2015 Updating and Screening Assessment for South Lanarkshire Council

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

September, 2015

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Executive Summary

This Updating and Screening assessment report fulfils the requirements of the Local Air Quality Management 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 exceedances 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.

A review of the latest pollutant measurement data has identified the following:

- Exceedances of the 40 µg.m^{-3} NO_2 annual mean objective were measured at the Rutherglen and Raith Interchange automatic sites during 2014. Neither of the sites are however at locations where the annual mean objective applies as there is no relevant long-term human exposure present. Based on previous dispersion modelling at Rutherglen; and DMRB calculations at Raith Interchange conducted in previous rounds of review and assessment; it is considered unlikely that the 40 µg.m^{-3} NO_2 annual mean objective is being exceeded at the closest location where relevant exposure is present.

- The 1-hour mean objective was not exceeded at any of the South Lanarkshire Council automatic monitoring sites during 2014.

- The trend in automatic measurement indicate that NO_2 annual means concentrations have on average been declining at Raith Interchange, Whirlies roundabout, East Kilbride; and Lanark. Measured NO_2 annual mean concentrations appear to have been increasing at Uddingston over the last five years.

- Annual mean NO_2 concentrations in excess of the 40 µg.m^{-3} objective were measured at two diffusion tube sites during 2014. The distance corrected NO_2 annual mean at the nearest location of relevant exposure was in excess of the 40 µg.m^{-3} objective at one site only - site number (8) Duke Street/Low Patrick Street, Hamilton. However, when considering this latest measurement in context with the conclusions of the Detailed Assessment conducted at this location last year (2014) it is very unlikely that exceedances of the objective are occurring where relevant exposure is present. No further action is required based on the 2014 NO_2 diffusion tube results.

- The annual mean PM_{10} concentration measured at Whirlies Roundabout in East Kilbride was equal to the 18 µg.m^{-3} Scottish objective during 2014. PM_{10} concentrations did appear to be declining at this location over recent years but have increased again in 2014. The area around Whirlies Roundabout is currently an AQMA for PM_{10} so no further action is required based on this measurement.

- An annual mean PM_{10} concentration in excess of the 18 µg.m^{-3} Scottish objective was measured at the Rutherglen automatic monitoring site. The daily mean objective was not exceeded at Rutherglen during 2014. South Lanarkshire Council is currently in the process of declaring an AQMA for exceedance of the PM_{10} annual mean objective at Rutherglen. Examination of the last five years measurements indicates that measured annual mean PM_{10} concentrations have

increased slightly over the last few years at this location. The 2014 results should however be considered in context with the low data capture due to analyser power supply problems.

- At the Raith Interchange site an annual mean PM_{10} concentration of 22 $\mu g.m^{-3}$ was measured during 2014 with 2 exceedances of the 50 $\mu g.m^{-3}$ daily-mean objective measured. Data capture at this site was however very low (30%) during 2014. The 98th percentile of daily means was less than 50 $\mu g.m^{-3}$ therefore, based on the available monitoring data, the short-term PM_{10} objective was not exceeded at Raith Interchange during 2014. Based on the results of the DMRB screening calculations conducted in 2012; and that measured PM_{10} concentrations are now lower than measured during 2012. It is considered very unlikely that the PM_{10} annual mean or short–term objectives are being exceeded at the nearest locations to the monitoring site where there is relevant exposure.

The screening review of potential pollutant sources has not identified any locations where there may be a risk of the air quality objectives being exceeded. This Updating and Screening assessment has not identified any requirement to proceed to a Detailed Assessment at any location.

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Introduction

1.1 Description of Local Authority Area

South Lanarkshire is a diverse area containing both densely populated industrial towns and large expanses of rural landscapes. It stretches from the Glasgow suburbs south to the open moorlands of the Leadhills via the Clyde Valley. The South Lanarkshire district shares its borders with a number of authorities from Dumfries and Galloway and Scottish Borders in the south, to East Ayrshire, East Renfrewshire, City of Glasgow, North Lanarkshire and West Lothian to its North, East and West boundaries.

The Council District can be described in four distinct areas:

- Cambuslang and Rutherglen area;
- Clydesdale.
- East Kilbride area; and
- Hamilton area;

The Cambuslang and Rutherglen areas are situated at the north-western tip of South Lanarkshire, bordering Glasgow City. The towns are commonly considered part of greater-Glasgow which is made up of a mix of both densely populated area suburbs and areas of large scale former industrial land use. The Hamilton area includes Blantyre, Bothwell, Larkhall and Stonehouse as well as the county town of Hamilton and many surrounding villages.

The East Kilbride area takes in the new town of East Kilbride and its surrounding villages as well as the small town of Strathaven. East Kilbride is a large new-town with high-technology industrial and extensive commercial activity, whilst Strathaven and the surrounding area is largely rural and agricultural.

The Clydesdale area forms the largest region in South Lanarkshire, and incorporates the southern and eastern areas of the district. The areas are largely rural and agricultural, dotted with several market towns, including Carluke, Lanark, Lesmahagow and Biggar as well as numerous villages.

There are a number of industrial sites located within South Lanarkshire, however most manufacture higher technology products and do not generate significant emissions to the air. The South Lanarkshire Council area is well served by an extensive road and rail network, including the M74 motorway, passing north to south through the council area.

1.2 Purpose of Report

This report fulfils the requirements of the Local Air Quality Management 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.

The objective of this Updating and Screening Assessment is to identify any matters that have changed which may lead to risk of an air quality objective being exceeded. A checklist approach and screening tools are used to identify significant new sources or changes and whether there is a need for a Detailed

Assessment. The USA report should provide an update of any outstanding information requested previously in Review and Assessment reports.

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 microgrammes per cubic metre $\mu g.m^{-3}$ (milligrammes per cubic metre, $mg.m^{-3}$ 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 $\mu g.m^{-3}$	Running annual mean	31.12.2003
	3.25 $\mu g.m^{-3}$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu g.m^{-3}$	Running annual mean	31.12.2003
Carbon monoxide	10.0 $mg.m^{-3}$	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu g.m^{-3}$	Annual mean	31.12.2004
	0.25 $\mu g.m^{-3}$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu g.m^{-3}$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu g.m^{-3}$	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 $\mu g.m^{-3}$, not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	18 $\mu g.m^{-3}$	Annual mean	31.12.2010
Sulphur dioxide	350 $\mu g.m^{-3}$ not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu g.m^{-3}$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu g.m^{-3}$, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

South Lanarkshire Council has completed a number of LAQM Review and Assessment reports. A brief summary of all previous reviews and assessments of local air quality in South Lanarkshire is presented in Table 1.1. A map showing the location and boundary of the existing air quality management area (AQMA) at Whirlies Roundabout in East Kilbride is presented in Figure 1.1.

Table 1.2 Summary of previous reviews and assessments

Review/Assessment	Year	Outcome
Updating and screening assessment	2003	AQS objectives were likely to be met for all pollutants except for particulate matter (PM_{10}). Potential exceedances of the 2010 PM_{10} objective were identified at some busy roads and junctions.
Detailed Assessment of PM_{10} concentrations at Whirlies roundabout, East Kilbride	2005	Concluded that neither the annual mean objective nor the 24-hour objectives were likely to be exceeded in 2010.
Progress Report	2006	Reported monitoring data and local developments relevant to LAQM
Updating and screening assessment	2007	Concluded that the measured PM_{10} annual mean at Whirlies roundabout was in excess of the 2010 objective. Annual mean NO_2 diffusion tube measured close by was also in excess of the NO_2 objective. A detailed assessment of PM_{10} and NO_2 was recommended at Whirlies Roundabout.
Detailed assessment	2007	PM_{10} annual mean objective likely to be exceeded close to Whirlies Roundabout and that declaration of an AQMA be considered. NO_2 annual mean was not likely to be exceeded in the study area
AQMA declaration at Whirlies Roundabout, East Kilbride	2008	Based on the conclusions of the 2007 detailed assessment an AQMA for PM_{10} was declared at Whirlies roundabout effective from the 28th November 2008
Progress Report	2008	Measured annual mean NO_2 was in excess of the 40 $\mu g.m^{-3}$ objective at three locations; further monitoring was recommended at these locations. The annual mean PM_{10} measured at Whirlies Roundabout was in excess of the 2010 objective of 18 $\mu g.m^{-3}$
Updating and screening assessment	2009	Based on the measured PM_{10} and NO_2 concentrations and a review of roads within South Lanarkshire the report recommended: • A further assessment of PM_{10} in the Whirlies AQMA; • A detailed assessment of PM_{10} and NO_2 at Rutherglen; • A detailed assessment of PM_{10} and NO_2 at Hamilton town centre; • A detailed assessment of NO_2 in Lanark town centre; • A detailed assessment of NO_2 at Main Street, Uddingston.
Progress Report	2010	Measured annual mean NO_2 was in excess of the 40 $\mu g.m^{-3}$ objective at three locations; further monitoring was recommended at these locations which has already been highlighted in 2009's U&SA. The annual mean PM_{10} measured at Main Street Rutherglen was in excess of the 2010 objective of 18 $\mu g.m^{-3}$
Detailed Assessment at Rutherglen	2010	Annual mean PM_{10} concentrations in excess of the 2010 objective were predicted at multiple locations of relevant human exposure across the study area. Based on the modelling predictions it was considered necessary to declare an Air Quality Management Area (AQMA) within this area of Rutherglen for PM_{10}.

Review/Assessment	Year	Outcome
Further Assessment at Whirlies Roundabout	2010	Modelling predictions of PM_{10} concentrations confirmed that the declaration of the AQMA was valid and that the boundary should be maintained. Annual mean PM_{10} concentrations were predicted to exceed the 2010 objective at many locations of relevant human exposure which close to the roads assessed. Source apportionment indicated that volume sources i.e. local background, are the most significant source of PM_{10} concentrations at this location.
Progress Report	2011	Measured annual mean NO_2 concentrations increased across the monitoring network when compared to the previous year, it was noted that this could be attributable to the meteorological conditions during 2010. The 2010 NO_2 monitoring data confirmed the conclusions of the 2009 Updating and Screening Assessment and 2010 Progress Report which recommended proceeding with Detailed Assessments of NO_2 concentrations at Bannatyne Street, Lanark and at Brandon Street, Hamilton. Both Detailed Assessments were planned for completion in 2011.
Updating and Screening assessment	2012	The review of new monitoring data and screening of new sources did not identify any new locations where a detailed assessment was required for any pollutant. The 2011 annual mean NO_2 concentration measured in Hamilton confirmed the requirement to conduct a Detailed Assessment of NO_2 in Hamilton town centre; the report noted that this assessment will be conducted when there is sufficient automatic monitoring data available to inform the study
Progress Report	2013	The NO_2 annual mean concentration measured at the Low Patrick Street/Duje Street diffusion tube site in Hamilton confirmed the requirement to conduct a Detailed Assessment for the area surrounding the Duke Street/Quarry Street junction. The Detailed Assessment is planned for completion in early 2014 when sufficient ratified automatic monitoring data is available The review of new developments did not identify any other locations where there may be a risk of the air quality objectives being exceeded
Detailed Assessment at Lanark	2014	The Detailed Assessment concluded that there are exceedances of the NO_2 annual mean objective occurring at locations with relevant exposure. The exceedance area encompasses stretches of Bannatyne Street at both ground floor and 1st floor level. South Lanarkshire Council are required to declare an Air Quality Management Area encompassing all areas of exceedance is the report also recommended that the Council expand their NO_2 diffusion tube network to include sections of West Port and Bloomgate where residential properties are present at ground level; and should consider monitoring of PM_{10} concentrations within Lanark town centre.
Further Assessment at Rutherglen	2014	The Detailed Assessment concluded that there are marginal exceedances of the PM_{10} annual mean objective occurring at locations with relevant exposure. The exceedance area encompasses the section of Main St up to 40m to the east of the junction with Farmeloan Road where there are residential properties at ground floor level. South Lanarkshire Council are required to declare an Air Quality Management encompassing all areas of exceedance of the PM_{10} annual mean objective predicted in the study.
Detailed Assessment at Hamilton	2014	The dispersion modelling study concluded that there were no exceedances of the NO_2 and PM_{10} annual mean objective occurring at

Review/Assessment	Year	Outcome
		locations with relevant exposure and there is no requirement to declare an Air Quality Management Area at this time. The assessment noted that as there was no PM_{10} monitoring data with which to verify and adjust the model predictions there was uncertainty in the predicted PM_{10} concentrations; the report recommended that South Lanarkshire Council consider this again when a full year of PM_{10} measurements are available.
Detailed Assessment at Uddingston	2014	The dispersion modelling study concluded that there were no exceedances of the NO_2 annual mean objective occurring at locations with relevant exposure therefore South Lanarkshire Council are not required to declare an Air Quality Management Area at this time.
Progress Report	2014	The report concluded that annual mean NO_2 concentrations in excess of the 40 $\mu g.m^{-3}$ objective were measured at the diffusion tube in Almada Street, Hamilton – the council are therefore required to conduct a Detailed Assessment of NO_2 at this location and should consider expanding the diffusion tube network to provide additional measurements that can be used for model verification. All other locations where exceedances of the objective were measured have already been declared, or are pending declaration as an AQMA.

Figure 1.1: East Kilbride AQMA Boundary

N

Key:

AQMA Boundary

RICARDO-AEA

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Maps showing the locations of the automatic monitoring sites and diffusion tube monitoring sites are presented in Figures 2.1 to 2.12.

During 2014 there were two changes to the automatic monitoring network in South Lanarkshire. South Lanarkshire council have removed the continuous PM_{10} analyser site at Glespin. This was relocated and installed as a continuous PM_{10} monitoring site at Main Street/Greenlees Rd junction in Cambuslang on the 18th February 2015.

During early 2014 South Lanarkshire council also removed the automatic monitoring site at Raith Interchange; and are planning to re-install the analyser at Clydeview, Bothwell. This is a result of preparatory works for a planned upgrade of the M74/Raith Interchange. At the time of writing this report, the new site has not been installed.

In early 2015 South Lanarkshire installed two new PM_{10} FIDAS analysers; at Lanark (10th March 2015); and Uddingston (1st March 2015).

2.1.1 Non-Automatic Monitoring Sites

NO_2 concentrations were measured at 38 diffusion tube sites across the South Lanarkshire Council area during 2014. Details of the diffusion tube monitoring locations where measurements were conducted are presented in Table 2.2. The locations include kerbside, roadside and urban background sites. Maps showing the locations of the diffusion tube monitoring sites are presented in Figures 2.1 to 2.12.

South Lanarkshire Council currently operates two diffusion tube co-location studies at the Whirlies Roundabout, East Kilbride; and at the Main Street, Rutherglen NO_2 automatic analyser sites. Full details of the co-location studies and diffusion tube QA/QC are presented in Appendix A.

Figure 2.1 Monitoring locations (East Kilbride – Whirlies)

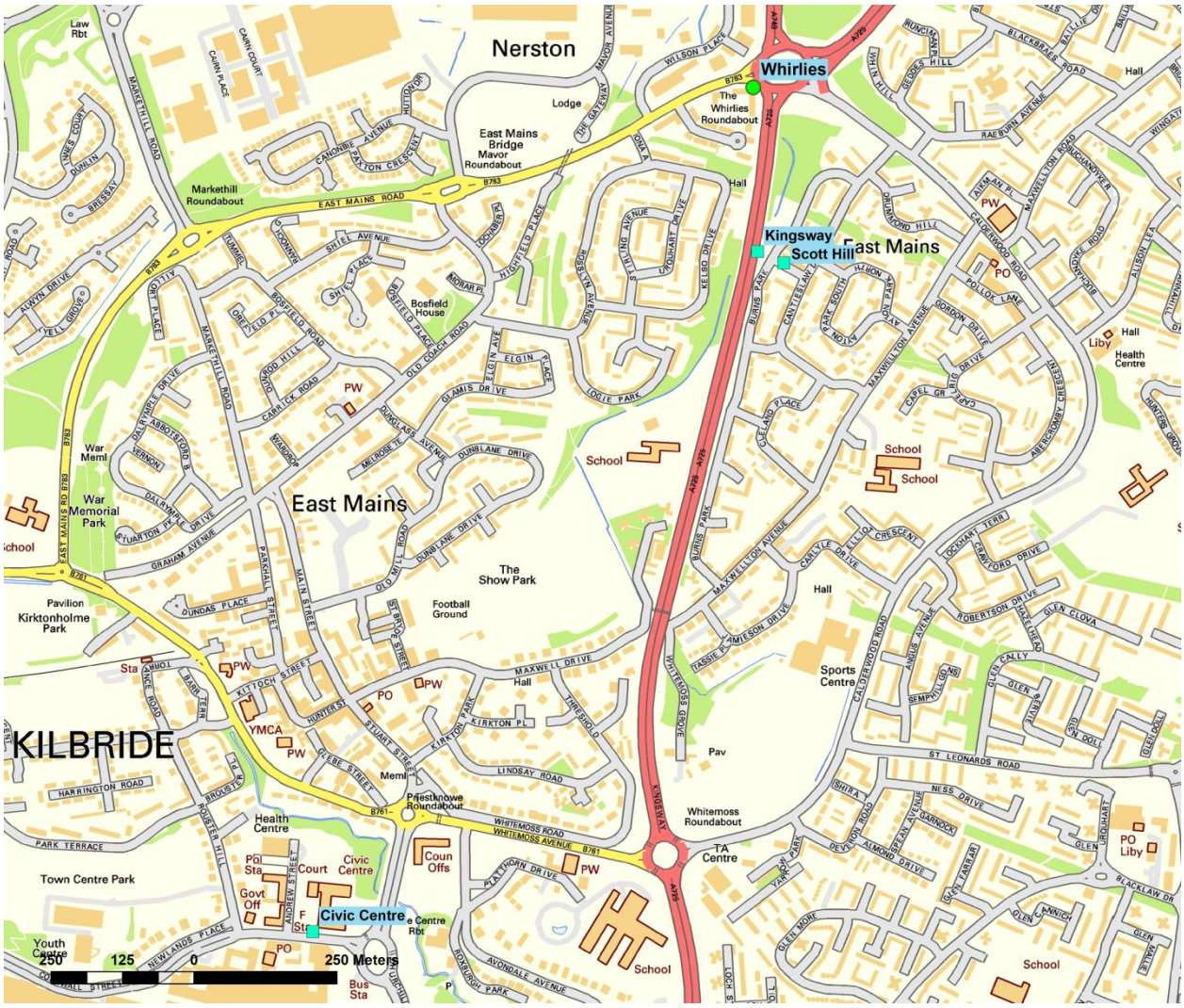


Figure 2.2: Monitoring locations (Strathaven)

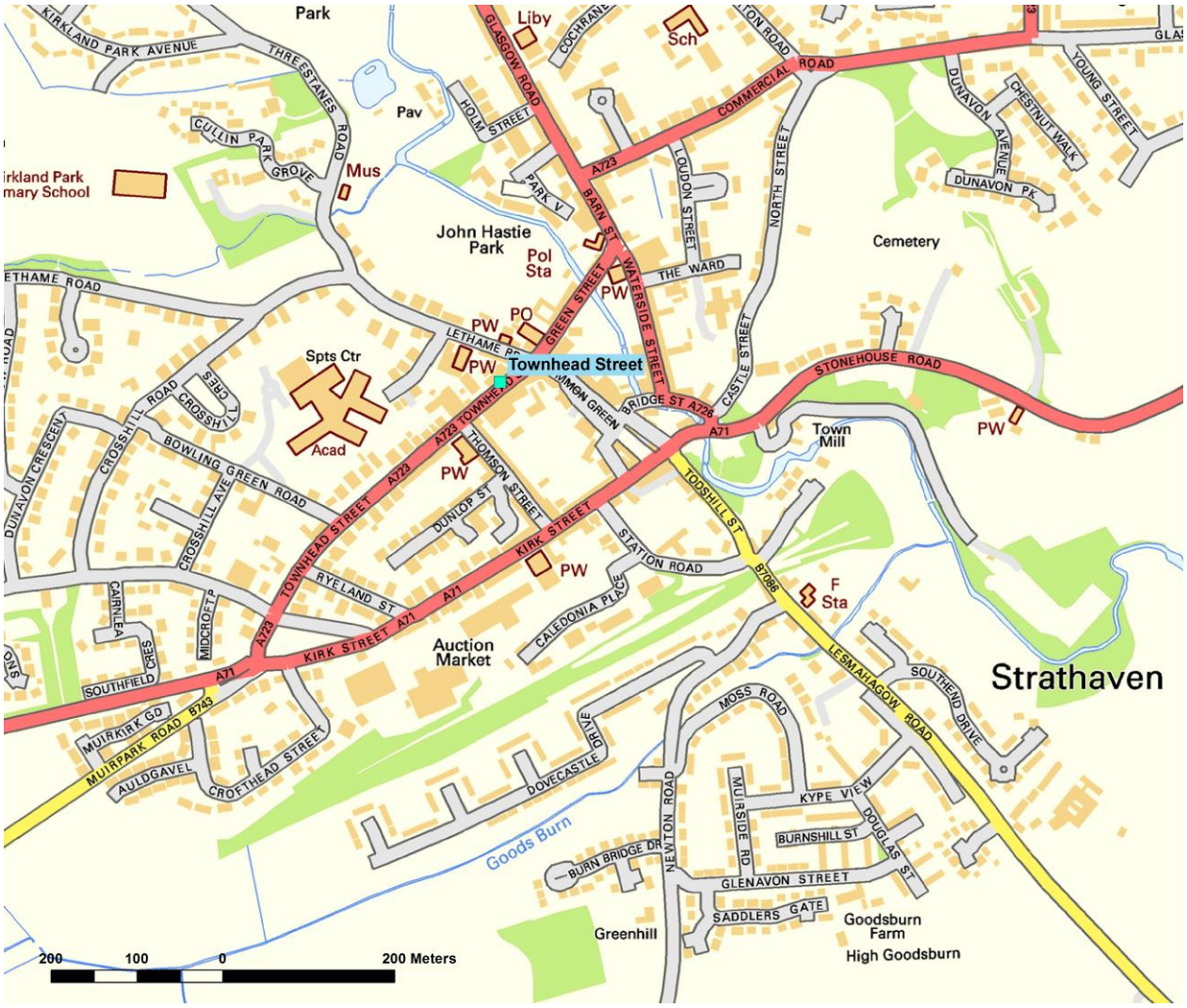
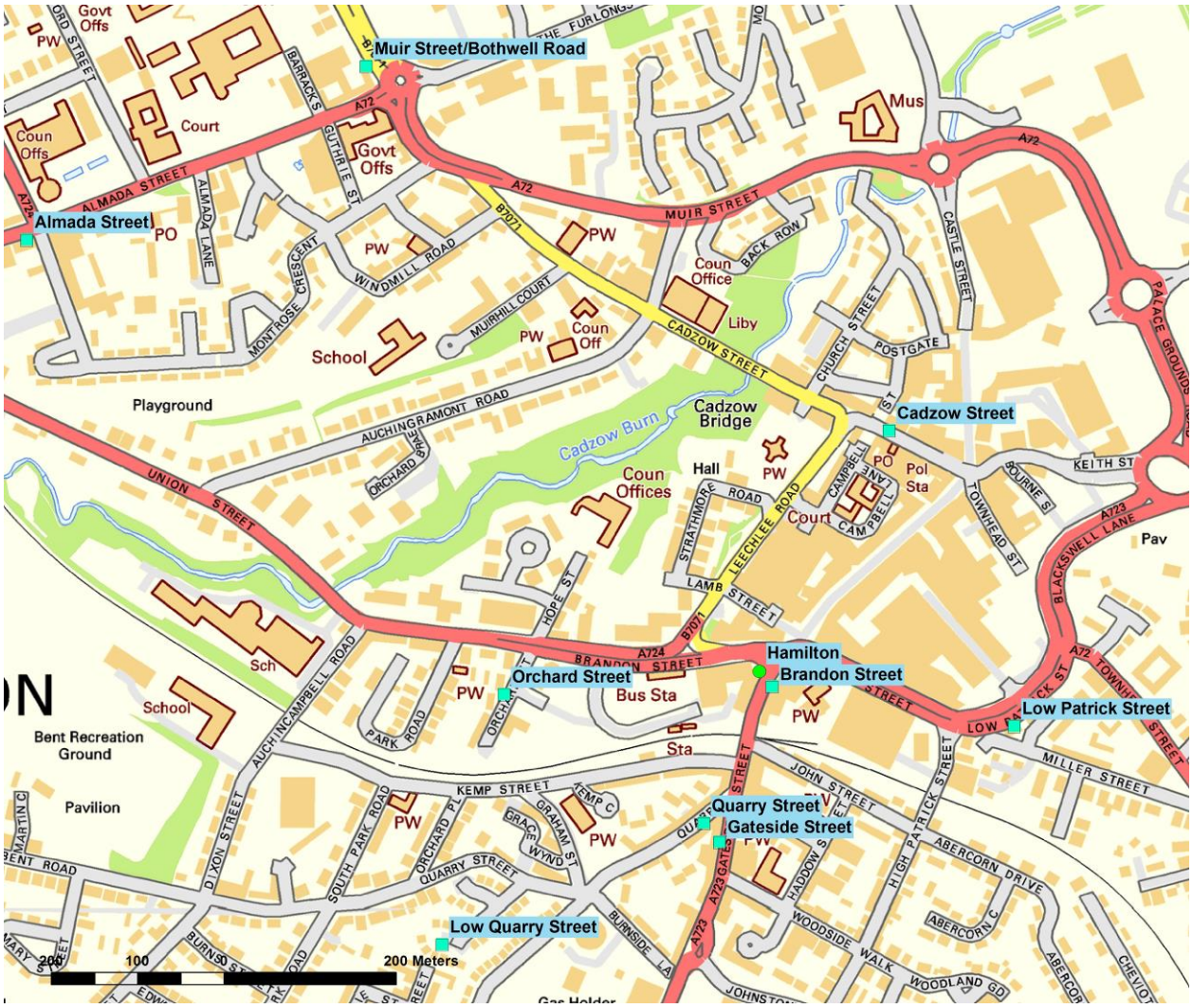


Figure 2.3: Monitoring locations (Hamilton centre)



N	Key: Diffusion tube Auto monitor	RICARDO-AEA **Contains Ordnance Survey data © Crown copyright and database right 2015**

Figure 2.4: Monitoring locations (Hamilton South)

N	Key: Diffusion tube	RICARDO-AEA **Contains Ordnance Survey data © Crown copyright and database right 2015**

Figure 2.5: Monitoring locations (Larkhall)

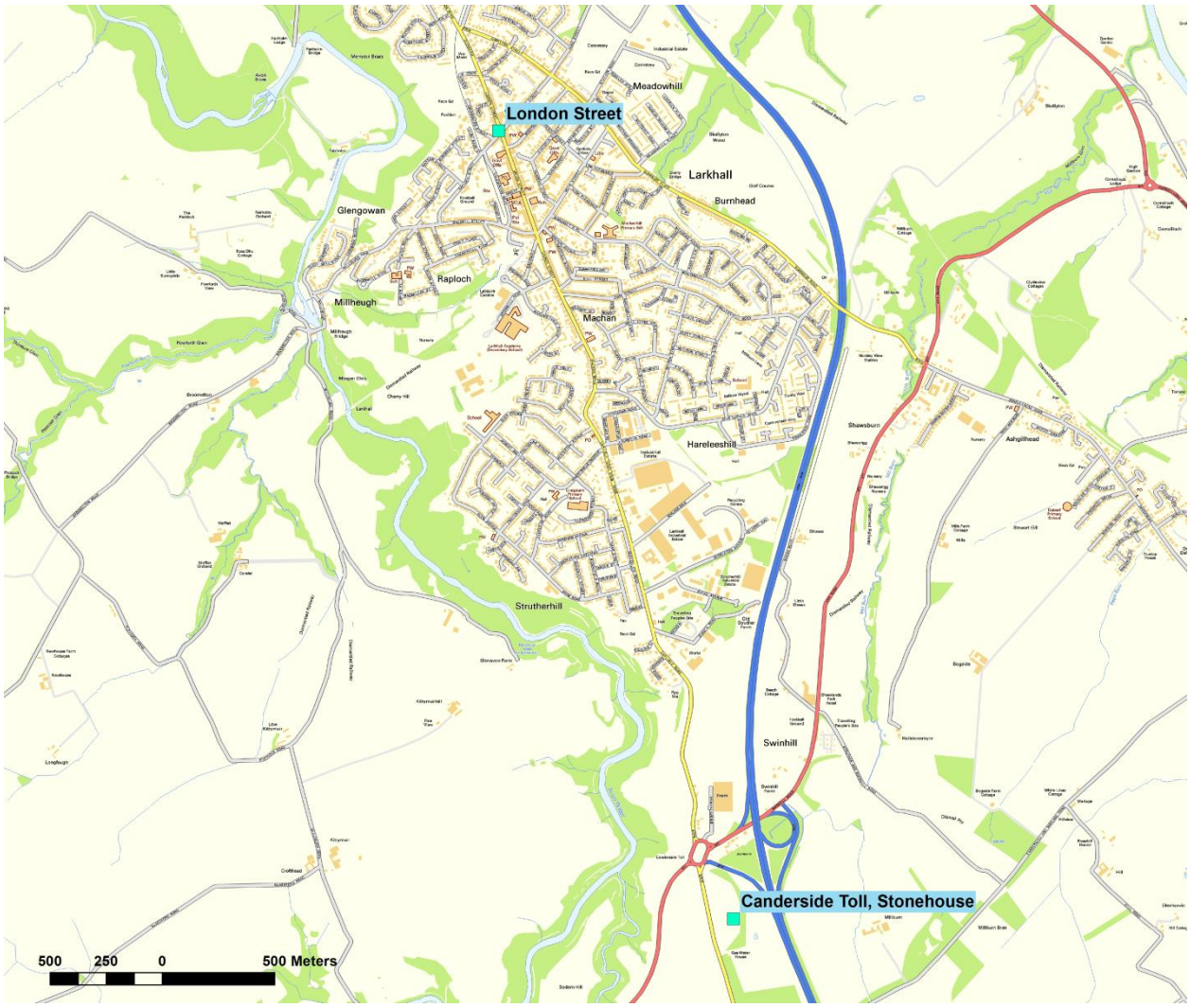


Figure 2.6: Monitoring locations (Carluke)

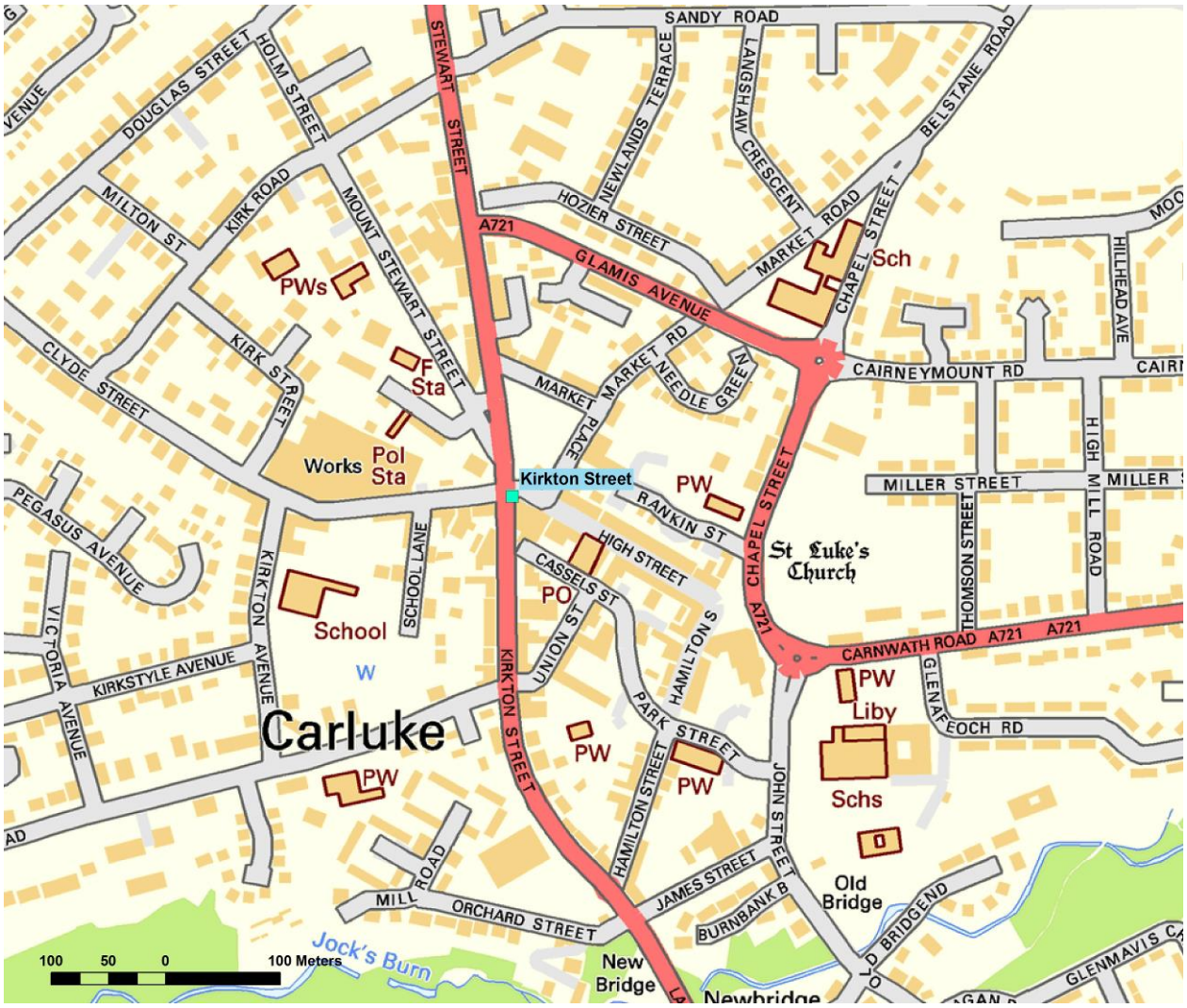


Figure 2.7: Monitoring locations (Lanark)

Key:

Diffusion tube

Auto monitor

RICARDO-AEA

Figure 2.8: Monitoring locations (Bothwell/Raith interchange)

Figure 2.9 Monitoring locations (Uddingston)

Figure 2.10 Monitoring locations (Cambuslang)

Figure 2.11 Monitoring locations (Rutherglen)

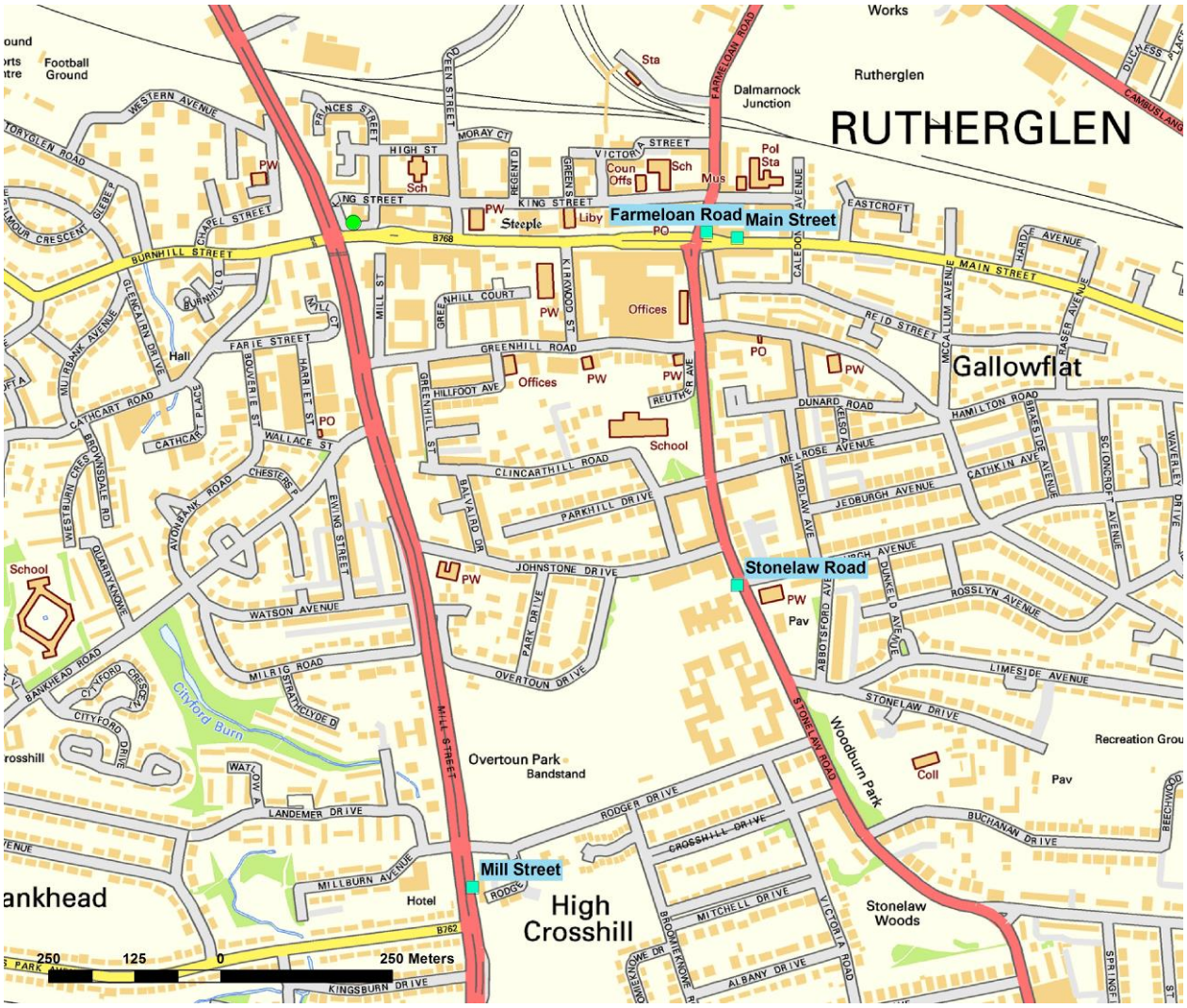


Table 2.1: Details of Automatic Monitoring Sites

Site Name	Site Type	OS Grid Ref		Pollutants Monitored	Monitoring technique	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Does this location represent worst-case exposure?
Rutherglen	Roadside	261128	661703	NO_2, PM_{10}	Chemiluminescense, FDMS	No	N (60m)	1-2m	Yes
Whirlies	Roadside	264370	655670	NO_2, PM_{10}	Chemiluminescense , FDMS	Yes	Y(10m)	1m	Yes
Raith Interchange	Roadside	271125	658320	NO_2, PM_{10}	Chemiluminescense, FDMS	No	N(60m)	1-2m	Yes
Lanark	Roadside	288426	643704	NO_2 , PM_{10}	Chemiluminescense, FIDAS	No	Y (2m)	1-2m	Yes
Hamilton	Roadside	272310	655276	NO_2, PM_{10}	Chemiluminescense, FDMS	No	Y(2m)	6-7m	Yes
Uddingston	Roadside	269663	660304	NO_2, PM_{10}	Chemiluminescense, FIDAS	No	Y(2m)	4-5m	Yes
Cambuslang	Roadside	269657	660305	PM_{10}	FDMS	No	Y(10m)	4-5m	Yes

Table 2.2: Details of Non-Automatic Monitoring Sites

Site Name	Site Type	OS Grid Ref		Pollutants Monitored	In AQMA?	Relevant Exposure?	Distance to kerb of nearest road	Worst-case Location?
(1) Civic Centre, East Kilbride	Roadside	263600	654194	NO_2	No	No	4m	Yes
(2) Kingsway, East Kilbride	Roadside	264378	655383	NO_2	Yes	No (20m)	8m	Yes
(3) Scott Hill, East Kilbride	Roadside	264424	655363	NO_2	No	Yes (5m)	2m	No
(4) Townhead Street, Strathaven	Roadside	270081	644523	NO_2	No	Yes (12m)	2m	No
(5) 179 Quarry Street, Hamilton	Roadside	272246	655099	NO_2	No	Yes (0m)	1.5m	Yes
(6) 129 Quarry Street, Hamilton	Roadside	272325	655258	NO_2	No	Yes (0.5m)	2.5m	Yes
(7) Cadzow Street, Hamilton	Roadside	272461	655556	NO_2	No	No	4m	Yes
(8) Duke Street/Low Patrick Street, Hamilton	Roadside	272606	655212	NO_2	No	Yes(1m)	1.5m	Yes
(9) Gateside Street, Hamilton	Roadside	272264	655077	NO_2	No	Yes (0m)	2.5m	Yes
(10) Almada Street, Hamilton	Roadside	271460	655778	NO_2	No	Yes (0m)	3m	Yes
(11) Muir Street/Bothwell Road	Roadside	271854	655980	NO_2	No	Yes (0m)	6m	Yes
(12) Low Quarry Gardens, Hamilton	Background	271942	654958	NO_2	No	n/a	n/a	n/a
(13) London Street, Larkhall	Kerbside	276090	651564	NO_2	No	Yes (1m)	0.5m	Yes
(14) Kirkton Street, Carluke	Roadside	284550	650579	NO_2	No	Yes (2m)	2m	Yes
(15) Hospitland Drive, Lanark	Background	289035	643842	NO_2	No	Yes (5m)	2m	No
(16) Bannatyne Street, Lanark	Roadside	288475	643675	NO_2	No	Yes (0m)	1m	Yes
(17) Wellgate, Lanark	Roadside	288173	643651	NO_2	No	Yes (5m)	2m	Yes
(18) 4 High Street/Bloomgate, Lanark	Roadside	288122	643685	NO_2	No	Yes (1m)	3m	Yes
(19) 51 High Street, Lanark	Roadside	288238	643675	NO_2	No	Yes(0m)	3m	Yes
(20) Main Street, Bothwell	Roadside	270574	658508	NO_2	No	Yes (2m)	2m	Yes
(21) Wordsworth Way, Bothwell	Background	270924	659109	NO_2	No	Yes (5m)	2m	No
(22) North British Road, Uddingston	Background	270180	660753	NO_2	No	Yes (5m)	3m	No

Site Name	Site Type	OS Grid Ref		Pollutants Monitored	In AQMA?	Relevant Exposure?	Distance to kerb of nearest road	Worst-case Location?
(23) Burnpark Avenue, Uddingston	Roadside	268948	661476	NO_2	No	Yes (5m)	30-40m (M74)	Yes
(24) 73 Main Street (St Andrews Hospice), Uddingston	Roadside	269620	660425	NO_2	No	Yes (0m)	5m	Yes
(25) 86 Main Street (Ding's express), Uddingston	Roadside	269571	660654	NO_2	No	Yes(0m)	3m	Yes
(26) Clydeford Road, Cambuslang (Moved Sep 2012)	Roadside	264482	661160	NO_2	No	Yes (30m)	1m	Yes
(26) Clydeford Road, Cambuslang (New site Sep 2012)	Roadside	264386	661119	NO_2	No	Yes (5m)	2m	Yes
(27) Cambuslang Road, Rutherglen	Roadside	263524	661835	NO_2	No	No	2m	No
(28) Farmeloan Road, Rutherglen	Roadside	261643	661689	NO_2	No	Yes (25m)	2m	Yes
(29) Stonelaw Road, Rutherglen	Roadside	261688	661174	NO_2	No	Yes (21m)	2m	Yes
(30) 263 Main Street, Rutherglen	Roadside	261688	661681	NO_2	No	Yes (0m)	2m	Yes
(31) Mill Street, Rutherglen	Roadside	261302	660734	NO_2	No	Yes (4m)	2.5m	Yes
(32) Main Street, Rutherglen Co Loc 1	Roadside	261116	661699	NO_2	No	Yes (10m)	2-3m	Yes
(33) Main Street, Rutherglen Co Loc 2	Roadside	261116	661699	NO_2	No	Yes (10m)	2-3m	Yes
(34) Main Street, Rutherglen Co Loc 3	Roadside	261116	661699	NO_2	No	Yes (10m)	2-3m	Yes
(35) Whirlies Roundabout,EK Co Loc 1	Roadside	264383	655663	NO_2	Yes	Yes (10m)	1m	Yes
(36) Whirlies Roundabout,EK Co Loc 2	Roadside	264383	655665	NO_2	Yes	Yes(10m)	1m	Yes
(37) Whirlies Roundabout, EK Co Loc 3	Roadside	264383	655667	NO_2	Yes	Yes(10m)	1m	Yes
(38) Maxwellton Dr, East Kilbride	Roadside	264920	655583	NO_2	No	Yes(10m)	1m	Yes

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

The annual mean NO_2 concentrations measured at the automatic monitoring sites in South Lanarkshire from 2009 to 2014 are presented in Table 2.3. Concentrations in excess of the 40 µg.m^{-3} objective are highlighted in bold.

Exceedances of the 40 µg.m^{-3} NO_2 annual mean objective were measured at the Rutherglen and Raith Interchange automatic sites during 2014. Neither of the sites are however at locations where the annual mean objective applies. Based on previous dispersion modelling at Rutherglen; and DMRB calculations at Raith Interchange conducted in previous rounds of review and assessment; it is considered unlikely that the 40 µg.m^{-3} objective is being exceeded at the closest location where relevant exposure is present.

The 1-hour mean objective was not exceeded at any of the automatic monitoring sites during 2014.

The trend in automatic measurement indicate that NO_2 annual means concentrations have on average been declining at Raith Interchange, Whirlies roundabout, East Kilbride; and Lanark.

Measured NO_2 annual mean concentrations appear to have been increasing at Uddingston over the last five years.

Table 2.3 NO_2 automatic Monitoring: Comparison with Annual Mean Objective

Site name	Within AQMA?	Site Type	Data Capture 2014 (%)	Annual mean concentrations (µg.m-3)					
				2009	2010	2011	2012	2013	2014
Rutherglen	No	Roadside	71%	**40.3**	24	37	39	36	**40.6**[#]
East Kilbride Whirlies	Yes	Roadside	94%	37.5	**49**	**41**	34[#]	29*	35
Raith Interchange	No	Roadside	28%	-	**61**	**56**	**56**	**51**	**46.3**[#]
Lanark	No	Roadside	83%	-	17	30	29	25	22
Hamilton	No	Roadside	96%	-	-	41*	42[$]	35	37
Uddingston	No	Roadside	100%	-	-	24*	31[$]	27	29

***no short to long term adjustment was applied, due to the sporadic nature of the date capture. As a result, these data should be used for indicative purposes only, similar to NO_2 diffusion tube data**

[#]Short-term to long-term adjustment applied as data capture < 75%

[$]Please note that the 2012 data highlighted are not reported as ratified due to insufficient calibration data, this was as a result of a change of contractor and an oversight in not including calibration within the renewed contract. This has since be rectified with a separate contract running which looks after site calibrations (presently undertaken by Ricardo AEA); a scaling factor of 1.000 ppb/mV has been assumed throughout 2012. As a result, these data should be used for indicative purposes only, similar to NO_2 diffusion tube data.

Chart 2.1 Trends in Annual Mean Nitrogen Dioxide Concentrations measures at Automatic Monitoring Sites

Table 2.4 NO_2 Automatic Monitoring results: Comparison with 1-hour mean Objective

Site name	Within AQMA?	Data Capture 2014 (%)	Number of exceedences of hourly mean objective (200 µg.m^{-3}) For data capture < 90%, the 99.79th %ile of 1-hr means is shown in brackets (µg.m^{-3})					
			2009	2010	2011	2012	2013	2014
Rutherglen	No	71%	0 (74)	0 (101)	0	1	1	0 (126)
East Kilbride, Whirlies	Yes	94%	4	27(201)	12	21(226)	5 (170)	7 (164)
Raith Interchange	No	28%	-	38(227)	0	4	1	1 (n/a)
Lanark	No	83%	-	0 (66)	0(120)	0	0	0 (96)
Hamilton	No	96%	-	-	1(124)*	0$	0	0
Uddingston	No	100%	-	-	0(107)*	1$	0	0
NB: For data capture < 90%, the 99.79th %ile of 1-hr means is shown in brackets (µg.m^{-3})								

Diffusion Tube Monitoring Data

Details of the annual mean NO_2 concentrations measured at diffusion tube sites during 2011 are presented in Table 2.5. The time series of results measured from 2009 to 2014 are presented in Table 2.6. Bar charts showing the trends in measured NO_2 annual mean concentrations are presented in Chart 2.2. For diffusion tube sites where data capture was less than 75%, short-term to long-term adjustment calculations have been applied. Details of the calculations are presented in Appendix A.

The bias adjustment factor of 0.74 from the national database of factors was used to adjust to adjust the diffusion tube results. A discussion of the choice of factor used is included in Appendix A.

At locations where measured annual mean concentrations were in excess of the 40 $\mu g.m^{-3}$ objective; distance correction calculations have been conducted to predict the annual mean concentration at the nearest location of relevant exposure. The calculation was conducted using the 'NO_2 with distance from road calculator' available to download on the Defra LAQM support website. The predicted annual mean concentrations at the nearest relevant exposure are presented in brackets in Table 2.5 at relevant tube locations.

Annual mean NO_2 concentrations in excess of the 40 $\mu g.m^{-3}$ objective were measured at two diffusion tube sites during 2014. The distance corrected NO_2 annual mean at the nearest location of relevant exposure was in excess of the 40 $\mu g.m^{-3}$ objective at one site only - site number (8) Duke Street/Low Patrick Street, Hamilton.

The latest (2014) Detailed Assessment of NO_2 in Hamilton which was based on measurements conducted during 2013 concluded that although the measured NO_2 annual mean at the Duke St/Low Patrick site during 2013 was exceeding the objective at 51.3 $\mu g.m^{-3}$; the modelled NO_2 annual mean at first floor height where the residential property windows are present at this location were all less than the 40 $\mu g.m^{-3}$ objective. The 2014 measured annual mean of 48.5 $\mu g.m^{-3}$ is less than the 51.3 $\mu g.m^{-3}$ 2013 measurement; therefore when considering this latest measurement in context with the conclusions of the latest Detailed Assessment it is very unlikely that exceedances of the objective are occurring where relevant exposure is present.

No annual mean NO_2 concentrations in excess of 60 $\mu g.m^{-3}$ were measured at any of the diffusion tube sites; it is therefore considered unlikely that there is a risk of the 1-hour mean NO_2 objective being exceeded at any of the tube locations.

No further action is required based on the 2014 NO_2 diffusion tube results.

Table 2.5: Results of Nitrogen Dioxide Diffusion Tubes in 2014

Site ID	Location	Town	Site Type	Within AQMA?	Triplicate or Co-located Tube	Data Capture 2014 (%)	Data < 9 months annualised (Y/N)	Distance corrected (Y/N)	2014 NO_2 annual mean concentration Bias Adjust factor = 0.74
1	Civic Centre	East Kilbride	Roadside	No	N	83%	N/A	N	16.9
2	Kingsway	East Kilbride	Roadside	Yes	N	83%	N/A	Y	41.6 (31.9)
3	Scott Hill	East Kilbride	Roadside	No	N	100%	N/A	N	14.8
4	Townhead Street	Strathaven	Roadside	No	N	75%	N/A	N	24.0
5	179 Quarry Street	Hamilton	Roadside	No	N	75%	N/A	N	25.7
6	129 Quarry Street	Hamilton	Roadside	No	N	42%	Y	N	25.9
7	Cadzow Street	Hamilton	Roadside	No	N	92%	N/A	N	24.4
8	Low Patrick Street/Duke Street	Hamilton	Roadside	No	N	100%	N/A	Y	48.5 (44.8)
9	Gateside Street	Hamilton	Roadside	No	N	75%	N/A	N	39.5
10	Almada Street	Hamilton	Roadside	No	N	42%	Y	N	27.4
11	Bothwell Road	Hamilton	Roadside	No	N	100%	N/A	N	25.9
12	Low Quarry Gardens	Hamilton	Background	No	N	100%	N/A	N	12.5
13	London Street	Larkhall	Kerbside	No	N	100%	N/A	N	23.7
14	Kirkton Street	Carluke	Roadside	No	N	92%	N/A	N	30.6
15	Hospitland Drive	Lanark	Background	No	N	42%	Y	N	11.2
16	Bannatyne Street	Lanark	Roadside	No	N	83%	N/A	N	32.8
17	Wellgate	Lanark	Roadside	No	N	92%	N/A	N	16.8
18	4 High Street / Bloomgate	Lanark	Roadside	No	N	83%	N/A	Y	34.1
19	51 High Street	Lanark	Roadside	No	N	92%	N/A	N	26.2
20	Main Street	Bothwell	Roadside	No	N	100%	N/A	N	24.7
21	Wordsworth Way	Bothwell	Background	No	N	92%	N/A	N	19.4
22	North British Road	Uddingston	Background	No	N	92%	N/A	N	24.6
23	Burnpark Avenue	Uddingston	Background	No	N	92%	N/A	N	26.5
24	81 Main Street	Uddingston	Roadside	No	N	67%	Y	N	32.8
25	86 Main Street	Uddingston	Roadside	No	N	100%	N/A	N	24.8

Site ID	Location	Town	Site Type	Within AQMA?	Triplicate or Co-located Tube	Data Capture 2014 (%)	Data < 9 months annualised (Y/N)	Distance corrected (Y/N)	2014 NO_2 annual mean concentration Bias Adjust factor = 0.74
26	Clydeford Road	Cambuslang	Roadside	No	N	100%	N/A	N	16.2
27	Cambuslang Road	Rutherglen	Roadside	No	N	100%	N/A	N	23.3
28	Farmeloan Road	Rutherglen	Roadside	No	N	100%	N/A	N	32.6
29	Stonelaw Road	Rutherglen	Roadside	No	N	100%	N/A	N	20.2
30	263 Main Street	Rutherglen	Roadside	No	N	67%	Y	N	29.9
31	Mill Street	Rutherglen	Roadside	No	N	100%	N/A	N	27.3
38	Maxwellton Drive	East Kilbride	Roadside	No	N	83%	N/A	N	21.0

( ) Brackets: distance correction calculations have been conducted to predict the annual mean concentrations at the nearest location of relevant exposure

Table 2.6: Results of Nitrogen Dioxide Diffusion Tubes (2009 to 2014)

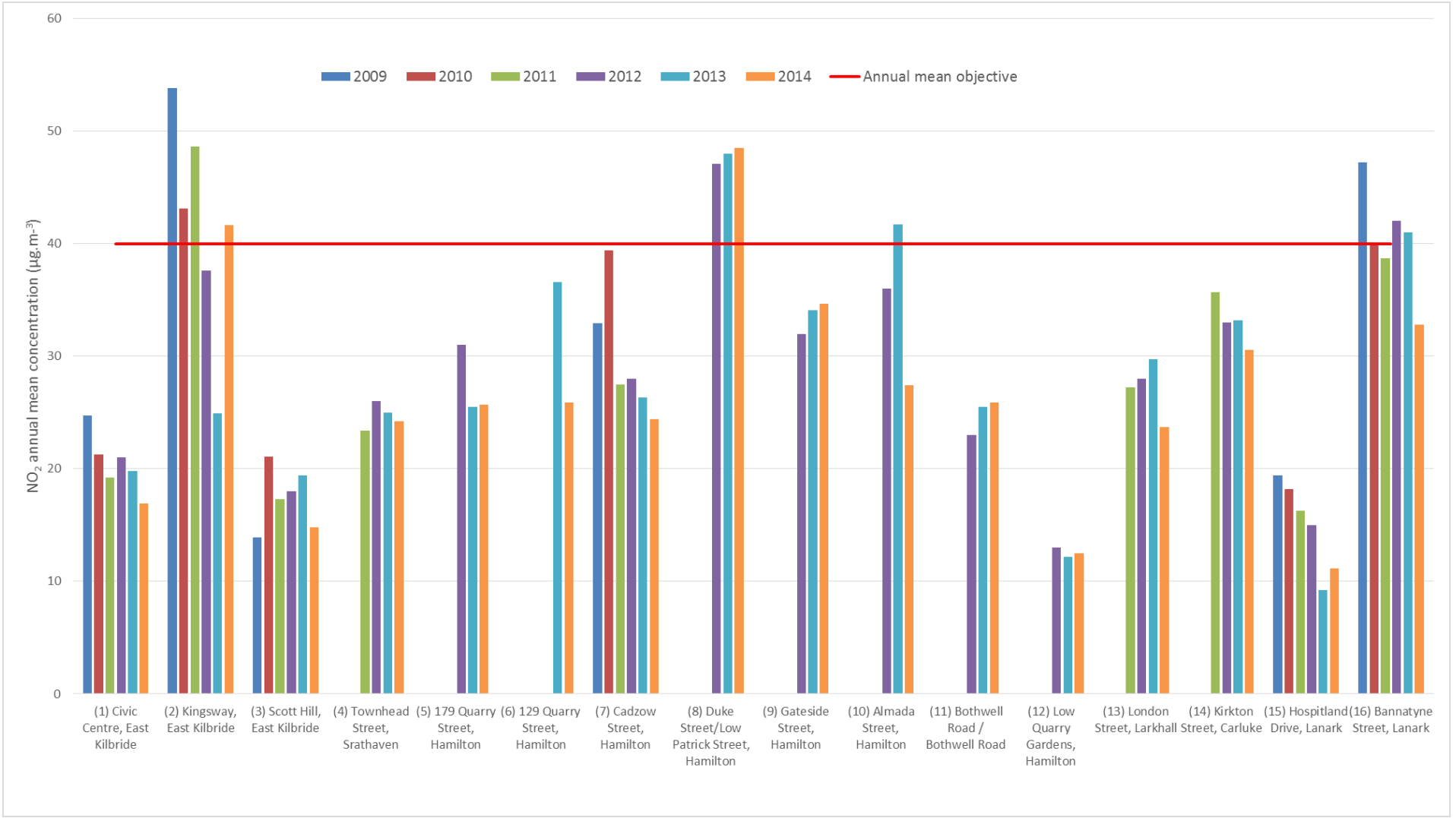
Location	Site Type	Within AQMA?	Bias adjusted NO_2 annual mean concentration ($\mu g.m^{-3}$)					
			2009 (Bias Adj. Factor = 0.98)	2010 (Bias Adj. Factor = 0.82)	2011 (Bias Adj. Factor = 0.84)	2012 (Bias Adj. Factor = 0.74)	2013 (Bias Adj. Factor = 0.79)	2014 (Bias Adj. Factor = 0.74)
(1) Civic Centre, East Kilbride	Roadside	No	24.7	21.3	19.2	21.0	19.8	16.9
(2) Kingsway, East Kilbride	Roadside	Yes	53.8	43.1	48.6	50 (37.6)	41.9 (24.9)	41.6 (31.9)
(3) Scott Hill, East Kilbride	Roadside	No	13.9	21.1	17.3	18.0	19.4	14.8
(4) Townhead Street, Strathaven	Roadside	No	-	-	23.4	26.0	25.0	24.0
(5) 179 Quarry Street, Hamilton	Roadside	No	-	-	-	31.0	25.5	25.7[#]
(6) 129 Quarry Street, Hamilton	Roadside	No	-	-	-	46 (45)	36.6	25.9
(7) Cadzow Street, Hamilton	Roadside	No	32.9	39.4	27.5	28.0	26.3	24.4
(8) Low Patrick Street/Duke Street, Hamilton	Roadside	No	-	-	-	50 (47.1)	51.3 (48.0)	48.5 (44.8)
(9) Gateside Street, Hamilton	Roadside	No	-	-	-	32.0	34.1	39.5[#]
(10) Almada Street, Hamilton	Roadside	No	-	-	-	36.0	41.7	27.4
(11) Bothwell Road, Hamilton	Roadside	No	-	-	-	23.0	25.5	25.9
(12) Low Quarry Gardens, Hamilton	Background	No	-	-	-	13.0	12.2	12.5
(13) London Street, Larkhall	Kerbside	No	-	-	27.2	28.0	29.7	23.7
(14) Kirkton Street, Carluke	Roadside	No	-	-	35.7	33.0	33.2	30.6
(15) Hospitland Drive, Lanark	Background	No	19.4	18.2	16.3	15.0	9.2	11.2
(16) Bannatyne Street, Lanark	Roadside	No	47.2	40.0	38.7	42 (42)	41.0	32.8
(17) Wellgate, Lanark	Roadside	No	-	-	19.8	21.0	21.1	16.8
(18) 4 High Street/Bloomgate, Lanark	Roadside	No	-	-	-	34.0	40.3 (38.0)	34.1 (32.1)
(19) 51 High Street, Lanark	Roadside	No	-	-	-	22.0	27.6	26.2
(20) Main Street, Bothwell	Roadside	No	-	-	-	29.0	29.0	24.7
(21) Wordsworth Way, Bothwell	Background	No	-	-	-	18.0	21.5	19.4
(22) North British Road, Uddingston	Background	No	31.4	33.4	25.5	30.0	27.5	24.6
(23) Burnpark Avenue, Uddingston	Roadside	No	31.9	32.5	25.4	31.0	29.8	26.5
(24) 81 Main Street (St Andrews Hospice), Uddingston	Roadside	No	-	-	-	29.0	33.3	32.8

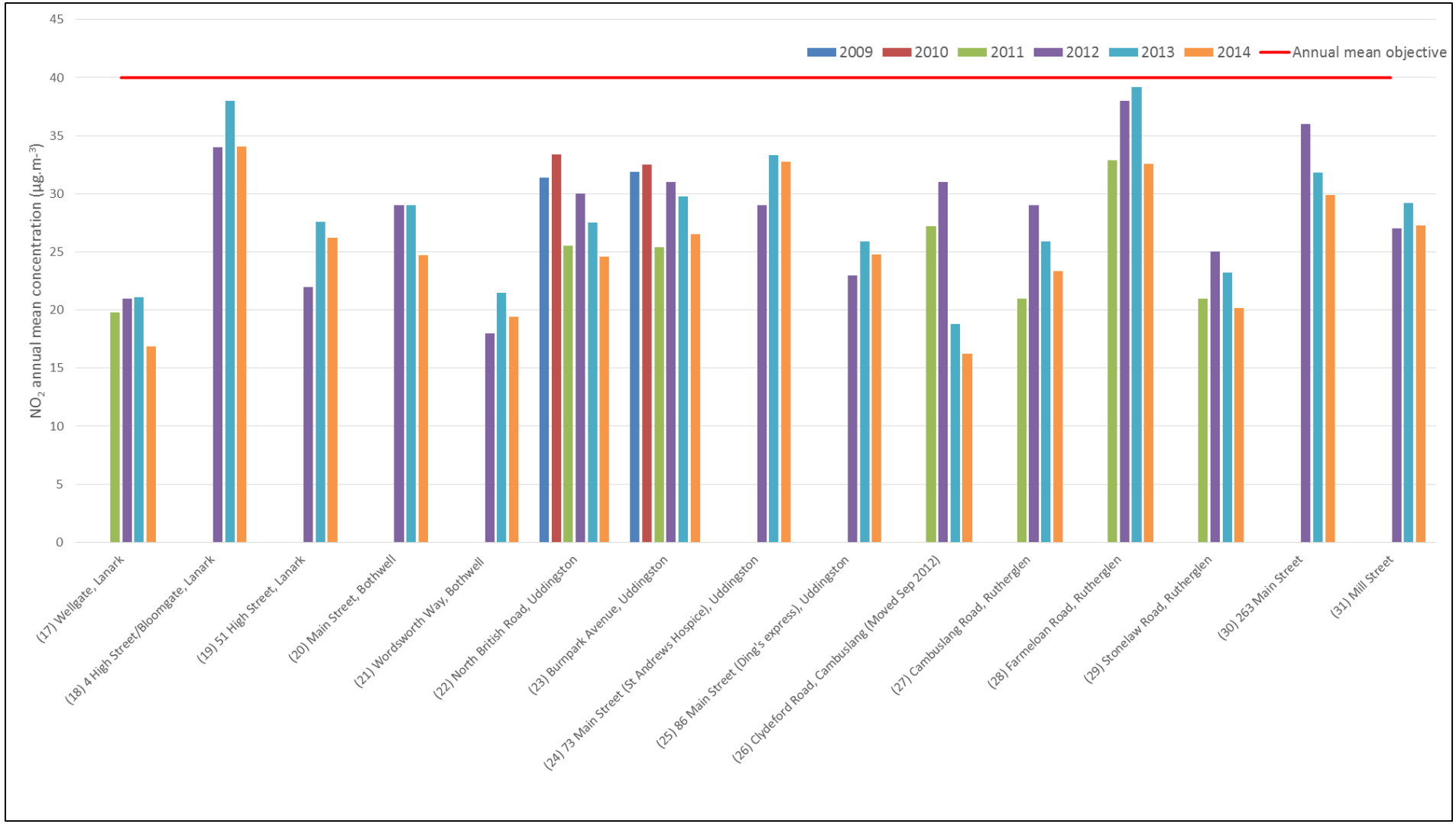
Location	Site Type	Within AQMA?	Bias adjusted NO_2 annual mean concentration ($\mu g.m^{-3}$)					
			2009 (Bias Adj. Factor = 0.98)	2010 (Bias Adj. Factor = 0.82)	2011 (Bias Adj. Factor = 0.84)	2012 (Bias Adj. Factor = 0.74)	2013 (Bias Adj. Factor = 0.79)	2014 (Bias Adj. Factor = 0.74)
(25) 86 Main Street (Ding's express), Uddingston	Roadside	No	-	-	-	23.0	25.9	24.8
(26) Clydeford Road, Cambuslang	Roadside	No	-	-	27.2	31.0	18.8	16.2
(27) Cambuslang Road, Rutherglen	Roadside	No	-	-	21.0	29.0	25.9	23.3
(28) Farmeloan Road, Rutherglen	Roadside	No	-	-	32.9	38.0	39.2	32.6
(29) Stonelaw Road, Rutherglen	Roadside	No	-	-	21.0	25.0	23.2	20.2
(30) 263 Main Street, Rutherglen	Roadside	No	-	-	-	36.0	31.8	29.9
(31) Mill Street	Roadside	No	-	-	-	27.0	29.2	27.3
(38) Maxwellton Dr, East Kilbride	Roadside		-	-	-	-	-	21.0
(1) Civic Centre, East Kilbride	Roadside	No	24.7	21.3	19.2	21.0	19.8	16.9
(2) Kingsway, East Kilbride	Roadside	Yes	53.8	43.1	48.6	50 (37.6)	41.9 (24.9)	41.6 (31.9)

( ) Brackets: distance correction calculations have been conducted to predict the annual mean concentrations at the nearest location of relevant exposure

[#]Short-term to long-term adjustment applied as data capture < 75%

Chart 2.2 Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Diffusion Tube Monitoring Sites




45
40
35
30
25
20
15
10
5
0
NO2 annual mean concentration (µg.m-3)
2009
2010
2011
2012
2013
2014
Annual mean objective
(17) Wellgate, Lanark
(18) 4 High Street/Bloomgate, Lanark
(19) 51 High Street, Lanark
(20) Main Street, Bothwell
(21) Wordsworth Way, Bothwell
(22) North British Road, Uddingston
(23) Burnpark Avenue, Uddingston
(24) 73 Main Street (St Andrews Hospice), Uddingston
(25) 86 Main Street (Ding's express), Uddingston
(26) Clydeford Road, Cambuslang (Moved Sep 2012)
(27) Cambuslang Road, Rutherglen
(28) Farmeloan Road, Rutherglen
(29) Stonelaw Road, Rutherglen
(30) 263 Main Street
(31) Mill Street

2.2.2 PM_{10}

The annual mean PM_{10} concentrations measured from 2009 to 2014 are presented in Table 2.7 and Chart 2.13. The number of 24-hour mean PM_{10} concentrations in excess of the 50 $\mu g.m^{-3}$ short-term objective; measured from 2008 to 2012 are presented in Table 2.8.

The annual mean PM_{10} concentration measured at Whirlies Roundabout in East Kilbride was equal to the 18 $\mu g.m^{-3}$ Scottish objective during 2014. PM_{10} concentrations did appear to be declining at this location over recent years but have increased again in 2014. The area around Whirlies Roundabout is currently an AQMA for PM_{10}.

An annual mean PM_{10} concentration in excess of the 18 $\mu g.m^{-3}$ Scottish objective was measured at the Rutherglen automatic monitoring site. South Lanarkshire Council is currently in the process of declaring an AQMA for PM_{10} at Rutherglen. Only one daily mean concentration in excess of the 50 $\mu g.m^{-3}$ short-term objective was measured at Rutherglen during 2014 and the equivalent 98th percentile (reported due to data capture < 75%) was less than 50 $\mu g.m^{-3}$, the short term objective was not therefore exceeded at Rutherglen during 2014. Examination of the last five years measurements indicates that measured annual mean PM_{10} concentrations have increased slightly over the last few years at this location. The 2014 results should however be considered in context with the low data capture and associated uncertainty introduced by adjusting a period mean into an annual mean.

At the Raith Interchange site an annual mean PM_{10} concentration of 22 $\mu g.m^{-3}$ was measured during 2014 with 2 exceedances of the 50 $\mu g.m^{-3}$ daily-mean objective measured. Data capture at this site was however very low (30%) during 2014. The 98th percentile of daily means was less than 50 $\mu g.m^{-3}$ therefore, based on the available monitoring data, the short-term PM_{10} objective was not exceeded during 2014.

The Raith interchange monitoring site is located approximately 60m from the nearest residential properties. Based on previous DMRB screening calculations conducted for the 2012 Updating and Screening assessment; and that measured PM_{10} concentrations are now lower than measured during 2012. It is considered very unlikely that the PM_{10} annual mean or short–term objectives are being exceeded at these nearest locations to the monitoring site where there is relevant exposure.

Examination of Chart 2.3 indicates that there is no clear trend in annual mean PM_{10} concentrations at any of the measurement sites

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

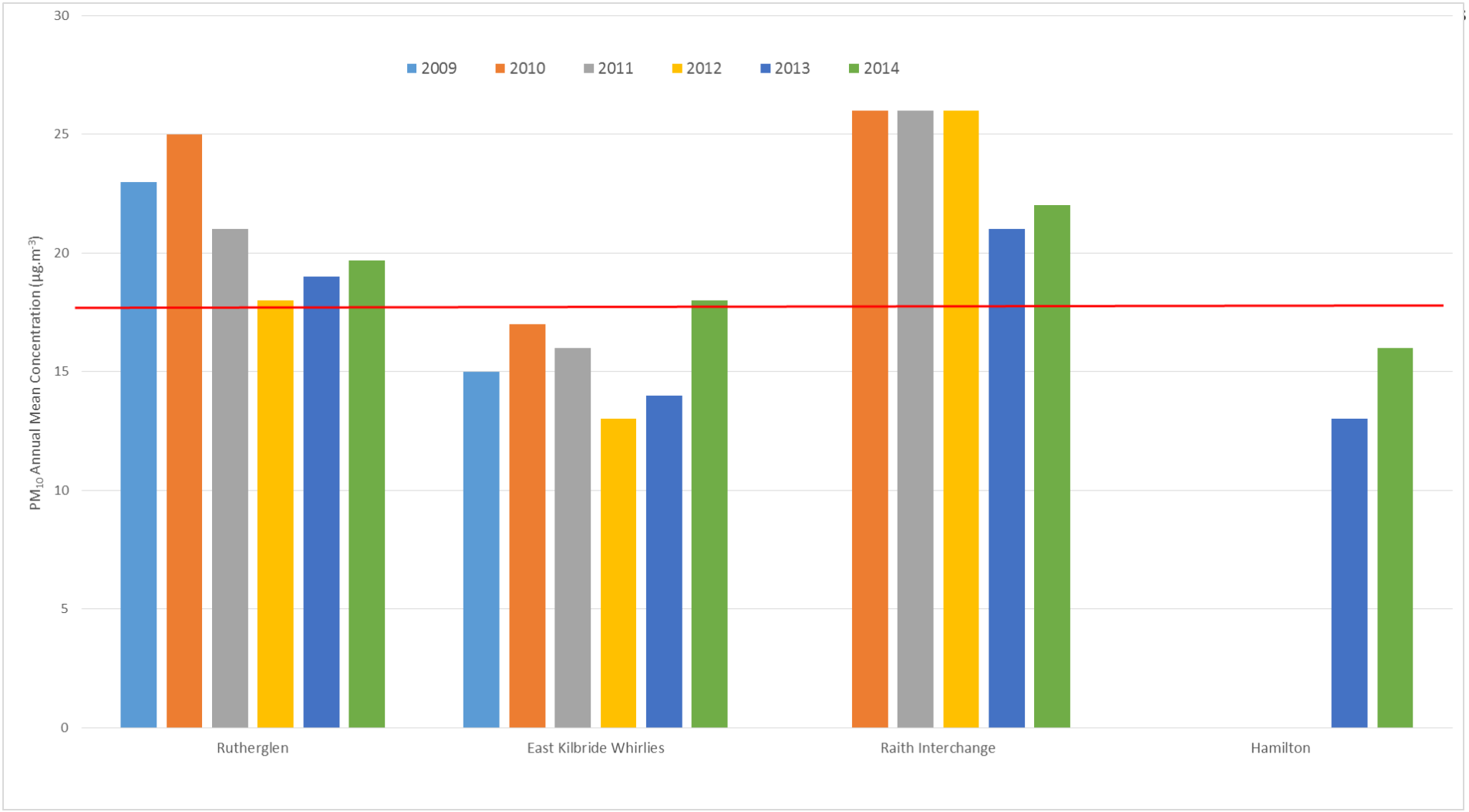
Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period (%)	Valid Data Capture 2014 (%)	Confirm Gravimetric Equivalent (Y or N/A)	Annual Mean Concentration (µg/m^3)					
						2009	2010	2011	2012	2013	2014
Rutherglen	Roadside	N	71%	71%	Y	**23**	**25**	**21**	**18**	**19**	**20#**
East Kilbride Whirlies	Roadside	Y	87%	87%	Y	15	17	16	13	14	**18**
Raith Interchange	Roadside	N	99%	30%	Y	-	**26**	**26**	**26**	**21#**	**22***
Hamilton	Roadside	N	98%	98%	Y	-	-	-	-	13*	16

#Short-term to long-term adjustment applied as data capture < 75%

***short to long term adjustment was applied. But due to low data capture, the data should be used for indicative purposes only. Details of the short-term to long-term adjustment calculation are presented in Appendix A.**

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 (%)	Valid Data Capture 2014 (%)	Confirm Gravimetric Equivalent (Y or N/A)	Number of Daily Means > 50µg/m3 (98.1th percentile in bracket if data capture < 75%)					
						2009	2010	2011	2012	2013	2014
Rutherglen	Roadside	N	71%	71%	Y	-	5	13	5	9	1 (38.8)
East Kilbride Whirlies	Roadside	Y	87%	87%	Y	5	5(81)	2	4	0	2
Raith Interchange	Roadside	N	30%	31%	Y	8 (56)	21	21	16	3 (48)	1 (47)
Hamilton	Roadside	N	98%	98%	Y	-	-	-	-	0 (31)	0


30
25
20
15
10
5
0
2009
2010
2011
2012
2013
2014
PM10 Annual Mean Concentration (µg.m-3)
Rutherglen
East Kilbride Whirlies
Raith Interchange
Hamilton

2.2.3 Sulphur Dioxide

South Lanarkshire Council do not currently measure SO_2 concentrations.

2.2.4 Benzene

South Lanarkshire Council do not currently measure Benzene concentrations.

2.2.5 Other pollutants monitored

South Lanarkshire Council does not undertake monitoring of any other pollutants.

2.2.6 Summary of Compliance with AQS Objectives

South Lanarkshire Council has examined the results from monitoring within the council area. Concentrations outside of the existing AQMA and AQMA's pending declaration are all below the objectives at relevant locations; hence there is no need to proceed to a Detailed Assessment.

3 Road Traffic Sources

The Council Roads Services Department have advised that there were no new or significantly changed road traffic sources, as per the screening criteria, that have not been previously assessed. It was therefore concluded that there have been no significant changes to emissions from traffic sources within the Council area since the 2011 Updating and Screening Assessment.

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

South Lanarkshire Council confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

3.2 Busy Streets Where People May Spend 1-hour or More Close to Traffic

South Lanarkshire Council confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

3.3 Roads with a High Flow of Buses and/or HGVs.

South Lanarkshire Council confirms that there are no new/newly identified roads with high flows of buses/HDVs.

3.4 Junctions

South Lanarkshire Council confirms that there are no new/newly identified busy junctions/busy roads.

3.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment

South Lanarkshire Council confirms that there are no new/proposed roads.

3.6 Roads with Significantly Changed Traffic Flows

South Lanarkshire Council confirms that there are no new/newly identified roads with significantly changed traffic flows.

3.7 Bus and Coach Stations

First Bus has a depot in Blantyre, consisting of a fleet of 200 – 230 buses at which there is a bus flow of 1000 vehicles per day. As this is less than the value of 2,500 vehicles per day set out in TG(09), no further action is currently required.

South Lanarkshire Council confirms that there are no relevant bus stations in the Local Authority area.

4 Other Transport Sources

4.1 Airports

South Lanarkshire Council confirms that there are no airports in the Local Authority area.

4.2 Railways (Diesel and Steam Trains)

4.2.1 Stationary Trains

South Lanarkshire Council confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

4.2.2 Moving Trains

South Lanarkshire Council confirms that there are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

4.3 Ports (Shipping)

South Lanarkshire Council confirms that there are no ports or shipping that meet the specified criteria within the Local Authority area.

5 Industrial Sources

5.1 Industrial Installations

5.1.1 New or Proposed Installations for which an Air Quality Assessment has been Carried Out

South Lanarkshire Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.1.2 Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been Introduced

South Lanarkshire Council confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

5.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment

South Lanarkshire Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.2 Major Fuel (Petrol) Storage Depots

There are no major fuel (petrol) storage depots within the Local Authority area.

5.3 Petrol Stations

South Lanarkshire Council confirms that there are no petrol stations meeting the specified criteria**.**

5.4 Poultry Farms

South Lanarkshire Council confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

Since the last round of review and assessment a number of biomass installations have been identified for screening within the South Lanarkshire Council area. The method described TG(09), Box 5.8 has been used. The relevant nomograms were used to assess if the individual installations were exceeding the relevant pollutant emission rate for NO_2 and PM_{10}. None of the Biomass sources assessed exceeded the threshold values presented in TG(09).

South Lanarkshire Council has assessed all new biomass combustion plant installed during the last round of review and assessment, and has concluded that it will not be necessary to proceed to a Detailed Assessment.

6.2 Biomass Combustion – Combined Impacts

South Lanarkshire Council has recently commissioned a project to create a GIS based tool which will assess the combined impacts of Biomass Combustion across the council area; therefore additional assessments are not required at this stage.

6.3 Domestic Solid-Fuel Burning

The Council was granted £1,670,113 for investment in Energy Efficiency Measures in 2014/2015 through the Scottish Government's Home Energy Efficiency Programme for Scotland (HEEPS). The investment, which is targeted at fuel poor households across Scotland, will be used for the installation of energy efficiency measures such as solid wall, cavity and loft insulation.
The bulk of Council housing stock now have energy efficient gas central heating boilers.

South Lanarkshire Council confirms that there are no areas of significant domestic fuel use in the Local Authority area.

7 Fugitive or Uncontrolled Sources

South Lanarkshire Council has assessed all potential sources of fugitive particulate emissions in the previous round of review and assessment. No new fugitive or uncontrolled sources have been identified since 2012.

South Lanarkshire Council has sources of fugitive particulate matter emissions in the Local Authority area, and has concluded that it is not necessary to proceed to a Detailed Assessment at this time.

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

8.1.1 NO_2 measurements

Exceedances of the 40 $\mu g.m^{-3}$ NO_2 annual mean objective were measured at the Rutherglen and Raith Interchange automatic sites during 2014. Neither of the sites are however at locations where the annual mean objective applies. Based on previous dispersion modelling at Rutherglen; and DMRB calculations at Raith Interchange conducted in previous rounds of review and assessment; it is considered unlikely that the 40 $\mu g.m^{-3}$ objective is being exceeded at the closest location where relevant exposure is present.

The 1-hour mean objective was not exceeded at any of the automatic monitoring sites during 2014.

The trend in automatic measurement indicate that NO_2 annual means concentrations have on average been declining at Raith Interchange, Whirlies roundabout, East Kilbride; and Lanark. Measured NO_2 annual mean concentrations appear to have been increasing at Uddingston over the last five years.

Annual mean NO_2 concentrations in excess of the 40 $\mu g.m^{-3}$ objective were measured at two diffusion tube sites during 2014. The distance corrected NO_2 annual mean at the nearest location of relevant exposure was in excess of the 40 $\mu g.m^{-3}$ objective at one site only - site number (8) Duke Street/Low Patrick Street, Hamilton. However, when considering this latest measurement in context with the conclusions of the Detailed Assessment conducted at this location in 2014 it is very unlikely that exceedances of the objective are occurring where relevant exposure is present.

No annual mean NO_2 concentrations in excess of 60 $\mu g.m^{-3}$ were measured at any of the diffusion tube sites; it is therefore unlikely that there is a risk of the 1-hour mean NO_2 objective being exceeded at any of the tube locations.

No further action is required based on the 2014 NO_2 diffusion tube results.

8.1.2 PM_{10} measurements

The annual mean PM_{10} concentration measured at Whirlies Roundabout in East Kilbride was equal to the 18 $\mu g.m^{-3}$ Scottish objective during 2014. PM_{10} concentrations did appear to be declining at this location over recent years but have increased again in 2014. The area around Whirlies Roundabout is currently an AQMA for PM_{10} so no further action is required based on this measurement.

An annual mean PM_{10} concentration in excess of the 18 $\mu g.m^{-3}$ Scottish objective was measured at the Rutherglen automatic monitoring site. The daily mean objective was not exceeded at Rutherglen during 2014. South Lanarkshire Council is currently in the process of declaring an AQMA for exceedance of the PM_{10} annual mean objective at Rutherglen. Examination of the last five years measurements indicates that measured annual mean PM_{10} concentrations have increased slightly over the last few years at this location. The 2014 results should however be considered in context with the low data capture and associated uncertainty introduced by adjusting a short-term period mean into an annual mean.

At the Raith Interchange site an annual mean PM_{10} concentration of 22 $\mu g.m^{-3}$ was measured during 2014 with 2 exceedances of the 50 $\mu g.m^{-3}$ daily-mean objective measured. Data capture at this site was however very low (30%) during 2014. The 98th percentile of daily means was less than 50 $\mu g.m^{-3}$

therefore, based on the available monitoring data, the short-term PM_{10} objective was not exceeded during 2014.

Based on DMRB screening calculations conducted in 2012; and that measured PM_{10} concentrations are now lower than measured during 2012. It is considered very unlikely that the PM_{10} annual mean or short–term objectives are being exceeded at these nearest locations to the monitoring site where there is relevant exposure.

8.2 Conclusions from Assessment of Sources

The review of potential pollutant sources has not identified any locations where there may be a risk of the air quality objectives being exceeded; therefore no additional assessments are recommended at this time.

8.3 Proposed Actions

This Updating and Screening assessment has not identified any requirement to proceed to a Detailed Assessment at any location.

The next LAQM requirements for South Lanarkshire Council are:

- Finalise the Whirlies Roundabout AQMA Action Plan
- Complete consultation on suggested AQMA boundary lines and declare AQMA at Rutherglen for PM_{10}
- Complete consultation on suggested AQMA boundary lines and declare AQMA at Lanark for NO_2
- Initiate the action planning process for the pending Rutherglen and Lanark AQMA's and prepare a draft action plan for each.
- Submit 2016 Progress Report

Appendices

Appendix A: QA/QC Data

Appendix A: QA/QC Data

QA/QC of automatic monitoring

All of South Lanarkshire Council's automatic monitoring sites are calibrated and audited by Ricardo-AEA Ltd whereby monitoring data are managed to the same procedures and standards as AURN sites.

PM Monitoring Adjustment

All PM_{10} measurements were made using TEOM analysers fitted with FDMS units. The measurements are therefore considered gravimetric equivalent and no adjustments have been applied to the data. All TEOM FDMS data were fully ratified by Ricardo-AEA to AURN standards.

QA/QC of diffusion tube monitoring

All passive diffusion tubes (PDT) for NO_2 measurements were prepared and analysed by Edinburgh Scientific Services. The PDTs were prepared using the 50% triethanolamine (TEA) in water method. Edinburgh Scientific Services is a UKAS accredited laboratory with documented Quality Assurance/Quality Control (QA/QC) procedures for diffusion tube analysis.

Edinburgh Scientific Services participates in the HSL WASP NO_2 PT rounds and the percentage (%) of results submitted which were subsequently determined to be satisfactory during the previous five rounds in 2013 and 2014 based upon a z-score of $< \pm 2$ were as follows:

- Oct - Dec 2013: 100%
- Jan - Mar 2014: 100%
- Apr - Jun 2014: 100%
- July - Sep 2014: 100%
- Oct - Dec 2014: 100%

Over a rolling five round WASP window, it is expected that 95 % of laboratory results should be $\leq \pm 2$. If this percentage is substantially lower than 95 % for a particular laboratory, within this five round window, then one can conclude that the laboratory in question may have significant systematic sources of bias in their assay. In this case the average percentage over the last five rounds is 100%.

Diffusion Tube Bias Adjustment Factors

Two co-location studies were conducted during 2014 at the Whirlies Roundabout and Rutherglen monitoring sites where NO_2 concentrations are measured using automatic analysers. Bias adjustment factors have been calculated for each site. Details of the co-location factor calculations, including the precision checks are presented in Figures A.1 to A.2. The bias factor from the national database is presented in Fig A.3.

Figure A.1: Co-location study – Whirlies Roundabout East Kilbride

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	31/12/2013	05/02/2014	36.8	31.1	34.6	34	2.9	8	7.1	34.13514	100	Good	Good
2	05/02/2014	05/03/14	53.2	59.1	52.6	55	3.6	7	8.9	32.86207	100	Good	Good
3	05/03/2014	02/04/2014								33.51724	100		Good
4	02/04/2014	30/04/2014	57.8	56.9	62.4	59	3.0	5	7.3	38.03448	100	Good	Good
5	30/04/2014	04/06/14	35.3	31.3	34.0	34	2.0	6	5.1	34	80	Good	Good
6	04/06/2014	09/07/2014	26.6	26.2	26.7	27	0.3	1	0.7	30	63	Good	or Data Capture
7	09/07/2014	06/08/2014	47.8	48.7		48	0.6	1	5.7	29	93	Good	Good
8	06/08/2014	10/09/2014	31.0	31.0	25.3	29	3.3	11	8.2	29	100	Good	Good
9	10/09/2014	11/10/2014	1.3	46.7	43.9	31	25.4	83	63.2	42	100	Poor Precision	Good
10	11/10/2014	08/11/2014	38.8	40.7	42.2	41	1.7	4	4.2	36	100	Good	Good
11	08/11/2014	06/12/2014	59.8	53.6	60.8	58	3.9	7	9.7	47.89286	96	Good	Good
12	06/12/2014	10/01/2015	22.0	28.8	35.5	29	6.8	23	16.8	33.25714	100	Poor Precision	Good
13													
											Overall survey -->	Good precision	Good Overall DC

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

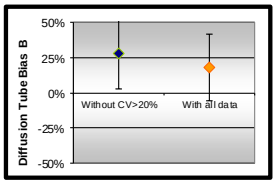
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Whirlies Roundabout

Precision 9 out of 11 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 8 periods of data	
Bias factor A	0.79 (0.66 - 0.98)
Bias B	27% (2% - 53%)
Diffusion Tubes Mean:	45 µgm^{-3}
Mean CV (Precision):	6
Automatic Mean:	35 µgm^{-3}
Data Capture for periods used:	96%
Adjusted Tubes Mean:	35 (30 - 44) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 10 periods of data	
Bias factor A	0.85 (0.71 - 1.07)
Bias B	17% (-7% - 41%)
Diffusion Tubes Mean:	42 µgm^{-3}
Mean CV (Precision):	16 caution
Automatic Mean:	36 µgm^{-3}
Data Capture for periods used:	97%
Adjusted Tubes Mean:	35 (30 - 45) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

If you have any enquiries about this spreadsheet please contact the LAQM Helpdesk at: LAQMHelpdesk@uk.bureauveritas.com

Figure A.2: Co-location study – Rutherglen

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	31/12/2013	05/02/2014	37.1	31.8	33.1	34	2.8	8	6.9	40.94286	94	Good	Good
2	05/02/2014	05/03/14	59.5	63.9	69.2	64	4.9	8	12.1	33.78571	100	Good	Good
3	05/03/2014	02/04/2014								34.91667	82		Good
4	02/04/2014	30/04/2014								43.86207	100		Good
5	30/04/2014	04/06/14								43	100		Good
6	04/06/2014	09/07/2014								35	49		or Data Capture
7	09/07/2014	06/08/2014									0		or Data Capture
8	06/08/2014	10/09/2014									0		or Data Capture
9	10/09/2014	11/10/2014	19.6	1.8		11	12.6	118	113.1	49	61	Poor Precision	or Data Capture
10	11/10/2014	08/11/2014	36.9	43.5	45.2	42	4.4	10	10.9	49	100	Good	Good
11	08/11/2014	06/12/2014	54.5	52.4	60.1	56	4.0	7	9.9	54.47368	64	Good	or Data Capture
12	06/12/2014	10/01/2015	37.8	25.7	34.7	33	6.3	19	15.6	42.74286	100	Good	Good
13													
											Overall survey -->	Good precision	Poor Overall DC

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

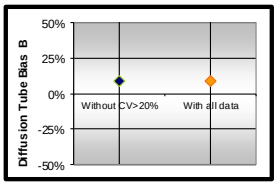
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Rutherglen

Precision 5 out of 6 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 4 periods of data	
Bias factor A	0.96 (0.53 - 5.6)
Bias B	4% (-82% - 90%)
Diffusion Tubes Mean:	43 µgm^{-3}
Mean CV (Precision):	11 caution
Automatic Mean:	42 µgm^{-3}
Data Capture for periods used:	99%
Adjusted Tubes Mean:	41 (23 - 242) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 4 periods of data	
Bias factor A	0.96 (0.53 - 5.6)
Bias B	4% (-82% - 90%)
Diffusion Tubes Mean:	43 µgm^{-3}
Mean CV (Precision):	11 caution
Automatic Mean:	42 µgm^{-3}
Data Capture for periods used:	99%
Adjusted Tubes Mean:	41 (23 - 242) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Figure A.3: Edinburgh Scientific Services – National average bias adjustment factor

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 06/13

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

This spreadsheet will be updated at the end of September 2013
LAQM Helpdesk Website

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

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

Step 1:	Step 2:	Step 3:	Step 4:
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.
If a laboratory is not shown, we have no data for this laboratory.	If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data[2]	If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953

Analysed By[1]	Method (To undo your selection, choose (All) from the pop-up list)	Year[5] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision[6]	Bias Adjustment Factor (A) (Cm/Dm)
Edinburgh Scientific Services	50% TEA in acetone	2012	KS	Marylebone Road Intercomparison	12	110	95	16.0%	G	**0.86**
Edinburgh Scientific Services	50% TEA in acetone	2012	R	Stirling Council	11	30	29	4.5%	G	**0.96**
Edinburgh Scientific Services	50% TEA in acetone	2012	R	City Of Edinburgh Council	11	46	39	16.7%	G	**0.86**
Edinburgh Scientific Services	50% TEA in acetone	2012	R	City Of Edinburgh Council	10	73	52	41.3%	G	**0.71**
Edinburgh Scientific Services	50% TEA in acetone	2012	R	City Of Edinburgh Council	12	43	28	52.8%	G	**0.65**
Edinburgh Scientific Services	50% TEA in acetone	2012	R	City Of Edinburgh Council	12	38	30	24.9%	G	**0.80**
Edinburgh Scientific Services	50% TEA in acetone	2012	KS	City Of Edinburgh Council	11	76	56	34.5%	G	**0.74**
Edinburgh Scientific Services	50% TEA in acetone	2012		**Overall Factor[3] (7 studies)**				**Use**		**0.78**

Discussion of Choice of Factor to Use

The bias adjustment factor of 0.78 from the combined national database of adjustment factors was used to adjust the 2014 diffusion tube results. This adjustment factor was considered most appropriate because:

- There was very poor data capture at the Rutherglen automatic monitoring site during 2014
- The adjustment factor derived from the co-location study at Whirlies Roundabout of 0.79 is very close to the national factor of 0.78, there were however some periods with poor precision.

Short-term to Long-term Data Adjustment

A short to long term data adjustment was applied to eleven annual mean NO_2 diffusion tube measurements where the data capture was less than 75%. Adjustment ratios were calculated as presented in Tables A.4 to A.8.

- (6) 129 Quarry Street, Hamilton
- (10) Almada Street, Hamilton
- (15) Hospitland Drive, Lanark
- (24) 73 Main Street (St Andrews Hospice), Uddingston
- (30) 263 Main Street, Rutherglen

Table A.1 Tube 6. 129 Quarry Street, Hamilton

Long term site	Annual Mean	Period Mean	Ratio (Am/Pm)
Glasgow Townhead	27.0	29.2	0.927
Bush Estate	6.5	10.0	0.648
Peebles	6.1	11.0	0.552
Eskdalemuir	2.3	2.8	0.821
		Average Ratio	0.737

Table A.2: Tube 10. Almada Street, Hamilton

Long term site	Annual Mean	Period Mean	Ratio (Am/Pm)
Glasgow Townhead	27.0	32.9	0.823
Bush Estate	6.5	7.5	0.871
Peebles	6.1	8.6	0.706
Eskdalemuir	2.3	3.1	0.752
		Average Ratio	0.788

Table A.2: Tube 15 Hospitland Drive, Lanark

Long term site	Annual Mean	Period Mean	Ratio (Am/Pm)
Glasgow Townhead	27.0	30.4	0.890
Bush Estate	6.5	7.0	0.933
Peebles	6.1	7.6	0.794
Eskdalemuir	2.3	2.6	0.875
		Average Ratio	0.873

Table A.2: Tube 24. 73 Main Street (St Andrews Hospice), Uddingston

Long term site	Annual Mean	Period Mean	Ratio (Am/Pm)
Glasgow Townhead	27.0	29.7	0.912
Bush Estate	6.5	7.3	0.892
Peebles	6.1	7.2	0.842
Eskdalemuir	2.3	2.7	0.867
		Average Ratio	0.878

Table A.2: Tube 30. 263 Main Street, Rutherglen

Long term site	Annual Mean	Period Mean	Ratio (Am/Pm)
Glasgow Townhead	27.0	29.7	0.912
Bush Estate	6.5	7.3	0.892
Peebles	6.1	7.2	0.842
Eskdalemuir	2.3	2.7	0.867
		Average Ratio	0.878

A short to long term data adjustment was applied to the annual mean NO_2 of the automatic monitoring at Rutherglen and Raith Interchange where the data capture was less than 75% during 2014. Adjustment ratios were calculated as presented in Tables A.9 to A.10.

Table A.9: Rutherglen automatic monitoring site NO_2 adjustment

Long term site	Annual Mean	Period Mean	Ratio (Am/Pm)
Glasgow Townhead	27.0	28.8	0.937
Bush Estate	6.5	6.8	0.964
		Average Ratio	0.951

Table A.10 Raith Interchange automatic monitoring site NO_2 adjustment

Long term site	Annual Mean	Period Mean	Ratio (Am/Pm)
Glasgow Townhead	27.0	30.2	0.896
Bush Estate	6.5	8.6	0.758
		Average Ratio	0.827

A short to long term data adjustment was applied to the annual mean PM_{10} of the automatic monitoring at Rutherglen and Raith Interchange where the data capture was less than 75%. Adjustment ratios were calculated as presented in Tables A.11 to A.12.

Table A.11: Raith Interchange Automatic site PM_{10} adjustment

Long term site	Annual Mean	Period Mean	Ratio (Am/Pm)
Perth Muriton	10.3	10.0	1.028
Glasgow Townhead	13.1	13.7	0.956
Auchencorth Moss	8.1	8.1	1.003
		Average Ratio	0.996

Table A.12 Rutherglen Automatic site PM_{10} adjustment

Long term site	Annual Mean	Period Mean	Ratio (Am/Pm)
Perth Muriton	10.3	9.8	1.046
Glasgow Townhead	13.1	13.3	0.984
Auchencorth Moss	8.1	7.7	1.054
		Average Ratio	1.028