AIR QUALITY PROGRESS REPORT

LAQM/PR May 2005

Executive Summary

The Local Air Quality Management regime was introduced by the Environment Act 1995 and the Air Quality Regulations of 1997, 2000 and 2002. It requires each local authority to undertake a review of air quality within its area. If the review indicates that any objective will not be met, the local authority must implement a management plan for air quality improvement.

East Renfrewshire Council undertook a first stage review and assessment in 2000 and in June 2002 completed an Updating and Screening Assessment. The assessment concluded that all standards and objectives were likely to be met within East Renfrewshire and, as a result, a further more detailed assessment would not be required. The report did however recommend that further monitoring of particulates be undertaken where levels are predicted to be close to the objective. A further progress report, completed in July 2004, concluded that there had been no significant developments within the area and consequently the recommendations of the Updating and Screening Assessment report were still valid.

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1 Introduction

1.1 Purpose of the report

This report has been produced by the Protective Services Division of East Renfrewshire Council, as part of the Local Air Quality Management process under Part IV of the Environment Act 1995 and with reference to the DEFRA/Scottish Executive guidance document LAQM.PRG (03)[1].

This report will review the conclusions of previous reports on air quality, in light of new monitoring data and developments within the area.

1.2 Conclusions of Updating and Screening Assessment 2003

An Updating and Screening Assessment report was produced for East Renfrewshire Council in June 2003. It concluded that there are no significant sources of sulphur dioxide, 1, 3-butadiene or lead within East Renfrewshire and therefore a detailed assessment is not required for any of these pollutants.

Within East Renfrewshire, the three pollutants that were considered to require further consideration were nitrogen dioxide, benzene and particulates.

Modelling indicated that the objective for particulates of less than 10 microns in diameter (PM_{10}) would be met at all locations within East Renfrewshire. The PM_{10} level at Sheddens roundabout was however predicted to be close to the objective. It was therefore planned to introduce automatic monitoring of particulates on the A726 (previously the A727) at Sheddens Roundabout.

1.3 Conclusions of Air Quality Progress Report 2004

The report concluded that there had been no new developments within East Renfrewshire with the potential to have a significant impact on air quality, since the previous report had been completed. Planned improvements to the road network were intended which would reduce traffic flow along the main routes through the district, with consequent improvements in pollutant levels.

The 2003 NO_2 monitoring data indicated that the annual mean objective for 2005 was already being met at all locations within East Renfrewshire, with the exception of the A727 Rouken Glen Road. The NO_2 levels at Rouken Glen Road will reduce as a result of the changes to the road network and it was therefore predicted the annual mean objective would be met at all locations by the end of 2005.

2 East Renfrewshire

2.1 Population

East Renfrewshire covers an area of 18 000 hectares and has a population of around 90 000. The population is centred in Barrhead in the west of the district and Newton Mearns, Giffnock, Clarkston, Thornliebank and Busby in the east. There are also communities in Neilston, Uplawmoor and Eaglesham. The remainder of the district is rural, containing around 200 farms.

2.2 Industrial/commercial premises

There are relatively few industrial sites in East Renfrewshire, with no Part A processes, eleven Part B processes and one process which is permitted under the Pollution Prevention and Control (Scotland) Regulations 2000. One Part B process has ceased operations since the 2004 report. None of the remaining processes emit pollutants at levels that are likely to have a significant impact on local air quality and have therefore not merited consideration in local air quality reviews.

There are 10 petrol stations in East Renfrewshire. A specific assessment of the benzene levels associated with a petrol station is considered to be necessary only where the station has a throughput of more than 2 000m^3 and is situated near a road with an annual average daily traffic flow of more than 30,000 vehicles[2]. None of the petrol stations within East Renfrewshire currently met these criteria. It is noted that a motorway service area is planned for the Maidenhill junction of the M77/GSO. Benzene monitoring will be required in the vicinity of the service area should the petrol station at the service area have a throughput in excess of 2 000m^3 of petrol per annum. This situation will be monitored.

2.3 Roads network

The principal roads in the locality are the M77, A77, A727 and A736. The B roads include the B764, B767, B769 and the B774 together with the other minor roads intersecting the primary roads network.

The roads network within East Renfrewshire has recently undergone significant change. The M77 has been extended from Malletsheugh, south of Newton Mearns, to Fenwick in East Ayrshire. In addition, a new road, the Glasgow Southern Orbital (GSO) opened in April 2005 providing a dual two-lane carriageway connecting the M77/A77 from the new Maidenhill Junction to the A726 at Philipshill, East Kilbride. East Renfrewshire Council's Roads and Transportation Division is conducting a 'before and after' study of impact of these developments and it is envisaged that the GSO will significantly reduce traffic flows along the A727 and B764 corridors.

The Protective Services Division, of course, continues to monitor air quality on the A727 and A77. A full assessment of the impact of the new road will be made in East Renfrewshire Council's Air Quality Report of 2006. This will include analysis of a full year's worth of monitoring data and will therefore be able to derive accurate, valid conclusions.

2.4 Future developments/planning applications

The Protective Services Division receive a list of all planning applications submitted, on a weekly basis and identify any applications which have the potential to affect air quality. The Development Control section is then advised accordingly, taking cognisance of the NSCA guidance document '*Development Control: Planning for Air Quality*'.

East Renfrewshire Council is relocating Williamwood High School from its current site at Seres Road, Clarkston to Eaglesham Road, Clarkston. Construction began in Spring 2005 and is anticipated to be completed by Summer 2006. The traffic flow along the A727 through Clarkston Toll and Sheddens Roundabout may increase as a result of this development, contributing to PM_{10} levels in the area.

Planning permission has been granted for a new industrial development at Glasgow Road. Barrhead. Although the exact nature of the businesses which will occupy the units are yet to be confirmed, the small-scale nature of the development indicates that it is unlikely that there will be any significant sources of pollutants, other than the increased traffic flow within the area. Monitoring data indicates that NO_2 levels along the roads that will be used to access the development are well within the objective level for 2005 and therefore it is not anticipated that any increased traffic flows as a result of the development will result in any exceedances of the objectives.

2.5 Local transport strategy

East Renfrewshire Council's Road and Transportation Division produced a local transport strategy for the period 2000 to 2003. A follow-on strategy is in preparation.

3 Nitrogen Dioxide

3.1 Diffusion tube monitoring

Nitrogen dioxide is monitored at 21 roadside and background locations within East Renfrewshire using passive diffusion tubes. The tubes are exposed for one month before being submitted to Glasgow Scientific Services for analysis using the 20% triethanolamine method. The bias factor produced by Air Quality Consultants Ltd for this method is 0.81 i.e. it exhibits a positive bias, overestimating the actual NO_2 concentrations by approximately 20%.

The mean of the monthly results for each site has been multiplied by the bias factor to give a corrected annual mean. These results have then been used to predict the annual mean levels for 2005, using the adjustment factors given in LAQM TG (03). For roadside sites, the factor is 0.975 (0.892/0.915) and for background sites, the factor is 0.979 (0.908/0.927). These projected levels can then be directly compared with the annual mean objective of 40μgm^{-3} to be achieved by 31 December 2005.

The monthly results for 2004 can be found in Appendix 1. The results for 2001, 2002, 2003 and 2004 are given in graphical form in Appendix 2. The results for 2001 do not appear to be comparable with the results for 2002-4 and taking only 2002-4 into account, there is a slight upward trend in the NOx levels. It is difficult to draw any conclusion from this however, due to the importance of meteorological conditions in giving rise to year-to-year variations.

Diffusion tube monitoring data and modelling using the Design Manual for Roads and Bridges (DMRB) methodology, predicted that the annual mean objective for NO_2 will be met at all monitoring sites, with the exception of the A727 at Rouken Glen Road, Giffnock, based on current circumstances. However, as discussed in paragraph 2.3, the traffic flow along the A727 will be reduced as a result of improvements to the road network. The resultant decrease in traffic is predicted to reduce annual mean NOx levels to below the objective of 40μgm^{-3} by 31 December 2005.

In addition, the diffusion tube, which is located on the A727 at Rouken Glen Road, Giffnock, has recently been relocated in order to more accurately reflect public exposure. The results, which have been obtained since the relocation indicate that the annual average NO_2 levels will be below 40μgm^{-3}. It is therefore predicted that the annual mean objective for 2005 will be met at all locations within East Renfrewshire. As the annual mean objective for nitrogen dioxide is more difficult to meet than the hourly mean objective, it is therefore predicted that the hourly objective will also be met.

3.2 Automatic monitoring

An automatic nitrogen dioxide monitor has been purchased and installed on the A736, Main Street, Barrhead. The monitor has been installed and it is predicted that the first calibrated results will be obtained from the monitor by the end of July 2005.

4 Particulates

The major sources of particulate matter are road transport and the burning of fossil fuels. It is classified according to the size of the particles, with PM_{10} referring to particles that are smaller than 10 μm in diameter. Smaller particles pose a higher risk to human health, as they are able to travel further into the respiratory system.

Within East Renfrewshire, there are no major industrial sites with large combustion plants and therefore the main source of particulate matter is road transport. East Renfrewshire Council's Updating and Screening Assessment Report of 2003[3] stated that:

> *"The DMRB [Design Manual for Road and Bridges] screening model indicates that the 24-hour and annual mean objectives for 2004 will be met without difficulty, as will the 24-hour mean objective in 2010. While it appears that the 2010 annual mean objective of 18μg m^{-3} will be met, this may be by a very small margin at locations close to some busy roads and junctions, particularly on the A727. There will be considerable changes to traffic flows on the A77 and other roads as a result of the construction of the M77 extension and Glasgow Southern Orbital dual carriageway: traffic flows on the A77 and A727 are likely to be reduced. A Detailed Assessment is not required for PM_{10}; however, the situation with regard to the 2010 annual mean objective is "borderline". PM_{10} monitoring at relevant locations is recommended."*

It was predicted that in 2010 the annual mean PM_{10} concentration at Sheddens roundabout would be 17.8μgm^{-3}, compared to an annual mean objective of 18μgm^{-3}. It should be noted that this modelling was based upon current traffic flows through the area (taking into account standard government forecasts of traffic growth and emissions) and did not take into account any likely changes to traffic flows as a result of the GSO.

As the predicted level was close to the objective for 2010, plans were put in place to introduce particulate monitoring at Sheddens roundabout. As a result of the planned relocation of Williamwood High School (as discussed in section 2.4), a TEOM Series 1400 Ambient Particulate Monitor has been purchased to enable us to conduct automatic, real-time monitoring. It has been installed at the junction of the A727 and the B764 (NS 574570), known as Sheddens Roundabout, where there is currently an annual average daily traffic flow of 29 462 vehicles. The results of this monitoring will be reported in future air quality reviews.

5 Conclusions

1. There have been no new developments within East Renfrewshire with the potential to have a significant impact on air quality since the Progress Report was completed in July 2004.

2. Improvements to the road network should reduce traffic flow along the main routes through the district and consequently lead to improvements in air quality. The results of these road developments will be monitored and assessed in future air quality reports.

3. The most recent NO_2 monitoring data indicates that the annual mean objective for 31 December 2005 is already being met at all locations within East Renfrewshire.

4. The automatic $NO\times$ monitor on Main Street, Barrhead has now been installed and the first fully calibrated results will be obtained shortly.

5. Automatic monitoring of particulates has been introduced at Sheddens Roundabout, the highest priority site within the district, and the results of the monitoring results will be reported in future reviews.

6 References

1. *Local Air Quality Management Progress Report Guidance*. LAQM.PRG(03) Department for Environment, Food and Rural Affairs, December 2003

2. *Local Air Quality Management Technical Guidance*. LAQM.TG (03), Department for Environment, Food and Rural Affairs, February 2003

3. *Updating and Screening Assessment Report* (AEAT/ENV/R/1509/Issue 1) East Renfrewshire Council, June 2003

4. *Air Quality Progress Report*, East Renfrewshire Council, July 2004

Appendices

1. Results of nitrogen dioxide monitoring 2004
2. Graph of nitrogen dioxide monitoring results 2002-2004
3. Map of diffusion tube monitoring locations
4. Map of automatic monitoring locations

APPENDIX 1

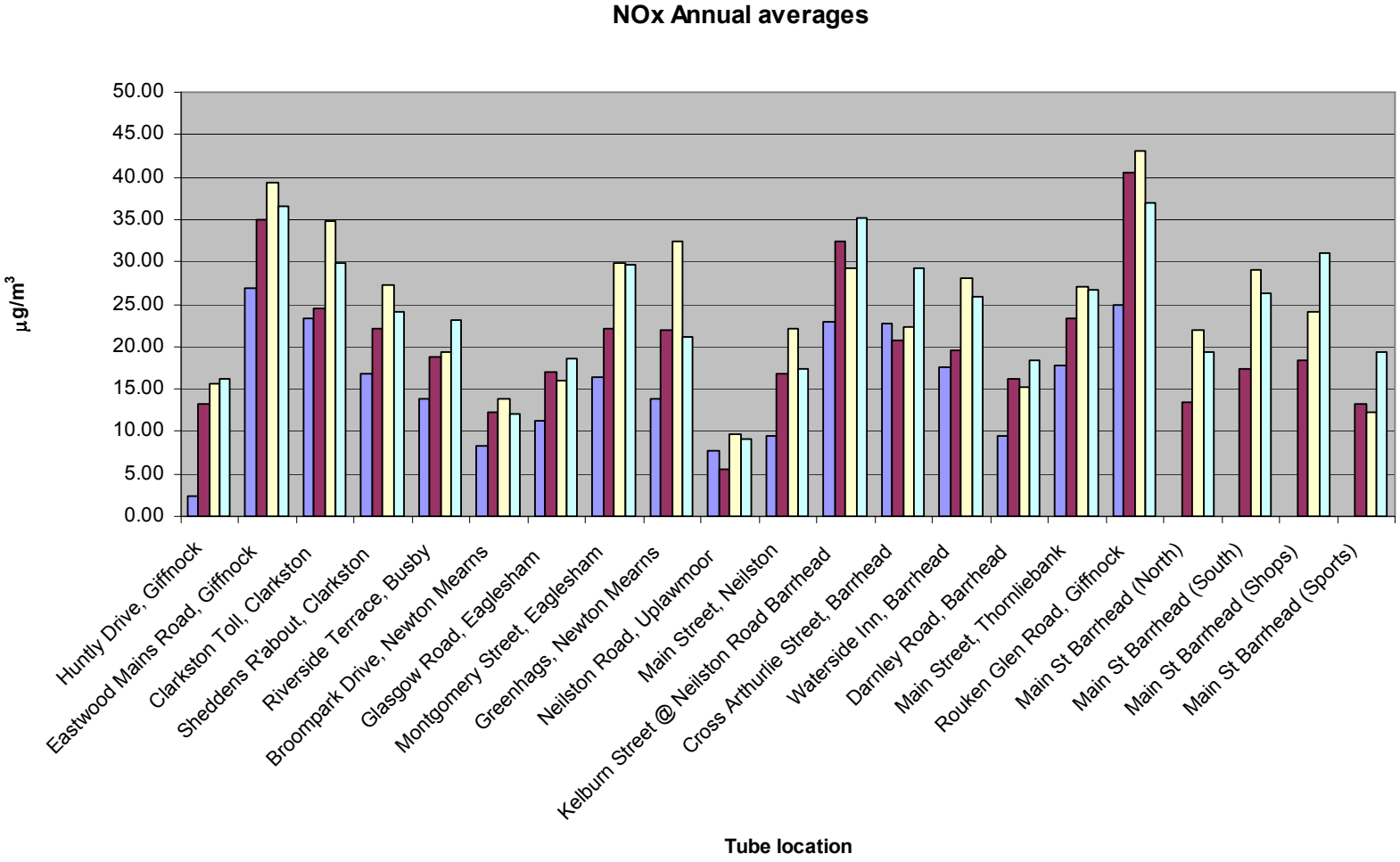
NO_2 results 2004

Location	Grid ref.	Class	J	F	M	A	M	J	J	A	S	O	N	D	Mean	Corrected	Predicted 2005
Huntly Drive, Giffnock	NS 566589	B	20	26	21	11	12	N	6	16	8	24	24	20	16	12.69	15.34
Eastwoodmains Road, Giffnock	NS 559583	R	42	37	47	30	26	26	32	48	34	52	48	42	39	31.32	37.70
Clarkston Toll, Clarkston	NS 572576	R	28	42	40	N	28	21	20	46	24	40	32	28	29	23.56	28.36
Sheddens Roundabout, Clarkston	NS 574570	R	35	38	29	15	15	14	18	24	19	39	32	35	26	21.13	25.43
Riverside Terrrace, Busby	NS 578565	R	22	36	29	19	22	15	18	36	16	32	30	22	25	20.05	24.13
Broompark Dr, Newton Mearns	NS 549566	B	16	24	17	7	N	7	5	N	8	18	19	16	11	9.25	11.18
Glasgow Road, Eaglesham	NS 572523	R	20	28	23	17	17	15	13	20	N	27	21	20	18	14.92	17.96
Montgomery Street, Eaglesham	NS 574519	R	23	39	30	28	29	29	27	44	28	40	38	23	32	25.52	30.71
Greenhags, Newton Mearns	NS 523544	R	16	32	23	21	26	9	19	41	17	33	18	16	23	18.29	22.02
Neilston Road, Uplawmoor	NS 435552	B	12	14	11	2	7	N	6	11	8	18	11	12	9	7.56	9.14
Main Street, Neilston	NS 480573	R	20	26	19	11	19	10	13	24	17	29	18	20	19	15.26	18.36
Kelburn Street, Barrhead	NS 494583	R	34	43	40	33	38	N	28	43	33	46	46	34	38	30.78	37.05
Cross Arthurlie Street, Barrhead	NS 497592	R	29	39	35	29	28	22	N	38	22	39	37	29	29	23.42	28.19
Waterside Inn, Barrhead	NS 511603	R	28	39	25	21	21	23	22	33	23	37	35	28	28	22.61	27.22
Darnley Road, Barrhead	NS 509593	R	20	28	23	15	14	12	11	24	14	25	26	20	19	15.66	18.85
Main Street, Thornliebank	NS 549595	R	32	35	34	24	21	20	17	31	24	39	34	32	29	23.15	27.87
Rouken Glen Road, Giffnock	NS 552584	R	39	58	53	N	65	19	23	37	12	42	45	39	36	29.16	35.10
Main Street, Barrhead (North)	NS 506592	R	19	26	24	15	N	11	N	26	16	31	N	19	16	12.62	15.19
Main Street, Barrhead (South)	NS 498587	R	29	33	32	23	28	14	19	33	22	36	38	29	28	22.68	27.30
Main Street, Barrhead (Shops)	NS 505591	R	36	41	38	25	34	20	20	35	N	46	42	36	31	25.18	30.31
Main Street, Barrhead (Sports Ct)	NS 503590	R	24	30	26	15	15	11	13	26	12	33	23	24	21	17.01	20.48

Key

R: Roadside site B: Background site N: No result

APPENDIX 2


NOx Annual averages
µg/m3
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Huntly Drive, Giffnock
Eastwood Mains Road, Giffnock
Clarkston Toll, Clarkston
Sheddens R'about, Clarkston
Riverside Terrace, Busby
Broompark Drive, Newton Mearns
Glasgow Road, Eaglesham
Montgomery Street, Eaglesham
Greenhags, Newton Mearns
Neilston Road, Uplawmoor
Main Street, Neilston
Kelburn Street @ Neilston Road Barrhead
Cross Arthurlie Street, Barrhead
Waterside Inn, Barrhead
Darnley Road, Barrhead
Main Street, Thornliebank
Rouken Glen Road, Giffnock
Main St Barrhead (North)
Main St Barrhead (South)
Main St Barrhead (Shops)
Main St Barrhead (Sports)
Tube location

APPENDIX 3