ABERDEEN
CITY COUNCIL

2014 Air Quality Progress Report for Aberdeen City Council

In fulfillment of Part IV of the
Environment Act 1995
Local Air Quality Management

October 2014

Local Authority Officer	Aileen Brodie/Nick Glover
Department	Environmental Health & Trading Standards
Address	Aberdeen City Council, Marischal College, Business Hub 15, Broad Street, Aberdeen AB10 1AB
Telephone	01224 523737
e-mail	poll@aberdeencity.gov.uk
Report Reference number	001
Date	October 2014

Executive Summary

This Progress Report has been undertaken to fulfil Aberdeen City Council's duty to annually review and assess air quality. The Report provides the latest monitoring results and discusses the implications for air quality management in Aberdeen. In writing the Report, the Council has regard to the Government's published technical guidance LAQM.TG(09).

In 2013 the annual mean nitrogen dioxide level (NO_2) continued to exceed the national air quality objective across the City Centre and Wellington Road Air Quality Management Areas (AQMA). Pockets of exceedances were also recorded within the Anderson Drive/Haudagain Roundabout/Auchmill Road AQMA. Levels at monitoring locations were generally similar to previous years but with decreases in levels at Union Street and Wellington Road.

There were no exceedances of the NO_2 1 hour objective at the continuous monitoring sites although diffusion tube data suggested potential exceedances at specific locations in the City Centre AQMA and Anderson Drive/Haudagain Roundabout/Auchmill Road AQMA. Diffusion tubes located outwith the AQMAs did not record any exceedances of the annual mean NO_2 objective.

The annual mean PM_{10} objective was exceeded at Wellington Road, Market St, Union Street and King Street. The objective was met at Errol Place and Anderson Drive. Concentrations at Anderson Drive and Wellington Road have remained steady over the period 2009-2013, however there has been a slight increase in levels at both King Street and Union Street.

Market Street recorded exceptionally high annual mean PM_{10} concentrations and daily exceedances of the air quality objective. Meteorological data strongly suggests that the predominate cause of the high levels was unusual local climatic conditions, particularly during March and April 2013.

Annual Average daily traffic flow data at Market Street showed a marginal increase in all vehicles in 2013 compared to 2012. The increased flow is unlikely to be a significant factor in the increased PM_{10} exceedences.

King Street exceeded the annual mean objective by $1ugm^{-3}$ in 2011, 2012 and 2013. The King Street site is outwith the existing AQMAs. During 2012 it became apparent that the BAMs at both Market Street and King Street were recording significantly elevated levels during prolonged periods of wet weather or sea mist in the area. A heat exchanger was installed at the Market Street site, however there may still be some influence from meteorological conditions on PM_{10} concentrations.

The 24-hour objective was met at Errol Place, Union Street, Wellington Road, Anderson Drive and King Street.

The 2013 monitoring data indicates the current AQMAs remain valid and Aberdeen City Council has no proposals to undertake any Detailed Assessments during 2014. PM_{10} concentrations at King Street will continue to be assessed and the need for further action will be considered in future Progress Reports.

This Progress Report includes information on the implementation of the measures within the 2011 Air Quality Action Plan. Significant progress has been made in the development of the Car Club, the integration of air quality within planning policies and initial steps in the development of a City Centre Masterplan, including a potential Low Emission Zone or Strategy.

There were no new developments or other sources of pollution introduced in Aberdeen during 2013 likely to have had a significant impact on local air quality.

Table of Contents

List of Tables

List of Figures

Appendices

1 Introduction

1.1 Description of Local Authority Area

Aberdeen is situated on the east coast of Scotland by the North Sea and has a population of 220,000. The city acts as a focus for employment, service and leisure activities both for residents of Aberdeen and the surrounding area.

There is little heavy industry within the city and much of the economy is based around services to the oil industry. Road traffic is the main source of atmospheric pollution. Aberdeen's road transportation system is constrained by the River Dee to the south of the city and the River Don to the north therefore there are limited routes to either arrive at or pass around the city. Construction of a Western Peripheral Route around the city commenced in 2014, and completion is anticipated by 2018. The A90 and A96 trunk roads, A93 North Deeside Road, A956 Ellon Road and A956 Wellington Road are the most significant routes to converge or pass through the city centre. Much of the commuter traffic entering the city comes from the neighbouring Aberdeenshire.

Aberdeen Harbour is located in the city centre and is a thriving environment acting as the UK's main base for supply vessels to offshore installations. There are also regular ferries to The Shetland and Orkney Islands. Aberdeen Airport (Dyce) is located around 7km to the northwest of the city.

1.2 Purpose of Progress Report

This report fulfils the requirements of the Local Air Quality Management (LAQM) process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 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 exceedences are considered likely, the local authority must then 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.

Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment reports. Their purpose is to maintain continuity in the LAQM process.

They are not intended to be as detailed as Updating and Screening Assessment Reports, or to require as much effort. However, if the Progress Report identifies the risk of exceedence of an Air Quality Objective, the Local Authority (LA) should undertake a Detailed Assessment immediately, and not wait until the next round of Review and Assessment.

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM in Scotland are set out in the Air Quality (Scotland) Regulations 2000 (Scottish SI 2000 No 97), the Air Quality (Scotland) (Amendment) Regulations 2002 (Scottish SI 2002 No 297), and are shown in Table 1.1. This table shows the objectives in units of micrograms per cubic metre µg/m3 (milligrams per cubic metre, mg/m3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

Table 1.1 Air Quality Objectives included in Regulations for the purpose of LAQM in Scotland

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 µg/m^3	Running annual mean	31.12.2003
	3.25 µg/m^3	Running annual mean	31.12.2011
1,3-Butadiene	2.25 µg/m^3	Running annual mean	31.12.2003
Carbon monoxide	10 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.50 µg/m^3	Annual mean	31.12.2004
	0.25 µg/m^3	Annual mean	31.12.2008
Nitrogen dioxide	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}) (gravimetric)	50 µg/m^3, not to be exceeded more than 7 times a year	24-hour mean	31.12.2011
	18 µg/m^3	Annual mean	31.12.2011
Sulphur dioxide	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

1.4 Summary of Previous Review and Assessments

The outcomes of the first, second, third and fourth rounds of the review and assessment process for NO_2 and PM_{10} are described in sections 1.4.1-1.4.4. All rounds of the process concluded levels of carbon monoxide, benzene, 1,3-butadiene, sulphur dioxide and lead in Aberdeen are unlikely to exceed the national air quality objectives.

1.4.1 First Round of Review and Assessment

The first round of the review and assessment process predicted exceedances of the annual mean objective for NO_2 in parts of the city centre. An Air Quality Management Area (AQMA) was declared in June 2001 centring around Market Street and Union Street. Following subsequent Detailed Assessments in 2001 and 2002 the AQMA was slightly amended in March 2003 to include adjoining areas.

1.4.2 Second Round of Review and Assessment

The second round of review and assessment confirmed levels of NO_2 continued to exceed the annual mean objective in the city centre, including streets adjacent to the AQMA. Exceedances of the 1-hour objective were also predicted on Market Street. Additionally, exceedances of the new annual mean objective for PM_{10}, to be achieved by 2010, were also predicted in the city centre. Following a Detailed Assessment, the AQMA was amended in January 2005 to include all areas of current or predicted exceedances of both the NO_2 and 2010 PM_{10} annual mean objectives in the city centre and the 1-hour NO_2 objective on Market Street.

Emissions from Aberdeen Harbour were considered in the Detailed Assessment. It was concluded that emissions from shipping contributed to elevated levels of NO_2 and PM_{10} in the Market Street and Guild Street areas, but do not cause exceedance of the objectives.

An Air Quality Action Plan was also published in July 2006 detailing measures to improve the air quality in the AQMA. These included

- Pedestrianisation of Union Street and associated road infrastructure improvements
- Additional controlled parking
- Additional Park and Ride facilities
- Green Transport Plans
- Improved Public Transport
- Increase Public Awareness of Air Quality Issues
- Construction of a Western Peripheral Route around the city (AWPR)

1.4.3 Third Round of Review and Assessment

A further Updating and Screening Assessment and Progress Reports were completed in 2006, 2007 and 2008 respectively. NO_2 levels across the City and PM_{10} levels on Union Street were found to be similar to previous years. In 2007 elevated levels of PM_{10} were recorded on Market St due to roadworks and the development of the Union Square retail park adjacent to the continuous monitoring station. Potential exceedances of the annual mean objective for both PM_{10} and NO_2 were predicted on the Anderson Drive/Haudagain roundabout corridor even with the construction of the proposed Aberdeen Western Peripheral Route (AWPR) and on parts of Wellington Road.

A Detailed Assessment completed in March 2008 concluded that the annual mean NO_2 objective and the annual mean 2010 PM_{10} objective were likely to be exceeded in 2010 at the Haudagain roundabout (A96/A90), locations along the A90 Anderson Drive and Wellington Road (Queen Elizabeth II Bridge to Balnagask Road) without the AWPR. With the AWPR exceedances were still predicted on Wellington Road although levels slightly below the objectives were predicted on the Haudagain roundabout/Anderson Drive corridor.

Wellington Road (Queen Elizabeth II Bridge to Balnagask Road) was designated an AQMA in November 2008 as a result of the Detailed Assessment and annual mean NO_2 and PM_{10} levels recorded in the 2008 Progress Report. The Haudagain roundabout/Anderson Drive corridor was also declared an AQMA for both pollutants as NO_2 monitoring in the vicinity of the roundabout had frequently recorded measurements in excess of the objective and the AWPR would not be completed until 2012 at the earliest.

The Detailed Assessment also considered NO_2 and PM_{10} levels on King Street. Although potential exceedances of both objectives were identified, there was a lack of monitoring data in the area to confirm the likelihood of exceedances. Accordingly further monitoring was recommended prior to any decision being made on the requirement for an AQMA on King Street.

1.4.3 Fourth Round of Review and Assessment

The 2009 Updating and Screening Assessment and 2010 Progress Report completed in July 2009 and July 2010 respectively confirmed measured NO_2 levels were again similar to previous years with the exception of Market Street. The Market Street monitoring station was relocated in 2008 and the lower levels recorded at the new site are attributable to the more open nature of the site and reduced congestion. Both reports confirmed continued widespread exceedances of the NO_2 annual mean objective within the City Centre AQMA and pockets of exceedances within the Wellington Road and Anderson Drive/Haudagain roundabout AQMAs.

PM_{10} levels were lower in 2009 compared to previous years. It is believed that the replacement of Errol Place TEOM with an FDMS and the use of the VCM for the first time contributed to the lower values.

In 2010 diffusion tube concentrations identified likely exceedances of the annual mean objective just outwith the existing boundaries of the City Centre and Anderson Drive/Haudagain roundabout AQMAs. These AQMAs were extended in November 2011 to include the following areas:

- City Centre AQMA: Victoria Road to the junction with Sinclair Road, Bridge Street and West North Street to the junction with Littlejohn Street
- Anderson Drive/Haudagain roundabout AQMA: Auchmill Road to the junction with Howes Road.

Additionally, the Union Street continuous monitoring recorded exceedances of the 1 hour NO_2 objective. As diffusion tube data indicated likely exceedances at several sites across the City Centre AQMA, the AQMA was also amended to include exceedance of the 1 hour objective.

A new Air Quality Action Plan (AQAP) covering all 3 AQMAs was adopted in March 2011. Measures to improve air quality were grouped into the following 6 categories:

- Modal Shift and Influencing Travel Choice
- Lower Emissions and Cleaner Vehicles
- Road Infrastructure
- Traffic Management
- Planning and Policies
- Non-Transport Measures

1.4.4 Fifth Round Review and Assessment

The 2012 Updating and Screening Assessment again confirmed continued exceedances of the annual mean PM_{10} and NO_2 objectives across the 3 AQMAs. NO_2 and PM_{10} levels were broadly similar to previous years with the exception of the Union St continuous monitor which recorded a 25% decrease in the annual mean concentration. The reason for the dramatic decrease is unknown but equipment malfunction may have been a factor, especially as traffic flows remained the same.

There were no exceedances of the 1 hour NO_2 objective. A slight rise in the number of exceedances of the 24 hour PM_{10} objective at Market St, Union St, King St and Wellington Road was observed.

A study of emissions from shipping and their impact on the City Centre AQMA was also completed in 2011. It was concluded that, whilst emissions from shipping are not likely to cause an exceedance of the annual mean objectives, they do contribute to existing exceedances in specific areas near the Harbour.

The 2012 monitoring data confirmed concentrations continued to exceed the annual mean NO_2 and PM_{10} objectives within the 3 AQMAs and the 1 hour NO_2 and 24 hour PM_{10} objectives within the City Centre and Wellington Road AQMAs.

The annual mean PM_{10} objective was also marginally exceeded at the King Street continuous monitoring station. Concentrations from the BAM monitor at this location

may be elevated during prolonged periods of heavy rain and sea mist. A Detailed Assessment was not proposed at that time, however concentrations to be monitored and reviewed to determine if further action is necessary. There were no exceedances of the objectives at any other location outwith the AQMAs.

Table 1.2 summarises the outcome of previous air quality reports.

Table 1.2 Summary of Air Quality Reports and Outcomes

Report	Outcomes
Stages 1, 2, 3 and 4 Reports 2000-2003	City centre AQMA declared in June 2001 due to predicted exceedances of annual mean NO_2 objective. Area of AQMA extended in March 2003.
Updating and Screening Assessment August 2003	Detailed Assessment of NO_2 and PM_{10} recommended in city centre and assessment of Aberdeen Harbour.
Detailed Assessment August 2004	Extension of city centre AQMA for NO_2 and inclusion of predicted exceedances of 1-hour objective on Market Street. City Centre AQMA declared for PM_{10} due to predicted exceedances of the 2010 annual mean objective. Concluded emissions from Aberdeen Harbour do not cause exceedances of objectives, but contribute to elevated levels of NO_2 and PM_{10} on Market Street and Guild Street areas.
Progress Report 2005	Update of monitoring results and new developments.
Updating and Screening Assessment July 2006	Update of monitoring results and new developments.
Air Quality Action Plan July 2006	Detailed measures to improve air quality in the AQMA.
Progress Report June 2007	Detailed Assessment of NO_2 and PM_{10} recommended on Wellington Road, Anderson Dr/Haudagain roundabout/Auchmill Rd corridor and King Street.
Detailed Assessment March 2008	AQMAs declared November 2008 on Anderson Drive/Haudagain roundabout and Wellington Rd (Queen Elizabeth II Bridge – Balnagask Rd) due predicted exceedances of NO_2 and 2010 PM_{10} annual mean objectives.
Progress Report May 2008	Update of monitoring results and new developments and progress on implementation of the Air Quality Action Plan.
Updating and Screening Assessment July 2009	Update of monitoring results. Recommended additional NO_2 diffusion tubes at potential areas of exceedances. Modelling of City Centre PM_{10} and NO_2 recommended to support proposed new Action Plan.
City Centre modelling study March 2010	City Centre modelling predicted widespread exceedances of annual mean PM_{10} objective and minor potential areas of exeedances of the NO_2 annual mean objective outwith the AQMA.
Progress Report July 2010	Update of monitoring results and progress in the development of a new Air Quality Action Plan covering the 3 AQMAs.
Progress Report June 2011	Update of monitoring results, extension of City Centre and Anderson Drive/Haudagain roundabout AQMAs and amendment of City Centre AQMA to include exceedance of the 1 hour NO_2 objective.

Table 1.2 Summary of Air Quality Reports and Outcomes - Continued

Report	Outcomes
Air Quality Action Plan March 2011	Detailed measures to improve air quality across the 3 AQMAs.
Updating and Screening Assessment July 2012	Update of monitoring results and planning developments. Assessment of emissions from Aberdeen Harbour.
Action Plan Progress Report January 2013	Update of progress in the Action Plan implementation, including specific indicators and trend analysis.
Progress report September 2013	Update of monitoring results. Additional diffusion tubes will be located near sensitive receptors along the route of the proposed 3rd Don Crossing

Figure 1.1: Map of City Centre AQMA

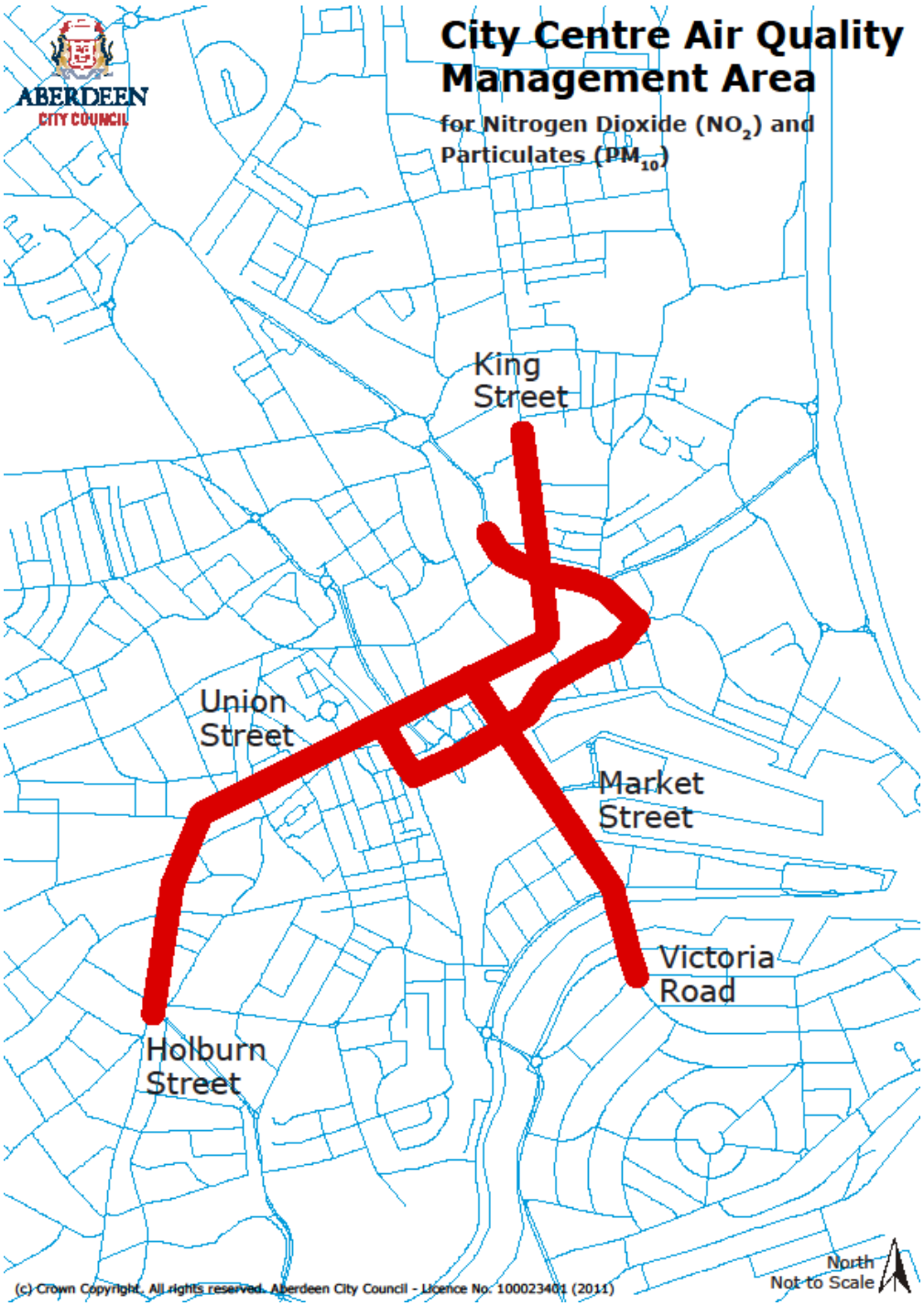


Figure 1.2: Map of Anderson Drive/Haudagain roundabout/Auchmill Road AQMA

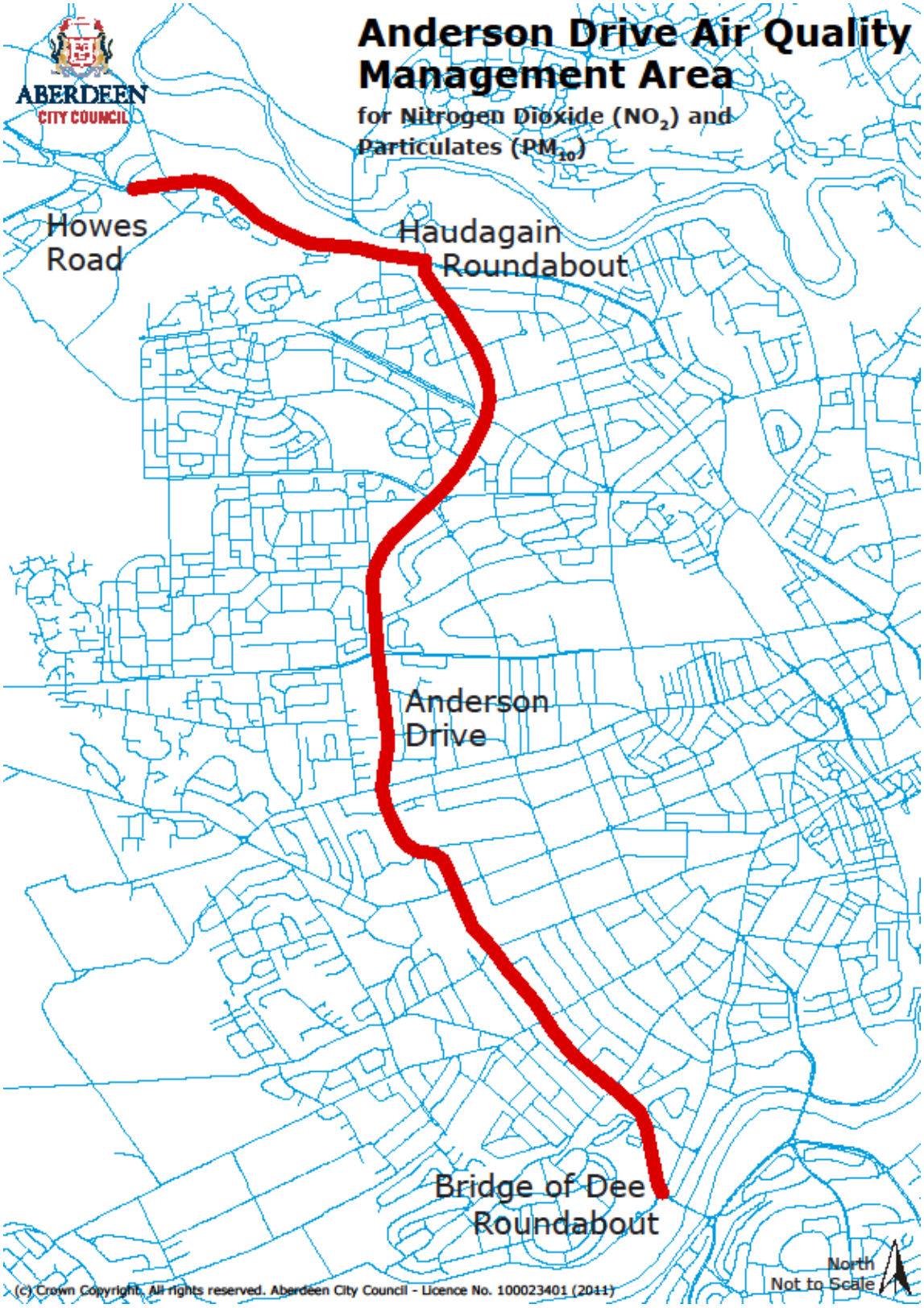
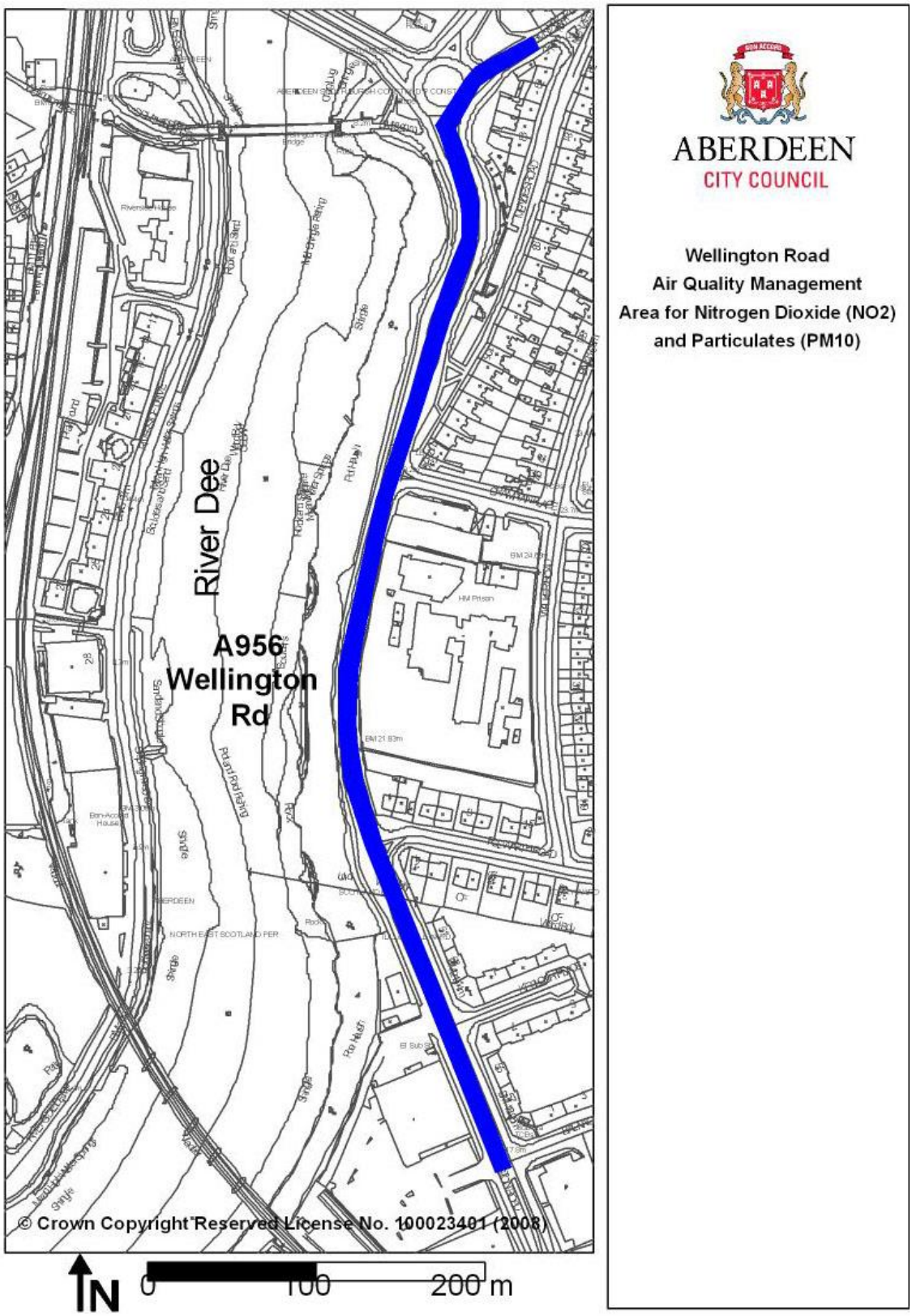


Figure 1.3: Map of Wellington Road AQMA



2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

There are 6 continuous monitoring sites in Aberdeen. Details of pollutants monitored, equipment types and site locations are described in Table 2.1. Figure 2.1 shows the site locations. QA/QC procedures are detailed in Appendix A.

The Market St site required to be removed in October 2008 due to the construction of the adjacent Union Square retail park. A new site at the junction of Market Street/Poynernook Road commenced collecting data in July 2009.

The Market St TEOM was replaced with a BAM in March 2010 and a replacement NOx analyser installed in April 2010. The Union Street NOx analyser was replaced in February 2012 due to recurrent technical problems during 2011.

Figure 2.1 Map of Automatic Monitoring Sites

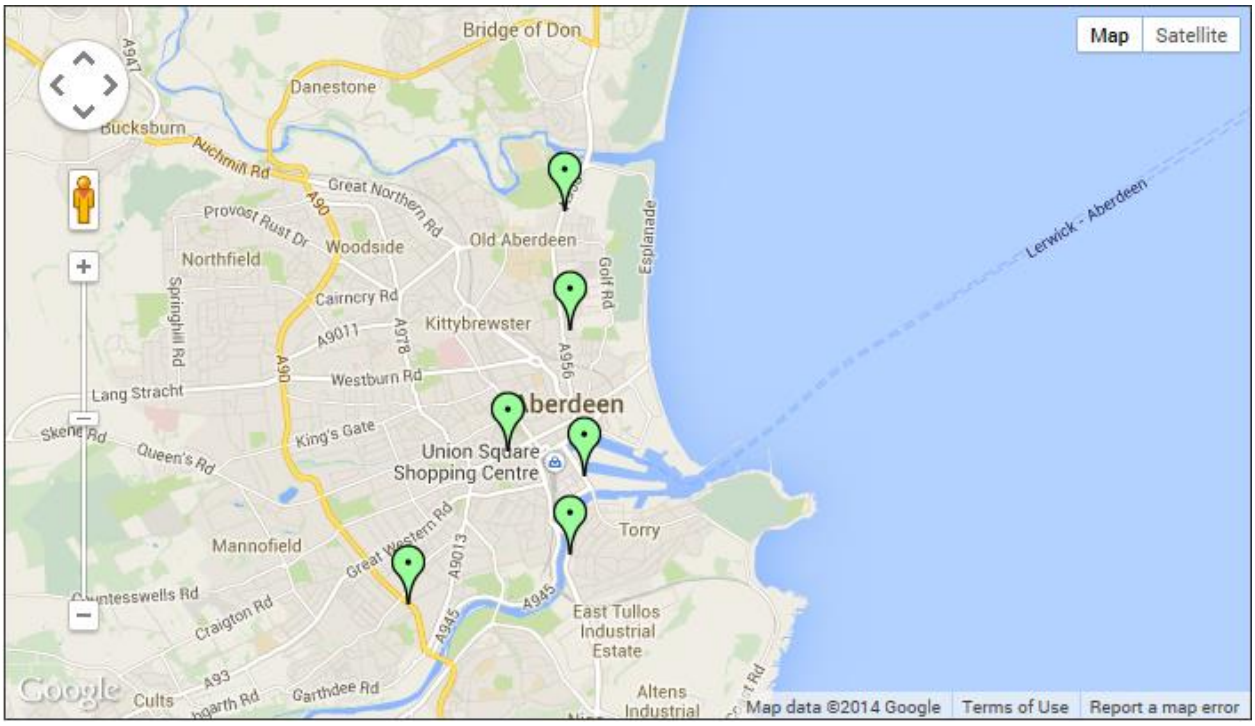


Table 2.1 Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Inlet Height (m)	Pollutants Monitored	In AQMA?	Monitoring Technique	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
CM1	Errol Place	Background	X394397	Y807392	7.0	PM_{10}, $PM_{2.5}$, O_3, NO_2 (NO, NO_x)	N	FDMS Chemiluminescence	N/A	N/A	N
CM2	Union Street	Roadside	X393656	Y805967	1.5	PM_{10}, NO_2 (NO, NO_x)	Y	TEOM Chemiluminescence	Y(2m)	2m	Y
CM3	Market Street	Roadside	X394560	Y805677	1.5	PM_{10}, NO_2 (NO, NO_x)	Y	BAM Chemiluminescence	Y(0m)	2m	N
CM4	Anderson Drive	Roadside	X392506	Y804186	1.5	PM_{10}, NO_2 (NO, NO_x)	Y	TEOM Chemiluminescence	Y(10m)	6m	N
CM5	Wellington Road	Roadside	X394395	Y804779	1.5	PM_{10}, NO_2 (NO, NO_x)	Y	TEOM Chemiluminescence	Y(5m)	4m	Y
CM6	King Street	Roadside	X394333	Y808770	1.5	PM_{10}, NO_2 (NO, NO_x)	n	BAM Chemiluminescence	Y(10m)	3m	N

2.1.2 Non-Automatic Monitoring Sites

Levels of nitrogen dioxide are also monitored across the city via diffusion tubes attached to lampposts and downpipes. Tube details and locations and are listed in Table 2.2. The diffusion tubes provide an indication of longer-term average NO_2 concentrations and highlight areas of high NO_2 concentrations. Tubes are co-located in triplicate at all the continuous monitoring sites detailed in Table 2.1 to enable the bias adjustment of the city wide survey. Duplicate tubes are also co-located at several city centre sites. Table 2.2 provides details of diffusion tube monitoring sites.

Table 2.2 Details of Non- Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
DT1	Bucksburn Primary Sch, Inverurie Road	Roadside	389744	809575	2.5	NO_2	Y	N	Y (façade)	8m	N
DT2	885 Gt Northern Rd	Roadside	391167	809161	2.5	NO_2	Y	N	Y (11m)	3m	Y
DT3	549 N Anderson Dr	Roadside	391394	808949	2.5	NO_2	Y	N	Y (17m)	3m	Y
DT4	38 Ellon Rd	Roadside	394652	809714	2.5	NO_2	N	N	Y(7m)	3m	Y
DT5	520 King St	Roadside	394236	808066	2.5	NO_2	N	N	Y(9m)	0.1m	N
DT6	86 Victoria Rd, Torry	Roadside	394764	805197	2.5	NO_2	N	Y	Y(façade)	3m	Y
DT7	Wellignton Rd//Kerloch Pl	Roadside	394411	804407	2.5	NO_2	Y	N	Y(façade)	3m	Y
DT8	107 Anderson Dr	Roadside	392337	804340	2.5	NO_2	Y	N	Y(14m)	3m	Y
DT9	31 Market St	Roadside	394258	806157	2.5	NO_2	Y	N	Y(façade)	3m	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
DT10	184/192 Market St	Roadside	394530	805708	2.5	NO_2	Y	N	Y(façade)	3m	Y
DT11	105 King St	Roadside	394406	806637	2.5	NO_2	Y	N	Y(façade)	3m	Y
DT12	40 Union St	Roadside	394284	806284	2.5	NO_2	Y	N	Y(façade)	3m	Y
DT13	Music Hall, Union St	Roadside	393777	806030	2.5	NO_2	Y	N	Y(façade)	6m	Y
DT14	Dyce Prim, Gordon Ter	Urban background	389046	812794	2.5	NO_2	N	N	Y(N/A)	N/A	N
DT15	Northfield swimming pool	Urban background	390801	808132	2.5	NO_2	N	N	Y(N/A)	N/A	N
DT16	Guild St/Market St	Roadside	394336	806097	2.5	NO_2	Y	N	Y(facade)	5m	Y
DT17	43/45 Union St	Roadside	394294	806266	2.5	NO_2	Y	N	Y(façade)	3m	Y
DT18	14 Holburn St	Roadside	393305	805734	2.5	NO_2	Y	N	Y(façade)	3m	Y
DT19	468 Union St	Roadside	393386	805826	2.5	NO_2	Y	N	Y(façade)	3m	Y
DT20	212 King St	Roadside	394400	806842	2.5	NO_2	N	N	Y(façade)	4m	N

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
DT21	26 King St	Roadside	394449	806453	2.5	NO_2	Y	N	Y(façade)	4m	Y
DT22	104 King St	Roadside	394425	806634	2.5	NO_2	Y	N	Y(façade)	4m	Y
DT23	785 Gt Northern Rd	Roadside	391458	809102	2.5	NO_2	N	N	Y(façade)	3m	Y
DT24	40 Auchmill Rd	Roadside	389913	809603	2.5	NO_2	N	Y	Y(facade)	3m	Y
DT25	21 Holburn St	Roadside	393332	805748	2.5	NO_2	Y	N	Y(façade)	3m	Y
DT26	147 Holburn St	Roadside	393214	805367	2.5	NO_2	N	N	Y(façade)	3m	N
DT27	80 Holburn St	Roadside	393233	805565	2.5	NO_2	Y	N	Y(façade)	3m	Y
DT28	61 Holburn St	Roadside	393275	805624	2.5	NO_2	Y	N	Y(5m)	3m	Y
DT29	469 Union St	Roadside	393400	805811	2.5	NO_2	Y	N	Y(façade)	3m	Y
DT30	209 Union St	Roadside	393795	806009	2.5	NO_2	Y	N	Y(façade)	5m	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
DT31	249 Union St	Roadside	393170	805120	2.5	NO_2	Y	N	Y(façade)	5m	Y
DT32	Willowbank Rd/Albury Rd	Roadside	393642	805503	2.5	NO_2	N	N	Y(5m)	3m	N
DT33	East North St	Roadside	394505	806529	2.5	NO_2	Y	N	Y(façade)	4m	Y
DT34	404 King Street	Roadside	394317	807527	2.5	NO_2	N	N	Y(façade)	9m	N
DT35	Riverside House, Riverside Drive	Roadside	39425	804873	2.5	NO_2	N	N	Y(façade)	6m	N
DT36	115 Menzies Rd/Wellington Rd	Roadside	394403	804799	2.5	NO_2	Y	N	Y(12m)	1m	Y
DT37	137 Wellington Road	Roadside	394697	803735	2.5	NO_2	N	N	Y(17m)	14m	N
DT38	Wellington Road / 4 Nigg Kirk Road	Roadside	394719	803329	2.5	NO_2	N	N	Y(7m)	3m	N
DT39	819 Gt Northern Rd	Roadside	391293	809136	2.5	NO_2	Y	N	Y(façade)	3m	Y
DT40	852 Fullerton Ct (facade)	Facade	391353	809158	2.5	NO_2	Y	N	Y(façade)	7m	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
DT41	852 Fullerton Ct (roadside)	Roadside	391352	809151	2.5	NO_2	Y	N	Y(7m)	0.1m	Y
DT42	248 George St	Roadside	393868	806741	2.5	NO_2	N	N	Y(façade)	2m	N
DT43	25 Rosemount Pl	Roadside	393424	806685	2.5	NO_2	N	N	Y(3m)	3m	N
DT44	214 Rosemount Pl	Roadside	392897	806352	2.5	NO_2	N	N	Y(façade)	3m	N
DT45	111 S Anderson Dr	Facade	392311	804349	2.5	NO_2	Y	N	Y(façade)	13m	N
DT46	West North Street	Roadside	394277	806671	2.5	NO_2	Y	N	Y(façade)	4m	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

The Union Street and Market Street continuous monitoring sites are on busy city centre roads and are representative of population exposure for NO_2. Union Street is the city's main shopping street with shops on the ground level and commercial premises and flats on the 1st, 2nd and 3rd floors. Almost all of the city's bus routes pass along at least part of Union Street and the inside lane of both sides of the road are designated bus lanes. Market Street is adjacent to Aberdeen Harbour and has a high proportion of HGV's travelling between the north-east of Scotland, the Harbour and locations to the south of Aberdeen. The street is used by pedestrians travelling to the city centre from residential properties to the south of the river Dee, visiting the new Union Square retail park and people working around the Harbour area. There are a small number of 1st, 2nd and 3rd floor flats. Emissions from Aberdeen Harbour also contribute to the pollution on Market Street.

The Anderson Drive site is 4m from the kerb and is not representative of population exposure as residential properties are set back 10-20m from the kerb. Similarly the site at Wellington Road is around 3-4m closer to the kerb than residential properties in the area. The nearest properties are 10m from the King Street site, however the location is typical of flatted properties close to the kerb at other locations on King Street. Errol Place is representative of typical residential properties close to the city centre but not adjacent to a major road.

Diffusion tubes on Market Street, Union Street and the majority of those on Holburn Street and King Street within the city centre are at building façade and are representative of population exposure. Some of the tubes outwith the city centre are at roadside locations with the façade of the nearest relevant property 5-20m back from the roadside. Procedures within LAQM.TG(09) have been used to estimate the concentration at the nearest receptor where appropriate.

2.2.1 Nitrogen Dioxide (NO_2)

Automatic Monitoring Data

Table 2.3 shows the annual mean NO_2 concentrations at the automatic continuous monitoring stations for NO_2 from 2009-2013.

The annual mean concentration at Errol Place is a best estimate due to valid data capture being less than 75%. The data is not "annualised" in accordance with LAQM.TG(09) due to the lack of other local background continuous monitoring sites. The annual mean of 20 μgm^{-3} from the 45% valid data captured is slightly less than the period 2008 to 2012. The trend is similar to other automatic sites in Aberdeen in 2013 and the concentration is considered to be representative for the year.

Concentrations at Union Street, Market Street and Wellington Road continue to exceed the annual mean objective. At Errol Place, Anderson Drive and King Street concentrations are well below the objective. The Anderson Drive AQMA was declared due to predicted exceedances of the annual mean objective at locations elsewhere along the Anderson Drive/Haudagain roundabout corridor. Errol Place and King Street are outwith the AQMAs.

Trends in the annual mean concentration are shown in Figure 2.2. Concentrations at Errol Place, Market Street and King Street were similar to previous years. At Anderson Drive the annual mean decreased by 8 μgm^{-3} compared to 2012 and is similar to concentrations pre 2012.

There was a $5ugm^{-3}$ decrease in the annual mean concentration at Union Street compared to 2012. The level of 48 μgm^{-3} is the lowest measured since 2009 (2011 data unlikely to be representative of the annual mean concentration – refer to 2013 report).

The annual mean at Wellington Road was similar to the 2010 and 2011 values and significantly lower than the 2012 concentration.

Table 2.4 shows the number of exceedances of the 1-hour objective at the automatic monitoring sites. The hourly NO_2 objective was met at all sites objective ($200\mu g/m^3$ – not to be exceeded more than 18 times per year).

Union Street had one exceedance of the objective and Wellington Road had six exceedances. This observation at Wellington Road is consistent with the decreased annual mean level. There were no exceedances recorded at the other sites.

Table 2.3 Results of Automatic Monitoring for NO_2: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % [a]	Valid Data Capture 2013 % [b]	Annual Mean Concentration (µg/m^3)				
					2009 [c]	2010 [c]	2011 [c]	2012 [c]	2013 [c]
CM1	Urban Background	N		45	26	21	23	21	(20)[d]
CM2	Roadside	Y		100	**56**[c]	**59**	**44**	**53**	**48**
CM3	Roadside	Y		89.8	38[c]	**44**	**40**	**44**	**43**
CM4	Roadside	Y		94	24	27	23	30	22
CM5	Roadside	Y		91.5	**43**	**52**	**51**	**59**	**52**
CM6	Roadside	N		95.1	32	29	32	29	28

In bold, exceedence of the NO_2 annual mean AQS objective of 40µg/m^3

[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

[c] Data has been seasonally adjusted in provide “annualised” data using procedures within PG(09), where monitoring was not carried out for the full year.

[d] Best estimate - Measured mean concentration due to valid data capture less than 75%.

Figure 2.2 Trends in Annual Mean NO_2 Concentrations Measured at Automatic Monitoring Sites

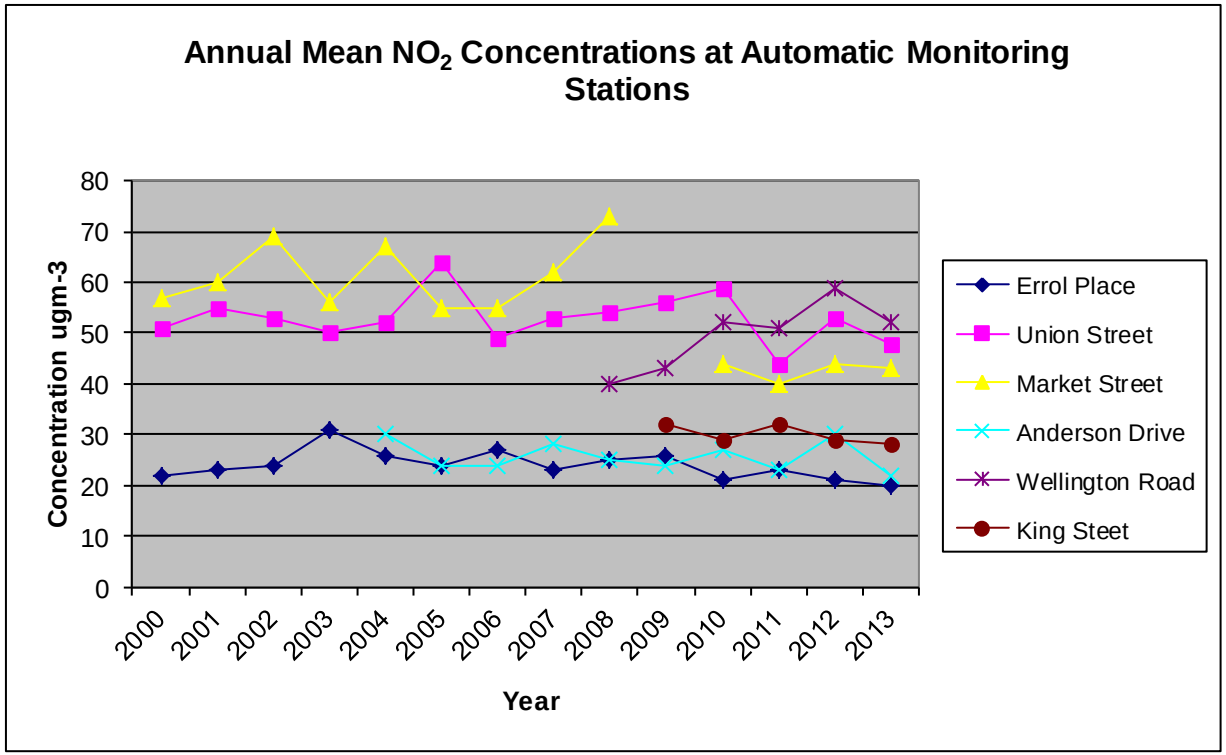


Table 2.4 Results of Automatic Monitoring for NO_2: Comparison with 1-hour Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % [a]	Valid Data Capture 2013 % [b]	Number of Hourly Means > 200µg/m^3				
					2009 [c]	2010 [c]	2011 [c]	2012 [c]	2013 [c]
CM1	Urban Background	N		45	0	0(101)	0	0	0 (86)
CM2	Roadside	Y		100	10(190)	17(202)	6(168)	1	0
CM3	Roadside	Y		89.8	2(175)	0(157)	1	0	1
CM4	Roadside	Y		94	0	0(111)	0	0	0
CM5	Roadside	Y		91.5	0	1	4	10	6
CM6	Roadside	N		95.1	0	0	0	0(108.4)	0

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

[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

[c] If the data capture for full calendar year is less than 90%, the 99.8th percentile of hourly means is provided in brackets

Diffusion Tube Monitoring Data

Table 2.5 details the results of the diffusion tube monitoring. Tubes have been bias adjusted using the methodology described in LAQM.TG(09). Details on the bias factors and adjustment calculations are in Appendix A.

Uncorrected 4-weekly diffusion tube data, bias adjustment calculations and calculations to correct to façade where appropriate are shown in Tables B1-B3 in Appendix B.

The majority of diffusion tubes within the City Centre AQMA continued to exceed the annual mean objective. Concentrations greater than 60ugm^{-3} were recorded at several sites indicating a risk of exceedance of the 1-hour objective.

The AQMA was extended in 2011 to include Victoria Road, Torry and West North Street as a result of previous measured exceedances at Victoria Road and modelling carried out in 2010. The concentration at the Victoria Rd site was below the objective in 2013, but marginally exceeded the objective in 2012. Monitoring at West North Street commenced in autumn 2011. The annual mean objective both in 2012 and 2013 was well below the objective. Measurements over the next couple years will indicate whether the modelling over estimated concentrations at this location. Bias adjustment concentrations at the majority of City Centre sites were generally lower in 2013 compared to 2012.

Concentrations at several sites within both the Wellington Road and Anderson Dr/Haudigan roundabout/Auchmill Road AQMAs exceeded the annual mean objective but were generally lower than 2012 levels and suggest pockets of exceedances across the AQMAs.

Outwith the AQMAs concentrations at the sites were below the objective. The site at 38 Ellon Road exceeded the objective for the first time in 2011 however compliance was achieved in 2012 and 2013. The 2013 concentration was lower than the concentration in 2012.

Table 2.5 Results of NO_2 Diffusion Tubes 2013

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2013 (Number of Months or %) [a]	2013 Annual Mean Concentration (µg/m^3) - Bias Adjustment factor RD = 0.894 [b] UB = 0
DT1	Bucksburn Primary Sch, Inverurie Road	Roadside	Y	Single	9	31.6
DT2	885 Gt Northern Rd	Roadside	Y	Single	10	**42**[b]
DT3	549 N Anderson Dr	Roadside	Y	Single	10	27.5[b]
DT4	38 Ellon Rd	Roadside	N	Single	10	34.8[b]
DT5	520 King St	Roadside	N	Co-located	10	28.4[b]
DT6	86 Victoria Rd, Torry	Roadside	N	Co-located	11	34.4
DT7	Wellington Rd//Kerloch Pl	Roadside	Y	Single	9	**46.3**
DT8	107 Anderson Dr	Roadside	Y	Single	8	39.1[a,b]
DT9	31 Market St	Roadside	Y	Co-located	10	**57.6**
DT10	184/192 Market St	Roadside	Y	Co-located	12	**70.4**
DT11	105 King St	Roadside	Y	Co-located	12	**64.7**
DT12	40 Union St	Roadside	Y	Co-located	10	**54.3**
DT13	Music Hall, Union St	Roadside	Y	Co-located	12	**43.4**
DT14	Dyce Prim, Gordon Ter	Urban background	N	Single	11	12.9[c]
DT15	Northfield swimming pool	Urban background	N	Single	11	14.5[c]

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2013 (Number of Months or %) [a]	2013 Annual Mean Concentration (µg/m^3) - Bias Adjustment factor RD = 0.894 [b] UB = 0
DT16	Guild St/Market St	Roadside	Y	Co-located	11	**52.3**
DT17	43/45 Union St	Roadside	Y	Co-located	12	**58.2**
DT18	14 Holburn St	Roadside	Y	Co-located	12	**50.1**
DT19	468 Union St	Roadside	Y	Co-located	12	**54.9**
DT20	212 King St	Roadside	N	Co-located	12	35.8
DT21	26 King St	Roadside	Y	Co-located	12	**44.5**
DT22	104 King St	Roadside	Y	Co-located	12	**51.1**
DT23	785 Gt Northern Rd	Roadside	N	Single	11	27.6[b]
DT24	40 Auchmill Rd	Roadside	N	Single	6	39.8[a]
DT25	21 Holburn St	Roadside	Y	Single	11	**40.5**
DT26	147 Holburn St	Roadside	N	Single	11	31.7
DT27	82 Holburn St	Roadside	Y	Co-located	8	31.6[a]
DT28	61 Holburn St	Roadside	Y	Co-located	12	**40.5**[b]
DT29	469 Union St	Roadside	Y	Co-located	11	**63.3**[b]
DT30	209 Union St	Roadside	Y	Single	11	**56.1**
DT31	249 Union St	Roadside	Y	Co-located	11	37.2
DT33	East North St	Roadside	Y	Co-located	11	**51**
DT34	404 King Street	Roadside	N	Co-located	12	33.9
DT36	115 Menzies Rd/Wellington Rd	Roadside	Y	Co-located	10	**43.4**[b]
DT37	137 Wellington Road	Roadside	N	Single	11	30.9[b]
DT39	819 Gt Northern Rd	Roadside	Y	Single	9	**63.8**

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2013 (Number of Months or %) [a]	2013 Annual Mean Concentration (µg/m^3) - Bias Adjustment factor RD = 0.894 [b] UB = 0
DT40	852 Fullerton Ct (facade)	Facade	Y	Single	11	36.6
DT41	852 Fullerton Road (roadside)	Roadside	Y	Single	10	25.4[b]
DT45	111 S Anderson Dr	Facade	Y	Single	11	37.1
DT46	West North Street	Roadside	Y	Single	10	33

In bold, exceedence of the NO_2 annual mean AQS objective of 40µg/m^3

Underlined, annual mean > 60µg/m^3, indicating a potential exceedence of the NO_2 hourly mean AQS objective

[a] Although collection is <75% data has not been annualised in accordance with LAQM.TG(09) since the periods of data collection was sporadic over the 12 month period.

[b] Concentrations at nearest relevant receptor have been estimated using the "NO2 fall-off with distance calculator" described in LAQM.TG.(09) and are discussed in section Appendix B.

[c] data not bias adjusted due to lack of continuous UB data.

Monitoring at Site ID DT32, DT35, DT38, DT42 to DT44 ceased in September 2011 as sites consistently recorded levels below the annual mean objective.

Table 2.6 Results of NO_2 Diffusion Tubes (2009 to 2013)

Site ID	Site Type	Within AQMA?	Annual Mean Concentration (µg/m^3) – Adjusted for Bias				
			2009 (Bias Adjustment Factor = RD 0.89, UB 0.74)	2010 (Bias Adjustment Factor = nearest site 0.76-1.0))	2011 (Bias Adjustment Factor = RD 0.864, UB 0.67)	2012 (Bias Adjustment Factor = RD 0.898. UB 0.78)	2013 (Bias Adjustment Factor = RD 0.894, UB 0)
DT1	Roadside	Y	33	37	33	34	31.6
DT2[b]	Roadside	Y	**41**	39	**41**	40	42
DT3[b]	Roadside	Y	27	30	28	29	27.5
DT4[b]	Roadside	N	38	31	**40**	37	34.8
DT5[b]	Roadside	N	30	31	30	29	28.4
DT6	Roadside	Y	34	**41**	33	**41**	34.4
DT7	Roadside	Y	**43**	**45**	**45**	**42**	**46.3**
DT8[b]	Roadside	Y	**42**	**42**	**42**	**46**	39.1[a]
DT9	Roadside	Y	**55**	**63**	**52**	**59**	**57.6**
DT10	Roadside	Y	**64**	**76**	**64**	**71**	**70.4**
DT11	Roadside	Y	**67**	**66**	**63**	**62**	**64.7**
DT12	Roadside	Y	**53**	**62**	**51**	**57**	**54.3**
DT13	Roadside	Y	**45**	**57**	**42**	**48**	**43.4**
DT14	Urban background	N	11	13	9	10	12.9[c]
DT15	Urban background	N	13	18	11	13	14.5[c]
DT16	Roadside	Y	**53**	**63**	**46**	**54**	**52.3**
DT17	Roadside	Y	**54**	**61**	**55**	**54**	**58.2**
DT18	Roadside	Y	**53**	**67**	**55**	**61**	**50.1**
DT19	Roadside	Y	**55**	**68**	**54**	**61**	**54.9**
DT20	Roadside	N	36	38	37	36	35.8
DT21	Roadside	Y	**44**	**46**	**43**	**43**	**44.5**
DT22	Roadside	Y	**47**	**52**	**48**	**49**	**51.1**
DT23[b]	Roadside	N	32	36	32	33b	27.6

Site ID	Site Type	Within AQMA?	Annual Mean Concentration (µg/m^3) – Adjusted for Bias				
			2009 (Bias Adjustment Factor = RD 0.89, UB 0.74)	2010 (Bias Adjustment Factor = nearest site 0.76-1.0))	2011 (Bias Adjustment Factor = RD 0.864, UB 0.67)	2012 (Bias Adjustment Factor = RD 0.898. UB 0.78)	2013 (Bias Adjustment Factor = RD 0.894, UB 0)
DT24	Roadside	N	39	**44**	**41**	**47**	39.8[a]
DT25	Roadside	Y	**49**	**55**	**47**	**55**	**40.5**
DT26	Roadside	N	35	38	31	33	31.7
DT27	Roadside	Y	38	38	31	33	31.6[a]
DT28[b]	Roadside	Y	**38**	**44**	38	**44b**	**40.5**
DT29	Roadside	Y	**65**	***65***	**63**	**56**	**63.3**
DT30[b]	Roadside	Y	**57**	**62**	**57**	**55**[c]	**56.1**
DT31	Roadside	Y	36	**41**	35	38	37.2
DT32	Roadside	N	21	27	27	N/A	N/A
DT33	Roadside	Y	**53**	**53**	**51**	**52**	**51**
DT34	Roadside	N	**40**	33	35	33	33.9
DT35	Roadside	N	28	30	27	N/A	N/A
DT36[b]	Roadside	Y	**44**	**42**	31	**48**	**43.4**
DT37[b]	Roadside	N	32	32	31	36	30.9
DT38[b]	Roadside	N	31	33	31	N/A	N/A
DT39	Roadside	Y	**54**	**55**	**55**	**69**[a]	**63.8**
DT40	Roadside	Y	36	**40**	36	36	36.6
DT41[b]	Roadside	Y	29	28	22	30	25.4
DT42	Roadside	N	34[a]	38[a]	35	N/A	N/A
DT43[b]	Roadside	N	30[a]	32[a]	28	N/A	N/A
DT44	Roadside	N	26[a]	30[a]	26	N/A	N/A
DT45	Roadside	Y	N/A	32	29	36	37.1
DT46	Roadside	Y	N/A	N/A	N/A	30	33

In bold, exceedence of the NO_2 annual mean AQS objective of 40µg/m^3

Underlined, annual mean > 60µg/m^3, indicating a potential exceedence of the NO_2 hourly mean AQS objective

[a] Although collection is <75% data has not been annualised in accordance with LAQM.TG(09) since the periods of data collection was sporadic over the 12 month period.

[b] Concentrations at nearest relevant receptor have been estimated using the "NO2 fall-off with distance calculator" described in LAQM.TG.(09) and are discussed in section Appendix B.

[c] data not bias adjusted due to lack of continuous UB data.

Monitoring at Site ID DT32, DT35, DT38, DT42 to DT44 ceased in September 2011 as sites consistently recorded levels below the annual mean objective.

2.2.2 Particulate Matter (PM_{10})

The Union Street and Market Street continuous monitoring locations are representative of population exposure for PM_{10} due to the proximity of flats in the area. Anderson Drive and Wellington Road are both closer to the kerb than the façade of the nearest residential properties and are not representative of population exposure. The nearest properties are 10m from the King Street site, however the location is typical of flatted properties close to the kerb at other locations on King Street. Errol Place is representative of typical residential properties close to the city centre but not adjacent to a major road.

Tables 2.7 and 2.8 show the annual mean and number of exceedances of the 24 hour objective for PM_{10} obtained from the continuous monitoring sites over the period 2009-2013. All data was ratified by AEA Technology. TEOM and BAM data from 2009 has been corrected to gravitational equivalent by AEA Technology using the procedures described in Appendix A

The annual mean objective was exceeded at Market Street, Union Street, Wellington Road and King Street continuous monitoring sites. Concentrations were below the objective at Errol Place and Anderson Drive.

King Street has exceeded the annual mean objective by $1ugm^{-3}$ since 2011. The King Street site is outwith the existing AQMAs. During 2012 it became apparent that the BAMs at both Market Street and King Street were recording significantly elevated levels during prolonged periods of wet weather or sea mist in the area.

Market Street recorded exceptionally high annual mean PM_{10} concentrations and daily exceedances of the air quality objective. Meteorological data strongly suggests that the predominate cause of the high levels was unusual local climatic conditions, particularly during March and April 2013.

The Market Street site is located at the coast with Aberdeen Harbour directly to the east. It is therefore particularly influenced by easterly winds and on-shore breezes that may be accompanied by foggy/misty conditions.

Around late February/early March Aberdeen experienced a prolonged period of high pressure with light winds and dry, bright conditions. This was followed by damp, misty weather and south easterly winds, lasting several days. Exceedances of the daily objective were evident at four of the City's continuous monitoring stations at this time, but most particularly at Market Street due to its coastal location. Unusually, easterly winds prevailed for much of March 2013 with occasional snow showers followed by a period of dry, bright weather with light east winds in early April. Raised levels were also evident at Wellington Road at this time. Resuspended dust/salt may be one possible contributor to the raised concentrations during this period. Interestingly, both Wellington Road and Market Street have a high HGV flow compared to other sites.

East winds accompanied by misty/foggy conditions can also explain concentration peaks evident in July, August and October 2013. Although Market Street has been fitted with a heat exchanger to reduce the influence of moisture on the BAM, it has

been noted that levels at both this site, and King Street, may be raised during prolonged periods of damp weather. It was not possible to install a heat exchanger at the King Street site due to the BAM model type.

Figure C1 in Appendix C illustrates PM_{10} concentration bandings against wind direction by month at Market Street in 2013. Figure C2 provides a plot of PM10 at Market Street against wind direction and speed during 2013. The plots used meteorological data from Aberdeen Airport which is located 7km north west of the Harbour and less influenced by on costal effects. The link between weather conditions and PM_{10} concentrations is clearly evident.

Annual Average daily flow data collated by Transport Scotland showed a marginal increase in vehicles in 2013 compared to 2012. The increase is unlikely to be a significant factor in the increases in annual mean and daily exceedences air quality objective seen for 2013.

The trend at the Errol Place monitoring site suggests the annual mean background concentration has remained steady at around 13 μgm^{-3}. Concentrations at Anderson Drive and Wellington Road and Union Street have also remained steady over the period 2009-2013.

The 24-hour objective was met at Errol Place, Union Street, Anderson Drive, King Street and Wellington Road.

Table 2.7 Results of Automatic Monitoring for PM_{10}: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % [a]	Valid Data Capture 2013 % [b]	Confirm Gravimetric Equivalent (Y or N/A)	Annual Mean Concentration (µg/m^3)				
						2009	2010	2011	2012	2013
CM1	Urban Background	N		89	N/A	15	13	14	12	13
CM2	Roadside	Y		97	Y	**18**	**18**	**22**	**21**	**20**
CM3	Roadside	Y		94.6	Y	**28**[c]	**22** [c]	**22**	**23**	**35**
CM4	Roadside	Y		97	Y	15	14	16	15	15
CM5	Roadside	Y		97	Y	**23**	**22**	**24**	**23**	**22**
CM6	Roadside	N		91.2	Y	17	18	**19**	**19**	**19**

In bold, exceedence of the PM_{10} annual mean AQS objective of 18µg/m^3

[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

[c] Data has been seasonally adjusted to provide “annualised” data using the Errol Place background site and procedures within TG(09).

Figure 2.3 Trends in Annual Mean PM_{10} concentrations measured at Automatic Sites 2009-2013

A trend chart providing PM_{10} annual mean results over the past 5 years

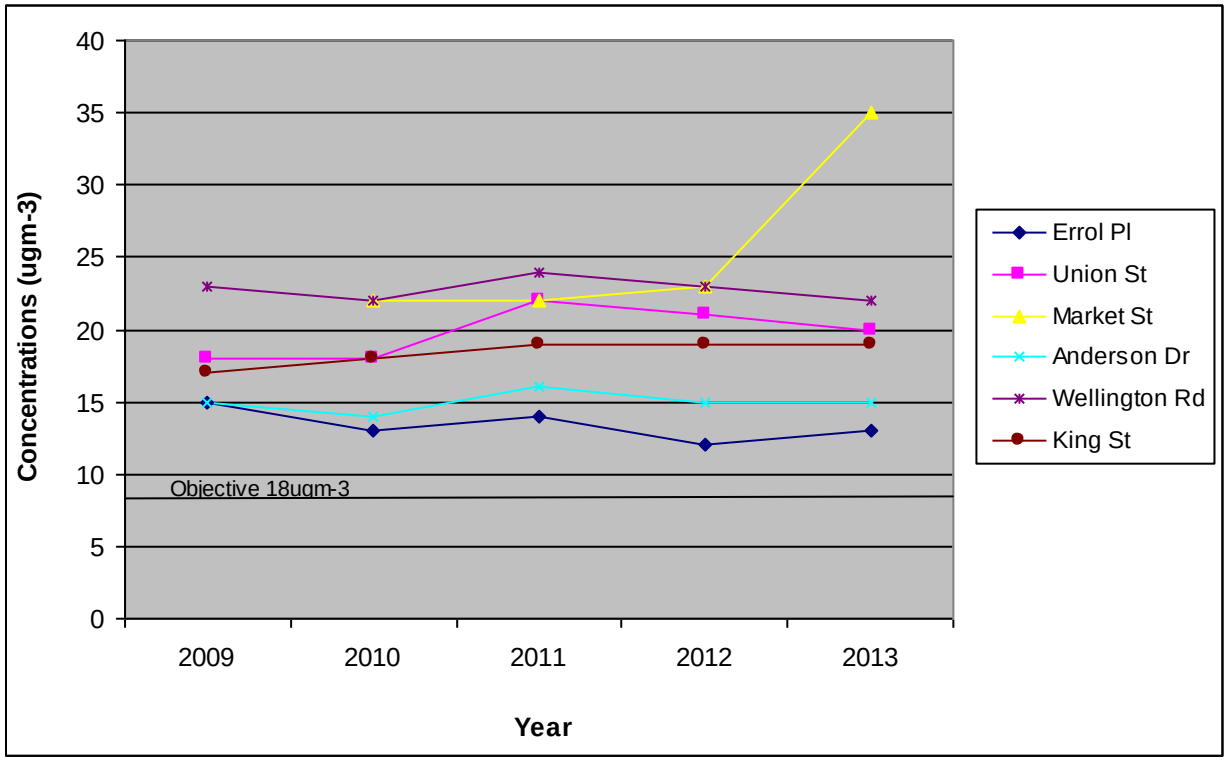


Table 2.8 Results of Automatic Monitoring for PM_{10}: Comparison with 24-hour Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % [a]	Valid Data Capture 2013 % [b]	Confirm Gravimetric Equivalent (Y or N/A)	Number of Daily Means > 50µg/m^3				
						2009 [c]	2010 [c]	2011 [c]	2012 [c]	2013 [c]
CM1	Urban Background	N		89	N/A	2	1	1	1	1 (42)
CM2	Roadside	Y		97	Y	1(39)	0	4	3	4
CM3	Roadside	Y		94.6	Y	148(170)	**6(53)**	**15**	**15(71.1)**	**59**
CM4	Roadside	Y		97	Y	0	0(32)	0	0	1
CM5	Roadside	Y		97	Y	3(46)	1	**8**	**10**	7
CM6	Roadside	N		91.2	Y	N/A	4	7(38)	6	4

In bold, exceedence of the PM_{10} daily mean AQS objective (50µg/m^3 – not to be exceeded more than 7 times per year)

[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

[c] data capture for full calendar year is less than 90%. The 98.1th percentile of 24-hour means is in brackets

2.2.3 Sulphur Dioxide (SO_2)

No monitoring of sulphur dioxide was carried out in 2013 as previous assessments did not predict a likelihood of exceedances of the objective and there has been no significant change in local emissions.

2.2.4 Benzene

No monitoring of benzene was carried out in 2013 as previous assessments did not predict a likelihood of exceedances of the objectives and there has been no significant change in local emissions.

2.2.5 Other Pollutants Monitored

$PM_{2.5}$

Monitoring of $PM_{2.5}$ at Errol Place commenced in February 2009 as part of the UK automatic urban network (AUN). The new objectives for $PM_{2.5}$ have not been incorporated into the LAQM regime and authorities are not required to review and assess air quality against the objectives. Table 2.9 shows the annual mean concentration from 2009-2012. These results indicate the $PM_{2.5}$ objective of 12ugm^{-3}, to be achieved by 2020, is likely to be met at urban background sites in Aberdeen. Concentrations have increased slightly over the 3-year monitoring period suggesting the target of a 15% reduction in concentrations at urban background sites, measured as a 3-year mean is unlikely to be met unless measures are adopted to reduce $PM_{2.5}$ concentrations.

Table 2.9 Results of $PM_{2.5}$ Automatic Monitoring: Comparison with the Annual Mean Objective

Year	Data Capture for Monitoring Period (%)	Annual Mean (ugm^{-3})
2009	60.6	7
2010	80.0	7
2011	90.8	8
2012	96.4	9
2013	83.0	9

Ozone

Monitoring of ozone is also carried out at Errol Place as part of the AURN. Concentrations of ozone are outwith the control of local authorities and hence ozone is not part of the Local Air Quality Management process. Action to reduce concentrations is a responsibility of the UK government and devolved administrations.

The national objective for ozone is a running 8-hour mean of 100ugm^{-3} not to be exceeded more than 10 times a year. Table 2.10 shows the annual mean concentration and number of exceedances of the 8-hour running mean at Errol Place over the period 2005-2013.

The annual mean has remained steady compared to previous years. Changes in ozone are reflective of meteorological conditions and the variable number of exceedance of the 8 hour objective over the monitoring period is likely to be attributable to the changeable weather.

Table 2.10 Results of Automatic Monitoring for Ozone: Comparison with the Annual Mean Objective

Year	Data Capture for Monitoring Period (%)	Annual Mean (ugm^{-3})	Number of exceedances of 8-hour objective
2005	99.0	50	26
2006	99.0	48	13
2007	98.5	48	2
2008	98.9	50	30
2009	94.4	42	1
2010	90.3	44	0
2011	96.0	42	38
2012	99.4	44	7
2013	88.0	47	0

2.2.6 Summary of Compliance with AQS Objectives

Aberdeen City Council has examined the results from monitoring in the district.

Concentrations still exceed the annual mean objective for NO_2 in the City Centre, Wellington Road, Anderson Drive (Haudagain roundabout/Auchmill Road) AQMAs. Diffusion tubes in the City Centre and Anderson Drive (Haudagain Roundabout/Auchmill Road) indicate a potential exceedence of the NO_2 hourly mean AQS objective. The AQMAs should remain valid.

Concentrations within both the City Centre and Wellington Road AQMAs still exceed the annual mean objective for PM_{10}. The City Centre AQMA (Market Street) exceeds the 24 hour PM_{10} objective.

Concentrations of both NO_2 and PM_{10} outside of the AQMA are all below the objectives at relevant locations with the exception of the annual mean PM_{10} objective at the King Street continuous monitoring station where the objective was marginally exceeded. Recorded measurements from BAM equipment may be elevated during periods of prolonged wet weather or sea mist resulting in a slightly elevated annual mean concentration at this location. A Detailed Assessment is not proposed at this time due to the uncertainty of data validity, however levels will continue to be monitored and the requirement for a Detailed Assessment assessed in future years.

3 New Local Developments

3.1 Road Traffic Sources

There are no significant road traffic sources since the 2012 Updating and Screening Assessment.

The main works in the construction of the Third Don Crossing commenced in September 2014 and are due to be completed by December 2015.

The main works in the construction of the Aberdeen Western Peripheral Route (AWPR) will commence in the latter part of 2014 with completion anticipated by 2018.

The AWPR will significantly improve air quality, particularly the Anderson Dr/Haudigain roundabout/Auchmill Road AQMA. The 3rd Don Crossing will also improve air quality at Ellon Rd near the existing bridge of the River Don where levels are currently close to the objective. Air quality assessments for both developments were discussed in previously Progress Reports.

3.2 Other Transport Sources

There are no new transport sources since the last Updating and Screening Assessment.

3.3 Industrial Sources

There are no new industrial installations, major fuel storage depots, petrol stations or poultry farms since the last Updating and Screening Assessment.

3.4 Commercial and Domestic Sources

There are no new biomass combustion plants since the last updating and screening assessment.

3.5 New Developments with Fugitive or Uncontrolled Sources

No potential new sources of fugitive or uncontrolled particulate matter were identified since the last Updating and Screening Assessment.

4 Local / Regional Air Quality Strategy

There is no local or regional Air Quality Strategy covering the Aberdeen area, however there are various City and Regional initiatives that consider air quality issues. These are described in Section 7.

5 Planning Applications

Table 5.1 provides information on planning applications that have the potential to impact on air quality.

Table 5.1: Planning Applications with Potential Air Quality Impact

Location	Application Approved	Development Description	Air Quality Impact
445-461 Union St./16 Justice Mill Lane & rear car park to 463 465, Union St, Aberdeen	**Yes - 9/1/14**	Demolition of existing hotel/public house/night club building and erection of new building consisting of office space at upper floor levels with lower floor level parking	ADMS- roads modelling carried out. Cumulative impact of development shown to have minimal impact on NO_2 and PM_{10} levels in city centre AQMA.
Shielhill Road, Mundurno Dubford Bridge of Don	Pending	Erection of 99 No. houses with associated car parking, landscaping and drainage.	DMRB assessment on traffic impact. Negligible increase in concentrations of NO2, PM10 and PM2.5. Concentrations predicted to remain well below objective levels.

6 Air Quality Planning Policies

The Aberdeen City and Shire Structure Plan was approved in August 2009 and set out the council's development policies over the next 25 years. No specific reference was made to air quality as these were issues considered in the Local Plan and Transport Strategy. The 2009 Structure Plan was reviewed in 2013 and an updated Proposed Aberdeen City and Shire Strategic Development Plan published for consultation on 22 February 2013. The Proposed Plan makes reference to improving air quality with regard to reducing the effect of transport on the environment, and makes reference to infrastructure projects which will assist in tackling traffic impacts. Partnership arrangements have been adopted with Aberdeenshire Council to account for major developments in Aberdeenshire that have the potential to impact significantly on traffic volumes in Aberdeen. This includes developer contributions to improve the transport network and, as a result, reduce the air quality impact. It is anticipated the Development Plan will be formally adopted in early 2014.

Aberdeen's Local Development Plan 2012 (LDP), including specific Air Quality Policy and associated Supplementary Guidance (SG), was formally adopted in February 2012. The LDP sets out the Council's proposals for development and how policy issues will be addressed up until 2023. The SG provides guidance on the way air quality will be dealt with through the planning process, when an air quality assessment will be required and what should be included. A review of the LDP and associated SG commenced in early 2014. Initial feedback of the SGs from an internal consultation generally indicated the air quality policy would be better placed within the transport section of the LDP to highlight the close links between transport and air quality. Development of the LDP and SG will continue in 2014. It is expected the Proposed Aberdeen Local Development Plan will be presented to Committee in late 2014, with the public consultation commencing early 2015.

The SG approved with the 2012 LDP does not contain any specific policy on biomass installations. A subsequent biomass policy was approved by the Council's Housing and Environment Committee in November 2011. The policy recommends that new biomass installations are not permitted in an AQMA or adjacent defined buffer zone unless it can be demonstrated that the change in the annual mean NO_2 or PM_{10} concentration will be negligible. Although the biomass policy does not have the same weighting as SGs in the planning process, it nonetheless clearly states the Council's position with regards to the provision of new biomass installations in locations where there is existing poor air quality. Inclusion of guidance on biomass installations will be included within the 2015 LDP supplementary guidance.

7 Local Transport Plans and Strategies

Nestrans Regional Transportation Strategy (RTS) covering Aberdeen and Aberdeenshire was approved by Ministers in 2008. A refresh of the Strategy undertaken in 2013 was approved by Ministers in January 2014. Aberdeen City Council's Local Transport Strategy (LTS) was also adopted in 2008 and is currently being reviewed with a schedule to adopt a revised LTS in early 2015.

Various initiatives and measures outlined in the RTS and LTS are designed to improve air quality at hot spots, primarily through travel planning issues that aim to encourage modal shift by improving the attractiveness of walking, cycling and public transport as well as roads proposals which reduce traffic in sensitive areas and alleviate congestion. Specific policies and actions cover issues such as car parking, land use and travel planning, traffic management and infrastructure measures. Within the RTS the Environmental Objective is to 'reduce the effects of transport on climate, noise and air quality' with a target to comply with the national air quality objectives. The LTS has adopted a similar draft outcome specifically for air quality of 'improved air quality and the environment'.

Various other initiatives are on-going to address transport issues. For example, the City Council works closely with Nestrans to take forward transport improvements that support and improve the economy, environment and quality of life across Aberdeen City and Shire. Nestrans are responsible for the development of the RTS. As the LTS actions for air quality and climate change are still in draft format these have not been included, howver, specific objectives within the Regional Transport Strategy that relate to air quality and climate change are as follows:

- To reduce the proportion of journeys made by cars and especially by single occupant cars
- To reduce the environmental impacts of transport, in line with national targets
- To reduce growth in vehicle kilometres travelled.

The revised LTS and RTS offer significant opportunities to implement significant changes to the local road network and prioritise sustainable and active transport.

Nestrans has produced a Freight Action Plan, Bus Action Plan and Active Travel Action Plan. Each of these Plans and the RTS complement and build on the objectives within the LTS by setting out measures to provide more sustainable transport within the area.

The Council also commenced the development of a Strategic Urban Mobility Plan (SUMP) for the City Centre during 2012. A SUMP is essentially a transport masterplan looking at the way people move around by different modes of transport. These include walking, cycling, bus, train, taxi, motorcycle, car, van and HGVs. The SUMP objectives are to create a city centre which is easy to move around and encourages appropriate access for all modes. Footfall studies, on-street interviews, an on-line questionnaire and four stakeholder workshops were all used to engage and consult with the public and other stakeholders. Aberdeen received a €10,000

award from the European Union in recognition of excellence in the development of the SUMP. The Plan is currently being further developed as part of plans to revitalise the city centre.

8 Climate Change Strategies

In 2007 Aberdeen, alongside other Scottish Local Authorities, signed Scotland's Climate Change Declaration (SCCD) demonstrating ongoing commitment to combating the effects of climate change through governance, leadership and management of climate change. SCCD includes commitments both to mitigate our impact on climate change through reducing greenhouse gas emissions and to adapt to predicted climate change impacts. For the year 2013/14, the Council reported on its SCCD including emissions from use of electricity, gas, oil, street lighting, staff commuting miles, fleet, business travel, waste to landfill and waste recycled. The SCCD report also identified priority actions for the Council to reduce its emissions.

Aberdeen City Council's Carbon Management Plan covers the period 2010-2015 and aims to reduce CO_2 emissions from Council buildings, vehicles, street lighting and landfill by 23% by 2015 and 42% by 2020. At the review of this plan in 2013/14, the Council is on target to meet the target of reducing CO2 emissions by 23% in 2015. However the target of 42% will be more challenging over the next 5 year period to 2020. The Council's Sustainable Development and Energy teams are working together to develop action plans to help the Council meet this target in 2020.

9 Implementation of Action Plans

The action plan progress is detailed in Table 9.1.

Table 9.1 Action Plan Progress

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
1.1a	Increase bus use	Creation of additional Park & Choose sites at A96 and Schoolhill	Nestrans/ ACC/ AC	2008 onwards	February 2015	253,753 passengers using Park & Ride in 2012/13	Not yet identified	A96 construction commences Feb 2015	Planning permission received	May 2016	Double number of passengers using by P&R to 600,000 by 2021
1.1b	Increase bus use	Delivery of standards and targets agreed by Bus Quality Partnership	LABOF	Agreed 2010	Ongoing	11.3% employed adults not working from home, resident in Aberdeen City, bus to work 2012/13	Not yet identified	Ongoing	Ongoing	Ongoing	Increase bus mode share
1.1c	Increase bus use	Increase corridors covered by Bus Punctuality Improvement Partnerships (BPIP)	LABOF	Signed 2010	Ongoing	11.3% employed adults not working from home, resident in Aberdeen City, bus to work 2012/13	Not yet identified	King Street/Buchan corridor identified in 2010 and now largely complete; subject to annual monitoring.	Westhill-Aberdeen corridor identified for possible Statutory Quality Parntership corridor and preliminary investigations underway.	Ongoing	Increase bus mode share

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
1.1d	Increase bus use	Integrated ticketing	LABOF/ Transport Scotland	No defined start date	Unknown		Not yet identified	Multi operator ticket being explored by LABOF. Integrated ticketing pilot launched with support from Transport Scotland but put on hold due to technical difficulties.	Multi-operator ticket launched in 2014. Discussions ongoing with Transport Scotland on the development of further pilot projects.	Ongoing	Increase bus mode share
1.2a	Improve walking and cycling provision	Implementation of strategic and local cycle routes	ACC	No defined start date	Ongoing	3% employed adults not working from home, resident in Aberdeen City, cycle to work 2012/13	Not yet identified	Major strategic and local projects being undertaken: A96, Aberdeen to Westhill, Deeside Line, NCN Route 1, Greenbrae, A90	Delivery of design and/or installation of elements of A96, Aberdeen to Westhill, Deeside Line, NCN Route 1, Greenbrae, A90, Ellon Road, Formartine and Bucan Way	Ongoing	Increase walking and cycling mode share. Work towards SG vision of 10% of all journeys undertaken by bike by 2020
1.2b	Improve walking and cycling provision	Increase cycle parking at schools, workplaces and in public areas	ACC	No defined start date	Ongoing	3% employed adults not working from home, resident in Aberdeen City, cycle to work 2012/13. 2.2% of pupils regularly cycle to school.	Not yet identified	Cycle parking installed at 3 primary schools in 2013. Cycle parking continues to be implemented in public areas where there is a need.	Ongoing	Increase cycle parking at schools, workplaces and in public areas	Increase walking and cycling mode share. Work towards SG vision of 10% of all journeys undertaken by bike by 2020

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
1.2c	Improve walking and cycling provision	Implement Designing Streets for better overall walking and cycling environments	ACC	2012	Ongoing	60% of adults walked at least quarter of a mile, at least one day in the previous 7 days	Not yet identified	Inclusion of Designing Streets principles in Aberdeen Local Development Plan and Supplementary Guidance	Ongoing	Ongoing	Increase walking and cycling mode share. Work towards SG vision of 10% of all journeys undertaken by bike by 2020
1.2d	Improve walking and cycling provision	Integrated ticketing	LABOF/ Transport Scotland	No defined start date	Unknown	60% of adults walked at least quarter of a mile, at least one day in the previous 7 days	Not yet identified	Multi operator ticket being explored by LABOF. Integrated ticketing pilot launched with support from Transport Scotland but put on hold due to technical difficulties.	Multi-operator ticket launched in 2014. Discussions ongoing with Transport Scotland on the development of further pilot projects.	Ongoing	Increase walking and cycling mode share. Work towards SG vision of 10% of all journeys undertaken by bike by 2020
1.3a	Travel Plans	Encourage uptake of voluntary travel plans	ACC/ Nestrans	No defined start date	N/A	[New indicator: The number of business travel plans in Aberdeen City]	Not yet identified	Provision of Nestrans Free Travel Plan Builder	Additional Getabout events in businesses	Ongoing	Increase numbers of businesses and organisations with Travel Plans

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
1.3b	Travel Plans	Ensure Travel Plans are requested as part of Planning process	ACC	No defined start date	N/A	[New indicator: Percentage compliance for developments over a certain size to have Travel Plans (as per Transport & Accessibility Guidance)]	Not yet identified	Development of Transport & Accessibility Guidance as part of ADLP as well as separate Travel Plan Guidance being produced	Ongoing	Ongoing	Increase numbers of businesses and organisations with Travel Plans
1.3c	Travel Plans	Encourage uptake of school travel plans	ACC	No defined start date	N/A	5 schools in Aberdeen have a Travel Plan (2013).	Not yet identified	Guidance on ACC website on how to develop a School Travel Plan (STP). Loss of STP Coordinator makes this difficult	Direct work undertaken with a couple of schools	Ongoing	[Increase number of schools with STPs - currently resourced]

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
1.3d	Travel Plans	Continue to implement the Council's Travel Plan	ACC	No defined start date	2014/15 Action Plan	57.4% of Council staff use sustainable modes to travel to work (CTP Survey 2014)	Not yet identified	Set up Car Club, undertaken biennial travel surveys, undertaken Green and Grey Fleet reviews, awareness raising and implementation of salary sacrifice schemes for bus, bike, carbon offsetting & green car	Undertaken 2014 survey, further car club cars available, additional pool bikes and cycle parking facilities have been made available	Ongoing	Reduced business mileage and increased sustainable mode share
1.4a	Improve public awareness of air quality issues	Air quality messages on Variable Message Signs	ACC/ Transport Scotland	No defined start date		Number of events led by ACC	Not yet identified	Real time information facilities and additional VMS installed	Links made between Transport Scotland VMS and local VMS. Bluetooth installed to measure journey times on key routes and between modes.	Ongoing	Increase public's awareness of air quality issues

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
1.4b	Improve public awareness of air quality issues	Improvements to air quality pages on Aberdeen City Council website	ACC		Ongoing	Number of events led by ACC	Not yet identified	Publication of 2011 AQAP, info leaflets and bus back advertising. Website includes live air quality information		Ongoing	Increase public's awareness of air quality issues
1.4c	Improve public awareness of air quality issues	Text services	ACC		Ongoing	Number of events led by ACC	Not yet identified	Text service publicised jointly with NHS Grampian June 2012		Ongoing	Increase public's awareness of air quality issues
1.4d	Improve public awareness of air quality issues	Undertake air quality and sustainable travel events	Getabout		Ongoing	Number of events led by ACC	Not yet identified	Various events in public areas, schools and businesses throughout the City.	Participation in Bike Week and European Mobility Week 2013. Celebrated In Town Without My Car Day on Sunday, 21st Sept - only LA in Scotland. Pedal for Scotland Aberdeen event launced in 2013. 6 school events held (2013)	Ongoing	Increase public's awareness of air quality issues
1.5a	Car Clubs/ Car Pooling	Expand cars and locations in Car Club	Co-wheels/ ACC	EV purchase 2013	Ongoing	419 Council staff members (Sept 2014)	Not yet identified	25 vehicles (23 out of 25 under 120g CO2/km, 21 under 100g CO2/km) in 21 locations (Oct 2014).	Installation of additional bays and purchase of further vehicles	Ongoing	Increase numbers using the Car Club and reduce private car ownership

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
1.5b	Car Clubs/ Car Pooling	Undertake promotional campaigns with the public and businesses/ organisations	Co-wheels/ ACC	TROs progressed for additional sites 2013 Leaflet drops undertaken 2013	Ongoing	326 private members (Oct 2014) 80 corporate drivers/ members (Sept 2014	Not yet identified	25 vehicles (23 out of 25 under 120g CO2/km, 21 under 100g CO2/km) in 21 locations (Oct 2014).	Leaflet drops for students, families and city centre residents	Ongoing	Increase numbers using the Car Club and reduce private car ownership
1.5c	Car Clubs/ Car Pooling	Continuation of car sharing scheme	Nestrans	No defined start date	Ongoing	2,486 car share scheme members (2013) 5.3% of employed adults (+16) not working from home car sharing 2012/13	Not yet identified	Regional database available	Ongoing	Ongoing	Increase car sharing mode share
1.6a	Rail Improvements	Continue to work with Nestrans and Transport Scotland/ Network Rail to deliver local rail improvements	Nestrans/ Transport Scotland	New station at Kintore 2014-2019	Unknown	8 railway stations in North East in 2013 700 rail services per week from Aberdeen to key destinations (2014)	Not yet identified	New station opened in Laurencekirk	Kintore station included in Scottish Government's funding programme for 2014-19	2020	Increase in passenger numbers

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
1.6b	Rail Improvements	Continue to work with Nestrans and Transport Scotland/ Network Rail to deliver local rail improvements	Nestrans/ Transport Scotland	Investigate potential new stations in the region	Unknown	4,097,970 passengers per year (2012/13) 1,755,000 passenger journeys to / from / within Aberdeen stations by rail (for journeys wholly within Scotland) (2011/12)	Not yet identified	New station opened in Laurencekirk	Inclusion of sites within ALDP	Ongoing	Increase train mode share
1.7a	Rail freight	Several supermarkets utilising rail freight rather than road	Nestrans			166 thousand tonnes carried to or from the region by rail freight per year (2013)	Not yet identified	Tesco have started moving goods by rail	Ongoing	Ongoing	Increase volume of goods moved by road to rail
2.1a	Green Vehicle procurement and fuel	Improve Council fleet	ACC	Hydrogen bus delivery 2014	Hydrogen refuelling station being constructed	1% green vehicles in Council fleet as a proprotion of total vehicles - 9/500 vehicles (2014)	Not yet identified	EVs purchased in 2011/12 using Scottish Government Electric Vehicle Procurement Scheme. Fortnightly waste collections services from weekly reducing vehicle routing. 10 hydrogen buses purchased.	Purchase of hydrogen buses and installation of hydrogen refuelling station at Kittybrewster. Two hybrid diesel/ hydrogen vans converted.	Ongoing	75% of bus miles to be operated with EURO IV or better vehicles by 2015.

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
2.1b	Green Vehicle procurement and fuel	Work with bus operators to deliver the Bus Quality Partnership including ensuring buses operated are EURO IV or better by 2015.	LABOF	Hydrogen bus delivery 2014		Aberdeen City Fleet - 83% Euro V; 17% Euro III. First Aberdeen - 35% Euro IV or better. Stagecoach - 53% Euro IV or better.	Not yet identified	Hybrid buses operating from 2012	See 2.1a above	Ongoing	75% of bus miles to be operated with EURO IV or better vehicles by 2015.
2.1c	Green Vehicle procurement and fuel	Install electric charging points	ACC	2011/12	Ongoing	39 Council installed electric charge points (Oct 2014)	Not yet identified	All public Council installed EV points are PAYG for public. Points installed in Marischal College, Spring Garden, West North Street, Kittybrewster, Tullos, Duthie Park, Gallowgate, Sclattie Park, Kinsgswells Park & Choose, Chapel St, Frederick St, Golden Sq, Dunmail Avenue, Garthdee	Additional locations identified at ARI, Danestone, Hazelhead Park, Kittybrewster take 2, Altens, Satrosphere, Mastrick, Kincorth, Palmerstone Road, Bridge of Don. New ALDP policies included in SG for EV requirements for all new developments.	Ongoing	Increase uptake of cleaner vehicles
2.2a	Emissions testing and idling enforcement	Undertake roadside emissions testing	ACC	Additional roadside testing in 2014	Ongoing	151 vehicles tested in 2012 (143 passed)	Not yet identified	178 vehicles tested over 3 days in Sept 2011		Ongoing	Reduce emissions

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
2.2b	Emissions testing and idling enforcement	Idling vehicles	ACC	2011	Ongoing	151 vehicles tested in 2012 (143 passed)	Not yet identified	Feasibility study undertaken and literature produced and sent to all taxi and freight firms	Enforcement by Traffic Wardens and Environmental Health officers	Ongoing	Reduce emissions
2.3a	Taxis	Non-idling signage	ACC	Ongoing	On hold	[New Indicator: Explore classification of taxi vehicle fleet - % clean taxi fleet]	Not yet identified	Idling signage not currently being pursued	Investigating variable charging based on emissions	Ongoing	[Reduce emissions]
2.3b	Taxis	Licensing improvements for vehicle inspections and emission restrictions	ACC	Ongoing	Ongoing	[New Indicator: Explore classification of taxi vehicle fleet - % clean taxi fleet]	Not yet identified	Idling signage not currently being pursued	Investigating variable charging based on emissions	Ongoing	[Reduce emissions]
2.3c	Low Emission Zone	To investigate potential for a Low Emission Zone in the City Centre	ACC/ Nestrans	Update previous feasibility study and investigate potential costs and funding sources		Detailed consideration of a Low Emission Zone	Not yet identified	Interim feasibility study recommended bus LEZ on Union Street and HGV LEZ on Market Street	Update previous of feasibility study and consideration of possible	Ongoing	Compliance with NOx and PM10 target in City Centre

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
3.1a	Pedestrianisation	Pedestrianise areas of the City Centre	ACC	Ongoing	Ongoing	Creation of a city centre pedestrianised area	Not yet identified	Updated modelling, previous feasibility study and investigate potential costs and funding sources	Currently being explored as part Sustainable Urban Mobility Plan/ Locking in Benefits of AWPR/ City Centre Masterplan	Ongoing	Improve city centre walking/ cycling environment
3.1b	Road Building/ Junction alterations	Aberdeen Western Peripheral Route	AWPR Managing Agent	Delivery of AWPR by Spring 2018.		AWPR operational by 2018 with LIB Schemes implemented	Not yet identified	Decision to reject appeal. AWPR contractor has been appointed. Work schedule still being determined.	Identification of prioritisation of Locking in the Benefits schemes and Road Hierarchy	Spring 2018	Reduce city centre traffic by x%
3.1c	Road Building/ Junction alterations	Haudagain roundabout	Transport Scotland	Ongoing	Spring 2018	AWPR operational by 2018 with LIB Schemes implemented	Not yet identified	Improvements to Haudagain roundabout to follow AWPR opening	Design considerations	2019	Improve traffic flow
4.1	Intelligent Transport Systems	Increase ITS provision	ACC	Ongoing	Ongoing	An integrated ITS with Real Time Information informing members of the public on traffic and air quality issues	Not yet identified	Real time facilities installed for Variable Message System to allow provision of information at key routes on VMS signage comparing bus and private car journeys	Additional bluetooth sites being installed	Ongoing	Reduce city centre congestion

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
4.2	High Occupancy Vehicle Lane	To install a HOV Lane on Stonehaven Road	ACC	Ongoing	Unknown	HOV/ Car Sharing Lane	Not yet identified	Feasibility of HOV lane on Stonehaven Road undertaken and agreed to be beneficial post AWPR	Delivery considered after 2018	Ongoing	Encourage car sharing and reduce single occupancy vehicles and congestion
4.3a	Freight and commercial vehicle access	HGV Priority Measures	ACC	Ongoing		An integrated strategy for HGVs/ Freight in the City	Not yet identified	Feasibility Study on Wellington Road complete and freight maps produced and distributed; new signal arrangements implemented	Wellington Road corridor study to improve all modes underway	Ongoing	Improved HGV/ Freight movement and delivery thereby reducing congestion and improving air quality
4.3b	Freight and commercial vehicle access	City Centre Commercial Delivery Strategy	ACC	Ongoing	May 2015	An integrated strategy for HGVs/ Freight in the City	Not yet identified	Feasibility study undertaken	Freight considered as part of CCMP/ SUMP	Ongoing	Improved HGV/ Freight movement and delivery thereby reducing congestion and improving air quality
4.3c	Freight and commercial vehicle access	Freight Consolidation Centre	ACC	Ongoing	Unknown	An integrated strategy for HGVs/ Freight in the City	Not yet identified	STRATMOS study investigated different sites	TBD	Ongoing	Improved HGV/ Freight movement and delivery thereby reducing congestion and improving air quality

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
5.1a	Produce Supplementary Planning Guidance	Construction Code of Practice	ACC	Ongoing	Ongoing	[New Indicator: Annual monetary contributions towards air quality/ sustainable transport measures in AQMAs]	Not yet identified	Major New Developments require Dust Management Plans	Ongoing	Ongoing	Compliance with Supplementary Guidance and monetary contributions towards sustainable transport measures in AQMAs
5.1b	Produce Supplementary Planning Guidance	Improve Development Management	ACC	Ongoing	Ongoing	[New Indicator: Annual monetary contributions towards air quality/ sustainable transport measures in AQMAs]	Not yet identified	Cumulative air quality impact assessment of 2011 ADLP, 2008 Structure Plan and Union Square development on AQMAS undertaken	2014 revision of ALDP SG and monetary contributions towards sustainable transport measures in AQMAs	Ongoing	Compliance with Supplementary Guidance and monetary contributions towards sustainable transport measures in AQMAs
5.1c	Produce Supplementary Planning Guidance	Targeted Section 75 monetary contributions towards delivery of mitigation measures	ACC	Ongoing	Ongoing	[New Indicator: Annual monetary contributions towards air quality/ sustainable transport measures in AQMAs]	Not yet identified	Development of SPG on Air Quality and Transport & Accessibility as part of Aberdeen Local Development Plan produced	2014 revision of ALDP SG and monetary contributions towards sustainable transport measures in AQMAs	Ongoing	Compliance with Supplementary Guidance and monetary contributions towards sustainable transport measures in AQMAs

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
5.2	Integration of AQAP with the Local Transport Strategy (LTS) and Regional Transport Strategy (RTS)	Ensure air quality issues are referenced in LTS and RTS	ACC/ Nestrans	2014	Ongoing	Updated/ Refreshed LTS and RTS	Not yet identified	RTS Refresh Main Issues Report has included air quality	Revised LTS due for consultation January 2015	Summer 2015	Ensure appropriate transport strategy and policy documents reflect air quality actions, measures and issues
5.3	Integration of AQAP with HTAP	Highlight the health impacts of poor air quality	ACC/ NHS	2014	Ongoing	HTAP containing air quality actions	Not yet identified	Environmental Health involved with HTAP issues	Revised HTAP produced 2014	Ongoing	Ensure the health impacts of air quality are recognised and advertised
5.4	Integration of AQAP with HTAP	Highlight the health impacts of poor air quality	ACC/ NHS	2014	Ongoing	HTAP containing air quality actions	Not yet identified	Report to Committee 2014. SIAS undertaking study. Results expected shortly.		Spring 2018	Reclassification of City Centre streets in order to reroute traffic
5.5a	Car Parking Policies	Include Emission Based Parking Charge (EBPC) Assessment as part of 2013 Parking Charges Review	ACC	2011	Ongoing	[New indicator: Number of vehicles applying for reduced parking charges/ proportion of low emission permits]	Not yet identified	Feasibility into EBPC undertaken	No progress	Ongoing	[To encourage the public to adopt cleaner vehicles by incentivisation schemes]

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
5.5b	Car Parking Policies	Limit car parking for new developments	ACC	2014	Ongoing	To monitor the price of car parking in Aberdeen City Centre relative to bus fares	Not yet identified	Transport & Accessibility Guidance developed as part of ADLP contains policies on low or no parking developments as well as number of spaces per development size and type	2014 revision of ALDP SG and monetary contributions towards sustainable transport measures in AQMAs	Ongoing	Limit the impact new developments have on the local transport network/ AQMAs
5.5c	Car Parking Policies	Development of Local and Regional Car Parking Policies	ACC/ Nestrans	2012	Ongoing	Local policies compliant with regional policies	Not yet identified	Nestrans Regional Car Parking Strategy completed and formally adopted by Aberdeen City Council	2014 revision of car parking standards within ALDP SG	Ongoing	Ensure local policies are compliant with regional policies
5.5d	Integration of AQAP with Noise Action Plan (NAP)	Implementation of policies that benefit both air quality and noise	ACC			NAP compliance	Not yet identified	Provision of draft NAP by July 2013 and final Plan by January 2014		Ongoing	Improved air quality and reduce noise exposure
5.6a	National Lobbying	Incentives/ funding/ tax breaks for Low emission initiatives	ACC	No identified date	No identified date	Increased incentivisation	Not yet identified	No progress	No progress	Unknown	Increased incentivisation
5.6b	National Lobbying	Shipping emissions reductions	ACC	No identified date	No identified date	Increased incentivisation	Not yet identified	No progress	No progress	Unknown	Increased incentivisation

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
6.1	Control Biomass Installations	Enforce cleaner biomass boiler installation	ACC	2011		Compliance with policy	Not yet identified	Air Quality Biomass Supplementary Guidance developed as part of ADLP	2014 revision of ALDP SG.	Ongoing	No non-compliant biomass installations
6.2	Industry Permitting	New and amended Integrated Pollution Control (IPC) applications reviewed and liaison with SEPA	ACC/ SEPA			Compliance with policy	Not yet identified	Ongoing		Ongoing	Applications reviewed
6.3	Tree Planting	Plant tree species with a positive air quality impact, and avoid tree species with a negative air quality impact	ACC	No identified date	No identified date	Compliance with policy	Not yet identified	No progress	No progress	Ongoing	Ensure tree planting complies with air quality objectives
6.4	Shipping	Work with the Harbour Board	ACC/ Aberdeen Harbour	Ongoing	Ongoing	Work with Aberdeen Harbour to reduce emissions from shipping, harbour activities and vehicles	Not yet identified	Detailed Air Quality modelling study of shipping emissions undertaken 2011	Ongoing	Ongoing	Reduce harbour emissions

9.1 Aberdeen Action Plan Progress

Car Club/Car Pooling

The Car Club now encompasses 25 vehicles in 21 locations, with 21 cars having emissions of less than 100g CO2/km. There are also 7 electric vehicles now in the fleet.

Events

2013 saw Aberdeen City Council and Getabout participate in both Bike Week and European Mobility Week to promote travel behaviour change and awareness of air quality issues. During EMW, Aberdeen was the only Local Authority in Scotland to formally take part by closing a road (Schoolhill and Belmont Street) to motor traffic and were held up as a best practice example by the Scottish Government.

2013 saw the launch of the first Pedal for Scotland family cycle ride in Aberdeen along the beachfront, which has now become an annual event.

Walking and Cycling Infrastructure

The dual use paths along the A90 route has not progressed due to a lack of funding, although designs for improvements to particular sections are available.

The following was achieved in 2013:

- Completion of the A96 cycle route between Aberdeen and Dyce
- Improvements to the Deeside Way and Formartine and Buchan Way long-distance commuting and leisure routes
- Improvements to cycling conditions in Dubford and Jesmond as part of the Greenbrae Cycle project
- Studies launched into improving conditions for cyclists on Ellon Road, the Parkway and Riverside Drive
- Cycle parking continues to be rolled out in public areas, schools and Council premises.
- Various Core Paths of local significance have been upgraded.

A draft Regional Active Travel Plan has been initiated. This will identify regionally important walking/cycling routes, interventions required and funding/implementation plans. This should be finalised late 2014/early 2015.

Following adoption of the revised Local Transport Strategy, Aberdeen City Council will be looking to revise its Cycling Strategy.

Low Emission Zones/Transport Masterplan

In 2014, consultants appointed to develop City Centre Masterplan. This will include delivery of the Sustainable Urban Mobility Plan (SUMP) and will consider issues such as Low Emission Zones, pedestrianisation and city centre parking policies.

A feasibility study into a City Centre Low Emission Zone or Strategy (LEZ/LES) commenced in 2014. The study will predict the reduction in emissions from a range of potential measures including the upgrade of the bus fleet to Euro IV or better; the introduction of a minimum standard for cars; reduced car annual average daily traffic (AADT), specifically diesel cars, and a shift from HGV to LGV vehicles.

Real-time tailpipe emission monitoring with vehicle number plate recognition is also proposed to support the LEZ/LES work by providing detailed information on the actual City Centre fleet and associated vehicle emissions. The identification of the most effective measures to reduce emissions from the implementation of various options will help support the potential development of a City Centre LEZ or LES. Further information on predicted emission reduction through the implementation of some of the actions in Table 9.1 should be available for the 2015 annual report.

10 Conclusions and Proposed Actions

10.1 Conclusions from New Monitoring Data

Monitoring data collected in 2013 has confirmed concentrations continue to exceed the annual mean NO_2 objective within all three AQMAs.

The one hour NO_2 objective was exceeded in the City Centre and Anderson Drive (Haudagain/Auchmill Road) AQMAs. The objective was met in the Wellington Road AQMA.

The annual mean PM_{10} objective continued to be exceeded in the City Centre and Wellington Road AQMAs.

The 24 hour PM_{10} objective continued to be exceeded in the city centre AQMA (Market Street). It is likely that a large proportion of exceedences at the site was due to unusual local meteorological conditions.

The annual mean PM_{10} objective also continued to be marginally exceeded at the King Street continuous monitoring station. Concentrations from the BAM monitor at this location may be elevated during prolonged periods of heavy rain and sea mist. Further assessment is still not proposed at this time, however concentrations will continue to be monitored and reviewed to determine if further action is necessary.

There were no exceedances of the objectives at any other location outwith the AQMAs.

10.2 Conclusions relating to New Local Developments

There are no new local developments that will require more detailed consideration in the next Updating and Screening Assessment.

Additional diffusion tubes have been located near sensitive receptors along the route of the proposed 3rd Don Crossing to assess both the impact on receptors in the vicinity of the new route and to monitor any reduction in NO_2 concentrations along the existing road network where the traffic flow is expected to reduce.

It is intended that data for the current monitoring will be available for publishing in the 2015 report.

10.3 Other Conclusions

The 2008 Aberdeen City and Shire Regional Transportation Strategy (RTS) was reviewed in 2013 and a refreshed Strategy approved by Ministers in January 2014. Various initiatives and actions outlined in the new RTS are designed to improve air quality, primarily through travel planning measures to encourage modal shift.

The 2009 Aberdeen City and Shire Structure Plan was also reviewed in 2013. It is anticipated the new Aberdeen and Shire Development Plan, which will replace the Structure Plan will be formally adopted in 2014. The Proposed Plan makes reference to air quality by reducing the effect of transport and the implementation of infrastructure projects.

10.4 Proposed Actions

- The new monitoring data has not identified the need to proceed to a Detailed Assessment for any pollutant.
- Monitoring to continue and specifically review PM_{10} concentrations at the King Street continuous monitoring station.
- Continue monitoring (non automatic) near sensitive receptors along the route of the proposed 3rd Don Crossing and the existing road network where traffic flows are expected to reduce.
- Consider the development of a City Centre Low Emission Strategy or Zone following the completion of a feasibility study to be undertaken during 2014/15.
- Liaison with the Planning Service on the Local and Regional Transportation Strategies which will be updated during 2014/15. A review of the Local Development Plan will also commence in 2014. The air quality Supplementary Guidance and other relevant policies will be considered during the Local Development Plan review.
- New monitoring data has not identified a need for any other additional monitoring or changes to the existing AQMAs and no other LAQM Tasks have been identified.
- A $PM_{2.5}$ Dicotamous FDMS and replacement PM_{10} for the Union Street automatic monitoring station was purchased towards the end of 2013. $PM_{2.5}$ data for the site will be reported in 2015.
- The next course of action is to submit a 2015 Air Quality Progress Report.

11 References

1 The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, DETR July 2007.

2 Environment Act 1995.

3 The Air Quality (Scotland) Regulations 2000.

4 The Air Quality (Scotland)(Amendment) Regulations 2001.

5 Aberdeen City Council Updating and Screening Report August 2003.

6 Aberdeen City Council Detailed Assessment of Air Quality, August 2004.

7 Aberdeen City Council Air Quality Action Plan July 2006.

8 Aberdeen City Council Updating and Screening Assessment, July 2006

9 Aberdeen City Council Progress Report, June 2007

10 Aberdeen City Council Detailed Assessment, March 2008

11 Aberdeen City and Shire Structure Plan 2009

12 Local Air Quality Management Technical Guidance LAQM, TG(09), DEFRA, February 2009

13 Local Air Quality Management Policy, (PG)(S)(09), DEFRA, February 2009

14 Aberdeen City Council Updating and Screening Assessment, July 2009

15 Aberdeen City Council Air Quality Modelling Study, March 2010

16 Aberdeen City Council Progress Report, July 2010

17 Aberdeen City Council 2011 Local Plan

18 Aberdeen City Council Action Plan, March 2011

19 Aberdeen City Council Progress Report, September 2013

20 Aberdeen Harbour Local Air Quality Study, September 2011

21 Aberdeen City Council Updating and Screening Assessment, July 2012

Appendices

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

Diffusion tubes are provided by Gradko International and analysed by Aberdeen City Council's Public Analyst. The preparation technique is 20% tri-ethanolamine in water.

The web based spreadsheet of national bias adjustment factors (NBAFS) was reviewed however the information for Aberdeen is limited to one site. Although the Council's Public Analyst undertakes the analysis of diffusion tubes from neighbouring authorities, Aberdeen City Council is the only authority with continuous monitoring stations that can be used to calculate bias adjustment factors. Accordingly, a locally derived bias factor based on the co-located tubes at the Aberdeen continuous monitoring stations was used to adjust diffusion tube measurements at the other locations across the city. This process was considered appropriate due to the lack of other co-located studies using the laboratory for tube analysis, the remote location of Aberdeen from other conurbations and the good QA/QC performance of the laboratory.

Factor from Local Co-location Studies

Spreadsheets downloaded from the DEFRA Local Air Quality Management website were used to calculate bias adjustment factors and the precision and accuracy of the co-located tubes. Table B1 summarises the bias adjustment factors. Only data with good precision and accuracy has been used. Errol Place is an urban background site while the others sites are roadside.

Table A1: Bias Factor Calculations

Type	DT Mean (ugm^{-3})	CM Mean (ugm^{-3})	Bias Factor A (%)	Bias Factor B (%)	CM Data Capture (%)	No Monitoring Periods
Errol Place	23	20			45	3
Union Street	55	48	0.89	13	100	12
Wellington Road	34	28	0.98	0	91.5	12
King Street	54	52	0.85	15	95.1	13
Market Street	24	22	0.86	17	89.9	12
Anderson Drive	52	43	0.91	10	94	12

Discussion of Choice of Factor to Use

Continuous monitoring data for Errol Place was <6months and therefore no bias factor has been calculated. Twelve months diffusion tube data was available for the 5 roadside sites, however analysis of exposure time identified periods of <3 and >6 weeks at all sites. The bias factor (using ornithological regression) with the 5 sites would be 0.894 with the 12 months data and 0.914 removing periods of <3 and >6 weeks. Only 5 months of data with exposure of 3-6 weeks was available for Anderson Drive. The bias factors (using ornithological regression) for the 4 sites with 9 months data i.e. excluding Anderson Drive, was 0.897 and 0.890 with 12 months data. As these values are similar to the value of 0.914 with periods <3 and >6 weeks removed, it is reasonable to assume the periods with exposure <3 and >6 weeks are valid. Therefore, and on the advice of the national air quality helpline, the bias correction factor of 0.894 has been applied to all roadside sites. No correction factor has been used for urban background sites.

PM Monitoring Adjustment

All TEOM data between 2009 to 2013 from Union Street, Anderson Drive and Wellington Road was corrected to gravitational equivalent by AEA using the Volatile Correction Model (VCM). Data from the BAMs at King Street and Market Street were also corrected by AEA Technology (AEAT) using a gravitational factor of 0.83333 for Gravitational Equivalent.

Short-term to Long-term Data adjustment

The annual mean concentration at Errol Place is a best estimate due to valid data capture being less than 75%. The data is not “annualised” in accordance with LAQM.TG(09) due to no other local background continuous monitoring sites available. The annual mean of the 45% valid data captured is slightly less than the period 2008 to 2012. The trend is similar to other automatic sites in 2013 and the concentration is considered to be representative for the year.

QA/QC of Automatic Monitoring

All equipment is subject to the QA/QC procedure recommended with LAQM.TG(09). Equipment is serviced at 6 monthly intervals. The contract includes call outs to site for repairs and the routine replacement of consumables.

The Errol Place and Union Street sites are part of the UK’s Automatic Urban Network. All sites are part of the Scottish Government data reporting process and subject to independent audit by Ricardo AEA (RAEA) at 6 monthly intervals. Data validation and ratification is also performed by RAEA.

The analysers perform daily automatic calibrations which are used to assess the routine performance of the analysers and any long term response drift. Manual calibrations are performed by trained Council officers every two weeks using a calibration mixture traceable to national standards. These calibrations act as a check

on the operation of the analysers and enable determination of the instrument response factors used to calculate the concentration of NO_2.

Data is checked daily (Monday-Friday). Should a problem be identified either by Council officers or by RAEA the site is visited immediately and, if necessary, a further manual calibration is performed. Data considered suspect is deleted. Records are kept of instrument breakdowns, services and audits and any local activities or weather that may influence readings.

QA/QC of Diffusion Tube Monitoring

Diffusion tube monitoring is carried in accordance with the procedures contained in the guidance 'Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance for Laboratories and Users' and LAQM.TG(09). All tubes, other than those co-located at the continuous analysers are attached to lampposts/downpipes at a height of 2m above ground level and exposed for 4 weeks. Co-located tubes are located in triplicate close to the analyser air intake. All exposure times are recorded. Three unexposed travel blanks are submitted to the laboratory with each batch of exposed tubes.

Aberdeen City Council's Public Analyst is UKAS accredited for the analysis of diffusion tubes and also participates in the WASP scheme.

UKAS carried out an annual assessment of the laboratory in March 2014 to ensure laboratory guidance is being implemented. No problems were identified.

All results of the WASP performance reporting scheme were satisfactory (z-score < ± 2) during both 2013 and 2014, apart from a single tube that gave z-score in the warning category (z = -2.52).

The laboratory participates monthly in the nitrogen dioxide "inter comparison" exercise, managed by the National Physical Laboratory. All results up to the end of April 2014 have been satisfactory. The annual summary for 2013 that indicates that the results were classified as "Good" throughout 2013.

Appendix B: Diffusion tube Data and Calculations

Table B1: Measured 4-Weekly Diffusion Tube Data

Ref	Site	Site ID	1	2	3	4	5	6	7	8	9	10	11	12	Mean (ugm^3)	Nos Periods
1	Bucksburn Primary School	DT1		38	42		30	26	32	37	34	37	43		35.4	9
2	885 Gt Northern Rd at Haudigan	DT2			69	71	44	59	52	54	44	57	120	46	61.6	10
3	549 North Anderson Drive	DT3		40	53	63	29	42	37	42		48	31	27	41.2	10
4	38 Ellon Road	DT4		62	68	30		30	35	36	40	37	51	56	44.5	10
5	Linksfield Cente, 520 King Street	DT5		58	60	54	43	44	45	46		43	50	45	48.8	10
6	86 Victoria Road, Torry	DT6		49	43	38	31	38	30	36	35	44	48	31	38.5	11
7	Wellington Rd/ Kerloch Place	DT7		69	69	49	46	46	42	49	46	50			51.8	9
8	107 South Anderson Drive	DT8		73	46	81	55				59	68	77	34	61.6	8
9	Jessops, Market St	DT9	72	70	74	81	53			59	54	70	56	55	64.4	10
10	184/192 Market St	DT10	99	83	69	88	68	83	60	69	74	75	110	67	78.8	12
11	105 King St	DT11	80	85	93	61	67	64	63	55	73	75	78	75	72.4	12
12	40 Union St	DT12			80	61	58	63	51	53	58	65	65	53	60.7	10
13	Music Hall, Union St	DT13	57	52	61	64	40	41	36	42	43	45	57	45	48.6	12
14	Dyce Primary School	DT14		18	21	11	9	9	9	10	10	13	15	17	12.9	11
15	Northfield Swimming Pool	DT15		18	25	20	9	5	12	12	11	16	13	18	14.5	11
16	Guild St/ Market St roundabout	DT16	89	65	68	77	43	57	43	50	52		56	44	58.5	11
17	43/45 Union St) Poundstretchers	DT17	66	62	80	77	74	63	59	66	55	67	58	54	65.1	12
18	V Rosa, 14 Holburn	DT18	68	64	74	60	56	49	43	40	52	51	68	47	56.0	12
19	Halo 468 Union St	DT19	71	67	82	73	54	51	50	51	54	58	68	58	61.4	12

Table B1 continued: Measured 4-Weekly Diffusion Tube Data

Ref	Site	Site ID	1	2	3	4	5	6	7	8	9	10	11	12	Mean (ugm^3)	Nos Periods
20	Jasmine Tce opp S/way 212 King St	DT20	46	48	54	27	36	31	37	34	35	44	44	44	40.0	12
21	26 King Street	DT21	59	52	62	46	47	46	46	47	48	46	50	49	49.8	12
22	Gala Bingo, 104 King St	DT22	60	59	71	62	49	49	52	52	49		76	50	57.2	12
23	785 Gt Northern Road at Shell garage	DT23		48	69	35	31	26	27	24	34	34	42	31	36.5	11
24	40 Auchmill Road	DT24		60			60				37	32	44	34	44.5	6
25	Run 4 It, 21 Holburn	DT25	66	57	75	72	41		50	51	48	72	56	52	58.2	11
26	147 Holburn Street	DT26		37	49	52	30	29	29	27	31	37	39	30	35.5	11
27	82 Holburn St (Malt Mill)	DT27	17	40	50	46	24					37	36	32	35.3	8
28	61 Holburn Street	DT28	55	46	71	69	35	46	39	34	39	49	48	49	48.3	12
29	469 Union Street	DT29		72	89	80	57	59	64	67	63	74	76	78	70.8	11
30	209 Union St (British Airways)	DT30		70	81	72	58	56	51	59	56	59	69	60	62.8	11
31	249 Union Street	DT29		45	57	53	35	37	35	37	35	43	44	37	41.6	11
32	East North Street	DT33		65	76	53	56	49	49	54	50	58	58	60	57.1	11
33	404 King Street	DT34	44	48	52	29	35	29	32	36	32	38	41	39	37.9	12
34	115 Wellington Road	DT36		60	68	79	64	60	63	70		66	56	55	64.1	10
35	137 Wellington Road	DT37		44	48	24	32	32	31	33	37	33	45	33	35.6	11
36	819 Gt Northern Rd, Bridal Shop	DT39			65	65	67	68	61	64	63		46	144	71.4	9
37	852 Fullerton Court	DT40		44	52	33	35	29	29	38	34	38	49	69	40.9	11
38	852 Fullerton Court Roadside	DT41		55	61	16	56	40	45	32	47	52		46	45.0	10
39	111 South Anderson Drive	DT45		33	82	48	28	36	29	31	30	34	40	66	41.5	11
40	West North Street	DT46	39	46	53	40	29	29	32	27		40	34		36.9	10

Table B2: Annual Mean Bias adjusted diffusion tube data and correction to façade

Site ID	Site	Measured Concentration (ugm-3)	Bias Factor Applied	Factor	Bias Factor concentration (ugm-3)	Façade (ugm-3)
1	Bucksburn Primary Sch, Inverurie Rd	35.4	orn reg	0.894	31.6	31.6
2	885 Gt Northern Road	61.6	orn reg	0.894	55.1	42
3	549 North Anderson Dr	41.2	orn reg	0.894	36.8	27.5
4	38 Ellon Road	44.5	orn reg	0.894	39.8	34.8
5	Linksfield Centre, 520 King St	48.8	orn reg	0.894	43.6	28.4
6	86 Victoria Road Torry	38.5	orn reg	0.894	34.4	34.4
7	Wellington Rd/ Kerloch Pl	51.8	orn reg	0.894	46.3	46.3
8	107 Anderson Drive	61.6	orn reg	0.894	55.1	39.1*
9	31 Market St	64.4	orn reg	0.894	57.6	57.6
10	184/192 Market St	78.8	orn reg	0.894	70.4	70.4
11	105 King Street	72.4	orn reg	0.894	64.7	64.7
12	40 Union St	60.7	orn reg	0.894	54.3	54.3
13	Music Hall Union St	48.6	orn reg	0.894	43.4	43.4
14	Dyce Primary, Gordon Terr	12.9	Errol Place	0	12.9	12.9
15	Northfield swimming pool, Kettleshill Cres	14.5	Errol Place	0	14.5	14.5
16	Guild St/ Market Street	58.5	orn reg	0.894	52.3	52.3
17	43/45 Union St	65.1	orn reg	0.894	58.2	58.2
18	14 Holburn St	56	orn reg	0.894	50.1	50.1
19	468 Union St	61.4	orn reg	0.894	54.9	54.9
20	212 King Street	40	orn reg	0.894	35.8	35.8
21	26 King Street	49.8	orn reg	0.894	44.5	44.5
22	104 King St (Gala Bingo)	57.2	orn reg	0.894	51.1	51.1
23	785 Gt Northern Road	36.5	orn reg	0.894	32.6	27.6
24	40 Auchmill Road	44.5	orn reg	0.894	39.8	39.8*
25	21 Holburn St	58.2	orn reg	0.894	52.0	40.5

Table B2 continued: Annual Mean Bias adjusted diffusion tube data and correction to façade

Site ID	Site	Measured Concentration (ugm-3)	Bias Factor Applied	Factor	Bias Factor concentraion (ugm-3)	Façade (ugm-3)
26	147 Holburn Street	35.5	orn reg	0.894	31.7	31.7
27	82 Holburn St	35.3	orn reg	0.894	31.6	31.6*
28	61 Holburn Street	48.3	orn reg	0.894	43.2	40.5
29	469 Union Street	70.8	orn reg	0.894	63.3	63.3
30	209 Union St	62.8	orn reg	0.894	56.1	56.1
31	249 Holburn Street	41.6	orn reg	0.894	37.2	37.2
33	East North Street	57.1	orn reg	0.894	51.0	51
34	404 King Street	37.9	orn reg	0.894	33.9	33.9
36	115 Wellington Road	64.1	orn reg	0.894	57.3	43.4
37	137 Wellington Road	35.6	orn reg	0.894	31.8	30.9
39	819 Great Northern Road	71.4	orn reg	0.894	63.8	63.8
40	852 Fullerton Court	40.9	orn reg	0.894	36.6	36.6
41	852 Fullerton Court Roadside	45	orn reg	0.894	40.2	25.4
45	111 South Anderson Drive	41.5	orn reg	0.894	37.1	37.1
46	West North Street	36.9	orn reg	0.894	33.0	33

*****< 9 months data

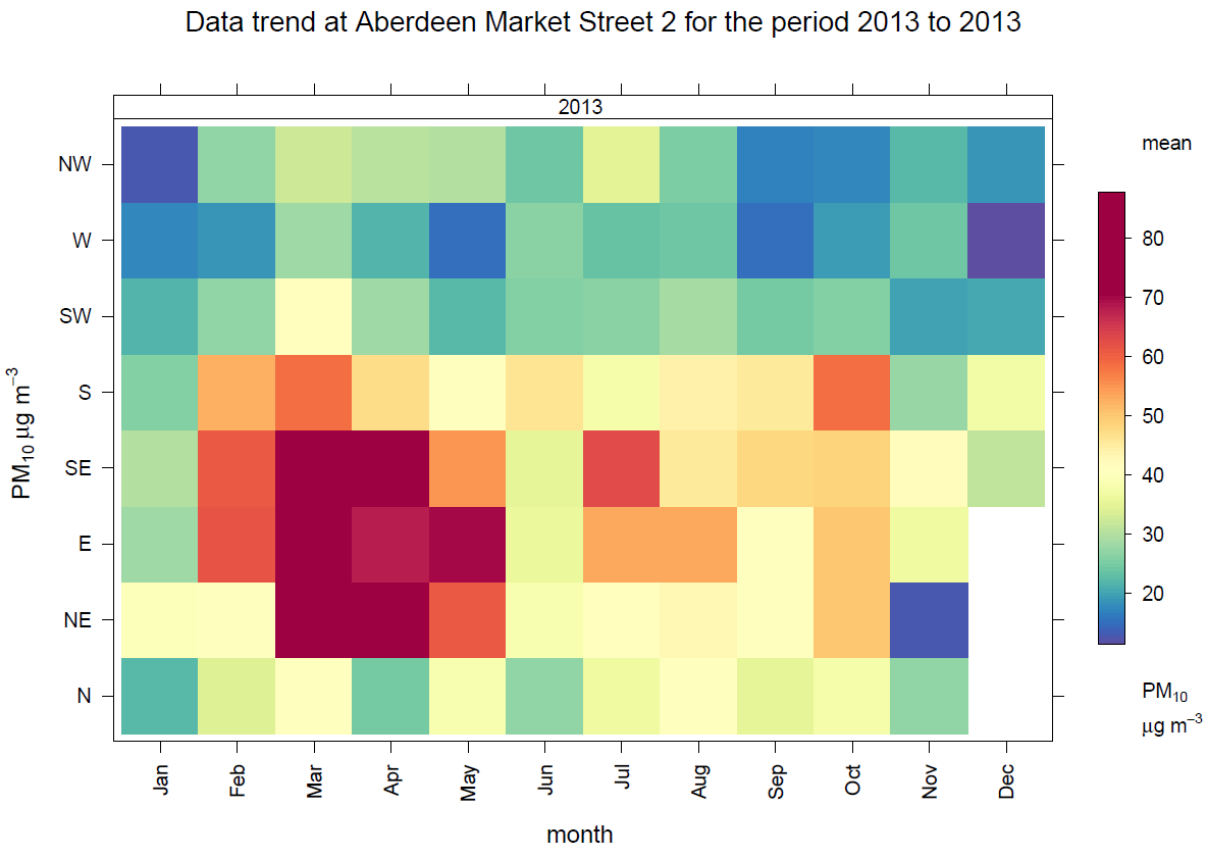
Table B3: Diffusion Tube concentrations showing calculations to façade

Site ID	Site	Bias Factor Conc (ugm-^{3})	Background Conc (ugm-^{3})	Dist to kerb Dy (m)	Dist façade Dz (m)	Calculated Façade Conc (ugm-^{3})
2	885 Gt Northern Rd	55.1	16.1	3	11	42.0
3	549 North Anderson Dr	36.8	16.1	3	17	27.5
4	Ellon Rd	39.8	17.2	3	7	34.8
5	520 King Street	43.6	19	0.1	9	28.4
8	107 South Anderson Dr	55.1	15	3	14	39.1
23	785 Gt Northern Rd	32.6	14.9	3	9	27.6
28	61 Holburn St	43.2	22.5	3	5	40.5
36	115 Menzies Rd	57.3	24.2	1	8	43.4
37	137 Wellington Rd	31.8	22.2	10	13	30.9
41	Fullerton Court roadside	40.2	14.9	0.1	7	25.4

Dy -distance to kerb at which concentrations were measured
Dz -distance to kerb at which concentrations are to be predicted

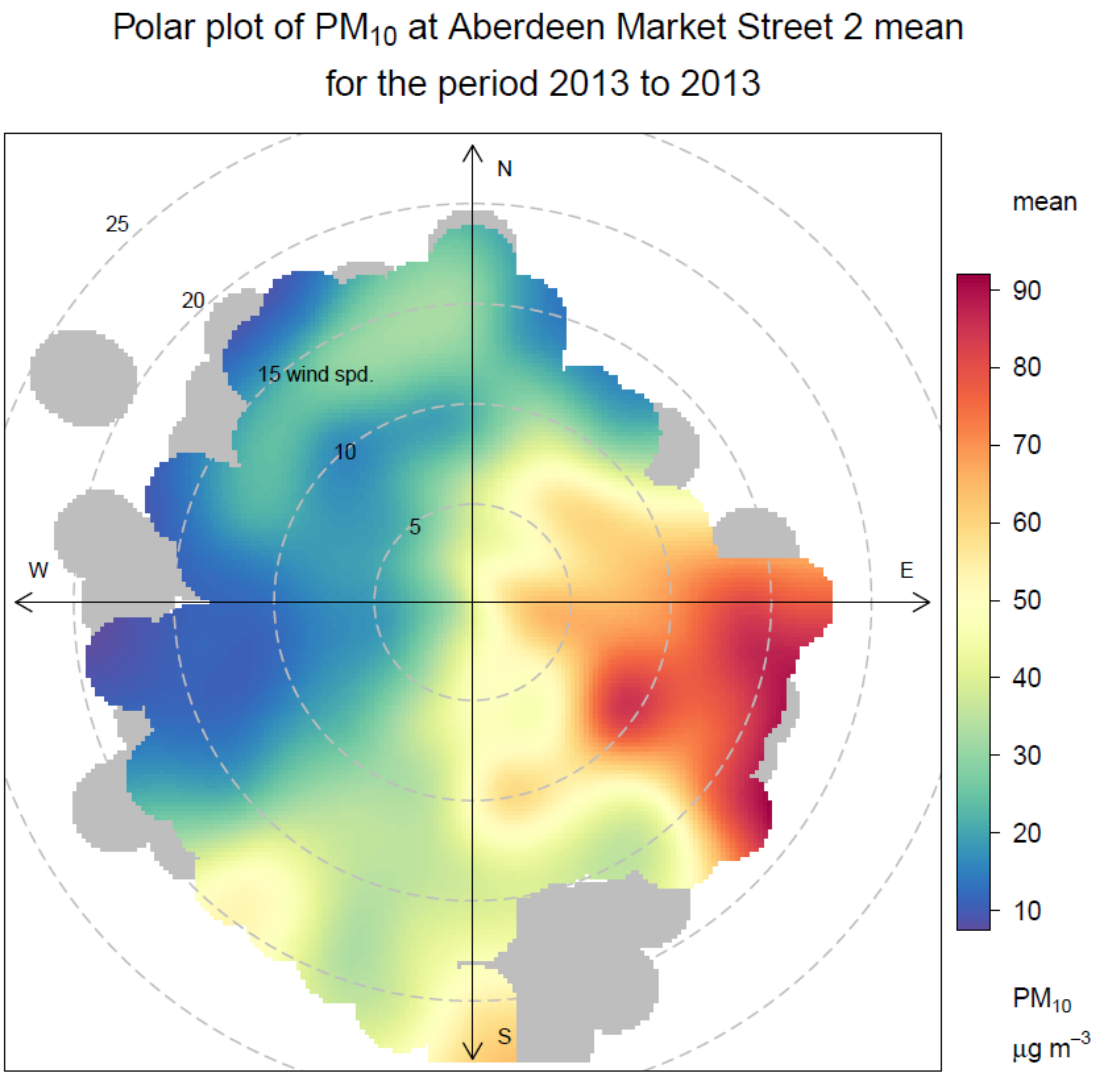
Appendix C: Wind Speed and Direction and PM10 Data Trend at Market Street Continuous Monitoring Station 2013

Figure C1: Wind speed and PM10 concentration bandings Market Street Continuous Monitoring Station 2013



Source: www.scottishairquality.co.uk/data/openair

Figure C2: Wind Speed and Direction and PM10 Data Trend at Market Street Continuous Monitoring Station 2013



Source: www.scottishairquality.co.uk/data/openair