Transport and Environment Committee

10.00am, Tuesday, 17 January 2017

Air Quality Update

Item number	8.1
Report number	
Executive/routine	Routine
Wards	All

Executive Summary

This report provides an update on air quality monitoring data collected in 2015. It includes progress by the Council on actions to improve air quality and an update on development of Low Emission Zones.

The data indicates that Nitrogen dioxide (NO_2) is showing an overall improvement in Edinburgh and concentrations within the Air Quality Management Areas (AQMAs) are going down. A similar downward trend has also being observed with particle (PM_{10} and $PM_{2.5}$) data.

In accordance with Scottish Government and Scottish Environment Protection Agency (SEPA) procedures an AQMA has been declared in Salamander Street for non-compliance of PM_{10} Scottish targets.

Through the Scottish Government's Cleaner Air for Scotland Programme, a consultation on Draft National Low Emission Framework guidance is expected in April 2017. The guidance will include an appraisal procedure and mechanism for the implementation of a Low Emission Zone, as well as other transport alternatives.

Links

Coalition Pledges	P51
Council Priorities	CP2
Single Outcome Agreement	SO2

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Report

Air Quality Update

Recommendations

1.1 It is recommended that the Committee notes the contents of this report.

Background

2.1 Under the Environment Act 1995 and the associated Local Air Quality Management (LAQM) framework, all local authorities are duty bound to regularly review and assess air quality in their areas against national pollution targets. The targets are known as Air Quality Objectives (AQOs). When a pollutant fails to comply with an AQO an Air Quality Management Area (AQMA) must be declared and an Action Plan prepared, detailing measures which will be implemented to improve air quality within the designated area.

2.2 The Council's current Air Quality Action Plan requires to be revised to reflect national and local policy direction and investigate new measures. This will be progressed under the Future Transport Member Officer Working Group as recommended in the report "Delivery of Air Quality" discussed by the Transport and Environment Committee at its meeting on 1 November 2016.

2.3 The Annual Progress Report (APR) contains monitoring data, data trends, emerging issues and progress which has been made with respect to the implementation of air quality actions. The reports are carried out in accordance with the Technical Guidance (TG16) issued by the Department of Environment Food and Rural Affairs (DEFRA) and are peer reviewed by DEFRA, Scottish Environment Protection Agency (SEPA) and the Scottish Government for approval prior to public release.

2.4 Edinburgh currently has five AQMAs for traffic sources of the pollutant nitrogen dioxide (NO_2). Assessment studies have shown that the NO_2 contribution from each vehicle class is variable within the AQMAs. In some locations buses are a significant contributor, in others cars are a dominant source. Therefore, in order to improve air quality, it will be necessary to keep all motor vehicle types under review.

2.5 In November 2015, the Scottish Government released its low emission strategy, Cleaner Air for Scotland – the road to a healthier future (CAFs). This sets out a five year plan of how Scotland will achieve full compliance with National and European air quality standards. Two key actions in CAFs are the National Modelling Framework (NMF) and the National Low Emission Framework (NLEF).

2.6 The NMF will provide a consistent approach to modelling air quality at local and regional levels across Scotland and will help support decisions on potential transport and planning options. Four Scottish cities, including Edinburgh will be modelled. It is expected that the Edinburgh model will be completed during 2017.

2.7 The NLEF will be designed to assist local authorities appraise, justify and implement a range of transport related air quality improvement options, including Low Emission Zones.

2.8 These actions are being progressed by the Scottish Government, Transport Scotland, and SEPA, working in partnership with local authorities, regional transport partnerships and strategic development planning authorities. Local authorities will be expected to work within the set frameworks.

2.9 In April 2016, it became a statutory requirement for Scottish local authorities to review and assess the smaller fraction of particles $PM_{2.5}$ and to facilitate this, the Scottish Government, in conjunction with local authorities is establishing a $PM_{2.5}$ monitoring network for Scotland. Edinburgh secured funding from the Scottish Government to purchase equipment which measures both fractions of particles. This is located at St Johns Road, as agreed with the Scottish Government.

Main report

Monitoring

3.1 Edinburgh has a well established monitoring regime for nitrogen dioxide (NO_2) and fine particles (PM_{10}). These are the pollutants of concern in most urban areas in the UK. Measurement is by approved automated analysers housed in air quality stations, which are located at roadside and background sites. Additional NO_2 monitoring is carried out across the city using 153 passive diffusion samplers. The majority of the samplers are located at or close to residential building facades on radial transport routes in and around the city and reflect worst case exposure.

3.2 The Air Quality Monitoring station located at Queen Street was decommissioned in June 2016. Council officers are working in partnership with DEFRA to establish a new site on the A7 at Nicolson Street, which will measure NO_2 and $PM_{10.}$

3.3 Improvements in air quality are assessed by analysis of long term trend data. Short term results are influenced by weather and temporary events such as, local traffic diversions and road works.

3.4 Although, NO_2 data for 2015 shows that the AQMAs are still required, the concentrations are going down based on trend analysis. The NO_2 trend data is shown in Figure 1, Appendix 1

3.5 A summary of locations where the 2015 monitoring results of NO_2 are at or exceed the annual mean nitrogen dioxide objective is illustrated in Table 1, Appendix 1.

3.6 One new monitoring location established on Duke Street in 2015 is at the threshold level. Monitoring will continue at this location. A site specific location on Queensferry Road exceeds the objective when corrections have been applied to represent relevant exposure (48µg/m^3). However, at the start of 2015, additional monitoring commenced at the facade of the adjacent residential property which is compliant (36µg/m^3). Detailed analysis of the localised conditions will be carried out as part of the National Modelling Framework in 2017.

3.7 The APR 2016 identified a new point emission source from a gas fired Combined Heat and Power Plant (CHP) at the University of Edinburgh (The Pleasance) which may lead to the NO_2 air quality standards being breached. This will involve further investigation and monitoring in conjunction with the University.

3.8 Scotland has set tighter standards for particulates (PM_{10} and $PM_{2.5}$) compared with the rest of the UK and Europe, as shown in Table 2 Appendix 1.

3.9 Additional work relating to the assessment of particles has been addressed in a separate report, Detailed Assessment of Particles 2016. This study reviewed measured data and modelled roadside data which was obtained from the Pollution Climate Mapping Model (PCM) which is used by the UK Government for reporting to the European Commission and recently became available to local authorities.

3.10 A number of key sources of PM_{10} that are likely to contribute to exceedances of AQOs in Edinburgh were also looked at in more detail, for example, road traffic, fugitive emissions from handling and stockpiling aggregate material at Leith Docks and poultry farm operations.

3.11 All current PM_{10} measured data from the air quality monitoring stations complies with EU limit values and the Scottish AQOs except the roadside location at Salamander Street which fails the Scottish AQOs.

3.12 The Scottish Government and SEPA have advised the Council that an AQMA will be required for the non- compliance of PM_{10} Scottish AQOs at Salamander Street.

3.13 The Detailed Assessment also included a summary of the independent modelling study which was undertaken by air quality consultants Ricardo on behalf of the Council.

3.14 The modelling study used an approved methodology to assess the likely emissions from fugitive sources and vehicle tail pipe emissions from local traffic movements in, and adjacent to, Leith Docks. Based on modelled outputs, a zone was identified whereby concentrations of PM_{10} could potentially be above the Scottish AQOs. The AQMA boundary is shown in Figure 3, Appendix 1.

3.15 PM_{10} modelled data from the UK Pollution Climate Mapping (PCM) model (2014) showed that a number of road sections were either at or below the AQO. However, outputs from the PCM model for the same road network has identified that the majority of locations are at or exceed the $PM_{2.5}$ annual standard of 10µg/m^3.

3.16 An approved national correction method has also been applied to PM_{10} measured data to derive estimated $PM_{2.5}$ concentrations, which shows that there are potential exceedances of $PM_{2.5}$ at current roadside monitoring locations where PM_{10} is measured (see Appendix 1- Table 3).

3.17 Although, it is now mandatory for local authorities to review and assess this particle fraction, the Scottish Government does not expect local authorities to declare AQMAs until more robust monitoring data has been gathered.

3.18 PM_{10} and $PM_{2.5}$ (background) long term trends from measured data show a decrease in concentrations with time as shown in Figure 2, Appendix 1.

3.19 In conjunction with SEPA and funding support from the Scottish Government, PM_{10} monitoring equipment was deployed at Gogarburn Poultry Farm in July 2015, the monitoring programme was extended to the end of September 2016. Interim data indicates that the Scottish AQOs are likely to be achieved at this location. SEPA will produce a draft report by mid December.

Progress with Actions

3.20 The main actions in the Council's Air Quality Action Plan and Local Transport Strategy to improve air quality are based on the promotion of cleaner transport particularly the bus fleet, easing congestion by improving traffic flow and promoting model shift away from car use by means of an Active Travel Action Plan, provision of Park and Rides, controlled parking and priority parking zones.

3.21 Lothian Buses (Transport for Edinburgh) is the largest bus service provider in the city. Steady progress in improving bus engine standards has been achieved since 2006. Currently 66% of the main fleet is Euro 5 standard or better and from September 2016 the city tour fleet will be of a Euro 6 Standard. The tour fleet which has a high presence in the Central AQMA was previously Euro 2 Standard.

3.22 The Euro 6 standard Tour Fleet will significantly reduce emissions of NO_x and particulates compared with the Euro 2 standard vehicles. The reductions have been calculated as being in the range of 95% to 99%.

3.23 During 2015, 49 double deck vehicles of Euro 4 standard were converted to a cleaner Euro 5 standard by a process of engine management system re-mapping which has been certified by the Vehicle and Operators Service Agency (VOSA). The estimated reductions under normal route operating conditions for NO_x have been calculated at 13%.

3.24 The City Mobility project (deployment of hybrid- electric vehicles with extended electric range) has been delayed due to funding being sought for the provision of rapid electric charging infra-structure. In addition, Lothian Buses is looking at the purchase of a number of electric only powered buses for a city centre operation.

3.25 Other bus operators in the city have also improved their fleets. Stagecoach operates a fleet of 60 buses on services into Edinburgh. All Euro 3 standard vehicles have now been removed and 83% of vehicles are Euro 5 standard or

better. Citylink operates a number of 'inter-city' coach services throughout Scotland. These are sub-contracted to a range of different operators. The company has 51 contracted vehicles entering Edinburgh. The vast majority (86%) are Euro 5 standard or better.

3.26 First Scotland (East) fleet services into Edinburgh were under review at the time of reporting. However, their overall fleet has improved during 2016 with the purchase of 31 Euro 6 vehicles and a further 19 Euro 6 Hybrid Vehicles.

3.27 ECOSTARS Edinburgh is a fleet efficiency recognition scheme which has been successful in assisting the Council to encourage emission improvement from the goods and passenger transport sector operating in the city. As of November 2016, 129 operators have joined the scheme and a total of 6,089 vehicles are registered.

3.28 Improving traffic flow and reducing idling time are measures which help improve air quality. Spilt 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. A number of new installations are being progressed.

3.29 A new traffic signalling system has been installed (Microprocessor Optimised Vehicle Actuation (MOVA)) at Newbridge Roundabout which became fully operational in April 2016. This was designed to improve flow and vehicle delay times and hence reduce exhaust emissions in the Glasgow Road AQMA. Results have shown that there has been a significant reduction in waiting time on the A8 westbound corridor. The assessment of ambient concentrations of NO_2 will be reviewed for the APR 2017 (see Appendix 2).

3.30 The Council continues to promote and embrace electric vehicle charging infrastructure. All public accessible charging sites can be viewed on the following website – www.chargeyourcar.org.uk . At the time of reporting there were 141 charging heads at 60 site locations. The Council has seen a steady increase in the number of charging sessions and amount of power used (see Appendix 2).

3.31 Transport Scotland has become a partner with the Council to assist the funding of an on street pilot electric charging scheme which will 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.

3.32 The Council's Active Travel Action Plan (ATAP) 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. A number of major and smaller cycling and pedestrian schemes have been delivered and other schemes are in progress. The Scottish Household Survey 2015 and the Edinburgh Bike Life report indicate that cycling to work by Edinburgh residents increased from 4.9% in 2011 to 7.3% during 2014/15.

3.33 The Detailed Assessment of Particles 2016 and the Annual Progress Report 2016 have been submitted to the Scottish Government, DEFRA and SEPA for peer review and have been accepted.

National Low Emissions Framework

3.34 Council Pledge 51 states, 'Investigate the possible introduction of low emission zones'. Edinburgh along with the three other major Scottish cities, Aberdeen, Dundee and Glasgow has formed a partnership with Transport Scotland, Scottish Government and SEPA to assist with development of the NMF for each city. Outputs from the National Modelling will provide quantitative evidence for the NLEF appraisal process. Both these actions are being delivered by the aforementioned agencies through the CAFs programme. Traffic data to support the modelled areas of Edinburgh will be gathered from 144 sections of road network and junctions throughout the City. The models for all four cities should be completed during 2017.

3.35 The draft NLEF guidance for consultation, which will include LEZs as an option, is expected to be available in April 2017. This will include an appraisal procedure and mechanism for the implementation of a Low Emission Zone.

3.36 The Scottish Government's Programme for Government has been revised to have an LEZ in place by 2018. This is two years ahead of the original proposed timescale and there is a desire for a local authority to come forward and a take a lead.

Future Challenges

3.37 The APR 2016, required local authorities to make comment with respect to the challenges that they face with respect to improving air quality in their cities. Continuing economic growth in Edinburgh and the wider region presents an inevitable demand for all modes of transport. The recent Census figures estimate that, if the recent trend continues Edinburgh's population would grow by 28.2% to reach 619,000 at 2037. The 2011 Census also states that car journeys are still the most popular mode of transport to work and account for 46% of all journeys into or within the city, even though trips to work by more sustainable travel have increased by bus (9%), rail (52%), bicycle (59%) and walking (16%).

3.38 Edinburgh is a major centre of employment and attracts a substantial amount of commuter traffic as well as local traffic. There is therefore a need to manage regional economic growth in a more sustainable manner that does not lead to breaches of air quality thresholds.

Measures of success

4.1 An improvement in air quality based on long term trend data within each of the AQMAs.

Financial impact

5.1 The report has no direct financial impacts arising from this update report.

Risk, policy, compliance and governance impact

6.1 The European Commission launched infraction proceedings against the UK Government (Member State) for breach of nitrogen dioxide Limit Values under the EU Air Quality Directive. The European Commission allowed an extension until 1 January 2015 for compliance of the Edinburgh Urban area. However, the Scottish Government has indicated that it would not seek to pass on any fines to Local Authorities which are imposed by the EU on the UK Government

Equalities impact

7.1 This report is a statement of facts regarding the results of ambient air quality monitoring and improvements achieved to date regarding progress with actions. Therefore, a full equalities impact is not required. The contents have no negative impacts on the Public Sector Equality Duty of the Equality Act 2010.

Sustainability impact

8.1 The content of this report is a statement of facts and does not in itself promote any environmental impact.

Consultation and engagement

9.1 The 2016 reports will be published on the Council's website.

Background reading/external references

10.1 Detailed Assessment of Particles for City of Edinburgh Council 2016 http://www.edinburgh.gov.uk/downloads/download/117/local_air_quality_management_reports.

10.2 2016 Air Quality Annual Progress Report (APR) for City of Edinburgh Council August 2016. http://www.edinburgh.gov.uk/downloads/download/117/local_air_quality_management_reports

10.3 Delivering Air Quality, Transport and Environment Committee, November 2016 http://www.edinburgh.gov.uk/meetings/meeting/4053/transport_and_environment_committee.

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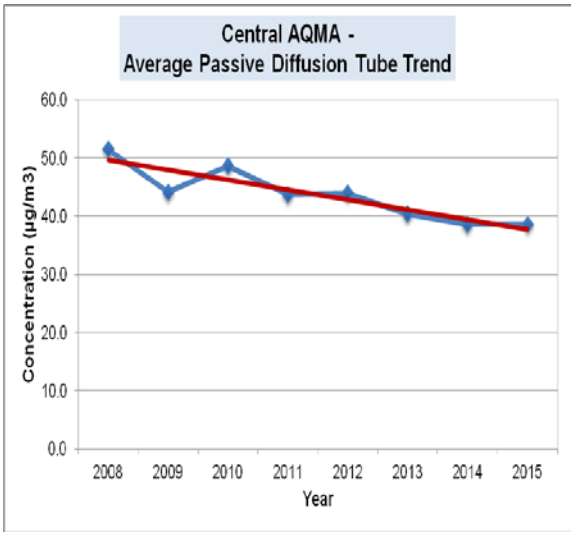
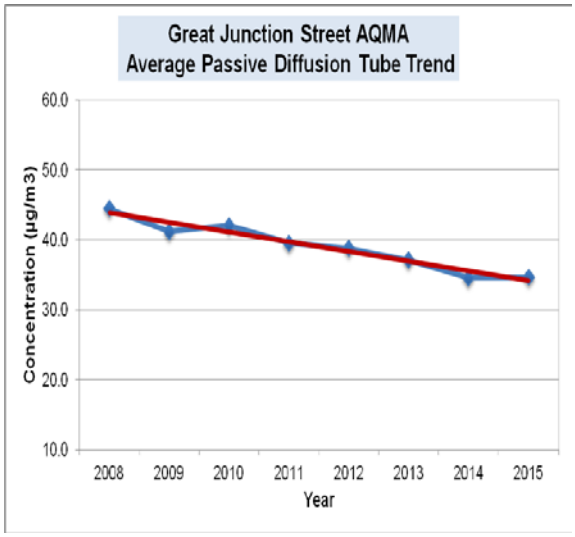
Links

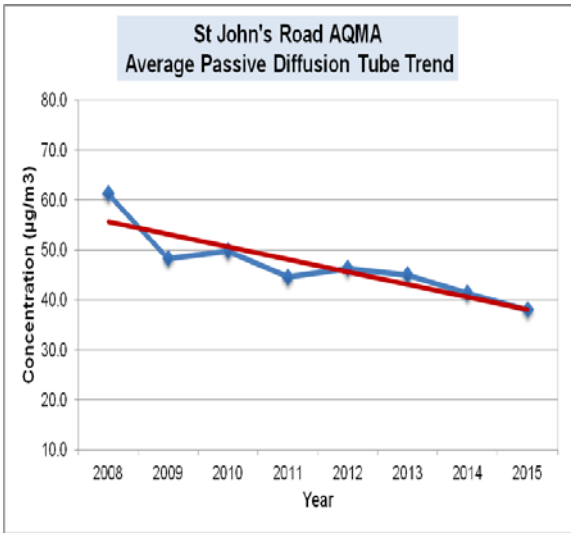
Coalition Pledges	P51 – Investigate the possible introduction of low emission zones
Council Priorities	CP2 – Improved health and wellbeing: reduced inequalities
Single Outcome Agreement	SO2 – Edinburgh's citizens experience improved health and wellbeing, with reduced inequalities in health
Appendices	Appendix 1 – Summary of Monitoring Data Appendix 2 – Progress with Actions

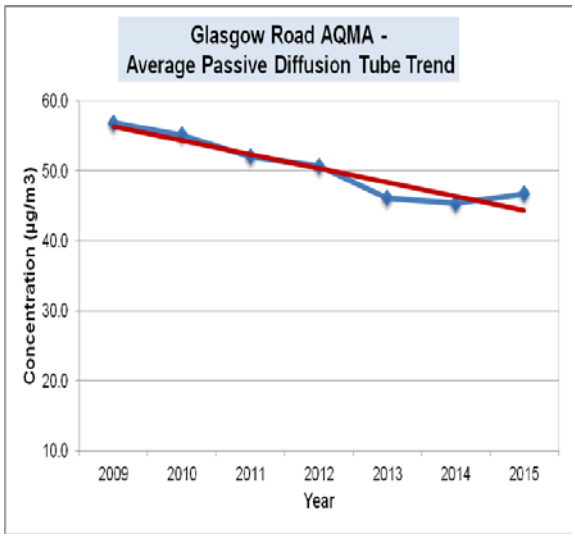
Appendix 1 - Summary of Trends and Monitoring Data

Figure 1 Nitrogen dioxide trends within the Air Quality Management Areas (AQMAs)









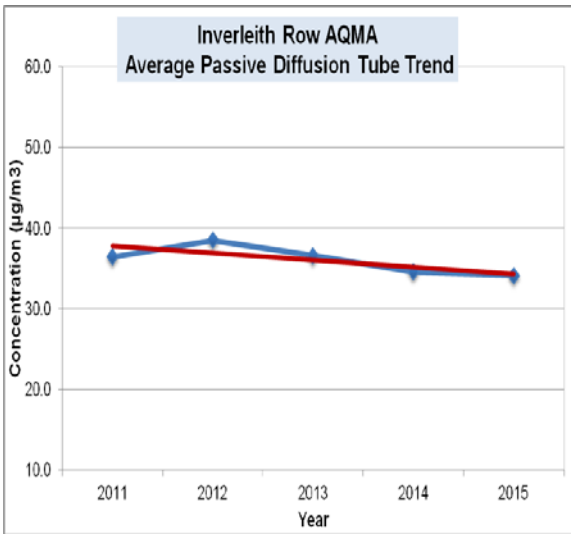
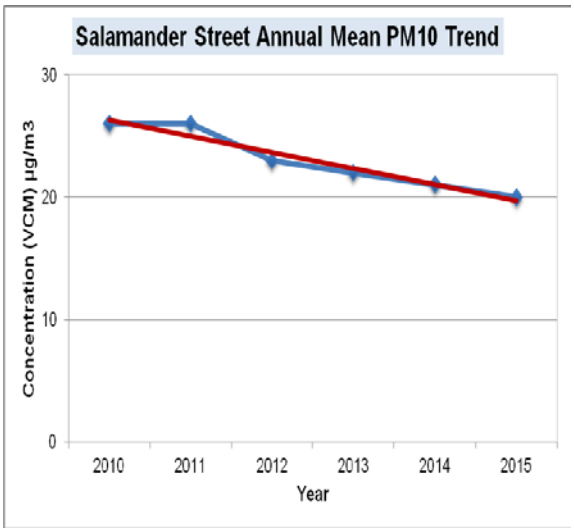
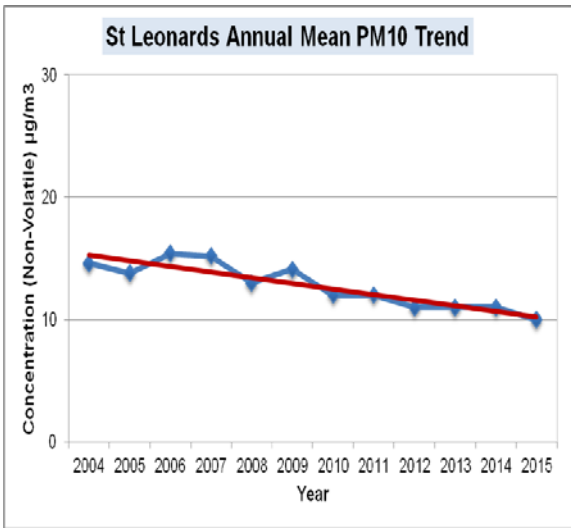
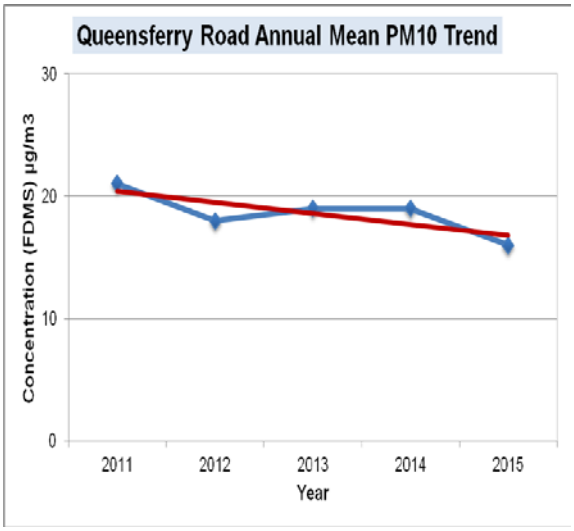
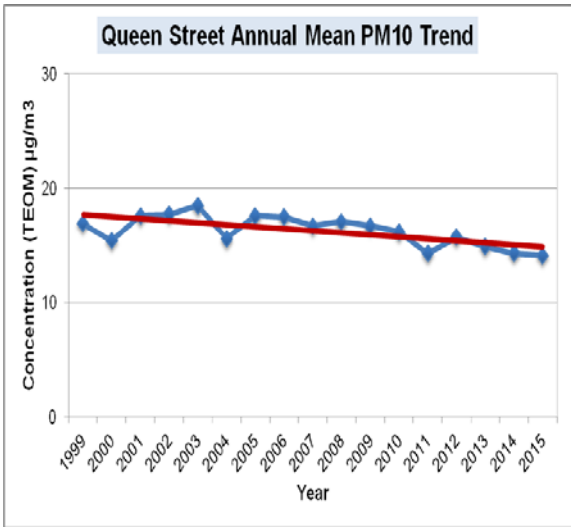


Figure 2 PM_{10} trends from Air Quality Monitoring Stations









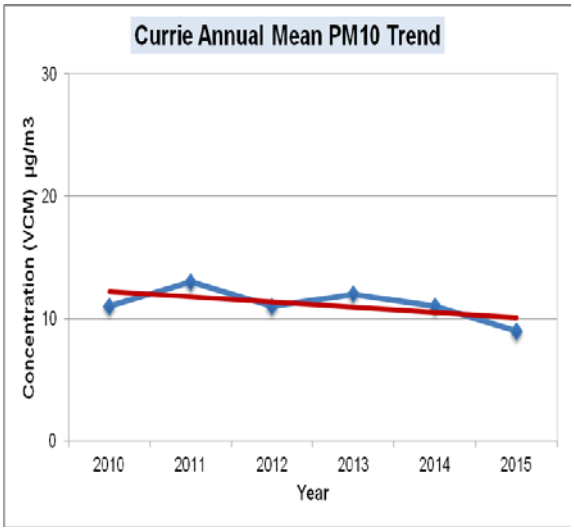


Table 1 - Summary of the locations where 2015 monitoring results are at or exceed the Annual Mean Nitrogen Dioxide Objective (40µg/m^3)

Site ID	Site Address	% Data Capture	Annual mean (µg/m^3) Bias 0.76
Central AQMA			
76b	Angle Park Terr 74	100	**46**
48c	Cowgate Blackfriars	67	**41**
48e	Cowgatehead 2	50	**44**
79d	Dundee St/Yeaman	75	**42**
25	Easter Road	42	**40**
37a	Grassmarket 41	58	**43**
74g	Leith Street	75	**49**
67	London Rd/Earlston	58	**42**
81	London Rd/E.Norton	100	**50**
69	London Rd/Wolseley	92	**43**
70	London Rd/Wolseley	100	**44**
135	Nicolson Street 69	100	**46**
47	Princes St Eastbound	100	**42**
24	Princes St / Mound	83	**42**
144	South Bridge 59	83	**44**
141	South Clerk St 84	83	**40**
3b	Torphichen Pl 1	83	**42**
3	Torphichen Pl	100	**45**
2	West Maitland St	100	**42**
28d	West Port 42	83	**52**
28c	West Port 50	83	**46**
28b	West Port 62	83	**58**
Glasgow Road AQMA			
16	Glasgow Road 68	100	**40**
15	Glasgow Rd Newbridge	100	**40**
58	Glasgow Rd Newbridge	100	**45**
Great Junction St AQMA			
29c	Bernard Street/PS	100	**40**
St John's Road AQMA			
ID5	St John's Rd (Auto)	89	**65**
1d	St John's Rd 131	100	**46**
Inverleith Row AQMA			
55	Inverleith/Ferry Rd	100	**41**
Outwith any AQMA			
30f	Duke Street	92	**40**
64	Queensferry Rd 550	92	**48**

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

A full set of corrected passive diffusion tube data for the calendar year 2016 will not be available until Spring 2017. This data will be reported in the 2017 Air Quality Progress Report

Table 2 - Particle PM_{10} and $PM_{2.5}$ Standards

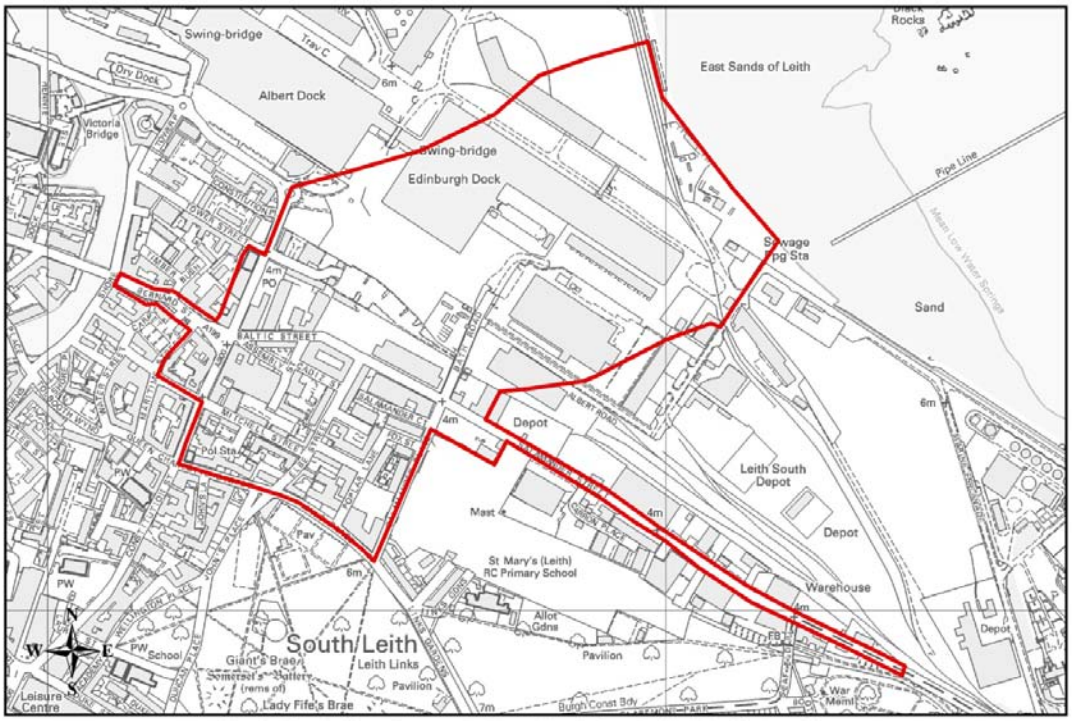
Pollutant	Status	Concentration in Ambient air	Measured as	To be achieved by
PM_{10}	Scottish Statutory Air Quality Objective	18 µg/m^3 50 µg/m^3 not to be exceeded more than 7 times a year	Annual mean Daily mean	2010 2010
	Statutory UK Objective and EU limit values	40 µg/m^3 50 µg/m^3 not to be exceeded more than 35 times a year	Annual mean Daily mean	2004 2004
$PM_{2.5}$	Scottish Local Authorities	10 µg/m^3	Annual mean	2020
	Statutory UK Objective and EU limit values	25 µg/m^3 15% reduction in urban background	Annual mean -	2020 2010-2020

Table 3- 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

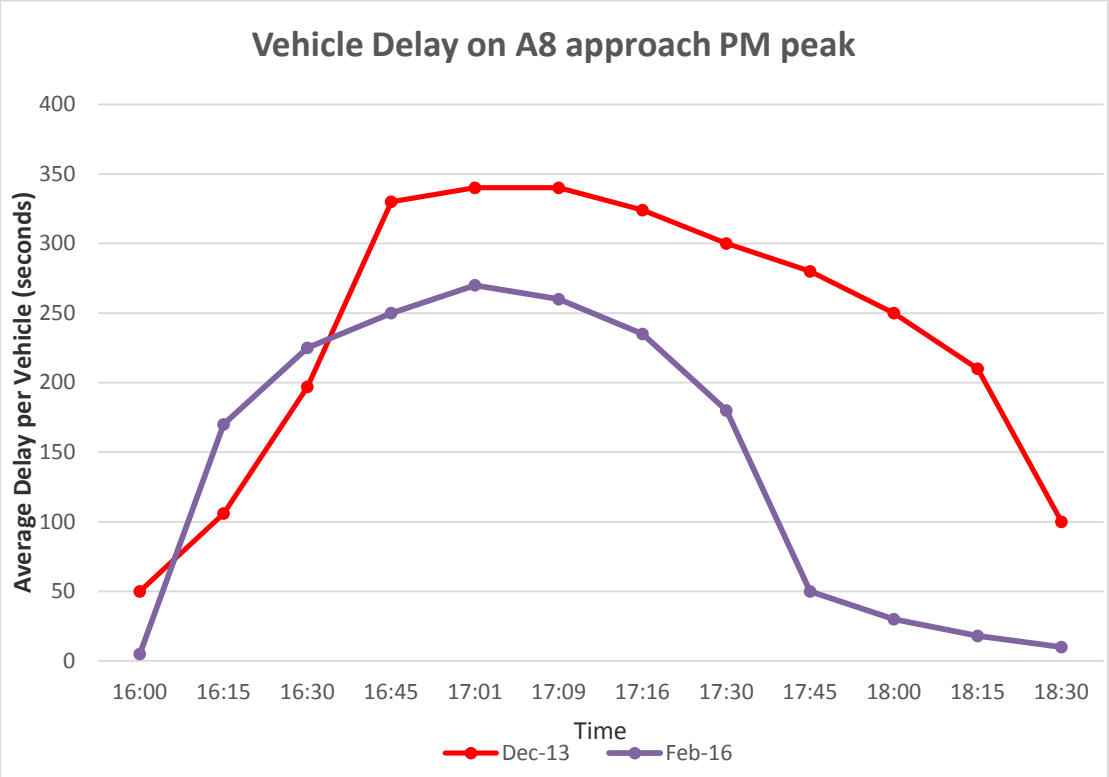
Notes for Table: [#] Estimation of $PM_{2.5}$ concentrations from PM_{10} Measurements using national factor (0.7). Exceedances and potential exceedances of the $PM_{2.5}$ annual mean objective of 10µg/m^3 are shown in bold red.

Figure 3 Boundary of AQMA designation for exceedances of PM_{10} Air Quality Objectives at Salamander Street



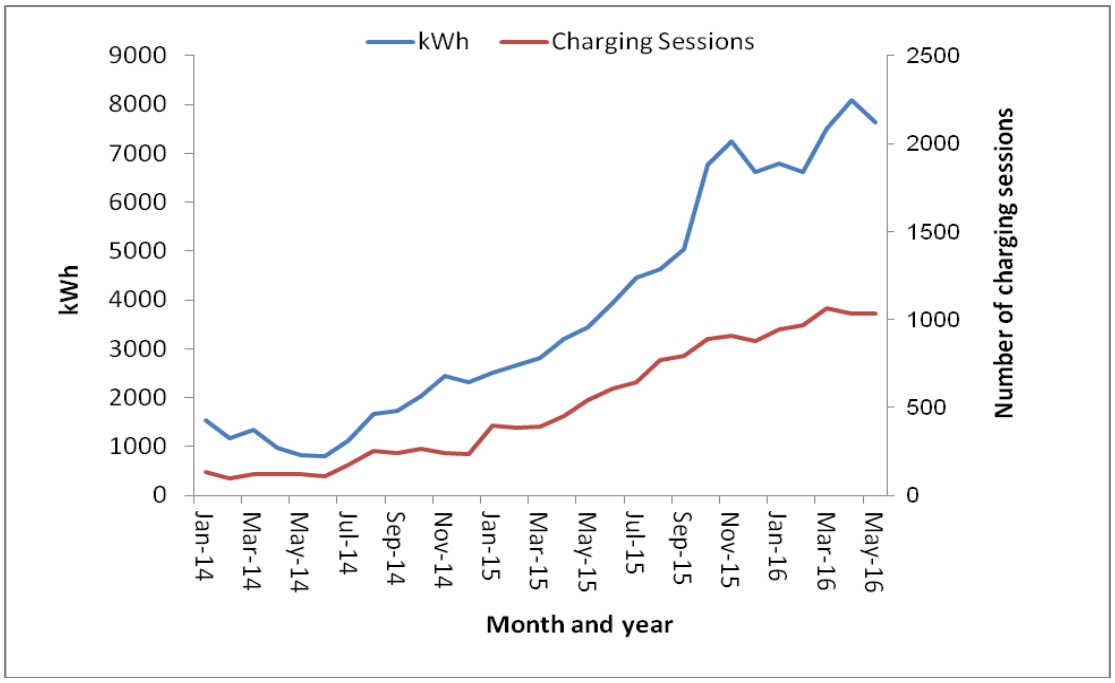
Appendix 2: Progress with Actions

Improvement in average delay per vehicle on A8 Glasgow Road pre and post MOVA traffic signalling at Newbridge Roundabout



Pre MOVA (Dec 13) Post MOVA (Feb 16)

Graph showing an increase in power (KWh) and number of electric charging sessions per month from January 2014 to May 2016.



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