6	27.2	59.6	59.0	36.6	44.0	45.9	57.0	M	65.4	M	46.3	48.66	36.98
140	Hope Park Terrace/Clerk Street	44.4	41.1	50.8	49.7	29.6	M	51.3	54.0	59.6	60.3	46.8	30.2	47.07	35.78
141	South Clerk Street 84	42.4	41.4	51.7	M	42.2	M	41.4	54.1	61.3	83.8	60.4	51.2	52.99	40.27
142	South Clerk Street 41a	33.2	38.6	54.3	50.3	37.7	44.0	44.6	39.8	M	63.0	53.6	39.9	45.36	34.48
144	South Bridge 59	41.6	M	56.4	59.8	55.5	52.0	56.1	64.0	M	73.2	64.2	55.4	57.82	43.94
149	Captains Road 150	25.0	M	39.9	31.8	26.0	31.4	36.4	35.4	45.0	50.9	37.3	M	35.91	27.29
150	Drum Street	31.7	35.5	38.3	**38.9**	25.3	30.2	33.1	35.0	40.5	45.7	35.9	32.9	34.92	26.54
143a	Hamilton Place/Stockbridge Library	37.9	37.2	37.5	35.0	24.3	33.1	35.5	41.5	33.8	53.8	55.8	38.2	38.63	29.36
149a	Howden Hall Road 79	25.1	33.4	39.6	36.9	28.6	M	41.8	41.4	51.3	58.8	36.9	37.2	39.18	29.78
149b	Howden Hall Road 77s	29.2	36.1	32.0	33.9	27.9	29.0	25.8	35.4	36.0	39.7	38.5	27.8	32.61	24.78
149c	Howden Hall Road 67	21.9	36.8	M	M	M	33.2	M	37.2	46.3	M	38.9	31.1	35.3[a]	26.8
15a	Glasgow Road Facade/9	74.0	57.5	46.7	54.2	33.4	**<1.0**	**104.2**	50.3	55.7	57.2	51.3	38.2	51.85	39.41
16a	Glasgow Road 68/ Facade	36.5	34.4	49.5	45.6	46.4	41.6	51.9	53.3	M	57.9	M	35.8	45.29	34.42
16b	Glasgow Road/Ratho Station 94	47.0	M	47.5	50.2	29.9	43.5	33.0	37.7	47.4	47.6	43.2	31.7	41.70	31.69
17a	Hope Park Terrace/VS	50.9	44.1	45.5	48.9	36.5	42.3	45.7	43.4	51.1	48.1	43.7	40.0	45.02	34.21
17a	Hope Park Terrace/VS	45.8	46.3	49.9	51.9	34.8	43.5	39.1	46.2	50.5	54.5	85.2	40.5	49.02	37.25
1b	St John's Road IR	39.0	41.7	44.8	47.8	38.5	**<1.0**	37.6	43.8	39.1	59.4	45.6	33.9	42.84	32.56
1d	St John's Road 131	64.4	70.6	61.9	68.4	58.6	61.0	45.4	55.7	50.9	65.8	69.3	49.2	60.10	45.68
25b	Easter Road/Rossie Place	38.8	40.1	33.5	43.9	38.1	29.8	32.2	35.5	46.2	52.5	44.5	54.9	40.83	31.03
25c	Easter Road 105/109	43.3	48.1	38.9	44.8	29.4	32.7	29.6	41.0	33.2	51.5	38.9	59.0	40.87	31.06
25d	Easter Road/Bothwick	37.5	37.5	32.5	45.4	30.2	35.4	M	35.4	44.7	49.1	40.9	M	38.86	29.53
25e	Easter Road 198	25.8	34.9	31.0	36.0	24.6	30.5	26.6	32.9	30.5	49.3	M	31.9	32.18	24.46
28b	West Port 62	67.3	75.4	66.8	80.0	61.3	80.0	77.3	73.3	85.4	96.1	**2.7**	M	76.29	57.98
28c	West Port Opp 50	47.4	57.7	51.0	56.2	M	54.3	45.2	46.7	59.1	M	74.1	112.0	60.37	45.88
28d	West Port 42	65.1	84.6	M	63.6	61.2	70.0	69.6	74.5	M	61.2	73.6	65.3	68.87	52.34

Site Code	Site address	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
														Raw data[1]	Bias Adjusted[2]
28e	St Leonards 145A	29.0	48.0	43.3	32.8	30.2	34.6	35.5	38.0	49.5	57.3	45.1	38.9	40.18	30.54
29a	Bernard Street/opp King Chambers	39.6	43.3	45.0	47.2	38.6	37.4	35.7	38.4	49.4	53.6	M	39.6	42.53	32.32
29a	Bernard Street/opp King Chambers	51.7	53.6	55.4	52.6	33.4	42.7	33.8	41.0	37.0	61.6	M	38.3	45.55	34.62
29c	Bernard Street/PS	39.1	40.5	55.7	57.6	48.3	42.3	38.7	47.1	39.2	73.8	53.3	53.3	49.08	37.30
29c	Bernard Street/PS	45.7	52.4	57.6	52.6	45.8	47.2	40.1	46.3	56.2	83.4	95.3	51.5	56.18	42.69
30b	Great Junction Street 137	45.9	63.3	48.5	49.0	M	M	34.6	47.2	M	56.6	53.4	51.4	49.99	37.99
30c	Great Junction Street 14	29.9	42.4	44.2	49.0	33.8	35.7	45.1	48.8	42.5	66.7	44.5	52.7	44.61	33.90
30d	Great Junction Street/WC	33.0	40.2	41.7	49.0	26.5	34.5	30.0	39.7	38.4	58.6	38.9	36.6	38.93	29.58
30e	Great Junction Street/CG	34.8	42.1	52.7	41.4	M	42.6	32.8	39.7	35.9	55.4	42.8	48.8	42.64	32.40
30f	Duke Street	59.1	53.2	63.2	55.2	39.1	50.2	37.1	50.9	M	61.5	56.2	50.1	52.35	39.78
37a	Grassmarket 41	**61.0**	56.6	46.3	**<1.0**	39.7	45.3	49.8	42.8	55.8	M	M	M	57.9[a]	44.0
37a	Grassmarket 41	42.9	48.0	63.2	**<1.0**	37.9	M	39.1	46.8	71.4	M	M	M	54.7[a]	41.6
37b	Grassmarket 75	50.5	42.2	43.2	47.9	37.4	M	M	48.4	56.1	M	50.0	47.4	47.01	35.73
37c	Grassmarket/nrThomsons Court	57.2	33.7	35.1	30.3	27.4	27.5	34.7	28.9	39.4	44.9	M	33.4	35.68	27.12
3a	Torphichen Street	**14.7**	47.3	35.3	44.8	35.0	36.7	30.4	40.3	35.3	48.1	47.3	39.1	39.96	30.37
3b	Torphicen Place 1	48.4	M	58.9	61.2	51.1	57.1	46.1	53.0	61.5	69.6	M	52.2	55.91	42.49
40d	Hillhouse Road/Marischall Place4	52.1	25.2	40.5	38.5	33.4	38.1	35.4	37.8	38.6	53.0	40.9	M	39.41	29.95
40f	Hillhouse Road 118	33.1	28.7	42.9	37.4	30.1	40.4	42.9	41.3	48.1	63.4	42.9	29.0	40.02	30.41
45d	Ferry Road/North Junction Street	M	55.4	41.5	45.7	M	37.1	34.2	44.8	56.6	58.4	56.7	50.8	48.12	36.57
46b	London Road/Brunton Pl	31.0	30.9	36.4	45.8	27.6	32.9	31.2	32.5	38.2	46.9	40.1	34.7	35.68	27.12
48a	Cowgate/Blair Street	M	42.8	41.1	42.6	33.3	42.3	42.9	41.3	53.7	59.0	M	42.6	44.16	33.56
48c	Cowgate/Blackfriars	64.3	56.0	53.3	M	42.2	56.6	51.9	M	**108.3**	66.5	M	49.0	54.2[a]	41.19
48e	Cowgatehead 2	50.0	M	56.2	55.2	M	M	53.0	51.1	64.4	M	M	M	57.6[a]	43.8
48f	Cowgate/ 50 St Mary's Street	M	M	45.1	M	37.8	M	49.2	49.1	55.5	66.3	47.6	45.0	48.7[a]	37.0
50a	WhitehouseRoad/Barnton Grove	44.9	42.9	39.1	35.9	30.2	M	35.4	42.5	42.8	M	81.1	M	43.87	33.34

Site Code	Site address	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
														Raw data[1]	Bias Adjusted[2]
51b	Salamander Street/Bath Road	32.4	43.3	49.1	47.4	33.4	38.1	32.2	31.6	34.9	52.1	47.7	34.6	39.73	30.20
51c	Salamander Street/Baltic Street	39.5	55.0	46.5	42.8	M	34.7	27.2	36.8	34.6	54.4	48.7	47.1	42.48	32.29
55b	Inverleith Row/Summer Place	42.2	53.3	34.2	41.6	27.4	37.6	26.1	38.0	33.1	39.1	50.5	43.9	38.92	29.58
55c	Inverleith Row/Café Montague	25.4	27.7	32.5	36.0	30.6	30.9	27.7	31.9	34.8	48.9	33.7	32.6	32.73	24.87
64a	Queensferry Road 552	56.4	32.7	38.4	39.3	28.2	**<1.0**	**80.7**	33.9	48.0	54.1	40.7	28.3	40.00	30.40
64b	Queensferry Road 550F	54.2	57.5	51.5	45.1	M	52.0	38.7	38.4	43.9	54.0	51.4	30.8	47.05	35.75
6a	Bruntsfield Place 210	40.8	35.3	35.9	M	24.3	**<1.0**	**71.2**	42.5	38.8	56.3	44.4	39.0	39.70	30.17
72a	Seafield Road East 7	34.7	38.1	39.9	49.1	31.4	34.6	35.3	33.9	45.9	58.0	40.1	40.0	40.08	30.46
73a	Portobello Road/Ramsay Institute	37.7	58.1	54.1	50.5	34.8	M	41.7	53.5	61.2	70.3	61.0	56.6	52.68	40.04
73d	Portobello Rd facade Ramsay Inst	36.4	50.2	47.5	44.3	M	53.9	36.4	54.1	53.2	63.3	52.5	55.7	49.77	37.83
74f	George Street 112	33.7	42.7	33.5	40.9	24.8	22.7	27.1	33.9	23.0	44.9	36.3	52.1	34.63	26.32
74g	Leith Street News Room Pub	51.9	64.8	52.8	71.0	M	M	57.9	M	58.7	86.3	66.2	75.7	65.03	49.43
75a	St Colme Street	43.3	37.8	39.6	48.7	41.1	M	39.6	49.4	44.9	59.7	47.9	41.0	44.82	34.06
75b	Gt Stuart Street 7	38.5	42.8	33.5	43.5	M	32.8	27.7	39.5	38.3	49.2	44.5	37.5	38.89	29.56
75d	St Colme Street/4	25.3	33.1	**14.3**	40.2	25.9	31.2	30.3	37.9	M	49.5	39.1	31.2	34.37	26.12
75e	Gt Stuart Street 9	32.0	35.1	29.0	32.9	24.5	26.4	22.3	32.5	26.8	48.3	35.8	35.5	31.74	24.12
75f	Gt Stuart Street 14	31.8	35.2	30.4	**2.0**	**55.5**	22.5	23.0	27.9	27.1	47.9	36.7	37.9	32.04	24.35
76a	Ardmillan Terrace 22	38.2	35.5	36.5	30.1	22.7	M	M	29.3	41.4	54.3	39.8	33.0	36.08	27.42
76b	Angle Park Terrace 74 2M East	75.2	61.9	70.1	54.4	48.7	55.3	54.3	45.8	62.1	78.6	55.6	59.8	60.15	45.71
76c	Angle Park Terrace 25	42.0	40.3	45.1	37.0	28.9	37.8	34.9	35.1	41.9	51.5	49.0	36.6	40.01	30.41
76d	Henderson Terrace	41.6	44.2	43.7	38.8	29.9	39.2	40.3	35.8	51.6	M	54.6	36.9	41.51	31.55
77a	Slateford Road 51	53.7	55.0	46.1	40.9	29.9	41.0	39.1	43.5	50.5	65.7	47.4	41.6	46.20	35.11
77b	Slateford Road 93/95	52.6	44.6	50.5	42.1	M	47.0	40.1	M	M	67.5	55.2	47.9	49.72	37.79
79a	Fountainbridge 103	36.4	40.9	46.3	M	41.8	37.5	44.8	38.5	M	50.1	M	34.0	41.14	31.27
79b	Fountainbridge Grove Street	26.9	31.9	34.2	M	M	34.4	36.1	32.6	M	M	M	M	36.1[a]	27.4

Site Code	Site address	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
														Raw data[1]	Bias Adjusted[2]
79d	Dundee Street/Yeaman Place	53.4	64.8	59.1	60.8	47.1	M	46.1	53.4	57.8	M	56.5	M	55.44	42.14
80a	Gorgie Road/Glen Lea	34.0	M	39.2	M	M	31.1	M	33.5	M	49.9	37.6	36.9	35.3[a]	26.8
80b	Gorgie Road 549	28.5	38.6	39.0	39.4	28.5	33.3	34.7	M	34.8	60.8	M	33.4	37.10	28.20
80c	Gorgie Road 87	43.1	57.9	37.2	38.4	33.6	40.3	33.5	37.5	63.4	M	57.8	44.2	44.26	33.64
80d	Balgreen Rd/School	39.4	51.2	35.5	47.8	34.2	39.7	31.1	40.7	44.6	57.3	54.4	37.9	42.82	32.54
80e	Balgreen Rd/Library	50.6	54.2	42.3	50.6	27.1	32.8	39.4	M	M	56.3	54.6	M	45.32	34.44
9a	Commercial Street/Portland Place	50.8	62.8	48.0	59.5	52.6	46.2	**<1.0**	M	M	64.1	60.0	55.4	55.49	42.17
9b	Ocean Drive/Leith	31.5	33.1	31.1	40.5	21.2	33.1	33.6	33.2	26.6	44.8	36.9	25.9	32.63	24.80
9c	North Junction St nr 4	34.8	42.4	M	44.0	M	34.4	M	36.7	28.8	M	M	39.3	39.1[a]	29.7
9d	Commercial Street	48.4	43.0	44.1	56.1	M	47.6	42.6	46.5	42.1	63.0	43.5	44.0	47.35	35.99
HT1	Haymarket Terrace North side	N/A	N/A	N/A	N/A	N/A	N/A	49.5	44.0	37.8	M	M	45.7	49.1[a]	37.3
HT2	Haymarket Terrace South side	N/A	N/A	N/A	N/A	N/A	N/A	63.7	66.0	M	68.6	71.0	48.3	59.1[a]	44.9
SH1	Shandwick Place Hostel	N/A	N/A	N/A	N/A	N/A	N/A	48.0	44.7	M	M	54.5	51.6	50.9[a]	38.7
SJ1	St John's Rd K Rd	M	49.0	41.7	51.1	30.9	40.1	33.3	M	32.0	54.9	50.2	45.2	42.84	32.56
SJ2	St John's Rd 63	34.5	40.5	33.1	42.8	22.2	34.8	M	32.8	40.5	M	36.0	33.5	35.07	26.65
SJ3	St John's Rd 81	44.9	54.6	44.3	M	44.8	M	M	47.3	M	61.6	54.6	M	47.2[a]	35.9

Notes for Table;
N/A – Data not collected / insufficient data
Data in red and bold – problematic data removed from the data set to produce raw annual mean data
[1] Raw data annualised([a]) where data capture below 75%. See details in Appendix C.
[2] See Appendix C for details on bias adjustment.
M – Tube missing on collection
INV – Tube inverted on collection, data not used

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 2014 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.

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

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

(Table continued overleaf)

Table C1b Historical bias data used in previous reports 2007 - 2014

Site	Type	2008	2009	2010	2011	2012	2013	2014
Glasgow Road	Roadside	N/A	N/A	N/A	N/A	N/A	0.64	0.67
Gorgie	Roadside	0.94	N/A	N/A	0.87	0.86	0.87	0.85
Haymarket	Roadside	0.87	N/A	N/A	N/A	N/A	N/A	N/A
Queensferry Rd.	Roadside	N/A	N/A	N/A	0.66	0.71	0.71	0.69
Queen Street	Roadside	0.81	0.83	0.84	0.69	0.65	0.7	0.64
Salamander St	Roadside	N/A	N/A	0.79	0.77	0.80	0.78	0.77
Roseburn	Roadside	0.91	0.82	0.85	N/A	N/A	N/A	N/A
St. John's Rd.	Kerbside	0.86	0.92	0.92	0.79	0.74	0.77	0.82
Mean		**0.88**	**0.86**	**0.85**	0.76	0.75	0.75	0.73
Combined Mean[3]					**0.81**	**0.76**	**0.75**	**0.74**

Edinburgh co-locates triplicate tubes on the sampler head cages of each roadside and kerbside monitoring station. Data from six sites were considered for the co-location study during 2015. 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 2015 Data

Site	Type	Analyser Mean[4]	DC[5] (%) Analyser	PDT[6] Mean	PDT* Precision	Periods	Bias Factor A	Bias B (%)
Glasgow Road	Roadside	26	99	43	9	12	0.6	68
Gorgie Road	Roadside	31	99	37	10	9	0.86	17
Queensferry Rd	Roadside	41	96	62	8	10	0.66	51
Queen Street	Roadside	27	98	39	7	12	0.7	43
Salamander St	Roadside	28	99	36	7	12	0.8	25
St John's Road	Kerbside	62	96	66	6	10	0.94	7

In 2015 the overall precision of triplicate tubes was good. The overall data capture was poor at Gorgie Road and St John's Road but good in all other studies. 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.

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

An annual mean bias factor of 0.74 from the local co-location studies was calculated using the updated guidance in LAQM Technical Guidance 2016 as per Table C3 – Mean Local Bias.

Table C3 Calculation of Local and Combined Bias Factors

	Bias A	Bias B	Calculation	Bias
Local Bias				
Glasgow Road	0.6	68		
Gorgie Road	0.86	17		
Queensferry Road	0.66	51		
Queen Street	0.7	43		
Salamander Street	0.8	25		
St John's Road	0.94	7		
Mean Local Bias	N/A	35	0.35+1 = 1.35	
			1/1.35 =	**0.74**
National Bias				
Marylebone Road	0.82	21		
West Lothian 1	0.77	30		
West Lothian 2	0.84	18		
Mean Combined Bias	N/A	31	0.31+1 = 1.31	
			1/1.31 =	**0.76**

At the time of writing the National Bias Adjustment Factor available on the National Diffusion Tube Bias Adjustment Factor Spreadsheet [Version v03_16_Final_v2] http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html for Edinburgh Scientific Services was 0.81, significantly different to the locally derived factor. The three studies included in the national spreadsheet were all from similar types of sites to the local studies and used the same tube preparation method. The overall precision was good with all the studies and the resulting bias factors were in accordance with those obtained in the local studies.

A further calculation was therefore undertaken to combine the local studies with the national data. This resulted in a bias adjustment factor of **0.76**. Details of the calculation are also shown in Table C3. This combined factor was chosen as the most appropriate factor to use with 2015 data. The local authority has used a combined mean methodology since 2011 hence some consistence is maintained in choosing the factor in this respect.

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 on a daily basis by Local Authority officers (Monday to Friday) by visual examination, to see if they contained unusual measurements. Any data which was considered to be 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. Training was carried out by Ricardo in February 2013 and annually their auditors will meet Local Site Operators on site to provide updates/ refresher sessions.

Calibration procedures

The three ML 9841 B NO_x analysers (located at Queen Street, 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 site AURN which is 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 - 18 month 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 2015.

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 or not 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. In 2015 the bias adjustment factor was 0.76.

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

Data from 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 considered to be 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, a calculation is undertaken to estimate the annual concentrations. Details are shown in the subsequent tables.

Note; annual mean concentrations from the automatic sites varies as timings/dates are coordinated to the relevant passive diffusion tube exposure dates.

PDT 8				
Measured Mean Value (M) 31.72				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	6.00	5.91	1.015
Currie	Suburban	6.86	6.27	1.094
			Average Ratio (R)	1.055
Adjusted Mean (M x R) = 33.5µg/m^3				

PDT 9c				
Measured Mean Value (M) 37.20				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	5.97	5.78	1.033
Currie	Suburban	6.84	6.38	1.072
			Average Ratio (R)	1.053
Adjusted Mean (M x R) = 39.2µg/m^3				

PDT 19				
Measured Mean Value (M) 28.59				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	6.00	6.05	0.992
Currie	Suburban	6.86	7.67	0.894
			Average Ratio (R)	0.943
Adjusted Mean (M x R) = 27.0µg/m^3				

PDT 25				
Measured Mean Value (M) 50.76				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	5.97	6.07	0.984
Currie	Suburban	6.84	6.43	1.064
			Average Ratio (R)	1.024
Adjusted Mean (M x R) = 52.0µg/m^3				

PDT 37A				
Measured Mean Value (M) 49.66				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	6.00	5.39	1.113
Currie	Suburban	6.86	5.93	1.218
			Average Ratio (R)	1.166
Adjusted Mean (M x R) = 57.9µg/m^3				

PDT 37A				
Measured Mean Value (M) 49.90				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	6.00	5.70	1.053
Currie	Suburban	6.86	6.01	1.141
			Average Ratio (R)	1.097
Adjusted Mean (M x R) = 54.7µg/m^3				

PDT 48C				
Measured Mean Value (M) 54.98				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	6.00	5.93	1.012
Currie	Suburban	6.86	7.15	0.959
			Average Ratio (R)	0.986
Adjusted Mean (M x R) = 54.2µg/m^3				

PDT 48E				
Measured Mean Value (M) 54.98				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	6.00	6.11	0.982
Currie	Suburban	6.86	6.17	1.112
			Average Ratio (R)	1.047
Adjusted Mean (M x R) = 57.6µg/m^3				

PDT 48f				
Measured Mean Value (M) 49.45				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	6.00	6.07	0.988
Currie	Suburban	6.86	7.00	0.980
			Average Ratio (R)	0.984
Adjusted Mean (M x R) = 48.7µg/m^3				

PDT 67				
Measured Mean Value (M) 58.5				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	5.97	6.40	0.933
Currie	Suburban	6.84	7.10	0.963
			Average Ratio (R)	0.948
Adjusted Mean (M x R) = 55.5µg/m^3				

PDT 77				
Measured Mean Value (M) 49.87				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	6.00	5.88	1.020
Currie	Suburban	6.86	7.07	0.970
			Average Ratio (R)	0.995
Adjusted Mean (M x R) = 49.6µg/m^3				

PDT 78				
Measured Mean Value (M) 34.48				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	6.00	6.53	0.919
Currie	Suburban	6.86	7.76	0.884
			Average Ratio (R)	0.901
Adjusted Mean (M x R) = 31.1µg/m^3				

PDT 79B				
Measured Mean Value (M) 32.68				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	6.00	5.43	1.105
Currie	Suburban	6.86	6.21	1.105
			Average Ratio (R)	1.105
Adjusted Mean (M x R) = 36.1µg/m^3				

PDT 80A				
Measured Mean Value (M) 37.46				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	5.97	6.08	0.982
Currie	Suburban	6.84	7.57	0.904
			Average Ratio (R)	0.943
Adjusted Mean (M x R) = 35.3µg/m^3				

PDT 136				
Measured Mean Value (M) 43.56				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	6.00	5.50	1.091
Currie	Suburban	6.86	6.75	1.016
			Average Ratio (R)	1.054
Adjusted Mean (M x R) = 45.9µg/m^3				

PDT 149C				
Measured Mean Value (M) 35.06				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	6.00	5.85	1.026
Currie	Suburban	6.86	6.96	0.986
			Average Ratio (R)	1.006
Adjusted Mean (M x R) = 35.3µg/m^3				

PDT HT1				
Measured Mean Value (M) 44.25				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	5.97	5.47	1.091
Currie	Suburban	6.84	6.06	1.129
			Average Ratio (R)	1.110
Adjusted Mean (M x R) = 49.1µg/m^3				

PDT SJ3				
Measured Mean Value (M) 50.30				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	5.97	6.25	0.955
Currie	Suburban	6.84	7.42	0.922
			Average Ratio (R)	0.939
Adjusted Mean (M x R) = 47.2µg/m^3				

PDT HT2				
Measured Mean Value (M) 63.52				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	5.97	6.05	0.987
Currie	Suburban	6.84	7.83	0.874
			Average Ratio (R)	0.931
Adjusted Mean (M x R) = 59.1µg/m^3				

PDT SP1				
Measured Mean Value (M) 49.70				
Site	**Site Type**	**Annual Mean (AM) µg/m^3**	**Period Mean (PM) µg/m^3**	**Ratio AM/PM**
Bush	Rural background	5.97	5.44	1.097
Currie	Suburban	6.84	7.18	0.953
			Average Ratio (R)	1.025
Adjusted Mean (M x R) = 50.9µg/m^3				

C5 PM Monitoring Adjustment

Ricardo on behalf of the Scottish Government, provided Volatile Correction Model (VCM) corrected Tapered Element Oscillating Microbalance (TEOM) data to the Local Authority under the Scottish Air Quality Database and Website project for the following automatic monitoring stations; Queen Street, Salamander Street, Glasgow Road and Currie.

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

A new baseline correction procedure has been devised to ensure better data capture with the TEOM FDMS analysers. This procedure was applied to data at St Leonards in 2015 by Ricardo on behalf of DEFRA.

Appendix D: Nitrogen Dioxide Fall Off with Distance Calculations

Passive Diffusion Tube Data

SITE NO.	1	2	4	5	8	9a	9c	11	13	14	15
Step 1 How far from kerb was measurement made (m)	0.54	0.5	1.6	0.3	0.7	1.47	2.65	1.5	2.7	2.0	4.0
Step 2 How far from kerb is receptor in metres (m)	2.34	5.7	26.6	5.2	3.5	5.37	4.7	5.2	7.8	6.0	7.8
Step 3 Local background concentration of NO_2	19.9	29.2	21.0	24.1	19.8	21.4	21.4	15.2	23.0	19.4	26.6
Step 4 Annual mean bias corrected value	34.59	51.36	32.73	42.37	25.50	42.17	29.72	22.24	29.15	22.73	42.76
Result; Predicted annual mean at receptor	**30.7**	**41.8**	**25.4**	**33.9**	**23.8**	**36.3**	**28.5**	**20.3**	**27.5**	**21.9**	**39.7**

SITE NO.	16	21	23	24	31	32	35	36	38	39	40f
Step 1 How far from kerb was measurement made (m)	1.8	1.16	0.23	1.0	1.8	2.6	2.4	5.5	2.8	1.6	2.6
Step 2 How far from kerb is receptor in metres (m)	6.2	4.56	2.53	10	6.7	7.3	9.7	8.2	12.8	5.75	5.17
Step 3 Local background concentration of NO_2	23.3	26.2	21.5	28.5	18.9	16.4	26.6	26.6	21.4	20.3	20.6
Step 4 Annual mean bias corrected value	45.95	35.02	37.46	53.63	24.90	31.93	28.61	36.42	26.37	33.65	30.41
Result; Predicted annual mean at receptor	**39.5**	**32.5**	**31.5**	**42**	**23.1**	**27.9**	**27.9**	**35.2**	**24.4**	**29.8**	**28.7**

SITE NO.	47	49	50a	52	53	55c	56	57	58	58	61
Step 1 How far from kerb was measurement made (m)	9.0	2.2	3.5	1.65	4.6	4.28	2.57	3.6	2.8	2.8	2.8
Step 2 How far from kerb is receptor in metres (m)	2.5	4.6	5.07	6.25	6.17	5.34	7.17	12.1	8.0	8.0	15.3
Step 3 Local background concentration of NO_2	28.5	29.2	14.9	19.4	19.4	20.2	20.3	19.2	26.6	26.6	17.2
Step 4 Annual mean bias corrected value	37.84	36.40	33.34	30.51	36.39	24.87	27.91	39.96	51.25	51.40	30.00
Result; Predicted annual mean at receptor	**42.2**	**35.1**	**31.5**	**27.2**	**34.9**	**24.6**	**26.0**	**33.1**	**44.7**	**44.8**	**24.5**

SITE NO.	64	73a	75a	75b	140	SJ1	SJ2	SJ3	HT2	Auto Data ID9
Step 1 How far from kerb was measurement made (m)	1.49	2.8	0.6	2.5	1.3	0.28	0.37	1.15	0.5	1.7
Step 2 How far from kerb is receptor in metres (m)	10.69	4.78	5.7	8.6	4.8	2.54	9.52	15.63	2.25	8.2
Step 3 Local background concentration of NO_2	17.2	19.8	23.0	29.2	22.9	19.9	19.9	19.9	21.5	17.2
Step 4 Annual mean bias corrected value	70.62	40.04	34.06	29.56	35.78	32.56	26.65	35.87	44.9	41
Result; Predicted annual mean at receptor	**47.6**	**37.3**	**29.5**	**29.5**	**32.2**	**28.1**	**23.0**	**27.2**	**38.7**	**32.5**

Appendix E - Quarries Assessment

Fugitive PM_{10} Assessment TG16 (LAQM) Criterion

Relevant exposure from Source (distance in metres)	2004 PM_{10} Standard (Background concentrations)	2010 PM_{10} Standard (Background concentrations)
Up to1000m (1km)	If background > 28 µg/m^3 Require a DA	If background > 17 µg/m^3 Require a DA
Exposure within 200m from source	Require DA irrespective of background concentrations	
Notes: If relevant exposure is within 50m of an off-site road used to the access site and there are visible deposits on the road, then exposure along these sections of road, which may extend up to 1km from the site entrance should also be considered as long as PM_{10} annual mean background concentration is above 11 µg/m^3 (in Scotland) or above 25 µg/m^3 (rest of the UK).		

Hillwood Quarry – Sources of PM_{10} 2015

Northing	312198 (312500)
Easting	671449 (671500)

Total	**21.7**		
Motorway In	0.6	Industry In	3.1
Motorway out	0.1	Industry Out	2.0
Trunk Road In	0.0	Domestic In	0.0
Trunk road out	0.0	Domestic Out	0.4
Primary A Rd In	0.0	Rail In	0.0
Primary A Rd out	0.0	Rail Out	0.1
Minor A road Cold Start In	0.0	Other In	0.0
Minor A road Cold Start Out	0.1	Other Out	0.5
Break and Tyre wear In	0.6	PM Secondary	3.3
Break and Tyre wear Out	0.3	Residual and salt	9.6
Road Abrasion In	0.7	Point Sources	0.1
Road Abrasion Out	0.2		

Data obtained from Estimated Background Air Pollution Maps, downloaded from http://www.scottishairquality.co.uk/mapping

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
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PCM	Pollution and Climate Mapping
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
SEPA	Scottish Environmental Protection Agency
SO_2	Sulphur Dioxide

References

1 Action Plan for Area Designated 31st December 2000 (July 2003)

2 Newbridge Air Quality Improvement Study CH2m-Hill (March 2014)

3 Newbridge roundabout- vehicle delay report following installation of MOVA CH2MHill July 2016.

4 The City of Edinburgh Council – Trial Findings (Masternaut Ltd)

5 Air Quality Action Plan Progress with Actions 2015 (August 2015)

6 Detailed Assessment of Particles for City of Edinburgh Council (June 2016)

7 Measurement and Modelling of fine Particulate Emissions (PM_{10} and $PM_{2.5}$) from Wood Burning Biomass. AEA Energy and Environment (26 September 2008)

8 Assessment of airborne particulate matter at Salamander Street,Leith. Ricardo-AEA (2015)