2011 Air Quality Progress Report for South Lanarkshire Council

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

October, 2011)

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South Lanarkshire Council

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Executive Summary

This Air Quality Progress Report has been prepared for South Lanarkshire Council as part of the Local Air Quality Management (LAQM) system introduced in Part IV of the Environment Act 1995. The Local Air Quality Management Technical Guidance LAQM.TG (09)[2] has been followed in the preparation of this report.

A review of new pollutant monitoring data and atmospheric emission sources within the South Lanarkshire Council area has been undertaken. The assessment compared the available monitoring data to national air quality standards in order to identify any locations where pollutant concentrations are in excess of the standards.

The review of new and changed emission sources identified no new sources that were likely to result in an exceedence of the NAQS objectives.

Analysis of the 2010 Nitrogen Dioxide (NO_2) and Particulate Matter (PM_{10}) monitoring data concluded the following:-

- Measured annual mean NO_2 concentrations have increased across the entire diffusion tube network in 2010 when compared to 2009.
- The measurements at Rutherglen reinforce the findings of the detailed assessment conducted at this location in 2010 and the need to declare an AQMA for PM_{10}.
- The measured annual mean NO_2 concentration at Whirlies Roundabout was in excess of the objective in 2010 and has increased year on year since 2008. The annual mean PM_{10} concentration measured at Whirlies during 2010 has also shown a slight increase since 2009 but is still significantly less than the concentration measured in 2008 and is now below the 18 $\mu g.m^{-3}$ Scottish objective. The current AQMA at this location is for PM_{10} only.
- Data capture at the automatic monitor at Bannatyne Street, Lanark was insufficient to provide a useful indication of annual mean NO_2 concentrations. The annual mean measured using a diffusion tube at this location was in excess of the NAQS objective. A detailed assessment for this location is proposed for completion later in 2011.
- The annual mean NO_2 concentration measured using a diffusion tube at Brandon Street, Hamilton has increased significantly between 2009 and 2010 and is in excess of the NAQS annual mean objective and the 60 $\mu g.m^{-3}$ threshold at which there may be a risk of the short term NO_2 objective being exceeded. A detailed assessment for this location is proposed for completion later in 2011.

South Lanarkshire Council will implement the recommendations contained in this report.

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1 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. Stretching from Glasgow's suburbs 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 Boarders 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 made up of a mixed 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 little 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 Progress Report

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 Local Air Quality Management 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 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 Local Air Quality Management in Scotland.

Pollutant	Concentration	Measured as	Date to be achieved by
Benzene	16.25 µg.m^{-3}	Running annual mean	31.12.2003
	3.25 µg.m^{-3}	Running annual mean	31.12.2010
1,3-Butadiene	2.25 µg.m^{-3}	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg.m^{-3}	Running 8-hour mean	31.12.2003
Lead	0.5 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
Particles (PM_{10}) (gravimetric)	50 µg.m^{-3}, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	50 µg.m^{-3}, not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	40 µg.m^{-3}	Annual mean	31.12.2004
	18 µg.m^{-3}	Annual mean	31.12.2010
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

Since the commencement of the second round of the review and assessment process, South Lanarkshire Council has completed the following Review and Assessment reports:

- Updating and Screening Assessment (2003)
- Detailed Assessment (2005)
- Progress Report (2006)
- Updating and Screening Assessment (2007)
- Detailed Assessment (2007)
- Progress Report (2008)
- Updating and Screening Assessment (2009)
- Detailed assessment at Rutherglen (2010)
- Further assessment at Whirlies Roundabout(2010)

A brief summary of all previous reviews and assessments of local air quality in South Lanarkshire are presented in Table 1.2 and described further in the following texts.

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 exceedences 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}.
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.

Updating and Screening Assessment (2003)

South Lanarkshire's Updating and Screening Assessment (U&SA) concluded that the AQS objectives were likely to be met for all pollutants except for particulate matter (PM_{10}). Potential exceedences of the 2010 PM_{10} objective were identified at some busy roads and junctions. The assessment specified that potential PM_{10} concentrations in excess of the 18 $\mu g.m^{-3}$ annual mean objective may occur at the junction of the A730 and the B768 in Rutherglen; the junction of the A726 and the B761 in East Kilbride; the Hamilton and Bothwell motorway junctions where the M74 meets the A723 and the A725 respectively; and at the Whirlies roundabout in East Kilbride.

Detailed Assessment (2005)

A Detailed Assessment of PM_{10} concentrations at Whirlies roundabout, East Kilbride was undertaken in 2005. The Detailed Assessment concluded that neither the annual average objective nor the 24-hour objectives were likely to be exceeded around the Whirlies roundabout in 2010. The predicted concentrations close to the roundabout were however close to the objective.

Progress Report (2006)

A Progress Report was produced in 2006. This reported trends in diffusion tube monitoring data and listed developments with the potential to impact upon air quality in the local authority area.

Updating and Screening Assessment (2007)

The 2007 U&SA concluded that the measured annual average PM_{10} concentrations at the Whirlies roundabout were in excess of the 2010 PM_{10} annual mean objective. The Whirlies junction was considered representative of other "busy junctions" in South Lanarkshire; it was therefore decided to undertake further Detailed Assessment of PM_{10} at the following junctions:

- Whirlies roundabout, East Kilbride
- A730/B768, Rutherglen;
- A726/B764, East Kilbride;
- A726/B761, East Kilbride;
- M74/A723, Hamilton and
- M74/A725, Bothwell.

Measured NO_2 concentrations at monitoring location "East Kilbride 5N" were in excess of the annual mean objective, this location was considered to be one of relevant public exposure; the U&SA therefore concluded that a detailed assessment of NO_2 at this location should be conducted.

Detailed Assessment (2007)

The Detailed Assessment completed in 2007 concluded:

- The 2010 PM_{10} annual average objective is likely to be exceeded in the area around the Whirlies roundabout. It was recommended that air quality at this location was kept under review by South Lanarkshire Council and that the declaration of an AQMA be considered.
- Predicted NO_2 annual mean concentrations were not in excess of the objective at, and in the vicinity of the "East Kilbride 5N" monitoring location at locations of relevant public exposure.

The Detailed Assessment also recommended that the Council reviewed their monitoring systems and considered additional PM_{10} monitoring at the following locations: A730/B768, Rutherglen; A726/B764, East Kilbride; and A726/B761, East Kilbride.

Based on the conclusions of the Detailed Assessment, an AQMA for PM_{10} was declared at Whirlies roundabout effective from the 28th November 2008. A map showing the location of the AQMA is presented in Figure 1.

Progress Report (2008)

The 2008 progress report concluded that measured annual mean NO_2 concentrations were in excess of the 2005 objective at three diffusion tube locations:

- East Kilbride 1N, a roadside monitoring location;

- East Kilbride 5N, a roadside monitoring location; and
- Lanark 1N, a roadside location within a narrow, congested, street canyon.

Further monitoring was recommended at other locations of relevant public exposure near each site. Automatic monitoring of PM_{10} concentrations conducted from February to May 2007 at Whirlies roundabout were adjusted to determine an estimated annual mean PM_{10} concentrations using an adjustment factor derived with PM_{10} measurement data from two Scottish AURN urban background sites. The estimated annual mean PM_{10} concentration of 23.1 $\mu g.m^{-3}$ was determined to be in excess of the 2010 objective.

Automatic monitoring of PM_{10} was undertaken at Glespin between February and May 2007 in response to a complaint received regarding an opencast mine in the area. The results of the two months monitoring were adjusted to an estimated annual mean using factors derived from the Scottish AURN sites. The resulting annual mean PM_{10} concentration of 7.44 $\mu g.m^{-3}$ at Glespin was significantly below the 2010 objective and no further action was recommended.

Updating and Screening Assessment (2009)

Measured annual mean NO_2 concentration from eleven months of automatic measurements at Whirlies Roundabout were very close to exceeding the NAQS annual mean objective and exceeded the objective at Main Street, Rutherglen. Data capture at Rutherglen (59.8%) was low, and insufficient to derive firm conclusions for the site. The short-term NO_2 objective was not exceeded at either of the monitoring locations.

Annual mean NO_2 concentrations measured in 2008 increased at many of the diffusion tube sites when compared to the previous two years and were in excess of the NAQS objective at Glen Esk, East Kilbride 3N; and at Cadzow Street, Hamilton 1N. Measured annual mean NO_2 concentrations at Bannatyne Street, Lanark exceeded the annual mean objective level for the third year in a row, thus it was considered likely that the objective is being exceeded within that narrow street canyon.

Annual mean PM_{10} concentrations measured at Whirlies Roundabout, East Kilbride and Main Street, Rutherglen were less than the 2004 annual mean PM_{10} objective. Predicted annual mean PM_{10} concentrations at both sites were, however, in excess of the 2010 annual mean objective of 18 $\mu g.m^{-3}$. Both sites were however noted to be at roadside locations and not considered representative of relevant long-term exposure, although residential properties are located close to each monitoring station. The 24-hour mean PM_{10} objective was also exceeded at both sites.

A review of roads within the South Lanarkshire Council area identified two narrow congested streets that require Detailed Assessment at:

- Main Street, Rutherglen (including both Farmeloan and Glasgow Road junctions); and
- The section of Main Street, Uddingston, between the junctions with Church St/Spindlerow Road and the junction with Bellshill Road.

A review of all other roads identified that annual mean PM_{10} concentrations at two road junctions in Hamilton town centre, the Almada Street / Bothwell Road junction, and Quarry Street / Duke Street junction may exceed the annual mean PM_{10} objective. The report also noted that one road with a predicted traffic flows greater than 10,000 AADT is currently under construction within South Lanarkshire; the M74 extension project. The report recommended that a Detailed Assessment of road traffic emissions from the new road is conducted for the section of the road passing through Rutherglen.

The U&SA recommendations were:

- A Further Assessment of PM_{10} concentrations within the Whirlies AQMA in East Kilbride is required as part of the Action planning process. The Further Assessment should take cognisance of the measured exceedences of the 24-hour mean PM_{10} objective and review the extent of the AQMA accordingly.
- A Detailed Assessment of both NO_2 and PM_{10} concentrations in Rutherglen should be undertaken, extending beyond the junction previously considered to include the Farmeloan Road junction. The Detailed Assessment should include for the effect of the opening of the M74 extension.
- A Detailed Assessment of both NO_2 and PM_{10} concentrations in Hamilton town centre should be undertaken, accounting for the effect of street canyons and exposure at receptor locations above ground level.
- A Detailed Assessment of NO_2 concentrations in Lanark town centre should be undertaken, accounting for the influence of the narrow streets and queuing traffic.
- A Detailed Assessment of NO_2 concentrations at Main Street, Uddingston should be undertaken, between the junctions with Church St/Spindlerow Road and the junction with Bellshill Road.

It also recommended that the Council review the NO_2 diffusion tube monitoring network in light of the findings of this assessment and target additional monitoring at locations of public exposure.

Progress Report (2010)

The 2010 progress report concluded that measured annual mean NO_2 concentrations at Main Street Rutherglen had decreased since 2008 but were still in excess of the NAQS objective of 40 $\mu g.m^{-3}$. Annual mean NO_2 concentrations measured at Whirlies Roundabout in 2009 decreased slightly when compared with 2008 and were below the 40 $\mu g.m^{-3}$ NAQS objective.

No clear trend in annual mean NO_2 concentration across the diffusion tube network was apparent from the 2009 results. Annual mean concentrations increased at five locations and decreased at five locations when compared with the 2008 measurements.

The measured NO_2 annual mean concentration at Bannatyne Street, Lanark was in excess of the 40 $\mu g.m^{-3}$ objective and had increased since 2008. The monitoring data reinforced the

recommendation of the 2009 U&SA to conduct a Detailed Assessment of NO_2 in Lanark town centre.

The first year of diffusion tube monitoring at Brandon Street, Hamilton reported an annual mean NO_2 concentration in excess of the 40 $\mu g.m^{-3}$ objective. This reinforced the recommendation of the 2009 U&SA to conduct a Detailed Assessment of NO_2 within the Hamilton town centre.

South Lanarkshire Council was awarded additional funding from the Scottish Government to install automatic monitoring stations at a location close to Bannatyne Street, Lanark and Brandon Street, Hamilton.

The 2009 NO_2 monitoring data confirmed the conclusions of the 2009 Updating and Screening Assessment which recommended proceeding with Detailed Assessments of NO_2 concentrations at Bannatyne Street, Lanark and at Brandon Street, Hamilton.

Detailed assessment at Rutherglen (2010)

Based on the results of PM_{10} and NO_2 monitoring conducted over 2008 and 2009; and the apparent under-prediction of PM_{10} concentrations in a dispersion modelling assessment conducted in 2007; a Detailed Assessment of NO_2 and PM_{10} concentrations was conducted for the main roads and junctions in Rutherglen.

The dispersion modelling assessment predicted pollutant concentrations at the Main Street automatic monitoring site and across a study area covering many locations of relevant human exposure. Comparison of modelled NO_2 predictions with local monitoring data indicated that the model was over-predicting NO_2 concentrations but not significantly enough to require adjustment of the predicted concentrations. Marginal exceedences of the annual mean NO_2 objective were predicted at several locations of relevant human exposure at residential properties close to the modelled roads and junction; these predictions were however noted to represent an over-estimation of actual annual mean NO_2 concentrations when compared with measured concentrations from one monitoring site. The study also recognised that there were uncertainties relating to the modelled predictions based on the limitations of the available NO_2 monitoring data. The report concluded that NO_2 concentrations in excess of the annual mean objective could be occurring at locations of relevant human exposure where the predicted concentrations are close to the objective. The report recommended that additional NO_2 monitoring data is required to allow better verification of the model predictions across the overall study area.

Comparison of modelled annual mean PM_{10} concentrations with local monitoring data indicated that the model was under-predicting PM_{10} concentrations. The modelling predictions were, therefore, adjusted, in accordance with the method specified in the technical guidance to account for the under-prediction. Annual mean PM_{10} concentrations in excess of the 2010 objective were subsequently 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}. It was also recommended

that the Council continue automatic monitoring at the Main Street location to provide twelve months of continuous monitoring data and that the Council give consideration to locating passive diffusion tubes at a number of representative receptor locations across the study area to provide further NO_2 monitoring data with which any future modelling results can be verified.

Further assessment at Whirlies Roundabout (2010)

Analysis of the 2009 monitoring data at Whirlies roundabout indicated an improvement in air quality when compared to previous years. The improvement was attributed to a reduction in traffic flows associated with the economic downturn. It was anticipated that this may be a short-lived improvement and that air quality may deteriorate again as traffic flows increase again as the economy recovers.

Due to the assumed temporary improvement in air quality levels the study considered air quality over a two-year period, i.e. analysed the average annual mean concentrations for the period 2008-09. The two-year average measured mean PM_{10} concentrations was found to be above the 2010 objective level, however measured NO_2 concentrations were below objective levels.

To evaluate the validity of the approach to monitoring data, and to examine the spatial extent of any exceedence of NAQS objectives a dispersion modelling study of local emissions sources was undertaken. The dispersion modelling study utilised emissions data compiled in an inventory of local emissions sources.

The results of the dispersion modelling study indicated that it was likely that there would be no predicted exceedences of the NO_2 objectives at a location of relevant public exposure, therefore there is no requirement to declare an AQMA for NO_2.

Modelling predictions of PM_{10} concentrations confirmed that the declaration of the AQMA was valid and that the boundary that has been set should be maintained. Annual mean PM_{10} concentrations were predicted to exceed the 2010 objective of 18 $\mu g.m^{-3}$ at locations within approximately 40-45m from the roads modelled, and at up to 70m from the Whirlies roundabout. This represents many locations of relevant human exposure which are close to the roads assessed.

The source apportionment study indicated that volume sources i.e. local background, are the most significant source of PM_{10} concentrations. Road traffic is the dominant source of PM_{10} concentrations at roadside locations while at background locations, volume sources are a more significant source of both PM_{10} and NO_2 concentrations.

Analysis of the likely effect of Action Plan measures on traffic flows in and around the AQMA indicated that a modest reduction in traffic flows may occur. The reduction in traffic flows will result in a small improvement in PM_{10} concentrations within the AQMA, however the improvements will not be sufficient to allow the 2010 annual mean objective level to be met by 2012.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

During 2010, South Lanarkshire Council operated four automatic continuous monitoring sites. These are located at Raith Interchange, Bothwell; Whirlies Roundabout, East Kilbride; Main Street, Rutherglen and Glespin. Monitoring at Whirlies and Rutherglen commenced in 2008 and both NO_X and PM_{10} concentrations are measured at each site. Monitoring at Glespin began in May 2009 though this site measures PM_{10} only. Monitoring in Glespin stopped in Sept 2010 and restarted in May 2011. Monitoring at Raith Interchange began in April 2010 measuring both NO_X and PM_{10}.

Details of the automatic monitoring sites are presented in Table 2.1 The locations of the automatic monitoring sites are annotated in Figure 1.

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?
Glespin	Roadside	280492	628150	PM_{10}	FDMS	N	Y (10m)	5m	Y
Rutherglen	Roadside	261128	661703	NO_2, PM_{10}	FDMS	N	Y (10m)	2-3m	Y
Whirlies	Roadside	264370	655670	NO_2, PM_{10}	FDMS	Y	Y(10m)	10m	Y
Raith Interchange	Roadside	271125	658320	NO_2, PM_{10}	FDMS	N	N(60m)	1-2m	Y
Lanark	Roadside	288426	643704	NO_X	Chemiluminescense	N	Y (2m)	1-2m	Y

2.1.2 Non-Automatic Monitoring Sites

South Lanarkshire Council operate an extensive network of diffusion tubes. An inventory of the monitoring sites is presented in Table 2.2 detailing the locations and other relevant details. Maps showing the locations of the diffusion tube sites are presented in Figure 1. Details of QA/QC for the 2010 diffusion tubes results are presented in Appendix A.

Figure 1 Map(s) of Monitoring Sites

Raith Interchange Automatic Monitor& diffusion tube

N

Key:

Auto monitor

Diffusion tube

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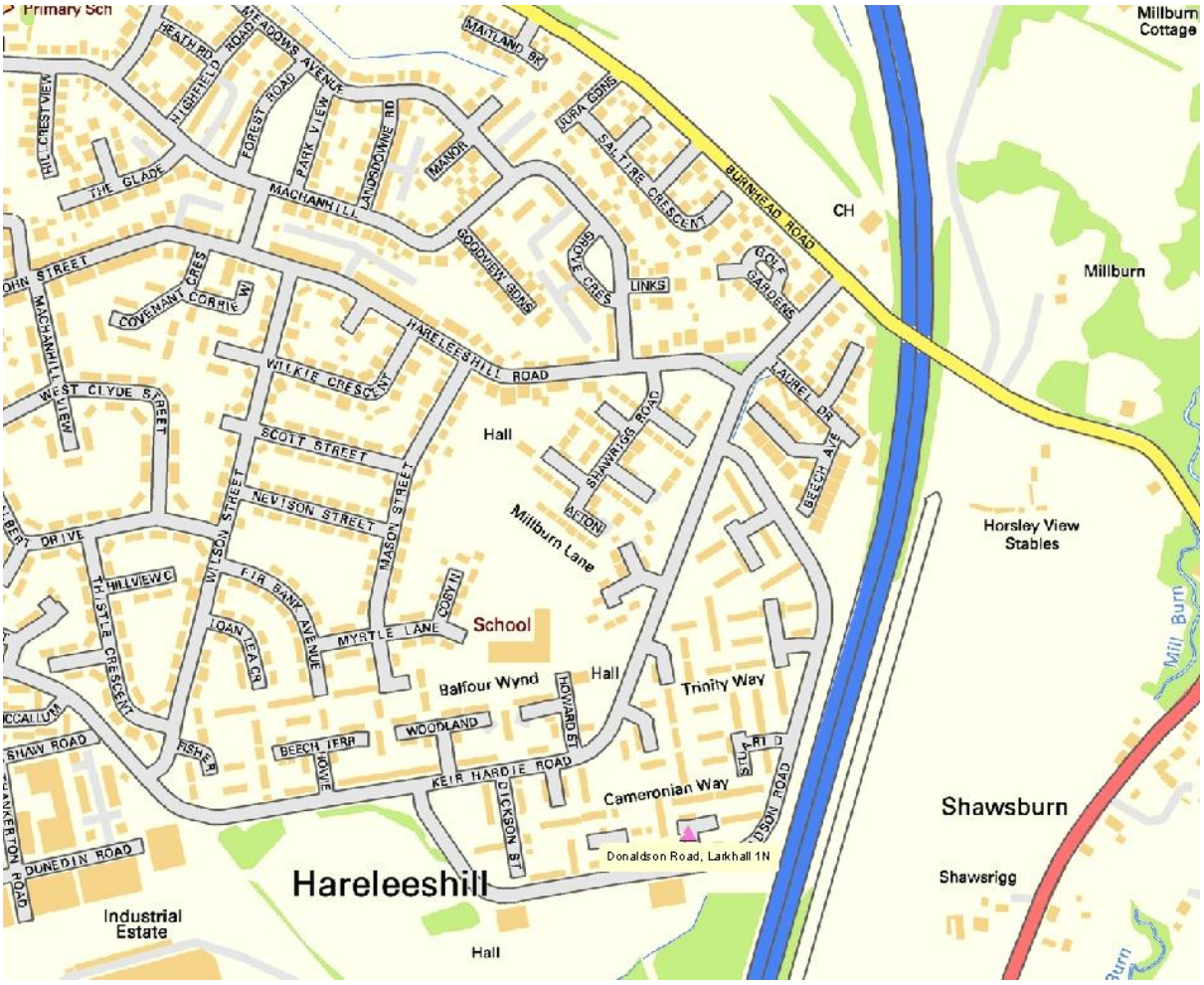
Date: October 2011



Donaldson Road, Larkhall diffusion tube

N

Key:

Diffusion tube

AEA

Date: October 2011

East Kilbride monitoring locations 1

N

Key:

Auto monitor

Diffusion tube

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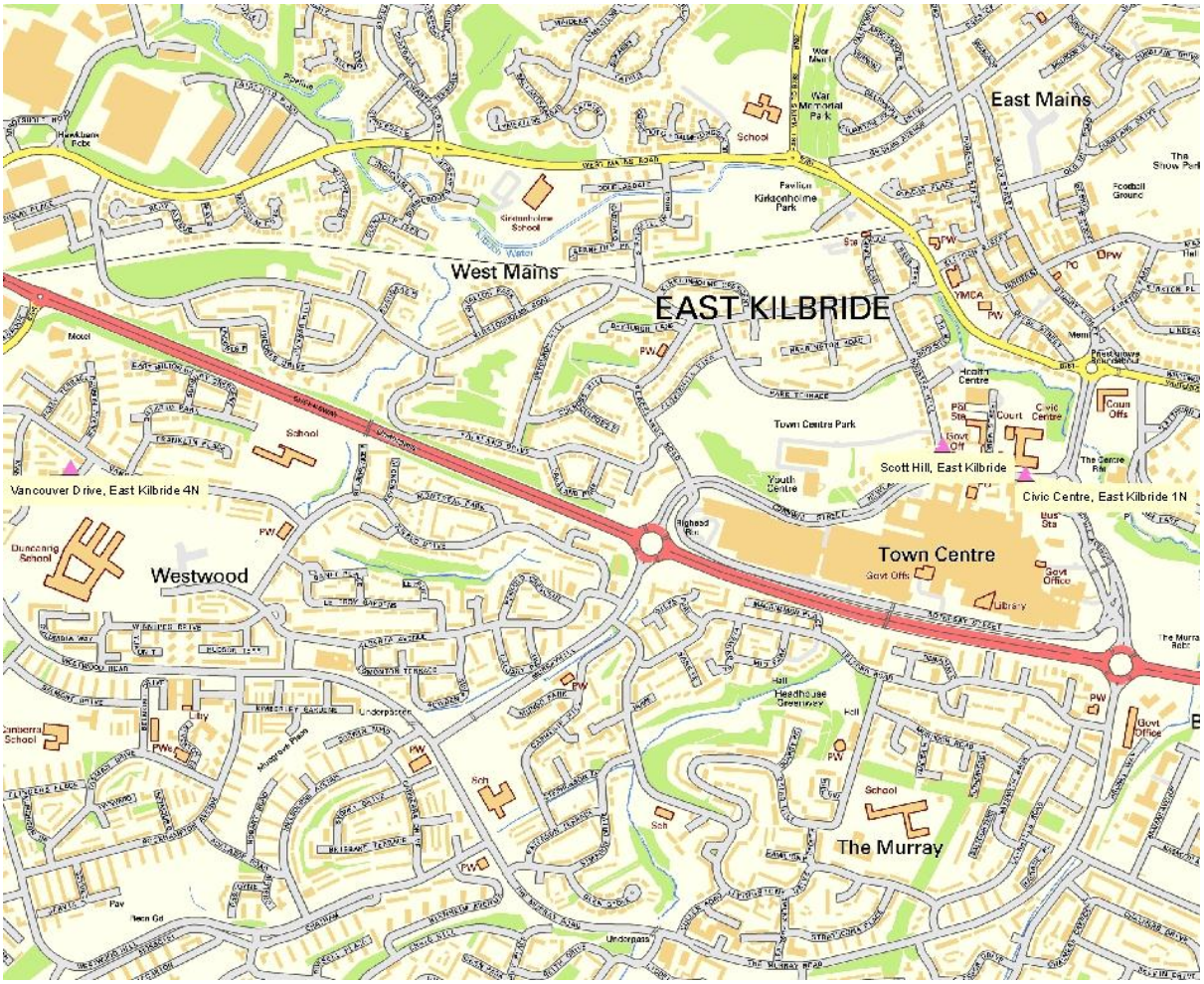
Date: October 2011



East Kilbride monitoring locations 2

N

Key:

▲ **Diffusion tube**

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Glespin automatic monitor location

N

Key:

Auto monitor

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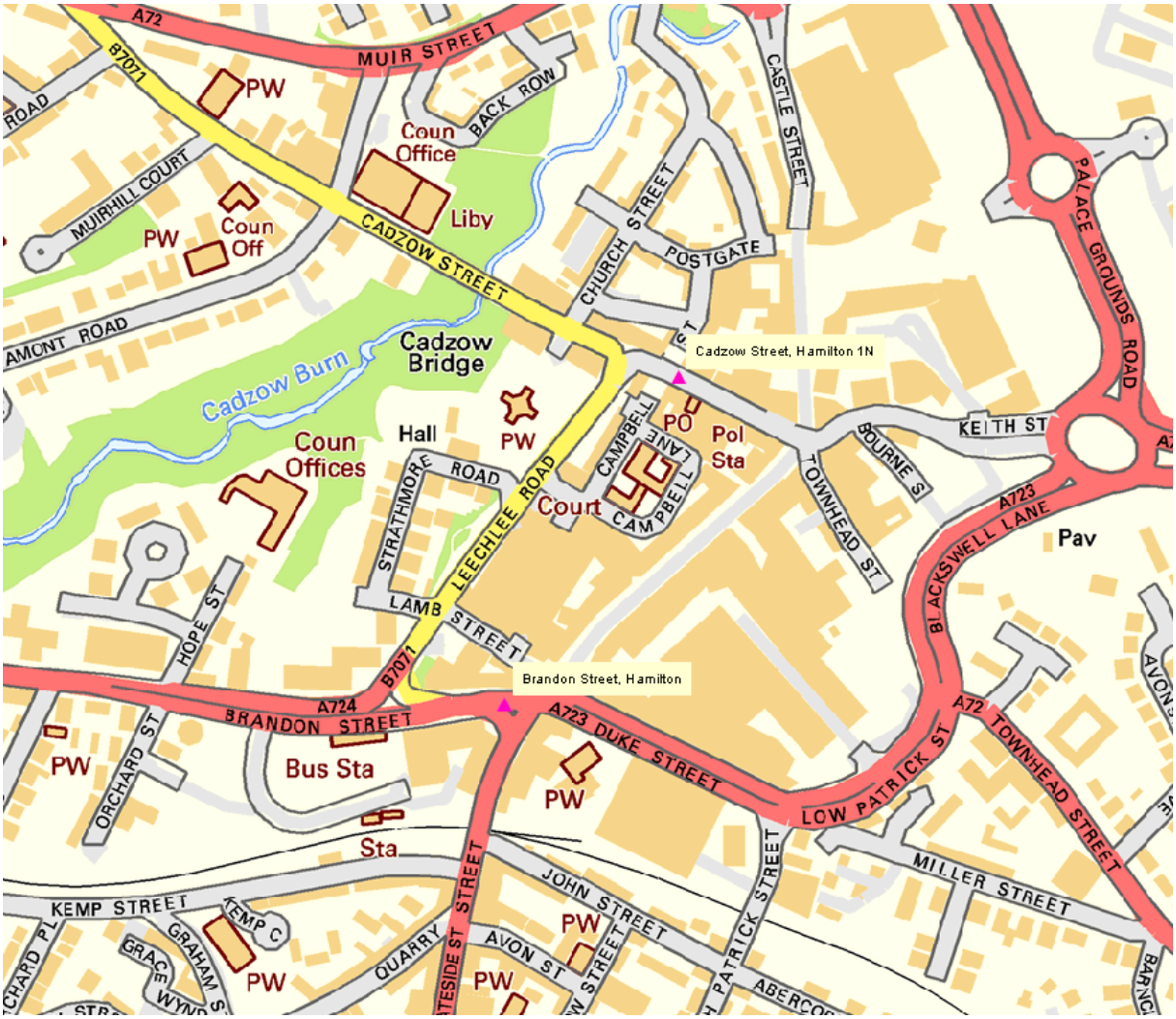

Hamilton monitoring locations 1

N

Key:

▲ **Diffusion tube**

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Hamilton monitoring locations 2

N

Key:

Diffusion tube

AEA

Date: October 2011

Lanark monitoring locations

N

Key:

- Auto monitor
- Diffusion tube

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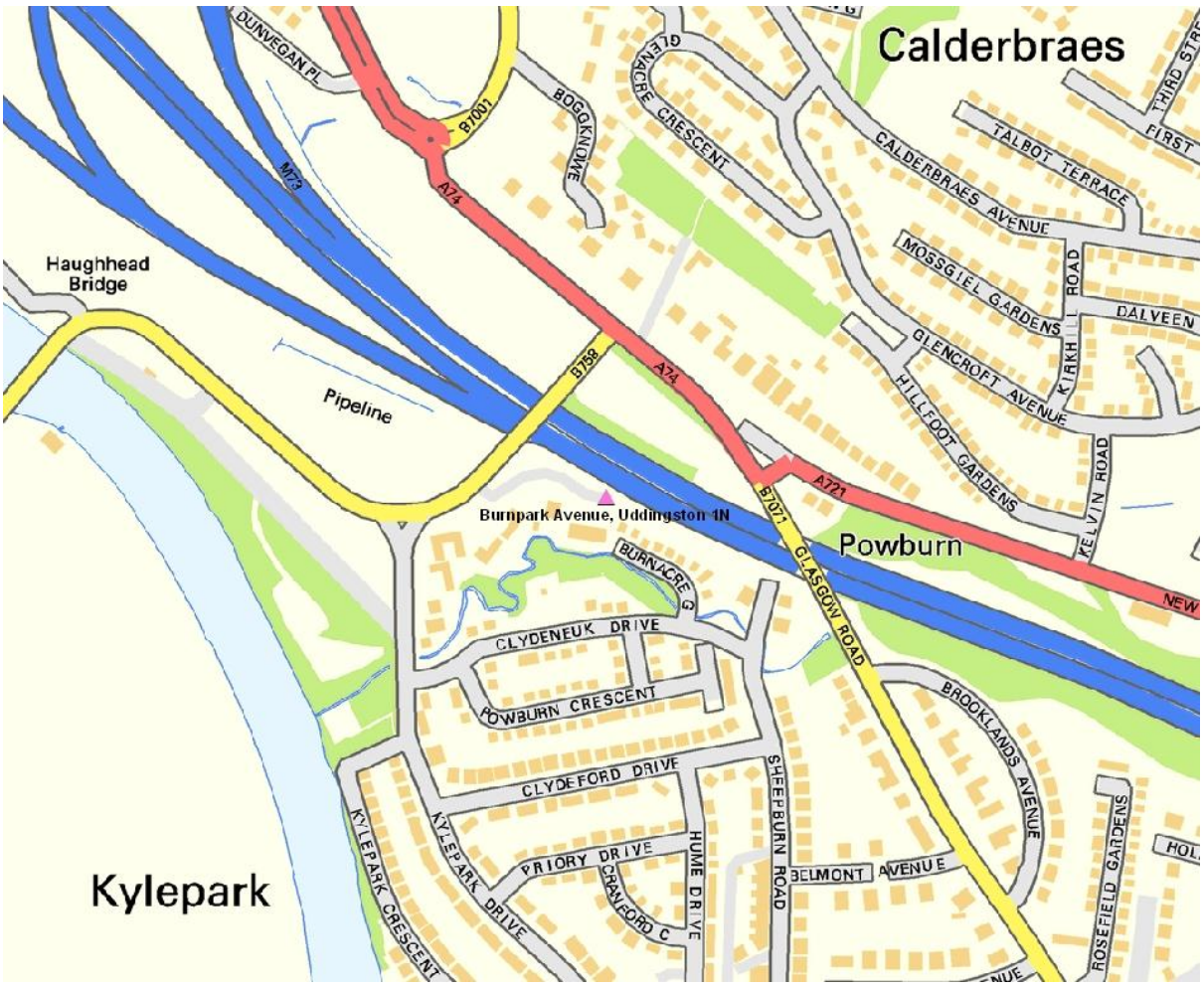
Date: October 2011



Uddingston monitoring locations 1N

N

Key:

Diffusion tube

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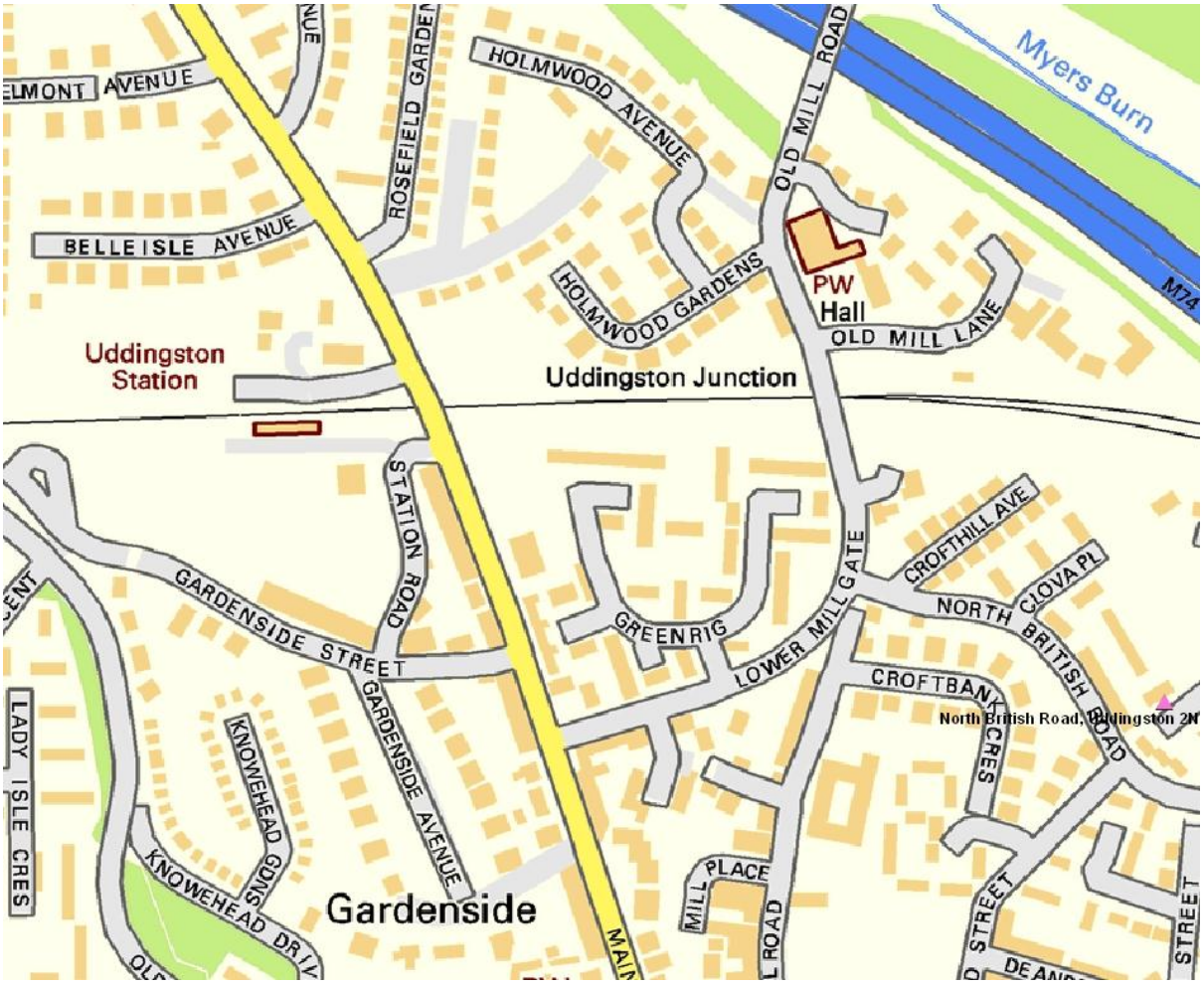


Uddingston monitoring locations 2N

N

Key:

Diffusion tube

AEA

Date: October 2011

Table 2.2 Details of Non- Automatic Monitoring Sites

Tube ID	Site Name	Site Type	OS Grid Ref		Pollutants Monitored	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location?
1	Civic Centre, East Kilbride 1N	Roadside	263634	654186	NO_2	No	No	4m	Yes
2	Kingsway, East Kilbride 5N	Roadside	264373	655354	NO_2	No	No (20m)	8m	Yes
3	Vancouver Drive, East Kilbride 4N	Background	261700	654200	NO_2	No	Yes (5m)	2m	No
4	Glen Esk, East Kilbride 3N	Background	265500	654900	NO_2	No	Yes (5m)	2m	No
5	Cadzow Street, Hamilton 1N	Roadside	272454	655557	NO_2	No	No	4m	Yes
6	Strathaven Road, Hamilton	Roadside	271397	652701	NO2	No	No	2m	Yes
7	Brandon Street, Hamilton	Roadside	272317	655299	NO2	No	Yes (5m)	3m	Yes
8	Burnpark Avenue, Uddingston 1N	Roadside	269011	661451	NO_2	No	Yes (5m)	30-40m (M74)	Yes
9	North British Road, Uddingston 2N	Background	269967	660703	NO_2	No	Yes (5m)	3m	No
10	Wordsworth Way, Bothwell 1N	Background	270864	659287	NO_2	No	Yes (5m)	2m	No
11	Donaldson Road, Larkhall 1N	Roadside	277366	650224	NO_2	No	Yes (7m)	60m (M74)	Yes
12	Bannatyne Street, Lanark 1N	Roadside	288476	643672	NO_2	No	Yes (façade)	1m	Yes
13	Ridgepark Drive, Lanark 5N	Background	287900	644200	NO_2	No	Yes (5m)	2m	No
14	Hospitland Drive, Lanark 6N	Background	289000	643900	NO_2	No	Yes (5m)	2m	No
15	Brouster Hill, East Kilbride	Roadside	264427	655362	NO_2	No	Yes (5m)	2m	No
16	Scott Hill, East Kilbride	Roadside	263466	654245	NO_2	No	Yes (5m)	2m	No
17	Wellgate, Lanark	Roadside	288213	642659	NO_2	No	Yes (5m)	2m	Yes

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

Automatic monitoring data recorded at Whirlies Roundabout and Main Street, Rutherglen during all of 2010 are available for comparison with the air quality objectives. Monitoring at Lanark commenced in September 2010 therefore the mean concentration from the available data has been annualised using the method described in TG(09). Monitoring of NO_2 at Raith Interchange began in April 2010 therefore the overall data capture rate is 70%.

The annual mean NO_2 concentrations measured at each location from 2007 to 2009 are presented in Table 2.3a. Measured concentrations in excess of the NAQS objective of 40 $\mu g.m^{-3}$ are highlighted in bold; the trends in concentrations measured over the last three years are shown on Figure 2.3.

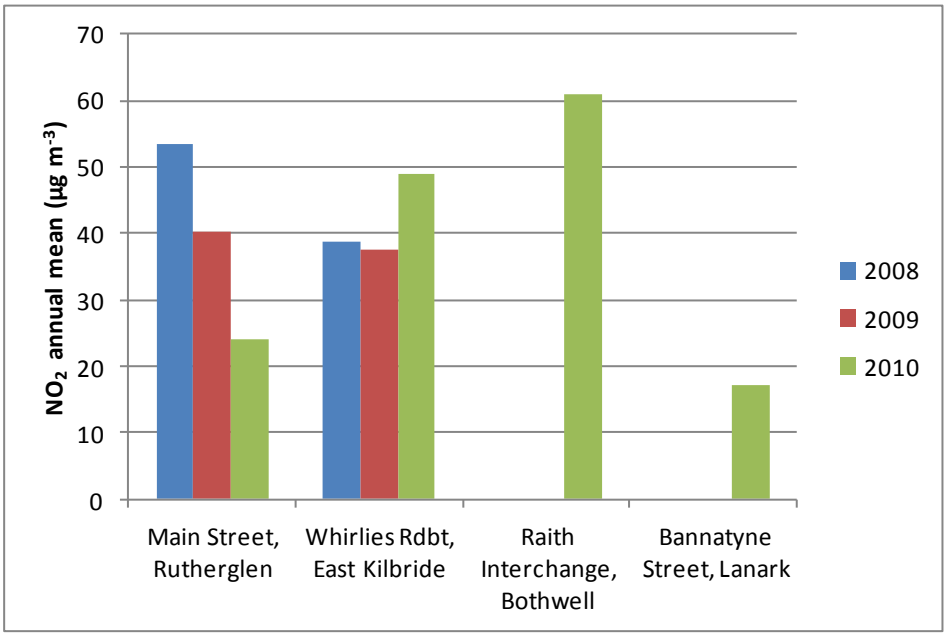
The following observations have been made from the available automatic monitoring data:

- Measured annual mean NO_2 concentrations at Rutherglen have decreased since 2008 and 2009 and are now below the NAQS objective of 40 $\mu g.m^{-3}$.
- The measured annual mean NO_2 concentrations at Whirlies Roundabout in East Kilbride have increased since 2009 and are were in excess of the 40 $\mu g.m^{-3}$ objective during 2010.
- The annual mean NO_2 concentration of 61 $\mu g.m^{-3}$ measured at the new automatic monitoring site at the Raith interchange in Bothwell is significantly greater than the 40 $\mu g.m^{-3}$ NAQS objective. This monitoring location is however not considered representative of relevant human exposure.
- The period mean of 17 $\mu g.m^{-3}$ measured at Bannatyne Street, Lanark is well below the annual mean objective; the data capture at this site of 28.5% is however too low to provide a realistic indication of annual mean NO_2 concentrations at this location. Further monitoring at this location is required before any conclusions can be drawn from the measurements.

Table 2.3a Nitrogen Dioxide Automatic monitoring results: Annual Mean

Site ID	Location	Within AQMA ?	Data Capture for monitoring period %	Data Capture for full calendar year 2010 %	Annual mean concentrations ($\mu g.m^{-3}$)		
					2008	2009	2010
Rutherglen	Main Street, Rutherglen	N	88.7	88.7	**53.3**	**40.3**	24
Whirlies	Whirlies Rdbt, East Kilbride	Y	99.6	99.6	38.8	37.5	**49**
Raith Interchange	Raith Interchange, Bothwell	N	70.2	70.2	-	-	**61**
Lanark	Bannatyne Street, Lanark	N	28.5	28.5	-	-	17

Figure 2.3 Trends in annual mean NO_2 concs. measured at automatic monitoring Sites.



The measured 1-hour mean concentrations at each monitoring location, in comparison with the 1-hour mean objectives, are presented in Table 2.3b.

Table 2.3b Nitrogen Dioxide Automatic Monitoring results: 1-hour Mean Objective

Site ID	Location	Within AQMA ?	Data Capture for monitoring period %	Data Capture for full calendar year 2010 %	Number of Exceedences of 1-hr mean objective (200 µg.m^{-3})		
					2008	2009	2010
Rutherglen	Main Street, Rutherglen	N	88.7	88.7%	4(169)	0 (74)	0 (101)
Whirlies	Whirlies Rdbt, East Kilbride	Y	99.6	99.6%	9(179)	4	27(201)
Raith Interchange	Raith Interchange. Bothwell	N	70.2	70.2%	-	-	38(227)
Lanark	Bannatyne Street, Lanark	N	28.5	28.5%	-	-	0 (66)
NB: For data capture < 90%, the 99.79th %ile of 1-hr means is shown in brackets (µg.m^{-3})							

Measured 1-hour mean concentrations in excess of the 200 µg.m^{-3} short-term objective were recorded twenty seven times at the Whirlies monitoring site; and zero were recorded at the Rutherglen site during 2010. At Rutherglen, the annual data capture was less than the preferred 90%. It is therefore appropriate to assess the 99.79th percentile of measured hourly mean NO_2 concentrations in relation to the 1-hour mean NO_2 objective. The 99.79th percentile of 1-hour mean concentrations measured at Rutherglen during 2009 was 101 µg.m^{-3}, which is less than the 200 µg.m^{-3} NAQS objective.

Data capture at the Raith interchange was less than the preferred 90%. It is therefore appropriate to assess the 99.79th percentile of measured hourly mean NO_2 concentrations in relation to the 1-hour mean NO_2 objective. The 99.79th percentile of 1-hour mean concentrations measured at the Raith interchange during 2009 was 227 µg.m^{-3} which is in excess of the 200 µg.m^{-3} NAQS objective. This monitoring location is however not considered representative of relevant human exposure.

Diffusion Tube Monitoring Data

Measured NO_2 concentrations across the diffusion tube network in 2010 and the previous two years are presented in Table 2.. Measured concentrations in excess of the NAQS objective of 40 $\mu g.m^{-3}$ are highlighted in bold. A bias adjustment factor of 1.02 has been applied to all of the reported diffusion tube results as specified on the summary spreadsheet of co-location studies v0611 (National Physical Laboratory, 2011).

Data capture rates are below the preferred 90% at nine of the seventeen locations, of which three are also below 75%. As advised in paragraph 3.15 of TG (09) the results with a data capture rate below 75% should be treated with caution.

At two of the new monitoring locations, (16) Scott Hill, East Kilbride; and (17) Wellgate, Larkhall; only seven months of measured data are available. These results therefore represent a period mean covering June through to December 2010, and are not relevant for comparison with the annual mean NO_2 objective.

The recent trends in annual mean NO_2 concentrations from 2007 to 2010 measured at the diffusion tube sites are presented in Fig 2.4. The following observations have been made:

- Annual mean NO_2 concentrations have increased across the entire diffusion tube network in 2010 when compare to 2009.
- The bias correction factor of 1.02 is greater than the factor of 0.95 applied last year.
- The measured NO_2 annual mean at Kingsway, East Kilbride 5N of 54 $\mu g.m^{-3}$ is above the 40 $\mu g.m^{-3}$ objective and has increased every year since 2008. It should be noted that the diffusion tube site is at a roadside location and is not therefore at a location of relevant public exposure. The nearest residential receptor is about 20m from the tube location and using the "NO2 with Distance from Road Calculator" this equates to an annual mean of about 36 $\mu g.m^{-3}$. For the purposes of this calculation a background of 24.5 $\mu g.m^{-3}$ was assumed- which is the value recorded at the Brousterhill location which is close to the site.
- The annual mean NO_2 concentration of 64 $\mu g.m^{-3}$ measured at Brandon Street, Hamilton has increased significantly between 2009 and 2010 and is now in excess of the 60 $\mu g.m^{-3}$ threshold at which there may be a risk of the short term NO_2 objective being exceeded.
- Annual mean concentrations in excess of the 40 $\mu g.m^{-3}$ annual mean objective have been measured at five other diffusion tube locations;
    - (1) Civic Centre, East Kilbride;
    - (5) Cadzow Street, Hamilton;
    - (8) Burnpark Avenue, Uddingston;
    - (9) North British Road, Uddingston; and,
    - (12) Bannatyne Street, Lanark.

  Measured concentrations have been increasing over recent years at each of these locations.

Figure 2.4 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites.

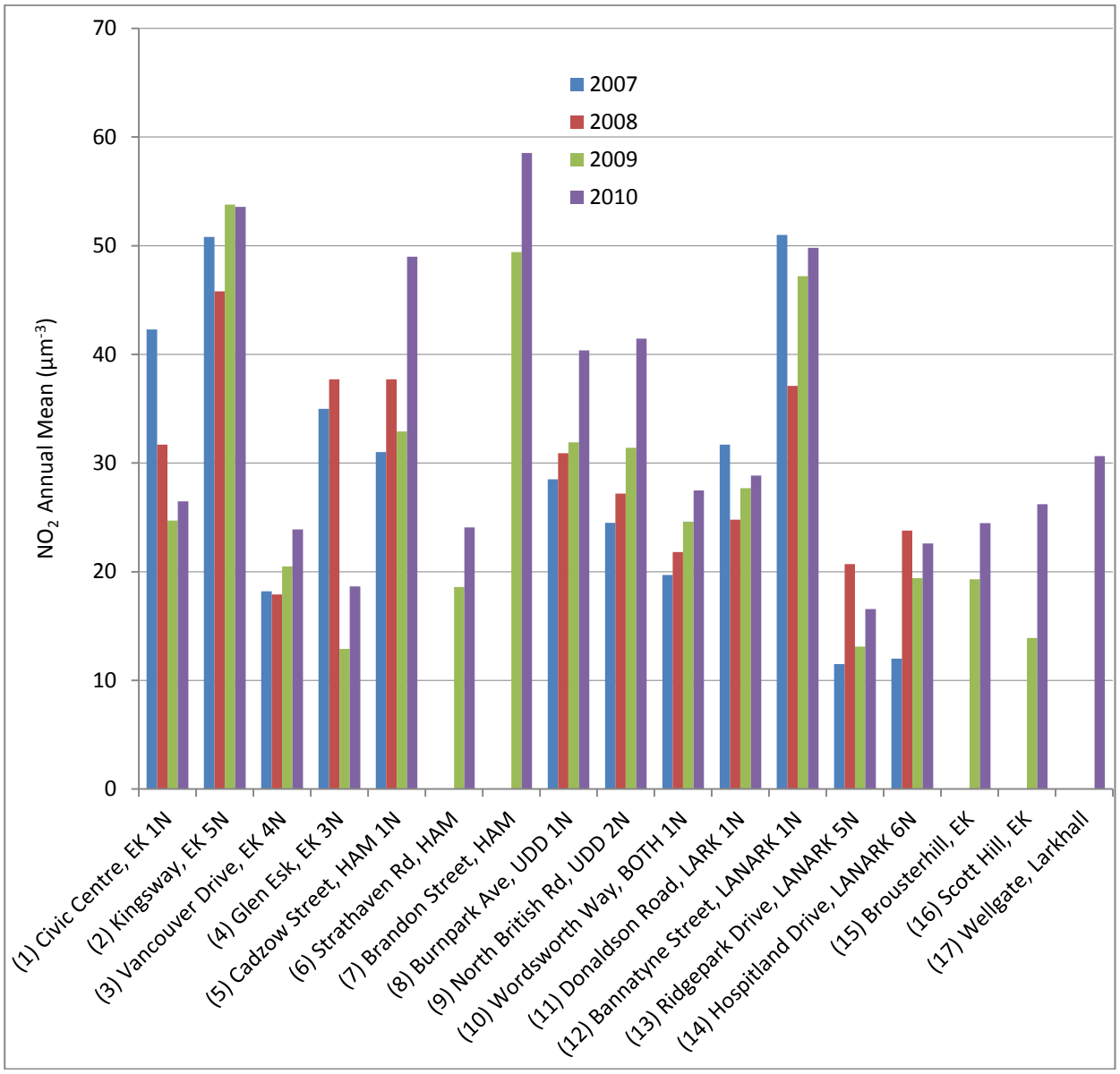


Table 2.4 NO_2 Diffusion tubes results 2010

Site ID	Location and site ID	Within AQMA?	Data Capture for full calendar year 2010 %	Annual mean concentrations (µg.m^{-3})			
				2007	2008	2009	2010
1	Civic Centre, East Kilbride 1N	No	83.3%	**42.3**	31.7	24.7	26.5
2	Kingsway, East Kilbride 5N	No	100.0%	**50.8**	**45.8**	**53.8**	**53.6**
3	Vancouver Drive, East Kilbride 4N	No	100.0%	18.2	17.9	20.5**	23.9
4	Glen Esk, East Kilbride 3N	No	83.3%	35.0	37.7	12.9	18.7
5	Cadzow Street, Hamilton 1N	No	83.3%	31.0	37.7	32.9	**49.0**
6	Strathaven Road, Hamilton	No	83.3%	-	-	18.6	24.1
7	Brandon Street, Hamilton	No	83.3%	-	-	**49.4**	**58.5**
8	Burnpark Avenue, Uddingston 1N	No	91.7%	28.5	30.9	31.9	**40.4**
9	North British Road, Uddingston 2N	No	75.0%	24.5	27.2	31.4	**41.5**
10	Wordsworth Way, Bothwell 1N	No	66.7%	19.7	21.8	24.6**	27.5**
11	Donaldson Road, Larkhall 1N	No	91.7%	31.7	24.8	27.7	28.8
12	Bannatyne Street, Lanark 1N	No	100.0%	**51.0**	37.1	**47.2**	**49.8**
13	Ridgepark Drive, Lanark 5N	No	100.0%	11.5	20.7	13.1	16.6
14	Hospitland Drive, Lanark 6N	No	100.0%	12.0	23.8	19.4	22.6
15	Brouster Hill, East Kilbride	No	100.0%	-	-	19.3	24.5
16	Scott Hill, East Kilbride	No	66.7%	-	-	13.9	26.2**
17	Wellgate, Larkhall	No	58.3%	-	-	-	30.6**
	** Annualised data as data capture <75%						

2.2.2 PM_{10}

Annual mean PM_{10} concentrations measured from 2008 to 2010 are presented in Table 2.5a and the number of 24-hr mean PM_{10} concentrations in excess of the 50 $\mu g.m^{-3}$ objective at each site are presented in Table 2.5b. The trends in concentrations measured over the last three years are shown on Figure 2.5.

The 2010 PM_{10} measured annual mean of 25 $\mu g.m^{-3}$ at the Main Street, Rutherglen site was in excess of the 2010 Scottish objective of 18 $\mu g.m^{-3}$ and has increased slightly since 2009. The 24-hour mean PM_{10} concentration was in excess of the 50 $\mu g.m^{-3}$ short-term objective at Rutherglen twenty one times during 2009 which is in excess of the seven times per year specified in the Scottish air quality objectives. The annual mean PM_{10} concentration measured at the Whirlies Roundabout site during 2010 has also shown a slight increase since 2009 but is still significantly less than the concentration measured in 2008 and is below the 18 $\mu g.m^{-3}$ Scottish objective.

Due to a data capture rate less than 90%, the PM_{10} annual mean at the new monitoring location at the Raith interchange was calculated by annualising the available data. The calculated annual mean is in excess of the 18 $\mu g.m^{-3}$ Scottish objective. This monitoring location is however not considered representative of relevant human exposure.

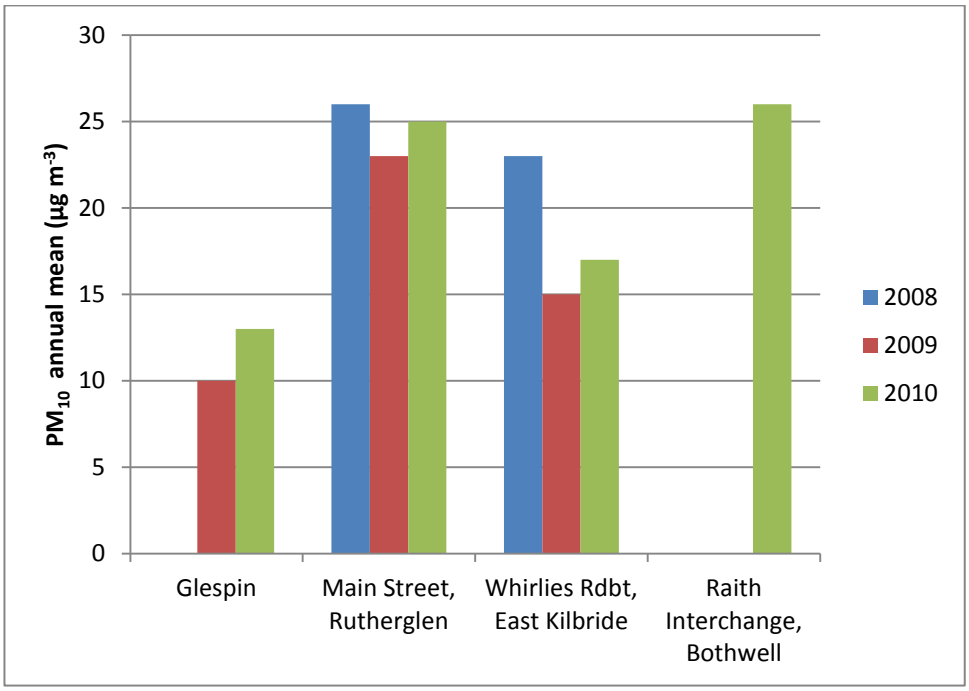
Table 2.5a PM_{10} Automatic Monitoring: Comparison with Annual Mean Objective

Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture 2010 %	Annual mean concentrations ($\mu g.m^{-3}$)		
					2008	2009	2010
Glespin	Glespin	N	68.3	68.3	-	10	13
Rutherglen	Main Street, Rutherglen	N	89.1	89.1	**26**	**23**	**25**
Whirlies	Whirlies Rdbt, East Kilbride	Y	97	97	**23**	15	17
Raith Interchange	Raith Interchange, Bothwell	N	55.6	55.6	-	**-**	**26**

Table 2.5b PM_{10} Automatic Monitoring: Comparison with 24-hour Mean Objective

Site ID	Location	Within AQMA ?	Data Capture for monitoring period %	Data Capture 2010 %	Number of Exceedences of daily mean objective (50 $\mu g.m^{-3}$)		
					2008	2009	2010
Glespin	Glespin	N	68.3	68.3	-	0	0
Rutherglen	Main Street, Rutherglen	N	89.1	89.1	**9(54)**	**8 (56)**	**21**
Whirlies	Whirlies Rdbt, East Kilbride	Y	97	97	**11 (59)**	5	5(81)
Raith Interchange	Raith Interchange, Bothwell	N	55.6	55.6	-	**-**	5
NB: For data capture < 90%, the 98th %ile of 24-hr means is shown in brackets ($\mu g.m^{-3}$)							

Figure 2.5 Trends in Annual Mean PM_{10}



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2.2.3 Sulphur Dioxide

South Lanarkshire council have not conducted monitoring of SO_2 in 2010.

2.2.1 Benzene

South Lanarkshire council have not conducted Benzene monitoring in 2010.

2.2.2 Other pollutants monitored

South Lanarkshire council do not undertake monitoring of any other pollutants

Summary of Compliance with AQS Objectives

South Lanarkshire Council has measured concentrations of Nitrogen Dioxide above the annual mean objective at relevant locations at:

- Bannatyne Street, Lanark;
- Brandon Street and Cadzow Street, Hamilton.
- Burnpark Avenue and North British Road, Uddingston

And will need to proceed to a Detailed Assessment at all of these locations. This requirement was previously identified for the locations in Hamilton and Lanark in the 2009 Updating and Screening Assessment.

Measured PM_{10} concentrations in excess of the annual mean objective have been measured at:

- Rutherglen; where a detailed assessment was conducted in 2010; and
- Raith Interchange; where insufficient monitoring data is available with which to draw firm conclusions.

Measured PM_{10} concentrations were below the objectives at all other locations.

3 New Local Developments

3.1 Road Traffic Sources

Updated 2010 traffic count data were obtained from Department of Transport and South Lanarkshire Council Roads Services. The data were reviewed to identify any roads with significant increases or new sections of road that have not previously been assessed that fit the screening criteria. It was determined that there have been no significant changes to emissions from traffic sources within the South Lanarkshire Council area since the 2009 Updating and Screening Assessment. It was noted that a number of roads surveyed in 2010 within the South Lanarkshire Local Authority district experienced small reductions in the number of Total Vehicles counted.

In recent years construction of the M74 extension running east to west through Rutherglen and Cambuslang has been completed. This new extension opened in June 2011 and is likely to have an effect on air quality within these areas. South Lanarkshire Council's Rutherglen automatic monitoring station is within 250m of this newly opened extension.

Since it is likely that the M74 extension will be the subject of air quality investigations by the Council in the coming years (USA and perhaps Detailed Assessment), it would be prudent to install additional monitoring sites at locations of closest relevant exposure to the new road. This data will be particularly useful to inform any modelling work that is required in future.

3.2 Other Transport Sources

There have been no significant changes to emissions from rail, shipping or aircraft operations within the South Lanarkshire Council area since the 2009 Updating and Screening Assessment.

3.3 Industrial Sources

The Scottish Environment Protection Agency (SEPA) were contacted to determine if there have been any new or significantly changed industrial processes in the area which may impact on air quality.

The register of Pollution Prevention and Control (PPC) processes included 14 Part A PPC processes and 100 Part B processes that are operated in the South Lanarkshire Council area.

A full inventory of Industrial installation permitted under the Pollution Prevention and Control (Scotland) Regulations which emit pollutants relevant to the NAQS objectives is presented in Appendix C.

The proposed Dovesdale Incinerator at Canderside, Stonehouse was granted planning permission in 2011. At the time of writing, it is understood that a PPC permit for this waste incineration process has not been issued to date; and that SEPA is awaiting further

information from the plant developers relevant to the permit application. It is not therefore currently known when the site is planned to commence operation.Additional information regarding this source will be included in the 2012 updating and screening assessment.

3.4 Commercial and Domestic Sources

A review of commercial and domestic combustion sources within the South Lanarkshire area has not identified any new commercial biomass combustion sources or new areas of domestic fuel burning. A planning application for a biomass boiler at Hairmyres in East Kilbride has been submitted; the outcome of the application is pending provision of further information from the plant developer. An assessment of the potential air quality impacts of this proposed plant may be required for the 2012 updating and screening assessment when more details are available regarding the specification of the proposed plant and the outcome of the planning application.

3.5 New Developments with Fugitive or Uncontrolled Sources

In relation to any changed waste, landfill or quarry processes identified in the public registers. There has been one significant change to existing process emissions with the August 2010 operational opening of the Mainshill open cast coal site in Douglas. The new fugitive sources that have been identified since the last round of review and assessment, and those that are currently being considered within the planning process, are listed in Table 3.1.

Table 3.1 New developments with fugitive or uncontrolled sources

Name	Location	Status	Comments
Mainshill open cast coal site	Douglas	Commenced operation August 2010	
Brokencross OCCS Extension	Douglas	In Planning system	
Glen Taggert OCCS Extension	Glespin	In Planning system	
Auldtown Heights OCCS	South of Lesmahagow	EIA Scoping	
Dunduff Quarry extension	South of Kirkmuirhill	In Planning system	Operational hard rock quarry
Snabe Sand and Gravel Quarry extension	East of Drumclog	Permission granted	Operational sand and gravel quarry
Hyndford Sand and Gravel Quarry extension	Lanark	EIA Scoping	Operational sand and gravel quarry. Potential to impact Banatyne Street – Traffic impact assement and AQA requested.

South Lanarkshire Council has identified new or previously unidentified local developments which may impact on air quality in the Local Authority area. These are:

- The M74 extension
- Mainshill open cast coal site in Douglas
- Wellburn Farm Housing Development , Lesmahagow

These will be taken into consideration in the next Updating and Screening Assessment, scheduled for 2012.

4 Local / Regional Air Quality Strategy

South Lanarkshire Council does not have a local or regional air quality strategy at present. This is planned for completion later in 2011.

5 Planning Applications

A review of planning applications submitted and granted has been conducted in order to identify any developments which may have a significant impact upon local air quality.

A review of the following and their potential impact on air quality will be required for the 2012 updating and screening assessment:

- There are a number of developments planned for South Lanarkshire which may have an impact on air quality. Due to the current economic downturn, some of these are still planned but have not proceeded any further as of yet. The Community Growth Areas at East Kilbride, Newton Farm, Carluke, Ferniegair, Larkhall and Hamilton are still in plan form.
- A re-application for planning permission for the new town planned at Owenstown is expected in 2011.
- Planning permission has now been granted for an extensive housing development at Wellburn Farm, Lesmahagow.

6 Air Quality Planning Policies

South Lanarkshire Council uses the triggers detailed in the EPUK Planning for Air Quality Guidance[1] and have a number of planning conditions which are relevant to air quality.

The planning conditions are as follows:

COND 06.21: Air Quality – Control of Pollutants

Prior to development commencing on site, a scheme to control and minimise the emission of pollutants from and attributable to the development, shall be submitted to and approved in writing by the Council as Planning Authority. The scheme shall set out measures which will be implemented to ensure that the emission of pollutants shall meet the requirements of the Air Quality (Scotland) Regulations 2000 and Air Quality (Amendment) Regulations 2002. The approved scheme shall thereafter be implemented prior to the development being brought into use and shall thereafter be implemented in accordance with the approved scheme to the satisfaction of the Council as Planning Authority.

Reason: To minimise the risk of nuisance from pollutants to nearby occupants.

COND 06.22: Air Quality – Control of Vehicle Emissions

Prior to the [commencement of use/occupation of the development] hereby approved, a scheme for controlling emissions from vehicles used in connection with the development, shall be submitted to and approved in writing by the Council as Planning Authority. The approved scheme shall thereafter be implemented prior to the development being brought into use and shall thereafter operated to the satisfaction of the Council as Planning Authority.

Reason: To minimise the risk of nuisance from pollutants to nearby occupants.

COND 06.23: Dust Mitigation/Control

Prior to development commencing on site, a scheme for the control and mitigation of dust shall be submitted to and approved in writing by the Council as Planning Authority. No changes to the approved scheme shall take place unless agreed in writing by the Council as Planning Authority. The scheme shall thereafter be implemented in accordance with a programme to be agreed in writing with the Council as Planning Authority.

Reason: To minimise the risk of nuisance from dust to nearby occupants.

COND 06.24: Dust Monitoring

Prior to development commencing on site, a scheme of dust monitoring shall be submitted to and approved in writing by the Council as Planning Authority. The scheme shall thereafter be

[1] Environmental Protection UK (2010) Development Control: Planning For Air Quality (2010 Update)

implemented in accordance with a programme to be agreed in writing with the Council as Planning Authority.

Reason: To minimise the risk of nuisance from dust to nearby occupants.

ADV NOTE ES 6 Formal action may be taken if nuisance occurs.

None of the above conditions will preclude formal action being taken by the Executive Director of Community Resources against the author of any nuisance, which may arise due to the operation of the proposed development

7 Local Transport Plans and Strategies

South Lanarkshire Council's Local Transport Strategy (LTS) was updated in 2006. The policy in relation to air quality is as follows:

- **LTP 95** The Council will continue to monitor and work to meet statutory requirements as appropriate.

The council LPS also includes the following actions with regard to air quality:

- **LTA 138** Assessment be made of industrial, transport related new developments, or any changes in domestic fuel use to ensure that air quality continues to meet exceed air quality objectives for Scotland

- **LTA 139** Monitoring of traffic flows and speeds be carried out to assess the impact of M74 completion to ensure that the predicted impacts on air quality are realistic and do not breach air quality objectives.

- **LTA 140** The council will operate their continuous monitoring equipment in the areas which are most likely to be closest to breaching the 2010 objectives for $PM_{10.}$

- **LTA 141** New sites to be pursued at Whirlies roundabout in East Kilbride and the new motorway junctions when the M74 is completed.

8 Implementation of Action Plans

South Lanarkshire Council declared the Whirlies AQMA in November 2008 and are currently working towards completing their action plan for submission in late 2011.

9 Conclusions and Proposed Actions

9.1 Conclusions from New Monitoring Data

The following observations have been made from the available monitoring data:

Annual mean NO_2 concentrations have increased across the entire diffusion tube network in 2010 when compare to 2009. This may be attributable to the extended periods of unusually cold weather that occurred during 2010.

The measured annual mean NO_2 concentration at Rutherglen using automatic monitoring has decreased steadily from 2008 to 2010 and was below the NAQS objective of 40 $\mu g.m^{-3}$ in 2010. The 2010 measured annual mean PM_{10} concentration at the Main Street, Rutherglen site was in excess of the 2010 Scottish objective of 18 $\mu g.m^{-3}$ and has increased slightly since 2009. The PM_{10} objective for short term exposure was also exceeded at this location. The 2010 measurements at Rutherglen reinforce the findings of the detailed assessment conducted at this location and the need to declare an AQMA for PM_{10}.

The measured annual mean NO_2 concentration at Whirlies Roundabout in East Kilbride has increased since 2009 and was in excess of the 40 $\mu g.m^{-3}$ objective during 2010. The NO_2 annual mean measured with a diffusion tube at Kingsway, East Kilbride was also in excess of the objective in 2010 and has increased every year since 2008 but this site lies about 20m from residential properties and the calculated concentration is below the objective. The annual mean PM_{10} concentration measured at Whirlies during 2010 has also shown a slight increase since 2009 but is still significantly less than the concentration measured in 2008 and is below the 18 $\mu g.m^{-3}$ Scottish objective. The current AQMA at this location is for PM_{10} only.

The annual mean NO_2 and PM_{10} concentrations measured at the new automatic monitoring site located by the Raith interchange in Bothwell are significantly greater than the applicable Scottish objectives. The short term 1-hr mean NO_2 objective was also exceeded at this location. The monitor is however is however located 1m from the interchange roadside and is approximately 60m from the nearest residential property, it is not therefore considered representative of relevant human exposure.

The low data capture from the automatic monitor at Bannatyne Street, Lanark in 2010 was insufficient to provide a useful indication of annual mean NO_2 concentrations. The annual mean measured using a diffusion tube at this location was in excess of the NAQS objective. A detailed assessment for this location is proposed for completion later in 2011.

The annual mean NO_2 concentration measured using a diffusion tube at Brandon Street, Hamilton has increased significantly between 2009 and 2010 and is now in excess of the 60 $\mu g.m^{-3}$ threshold at which there may be a risk of the short term NO_2 objective being exceeded.

9.2 Conclusions relating to New Local Developments

No new local developments were identified for which there was a need to proceed to a Detailed Assessment. Details of the planning applications that may require review in the 2012 updating and screening assessment are listed in Sections 3 and 5 above.

The Council may wish to consider deployment of additional monitoring sites along the new M74 extension to inform future review and assessment of air quality

9.3 Other Conclusions

None

9.4 Proposed Actions

The 2010 NO_2 monitoring data have 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 are planned for completion in 2011.

A Further Assessment of NO_2 and PM_{10} concentrations was conducted at the Whirlies Roundabout AQMA, East Kilbride. An action plan is currently in preparation for this location.

A Detailed Assessment of NO_2 and PM_{10} concentrations at Main Street, Rutherglen was conducted in 2010. The modelling study concluded that an AQMA for PM10 should be declared at Rutherglen, this is expected to happen in 2011.

To establish if there is a risk of the NO_2 objectives being exceeded at relevant locations near to the automatic monitoring site at the Raith interchange, it may be appropriate to deploy diffusion tubes closer to the residential properties at Clydeview that are approximately 60m west of the automatic monitoring location.

The Council may wish to consider deployment of additional monitoring sites along the new M74 extension to inform future.

10 References

DEFRA (2009) Part IV of the Environment Act 1995 Local Air Quality Management Technical Guidance LAQM.TG(09) February 2009

National Physical Laboratory (2011) National Diffusion Tube Bias Adjustment Factor Spreadsheet; available for download at http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html

Appendices

Appendix A: QA/QC Data

Diffusion Tube Bias Adjustment Factors

All passive diffusion tubes (PDT) for NO_2 measurement 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 WASP scheme that is managed by the Health & Safety Laboratory and a monthly inter-comparison exercise that is managed by AEA. The performance of Edinburgh Scientific Services in the WASP scheme is shown in Table A1 below.

Table A.1 Details of the performance of Edinburgh Scientifics in the WASP scheme

	Performance on basis of RPI, OLD CRITERIA, best 4 out of the 5 rounds 105 -109	Performance on basis of RPI, NEW CRITERIA, best 4 out of the 5 rounds 105 - 109
Edinburgh scientific services	Good	Good

The tube precision for Edinburgh Scientific Services for the only co-location study conducted during 2009 is shown in Table A.2. The results show good precision in the study. The most recently available bias adjustment factor for this laboratory based on the Marylebone Road Intercomparison and the West Lothian Council co-location study was 1.12. The averaged laboratory bias factor taken from both studies is presented in Table A2.

Table A.2: Details of the 2009 bias correction factors for NO_2 diffusion tubes

Site Name	Study duration (months)	Tube precision	Bias correction factor
West Lothian Council	9	Good	1.10
Marylebone Road Intercomparison	12	Good	0.95
Overall factor (2 studies)			**1.02**

PM Monitoring Adjustment

All automatic monitoring of PM_{10} was conducted using TEOM FDMS instruments, therefore no adjustments have been applied to the data to account for loss of volatile PM_{10} components.

Short-term to Long-term Data adjustment

South Lanarkshire Council had one automatic monitoring location where data capture was below 75%. An adjustment factor was calculated for this location using an average of the measured period and annual means at the Glasgow Centre, Glasgow Anderston and Edinburgh St Leonards automatic monitoring sites.

Location	Data capture	Factor
Wordsworth Way	66.7%	0.876

QA/QC of automatic monitoring

AEA Technology currently carries out all data ratification on behalf of Scottish Government for South Lanarkshire Council at Whirlies Roundabout, East Kilbride.

This consists of:

- Polling the data on a daily basis
- 6 month site audit

South Lanarkshire Council does not currently carry out manual calibrations on the NO_x analysers; each analyser carries out an automatic calibration overnight daily. The automatic calibrations are used by AEA to scale and ratify the data.

South Lanarkshire Council currently carries out its own filter changes.

Appendix B: Inventory of Industrial Activities

Company	Process	Location	Date of last permit and/or variation	Atmospheric Pollutants
PPC Part A Regulated Processes				
Intense Photonics Ltd,	Manufacture of small semiconductor devices	High Blantyre	12-Dec-2002	VOCs
Atmel Smart Card Ics,	Microelectronics	East Kilbride	7-Aug-2006	VOCs
Caradale Brick Limited	Ceramic Production	Carluke	22-Jan-2007	PM_{10}, NO_2, CO
Raeburn Brick Limited	Ceramic Production	Blantyre	20-Apr-2005	PM_{10}, NO_2, CO
Glasgow City Council Environmental Protection Services	Landfill	South Cathkin Landfill Site, East Kilbride	27-Nov-2006	PM_{10}
Grampian Country Chickens (Rearing) Ltd	Poultry Farm	Lanark	23-Feb-2010	PM_{10}
Freescale Semiconductor UK Ltd	Inorganic Chemicals	East Kilbride	30-Nov-2006	VOCs
Philips Lighting	Inorganic Chemicals	Hamilton	14-Jul-2005	VOCs
Robert Wiseman Dairies	Treating and processing milk the quantitiy of which received being greater than 200 tonnes per day.	East Kilbride		PM_{10}, NO_2, CO
Coca-Cola Enterprises Ltd	Treating and processing of raw materials required for the production of soft drinks from fruit/vegetable based materials.	East Kilbride	20-Feb-2006	PM_{10}, NO_2, CO
VION Agriculture Ltd.	Poultry Farm	Lanark	23-Feb-2010	PM_{10}
Viridor Waste Management Ltd	Landfill Site	East Kilbride	28-Sep-2007	PM_{10}
William Hamilton & Sons (Contractors) Ltd	Landfill	Dovesdale Farm Landfill Site, Carlisle Road		PM_{10}
PPC Part B Processes				
Arnold Clark Automobiles Ltd	Coating of road vehicles.	East Kilbride	05-May-04	VOC's, PM_{10}
Bennetts Scotland Ltd	Vehicle Respraying	Uddingston	16-Jun-04	VOC's, PM_{10}
BHC Ltd	Coating Activities - spray painting of steel	Carnwath	06-Apr-05	VOC's, PM_{10}
Blantyre Castings	Casting	Blantyre	30-Oct-06	PM_{10}, NO_2, CO

Company	Process	Location	Date of last permit and/or variation	Atmospheric Pollutants
CEMEX UK Materials Ltd	Bulk cement	Thankerton Quarry Biggar	07-Nov-06	PM_{10}
CEMEX UK Materials Ltd (previously RMC Concrete UK Ltd)	Cement process	Hyndford Quarry Lanark	11-Dec-06	PM_{10}
Cemex UK Materials Ltd	Cement process	Rutherglen	30//10/06	PM_{10}
CEMEX UK Materials Ltd,	Concrete Batching	East Kilbride	07-Nov-06	PM_{10}
Cloburn Quarry Company Limited	Quarrying Processes	Cloburn Quarry, Lanark	02-Mar-06	PM_{10}
CORUS UK Ltd	Heat treatment - Combustion	Cambuslang	30-Oct-03	PM_{10}, NO_2, CO
CPI - Glasgow	Coating Activities, Printing and Textile Treatments	Blantyre	24-Oct-03	VOC's, PM_{10}
D Marshall & Sons Ltd	Cement process	Rutherglen	19-Jul-06	PM_{10}
Field Packaging	Coating	East Kilbride	12-Aug-08	VOC's PM_{10}
FP Castings	Ferrous metal casting and foundry	East Kilbride	11-Feb-04	PM_{10}, NO_2, CO
Fuji Electric (Scotland) Limited	Solvent Emissions F1 Ultrasonic Wash	East Kilbride	29-Dec-04	VOCs
George Raeburn (Minerals) Ltd	Coal Crushing	East Kilbride	20-Mar-06	PM_{10}
George Taylor & Co	Foundry process	Hamilton	30-Oct-06	PM_{10}, NO_2, CO
H Macartney	Respraying of road vehicles	East Kilbride	04-Feb-04	VOC's, PM_{10}
Hall Construction Services Ltd	Opencast Coal Site	Wilsontown Opencast Coal Site Near Forth	07-Aug-06	PM_{10}
Hanson Aggregates Ltd	Concrete	Rutherglen	24-Oct-05	PM_{10}
Hanson Aggregates Ltd	Roadstone coating processes	Rutherglen,	29-Nov-06	PM_{10}
Heraeus QuartzTech Limited,	Polishing/etching glass products	East Kilbride	20-Oct-04	PM_{10}
Hrabro Ltd	Animal feed manufacture	Coalburn		PM_{10}, NO_2, CO
Ireland Alloys Ltd	Solvent Emissions Surface cleaning using trichloroethylene	Blantyre	20-Apr-05	VOCs
M & A Thomson Litho Ltd	Coating and pritning	East Kilbride	21-Jul-04	VOC's, PM_{10}
Nationwide Crash Repair Centre	Vehicle Respraying	Hamilton	11-Feb-04	VOC's, PM_{10}
Parks of Hamilton	Vehicle Respraying	East Kilbride	16-May-08	VOC's, PM_{10}

Company	Process	Location	Date of last permit and/or variation	Atmospheric Pollutants
Patersons of Greenoakhill	Hard rock quarry process	Dunduff Quarry Boghead		PM_{10}
Patersons of Greenoakhill Limited	Concrete Batching	Rigside	03-Apr-09	PM_{10}
Paver Systems Ltd	Production of Cement and Lime	Carluke	28-Apr-08	PM_{10}
Polestar East Kilbride Ltd	Offset Heatset Litho Printing	East Kilbride		VOCs
Richmond Coachworks Ltd	Re-spraying of vehicles	Cambuslang	21-Aug-06	VOC's, PM_{10}
Rosti Scotland	Coating	Larkhall	11-Feb-04	VOC's, PM_{10}
Scottish Coal Co Ltd	Opencast Coal Mining	Broken Cross Opencast Coal Site Near Rigside	16-Jun-04	PM_{10}
Scottish Coal company Ltd	Crushing & screening of coal	Glentaggart Opencast Coal Site, Glespin	04-May-05	PM_{10}
Scottish Coal company Ltd,	Crushing, screening, grading, loading, unloading and storage of coal.	Poniel Opencast Coal Site, Douglas, Lanark	06-Feb-08	PM_{10}
Scottish Power	Crushing, grinding and screening of coal.	Climpy, Near Forth Lanark	10-Mar-04	PM_{10}
Somerville & Morrison Ltd	Tar and bitument processes	Rutherglen	02-Nov-04	PM_{10}, NO_2, CO
Surface Technology	coating process	East Kilbride	26-Mar-08	VOC's, PM_{10}
Tarmac Ltd	Roadstone coating processes	Lanark	19-Jul-06	PM_{10}
Tarmac Northern Ltd	Concrete Batching	Cambuslang	28-Jun-06	PM_{10}
Tarmac Northern Ltd	Dry Mortar Plant	Uddingston	21-Jan-04	PM_{10}
The Pet Crematorium Ltd	Crematorium	Larkhall	12-Sep-08	PM_{10}, NO_2, CO
The Scottish Coal Company Ltd	Crushing & screening	Ravenstruther	30-Jan-06	PM_{10}
The Verve Bodyshop Wildman Road Law	Vehicle Respraying	Law	21-Jan-04	VOC's, PM_{10}

In addition, 37 Petrol Stations and 1 dry cleaner are reported as regulated as PPC Part B processes by SEPA in the South Lanarkshire area.