2013 Air Quality Progress Report for East Renfrewshire Council

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

May 2013

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Executive Summary

East Renfrewshire Council has been monitoring air quality across the district since 1996. The results of this monitoring are reviewed and published in our annual air quality reports. Air quality within East Renfrewshire has generally complied with air quality objectives and there has therefore been no need to declare any Air Quality Management Areas to date.

The monitoring results from 2012 indicate that national air quality objectives were met and there is therefore no requirement to proceed to more detailed assessment at this time.

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1 Introduction

1.1 Description of Local Authority Area

East Renfrewshire covers an area of approximately 18,000 hectares to the south and west of Glasgow. The north of the area comprises the suburban residential areas of Giffnock, Newton Mearns, Clarkston and Thornliebank and the industrial town of Barrhead. There is also an extensive rural area within which the villages of Uplawmoor, Neilston, Waterfoot and Eaglesham are located. Approximately 75% of the district is agricultural land. There are no major industrial or commercial sources of air pollutants within East Renfrewshire.

East Renfrewshire has a population of 89,950 (National Records of Scotland 2011). 60% of residents are of working age, with 70% of the working population travelling outside the authority to work. Currently 16% of employees travel to work by bus or rail. The level of car ownership is amongst the highest in Scotland, with 82% of households owning a car.

1.2 Purpose of Progress 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.

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. However, if the Progress Report identifies the risk of exceedence of an Air Quality Objective, the Local Authority should undertake a Detailed Assessment immediately.

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 μg/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 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 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.50 µg/m^3	Annual mean	31.12.2004
	0.25 µg/m^3	Annual mean	31.12.2008
Nitrogen dioxide	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m^3	Annual mean	31.12.2005
Particulate Matter (PM_{10}) (gravimetric)	50 µg/m^3, not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	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

East Renfrewshire Council has been monitoring air quality across the district since the council was formed in 1996. The data from this monitoring has been subject to periodic review and assessment. There are no Air Quality Management Areas (AQMAs) within East Renfrewshire. The most recent rounds of review and assessment are detailed below:

A Detailed Assessment was conducted for Sheddens Roundabout, Clarkston in February 2009 as previous monitoring had indicated that the PM_{10} levels were close to the Scottish annual mean objective of 18µg/m^3. The 2009 data showed a decrease in PM_{10} levels. Dispersion modelling found potential exceedences of the 2010 annual mean objective for PM_{10} at several residential properties along the roadside, although the 24 hour PM_{10} objective was being met. There was naturally a level of uncertainty in the model and, in addition, TEOM monitors were found not to be operating in compliance with the EU reference method. The decision was therefore made to defer the decision on whether to declare an Air Quality Management Area (AQMA) until the monitor had been upgraded and a further 6 months of monitoring data had been collected.

The 2009 Updating and Screening Assessment review of PM_{10} data from Sheddens Roundabout indicated that the annual mean objective was being met and that the 2010 annual mean objective would also be met.

The USA found that in 2008 the NO_2 annual mean objective may not have been met at three locations, Eastwoodmains Road, Rouken Glen Road, Giffnock and Kelburn Street at Neilston Road, Barrhead. This was however based solely on diffusion tube results which does carry a high level of uncertainty. It was proposed that a further six months of monitoring would be undertaken before conducting a further review of the results to determine if it would be necessary to proceed to a Detailed Assessment for NO_2.

The 2010 Progress Report found that the UK and Scottish objectives for NO_2 and PM_{10} were being met at all locations within East Renfrewshire and as such there was no requirement to proceed to a Detailed Assessment for any pollutant.

A review of the Detailed Assessment at Sheddens Roundabout was undertaken in April 2010. The TEOM analyser was upgraded to be comparable to the EU reference method, and the first six months of monitoring data was analysed. The review found that the annual mean PM_{10} concentration was below the 2010 objective of 18μgm^{-3}. Modelling predictions also found that national air quality objectives would be met at all relevant locations.

The 2011 Progress Report found that, based on 2010 diffusion tube monitoring data, the annual mean objective for NO_2 was exceeded at three sites: Kelburn Street at Neilston Road, Barrhead, Rouken Glen Road, Giffnock and 27 Rouken Glen Road. Due to the exceedences being marginal (particularly taking into account the high error factor for diffusion tubes) and very localised, it was considered not sufficient to justify proceeding to a Detailed Assessment and/or declaration of an AQMA at that time. The results from these sites would be reviewed again once another year's data was available.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

There is one automatic monitoring site in East Renfrewshire; a TEOM/FDMS particulate monitor located at Sheddens Roundabout, Clarkston (see Figure 2.1 and Table 2.1 below). In August 2009, the dryer was upgraded to ensure that the monitor is comparable with the EU reference method for particulate monitoring. QA/QC information is contained in Appendix A.

Figure 2.1 Map of TEOM/FDMS site at Sheddens Roundabout, Clarkston

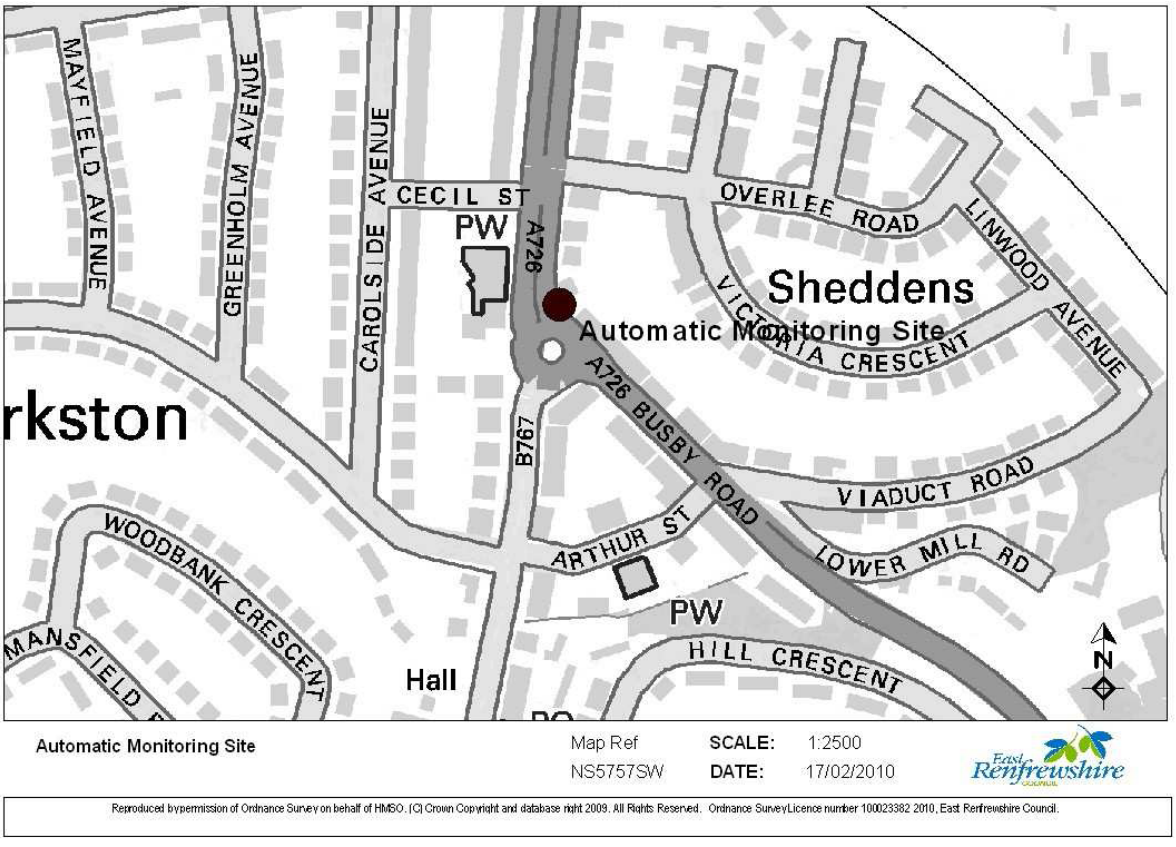


Table 2.1 Details of Automatic Monitoring Sites

Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Inlet Height (m)	Pollutants Monitored	In AQMA?	Monitoring Technique	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
Sheddens Roundabout, Clarkston	Roadside	257464	657108	2.0	PM_{10}	N	FDMS	Y (3m)	3	Y

Unfortunately, the monitor developed a fault In July 2012 as result of water in the system. The fault took some considerable time to rectify and the monitor was not operational again until November 2012. The overall rate of data capture was 60.9%. The statistics for Sheddens FDMS are:

Table 2.2 Results from Automatic Monitoring at Sheddens FDMS

CRITERIA	PM_{10}*
Maximum daily mean	60 µg m^{-3}
Average	14 µg m^{-3}
Days when daily mean exceeded	2
Data capture	60.9 %

2.1.2 Non-Automatic Monitoring Sites

There are currently twenty one nitrogen dioxide diffusion tube monitoring sites in East Renfrewshire. Location maps for all the diffusion tubes are located in Appendix B. Three tubes were removed in 2012, due to the presence of heavy foliage around the tube sites. The diffusion tubes are supplied and analysed by Glasgow Scientific Services (GSS).

A bias adjustment factor has been applied to the annual average results from each of the 21 sites. The adjustment factor is an estimate of the difference between diffusion tube concentrations and continuous monitoring, the latter assumed to be a more accurate method of monitoring.

The national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method. The bias adjustment factor for GSS is 0.95 (LAQM Support website, March 2013). There are no co-located tubes in East Renfrewshire or locally produced bias adjustment factors, therefore this factor has been used in the results presented below.

For previous data, years 2008 to 2011, the bias adjustment factors have been taken from the Council's previous LAQM annual reports. The factors used were 0.97 (2008) 1.23 (2009), 1.1 (2010) and 0.94 (2011).

Table 2.2 Description and Results from Diffusion Tube Sites

Site Name	Type[1]	Grid Ref	Relevant Exposure (y/n with distance (m) to relevant exposure)	Distance corrected?	Distance to kerb (m)	Data Capture 2012 (%)	Unadjusted Annual Mean NO_2 Concentration	Annual mean concentration with bias adjustment factor applied (µg/m3)
Huntly Drive, Giffnock	R	567589	Y 20	N	0	83.3	19.3	18.3
Eastwoodmains Rd opp. Bar	K	559583	Y 50	N	2.5	75.5	33	31.4
Clarkston Toll	R	573576	Y 5	N	0	100	32.7	31.1
Sheddens Roundabout	K	574572	Y 20	N	3	100	32.2	30.6
Riverside Terrace, Busby	K	579566	Y25	N	2.5	58.3	20.1[A]	19.1[A]
Main St, Neilston	K	480573	Y 10	N	2.5	75	19.2	18.2
Kelburn Street, Barrhead	K	494584	Y 20	N	2.5	91.7	39.5	37.5
Cross Arthurlie St, B.head	K	498593	Y 10	N	2	100	34.1	32.4
Waterside Inn, Barrhead	K	512604	Y 50	N	0	100	32.4	30.8
Darnley Rd, Barrhead	K	508593	Y 50	N	2.5	83.3	19.2	18.2
Main Street,	K	549595	Y 50	N	2.5	100	28.8	27.4

Thornliebank								
Main St, Barrhead N	R	507592	Y 70	N	0.5	100	25.0	23.8
Main St, Barrhead S	R	498588	Y 50	N	0	58.3	34.7	33.0
Lochlibo Road, Barrhead	K	505591	Y 70	N	4	75	38.3	36.4
Eastwoodmains Rd at Mains	K	559582	Y 50	N	2	100	30.0	28.5
Rouken Glen Road, Giffnock	K	547587	Y 50	N	2	100	40.9	38.9
Mearnskirk Nursing Home	R	548588	Y 25	N	1	100	18.9	18.0
Brodick Place, N.M.	R	563593	Y 5	N	0	100	24.9	23.7
Fenwick Rd, Giffnock	K	559583	Y 5	N	2.5	83.3	36.5	34.7
Burnfield Rd, Giffnock	R	562594	Y 10	N	2.5	100	25.8	24.5
Braidholm Rd, Giffnock	R	563593	Y 15	N	2.5	91.7	27.7	26.3

1. R = roadside, K = kerbside
2. Result marked with an 'A' has been annualised as less than 9 months data was gathered.
3. The bias adjustment factor for 2012 is 0.95.

Less than nine months data was available for Main Street, Barrhead (South) and Riverside Terrace, Busby. The annual average for Riverside Terrace has been annualised using the methodology given in Box 3.2 of TG 09[1]. This methodology uses data from nearby monitoring sites to calculate both the annual means and the means for the period for which data is available for the site

of interest. The period mean of the site of interest is then multiplied by this ratio to predict its annual mean. For Riverside Terrace, two similar nearby sites had a full 12 months of data (Main Street, Thornliebank and Clarkston Toll), therefore these were used to annualise the Riverside Terrace result.

At Barrhead Main Street (South) the gaps in the data were sporadic (the tube frequently goes missing during its exposure period, even if placed at higher heights on the lamp-post). It was therefore not appropriate to annualise the result. The annual average was calculated on the basis of the 7 months worth of data available. The December result was available for this site though (which was the highest of the year across all sites) and it could therefore be reasoned that the average does reflect the worst-case scenario.

2.2 Comparison of Monitoring Results with Air Quality Objectives

There are no diffusion tube monitoring sites where the annual average NO_2 concentration was greater than 40µg/m^3. The measured annual average concentration at Rouken Glen Road was 40.9 µg/m^3 however, once the bias adjustment factor of 0.95 was applied, this became 38.9 µg/m^3. There were two other sites where the levels were borderline (i.e. above 36µg/m^3 for NO_2); Lochlibo Road and Kelburn Street, Barrhead. These two monitoring sites are reasonably close to one another on a stretch of road which has a reasonably steep gradient. There have been proposals to alter the road layout at this location. Particular attention will be paid to this area in future reviews of air quality.

Across the district in 2012, NO_2 levels in March were found to be particularly low, while levels in December 2012 were notably high as a result of the weather conditions. Generally the 2012 results were found to be slightly higher than the results from 2011, though still significantly lower than the peak levels that were found in 2010.

Table 2.6 Results of NO_2 Diffusion Tubes (2008 to 2012)

Site	Annual Mean Concentration (µg/m^3) - Adjusted for Bias				
	2008 (Bias Adjustment Factor = 0.97)	2009 (Bias Adjustment Factor = 1.23)	2010 (Bias Adjustment Factor = 1.1)	2011 (Bias Adjustment Factor = 0.94)	2012 (Bias Adjustment Factor = 0.95)
Huntly Drive	12.8	14.2	18.5	**13.2**	18.3
Eastwoodmains Rd opp. Bar	41	25.8	36.5	28.5	31.4
Clarkston Toll	34.4	25.7	36.6	26.6	31.1
Sheddens	28.9	23.2	34.7	24.7	30.6
Riverside Terrace	19.8	19.0	34.8	17.9	19.1
Main St, Neilston	17.7	13.7	21.1	15.2	18.2

Site	Annual Mean Concentration (µg/m^3) - Adjusted for Bias				
	2008 (Bias Adjustment Factor = 0.97)	2009 (Bias Adjustment Factor = 1.23)	2010 (Bias Adjustment Factor = 1.1)	2011 (Bias Adjustment Factor = 0.94)	2012 (Bias Adjustment Factor = 0.95)
Kelburn Street, Barrhead	47.7	38.1	45.1	41.4	37.5
Cross Arthurlie St	38.6	23.2	31.6	25.9	32.4
Waterside Inn	23.0	21.3	28.4	22.6	30.8
Darnley Rd	18.2	16.1	25.4	16.8	18.2
Main Street, Thornliebank	24.2	23.7	32.0	26.6	27.4
Main St, Barrhead N	19.9	17.9	24.1	17.4	23.8
Main St, Barrhead S	27.5	22.4	29.4	24.7	33.0
Lochlibo Road		28.0	38.9	31.2	36.4
Eastwoodmains Rd		20.0	27.4	21.6	28.5
Rouken Glen Road		36.4	40.1	30.5	38.9
Mearnskirk		13.3	19.3	13.2	18.0
Brodick Place		15.8	25.6	20.0	23.7
Fenwick Rd				29.6	34.7
Burnfield Rd				18.2	24.5
Braidholm Rd				20.2	26.3

2.2.1 Particulate Matter (PM_{10})

Unfortunately, due to the fault in the FDMS analyser between July and November 2012, the data capture rate was only 60.9%, far below the acceptable data capture rate of 90% that is required for making direct comparisons with national air quality objectives.

The available data can however be used as an indicator of the likelihood of PM_{10} objectives being met. During the period when the monitor was operational, the daily mean objective of 50 μgm^{-3} (not to be exceeded more than 7 times a year) was exceeded on only two occasions. Given the data capture rate of 60.9%, this would suggest that it is unlikely that the objective would be exceeded over the full year, particularly taking into account that the monitor was operational during December 2012, which represented the worst air quality conditions of the year.

The average PM10 during the measurement period was 14 μgm^{-3}. The annual mean objective for PM10 is 18 μgm^{-3} and it is therefore likely that this objective is also being met. Obviously, the data will be reviewed once the full year's data for 2013 is available.

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

Site	Site Type	Within AQMA?	Valid Data Capture 2012 %	Confirm Gravimetric Equivalent (Y or N/A)	Annual Mean Concentration ($\mu g/m^3$)				
					2008	2009	2010	2011	2012
Sheddens	Roadside	Y	60.9	Y	17.0	16.0	17.0	**14.1**	**14**

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 2012 %	Confirm Gravimetric Equivalent	Number of Daily Means > 50µg/m^3				
					2008	2009	2010	2011	2012
Sheddens	Roadside	Y	60.9	Yes	3	4	3	0	2 (37 µg m^{-3})

[1] As data capture for full calendar year is less than 90%, the 98.1th percentile of 24-hour means is in brackets

2.2.2 Sulphur Dioxide (SO_2)

ERC does not have any sulphur dioxide monitoring locations as there are no significant sources of sulphur dioxide, either industrial or domestic.

2.2.3 Benzene

There are no benzene monitoring sites in East Renfrewshire as there are no significant benzene sources.

2.2.4 Summary of Compliance with AQS Objectives

East Renfrewshire Council has examined the results from monitoring across East Renfrewshire. Concentrations are all below the objectives, therefore there is no need to proceed to a Detailed Assessment.

3 New Local Developments

East Renfrewshire Council confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

East Renfrewshire Council confirms that all the following have been considered:

- **Road traffic sources**
- **Other transport sources**
- **Industrial sources**
- **Commercial and domestic sources**
- **New developments with fugitive or uncontrolled sources.**

4 Planning Applications

East Renfrewshire Council's Environmental Health Services reviews all planning applications received on a weekly basis. Where there are proposed developments which have the potential to impact on local air quality, Environmental Health recommends to the planning officer that the applicant should be required to submit an air quality impact assessment to accompany the planning application. This air quality impact assessment should take into cognisance the Environmental Protection UK guidance document on air quality and development control and should consider the construction period as well as the short, medium and long term impacts of the development.

Environmental Health will advise the Development Management section where the Environmental Health Officer believes that a proposed development is undesirable for air quality reasons.

Forthcoming developments include the redevelopment of Barrhead Town Centre to include a new supermarket and petrol station. An air quality impact assessment was made as part of the planning application for the supermarket site. The use of a town centre site is considered desirable, particularly given the low levels of car ownership in Barrhead. The site is well-served by public transport.

East Renfrewshire is home to a number of different renewable energy projects, including Whitelee Wind Farm, one of the largest wind farms in Europe, as well as a number of smaller wind turbine developments. Applications continue to be received for wind turbines and these, together with the existing renewable energy developments help contribute towards improving air quality nationally.

5 Local Transport Plans and Strategies

The Local Transport Strategy (LTS) 2008-2011 was published in May 2008 and produced in accordance with guidance from the Scottish Government. The Local Transport Strategy sits in a hierarchy of transport plans below the National Transport Strategy and Regional Transport Strategy.

Initially the Local Transport Strategy was published with a three year time period in line with Scottish Government guidance. The strategy includes an action plan recognising that many of the transport projects included would extend far beyond the three year lifespan of the document.

Following the decision to consolidate existing National and Regional Transport Strategies to focus on delivery, the existing local strategy will remain the core document for East Renfrewshire. The policies and projects remain relevant and a continuing focus will be placed on implementation.

6 Climate Change Strategies

East Renfrewshire Council has a Carbon Management Strategy and Implementation Plan which is the first step towards a systematic approach to reducing our greenhouse gas emissions and enables us to adopt a Council wide approach towards the cost-effective reduction of emissions, starting with simple short term actions and looking forward to potential long-term projects and initiatives leading towards 2013.

The Council's target to reduce carbon emissions by 25% of the 2006/07 baseline by 2012/13 is one of the most ambitious of all Scottish councils. East Renfrewshire Council has worked with the Carbon Trust to develop this Local Authority Carbon Management (LACM) Strategy & Implementation Plan (SIP) with one key aim – to reduce carbon emissions from East Renfrewshire Council controlled buildings and activities over the next five years.

By detailing the various sources of the Council's carbon emissions, our SIP provides a time defined baseline from which the environmental effects and financial benefits of our future actions can be quantified. The SIP allows ERC to build upon the wide range of energy efficiency and improvement projects which have been undertaken by the Council over a period of years and helps ERC to identify the most suitable projects for future consideration, allowing us to make progress towards more clearly defined outcomes.

7 Conclusions and Proposed Actions

7.1 Conclusions from New Monitoring Data

The available monitoring data from 2013 indicates that relevant air quality objectives are being met at all locations within East Renfrewshire. There is therefore no need to proceed to any detailed assessments or declarations of Air Quality Management Areas at this time.

In general, air quality in 2012 seems to show a slight improvement on previous years. Monitoring will continue at all sites throughout 2013.

7.2 Conclusions relating to New Local Developments

There are no new local developments since the last Updating and Screening Assessment which require to be considered at this time.

7.3 Proposed Actions

East Renfrewshire Council will continue to monitor air quality across the district throughout 2013. The monitoring data will be reviewed and a further assessment of air quality will be published in the form of an Air Quality Progress Report in May 2014.

8 References

1. Technical Guidance LAQM.TG (09), Department for Environment, Food and Rural Affairs, February 2009

2. East Renfrewshire Council 2009 Local Air Quality Management - Updating and Screening Assessment

3. East Renfrewshire Council 2010 Local Air Quality Management – Progress Report

4. East Renfrewshire Council 2011 Local Air Quality Management – Progress Report

5. East Renfrewshire Council 2012 Local Air Quality Management – Updating and Screening Assessment

Appendices

Appendix A: Quality Assurance / Quality Control (QA/QC) Data

Appendix B: Full diffusion tube results 2012

Appendix C: Maps of diffusion tube locations

Appendix A: QA:QC Data

1. Automatic Monitoring: QA/QC of TEOM/FDMS

The FDMS at Sheddens is serviced and maintained by Air Monitors Ltd, with routine filter changes/checks etc made by officers from East Renfrewshire Council. The Sheddens FDMS automatic particulate monitoring site is now part of the Scottish Government network and, as such, the site is audited and the monitoring data ratified by Ricardo-AEA Technology, Glengarnock, Ayrshire. Site audits are conducted on a six-monthly basis and a certification of calibration issued for the FDMS. Ricardo-AEA Technology also provides ERC with QA/QC data for the site and validates/ratifies that data. The report for Sheddens for 2012 is shown below:

AIR POLLUTION REPORT

Produced by Ricardo-AEA on behalf of the Scottish Government

EAST RENFREWSHIRE SHEDDENS
1st January to 31st December 2012

These data have been fully ratified by AEA

POLLUTANT	PM_{10}*
Maximum daily mean	60 µg m^{-3}
98.08th percentile of daily means	37 µg m^{-3}
Average	14 µg m^{-3}
Data capture	60.9 %

+ PM_{10} instruments: FDMS using a gravimetric factor of 1 from 1st January 2012
Particulate matter concentrations are reported at ambient temperature and pressure.

Pollutant	Air Quality Regulations (2000) and Air Quality (Scotland) Amendment Regulations 2002	Exceedences	Days
PM_{10} Particulate Matter (Gravimetric)	Daily mean > 50 µg m^{-3}	2	2
PM_{10} Particulate Matter (Gravimetric)	Annual mean > 18 µg m^{-3}	0	-

No adjustments are required to the PM monitoring data as the TEOM/FDMS method is being used and the original dryer has been replaced with a CB dryer. For a strict comparison against the objectives there must be a data capture of >90% throughout the calendar year. Unfortunately, the FDMS developed a fault in July 2012, after water was found inside the equipment and was out of service until November 2012. The data cannot therefore strictly be compared against national objectives, although the data gained throughout the remainder of the year does indicate that the objective is likely being complied with.

2. Non-Automatic Monitoring: QA/QC of Diffusion Tube Monitoring

The diffusion tubes are supplied and analysed by Glasgow Scientific Services (GSS) utilising the 20% TEA in water preparation method. GSS participates in the Workplace Analysis Scheme for Proficiency (WASP) for NO_2 diffusion tube analysis. The WASP scheme sends 4 tubes spiked with known concentrations of nitrite to each participating laboratory every quarter. There are strict performance criteria for participating laboratories to meet to ensure that NO_2 concentrations reported are of a high calibre. In WASP rounds 116 to 119 (January to December 2012) GSS scored 100% in Quarter 1, 50% in Quarter 2, 100% in Quarter 3 and 100% in Quarter 4.

The bias adjustment factor, taken from the LAQM helpdesk website, for GSS diffusion tubes in 2012 was 0.95. East Renfrewshire Council does not carry out any co-location studies therefore no local adjustment factor is available. It was therefore appropriate to use the GSS factor.

3. Short-term to Long-term Data adjustment

Table A.1 Short-Term to Long-Term Monitoring Data Adjustment

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
Clarkston Toll	Roadside	32.7	29.8	1.1
Main St, Thornliebank	Kerbside	28.8	23.5	1.2
Average				1.15

These sites were chosen are they are the two closest sites with a complete data set for the calendar year 2012. The ratio of 1.15 was used to then annualise the result for Riverside Terrace, Busby. The start date for the period mean was August 2012, finishing in December 2012.

APPENDIX B – DIFFUSION TUBE RESULTS FOR 2012 (µgm^{-3})

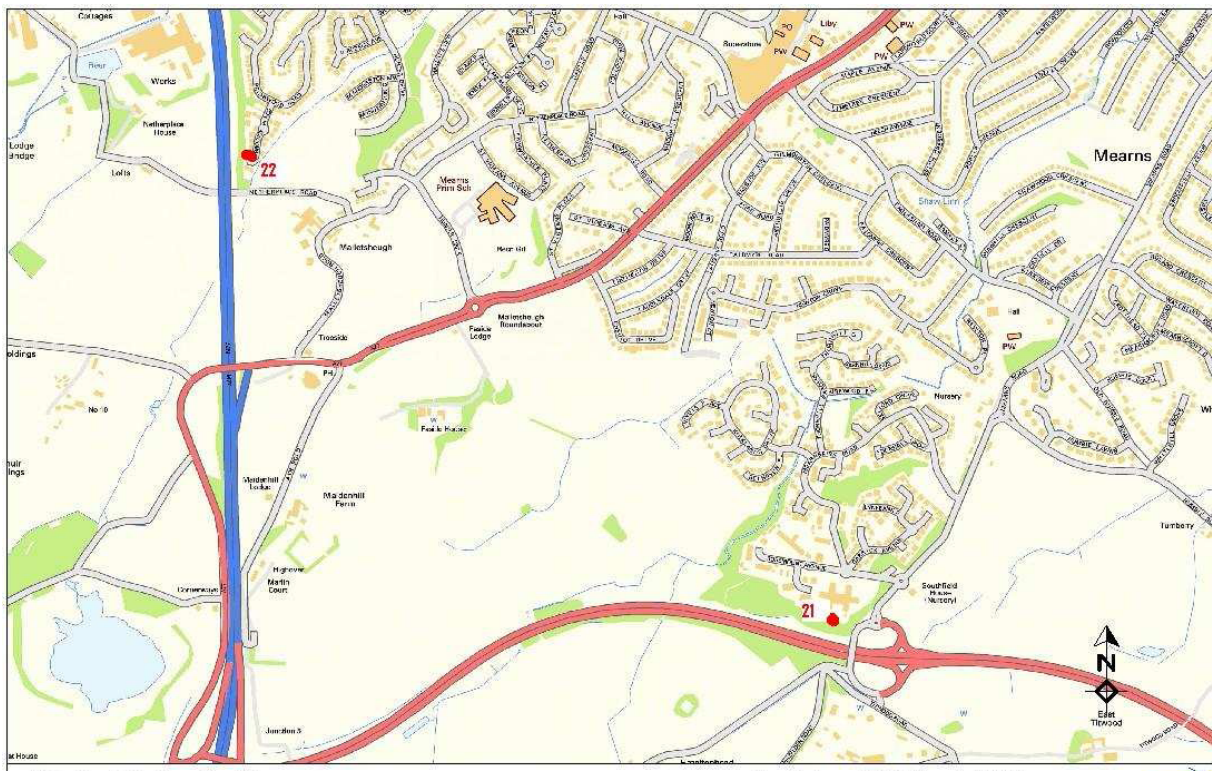
Site Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Huntly Drive, Giffnock	25.2	19.4	12.2	13.7	7.6	x	x	11.1	5.5	31.6	22.9	44.4
Eastwoodmains Rd opp. Bar	26.1	52.3	15.1	20.8	21.6	18.3	17.1	1.5	39.2	45.7	51.4	50.4
Clarkston Toll	31.6	36.3	15.5	36.7	33.8	28.2	27.4	28.2	25.9	42.9	31.3	56.1
Sheddens Roundabout	40.6	34.6	18.3	35.6	21	27.7	x	16.8	26.6	36.4	34.1	62
Riverside Terrace, Busby	21.7	19.4	14.9	16.4	15.5	20	14. 9	x	x	x	x	X
Main St, Neilston	16.3	21.7	16.8	16.3	18.3	19.7	13.1	13.7	x	51.4	36.3	39.9
Kelburn Street, Barrhead	35.8	60	37.1	45.5	29.5	36.8	31.4	31	X	51.4	36.3	39.9
Cross Arthurlie St, B.head	33.7	69.2	28.9	33.6	17.5	33	26.3	21.5	29	36.4	37.4	42.5
Waterside Inn, Barrhead	x	64.9	20.1	18.7	14.4	20.1	24	21.6	26.7	56.3	39	50.4
Darnley Rd, Barrhead	26.9	26.2	14.6	20.5	16.6	21.5	17.6	13.4	15.6	1.9	x	X
Main Street, Thornliebank	35.4	29.4	16.2	20.2	21.1	19.5	22.5	23	25.9	38	41.5	52.4
Main St, Barrhead N	23.6	41.1	13.7	21.7	19.3	21.5	16.3	14.9	16.5	34.1	28.5	48.9
Main St, Barrhead S	26	x	34.5	36.2	20.6	26.2	x	38.8	x	x	x	60.6
Lochlibo Road, Barrhead	41.3	44.9	10.8	33.3	21.8	34.2	x	45.1	x	54.3	59.2	X
Eastwoodmains Rd at Mains	26.1	52.3	15.1	20.8	21.6	18.3	171	1.5	39.2	45.7	51.4	50.4
Rouken Glen Road, Giffnock	42.5	65.6	27.3	31	21.6	28.4	x	x	32.6	41.9	48.8	69.1
Mearnskirk Nursing Home	15.4	52.5	16.1	14	12.3	11.7	10.1	10.5	12.2	20.2	21.1	30.6
Brodick Place, N.M.	x	33	24.5	23.3	19.4	11.2	12.8	19.2	23.4	30.1	31.8	45.7
Fenwick Rd, Giffnock	36.8	50.7	33.8	27.9	22.3	x	23.4	26.4	29.3	x	45.3	69.5
Burnfield Rd, Giffnock	43.1	31.5	19.1	18.2	13.1	19.3	17.8	19	13.4	29.1	30.9	54.6
Braidholm Rd, Giffnock	x	43.2	23	26	12.1	22.3	23.9	18.3	22	1.9	37.8	48.7

Appendix C – Map of diffusion tube locations

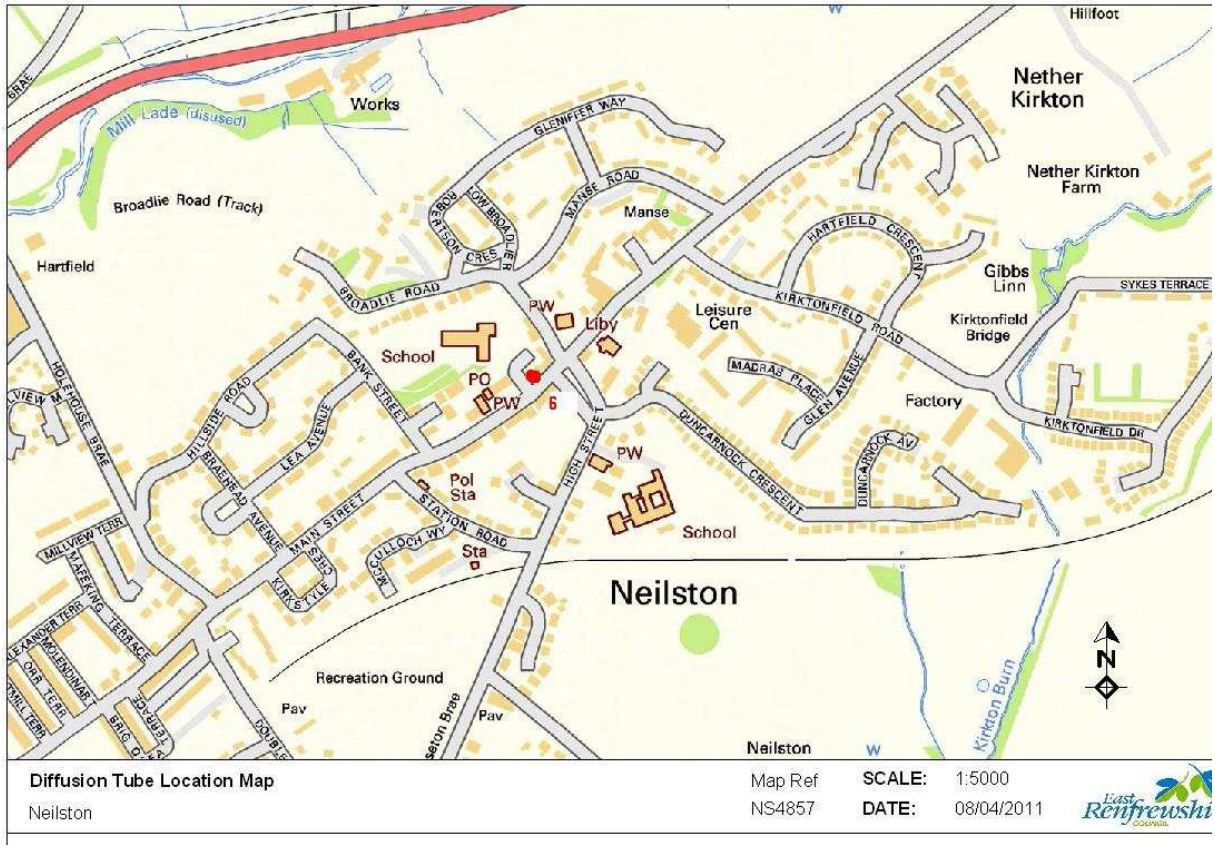
Key

Site Name
1. Huntly Drive, Giffnock
2. Eastwoodmains Rd opp. Bar
3. Clarkston Toll
4. Sheddens Roundabout
5. Riverside Terrace, Busby
6. Main St, Neilston
7. Kelburn Street, Barrhead
8. Cross Arthurlie St, B.head
9. Waterside Inn, Barrhead
10. Darnley Rd, Barrhead
11. Main Street, Thornliebank
13. Main St, Barrhead N
14. Main St, Barrhead S
16. Lochlibo Road, Barrhead
18. Eastwoodmains Rd at Mains
19. Rouken Glen Road, Giffnock
21. Mearnskirk Nursing Home
22. Brodick Place, N.M.
20. Fenwick Rd, Giffnock
24. Burnfield Rd, Giffnock
25. Braidholm Rd, Giffnock

Newton Mearns

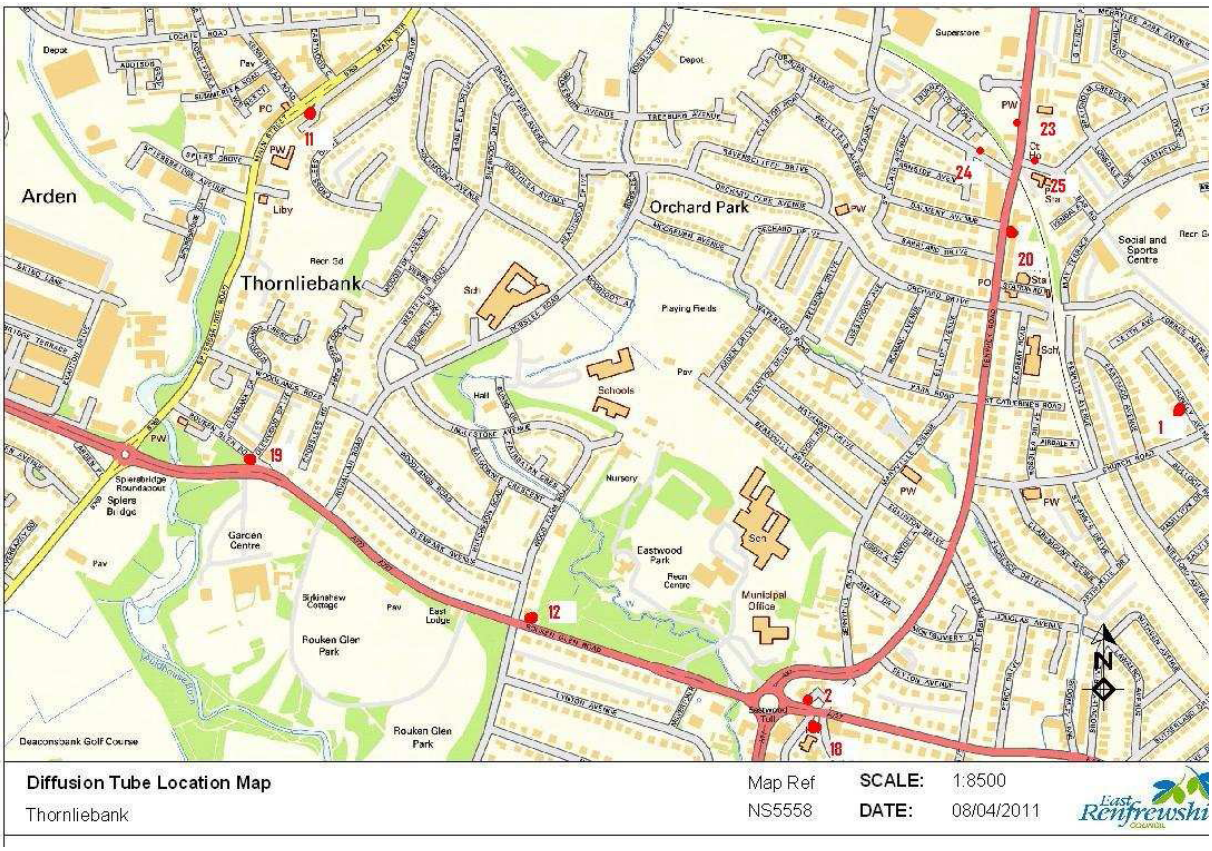


Neilston

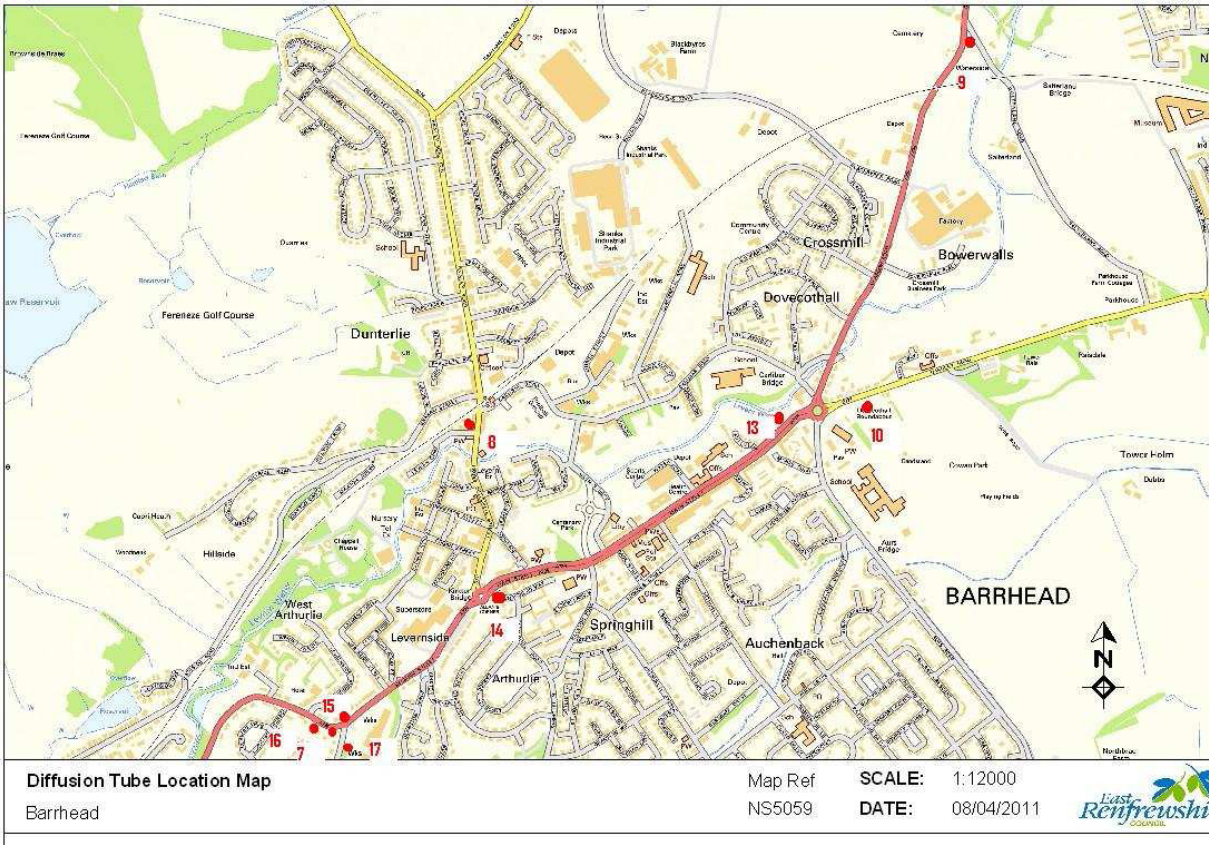


Clarkston

Giffnock and Thornliebank



Barrhead


Crossmill
Bowerwalls
Dovecothall
Dunterlie
Fereneze Golf Course
BARRHEAD
Auchenback
Springhill
Levernside
West Arthurlie
Arthurlie
Hillside
Towerhill
N
8
9
10
13
14
15
16
17
7
Diffusion Tube Location Map
Barrhead
Map Ref
NS5059
SCALE:
1:12000
DATE:
08/04/2011